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Author(s): Lalas, Chris

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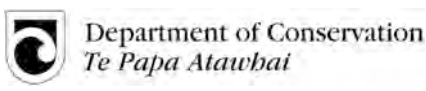

Recolonisation of Otago, southern New Zealand, by fur seals and sea lions: unexpected patterns and consequences

Chris Lalas

Box 31, Portobello, Dunedin, New Zealand

email: <ithaki@xtra.co.nz>

Abstract

Recolonisation of Otago by New Zealand fur seals (*Arctocephalus forsteri*) and New Zealand sea lions (*Phocarctos hookeri*) following their extirpation from the New Zealand mainland 200 years ago is a conservation issue that differs from that of other native species. Most dramatically they are doing it themselves, largely unaffected by anthropogenic impacts. Public opinions as expressed in newspaper articles have identified areas of conflict involving seals at Otago and highlight that advocacy by the Department of Conservation must address public concerns in addition to conservation goals. Priorities for conservation management of these species are evolving to include increases in their interactions with people. Public opinion is polarised on perceptions of seals as either victims or vermin in interactions with fisheries. Fur seals began breeding at Otago in the 1970s and their population now has reached a plateau, a recolonisation that passed largely unnoticed. Although no subsequent reduction in fish stocks are apparent, the belief that fur seals are detrimental to fisheries has not been erased. Breeding by sea lions at Otago began in 1994 and represents the vanguard of recolonisation of the New Zealand mainland by this species. Sea lions are large and potentially dangerous animals that frequent public beaches and so raise conservation management issues not encountered previously in New Zealand.

Key words: New Zealand fur seals, *Arctocephalus forsteri*, New Zealand sea lions, *Phocarctos hookeri*, human interactions, fisheries interactions

Introduction

The New Zealand region, an isolated group of continental islands featuring high endemism among species, has suffered several waves of extinction since colonisation by humans about 800 years ago (Saunders 1994; Worthy & Holdaway 2002; Tennyson & Martinson 2006). New Zealand fur seals (*Arctocephalus forsteri*) and New Zealand sea lions (*Phocarctos hookeri*), also known as Hooker's sea lions, are now recolonising the New Zealand mainland following their extirpation 200 years ago (Lalas & Bradshaw 2001; McConkey et al. 2002a,b). Their pattern of increase in numbers and northward spread in breeding distribution differs from that of practically all other native species because they are doing it themselves; they are largely unaffected by anthropogenic impacts, particularly habitat loss and introduced mammals.

Mention of seals typically raises polarised opinions that focus on their interactions with humans. Seals are either victims in need of protection against the plundering of the ocean by fisheries or vermin that must be culled to curb their devastation of fish stocks (Lavigne 1992, 2003; Lalas & Bradshaw 2001; Kaschner & Pauly 2004). Both extremes centre on perceptions of the abundance and diet of seals, topics that can be clarified only with long-term monitoring and transfer of knowledge into the public domain.

This paper concentrates on issues specific to Otago, southeastern South Island, where long-term monitoring indicates that neither the patterns of colonisation nor the subsequent environmental interactions of fur seals and sea lions follow expectations. Here seals are in continual contact with people, especially at Otago Peninsula that holds a concentration of seals within Dunedin city limits. The issue of the effects and management of tourism has been addressed (Barton et al. 1998; Constantine 1999; Orams 1999; Boren et al. 2002). I concentrate on other human interactions with seals at Otago. In particular, I address aspects that have not been covered in scientific publications by referencing articles and Letters to the Editor from the two Dunedin newspapers, *Otago Daily Times* (*ODT*) and *The Star*. Greater attention is given to sea lions because, unlike fur seals, they typically show no fear of people. This is an unexpected response from an undomesticated animal and is interpreted in human terms: opinions of sea lions range from them being tame and inquisitive or bold and boisterous to being aggressive and dangerous.

Changes in distribution and abundance

Understanding of the distributions of New Zealand fur seals and New Zealand sea lions today differs from up to 20 years ago when their pristine breeding distributions were assumed to be the same as those encountered by Europeans in the late 18th century. Breeding by sea lions was restricted to subantarctic islands south of New Zealand; breeding by fur seals was more widespread, and included southern Australia, but with a range on mainland New Zealand restricted to southern South Island and Stewart Island (Gaskin 1972; Crawley 1990). Although hunting by Maori was acknowledged (Crawley 1990), a Eurocentric impression prevailed: Stone Age hunters were considered incapable of eliminating whole species (Crosby 1986). We now know that the pristine distributions of fur seals and sea lions encompassed the New Zealand mainland and that their constriction southward was the result of elimination by Polynesian hunting before the arrival of Europeans (Smith 1989,

2005; Nagaoka 2006); facts released into the public domain in the *New Zealand Historical Atlas* (McKinnon et al. 1997: Plate 12). European sealers first arrived in New Zealand waters during the 1790s and by 1830 both New Zealand fur seals and New Zealand sea lions were brought to the brink of extinction (Ling 2002).

A comprehensive survey in the early 1970s by Wilson (1981) established that the range of New Zealand fur seals around the New Zealand mainland had recovered to resemble that of 100 years earlier, before the arrival of European sealers. Since then the breeding distribution of fur seals has spread to encompass South Island (Taylor et al. 1995) and has jumped to North Island with colonies near Wellington and at New Plymouth (Dix 1993) but estimates for the total number of fur seals are in a state of disarray (Lalas & Bradshaw 2001).

Long-term monitoring has documented the pattern of recolonisation by New Zealand fur seals at Otago. Regular breeding at Otago began during the 1970s at Otago Peninsula and since then has spread along 200 km of the Otago coast north to Moeraki, North Otago, and south to Cosgrove Island, The Catlins (Lalas & Bradshaw 2001). The nearest colonies outside this range are 200 km northward at Banks Peninsula and 50 km westward on islands in Foveaux Strait and so fur seals at Otago can be treated as a distinct population. The trend for pup counts, an indicator of population size, equated to average annual increase of about 30% up to 1998 (Lalas & Bradshaw 2001). However, these data updated to include all Otago locations and the subsequent years to 2004 show an unmistakable recent reduction in the annual rate of increase (Figure 1).

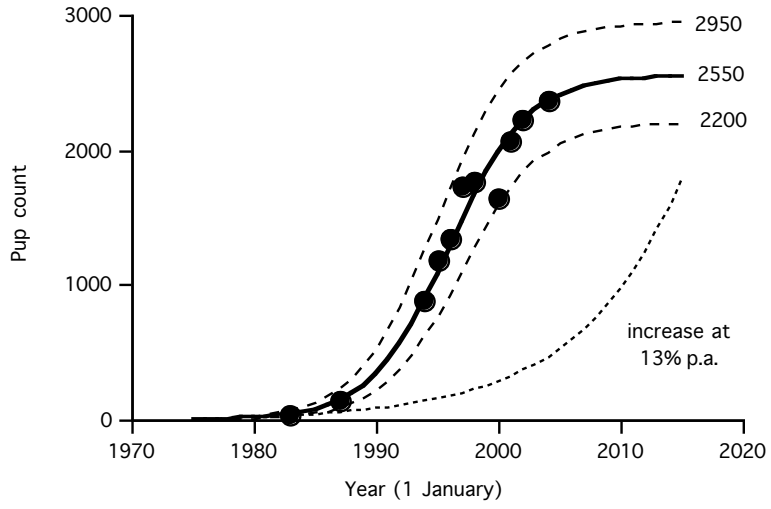

Figure 1: Trend from 11 annual totals for counts of New Zealand fur seal pups at Otago, 1983-2004. A logistic curve of best fit, extrapolated to 2015 and bounded by a 95% confidence interval, indicates that numbers are beginning to plateau. The dotted line plots the maximum possible innate rate of increase of 13% postulated by Lalas & Bradshaw (2001).

Under this scenario of increase from zero to a plateau of 2550 for the annual pup count, 99% of the increase would occur in the 29 years 1982 to 2011 and 90% of the increase occurred in the 19 years

from 1987 to 2006. Although immigration (extrinsic growth) was a major source of population growth (Lalas & Bradshaw 2001), the brief duration of this recolonisation, about 30 years, is a surprise. Annual counts of pups can give an accurate account of trends but the actual number of pups born remains unknown; some pups die before surveys and some live pups are missed during counts, a problem that can be rectified only with mark-recapture estimates (Lalas & Bradshaw 2001). Preliminary estimates indicate that the plateau in pup production is likely to equate to a stable population size of about 20,000-30,000 fur seals at Otago.

Sea lions have been slower than fur seals to recolonise the New Zealand mainland. Immigrant males established a continuous presence at Otago in about 1980 where the number of male residents increased from about 15 in the mid 1980s to about 110 in 1999 (McConkey et al. 2002a). The number of males at Otago Peninsula is increasing by about 10% annually (Lalas et al. 2007), primarily through males emigrating from further south.

Otago is the only location for continual breeding by New Zealand sea lions away from Auckland Islands and Campbell Island (Lalas & Bradshaw 2003; Chilvers et al. 2007). Breeding began in 1994 (McConkey et al. 2002b) and in 2006 the female population at Otago Peninsula totaled 11 individuals at least one year old, including six breeders, all from the single matriarchal line (Lalas et al. 2007). The number of females here is increasing at about 13% annually, all created by intrinsic growth (Lalas et al. 2007), a scenario that predicts a population size of about 10,000 sea lions at Otago in another 50 years. Occasional births have been reported elsewhere on mainland New Zealand at Stewart Island (Childerhouse & Gales 1998; McConkey et al. 2002b). However, the only indicator for the initiation of breeding at a new location is at the Catlins, 100 km south of Otago Peninsula, where an immigrant female has given birth in two consecutive years, 2006 and 2007.

Priorities designated by the Department of Conservation (DOC)

The recolonisation of Otago by fur seals and sea lions through the last 30 years has brought them into regular human contact. Consequently, the conservation management of these species is evolving to address their interactions with people.

All seals within the New Zealand exclusive economic zone are fully protected under the Marine Mammals Protection Act 1978. DOC is responsible for their protection and for management of human interactions with seals, issues addressed in the Marine Mammal Action Plan for 2005-2010 (Suisted & Neale 2004). Priorities differ between the New Zealand fur seal, not regarded as a threatened species, and the New Zealand sea lion, designated as a range-restricted threatened species.

For New Zealand fur seals (Suisted & Neale 2004: 36):

> "The Department aims to focus management on:
>
> - reducing fishing-related mortality in the West Coast South Island hoki trawl fishery;
> - ensuring appropriate behaviour of people around fur seals on beaches and in seal colonies".

For New Zealand sea lions (Suisted & Neale 2004: 27):

> "The Department aims to focus management on:

- encouraging the establishment and growth of new breeding sites away from the Auckland Islands;
- reducing fishing-related mortality in the Auckland Islands squid trawl fishery".

These two aims for sea lions are interrelated. The long-term goal of the current draft of the New Zealand sea lion Population Management Plan (Department of Conservation 2006a) is conservation management to expand their breeding distribution. The current perception is that this expansion is prevented by losses through incidental kills of sea lions in a seasonal squid trawl fishery around Auckland Islands. A management strategy has been implemented to reduce these kills by closure of the squid fishery in years when a designated maximum number of kills is exceeded, with the first closure in 1996. This strategy presumes that a resulting increase in sea lions will lead to emigration and the creation of new breeding locations elsewhere as the Auckland Islands population approaches carrying capacity (McConkey et al. 2002a,b; Wilkinson et al. 2003). Pup production at Auckland Islands has fallen by 30% from a peak through the late 1990s, a decline attributed to disease events and kills in the squid fishery (Chilvers et al. 2007).

Suisted & Neale (2004: 28) listed the first management action for sea lions as "Proactively manage population recovery on NZ mainland. Protection of current mainland breeding and investigation of active population management". I asked the Dunedin DOC office for comment on this statement and received the following reply: "A temporary increase in capacity for marine mammal work in coastal Otago has resulted from staff restructuring to meet the work requirements of a new Marine Protected Area Policy and Implementation Plan. This benefit was serendipitous and not planned, with further demands likely on area staff when the marine protection programme for the southern region gets underway" (pers. comm. Jim Fyfe, Otago Coastal Area Office, DOC, 2 July 2007). One notable recent advocacy by DOC is a pamphlet entitled "New Zealand sea lions – Living together on the mainland" (Department of Conservation 2006b). This pamphlet describes the return of sea lions to Otago and includes guidelines on how to behave during encounters.

Fish prey of fur seals and sea lions at Otago: perceptions and reactions

New Zealand fur seals at Otago typically forage away from shore over the edge of the continental shelf and beyond where they target species of interest to commercial fisheries but not to recreational fisheries (Harcourt 2001, 2005; Lalas & Bradshaw 2001; Harcourt et al. 2002). Common misconceptions of their diet are that they target small, non-commercial species and that the larger species taken are not of commercial interest. Small species predominate numerically at Otago but form only a small proportion of the total prey biomass (Fea et al. 1999). The number of species designated as commercial has increased through time (Clement & Associates 2006) and now includes practically all large prey of fur seals.

New Zealand sea lions at Otago forage closer to shore than fur seals where they target large species of interest to commercial and/or recreational fishers, including flounder (*Rhombosolea* spp.), quinnat salmon (*Oncorhynchus tshawytscha*) and sea-run brown trout (*Salmo trutta*) (Lalas 1997; Lalas et al. 2007). DOC is clearly wrong in the statement "Sea lions eat a wide variety of prey species, few of which are important for commercial or recreational fishing" (Department of Conservation 2006b). Sea

lions foraging within Otago Harbour are regularly seen with large prey items, typically sand flounder (*R. plebeia*) ("Fur seal flouts flounder quota" *ODT* 26 July 1993: 1, a misidentification corrected in "Picnicker was hookers sea lion" *ODT* 27 July 1993: 5; "Sea lion flounders in harbour" *ODT* 30 July 1997: 1; "Fish on the menu" *ODT* 7 May 2005: 2), quinnat salmon ("An eye witness to life and death in the wild" *ODT* 19 August 2006: 37) and sea-run brown trout ("Fish for dinner" *ODT* 23 May 2007: 32).

Trout and salmon are introduced species, the targets of recreational freshwater angling in New Zealand (McDowall 1990). Sea lions penetrate up to 10 km inland up the Shag River North Otago, 50 km north of Dunedin where they eat trout, first reported in an *ODT* Letter to the Editor that included "If Doc cannot control the spread of these animals there is not much hope for the trout population" ("Sea lions decimating trout" *ODT* 12 November 2001: 10). The DOC reply included "The key limit on the trout population in North Otago is the amount and quality of water, and hence habitat, available for them" and "With dialogue and education we hope to ensure that New Zealand sea lions become a valued part of Otago's coastal experience." This prompted a response that included "It is devastating for anglers to watch these sea lions taking trout from the river, but even harder to take when Doc will do nothing to try and remove these animals" and "Anglers who fish this area are sick and tired of hearing about "dialogue and education" from Doc. They want action and they want it soon" ("Sea lions" *ODT* 11 December 2001: 20), an opinion repeated the following year ("Anglers want sea lions to go" *ODT* 5 August 2002).

The quinnat salmon population in Otago Harbour is sustained through the annual release of juveniles by the Otago Branch of the New Zealand Salmon Anglers Association ("Hatchery teems with 'magic little fish'" *ODT* 29 September 2001: A24), recently subsidised by the Dunedin City Council ("$10,000 grant for salmon anglers" *ODT* 30 January 2007: 6). Salmon is regarded by some fishers as being more important than native species, an attitude encapsulated in this succinct and logical Letter to the Editor that presents the problem, the cause and a definitive solution ("Seals cause salmon scarcity" *ODT* 8 March 2005: 14):

> "I have been fishing for salmon for at least 25 years and I am amazed to hear that only now is there an investigation into why salmon aren't coming into the harbour. My thoughts are very strong on having a cull of the seals that the Department of Conservation and the greenies want to protect. Fifteen years ago, there weren't many seals at the heads, but now they are breeding there because their tucker is on their doorstep. They love salmon."

This blames a decrease in salmon in Otago Harbour on an increase in New Zealand fur seals. However, this perceived conflict between seals and recreational fisheries is attributable to another cause: annual fluctuations in the abundance of quinnat salmon available for anglers; e.g., there was "a particularly good salmon run in Otago Harbour" in 2007 ("Salmon on spawning run despite low flow" *ODT* 14 May 2007: 2). Hence, the occurrence of years with low abundance is not indicative of increased predation by seals. This is easy to say but unlikely to gain acceptance among those with "predator paranoia" (Lavigne 1992: 49) who believe that seals must be detrimental to fisheries. There is a precedent for seals significantly impacting on salmon populations. Predation by California sea lions (*Zalophus californianus*) threatens a stock of a native Pacific salmon species on its spawning run in the northwestern United States (Fraker & Mate 1999). However, these salmon are already depleted

through anthropogenic causes, overfishing and deterioration of freshwater habitat, and there are no known cases where seals threaten a robust salmon population (Fraker & Mate 1999).

Sea lions as predators of fur seals and penguins at Otago

A precedent for a substantial impact of predation by New Zealand sea lions on a prey species was reported from subantarctic Macquarie Island, the western tip of their distribution, where one male killed up to 43% of fur seal pup production in one year (Robinson et al. 1999). The potential impact on New Zealand mainland populations of fur seals was considered to be low when sea lions were first recorded taking fur seal pups in 1997 at Otago (Bradshaw et al. 1998). Since then, not only have fur seal pups become a regular prey item for large males but also older fur seals are taken, including a subadult male at 1.5 m long (Lalas et al. 2007). These recent records rekindle the possibility for a significant impact on fur seal populations as the number of sea lions increases. A substantial increase in predation of fur seals by sea lions is unlikely to raise conservation management issues because New Zealand fur seals are not a threatened species.

Predation by sea lions does create a quandary for conservation management at Otago Peninsula where it threatens the viability of yellow-eyed penguins (*Megadyptes antipodes*), an endangered species. Here 20-30 penguins are eaten annually with most kills attributable to one adult female, the eldest offspring of the founder female (Lalas et al. 2007). Modelling indicated that the penguin population at any one site could not remain viable if it were the sole source of the penguins killed (Lalas et al. 2007). The dilemma is whether to do nothing, and risk collapse of the Otago Peninsula population of yellow-eyed penguins, or to take action against the known culprit, and risk failure in recolonisation of the New Zealand mainland by sea lions (Lalas et al. 2007). "The Department of Conservation's management decision is to continue to monitor yellow-eyed penguins on the Otago coast to see if this predation pattern happens elsewhere. The Department will also continue to promote research initiatives on female sea lion diet and foraging range at this and other sites on the Otago Peninsula" (pers. comm. Bruce McKinlay, Otago Conservancy, DOC, 28 June 2007).

Increase in contact between people and sea lions at Otago

The present increasing human contact with sea lions at Otago has a quaint precursor from the 1930s when seals were regarded as curiosities. A large male sea lion, 'Joey', settled at St Clair Beach, Dunedin, in September 1935 where he became a local attraction; a photograph shows him being patted by a boy and engulfed in a crowd of over 100 onlookers ("His largest audience yet" *ODT* 7 October 1935: 4). His celebrity wore thin and by April 1936 he was regarded as an obtrusive nuisance; he was captured and shipped to Wellington Zoo ("Good-bye! / Sea lion goes north / Sailing on the Waitaki today" *ODT* 8 April 1936: 7) where he died a month later ("St Clair sea lion / Death at Wellington Zoo / Believed to have been poisoned" *ODT* 8 May 1936: 7). The outcome was a regret that memory of 'Joey' could not be perpetuated by mounting his body for display at Otago Museum ("The body destroyed / Request for skin too late" *ODT* 11 May 1936: 6). The following year another male sea lion, 'Sammy', settled in Otago Harbour and underwent the same transformation from celebrity

to nuisance ("Sea lion in danger" *ODT* 22 January 1937: 6), a problem resolved when "his luck deserted him" ("Death of sea-lion / Killed at Broad Bay / Struck by motor lorry" *ODT* 1 June 1937: 4).

As a result of the recent increase and spread at Otago, sea lions now have a continual contact with people in an urban setting. The last mention of the appearance of a sea lion as a novel event at Dunedin was in 1994 ("Sea lion's beach frolic opportunity for experts" *ODT* 18 October 1994: 2). Since then, media reports about sea lions ashore have tended towards episodes where sea lions have been perceived as aggressive or a nuisance (e.g., "No lyin' on our slipway, please" *ODT* 1 September 1998: 17; "Sea lion king of the beach" *ODT* 2 December 1994: 1-2) or have appeared at urban houses ("Wandering sea lion has sojourn ashore" *ODT* 19 August 1995: 4; "Sea lion finds St Clair to liking" *ODT* 13 November 2002: 4; "Flipping heck, it's a seal" *ODT* 7 December 2005: 14). Most notably, the first four births by the mainland founder female were on urban properties at Taieri Mouth, 25 km southwest of Dunedin (e.g., "Hooker's sea lion pup find 'historic' *ODT* 29 January 1994: 5; "Sea lion maternity ward in garden" *ODT* 4 January 1999: 1).

Most human contact is in Otago Harbour where sea lions have been seen regularly since April 1995 and now (June 2007) four individuals, all adult males, are resident. They spend most of their time ashore beside houses at Te Rauone Beach, near the harbour mouth but also frequent sites nearer Dunedin City at Ravensbourne ("Sea lion takes time out" *ODT* 16 September 2002: 6) and Macandrew Bay ("Otago region basks in Indian summer" *ODT* 20 April 2006: 3). Reports of people in boats hand-feeding sea lions in Otago Harbour prompted a press release by DOC to discourage such behaviour: "We've had stories of sea lions sticking their heads over the back of boats and that can be quite a frightening experience, especially if you're in a small boat" ("Sea lion warning" *ODT* 5 November 2005: 32). This problem still existed a year later, illustrated with a photograph of a sea lion hand-fed from a boat ("Feeding sea lions an offal problem" *ODT* 6 December 2006: 4).

The increase in sea lions at Otago has resurrected the problem of animals on roads that puts animals at risk and creates a hazard for vehicles ("Care urged near sea lions on land" *ODT* 1 August 2002: 6). One road death has been reported recently, a four year old female accidentally struck on a coastal road 20 km south of Dunedin ("Female sea lion killed on road" *ODT* 7 June 2007: 2). This female, tagged as a pup in Auckland Islands, was first recorded on the New Zealand mainland in February 2007 (pers. obs.) and so Otago was deprived of a new potential breeder. An earlier *ODT* Letter to the Editor suggested that signs forewarning drivers should be installed on roads frequented by sea lions; the response from the Dunedin City Council included " We are prepared to investigate sites where the public believes the presence of wildlife constitutes a hazard to motorists" ("Sea lions" *ODT* 21 May 2005: 38). No signs have appeared yet.

Deliberate killing of seals at Otago

People occasionally deliberately kill fur seals and sea lions at Otago despite the fact that seals are protected species. However, only one prosecution for the deliberate killing of a seal has been brought under the Marine Mammals Protection Act 1978. Following an incident filmed by a tourist that showed the shooting of fur seals at Otago Peninsula on 12 June 2005 ("Shotgun seal killers were 'after rabbits' *ODT* 14 June 2005: 1), three men pleaded guilty to killing a fur seal, a crime described

by the court judge as a "grossly irresponsible spontaneous act of hooliganism"; the defendants each were fined $2,500 and discharged without conviction ("Otago farmers fined $2500 for killing fur seal" *ODT* 28 July 2005: 1-2).

A total of eight sea lions were found killed deliberately by people at The Catlins from November 1992 to May 1995 : five shot, one clubbed and two rammed by vehicles on beaches ("Sea lions, seal found shot" *ODT* 13 August 1993: 1; "DOC investigating shooting of rare sea lion" *ODT* 15 January 1994: 1; "Skeleton of shot sea lion found" *ODT* 28 February 1994: 9; "DOC fears sea lions may have been shot" *ODT* 8 September 1994: 32; "Killing of sea lion outrages DOC" *ODT* 26 May 1995: 1), with most documented in McConkey (1994). There were about 40 sea lions resident at Otago in 1994 (McConkey et al. 2002a) and so these eight deaths accounted for 20% of the population. There are no reports of deliberate killing of sea lions at Otago Peninsula but Ludmerer (2002) presented anecdotal evidence that a total of four sea lions had been shot in North Otago, 50-80 km further north.

Non-lethal harassment of seals by people

Most encounters between people and seals involve sea lions because sea lions frequent beaches whereas fur seals are largely restricted to rocky shorelines. Reports of harassment of sea lions at Otago have involved vehicles ("Outrage over harassment of sea lions by trail-bike riders" *ODT* 9 April 1994: 5) and sticks and fireworks ("Offenders prosecuted if found / Reports of sea lion abuse disgust Doc" *ODT* 15 January 2003: 4) on beaches and thrashing with a boathook in Otago Harbour ("Reaction to seal shocks passer-by" ODT 10 April 2007: 1 - here a sea lion was misidentified as a fur seal). The latter two articles included statements from DOC that sea lions were fully protected and that harassing them could incur a fine of up to $10,000.

Attacks on seals by dogs accompanying people occur occasionally despite council bylaws that require dogs to be under control on Otago beaches (e.g., "Dog owners face prosecution" The Star 15 September 2005: 4; "Second incident with seal reported" *ODT* 14 January 2006: 4 – here a fur seal was misidentified as a sea lion). The small size of sea lion pups leaves them particularly vulnerable; e.g., in January 1999 a two-week old pup of the mainland founder female was bitten by a Rottweiler but survived the attack (McConkey et al. 2002b).

Seals as threats to people

Episodes where seals are perceived as threats to people almost inevitably involve sea lions. Misidentification or, more bluntly, a failure to register that fur seals and sea lions are different species are ongoing problems in reports about seals. DOC has attempted to rectify this shortfall (e.g., "Doc keen to learn of sealion sightings" *ODT* 28 December 2005: 4; Department of Conservation 2006b; "Public should make room for marine mammals" *ODT* 18 July 2007: 8). For example, several misidentifications are indicated for newspaper articles referenced in this paper.

Sea lions ashore often are perceived as dangerous because they move towards people, their standard response when people approach too closely. Whether or not a sea lion is behaving aggressively, this response is interpreted as an attack (e.g., "Sea lions should not be disturbed" *The Star* 7

May 2000:5). The perception that sea lions are aggressive is unlikely to change; for example, a recent press release from DOC explaining that sea lions were "not inherently aggressive" but that "people should stay 10m away from sea lions on beaches if the mammals were active and at least 20m if they were moving around" was contradicted by its headline: "Alert over stroppy sea lions" (*ODT* 4 March 2006: 4).

Encounters in the water potentially are more dangerous than those on land because sea lions swim faster than people and so people cannot retreat from situations where they feel confronted. Unavoidably, all pursuits by swimming sea lions are assumed to be attacks. Emotive descriptions reinforce this perception; for example, the caption for two photographs in "Sea lion disrupts surfing contest" (*ODT* 29 January 1994: 1) describes how a surfer "paddles furiously away from the snapping jaws of a sea lion which lunged at him at St Clair yesterday. He could see the seal's sharp teeth and feel its breath as it circled him for some time during the national surfing championships". The surfer was not bitten. A similar incident occurred nine years later but was reported differently "A scene-stealing Hooker's sea lion nicknamed Trevor delighted crowds watching the Surfing New Zealand national championships at St Clair, but unnerved several competitors and chased a cameraman from the sea. "Some surfers were a bit freaked. They aren't used to the attentions of our Southern marine friends," a spokesman said." ("Surfing on a sea lion's turf" *ODT* 9 January 2003: 3 – here "Trevor" was a female, the third daughter of the founder female).

Following an incident where a sea lion frightened a diver, DOC emphasised the importance of avoiding panic ("Sea lion incident prompts DOC warning to divers" *ODT* 20 December 1997: 3), a potentially life-threatening response for people in water. In the most extreme incident to date, three surfers were bitten with one hospitalised off Oreti Beach, Invercargill, Southland ("Mystery attack blamed on seal or sea lion" *ODT* 5 January 2000: 3). Any bites by seals are potentially life-threatening and need medical attention (e.g., Lalas & Bradshaw 2001). Incidents involving people in small boats, first reported in 1999 ("Sea lion unnerves harbour rowers" *ODT* 24 July 1999: 5) are likely to continue ("Sea lion warning" *ODT* 5 November 2005: 32).

One curious story of interaction runs counter to sea lions as a threat to people: a teenager whose kayak capsized at sea grabbed the flipper of a sea lion and was taken towards shore ("Sea lion sees boy to safety" *ODT* 16 April 2003: 3).

Current negative opinions about sea lions at Otago

Sea lions eating yellow-eyed penguins at Otago Peninsula (Lalas et al. 2007) became public knowledge with media releases in June 2007 (e.g., "Penguins just too delicious to resist" *ODT* 5 June 2007: 1) and generated polarised public responses through *ODT* Letters to the Editor and two articles ("Penguin-eating sea lion dilemma" *ODT* 12 June 2007: 5; "Sea lions make surfers fear going into water" *ODT* 3 July 2007: 5). There were seven letters against and nine in favour of sea lions at Otago up until 19 July 2007. Only those against are considered here because writers vented their spleens and expressed negative perceptions about sea lions that need to be addressed by DOC. These issues were encapsulated in extracts from the first letter published ("Sea lions seen as pit bulls of the oceans" *ODT* 9 June 2007: 32): "The worst news to me was that the Department of Conservation is actually

trying to establish a breeding colony of sea lions on the Otago Peninsula. What on earth are their staff thinking?" "Since their recent proliferation, these cunning and intimidating animals are already in conflict with humans – snatching salmon from fishers' lines and attacking surfers and divers." "Why should we be forced to give up our beaches and harbour to these aggressive territorial animals? One has already grabbed a girl surfer by the throat. Will Doc assume responsibility when someone's swimming child is taken? Doc should focus on conserving Otago's gentle yellow-eyed penguins and friendly Hector's dolphins. This would benefit us all. To anyone who actually goes in the sea or fishes it – these sea lions are as welcome as a pit bull in a school playground. We don't need them here."

The seventh *ODT* Letter to the Editor that resented the local presence of sea lions concluded with: "I ask why Doc is hellbent on establishing a colony on Otago Peninsula? Viewed from the water, although menacing, the sea lion is indeed graceful, swift as any fur seal, but on land is only a smelly attraction for clouds of blow flies. Auckland Islands are homes to thousands of sea lions and Doc's arguments against human disturbance of these mammals is very relevant there. However, the same argument applied to them on the mainland belongs in airy fairyland" (extract from "Sea lions" ODT 14 July 2007: 36). This was the only letter to glean a reply from DOC: yes, sea lions attract flies; the decision to establish at Otago Peninsula was made by sea lions but DOC is responsible for their protection; and "There are far more dangerous creatures than sea lions in the marine environment".

Conservation management strategies are not decided by public opinion. If they were then we would be beset with fiascos resembling the response to sea lions at Otago in the 1930s. I suggest that public response to animals largely reflects perceptions of cuteness; for example, depictions of predation in Otago Harbour by a leopard seal (*Hydrurga leptonyx*) on another New Zealand threatened endemic seabird species, Stewart Island shag (*Leucocarbo chalconotus*) ("Spotted: leopard seal in harbour" *ODT* 5 July 2007:3: "Dinner time" *ODT* 13 July 2007: 6) did not generate comment. Shags are paired with seals as manifestations of Satan because they eat fish. Their antitheses are penguins and dolphins, regarded as angelic icons even though they also eat fish. Perhaps the most succinct positive statement has been made by Hoani Langsbury, Otago Conservation Board chairman: "marine mammals are the marine equivalent of large land animals in other countries and should be valued in the same way" ("Public should make room for marine mammals" *ODT* 18 July 2007: 8).

Conclusions

The proximity to Dunedin of breeding New Zealand fur seals and New Zealand sea lions can be perceived from two valid but polarised points of view. For science and conservation it represents a desired recolonisation by species extirpated from the New Zealand mainland 200 years ago. At the other extreme, seals not only compete with people for fish but also they are large and potentially dangerous additions to a coastline previously devoid of threatening animals. Although many attacks by sea lions can be attributed to inappropriate behaviour by people, the fact that sea lions can kill and eat large fur seals indicates that their potential as a threat to people must not be underestimated.

The Otago fur seal population is approaching a plateau, while sea lions are still in the initial stages of establishment. The recolonisation of Otago by New Zealand fur seals has passed largely unnoticed because fur seals typically frequent rocky shores away from the public eye. Any perceived

threat fur seals may pose to recreational or commercial fisheries at Otago has either already happened or is not going to happen. In contrast to fur seals, sea lions feed near to shore and target species of interest to fishers. The most immediate conflicts are sea lions taking salmon in Otago Harbour and trout in the Shag River. However, regardless of the facts, seals will remain the scapegoats for reductions in fish catches.

The instigation of breeding by sea lions at Otago has not followed the DOC management strategy implemented to generate emigration through an increase in the Auckland Island population. The founder female arrived at Otago before closures were enforced in the squid trawl fishery and the second immigrant breeder arrived during a period when the Auckland Islands sea lion population was in decline.

Protection of the mainland population is the top priority for sea lions in the DOC Marine Mammal Action Plan. A determined killing spree by a few people could extirpate sea lions from the mainland. Highlighting the risk of prosecution and fines up to $10,000 for harassing seals seems hollow given that the only prosecution for killing seals, the most extreme form of harassment, resulted in discharge without conviction and fines of $2,500. The ongoing advocacy that promotes sea lions as a positive addition to the wildlife of Otago is commendable. However, DOC faces an unenviable task of reconciliation with those who resent the proximity of New Zealand sea lions.

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