New Zealand sea lion species management plan: 2009–2014

Department of Conservation
Te Papa Atawhai

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EXECUTIVE SUMMARY

The *New Zealand sea lion species management plan: 2009–2014* (the Plan) provides a strategic framework to guide the Department of Conservation (DOC) in managing the recovery of the New Zealand sea lion (*Phocarctos hookeri*) to non-threatened status. The aim of the Plan is:

> *To make significant progress in facilitating an increase in the New Zealand sea lion population size and distribution.*

In 1997, the New Zealand sea lion (formerly known as Hooker's sea lion) was declared threatened under the Marine Mammals Protection Act 1978. The species has one of the lowest abundance estimates of all sea lion species (around 12 000 individuals). The majority of breeding occurs within New Zealand's subantarctic islands, principally the Auckland Islands and Campbell Island/Motu Ihupuku. There is evidence of continued declines in pup production (around 50% since 1998) on the Auckland Islands.

There is significant concern over the vulnerability of the species to a catastrophe, such as a tsunami or oil spill, at one or more of the breeding strongholds (Auckland Islands or Campbell Island/Motu Ihupuku). The impacts of natural disease events on the already depleted and restricted population may be further increased by adverse human interactions, such as the direct and indirect effects of fishing.

An increase in the population size, as well as in breeding distribution, would reduce the vulnerability of the New Zealand sea lion and enhance its ability to withstand the effects of human activities or potentially catastrophic events.

Successfully managing the recovery of the New Zealand sea lion, in terms of its threat status, within the Plan term (5 years) is unlikely given various biological constraints. Consequently, management measures will focus on a number of key areas to ensure that progress towards recovery is achieved:

- Management of the adverse effects of human interactions
- Protection provisions and compliance
- Community relations

At the same time, research will be undertaken to increase our understanding of the New Zealand sea lion and to support its management.

Department of Conservation 2009: New Zealand sea lion species management plan: 2009–2014. Department of Conservation, Wellington. 31 p.

1. Threat status

Based upon relevant New Zealand and international threat classification standards, the New Zealand sea lion (*Phocarctos hookeri*) was declared threatened by the Minister of Conservation under section 2(3) of the Marine Mammals Protection Act 1978 (MMPA) on 31 July 1997.

Two threat classification systems (or standards) are relevant and will be considered in any future review of the threat status of the New Zealand sea lion: the New Zealand Threat Classification System and the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species.

The New Zealand Threat Classification System lists the species as 'threatened', under the category of 'range restricted' (Hitchmough et al. 2007). To be classified as range restricted in this system, a taxon must be restricted to a small geographic area, a particular habitat, or a very specific substrate with less than ten locations. A review of the classification was undertaken in 2009 and the result will be made available by publication in a peer-reviewed journal.

On the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species, the New Zealand sea lion is classified as 'vulnerable'.[1] The species is listed under 'vulnerable' criteria A3b or 'population reduction projected or suspected to be met in the future'. The classification is based on 'a marked (30%) decline in pup production in the last 10 years, at some of the major rookeries'.

2. Natural history

2.1 DESCRIPTION

The New Zealand sea lion has a blunt nose and short whiskers. Distinct physical differences exist between mature males and females (Crawley & Cameron 1972; Gaskin 1972; Gales 1995). Mature males are brown to black in colour, with well-developed manes reaching to the shoulders (Fig. 1). Females are lighter in colour, predominantly creamy grey with darker pigmentation around their flippers (Fig. 2). There are also size differences:

- Adult females: length 1.6–2.0 m; weight 100–160 kg
- Adult males: length 2.4–3.5 m; weight 250–400 kg.

Pups of both sexes are chocolate brown with paler areas around the head. Juvenile males can resemble adult females in colour and size.

[1] IUCN 2008 Red List of Threatened Species. www.iucnredlist.org (viewed 24 June 2009).

Figure 1. Adult male New Zealand sea lion, Campbell Island/ Motu Ihupuku, 1988. *Photo: Peter J. Moore.*

Figure 2. Adult female New Zealand sea lion with pup, Sandy Bay, Enderby Island, Auckland Islands, December 2005–January 2006. *Photo: Andrew Maloney.*

2.2 DISTRIBUTION

Although hunting, primarily for both food and pelts, was eventually banned in 1893, this was not before the activity had significantly reduced the species' population size and range (Cumpston 1968; Smith 1985, 1989; McFadgen 1994; Childerhouse & Gales 1998).

2.2.1 Present distribution

The present distribution of the New Zealand sea lion is centred on the New Zealand subantarctic islands (Fig. 3). A small number of individuals have been recorded hauling out at sites further north, up to and along the Otago Peninsula, and further south, at Macquarie Island (Gales 1995; Chilvers et al. 2007; Chilvers & Wilkinson 2008).

2.2.2 Historic distribution

Archaeological evidence from sand dunes and midden sites indicates that New Zealand sea lions once occupied sites scattered around New Zealand (Berry & King 1970; Smith 1978, 1979, 1985, 1989, 1996; Jeal 1987; Worthy 1992, 1994; McFadgen 1994) including the Chatham Islands (Sutton 1989; McFadgen 1994). Evidence of New Zealand sea lion pups in the Nelson area (Worthy 1994) and at North Cape (Gill 1998) indicate that New Zealand sea lions were breeding in at least these two areas on mainland New Zealand. Historic records indicate the presence of New Zealand sea lions in at least 45 sites around New Zealand. However, it cannot be concluded that breeding was occurring at all these sites as many appear to be sites dominated by males. Even in areas where remains of females and pups are evident, patterns of relative abundance cannot be determined (Childerhouse & Gales 1998), though Gill (1998) noted that fossil evidence at North Cape 'implies existence of reasonably large breeding colonies'. It is unclear if breeding has occurred on the Chatham Islands.

2.3 POPULATION ESTIMATE

Pup production can provide reliable evidence of a population trend (Berkson & DeMaster 1985; Gales & Fletcher 1999). New Zealand sea lion pups are easily recognisable. Being restricted to land makes them easier to survey and count than adults, which are much more mobile. The number of pups also reflects the proportion of the breeding female population. Based on pup counts, the total number of individual New Zealand sea lions in 2006 was estimated at around 12 000 (95% confidence interval: 10 259–13 625) (Campbell et al. 2006).

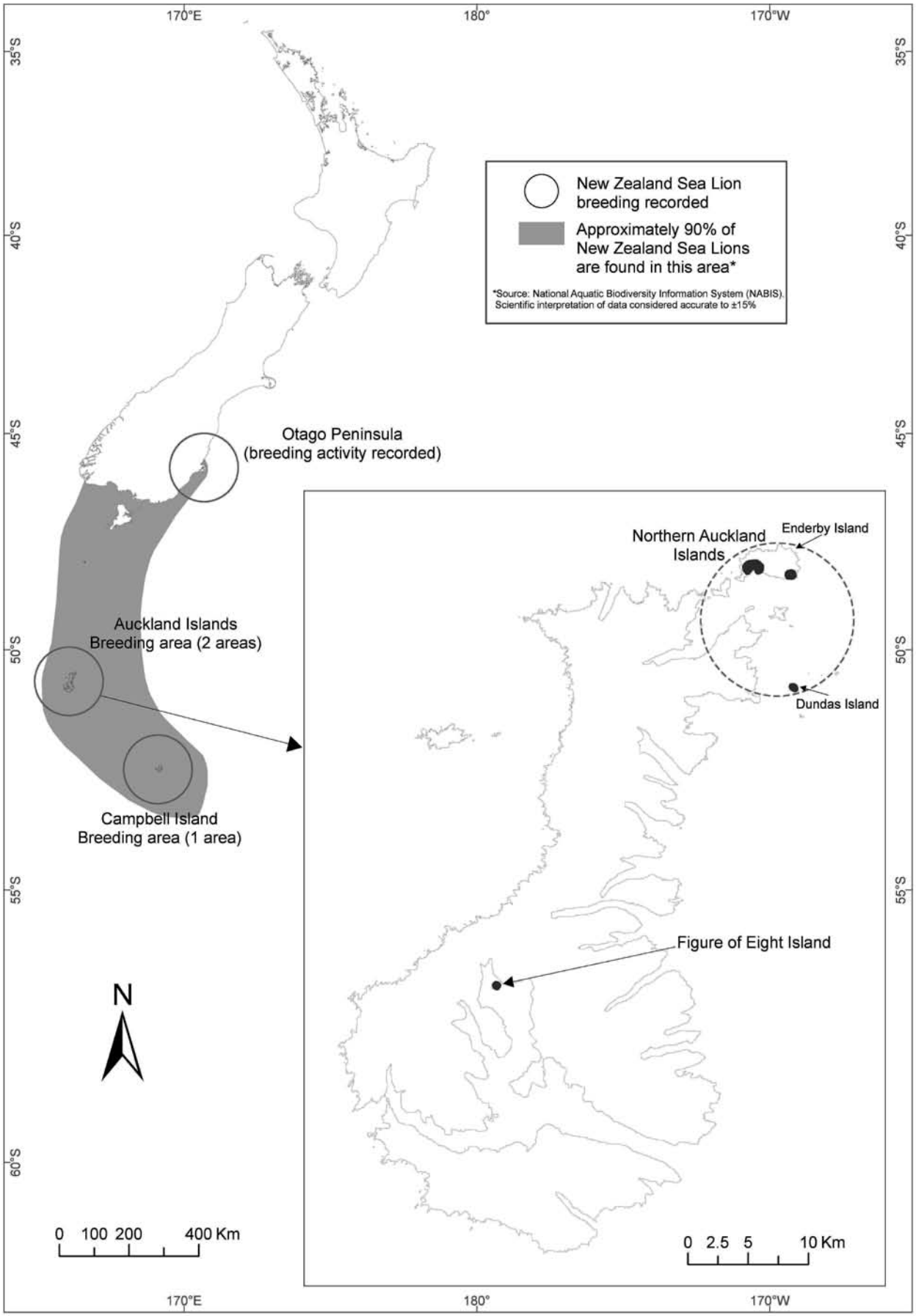

Figure 3. Breeding distribution of New Zealand sea lions. In management terms, there are three recognised breeding areas for New Zealand sea lions: two in the Auckland Islands, the third on Campbell Island/Motu Ihupuku (Chilvers & Wilkinson 2008).

2.4 POPULATION DISTRIBUTION

As well as providing evidence of population trends, pup production can be used to assess breeding distribution and to define the relative importance, in terms of breeding significance, of terrestrial sites used by New Zealand sea lions. The following criteria are used to define the sites:

Haul-out sites Terrestrial sites where New Zealand sea lions occur but where pups are not born, or where less than 35 pups are born per year over 5 consecutive years

Colonies Haul-out sites where 35 pups or more are born each year for a period of 5 years or more[2]

2.4.1 Auckland Islands

Under the breeding distribution criteria and based on information from recent pup counts, one breeding colony is located on Enderby Island (Sandy Bay)[3] and another on Dundas Island. A third colony is located on Figure of Eight Island (Chilvers et. al. 2007; Chilvers & Wilkinson 2008). Between 79% and 86% of the total breeding population occurs on these islands (Chilvers et al. 2007; Maloney et al. in press). Although pup production estimates for the Auckland Islands have varied[4], the overall trend has been one of a decline of around 50% since the mid-1990s (Chilvers et al. 2007) (see Fig. 4).

2.4.2 Campbell Island/Motu Ihupuku

One colony—Davis Point—is located on Campbell Island/Motu Ihupuku (Childerhouse et al. 2005). The possible existence of a second colony at Paradise Point (Maloney et al. in press) is worth noting.[5] The island is used by between 14% and 21% of the total breeding population (Chilvers et al. 2007; Maloney et al. in press). An estimated 583 pups were born in 2008. Records indicate that pup production may have increased, although direct comparisons are made difficult by variations in the pup production survey methodologies (Maloney et al. in press).

2.4.3 Otago

In recent years, pups have been born on the Otago Peninsula. All the recorded breeding females (four by 2002, nine by 2008) are derived from an immigrant female that first pupped in 1993/94 (McConkey, Heinrich et al. 2002; McConkey, McConnell et al. 2002). The number of breeding individuals makes up less than 0.1% (Chilvers et al. 2007) of the total breeding population, and annual pup production is currently less than five pups.

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[2] Related management criteria are used to define breeding and non-breeding/haul-out sites for the Steller sea lion (*Eumetopias jubatus*) (Sease & York 2003) and the South American sea lion (*Otaria flavescens*) (Grandi et al. 2008).

[3] Pupping has been recorded on South East Point on Enderby Island but is thought to be inadvertent (Chilvers & Wilkinson 2008). Pup production at this site does not meet the criteria of a colony.

[4] It is important to note that the figures reflect total estimated pup production. Actual pup survival rates will be lower (Chilvers et al. 2007).

[5] Paradise Point does not meet the criteria of a colony as, whilst colonial breeding was noted during a survey in 2008, it had not been recorded in earlier surveys. This may be due to differences in methodologies (Maloney et al. in press).

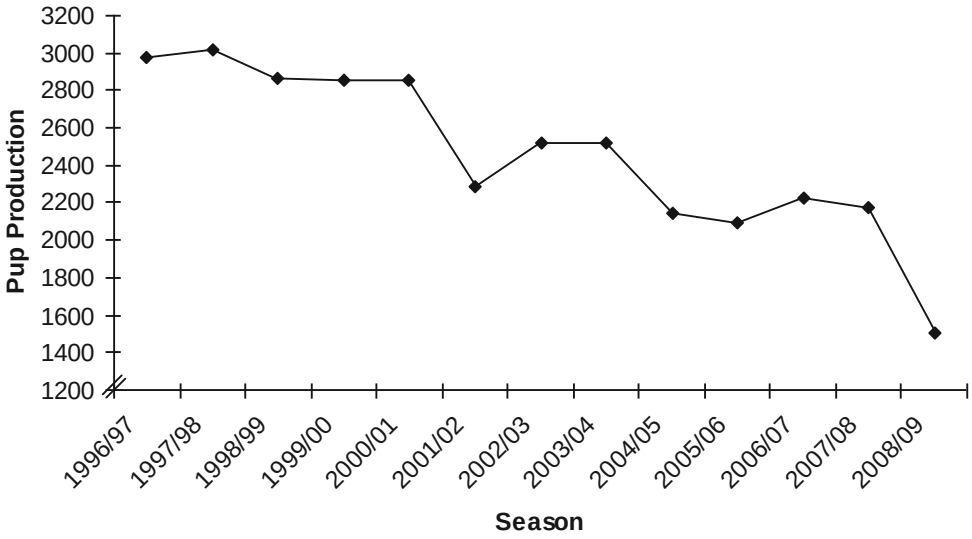

Figure 4. Pup production on the Auckland Islands, 1996/97 to 2008/09. (DOC, unpublished data)

2.4.4 Stewart Island/Rakiura and the Snares Islands/Tini Heke

Occasional births have been recorded on Stewart Island/Rakiura and outlying islands, including Codfish Island and the Snares Islands/Tini Heke (hereafter referred to as 'the Snares') (Childerhouse & Gales 1998; McNally et al. 2001; McConkey, Heinrich et al. 2002; Chilvers et al. 2007).

2.5 LIFE HISTORY

A maximum age of 23 years has been recorded for both males and females (Cawthorn et al. 1985; Campbell et al. 2006). Females reach sexual maturity at around 3 years of age (Dickie 1999) but typically do not start breeding until between the ages of 4 and 8 years. Males are thought to reach sexual maturity between 5 and 9 years of age (Cawthorn et al. 1985; Dickie 1999), and do not begin to hold harems until at least 8 years of age (Cawthorn et al. 1985).

Breeding behaviour is summarised by Cawthorn (1993). Female New Zealand sea lions exhibit strong philopatry to their breeding colony.[6] Their foraging range is limited, particularly when suckling a pup (Chilvers et al. 2005; Chilvers 2008; Chilvers & Wilkinson 2008).

On the Auckland Islands, males occupy a beach in late November and pregnant females congregate at nearby haul-outs. Females form into harems of up to 25 and are attended by a single dominant bull. Challenger and bachelor bulls remain around the periphery and occasionally challenge the dominant bull. Females give birth to a single pup every 1–2 years. Pupping begins in the first week of December and ceases by the second week in January, at which time the remaining bulls disperse and the harems break up. Pups are born on the beach but are moved by their mothers to nearby vegetation after about 6 weeks. The females

[6] Breeding philopatry occurs when a female returns to the proximity of a site in which she has bred at least once (successfully or unsuccessfully). This may not necessarily be the site at which she was born (natal philopatry).

then spend the next year alternating between foraging trips to sea and periods on land suckling their pups. Pups are dependent on their mothers for milk and for protection during the first year of their lives. While mothers are at sea feeding, pups are alone but may form into pods.

2.6 HABITAT

New Zealand sea lions rely on a variety of terrestrial habitats, including sandy beaches, coastal sward, herb fields, forested areas, solid bedrock and densely vegetated areas for haul-out sites and when breeding (Cawthorn 1993; Gales 1995; Augé 2006). Individuals can move significant distances inland between foraging trips (Augé 2006). This is especially true for females with young pups (Gales 1995; Chilvers et al. 2005).

2.7 DIET

New Zealand sea lions have a generalist diet including a wide range of marine vertebrates and invertebrates (Lalas 1997; McMahon & Robinson 1999; Childerhouse et al. 2001; Meyneir et al. 2008). The species primarily feeds in the shelf regions up to 175 km from their breeding locations. The species is the longest and deepest diving of all sea lions (Gales & Mattlin 1997; Costa & Gales 2000; Chilvers et al. 2005, 2006).

2.8 SOCIAL AND CULTURAL IMPORTANCE

A significant industry has been built up in New Zealand over the years around marine mammal viewing. The opportunity of sighting New Zealand sea lions around the subantarctic islands and along the Otago coastline is an important element. Management of all marine mammals within New Zealand's waters, including the New Zealand sea lion, is therefore of significant local and international interest.

Archaeological evidence indicates that Māori have used New Zealand sea lions as a resource in the past (Berry & King 1970; Smith 1978, 1979, 1985, 1989, 1996; Jeal 1987; Sutton 1989; Worthy 1992, 1994; McFadgen 1994; Gill 1998). Traditionally, both male and female New Zealand sea lions were hunted by Ngāi Tahu Whānui in the southern South Island for food, bone and other products.[7] The Ngāi Tahu Whānui association with New Zealand sea lions has been recognised in the Ngāi Tahu Claims Settlement Act 1998, where this species has been listed as a taonga species. New Zealand sea lions currently are present only in Ngāi Tahu Whānui Takiwā.

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7 Waitangi Tribunal 1992: Ngai Tahu sea fisheries report (Wai 27). Brooker and Friend, Wellington.

3. Known and potential threats

3.1 HUMAN-INDUCED THREATS

3.1.1 Direct effects of fishing (in particular, trawling)

During the late 1970s, a trawl fishery for squid was established around the Auckland Islands. The timing and location of the fishery coincides with the pupping and lactating season of New Zealand sea lions, resulting in significant numbers of animals being caught and killed in these fishing operations. New Zealand sea lions are also caught in the subantarctic scampi, southern blue whiting and other fisheries (Table 1) (Rowe in press).

3.1.2 Indirect effects of fishing

The indirect effects of fishing have yet to be thoroughly quantified but are thought to include prey depletion, habitat degradation and ecosystem disruption. Sub-optimal foraging conditions for a mother attempting to optimise the return time to her pup will increase foraging costs, hinder pup provisioning and affect species viability (Boyd et al. 1994, 1997).

The female New Zealand sea lions that breed on the Auckland Islands have been recorded as diving to depths and for durations beyond their physiological aerobic dive limit for more than 68% of their dives. Similar estimates for other sea lion species range from 4% to 10% (Gales & Mattlin 1997; Chilvers et al. 2006). Reductions in prey availability may exacerbate this situation.

TABLE 1. ESTIMATED NEW ZEALAND SEA LION MORTALITIES IN THE SQUID 6T FISHERY MANAGEMENT AREA (SQU 6T).

Mortalities from other fisheries, such as the southern blue whiting or scampi, are not included. Data were obtained from the Ministry of Fisheries plenary document on arrow squid status 2008: http://fpcs.fish.govt.nz/science/Documents/plenary/SQU_FINAL%2008.pdf (viewed 25 June 2009).

FISHERY SEASON	ESTIMATED MORTALITY (*n*)
2006/07	56
2005/06	110
2004/05	115
2003/04	118
2002/03	39
2001/02	84
2000/01	67
1999/2000	71
1998/99	14
1997/98	62
1996/97	123
1995/96	101
1994/95	109

3.1.3 Human disturbance

On mainland New Zealand, the effects of disturbance may include habitat loss, injury and/or death to New Zealand sea lions. Most incidents of disturbance of New Zealand sea lions and their habitats result from people (harassment, shootings, clubbing and use of vehicles) and dogs (Brooking 2002). Deliberate harassment and killing of New Zealand sea lions hauling up on the South Island (Catlins, Blenheim and Otago Peninsula) and on Stewart Island/Rakiura have been recorded. In some instances, this behaviour may be due to a misplaced perception that people are competing with the species for fish (Lalas & Bradshaw 2003).

New Zealand sea lions are subject to interactions with tourists at three main sites: Enderby Island, Otago Peninsula and the Catlins. Human-induced disturbances could become a more serious issue if breeding becomes more widespread and if interactions with humans continue to increase at current breeding locations (Wright 1998).

3.1.4 Climate change

A relatively small population size and restricted breeding distribution render New Zealand sea lions vulnerable to the possible effects of climate change. This might be through a loss of breeding and haul-out sites following a rise in sea levels, or other mechanisms such as disruptions in prey abundance and distribution.

3.1.5 Pollution

An oil spill or similar pollution event near a breeding or haul-out site could significantly impact upon breeding and survival over several seasons. Such catastrophic events could pose a significant risk to the species as a whole.

3.1.6 Marine debris

Entanglements are thought to pose a threat to individuals. Anecdotal evidence suggests that marine debris may pose an increasing threat. The potential hazard posed to the species as a whole is unknown.

3.2 NON-HUMAN INDUCED THREATS

3.2.1 Disease

Three mass mortality events have been recorded at the Auckland Islands in recent years. These epidemics resulted in the deaths of 53%, 32% and 21% of annual pup production for the 1998, 2002 and 2003 seasons, respectively (Chilvers 2008). Female mortality also increased during the 1997/98 event (Baker 1999; Wilkinson et al. 2003; Castinel, Duignan et al. 2007; Castinel, Kittelberger et al. 2007). Male New Zealand sea lions are highly mobile and move annually between the mainland and the New Zealand subantarctic islands; therefore, the likelihood of disease transmission (depending somewhat on season) could be relatively high (Robertson et al. 2006). As New Zealand sea lions gradually become established on the mainland, the risk of disease transfer (such as tuberculosis) from possums and other animals to New Zealand sea lions may pose a risk to the population.

The impacts of these natural disease events on the declining and restricted population may be further increased by ongoing adverse human interactions, such as fishing-related mortalities.

3.2.2 Predation

Sharks are the New Zealand sea lion's only known natural predator. This observation is based on presence of wounds consistent with this predator's anatomy and behaviour.

3.2.3 Tsunami

Similar to a pollution event, any impact would be dependent on the severity, location and timing of the tsunami.

4. Management

4.1 DEFINING THE PROBLEM

The relatively small population size and restricted breeding range of the New Zealand sea lion makes the species vulnerable should a catastrophe, such as a tsunami or oil spill, occur at one or more of the breeding strongholds (the Auckland Islands and/or Campbell Island/Motu Ihupuku) during the breeding season. This vulnerability will increase unless the current decline in population abundance at the Auckland Islands (79–86% of all breeding) is arrested.

4.2 THE SOLUTION

Legislation and policies relevant to the management of the New Zealand sea lion can be found in Appendix 1. Past management of the New Zealand sea lion is summarised in Appendix 2.

Reducing the vulnerability of the New Zealand sea lion will require an increase in the population size and the species' breeding distribution. A reduction in vulnerability would likely lead to a reclassification of the species, in terms of local and international threat status, to a category of 'less risk'.[8]

To achieve the above, a suite of management measures would need to be applied. This includes:

- Avoidance or minimisation of the adverse impacts of human interactions on the New Zealand sea lion
- Promotion of protection provisions and compliance
- Promotion of community awareness, understanding and involvement in management of the species

[8] Any changes would be dependent on the criteria utilised by the respective threat classification systems or standards.

At the same time, further research into the biology and ecology of the New Zealand sea lion and the threats facing the species is necessary. The research would need to support and complement the proposed management measures.

This wide range of management initiatives with supporting research would serve to arrest the overall decline in population abundance, promote an increase in overall population, and at the same time facilitate or promote the opportunities for breeding outside of the New Zealand subantarctic islands.

Although the process for establishing new colonies is not fully understood, it may be density dependent (Chilvers & Wilkinson 2008). That is to say, as the density of individuals increases, so does the likelihood of their dispersal. It is notable that density-dependent dispersal has been described in the Steller sea lion in Southeast Alaska (Raum-Suryan et al. 2002) and other pinniped species (Bradshaw et al. 2000; Grandi et al. 2008).

The potential for facilitating breeding in new breeding areas can be seen along the Otago Coast. Here, a single immigrant matriarch has given birth to several pups since the 1990s. Some of these pups have in turn later returned to successfully pup (McConkey, Heinrich et al. 2002; McConkey, McConnell et al. 2002). The site is likely to provide useful information and perhaps an insight into dispersal and colonisation triggers. Should breeding continue and should pup production increase, it is possible that the site might qualify as a colony sometime in the future.

5. Management through the species management plan

Managing an increase in population abundance and distribution to the point of recovery, in terms of threat status, will not be achievable within the 5-year time frame of this Plan. This is a consequence of the behavioural and biological characteristics of the New Zealand sea lion (including low population size and rates of fecundity, along with the low recolonisation rates). It is also unclear whether, or how, some human interactions might impact on the New Zealand sea lion and its ability to expand its breeding distribution. Aiming to ensure good progress towards a recovery by facilitating an expansion in population size and distribution is a pragmatic solution to these (possibly) constraining factors.

5.1 AIM

To make significant progress in facilitating an increase in the New Zealand sea lion population size and distribution.

Facilitating an increase in population size and distribution within the Plan term will be undertaken through the four key areas. It will take into account relevant legislation and policies (Appendix 1). Relevant goals have been set against each key area to ensure prioritisation of effort.

5.2 GOALS

Management of the adverse effects of human interactions:

Goal: To avoid or minimise adverse human interactions on the population and individuals.

Protection provisions and compliance:

Goal: To ensure comprehensive protection provisions are in place and enforced.

Community relations:

Goal: To ensure widespread stakeholder understanding, support and involvement in management measures.

Research:

Goal: To ensure research work:

- Enables an improved understanding of the biology and ecology of the New Zealand sea lion
- Enables an improved understanding of the threats to the species
- Supports implementation of robust management measures

5.3 CHANGE AND AMENDMENTS

An Implementation plan (see Fig. 5) has been established and is set out in section 6. To further assist with work prioritisation and with progress monitoring, a series of 'indicators of success' have also been established for each of the four key goals. These indicators provide a pragmatic manner in which to monitor and assess progress within the 5-year term of the Plan.

As a framework document, the Plan and all associated work will be subject to reviews and refinements during the 5-year term.

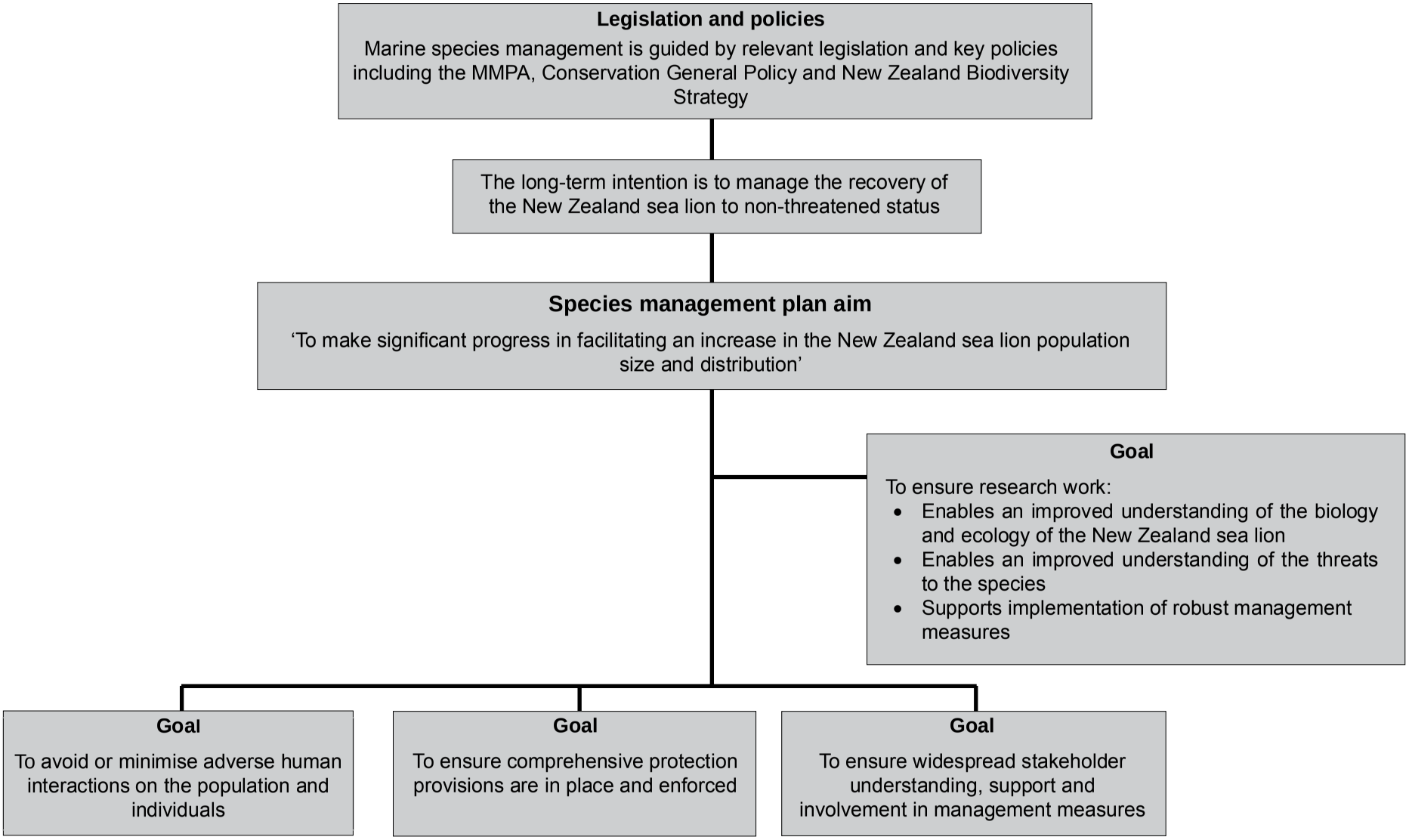

Figure 5. Flow chart of the management of the New Zealand sea lion.

6. Implementation plan

6.1 MANAGEMENT OF THE ADVERSE EFFECTS OF HUMAN INTERACTIONS

Goal:

- To avoid or minimise adverse human interactions on the population and individuals.

Success indicators:

- Adverse human interactions on the population and on individual New Zealand sea lions are avoided or minimised.

	TOPIC	ISSUE	ACTIONS
1.	Fishing (direct impacts)	Fishing-related mortality is ongoing in fisheries including those of squid, southern blue whiting and scampi.	To support the development of effective fishing-related mortality mitigation devices and strategies. To develop and implement management tools as a means to avoid or minimise fishing-related mortalities.
2.	Fishing (indirect impacts)	The indirect impacts of fishing remain unclear.	To explore any perceived indirect effects of fishing and to develop relevant management outcomes based on research findings.
3.	Human disturbance	Human disturbance (e.g. harassment, shooting, disturbance from tourism and through domestic animals) can threaten New Zealand sea lions in areas where they co-exist with humans.	To minimise, to the extent practicable, human disturbance of New Zealand sea lions by establishing and promulgating national guidelines for management of passive public interactions (including tourism and opportunistic viewing) for both the New Zealand mainland and subantarctic islands. In addition, by establishing (and promoting) clear guidelines on appropriate behaviour around New Zealand sea lions, including managing interactions with domestic animals.

6.2 PROTECTION PROVISIONS AND COMPLIANCE

Goal:

- To ensure comprehensive protection provisions are in place and enforced.

Success indicators:

- Protection provisions are reviewed and where found to be inadequate, enhanced.
- Violations against protection provisions are enforced.

	TOPIC	ISSUE	ACTIONS
1.	Enforcement	Enforcement of protection provisions has not always been undertaken consistently.	To improve protection of New Zealand sea lions in accordance with the MMPA, through a combination of increased prosecutions in cases of infringement and enhanced community awareness of, and support for, such protection.

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	TOPIC	ISSUE	ACTIONS
	Enforcement (continued)		To undertake an assessment of adequacy and effectiveness of existing protection mechanisms, and to identify where amendment to these mechanisms may be appropriate. To enhance community liaison and DOC capacity to detect incidents and prosecute as appropriate.
2.	Site protection and management	Not all haul-out and potential breeding sites for New Zealand sea lion are fully protected.	To review and assess protection provisions for sites of importance for New Zealand sea lions and to implement, where appropriate, additional protection and management mechanisms.

6.3 COMMUNITY RELATIONS

Goal:

- To ensure widespread stakeholder understanding, support and involvement in management measures.

Success indicators:

- A wide cross-section, including the public, other government agencies, industry, conservation groups and iwi, are informed and involved in management actions.
- The presence of New Zealand sea lions and establishment of breeding beyond the New Zealand subantarctic islands is widely accepted and supported.

	TOPIC	ISSUE	ACTIONS
1.	Tangata whenua	Ngāi Tahu Whānui's special association with the New Zealand sea lion is required to be recognised and their views given particular regard when undertaking protection, management and conservation of this species. The role Te Rūnanga o Ngāi Tahu has in management of this species is specified in section 293 of the Ngāi Tahu Claims Settlement Act 1998.	To consult with Te Rūnanga o Ngāi Tahu and Papatipu Runanga on management, conservation and protection of New Zealand sea lions—through Kaitiaki Roopu groups for Papatipu Rūnanga and via written correspondence in the case of Te Rūnanga o Ngāi Tahu.
		Expansion by the New Zealand sea lion into areas beyond the Ngāi Tahu Whānui Takiwā may have implications for other iwi.	To consult with other iwi as appropriate on management, conservation and protection of the New Zealand sea lion.
2.	Stakeholders	A lack of understanding in the community about management initiatives may compromise the recovery of the species. It is recognised that the community relations response to an issue will vary with target audience and location (e.g. mainland New Zealand versus subantarctic islands).	Community relations plans to be formulated by conservancies in which New Zealand sea lions occur by year end 2010, and should include: • Research characterising the public's current knowledge of New Zealand sea lions • Improving awareness of management aim and work initiatives • Fostering positive attitudes towards the establishment of new colonies • Assessment of the best mechanisms for improving this to achieve the desired objectives for the following groups:

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	TOPIC	ISSUE	ACTIONS
	Stakeholders (continued)		—Public conservation groups: Consult as appropriate to seek input towards and foster support for management, research and community relations initiatives. Produce standard DOC key messages for advocacy materials that can be adopted for use by others. —Territorial authorities and private landowners: Liaise on measures to be taken to support the establishment of new breeding colonies by minimising threats (e.g. managing public access, dog control). —New Zealand Sea Lion Trust and research organisations: Consult during development of research plans and enhance communication-networks to maintain involvement of these groups in ongoing population monitoring and any additional research on the New Zealand mainland, and ensure continuity of monitoring. —Ecotourism operators, schools, water users (including divers and surfers) and the general public: Produce and disseminate appropriate advocacy and educational materials to increase public support of the recovery of this species. Produce appropriate standard locale-specific guidelines for viewing New Zealand sea lions and make these readily accessible to members of the public likely to come into contact with New Zealand sea lions. Tools that could be considered for the purpose of public education are: temporary and permanent interpretive signs, fact sheets, educational resources, presentations and media opportunities. —Commercial and recreational fishers, muttonbirders, and yellow-eyed penguin interests: Community relations initiatives will need to address perceptions of competition for target species and/or utilisation of the same terrestrial or aquatic areas.
3.	Promotion of protection provisions	A lack of public awareness of the protection status of New Zealand sea lions and enforcement difficulties compromises New Zealand sea lions from both intentional and accidental human harassment.	Public awareness/education materials to be developed and made widely accessible, including promotion of protection status under the MMPA.
4.	Breeding range expansion	As New Zealand sea lion colonies become established in new sites beyond the New Zealand subantarctic islands, the incidence of interactions with people increases. In some instances, these interactions may compromise the process of establishment of new colonies when New Zealand sea lions (in particular females and pups) are disturbed/harassed by people, vehicles or other animals including dogs. Colonisation (such as at Otago Peninsula) may occur on public land administered by agencies other than DOC or on land held in private ownership.	To engage in a proactive community relations programme to educate stakeholders and interest groups about New Zealand sea lions, including ecological significance and appropriate behaviour when interacting with New Zealand sea lions.

6.4 RESEARCH

Goal:

- To ensure research work:
  - —Enables an improved understanding of the biology and ecology of the New Zealand sea lion
  - —Enables an improved understanding of the threats to the species
  - —Supports implementation of robust management measures.

Success indicators:

- The biology (including demography) and ecology of New Zealand sea lions (including the mechanisms and processes of establishment of new breeding colonies) are identified and better understood.
- Threats to the New Zealand sea lion are better understood and possible mitigation measures are investigated.
- Research undertaken aids and assists in the implementation of informed and effective management measures.

	TOPIC	ISSUE	ACTIONS
1.	Monitoring and population dynamics	Our understanding of overall New Zealand sea lion population dynamics is limited, as regular monitoring has taken place only over a 10-year period and has been concentrated on the Auckland Islands.	To continue monitoring of New Zealand sea lions on Enderby, Dundas and Figure of Eight Islands (Auckland Islands group) to allow annual estimation of pup production and breeding population size. To conduct New Zealand sea lion population monitoring on Campbell Island/Motu Ihupuku to allow regular estimates of pup production and breeding population size. To continue monitoring of the New Zealand sea lion population in Otago to allow annual estimation of pup production and breeding population size.
		The quantification of population parameters (e.g. recruitment, age specific survival and fecundity) is limited to a 10-year period and to the Auckland Islands breeding area. N.B. New Zealand sea lion population parameters have been investigated on the Auckland Islands and Otago Peninsula since the mid-late 1990s. Population (Otago Peninsula, Auckland Islands) and management scenario (Auckland Islands) modelling has also been undertaken.	To document a suite of population parameters for existing and establishing breeding and haul-out sites. Robust field protocols will be implemented to address current gaps in knowledge of population parameters at different breeding and haul-out sites. In particular (in order of priority): • Auckland Islands • Campbell Island/Motu Ihupuku • Otago Peninsula
		There is an incomplete understanding of population patterns and processes, including the impact of factors affecting New Zealand sea lions, such as catastrophic events, spatial utilisation and the effectiveness of management initiatives.	To develop robust population models based upon data emerging from population and ecological studies to assist conservation-management decision makers. The focus of research and development will be dynamic and influenced by the implementation of management action and circumstances impacting on the New Zealand sea lion population.

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	TOPIC	ISSUE	ACTIONS
	Monitoring and population dynamics (continued)	Dispersal and colonisation triggers are not understood, so management to facilitate colonisation is based on an assumption of density-dependent dispersal.	To investigate dispersal and colonisation triggers and processes by: • Conducting assessments of habitat quality and quantity at sites where New Zealand sea lions haul-out and breed • Describing and quantifying juvenile and adult movement including dispersal and settlement patterns • Describing and quantifying, where appropriate, New Zealand sea lion female landing cues, habitat requirements and social requirements to encourage breeding on New Zealand mainland.
		There are limitations to current modelling for management purposes owing to a lack of certain data (e.g. shape of the density-dependence curve) and structural limitations to management models.	To update existing models as new data become available, and explore alternative modelling options. Possibilities for modelling to be identified and be refined in the course of developing and executing empirical research actions.
		Metapopulation dynamics are not understood, so relationship (connectivity) of colonies cannot be robustly quantified.	To describe and quantify movements between breeding colonies and reproductive events resulting from these movements.
2.	Fishing (direct impacts)	Uncertainty exists about the degree of threat that fishing-related mortalities represent to the New Zealand sea lion population.	To obtain and develop robust estimates of New Zealand sea lion fishing-related mortalities in all fisheries. To support the development of robust fishing mortality mitigation measures and strategies.
3.	Fishing (indirect impacts)	Indirect fishing-related impacts on individuals and the population as a whole have not been quantified.	To investigate and to quantify any indirect fishing impacts on individuals and the species as a whole.
4.	Ecology	There is an inadequate understanding of some aspects of the ecology of the New Zealand sea lion, including foraging behaviour, diet and the impact of predation.	To undertake research to investigate and better quantify foraging patterns and diet and to continue observations on predation.
		Constraints imposed on New Zealand sea lions by limited resources need to be identified.	To undertake research to identify spatial and temporal resource constraints affecting New Zealand sea lions, particularly in their breeding environments. To further research foraging patterns, growth, diet and habitat and to integrate quantitatively and qualitatively with environmental data (including information on patterns of human use).
5.	Disease	The long-term effects of disease-induced adult and pup mortality on population dynamics are unknown.	To qualify and quantify the long-term effects of disease-induced mortality on population dynamics by investigating disease causal agents, disease vectors and their pathways. To undertake qualitative and quantitative studies of disease dynamics and the effects of disease-induced mortality on on population dynamics.

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	TOPIC	ISSUE	ACTIONS
6.	Genetics and taxonomy	Genetic diversity is thought to be low and its effects on breeding location structure, and on colonisation, paternity and immunology are not understood.	To increase understanding of the genetic structure of the New Zealand sea lion population by conducting genetic analysis (including using existing samples) to clarify the effects of genetic diversity on breeding locations structure, paternity and immunology of the New Zealand sea lion.
7.	Distribution	Patterns of New Zealand sea lion occurrence and distribution are not fully understood.	To undertake further surveying to increase the knowledge of the geographic range of New Zealand sea lions. To conduct, or support the undertaking of surveys, during the pupping season (December to January) to establish the extent of New Zealand sea lion occupancy, recolonisation and possible breeding on and around Stewart Island/ Rakiura, Fiordland, and the Snares. Areas of specific focus: Port Pegasus/Pikihatiti and beaches to the south (including Small Craft Retreat, Broad Bay, Flour Cask Bay). To consolidate incidentally collected data on New Zealand sea lion sightings (e.g. from Stewart Island/Rakiura, Fiordland, the Snares).
8.	Tourism	Impacts (direct and indirect) of tourism and other human interaction on colonisation processes and occupation patterns are unclear.	To qualify and quantify the effects of tourism/human interaction on New Zealand sea lions (e.g. disturbance, human effects on habitat negatively affecting animals coming ashore), thus enabling the development of guidelines promoting protection provisions. Attention to focus on the subantarctic islands, mainland New Zealand and Stewart Island/Rakiura.
9.	*Ex situ*/captive breeding	A lack of knowledge precludes *ex situ*/ captive holding of New Zealand sea lions for the purposes of breeding towards the species' recovery.	DOC has no intention to pursue any research into *ex situ* management strategies in the foreseeable future. Management of the New Zealand sea lion in its natural environment remains the priority.

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Appendix 1

SPECIES MANAGEMENT GUIDANCE

Legislation[9]

Marine Mammals Protection Act 1978 (MMPA)

All marine mammals are fully protected under the MMPA. The purpose of the MMPA is to make provision for the protection, conservation and management of marine mammals within New Zealand territorial and fisheries waters. It includes the provision to establish a population management plan or a marine mammal sanctuary as management tools. The Department of Conservation (DOC) administers this Act.

Conservation Act 1987 (CA)

The CA was developed to promote the conservation of New Zealand's natural and historic resources. Under the Act, DOC has a number of functions including promoting the benefits of the conservation of natural and historic resources.

Marine Mammal Protection Regulations 1992 (MMPR)

The MMPR are prepared under the MMPA and enforced by DOC. The MMPR provide the regulatory framework for behaviour around all marine mammals.

Fisheries Act 1996 (FA)

The Ministry of Fisheries administers this Act. The Minister of Fisheries has obligations under the FA to avoid, remedy or mitigate any adverse effects of fishing on the aquatic environment. Under section 15(2), this may include setting a fishing-related mortality limit (FRML) for a protected species. New Zealand sea lion (*Phocarctos hookeri*) mortalities in the Squid 6T fishery management area are currently managed through this mechanism on an annual basis and in the absence of a population management plan.

Policies

Conservation General Policy 2005[10]

The Department's Conservation General Policy (May 2005) was prepared under section 17C of the CA to provide unified policy for the implementation of a number of acts, including the MMPA.

The Conservation General Policy 2005 cannot derogate from legislation. Among other things, the Conservation General Policy 2005 provides guidance for the administration and management of the MMPA (see section 3B of the MMPA).

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[9] www.legislation.govt.nz/default.aspx (viewed 25 June 2009).

[10] www.doc.govt.nz/templates/MultipageDocumentPage.aspx?id=44031 (viewed 25 June 2009).

In developing a plan to manage the New Zealand sea lion, particular account should be taken of the following policies:

- '4.4 (e) The Department should work with other agencies and interests to promote and develop a marine protected areas network, including marine reserves, wildlife reserves, sanctuaries and other protective mechanisms.'
- '4.4 (f) Protected marine species should be managed for their long-term viability and recovery throughout their natural range.'
- '4.4 (j) Human interactions with marine mammals and other protected marine species should be managed to avoid or minimise adverse effects on populations and individuals.'
- '4.4 (l) The Department should work with other agencies and interests to protect marine species.'

New Zealand Biodiversity Strategy[11]

The New Zealand Biodiversity Strategy was prepared in response to the state of decline of New Zealand's indigenous biodiversity. It reflects a commitment, through ratification of the International Convention of Biological Diversity, to help stem the loss of biodiversity.

Theme Three of the New Zealand Biodiversity Strategy has a Desired Outcome for 2020 that 'No human-induced extinctions of marine species within New Zealand's marine environment have occurred. Rare or threatened marine species are adequately protected from harvesting and other human threats, enabling them to recover'. The aim of Objective 3.7 is to 'Protect and enhance populations of marine and coastal species threatened with extinction and prevent additional species and ecological communities from becoming threatened'.

Department of Conservation Marine Mammal Action Plan 2005–2010[12]

The Marine Mammal Action Plan 2005–2010 was adopted by DOC in October 2004. It provides specific outputs with regard to the conservation of marine mammals that DOC systematically aims to achieve. DOC's work is focused towards two broad aims:

- Species protection
- Management of human interactions and use

The Plan will seek to complement work previously and currently being undertaken against the Key Objectives:

- Ecology: To better understand the biology, population ecology, key habitat requirements, mechanisms for the establishment of new breeding locations, and threats to the species in New Zealand waters.
- Human impacts: To protect through controlling/mitigating fishing-related mortality of New Zealand sea lions in the Auckland Islands squid fishery, and to actively assist the recovery of the species. To prevent and minimise

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[11] www.biodiversity.govt.nz/picture/doing/nzbs/part-three/theme-three.html (viewed 25 June 2009).

[12] www.doc.govt.nz/publications/conservation/native-animals/marine-mammals/marine-mammal-action-plan-for-2005-2010/ (viewed 25 June 2009).

all other types of negative human impacts. To proactively manage all other human interactions with New Zealand sea lions (including tourism), primarily through public awareness. In particular, to foster further public support for the presence of New Zealand sea lions on mainland New Zealand.

- Species recovery: To facilitate and manage the recovery of the species to a self-sustaining non-threatened status throughout its natural range. To provide a high level of protection to potential new breeding sites outside the Auckland Islands and maximise the opportunity for the establishment and growth of such breeding sites.

Appendix 2

PAST MANAGEMENT OF THE NEW ZEALAND SEA LION (*Phocarctos hookeri*)

YEAR	MANAGEMENT ACTION
1893	Protection from hunting
1993	Establishment of the Auckland Islands Marine Mammal Sanctuary
1995	Production of the Department of Conservation's Hooker's sea lion recovery plan 1995–2005
1996–to date	Management of fishing-related mortality (Ministry of Fisheries Operational Plans for SQU6T 1996–2008/09)
1997	Full protection under the MMPA
2003	Establishment of the Auckland Islands Marine Reserve
Ongoing	Research programmes including, for example: • Population parameters and vital rates • Investigation of diet and foraging behaviour • Genetic analysis of the subantarctic populations • Breeding systems • Review of historical and modern distribution and abundance Management programmes including monitoring and minimisation of public and visitor disturbance of New Zealand sea lions, and education of the public on New Zealand sea lion ecology and on appropriate behaviour when encountering New Zealand sea lions.

New Zealand Government