

Consultation Document

New Zealand sea lion/rāpoka

Threat Management Plan



**NEW ZEALAND SEA LION/RĀPOKA
THREAT MANAGEMENT PLAN**

CONSULTATION PAPER

Department of Conservation and Ministry for Primary Industries

20 June 2016

Disclaimer

While every effort has been made to ensure the information in this publication is accurate, the Department of Conservation and Ministry for Primary Industries do not accept any responsibility or liability for error of fact, omission, interpretation or opinion that may be present, nor for the consequences of any decisions based on this information.

Requests for further copies should be directed to:

Publications Logistics Officer
Ministry for Primary Industries
PO Box 2526
WELLINGTON 6140
Email: brand@mpi.govt.nz
Telephone: 0800 00 83 33
Facsimile: 04-894 0300

Marine Species and Threats Team
Department of Conservation
PO Box 10420
Wellington 6143
Email: marine@doc.govt.nz
Telephone: 04-471 0726
Facsimile: 04-381 3057

This publication is also available on the Department of Conservation website at <http://www.doc.govt.nz/nature/native-animals/marine-mammals/seals/new-zealand-sea-lion/docs-work/new-zealand-sea-lion-threat-management-plan/>

And the Ministry for Primary Industries website at <http://www.mpi.govt.nz/news-and-resources/publications/>

Cover image: New Zealand sea lion and pup. *Photo: Andrew Maloney*

© Crown Copyright – Department of Conservation and Ministry for Primary Industries, June 2016

ISBN No: 978-0-478-15065-0 (print)

ISBN No: 978-0-478-15064-3 (online)

How to submit

DOC and MPI welcome written submissions on the New Zealand sea lion/rāpoka Threat Management Plan. The deadline for all submissions is:

Friday 5 pm, 5 August 2016

Please make sure you include the following information in your submission:

- the title of this consultation document
- your name and title
- your organisation's name (if you are submitting on behalf of an organisation), and
- your contact details (e.g. phone number, address and email).

You can return your submission via email, post or hand delivery:

Email: marine@doc.govt.nz

Post to:

Consultation: New Zealand sea lion Threat Management Plan
Marine Species and Threats Team
Department of Conservation
PO Box 10420
Wellington 6143

Deliver by hand to:

Consultation: New Zealand sea lion Threat Management Plan
Marine Species and Threats Team
Department of Conservation
Conservation House
18–32 Manners Street
Wellington 6011

Official Information Act

All submissions are subject to the Official Information Act 1982 and can be released, if requested, under the Act. If you have specific reasons for wanting to have your submission withheld, please set out your reasons in the submission. DOC and MPI will consider those reasons when making any assessment for the release of submissions if requested under the Official Information Act.

DOC and MPI will analyse all submissions and develop joint recommendations for each agency's respective Minister to consider.

Contents

| | |
|--|-----------|
| How to submit | 3 |
| Executive summary | 6 |
| Treaty of Waitangi obligations | 7 |
| Introduction | 8 |
| Problem definition | 10 |
| Status of sea lions | 10 |
| Recent population trend | 11 |
| TMP objective and scope | 12 |
| TMP goals | 12 |
| 1. Population goals | 12 |
| 2. Partnership goal | 12 |
| 3. Research and monitoring goal: | 13 |
| 4. Community goal: | 13 |
| Proposed Threat Management Plan actions | 13 |
| National programme | 13 |
| 1. Population monitoring | 15 |
| 2. New Zealand sea lion forum | 15 |
| 3. National engagement campaign | 15 |
| 4. Disease research | 16 |
| Regional programme | 16 |
| References | 19 |
| Other research priorities | 19 |
| Next steps | 23 |

Executive summary

The New Zealand sea lion/rāpoka (*Phocarctos hookeri*) is a taonga species, treasured by tangata whenua. It is the rarest sea lion in the world. Currently the estimated total population of around 11,800 sea lions is classified as ‘Nationally Critical’.¹

Annual sea lion pup counts at breeding sites are used to index trends in the total sea lion population. The Minister of Conservation and the Minister for Primary Industries asked officials to develop this New Zealand sea lion/rāpoka Threat Management Plan (TMP) because the number of sea lion pups born annually at the Auckland Islands declined by 50% in the 11 years between 1998 and 2009. The Auckland Islands is the largest breeding site for sea lions with 68% of all sea lion pups being born there, so the decline from 3,000 pups to around 1,500 pups is a major cause of concern.

The objective of the TMP is to ‘*promote the recovery and ensure the long-term viability of New Zealand sea lions*’. This will be achieved by a range of threat management/mitigation actions, as well as research and engagement activities, to be undertaken over the next 20 years.

A major part of developing the TMP was production of a risk assessment of threats to sea lions which focussed on the two regions with the most data available – the Auckland Islands subpopulation, and the Otago coast breeding population.

The TMP has four goals:

1. Population goal:

- long term, by 2036, the overall population is above the 2015 estimate of 11,800 sea lions, and will be increasing
- short term, by 2021 and every 5 years thereafter, the overall sea lion population is on track to achieving the 20-year goal.

2. Partnership goal:

The Crown works in partnership with Ngāi Tahu on issues involving sea lions.

3. Research and monitoring goal:

A structured research and monitoring programme is implemented to inform and target management actions to achieve the objective of the TMP.

4. Community goal:

Communities and stakeholders are involved and engaged in the conservation of sea lions.

¹ Under the *New Zealand Threat Management Classification System*, Department of Conservation.

Sea lions are exposed to different natural and man-made threats. For this reason, the TMP takes a holistic approach to mitigate the key threats to ensure recovery across the whole sea lion population. It sets out the national and regional management measures that are proposed to address the key threats. The TMP then outlines the actions that are being proposed for mitigating the threats at the main breeding sites: on the Otago coast of the South Island/Te Waipounamu, Stewart Island/Rakiura, the Auckland Islands, and Campbell Island/Motu Ihupuku. Research and monitoring associated with the TMP will be reviewed annually to assess progress against the 5-year goals. The TMP as a whole will be reviewed every 5 years and assessed against achievement of the 5-year goals and progress towards the 20-year goals.

Treaty of Waitangi obligations

Sea lions are very important to all New Zealanders. In te reo, the female sea lion is kake and the male is whakahao – rāpoka is used more generically for all sea lions. Sea lions are a taonga species (or treasure) to tangata whenua and more specifically, Te Rūnanga o Ngāi Tahu, under the Ngāi Tahu Claims Settlement Act 1998. The Crown acknowledges the cultural, spiritual, historical, and traditional association of Ngāi Tahu with sea lions under this Act. This commits the Crown to consult with and have particular regard to the views of Te Rūnanga o Ngāi Tahu when the Minister of Conservation makes policy decisions concerning the protection, management, or conservation of sea lions.

Under the TMP, officials will work with whānau, hapū and iwi to develop the appropriate mechanisms to ensure kaitiakitanga responsibilities for sea lions are met. Appropriate mechanisms for ensuring iwi engagement will be developed further at the local level, through DOC's Pou Tairangahau and district treaty partnerships.

Introduction

The purpose of this New Zealand sea lion/rāpoka² Threat Management Plan (TMP) consultation paper is to:

- outline the proposed TMP – the actions and research (based on available resources) that are planned to reduce the key threats to sea lions, and
- seek feedback on the proposed TMP measures.

The TMP has been developed to prioritise sea lion research and management actions in a pragmatic way, targeting the key threats to sea lions within resource constraints. These proposed measures are designed to begin the sea lion population recovery process over the next 20 years.

In the two years since the TMP process began, a number of research programmes have been initiated or maintained. The background document contains information on the biology of sea lions, key threats, legislation, history of commercial fishing mitigation, and a description of the research undertaken during the development of the TMP. Extensive research on sea lions has taken place over the past 30 years. Identifying causes and relative importance and interdependencies, for the decline of the sea lion population has proven complex.

Sea lions were previously managed through the [New Zealand sea lion Species Management Plan \(2009-2014\)](#). The Department of Conservation (DOC) and Ministry for Primary Industries (MPI) are now proposing to manage sea lions through the implementation of the TMP to progress the recovery of the sea lion population. Prior to implementation, both agencies are seeking feedback on the TMP. An overview of the proposed TMP is provided in Figure 1. After submissions are considered, the final TMP will contain those threat management measures agreed to by the Minister of Conservation and the Minister for Primary Industries. If a management measure is included that contains legislative amendments – a separate consultation will be undertaken. The TMP as a whole will be reviewed every 5 years and assessed against achievement of the 5 year goals and progress towards the 20 year goals.

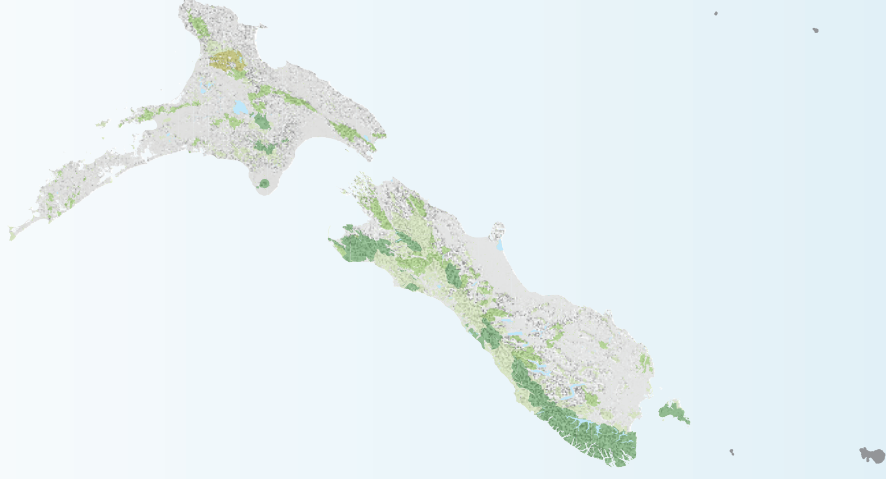
Substantial work was undertaken to support the development of the TMP and a number of information papers on sea lions are available to assist your submission:

1. [Review of threats to the recovery of New Zealand sea lions including a literature review of similar species overseas](#)
2. [Quantitative Risk Assessment of Threats to New Zealand Sea lions](#)
3. [A Summary of the Risk Assessment of Threats to New Zealand Sea lions](#)
4. [Aquatic Environment and Biodiversity Annual Review 2015 - sea lion chapter](#)
5. [Background document – further reading](#)

² Subsequently referred to as 'sea lion'.



New Zealand sea lion Threat Management Plan



National Programme

Four projects covering

1. Population monitoring
2. New Zealand sea lion Forum
3. National engagement campaign
4. Disease research

Regional Programme

Projects targeting four key threats

1. Pups drowning in holes
2. Human interactions
3. Male aggression
4. Effects of fishing

Research Priorities

Additional research on the following threats

1. Disease
2. Changes in food resources
3. Male aggression
4. Poor habitat/pups drowning in holes
5. Effects of fishing

Figure 1: New Zealand sea lion Threat Management Plan Overview

Problem definition

Annual sea lion pup counts at the main sea lion breeding sites are used to index trends in the total sea lion population. The Auckland Islands is the largest breeding site with 68% of all sea lion pups being born there. For this reason, pup counts have been undertaken at the four breeding colonies on the Auckland Islands since 1995³. The number of sea lion pups born at the Auckland Islands in the 11 years between 1998 and 2009 declined by 50% (Figure 2).

During the 2014 monitoring survey, 1,575 sea lion pups were estimated to have been born at the Auckland Islands. This was the third lowest pup count since 1995. In response to concern at this low pup count and the declining trend, the Minister of Conservation and the Minister for Primary Industries requested that the Department of Conservation (DOC) and the Ministry for Primary Industries (MPI) work to develop a New Zealand sea lion Threat Management Plan (TMP).

Status of sea lions

Before humans reached New Zealand, sea lions were found around the entire New Zealand coast. Hunting sea lions for food by Māori and then commercial hunting by sealers in the 1800s for pelts, meat and oil, significantly reduced the population and distribution. Hunting was banned in 1893. By the 20th century, sea lions were only found on Campbell Island/Motu Ihupiku and the Auckland islands in the subantarctic region. In the 1990s, sea lion population growth led to a small number of sea lions breeding on Stewart Island/Rakiura and the Otago coast. Sea lions also began to breed in the Catlins area in Southland in 2006, however the majority of sea lions pups (98%) are born either on Campbell Island (30%) or the Auckland Islands (68%).

The marine environment around the Auckland Islands was protected for marine mammals in 1993 when the area out to 12 nautical miles became a marine mammal sanctuary. In 2003, the value of the wider marine ecosystem was recognised with the area covered by the marine mammal sanctuary also becoming a marine reserve. In 1997, [the New Zealand sea lion was gazetted as a threatened species](#) under the Marine Mammals Protection Act 1978. In terms of current status, New Zealand sea lions have been assessed under two threat classification systems – the New Zealand Threat Classification System (Townsend et al, 2008), and the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species (IUCN, 2010). In 2010, the New Zealand Threat Classification System listed the New Zealand sea lion as ‘Nationally Critical’ based on the rate of decline prior to 2010 (Baker et al, 2010). This status was confirmed in the most recent review of the threat status of marine mammals in 2013. In 2015, the IUCN updated the Red List status of New Zealand sea lions, listing them as ‘Endangered’ (they were previously listed as ‘Vulnerable’) on the basis of a projected ongoing decline in pup production of 4% per year at the largest breeding colonies on the Auckland Islands (Chilvers, 2015).

³ Please note that a breeding season spans two calendar years. In this TMP, the second year will be used - for example a reference to 2015 will refer to the 2014/15 breeding season.

Recent population trend

Preliminary results for the most recent Auckland Islands pup count (conducted in January 2016) have recorded an estimated 1,727 sea lion pups a 10% increase from the previous year. Counts at the Campbell Island breeding colony have been infrequent due to the difficulty and cost of getting researchers to the island and due to methodological differences between counts it is difficult to infer population trends, however, sea lion pup count numbers have increased over time (Figure 2). Annual sea lion pup counts by researchers began on the Dunedin coast in 1994, the Catlins coast in 2006, and Stewart Island/Rakiura in 2011. The number of sea lion pups recorded each year also appears to be increasing at these breeding sites (Figure 2).

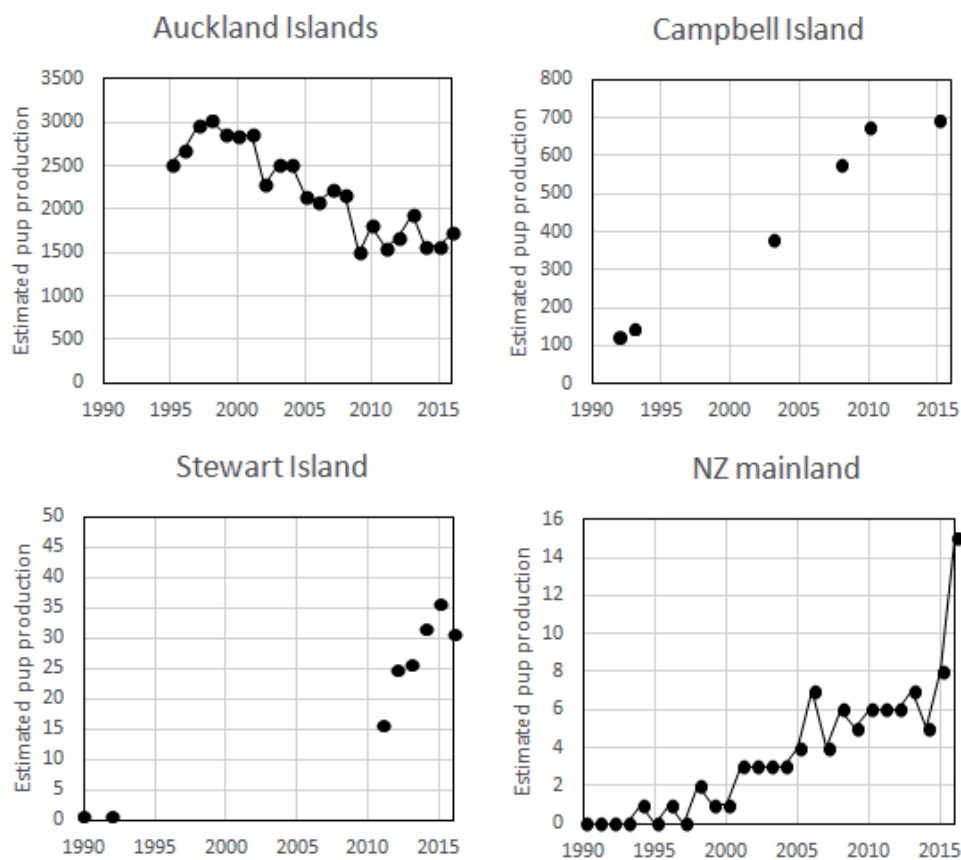


Figure 2: Annual pup census estimates of the main breeding populations of NZ sea lions. (Adapted from Roberts and Doonan, 2016.)

TMP objective and scope

The objective of the TMP is to:

Promote the recovery and ensure the long-term viability of the New Zealand sea lion population.

The TMP will be reviewed every 5 years to evaluate progress towards achieving this objective and the four goals which are outlined below. The scope of the plan includes all key threats to the sea lion population and all known breeding sites.

Trigger points will enable review of the TMP within the 5-year period if required. An example of a trigger point is an Auckland Islands sea lion pup count that is below 1,501.

TMP goals

1. Population goals

Long term, by 2036, the overall population is above the 2015 estimate of 11,800 sea lions and is increasing.

Short term, by 2021 and every 5 years thereafter, the overall sea lion population is on track to achieving the 20-year goal.

The breeding site-specific goals are:

- To reverse the declining trend in sea lion pup numbers born each year at the Auckland Islands, and
- Ensure that the number of sea lion pups born on the Otago coast, Stewart Island/Rakiura and Campbell Island/Motu Ihupuku continues to increase.

The sea lion population will be monitored to evaluate progress against these goals using the following population indicators at breeding sites.

At the Auckland Islands, Otago coast, and Stewart Island/Rakiura:

- Pup counts
- Pup survival (modelled based on tag re-sights)
- Adult female sea lion survival (modelled based on tag re-sights).

2. Partnership goal

The Crown works in partnership with Ngāi Tahu on issues involving sea lions.

DOC and MPI will enable whānau, hapū, and iwi to fulfil their kaitiakitanga responsibilities towards sea lions by working closely together, meeting regularly, and keeping each other updated on sea lion issues.

3. Research and monitoring goal:

A structured research and monitoring programme is implemented to inform and target management actions to achieve the objective of the TMP.

- Research and monitoring aligns with the goals of the TMP.
- Researchers and Government collaborate on sea lion-related projects to ensure that management is fully informed with the best available data.
- Research and monitoring used to inform management is subject to robust review.

4. Community goal:

Communities and stakeholders are involved and engaged in the conservation of sea lions.

- Public understanding of sea lions, their importance and threats to their population, improves.
- Public involvement in the conservation of sea lions increases through readily available community engagement opportunities.

DOC will engage with local authorities (district and regional councils) to protect breeding sea lions. Public understanding and involvement will be monitored over the 20-year term of the TMP.

Proposed Threat Management Plan actions

The background document outlines the current knowledge on sea lions, the TMP process and the results of a robust information gathering and risk assessment phase. Based on the results of the risk assessment this draft Threat Management Plan was developed for consultation.

The [risk assessment](#) (Roberts and Doonan, 2016) found that no single threat is responsible for the decline in the number of sea lion pups born at the main breeding sites on the Auckland Islands, and proposes that an integrated response is required to address the range of key threats identified. It also acknowledges the need for monitoring across all the subpopulations and breeding sites. The TMP proposes a national programme consisting of four projects, and a regional programme also consisting of four projects. Agencies believe this to be the base plan of core work that will make progress towards achieving the goals of the TMP. DOC and MPI recognise that there is the potential for more work to be included within the national and regional programmes that would expedite progress and increase certainty in achieving the goals. Therefore, the TMP proposes a list of prioritised research that can be incorporated into the plan in the future as resources allow.

National programme

Actions were identified that could be taken on a national level to help improve knowledge and awareness of sea lions at all sites. The national programme proposal is outlined in Table 1. It consists of four projects: population monitoring, the establishment of the New Zealand sea lion Forum, an awareness campaign, and disease research. These projects are also explained briefly below.

Table 1: National Programme

| Project | TWP Goal | Objectives | Breeding Location | 16/17 | 17/18 | 18/19 | 19/20 | 20/21 | Measurable outcome | Agency Responsible |
|---|---|---|---|-------|-------|-------|-------|-------|---|--|
| Monitoring | I. Population III. Research and Monitoring | 1. Monitor the population to measure against TMP population goal 2. Fill information gaps on population for less studied breeding sites 3. Fill information gaps on threats, e.g. potential overlap with sea lions and rate of incidence of lesser known threats | Auckland Islands Campbell Island Stewart Island South Island | ✓* | ✓* | ✓* | ✓ | ✓ | 1. Updated pup counts for measuring against TMP population goal 2. Tag resights uploaded into demographic database for analysis of demographic rates 3. Opportunities for additional monitoring are reported on the NZSL (New Zealand sea lion) Forum | DOC/MPI DOC/MPI DOC/MPI DOC/MPI |
| New Zealand sea lion Forum | I. Population II. Partnership III. Research and Monitoring | 1. Monitor the implementation of the Threat Management Plan, 2. Advise on research and management priorities as more information becomes available as a part of the plan, 3. Facilitate collaborative initiatives to help recover NZSL | National | ✓** | ✓ | ✓ | ✓ | ✓ | 1. Forum is established 2. Research and monitoring of NZSL are presented to the Forum annually 3. Research initiatives prioritised by the Forum are incorporated into the Plan as funding and resources become available 4. Information is disseminated into the community | DOC/MPI |
| Engagement Campaign | II. Partnership IV. Community | 1. Raise awareness with the general public about NZSL and what they can do to make a difference 2. Educate the public about behaviour around NZSL 3. Facilitate community groups, schools, interested parties to collaborate on local monitoring projects 4. Reduce the impact of human interactions on NZSL 5. Reduce the likelihood of mortalities related to deliberate human actions at Stewart Island and South Island | National | ✓** | ✓** | ✓ | ✓ | ✓ | 1. Improved public understanding of NZSL 2. Public are aware of how to behave safely around NZSL 3. Decline in incidents or mortality to NZSL as a result of human interactions | DOC |
| National Research Priority – <i>Klebsiella pneumoniae</i> | III. Research and Monitoring | 1. Support research to undertake a risk factor analysis on <i>Klebsiella pneumoniae</i> to understand what factors make pups more susceptible to infection and mortality 2. Determine presence of the disease at different locations, prevalence and total mortality, 3. Identification of infectious strain, 4. Identification of sources and vectors | National | ✓ | ✓ | ✓ | | | 1. Progress reports are delivered to the NZSL Forum for feedback 2. Identification of actions to deal with disease | DOC/MPI |

*= The monitoring takes place as a part of the disease research on *Klebsiella pneumoniae*

**= More investment required at set up, and then later years are maintenance and would require less resourcing

1. Population monitoring

In order to measure progress against the TMP population goal, monitoring of the sea lion population is necessary. Table 1 proposes a monitoring schedule for the four locations over the 5-year cycle of the plan. Monitoring may not be feasible or necessary at all locations every year. To ensure information is available for the review of the plan at the end of a 5-year cycle, the final year will include all locations. The table represents the most frequent monitoring that can be completed with current resourcing, however, should cost sharing or partnership arrangements arise, the proposed monitoring plan could be expanded. The first three years of monitoring at the Auckland Islands is proposed as a part of a wider research project (see project 4. Disease research), therefore the field season would be planned around the research project and monitoring could be undertaken as a part of that work. For years where there is no research project proposed, the monitoring expedition may be reduced in length unless there are synergies that would allow an extended field season.

2. New Zealand sea lion forum

Research continues to be required to inform decisions on the management of sea lions and to monitor the population to assess how effective TMP actions are. DOC and MPI propose to establish a jointly facilitated New Zealand Sea Lion Forum (the 'Forum') where iwi, researchers, government officials and stakeholders would come together to prioritise research and monitoring actions under the TMP and facilitate partnerships to achieve the goals of TMP. The Forum would provide transparency on research and monitoring requirements for sea lions, would assess progress towards achievement of the TMP goals, and prioritise and progress recommended future actions or research. It is proposed that the Forum terms of reference could be based on those for the [National Plan of Action Seabirds Advisory Group](#).

All key stakeholder groups will be invited to join the Forum in order to contribute to the process, be part of future reviews of the TMP, and respond to new information as required. Outputs from the Forum will guide sea lion research priorities and inform managers if there is a need to revisit TMP management actions. It is proposed that the Forum will review the implementation of the 5-year TMP sea lion research and monitoring plan and prioritise upcoming research and management needs. Where research and management needs are identified as priorities, the Forum will leverage their respective relationships in order to facilitate progress towards them, including by collaborative funding and resourcing models or in-kind support.

There has been a considerable amount of research on sea lions from different researchers. In order to make the data more easily accessible for gaps analyses and future research, a central research repository of sea lion data will be established. Data would be housed securely and made accessible to sea lion researchers.

3. National engagement campaign

A national engagement campaign is proposed to ensure that communities are involved and engaged in the conservation of sea lions. Officials will work in partnership with Ngāi Tahu to enable them to fulfill their kaitiakitanga responsibilities through this campaign. This project will aim to raise the New Zealand public's awareness of the threats to sea lions and also educate communities in areas frequented by sea lions, such as the Otago coast and Stewart Island/Rakiura. The primary objective of the campaign will be to minimise human impacts on sea lions at public locations where sea lions breed and/or haul out.

4. Disease research

The sea lion risk assessment (Roberts and Doonan 2016), estimated that the top natural threat to sea lions on the Auckland Islands is the bacterial disease *Klebsiella pneumoniae*. There are no proven methods for treating or preventing this disease in sea lions. Research is the first step in addressing this threat and determining whether there are feasible actions which may mitigate the impact of disease on the population.

Monitoring at the Auckland Islands covering the full breeding season (from birth to sea lion pups leaving the breeding site) is essential. This monitoring would include a range of sampling to gather information on a number of relevant factors including:

- Prevalence of disease
- Total mortality from disease
- Identification of the strain of *Klebsiella*
- Identification of the source and vectors of *Klebsiella*

In addition, a case-control study, undertaken in conjunction with Massey University, supported by DOC and MPI, will examine what factors make pups more susceptible to *Klebsiella*, to be able to provide advice on realistic treatment or management options.

Information from this study and outputs of research already underway would be reported back to the Forum. The Forum could then identify and facilitate options for management interventions (including future research) for the remainder of the period of the TMP.

Actions related to *Klebsiella* have so far focussed on the Auckland Islands subpopulation; however, the disease is likely to be present in other sea lion subpopulations. Opportunistic sampling at other locations will be facilitated for inclusion into the wider research programme on disease to examine the presence and extent of the disease.

Regional programme

The risk assessment identified a number of threats that were either specific to a location or that varied between locations. For this reason a regional programme is proposed to accommodate the site-specific nature of some of the key threats. The regional programme would comprise four main projects to research, monitor and mitigate the following four threats; pups drowning/starving in holes, male sea lion aggression, direct human interactions, and the effects of fishing. These projects and their associated actions over a 5-year timeline are outlined in Table 2.

Table 2: Regional Programme

| Threat focused project | TMP Goal | Project Objectives | Breeding location | 16/17 | 17/18 | 18/19 | 19/20 | 20/21 | Priority | Measureable outcome | Agency Responsible |
|------------------------|--|--|--|---|--|--|--|-------------------------|----------|---|--------------------|
| 1 | I. Population | 1. Reduce the mortality of pups from drowning or starving after falling into holes | Auckland Islands, Campbell Island ¹ | Continue the Planks for Pups initiative / consider expansion / Mapping of holes | Continue the Planks for Pups initiative / Mapping of holes | Assess if other options (fencing etc.) are needed and work with relevant parties to develop a plan | Implement new options or maintain Planks for Pups initiative | Maintenance and monitor | H | 1. Monitoring reports a reduction in sea lion pup mortality caused by starvation or drowning in holes | DOC |
| 2 | I. Population | 1. Reduce the chance of transmission of diseases through improved permit and quarantine procedures 2. Reduce the indirect impact of tourism on New Zealand sea lions | Auckland Islands, Campbell Island | Work with DOC Operations and Permissions staff to implement improved quarantine and/or procedures and monitor the outcomes | Maintenance | Maintenance | Maintenance | Maintenance and monitor | H | 1. A review of the current procedures is completed 2. New procedures are implemented 3. Results are reported back to the NZSL Forum | DOC |
| 2 | I. Population II. Partnership IV. Community | 1. Combine with the national awareness campaign to reduce the indirect impact of human interactions (tourism, dogs, vehicles) on a growing population of NZSL 2. Reduce mortality to sea lions from human interactions (dogs, vehicles, deliberate, pollution, boat interactions and entanglement) 3. Improve collaboration with local communities to protect and manage interactions with NZSL in coastal communities | Otago coast, Stewart Island | Work with iwi, local government and community groups to develop a beach management scheme for priority beaches for NZSL - this could include statutory and non-statutory measures | Implement beach management scheme | Maintenance | Maintenance | Maintenance and monitor | H | 1. Number of incidents impacting New Zealand sea lions on the South Island and Stewart Island is reduced. 2. Engagement of communities has increased. | DOC/Council |
| 2 | I. Population | 1. Reduce the incidence of mortality related to entanglement, vehicle collisions, and other human induced injuries through improved response capacity | Otago coast, Stewart Island | Work with local staff and vets to assess response capacity and make recommendations for future | Begin a process for implementing recommendations | Continue process | Maintenance | Maintenance and monitor | M | 1. DOC's policy on sea lion interventions reassessed; 2. Training and response programme is implemented | DOC |
| 2 | II. Partnership III. Research / Monitoring IV. Community | 1. Understand the impacts of human interactions on growing NZSL breeding sites these sites 2. Develop a means of monitoring progress at these sites 3. Improve collaboration with local communities to collect data on interactions with NZSL in coastal communities | Otago coast | Work with local community groups / schools to set up a monitoring/research programme on the Otago coast (*Note synergy with Male Aggression project below) | Implement monitoring programme | Maintenance | Maintenance | Maintenance | M | 1. Human impacts on breeding will be monitored and involve collaboration with communities and interested parties (e.g. iwi, universities, research agencies) 2. Results and recommendations are reported back to the NZSL Forum | DOC |
| 3 | III. Research / Monitoring | 1. Understand the role of male aggression in female and pup mortality through monitoring of behaviour 2. Develop actions to reduce the impact of male aggression on female and pup mortality | Otago coast, Future applicability to Auckland Islands, Campbell Island | Work with local schools to set up a monitoring/research programme on the Otago coast to understand the role of male aggression and recommend mitigation (*Note synergy with Human Interactions project above) | Implement monitoring programme Assess and develop actions if needed (e.g. translocation, use of decoys, habitat restoration) ² | Maintenance | Maintenance | Maintenance | M | 1. Effects of male aggression on the South Island of New Zealand are quantified 2. Development of a range of suitable operational tools for female protection and pup survival and minimising male aggression 3. Results and potential actions are reported to the NZSL Forum | DOC |

¹ Counts at Campbell Island will piggy back on other research opportunities

² Translocation (either short or long distance, of the aggressive male, or a female/pup pair) has been raised as a potential action to mitigate male aggression. The use of decoys and habitat restoration have been suggested as a means of encouraging females to pup at safe locations and/or to encourage problem males out of an area.

| | | | | | | | | | | | | | |
|---|--------------------|---------------|--|------------------|--|--|--|-------------------------------------|-------------------------------------|--|---|--|-----|
| 4 | Effects of fishing | I. Population | 1. Monitor sea lion captures in the Campbell Island Southern Blue Whiting Trawl fishery 2. Minimise incidental captures of sea lions in area SBW 61 | Campbell Island | Collaboratively develop and implement a SBW 61 Operational Plan for 2016-2020 | Implement the operational plan | Implement the operational plan | Implement the operational plan | Implement the operational plan | Collaboratively review the SBW 61 Operational Plan and update for 2021-2025 | H | 1. Vessels demonstrate over 90% adherence to the SBW 61 Operational Plan 2. Incidental captures of sea lions does not increase | MPI |
| 4 | Effects of fishing | I. Population | 1. Monitor sea lion captures in the Auckland Islands Squid Trawl fishery 2. Minimise incidental captures of sea lions in area SQU 6T | Auckland Islands | Review the current SQU 6T Operational Plan and management measures. Collaboratively develop and implement SQU 6T Operational Plan for 2016-2020 | Implement the operational plan | Implement the operational plan | Implement the operational plan | Implement the operational plan | Review the SQU 6T Operational Plan and management measures. Produce a new SQU 6T Operational Plan for 2021-2025 | H | 1. Vessels demonstrate over 90% adherence to the SQU 6T Operational Plan 2. Incidental captures of sea lions does not increase | MPI |
| 4 | Effects of fishing | I. Population | 1. Monitor and quantify sea lion captures in the Auckland Islands Scampi Trawl fishery 2. Minimise incidental captures of sea lions in area SCI 6A | Auckland Islands | Collaboratively develop and implement a SCI 6A Operational Plan for 2017-2021 | Implement the operational plan | Implement the operational plan | Implement the operational plan | Implement the operational plan | Collaboratively review the SCI 6A Operational Plan and update for 2021-2025 | H | 1. Information is available to quantify incidental captures of sea lions in SCI 6A 2. Vessels demonstrate over 80% adherence to the SCI 6A Operational Plan | MPI |
| 4 | Effects of fishing | I. Population | 1. Monitor and quantify sea lion captures in Stewart Island trawl and set net fishing 2. Minimise incidental captures of sea lions around Stewart Island | Stewart Island | Target increased observer coverage Develop and implement best practice guidelines | Target increased observer coverage Develop and implement best practice guidelines | Monitor interactions with sea lions | Monitor interactions with sea lions | Monitor interactions with sea lions | Quantify incidental captures of sea lions around Stewart Island | M | 1. Information is available to quantify incidental captures of sea lions around Stewart Island 2. Fishers are aware of and implement best practice to minimise captures | MPI |
| 4 | Effects of fishing | I. Population | 1. Monitor and quantify sea lion captures in trawl and set net fisheries off the Otago coast 2. Minimise incidental captures of sea lions off the Otago coast | Otago coast | Target increased observer coverage Understand potential impacts | Target increased observer coverage Develop and implement best practice guidelines | Monitor interactions with sea lions | Monitor interactions with sea lions | Monitor interactions with sea lions | Quantify incidental captures of sea lions off the Otago coast | M | 1. Information is available to quantify incidental captures of sea lions off the Otago coast 2. Fishers are aware of and implement best practice to minimise captures | MPI |
| 4 | Effects of fishing | I. Population | 1. Understand the costs/benefits of restricting fishing in sea lion foraging areas 2. Determine if additional fisheries restrictions are appropriate | All areas | Understand potential impacts | Review if fishing restrictions are required | If required, implement management measures | Evaluation | Evaluation | Evaluation | M | Review and evaluation | MPI |

References

Baker, C.S.; Chilvers, B.L.; Constantine, R.; DuFresne, S.; Mattlin, R.H.; van Helden, A.; Hitchmough, R. 2010: Conservation status of New Zealand marine mammals (suborders Cetacea and Pinnipedia), 2009. *New Zealand Journal of Marine and Freshwater Research* 44: 101–115.

Chilvers, B.L. 2015: *Phocarctos hookeri*. The IUCN Red List of Threatened Species 2015: e.T17026A1306343. <http://dx.doi.org/10.2305/IUCN.UK.2015-2.RLTS.T17026A1306343.en> . Downloaded on 08 October 2015.

IUCN 2010: IUCN red list of threatened species. Version 2010.4. <http://www.iucnredlist.org>. Downloaded on 1 June 2011.

Roberts, J.; Doonan, I. 2016: Quantitative risk assessment of threats to New Zealand sea lions. *New Zealand Aquatic Environment and Biodiversity Report No. 166*. Ministry for Primary Industries, Wellington. 111 p.

Townsend, A.J.; de Lange, P.J.; Duffy, C.A.J.; Miskelly, C.M.; Molloy, J.; Norton, D. 2008: New Zealand Threat Classification System manual. Department of Conservation, Wellington.

Other research priorities

We are aware that there is more work that could be done in a range of areas. Table 3 details what DOC and MPI view to be priority research projects that could be incorporated into the overall TMP over the life cycle of the TMP, as resources are secured. The national and regional programmes are believed to be the base plan that, when implemented would mitigate some of the key threats, inform future management actions, and begin to slow the decline in the sea lion population. Expansion of the monitoring or inclusion of any of these initiatives would increase the certainty and timeliness of achieving the goals of the TMP.

Indicative costs have been included for these projects. In some cases the range of costs is wide, e.g. \$10,000–\$100,000, depending on whether the project is able to take advantage of parallel work streams, thereby reducing the cost, or is run as a standalone project, resulting in more cost.

Table 3: Research Priorities

| Threat | Breeding Location | Priority | Project | Indicative cost | Expected outcome | Notes |
|---------|---------------------------------|----------|--|----------------------|--|--|
| Disease | All | H | Analysis of environmental & necropsy samples from previous field season, and opportunistic sampling | \$150,000 | Improved understanding of vectors for transmission of <i>Klebsiella</i> , and whether or not specific habitats are higher risk to sea lion pups. Results of the research would lead to recommendations to reduce the likelihood of pups becoming infected. | Samples have already been and will continue to be collected at the Auckland Islands, but additional samples will be collected opportunistically from other sites that can be analysed and feed into the larger national project. The cost will be dependent on # of samples. Can be spread over several years. |
| Disease | All - emphasis Auckland Islands | H | Analysis of historic necropsy samples | \$150,000 | Improved data on the prevalence of <i>Klebsiella</i> in the population over time. Knowledge of how long it has been in the population, and it's virulence through time. Results of the research would help inform what sort of management actions will have the most effect. | Up to \$150,000; could be sub-sampled/analysed over several years to reduce cost |
| Disease | All | M | Desktop review of available knowledge & related information gaps for <i>Klebsiella</i> (& other disease) | <\$50,000 | Gaps analysis to inform research priorities moving forward. | Cost could vary widely depending on whether it's done by student, or contractor |
| Disease | All | M | Epidemiological modelling / genetic investigation / molecular techniques | \$100,000 | Estimates of annual epidemic rates to understand the impact of <i>Klebsiella</i> over time. Evaluation of the origin of <i>Klebsiella</i> and its expansion in the population. Relates to the analysis of historic samples above. | Roughly \$100,000 each; projects can be divided into smaller parts/done by MSc or PhD students/done over multiple years |
| Disease | Auckland Islands | L | Investigate effectiveness of hookworm treatment | \$10,000 - \$100,000 | Treatment of pups for hookworm could improve resilience against other diseases, however, there are many caveats and this should be trialled and assessed on a small scale before full implementation is considered. | If undertaken alongside other work the cost will be minimal, if its own project the cost will be high. |

| | | | | | | |
|---------------------------|------------------------------------|---|--|--------------|--|---|
| Disease | All | L | Treatment and vaccine development | >\$1,000,000 | Not recommended at this time. | Not recommended at this point in time as very costly to develop and would take a number of years, no guarantees that it would work, and could result in complications (e.g. <i>Klebsiella</i> develops resistance to vaccine) |
| Changes in food resources | All | H | Female nutritional stress project | \$500,000 | Understanding female foraging behaviour, condition, and diet between locations, seasons, and years. This would inform the level of nutritional stress experienced at the different locations and inform where management measures might be taken. | Ideally this would be undertaken at multiple locations concurrently for multiple seasons. |
| Changes in food resources | All - emphasis on Auckland Islands | H | Analysis of opportunistic & historic diet sampling (scat & regurgitates) | \$100,000 | Understanding sea lion diet over time. Information on shifts in primary prey that may indicate times of nutritional stress. Could provide monitoring indicators that trigger increased management | Up to \$100,000; could be sub-sampled/analysed over several years to reduce cost |
| Changes in food resources | Auckland Islands | M | Estimating changes in NZSL diets using Bayesian modelling | \$50,000 | Data will be modelled to determine whether the population decline and changes in sea lion pup survival at the Auckland Islands were related to changes in sea lion diet. The study will also allow improved quantification of uncertainty in diet analysis using differing methods. | The first step of this project is to complete analysis of currently unprocessed blubber samples from 1997 – 2011. |
| Changes in food resources | All | M | Stable isotope analysis | \$50,000 | Examination of body condition in two groups of females (benthic and mesopelagic). Improved understanding of environmental changes that are stressing the population over the last decade. | Stable Isotope Analysis of skin samples previously collected, as well as those more recently collected from the Tangaroa survey. |

| | | | | | | |
|-------------------------------------|-----------------------------------|---|--|---------------------|--|---|
| Changes in food resources | All | M | Fatty acid signature analysis | \$50,000 | Information on the influence of changes in sea lion diet on pup survival. | The fatty acid signatures of female sea lions will be modelled to estimate their diet to determine the extent to which changes in observed pup weight are associated with the estimated diet of their mothers |
| Male aggression | Auckland Islands, Campbell Island | L | Monitoring aggressive male behaviour | \$10,000-\$100,000 | Information on the level of impact of aggressive male behaviour on female sea lions and pups. Information would inform potential actions if it was deemed a significant enough issue. | Cost minimal if monitored by individuals who are already at the study locations conducting related or unrelated work, main cost is in analysis and reporting of the data |
| Male aggression | Stewart Island, Otago Coast | M | Colony formation | \$50,000-\$100,000 | Understanding what influences the shift from dispersed pupping to colonial pupping (e.g. # of females, particular habitat requirements). Developing recommended actions to be used as preventative management for a range of threats like male aggression. | Cost higher due to logistics of getting to Port Pegasus, also it might require a range of methods due to the dispersed nature of the breeding location. |
| Poor habitat/pups drowning in holes | Campbell Island | M | Trialling short distance translocation to more suitable habitat | >\$500,000 | Development of a potential tool for encouraging pupping to shift from a less desirable habitat to a more desirable habitat. | Considerable logistical, ethics and safety constraints involved. If this were to be employed as a tool, it needs to be trialled on a small scale to assess risks and benefits |
| Understanding risk to NZSL | Stewart Island | H | Monitoring of the SI population to understand it's dynamics, major threats, and overlap with those threats | \$200,000-\$300,000 | Knowledge of where pupping occurs in Stewart Island, e.g. are there other areas important for sea lions outside of Port Pegasus? Knowledge of the major threats to sea lions and the rate of overlap between the threats and the sea lions. Recommended potential actions resulting from the research. | Large area with logistical constraints and minimal knowledge about this breeding site, therefore a robust monitoring programme should be developed utilising appropriate/suitable methods. |
| Effects of fishing | Auckland Islands, Campbell Island | H | SLED efficacy / estimating cryptic mortality | \$500,000 | Reduce uncertainty around the interaction rate and survival of sea lions that exit SLEDs. Better estimates for cryptic mortality and therefore a better understanding of the effects of fishing on sea lions. | Cost dependent on the technology used to determine SLED efficacy. Cameras and tagging recommended. |

Next steps

The submission period is open for six weeks.

DOC and MPI welcome written submissions on the New Zealand sea lion/rāpoka Threat Management Plan. The deadline for all submissions is:

Friday 5 pm, 5 August 2016

Please make sure you include the following information in your submission:

- the title of this consultation document
- your name and title
- your organisation's name (if you are submitting on behalf of an organisation)
- your contact details (e.g. phone number, address and email).

You can use the following questions to help in drafting a submission.

Do you agree with the objective of the TMP?

Will the four goals achieve the objective? If not, why not?

Are there any other goals you think should be included in the TMP?

Do you agree with the four projects of the national programme and the proposed monitoring plan?

Do you have any suggestions on the scope of the New Zealand sea lion forum or the disease research?

Do you agree with the four projects of the regional programme?

Do you have any other suggestions for addressing the threats?

Do you agree with the additional research priorities?

Are there other projects that you think are a higher priority?

What are your overall thoughts on the proposed Threat Management Plan?

