New Zealand sea lion/pakake/whakahao field report

South Island/Te Waipounamu, 2022/23

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Cover: Hoopers Inlet fence, Otago Peninsula. *Photo: Jim Fyfe*

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Contents

1 Overview

The small breeding population of New Zealand sea lions based on the Otago-Southland coast of the South Island/Te Waipounamu was monitored throughout the summer and autumn, with support from local communities. Monitoring and management of New Zealand sea lions is mandated by the New Zealand Sea Lion Threat Management Plan (NZSL TMP; DOC & MPI 2017), with specific targets and actions being outlined for the South Island population. Actions to support growth of this population include site-specific management to increase annual pupping rates from 16 to 35 pups per year, to ensure that deliberate human-caused mortality does not occur, and to provide opportunities for the public to be involved in the conservation of New Zealand sea lions (DOC & MPI 2017).

A minimum of 26 sea lion pups were born on the Otago coast in 2022/23, slightly lower than the 29 pups counted in 2021/22 (Manno 2022). Pup sex was skewed in favour of males (16:9), and one pup was of unknown sex. In the 2022/23 season, at least twenty-one pups were born at Otago Peninsula, with two of these pups dying from injuries consistent with subadult male sea lions. An additional pup was born at Bull Creek, south of Taieri Mouth. At least four pups were born in the Catlins, however all four pups were found dead between January and March 2023.

This report outlines advocacy, monitoring, and responses for the season, and considers next steps for the South Island New Zealand sea lion population.

1.1 Pre-season planning

As the New Zealand sea lion breeding distribution ranges from the Catlins to north of Dunedin, Departmental of Conservation (DOC) Operations staff engaged with a range of community groups and councils to strategically plan capacity and response during the breeding season.

1.1.1 Otago Peninsula and Dunedin

Pre-season discussions were held with the Dunedin City Council (DCC) and New Zealand Sea Lion Trust (NZSLT).

With the support of DOC and the DCC, the capacity of the Summer Ranger Programme was increased to advocate for the needs of wildlife using Dunedin's beaches across a six-month period from October 2022 to March 2023.

DCC's Animal Control worked alongside DOC to influence positive dog owner behaviour in line with DCC bylaw changes. New signage was placed at Smaills Beach clearly demarcating the areas of the beach where dogs were required to be on leads and open areas where dogs could be let off leads if no wildlife were present, with this requirement being in place from December 2022 to March 2023.

Fish & Game were contacted prior to the season opening to discuss the best ways to remind duck hunters of the presence of sea lions in Otago Peninsula inlets during May and June.

This year the Department met with Surf Lifesaving New Zealand to discuss messaging about sea lions spurred by an increasing incidence of sea lions between the flags at Dunedin beaches. SLSNZ were seeking advice on how to respond to these situations and the potential risks. A presentation about sea lions was given at an induction training session for the paid Dunedin summer lifeguards in 2022. This is an important relationship and training opportunity, as lifeguards on patrol beaches provide a first line of education at popular swimming beaches.

DOC and the NZSLT met with key coastal community stakeholders at Warrington, Long Beach, Aramoana, and Tomahawk. The purpose was to engage community support for contingency planning, education, signage, and awareness, managing site-specific conflicts where human-sea lion interactions were anticipated, and ensuring geographical coverage of the coastal Otago area to locate females and pups.

Participants provided feedback that helped develop actions for the season, including targeted sea lion advocacy opportunities for summer rangers, and ensuring DOC and NZSLT presence at key sites over the summer statutory holidays. In addition, 'Wildlife Alert' signs were distributed, and contingency plans were created for the busy summer holiday period.

1.1.2 Catlins

Engagement opportunities with the Clutha District Council were limited to development of new sea lion specific signage at Kaka Point. This signage is yet to be installed.

DOC Operations staff liaised with the NZSLT throughout the season, with NZSLT assisting with pup searches in February 2023.

2 Methods

2.1 Adult female inventory

NZSLT volunteers and DOC staff searched beaches to understand adult female habitat choices, which are influenced by female sea lions avoiding male attention prior to the breeding season. Females were identified according to their flipper tags, subcutaneous microchips, and distinctive scars or marks on their pelage. This pre-breeding inventory of female sea lions provides certainty around the accuracy of subsequent pup counts, by allowing the pups found to be associated with the known adult females in the population.

2.1.1 Otago Peninsula and Dunedin

Thirty-two adult females were confirmed to be of breeding age (4+ years) in the Otago Peninsula population for the 2022/23 breeding season, including one female of breeding age at Bull Creek (Table 1). Based on sightings of local females in the two months before Christmas, up to 26 births were predicted based on the body condition of breeding age females sighted.

2.1.2 Catlins

Six breeding age females were suspected to be pregnant in December 2022, of which four animals were identifiable by flipper tags (Table 1), from of a total of eleven known individuals of reproductive age. Activity was centred around the mouth of Catlins River, with regular sightings at Surat Bay and Pounawea.

2.2 Pupping and tagging

Pupping was determined by searching for and locating pups with mothers of known identity. Females found without pups were assumed to have skipped breeding, and observations of their association with their previous season's pup were kept.

The pedigree of dead untagged pups was determined by assessing behavioural responses to dead pups, if females were found in a grief state.

Tagging of pups followed the methods described in the New Zealand sea lion and fur seal pup tagging and sampling SOP (DOC-5993453) to double-flipper tag and microchip all pups using pink Dalton SuperFlexi® 45mm coffin tags (Dalton Tags, Newark-On-Trent, United Kingdom) and Trovan® ID-162C FDX-B 11.5mm microchips (Trovan Limited, United Kingdom). The Trovan ID-162C microchips were used (introduced to replace Trovan Unique-ID FDX-A microchips in January 2021), with these microchips being readable by both Trovan LID-575 and Gallagher HR4 and HR5 handheld scanners (Gallagher Group Ltd., Hamilton, New Zealand), but not by the old Trovan GR-250 scanners. On occasion, compatible Allflex RS420 microchip readers were used to scan these new tags (Allflex New Zealand, Palmerston North).

3 Results

A total of 26 pups were located on the Otago-Southland coast, from a total of 32 females expected to breed (81.3%); 28 females were thought to be pregnant in December 2022, with a further four experienced females being sighted infrequently that were expected to produce a pup but did not. In addition, two 4-year-old females were not thought to be pregnant and did not pup. Pup sexes were confirmed as 16 males, 9 females, and one pup of unknown sex. Numbers of pups were similar to the previous breeding season (Figure 1).

Tagging effort resulted in 17 pups being tagged, all from Otago Peninsula, with an additional pup being tagged at Bull Creek (Table 1).

Six pups (3 male, 3 female) were found dead before they reached three months old (23.1%), with all pup deaths being attributed to subadult male sea lions.

3.1 Otago Peninsula and Dunedin

A total of 22 pups were confirmed to be born on the Otago Peninsula and at Bull Creek, of which 18 were flipper tagged and microchipped for future identification. Confirmed birth sites previously used included Warrington, Long Beach, Victory Beach, Papanui Inlet, Boulder Beach, Smaills Beach, Tomahawk Beach, and Lawyers Head.

Pedigree information has been determined for 18 of these pups, with 13 females that have previously bred on the Otago Peninsula and South Otago coast having pups this season, and a further five females having their first pup. The age range of first-time breeders was 4 – 7 years (mean ± SD = 5 ± 1.2 years).

In total, 26 females were expected to produce a pup on the Otago coast. However, at least four females that have bred previously and that were expected to breed skipped breeding this season and instead continued to look after yearlings. Two four-year-olds were not thought to be pregnant and have been confirmed as having not pupped. A further four females of breeding age were sighted infrequently throughout the season, thus their breeding status in the current season remains unclear.

Two female pups were suspected to have been killed by subadult male sea lions at Hoopers Inlet and at Sandfly Bay before they could be tagged. Both pups were sent to Massey University Wildbase Pathology for confirmation by post-mortem. An additional two pups have not been resighted after they moved from their birthing sites, thus their survival to three months of age cannot be determined.

3.2 Catlins

A total of four pups were confirmed to be born on the Catlins coast, two on the Pounawea salt marsh, and one at Surat Bay, with a second pup found at Surat Bay at approximately six weeks old but with an unknown birth site. All four pups were associated with known breeding females, with two females changing their usual birthing locations. A further two females were suspected to be pregnant, however birth sites and pups were not found for these individuals during the field time allocated to local DOC rangers. A seventh female who was not thought to be pregnant in December was sighted feeding a yearling pup at Waikawa Harbour in January 2023, thus suggesting that this individual did not breed in the 2022/23 season. Three other breeding age females were sighted this season but were not thought to be pregnant, and an eleventh breeding age female known to be in the Catlins population was not sighted at all during the breeding season.

All four Catlins pups were found dead before they reached three months of age (3 male, 1 female); all appear to have been killed by the same subadult male sea lion at or near to their birthing locations. Three pups were sent to Massey University Wildbase Pathology to confirm their cause of death. The fourth dead pup was decomposed when located. None of the pups were tagged prior to their death.

Table 1. Status of resident female New Zealand sea lions of breeding age (4 years +) and known pups (as at June 2023) present on the Otago-Southland coast in 2022/23 season. Transient adult females are not included.

	Adult female ID	Previous season status 2021/22	Pre-season status 2022/23	Post-breeding status 2022/23	Pup sex 2022/23	Pup survival to 3 months	Pup tagging date	Pup tagging location	Pup mass at tagging (kg)
1	Gail	pupped	pregnant	pupped	M	survived	26/02/2023	Hoopers Inlet	31.0
2	Joy	pupped	pregnant	pupped	F	survived	17/01/2023	Warrington	13.0
3	Seazar	pupped	pregnant	pupped	M	survived	18/02/2023	Papanui Inlet	26.0
4	Moana	pupped	pregnant	pupped	M	survived	8/02/2023	Boulder Beach	23.0
5	Lena	pupped	pregnant	pupped	M	unknown	24/01/2023	Long Beach	20.0
6	Brionie	pupped	pregnant	pupped	F	survived	8/02/2023	Boulder Beach	15.0
7	Gem	pupped	pregnant	pupped	F	survived	8/02/2023	Smaills Beach	17.0
8	Vega	skipped	pregnant	pupped	M	survived	27/01/2023	Smaills Beach	20.0
9	Madeline	skipped	pregnant	pupped	M	survived	8/02/2023	Boulder Beach	22.0
10	Hiriwa	pupped	pregnant	pupped	M	survived	27/01/2023	Chisholm Links	19.0
11	Janet	pupped	pregnant	pupped	M	unknown	17/01/2023	Doctors Point	21.0
12	Olive	nonbreeder	pregnant	pupped	M	survived	3/03/2023	Papanui Inlet	25
13	Hipi	pupped	pregnant	pupped	M	survived	18/02/2023	Papanui Inlet	25
14	Tasman	nonbreeder	pregnant	pupped	M	survived	3/03/2023	Papanui Inlet	26
15	Doris	nonbreeder	pregnant	pupped	F	survived	18/02/2023	Papanui Inlet	20
16	Lulu	nonbreeder	pregnant	pupped	F	survived	18/02/2023	Victory Beach	18.5
17	Ngaire	nonbreeder	pregnant	pupped	M	survived	24/01/2023	Long Beach	14
18	Zoe	pupped	pregnant	pupped	F	assumed dead	#n/a	#n/a	#n/a
19	Patti	pupped	pregnant	pupped	U	assumed dead	#n/a	#n/a	#n/a
20	Mia	pupped	pregnant	pupped	F	died	#n/a	#n/a	#n/a
21	Pippa	pupped	pregnant	pupped	F	died	#n/a	#n/a	#n/a

	Adult female ID	Previous season status 2021/22	Pre-season status 2022/23	Post-breeding status 2022/23	Pup sex 2022/23	Pup survival to 3 months	Pup tagging date	Pup tagging location	Pup mass at tagging (kg)
22	Nuki	pupped	assumed	skipped	#n/a	#n/a	#n/a	#n/a	#n/a
23	Tektite	pupped	assumed	skipped	#n/a	#n/a	#n/a	#n/a	#n/a
24	Hope	pupped	assumed	skipped	#n/a	#n/a	#n/a	#n/a	#n/a
25	Bendy	pupped	assumed	skipped	#n/a	#n/a	#n/a	#n/a	#n/a
26	Mika	pupped	unknown	unknown	#n/a	#n/a	#n/a	#n/a	#n/a
27	Kaea	pupped	unknown	unknown	#n/a	#n/a	#n/a	#n/a	#n/a
28	Huru	pupped	unknown	unknown	#n/a	#n/a	#n/a	#n/a	#n/a
29	Pebble	pupped	unknown	unknown	#n/a	#n/a	#n/a	#n/a	#n/a
30	Phyllis	nonbreeder	not pregnant	skipped	#n/a	#n/a	#n/a	#n/a	#n/a
31	2XTX	nonbreeder	not pregnant	skipped	#n/a	#n/a	#n/a	#n/a	#n/a
32	Kotahi	pupped	assumed	pupped	M	survived	31/3/2023	Bull Creek	18.0
33	Kiwa	pupped	pregnant	pupped	M	died	#n/a	#n/a	#n/a
34	P448	pupped	pregnant	pupped	M	died	#n/a	#n/a	#n/a
35	P446	pupped	pregnant	unknown	#n/a	unknown	#n/a	#n/a	#n/a
36	P447	pupped	pregnant	pupped	F	died	#n/a	#n/a	#n/a
37	V158	unknown	pregnant	unknown	#n/a	unknown	#n/a	#n/a	#n/a
38	Untagged	unknown	pregnant	pupped	M	died*	#n/a	#n/a	#n/a
39	Angel	pupped	assumed	skipped	#n/a	#n/a	#n/a	#n/a	#n/a
40	Jade	pupped	not pregnant	skipped	#n/a	#n/a	#n/a	#n/a	#n/a
41	32PT	nonbreeder	nonbreeder	skipped	#n/a	#n/a	#n/a	#n/a	#n/a
42	10030	nonbreeder	nonbreeder	skipped	#n/a	#n/a	#n/a	#n/a	#n/a
43	10029	nonbreeder	unknown	unknown	#n/a	#n/a	#n/a	#n/a	#n/a

*Assumed to be the pup of untagged female, however this was not conclusively determined.

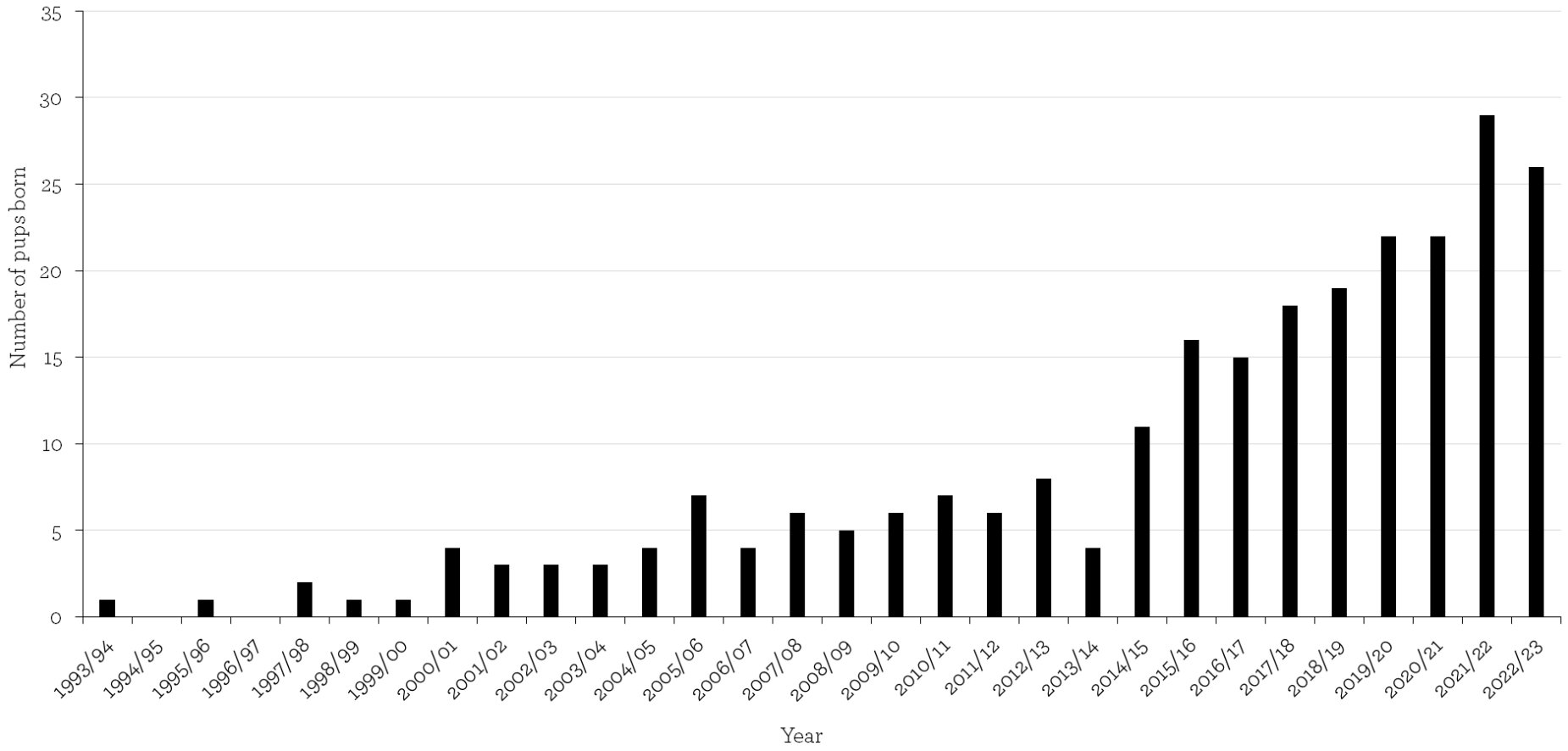

Figure 1. Minimum numbers of New Zealand sea lion pups born on the Otago-Southland coast of the South Island, 1993/94 to 2022/23.

4 Discussion

Approximately 81% of the female New Zealand sea lions of known breeding age on the Otago-Southland coast that were suspected to be pregnant in the 2022/23 season were confirmed to have pupped. Determining the identity and status of female sea lions prior to pupping is made difficult by their non-colonial behaviours, which are associated with avoiding male sea lions as the population remains at low population density. Individual identification based on tags, microchips, scars, and marks on the pelage allow for the majority of breeding females to be accounted for prior to pupping, and assists with determining search effort for locating and marking pups. However, it should be noted that due to the behavioural differences between subantarctic and mainland sea lions during pupping, pups cannot always be detected near to their birthing site in the first few weeks after their birth. Table 1 indicates the wide range of pup weights during tagging, which took place between 17 January to 31 March 2023, with the heaviest pup to be caught weighing c. 31.0kg at tagging. To this end, it is not always possible to catch, restrain, and mark large pups after February. Numbers of New Zealand sea lion pups born on Te Waipounamu carry a small degree of uncertainty, especially if dead pups are not able to be detected, and pedigree information cannot always be linked at an early stage. Six pups died before they could be marked, a further two pups have not been able to be located for marking by May 2023, and it is conceivable that several more live pups could be detected over the winter. The importance of preparing all tagging and resighting information for inclusion in the Dragonfly Science New Zealand sea lion database cannot be understated, as these data should comprise all comprehensive marking and resighting notes, while field reports are often representative of observations at a certain point in time when these data remain incomplete.

Pedigree information derived from identifying relationships between breeding age females and pups remains the primary method for determining the structure of the New Zealand population on the South Island. All of the pups found and tagged around Otago Peninsula are descendants of Mum. The majority of pups found around the Catlins coast are assumed to descend from Marea, with the exception of those born to Angel. Due to the highly philopatric behaviour of New Zealand sea lions, sightings of immigrant female sea lions on the Otago-Southland coast are rare, but will become more frequent as the Rakiura population increases in size. Two unidentifiable young adult females appeared on the Catlins coast this season, one at Fortrose and one at Hinahina Cove. Due to the dispersed population of South Island sea lions, locating pups for tagging is a labour-intensive exercise. Approximately seven days of work for up to five people were required to tag 18 pups on the Otago coast, with significant contributions by NZSLT volunteers and members of the public. Due to DOC Operations staff limitations, only six full days of fieldwork were achieved in the Catlins, and effort was put into locating pups at their birthing sites, and disappointingly, to recover the bodies of pups that were reported dead. While the current methods appear to be adequate for identifying unique individuals, dual marking all pups with double flipper tags and microchips should also be prioritised to ensure that pedigree and individual life history data can be maintained for this population as it increases in size. This might require more time resourcing over the January – March period, so that DOC staff can locate pups and coordinate experienced taggers and handlers to assist with tagging operations.

A key feature of South Island New Zealand sea lion breeding sites is that each of the sites have different anthropogenic pressures, some of which are successfully managed in association with community groups, with additional staffing, and with the assistance

of local councils where capacity allows. Roads remain a critical threat to New Zealand sea lions throughout their South Island range, and fortunately this season there has been no road-related mortality. Female sea lions and pups were known to be crossing roads at Tomahawk Beach, Smaills Beach, and at Hoopers Inlet, and young females were seen crossing The Nuggets Road. DOC staff and NZSLT have been actively raising awareness of sea lions on roads through local news stories, social media campaigns, and radio features. Effort was directed into improving dog control near sea lion birthing areas on Otago Peninsula, however, the DCC Animal Control team were under capacity this season with the loss of their team lead and several Animal Control rangers. The Pounawea salt marsh in the Catlins is a relatively new birthing site, and presents a management challenge due to the close proximity of this site to humans and dogs. 'Lead the Way' community events designed to encourage better dog owner behaviour were promoted at various events, including the Brighton Gala Day. While 'Wildlife Alert' signs and increased Summer Ranger presence were used to reduce dog owner-sea lion interactions on the Otago coastline, new signage was not able to be installed at Kaka Point in the Catlins due to reduced staffing capacity. A dog attack on a young female sea lion in the Catlins resulted in minor injuries to the sea lion, with a second dog attack on another sea lion being investigated. Breeding site fidelity appears to have been maintained for most breeding females on the Otago-Southland coast, with this behaviour assisting with safeguarding and planning site-specific advocacy and mitigation measures for future breeding seasons.

The Coastal Otago DOC Operations Team continues to work with many coastal communities and motivated locals who provide sightings, raise concerns, and advocate for sea lions. Coastal searches and site visits, undertaken predominantly by NZSLT volunteers, provided regular updates about the location of females and their pups. DOC staff were then able to target sites when specific actions or information were required. Pups had moved into the inlets of the Otago Peninsula by mid-February. This year a permanent fence was installed at Hoopers Inlet to ensure the safety of pups using this creche area, with the aggregation providing the opportunity to confirm pedigree associations between females and their pups, as well as data regarding tag retention. DCC roading staff have responded promptly to assist with temporary signage, and more work is planned to better understand sea lion habitat needs and accommodate safe habitat options through liaison with councils and landowners. DOC has been working with local researchers to identify how coastal areas can be safely modified to improve habitat options and messaging for dog owners sharing space with sea lions.

The majority of sea lion deaths observed on the Otago-Southland coast this season involved pups being killed by subadult male sea lions. Post-mortem investigations indicated that the pups had been killed in a different manner on the Otago Peninsula, compared to the pups that died in the Catlins. The Otago Peninsula pups are suspected to have died during rough play with subadult sea lions. However, Wero, a subadult male sea lion, is thought to be responsible for all of this season's pup deaths in the Catlins as well as many in the previous season, as the Catlins pups that were post-mortemed had injuries that were consistent across both years. Observations in the previous season indicate that this animal's behaviour was more direct than rough play (Manno 2022). Given the threat that Wero poses to the recovery of sea lions on the South Island, DOC Operations staff and managers have worked closely with Te Rūnanga o Ngāi Tahu, NZSLT, and veterinarians to assess the situation, and are currently determining a course of action for this animal to be euthanised. In addition to the six observed pup deaths attributed to subadult male sea lions, an adult male sea lion washed ashore at Te Rere Scientific Reserve in January 2023. The animal was losing hair and bleached, suggesting that it had died at sea. Due to the remote location, post mortem of the animal was not possible. A second adult male sea lion washed ashore at Whareakeake/Murdering Beach in March 2023. The animal was observed to be thin, which may have indicated

disease, but a necropsy was not possible for logistical reasons. The animal was thus buried on site.

5 Recommendations

- Continued monitoring, tagging, and local advocacy within the current capacity of DOC in Coastal Otago and Murihiku Districts, and with the continued support of the NZSLT, will deliver similar outputs to those achieved in the last year. Up to 30 pups are expected to be born in the 2023/24 season, and as the number of pups increases, detection and tagging are required to determine when the South Island population achieves colony status.

- An opportunity to debrief on the season with local Ngāi Tahu Rūnaka should be pursued prior to next season.

- Upload all tagging and resighting data for marked sea lions into the Dragonfly Science New Zealand sea lion database for the 2022/23 season, once the data are finalised.

- A course of action for managing aberrant subadult male sea lion aggression towards Catlins pups needs to be determined and actioned to prevent further mortalities of pups in this region.

- Continue to build and maintain relationships with coastal communities and local councils to manage road safety for sea lions, as well as to reduce interactions between sea lions and dogs.

- Following discussion at the annual New Zealand sea lion forum, determine a course of action for initiating discussions with private landowners of coastal land, as well as administrators of public land, which will assist with future planning as the South Island sea lion population increases in numbers.

6 Acknowledgements

We thank Mana Whenua for their continued advocacy for this taonga species. We are indebted to the New Zealand Sea Lion Trust volunteers, and local community volunteers on the Otago-Southland coast, who work tirelessly to promote sea lions in local communities throughout Otago and the Catlins. We thank Operational staff, including Rosalind Cole, Annie Wallace, and John McCarroll, for their efforts to protect sea lions in Coastal Otago and Murihiku. In particular, the DOC/DCC Summer Rangers must be thanked for their work patrolling beaches after hours and on weekends.

7 References

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