



Campbell Island NZ sea lion programme 2017/2018

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CSP NZSL TWG May 2018



New Zealand sea lion TMP



- Nationally Critical
- Restricted Breeding
- Decline

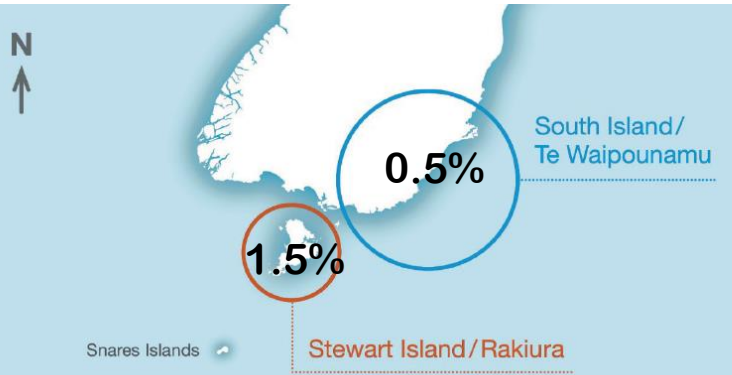
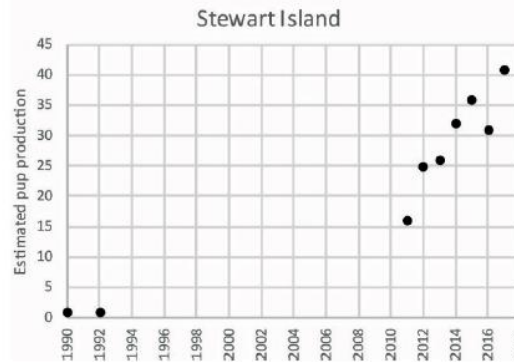
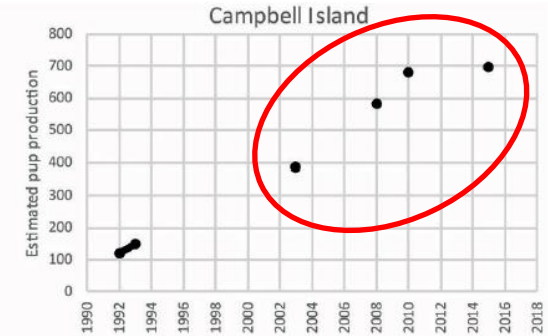


Figure 2: Annual sea lion pup count estimates from breeding sites. Note that the scale for each figure is different (adapted from Roberts and Doonan 2016, and updated with the most recent pup counts from 2016 and 2017).

New Zealand sea lion/rāpoka Threat Management Plan

Vision: Promote the recovery and ensure the long-term viability of New Zealand sea lions, with the ultimate goal of achieving 'Not Threatened' status.

Partnership: The principles of mātauranga Māori will be woven throughout all four workstreams to achieve the vision of the Threat Management Plan.

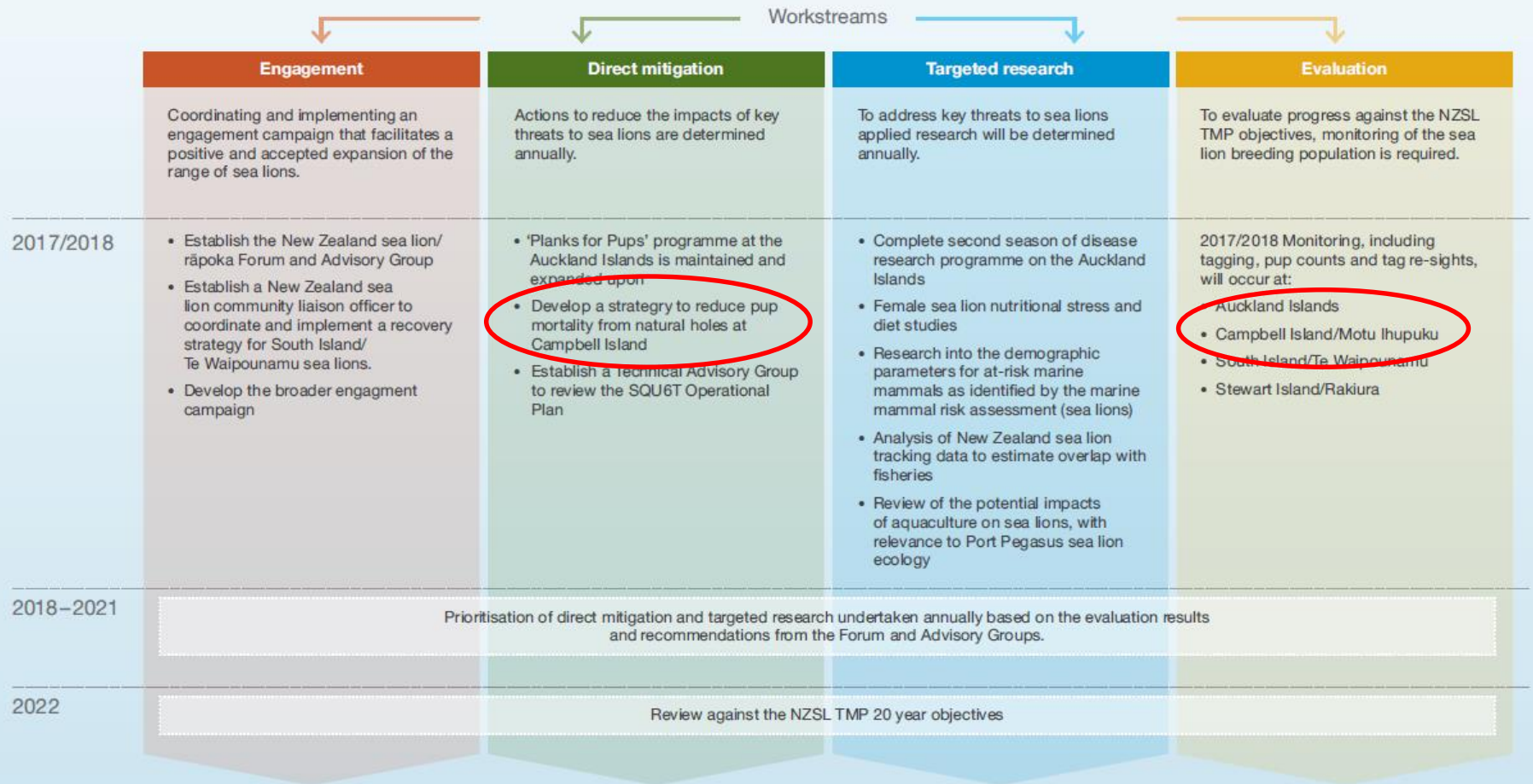


Figure 4: The four workstreams of the NZSL TMP

New Zealand sea lion/rāpoka Threat Management Plan

Vision: Promote the recovery and ensure the long-term viability of New Zealand sea lions, with the ultimate goal of achieving 'Not Threatened' status.

5 year objective: Halt the decline of the New Zealand sea lion population within 5 years.

20 year objective: Ensure the New Zealand sea lion population is stable or increasing within 20 years.

Site specific measures of success

Stewart Island/Rakiura

Support population growth to achieve breeding colony status:

- Pup counts remain higher than 35 for 5 years in a row, qualifying this site as a new breeding colony
- Pup production continues to increase to allow for colonial breeding
- There are no cases of deliberate human-caused mortality
- Public involvement in the conservation of sea lions increases.

Auckland Islands

Pup production continues to increase from the 2014 count:

- Adult female survival rate and pup survival rate improve
- Pup numbers are consistently above 1,575 (2014 pup count) and ideally over 1,965 (2017 pup count).

South Island / Te Waipounamu

Support population growth:

- Pup counts along this stretch of coastline increase to above 16 per year, eventually reaching 35, on track to achieving breeding colony status
- There are no cases of deliberate human-caused mortality
- Public involvement in the conservation of sea lions increases.

Campbell Island/Motu Ihupuku

Reduce pup mortality and support population growth:

- Pup counts are consistently at or above 696 (2015 pup count)
- Pup mortality rates are consistently lower than 40% per annum, and
- Frequency and consistency of monitoring of sea lions has increased.

Ideally Annually

Success across the New Zealand sea lion range

- Pup mortality from falling into natural holes is reduced
- Disease research yields answers to inform recommendations to reduce pup mortality from *Klebsiella pneumoniae*
- Estimation of SLED efficacy and cryptic mortality affecting adult female survival improves
- The effects of climate change and fisheries on sea lion nutritional status are better understood
- Sea lion breeding sites developing and colonies establishing at new locations
- The New Zealand sea lion threat status improves from Nationally Critical to Not Threatened.



Figure 3: What success looks like at each site and across the entire population.



Objectives

- **Continue monitoring pup numbers and mortality**
- **Improve knowledge of pup mortality**
 - Starvation
 - Holes
 - *Klebsiella*
- **Improve understanding of factors affecting pup mortality in holes**
- **Develop potential solutions to reduce pup mortality in holes**



Methods

- Team of 4 (2 DOC, 2 External – vet and tracking behaviour)
- ~6 weeks (similar to 2014/15)
- Locations of colonies and holes
- Direct counts / mark recapture, live and dead
- Pup weights / measurements
- Tagging (up to 700)
- GSP tracking (up to 40)
- Caps for camera trap behaviour (up to 100)
- Post mortems of fresh dead (up to 70)

Methods 2 - Schedule



Date	Location	Activity
13-15 Dec 2017	Invercargill	Quarantine
15 Dec 2017	Evohe	Depart Bluff
18 Dec 2017	Campbell	Arrive, unload gear, set up at Paradise
19-24 Dec 2017	Paradise	Camera traps, assess colony locations, direct counts, tag, post mortems
25-26 Dec 2017	Beeman	Transit to Davis via Beeman and set up camp
27 Dec – 17 Jan 2018	Davis	Mark recapture, Direct counts, mortality counts, post mortems, camera traps, GPS tracking, pup behaviour
18-20 Jan 2018	Beeman	Transit to Paradise via Beeman
21-27 Jan 2018	Paradise	Tag, mortality, post mortems, camera traps, GPS tracking, pup behaviour
28 Jan 2018	Evohe	Pick up gear and head to Auckland Islands
29 Jan – 2 Feb 2018	Evohe	Pup count and tagging Figure of 8
3-4 Feb 2018	Invercargill	Quarantine and return home

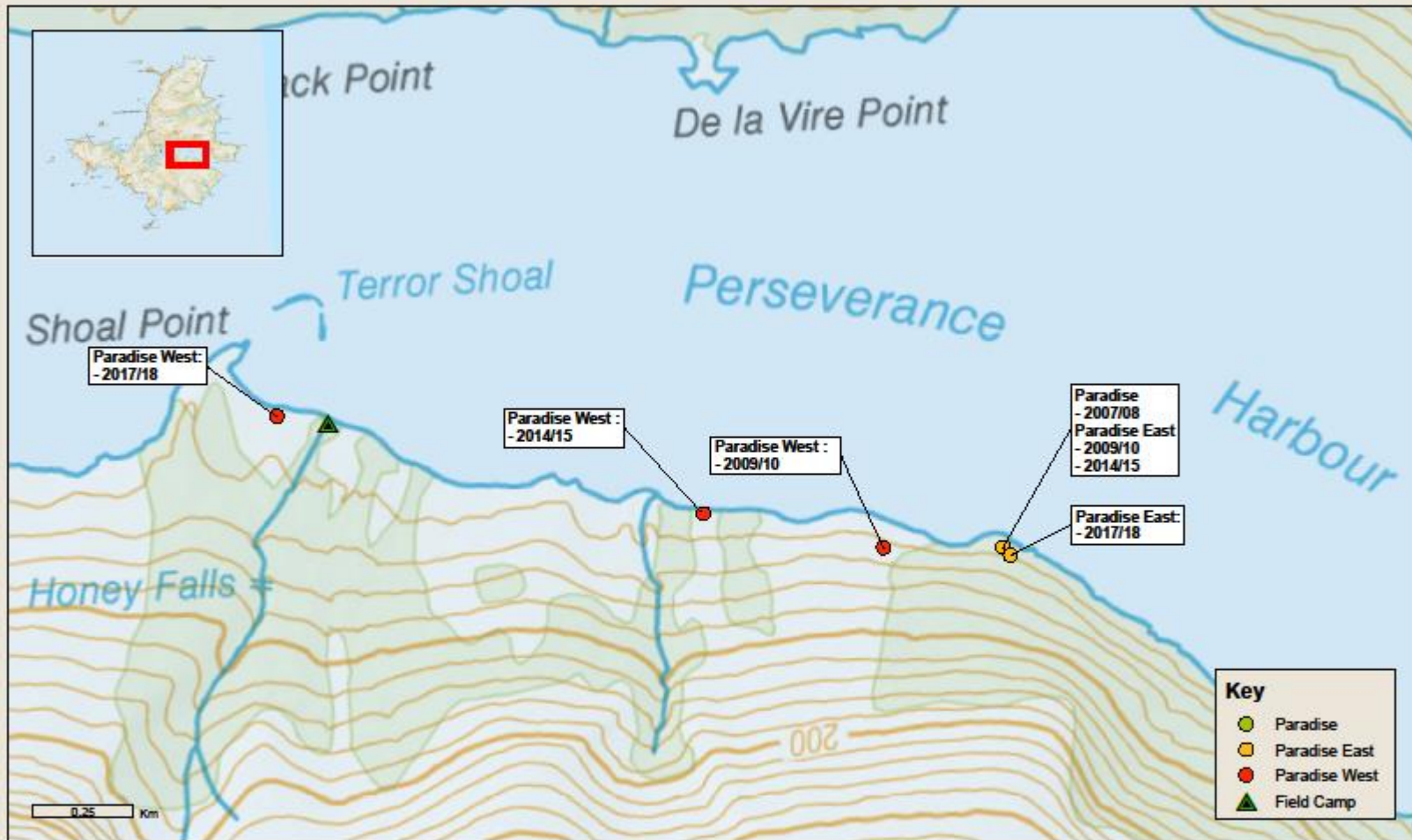


Differences from 2014/15

Year	Departure	Return	Davis Visits	Paradise Visits	Whole Island	Method
2014/15	16 Dec	29 Jan	4	3	Yes	Direct counts
2017/18	16 Dec	3 Feb	1 (3 wks)	2 (1 wk each)	No	Direct counts, and Mark- Recapture (Bog colony only)

- Slightly longer season
- More focus at Davis Point
 - To minimise time lost in transit (5hrs PP-Bm, 8hrs Bm-DP)
 - Feedback from 2014/15 PP v dangerous to access until mid Jan

Results – Colony location



NZGD 2000 New Zealand Transverse Mercator
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Locations of Paradise Point sea lion colony in Perseverance Harbour, Campbell Island over time



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Results – Pup Numbers

Location	# live pups tagged		# live pups not tagged	# tagged pups later found dead		# pups dead and not tagged	
	2017/18	2014/15	2017/18	2017/18	2014/15	2017/18	2014/15
Davis Point	387	360	3	27	166	113	155
Paradise Combined	196	116	5	2	22	26	57
Paradise East	5	55	3	0	7	2	12
Paradise West	191	61	2	2	15	24	45
Other locations	0		4	0		0	
Totals	583	481	12	29	188	139	215

Location	Total est pup production			Total dead tagged and untagged		Mortality rate		
	2017/18	2014/15	2009/10	2017/18	2014/15	2017/18	2014/15	2009/10
Davis Point	503	515	503	140	321	28%	62%	63%
Paradise Combined	227	173	168	28	79	12%	46%	NA
Paradise East	10	67	54	2	19	20%	28%	61%
Paradise West	217	106	114	26	60	12%	56%	18%
Other locations	1	8	10	0		NA	0%	NA
Totals	734	696	681	168	403	23%	58%	55%





Results – Pup Mass

Location	Date		Female					
			n		Mean mass (kg)		2017/18	
	2018	2015	2018	2015	2018	2015	Girth	Length
Davis Point	13-14/01/2018	13/01/2015	52	50	11.725 +/- 0.2	9.9 +/- 0.2	51.7 +/- 0.4	77.9 +/- 0.5
Paradise Point	20-21/01/2018	15-20/01/15	50	33	13.104 +/- 0.3	10.7 +/- 0.3	53.5 +/- 0.4	82.7 +/- 0.6

Location	Date		Male					
			n		Mean mass (kg)			
	2018	2015	2018	2015	2018	2015	Girth	Length
Davis Point	13-14/01/2018	13/01/2015	50	50	12.575 +/- 0.2	11.7 +/- 0.3	53.0 +/- 0.4	80.0 +/- 0.5
Paradise Point	20-21/01/2018	15-20/01/15	50	47	14.684 +/- 0.3	12 +/- 0.3	55.7 +/- 0.5	85.4 +/- 0.6

- Pups consistently heavier in 2018 than 2015
- Pups heavier at Paradise Point
- Difference between the colonies appears greater in 2018



Phase 2

- 9 Mar – 14 Mar 2018
- Navy Operation Endurance
- Team of 3 sea lion, 2 albatross (joint)
- Sea lion objectives:
 - **Assess the holes at sea lion colonies to inform potential solutions**
 - Create detailed aerial maps of the colonies, and trial feasibility of monitoring using drone
 - Collect general footage for Ocean Bounty documentary



Partial conclusions

- Pup production higher
- Pup mortality lower
- Paradise West = Shoal Point
- Paradise East decline (movement Shoal Point)
- Lower mortality due to warmer/drier summer?
- Or Shoal Point is a better location?
- Drones were able to fly at the sea lion colonies
- More work to come from all aspects



Proposal for next year?

- Based on the growing significance of Paradise/Shoal Point, and
- The difficulty of working at Shoal Point early
- Recommendations are for a shorter field season with 3 people at each colony for the duration
- Monitoring to see if movement continues or if new location becomes stable
- Could this work?
- Further pup behaviour?

Acknowledgements and ...



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