Campbell Island NZ sea lion programme 2017/2018
Laura J Boren
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).
2017 – 2022

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.

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**Engagement**
- Coordinating and implementing an engagement campaign that facilitates a positive and accepted expansion of the range of sea lions.

**Direct mitigation**
- Actions to reduce the impacts of key threats to sea lions are determined annually.

**Targeted research**
- To address key threats to sea lions applied research will be determined annually.

**Evaluation**
- To evaluate progress against the NZSL TMP objectives, monitoring of the sea lion breeding population is required.

### 2017/2018
- Establish the New Zealand sea lion/rāpoka Forum and Advisory Group
- Establish a New Zealand sea lion community liaison officer to coordinate and implement a recovery strategy for South Island/Ta Waipounamu sea lions.
- Develop the broader engagement campaign
- ‘Planks for Pups’ programme at the Auckland Islands is maintained and expanded upon
- Develop a strategy to reduce pup mortality from natural holes at Campbell Island
- Establish a Technical Advisory Group to review the SQUETI Operational Plan

### 2018–2021
- Complete second season of disease research programme on the Auckland Islands
- Female sea lion nutritional stress and diet studies
- Research into the demographic parameters for at-risk marine mammals as identified by the marine mammal risk assessment (sea lions)
- Analysis of New Zealand sea lion tracking data to estimate overlap with fisheries
- Review of the potential impacts of aquaculture on sea lions, with relevance to Port Pegasus sea lion ecology

### 2022
- Prioritisation of direct mitigation and targeted research undertaken annually based on the evaluation results and recommendations from the Forum and Advisory Groups.

Review against the NZSL TMP 20 year objectives.

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Figure 4: The four workstreams of the NZSL TMP
**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.

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**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.

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**Success across the New Zealand sea lion range**

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

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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

<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>13-15 Dec 2017</td>
<td>Invercargill</td>
<td>Quarantine</td>
</tr>
<tr>
<td>15 Dec 2017</td>
<td>Evohe</td>
<td>Depart Bluff</td>
</tr>
<tr>
<td>18 Dec 2017</td>
<td>Campbell</td>
<td>Arrive, unload gear, set up at Paradise</td>
</tr>
<tr>
<td>19-24 Dec 2017</td>
<td>Paradise</td>
<td>Camera traps, assess colony locations, direct counts, tag, post mortems</td>
</tr>
<tr>
<td>25-26 Dec 2017</td>
<td>Beeman</td>
<td>Transit to Davis via Beeman and set up camp</td>
</tr>
<tr>
<td>27 Dec – 17 Jan 2018</td>
<td>Davis</td>
<td>Mark recapture, Direct counts, mortality counts, post mortems, camera traps, GPS tracking, pup behaviour</td>
</tr>
<tr>
<td>18-20 Jan 2018</td>
<td>Beeman</td>
<td>Transit to Paradise via Beeman</td>
</tr>
<tr>
<td>21-27 Jan 2018</td>
<td>Paradise</td>
<td>Tag, mortality, post mortems, camera traps, GPS tracking, pup behaviour</td>
</tr>
<tr>
<td>28 Jan 2018</td>
<td>Evohe</td>
<td>Pick up gear and head to Auckland Islands</td>
</tr>
<tr>
<td>29 Jan – 2 Feb 2018</td>
<td>Evohe</td>
<td>Pup count and tagging Figure of 8</td>
</tr>
<tr>
<td>3-4 Feb 2018</td>
<td>Invercargill</td>
<td>Quarantine and return home</td>
</tr>
</tbody>
</table>
## Differences from 2014/15

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

- 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
### Results – Pup Numbers

<table>
<thead>
<tr>
<th>Location</th>
<th># live pups tagged</th>
<th># live pups not tagged</th>
<th># tagged pups later found dead</th>
<th># pups dead and not tagged</th>
</tr>
</thead>
<tbody>
<tr>
<td>Davis Point</td>
<td>387</td>
<td>360</td>
<td>3</td>
<td>27</td>
</tr>
<tr>
<td>Paradise Combined</td>
<td>196</td>
<td>116</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Paradise East</td>
<td>5</td>
<td>55</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Paradise West</td>
<td>191</td>
<td>61</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Other locations</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>583</strong></td>
<td><strong>481</strong></td>
<td><strong>12</strong></td>
<td><strong>29</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Location</th>
<th>Total est pup production</th>
<th>Total dead tagged and untagged</th>
<th>Mortality rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Davis Point</td>
<td>503</td>
<td>515</td>
<td>503</td>
</tr>
<tr>
<td>Paradise Combined</td>
<td>227</td>
<td>173</td>
<td>168</td>
</tr>
<tr>
<td>Paradise East</td>
<td>10</td>
<td>67</td>
<td>54</td>
</tr>
<tr>
<td>Paradise West</td>
<td>217</td>
<td>106</td>
<td>114</td>
</tr>
<tr>
<td>Other locations</td>
<td>1</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>734</strong></td>
<td><strong>696</strong></td>
<td><strong>681</strong></td>
</tr>
</tbody>
</table>
# Results – Pup Mass

<table>
<thead>
<tr>
<th>Location</th>
<th>Date</th>
<th>Female</th>
<th>2017/18</th>
<th></th>
<th>2015</th>
<th></th>
<th></th>
<th></th>
<th>Girth</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>n</td>
<td>Mean mass (kg)</td>
<td>2018</td>
<td>2015</td>
<td>2018</td>
<td>2015</td>
<td></td>
<td></td>
<td></td>
</tr>
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<td></td>
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</tr>
<tr>
<td>Davis Point</td>
<td>13-14/01/2018</td>
<td>52</td>
<td>11.725 +/- 0.2</td>
<td>9.9 +/- 0.2</td>
<td>51.7 +/- 0.4</td>
<td>77.9 +/- 0.5</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>13/01/2015</td>
<td>50</td>
<td>10.7 +/- 0.3</td>
<td>12 +/- 0.3</td>
<td>53.5 +/- 0.4</td>
<td>82.7 +/- 0.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paradise Point</td>
<td>20-21/01/2018</td>
<td>50</td>
<td>13.104 +/- 0.3</td>
<td>13.1 +/- 0.3</td>
<td>55.7 +/- 0.5</td>
<td>85.4 +/- 0.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>15-20/01/15</td>
<td>33</td>
<td>12.575 +/- 0.2</td>
<td>12.75 +/- 0.3</td>
<td>55.7 +/- 0.5</td>
<td>85.4 +/- 0.6</td>
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</tbody>
</table>

- 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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