NEW ZEALAND SEA LION PUP BEHAVIOUR AROUND WALLOWS ON CAMPBELL ISLAND

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Research conducted under a contract with the Department of Conservation, NZ
THE PROBLEM: PUPS STUCK IN WALLOWS/BOGS

THE GOAL: REDUCE WALLOW/BOG INDUCED MORTALITY OF NZSL PUPS
OBJECTIVES

• To assess how pups are using the colony terrain at Davis and Paradise Points in relation to wallows/bogs/tomos
• Spatially quantify risk wallows/bogs pose to pups during the breeding season at Davis and Paradise Points
METHODS: CAMERAS TRAPS

Aims
• Records no. of pups in vs. out of wallows
• Observe how pups fall into wallows

Methods
• Outdoor Swift 3C cameras with 50 deg FOV
• 5 camera traps at wallow/bog areas where pups have been found dead or trapped
• Camera traps moved/repositioned according to pup movements
• Captures a photo every 10 minutes
• Photos were downloaded after ~ 2 weeks
• Glued blue circle patches on the bumps of 100 pups for ID purposes.
METHODS: GPS TRACKING

Aims
• Track pup movements in the colony and quantify time spent near/in wallows
• Identify core areas pups visit

Methods
• Deployed 20 GPS trackers (±5 m resolution, Catlog S, Catnip Technologies) – records a position every 10 min
• Glued to neoprene, secured by zip ties, then a thin coating of glue (quick-setting epoxy) to the back of pups
• Pups were captured by hand and manually restrained
• Pups were weighed, measured (length and girth) and sexed
• Recovered trackers after ~ 12 days.
LOCATIONS OF WALLOWS/BOGS
CAMERA TRAPS: HIGH TRAFFIC BOGS

- For each photo: recorded number of pups inside and outside wallows.
- Only counted pups that can be clearly identified
- Mean no. pups inside and outside bogs seen from photos calculated by excluding photos without pups inside/outside
- Total no. pups counted inside = 1555
- Total no. pups counted outside = 9467
- Overall, there’s a 36% chance of going into a bog (only including photos with both pups in and outside the bogs)
GIANT BOG

- Ramp very effective
- Most pups able to self-rescue via ramp
- Some not able to figure out escape route – end up wandering to deeper parts of the bog/channel and risk getting stuck
- Higher chance of falling in when conditions are wet because steep sides, slippery and no vegetations/sticks
SMALL BOGS

- One of the deadliest bogs – small and deep
- Bog composition can change quickly based on weather or random events e.g. male sitting in a bog
- However, dried up bog is still deep and pups need a ramp to climb out if they go in
- Red arrows = where pups will try to climb out
- This area occupied later in the season
- High traffic area but channel is relatively safe for pups; just takes time to find the exit
GPS TRACKING ANALYSES

- 5 m buffer around the problem wallows and channels
17 pups tracked between 30 Dec 2017 and 13 Jan 2018 (15 days)

Individual track duration ranged from 1.9 to 14.8 days (9.9±3.7)

After a speed filter, there were 22,283 locations in total (1310±520)

Considerable pup movement within the colony, including within the buffer
• All pups moved a lot…
• Every one spent some time in the buffer
• Tracking area ~ 480 m²
CORE USAGE DISTRIBUTION OF 16 PUPS

Hours spent in each 1 x 1 m cell (70th percentile)
Time spent in each 1 x 1 m cell averaged over all pups (70th percentile)
USE OF THE COLONY CHANGED OVER TIME

GPS data split into:
Early: 2017-12-30 to 2018-01-06
Late: 2018-01-06 to 2018-01-13
THE PERCENTAGE TIME THAT EACH INDIVIDUAL SPENT IN THE BUFFER:

Overall and split into *Early* and *Late*

Density plots of frequency distributions

- Mean % time that an individual spent in the buffer = 11.5 ± 11.3%
- Mean % time that an individual spent in the buffer = 18.7 ± 17.0%
- Mean % time that an individual spent in the buffer = 5.3 ± 15.7%
DIFFERENCES IN BOG CHARACTERISTICS BETWEEN YEARS

- Red arrows = dead pups
- Orange arrow = reference tussock between years

- From 2017-18 direct counts:
  - ~ 8 deaths in bogs (over ~ 2 weeks)
  - ~ 29 pups rescued (vs. > 60 in 2014/15)

- 2017-18 terrain was drier than 2014-15
- 2014-15 death bog ridges have opened up (blue arrow). Not a bog any more.
OTHER GEOGRAPHIC CAUSES OF MORTALITY: CLIFFS
CONCLUSIONS

- The pups at Davis Point moved a lot – most individuals traverse the entire colony, and all got to within 5 m of a problem wallow
- The overall % time individuals spent in proximity to problem wallow was 11%
- Once near a wallow there was a 36% likelihood of a pup entering it
- Pups nonetheless had regions that they used more than others, and these core regions changed over time
- In early January pups spent only 5% of their time near problem wallows – this increased to 18% two weeks later
- **Most effective period of direct intervention?** Risk of pups entering wallows and the wallow-induced pup mortality changes in the short and long term e.g. permanent vs dynamic bogs, differences in terrain conditions between years, age of pups vs. different bog types (variable risk)

Management implications:

- All pups are at risk
- Ramps and digging trenches are effective solutions but requires maintenance
- Human intervention (rescuing pups) are also effective. Others: active infilling of wallows?
• Mud waterfall in 2014-15 (top row) is gone
• Main colony boggier in 2014-15 than 2017-18
• Bottom row 2017-18 photo was taken when the team first arrived at Davis, the area got progressively drier due to sunny weather