



# Messing with the mind: using unrewarding prey stimuli to reduce predator impacts

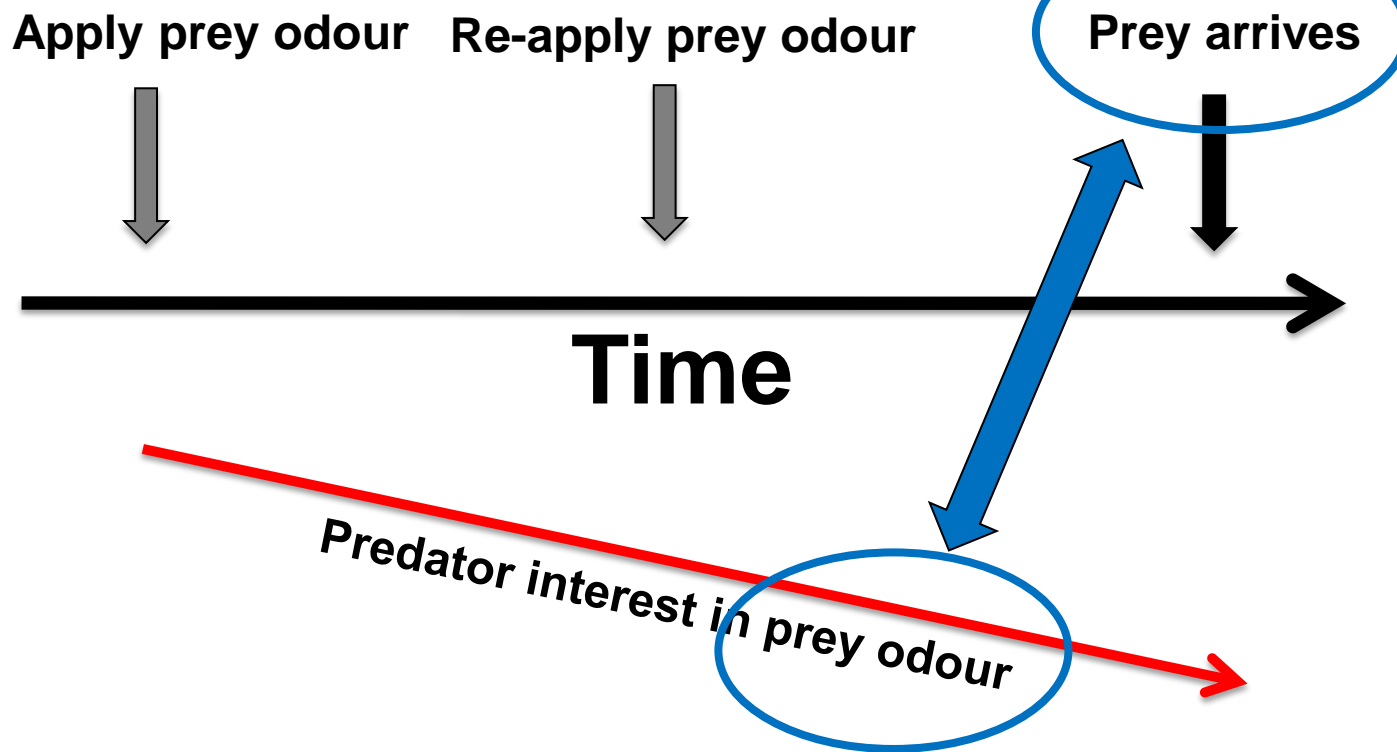
**Grant Norbury**, Catherine Price, David Latham, Samantha Brown



**LANDCARE RESEARCH**  
MANAAKI WHENUA

# The concept

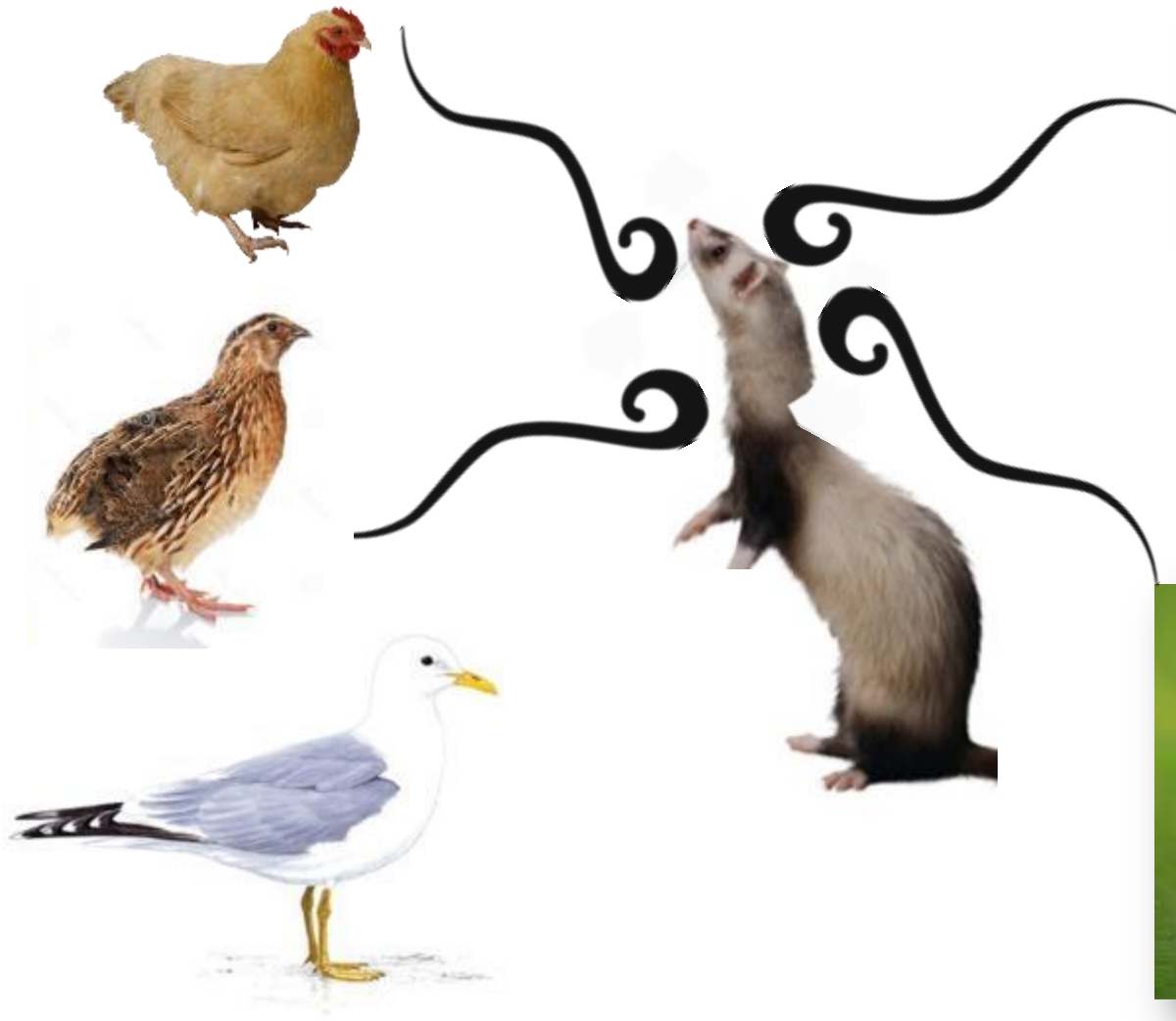
- Mammalian predators use odour cues to find prey
- Hunger forces them to ignore unrewarding cues and focus on rewarding cues
- ‘Chemical camouflage’ aims to hasten this process by repeatedly exposing predators to unrewarding prey odours (in this case, chicken, quail and gull)



Exploiting 'habituation' or '*perceptual filtering*'

Exploiting 'generalisation'

# Generalisation



# When & where might this be useful?

- Prey that are visually cryptic
- During vulnerable periods, e.g. breeding or translocation
- Predators that rely mostly on alternative prey
- Predators that are native and protected
- Small areas prone to rapid predator re-invasion
- Where trapping or poisoning is not possible



# Exploiting olfactory learning in alien rats to protect birds' eggs

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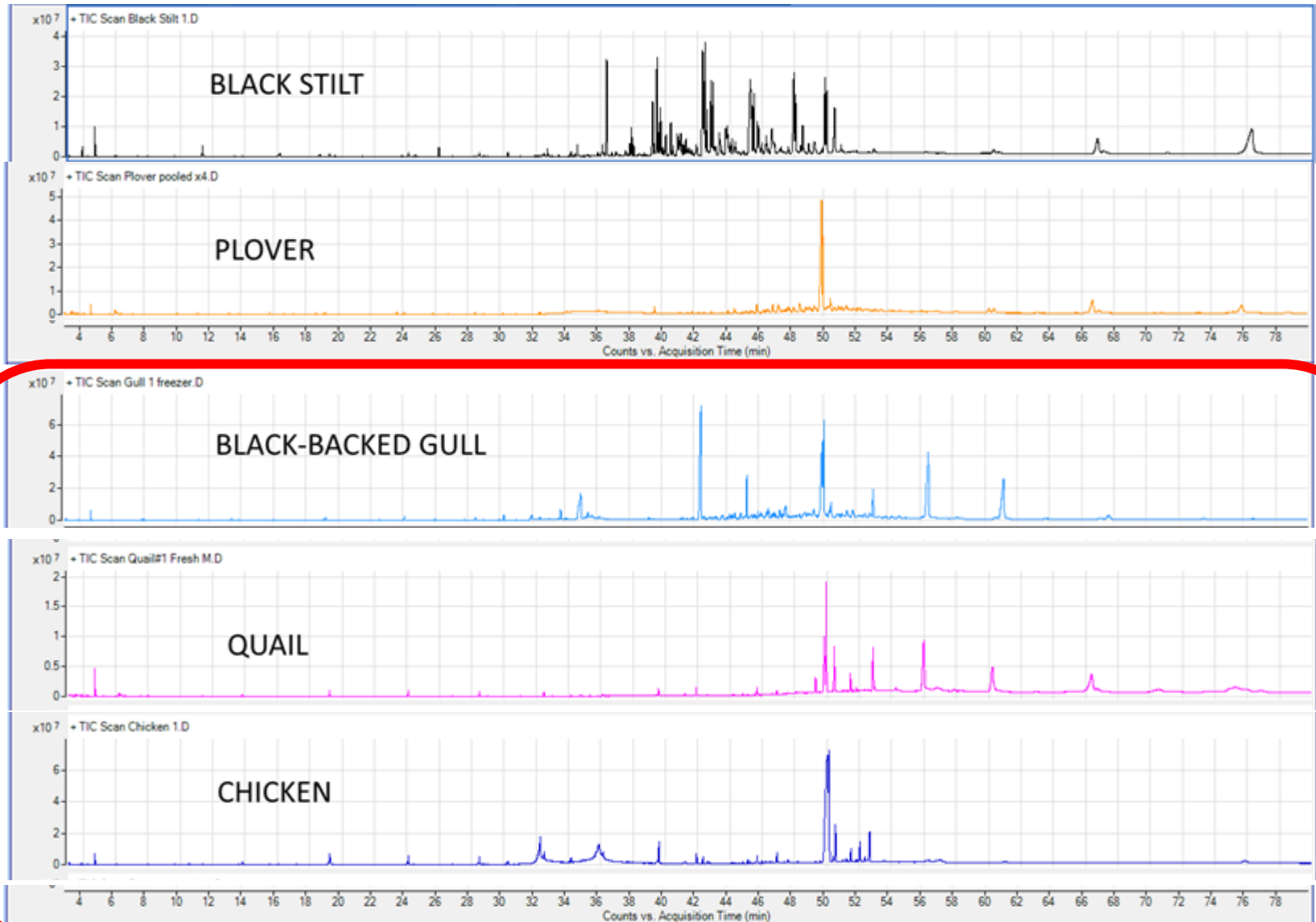
Edited by Stan Boutin, University of Alberta, Edmonton, AB, Canada, and accepted by the Editorial Board September 14, 2012 (received for review July 5, 2012)

**Predators must ignore unhelpful background “noise” within information-rich environments and focus on useful cues of prey activity to forage efficiently. Learning to disregard unrewarding cues should happen quickly, weakening future interest in the cue. Prey odor, which is rapidly investigated by predators, may be particularly appropriate for testing whether consistently unrewarded cues are ignored, and whether such behavior can be exploited to benefit prey.**

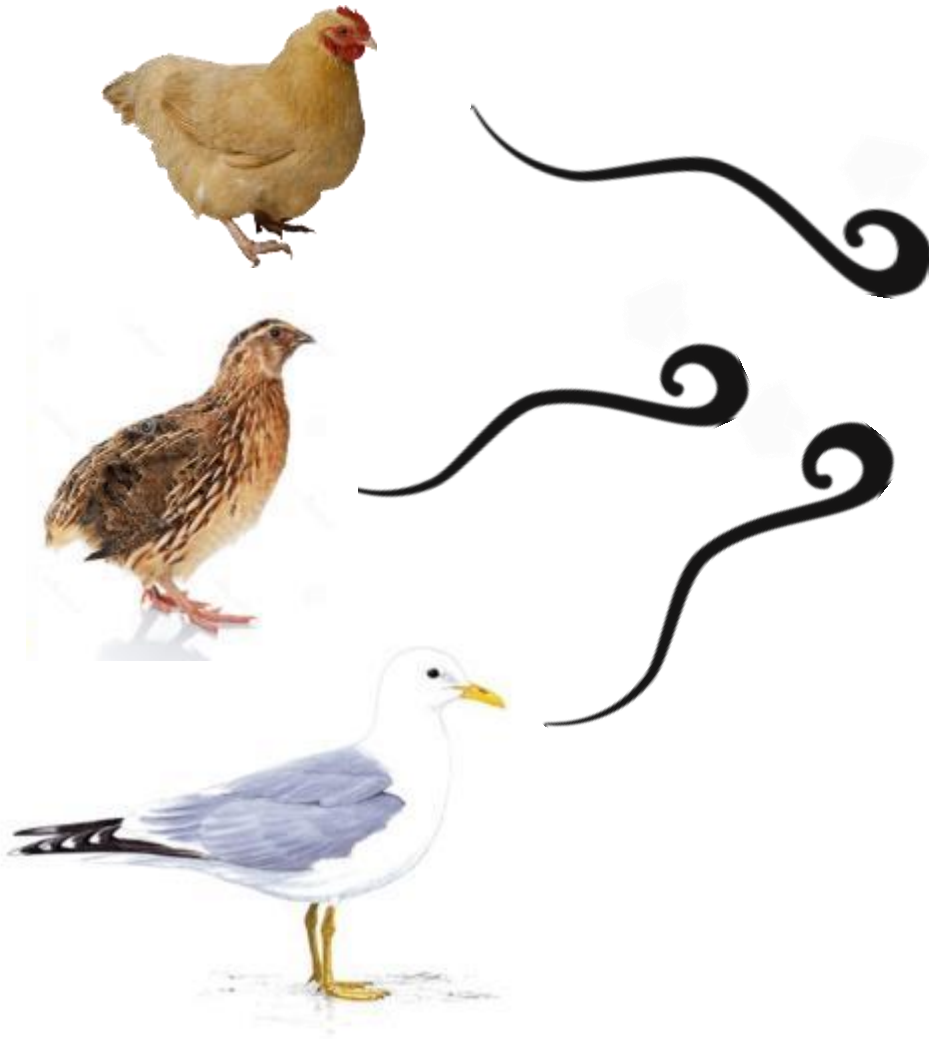
we predict that repeated failed foraging attempts “push” the cues into the background of a predator’s sensory realm so misleading or irrelevant information can be ignored in the future, a process that efficient predators must use constantly. Although actual sensory perception of the cue may not be affected, decreasing cue salience and responsiveness in this context is a short-term behavioral adaptation likely to arise out of a combination of associative



# Chemical profiles of 'primer' odours



# Standard odour discrimination test

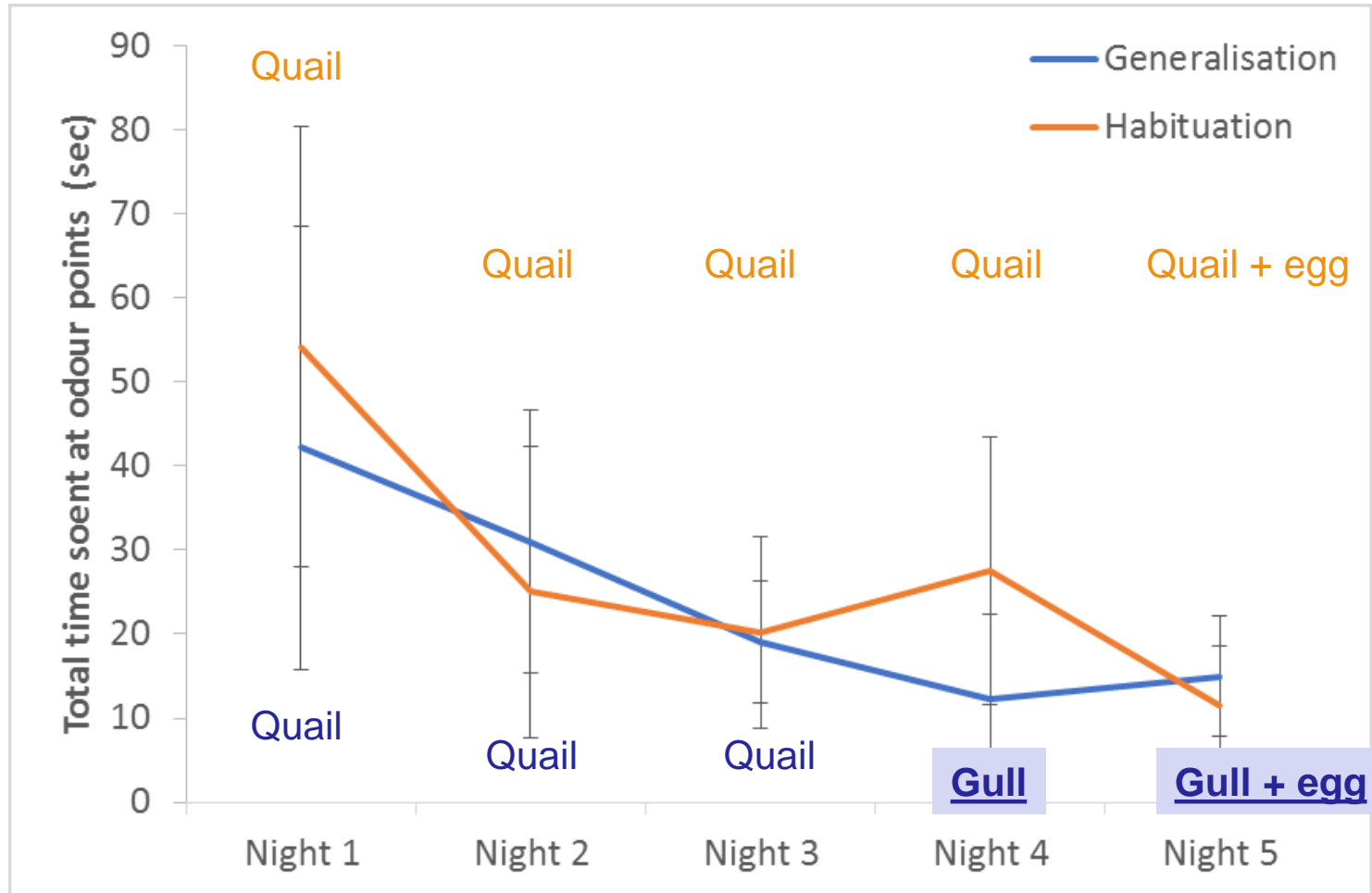




# Ferret and hedgehog trials

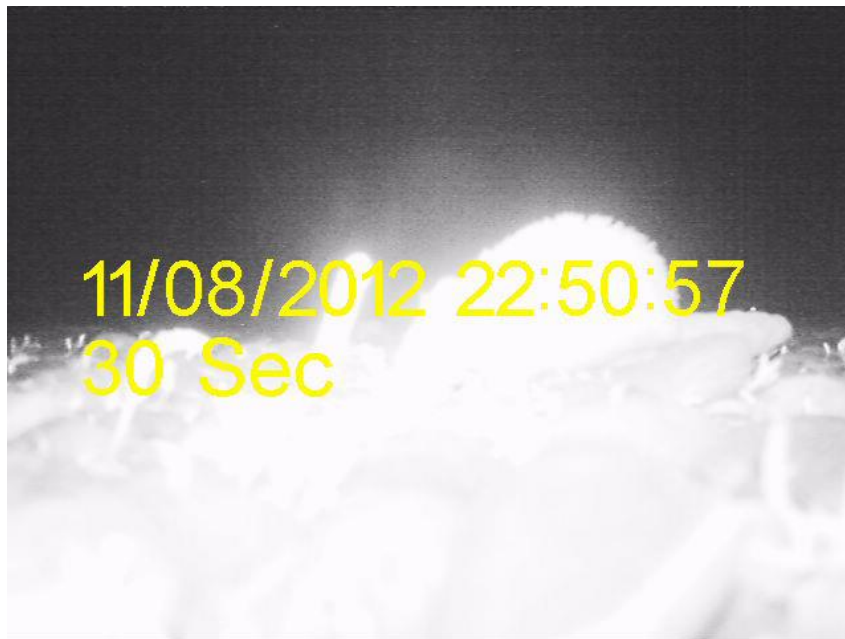


# Ferret trials



# Field trial

42 – 49 % of nests depredated  
*Sanders & Maloney (2002)*  
*Norbury & Heyward (2008)*











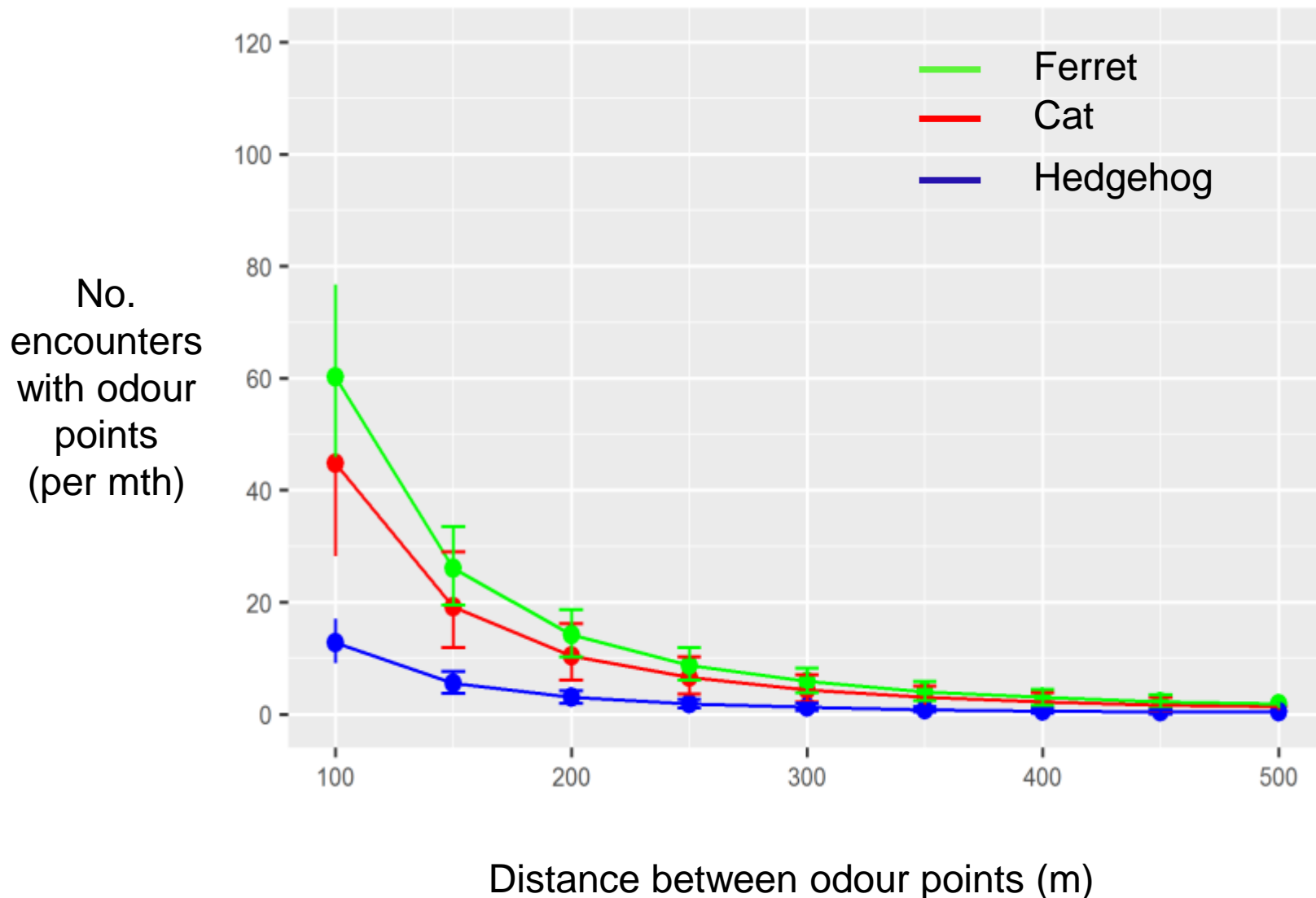


# Predator abundance

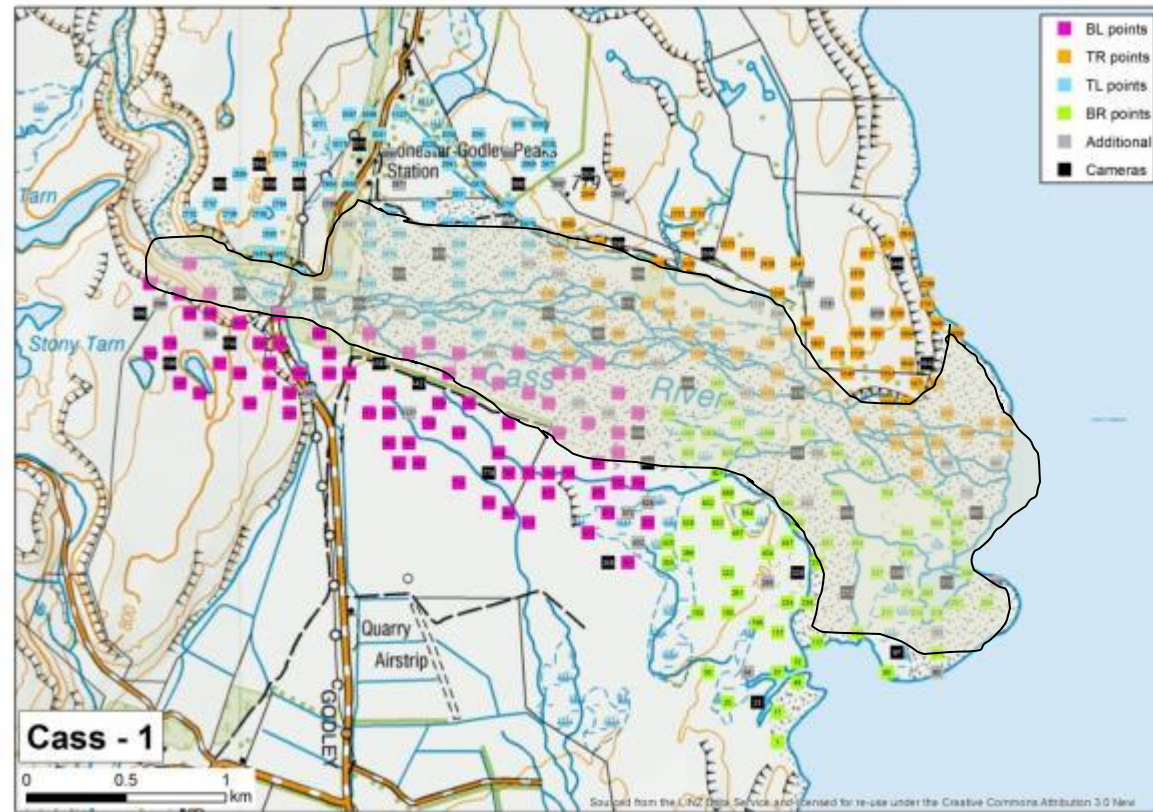
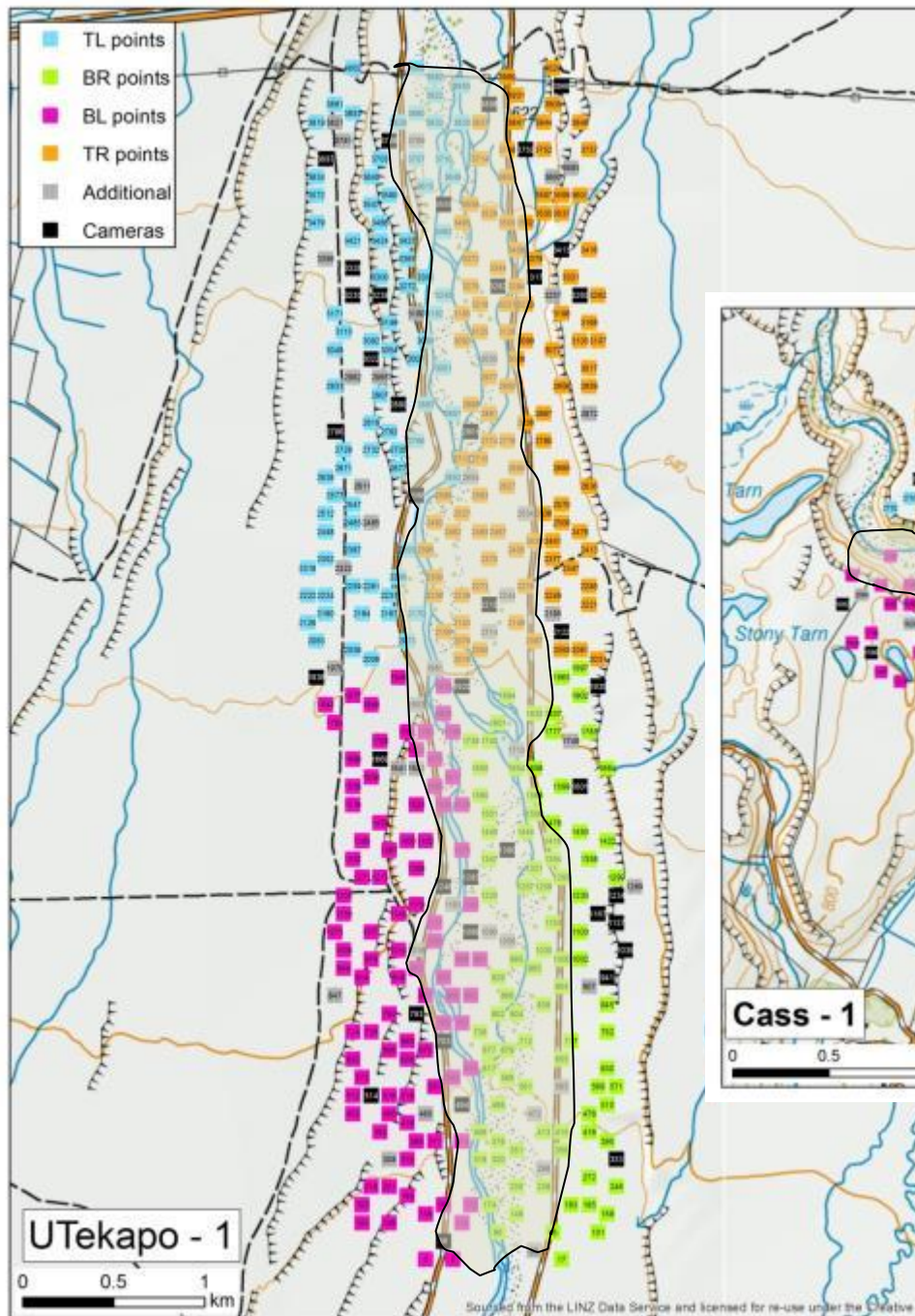




# Modelling encounters with odours



# Odour points





# Interactions with odour points

**Camera**

**Odour smear  
on rock**



# Were predators attracted to odour?

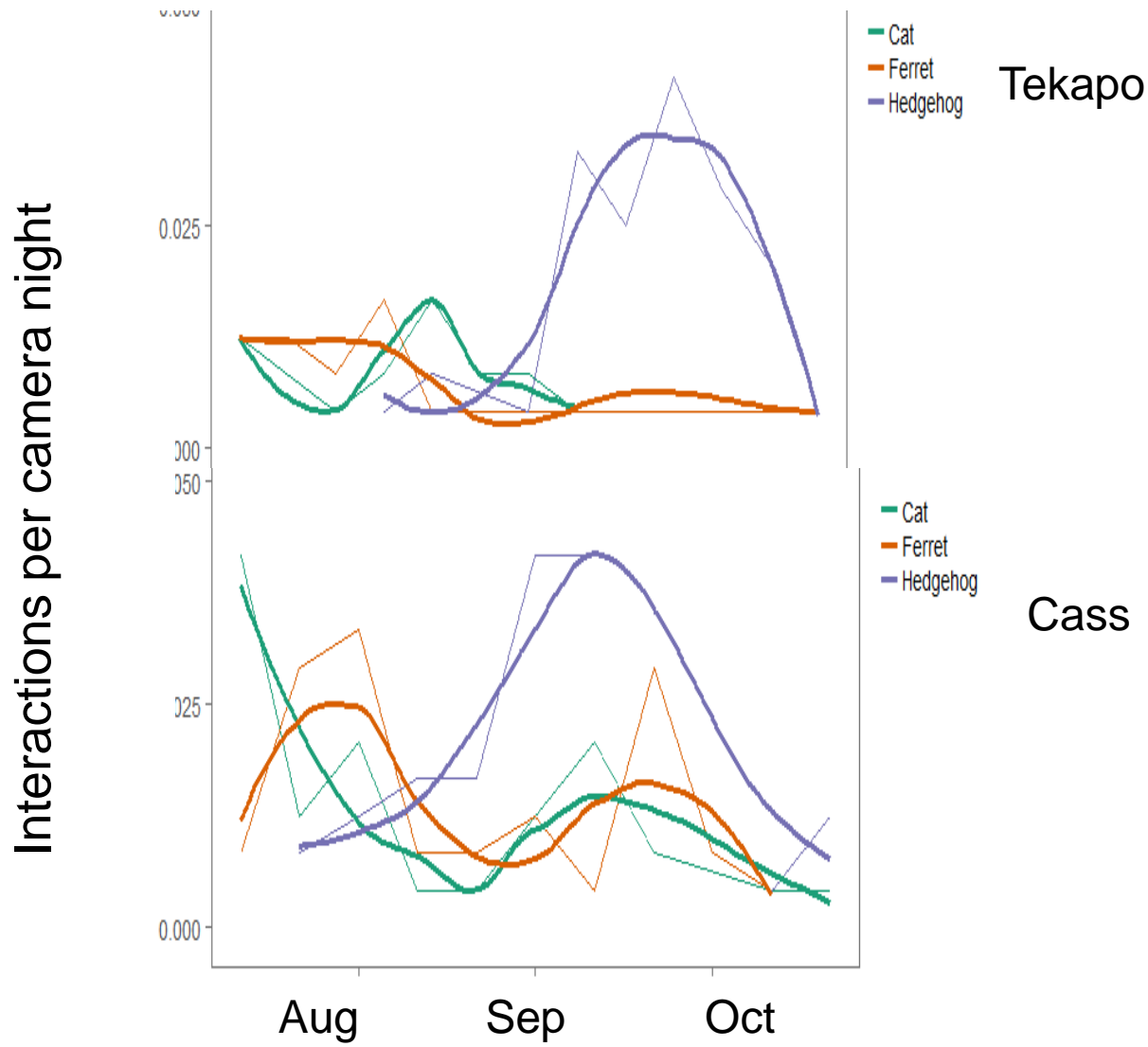
Interaction rate without odour:

0.8 predators per 100 camera nights

Interaction rate with odour:

3.9 predators per 100 camera nights

# Habituation to bird odour?









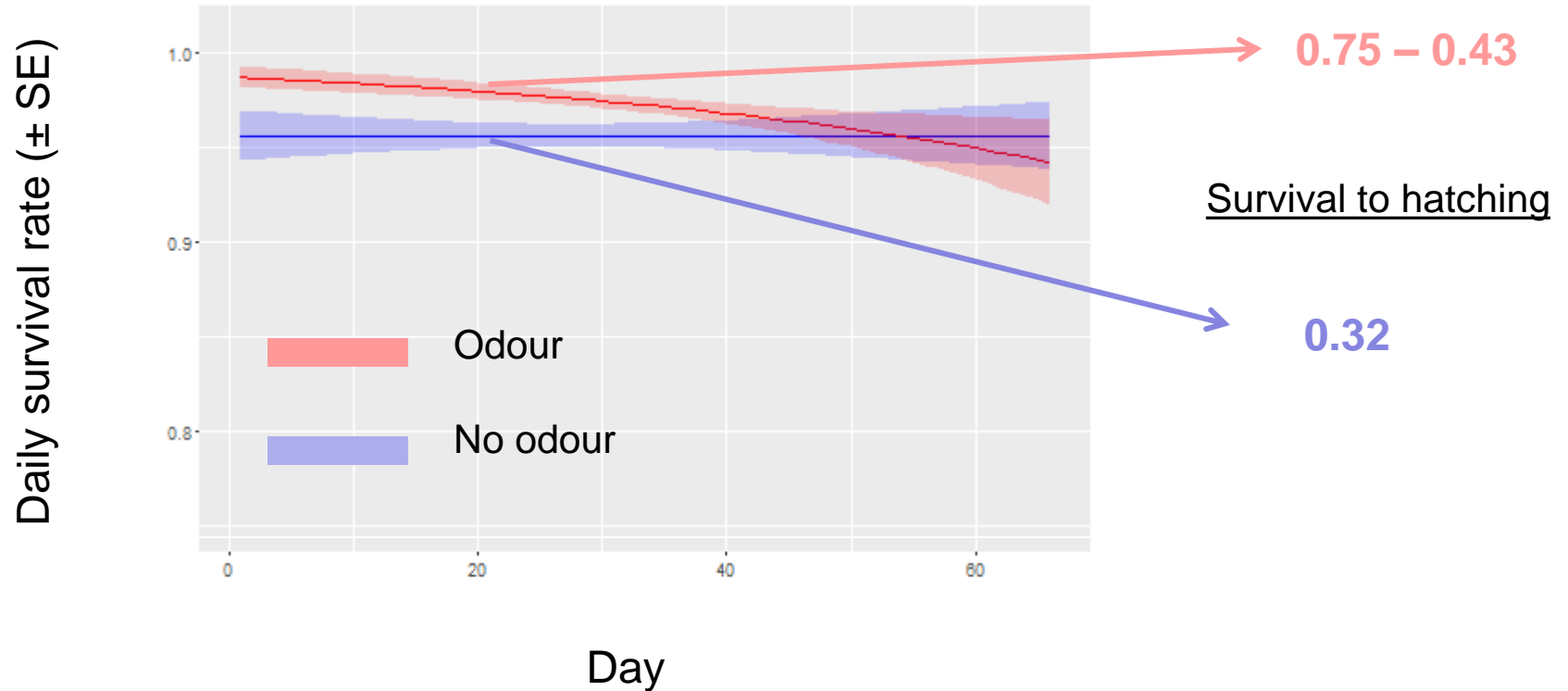
# Predation

Overall, 46% of 223 nests depredated

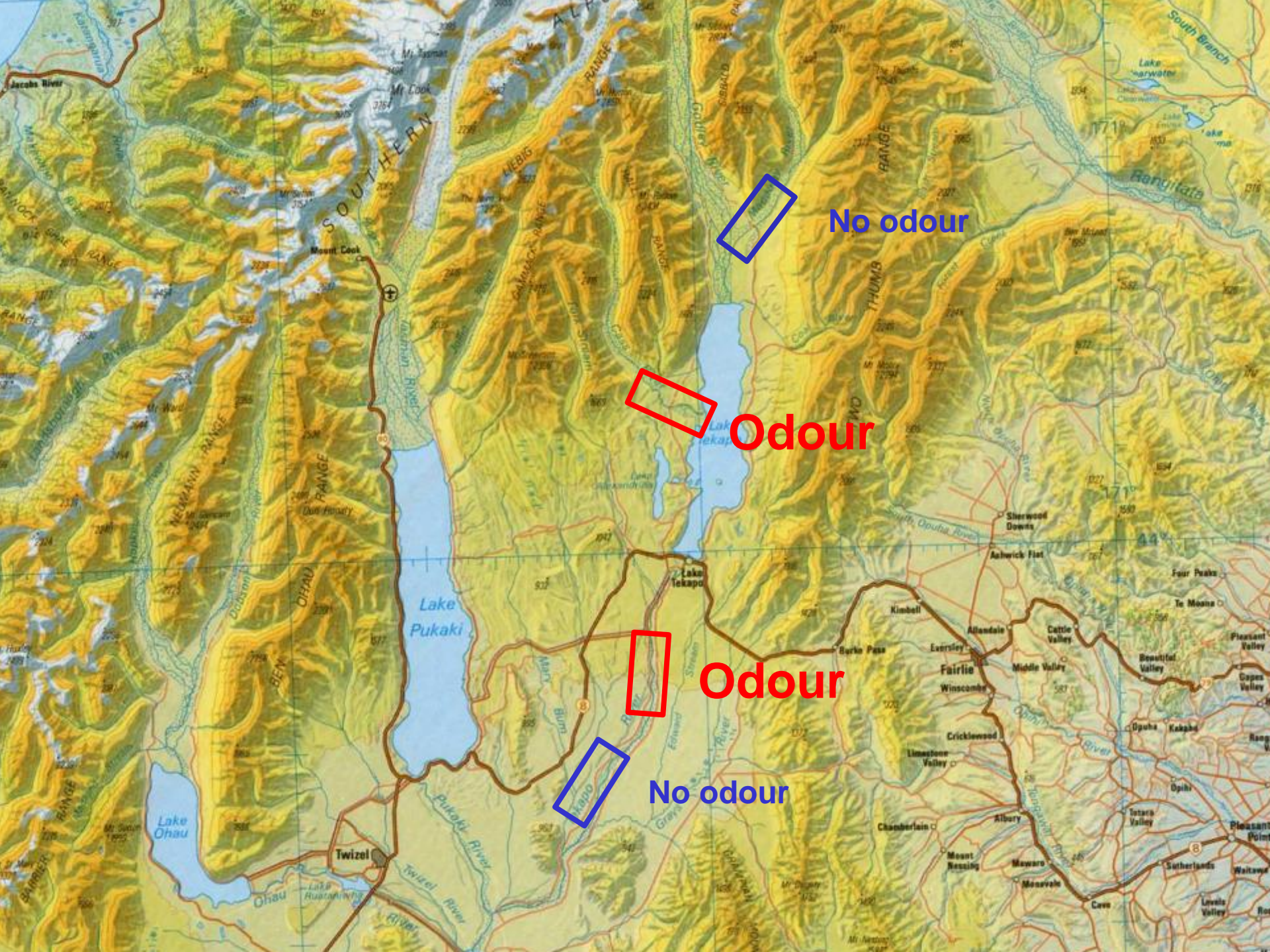


Hedgehog	Ferret	Cat	Rat	
46	20	2	2	No. identifiable predations
0.66	0.29	0.03	0.03	%

# Nest survival rates

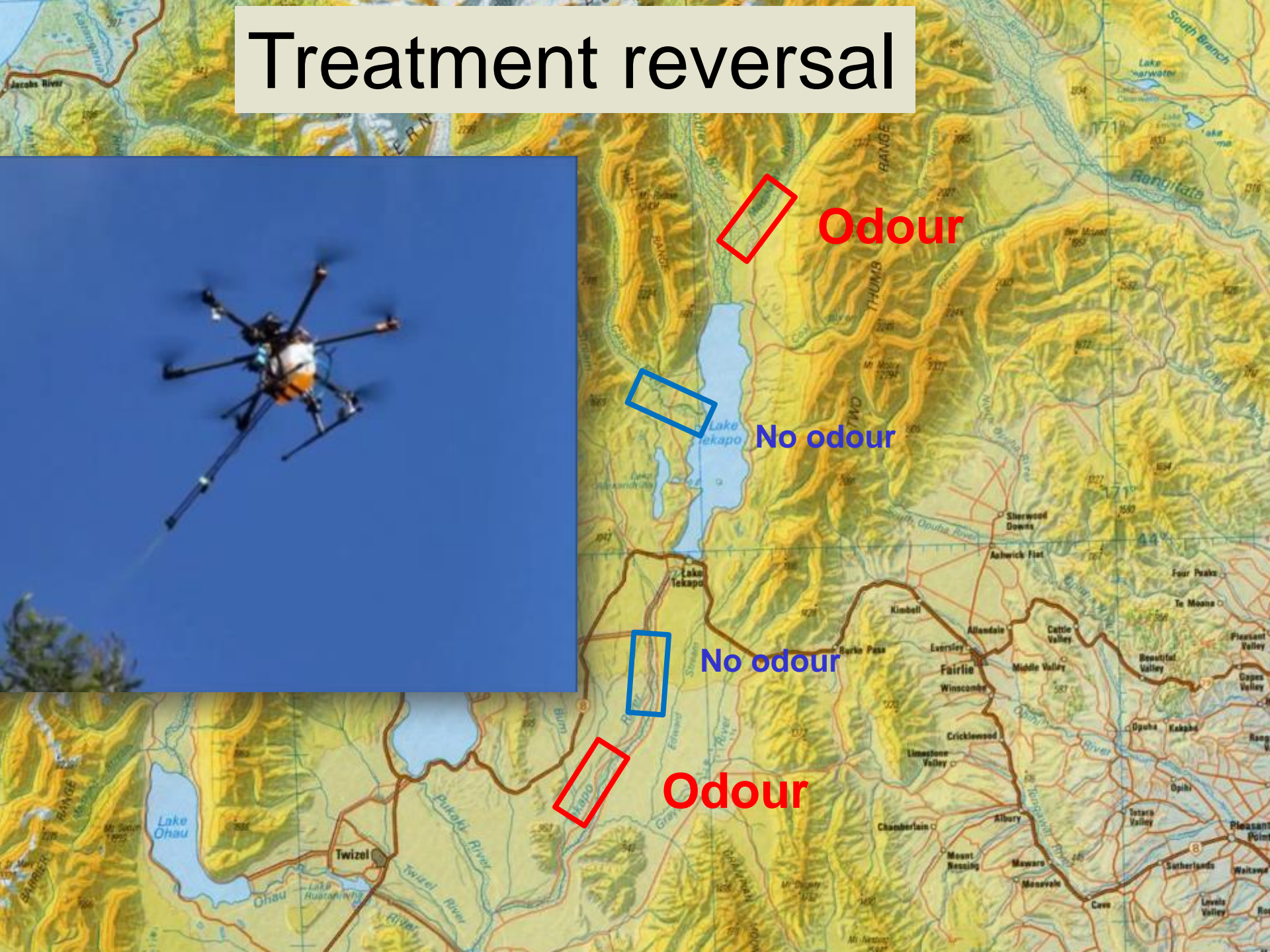








# Treatment reversal





# Thanks to:

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