Manaaki Whenua
Landcare Research

Achilles heel: Animal behaviour in pest management

Patrick Garvey

Talk outline

Why consider animal behaviour in pest management?

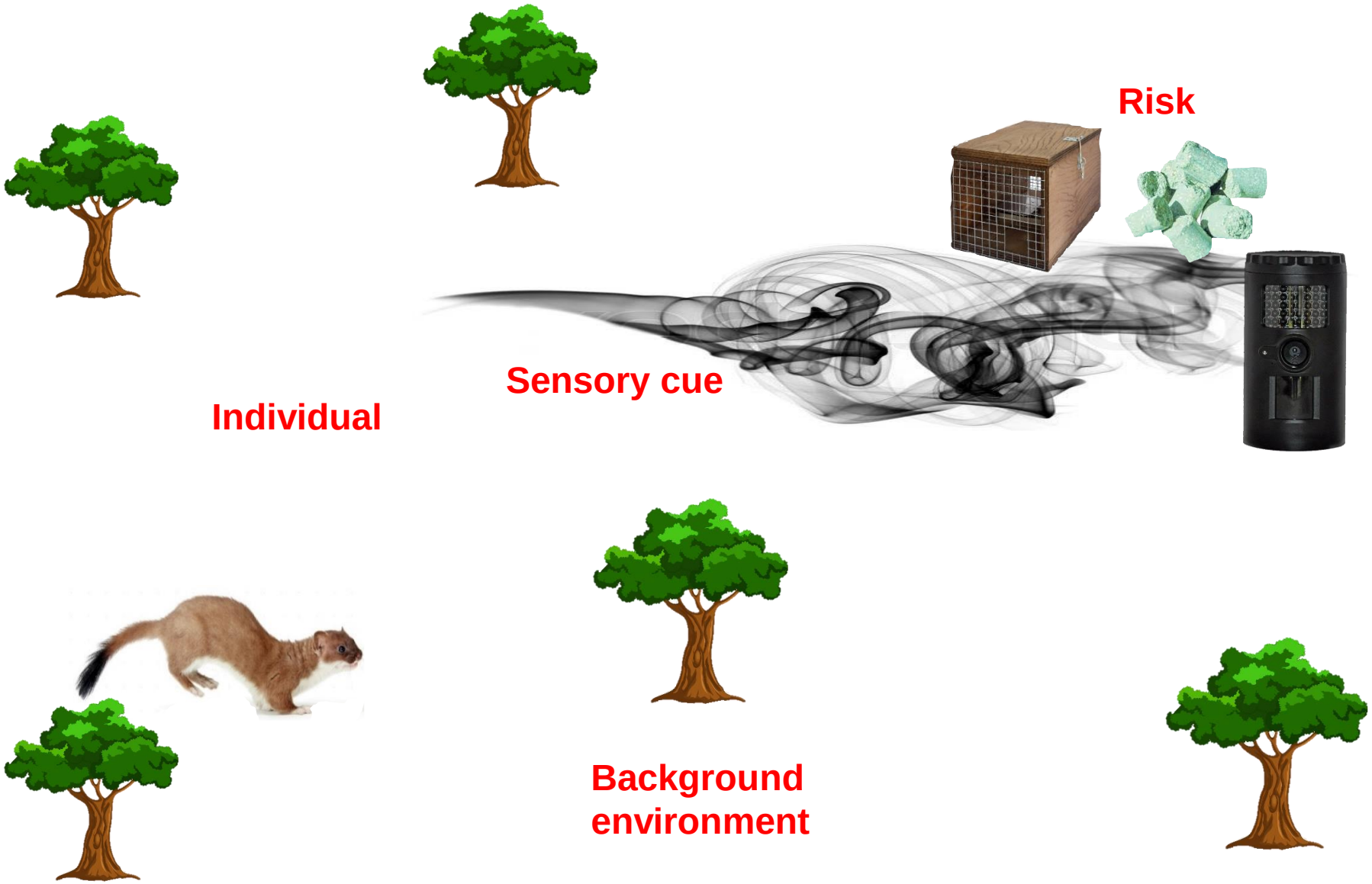
Animal behaviour & NZ pest management

1. Species interactions and risk
2. Sensory ecology
3. Individual variability e.g. personality

Eradication science

Behaviour-based management

Why consider animal behaviour in pest management?



1. Animal behaviour – Risk

Interactions – Species and devices

- Risk allocation, fear, trophic cascades
- Drive reponses and demographics
- Outcomes of management actions

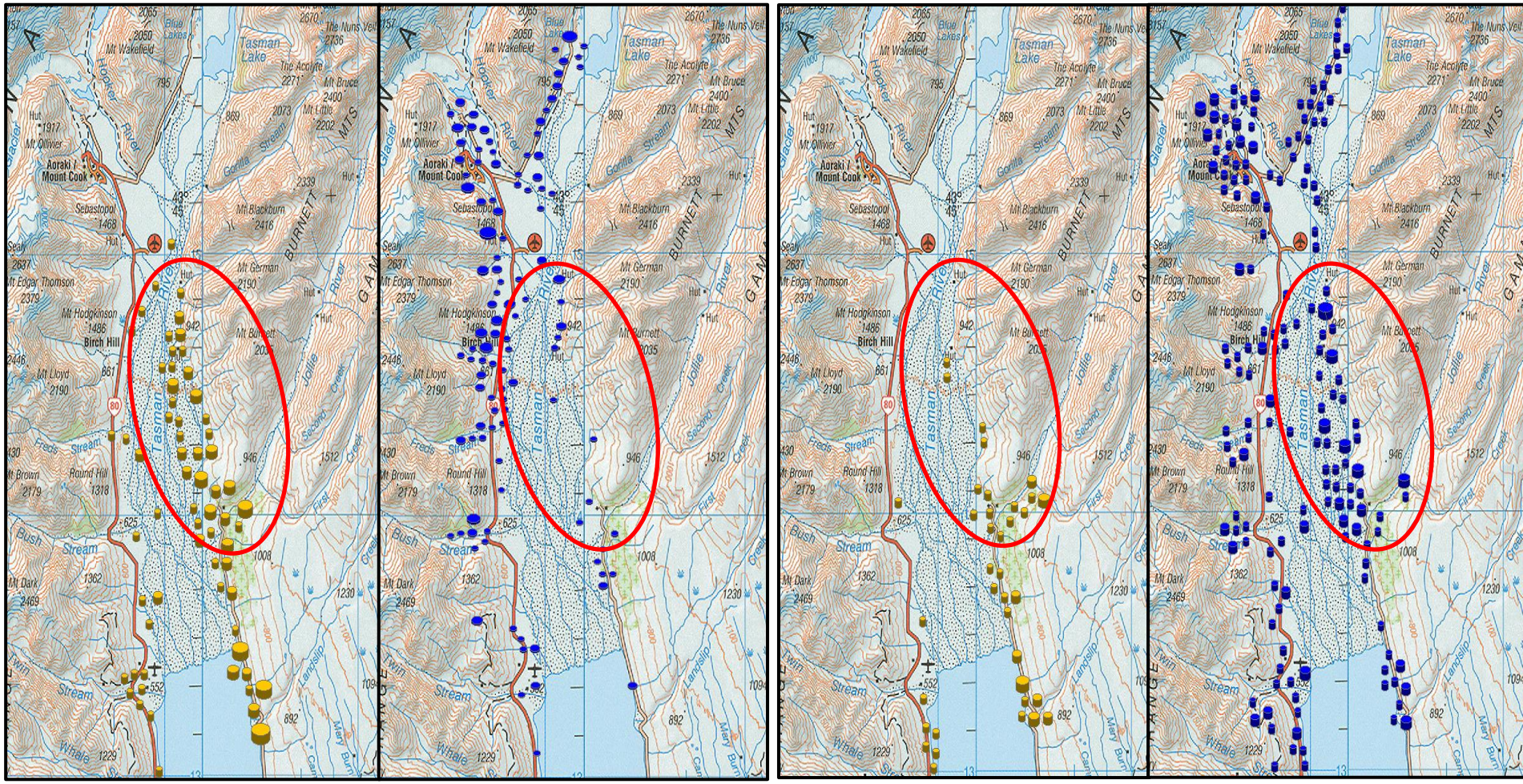
Stoats **fear and avoid** cats and ferrets

Garvey, Glen & Pech (2015) Bio. Invasions

Consequences of behavioural avoidance

Tasman Valley

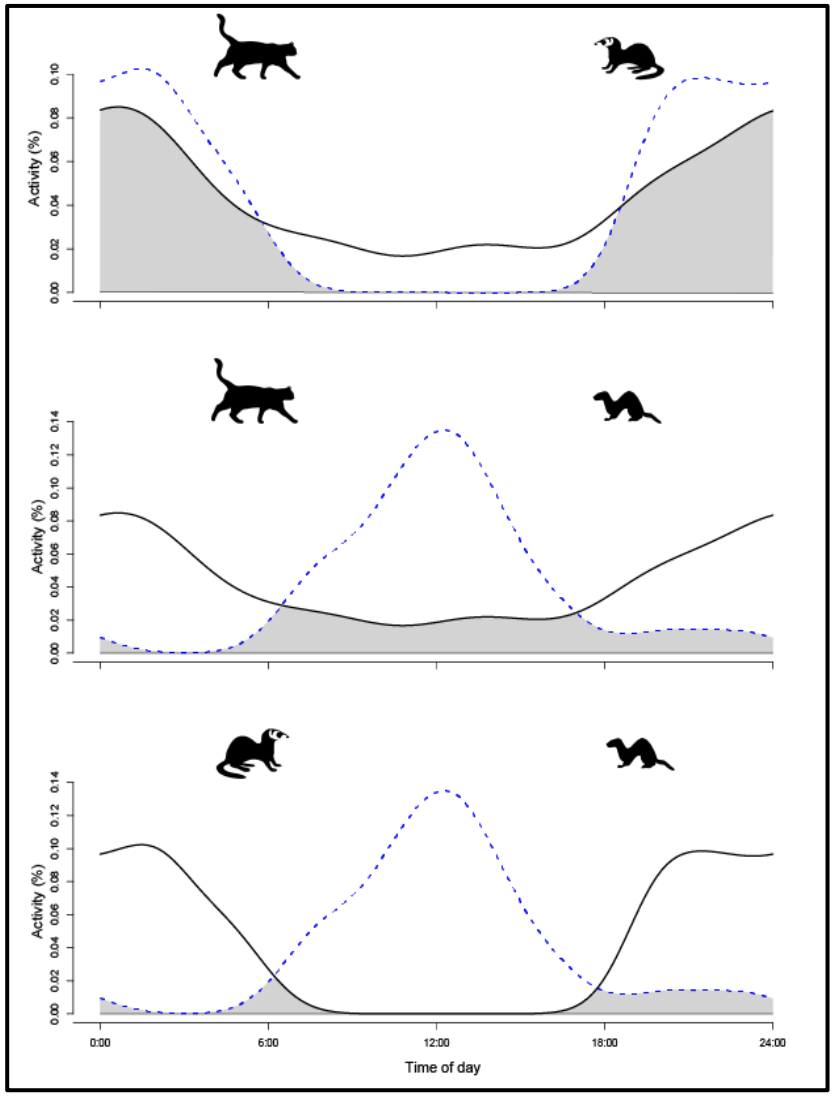
Pre-control | **Post-control**



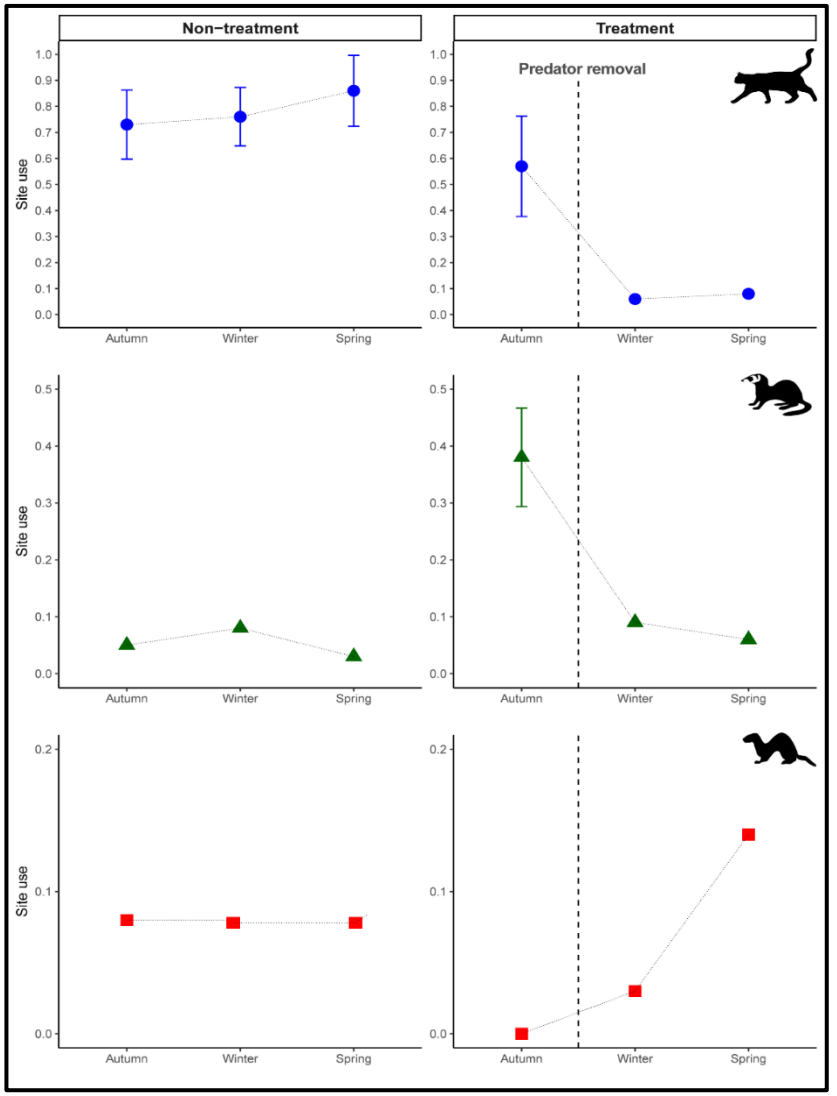
Pests on farmlands

Behavioural avoidance at landscape scale

Avoidance



Mesopredator release



Species interactions and management devices

2. Animal Behaviour – Sensory ecology

1. Sensory cues link management actions to desired outcome
2. Attract or deter pests
3. Perceptive abilities of pest
4. Value of a sensory cue – 4F motivations

Fleeing

Feeding

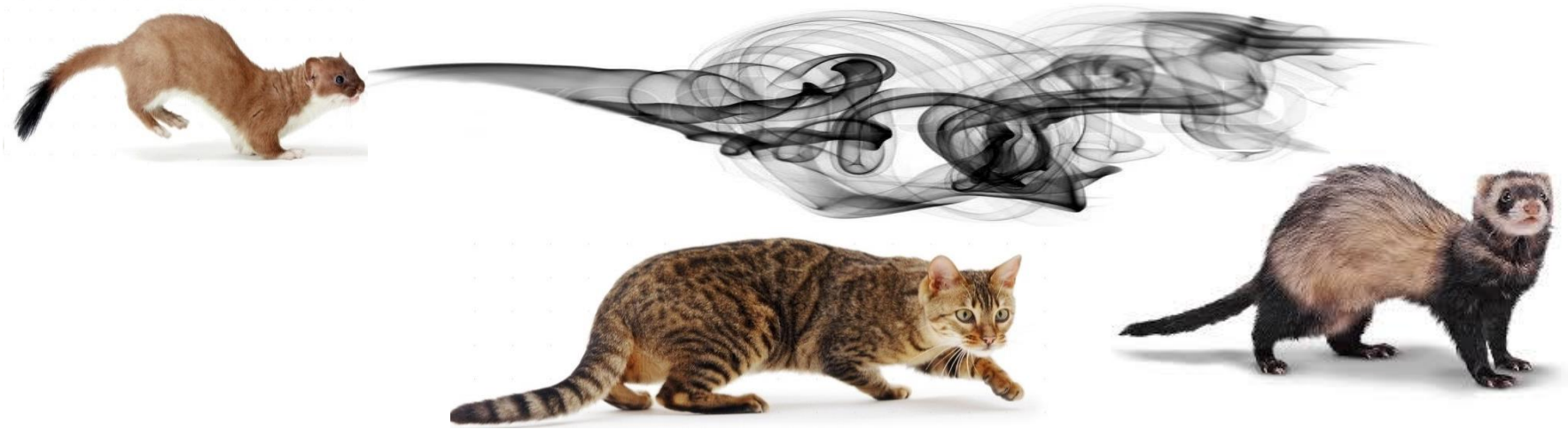
Fighting

Fornication

Sensory cues - NZ pest management

Stoats are **attracted** to the odour of ferrets and cats

Garvey, Glen & Pech (2016) Behav Ecology & Socio



Behaviour-based management

Kokako Recovery project

RUAHINE WHIO PROTECTOR RWP

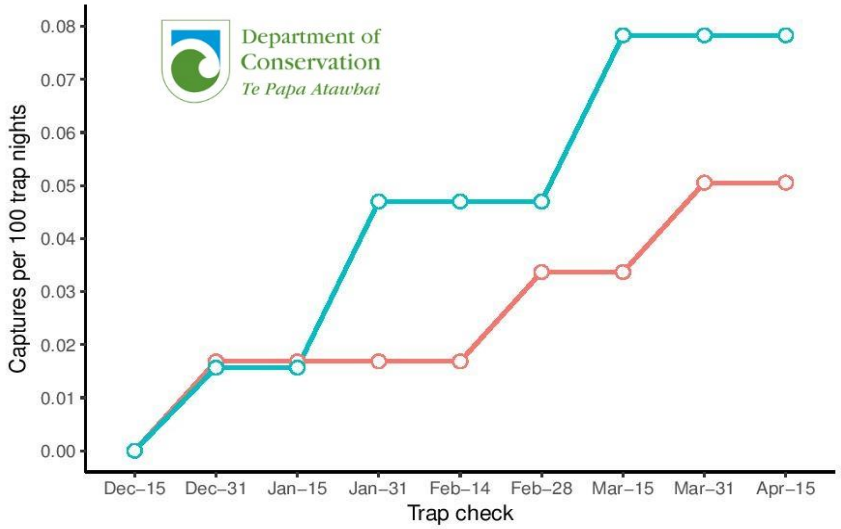
WHANGAWEHI CATCHMENT MANAGEMENT GROUP

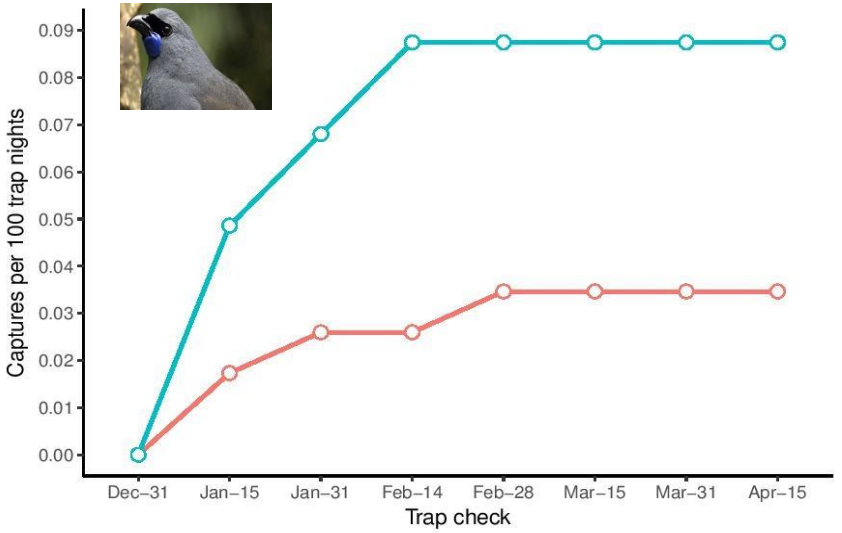
WHAREROA GUARDIANS COMMUNITY TRUST

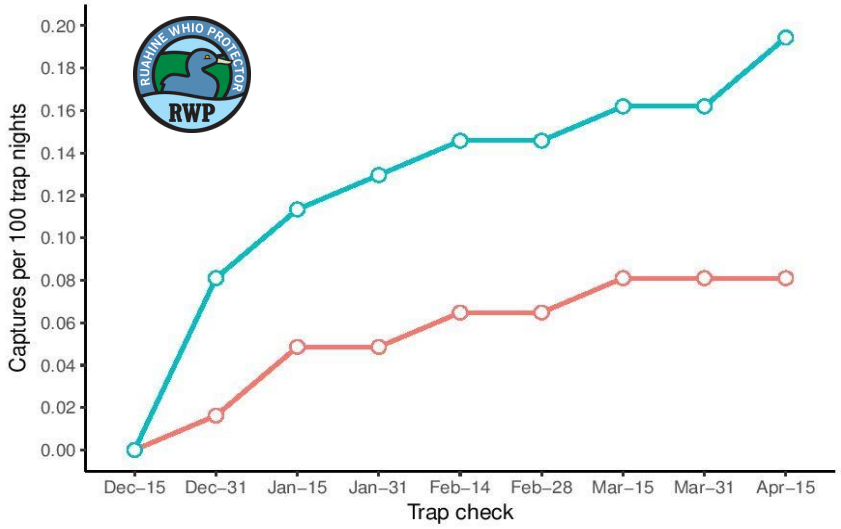
Department of Conservation *Te Papa Atawhai*

Kaweka Forest Park

Stoat captures with ferret odour







3. Animal Behaviour - Individual variability

1. Demographic traits e.g. sex
2. Experience
3. Genetics
4. Body condition e.g. hunger
5. Behavioural traits

Behavioural traits - “Personality”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Eradication Science – Bringing it together

MBIE research programme – 2019 to 2024

Manage the ‘individual’ not the ‘average’ pest

Invasive pests – Possum, ship rat, stoat

Why do some individuals survive control?

- Personality
- Learning and intelligence
- Microbiome and diet
- Density effects
- Genetics

How can we target these survivors?

- Sensory ecology
- Individual differences and motivations
- AI and computer learning
- New technology e.g. infra-red trail cameras

Eradication Science - Collaboration

Manaaki Whenua
Landcare Research

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

Department of Conservation
Te Papa Atawhai

PREDATOR FREE 2050
kia uru ora, return to life

NEW ZEALAND'S BIOLOGICAL HERITAGE
Ngā Koiora Tuku Iho
National SCIENCE Challenges

ZIP

HAWKE'S BAY REGIONAL COUNCIL

Vision Mātauranga:

Hapū research partners

- Ngāti Porou,
- Tūhoe Tuawhenua
- Northern Taranaki iwi
- Moriori imi

Sensory research:

THE UNIVERSITY OF SYDNEY

UNIVERSITY OF CALIFORNIA SANTA CRUZ

THE Cacophony PROJECT

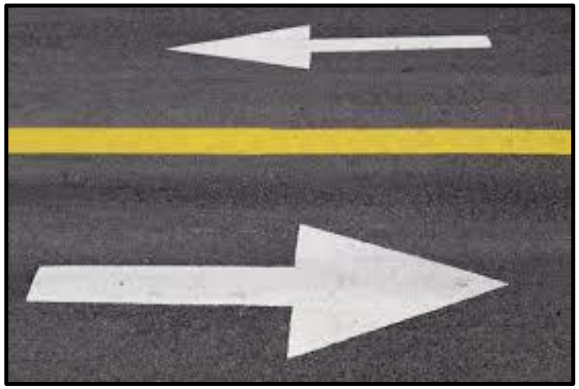
Personality research:

UCDAVIS UNIVERSITY OF CALIFORNIA

1495 UNIVERSITY OF ABERDEEN

UC UNIVERSITY OF CANTERBURY

Conclusion – Behaviour and management



Behaviour benefits pest management

- Management efficacy
- Management outcomes
- Predator Free 2050
- Animal ethics

Pest management benefits behaviour

- Understanding behaviour & sensory ecology
- Conservation worldwide

Social and learning opportunities


Thank you!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Information is power……

- Risk assessment
- Resources
- Niche partitioning
- Mustelid family