Introduced mammalian predators on braided river islands: results and recommendations

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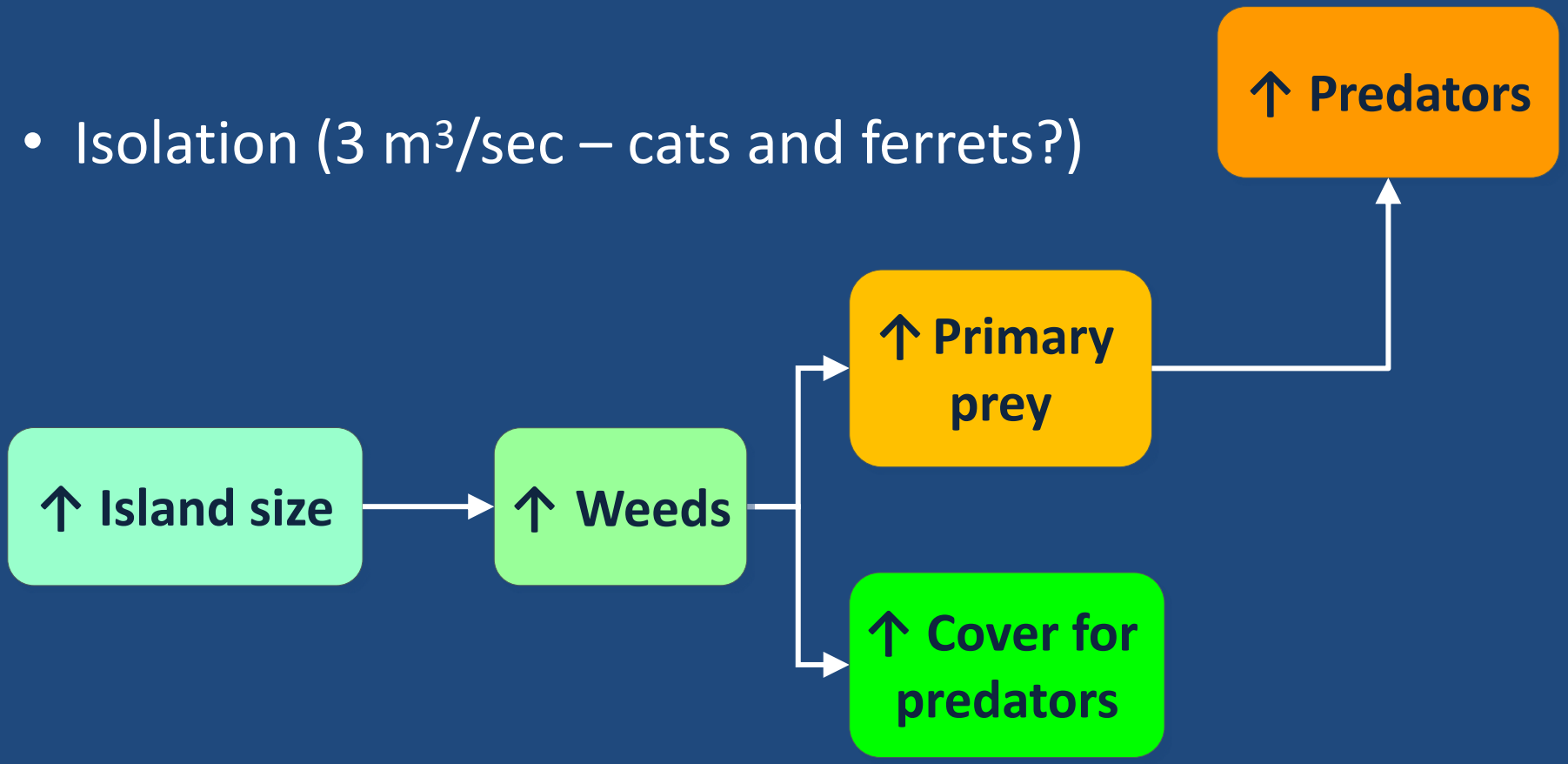
Predator distribution on braided-river islands

- Isolation (3 m^3/sec – cats and ferrets?)



Pascoe (1995) Unpubl MSc Thesis, Otago
Pierce (1987) Unpubl DOC report, Twizel

Aims

1. If islands are refuges:

   ↓ Mammalian predator presence;

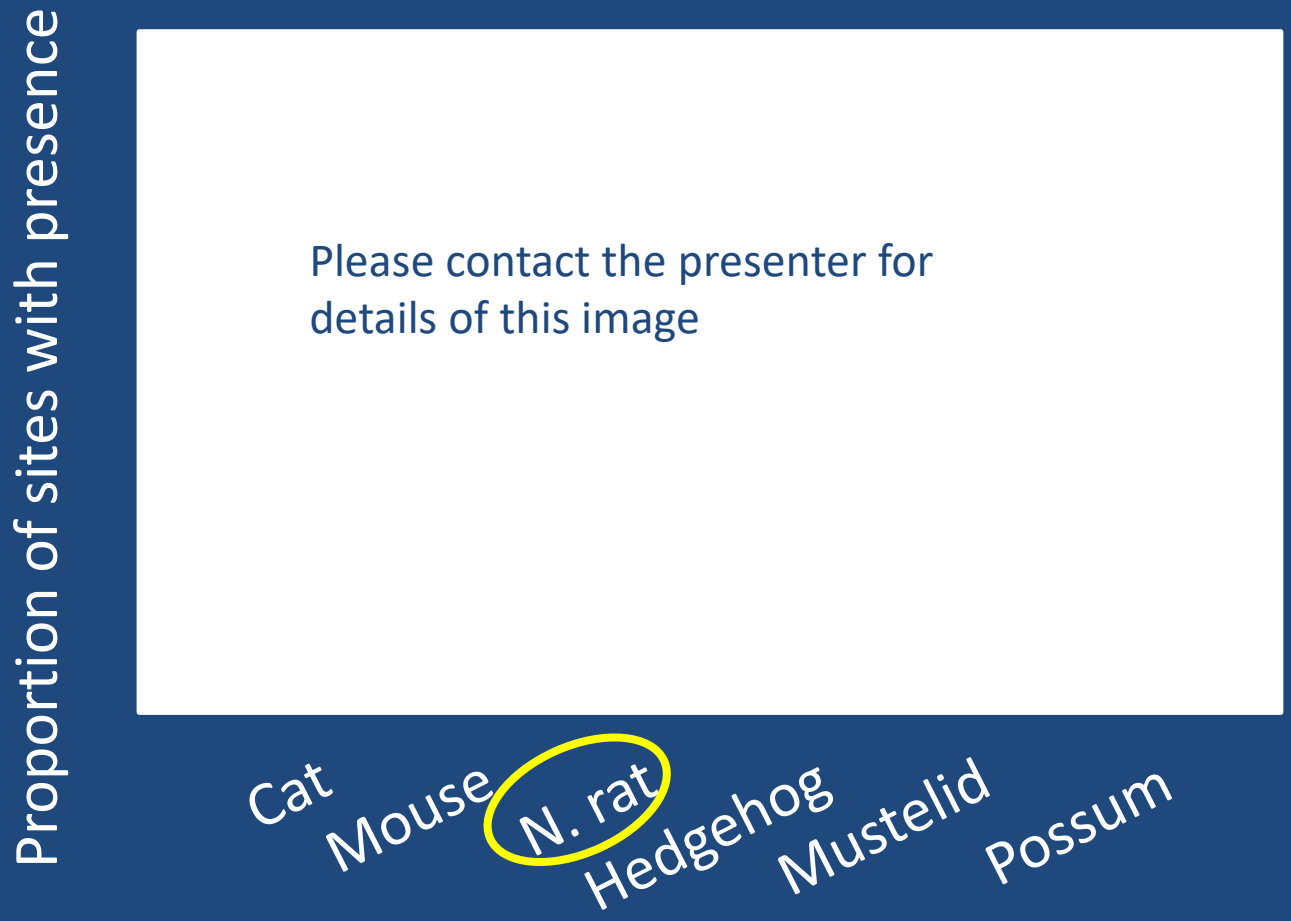
   Species differences?

2. Relative importance of factors determining predator presence on islands

   Which islands (i) are relatively safe; (ii) may need management (and which species to target)

3. Effect of reducing island isolation on predator presence

Predator distribution: ML versus island



- Predator presence less likely on islands
  - Predators found on 64% of study islands

Mainland versus island II

- Fewer predator species detected on islands

Conclusions

1. Islands can act as refuges
   - Reduces but does not prevent predator access
2. Species specific differences
   - Norway rats not deterred by water as much as other species (exception: stoats)
3. Stoats (and rats) difficult to detect and therefore monitor
4. Norway rat distribution temporally and spatially patchy

Predator presence risk models

- Response Variable:
  - Presence/absence mammalian predator (18 nights)
- Explanatory Variables:
  - Island size
  - 'Bare' or 'vegetated'
  - Lagomorphs 'rare' or 'common'
  - Minimum distance to mainland
  - Total discharge ≥ a threshold m^3/sec (< 10 m^3/sec)
- IT approach (AIC_c)
  - Effect size and Relative Variable Importance (RVI)

Relative Variable Importance (top 3 in model)

‘Any predator’

Island size	100%	+
Distance ML	67%	–
Vegetation >20cm	62%	+

Cat

Island size	97%	+
Distance ML	94%	–
Lagomorph	59%	+

Norway rat

Vegetation >0cm	100%	+
Discharge ≥ 7 m^3/s	51%	–
Island size	45%	+

Hedgehog*

Vegetation >20cm	100%	+

Conclusions

- Species-specific differences
- Island size and distance – larger predator species
  - Island **VISITORS**
  - Island isolation important
- Vegetation – smaller predator species
  - Island **RESIDENTS**
  - Island isolation less important

Effect of island size, isolation, vegetation & lagomorphs on ‘any predator’ presence

Veg & Lagomorph present; discharge < 6 m^3/sec

Veg & Lagomorph absent; discharge > 6 m^3/sec

Please contact the presenter for details of these images

Minimum distance (m)

Island size (ha)

Effect of island size, isolation, vegetation & lagomorphs on cat presence

- **Veg & Lagomorph present; discharge < 5 m^3/sec**
- **Veg & Lagomorph absent; discharge > 5 m^3/sec**

Minimum distance (m)

Please contact the presenter for details of this image

Island size (ha)

Effect of island size, isolation and vegetation on Norway rat presence

- **Veg present; discharge < 7 m^3/sec**
- **Veg absent; discharge > 7 m^3/sec**

Minimum distance (m)

Please contact the presenter for details of this image

Island size (ha)

Further observations

Hedgehogs (13 detections)

- Vegetated islands only
- Isolation unimportant
- Larger islands?

Mustelids (7 detections)

- Ad male Ferrets only found < 3 m^3/sec
- < 15 m from ML
- Largest islands
- Lagomorphs

- Only one definite stoat detection on island

Overall conclusions

- ↑ Island size, vegetation & lagomorph presence → ↑predator presence
- ↑ Island isolation → ↓ predator presence
- Vegetation on islands enables predators to be resident
  - isolation of vegetated islands less likely to provide protection from mammalian predators
  - reservoir
  - possible predator source for nearby 'safe' islands
- Rangitata: cats – largest impact on bird populations
  - stoats?
- Expect similar patterns on other braided rivers

Recommendations I

- Veg & lago on islands → ↑preds (resident)
  - Mainland trap lines only?
  - Vegetation and lagomorph removal from islands
    - (cats?)
  - Predator control on high-risk islands
    - > 2 ha; vegetated; < 20 m; < 6 cumecs
    - Cats: lagomorph sign

Especially important for small rivers where islands are unlikely to be > 20 m or > 6 m^3/sec from the mainland.

Recommendations II

Island maintenance or creation:

- < 1 ha = fewest predators (but too small for successful breeding colonies?)
- ↑ size = ↑ predator risk
- 1–3.5 ha; bare; > 20 m; > 6 m^3/sec
  - smaller rivers: 1–2.5 ha; bare
- assess impact on bird breeding success

Further studies

- Few data from islands w discharges > 7 m^3/sec
- More isolated islands
  - tended to be smaller and less vegetated
  - Larger river with isolated large +/or vegetated islands
  - Threshold that would prevent incursion?
- Test the applicability of these models for other rivers
  - quantify effects of lower flows
- Is bird breeding success related to island characteristics?

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