Rabbit population responses to predator removal in Hawke's Bay

Mandy Barron[1], Grant Norbury[1], Natalie de Burgh[2]

[1]Manaaki Whenua Landcare Research

[2]Hawke's Bay Regional Council

Manaaki Whenua Landcare Research

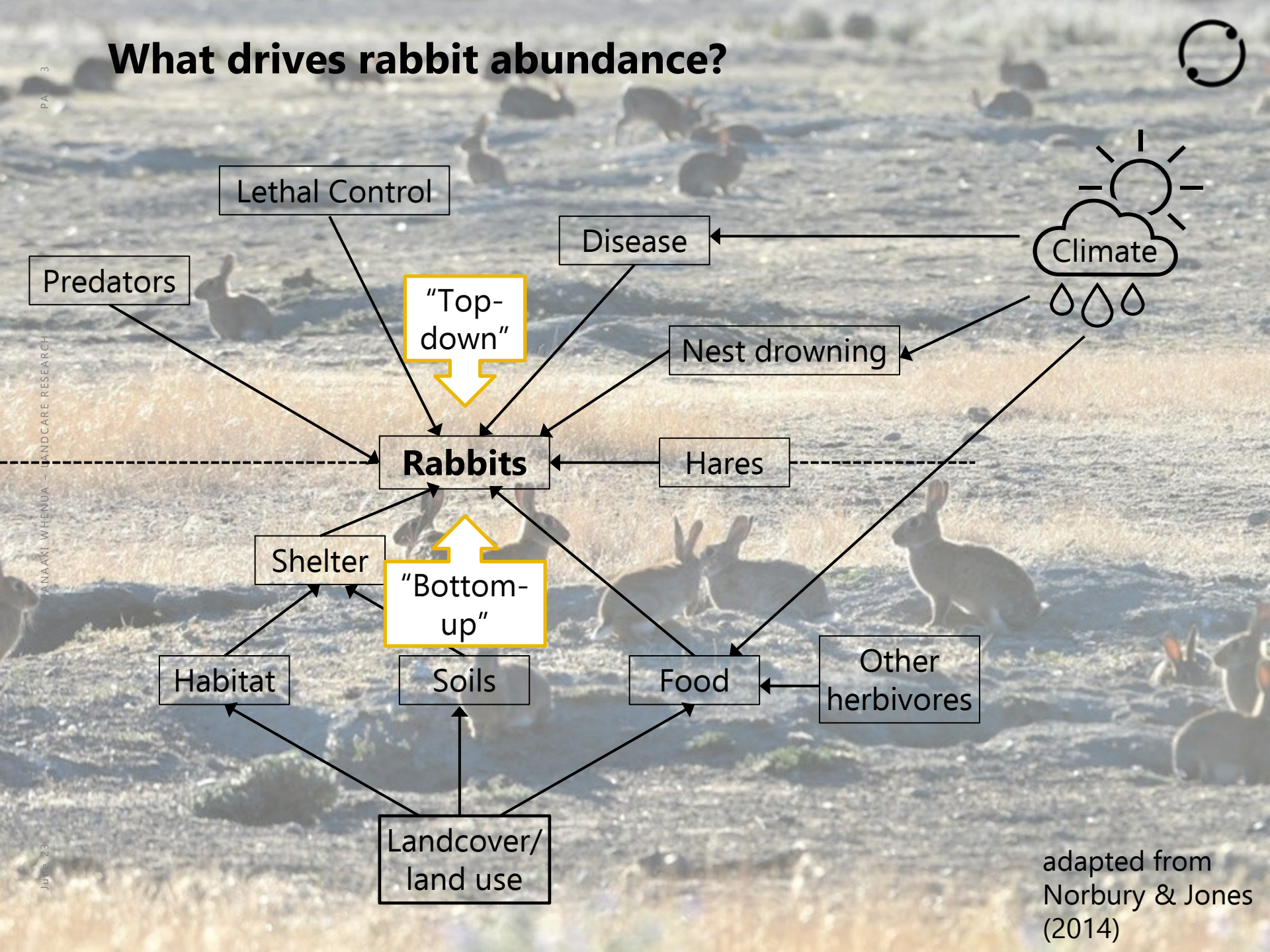
HAWKE'S BAY REGIONAL COUNCIL
TE KAUNIHERA Ā-ROHE O TE MATAU-A-MĀUI

What's the problem?

"The greatest barrier to conservation activities, and predator control activities specifically, may be a concern that the reduction of predator species will lead to an increase in rabbit numbers. More than 50% of participants agree to some extent that increasing rabbit numbers would be a consequence of reducing predator species."

McKelvie-Sebileau 2020 Landholder Perceptions of Predator Control in the Cape to City Region: Results from the Rural Survey.

What drives rabbit abundance?



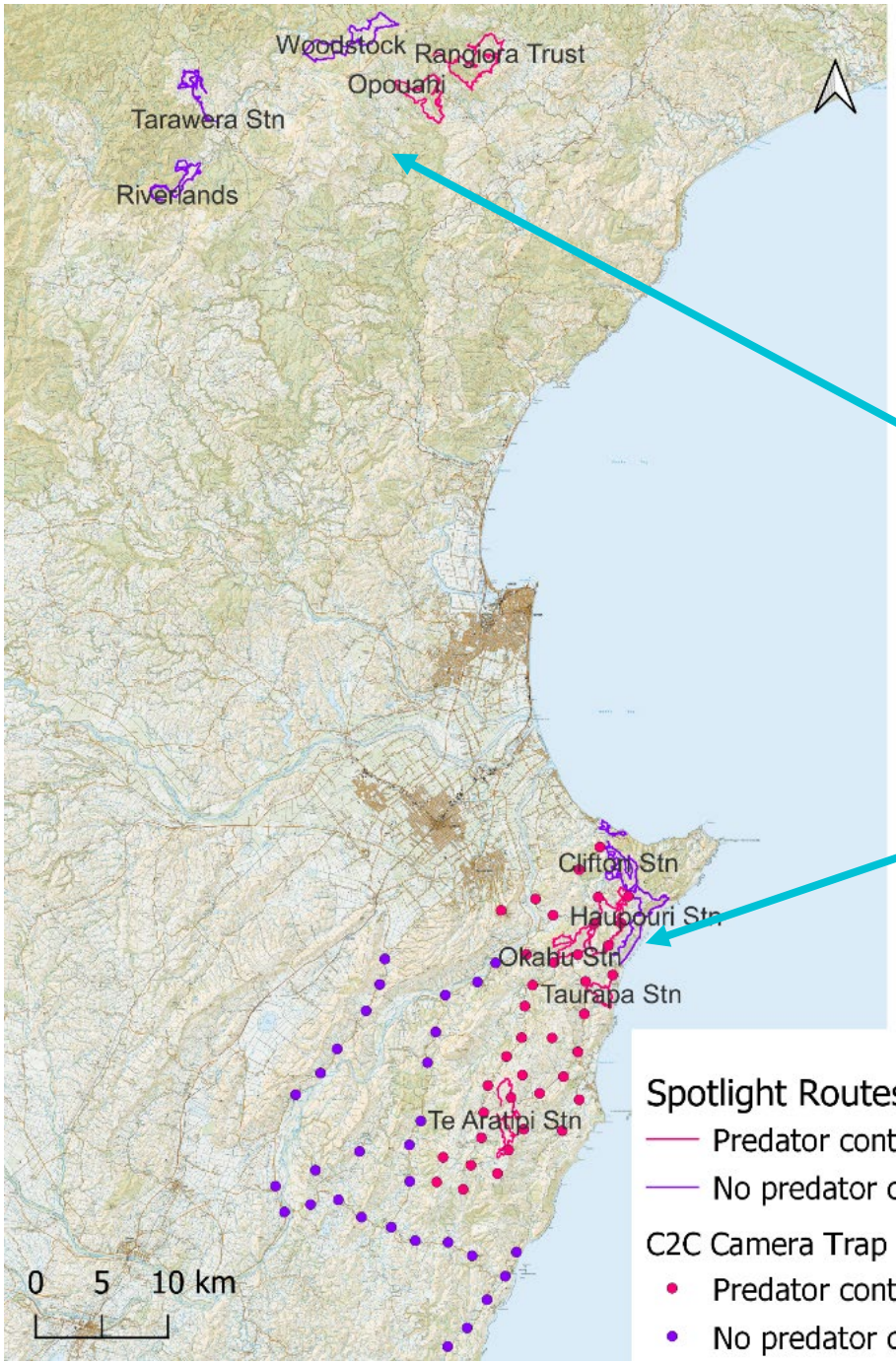
adapted from Norbury & Jones (2014)

What's the evidence?

"The evidence reviewed here is reasonably consistent: predation is a limiting factor for populations of rabbits, primarily through its effects on juvenile survival, and on rabbit abundance and population dynamics under certain conditions, but its effects are minor compared with the effects of climate, food, disease and habitat."

Norbury & Jones (2014) Pests controlling pests: does predator control lead to greater European rabbit abundance in Australasia?

Study sites



Poutiri Ao ō Tāne

Cape to City

Study Design

- **Spotlight Count Data**

  Poutiri Ao ō Tāne

  - 2 sites with ongoing predator control, beginning 2012 (treatment)
  - 3 sites with no predator control (non-treatment)
  - Counts done: 2012, 2013, 2014, 2015, 2017, 2019, 2021

  Cape to City

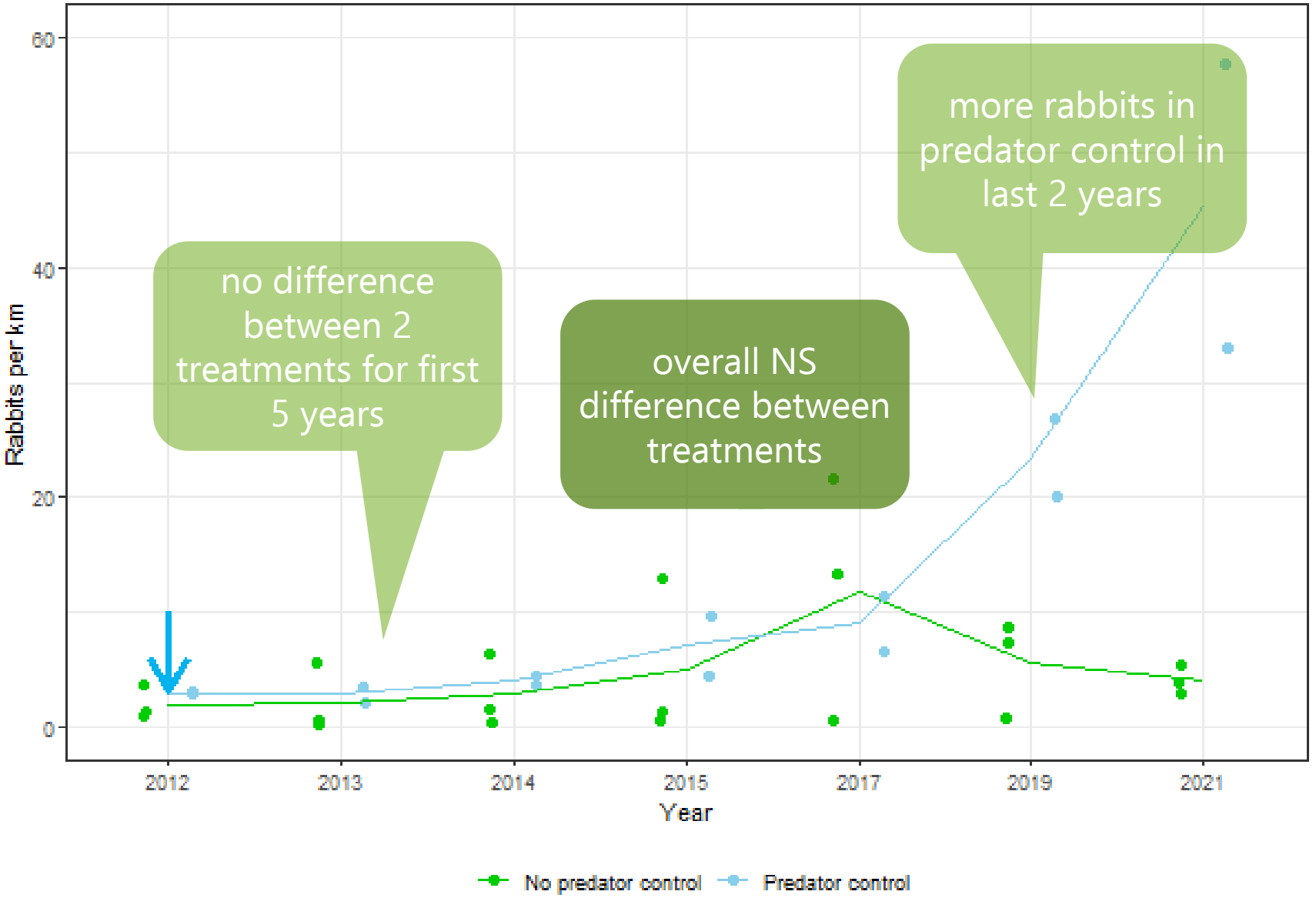
  - 3 predator treatment sites (control rolled out 2016 and 2017)
  - 2 non-treatment sites
  - Counts done annually: 2016-2021

- **Camera Trap Data**

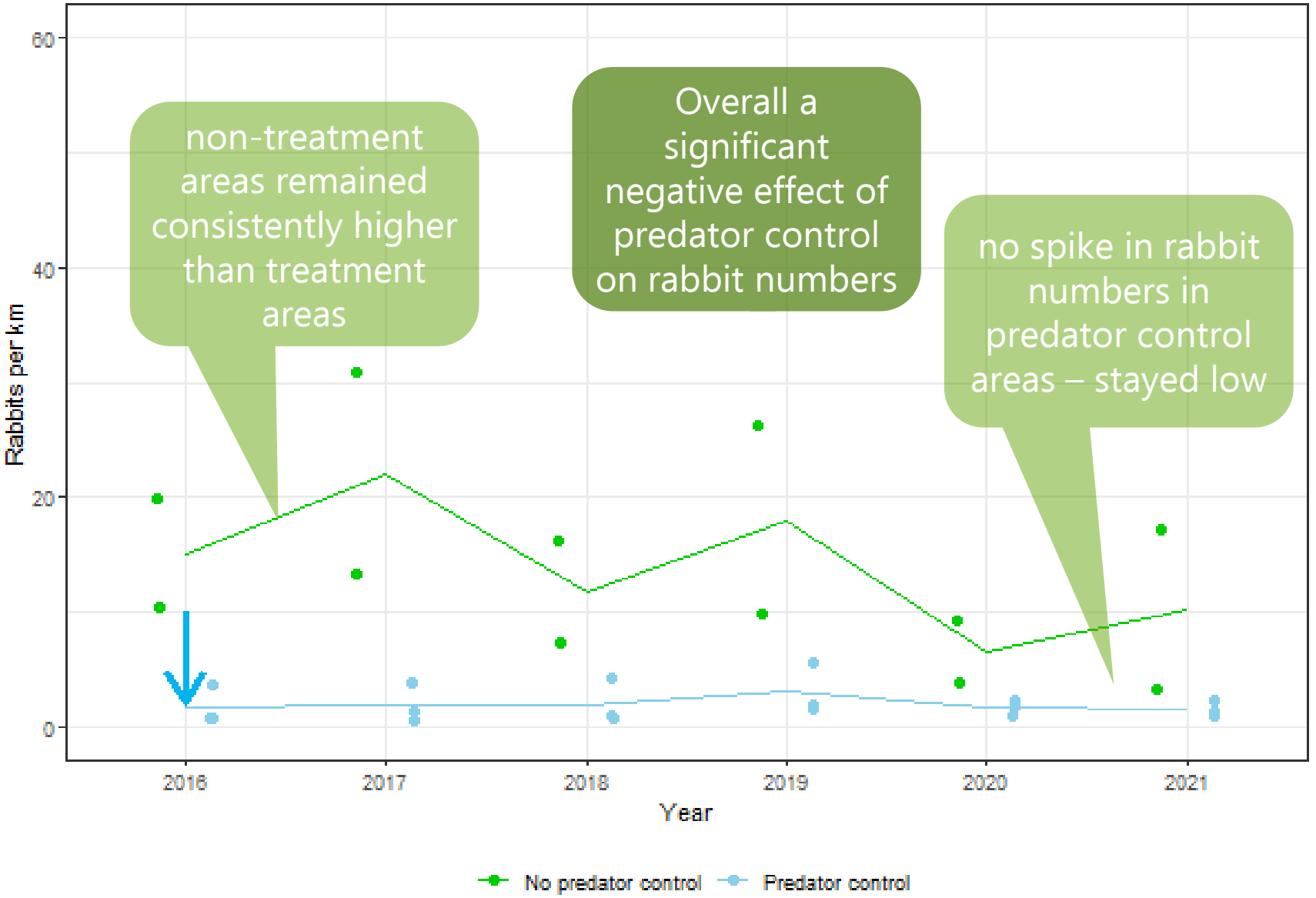
  Cape to City

  - 37 cameras in predator treatment area
  - 31 in adjacent non-treatment area
  - Cameras out for 3 weeks annually 2015-2020 (includes 1 yr pre-treatment)
  - Lagomorph (rabbits + hares)

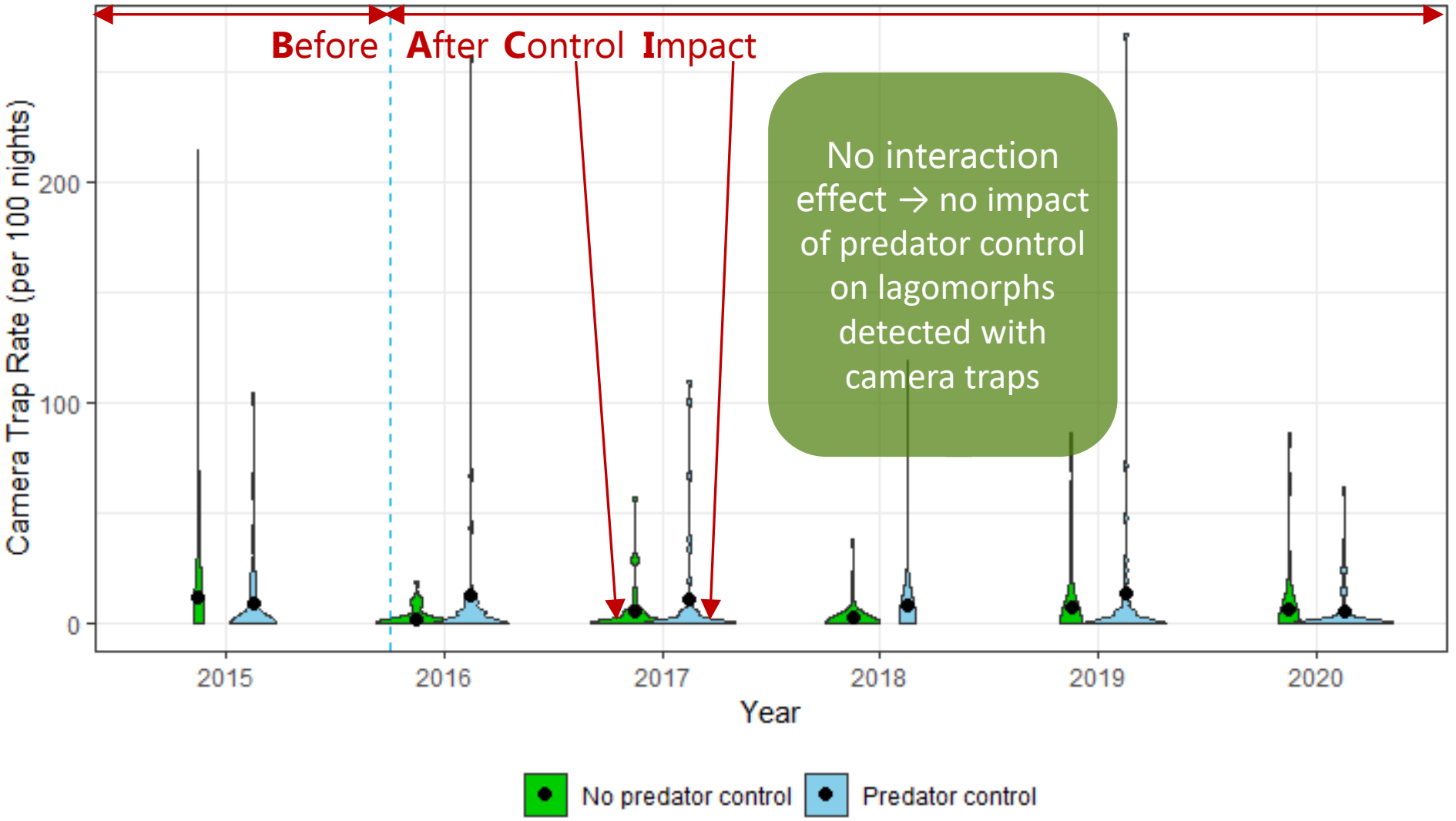
Spotlight Counts - Poutiri Ao ō Tāne



Spotlight Counts - Cape to City

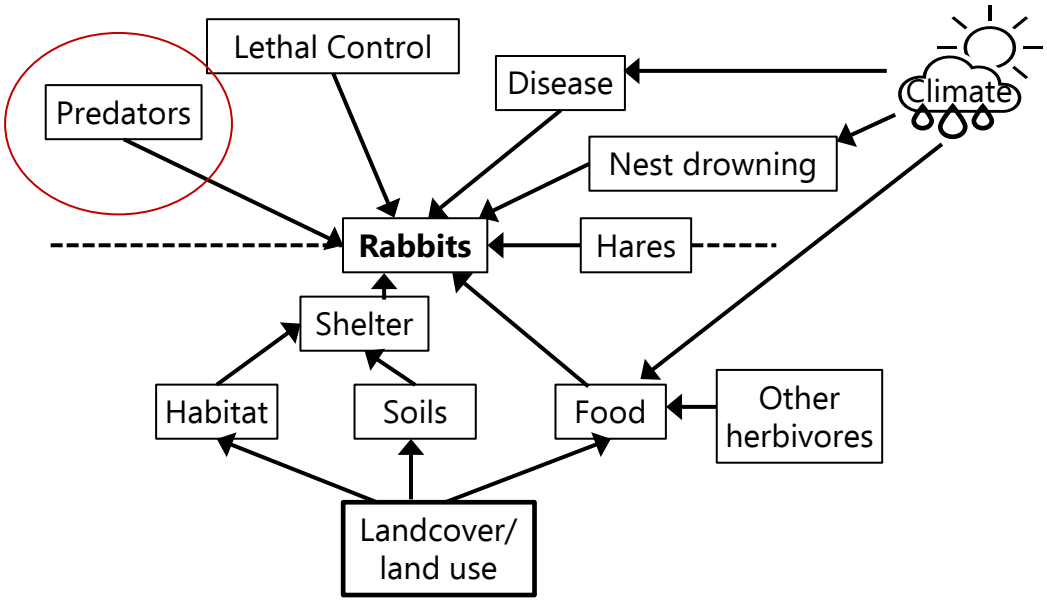


Camera traps - Cape to City

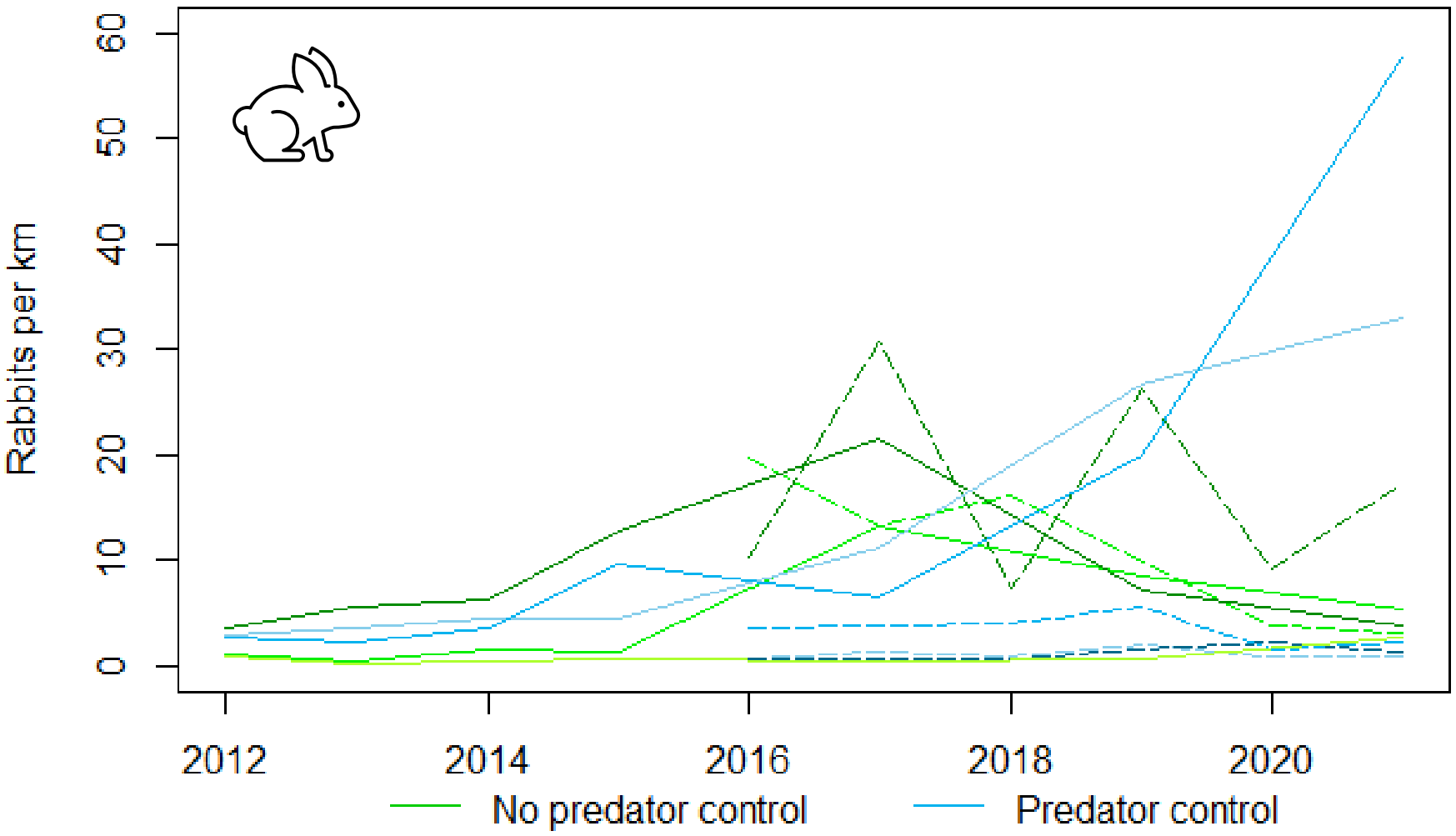


So what is controlling rabbit numbers?

- Doesn't appear to be predators (and not consistent)



Contradictory effects…



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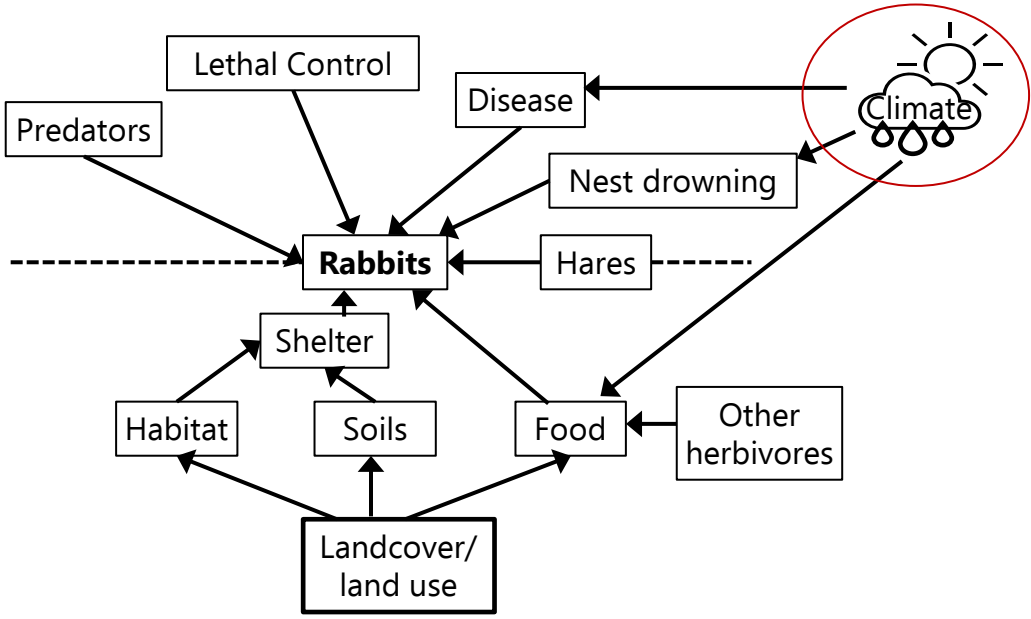
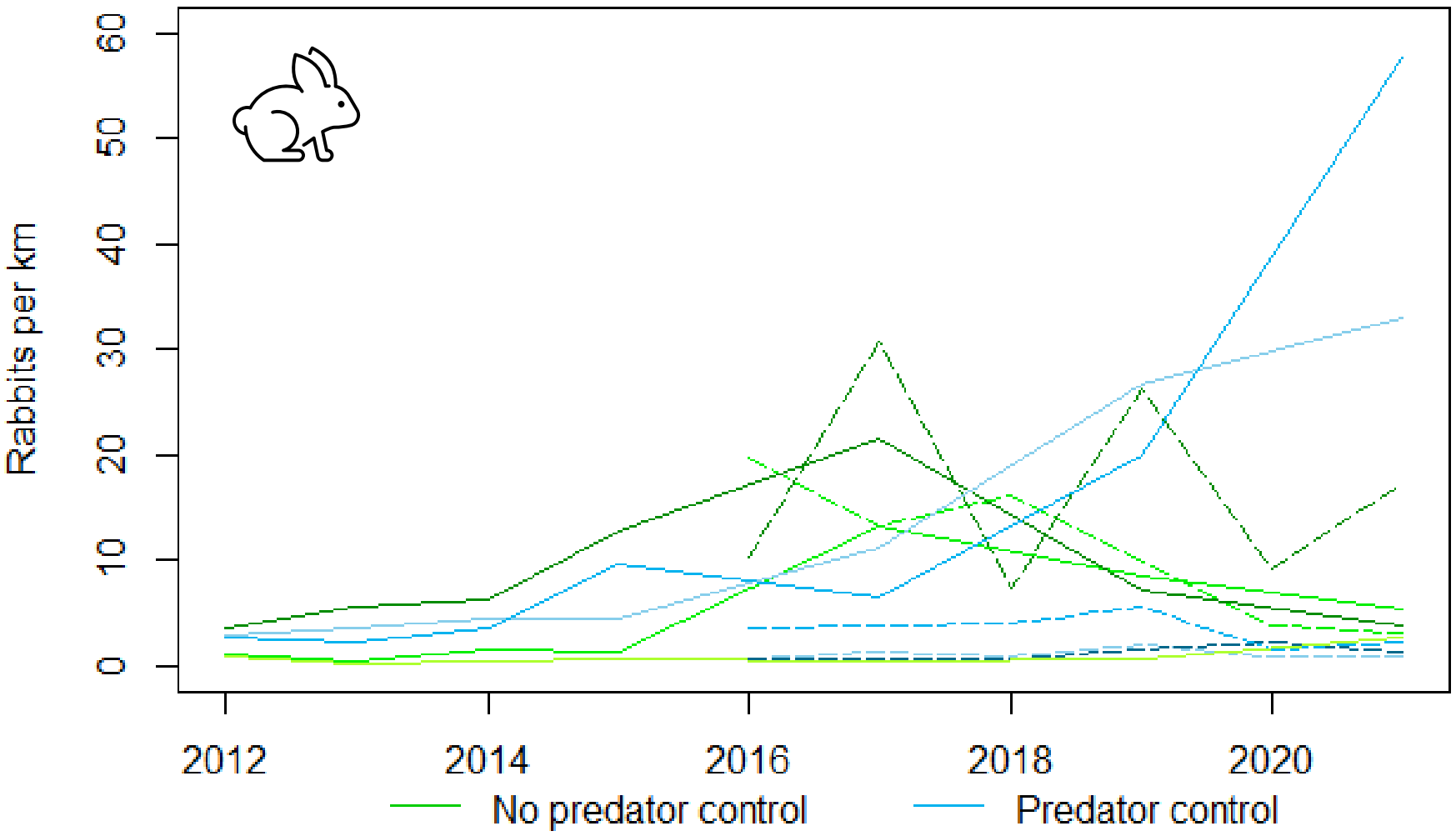
- Doesn't appear to be predators (and not consistent)
- Climate forcing?
  - Counts not synchronous between sites
  - Models with trend for year or global yearly effect poor fit
  - Having site-specific year effect better → more variation between years than between sites



Not much synchrony…



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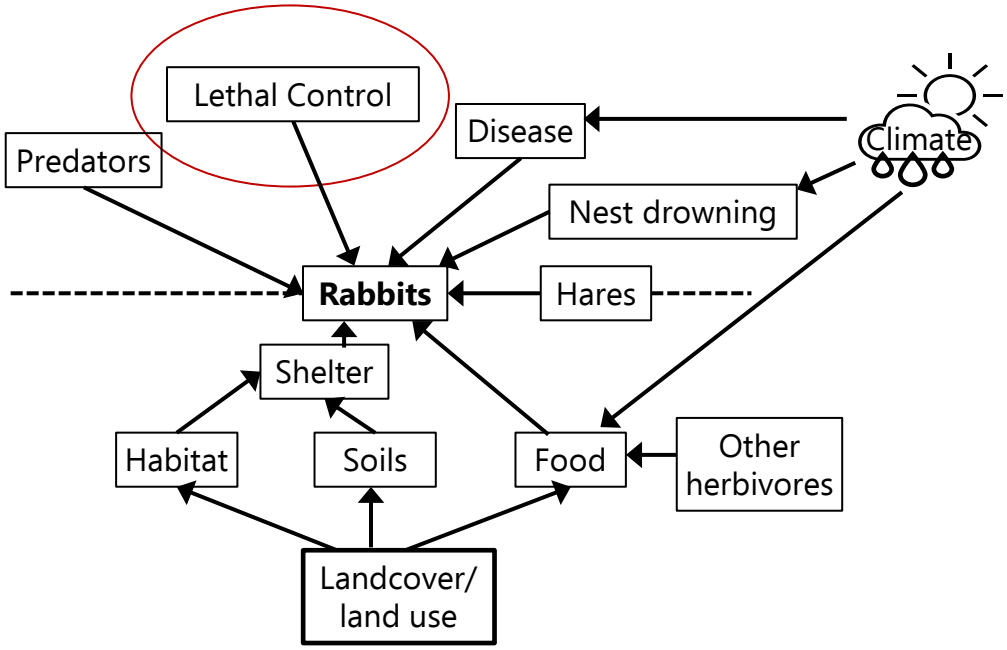

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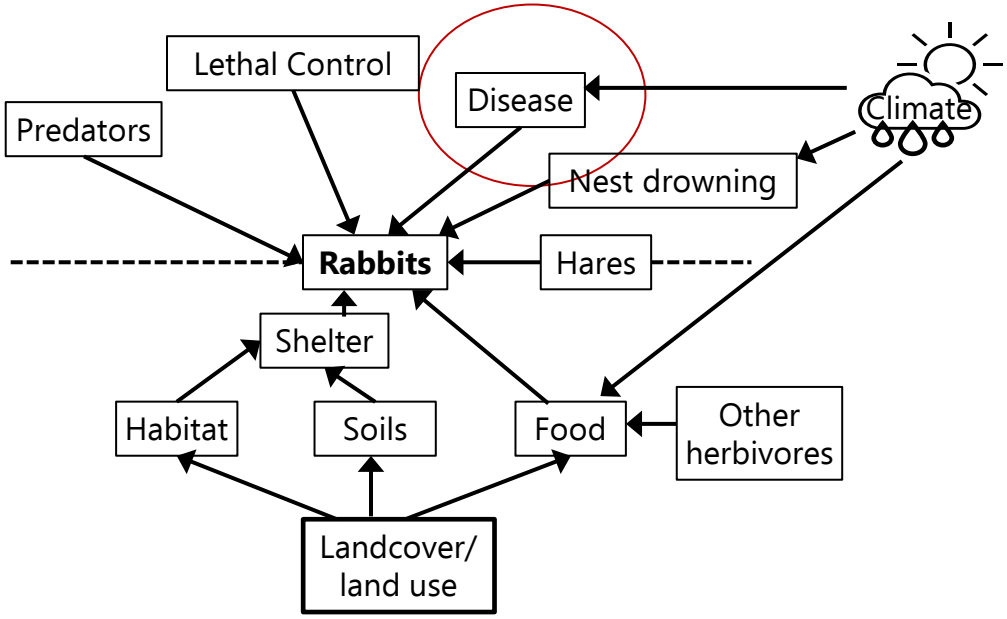
    -site/year specific AND regulating

    -serology data available but only NT sites and half years missing



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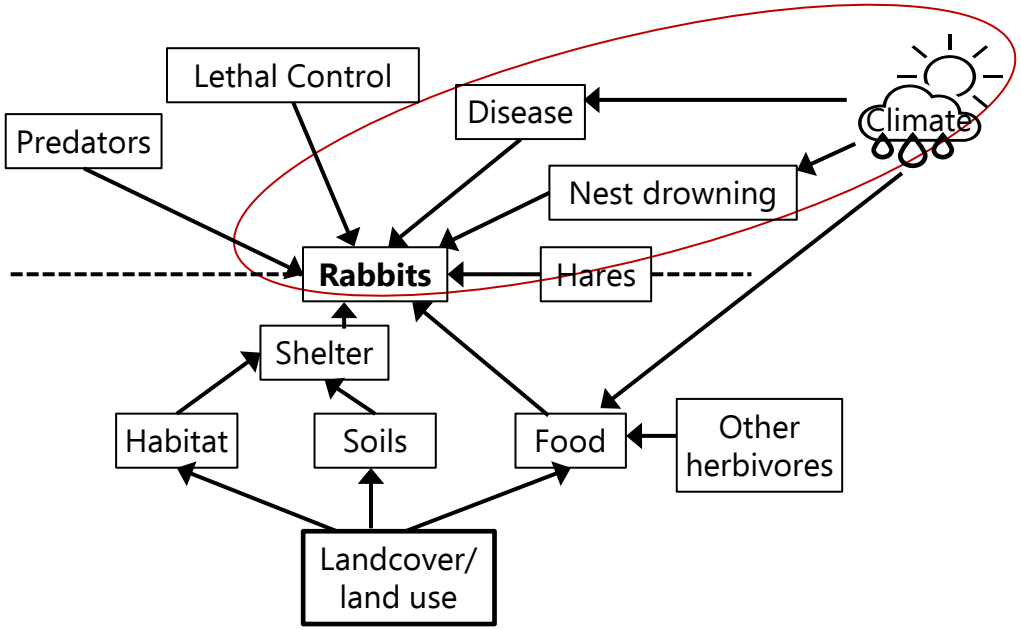
- Indirect effects
  - e.g. climate + coccidiosis + density



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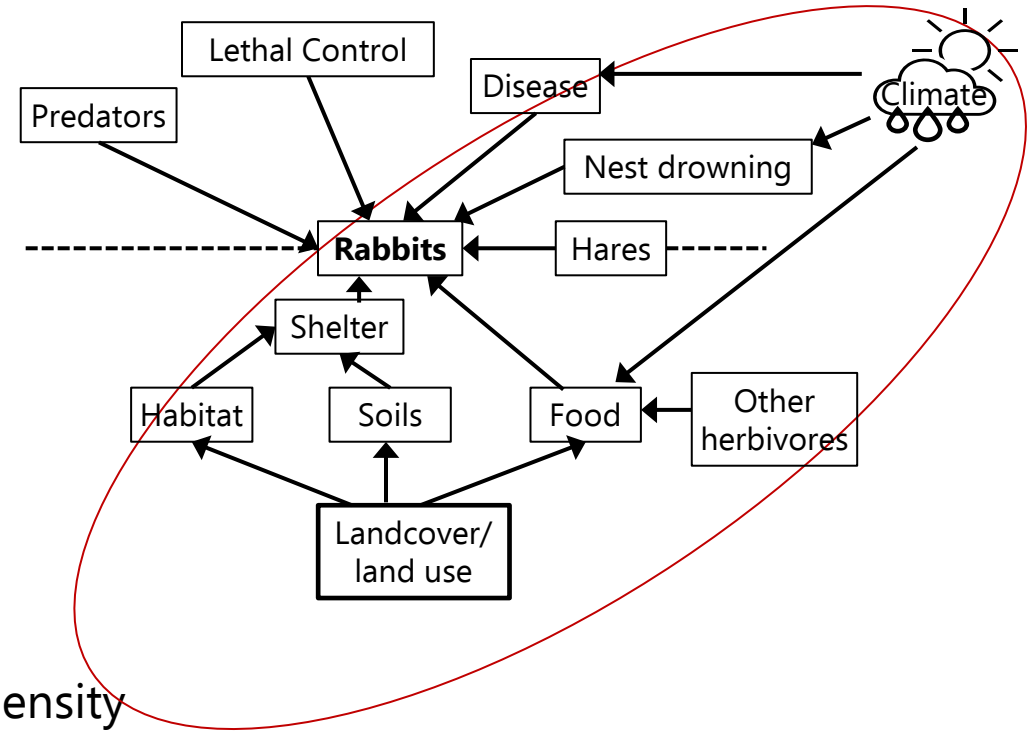

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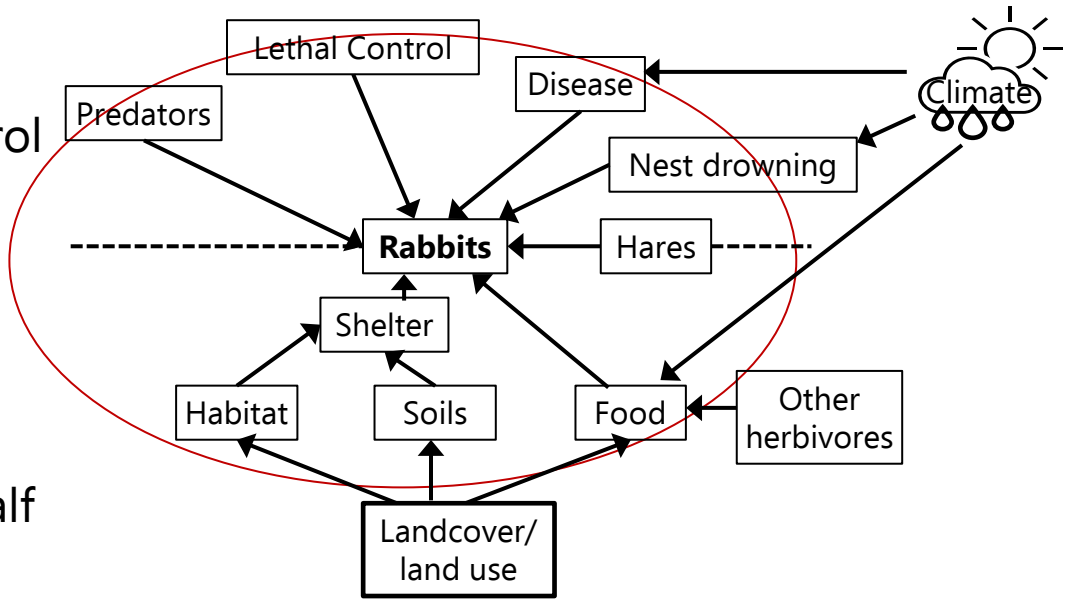

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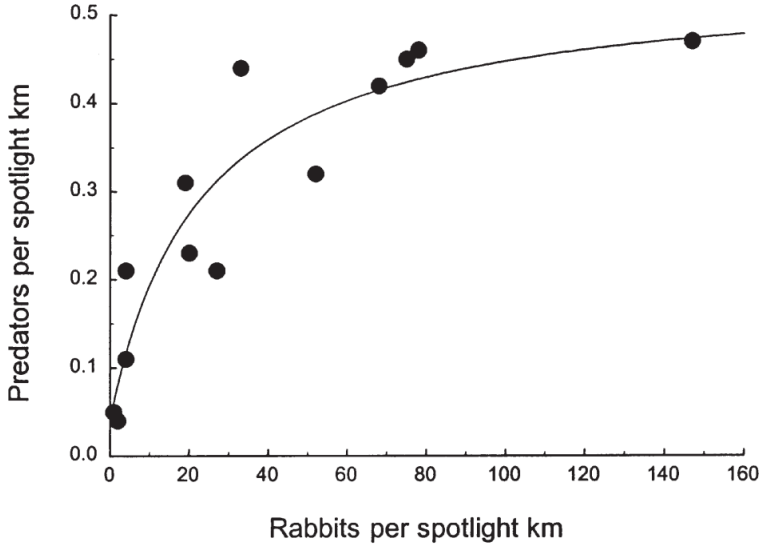
  - e.g. RHDV + density + predators + resources

So what is controlling rabbit numbers?

- We don't know!
- Complex interactions difficult to tease apart with spotlight data & coarse predictors (predator control was binary)
- Need annual data to detect density-dependence or predator-prey cycles
- Site-specific is a clue
- The good news is that predator control does not have a discernible effect on rabbit numbers

  Note: the opposite is not true:



Thanks for listening!

Thanks to the Hawkes Bay council staff and contractors who collected the data

Questions?