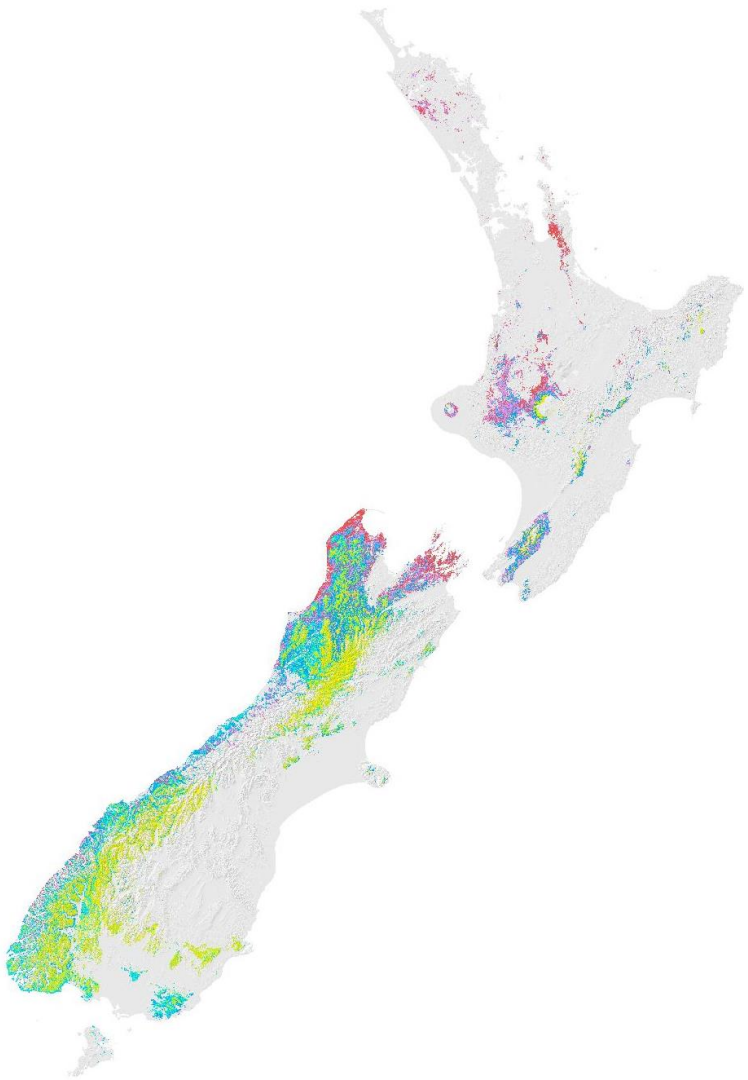

Where will conservation efforts bring the greatest benefits for native birds?

Susan Walker
Landcare Research, Dunedin
Wednesday 13th September 2017
Wellington

LANDCARE RESEARCH
MANAAKI WHENUA

Thanks

Funding
MBIE Core
Parliamentary Commissioner for the Environment

Thanks

Images
Neil Fitzgerald
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James Mortimer
James Reardon
Glenda Rees
Peter Scott
DOC

Thanks

Adrian Monks
John Innes
Graeme Elliott
Josh Kemp

Data

Ornithological Society of New Zealand (bird atlases)

Department of Conservation (rodents)

original
bird
fauna

MAINLAND land birds

Ornithological Society of New Zealand bird atlases

~25 YEARS

Bull et al. (1985)

1969-1979

Robertson et al. (2007)

1999-2004

Ornithological Society of New Zealand bird atlases

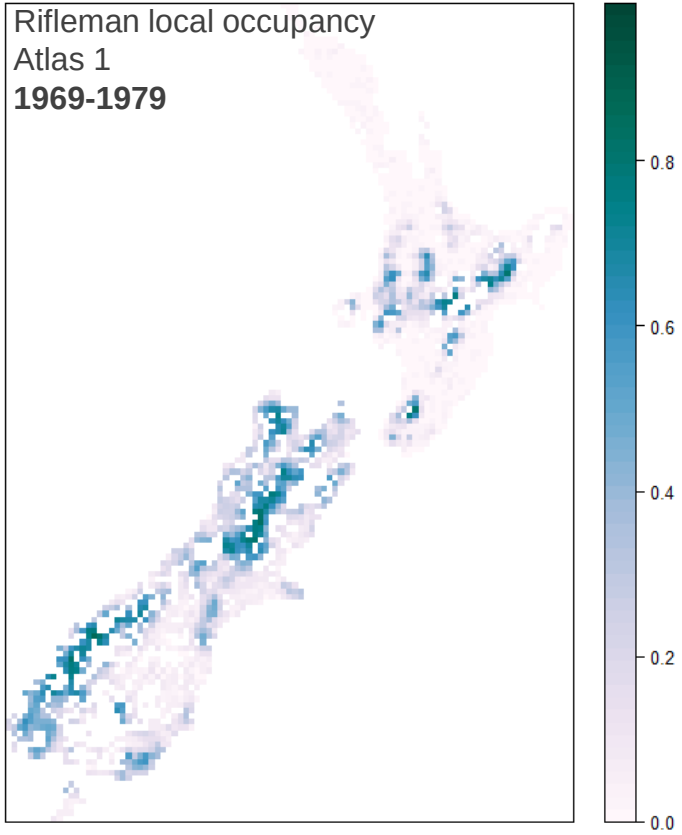
'Probability of occupancy'
Standardised for different:
- levels of effort
- spatial systems

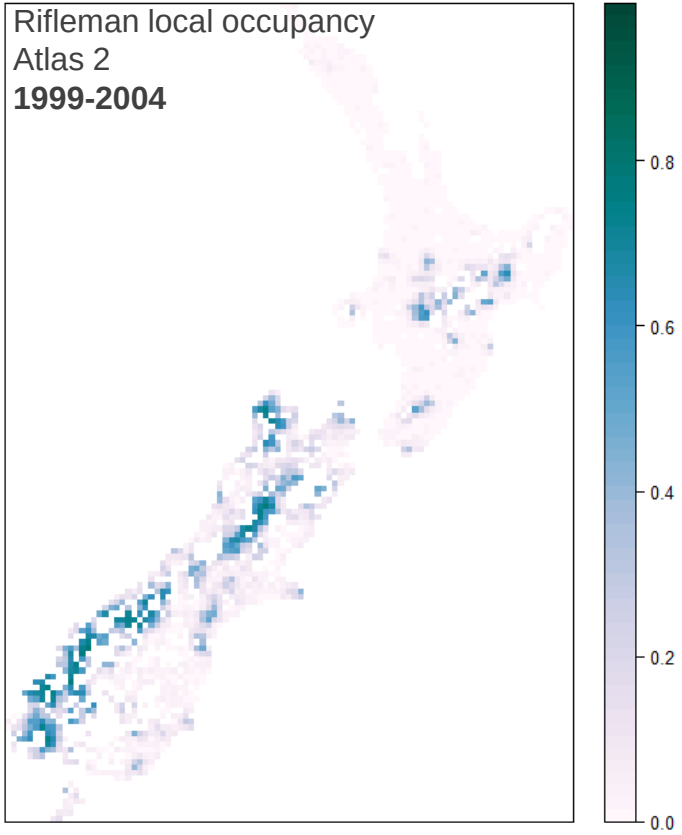
Bull et al. (1985)
1969-1979
Robertson et al. (2007)
1999-2004


birds
potentially
modelled
TOO RARE ON THE MAINLAND TO MODEL
Grey duck
Little spotted kiwi
New Zealand fairy tern
New Zealand shore plover
Marsh crake
Spotless crake
New Zealand dabchick
Takahē
Kākāpō
Red-crowned parakeet
Orange-fronted parakeet
North Island saddleback
South Island saddleback
South Island kōkako
Stitchbird

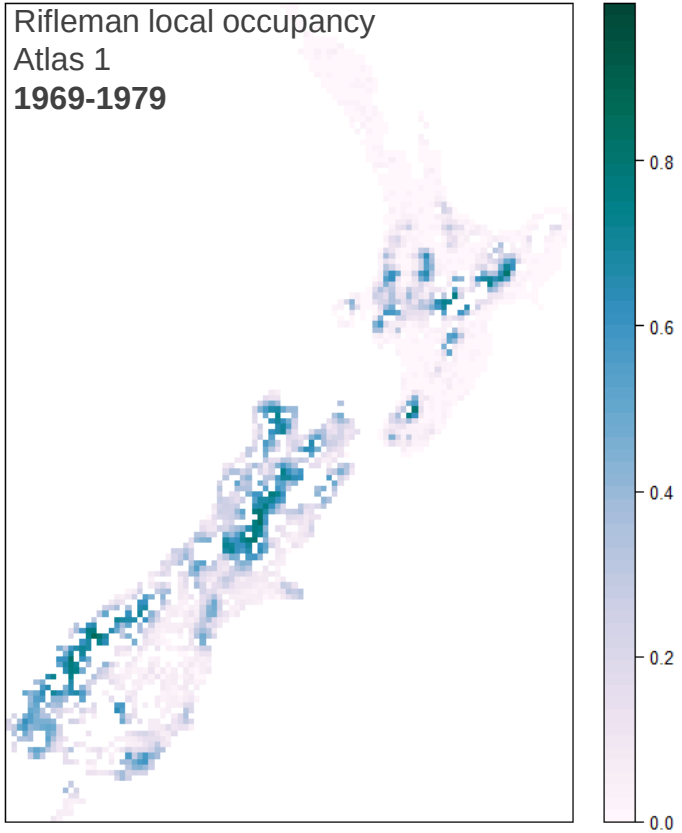

TOO RARE TO MODEL ALONE
NI brown kiwi
Stewart Island tokoeka
Haast tokoeka
Fiordland tokoeka
Great spotted kiwi
Rowi, Okarito brown kiwi
South Island brown teal
North Island brown teal
Northern New Zealand dotterel
Southern New Zealand dotterel
Buff weka
North Island weka
Stewart Island weka
Western weka
64 ‘taxa’

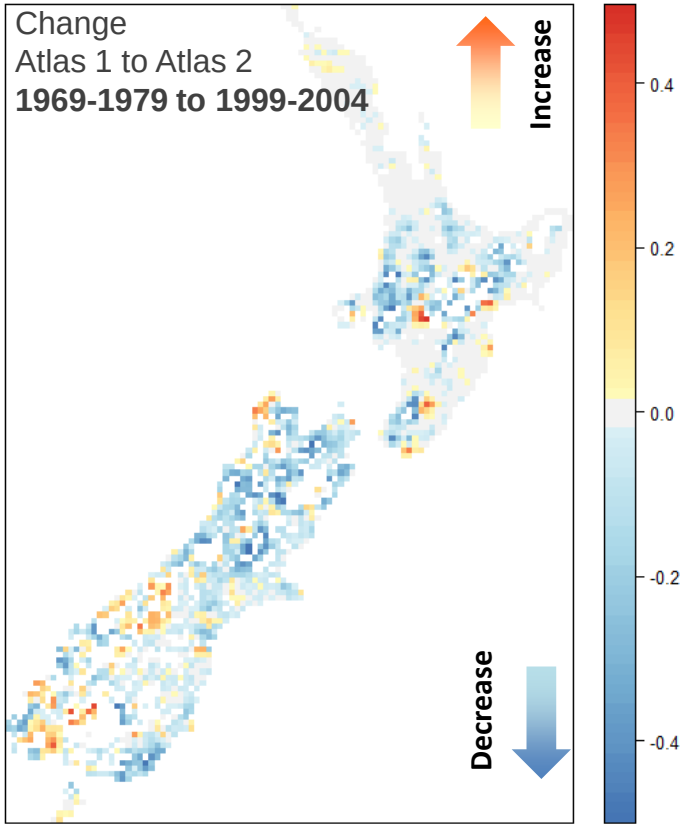
Local occupancy



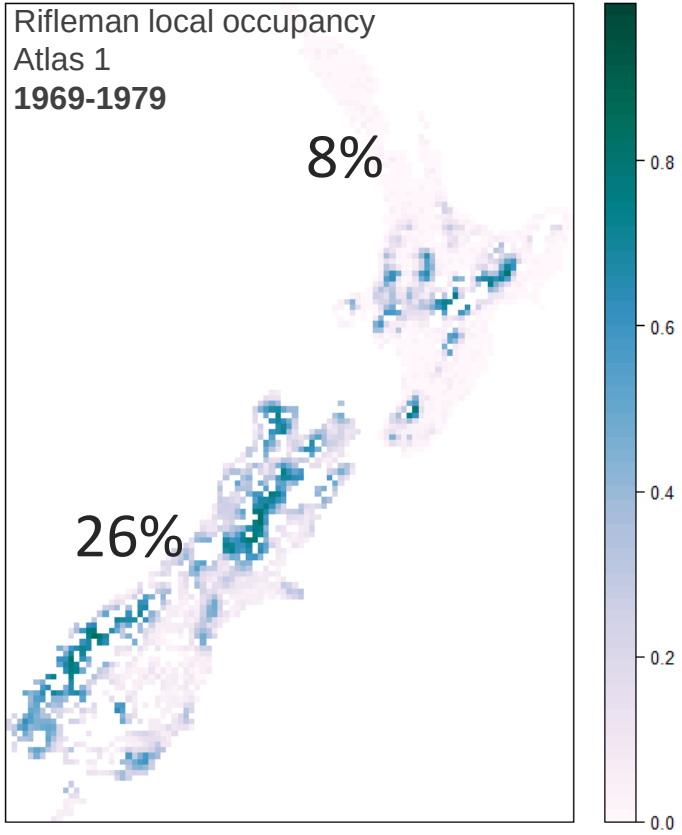


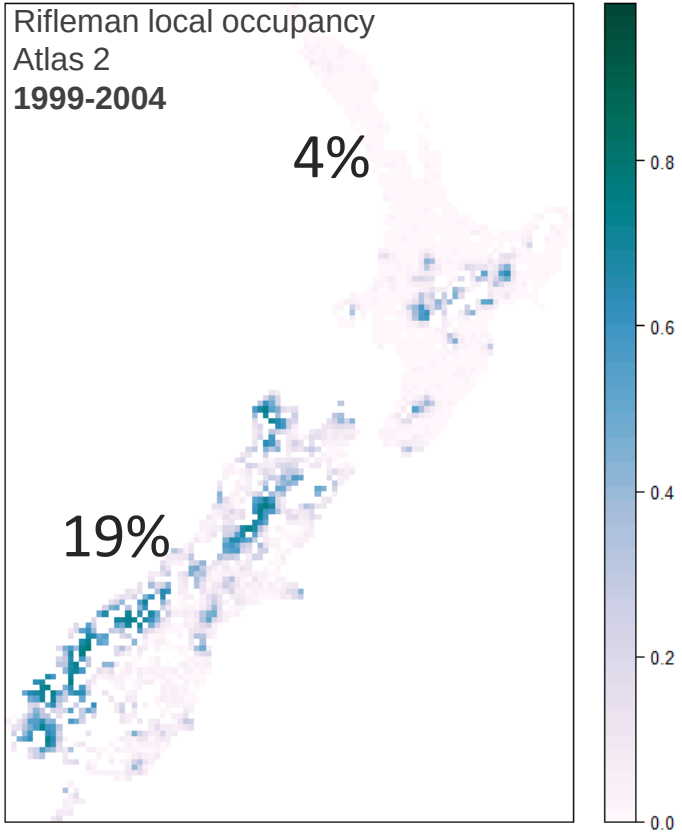
Local occupancy



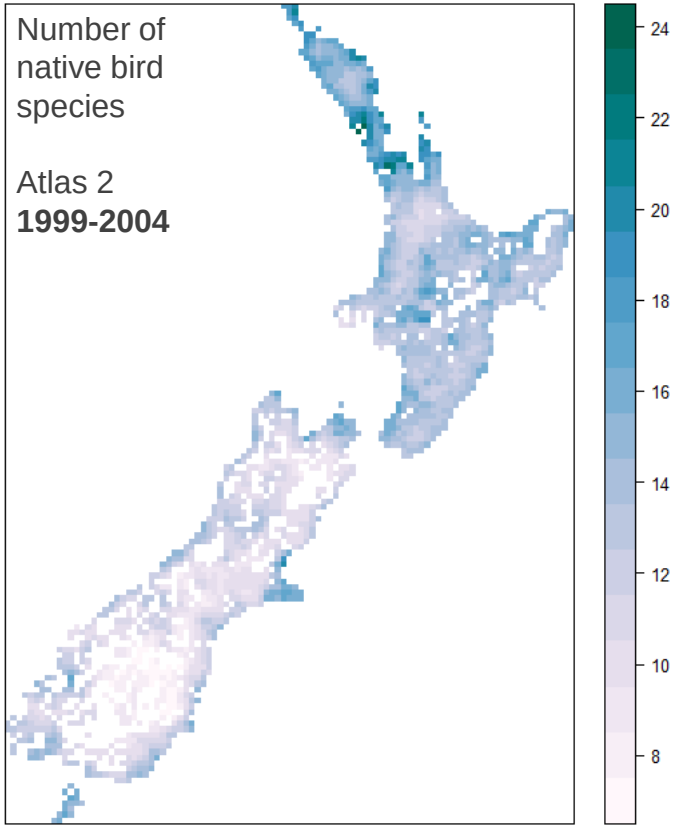


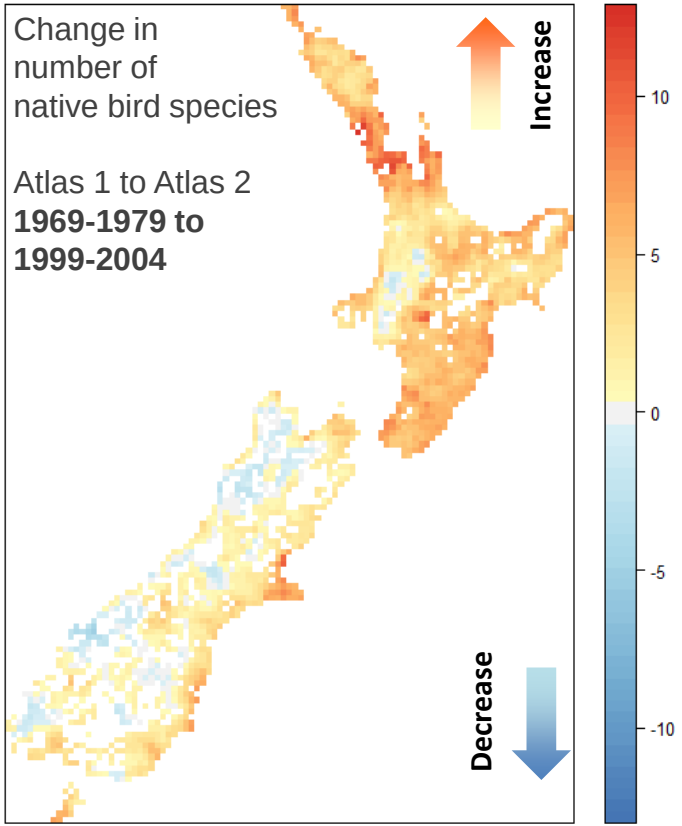
Total range occupancy





Local richness





Which birds were in most trouble, and where?

Endemism level
Habitat group

} **Which groups of birds?**

Environment
density of human occupation, land use, deforestation, temperature

} **Where?**

MURCHISON MOUNTAINS FROM TE ANAU, JAMES REARDON

Which birds were in most trouble, and where?

Endemism level

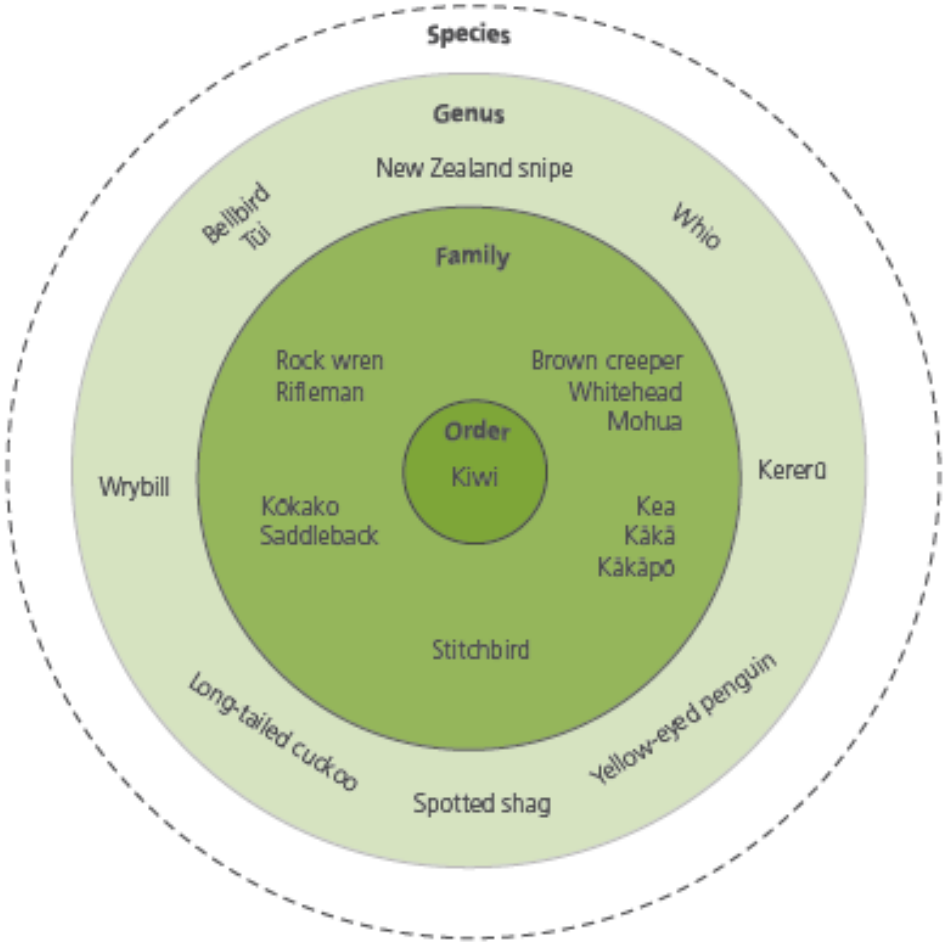
Habitat group

} Which groups of birds?

Environment

density of human occupation, land use, deforestation, temperature

} Where?



Level of endemism

Parliamentary Commissioner for the Environment
Te Kaitiaki Taiao a Te Whare Pāremata

Deep endemism

RIFLEMAN, NEIL FITZGERALD

Deep endemism

KAKA, JAMES REARDON

Deep endemism

NORTH ISLAND KOKAKO, JOHN INNES

Deep endemism

MOHUA IN RED BEECH FOREST , GLENDA REES

Deep endemism

‘Shallower’ (species-level) endemics

Forest birds
Grey warbler
Long-tailed cuckoo
NZ falcon
NZ robin
NZ tomtit
Parakeet species
Weka species
NZ fantail

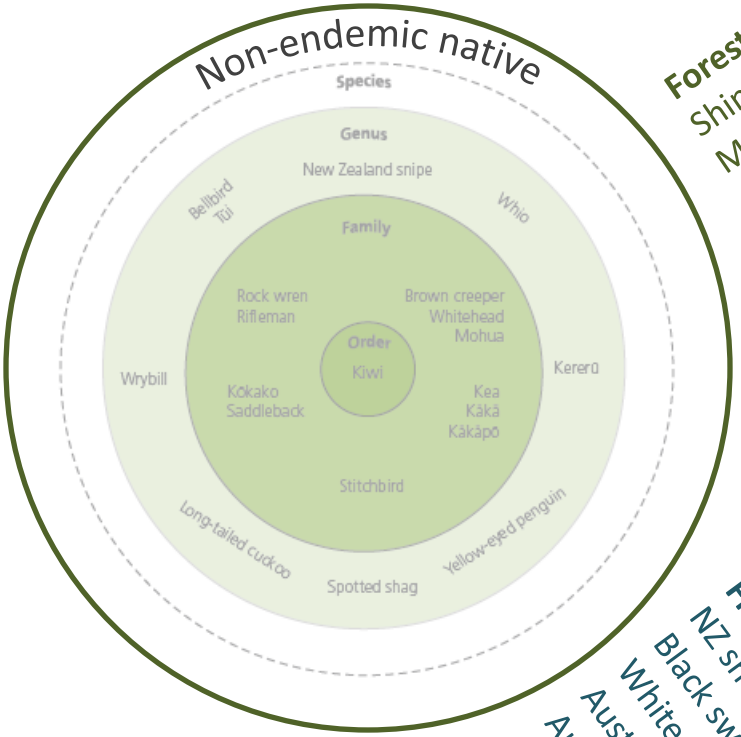
Coastal waders/terns/gulls
NZ dotterel

Inland-breeding waders/terns/gulls
Banded dotterel
South Island pied oystercatcher
Black-billed gull
Black stilt
Black-fronted tern

Open
Paradise shelduck
NZ pipit

Freshwater wetland
Brown teal
NZ scaup
Fernbird
Little shag
NZ dabchick

Coast
Stewart Island shag
Spotted shag



Forest birds
Shining cuckoo
Morepork

Coastal waders/terns/gulls
Variable oystercatcher
Southern black-backed gull
Red-billed gull
Caspian tern
White-fronted tern

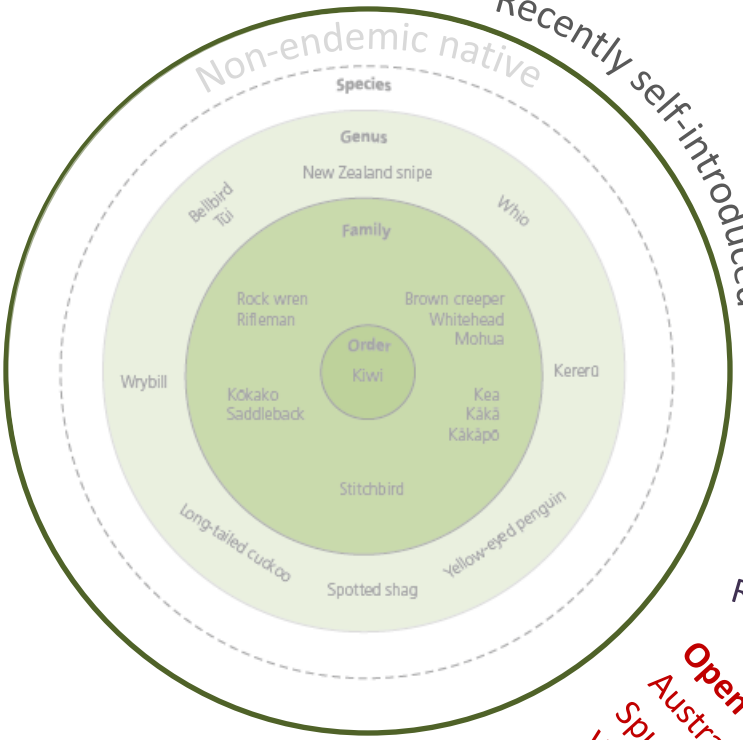
Inland-breeding wader
Australasian pied stilt

Freshwater wetland
NZ shoveller
Black swan
White heron
Australasian crested grebe
Australasian bittern
NZ kingfisher
Black shag
Little black shag
Pūkeko

Coastal wetland
Reef heron
Pied shag

‘Shallower’ (species-level) endemics

Non-endemic native



Forest
Silvereye

Freshwater wetland
Grey teal
White-faced heron
Australian coot

Coastal wetland
Royal spoonbill

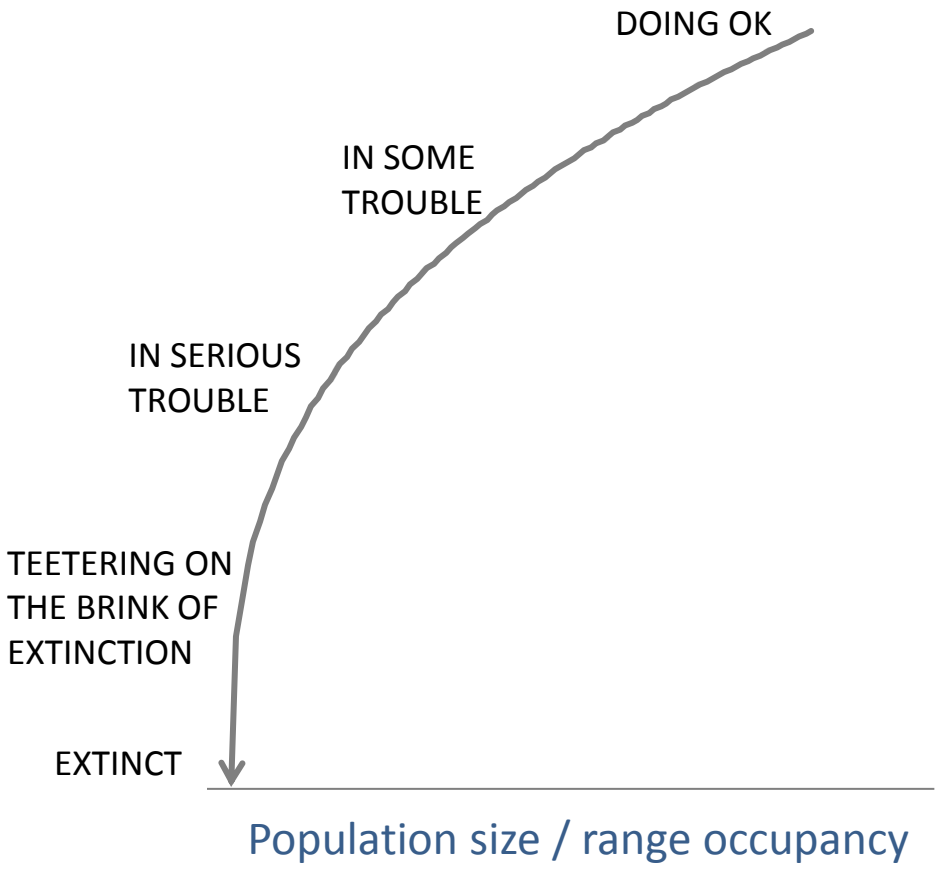
Open
Australasian harrier
Spurwing plover
Welcome swallow

‘Shallower’ (species-level) endemics

Non-endemic native

Recently self-introduced
(since ~ 1850)

Trouble



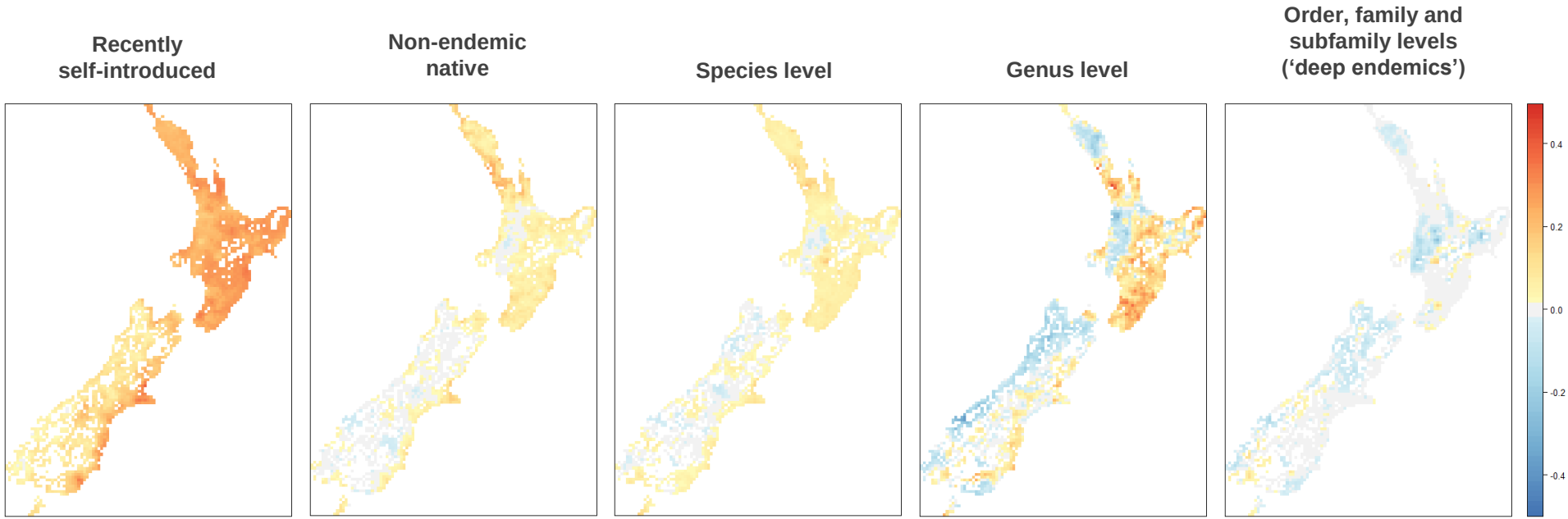
Deep endemism = deep trouble

"Species which have had a long evolutionary history in New Zealand seem now to be susceptible to extinction.

This suggests some peculiarity in the evolutionary process … which in a time related manner affects the present viability of the species" (McDowall 1969, p. 8).

Endemism = trouble

Changes in average local occupancy over 25 years (1969-1979 to 1999-2004)



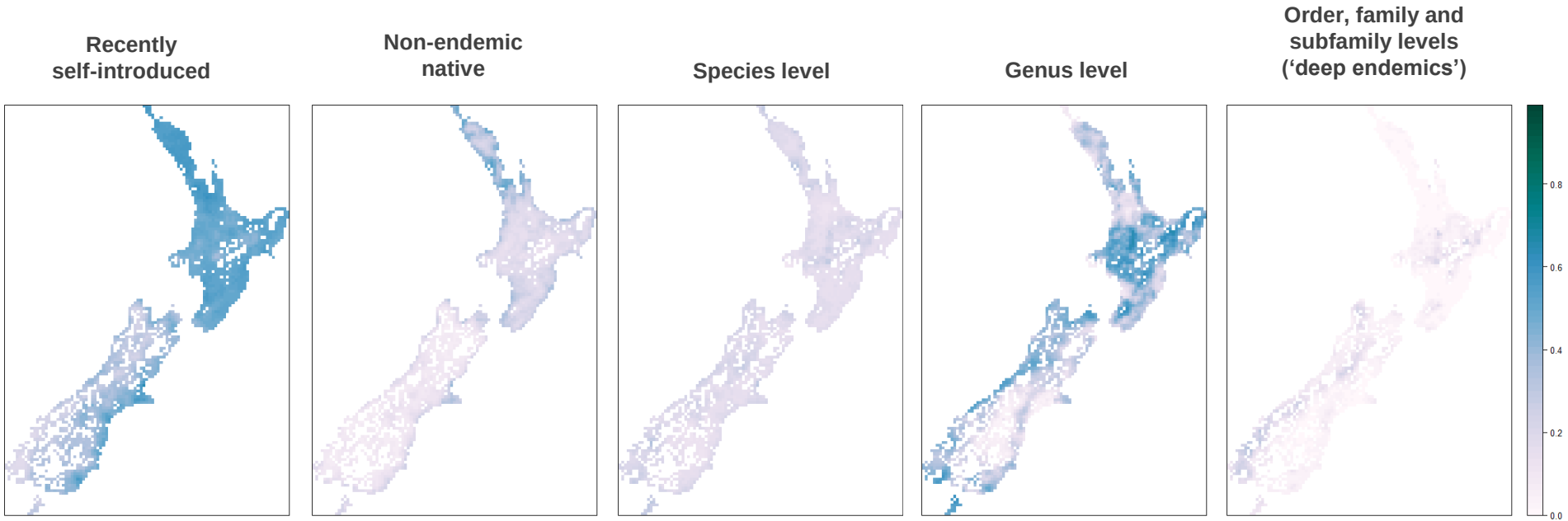
Level of endemism >>>

DOING OK

IN SERIOUS TROUBLE

Spatial distributions vary with endemism level

Average local occupancy in 1999-2004

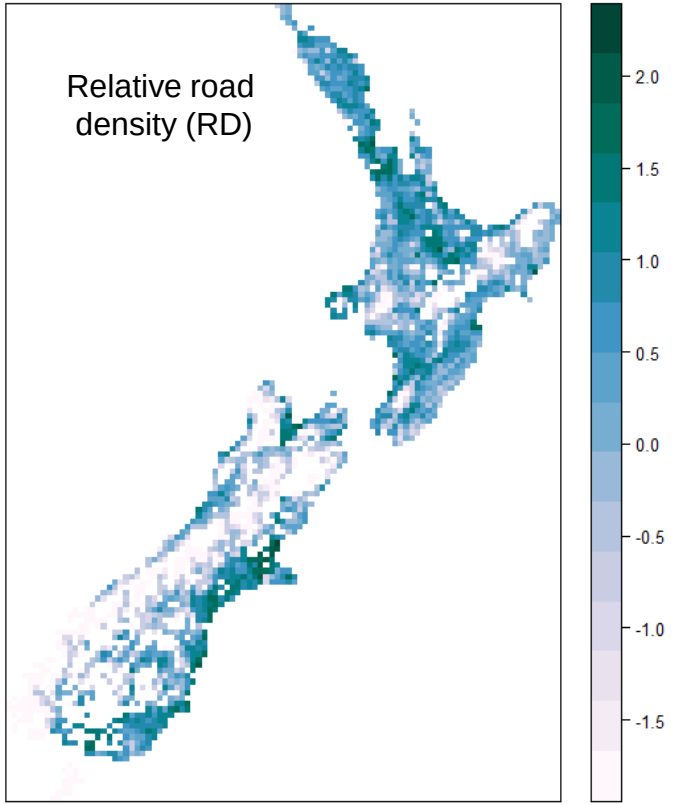


SETTLED AND PRODUCTION LOWLANDS

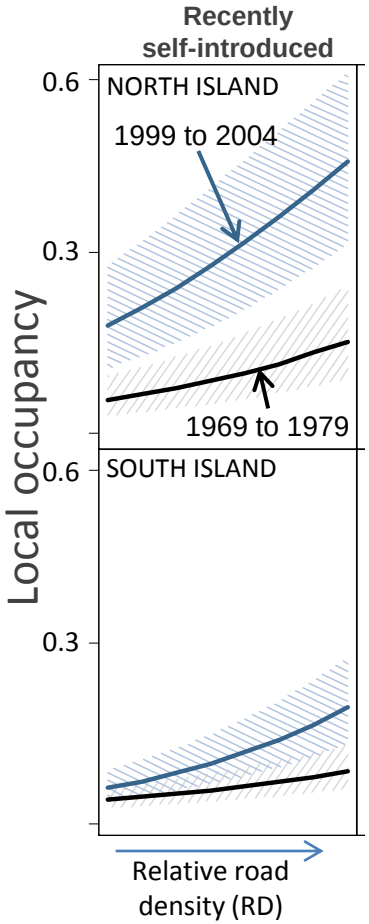
Level of endemism >>>

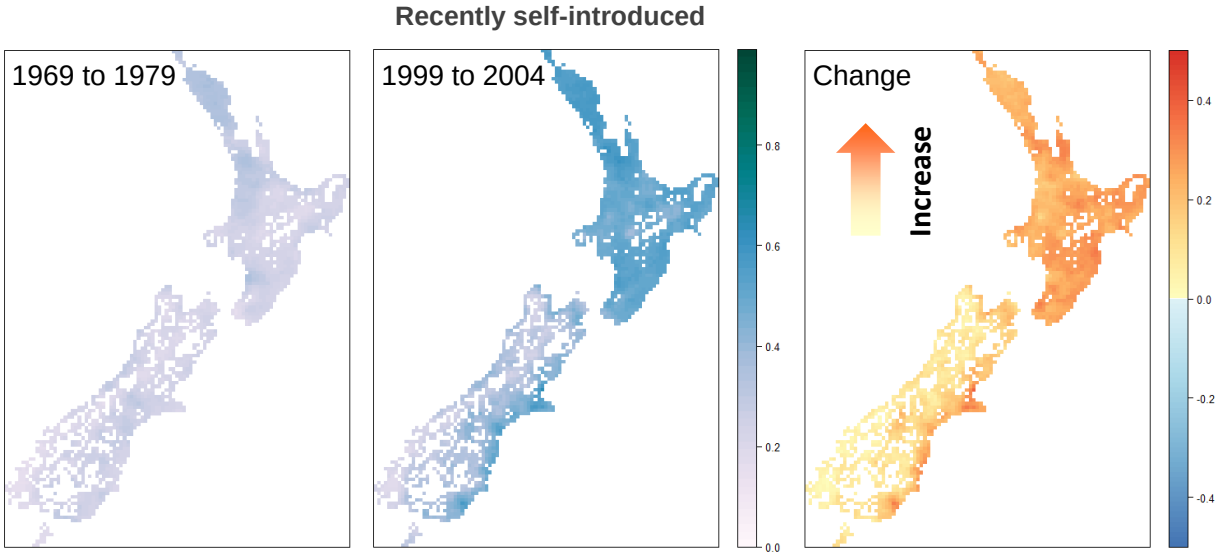
REMOTE FOREST AND ALPINE

Road density
as an index of human occupation

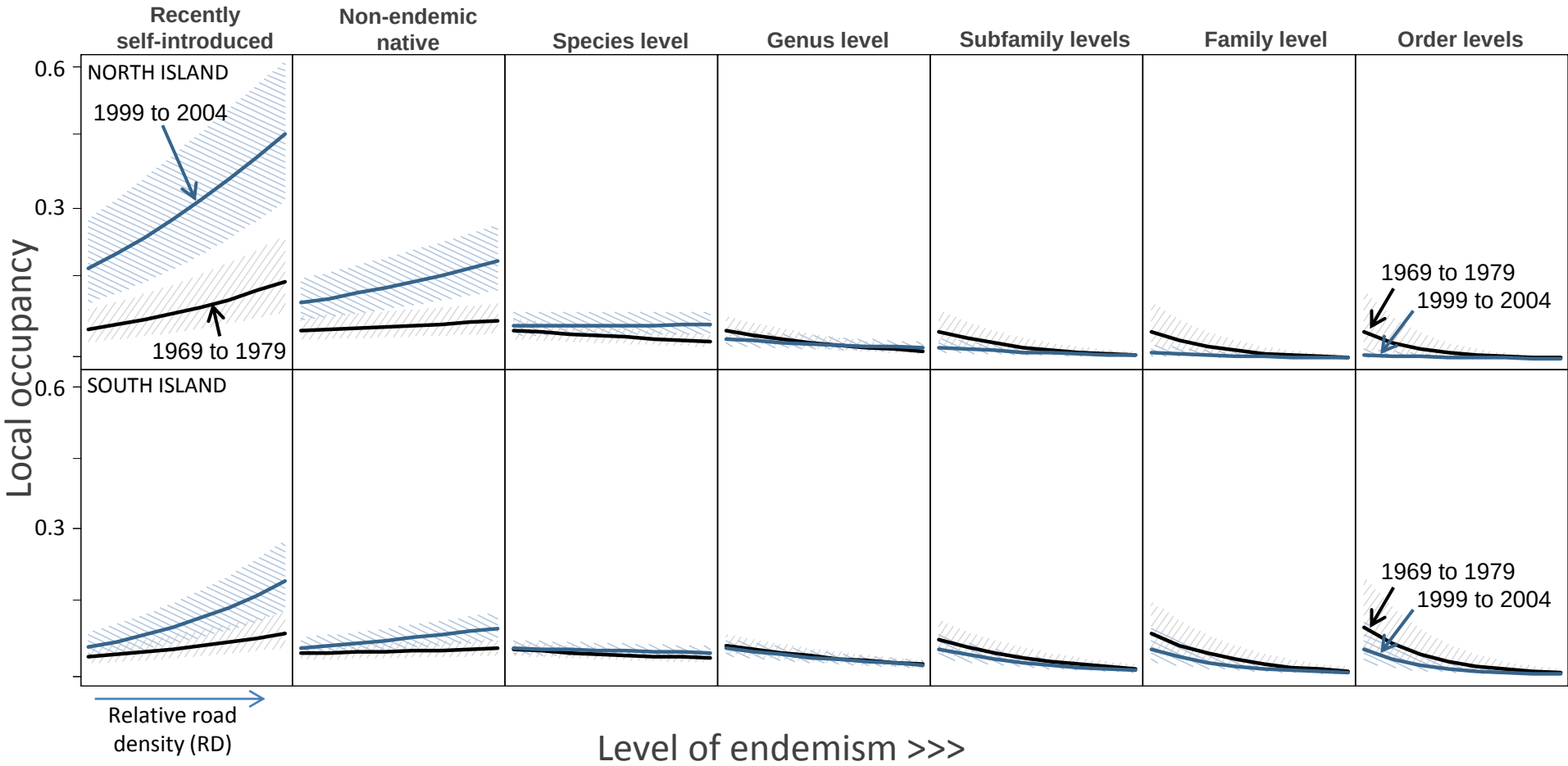


Effects of road density and endemism level





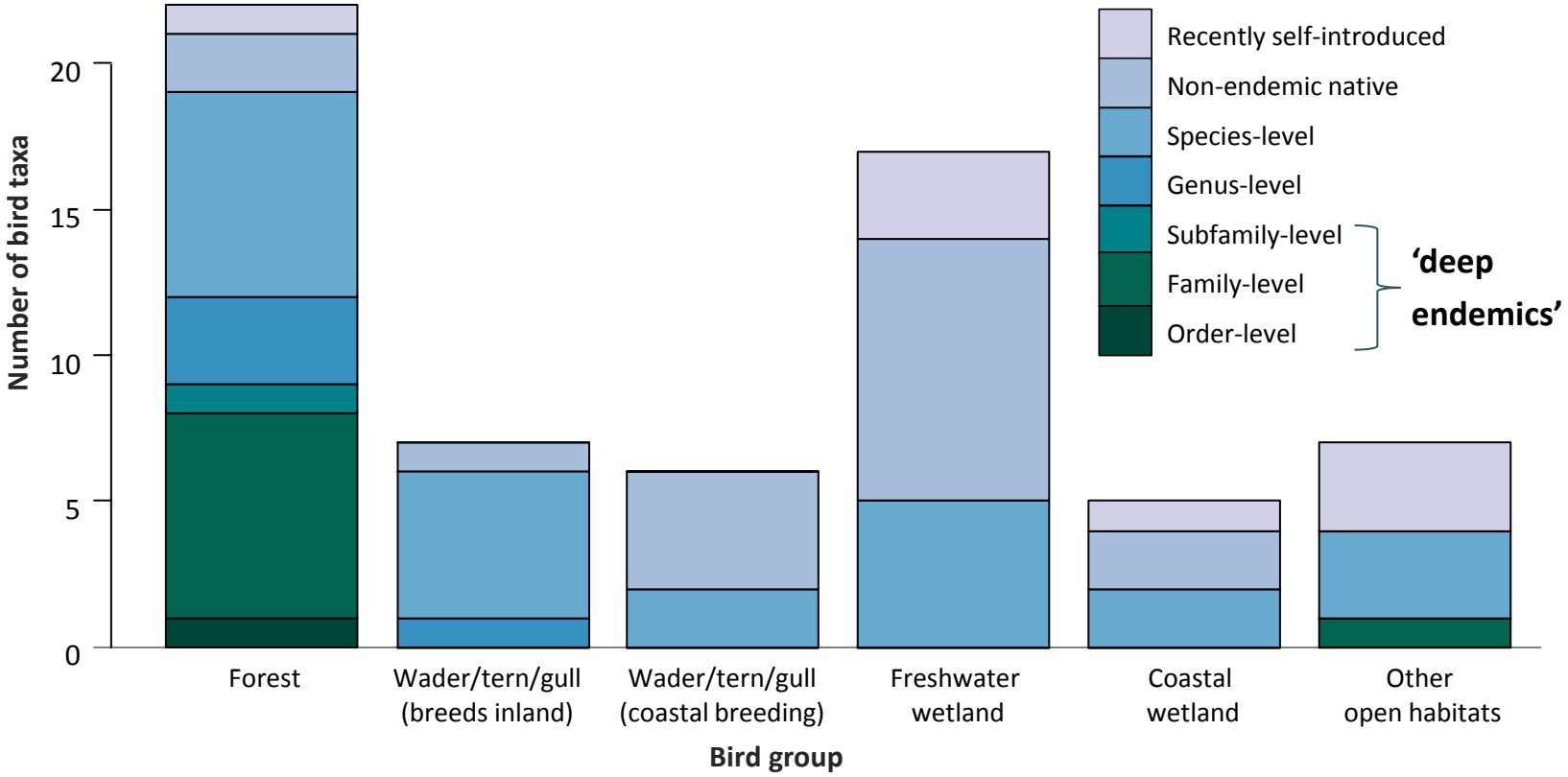
Effects of road density and endemism level



Biotic homogenisation

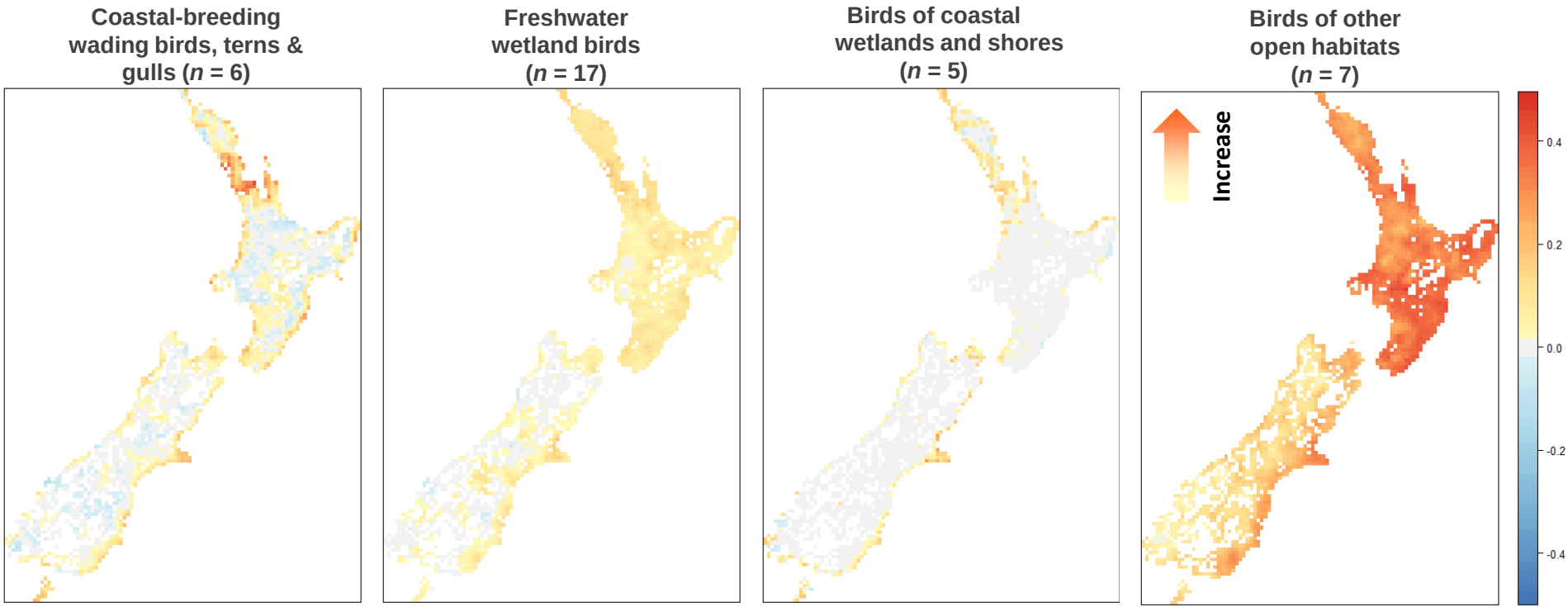
- Recent arrivals increasing in human occupied landscapes
- Deep endemics decreasing in refuges mainly remote from human occupation

Six habitat groups



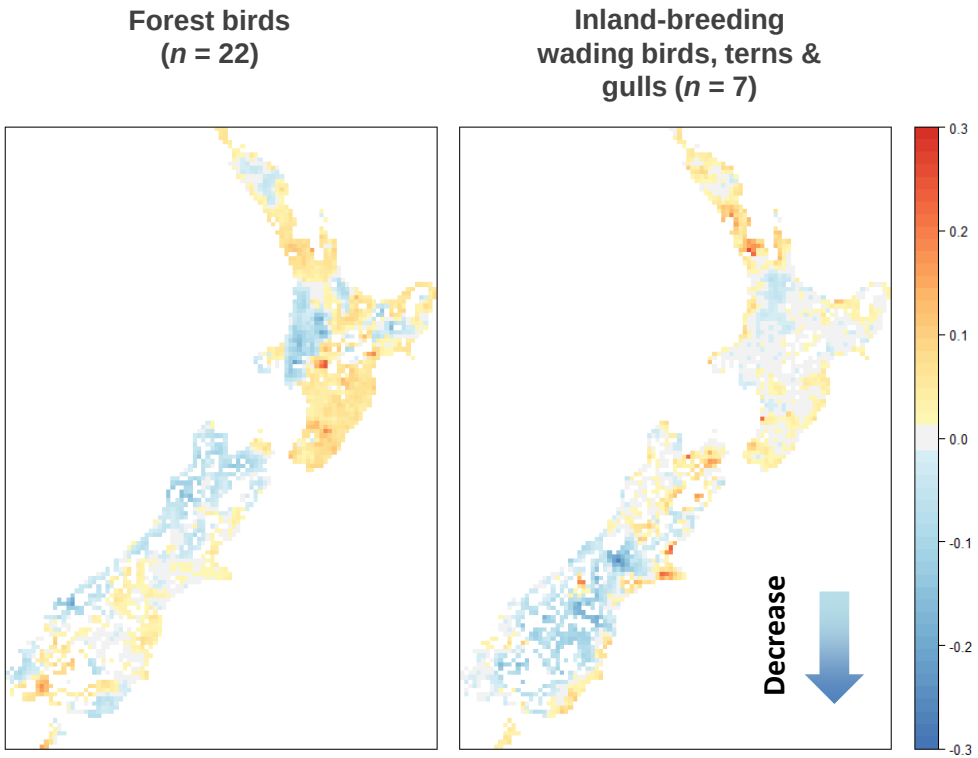
Doing OK

Changes in average local occupancy over 25 years



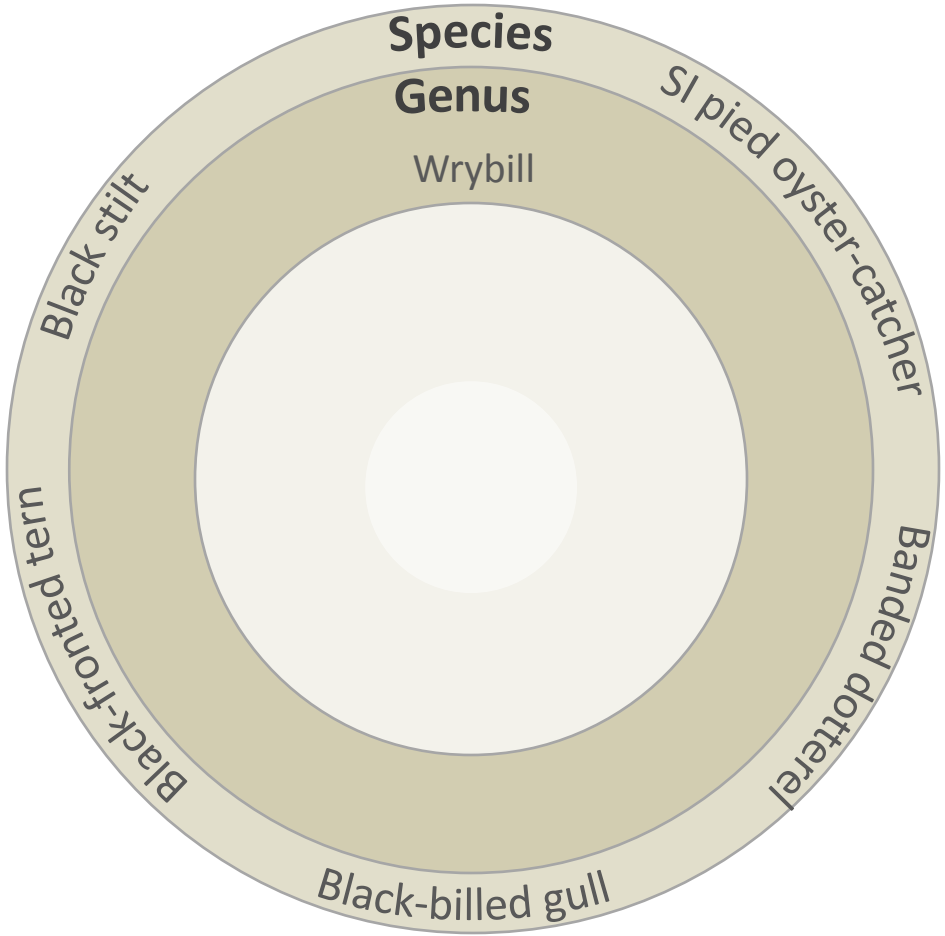
In some, or serious, trouble

Changes in average local occupancy over 25 years



Inland-breeding wading birds, terns and gulls

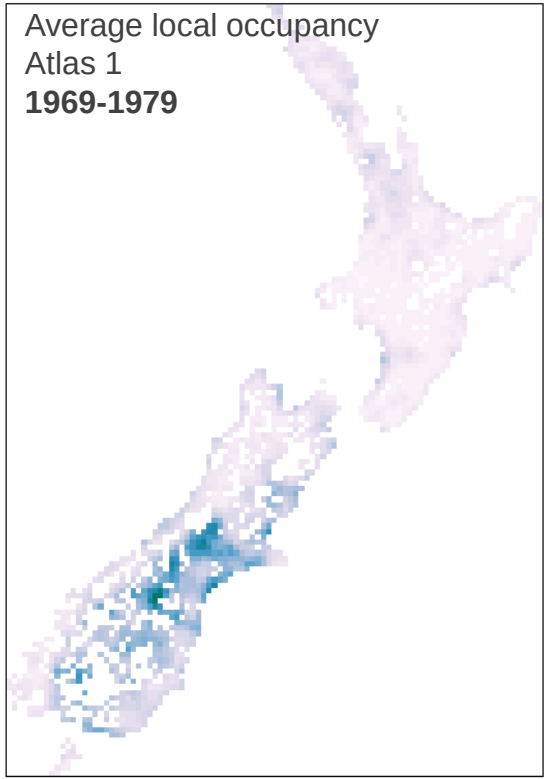
BANDED DOTTEREL, TASMAN VALLEY, © CRAIG MACKENZIE

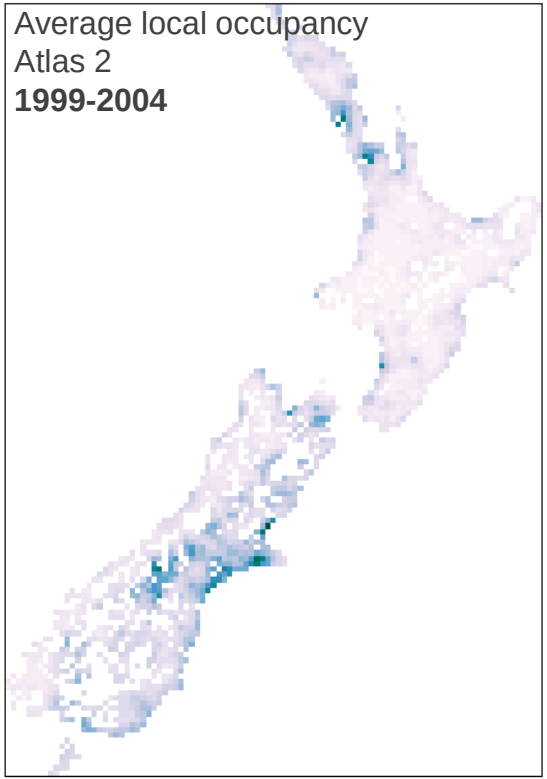


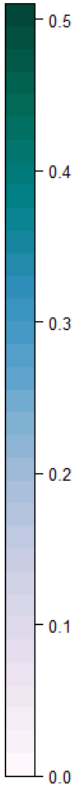
TASMAN VALLEY AND MT COOK, PETER SCOTT

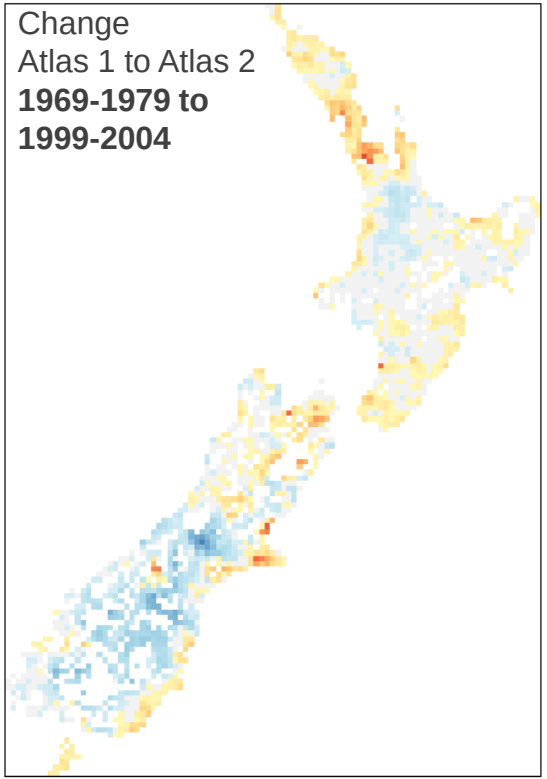
PUKAKI OUTWASH PLAIN, SIMONS PASS, MACKENZIE BASIN, PETER SCOTT

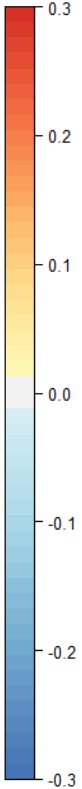
Inland-breeding wading birds, terns and gulls











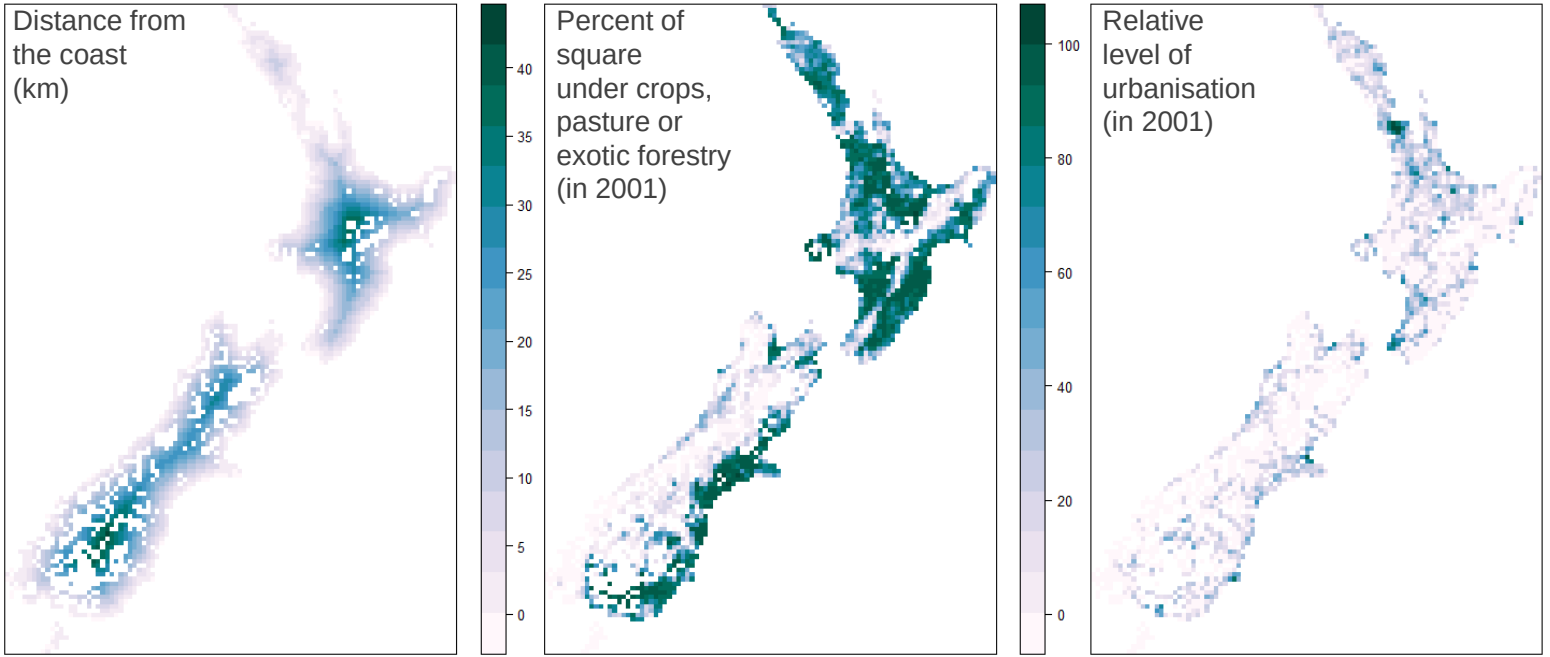
WRYBILL CHICK, MACKENZIE BASIN, DOC

Handy hint

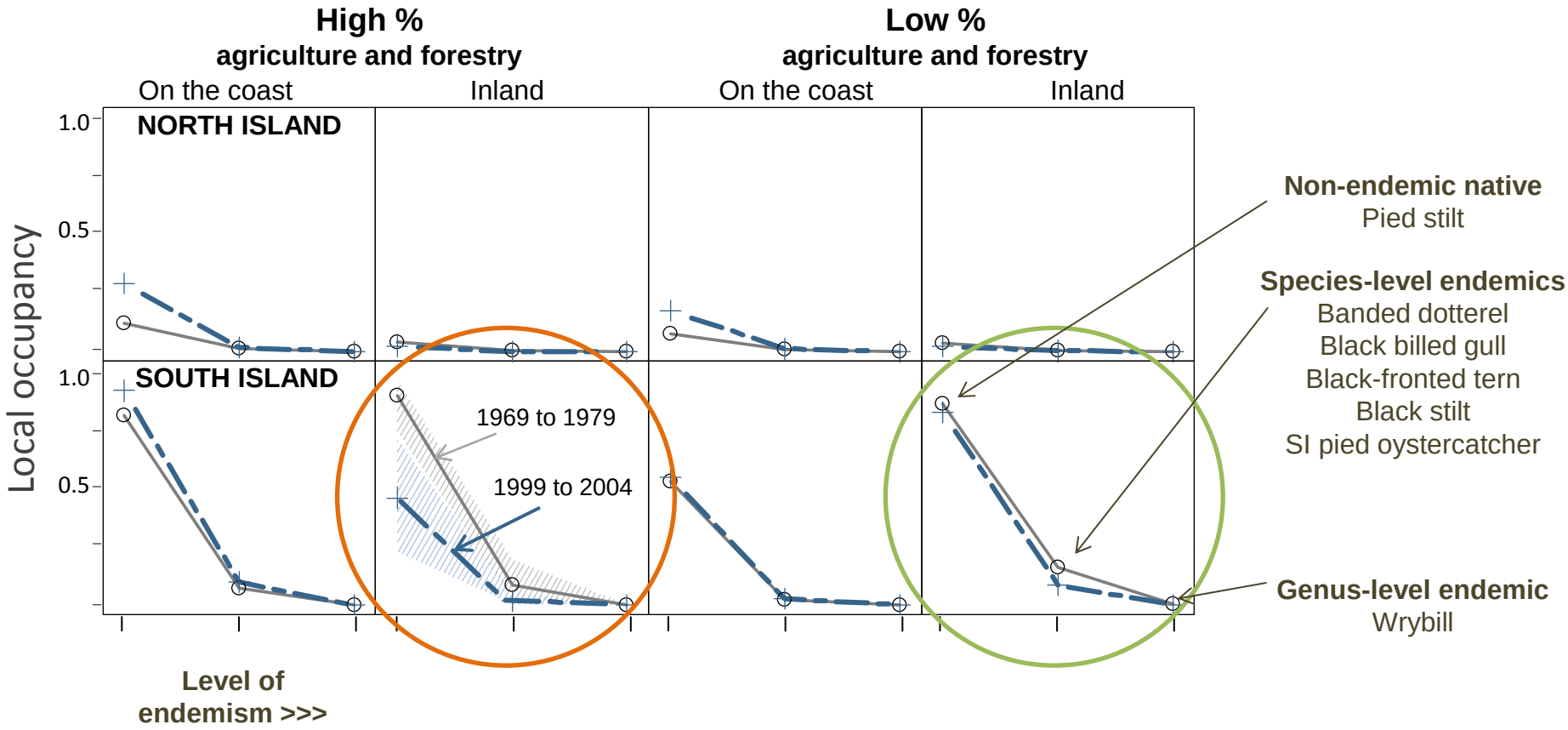
How about avoiding the peak of the breeding season by saving your trip to a braided river until after January? Most chicks have usually fledged by this time. Thank you for your consideration.

AHURIRI OUTWASH PLAIN, KILLERMONT, MACKENZIE BASIN, PETER SCOTT

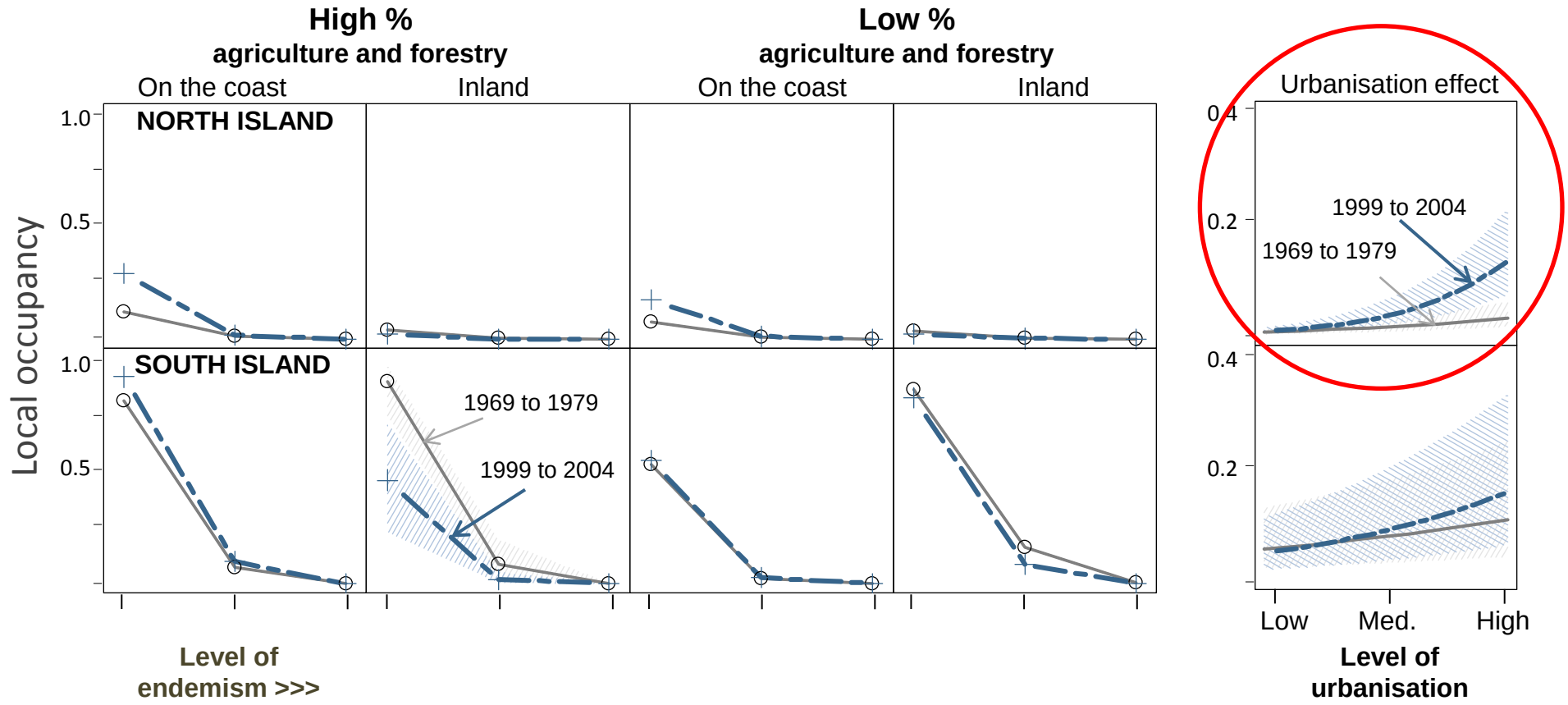
Environmental predictors of local occupancy change



Land use and urbanisation effects



Land use and urbanisation effects



Land use plays a role

Inland-breeding wading birds, terns and gulls

- greater declines in inland South Island breeding areas developed for agriculture and forestry
- greater increases in winter feeding areas surrounded by more urban development

Remaining forest birds

		Long-tailed cuckoo			Rifleman	
		Yellow-crowned parakeet			Kōkako	
		Falcon			Kea	
		Tomtit			Kākā	
		Robin			Whitehead	
		Weka (all)	Kererū		Mōhua	
	Shining cuckoo	Grey warbler	Bellbird			
Silvereye	Morepork	Fantail	Tūi	Blue duck	Brown creeper	Kiwi (all)

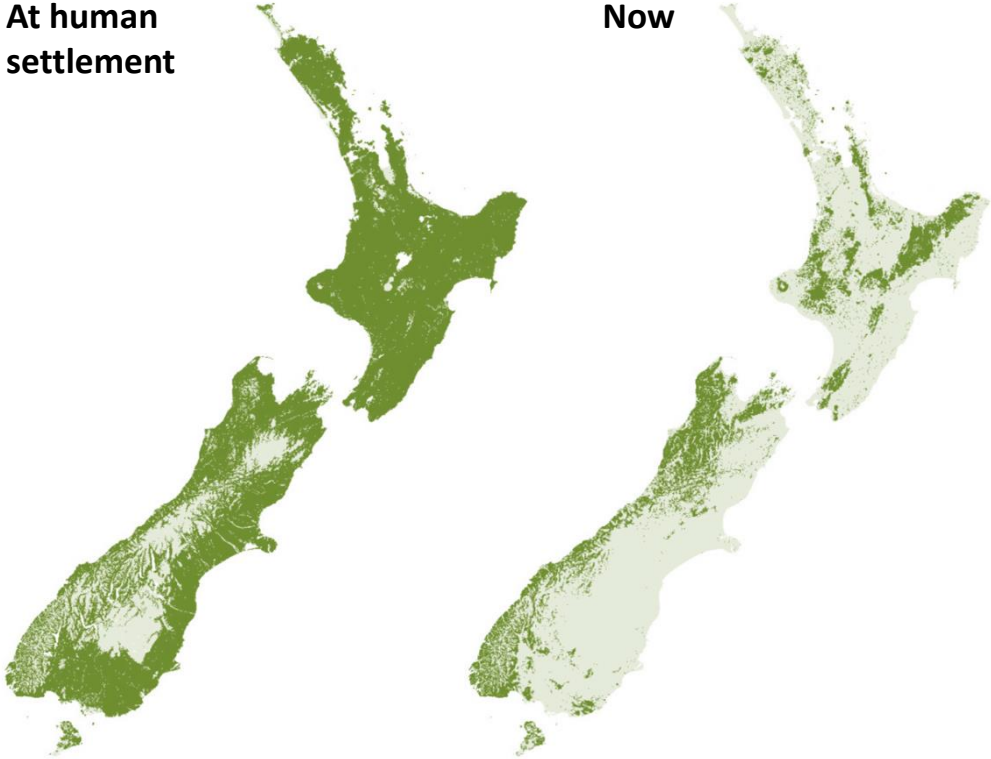
Level of endemism >>>

Forest birds need forest

Native forest cover

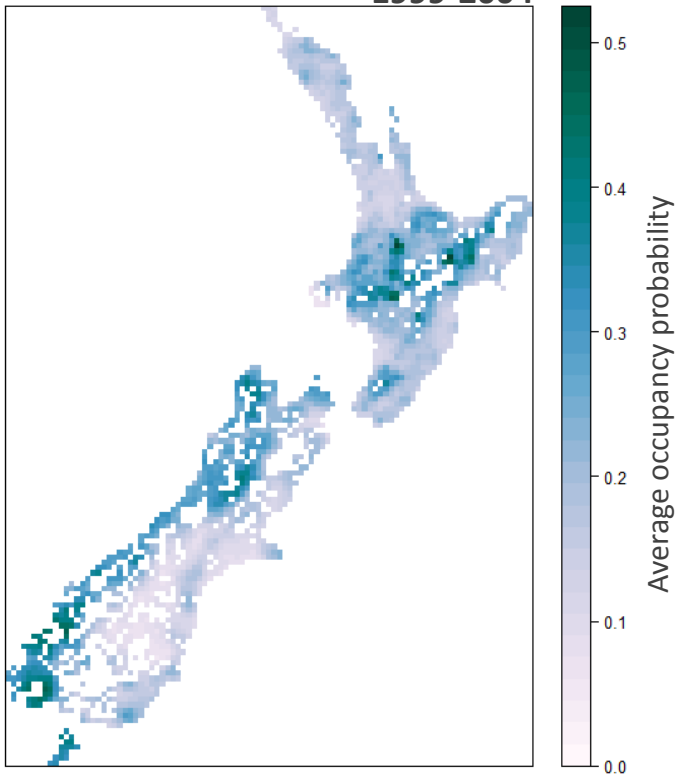
At human settlement

Now



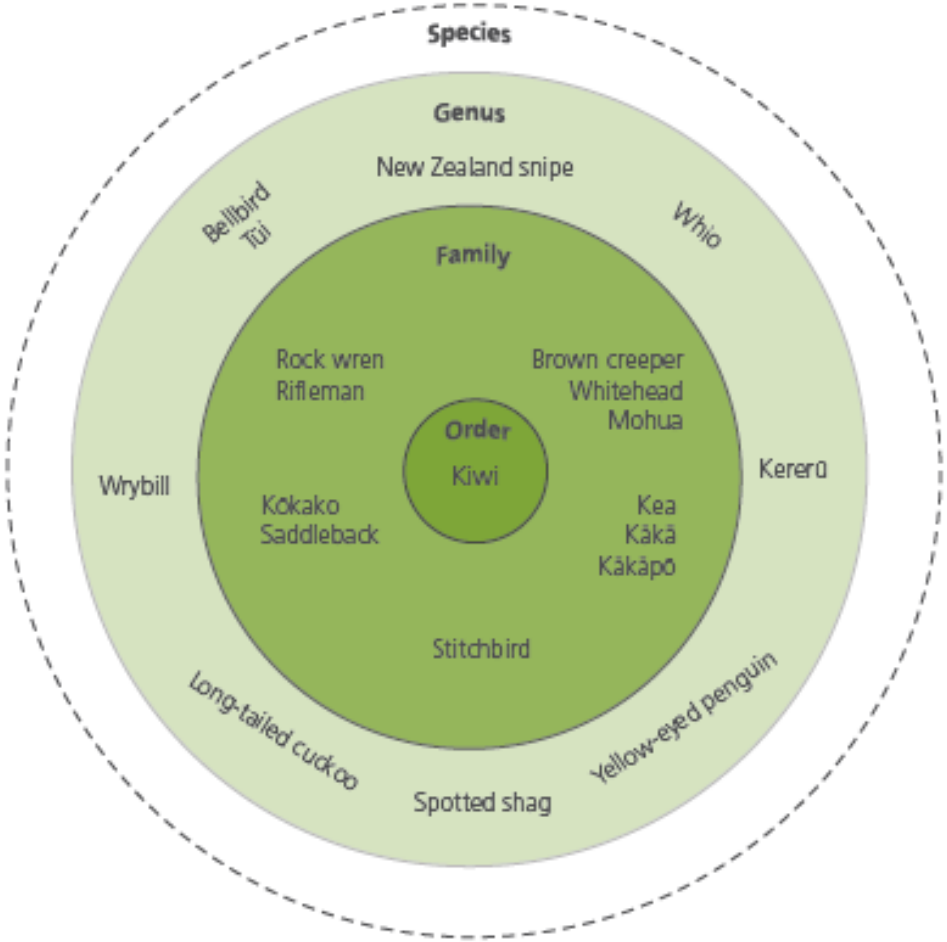
Endemic forest birds

1999-2004



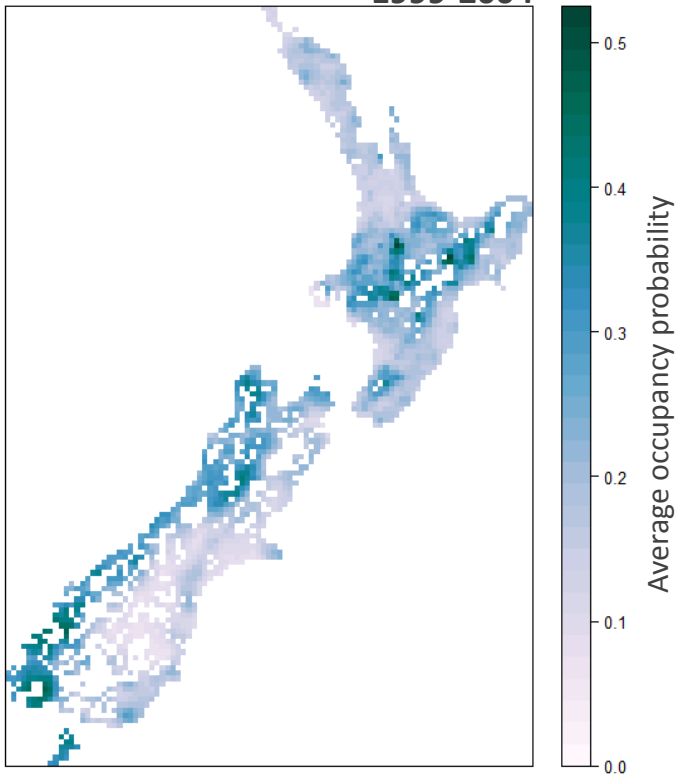
WALKER & MONKS 2017 (LANDCARE RESEARCH REPORT FOR THE PCE)

Endemic forest birds need forest more

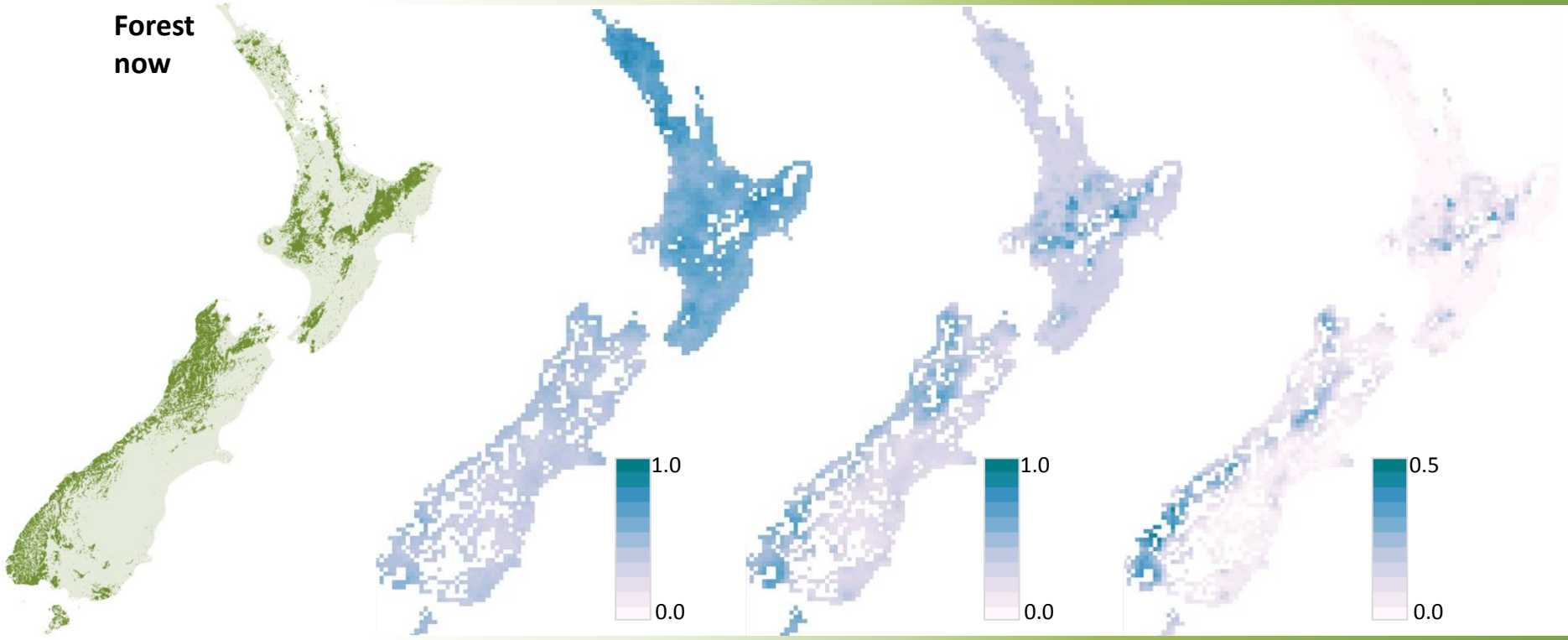


Endemic forest birds

1999-2004

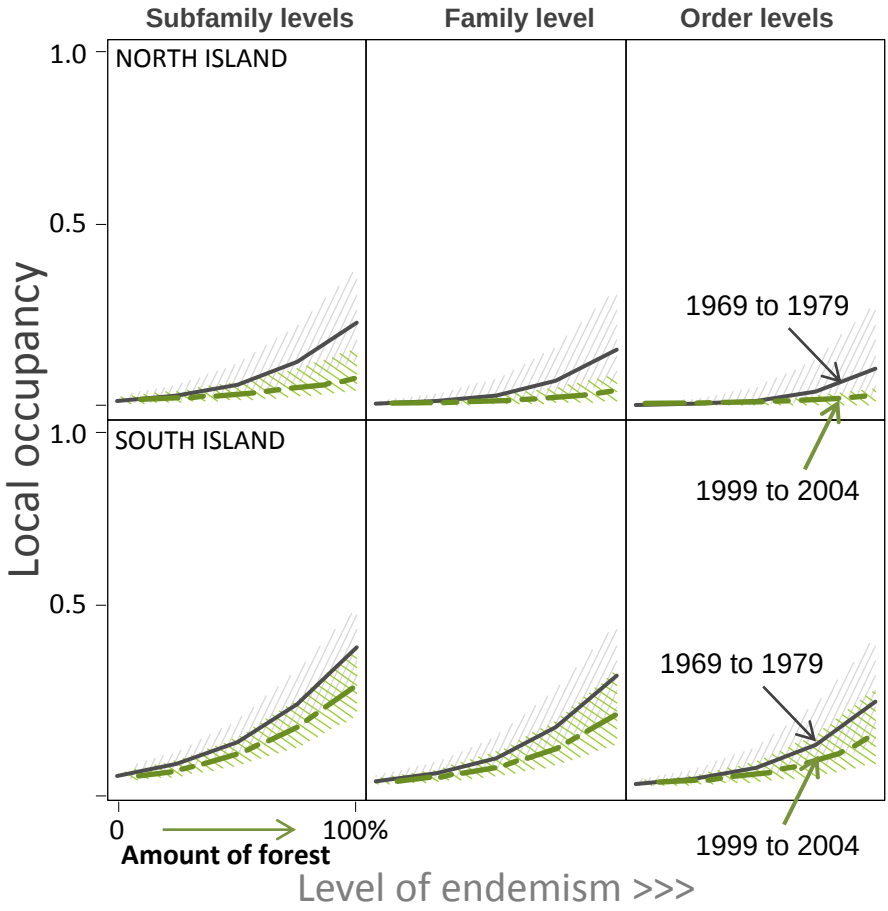


Endemic forest birds need forest more

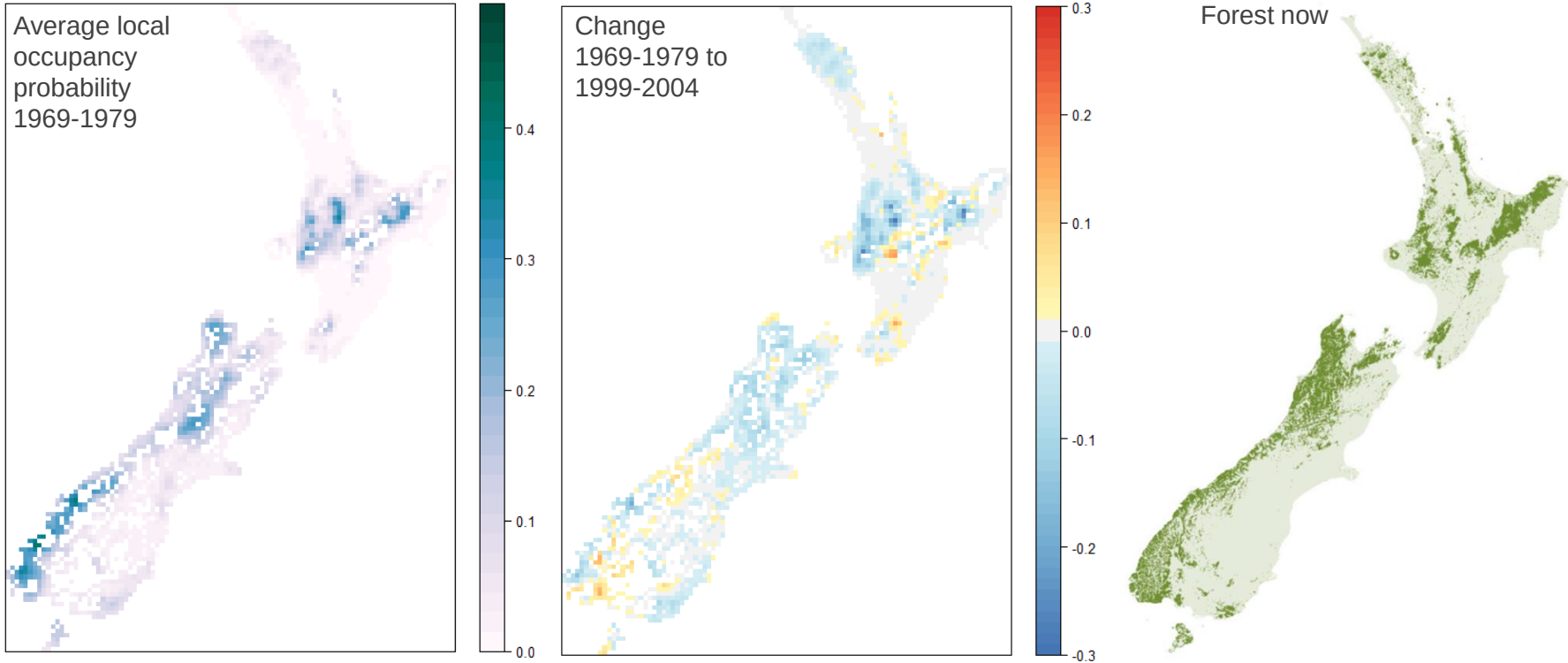


WALKER & MONKS 2017 (LANDCARE RESEARCH REPORT FOR THE PCE)

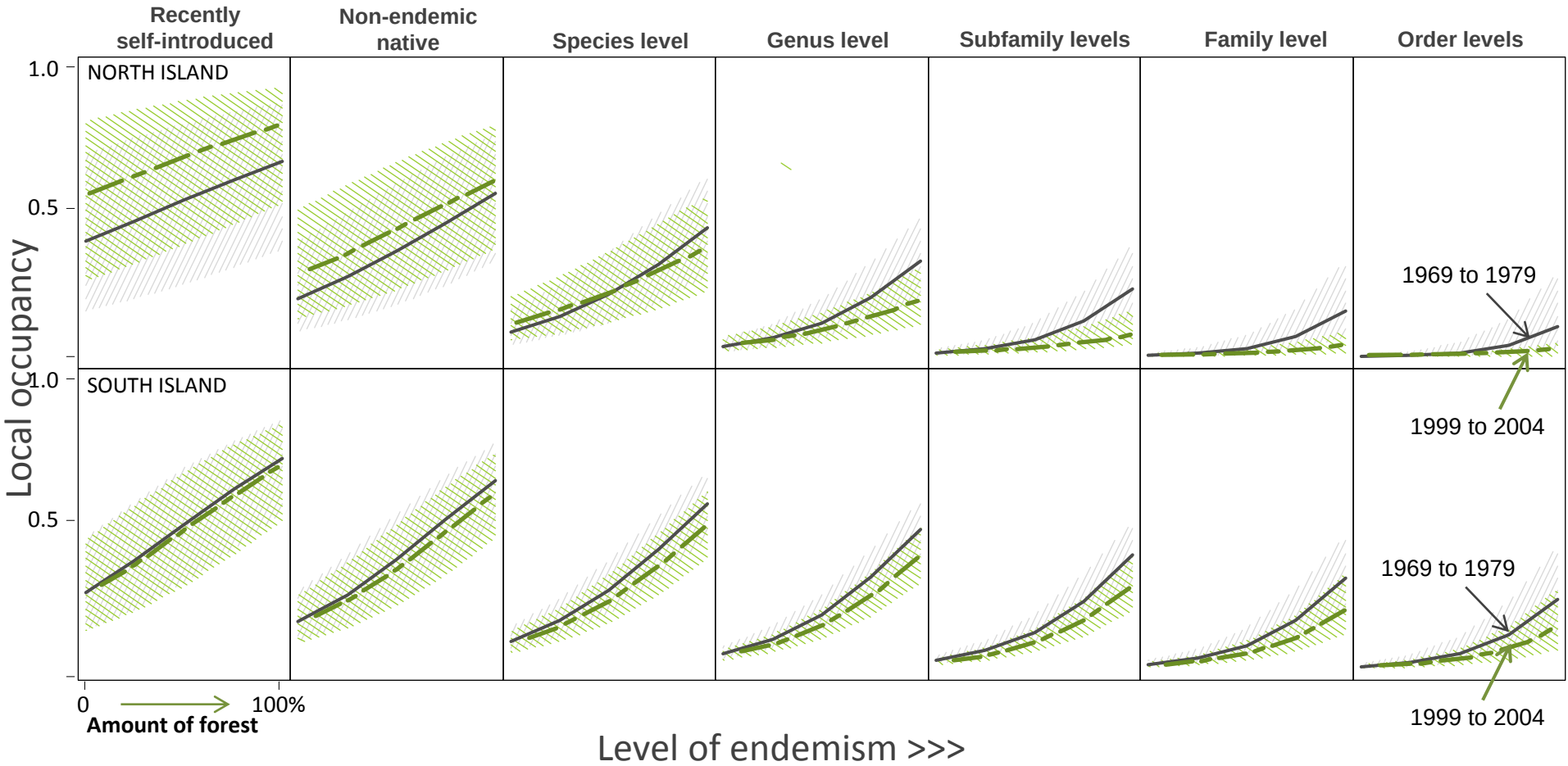
Effects of forest cover and endemism level



Deep endemic forest birds



Effects of forest cover and endemism level on forest birds



Not all forests are equal

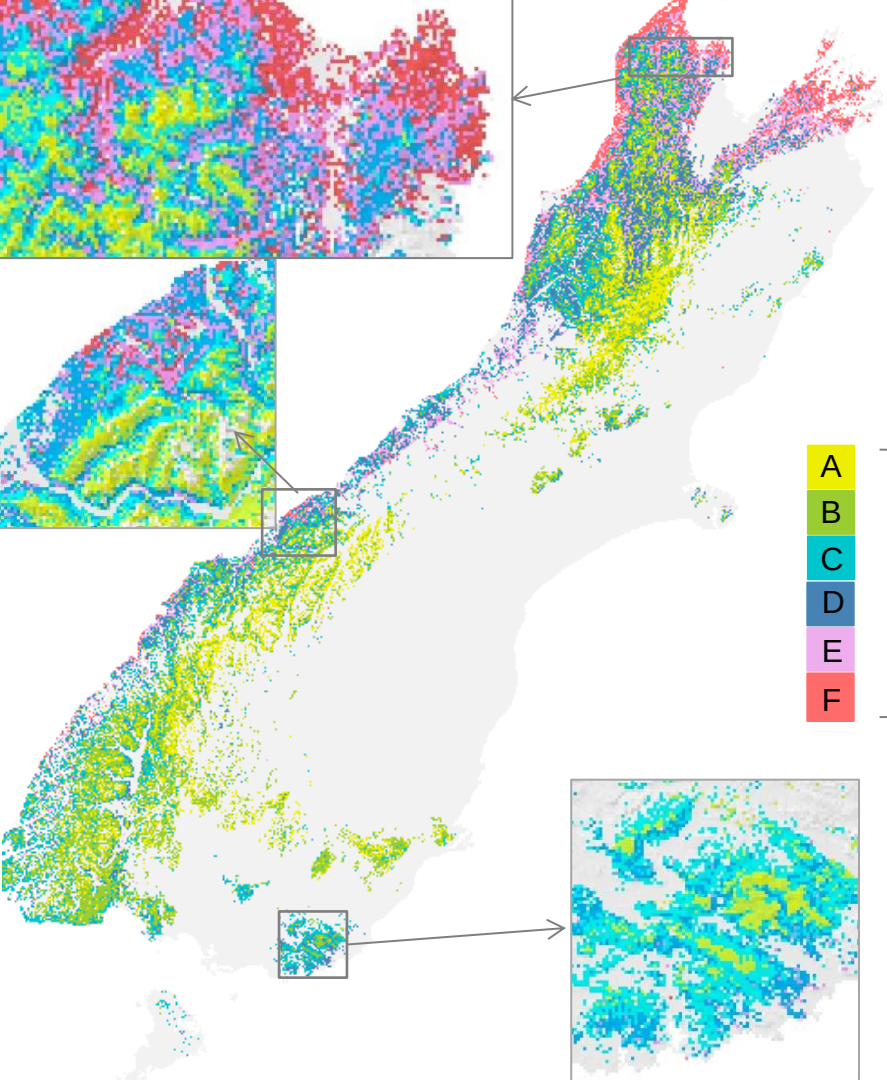
PAPAROA NATIONAL PARK, JAMES REARDON

Not all forests are equal

Ship rat

Predator patterns

Ship rats

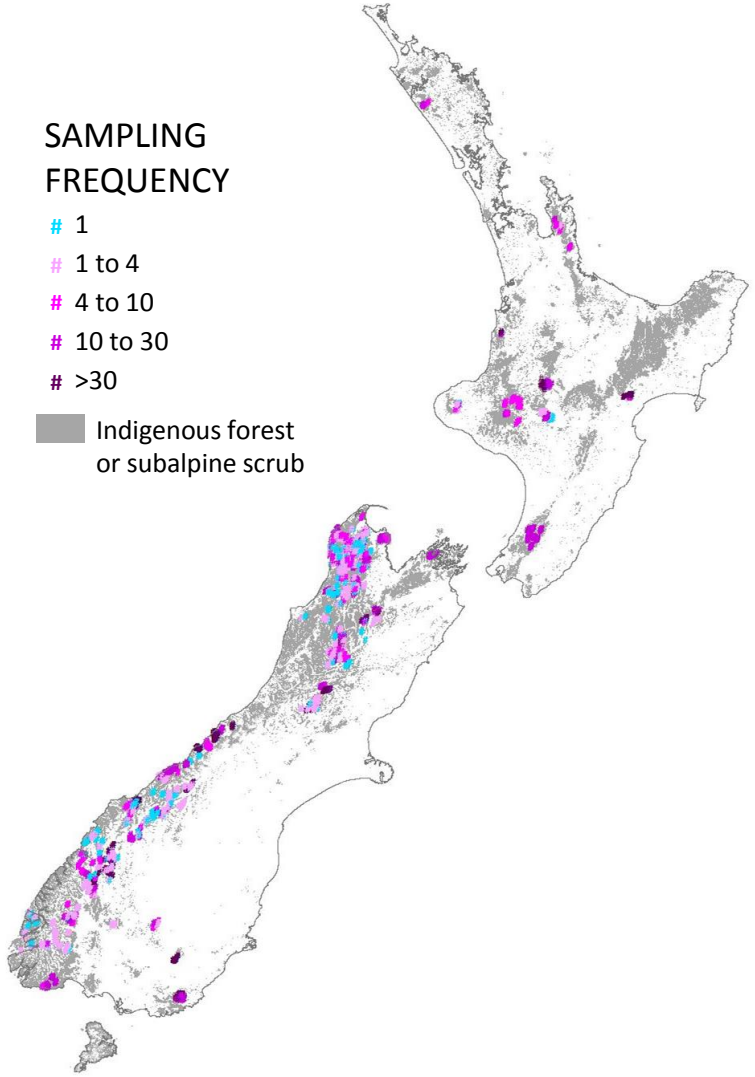


WALKER ET AL (LANDCARE RESEARCH AND DOC, IN PREP)

DOC's rodent tracking tunnel dataset

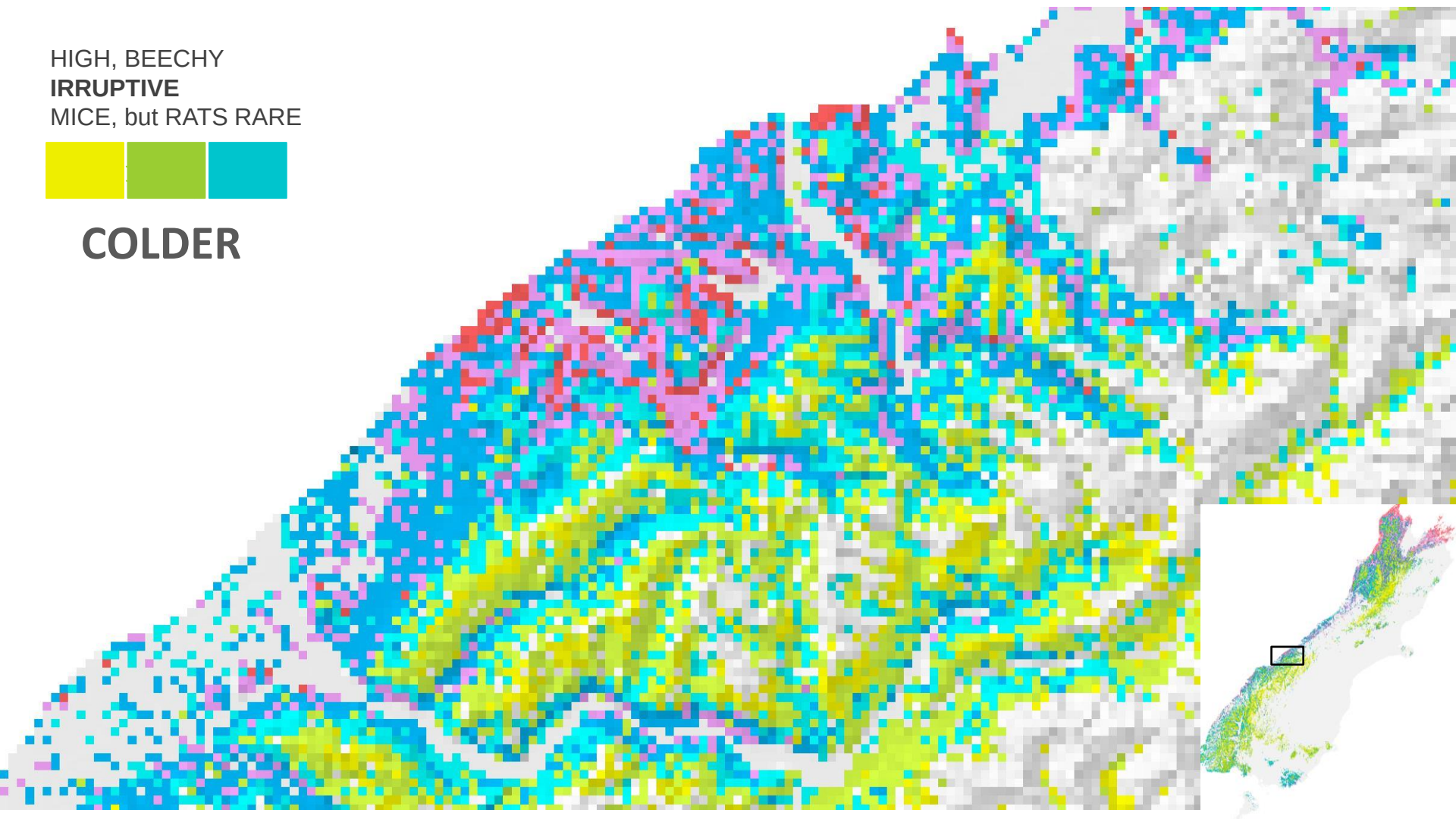
>250,000 records

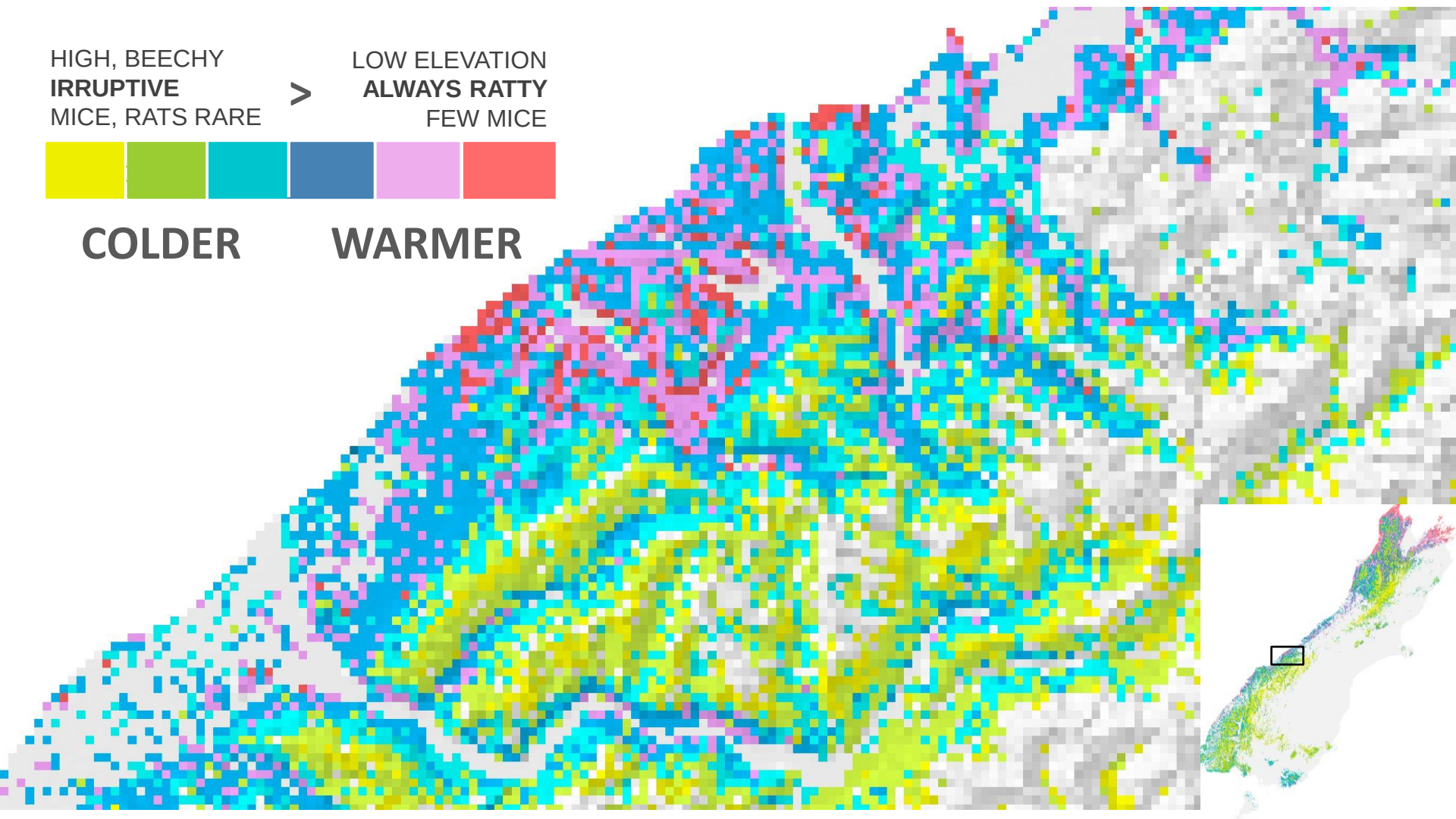
1999 to present



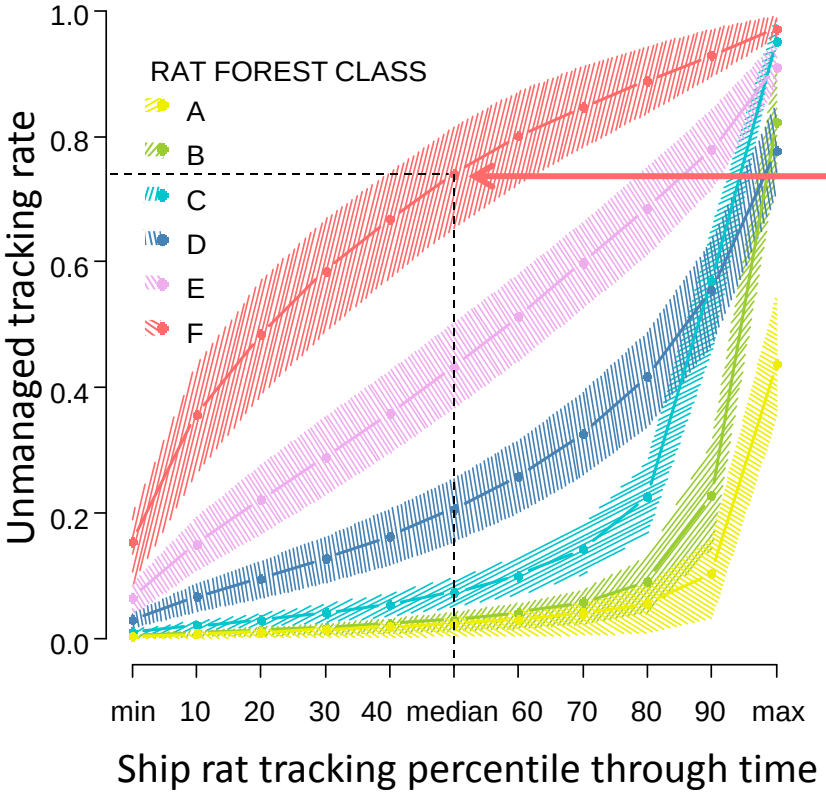
HIGH, BEECHY
IRRUPTIVE
MICE, but RATS RARE

COLDER

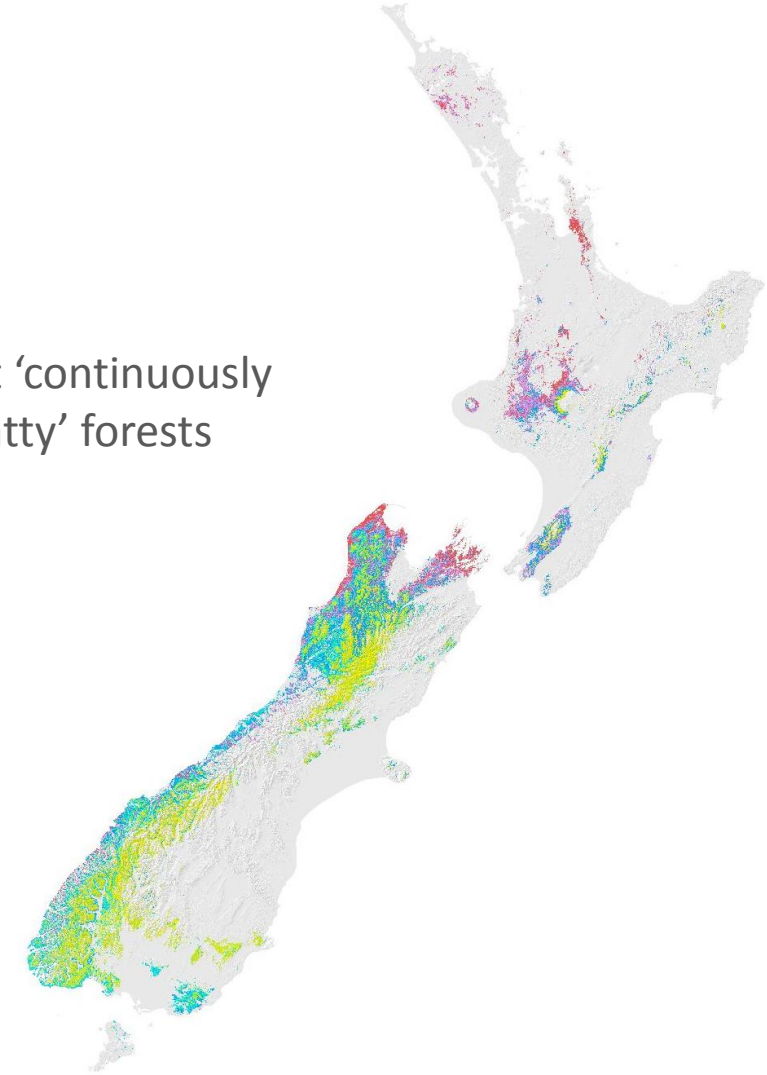



HIGH, BEECHY
IRRUPTIVE
MICE, RATS RARE
>
LOW ELEVATION
ALWAYS RATTY
FEW MICE
COLDER
WARMER

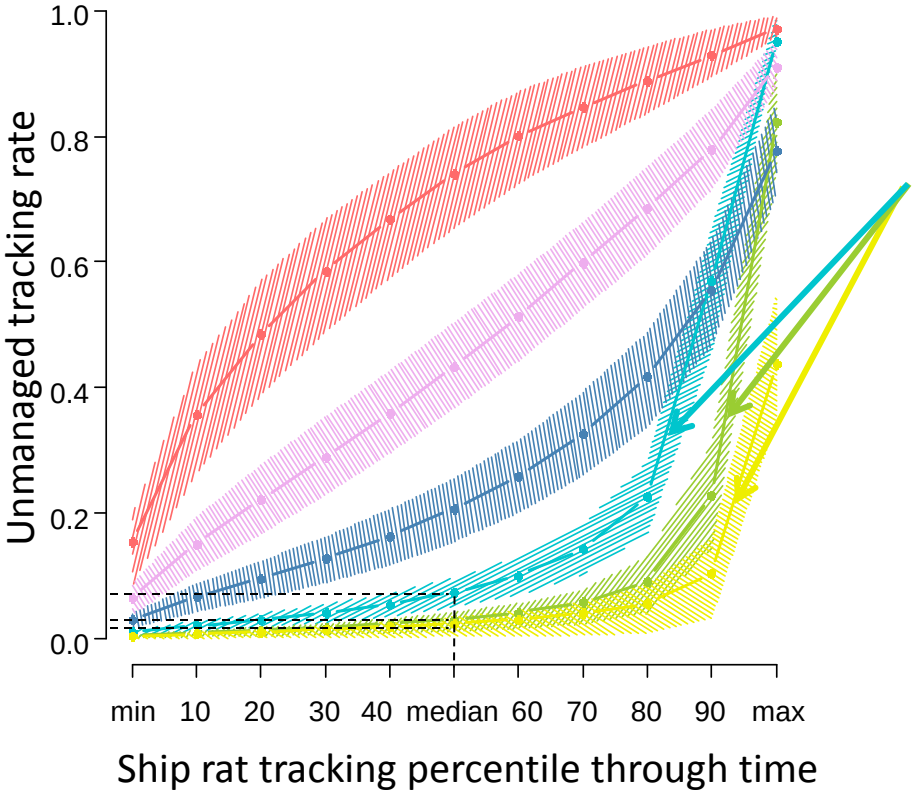
‘Rat forest’ classes



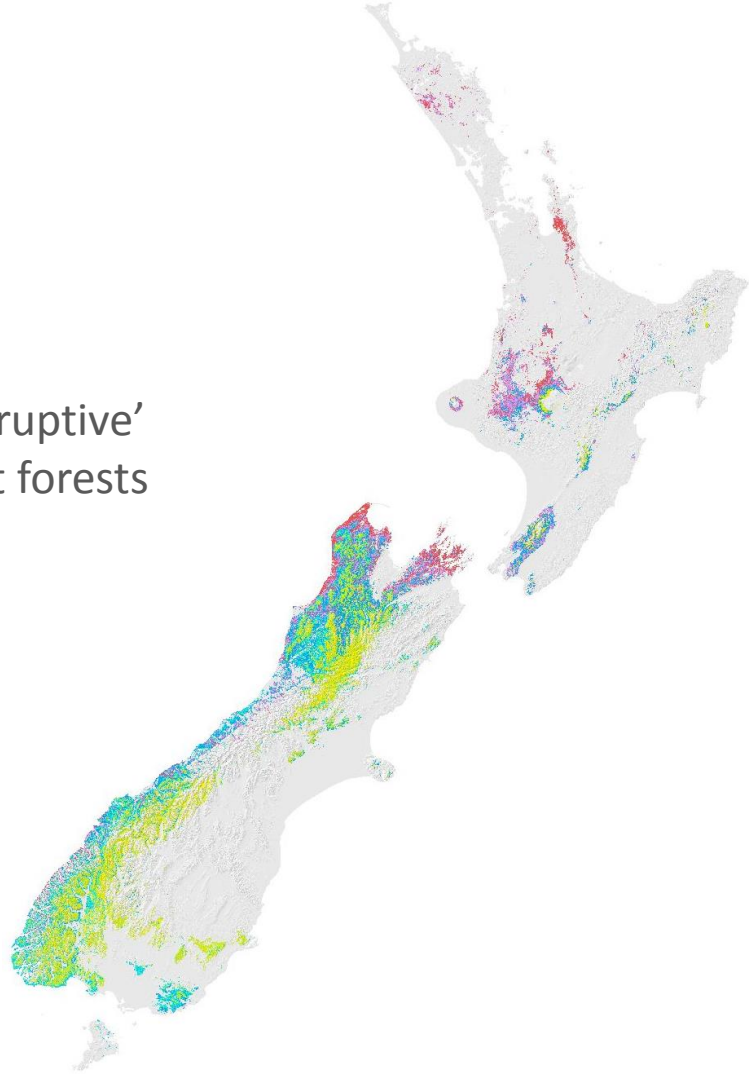
most ‘continuously ratty’ forests



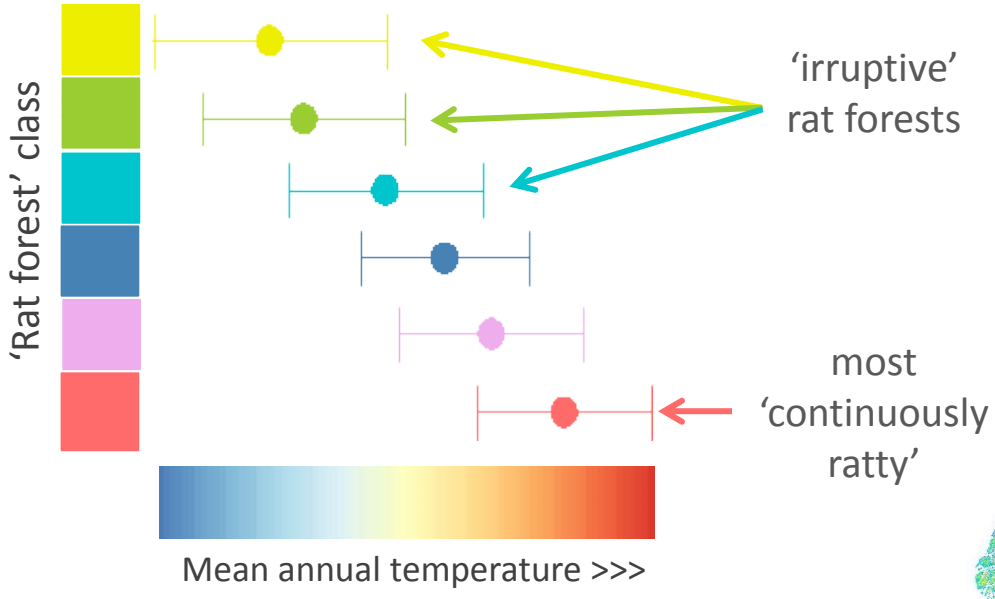
‘Rat forest’ classes

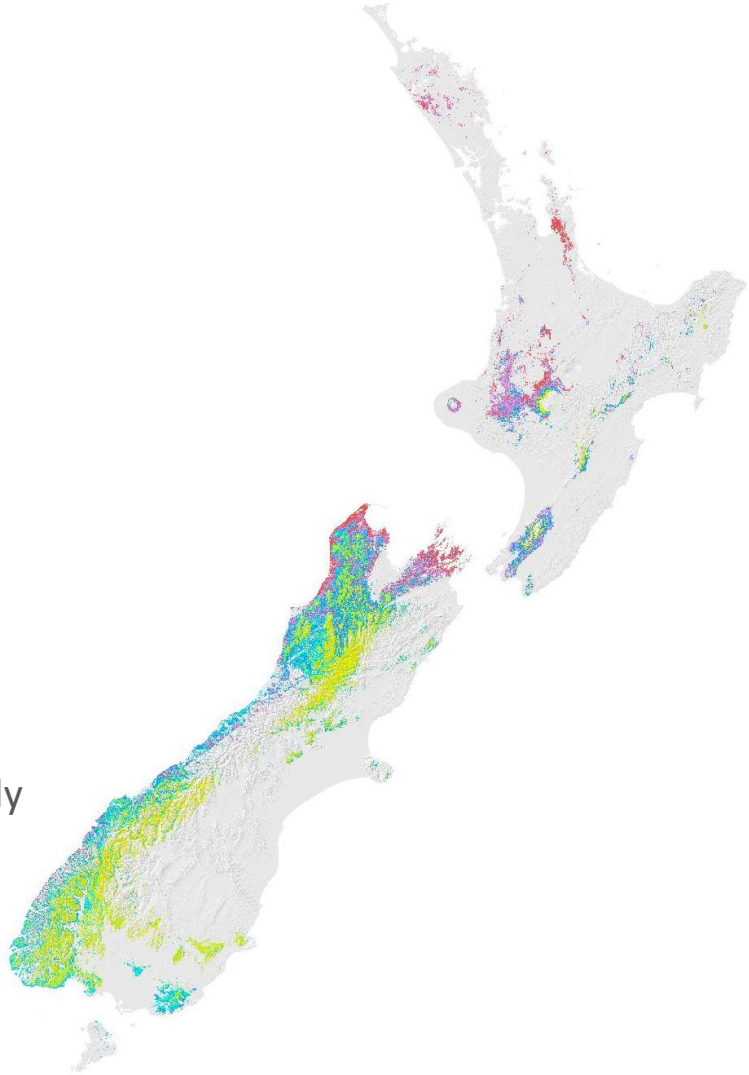


‘irruptive’
rat forests

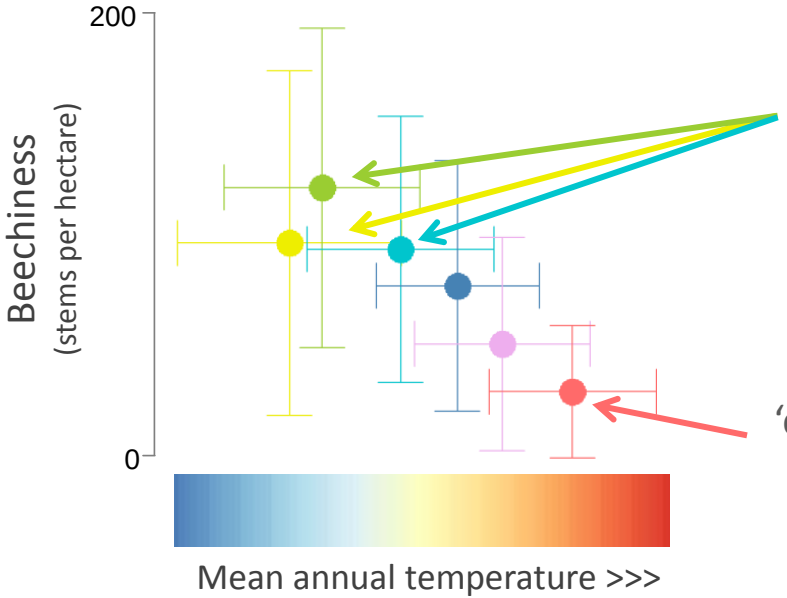


Temperature ≈ ship rats



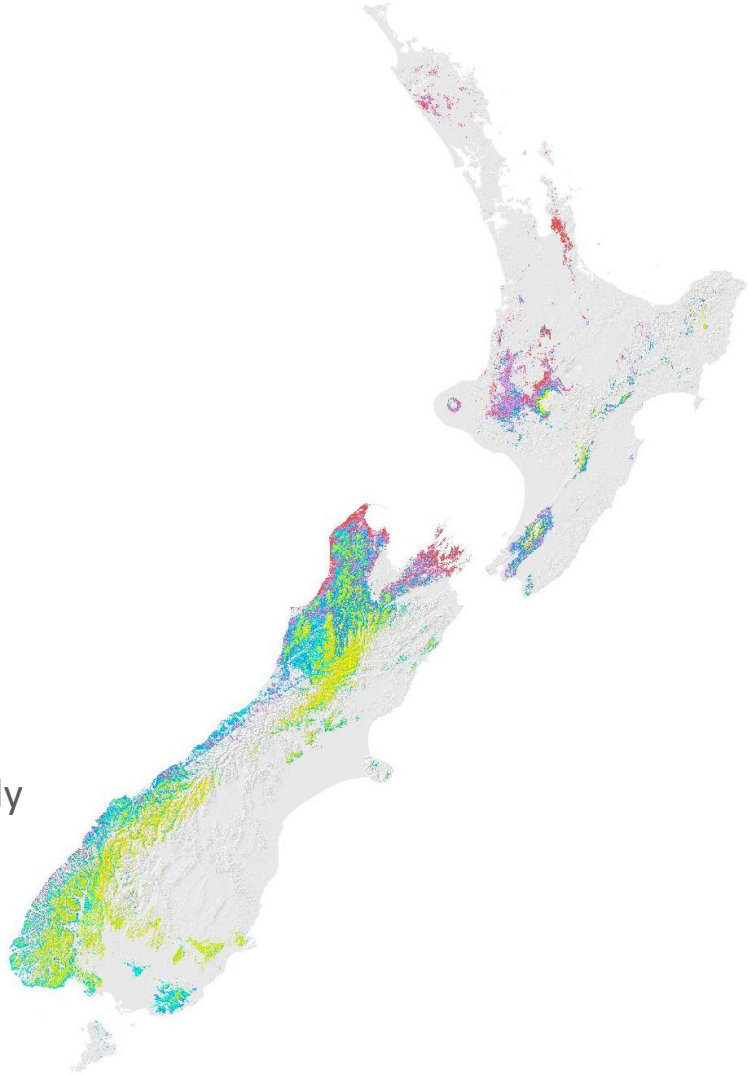


Ratty forests
are warm non-beech forests



‘irruptive’
rat forests

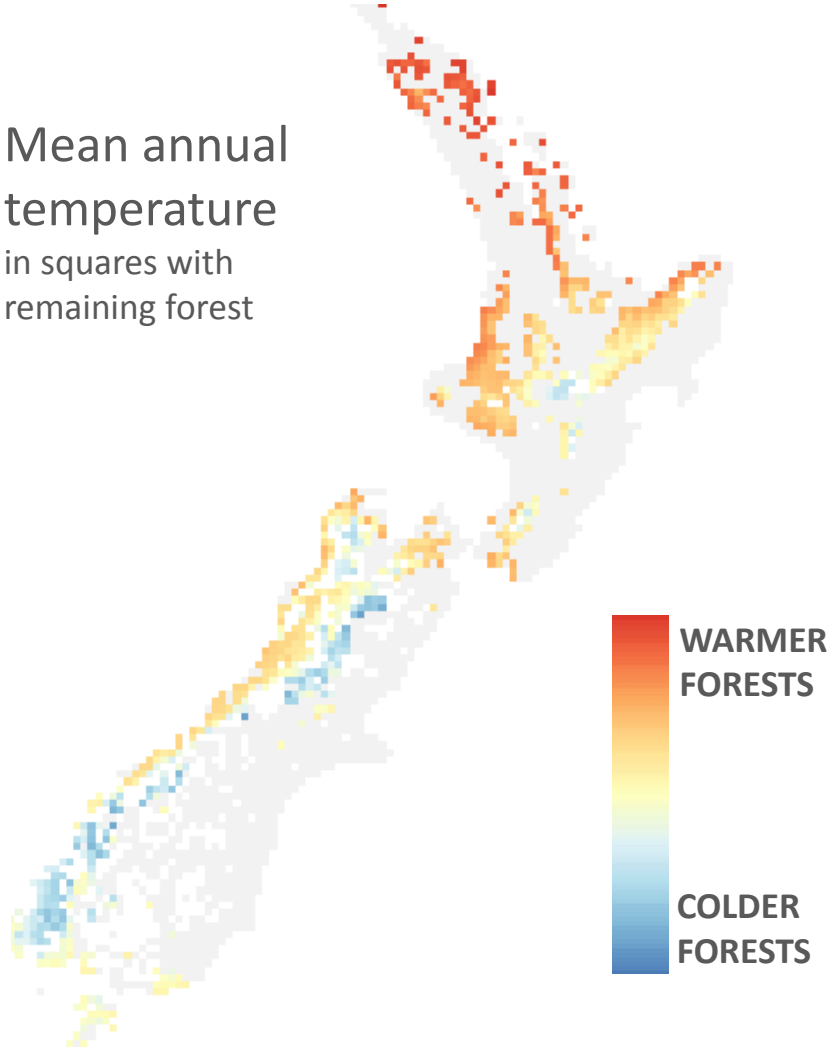
most
‘continuously
ratty’



Temperature patterns

Forests

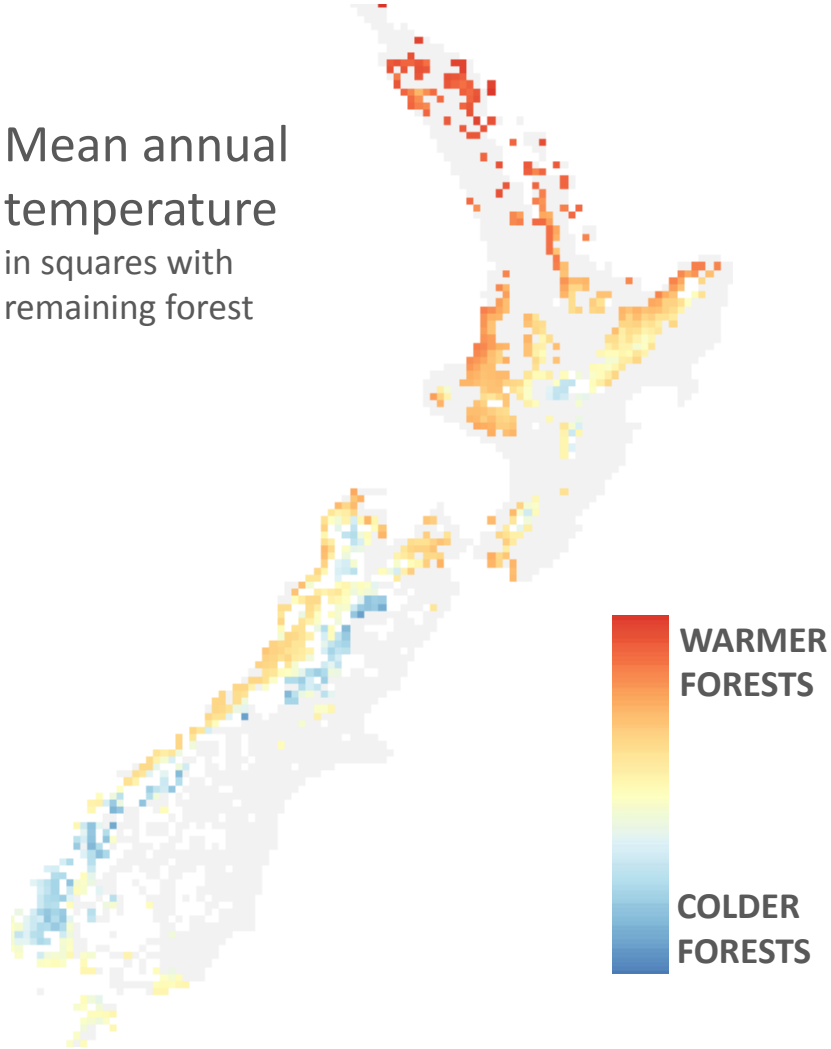
Mean annual temperature
in squares with remaining forest

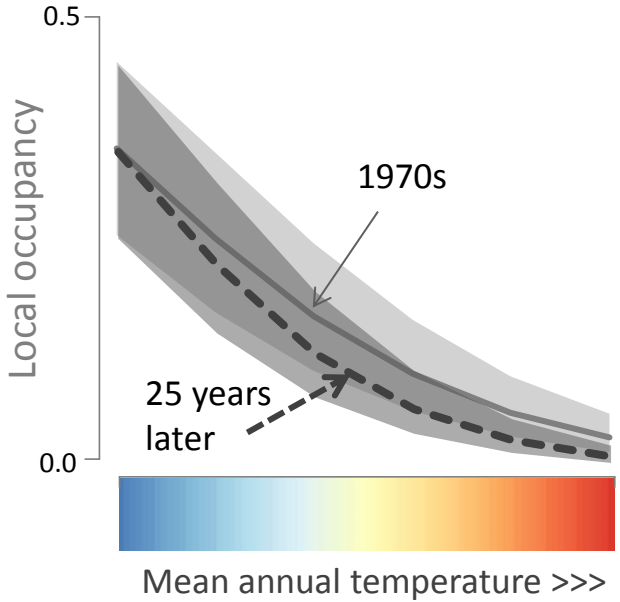


Temperature patterns

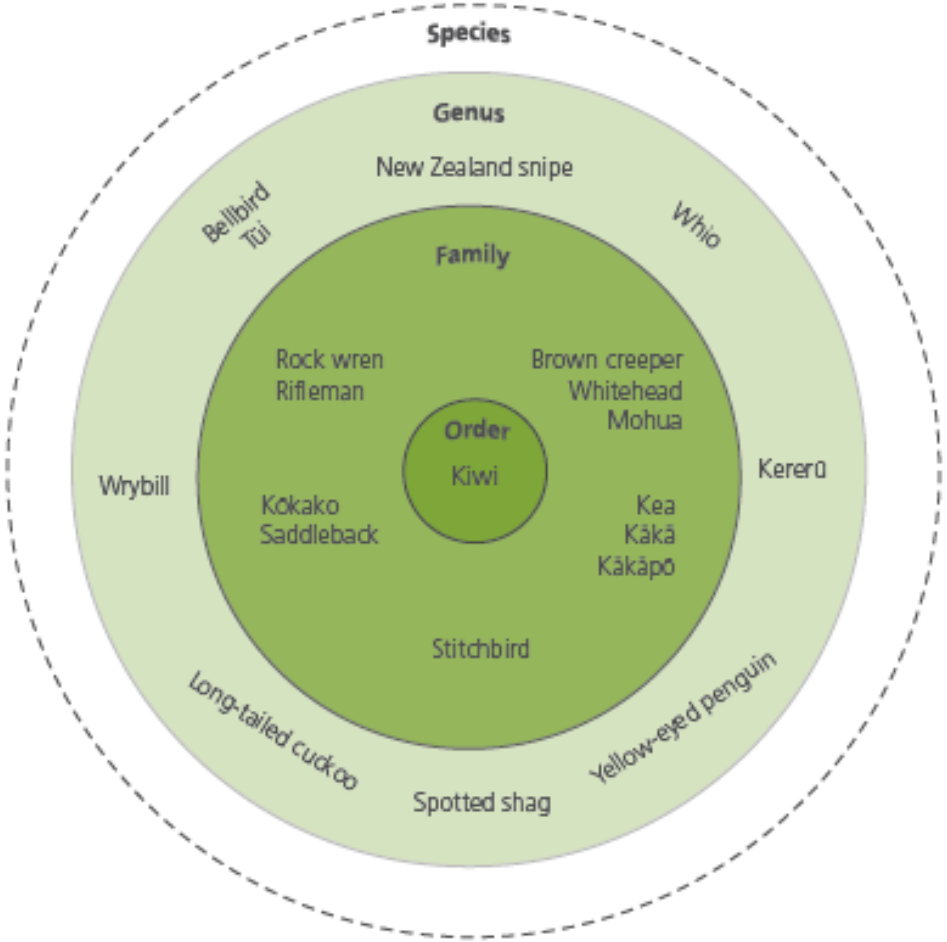
Endemic forest birds in forests

Mean annual temperature
in squares with remaining forest

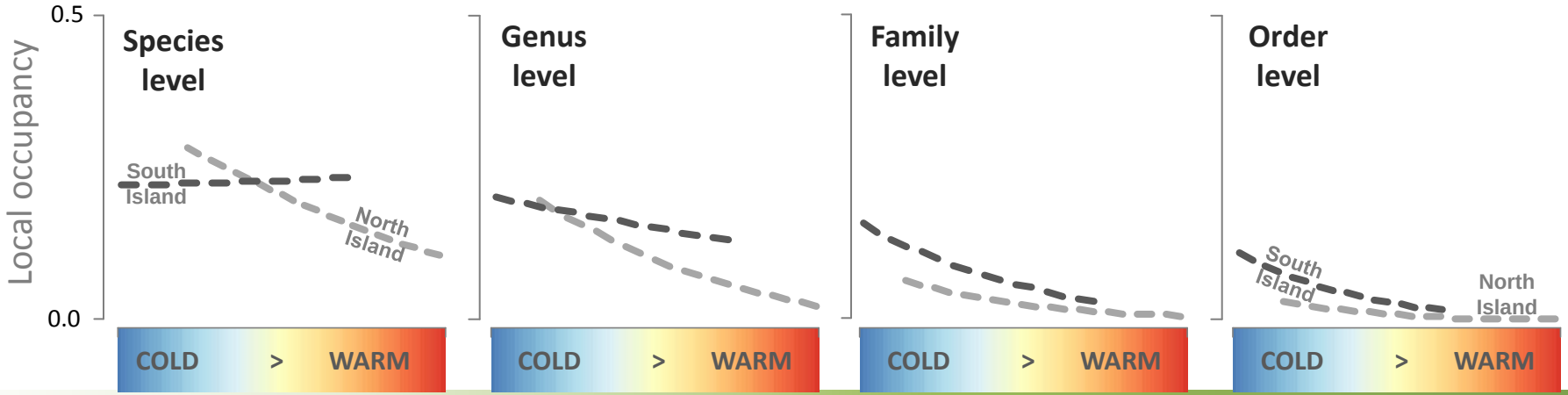




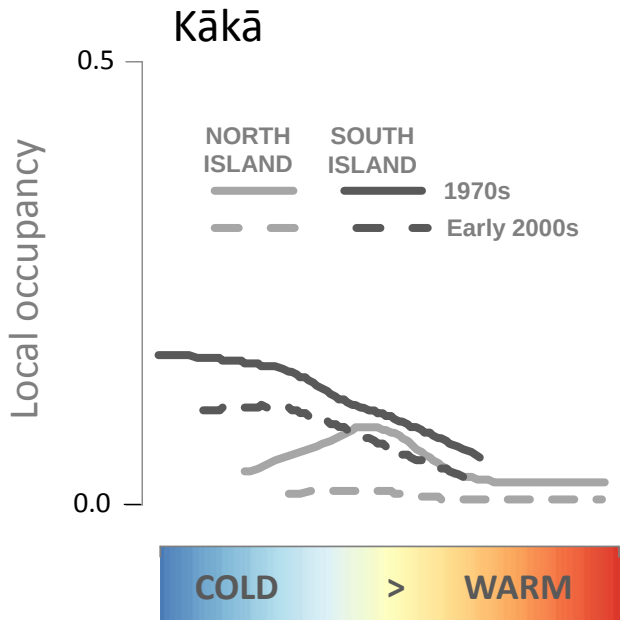
Deep endemic forest birds depend more on cold forests



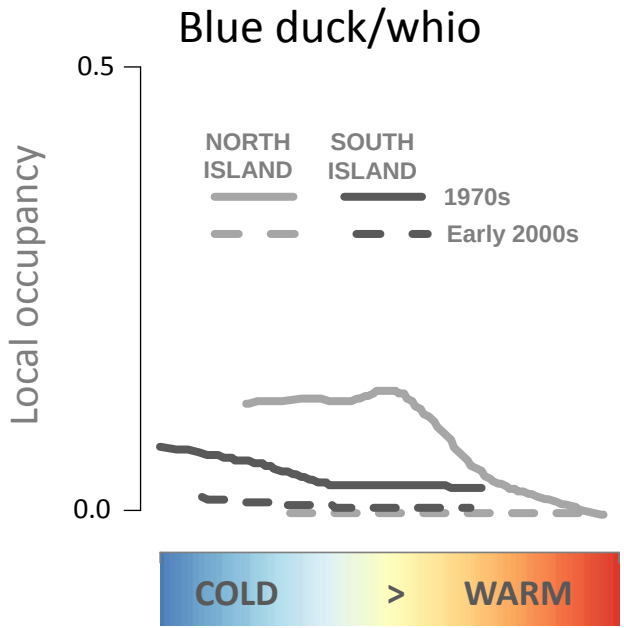
Deep endemic forest birds depend more on cold forests



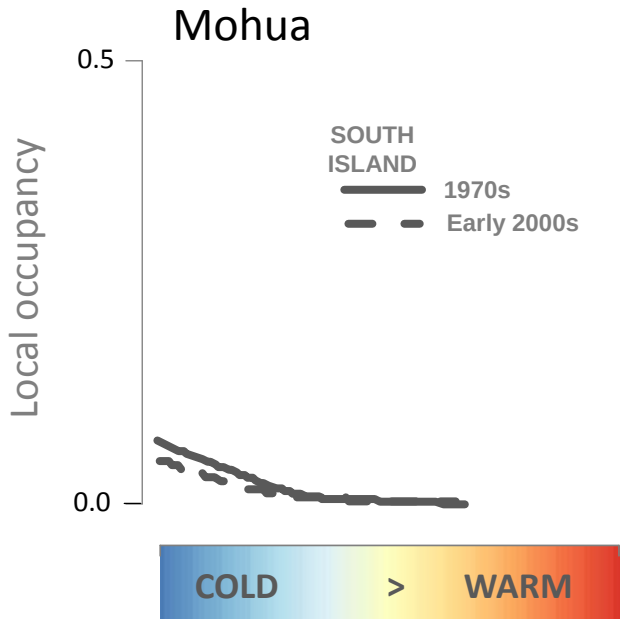
KAKA: JAMES REARDON



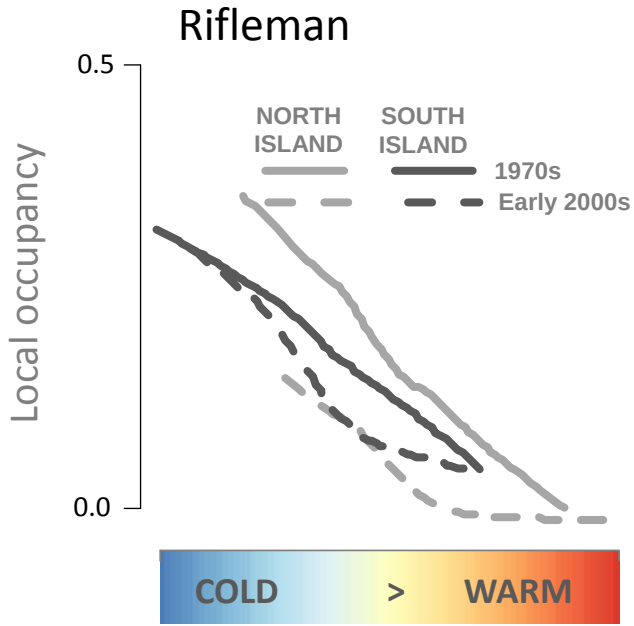
WHIO FORAGING: NEIL FITZGERALD



MOHUA IN RED BEECH FOREST : GLENDA REES



RIFLEMAN, NEIL FITZGERALD

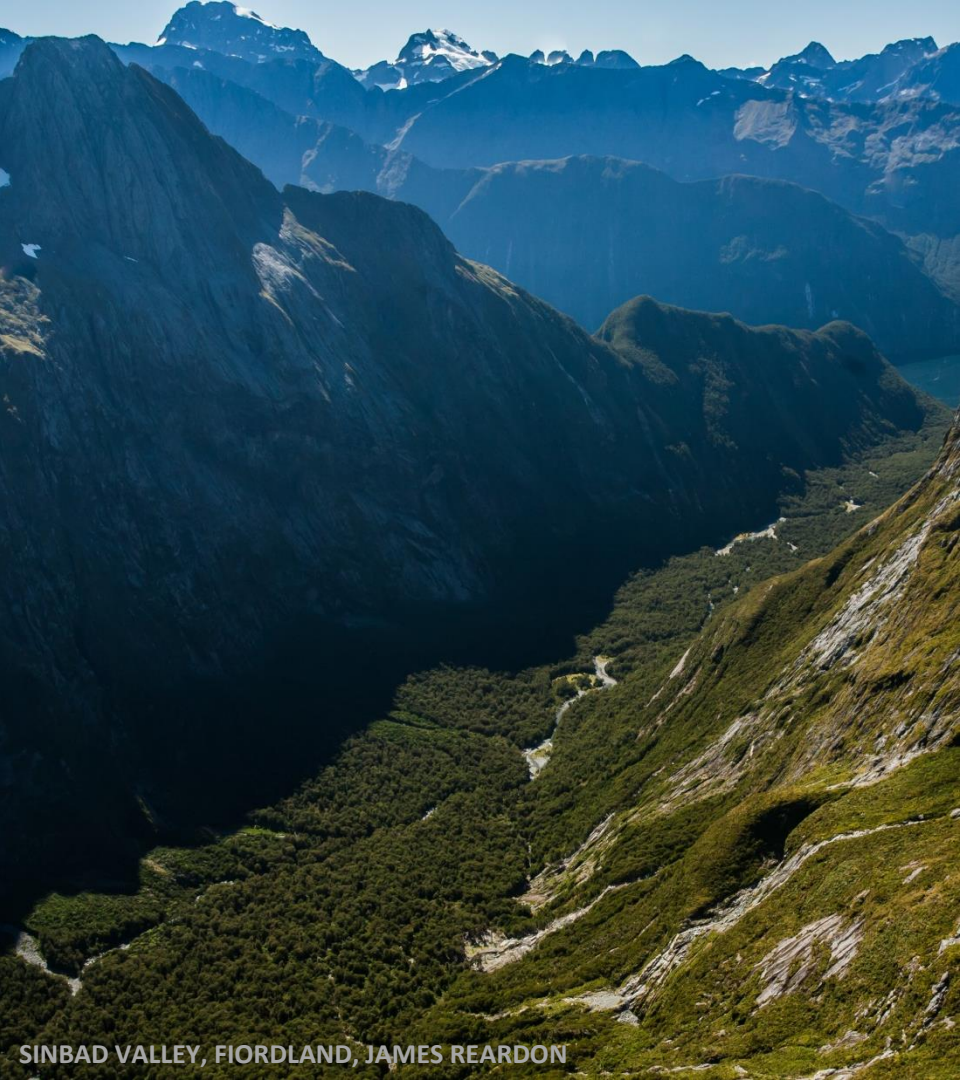


KEA : JAMES MORTIMER

Warm forests are a bigger management challenge than beech forest

Scale is key: ability to

- maintain low ship rat numbers
- over very large forest areas
- cost-effectively
- without unintended consequences


SINBAD VALLEY, FIORDLAND, JAMES REARDON

Conclusions

1. Homogenisation continues
   - loss of remaining deep endemics, in forests and the alpine zone
   - takeover by a recently arrived weedy avifauna, especially in human-modified landscapes

Conclusions

2. Humans have played and are still playing major roles
   - Past deforestation is likely to limit endemic forest bird recovery, and

     opportunity to keep and restore large populations lies in remaining forests.

   - Development of inland South Island basins is now foreclosing options for inland breeding wading birds, terns & gulls.

Conclusions

3. Not all forests are equal
   - Ability to effectively and cheaply control rodents at large scales in warm forests will be a key management tipping point

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