



Using spatial statistics to infer socioeconomic drivers of NZ conservation

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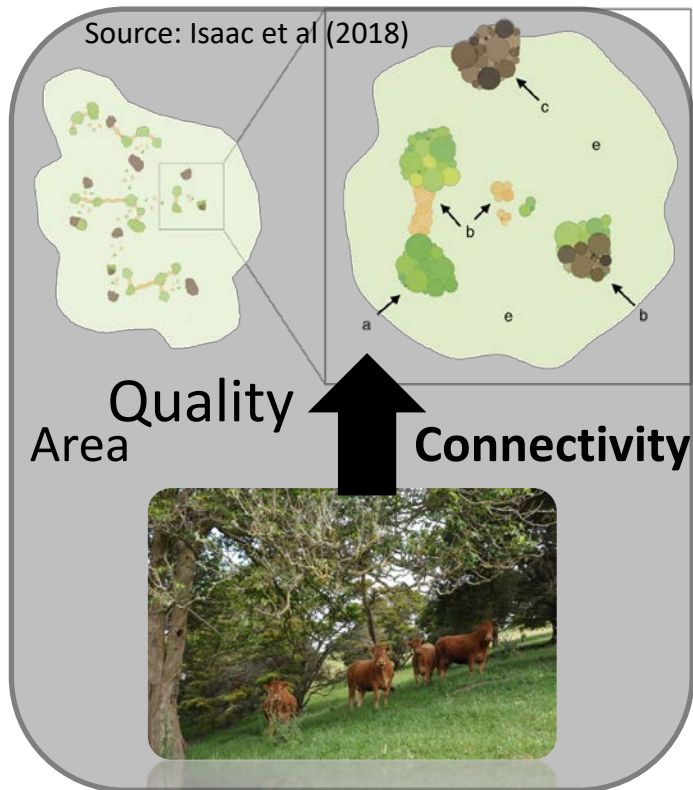
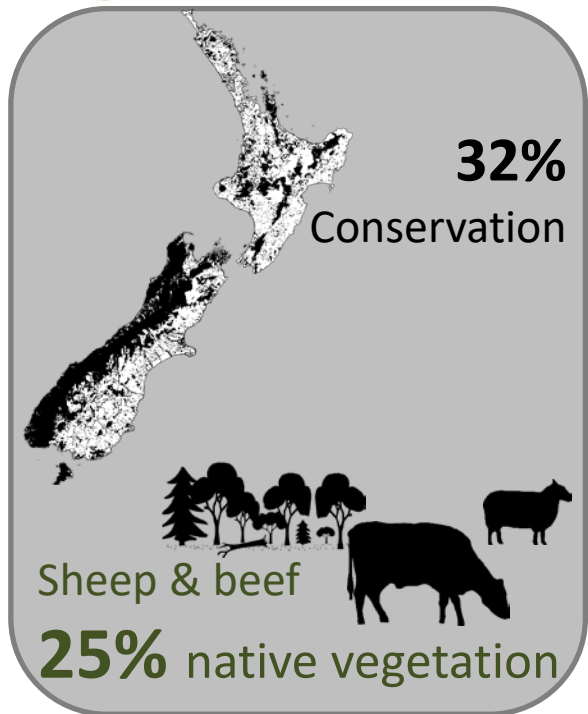


NEW ZEALAND'S
BIOLOGICAL
HERITAGE

Ngā Koiora
Tuku Iho

National
SCIENCE
Challenges

Conservation can't be confined to reserves



Making change requires changing minds

Conservation on private land is...

- Voluntary
- Expensive

Why do some choose to engage?

- Socioeconomic status, age, education, farm characteristics
- Does social network & peer group have positive effect?



Covenants on beef & sheep farms



Landowner-led conservation
Since 1977 Permanent
4,400 **180,000 ha**



50,000
Set-up



\$6000 p/a
Maintenance



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Ngā Kairauhi Papa Forever protected



Department of
Conservation
Te Papa Atawhai



horizons
regional council



HAWKE'S BAY
REGIONAL COUNCIL



Taranaki
Regional Council



Do neighbours influence conservation decisions?



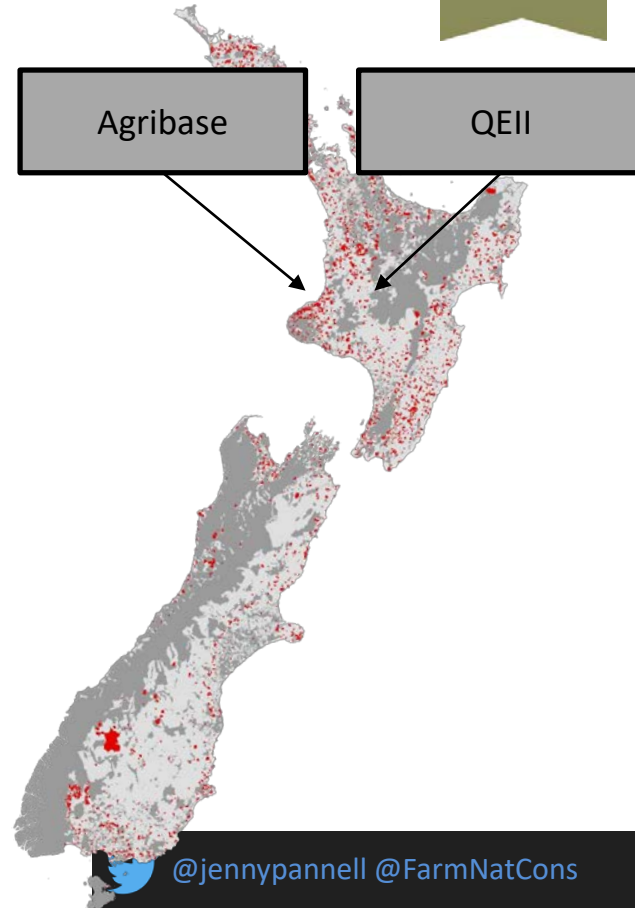
Bob's covenant is pretty flash. Maybe I should have one, too...



Survey of rural decision makers
(Brown, 2015)

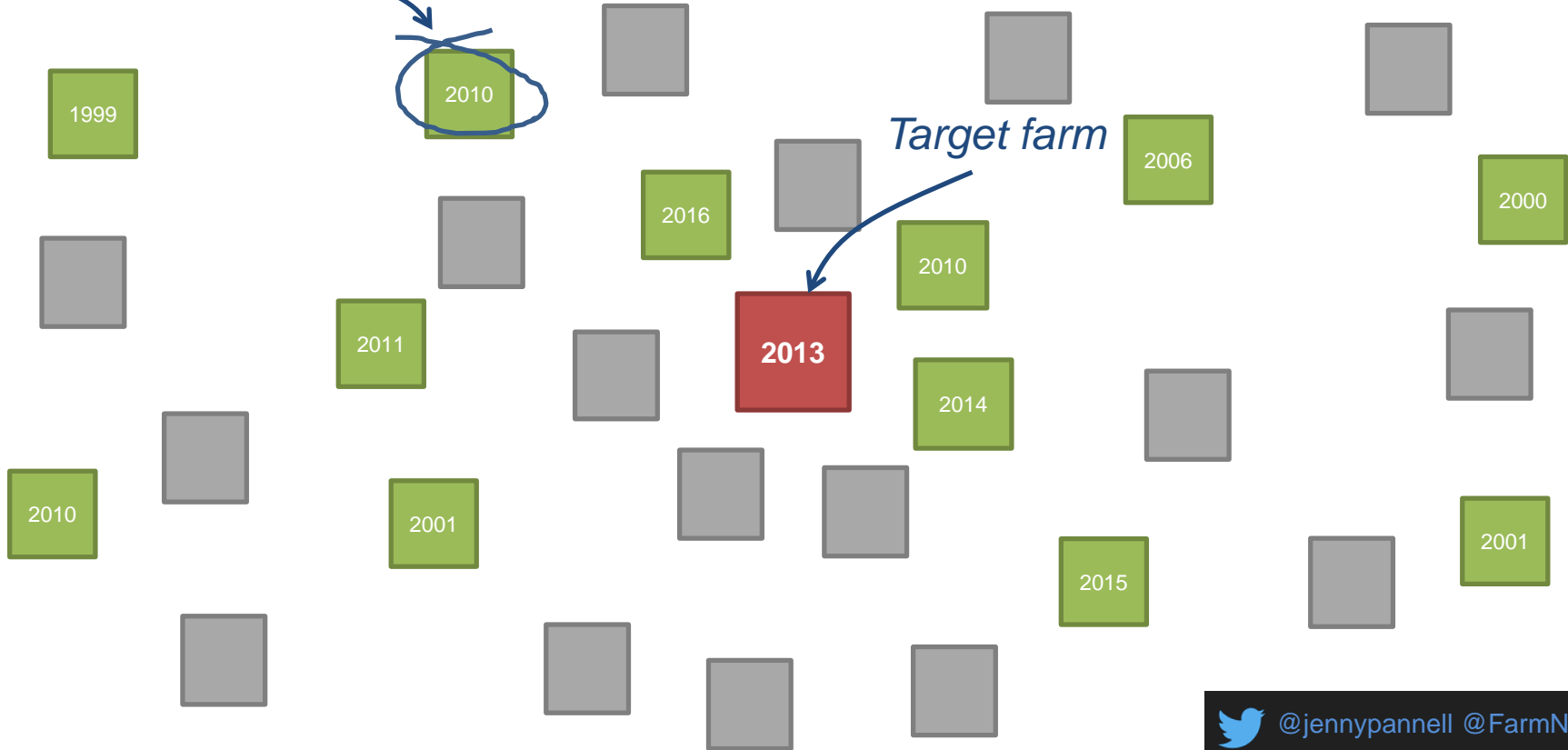


Good job Bob is taking care of the bush, so I don't have to

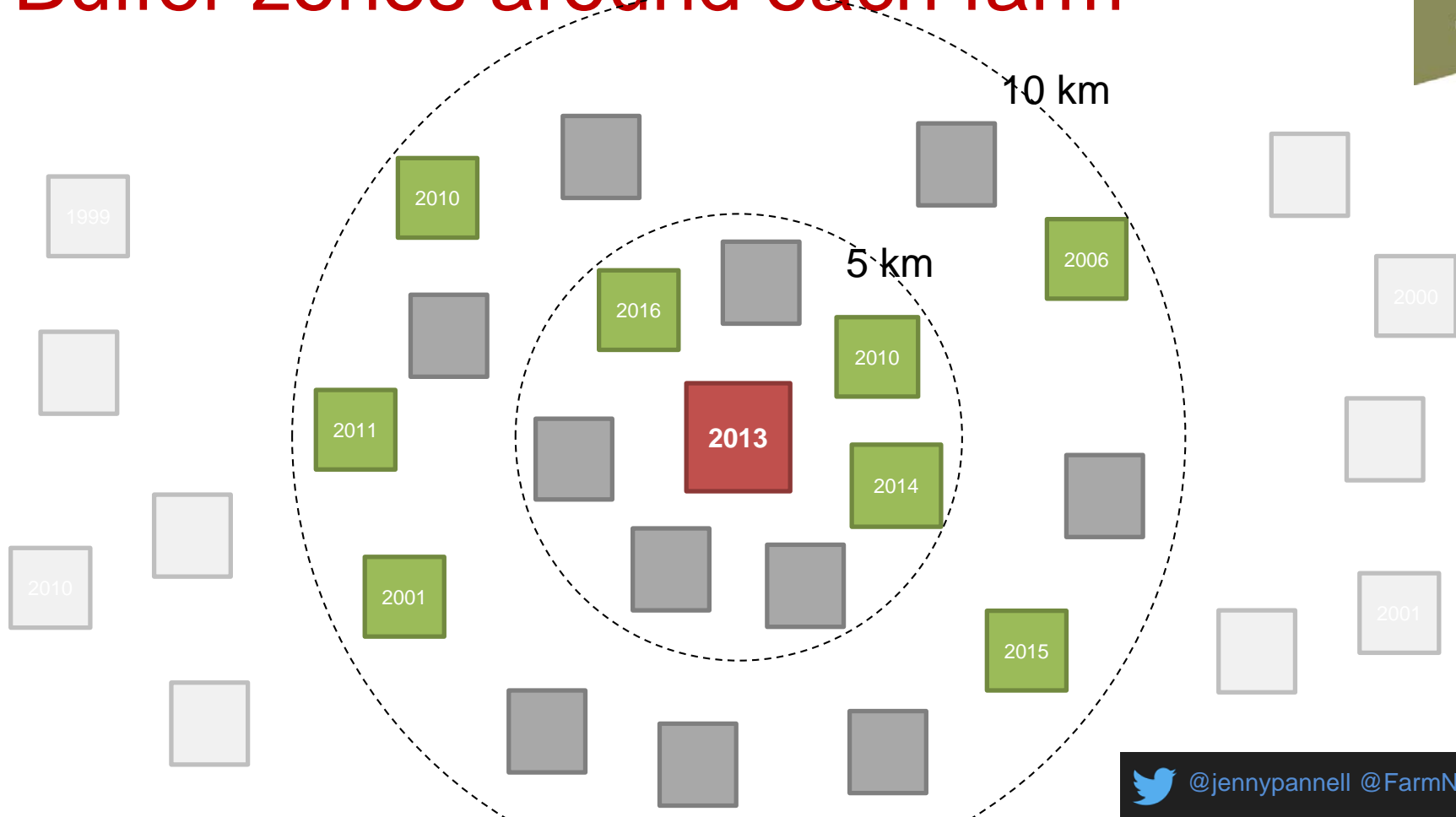


Map farms with & without covenants

Year installed



Buffer zones around each farm



How many covenants within buffers?

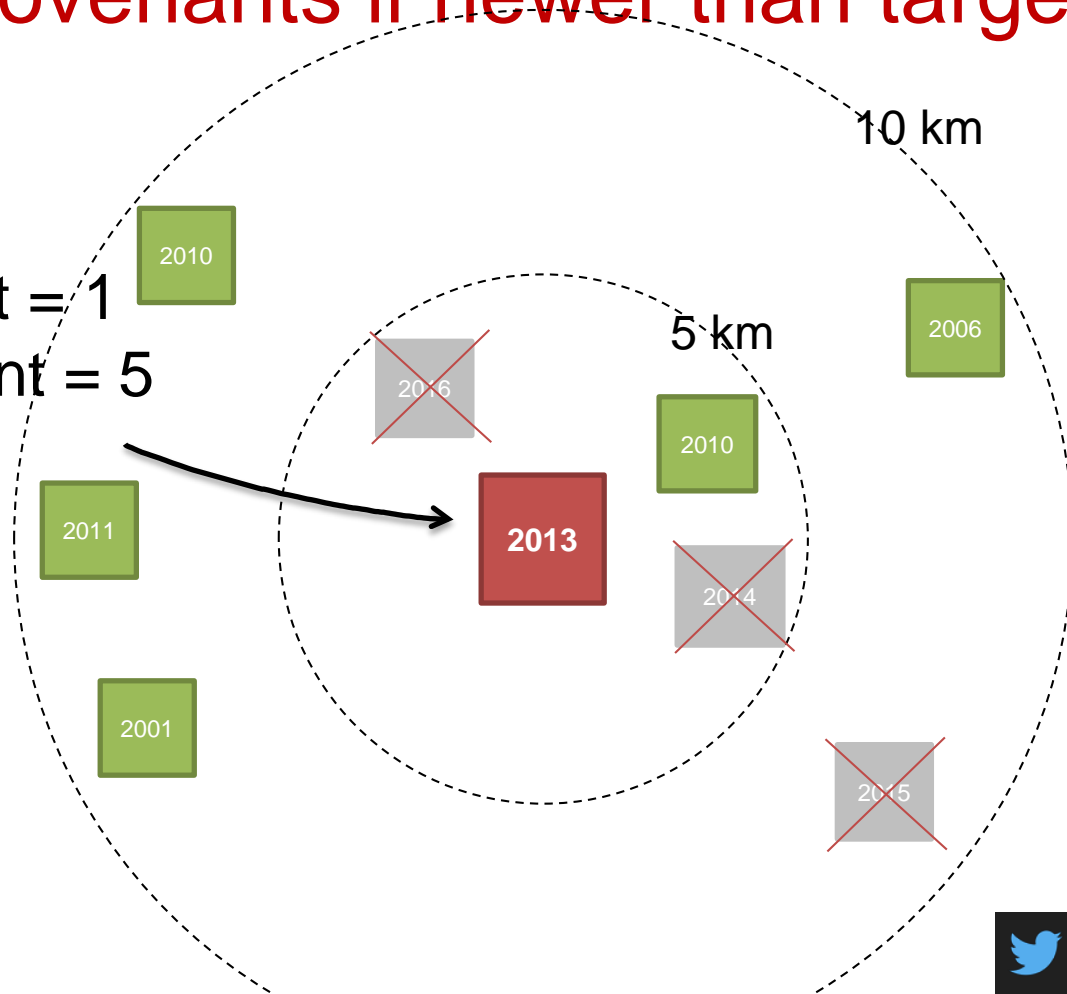


Delete covenants if newer than target

FINAL

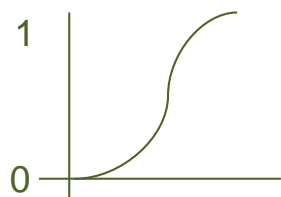
5 km count = 1

10 km count = 5



Model probability of covenanting

Farm	Covenant?	Regional Council	Covenants in 5km	Covenants in 10km
1	Yes	Auckland	5	7
2	No	Wellington	1	3
3	Yes	Otago	4	10



Binomial GLM

*Probability of farm having covenant ~ Regional council * Neighbours with covenants*

**Effect may differ by
regional council
(policy, reps, funding)**

Within 5km or 10km



Covenants are spatially clustered

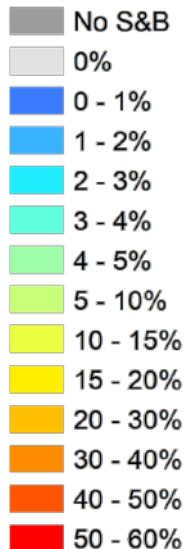
134,782 ha

Total area



6% farms
covenanted

% farm area
covenanted



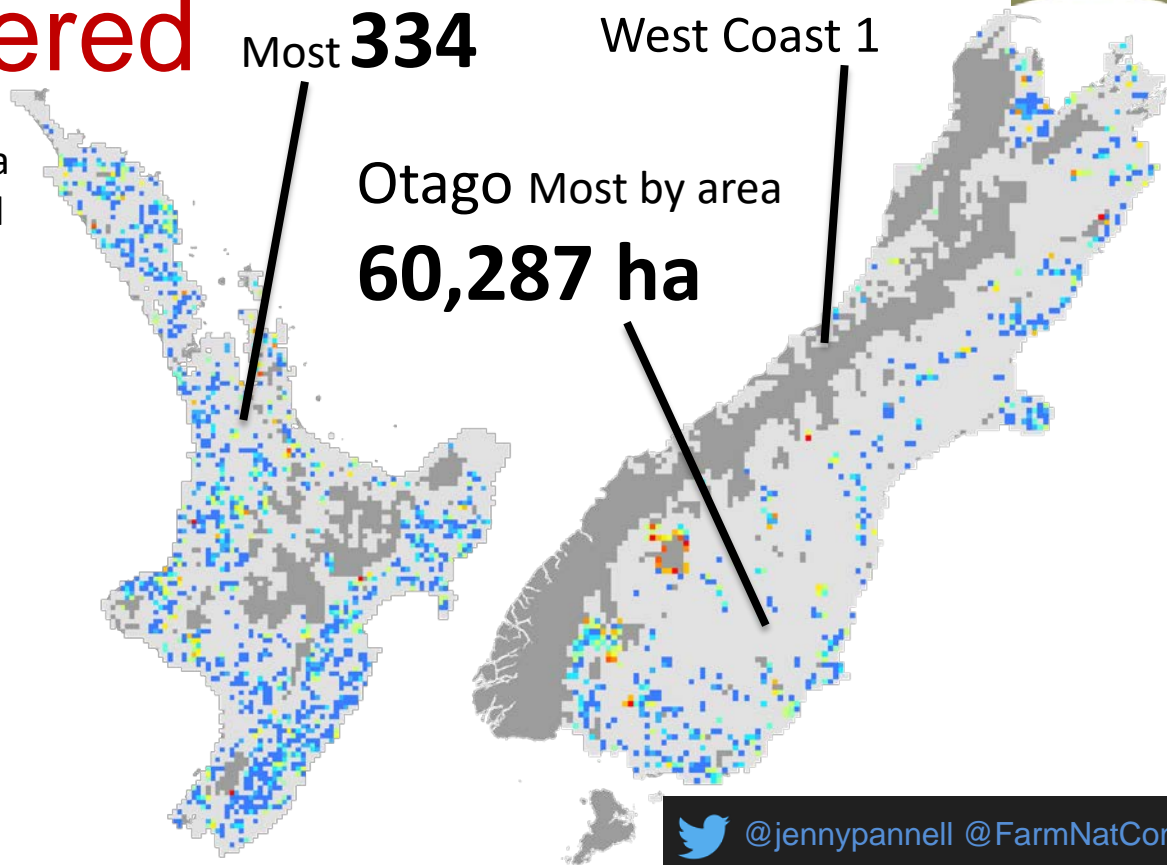
Waikato

Most **334**

West Coast 1

Otago Most by area

60,287 ha



Neighbours make a difference, in some regions

*Region * 5km count*

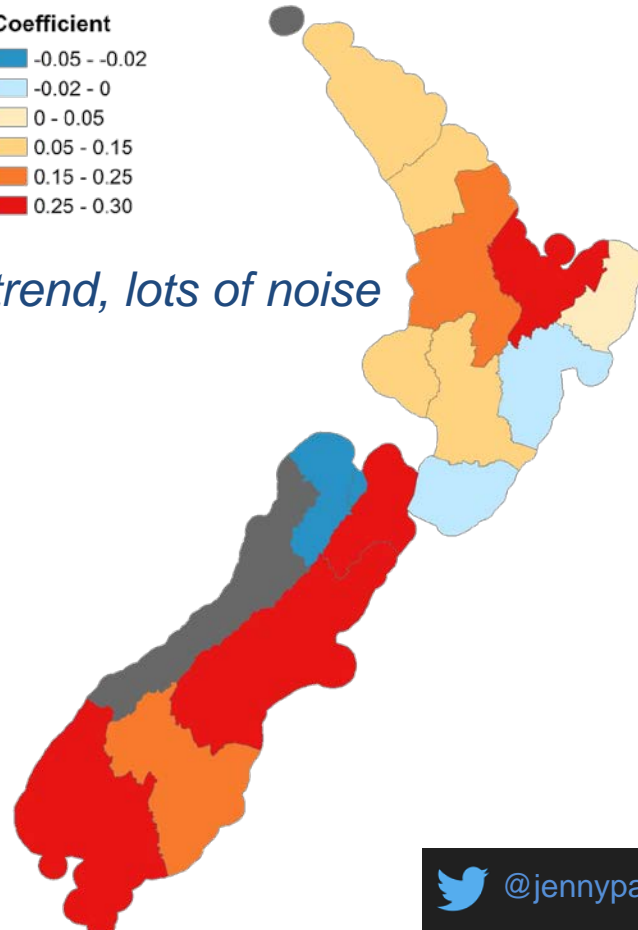
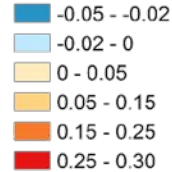
pseudo-R² 0.05

AUC 0.70

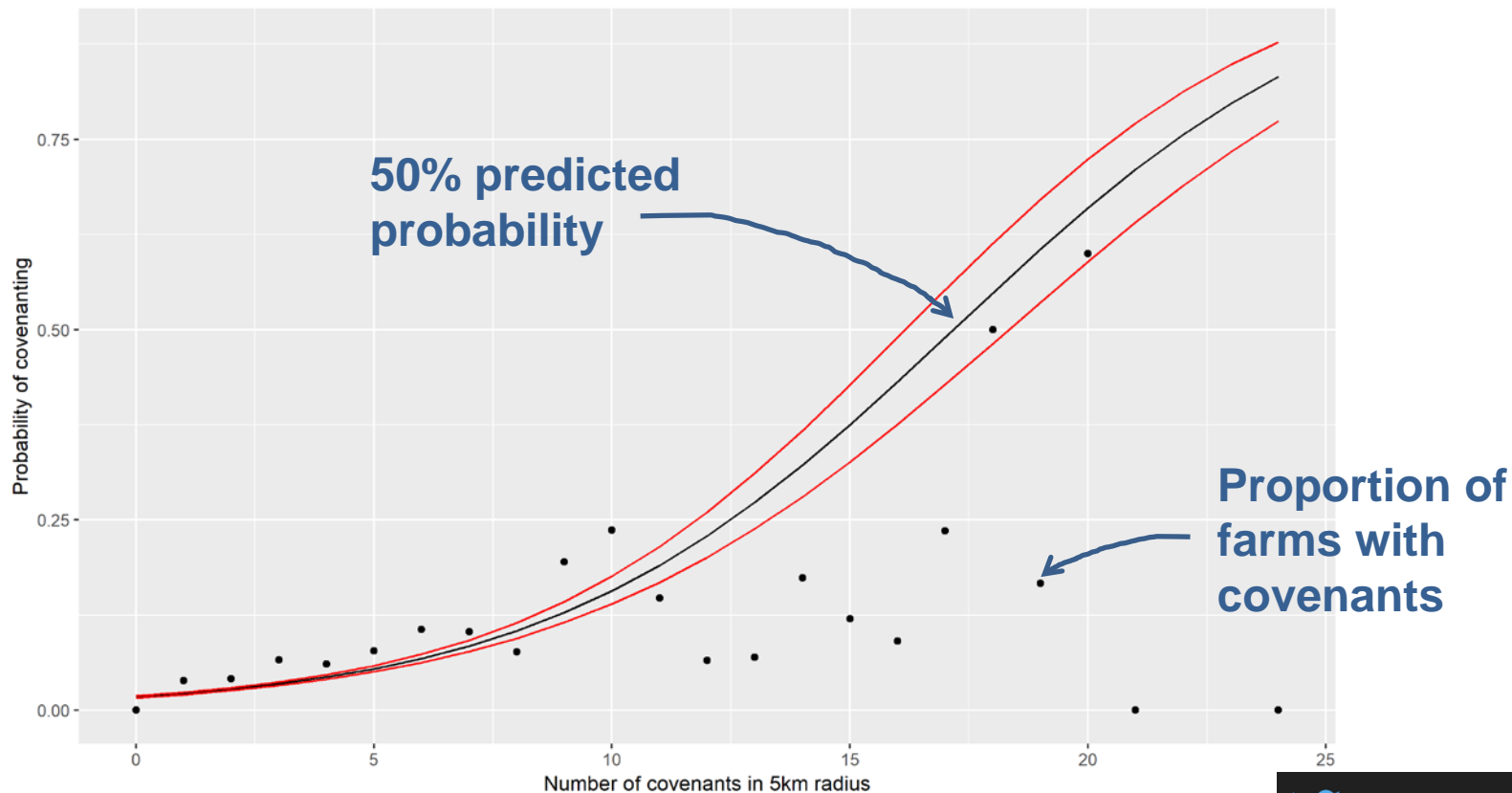
Significant trend, lots of noise

More neighbours with covenants = higher chance of covenanting

Coefficient

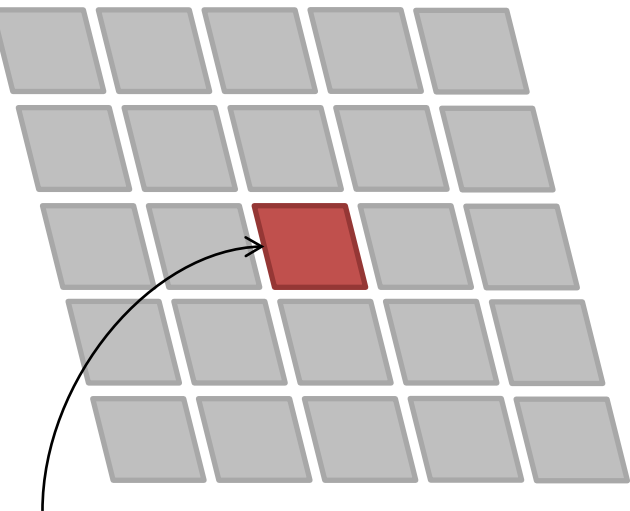


Regions with strong neighbour effects



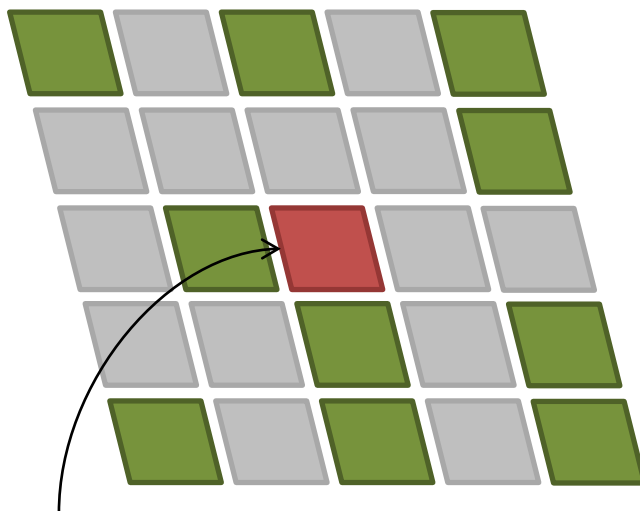
Where is the tipping point?

0



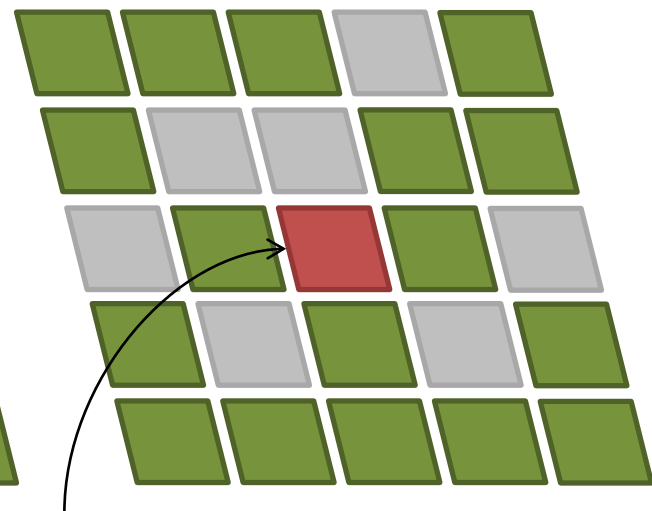
2% PROBABILITY
OF COVENANTING

10



10 X MORE LIKELY
TO COVENANT

17



MORE LIKELY TO
COVENANT THAN NOT



Implications

Spatial autocorrelation \neq causation!

But! Supports previous qualitative findings

We should be supporting communities

Bottom up in conjunction with top down (regional differences)

Catchment/landscape level schemes e.g. Cape to City

Building and strengthening community ties



Opportunities to improve



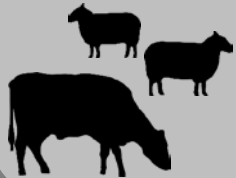
% forest in
landscape

Helper
density



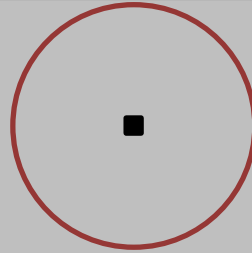
Other variables to
explain noise?

Stock/ha



Drought Flooding
Exposure Shade

Arbitrary
Unrealistic

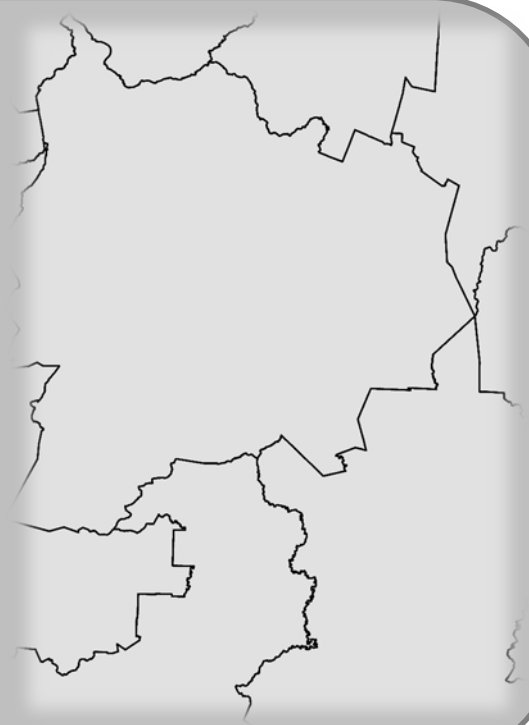


Better buffers



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District
Council





National **SCIENCE** Challenges

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Neighbour effects by region

