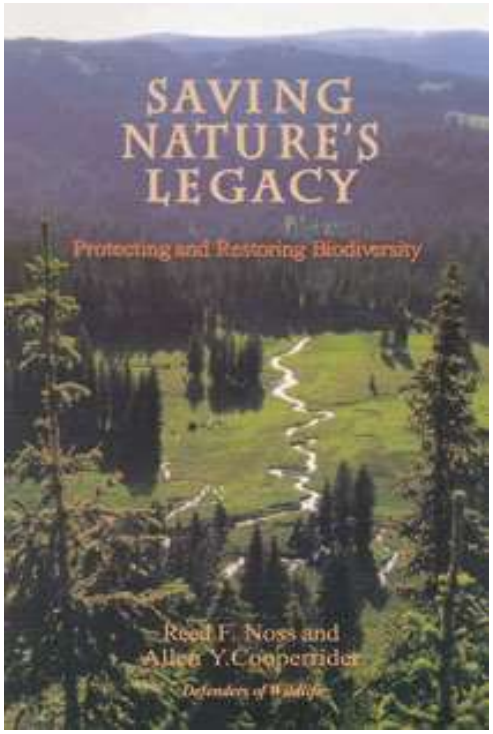
Using classification assignment rules to assess land use change impacts on national and regional biodiversity

Kathrin Affeld, Susan Wiser, Ian Payton,
Miquel De Cáceres

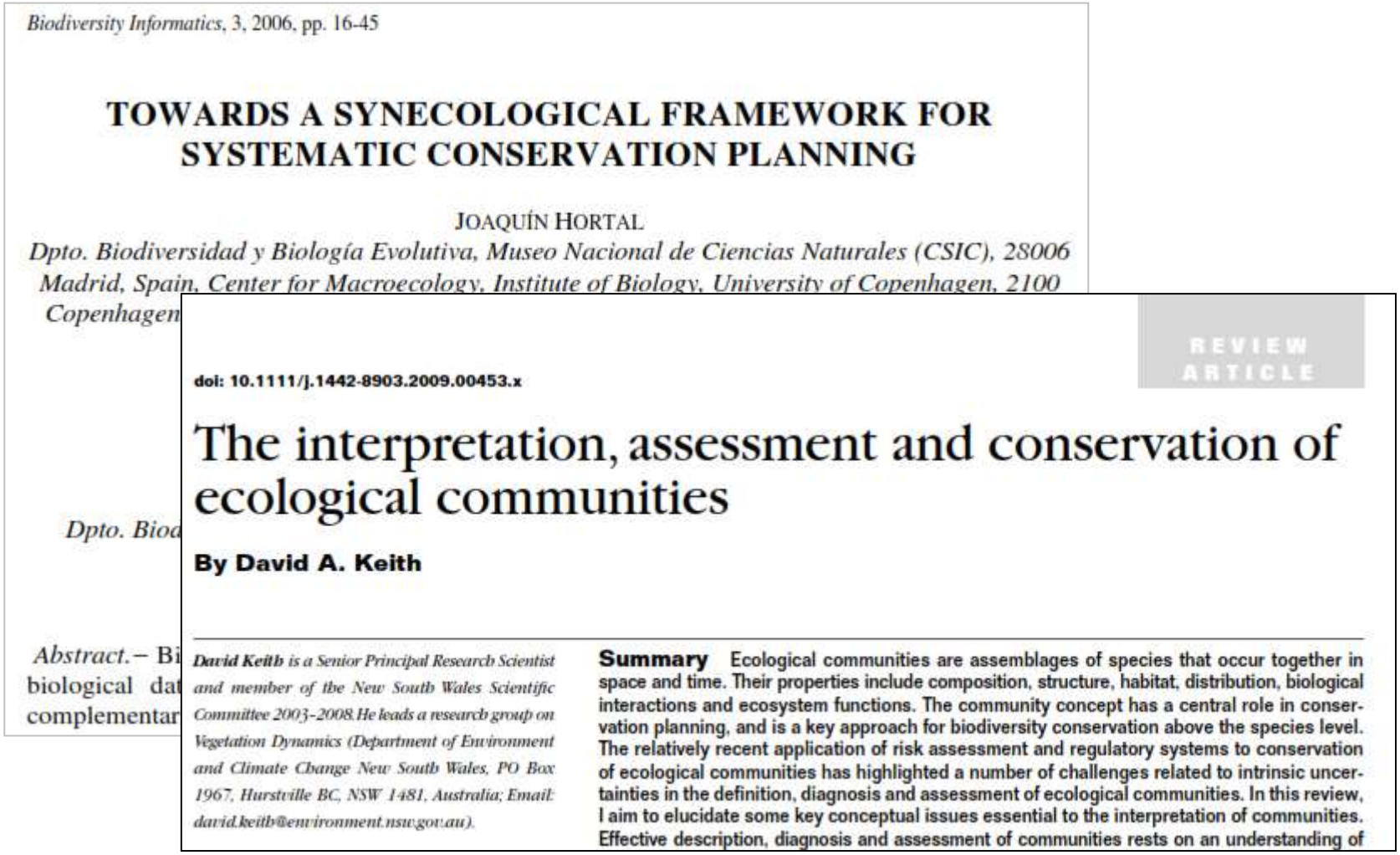
GFBI Conference, Beijing, September 2017



- Represent ecosystems across their natural range of variation
- Maintain viable populations of native species
- Sustain ecological and evolutionary processes
- Ensure conservation networks resilient to environmental change

Noss, Reed F., and Allen Cooperrider. Saving nature's legacy: protecting and restoring biodiversity. Island Press, 1994.

Plant communities: ecosystem surrogates and conservation units



Biodiversity Informatics, 3, 2006, pp. 16-45

TOWARDS A SYNECOLOGICAL FRAMEWORK FOR SYSTEMATIC CONSERVATION PLANNING

JOAQUÍN HORTAL

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doi: 10.1111/j.1442-8903.2009.00453.x

REVIEW ARTICLE

The interpretation, assessment and conservation of ecological communities

By David A. Keith

David Keith *is a Senior Principal Research Scientist and member of the New South Wales Scientific Committee 2003–2008. He leads a research group on Vegetation Dynamics (Department of Environment and Climate Change New South Wales, PO Box 1967, Hurstville BC, NSW 1481, Australia; Email: david.keith@environment.nsw.gov.au).*

Summary Ecological communities are assemblages of species that occur together in space and time. Their properties include composition, structure, habitat, distribution, biological interactions and ecosystem functions. The community concept has a central role in conservation planning, and is a key approach for biodiversity conservation above the species level. The relatively recent application of risk assessment and regulatory systems to conservation of ecological communities has highlighted a number of challenges related to intrinsic uncertainties in the definition, diagnosis and assessment of ecological communities. In this review, I aim to elucidate some key conceptual issues essential to the interpretation of communities. Effective description, diagnosis and assessment of communities rests on an understanding of

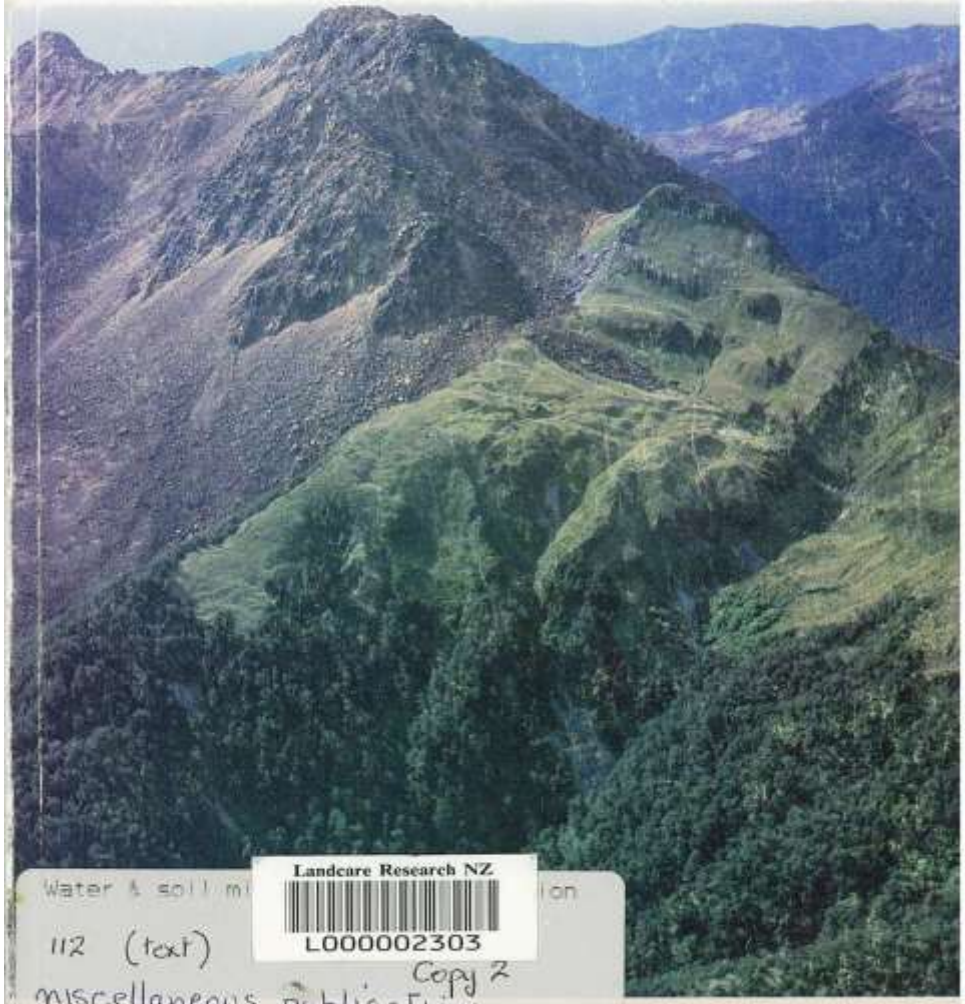
Ecological Management and Restoration 2009

Representation assessed with GIS-based analysis of mapped ecosystem distributions

Mokihinui dam proposal

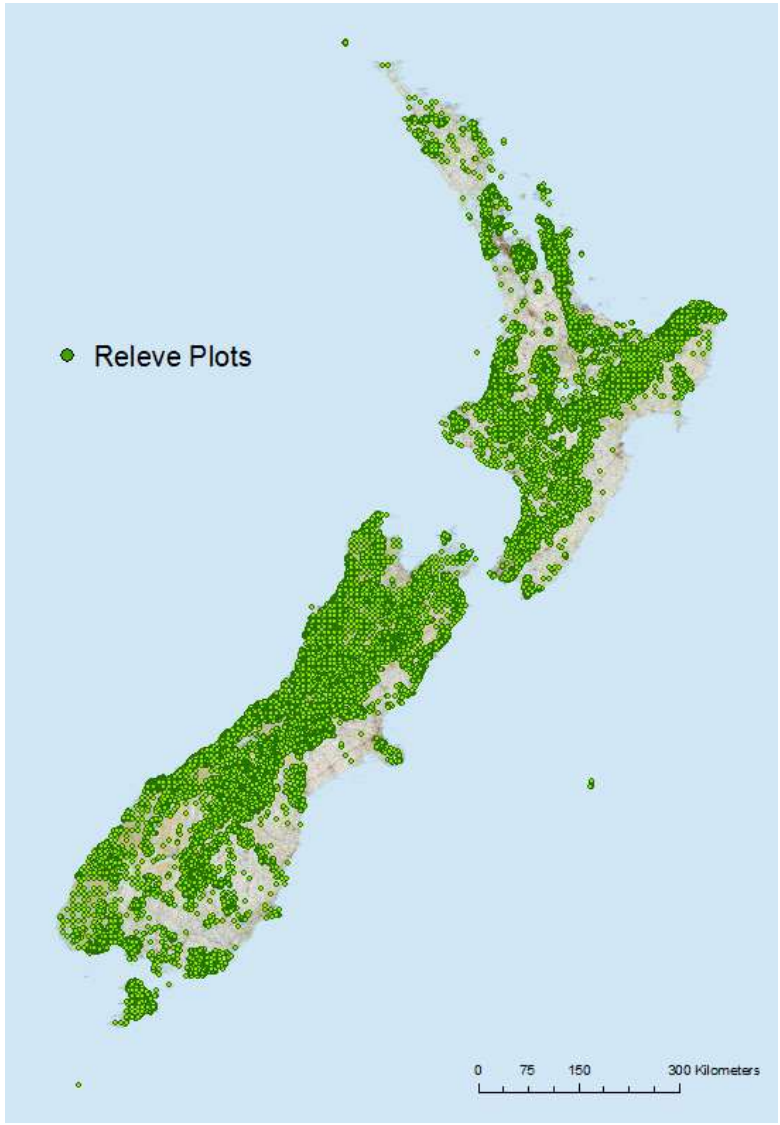
The Vegetative Cover of New Zealand

P F J Newsome



National Water and Soil
Conservation Authority

NZ has a wealth of vegetation plot data



..and a national classification of woody vegetation types

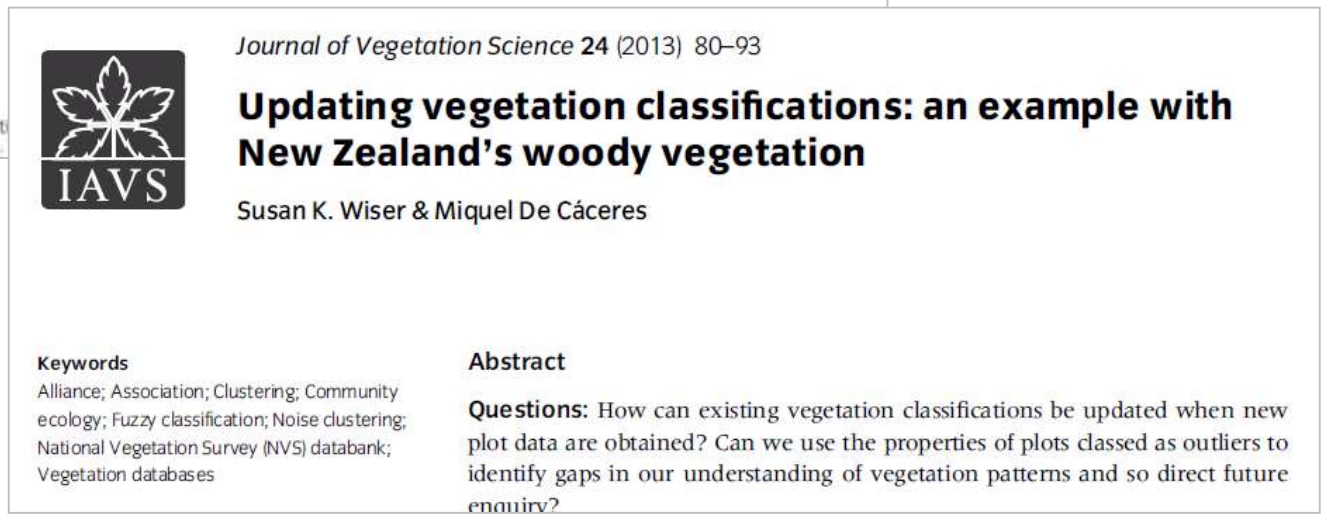
Applied Vegetation Science **14** (2011) 506–523

SPECIAL FEATURE: VEGETATION SURVEY

New Zealand's forest and shrubland communities: a quantitative classification based on a nationally representative plot network

Susan K. Wiser, Jennifer M. Hurst, Elaine F. Wright & Robert B. Allen

Keywords
Cluster analysis; Ecological indicator; Exoti
Nothofagus; OptimClass; Podocarpaceae



Journal of Vegetation Science **24** (2013) 80–93

Updating vegetation classifications: an example with New Zealand's woody vegetation

Susan K. Wiser & Miquel De Cáceres

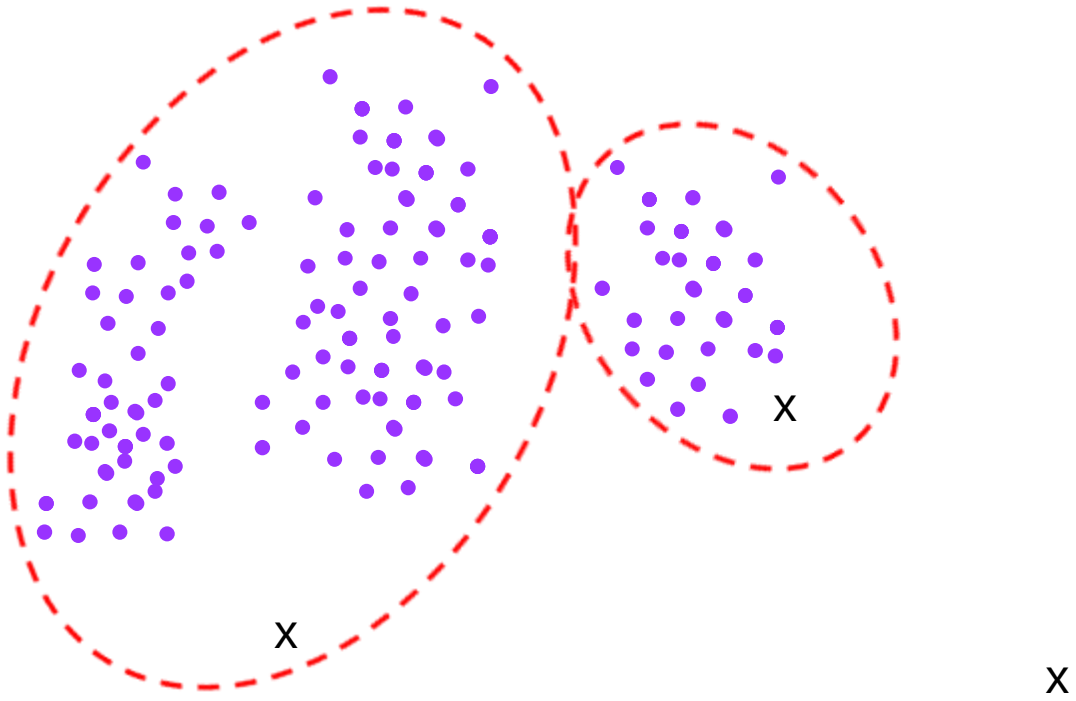
Keywords
Alliance; Association; Clustering; Community ecology; Fuzzy classification; Noise clustering; National Vegetation Survey (NVS) databank; Vegetation databases

Abstract

Questions: How can existing vegetation classifications be updated when new plot data are obtained? Can we use the properties of plots classed as outliers to identify gaps in our understanding of vegetation patterns and so direct future enquiry?

29 Alliances
79 Associations

‘Noise clustering’ allows new plots to be assigned to existing types or identified as outliers

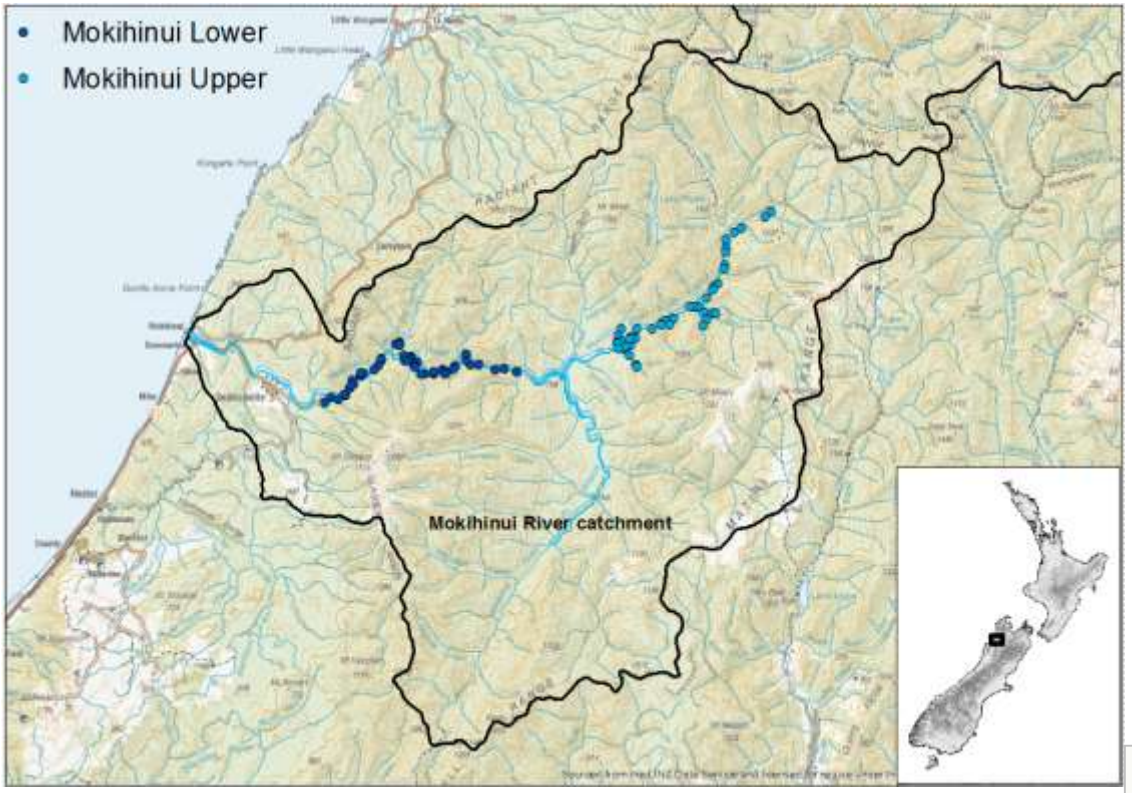


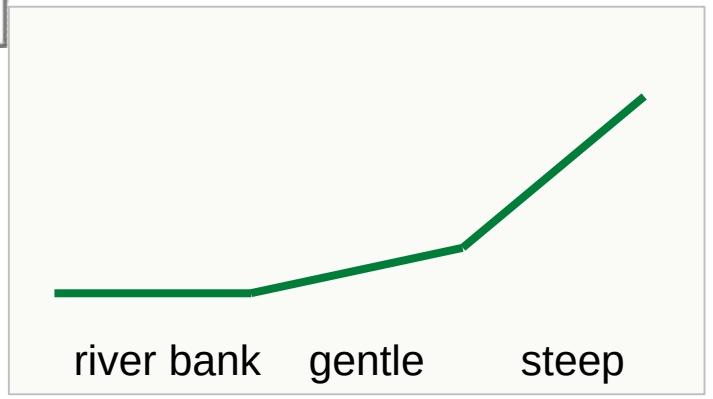
De Cáceres et al. 2010. The management of vegetation classifications with fuzzy clustering. Journal of Vegetation Science 21: 1138-1151

Multi-scale assessment of representation

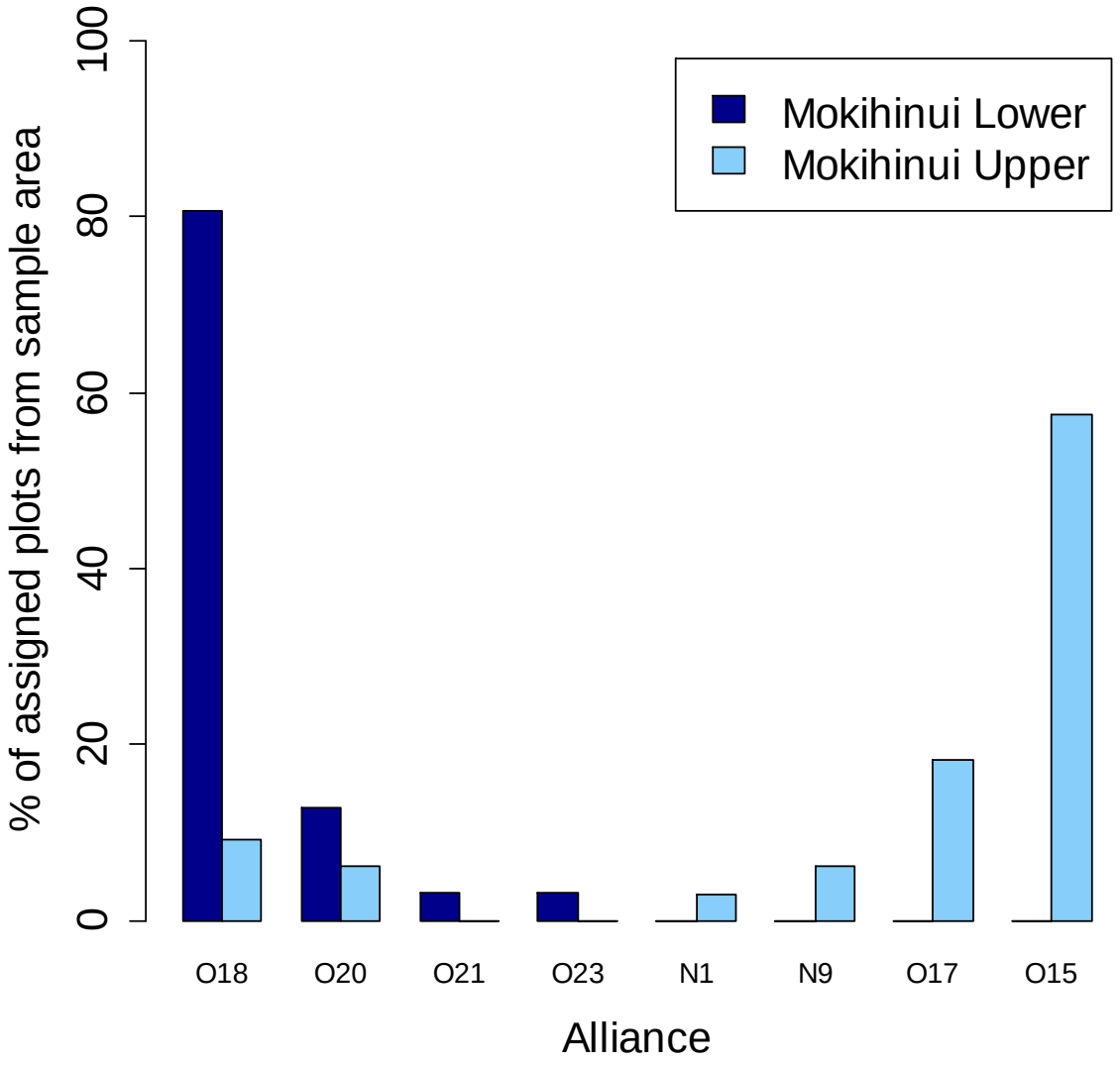
- Local scale: are forest alliances and associations in the inundation zone present elsewhere in the Mokihinui catchment?
- Regional scale: are forest alliances and associations in the inundation zone present in a similar catchment nearby?
- National scale: are any of the forest alliances or associations in the inundation zone confined to the region?
- National scale: are there species assemblages in the inundation zone that are not currently defined as alliances or associations in the national classification?
- National scale: how does the number of distinct forest alliances and associations (i.e. beta diversity) in the Mokihinui catchment compare to all other catchments nationally?

Are forest alliances & associations present elsewhere in the Mokihinui catchment?

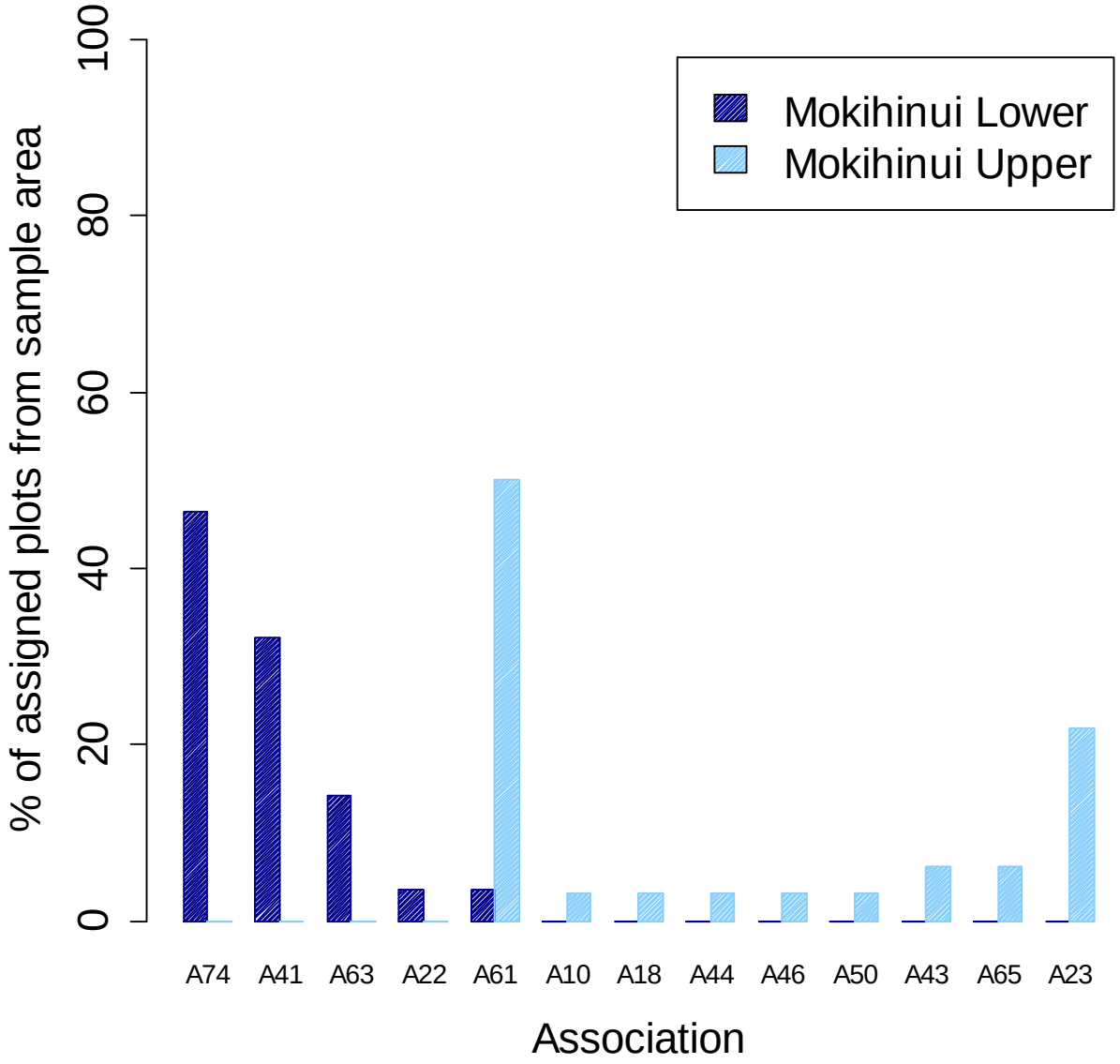




Alliances in lower gorge are different than those in the upper gorge



Associations in lower gorge are different than those in the upper gorge



Regional-scale representation

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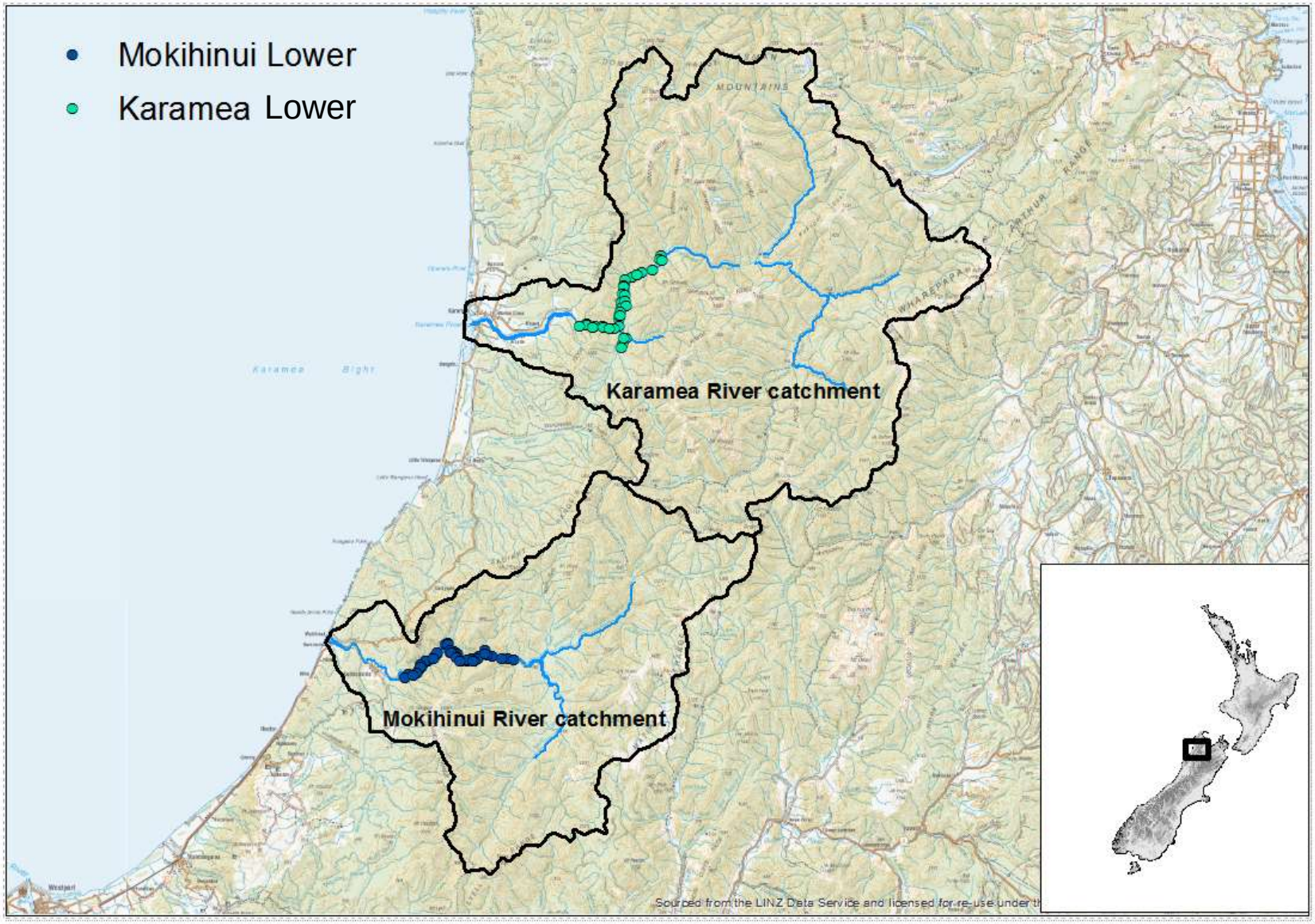
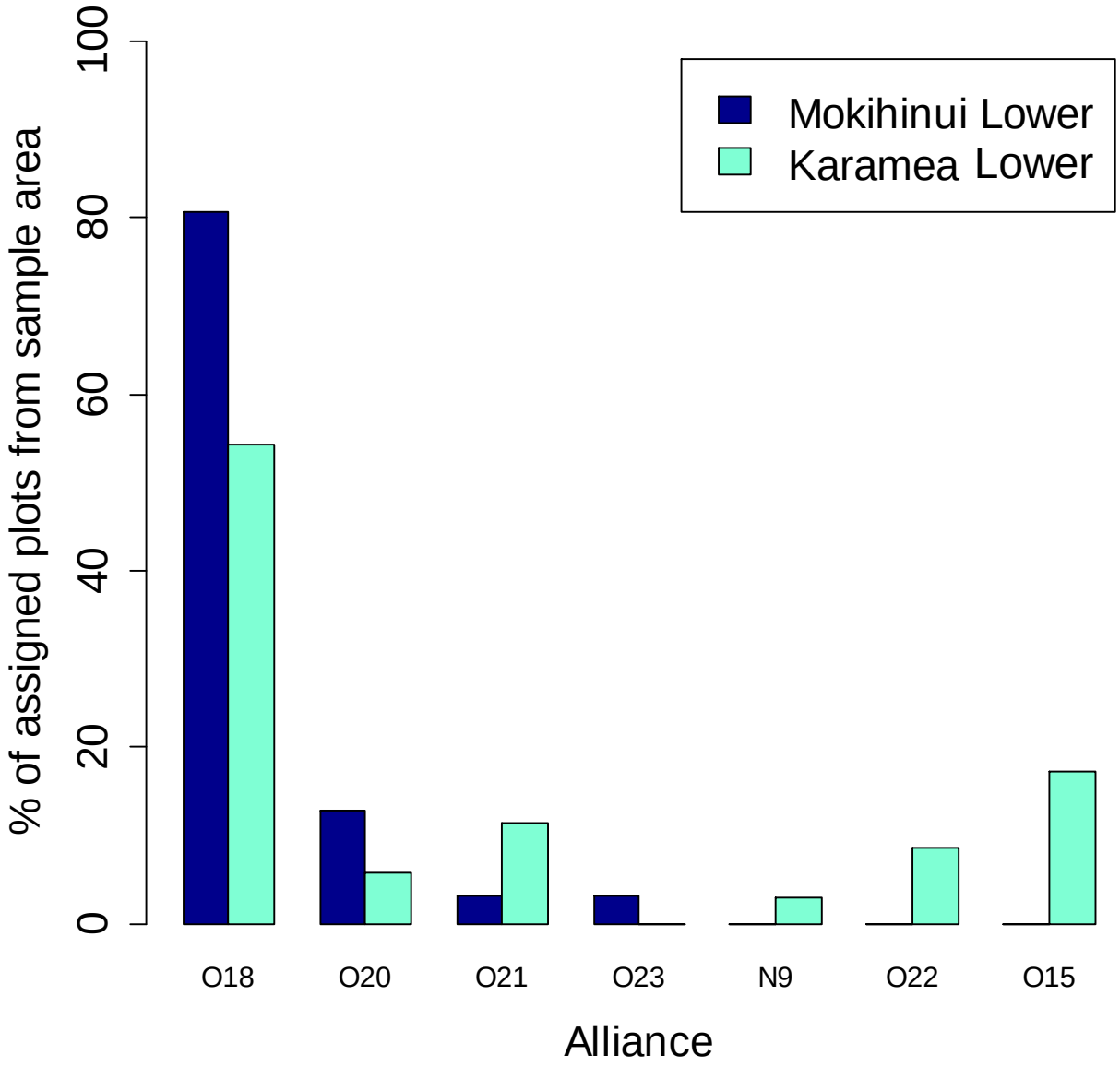
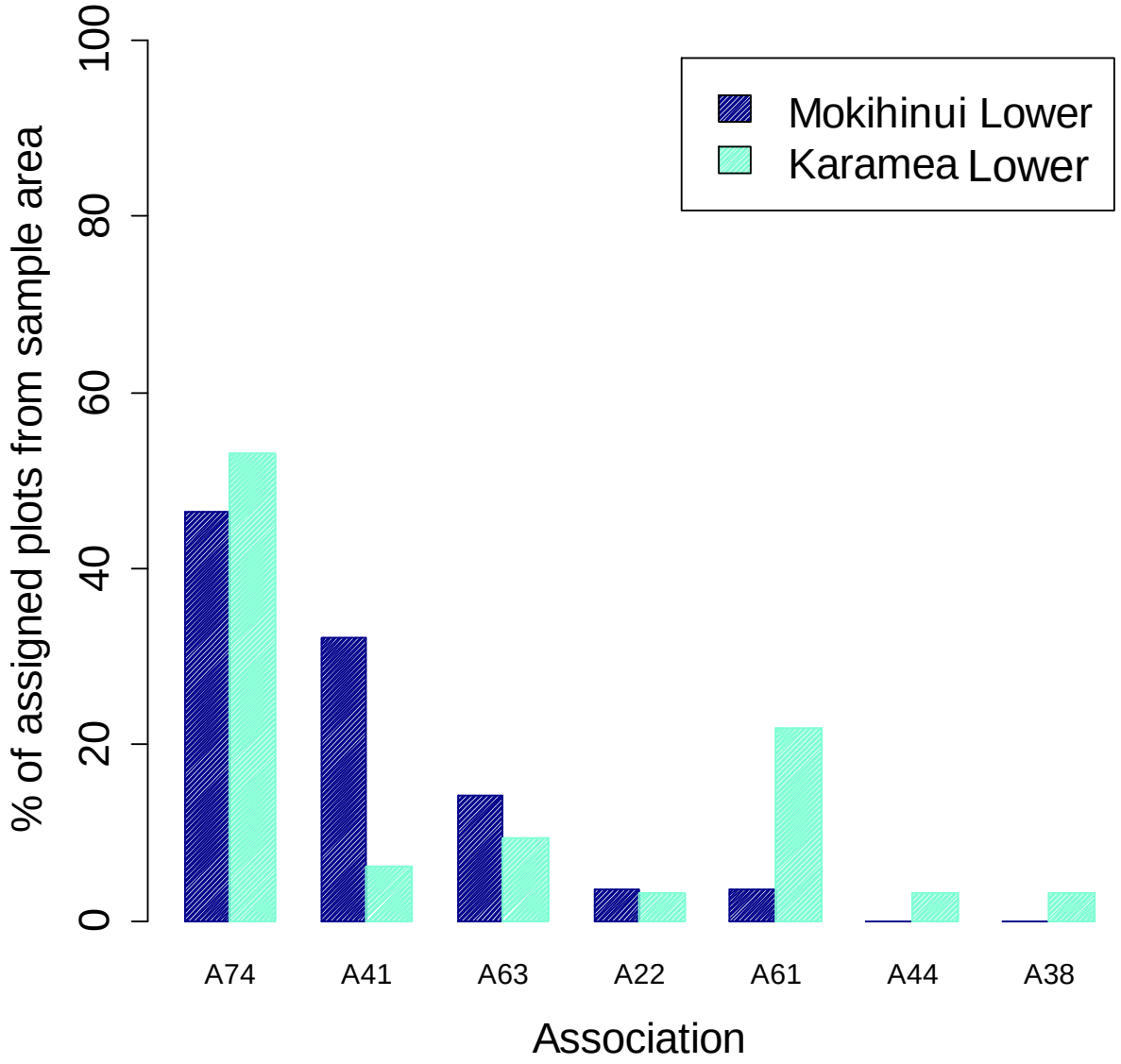
Are alliances & associations present in a similar catchment nearby?



Most alliances are present in Karamea



Most associations in inundation zone present in Karamea



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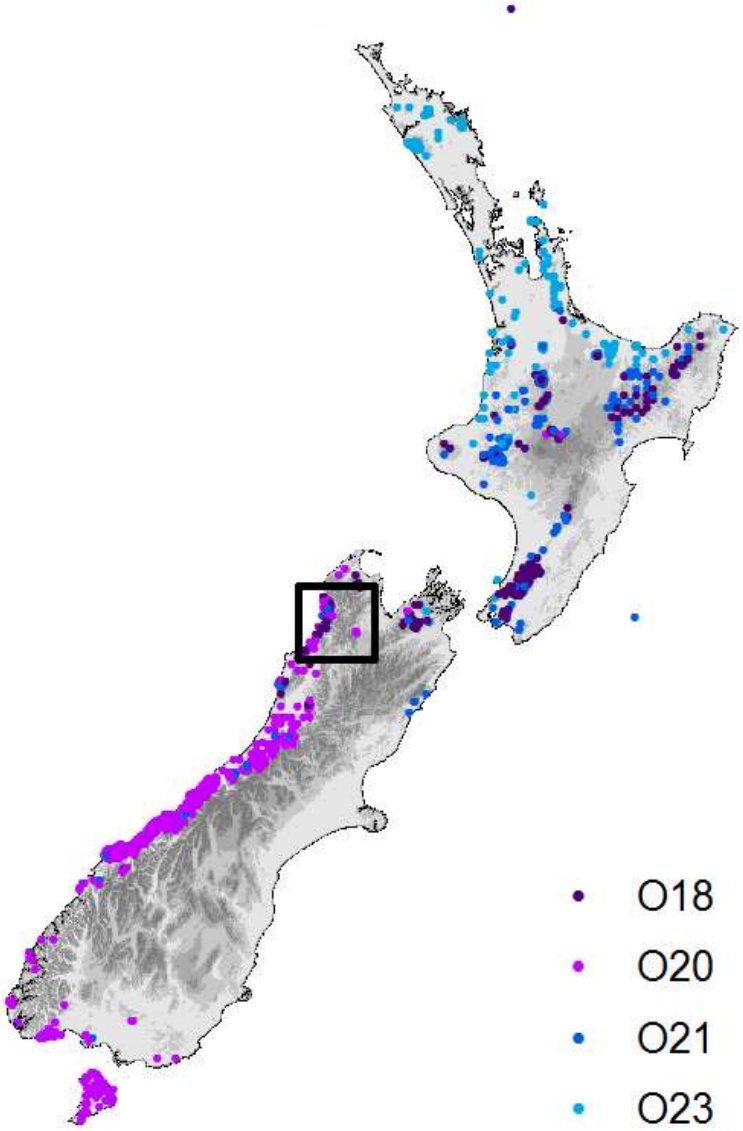
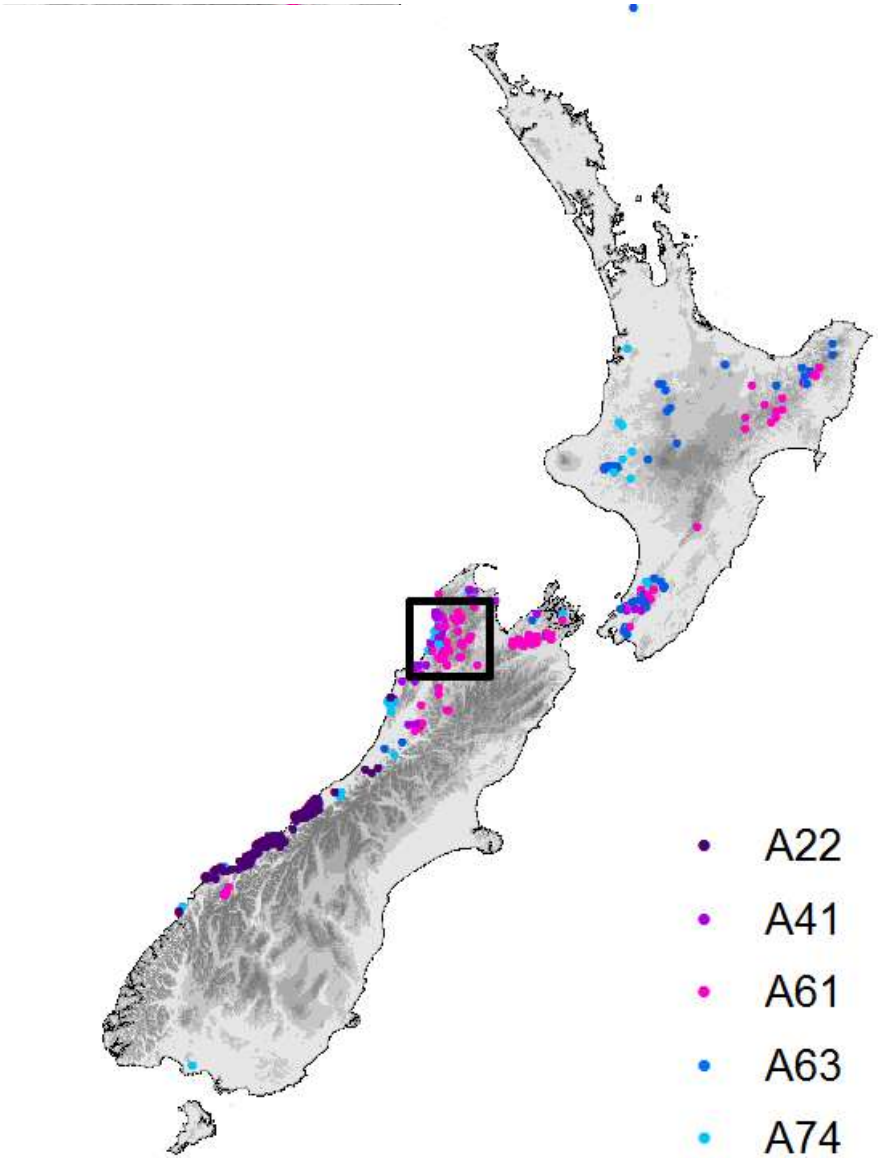
National representation: Alliances



National representation: Associations



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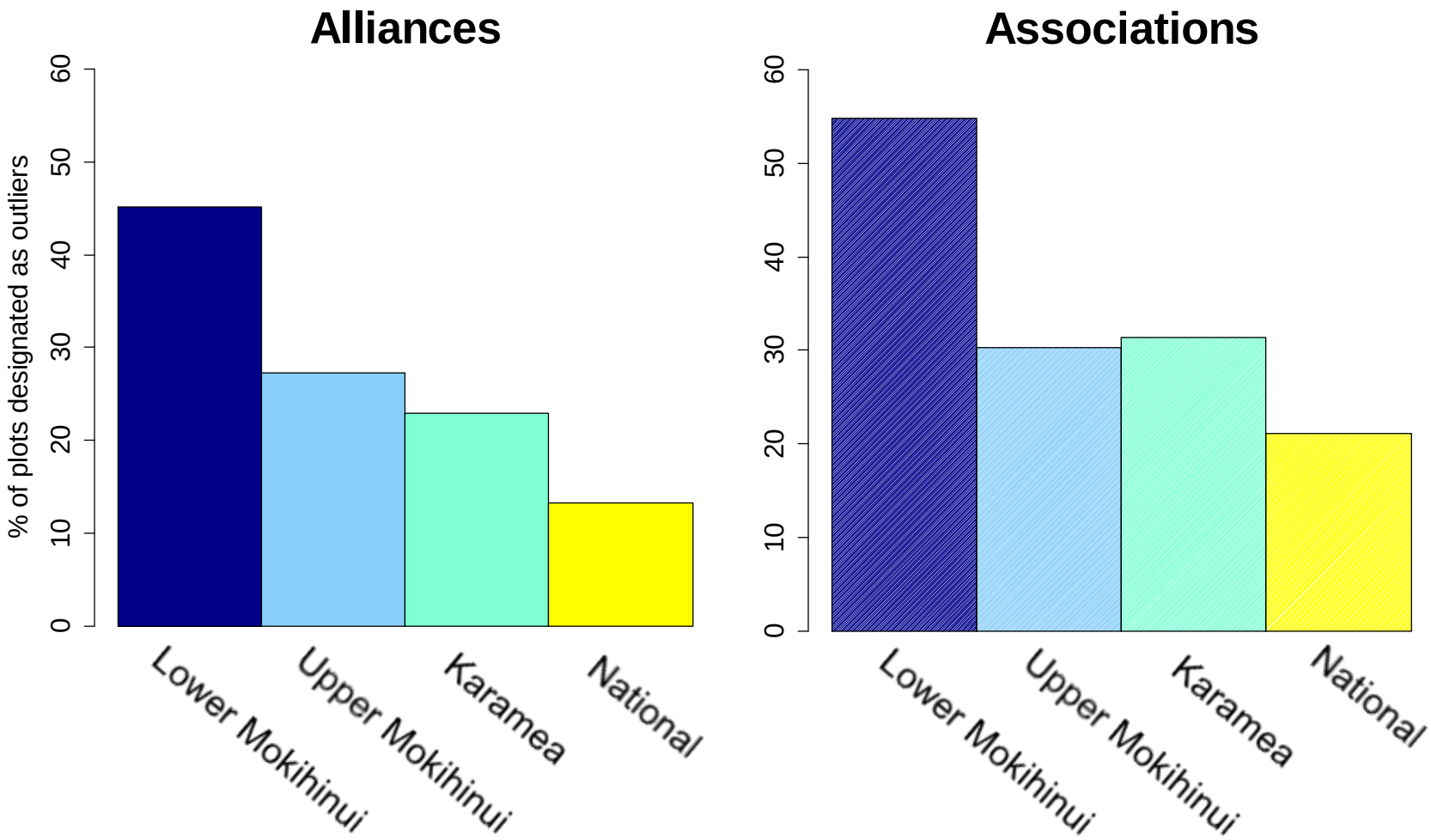
Lower Mokihinui has high proportion of ‘outlier’ plots



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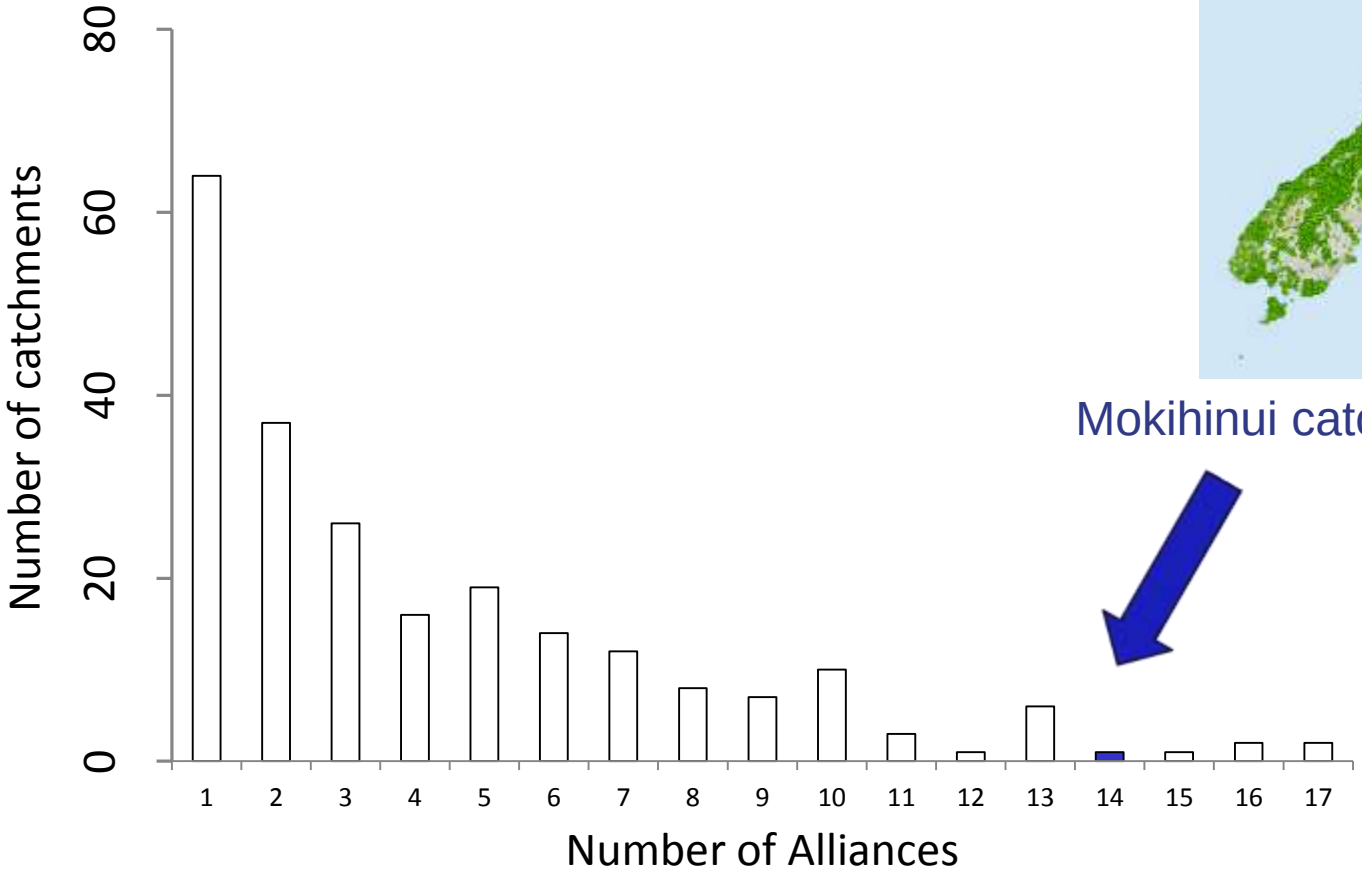
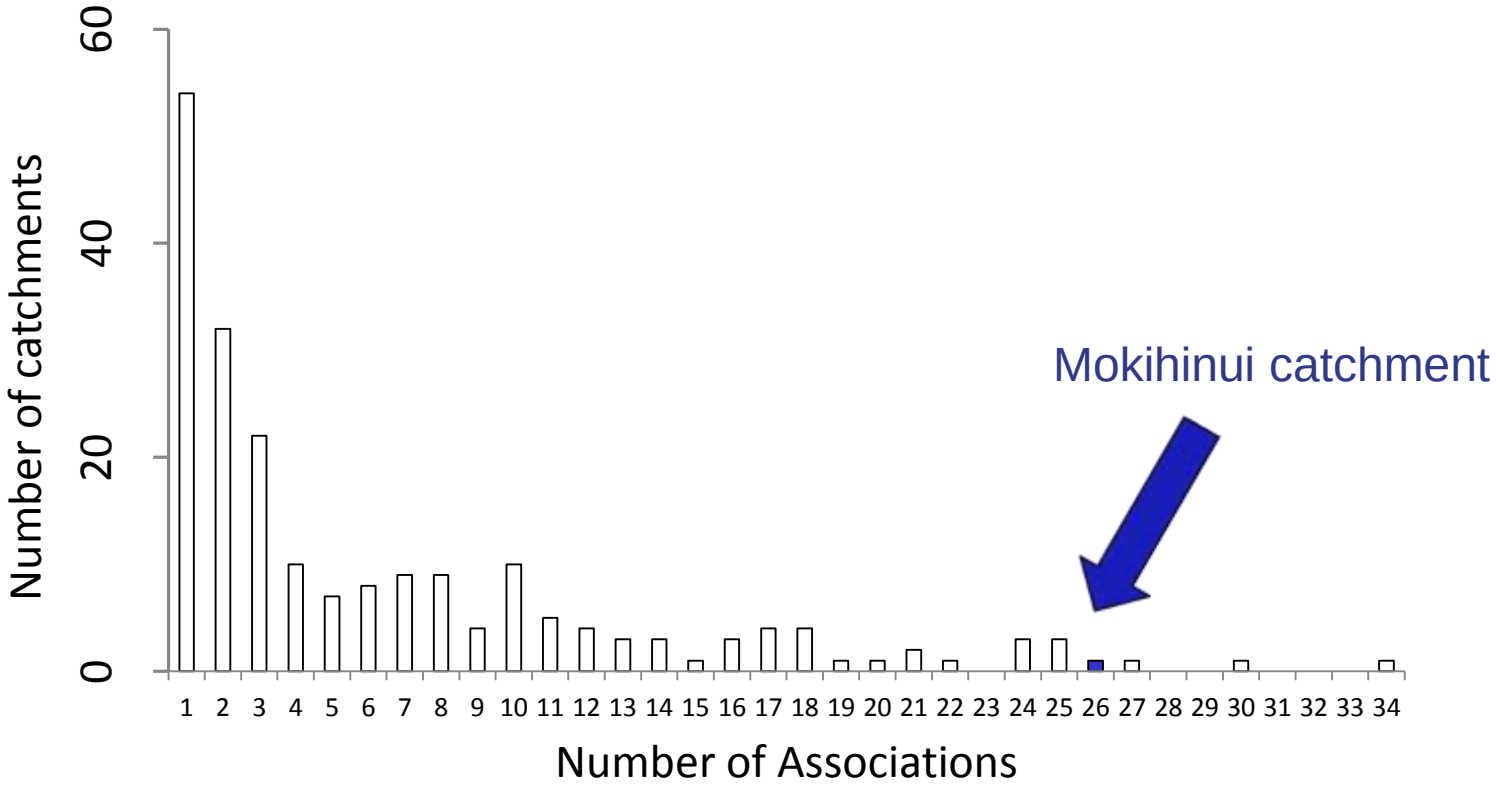
National scale: alliances within-catchments

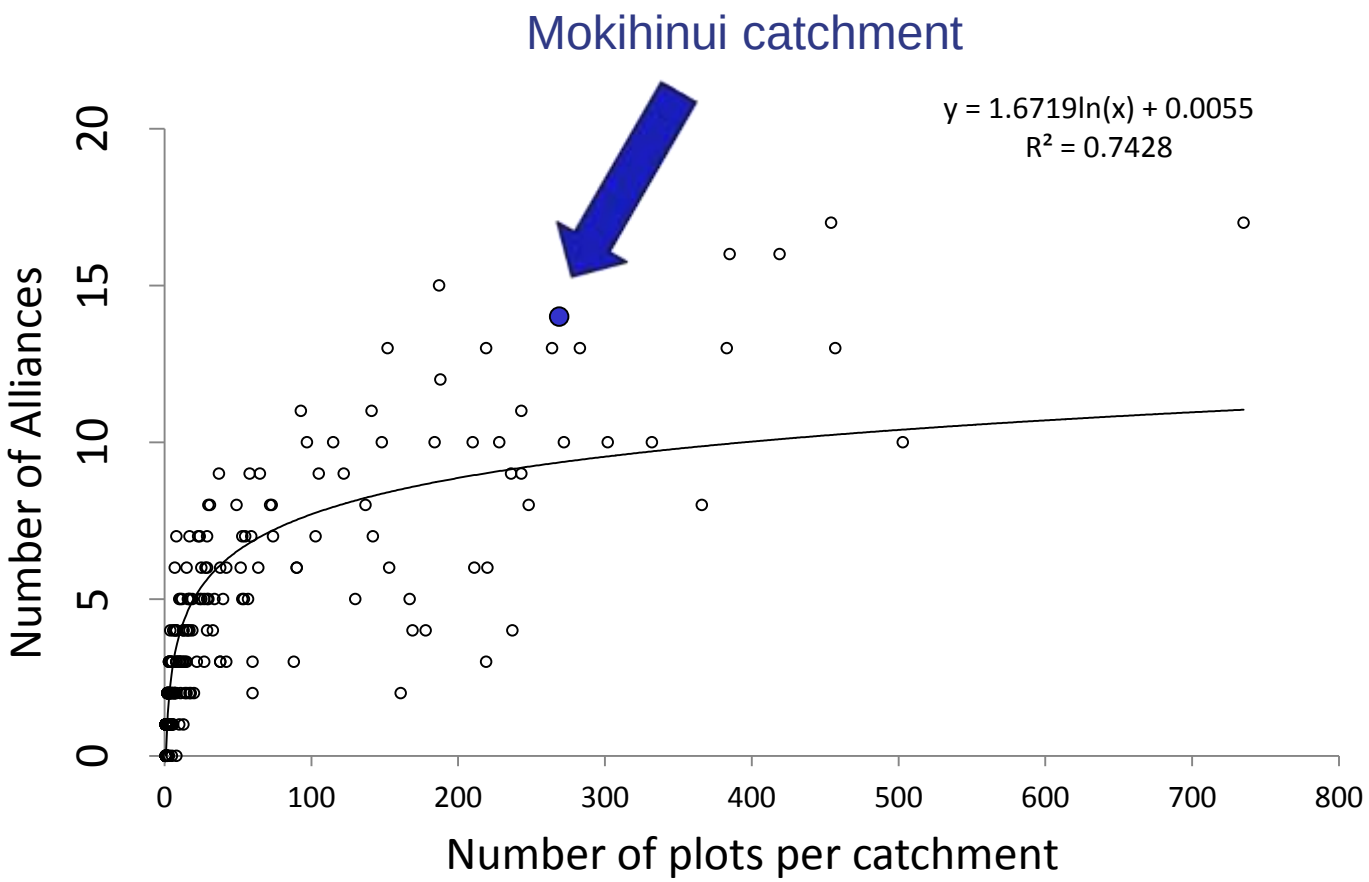
Mokihinui catchment



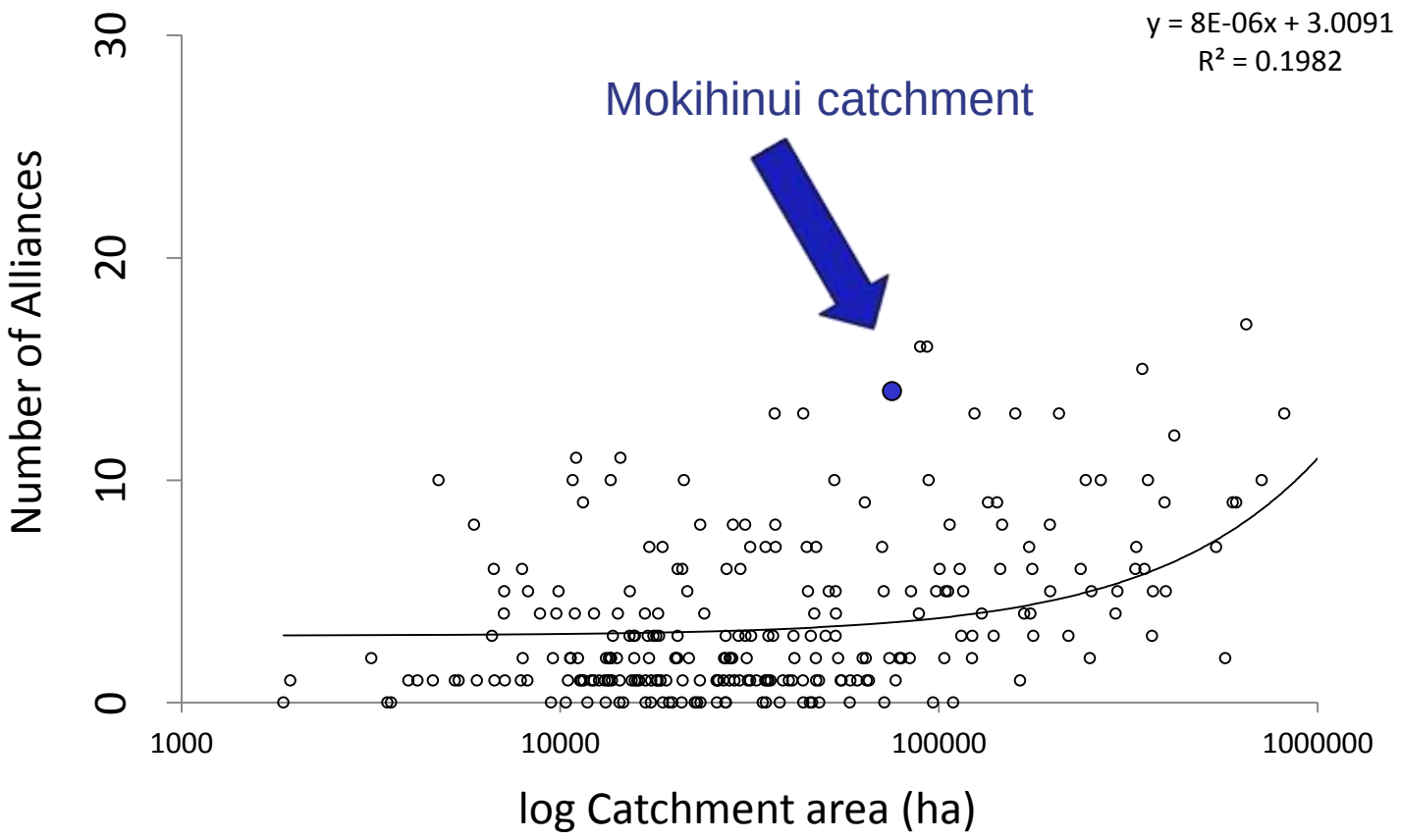
National scale: associations within-catchments



Sample effort per catchment: alliances



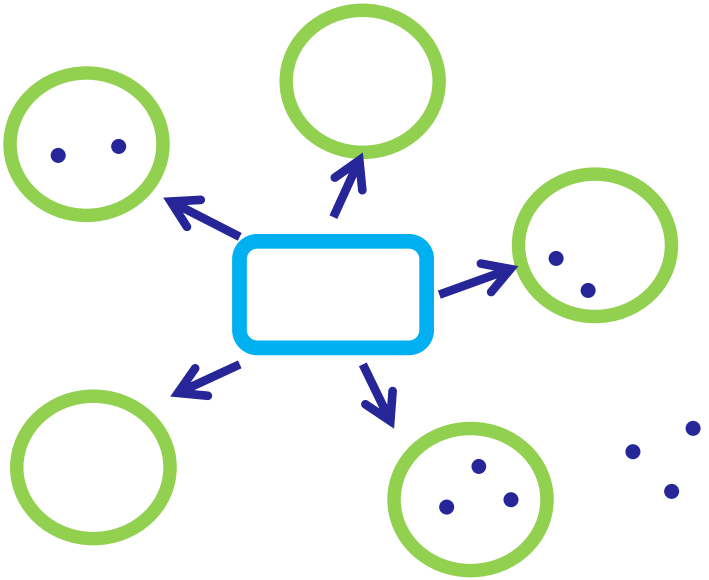
Catchment size: alliances

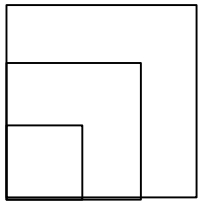


Conclusions

- Flooding would drastically reduce or eliminate certain alliances and associations from the Mokihinui catchment
- Most alliances & associations would persist in the region and nationally
- The flooded zone has a high proportion of vegetation that has yet to be described in the national classification
- The Mokihinui catchment has a higher diversity of woody plant communities than most other catchments in the country

Take home message





This provides another way to integrate plant communities into the assessment of biodiversity representation

Acknowledgements

Meridian Energy funded new data collection

James Barringer provided GIS support

Elise Arnst produced the maps