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Ministry for the Environment
Manatū Mō Te Taiao

Ministry for Primary Industries
Manatū Ahu Matua

NATIONAL POLICY STATEMENT FOR FRESHWATER MANAGEMENT 2014

A Guide to the National Policy Statement for Freshwater Management 2014

New Zealand Government

LAND & WATER FORUM

Fourth Report of the

Land and Water Forum

November 2015

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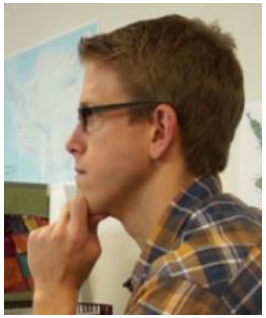
Next steps for fresh water

SUMMARY OF SUBMISSIONS

Economic costs and environmental benefits of riparian restoration in New Zealand

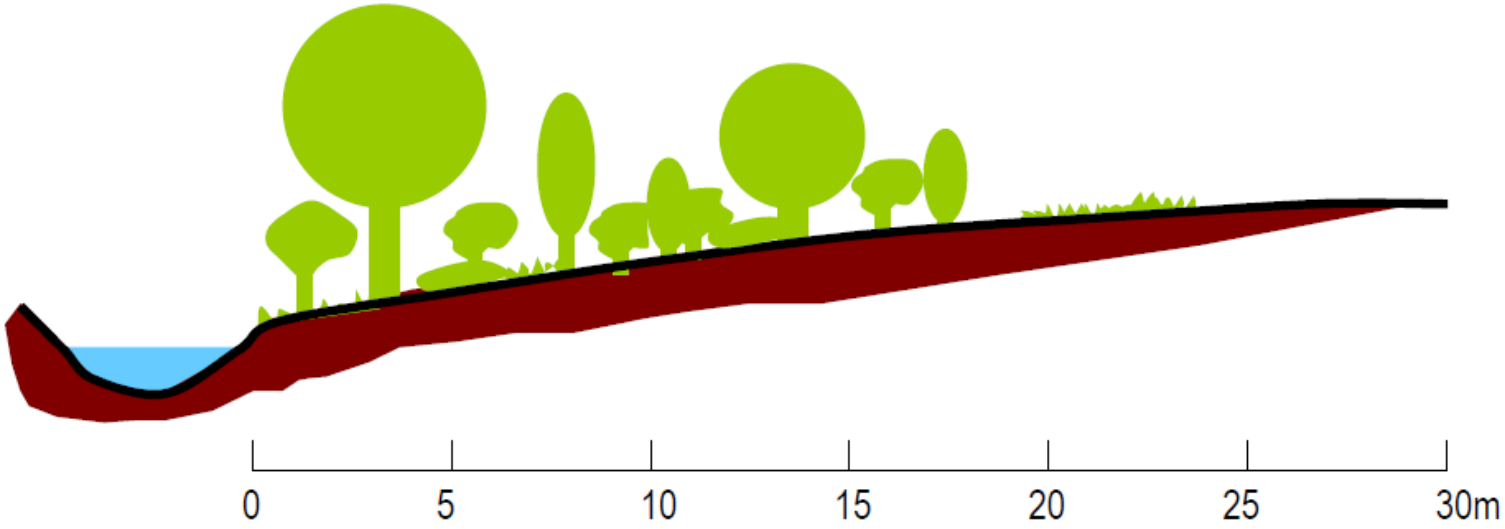



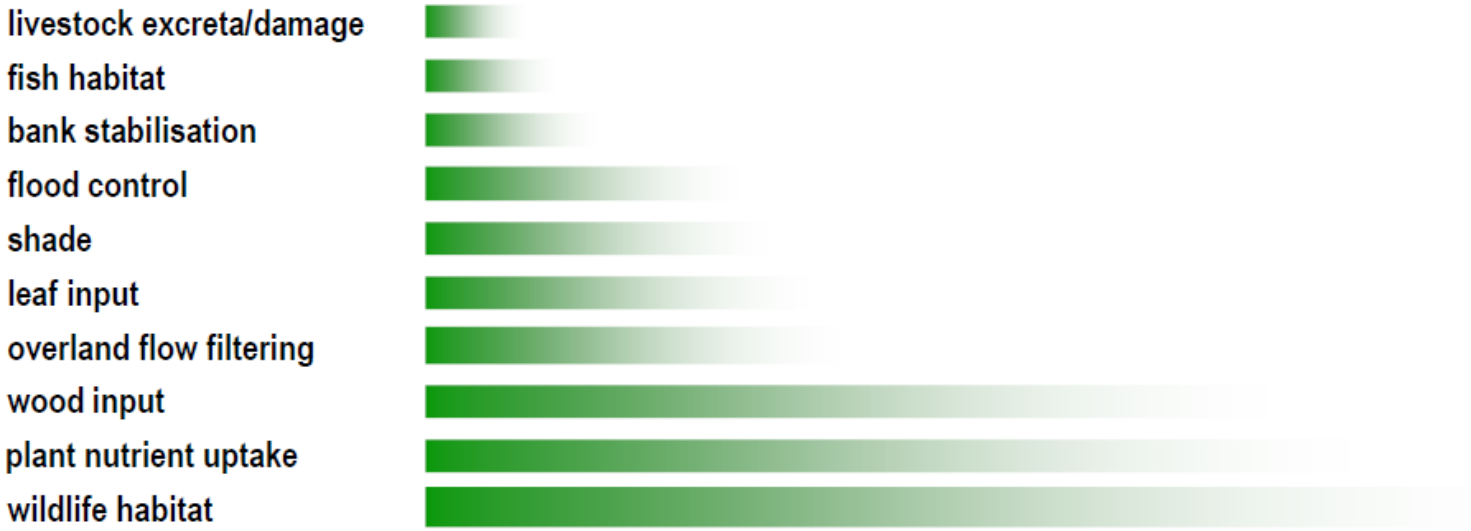

Landcare Research LINK Seminar

6 September 2016

LANDCARE RESEARCH
MANAAKI WHENUA

Impact of riparian margins





Source: Dosskey et al. (1997) How to Design a Riparian Buffer for Agricultural Land. *Agroforestry Notes*

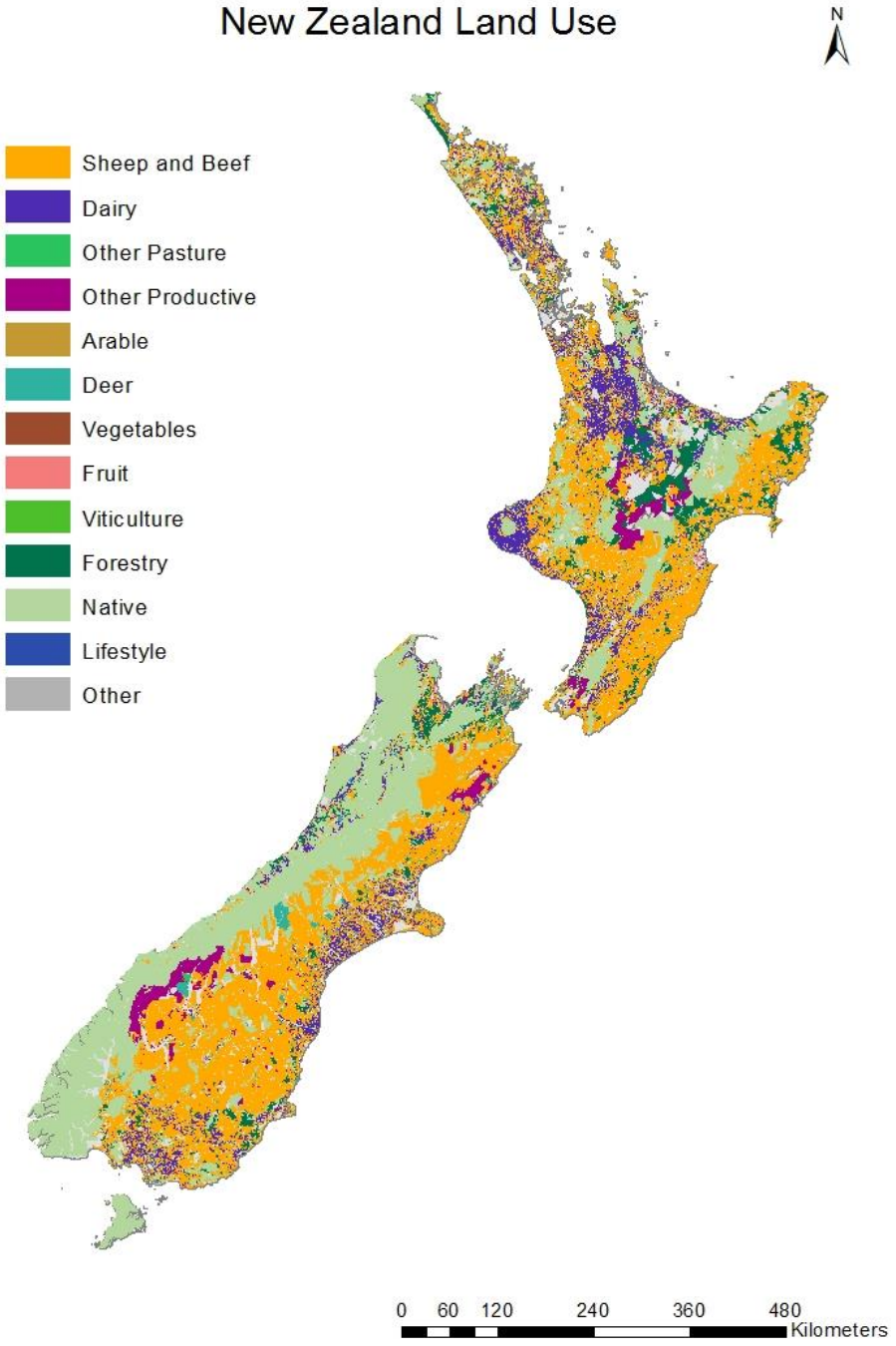
Methodology - baseline

- Spatially explicit baseline estimates:
  - Land use
  - Land productivity and stock numbers
  - Net farm revenue
  - Environmental impacts

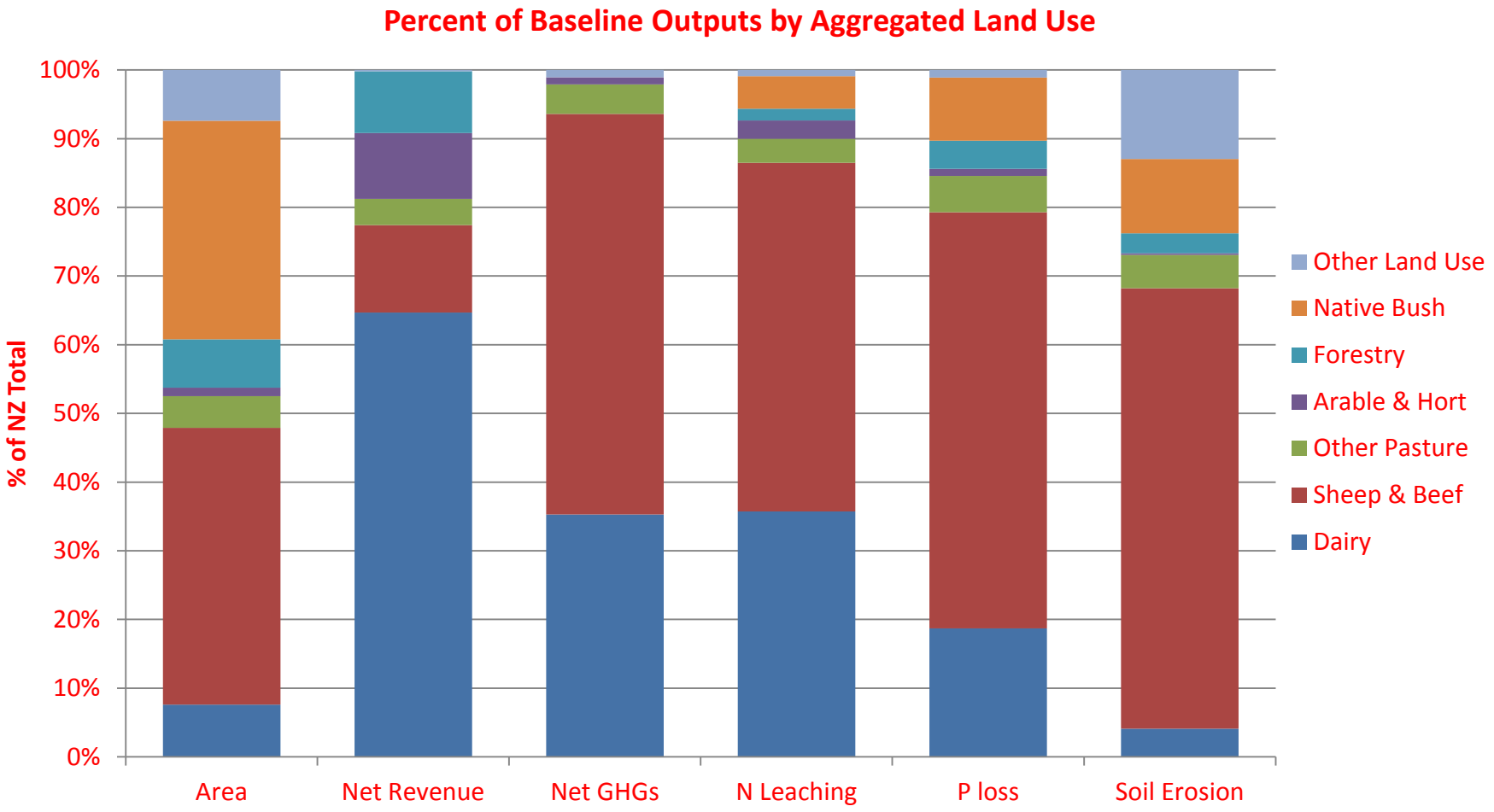
New Zealand Land Use

Total area:

~27 million ha



Baseline estimates



Area (Mha)	Net Revenue (mil $)	Net GHGs (MtCO2e)	N Leaching (Kt)	P loss (Kt)	Soil Erosion (Mt)
27.4	11,018	10.7	221.7	9.5	213.6

Methodology – riparian margins

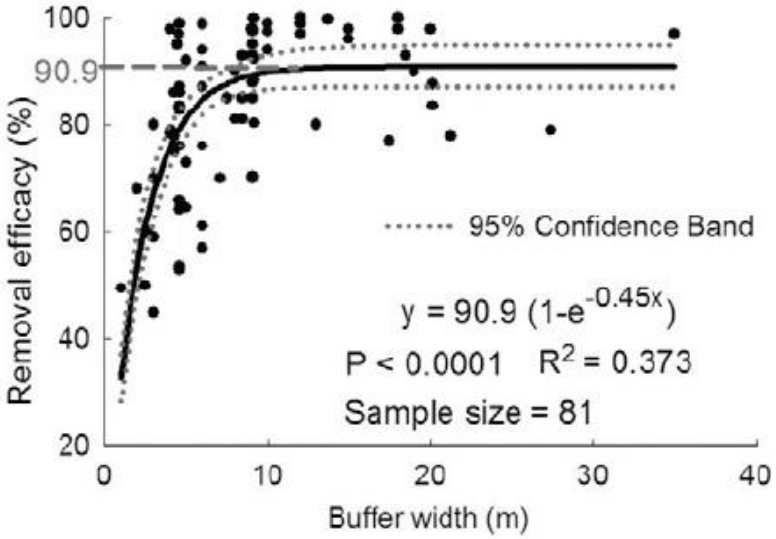
- Overlay of agriculture and streams/margins
- > 508,000 km of streams in NZ
  - ~ 348,000 km on productive land
  - 5, 10, 20, and 50m margins on all such streams
- Cost and impact mitigation
  - Sensitivity analyses

Riparian margin costs

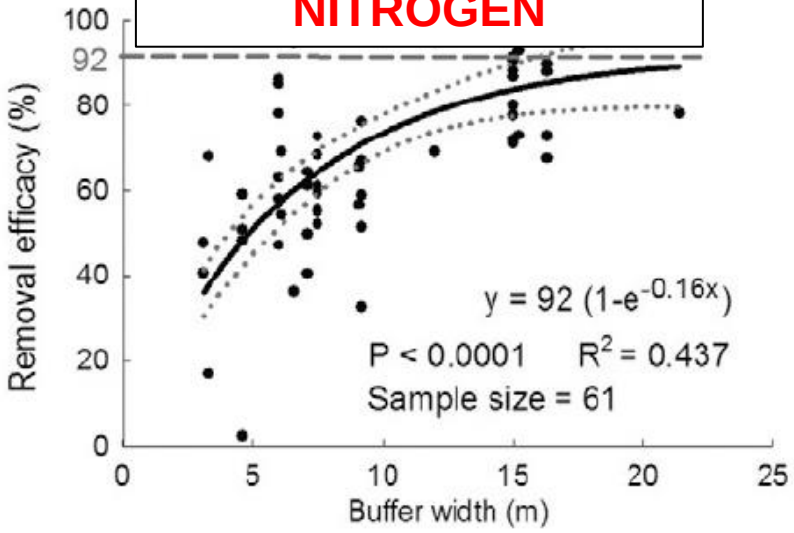
Cost Component	Low	Medium	High
Fence (pastoral; per m stream)	$2	$8	$16
Water supply (pastoral; per paddock)	$100	$250	$500
Revegetation (per ha)	$0	~~$300~~ $1,000	~~$1,000~~ $5,000
Opportunity cost	0%	50%	100%

Margin width and mitigation effectiveness

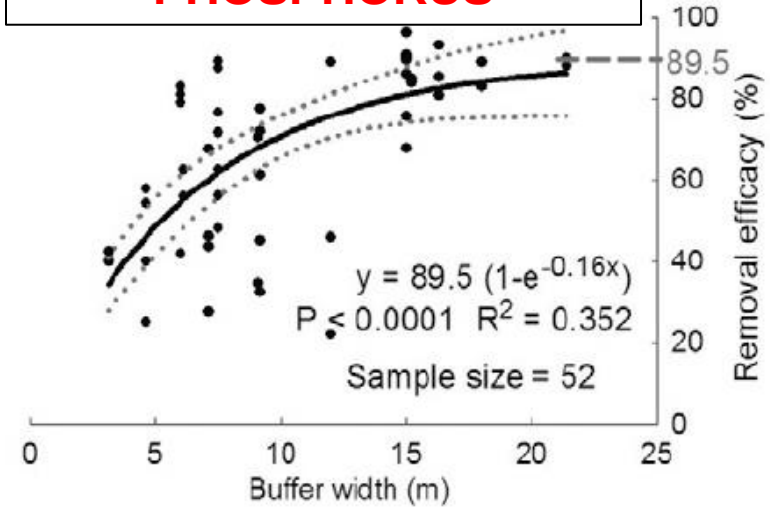
SEDIMENT



NITROGEN

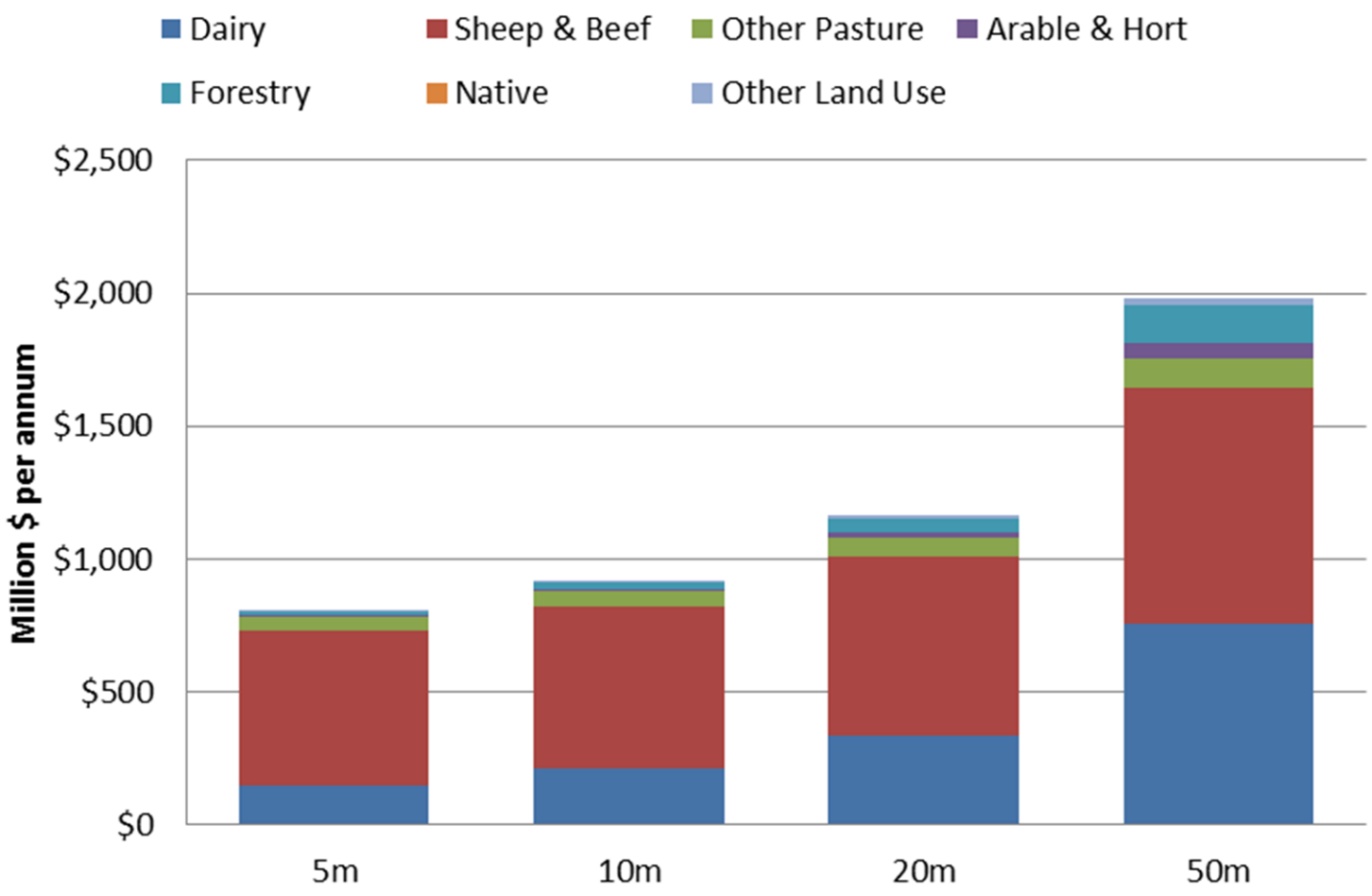


PHOSPHORUS



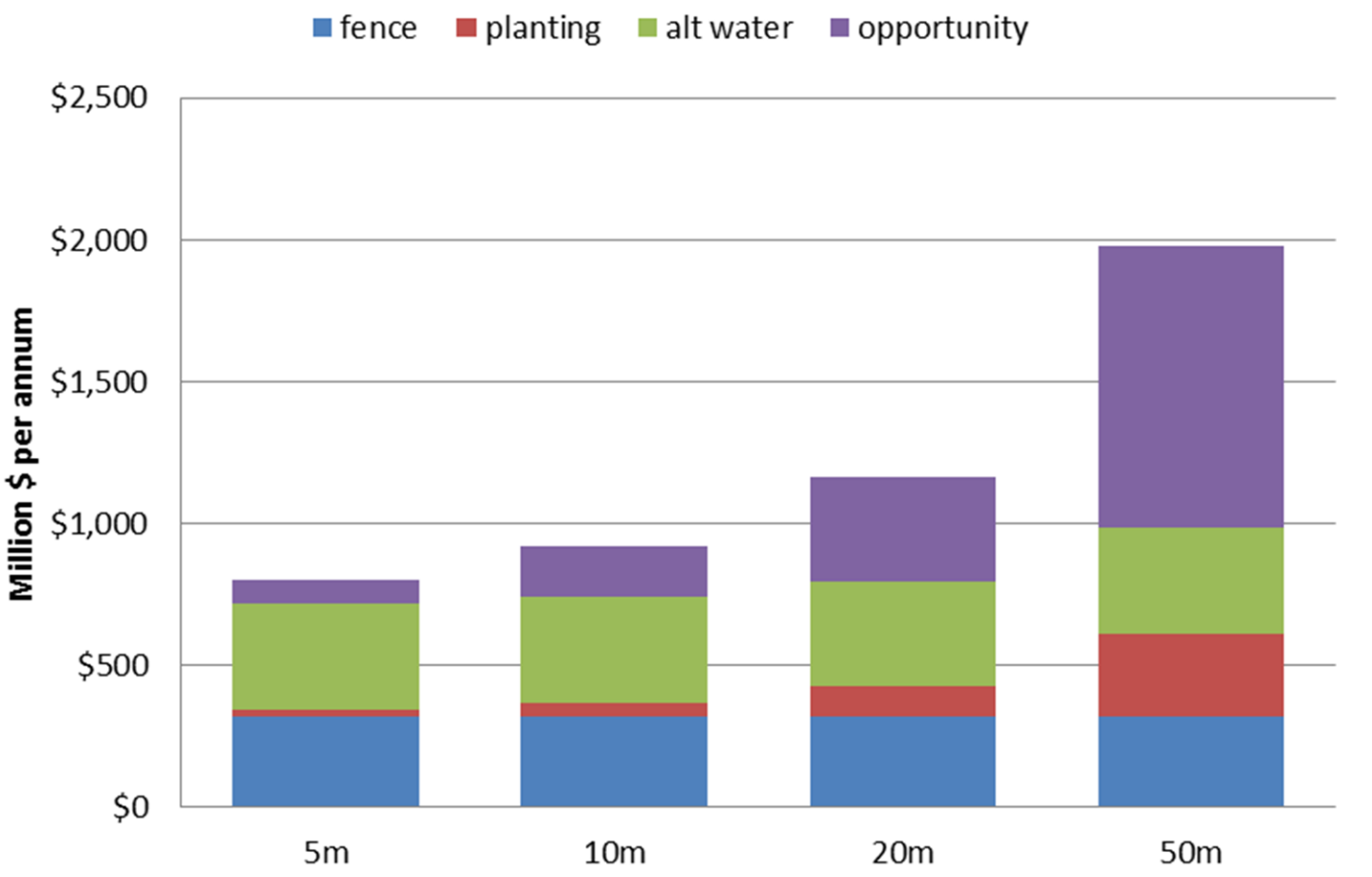
Source: Zhang et al. 2010. *J of Env Quality.*

Results – Sectoral cost

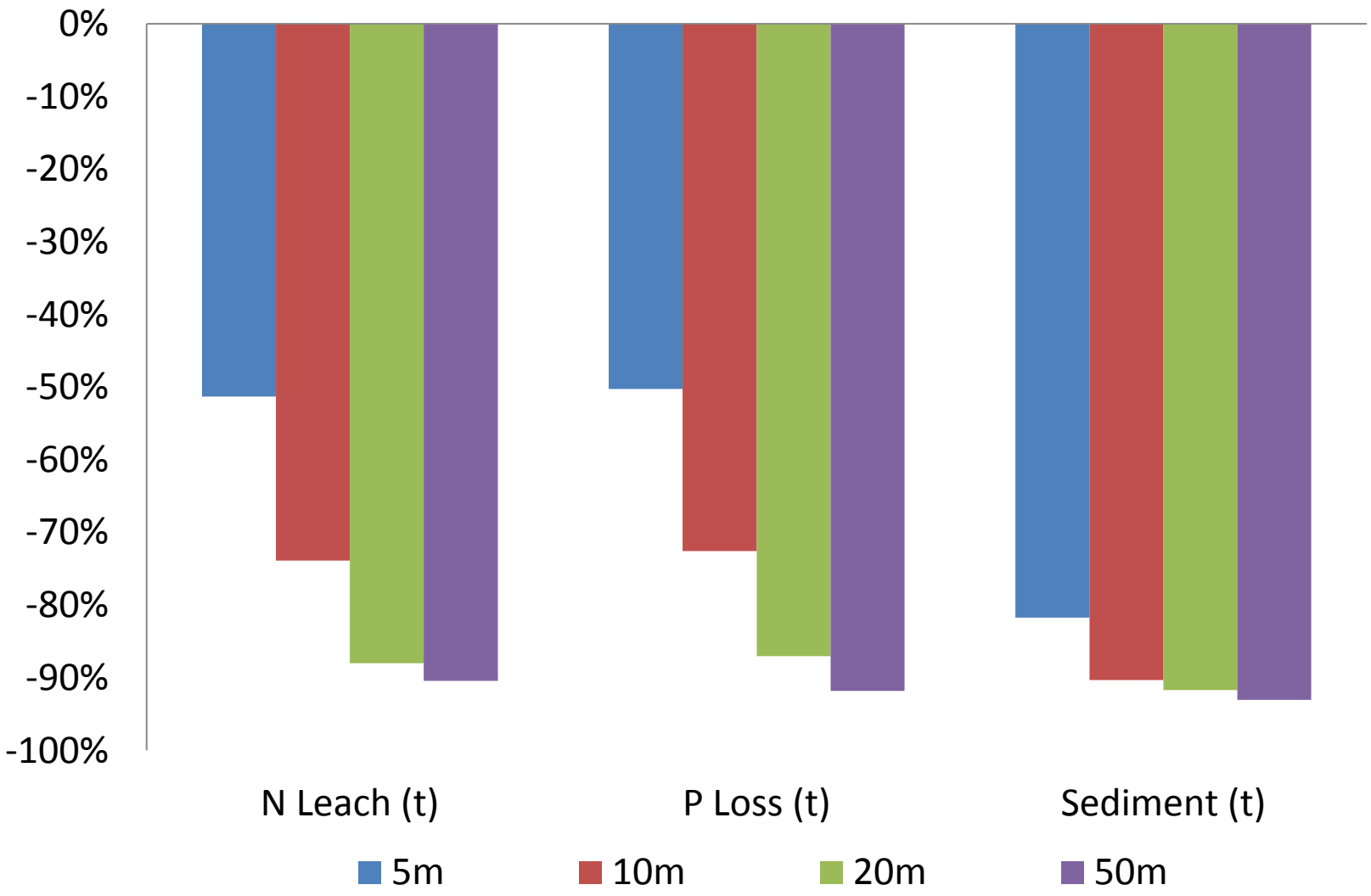


A 7-17% reduction in net farm revenue

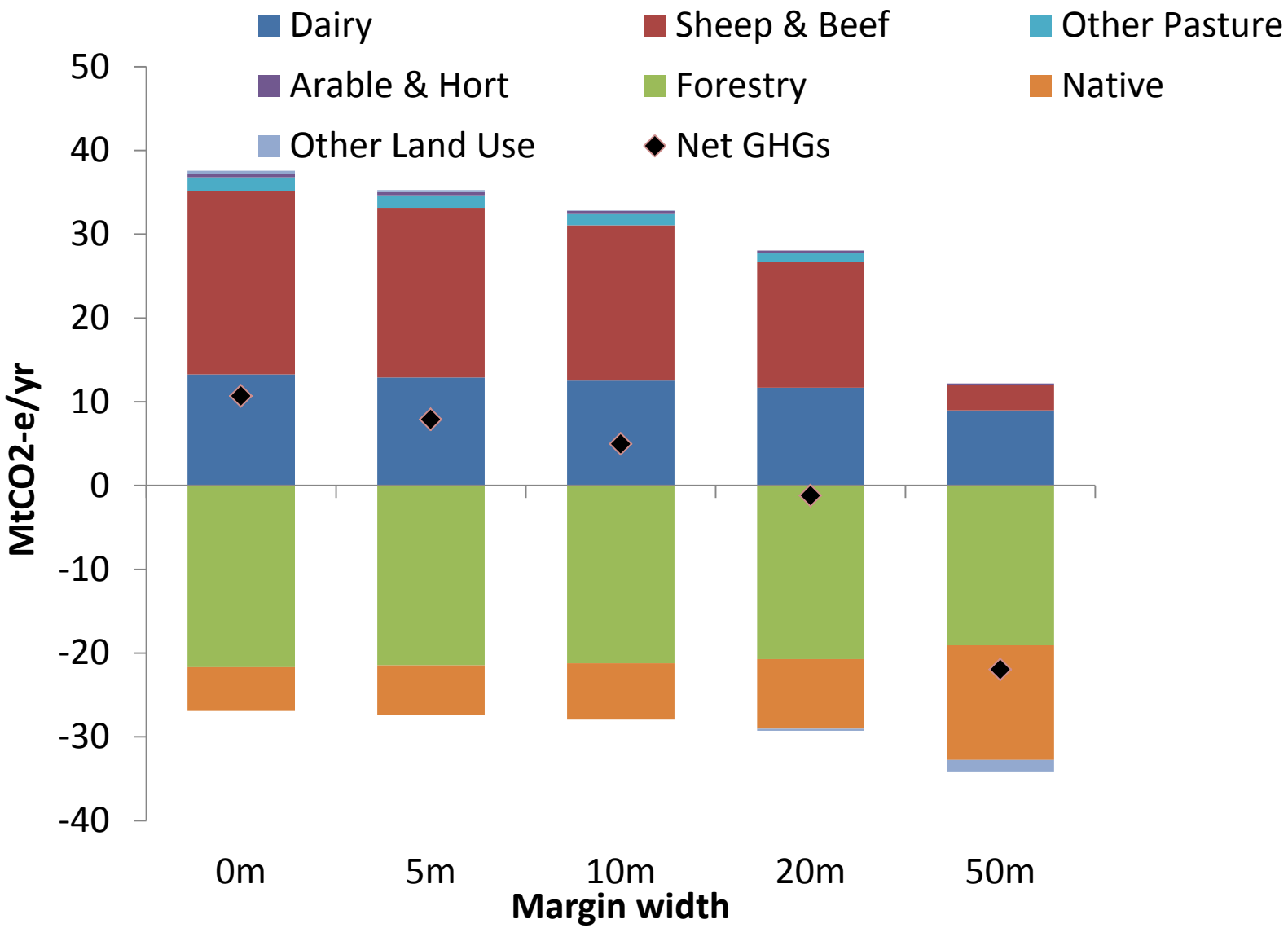
Results – Cost type



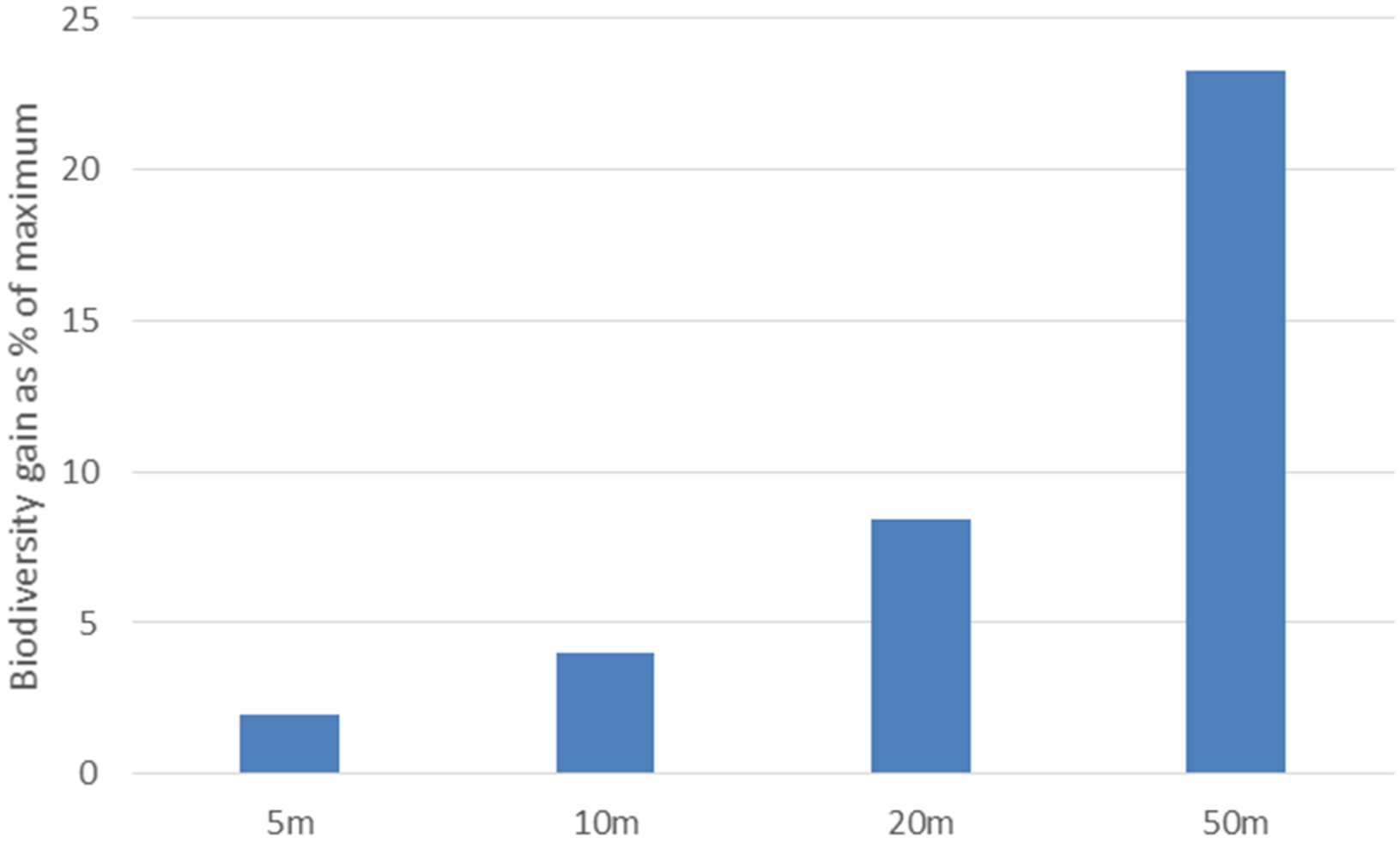
Results – water benefits



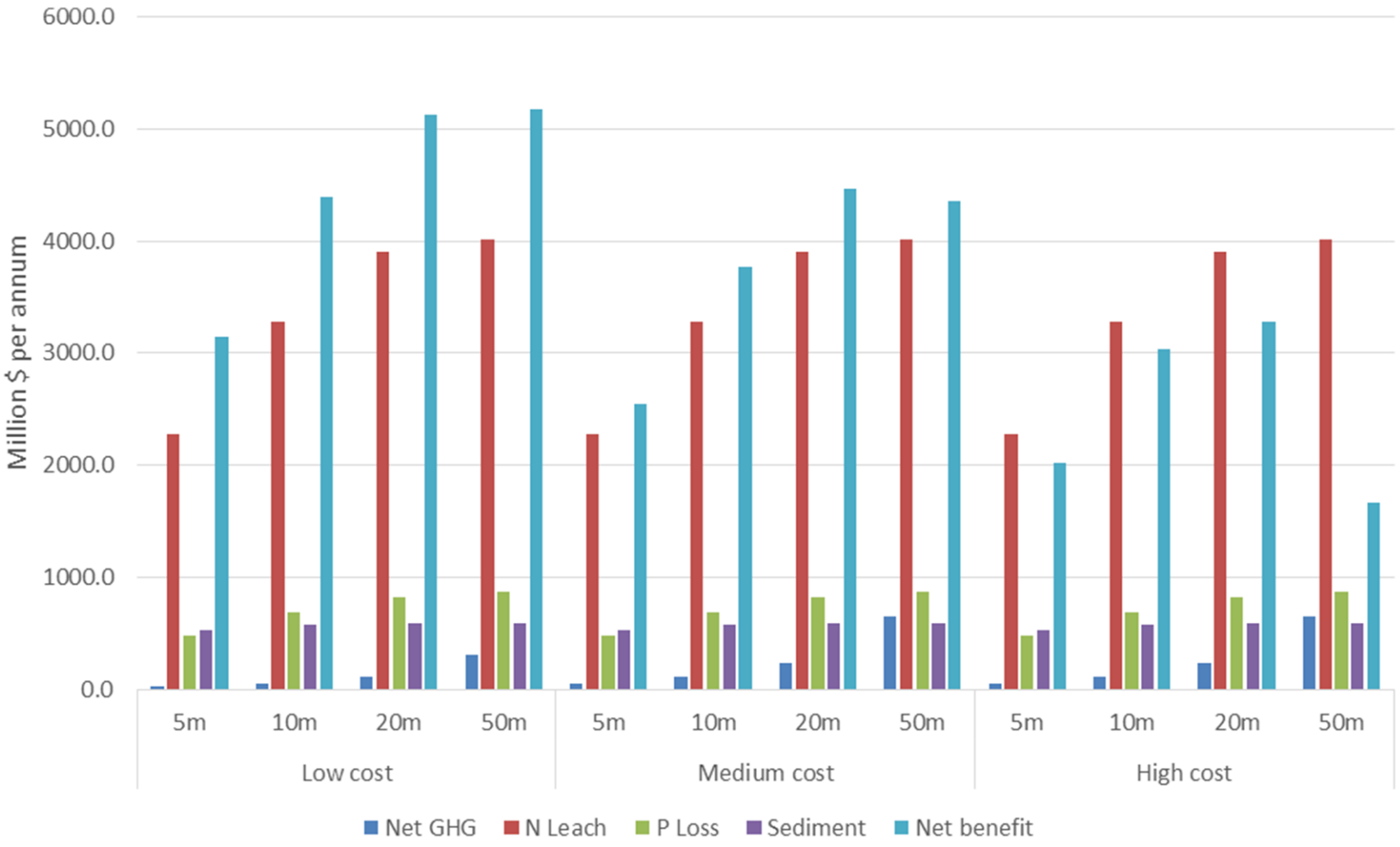
Results – GHG benefits



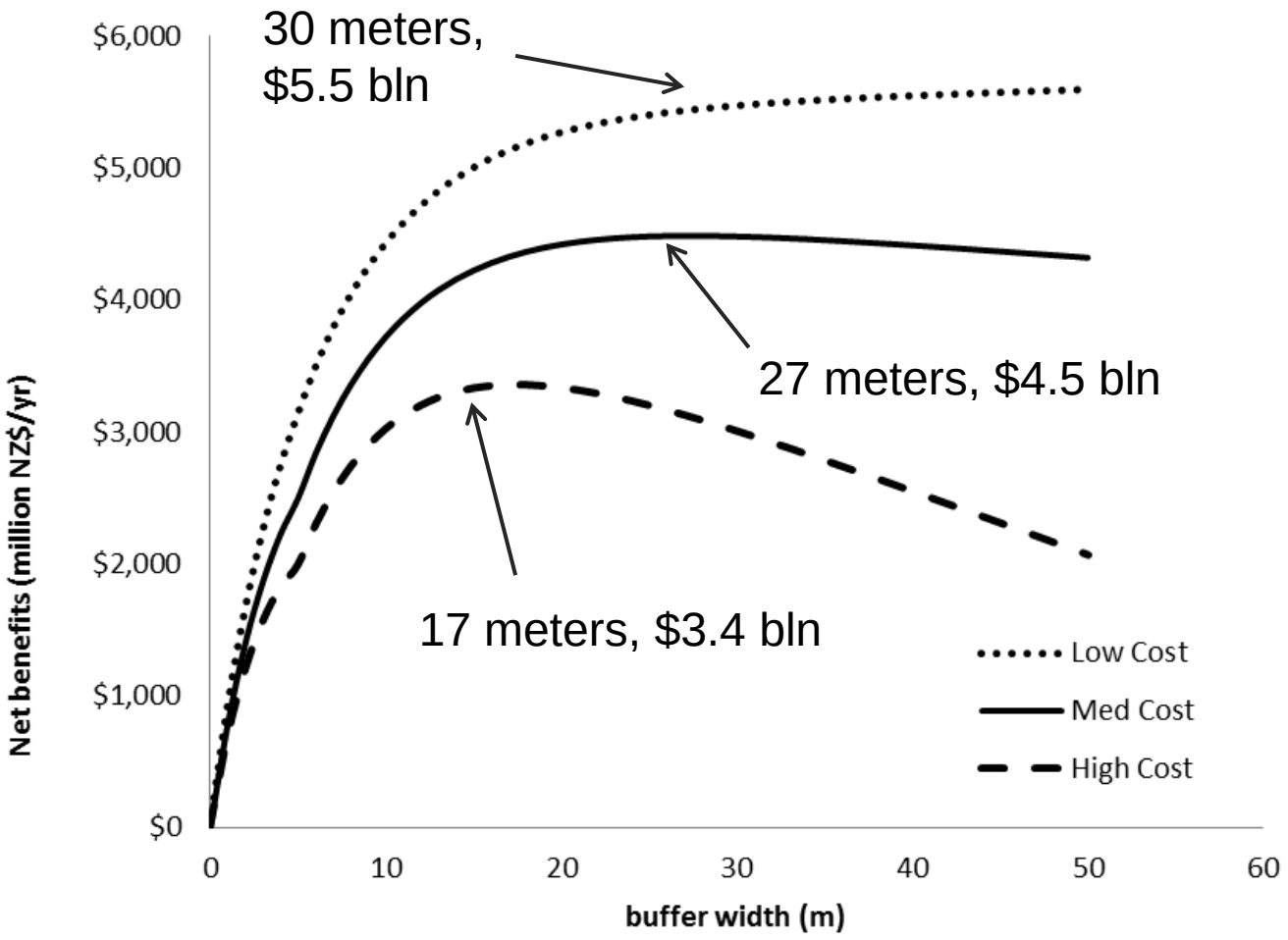
Results – biodiversity



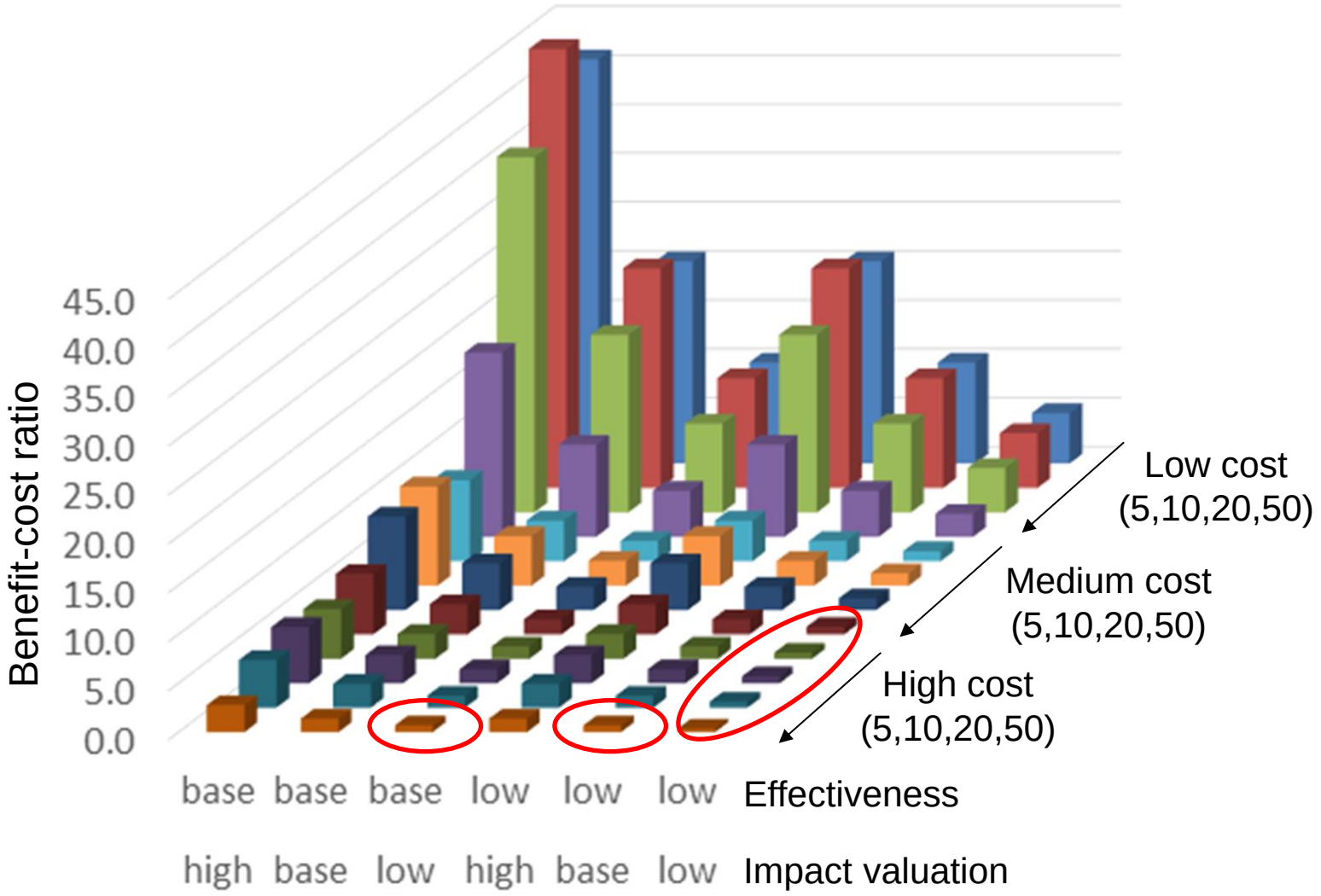
Results – net benefits



Results – Optimal margin



Results – Sensitivity analysis



Summary

- Total cost of $0.8 to $1.9 billion per year
  - ~ 7-17%
- S&B and Dairy to face costs
  - Regional variation
- Positive welfare impacts are very likely
  - $1.7 – $5.2 bln / year
  - Non-market benefits!

Refinements

- Existing fencing and margins[a]
- Slope[b], soil type, …
- Improved biodiversity and cultural value

- Spatial optimisation with budget constraints

[a] DairyNZ, DCANZ 2015. *Sustainable dairying water accord: two years on*. DairyNZ and DCANZ.

[b] MfE 2016. *Next steps for freshwater: consultation document*. Wellington, Ministry for the Environment

Thank you