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# **Economic costs and environmental benefits of riparian restoration in New Zealand**

Florian Eppink & Adam Daigneault

Contributed presentation at the 60th AARES Annual Conference,  
Canberra, ACT, 2-5 February 2016

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# Economic costs and environmental benefits of riparian restoration in New Zealand

Florian Eppink & Adam Daigneault

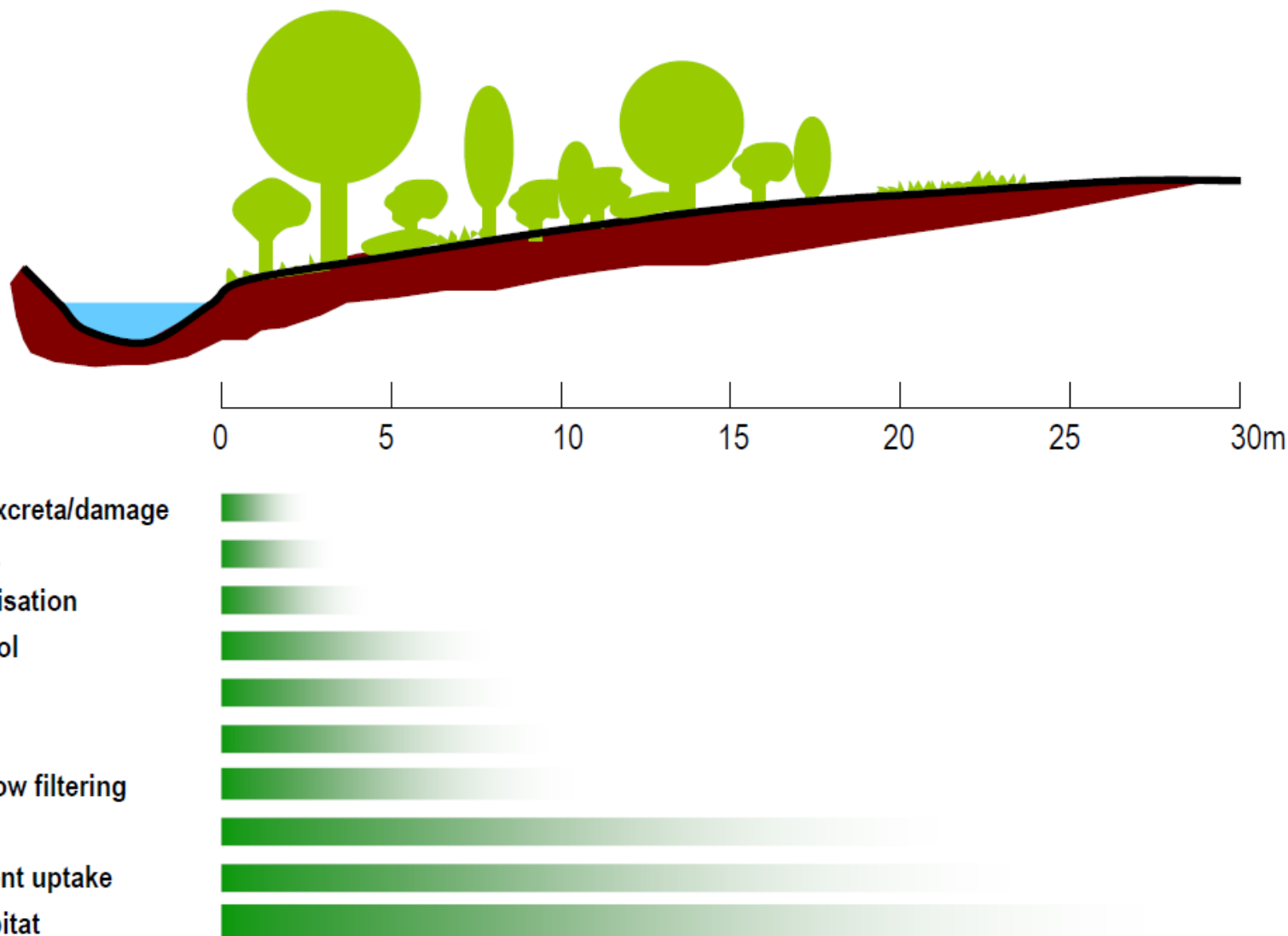
2016 AARES Annual Meetings

4 February 2016



**LANDCARE RESEARCH**  
MANAAKI WHENUA

# Impact of Buffer Width



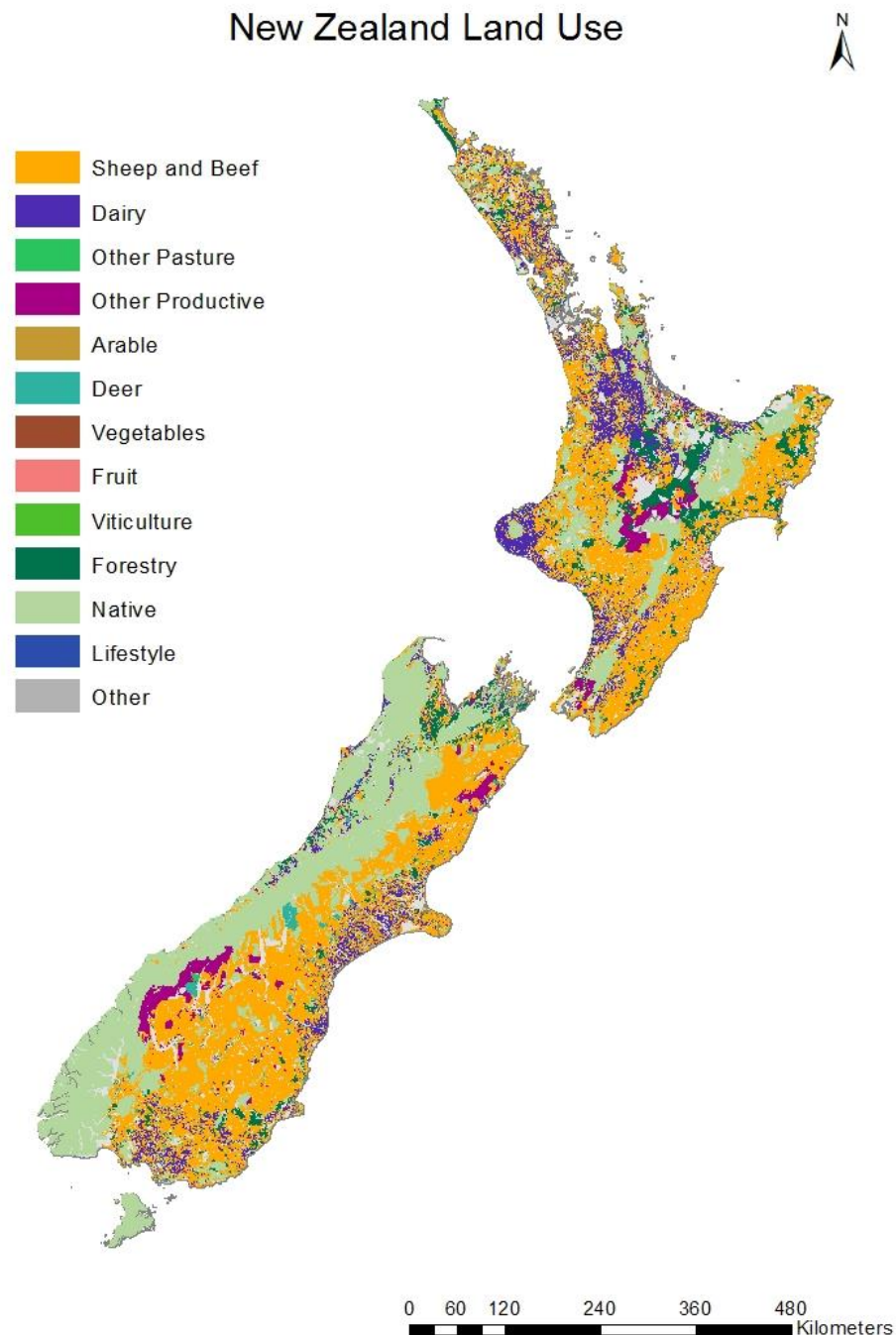
# Methodology - baseline

- Spatially explicit baseline estimates:
  - Land use
  - Land productivity and stock numbers
  - Net Farm Revenue
  - Environmental effects

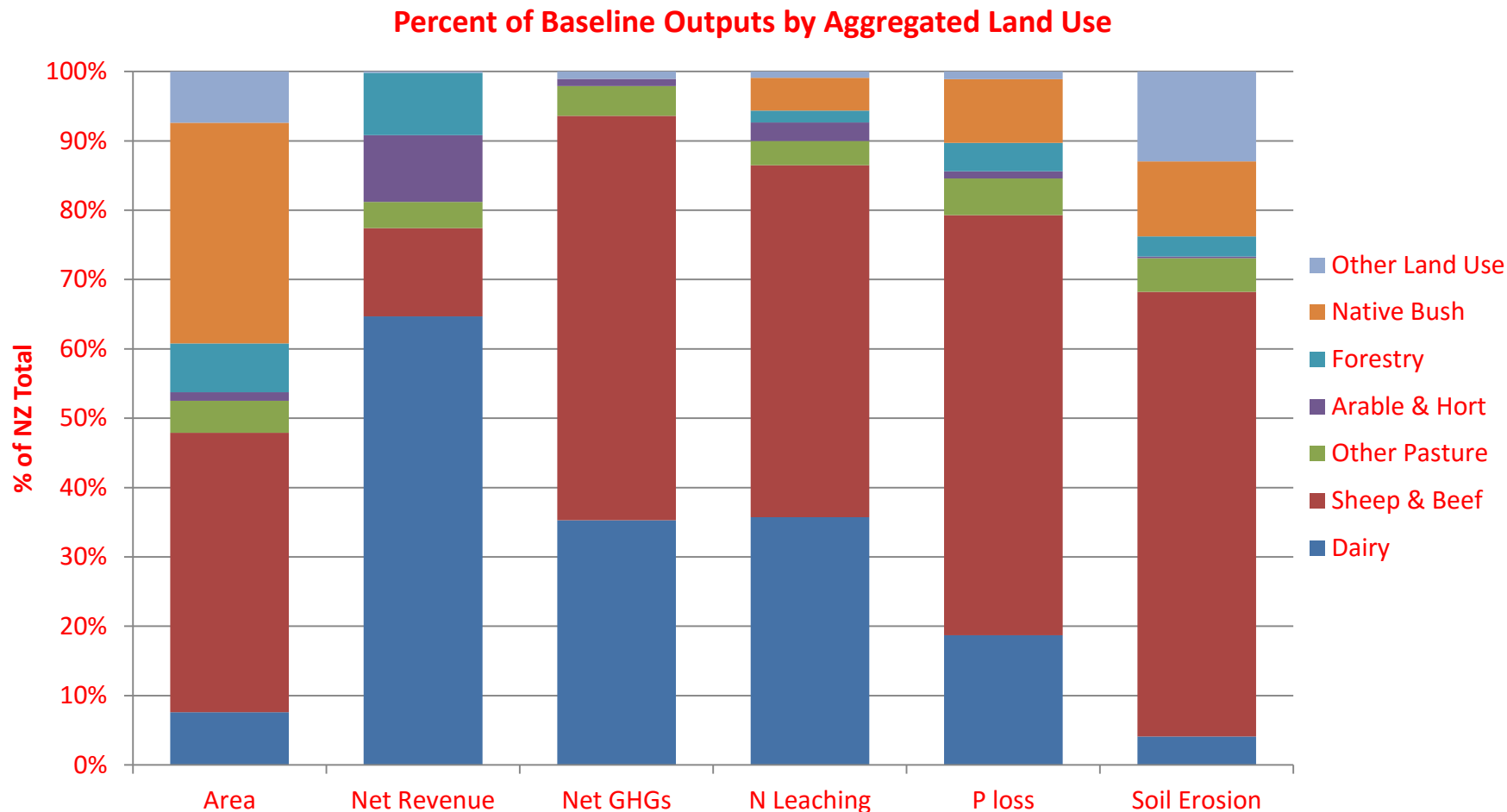
# New Zealand Land Use

Total Area:  
~27 million ha

Net Farm Revenue:  
\$11 billion/yr



# Baseline (no riparian) Estimates



Area (Mha)	Net Revenue (mil \$)	Net GHGs (Mt)	N Leaching (Mt)	P loss (Mt)	Soil Erosion (Mt)
27.4	11,018	10.7	221.7	9.5	213,555

# Methodology – riparian buffers

- > 500,000 km of streams in NZ
  - ~ 160,000 on native vegetation
- Stream and Buffer Overlay
  - 5, 10, 20, and 50m on all streams (except native)
  - Opportunity costs
  - Planting costs
  - Alternative water sources (pastoral)
  - Fences (pastoral)
  - Mitigation effectiveness

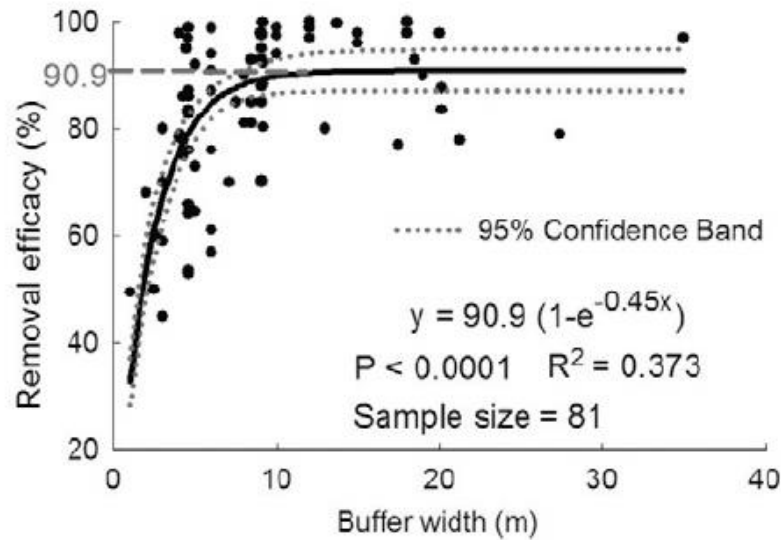
# Riparian buffer costs

- Construction and planting costs annualised over 25 years at rate of 5%

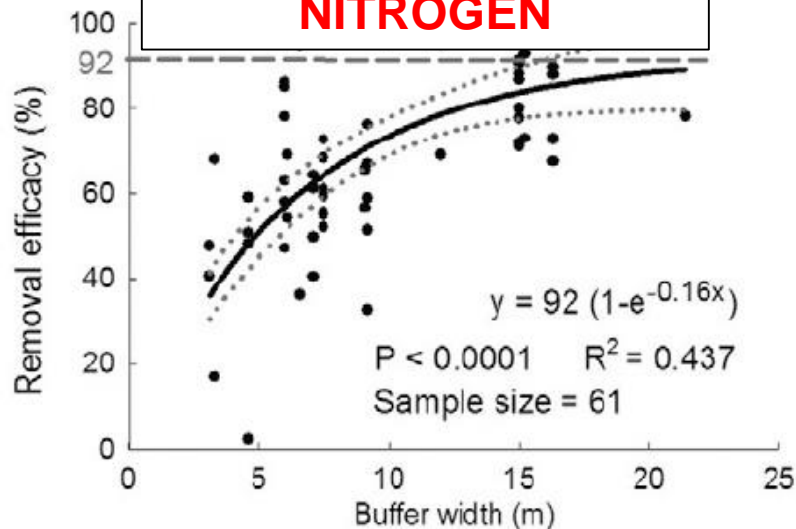
Cost Component	Low	Medium	High
Fence (per m)	\$2	\$8	\$16
Alt Water Supply (per paddock)	\$100	\$500	\$1,000
Revegetation (per ha)	\$0	\$300	\$1,000

# Buffer Width and Mitigation Effectiveness

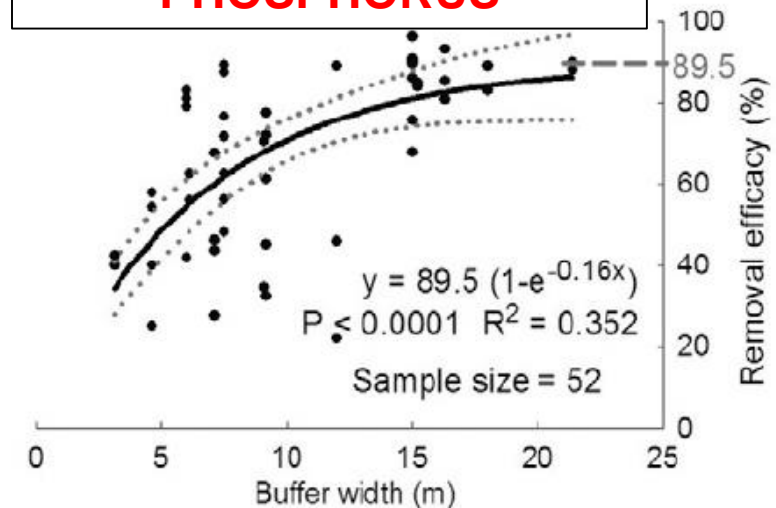
## SEDIMENT



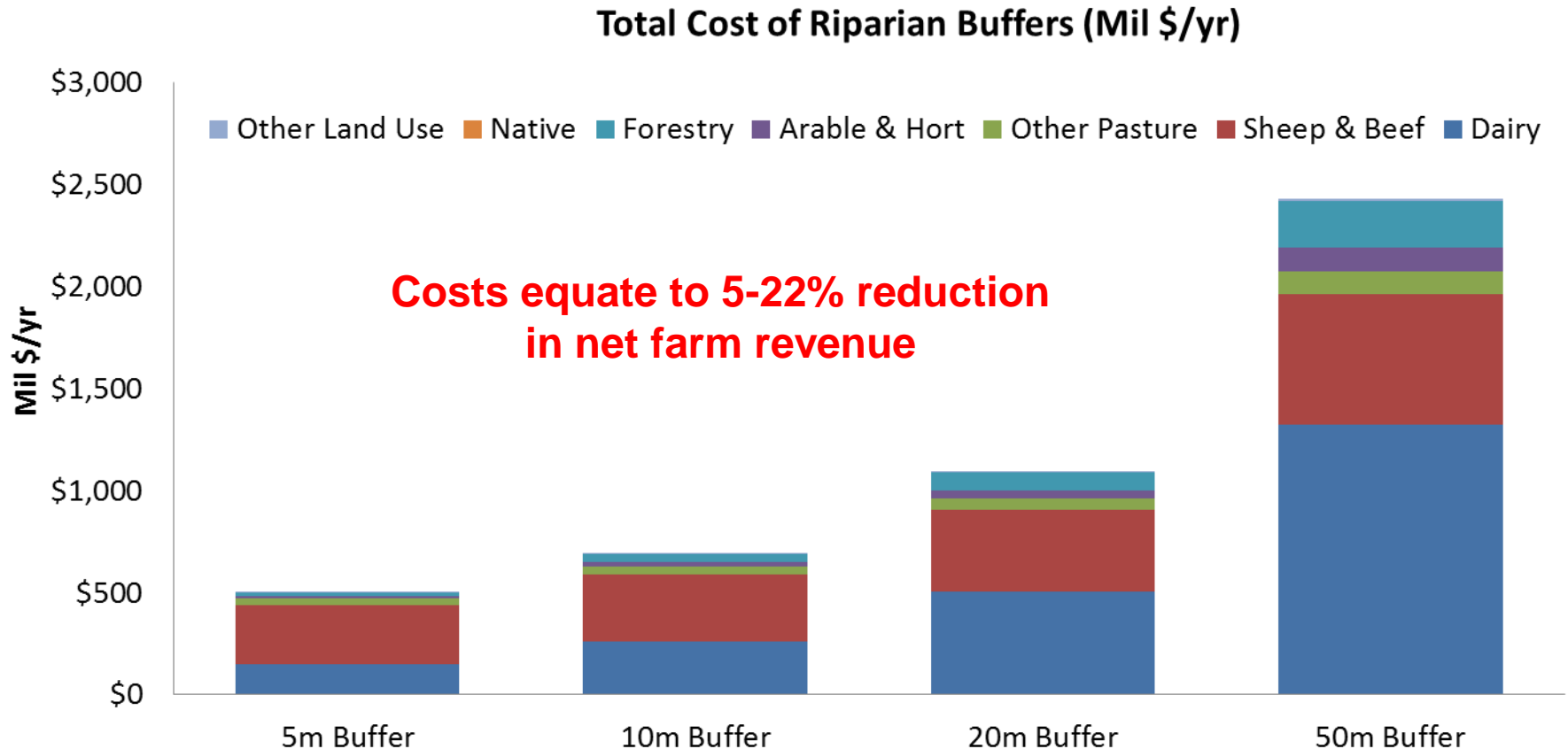
## NITROGEN



## PHOSPHORUS

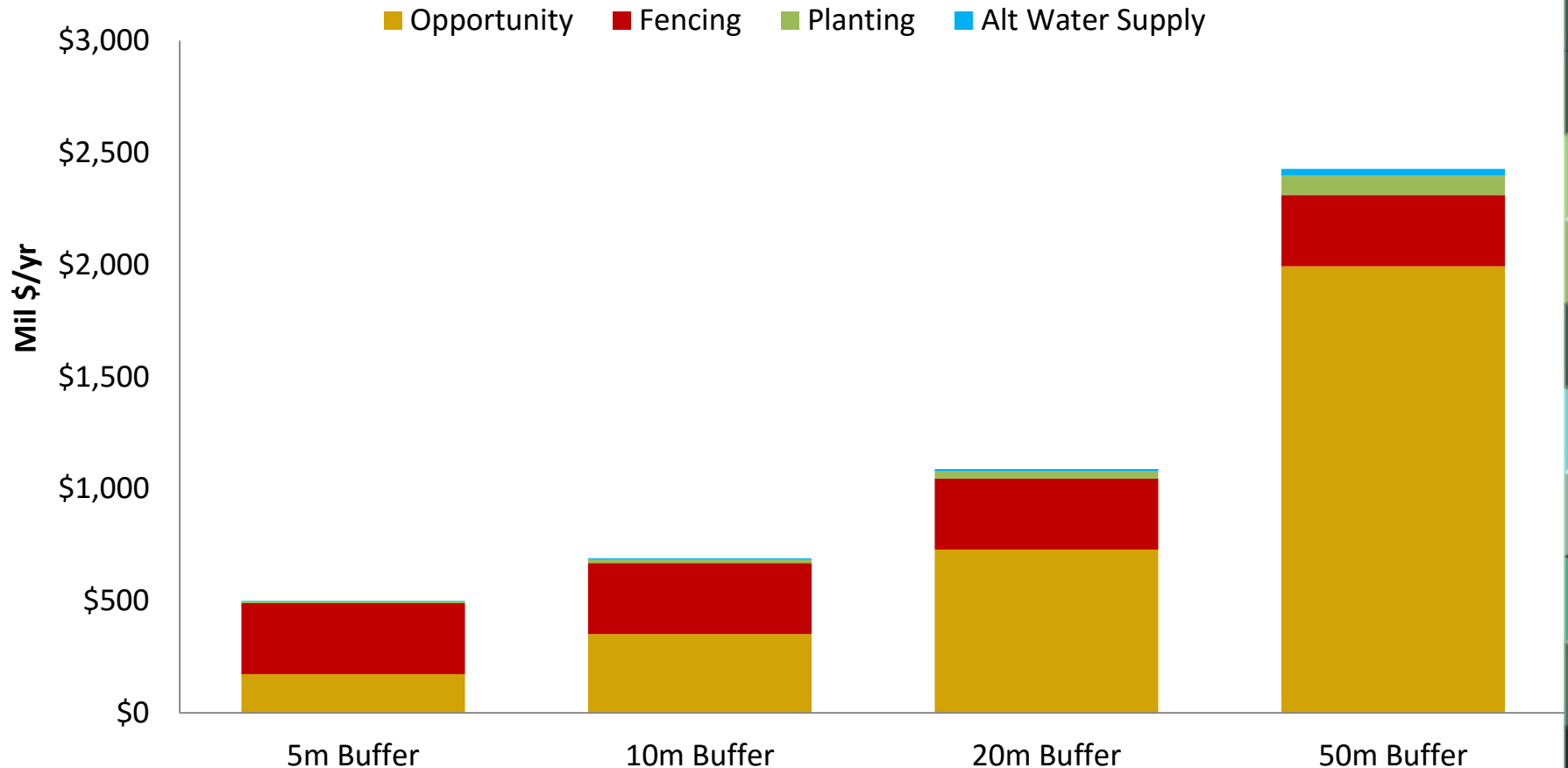


# Results – total costs

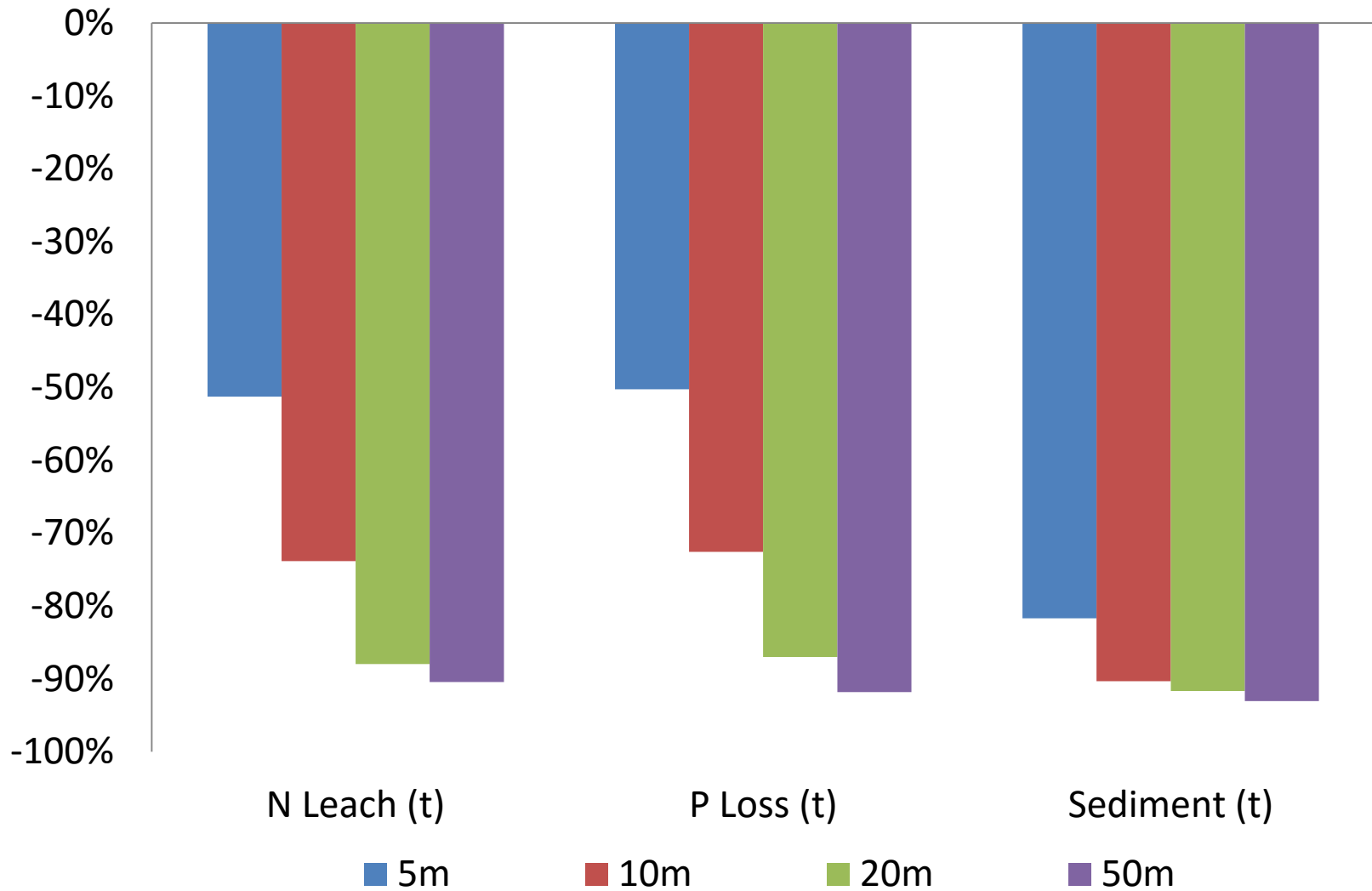


**Baseline Net Farm Revenue: \$11 bil/yr**

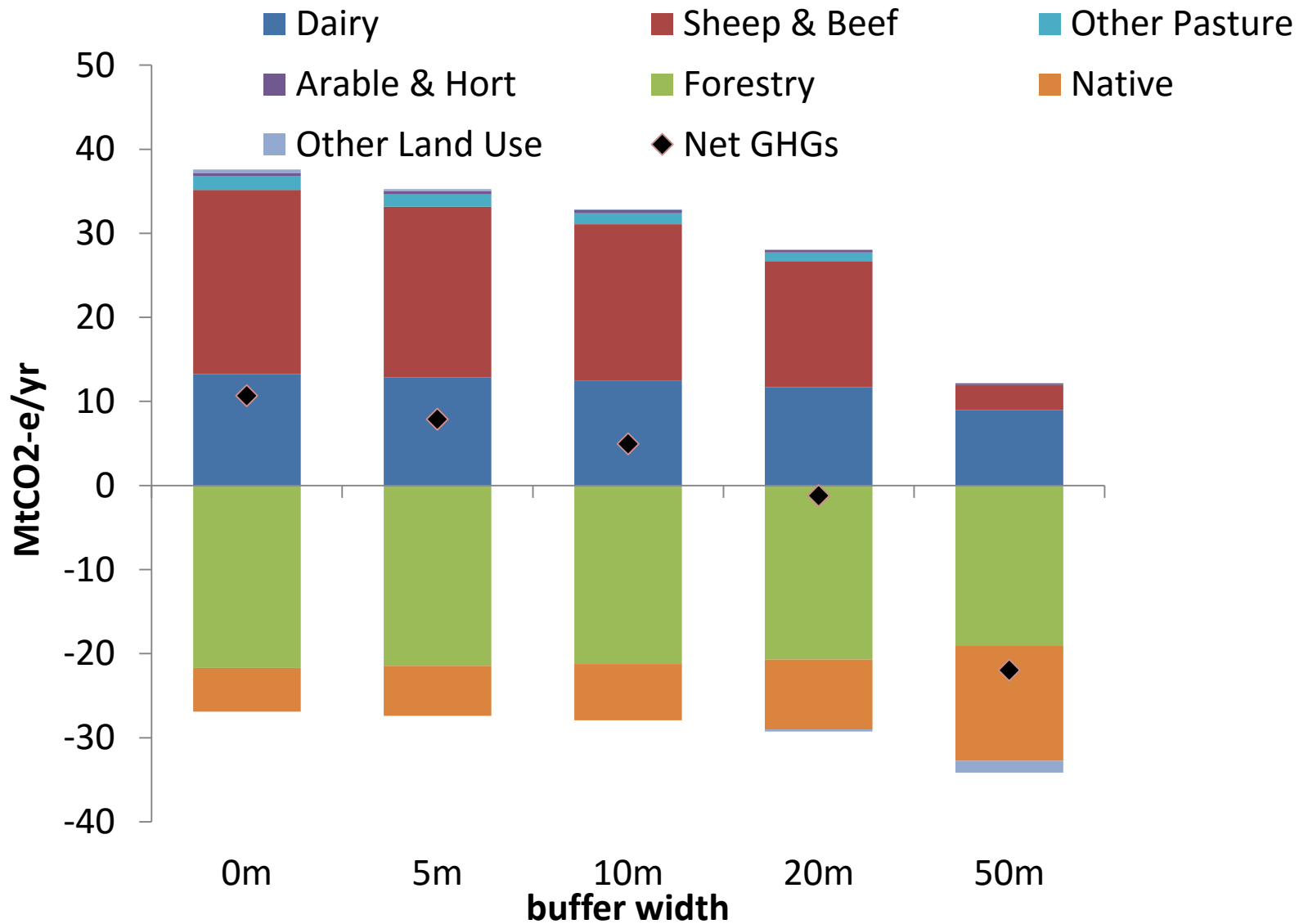
# Results – cost decomposition



# Results – water benefits



# Results – GHG benefits



# Summary

- Potentially 350,000 km of streams planted
- Total cost of \$0.5 to \$2.4 billion per year
  - Equates to 5-22% of current net farm revenue
- S&B and Dairy estimated to face most of costs
- Large environmental benefits, even with 5m buffers
- Regional variation of estimates

# Ongoing Research

- Refinements
  - Account for existing buffers
  - Slope
  - Cost variance
- Add biodiversity indicators
- Spatial optimisation with budget constraints