

Phosphorus Legacies: Impact of Past Land Use Practices on Today's Water Quality in the Lake Erie Basin

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Introduction

Excess phosphorus (P) in Lake Erie is responsible for harmful algae growth. P stored in the land from past years (legacy P) delays the benefits of conservation efforts to reduce P in the landscape. An estimation of legacy P can assess the progress towards the P reduction goal.

This study focuses on quantifying the legacy P in the basin.

We answered

1. How have P inputs and outputs changed over the last century across the transboundary Lake Erie Basin?
2. How legacy P varies across the basin?
3. What are the major pools for legacy P?



Fig 1: Algal bloom and Lake Erie (Ref: Great Lakes Echo, ESA)

P Surplus Trends have Declined in past 50 Years

In Canada, 72% of phosphorus comes from manure, while in the USA, it's 27%, with greater contributions from fertilizers.

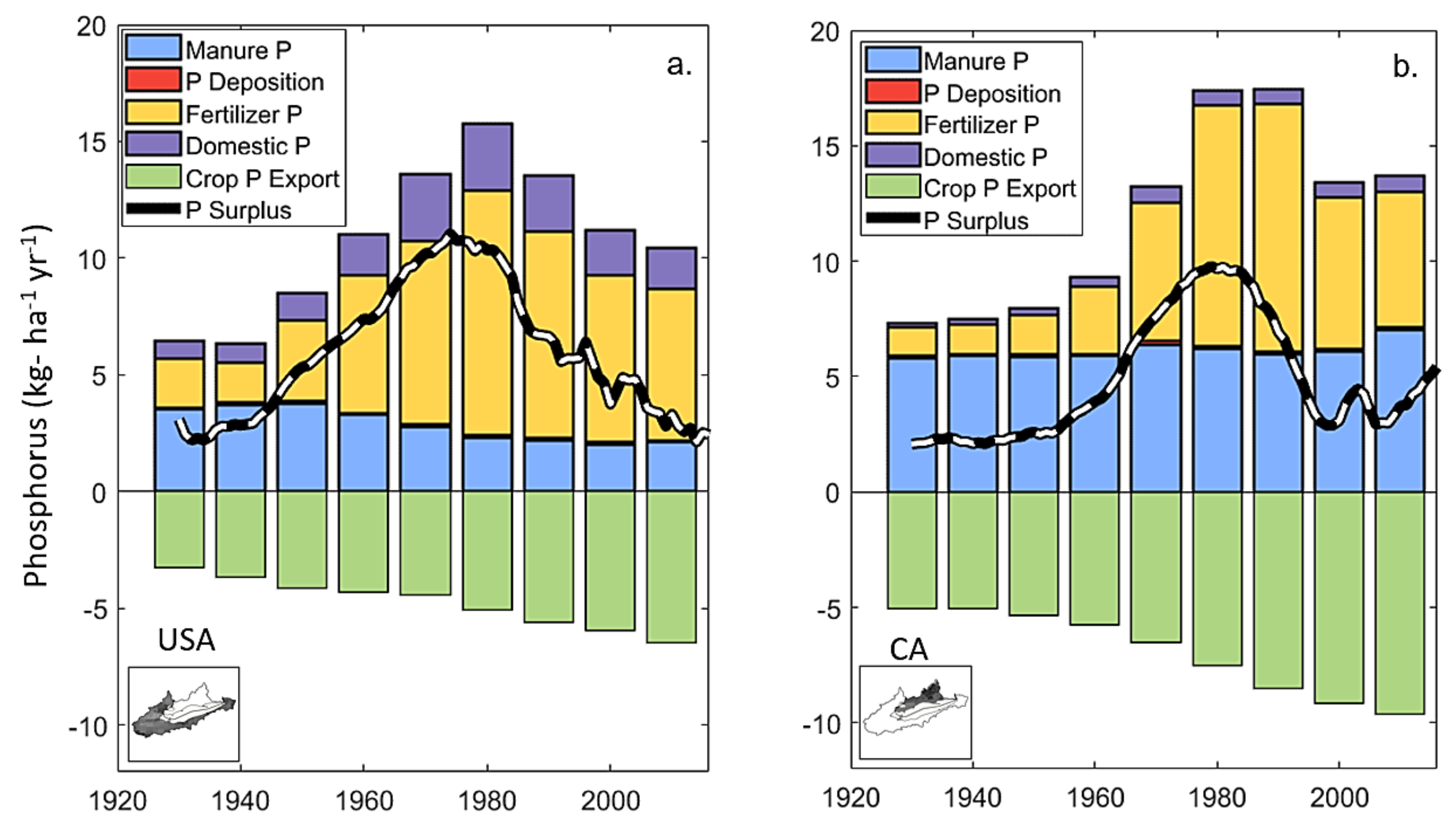


Fig 2: Basin-scale P inputs (fertilizer, atmospheric deposition, manure and domestic P) and outputs (crop P export) across the Lake Erie Basin

80% of legacy P is accumulated in soil pool and 13% is exported via stream

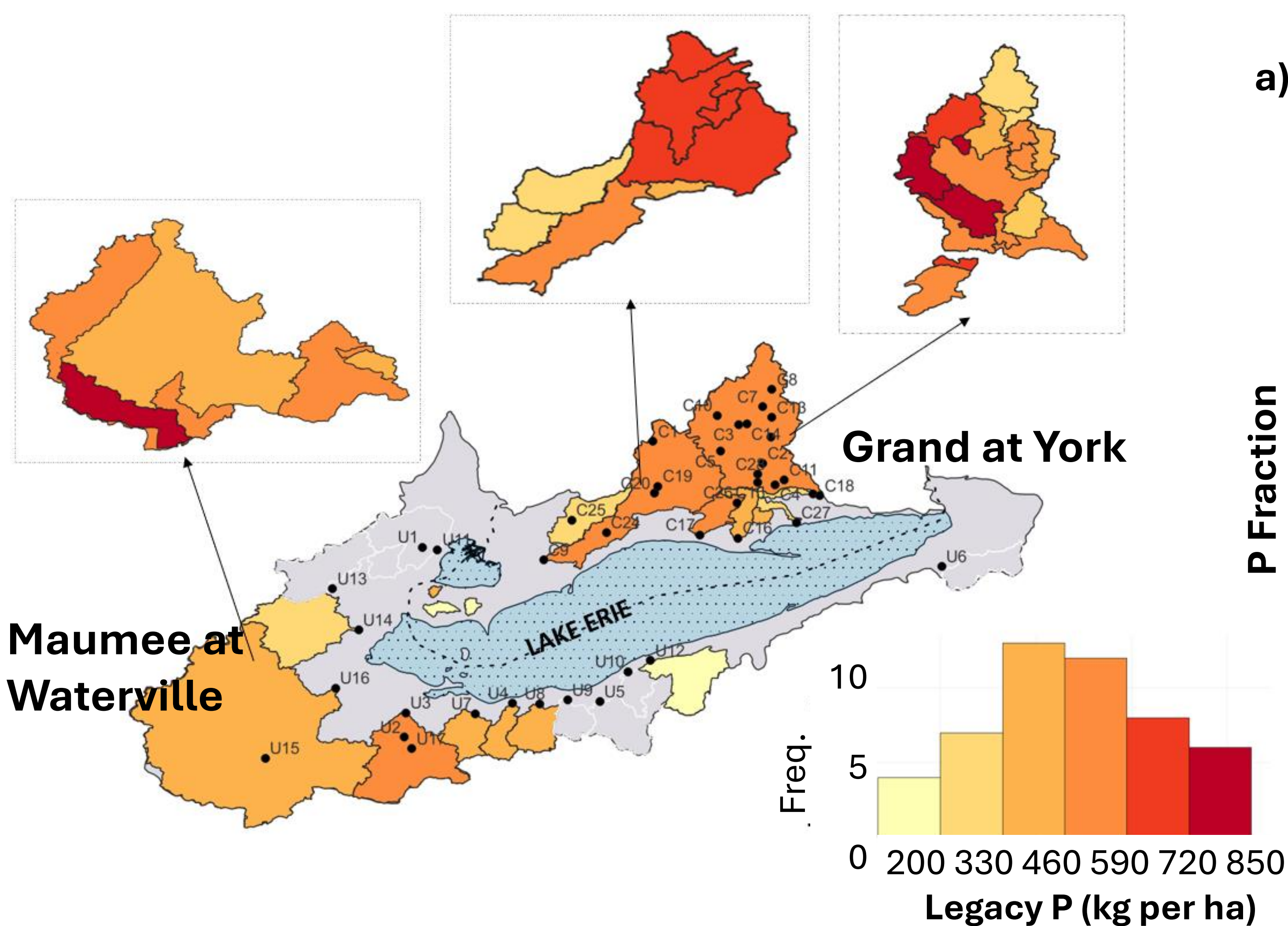
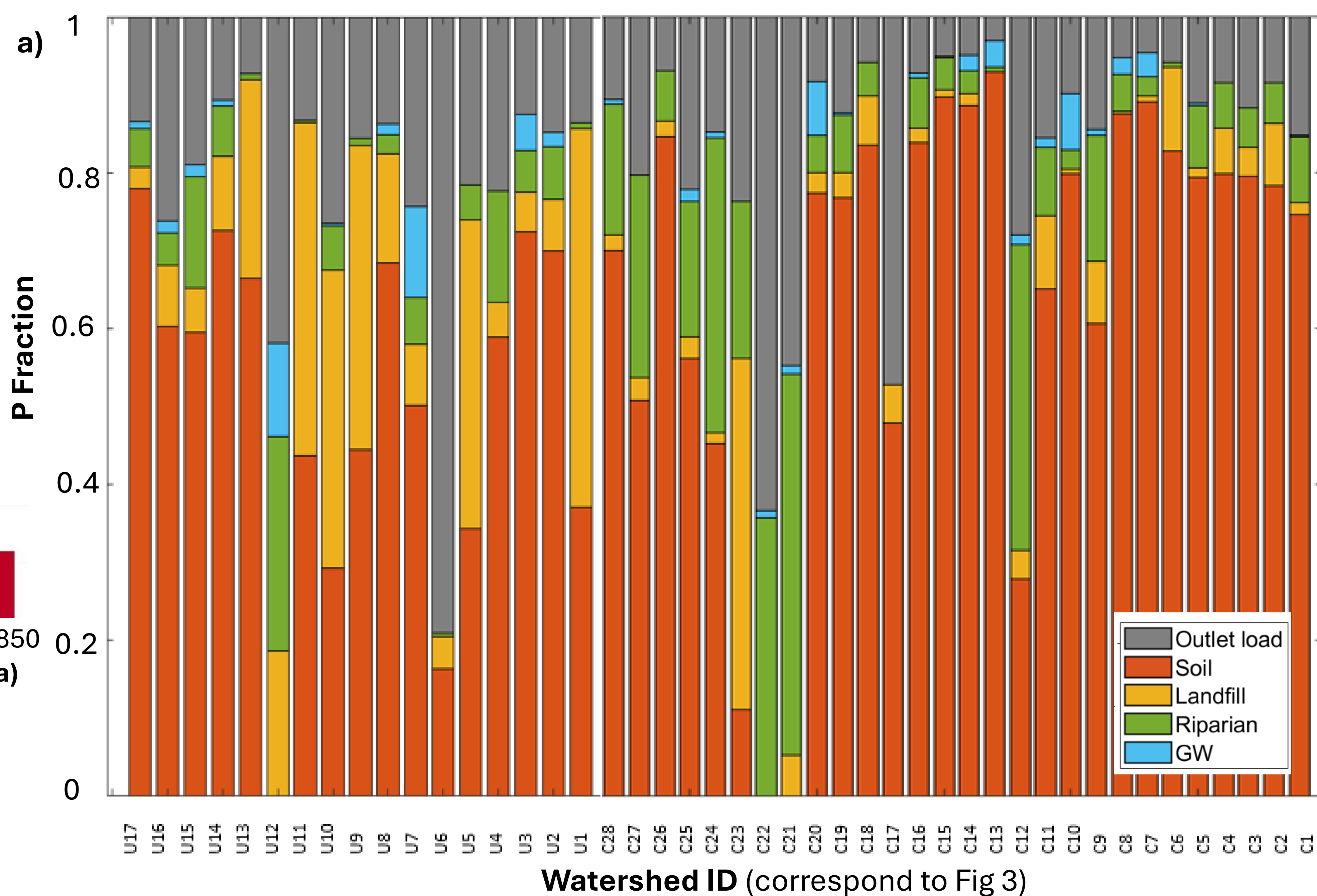


Fig 3: Legacy P accumulation magnitude across the LEB



Manure P input Drives Legacy P

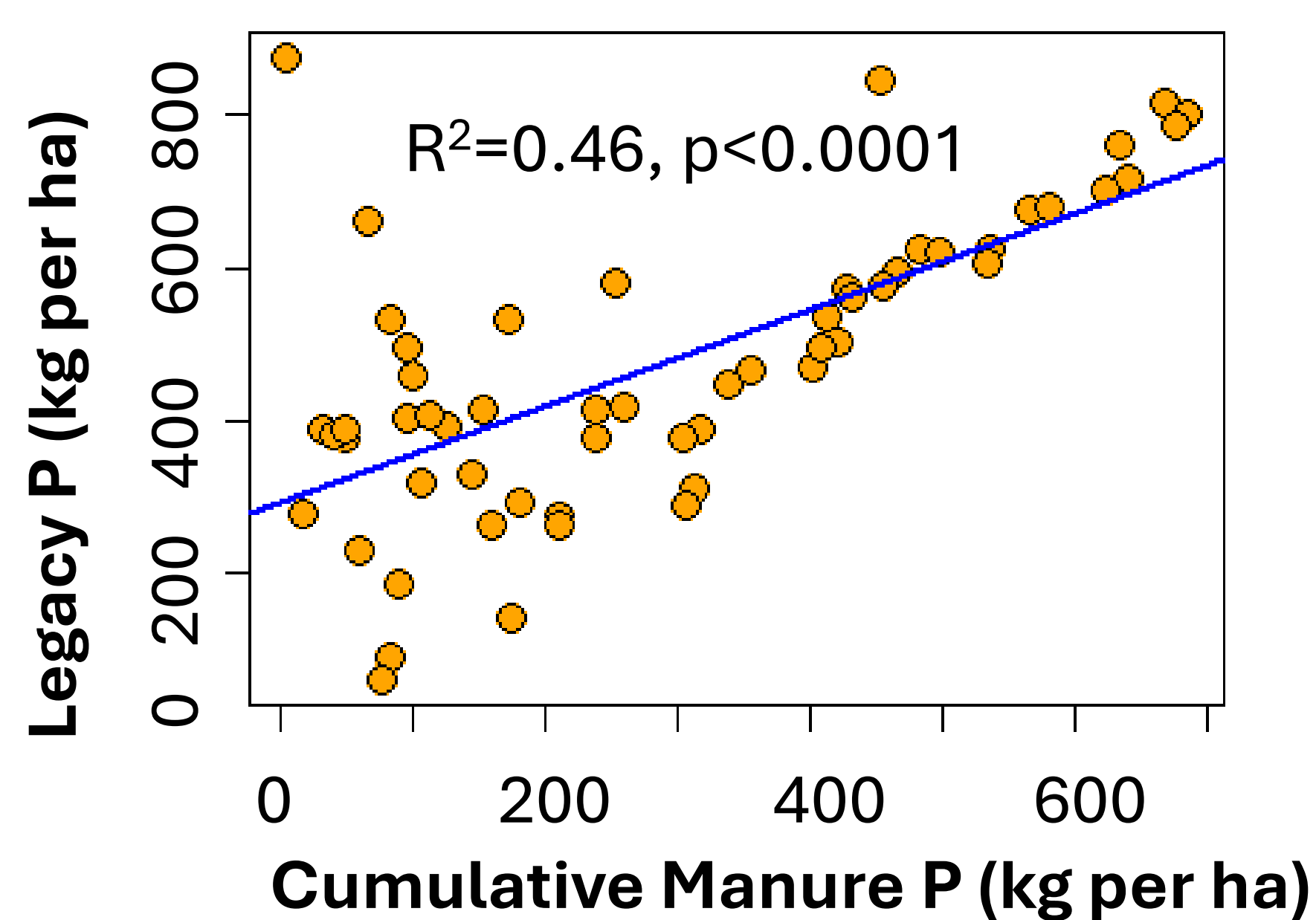


Fig 4: Relationship between legacy P and manure P input

Proper management and recycling manure can help reduce legacy P in areas with high livestock farm density

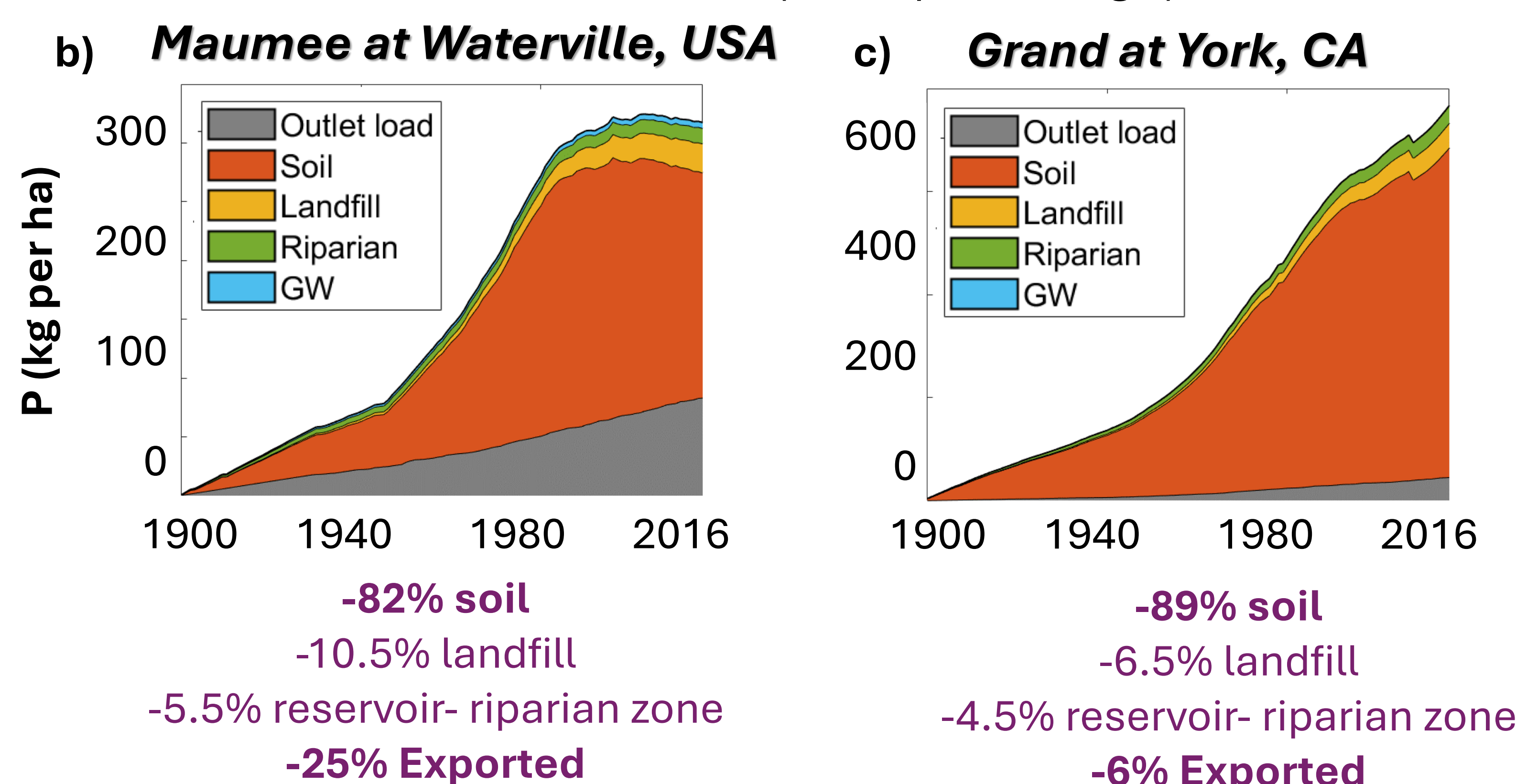


Fig 5: Fate of applied P since 1900. [a] The proportion of P attributed to fluxes and stores in all modelled sub-watersheds. [b-c] Trajectories of P Flux and P stores in different land compartments for Maumee and Grand River Watershed.

Acknowledgements



Contact

