

Modelling Nutrient Losses using SPASMO and GIS aggregation - Waimea Basin



Landcare Research
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Modelling Approach

- **SPASMO model (Plant & Food Research)**
- **Farm systems, financial analysis (Fruition Horticulture)**
- **Land use & soil mapping, GIS aggregation of N & P losses, expert judgement on nutrient attenuation (Landcare Research with TDC)**

Updated land use mapping – current land uses

Suggested modelling of climate-soil-crop combinations for catchment nutrient loss modelling:

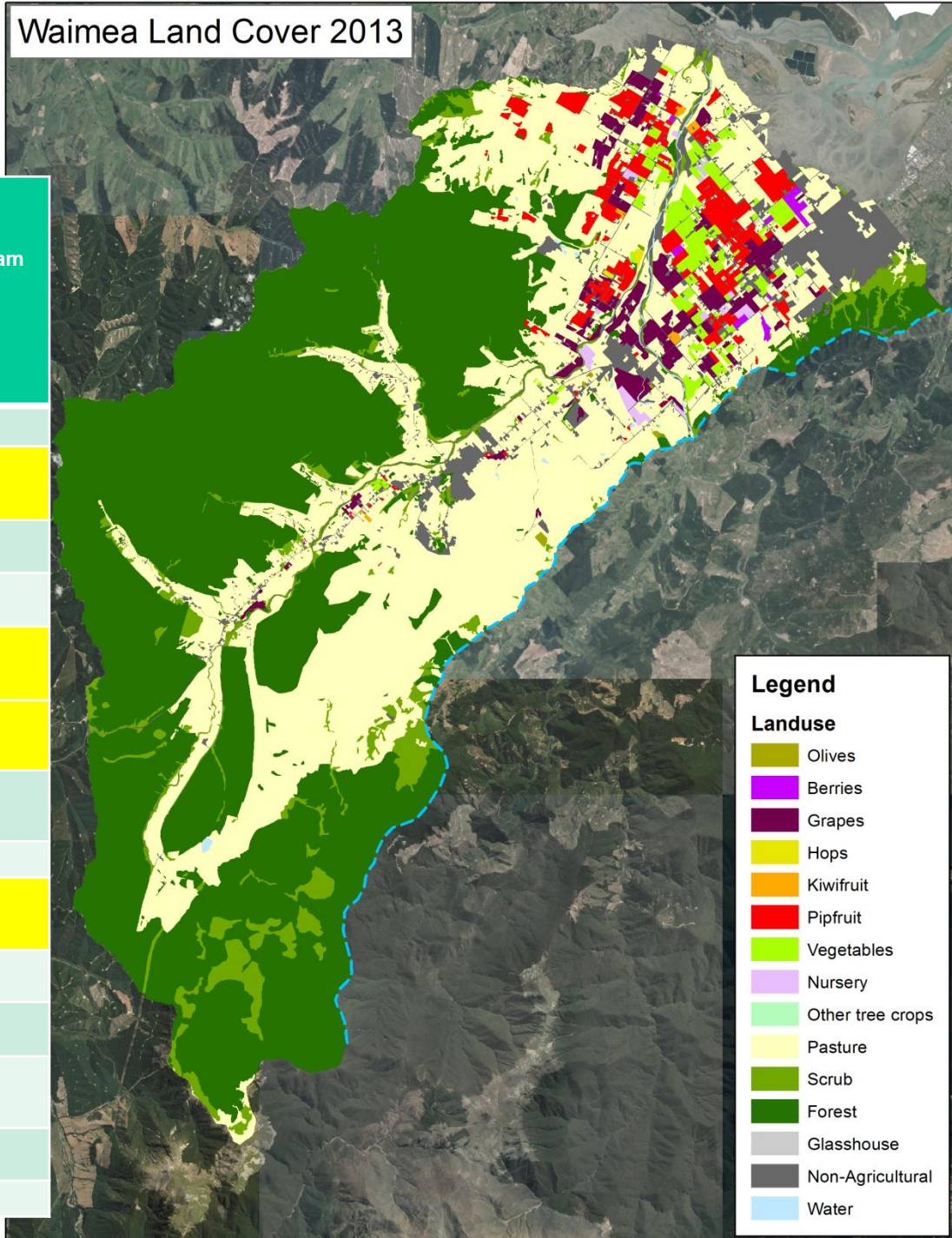
1 climate (conditions at Hope, 1972-present)

4 soils (Ranzau, Waimea-Motupiko, Wakatu-Dovedale, Richmond)

5 farm systems (dairy, pipfruit, grapes, outdoor veges, dryland sheep? = lifestyle blocks)

2013 Land Cover

Land use class	Area within Waimea Plains catchment (below Wairoa Gorge)	Area within Waimea Community Dam service zone
Berries	80	79
Grapes, Olives	957	717
Hops	15	11
Kiwifruit	37	32
Pipfruit, other tree crops	1112	807
Outdoor vegetables	680	655
Nursery	113	49
Glasshouses	29	27
Pasture	13939	3923
Scrub	2100	98
Forest	19692	22
Non-Agricultural	2192	1811
Water	86	54
TOTAL AREA	40780ha	8285ha



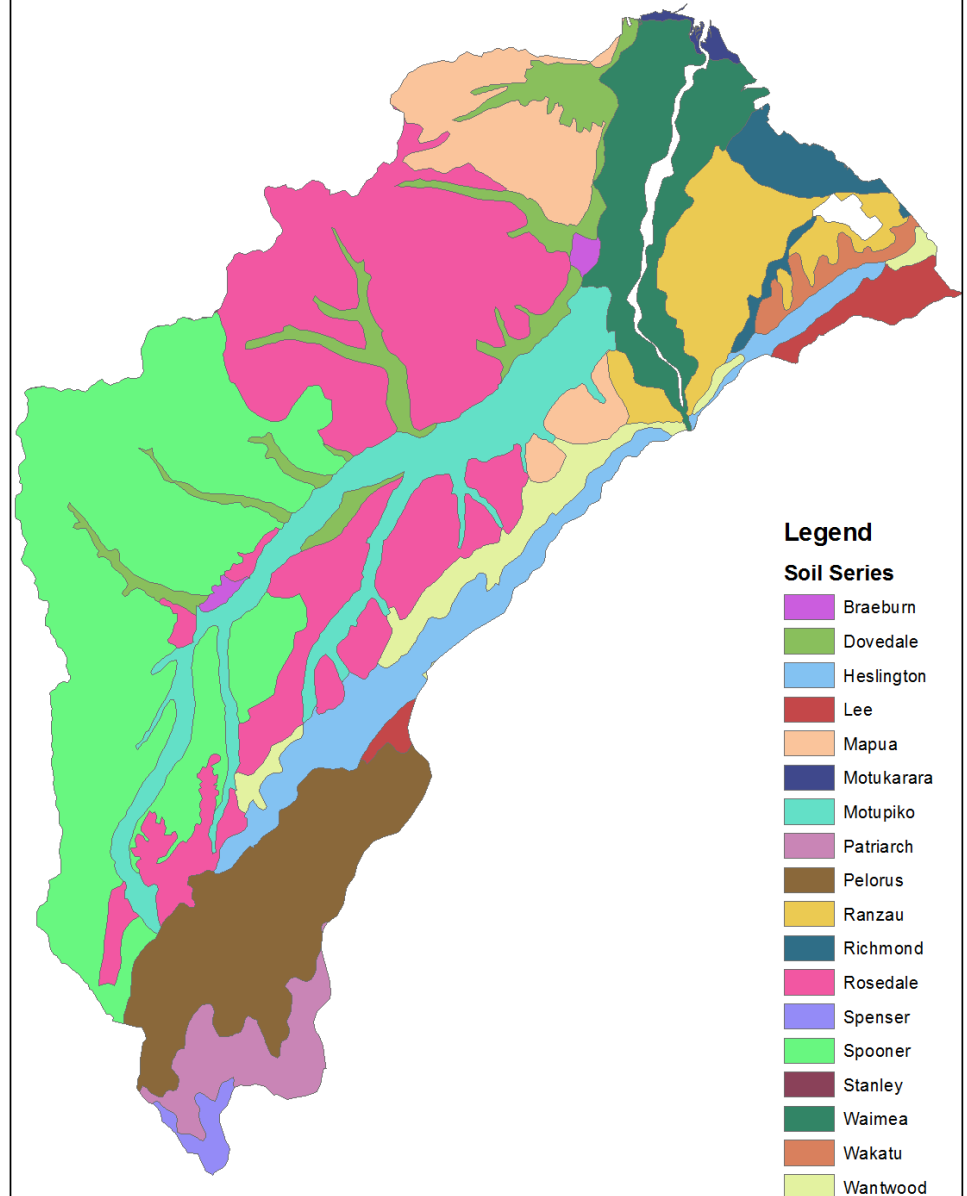
Legend

Landuse

- Olives
- Berries
- Grapes
- Hops
- Kiwifruit
- Pipfruit
- Vegetables
- Nursery
- Other tree crops
- Pasture
- Scrub
- Forest
- Glasshouse
- Non-Agricultural
- Water

Soil series - Waimea Catchment

Soil series	Area within Waimea Plains catchment (below Wairoa Gorge)
Braeburn	143
Dovedale	2049
Heslington	1982
Lee	616
Mapua	2261
Motukarara	111
Motupiko	3146
Patriarch	1073
Pelorus	3681
Ranzau	2272
Richmond	714
Rosedale	8809
Spenser	234
Spooner	9196
Stanley	1
Waimea	2617
Wakatu	368
Wantwood	1129
rivers	230
towns	137
TOTAL AREA	40770ha



Soil/crop combos we could model

Current land use – fully irrigated, with dam (No rationing)

Current land use – fully irrigated, without dam (severe rationing)

Future land use? – fully irrigated, with dam (No rationing)

LAND USE	Ranzau soil TDC weekly alloc = 35mm	Waimea-Motupiko TDC weekly alloc = 30mm	Wakatu-Dovedale TDC weekly alloc = Wakatu 27 & Dovedale 30mm	Richmond/Heslington TDC weekly alloc = Richmond 27mm
Dairy pasture TDC crop alloc = 35mm		Max irrigation 30mm/week (35)		Max irrigation 27 mm/week (35)
Apples +pears, nashi, hazelnuts +kiwifruit, feijoa TDC crop alloc = 35mm	Max irrig 35 mm/week	Max irrigation 30 mm/week (35)	Max irrigation 30 mm/week (35)	Max irrigation 27 mm/week (35)
Grapes +olives TDC crop alloc = 14mm	Max irrig 14mm/week (35)	Max irrigation 14 mm/week (35)	Max irrigation 14 mm/week (35)	Max irrigation 14 mm/week (35)
Outdoor vegetables +flowers, nurseries TDC crop alloc = 35mm	Max irrig 35 mm/week	Max irrigation 30mm/week (35)	Max irrigation 30 mm/week (35)	Max irrigation 27 mm/week (35)
Lifestyle = S&B? TDC crop alloc = 35mm	Dryland 0 35 mm/week	Dryland 0 30 mm/week (35)	Dryland 0 30 mm/week (35)	Dryland 0 27 mm/week (35)

Example model output – crop irrigation use, nitrate leached, crop yield, EBITD

Yield - Apples Ranzau with rationing

