



E. Coli & Limit setting

Te Awarua-o-Porirua Whaitua

Stuart Easton

23/5/2018

JACOBS[®]

www.jacobs.com | worldwide

Acknowledgements

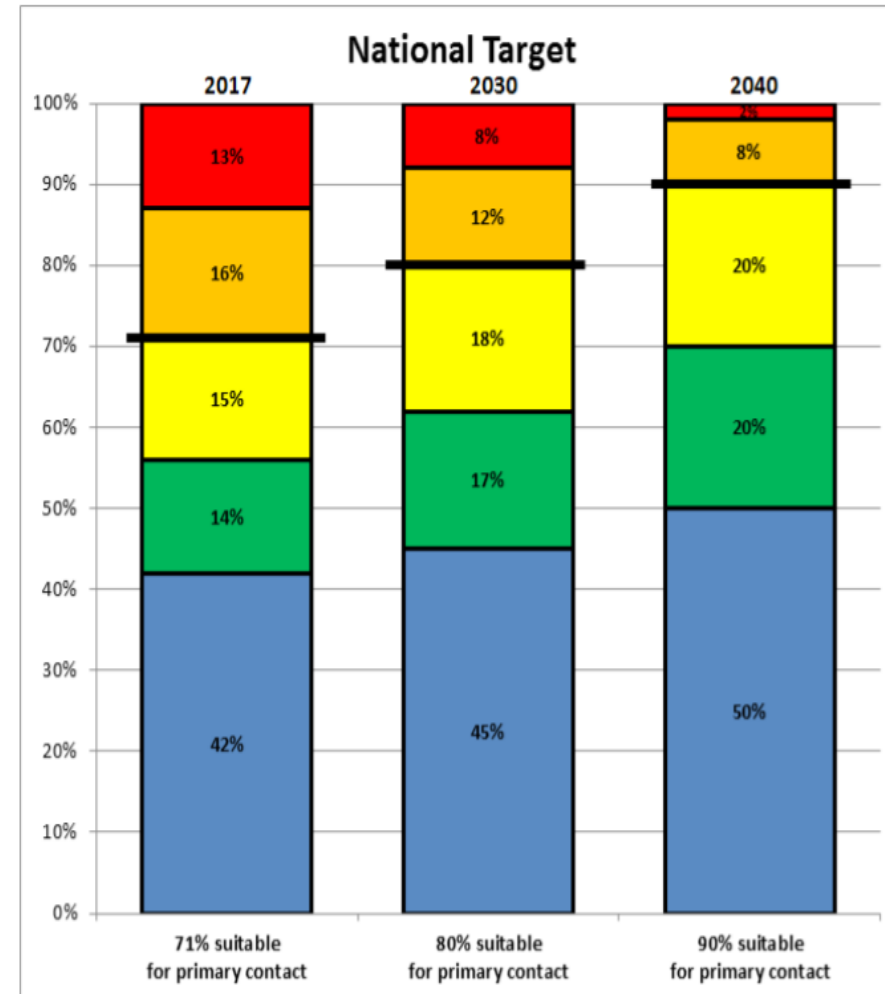
- Jacobs – Michelle Sands, Lydia Cetin, Manoj Shrestha, Ailsa Robertson
- Greater Wellington Regional Council – Brent King
- NIWA – Jonathan Moores, Annette Semadeni-Davies, Jennifer Gadd
- Kapiti Coast District Council – Haig Meyer

Overview

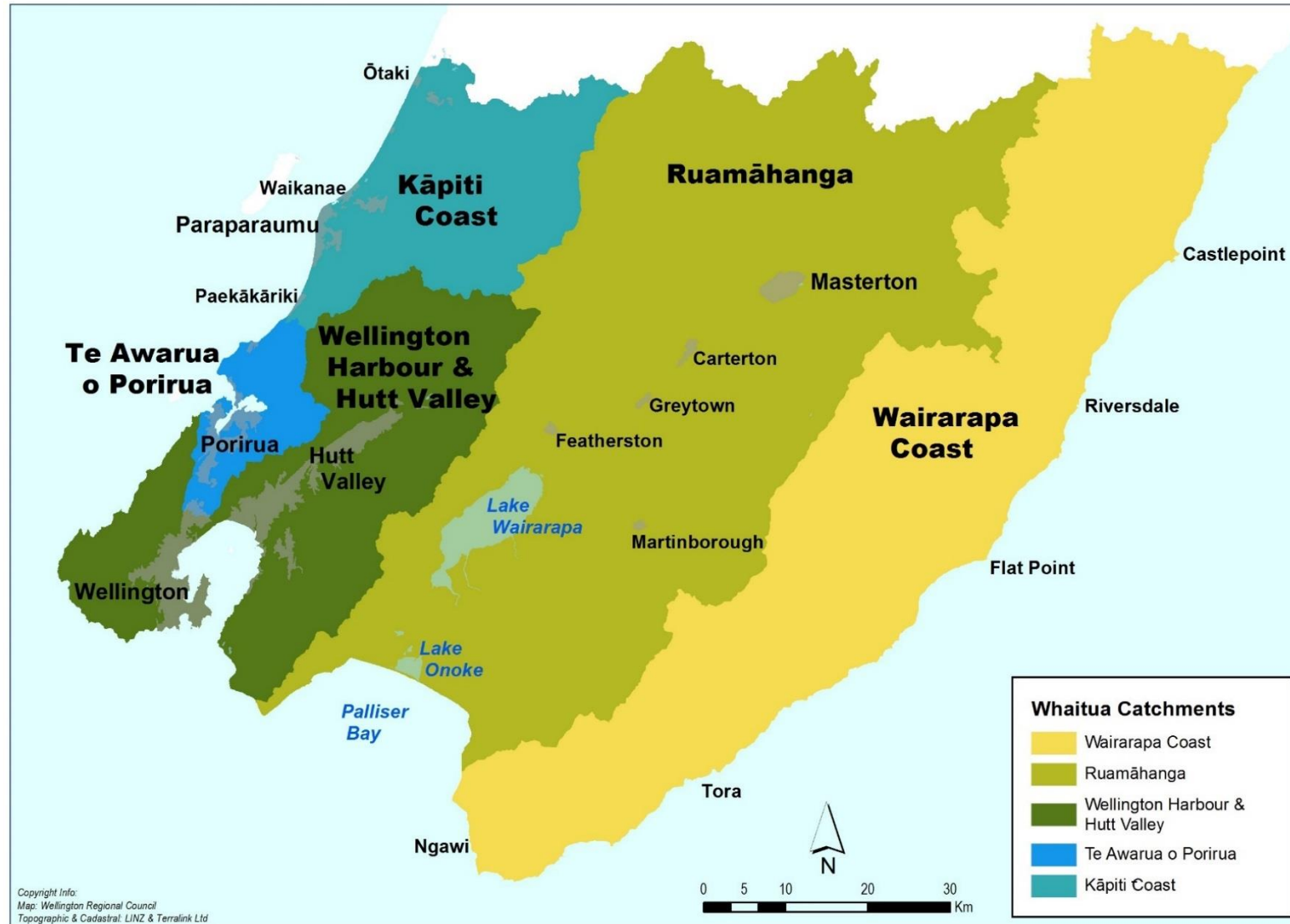
- NPS-FW and 2017 amendment & Whaitua collaborative process
- Introduction to Te Awarua-o-Porirua catchments
- Porirua Baseline model architecture
- Preliminary Scenario results

NPS-FW 2017 Amendment

- The Government has set a national target of making 90 per cent of New Zealand's large rivers and lakes swimmable by 2040, with an interim target of 80 per cent swimmable by 2030
- Requires water quality to be maintained or improved



Whaitua



Te Awarua-o-Porirua



Porirua Land



Porirua Water

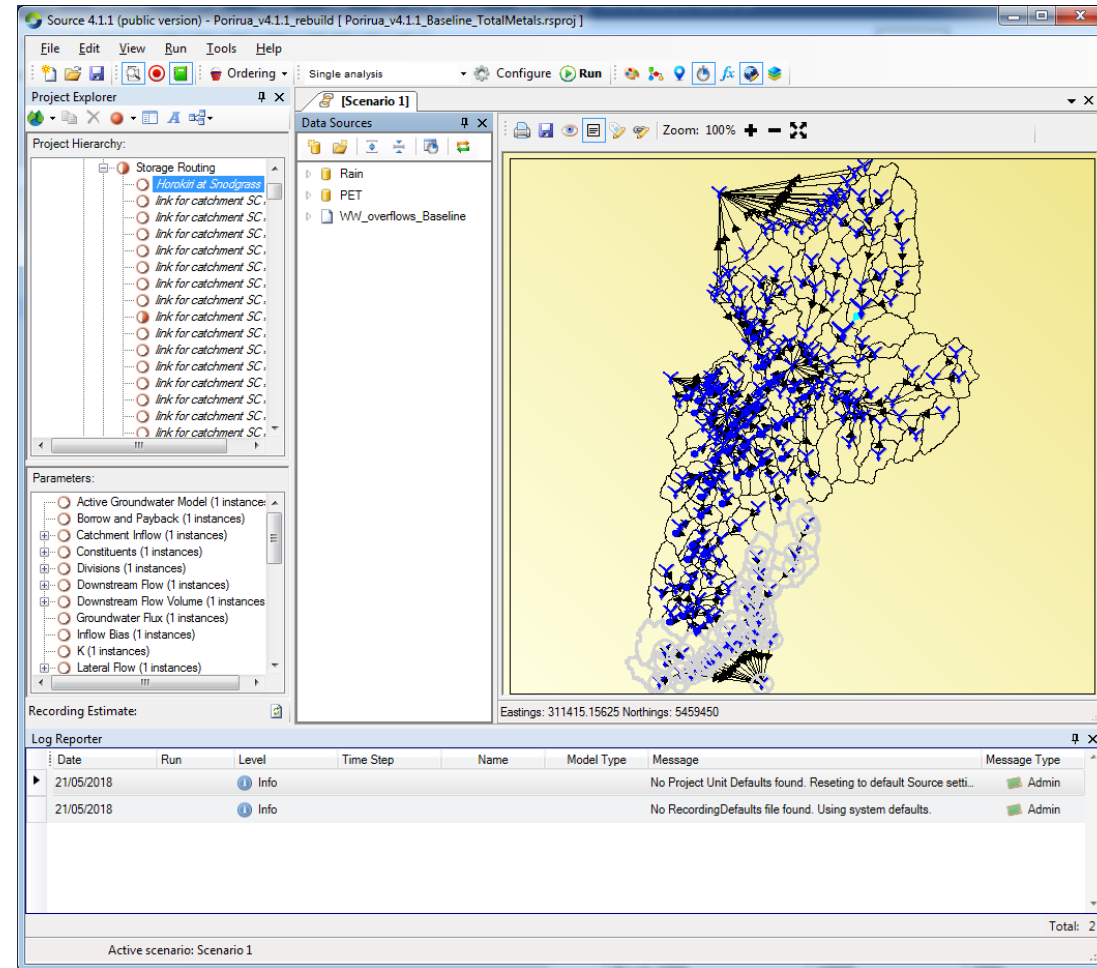


Porirua Values

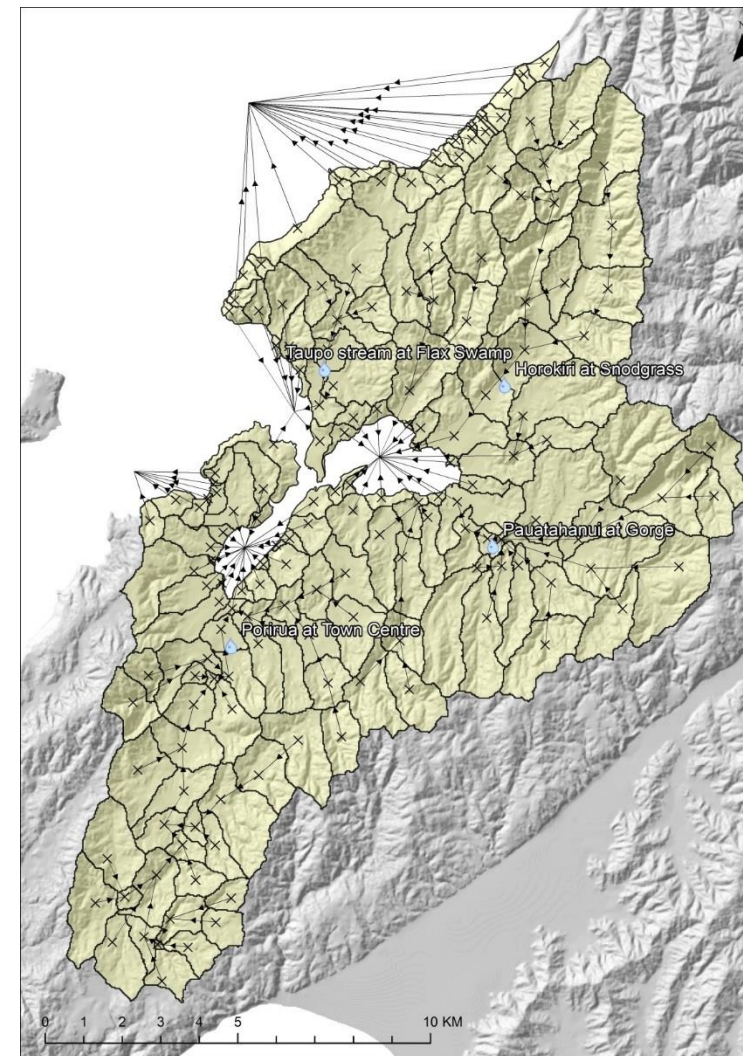
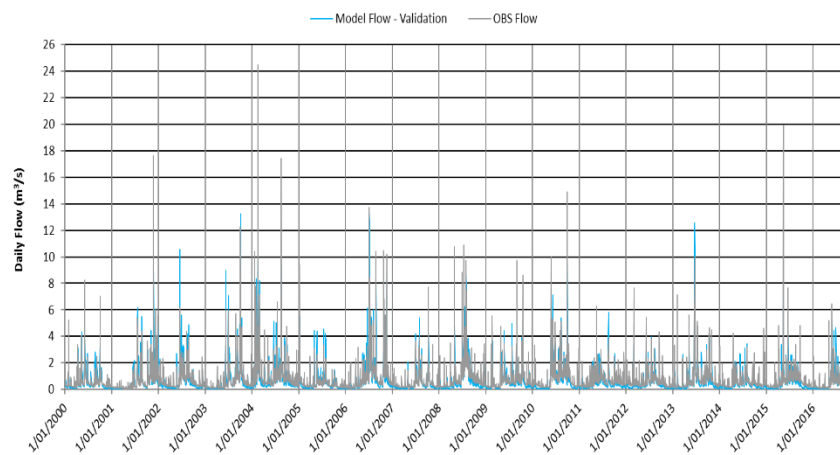
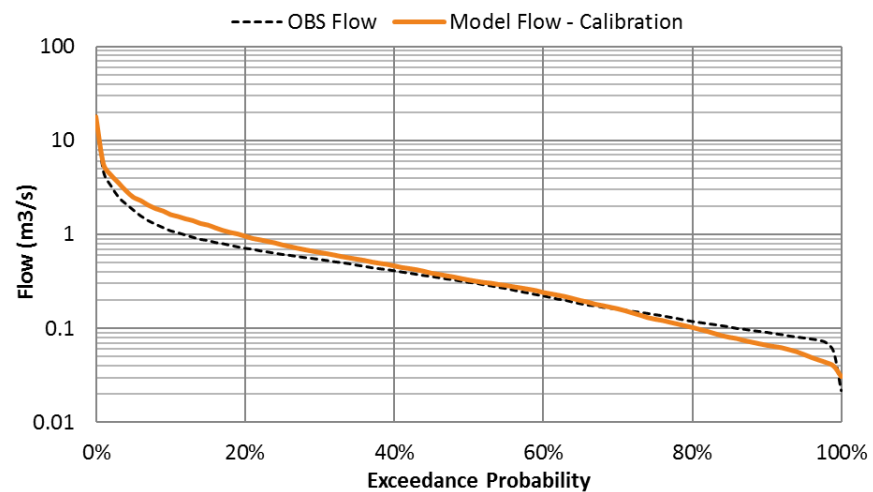


Source model - architecture

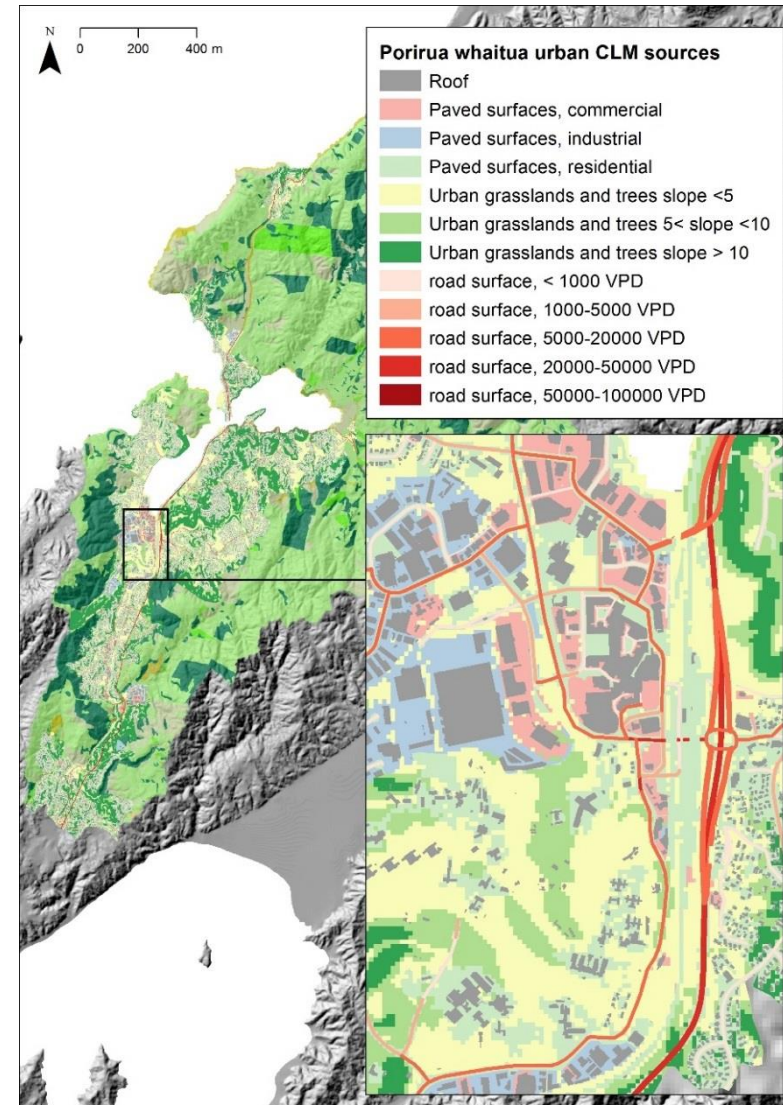
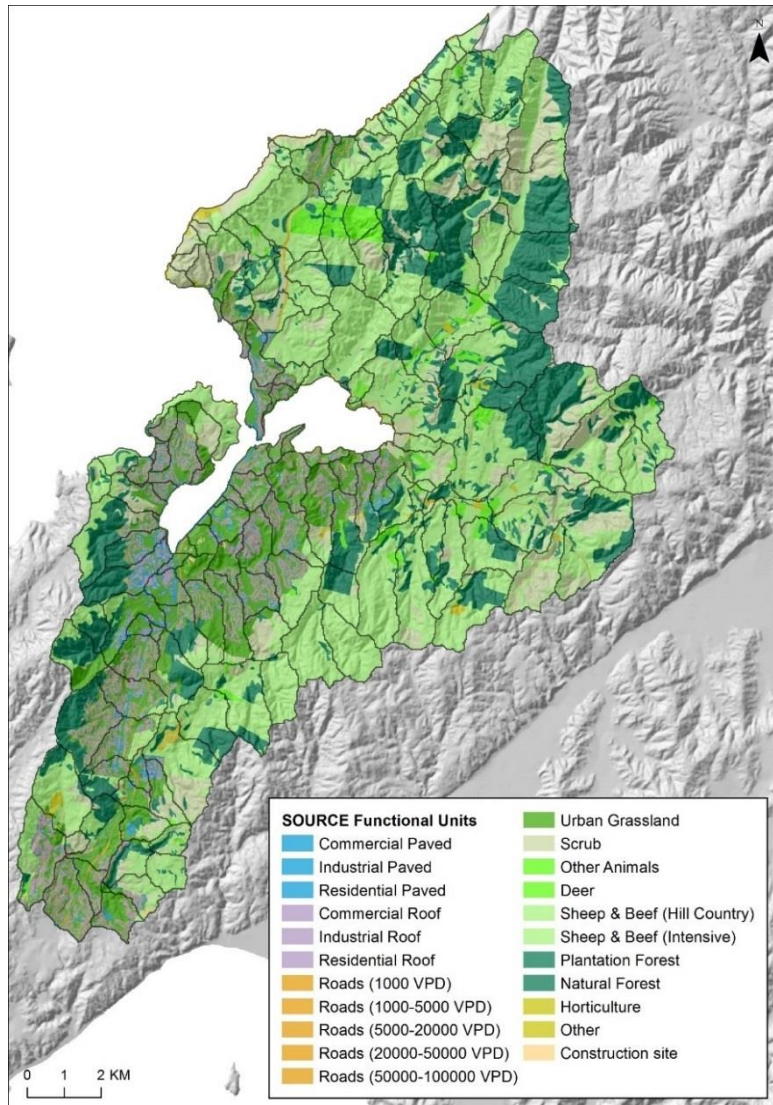
- Link / node semi-distributed hydrological and integrated water quality model
- EMC / DWC contaminant model



Source Model – flow calibration

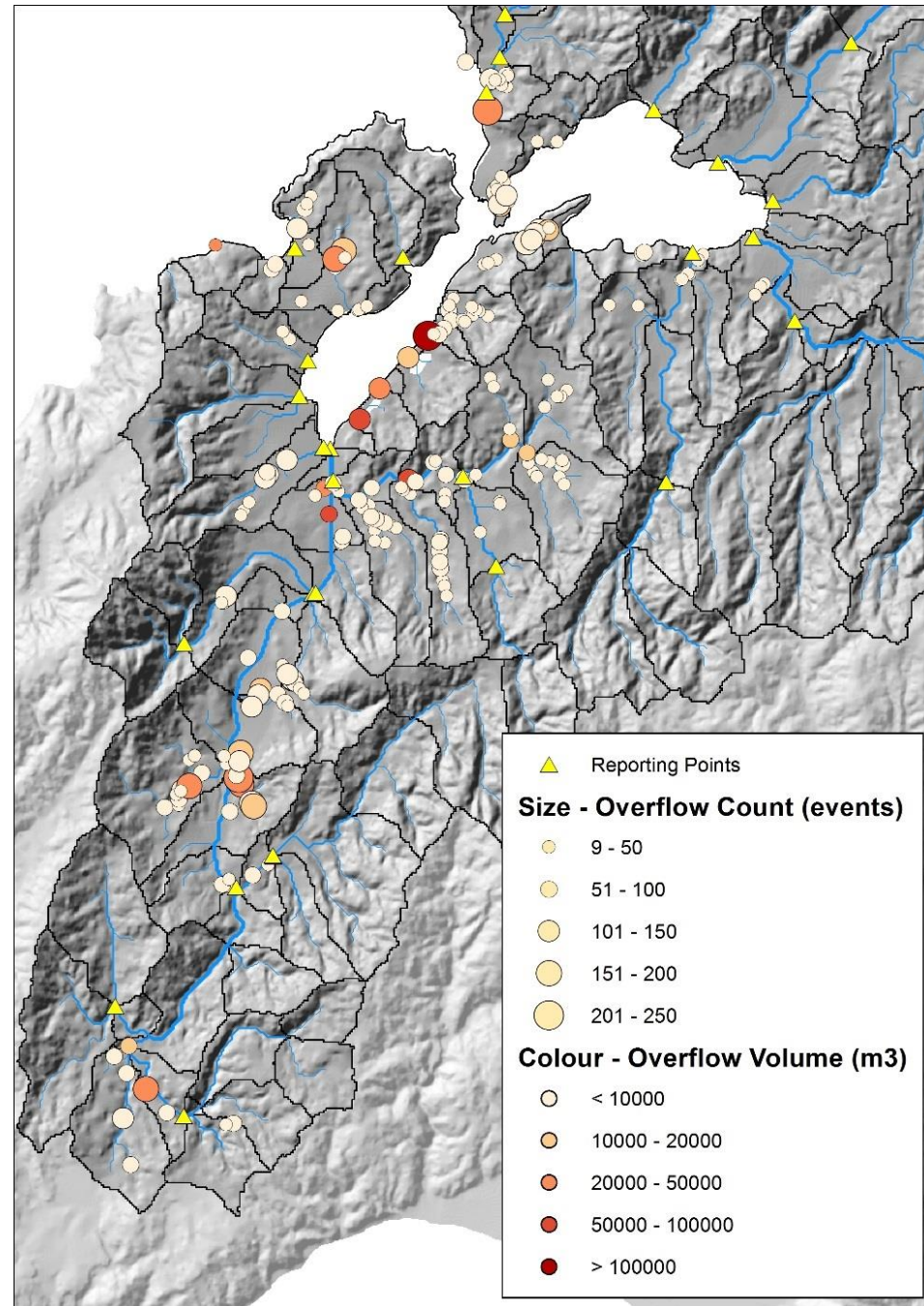


Source Model - landuse



Wastewater Overflows

- Wellington Water provided a 10 year timeseries of predicted wastewater overflows from a Mouse model of the network.

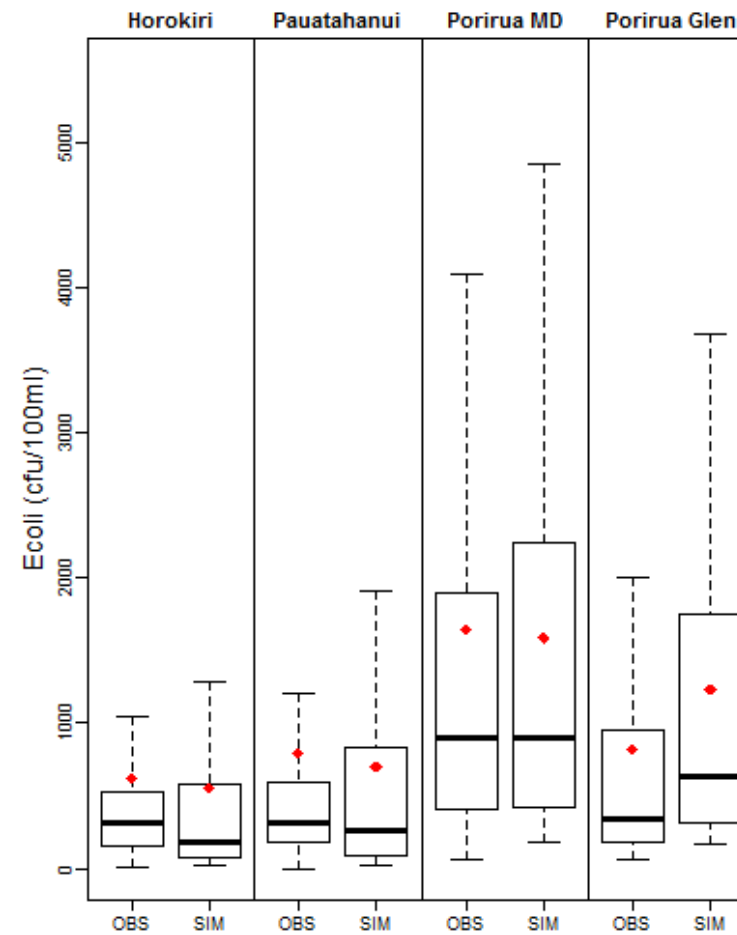
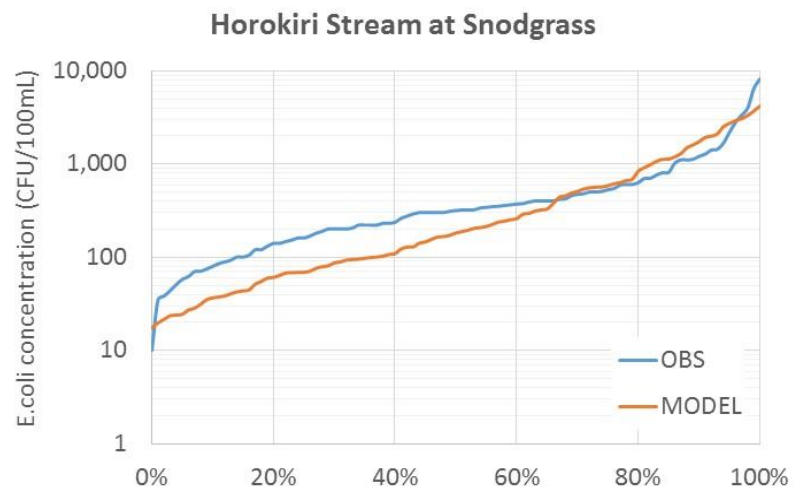
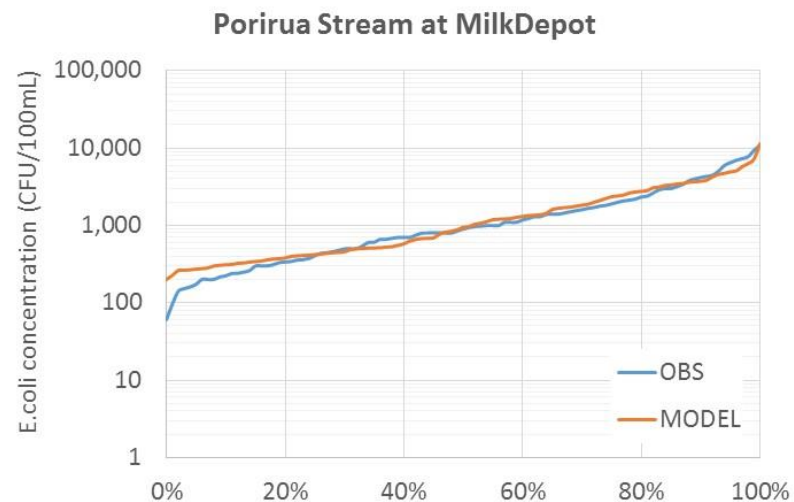


E. coli Calibration

- 4 calibration sites; 2 rural, 2 urban
- Monthly SoE reporting data 2003 - 2016



E. coli Calibration



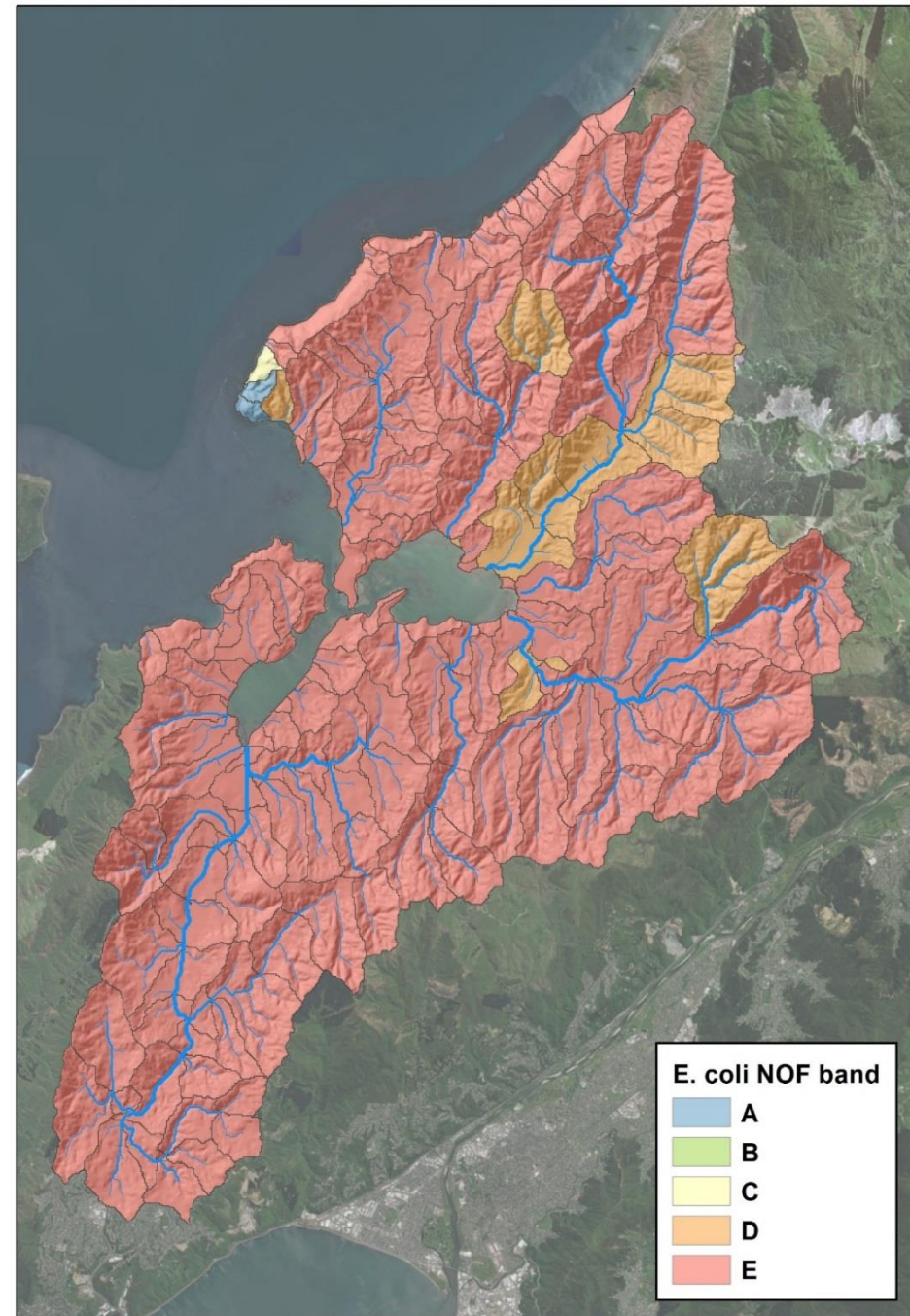
E. coli Calibration

Category	% of exceedances over 540 CFU/100mL	Median concentration (CFU/100mL)	95th percentile <i>E.coli</i> /100mL	% of exceedances over 260 CFU/100mL
A (Blue)	< 5%	≤ 130	≤ 540	< 20%
B (Green)	5 – 10%	≤ 130	≤ 1000	20 – 30 %
C (Yellow)	10 – 20%	≤ 130	≤ 1200	20 – 34%
D (Orange)	20 – 30%	>130	>1200	>34%
E (Red)	>30%	>260	>1200	>50%

Calibration Site		Exceedances over 540 cfu/100ml (%)	Exceedances over 260 cfu/100ml (%)	Median (cfu/100 ml)	95th Percentile (cfu/100ml)	Attribute State
Horokiri Snodgrass	OBS	24	58	315	2540	E
	MODEL	29	40	182	2778	D
Pauatahanui Elmwood	OBS	27	58	315	3070	E
	MODEL	33	49	256	2833	E
Porirua Milk Depot	OBS	66	85	900	6750	E
	MODEL	61	97	927	5985	E
Porirua Glenside	OBS	37	60	340	2777	E
	MODEL	57	99	779	4860	E

Baseline – NPS-FW Attribute State

- Attribute state results dominated by yields from grazed pasture and urban areas
- Below national bottom line for the 3 main reaches

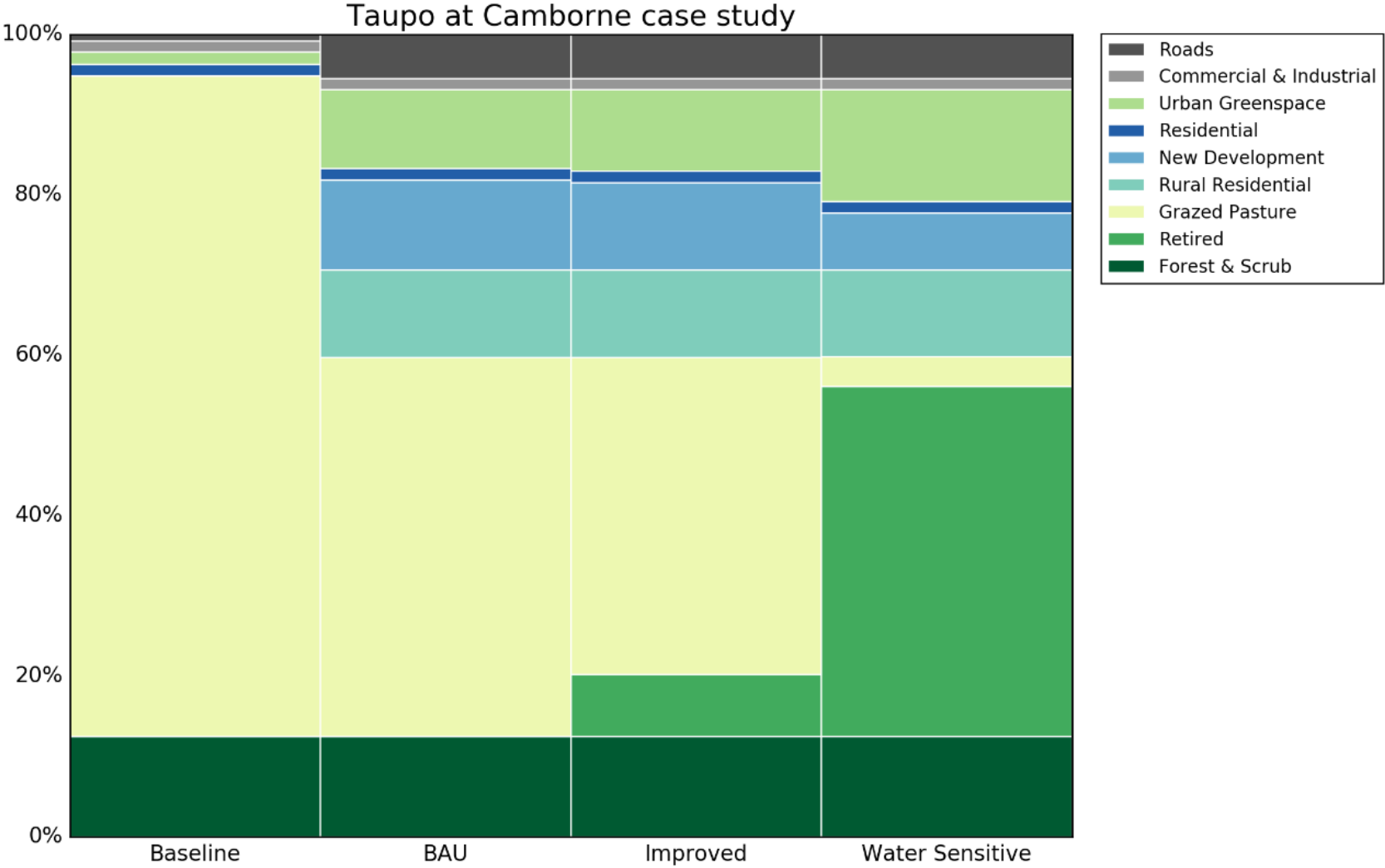


Scenarios

Scenario modelling has tested mitigations in rural and urban areas:

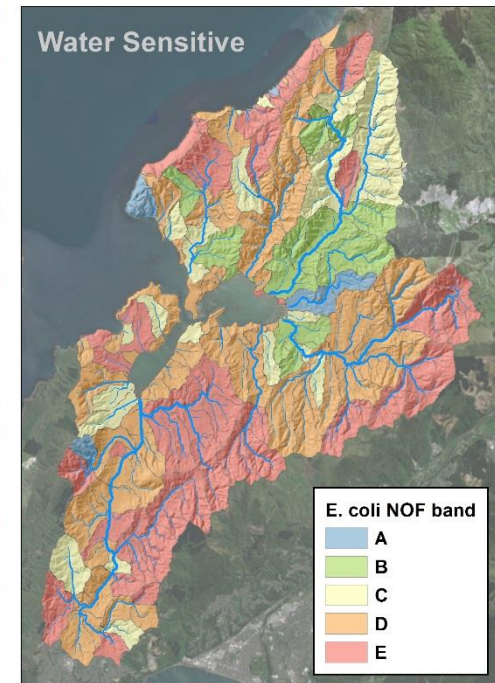
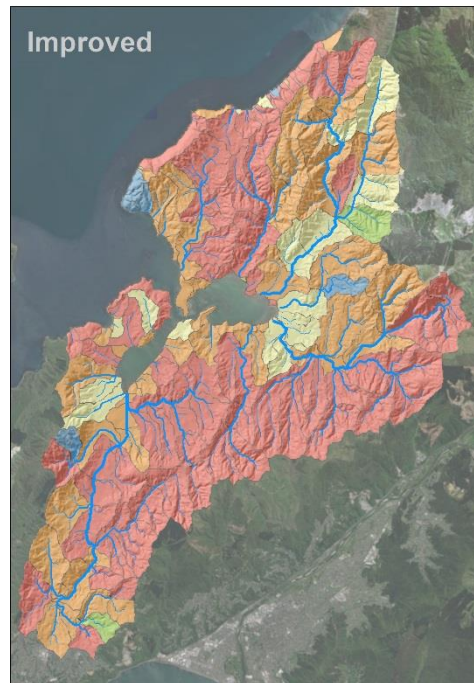
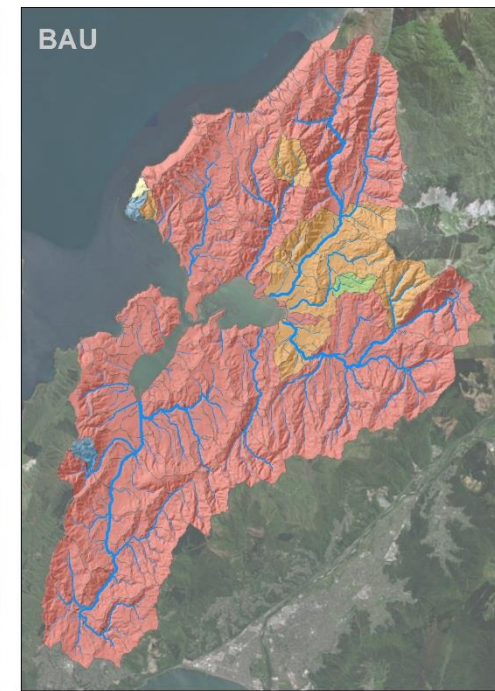
- Retirement of grazing land
- Riparian fencing and planting
- Repair of cross-connections in stormwater network
- Wastewater overflow repair
- Different urban development configurations
- Stormwater bioretention, wetlands, media filters

Scenarios



Scenarios

Preliminary results show general improvement in *E. coli* concentrations, however the Porirua stream still does not meet the national bottom line.



Conclusions

- Model achieved good calibration and was able to inform Whaitua decision making processes
- Models can aid decision making – but must be designed to answer specific questions
- Very difficult to improve water quality in urbanised catchments
- Need to be innovative to achieve our water quality targets

Thankyou

Questions?