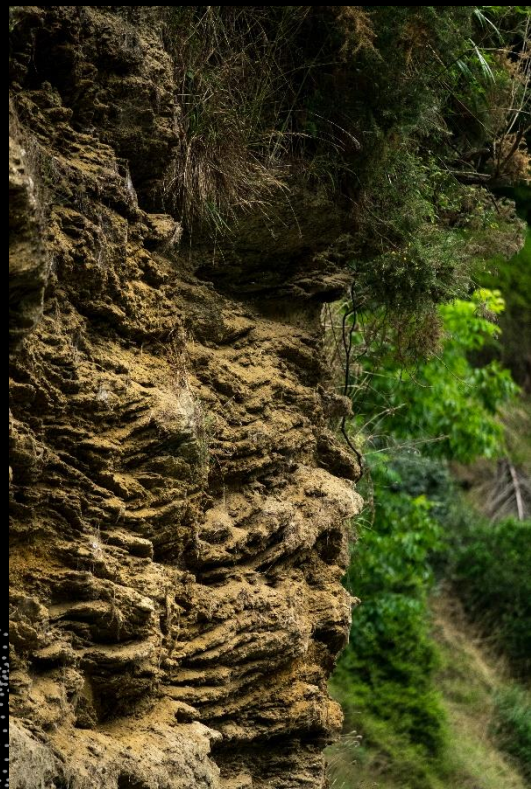
Manaaki Whenua
Landcare Research

The Secret's in the Soil

Linda Lilburne
Sam Carrick



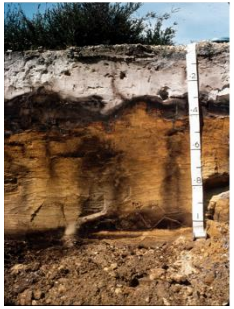
Outline – 2 parts

- S-map 101
- S-map application – the value of the inference engine

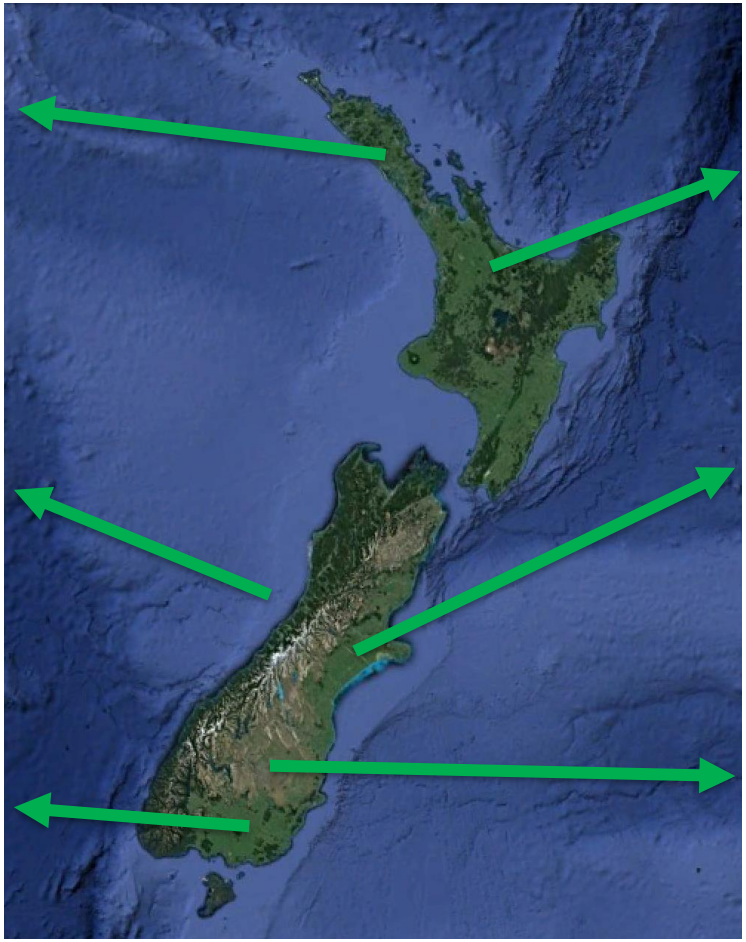
Part I: New Zealand is a land of high pedo-diversity

Old clays

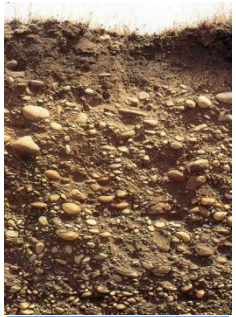
Rainforest Podzols



Loess downlands



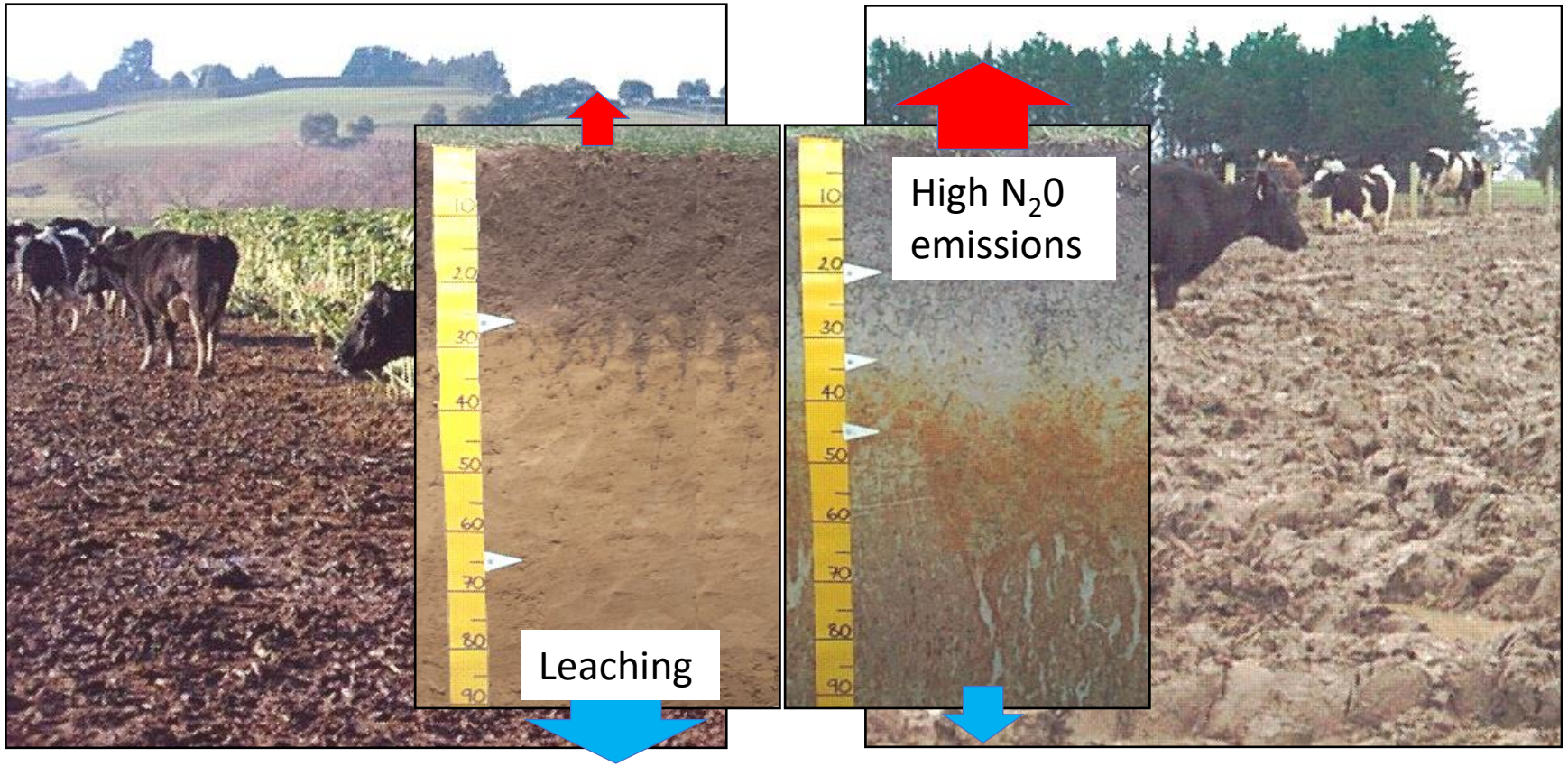
Volcanic Tephra



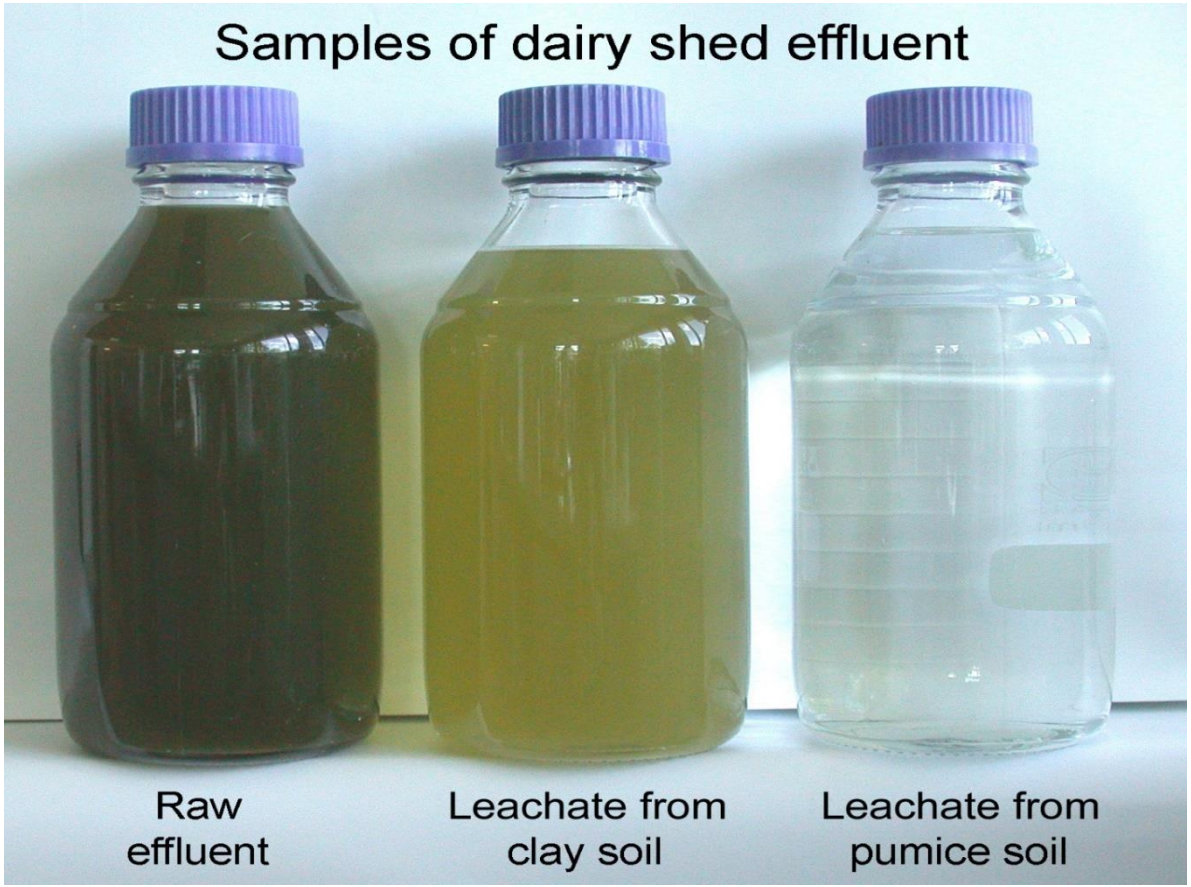
Glacial outwash

Semi-arid

Soils respond differently to pressure



Soils vary in filtering capacity



S-map: prime goals

- **Comprehensive** soil map for NZ
- Common and consistent **standard**
- **Evolves** with advances in soil and information science
- **Quantitative** information for every soil
- Adaptable to **changing requirements**
- Support decision-making at all scales: **nation to farm**
- **Accessible** to a wide range of users

Long term collective effort

Many partners have funded S-map, predominately:

- Historical government regional growth programmes
- Regional Councils
- MPI
- Fertiliser companies & Overseer
- MWLR (MBIE)

Progress …

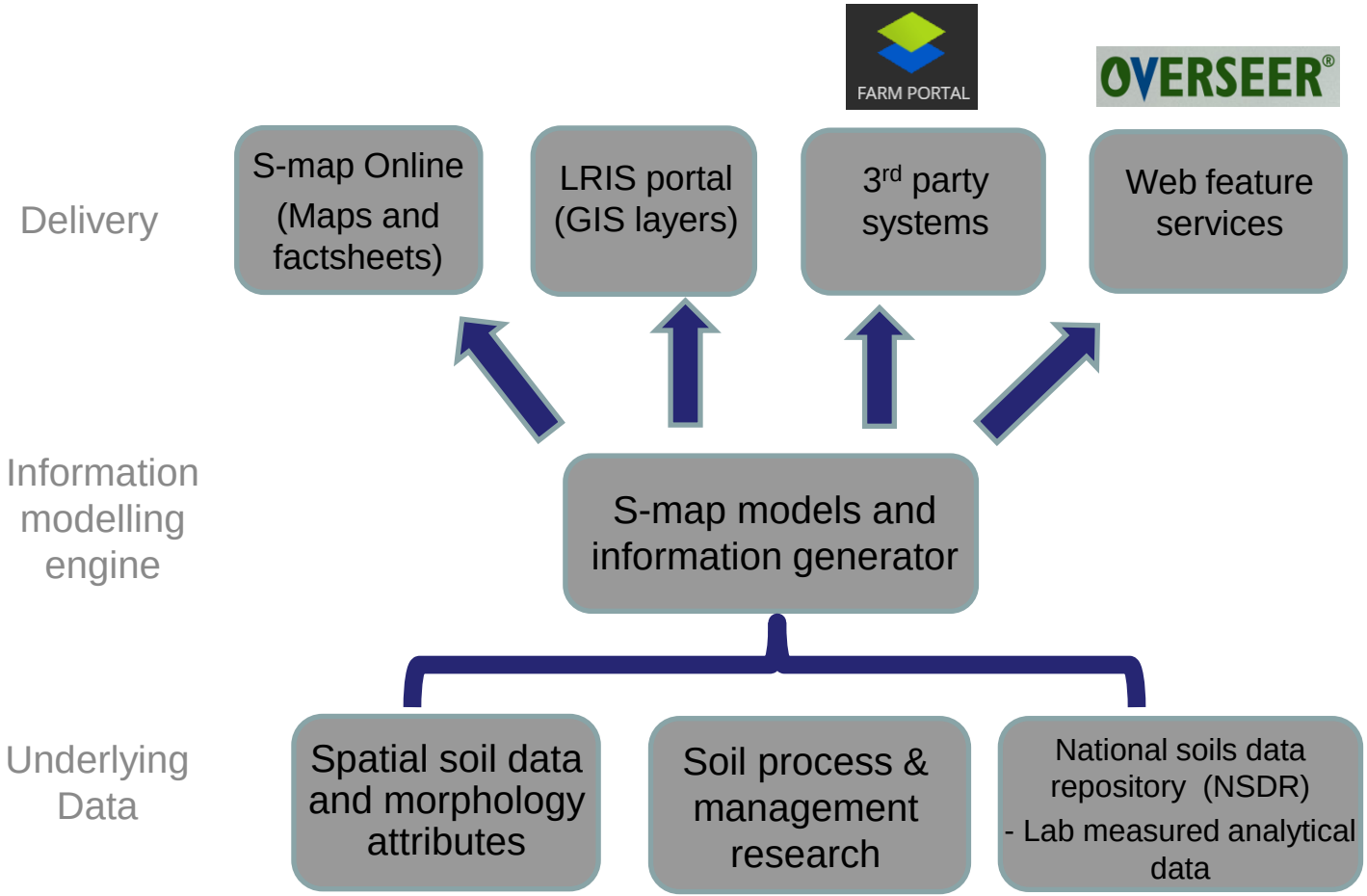
35% mapped = c. 8M ha

Tho 45% NZ is class 7 - 8

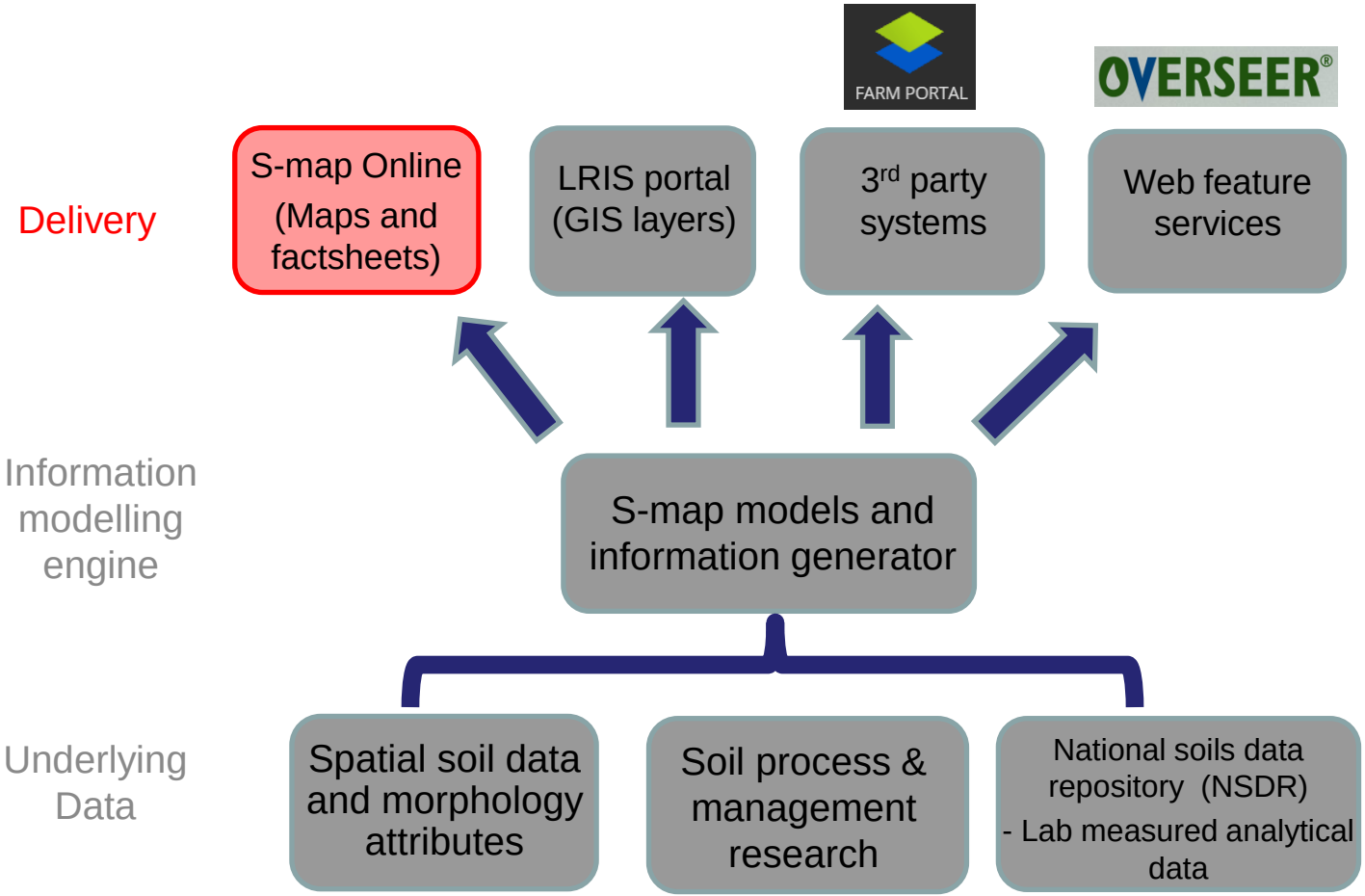
So we have covered 50% of class 1 – 6 land

High diversity mapped thus far, c. 5,000 soil types

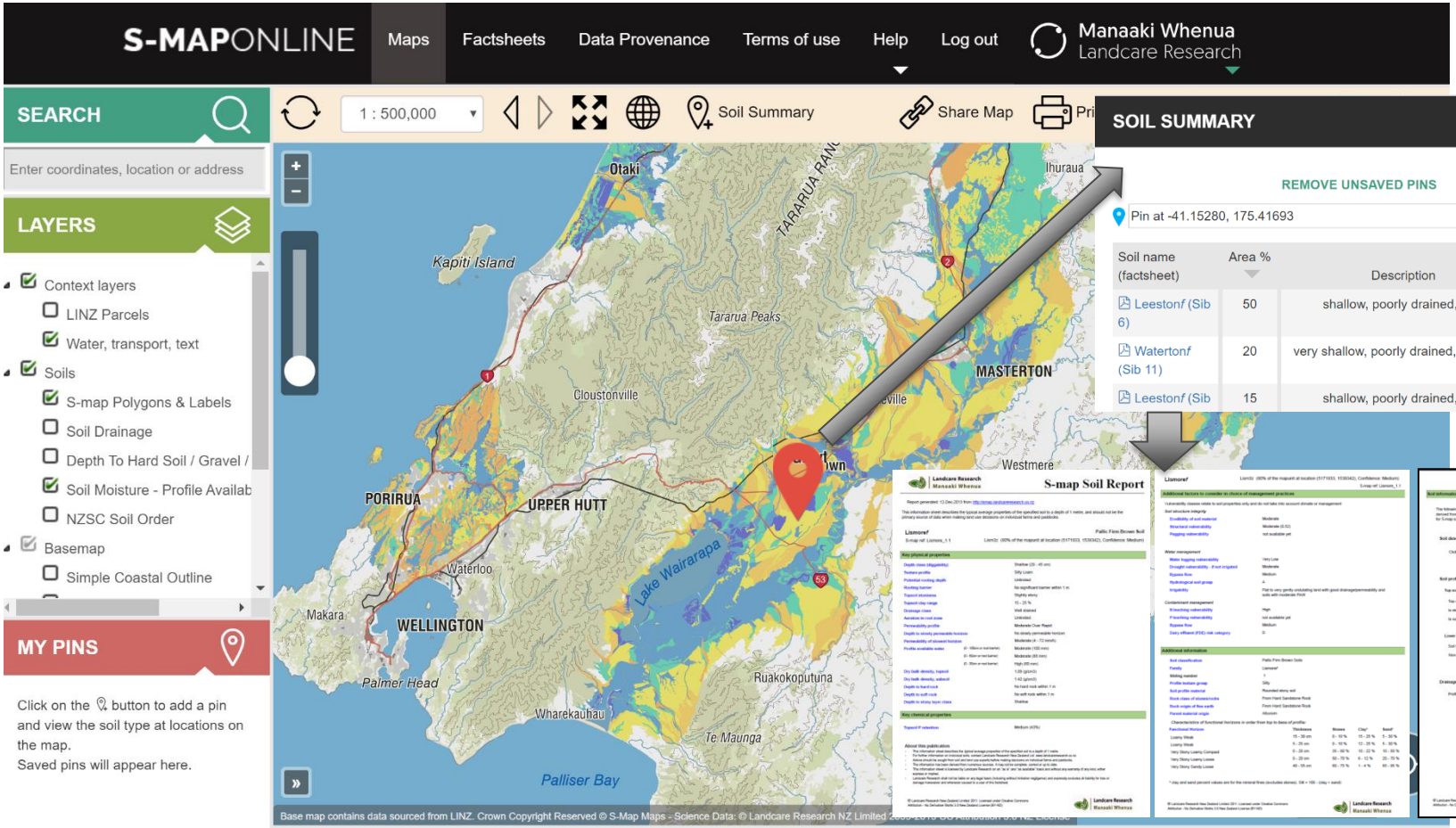
S-map information system

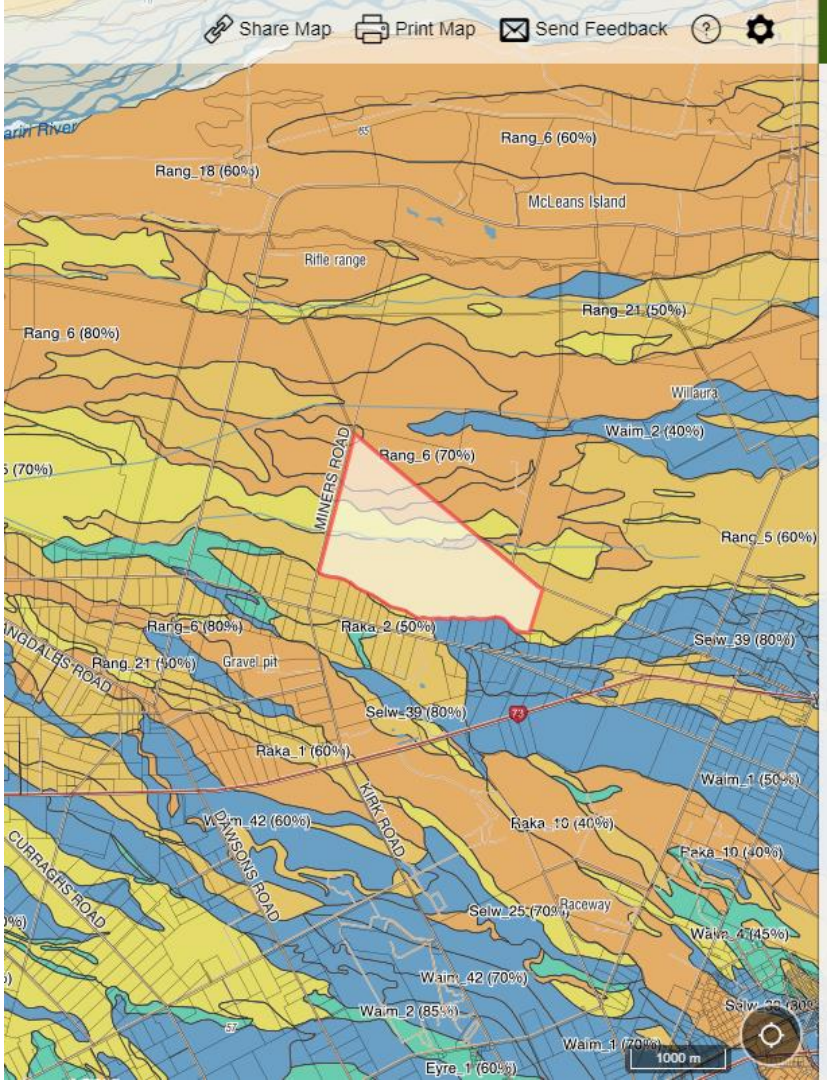


S-map information system



S-map Online http://smap.landcareresearch.co.nz/home





FEATURE REPORT

LINZ Parcels

Lot 1 DP 68764

Approximate area

236ha

view more

Report

Soil Moisture - Profile Available Water in 1m (mm)

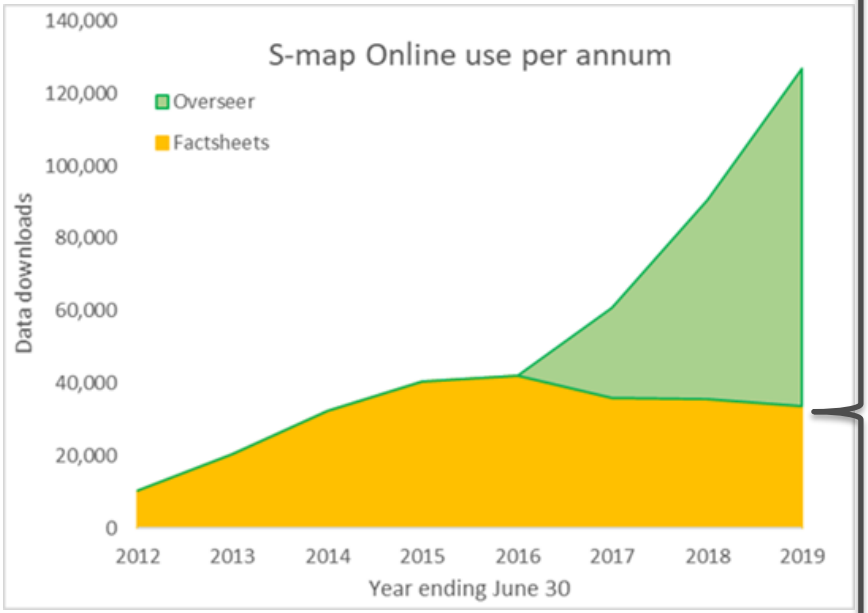
Class	Description	Area
	Low	74ha
	Moderate to Low	137ha
	Moderate	< 1ha
	Moderate to High	25ha
	High	< 1ha
	Unclassified Land	0ha
	Water	< 1ha

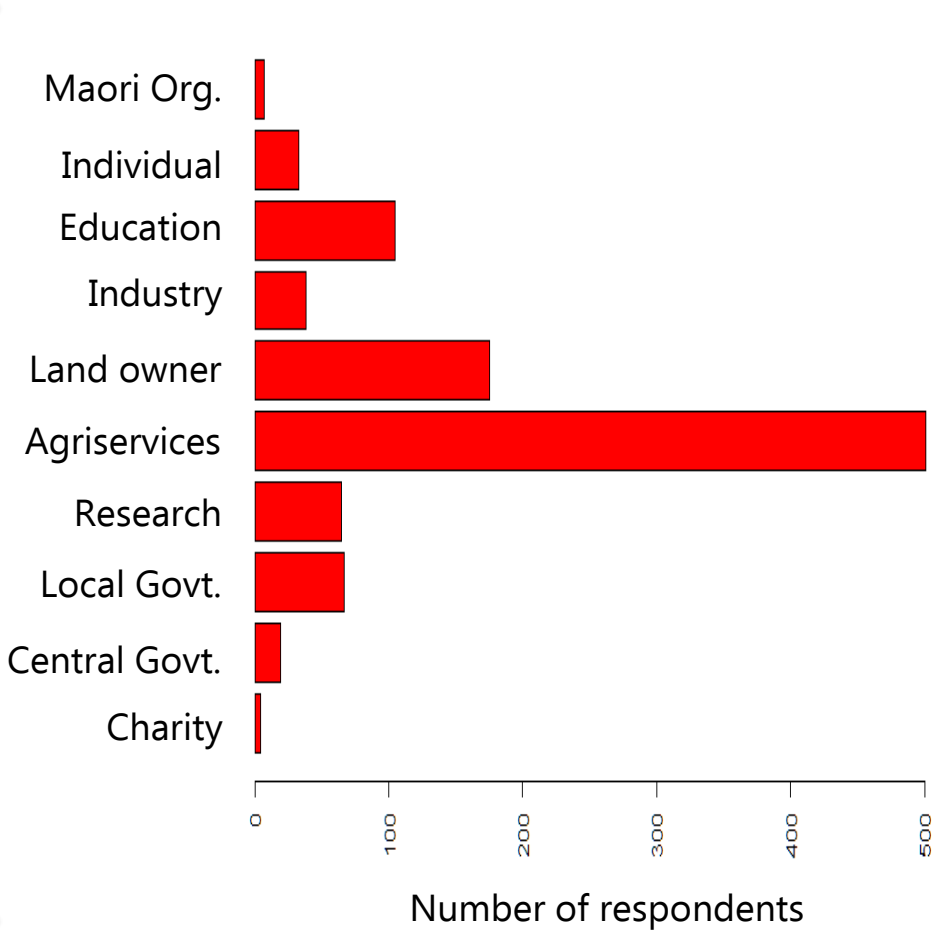
Disclaimer - Report statistics are estimated from all siblings in the selected area - including the non-dominant siblings in each soil polygon.

Soil Siblings

Sibling	Area	Proportion
Rang_5a.1	86 ha	36.4%
Rang_6a.1	61 ha	26.0%
Rang_48a.1	51 ha	21.6%
Selw_25a.1	25 ha	10.5%
Rang_18b.1	12 ha	5.2%

Who uses it?

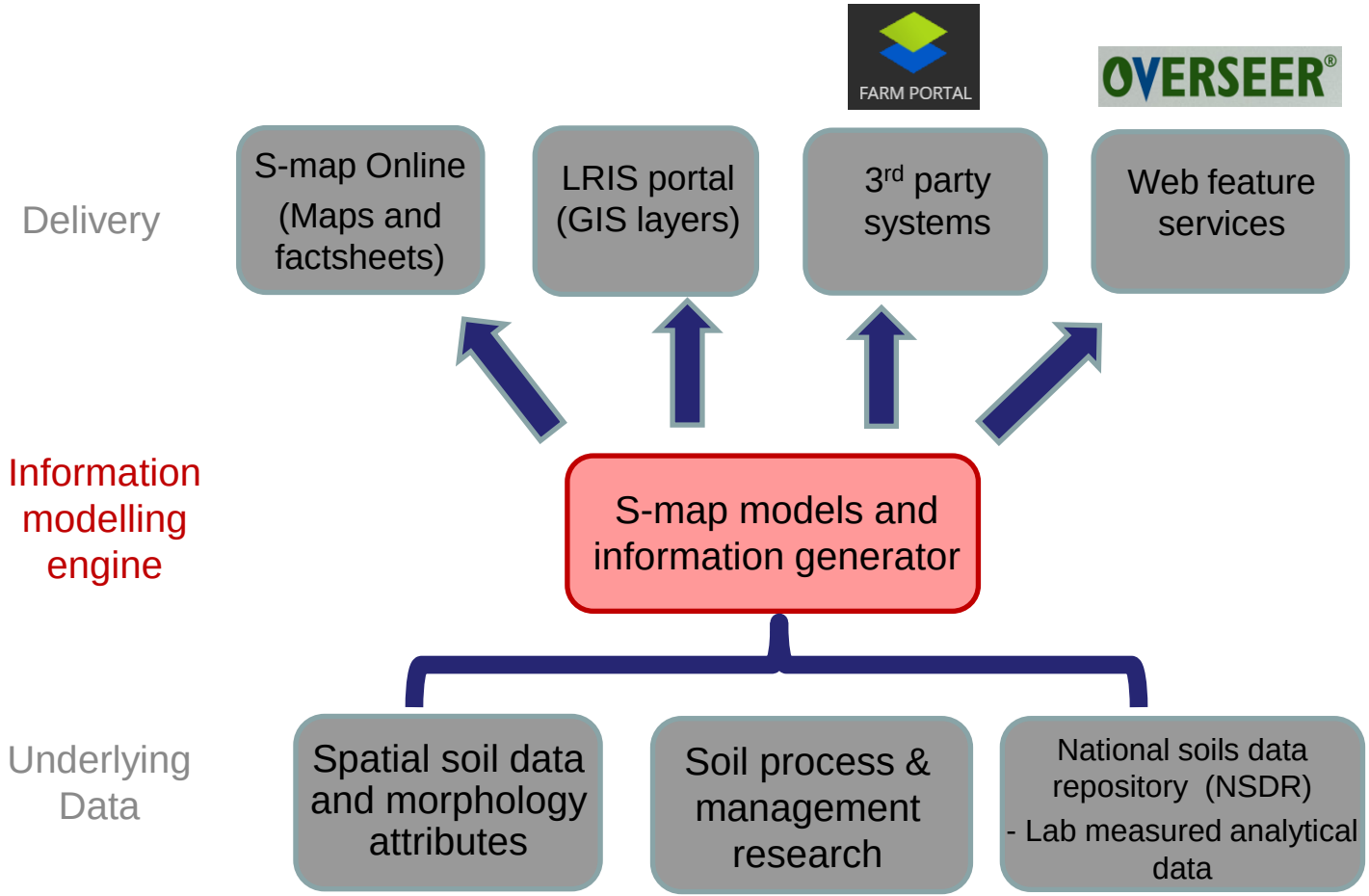

S-map Online use per annum
Overseer
Factsheets
Data downloads
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
2012
2013
2014
2015
2016
2017
2018
2019
Year ending June 30


Maori Org.
Individual
Education
Industry
Land owner
Agriservices
Research
Local Govt.
Central Govt.
Charity
0
100
200
300
400
500
Number of respondents

Part I: key take home message

Soil information is important for a wide range of issues and where available it is extensively used.

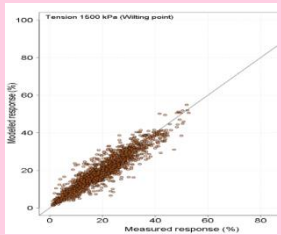
Part II: S-map inference engine



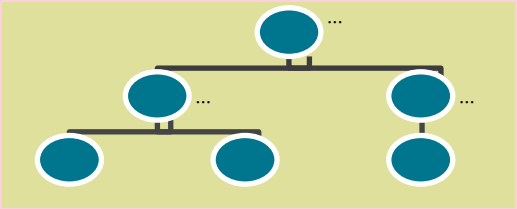
Soil information

S-map inference engine

$$Y = \int B\sqrt{K}dx$$



PTF CODE



Research

Soil Survey data

NSDR data

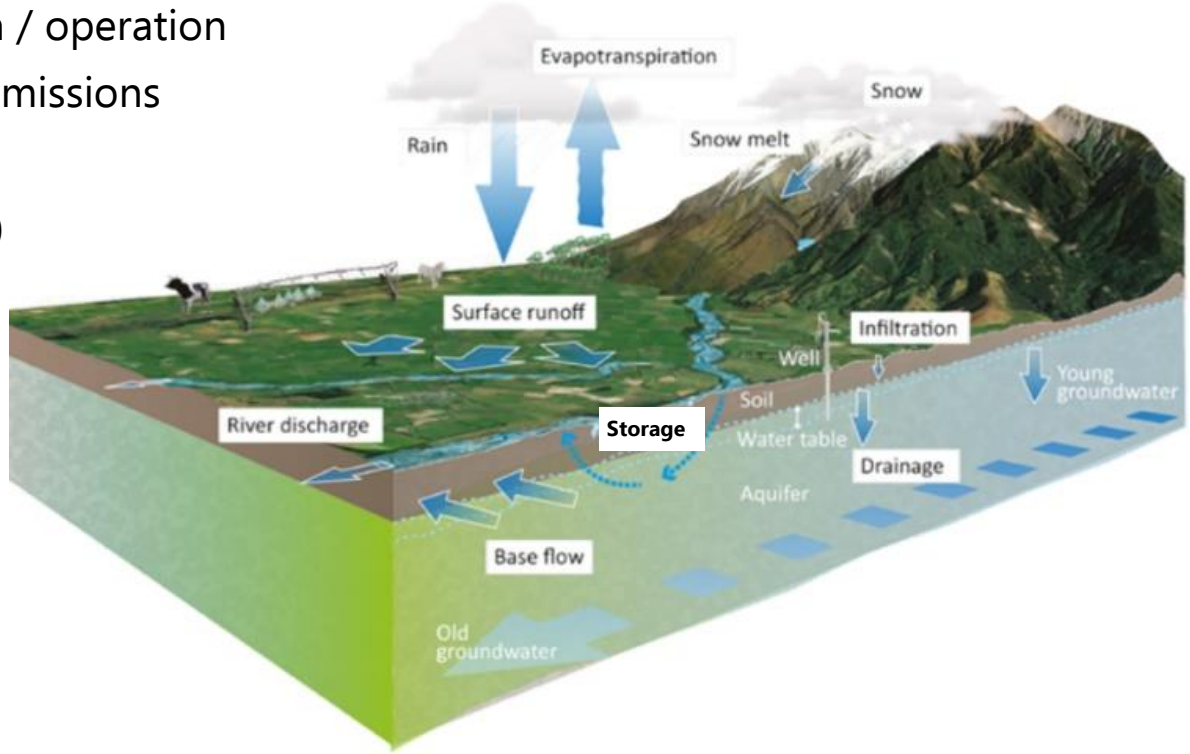
Predictions of soil water information

Essential for:

- Irrigation and effluent design / operation
- Nutrient leaching and GHG emissions

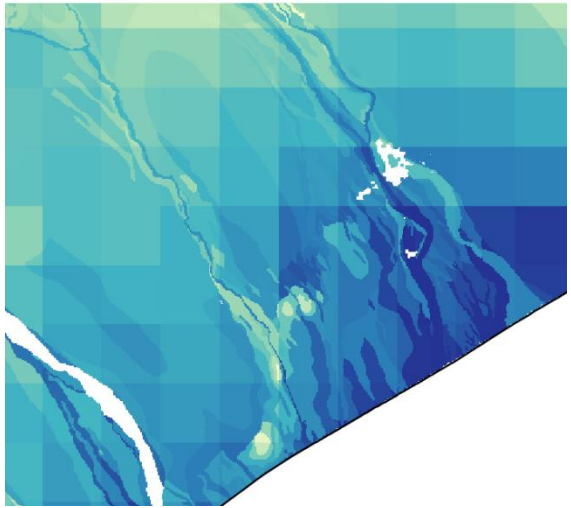
Overseer

- Catchment models (NZWaM)
- Weather (NZ Drought Index)

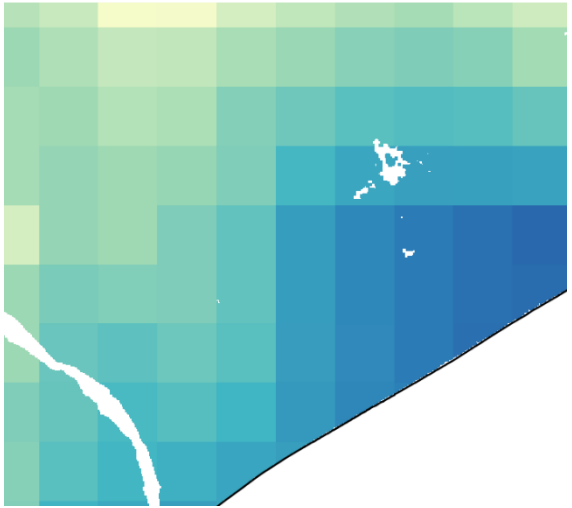


Droughtiness modelling

(a) 100 m S-map



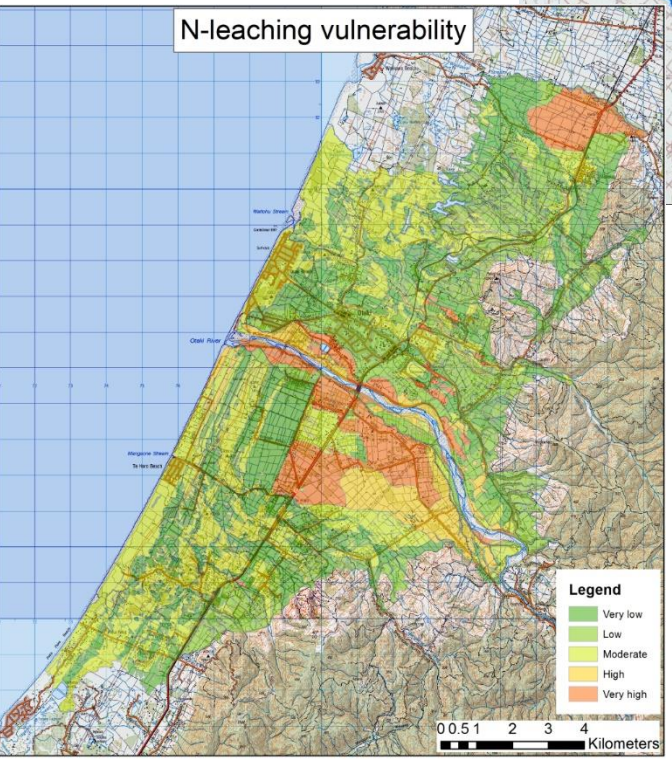
(e) 5000 m nominal soil

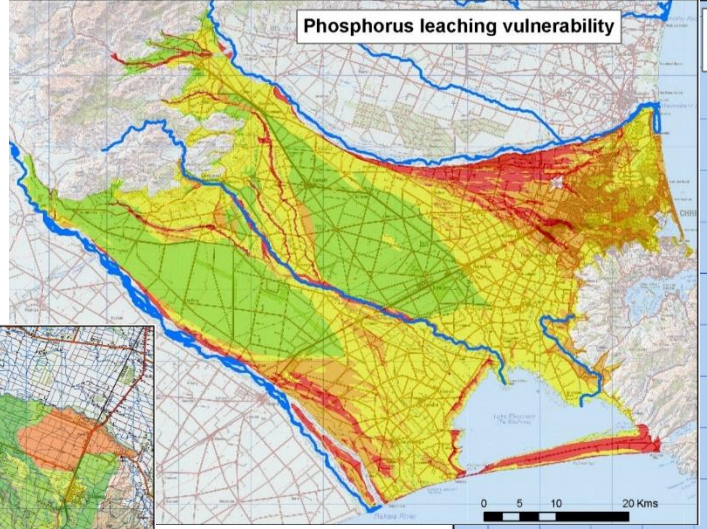


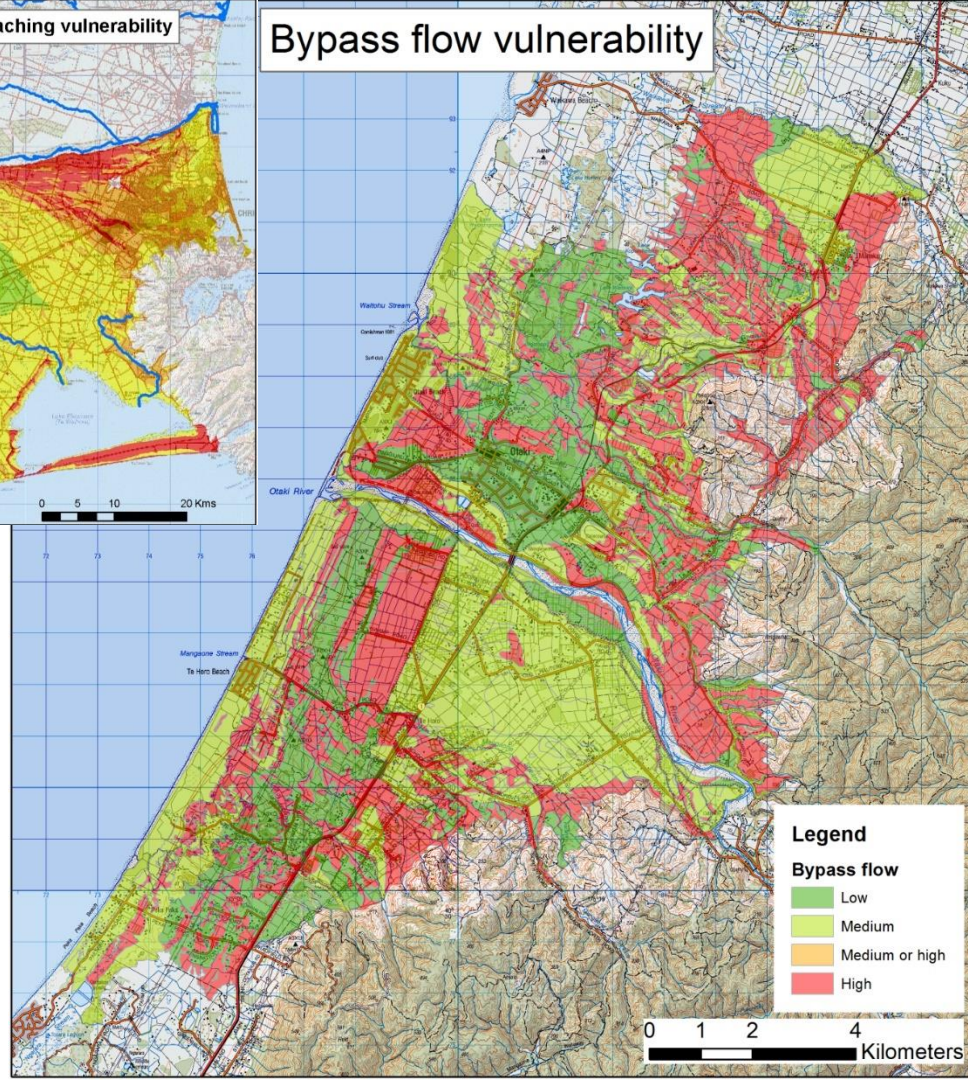
0 5 10 15 20 km

CWD (mm)
250
312
375
438
500

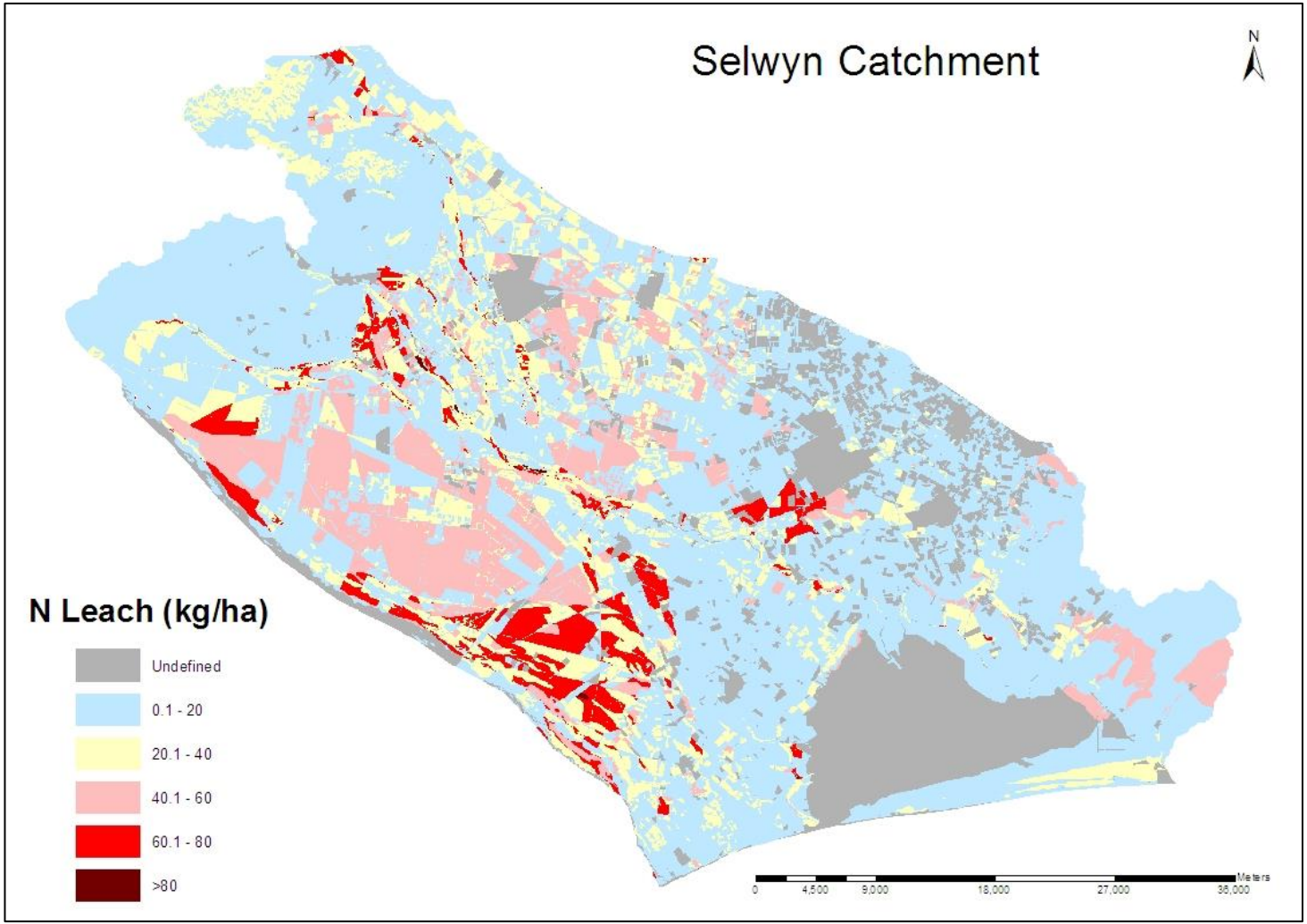
Risk mapping







Nutrient limit setting



Highly versatile land (LUC 1-2)

Total LUC 1-2 area:

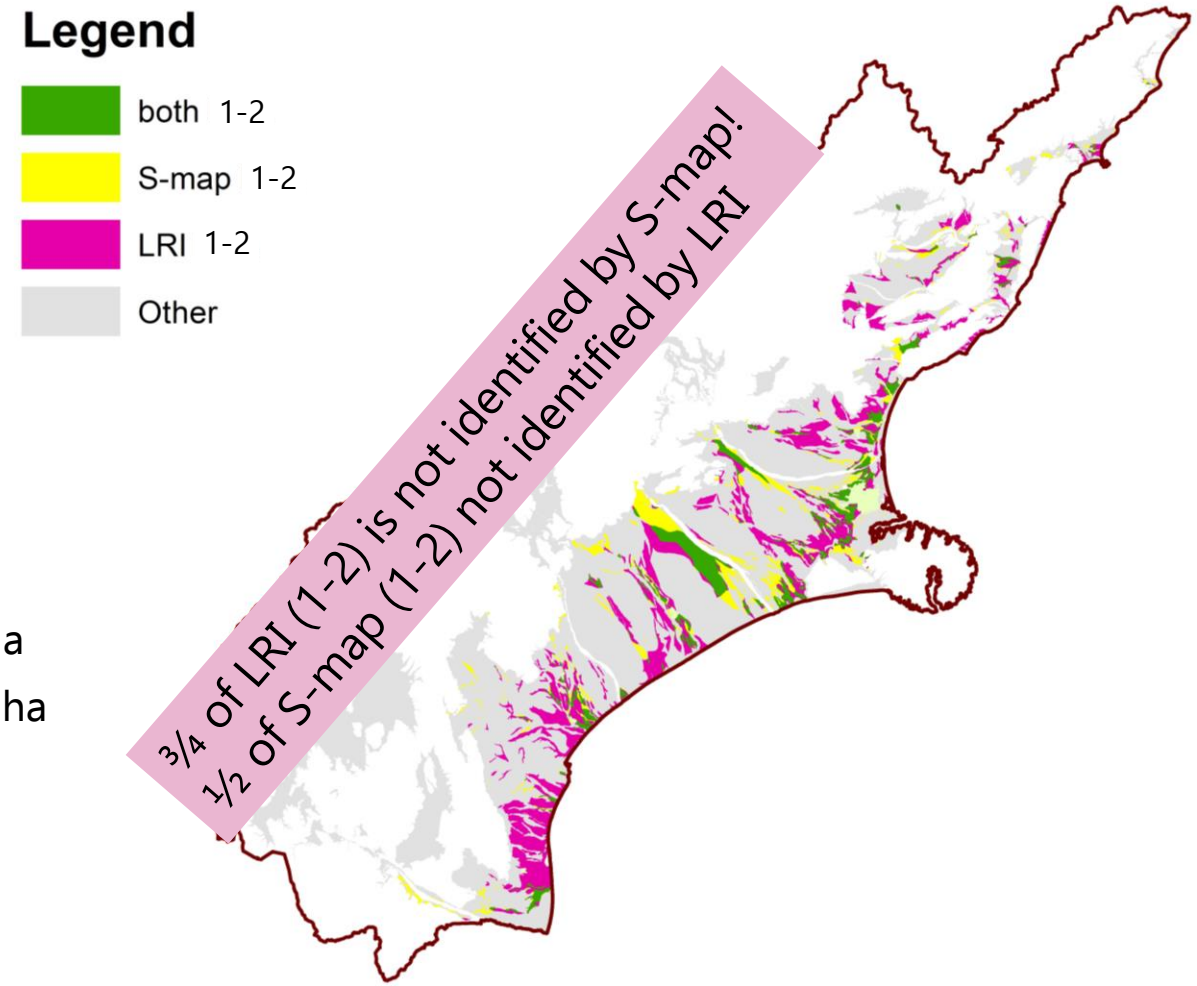
LRI: 286,008 ha

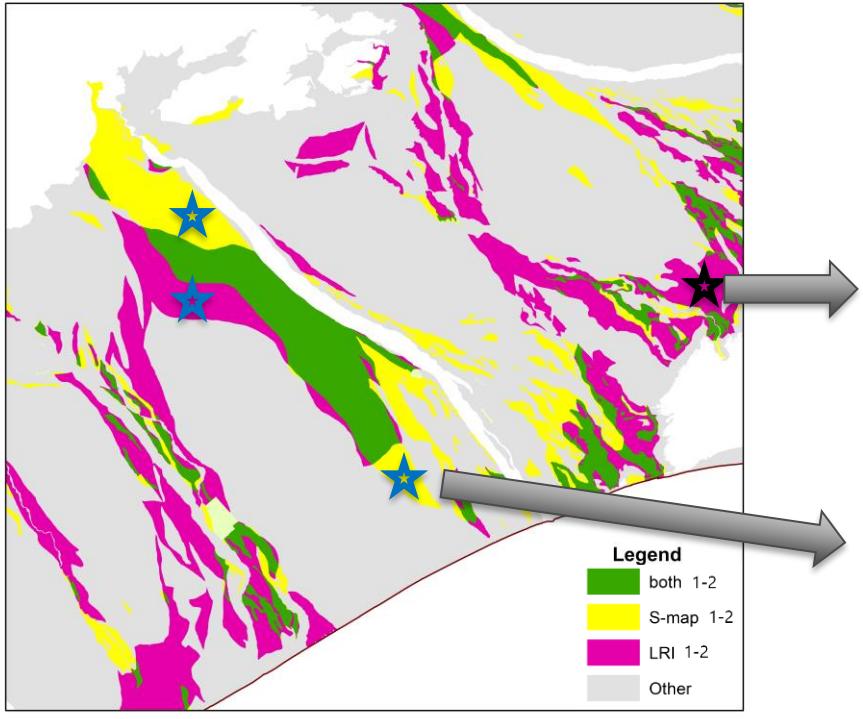
S-map: 148,794 ha

Differences:

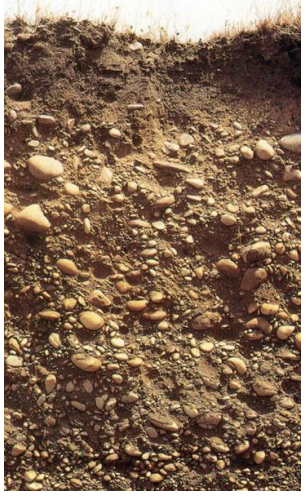
in S-map not LRI: 73,517 ha

in LRI not S-map: 210,731 ha





LRI

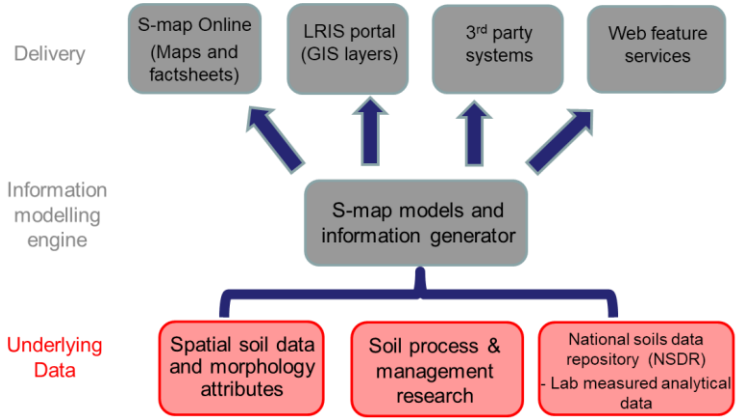


S-map

Part II: key take home message

Good science underpins transforming soil data into information & products. But quality soil information is needed to avoid expensive mistakes or lost opportunities.

Upcoming developments



- Increased coverage 350,000 ha (Aug)
- Improved soil water prediction model (Aug)
- S-map Farm Test - Enabling consultants to use S-map science at the farm scale

Update by webinar on 21st July

Other related datasets

NSDR – the National Soil Data Repository of individual point observations (often with measured analytical data)

S-map – maps the spatial pattern of soil variability across the landscape

LRI – national scale inventory of 5 land attributes (Slope, Soil, Vegetation, Parent rock, Erosion)

LUC – combines soil information with three other land attributes (climate, slope, parent material) to classify the overall capability of the land and erodibility.