

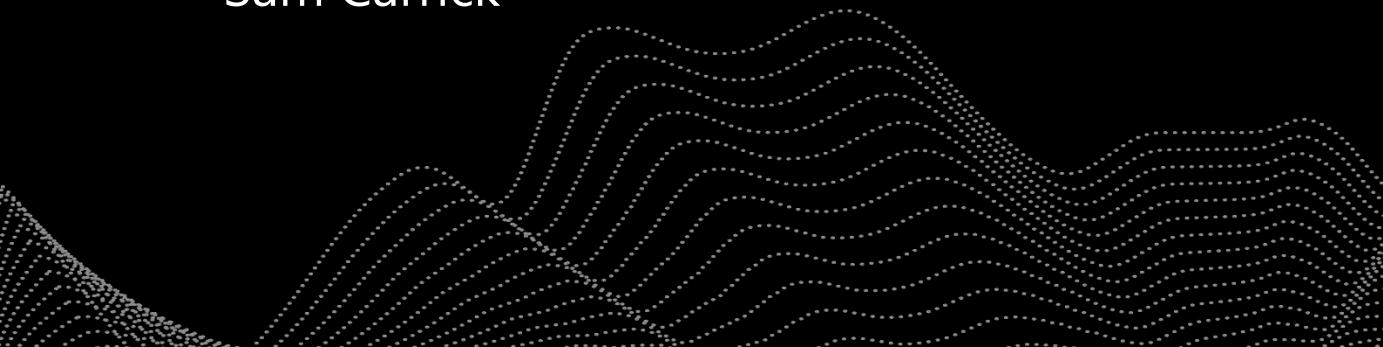
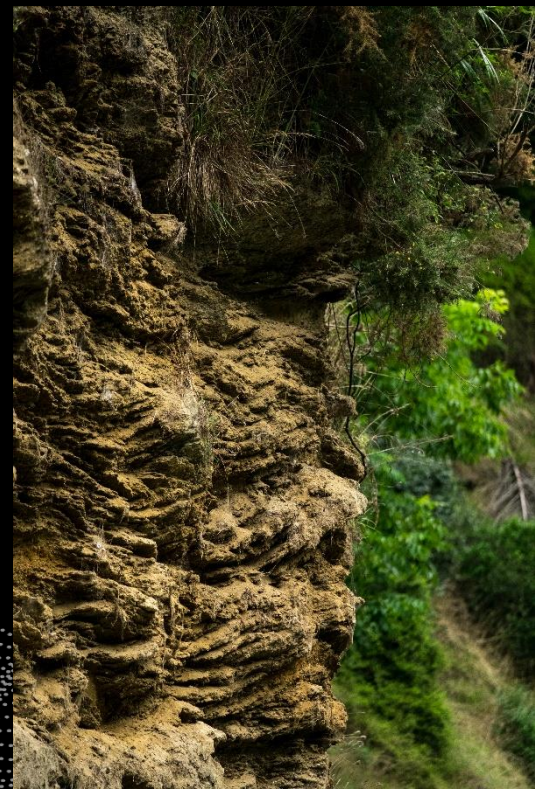


Manaaki Whenua
Landcare Research

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



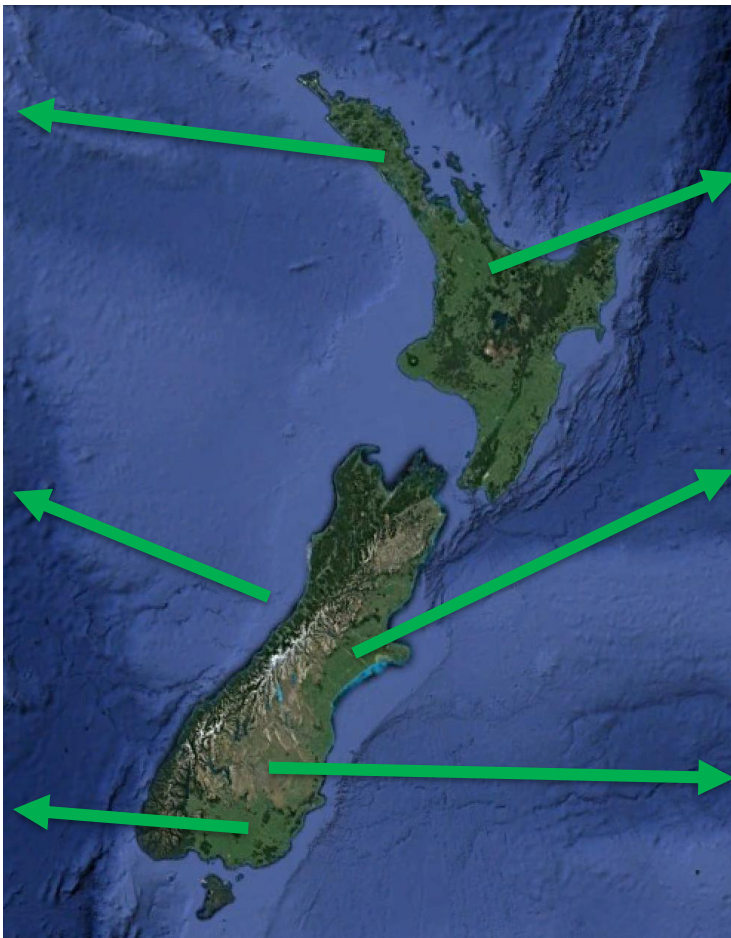
Old clays



Rainforest Podzols



Loess downlands



Volcanic Tephra



Glacial outwash

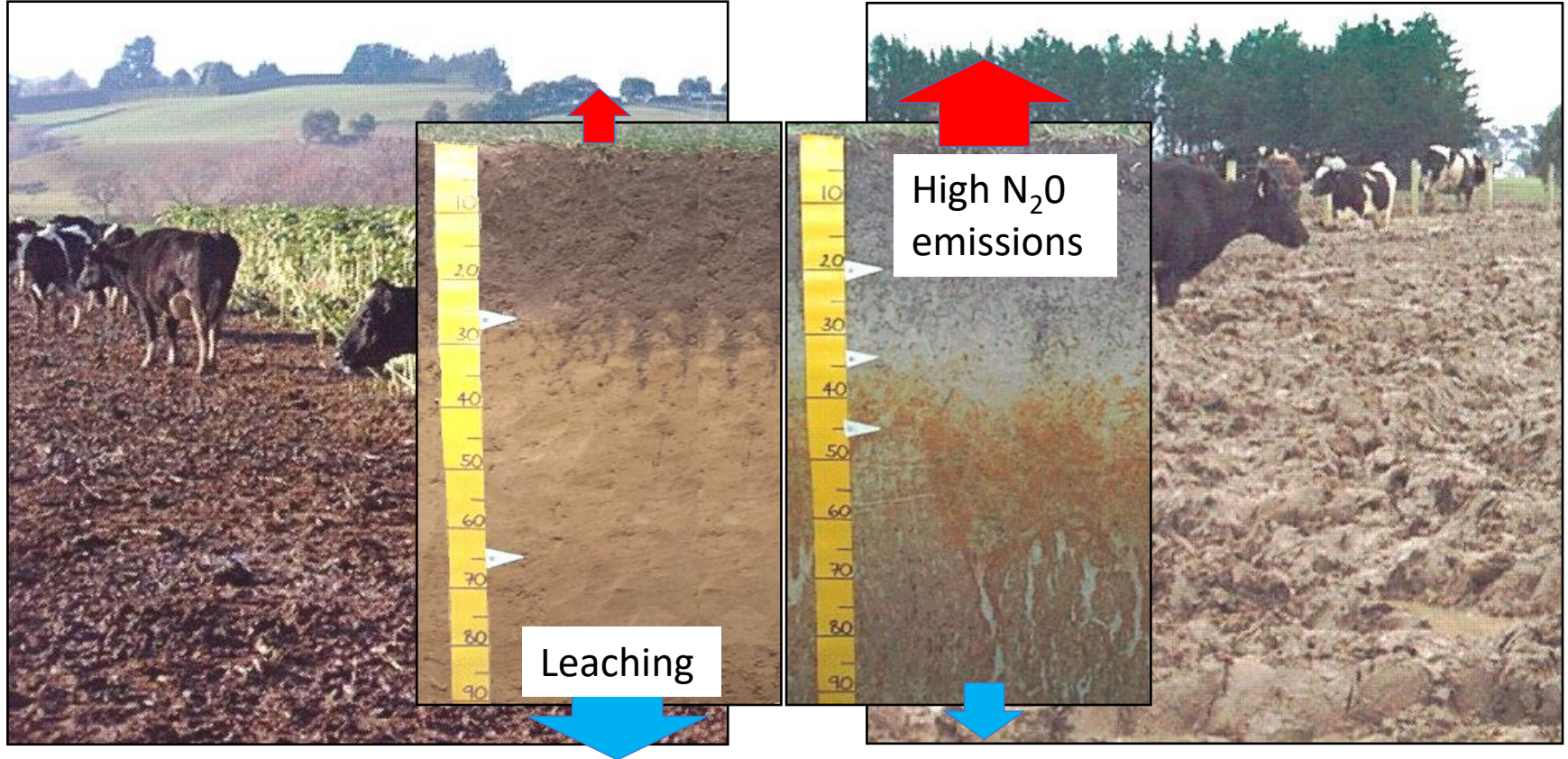


Semi-arid

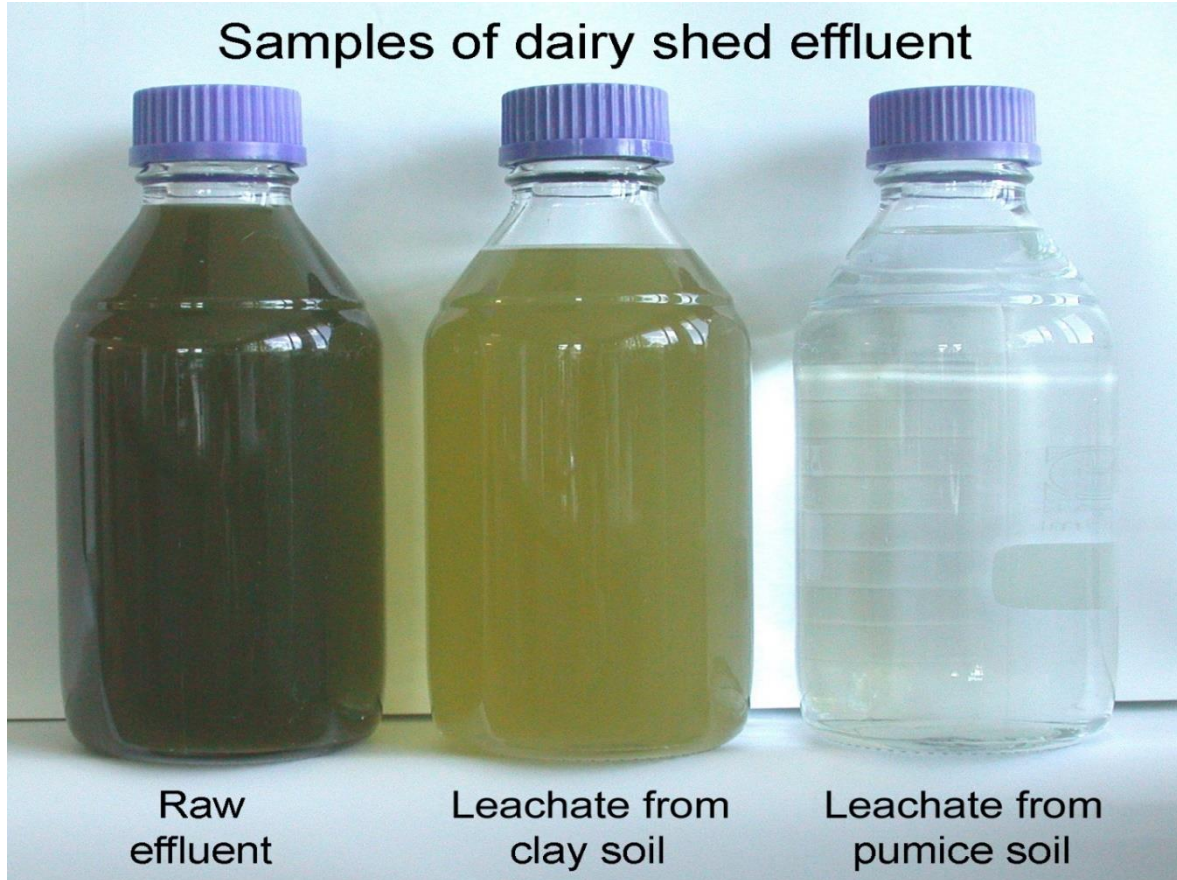




Soils respond differently to pressure



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

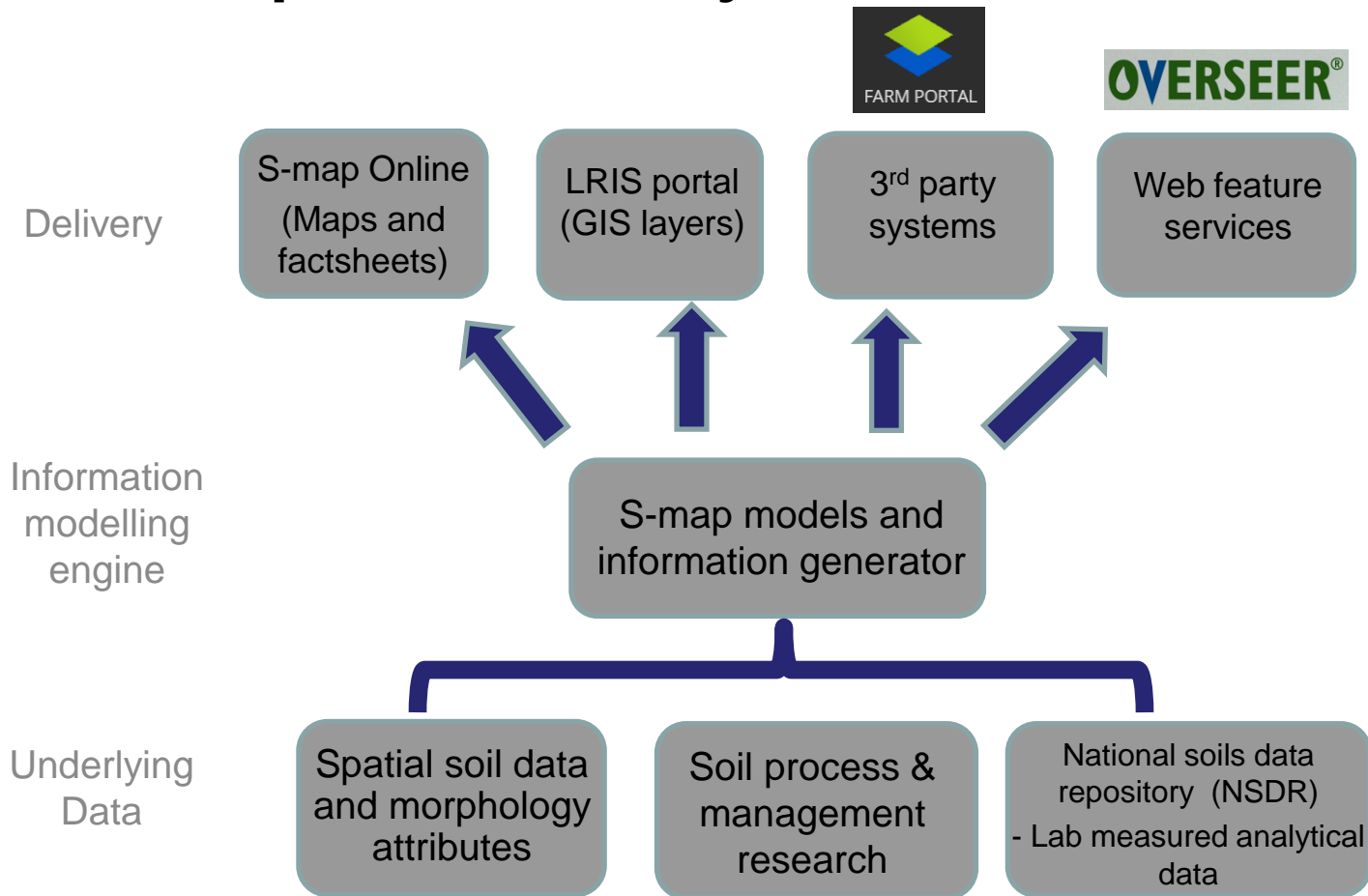
Tho 45% NZ is class 7 - 8

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

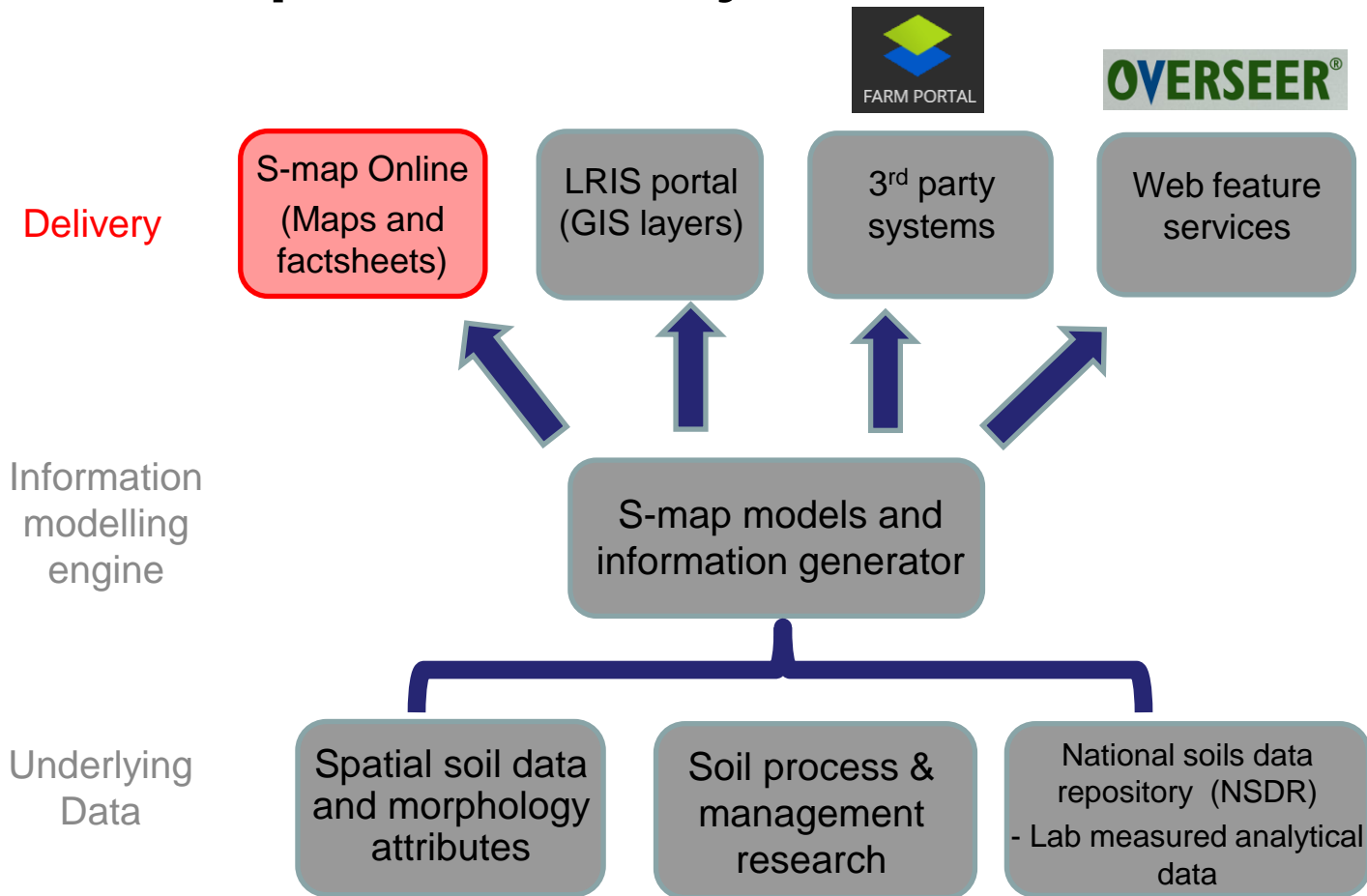
High diversity mapped thus far, c. 5,000 soil types



S-map information system



S-map information system





SEARCH

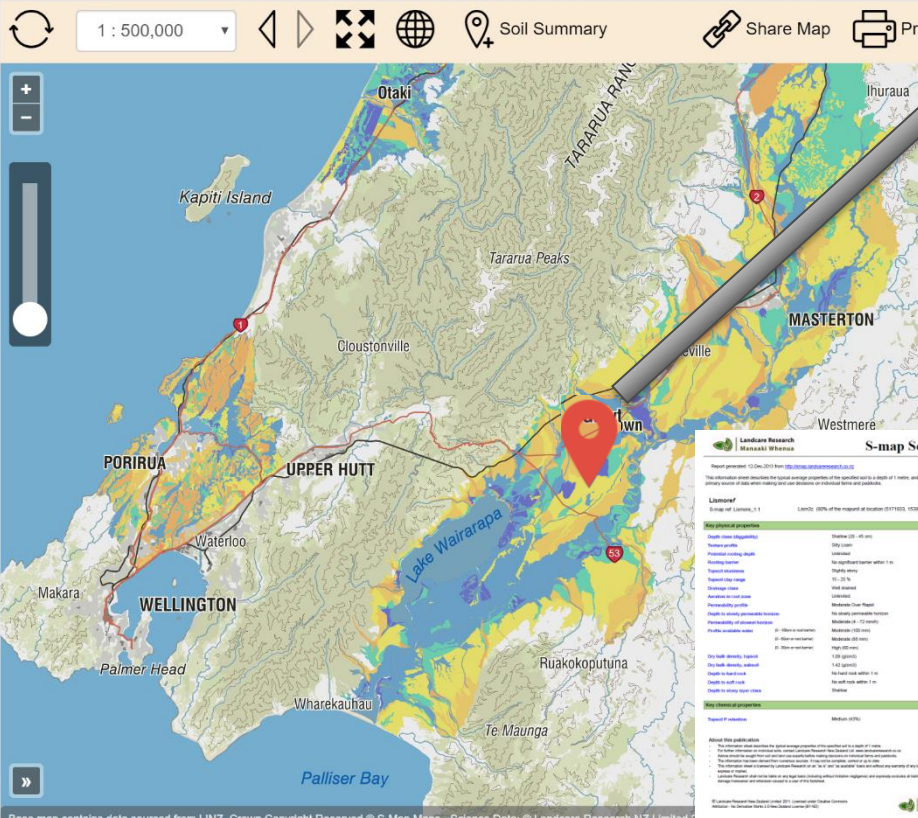
Enter coordinates, location or address

LAYERS

- Context layers
- LINZ Parcels
- Water, transport, text
- Soils
- S-map Polygons & Labels
- Soil Drainage
- Depth To Hard Soil / Gravel /
- Soil Moisture - Profile Availab
- NZSC Soil Order
- Basemap
- Simple Coastal Outline

MY PINS

Click on the button to add a pin and view the soil type at locations on the map. Saved pins will appear here.



SOIL SUMMARY

REMOVE UNSAVED PINS

Pin at -41.15280, 175.41693 DELETE SAVE

Soil name (factsheet)	Area %	Description	Confidence
Leestonf (Sib 6)	50	shallow, poorly drained, clay	Medium
Watertonf (Sib 11)	20	very shallow, poorly drained, silty loam	Medium
Leestonf (Sib 15)	15	shallow, poorly drained, clay	Medium

S-map Soil Report

Report generated: 13 Dec 2019 10:00 AM [View Report](#)

Location: **Leestonf** (6) **Leestonf** (60% of the report at location (571763, 1038042). Confidence: Medium

Soil description page: [View Report](#)

Water management: **High**

Soil moisture: **High**

Soil drainage: **High**

Soil texture: **High**

Soil structure: **High**

Soil depth: **High**

Soil fertility: **High**

Soil stability: **High**

Soil erosion: **High**

Soil salinity: **High**

Soil acidity: **High**

Soil alkalinity: **High**

Soil temperature: **High**

Soil moisture: **High**

Soil drainage: **High**

Soil texture: **High**

Soil structure: **High**

Soil depth: **High**

Soil fertility: **High**

Soil stability: **High**

Soil erosion: **High**

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Soil acidity: **High**

Soil alkalinity: **High**

Soil temperature: **High**

Soil description page

Soil name: **Leestonf**

Soil description: **shallow, poorly drained, clay**

Soil confidence: **Medium**

Soil texture: **High**

Soil structure: **High**

Soil depth: **High**

Soil fertility: **High**

Soil stability: **High**

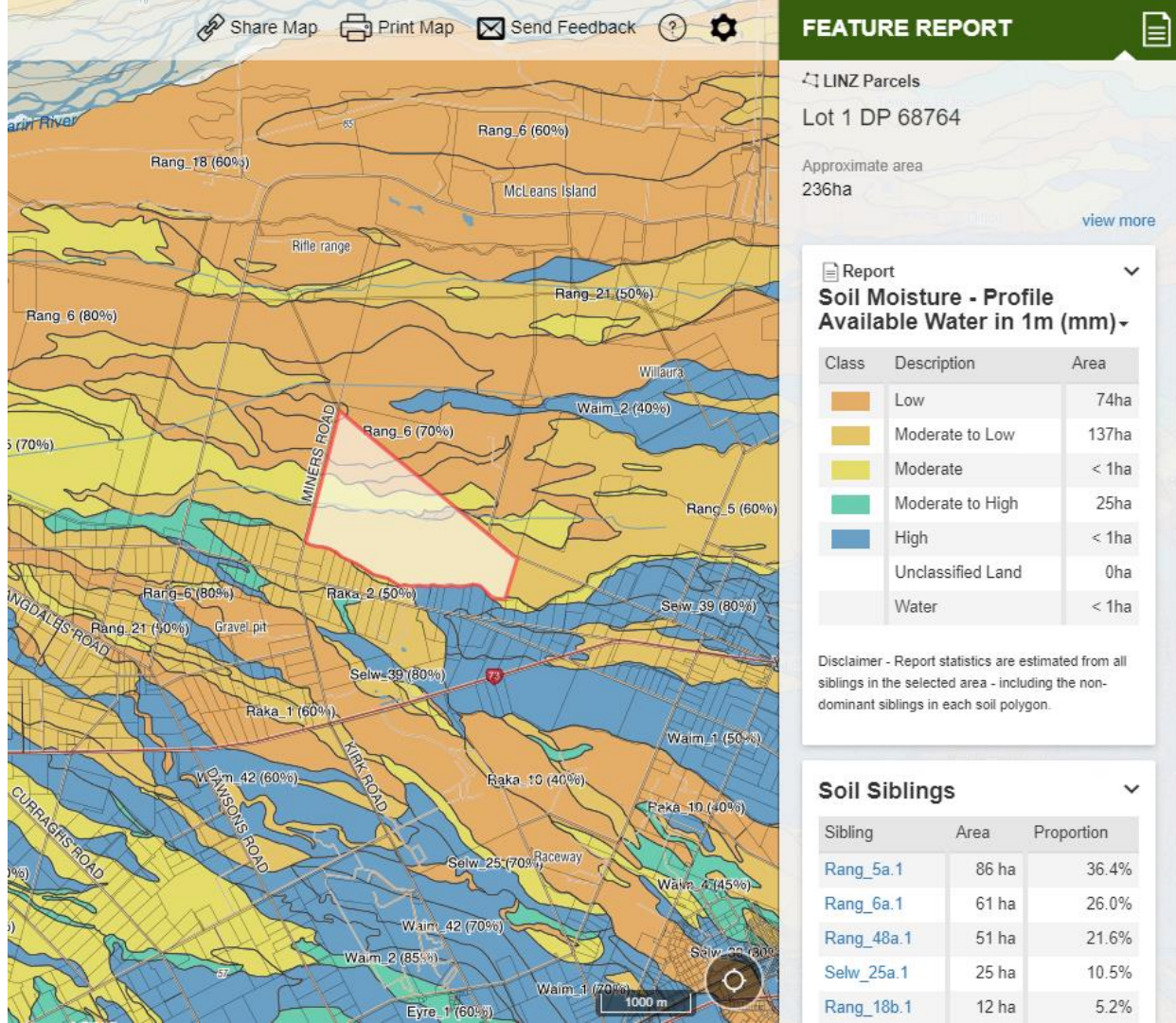
Soil erosion: **High**

Soil salinity: **High**

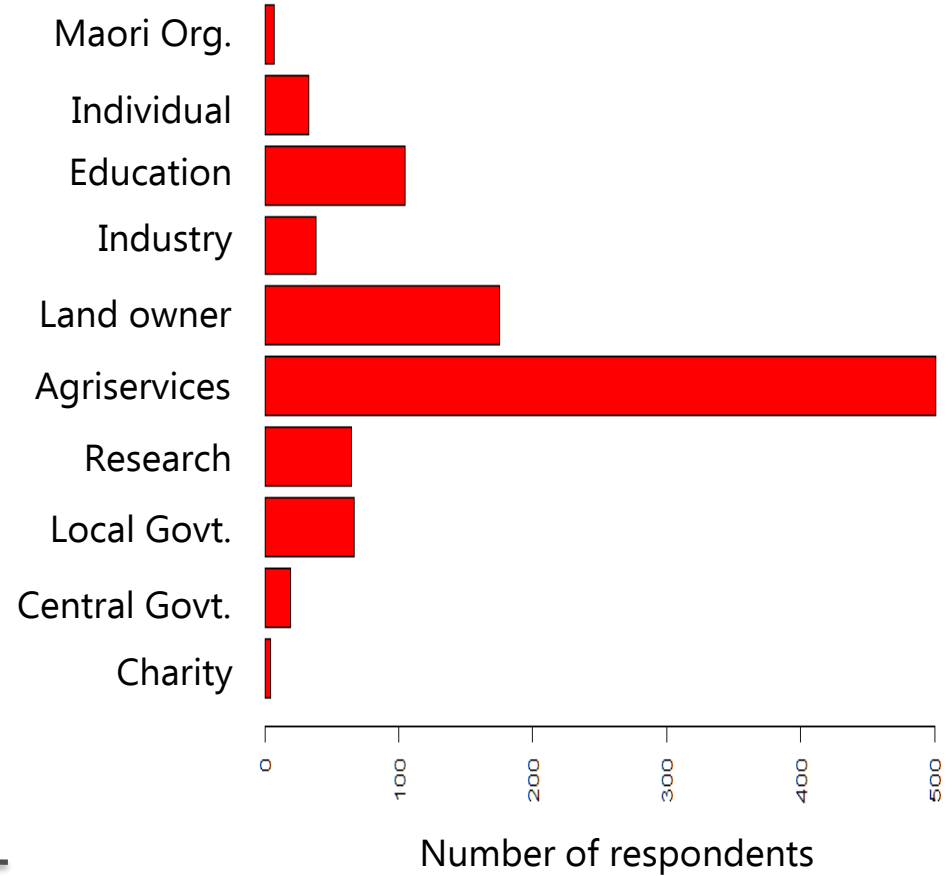
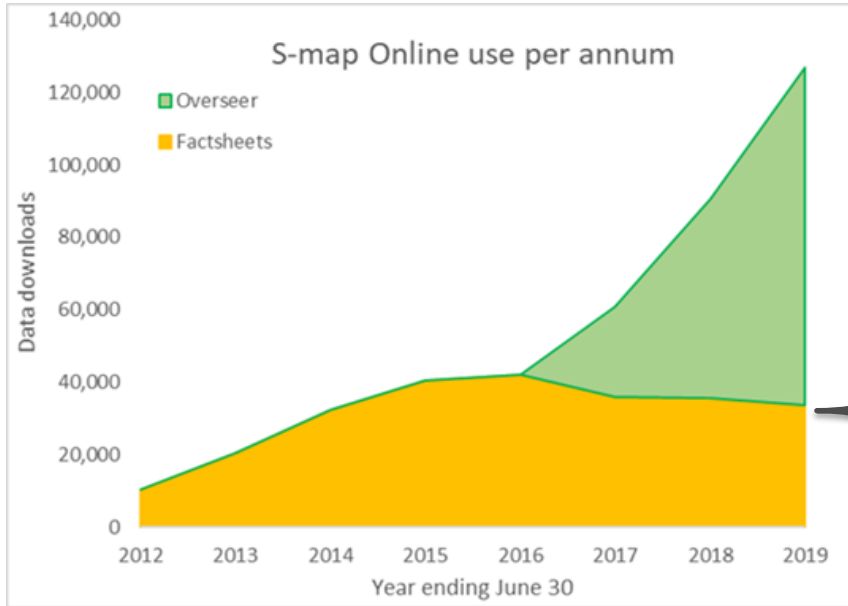
Soil acidity: **High**

Soil alkalinity: **High**

Soil temperature: **High**



Who uses it?

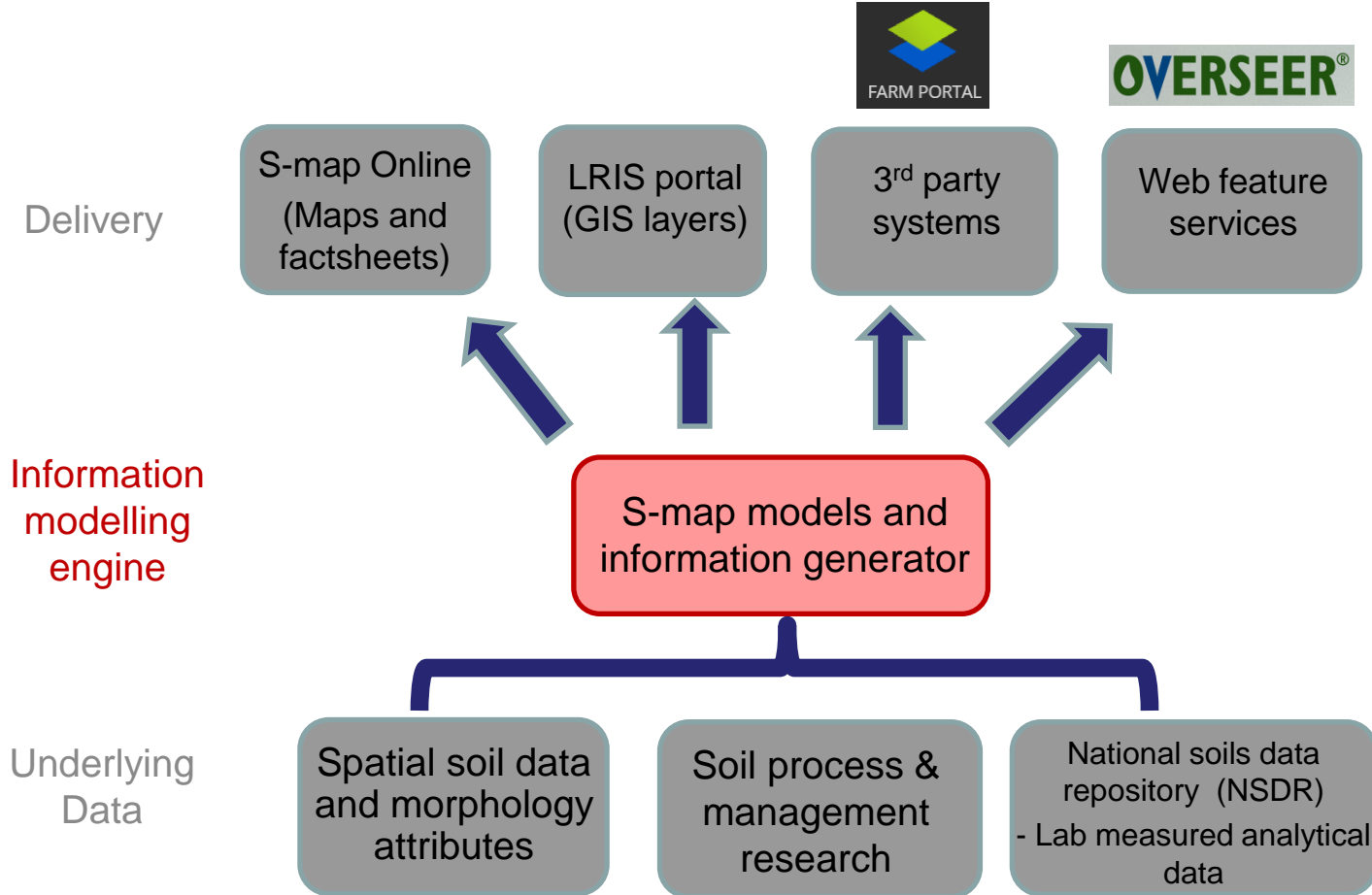




Part I: key take home message

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

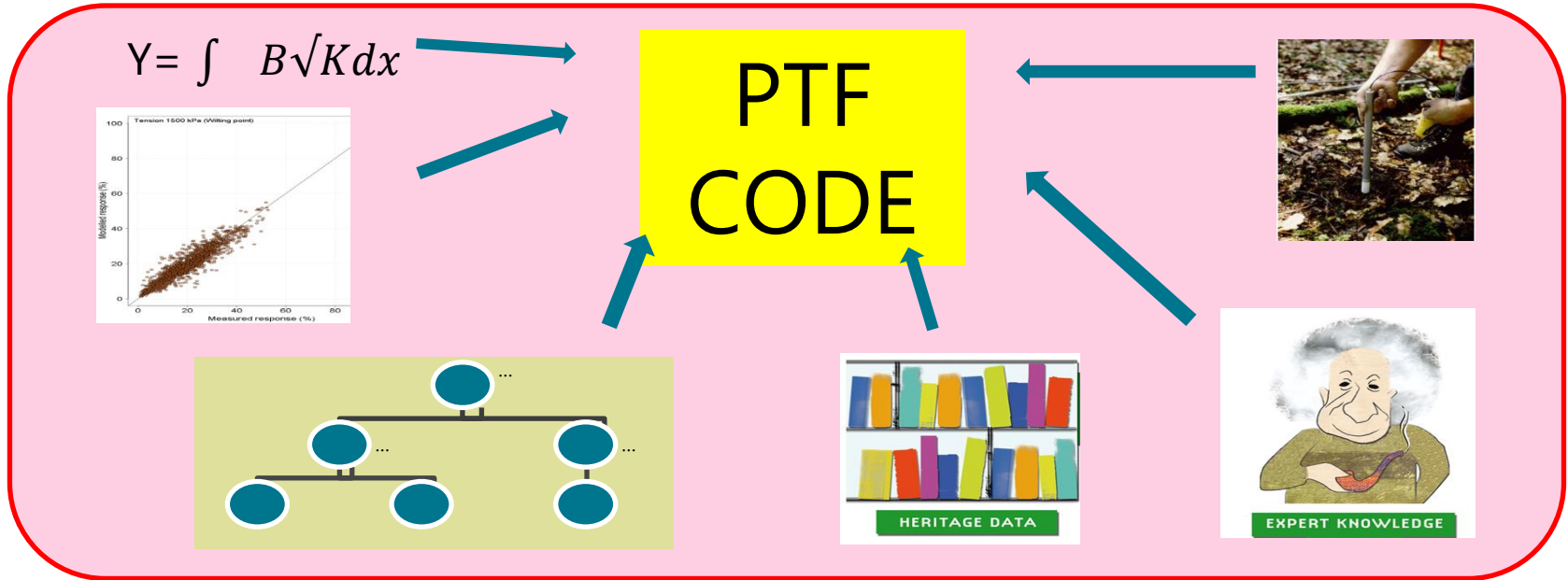
Part II: S-map inference engine



Soil information



S-map inference engine



Research

Soil Survey data

NSDR data



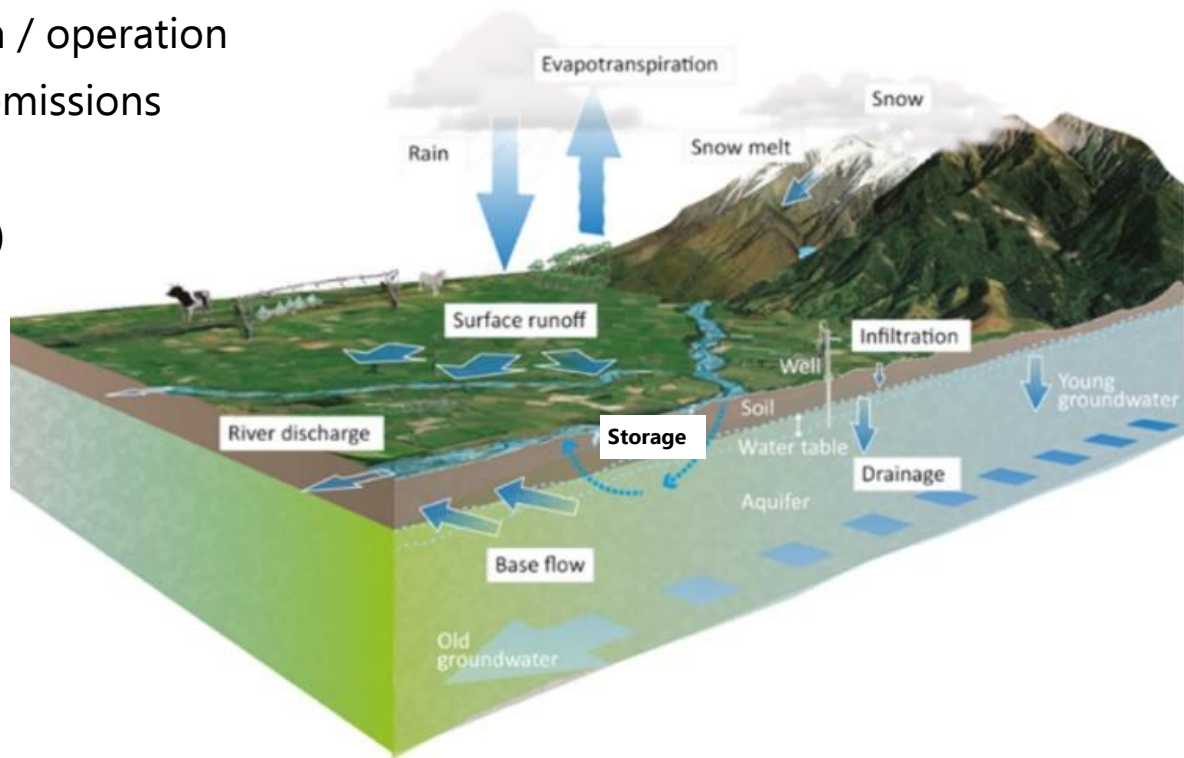
Predictions of soil water information

Essential for:

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



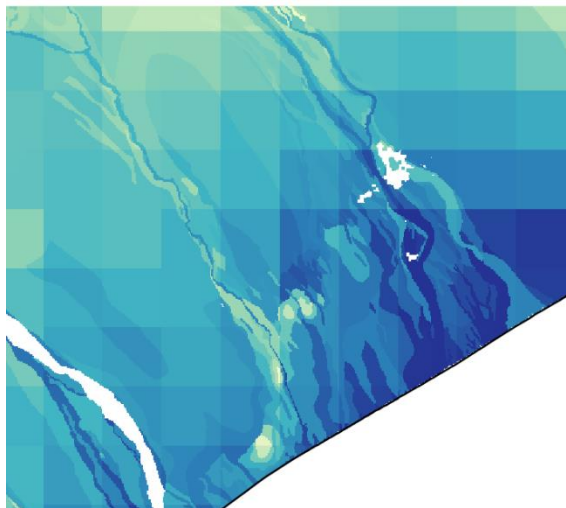
- Catchment models (NZWaM)
- Weather (NZ Drought Index)



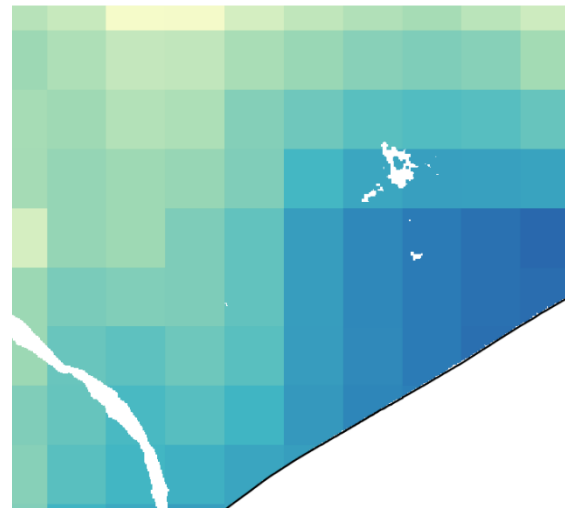


Droughtiness modelling

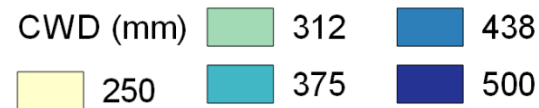
(a) 100 m S-map



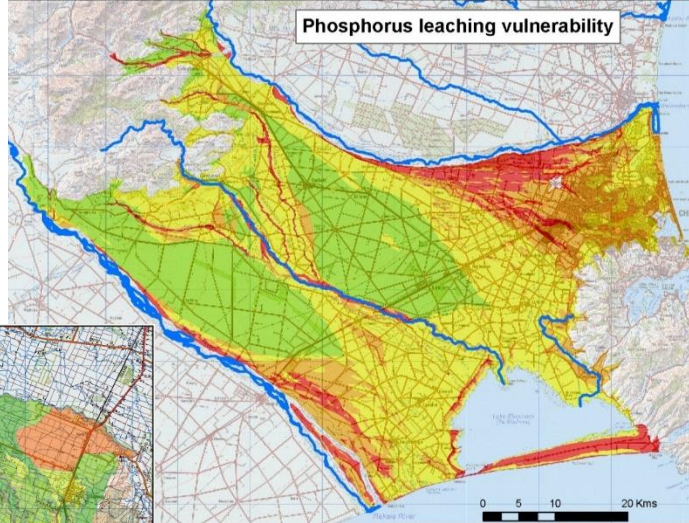
(e) 5000 m nominal soil



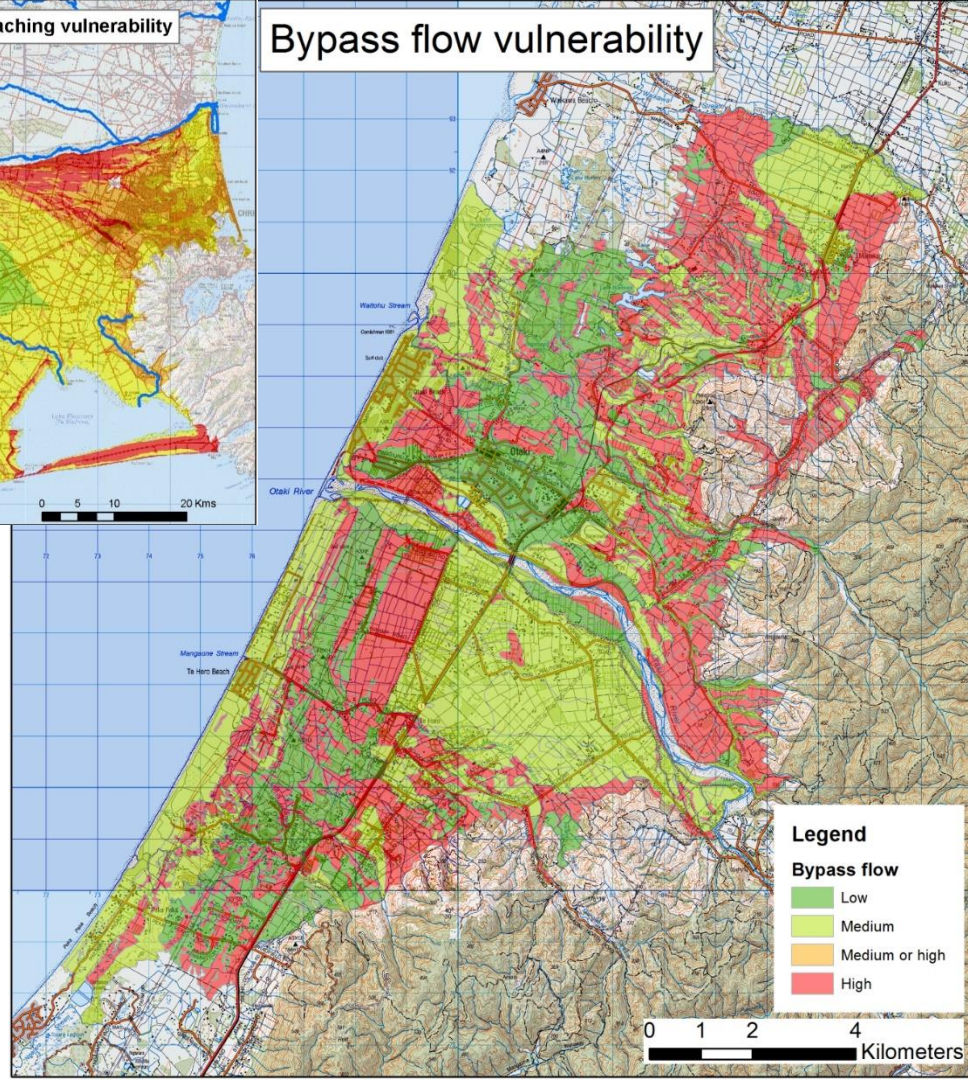
0 5 10 15 20 km



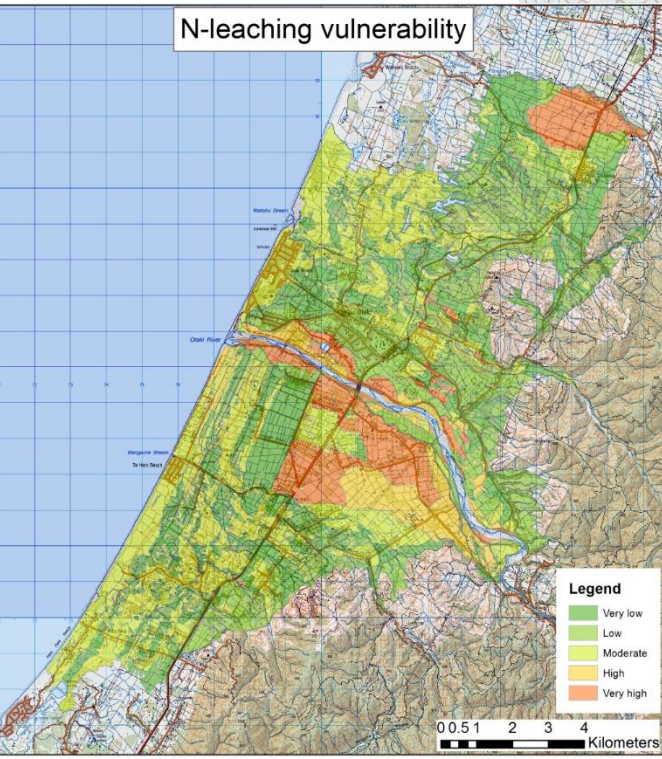
Risk mapping



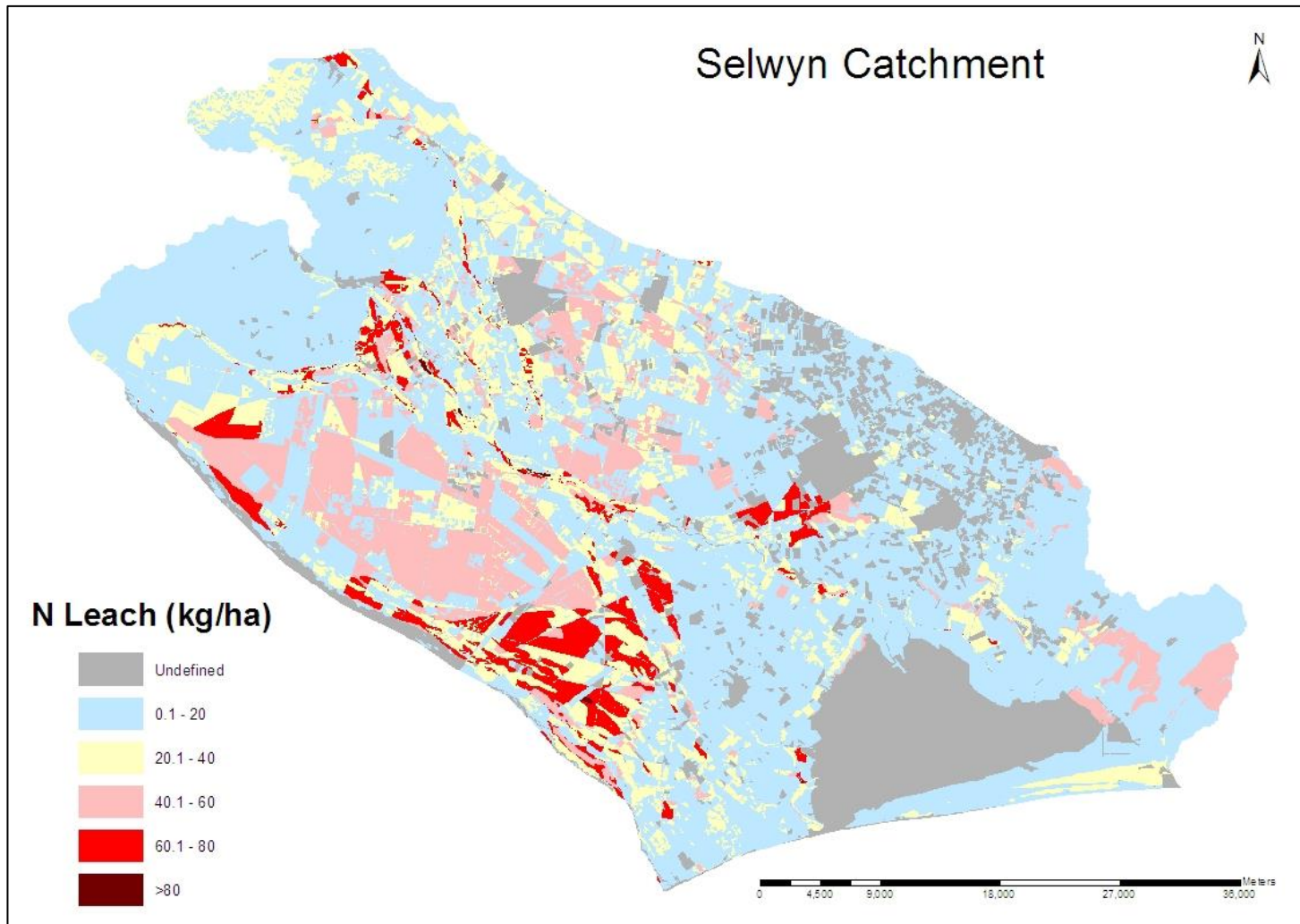
Bypass flow vulnerability



N-leaching vulnerability



Nutrient limit setting



Highly versatile land (LUC 1-2)

Total LUC 1-2 area:

LRI: 286,008 ha

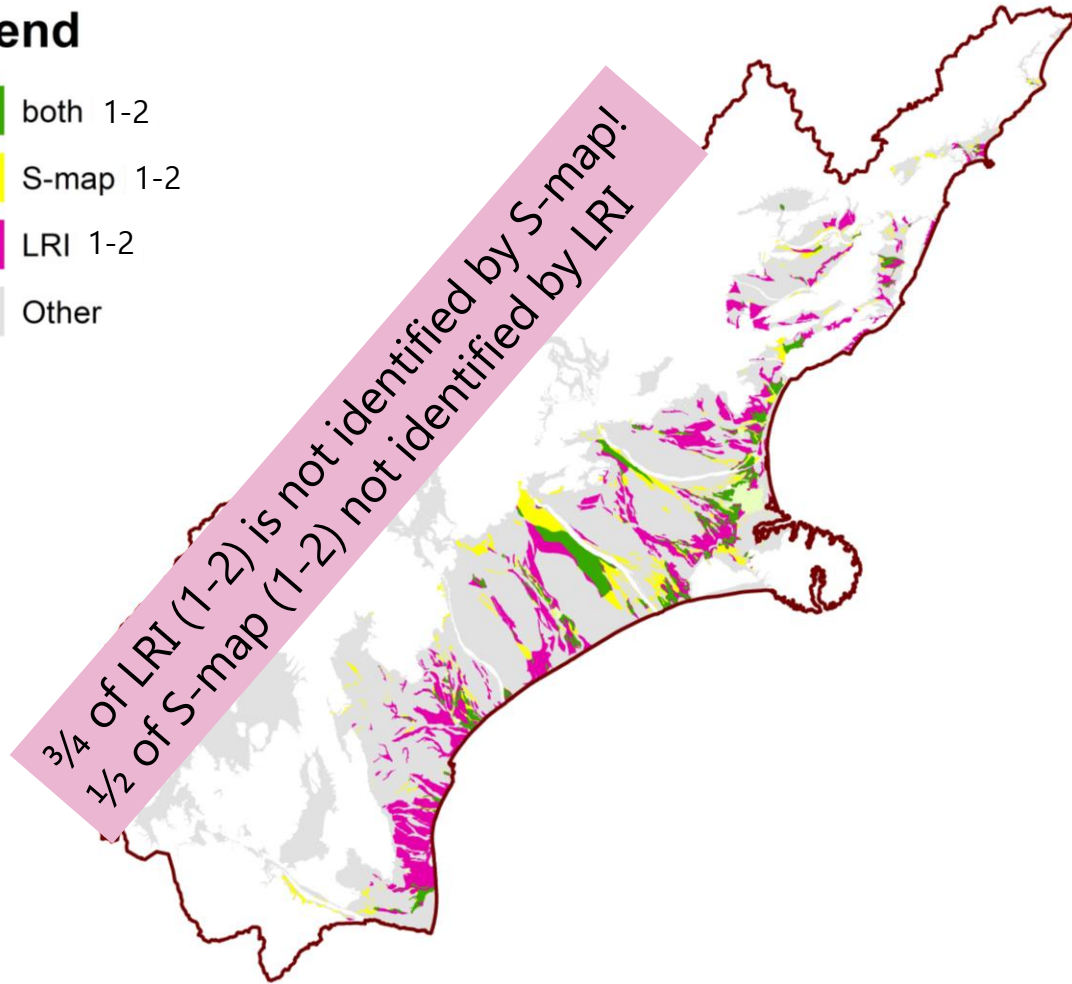
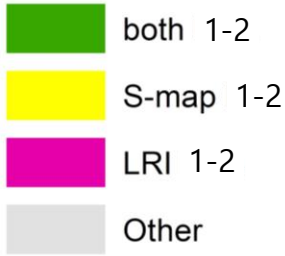
S-map: 148,794 ha

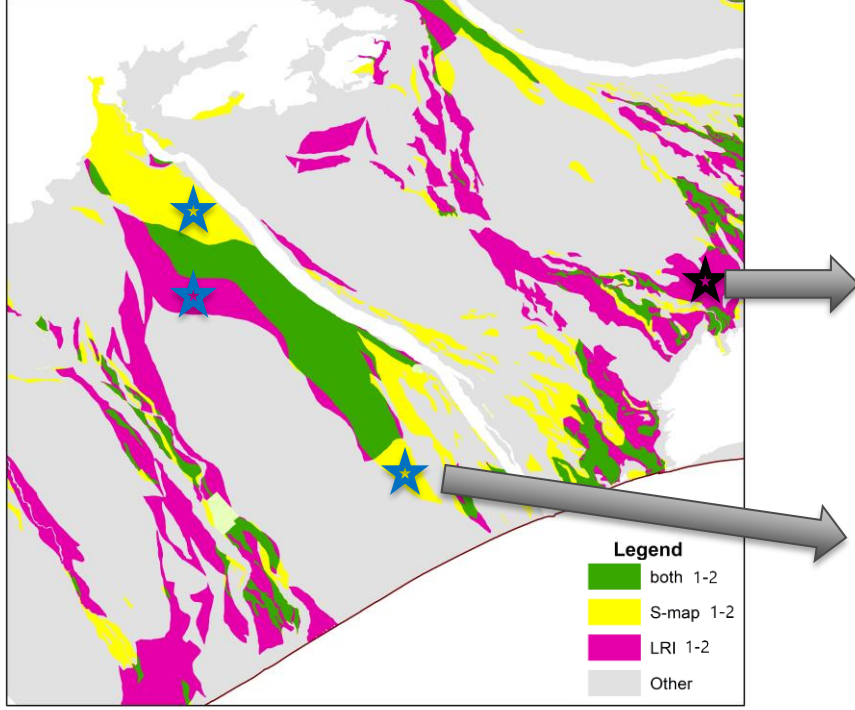
Differences:

in S-map not LRI: 73,517 ha

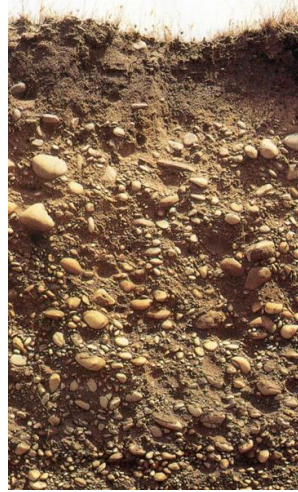
in LRI not S-map: 210,731 ha

Legend

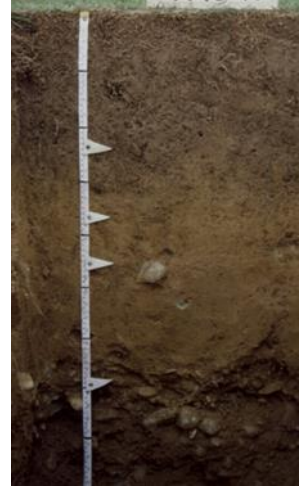




LRI



S-map





Part II: key take home message

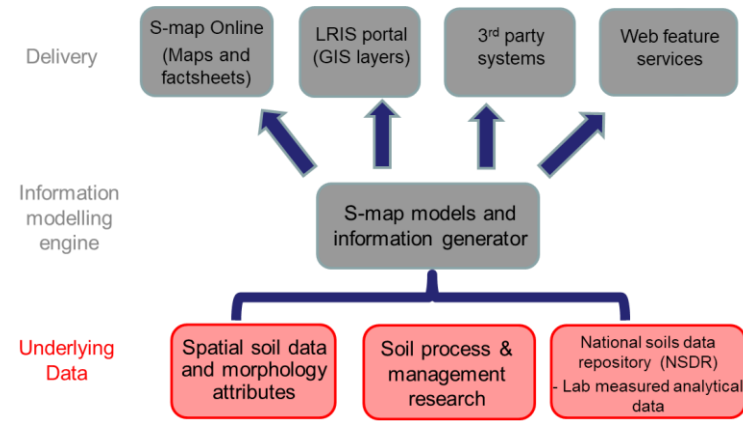
Good science underpins transforming soil data into information & products. But quality soil information is needed to avoid expensive mistakes or lost opportunities.

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.