Briefing Note about the S-map soil water modelling update April 2024:

Why the change?

- This is part of a process of continual improvement in New Zealand's soil information. Future updates will occur as more data and science becomes available.
- This update is the result of significant investment in measuring the hydrological characteristics of NZ soils between 2016 and 2023.
- S-map provides the best available soil data for NZ. These improved estimates are important for helping New Zealanders achieve environmental and economic outcomes from their land.
- Profile available water (PAW) is the key soil attribute that changes with this update. PAW estimates how much water a soil can store. More accurate soil moisture information will lead to better knowledge of irrigation demand and nutrient losses.

Science behind the change

- New Zealand is internationally recognised as having a high diversity in its soils – S-map has identified >6000 different soil types in the 39% of NZ mapped thus far.
- Measurement of soil water attributes is very costly (c.$10k per site) so we have not been able to measure these attributes for every soil. Instead, we measure at as many reference sites as we can, then use statistical models to predict out to the wider S-map soils.
- The MBIE programme has allowed us to significantly increase the number of laboratory datapoints to 5956 samples from 797 sites spread across NZ (compared to 4641 samples in 2020).
- Much richer data means much better modelling.
- There are still some soils that are under-represented in measured reference data, particularly Granular, Oxidic and Organic soils.
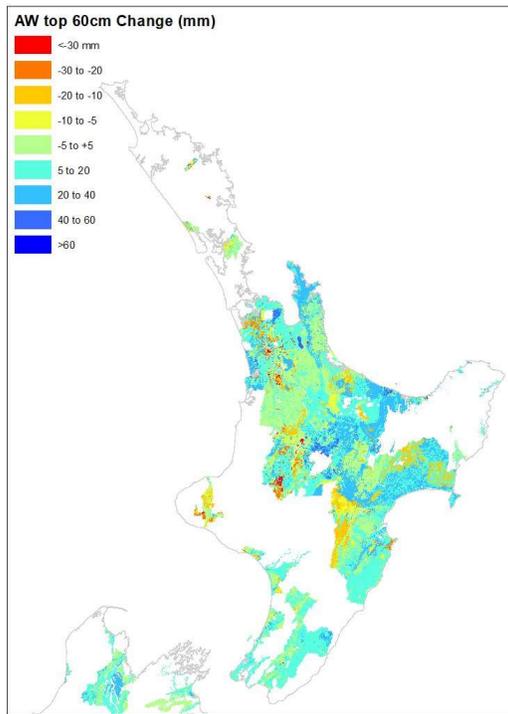
Implications

- Because this a national model, all estimates of soil moisture in S-map will change.
- Most areas will have an increase in water storage, although some areas will show a decrease in water storage (particularly Granular and Allophanic soils) – refer to figure 1 & 2. The pale green indicates a change of +/- 5mm in PAW to 60 cm. The turquoise colour indicates an increase of 5 – 20 mm in PAW to 60 cm.
- Consequentially all predictions in tools such as Overseer will change – refer to figure 3.
- Overseer estimates that 76% of farms will have a change of less than ± 10%, but 0.05% will see an increase of more than 20% of the estimated nitrogen loss/ha, and 3.4% will decrease more than 20%.
- Modelling of the effect on irrigation demand calculations indicates the change will be predominantly less than ± 10%
- Overseer will not automatically update analyses in OverseerFM, rather, a "Check for S-map soil updates" button is available within each farm account. This button allows users to easily check for changes and update the soil data.

Communicating with stakeholders and end-users

- A public webinar was given on the update. The recording can be found here: https://youtu.be/FSRegsFAOjA
- A notification email will be sent to all S-map Online users prior to release.

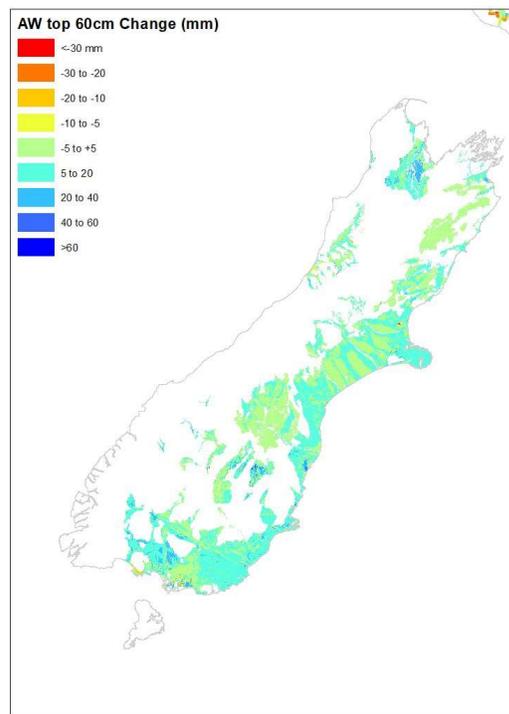S-map Water Retention Model Dec 23 vs Published Model

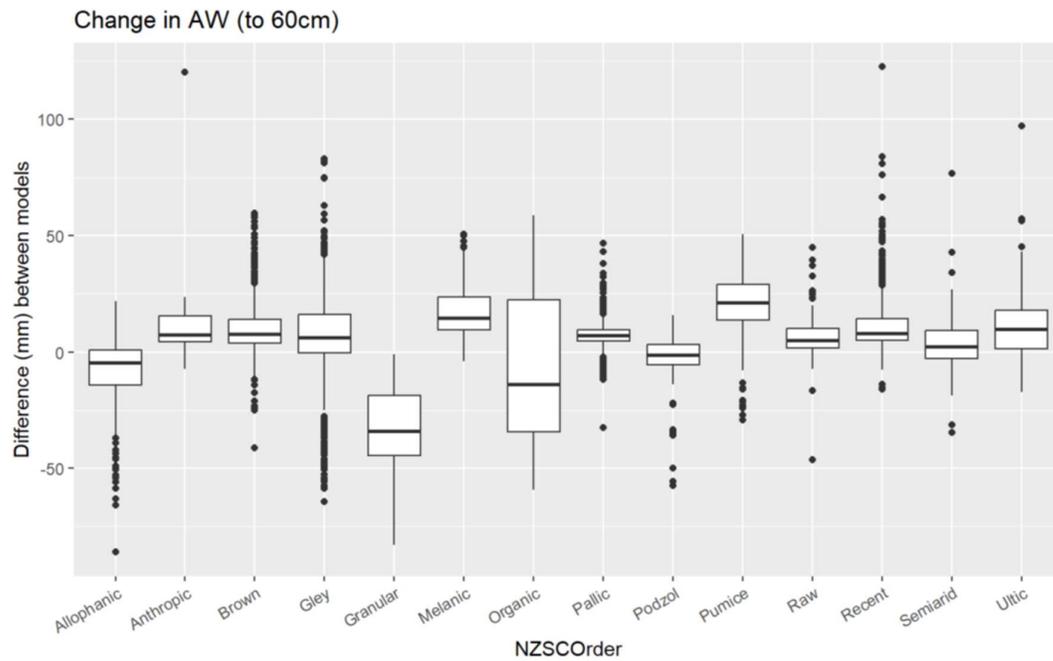*Figure 1 Change in S-map soil water storage from previous model*
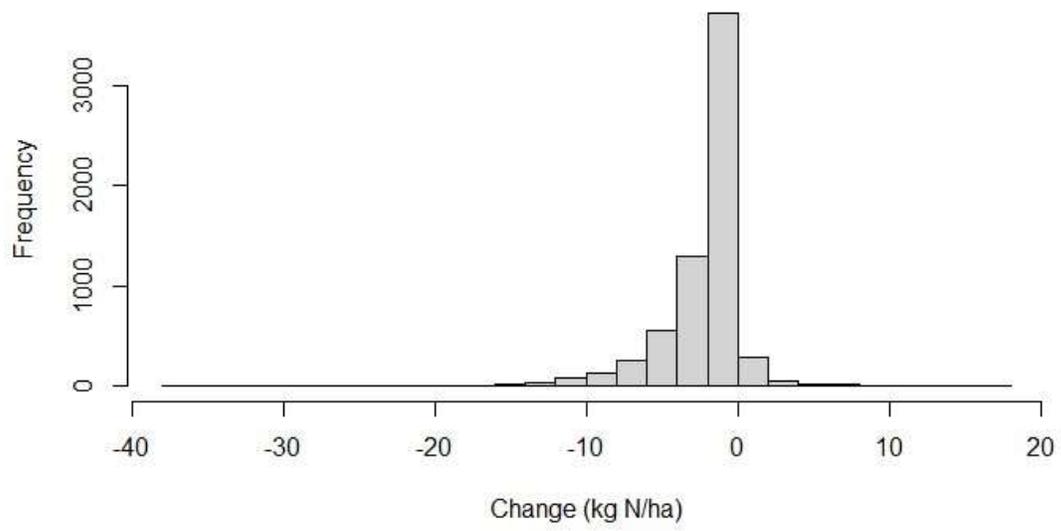

Figure 2 Indicates the change in PAW to 60 cm by soil order

Figure 3 Change in nutrient budget for 6,492 Overseer farms