

Soil testing and management advice for eroded paddocks.

Soil sampling took place at 6 sites that had suffered soil erosion across the northern SA Mallee with 3 soil zones sampled in each paddock – sand, mid slope and flat. The following image shows the distribution of samples collected across the Mallee.



The results of the sampling were analysed by Dr Sean Mason from Agronomy Solutions and presented at the Brown's Well Mallee Research Update held Thursday 6th of February at the Brown's Well Football Club.

Summary of eroded soils testing presented at the MRU

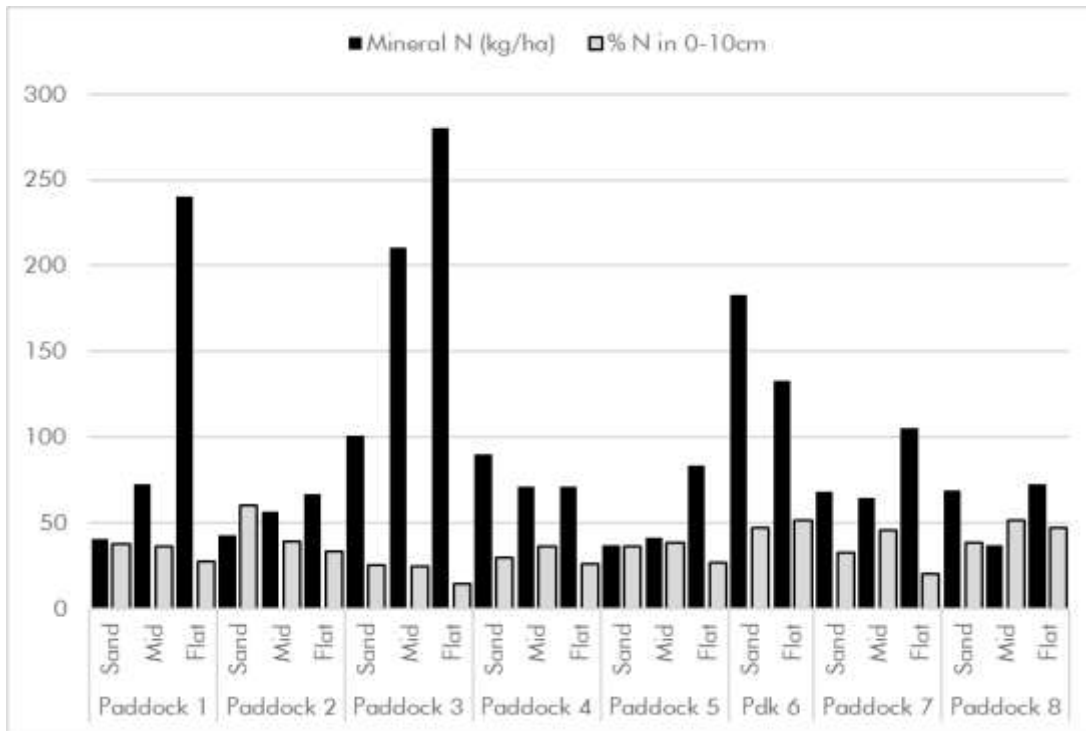
Whilst the sampling revealed useful results in terms of providing an idea of the current levels of nutrients in the system, the absence of sampling prior to erosion events makes it difficult to draw conclusions of how much may have been lost through soil movement.

However, when the soil test results of the eroded soils were averaged across all sites they showed similar nutrient trends to regular soil testing.

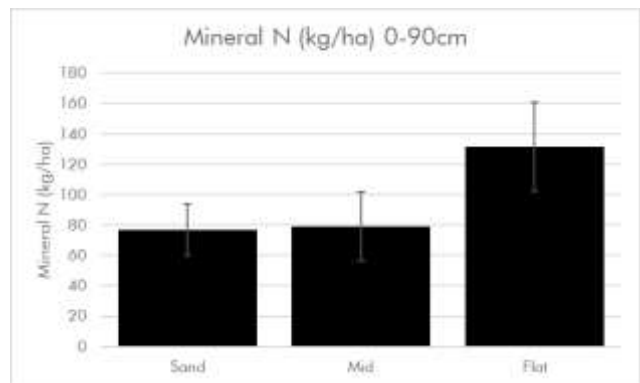
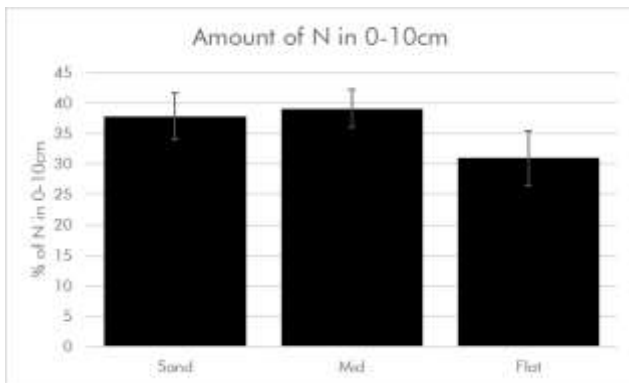
Sands of dune systems have very low organic carbon (OC) levels but reasonable mineral N levels potentially due to carryover N of failed pulse crops of 2019. Low OC indicates that these systems are heavily reliant on fertiliser N inputs to meet crop N demand in a favourable season. The mid-slope area had very similar results to the dune zone with slightly higher OC levels and associated higher mineral N values.

There were some inflated mineral N values for the flat (swale) zone which indicated an accumulation of N due to subsoil constraints (salt and Boron). This provides more evidence of the value of ground truthing different soil zones as there are opportunities to improve fertiliser efficiencies. Other paddocks without constraints had moderate N levels on the swales which provides an opportunity for significant crop N uptake in a favourable year.

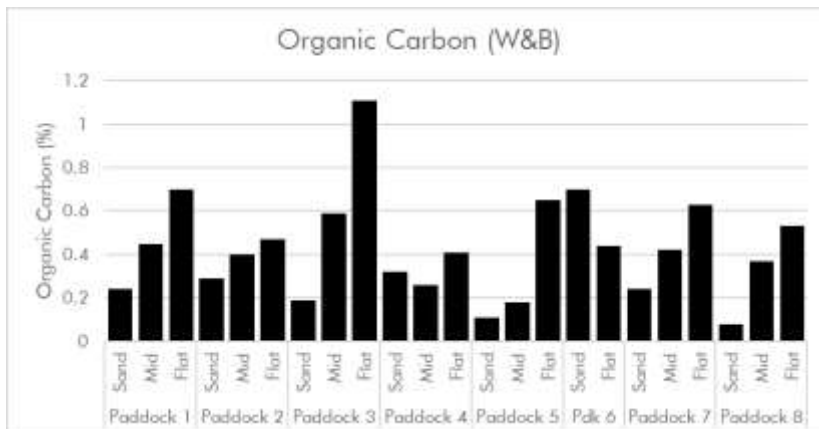
Nitrogen status of eroded paddocks in SA Mallee



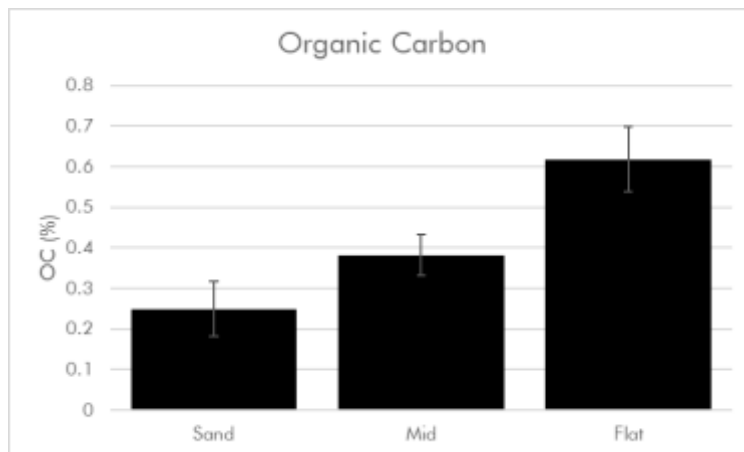
Nitrogen averages across all eroded paddocks sampled



Organic carbon levels of eroded paddocks in the SA Mallee

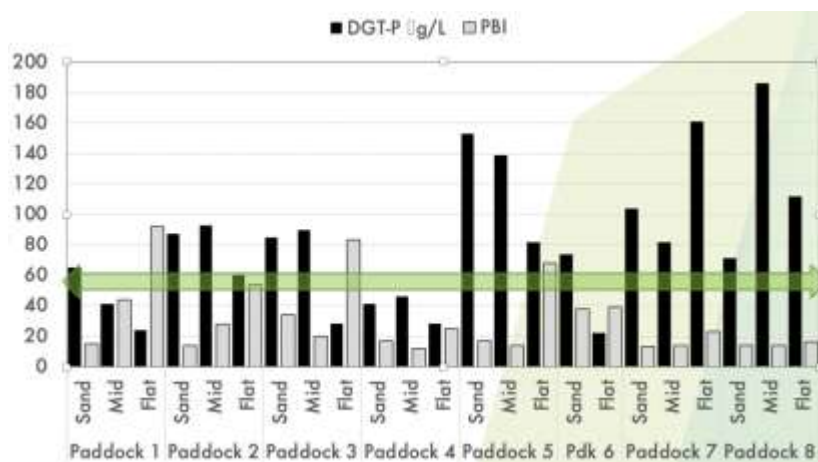


Organic carbon averages across all eroded paddocks sampled

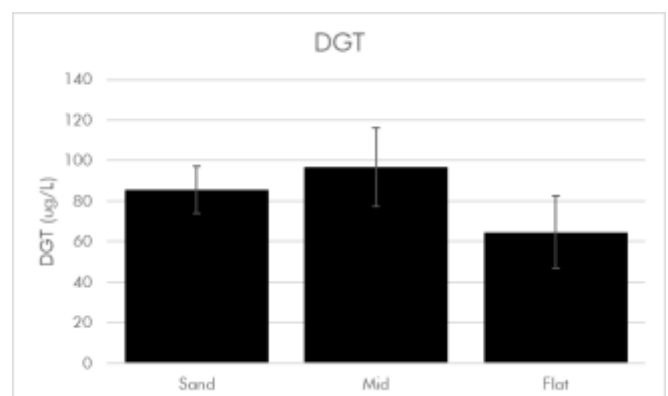
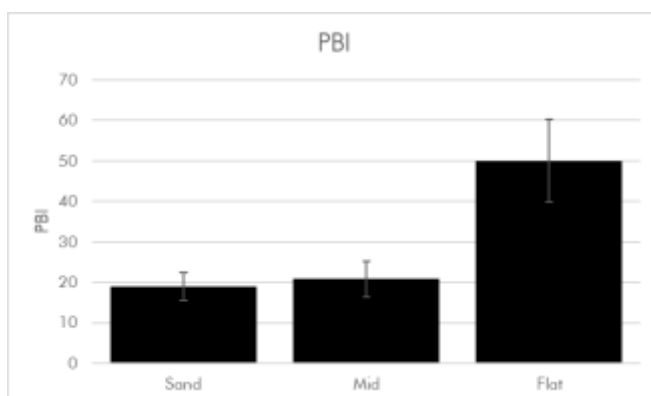


Phosphorus status of the mid slope and sand zones were generally quite good and is an indication that replacement strategies are appropriate. Phosphorus was highly variable in the swale or flat zone; low P was mostly associated with higher fixation potential of fertiliser inputs as measured by PBI where there is an opportunity to build P reserves. Other swale zones had low to moderate PBI values and good soil P status.

Phosphorous status and PBI of eroded paddocks in SA Mallee



Phosphorous status averaged across eroded Paddocks sampled



The PBI measure potential phosphorous fixation. Levels above 70 indicate moderate to high P fixation with limited P movement and would indicate inputs greater than replacement P levels are likely to be required.

Key take home messages for growers:

- There were no clear trends that showed eroded soils suffered significant nutrient decline however if testing had been done prior to erosion in paddocks this would have helped to clarify the outcome.
- Some soils were more deficient than others in some nutrients and this appeared to be more closely linked to paddock history and longer-term management.
- The recommendation is for growers to soil sample paddocks to get an accurate indication of what's happening with soil nutrition because there are many variables.

A compendium article of soil testing including the eroded soils results has been submitted and can be accessed at <https://msfp.org.au/soil-and-plant-testing-for-profitable-fertiliser-use/>

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