

# EM38 Mapping on MAC – Farm Approach

DEMO

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## Key messages

- **EM38 is a valuable component in building variable rate technology (VRT) maps.**
- **Yield maps record what happens, not why it happens.**
- **EM38 mapping aids understanding of plant available water.**
- **Soil testing is essential for good decision making for different zones.**

## What is EM38?

EM38 is a form of electro-magnetic soil mapping that measures the electrical conductivity of soils. This reading is predominately driven by soil salinity, texture and moisture. Other factors like boron and sodicity contribute to the value. These factors are also the major drivers of crop lower limits and thus plant available water and hence the relationship with EM38 results. The relationship between EM38 soil surveys and plant

available water allows us to look into VRT using EM38 mapping.

## Why do the demo?

EM38 mapping has been demonstrated in other parts of South Australia and Australia, but had not been done on Minnipa Agricultural Centre. With the technology becoming more available through commercial sources, farm machinery having yield mapping and variable rate capability, how can these technologies be integrated to provide a useful tool to make informed decisions regarding matching inputs to soil type?

Previous work in the Mallee has shown the EM38 technology has benefited farm profit. On that basis we have commenced a demonstration on the Minnipa Agricultural Centre to validate previous Mallee outcomes.

## How was it done?

The MAC farm was EM38 mapped over 2 days; an average

sized property can generally be mapped in 1 - 2 days, with the cost being the equivalent of a summer weed spray. The EM38 unit was placed in a sledge and towed around the paddock attached to a laptop computer in the 4WD which received the signal. The information was then downloaded into a program that placed the signals into coloured variances as a paddock or farm map.

## What happened?

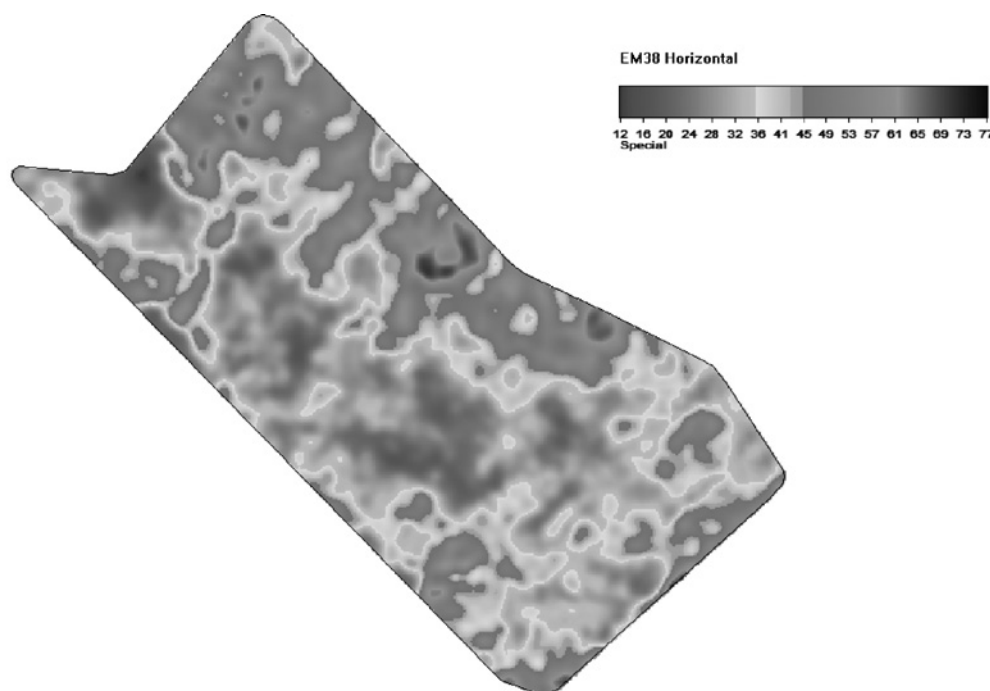
To ground truth what the signals and related output meant, GPS points were selected in the different colour zones (Figure 3) and soil samples were taken of the different horizons at those locations. These samples were sent to a soils laboratory and results identified drivers for the electrical conductivity such as salts, soil texture and rocks. Other related chemical indicators include sulphur, boron, magnesium and calcium carbonate levels, which give a good indication of any subsoil constraints.



**Figure 1** Peter Treloar explains EM38 mapping to Dot Brace. The EM38 unit is attached to the back of a 4WD.



**Figure 2** Information is fed directly into the laptop computer.



**Figure 3** A soil zone map produced as a result of EM38 mapping.

### What does this mean?

From the subsoil constraint information and testing of soil nutrition in the 0-10 cm layer, high quality data is available for input into VRT for varying fertiliser and seed inputs at sowing.

By understanding the variability in soil potential we are able to reduce risk and achieve a better gross margin through targeting areas that will more likely respond to higher inputs. By using soil maps as the main driver of zoning

we are creating consistent zones from year to year thereby applying the cost of zoning over several years. Yield maps tend to flip flop due to varying seasons as they tell you what has happened, not why it has happened.

Continuing work will be undertaken to improve the accuracy of zoning and monitoring the stability of zones over time. Work is continuing on improving the estimation of plant available water and crop lower limit, through

better understanding of subsoil constraints and by investigating the use of decision support programs such as Yield Prophet®.

### Acknowledgements

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