Precision Agriculture Project

Michael Coote, "Marengo", Waterhouse

Site details

- predominantly podosol (dark grey loamy sand over light sand, and dark brown sandy loam over sandy clay)
- 60 ha paddock, divided based on annual cropping needs, centre pivot irrigator with VRI capability
- Undulating topography with complicated drainage issues
- strategic surface drainage installed
- 2015-16 crops – three varieties of seed potatoes (¼), grass/brassica fodder (½)

Representative data layers

Various data layers, such EM38 and soil pH, have been collected. Examples are shown on the next page.

In-season NDVI images

NDVI images were captured by Terrapix two times during the growing season, as seen below.


NDVI – 04 Feb 2016

NDVI – 20 Feb 2016

Yield variability

Yield samples were taken from 21 points in a grid pattern across the paddock – see images on next page. This represents one sample per 0.75 hectare. At each sample location, tubers were dug from 2 rows x 3 linear metres per row. Samples were graded in the field into grades relevant to seed potatoes (<35 g, 35 – 350 g and >350 g for Ranger, and <35 g,

35 – 250 g and >250 g for Atlantic) and reject. Variation in total yield and the percentage making grade across the sampling points is shown on the last page. The graded yield is shown as the percentage making grade because there were two different varieties in the paddock.

EM38 shallow

Wetness index

Total yield
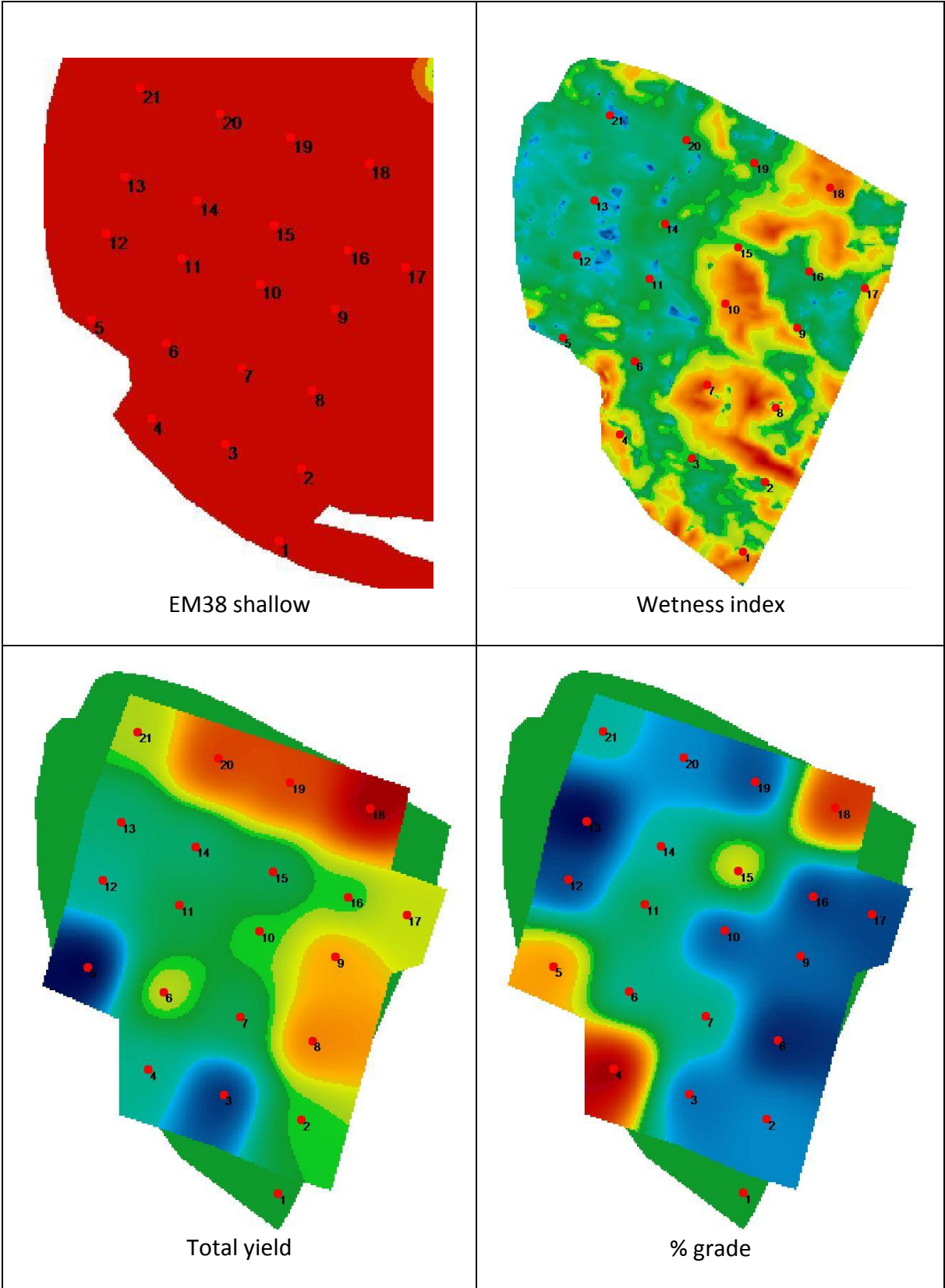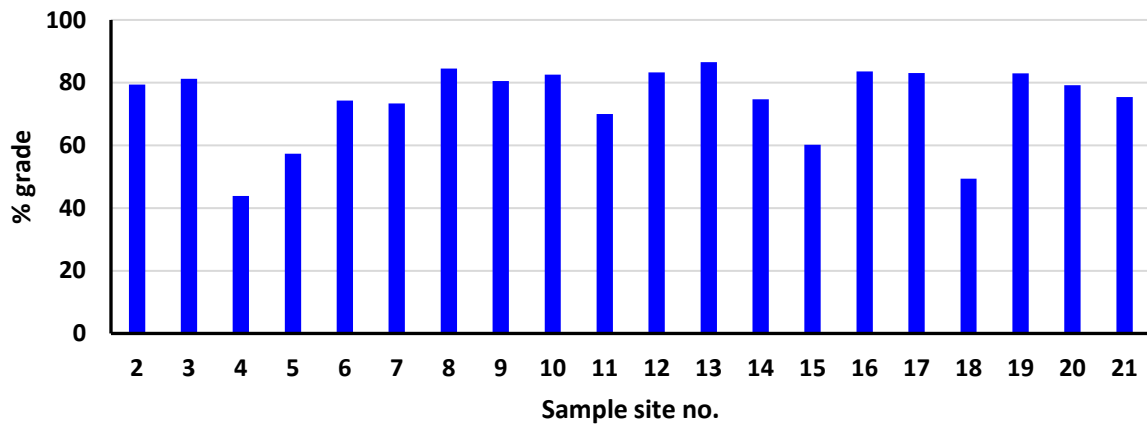
% grade

Site	Crop	Measure	Units	Avg	Min	Max	Variation (%)
Marengo, Waterhouse	Seed potatoes	% grade	%	74	44	87	200

Comments:

Based on Topography (DEM) model, it was determined that some key drainage arteries could not be directed off the paddock. As a compromise, these drains were directed to excavated sumps (5m X 5m) which were periodically emptied by a fire pump. Although time consuming, this enabled very efficient removal of surface water during the peak growing phase.

The NDVI images tell an interesting story for this paddock, which has a number of drainage issues, surface drains being evident in the NDVI images. The first NDVI image was taken just after heavy rainfall, and shows that despite the drainage challenges, variable-rate irrigation had been managed to produce a relatively uniform crop. The large red area on the right hand side was not cropped. The second image, two weeks later, shows that some of the crop in the southern part of the paddock suffered from water logging, although a large part of the paddock was still vigorous, with drainage structures having done their job.

Along with pasture and feed barley in part of the pivot, half of the pivot will grow seed potatoes in the coming season.

Considerations from this season for following crop:
- Drainage modelling and implementation of sumps can provide considerable risk management advantages in this landscape.
- VRI is applied at key stages – early and late based on topography and soil type.
- How to cope with 100 -150 mm storm event as witnessed this season.

Upcoming data sets:
- CSIRO i-EKbase Satellite NDVI – could be advantageous in remote regions
- Grid nutrient mapping of P& K – Summer/Autumn 2017