

# HART BEAT

22<sup>nd</sup> August 2018

ISSUE 47

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flexi/coil



## HART BEAT

### Yield Prophet® simulations for 8 sites across the mid-north of SA

The Yield Prophet® simulations featured are not a crystal ball, but provide a realistic prediction of the available soil water and nitrogen status of your crop



## HART EVENTS

Hart Field Day – September 18, 2018

Spring Twilight Walk – October 16, 2018

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[www.hartfieldsite.org.au](http://www.hartfieldsite.org.au)

# Definitions

## Hart Beat definitions

Each site has been characterised for plant available water capacity (PAWC) and bulk density to determine how much of the measured water and nitrogen is available to the crop during the season.

**Drained upper limit (DUL)** – is the amount of water that a saturated soil holds after it has drained.

**Crop lower limit (CLL)** – is the amount of water remaining in the soil after crop senescence.

**Plant available water capacity (PAWC)** – is the difference between the drained upper limit of the soil and the lower extraction limit of a crop over the depth of rooting. It is the maximum water available to a crop from a particular soil type.

**Plant available water (PAW)** – is the amount of water contained in the soil at a given time minus the crop lower limit.

**Bulk density (BD)** – is a measure of the weight of dry soil per unit volume of soil.

**Growing season rainfall (GSR)** – is rainfall for the period between and including April to October.

**Decile** – is a measure of seasonal rainfall on a scale of 1 to 9. In a decile 7 year, 70% of previous years were dryer, in a decile 3 year 30% of previous years were dryer.

**Yield probability curves** - display two different nitrogen scenarios for each site. The **green dashed line** displays the actual grain yield with the current soil available nitrogen. The **blue dashed line** represents the grain yield potential with unlimited nitrogen (yield potential). A small difference between these two lines indicates the current soil N level is adequate for the crop to reach its yield potential. Conversely, a large difference between these two lines indicates additional N fertiliser is required for the crop to reach its yield potential. Both these lines also

now take into account frost and heat effects on grain yield potential.

The **French & Schultz** formula estimates the rainfall limited grain yield based on the growing season rainfall (GSR). It assumes evaporation of 110mm, includes stored water at sowing (30% of Jan to Mar rainfall) and a maximum grain yield potential of 20 kg/mm/ha.

Yield Potential = GSR (Apr-Oct) – Evaporation (110mm) \* 20 kg/mm/ha.

**Yield Prophet®** has been very accurate throughout Australia, over the past 5 seasons. At the Hart field site the **Yield Prophet®** prediction on the 15<sup>th</sup> September, using an average finish, has been only 16% above the final grain yield, averaged over the past 4 years, making wheat growth models such as APSIM highly valuable.

**Yield Prophet®** is an internet based service which uses the APSIM wheat prediction model.

The model relies on accurate soil, crop, historical climate data and up to date local weather information to predict plant growth rates and final hay or grain yields. These are critical measurements specific to the site being analysed and may not fit closely to individual situations. Instead the predictions will give a realistic guide to seasonal prospects based on a site with similar rainfall and / or soil type.

Using climate data for the current season, **Yield Prophet®** simulates the soil water and nitrogen processes in the paddock, and crop growth. **Yield Prophet®** calculates the amount of water and nitrogen available to the crop and the water and nitrogen demand of the crop.

**Disclaimer:** *Yield Prophet®* information is used entirely at your own risk. You will accept all risks and responsibility for losses, damages, costs and other consequences of using *Yield Prophet®* information and reports. To the maximum extent permitted by law, APSRU and BCG excludes all responsibility and liability to any person arising directly or indirectly from using the information generated by *Yield Prophet®*.

**Important Notice:** *Yield Prophet®* does not generate recommendations or advice, it is only a guide and must be combined with local paddock and district knowledge. APSIM does not take into account weed competition, pest/disease pressure, pesticide / herbicide damage, farmer error, or extreme events (such as extreme weather, flood and fire). For more information about APSIM or *Yield Prophet®* please visit [www.yieldprophet.com.au](http://www.yieldprophet.com.au).

# Site information

## Rainfall and soil water characteristics for all sites

Site	Average annual rainfall (mm)	Soil type	Plant Available Water Capacity (mm)	Soil Profile Depth (cm)	Plant Available Water at 16 April (mm)	Pre-sowing soil nitrogen (kg/ha)
Hart	400	Sandy clay loam	206	150	17	77
Spalding	430	Red brown earth	143	150	16	68
Condowie	350	Sandy loam	115	150	0	80
Kybunga	428	Clay loam	262	120	22	72
Farrell Flat	474	Light clay loam	172	120	11	68
Pinery	374	Silty clay loam	79	150	0	59
Eudunda	445	Gravelly loam	96	100	19	67
Tarlee	474	Sandy loam	113	150	26	76

## 2018 site locations



## SANDY CLAY LOAM

### Crop growth

**Variety:** Mace wheat      **Sowing date:** 1st May      **Nitrogen fertiliser:** 30 kg N/ha at seeding +  
**Emergence date:** 12<sup>th</sup> May      20 kg N/ha 18<sup>th</sup> July

### The season so far

**Annual rain to date:** 155 mm      **GSR decile:** 2  
**GSR to date:** 131 mm (35 mm since last report)      **PAWC:** 206 mm  
**Current predicted PAW:** 23 mm (11 % full)

### Grain yield predictions (Yield Prophet)

**Yield prophet estimate:** (Date of report 22/08/2018)

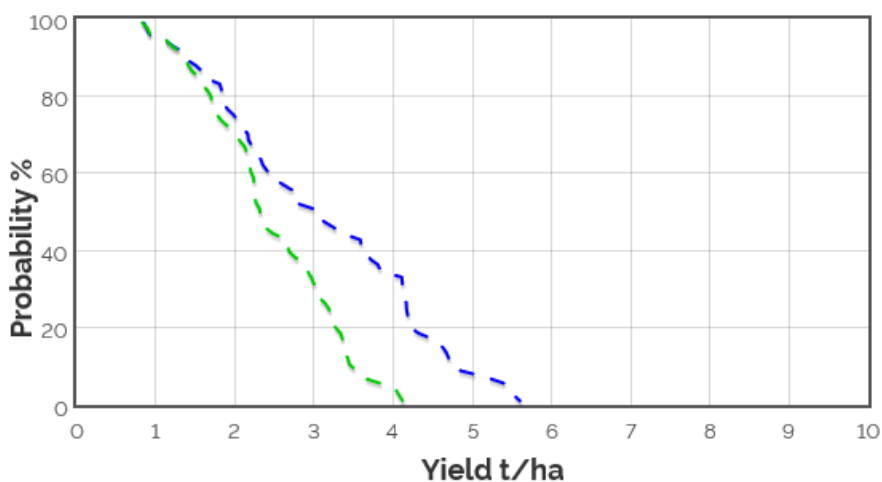
*These estimates are based on a 50% probability*

Yield t/ha	Sown 1 <sup>st</sup> May (see graph)	Change since last report	Sown 20 <sup>th</sup> May	Change since last report
Grain	2.7	-0.3	2.3	-0.3

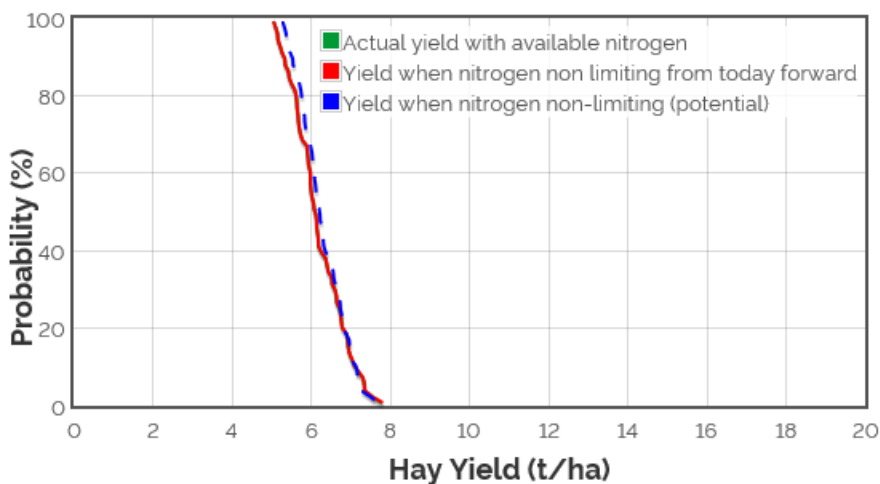
### French & Schultz grain yield estimate:

<b>100% WUE:</b>	<b>2.2 t/ha</b>
<b>80% WUE:</b>	<b>1.8 t/ha</b>

*This model assumes that there is 7 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (81 mm) for the rest of the season.*



The graphs above and below show the chance of reaching the corresponding yield given weather, soil conditions and agronomic inputs to date, and historical climate data (100yrs) to simulate remainder of the season.



# SPALDING

## RED BROWN EARTH

### Crop growth

Variety: Mace wheat      Sowing date: 1st May      Nitrogen fertiliser: 30 kg N/ha at seeding +  
Emergence date: 11<sup>th</sup> May      20 kg N/ha 18<sup>th</sup> July

### The season so far

Annual rain to date: 212 mm  
GSR to date: 183 mm (51 mm since last report)  
Current predicted PAW: 62 mm (43 % full)

GSR decile: 4  
PAWC: 143 mm

### Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 22/08/2018)

These estimates are based on a 50% probability

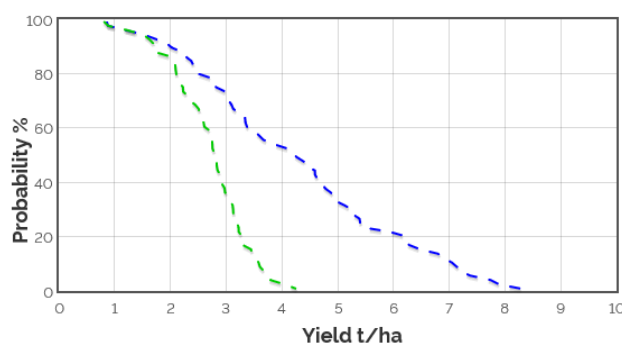
Yield t/ha	Sown 1 <sup>st</sup> May (see graph)	Change since last report	Sown 20 <sup>th</sup> May	Change since last report
Grain	3.5	0.0	3.1	+0.2

### French & Schultz grain yield estimate:

100% WUE: 3.5 t/ha  
80% WUE: 2.8 t/ha

This model assumes that there is 9 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (93 mm) for the rest of the season.

### Grain yield outcome graph



This graph shows the chance of reaching the corresponding yield given weather, soil conditions and agronomic inputs to date, and historical climate data (100yrs) to simulate remainder of the season.

# CONDOWIE

## SANDY LOAM

### Crop growth

Variety: Mace wheat      Sowing date: 1st May      Nitrogen fertiliser: 30 kg N/ha at seeding +  
Emergence date: 12<sup>th</sup> May      20 kg N/ha 18<sup>th</sup> July

### The season so far

Annual rain to date: 163 mm  
GSR to date: 143 mm (44 mm since last report)  
Current predicted PAW: 14 mm (12 % full)

GSR decile: 4  
PAWC: 115 mm

### Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 22/08/2018)

These estimates are based on a 50% probability

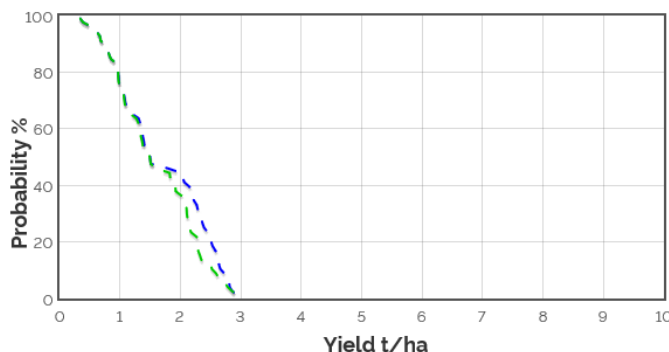
Yield t/ha	Sown 1 <sup>st</sup> May (see graph)	Change since last report	Sown 20 <sup>th</sup> May	Change since last report
Grain	1.5	0.0	1.0	0.0

### French & Schultz grain yield estimate:

100% WUE: 2.2 t/ha  
80% WUE: 1.7 t/ha

This model assumes that there is 6 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (69 mm) for the rest of the season.

### Grain yield outcome graph



This graph shows the chance of reaching the corresponding yield given weather, soil conditions and agronomic inputs to date, and historical climate data (100yrs) to simulate remainder of the season.

## CLAY LOAM

### Crop growth

Variety: Mace wheat      Sowing date: 1st May      Nitrogen fertiliser: 30 kg N/ha at seeding +  
 Emergence date: 11<sup>th</sup> May      20 kg N/ha 18<sup>th</sup> July

### The season so far

Annual rain to date: 218 mm  
 GSR to date: 197 mm (59 mm since last report)  
 Current predicted PAW: 60 mm (23 % full)

GSR decile: 5  
 PAWC: 262 mm

### Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 22/08/2018)

These estimates are based on a 50% probability

Yield t/ha	Sown 1 <sup>st</sup> May (see graph)	Change since last report	Sown 20 <sup>th</sup> May	Change since last report
Grain	3.5	+0.4	2.9	+0.3

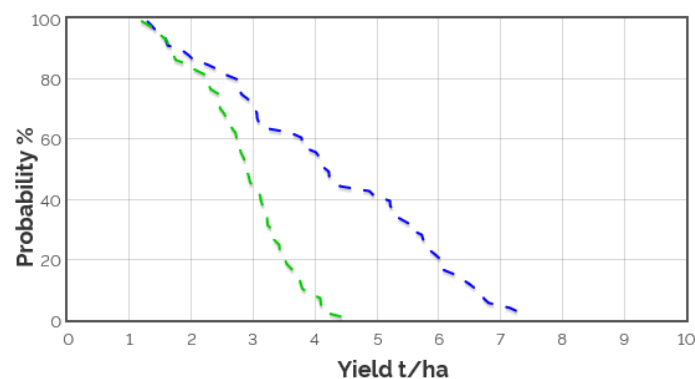
### French & Schultz grain yield estimate:

100% WUE: 4.2 t/ha

80% WUE: 3.4 t/ha

This model assumes that there is 6 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (117 mm) for the rest of the season.

### Grain yield outcome graph



This graph shows the chance of reaching the corresponding yield given weather, soil conditions and agronomic inputs to date, and historical climate data (100yrs) to simulate remainder of the season.

# FARRELL FLAT

## LIGHT CLAY LOAM

### Crop growth

Variety: Mace wheat      Sowing date: 1st May      Nitrogen fertiliser: 30 kg N/ha at seeding +  
 Emergence date: 12<sup>th</sup> May      20 kg N/ha 18<sup>th</sup> July

### The season so far

Annual rain to date: 236 mm  
 GSR to date: 204 mm (48 mm since last report)  
 Current predicted PAW: 68 mm (39% full)

GSR decile: 4  
 PAWC: 172 mm

### Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 22/08/2018)

These estimates are based on a 50% probability

Yield t/ha	Sown 1 <sup>st</sup> May (see graph)	Change since last report	Sown 20 <sup>th</sup> May	Change since last report
Grain	4.4	-0.1	3.6	-0.1

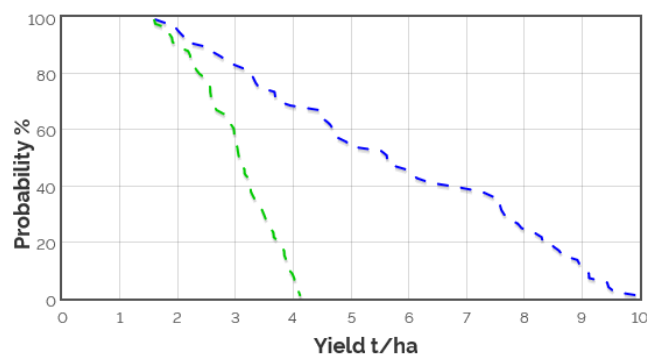
### French & Schultz grain yield estimate:

100% WUE: 4.4 t/ha

80% WUE: 3.5 t/ha

This model assumes that there is 9 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (109 mm) for the rest of the season.

### Grain yield outcome graph



This graph shows the chance of reaching the corresponding yield given weather, soil conditions and agronomic inputs to date, and historical climate data (100yrs) to simulate remainder of the season.

## SILTY CLAY LOAM

### Crop growth

Variety: Mace wheat      Sowing date: 1st May      Nitrogen fertiliser: 30 kg N/ha at seeding +  
 Emergence date: 13<sup>th</sup> May      20 kg N/ha 18<sup>th</sup> July

### The season so far

Annual rain to date: 171 mm  
 GSR to date: 149 mm (55 mm since last report)  
 Current predicted PAW: 30 mm (38 % full)

GSR decile: 2  
 PAWC: 79 mm

### Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 22/08/2018)

These estimates are based on a 50% probability

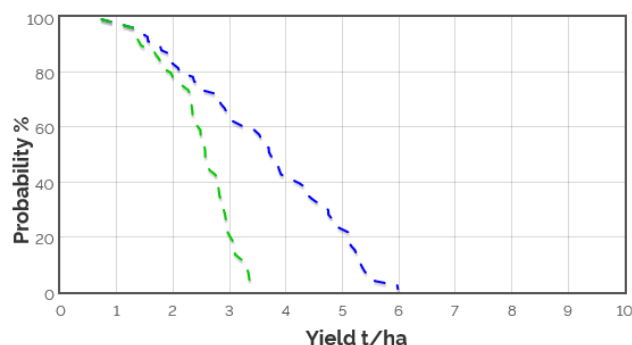
Yield t/ha	Sown 1 <sup>st</sup> May (see graph)	Change since last report	Sown 20 <sup>th</sup> May	Change since last report
Grain	3.0	-0.1	2.7	0.0

### French & Schultz grain yield estimate:

100% WUE: 2.7 t/ha  
 80% WUE: 2.1 t/ha

This model assumes that there is 7 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (89 mm) for the rest of the season.

### Grain yield outcome graph



This graph shows the chance of reaching the corresponding yield given weather, soil conditions and agronomic inputs to date, and historical climate data (100yrs) to simulate remainder of the season.

# EUDUNDA

## GRAVELLY LOAM

### Crop growth

Variety: Mace wheat      Sowing date: 1st May      Nitrogen fertiliser: 30 kg N/ha at seeding +  
 Emergence date: 14<sup>th</sup> May      20 kg N/ha 18<sup>th</sup> July

### The season so far

Annual rain to date: 189 mm  
 GSR to date: 150 mm (48 mm since last report)  
 Current predicted PAW: 24 mm (25 % full)

GSR decile: 2  
 PAWC: 96 mm

### Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 22/08/2018)

These estimates are based on a 50% probability

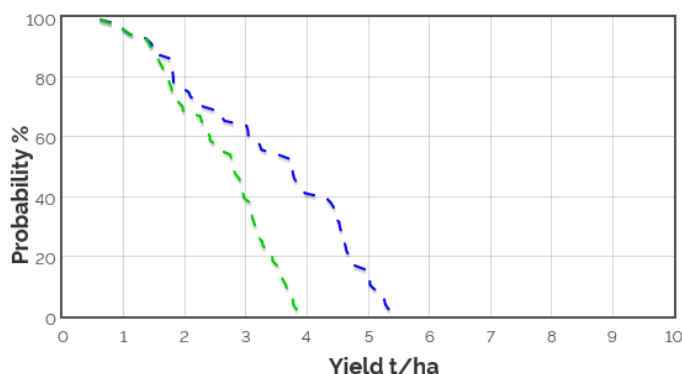
Yield t/ha	Sown 1 <sup>st</sup> May (see graph)	Change since last report	Sown 20 <sup>th</sup> May	Change since last report
Grain	3.1	+0.2	2.8	+0.2

### French & Schultz grain yield estimate:

100% WUE: 3.1 t/ha  
 80% WUE: 2.5 t/ha

This model assumes that there is 12 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (103 mm) for the rest of the season.

### Grain yield outcome graph



This graph shows the chance of reaching the corresponding yield given weather, soil conditions and agronomic inputs to date, and historical climate data (100yrs) to simulate remainder of the season.

## SANDY LOAM

### Crop growth

**Variety:** Mace wheat      **Sowing date:** 1st May      **Nitrogen fertiliser:** 30 kg N/ha at seeding + 20 kg N/ha 18<sup>th</sup> July  
**Emergence date:** 10<sup>th</sup> May

### The season so far

**Annual rain to date:** 170 mm  
**GSR to date:** 149 mm (55 mm since last report)      **GSR decile:** 2  
**Current predicted PAW:** 45 mm (39% full)      **PAWC:** 113 mm

### Grain yield predictions (Yield Prophet)

**Yield prophet estimate:** (Date of report 22/08/2018)

*These estimates are based on a 50% probability*

Yield t/ha	Sown 1 <sup>st</sup> May (see graph)	Change Since last Report	Sown 20 <sup>th</sup> May	Change Since Last Report
Grain	3.2	0.0	3.3	+0.6

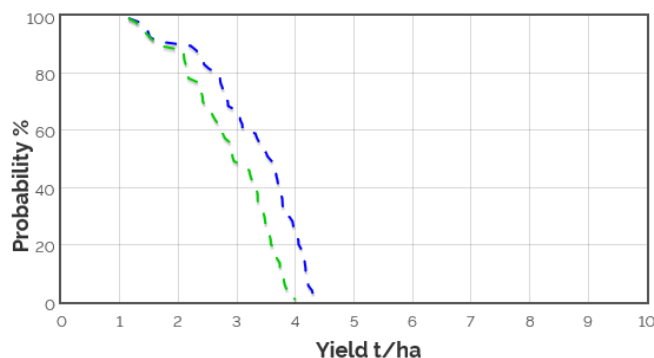
### French & Schultz grain yield estimate:

**100% WUE:** 3.2 t/ha

**80% WUE:** 2.6 t/ha

*This model assumes that there is 6 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (115 mm) for the rest of the season.*

### Grain yield outcome graph



*This graph shows the chance of reaching the corresponding yield given weather, soil conditions and agronomic inputs to date, and historical climate data (100yrs) to simulate remainder of the season.*

# Hart Field Day

## September 18



**tickets on sale now:**

[www.hartfieldsite.org.au](http://www.hartfieldsite.org.au)