

# HART

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# BEAT

Yield Prophet® simulations for 8 sites across the Mid-North of SA

Hart | Spalding | Condowie  
Kybunga | Farrell Flat | Pinery  
Eudunda | Tarlee



ISSUE 59  
October 29, 2021

## HART BEAT definitions

All sites have 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.

**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.

**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 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, nitrogen processes and crop growth in the paddock. *Yield Prophet®* calculates the amount of water and nitrogen available to the crop as well as the water and nitrogen demand of the crop.

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.

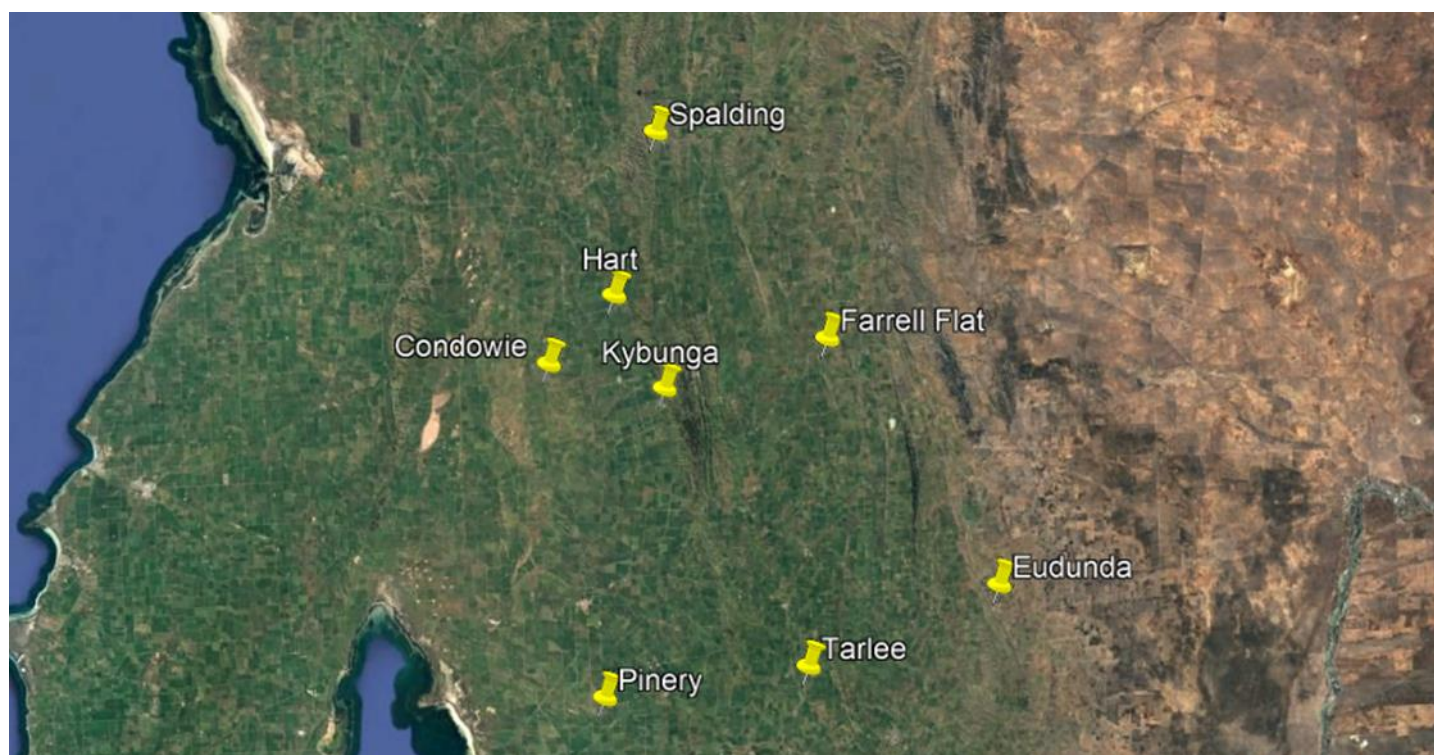
**Disclaimer:** *Yield Prophet®* information is used entirely at your own risk. You will accept all risks and responsibility for losses, damages, costs and other consequences of using *Yield Prophet®* information and reports. To the maximum extent permitted by law, APSRU and BCG excludes all responsibility 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).

## Rainfall and soil water characteristics for all sites

Site	Average annual rainfall (mm)	Soil type	PAWC (mm)	Soil sampling date	Profile depth (cm)	Pre-sowing nitrogen (kg/ha)
Hart	400	Sandy clay loam	206	April 7, 2021	150	61
Spalding	430	Red brown earth	143	April 9, 2021	150	64
Condowie	350	Sandy loam	115	April 7, 2021	150	65
Kybunga	428	Clay loam	262	April 7, 2021	120	69
Farrell Flat	474	Light clay loam	172	April 9, 2021	120	67
Pinery	374	Silty clay loam	79	April 9, 2021	150	60
Eudunda	445	Gravelly loam	96	April 9, 2021	100	63
Tarlee	474	Sandy loam	113	April 9, 2021	150	60

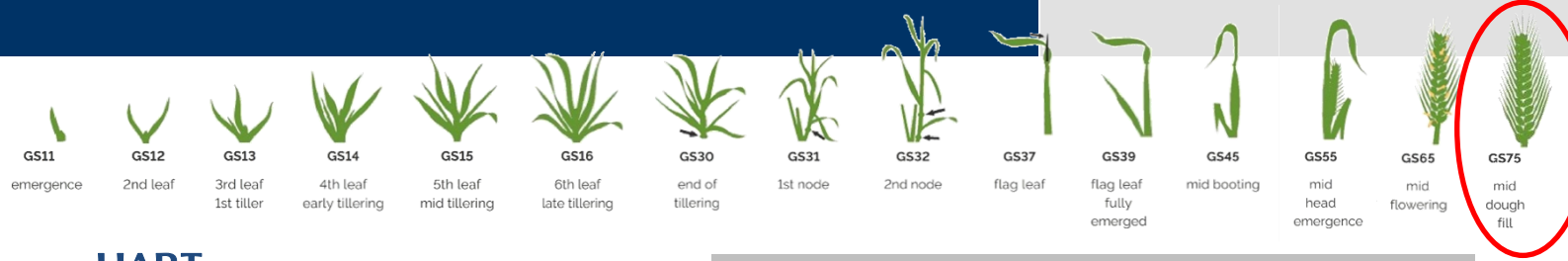
## 2021 site locations



Location:

# HART

# HART BEAT



## HART

Soil type: Sandy clay loam

Date of report: October 29, 2021

### Crop growth

Variety: Scepter wheat  
 Sowing date: May 1, 2021  
 Emergence: May 19, 2021  
 Nitrogen fertiliser: 30 kg N/ha @ seeding  
 + 40 kg N/ha July 21

### The season so far

Annual rainfall to date: 267 mm  
 GSR to date: 230 mm  
 Current GSR decile: 3  
 Current predicted PAW: 9 mm (4% full)  
 PAWC: 206 mm

## Yield Prophet® predictions

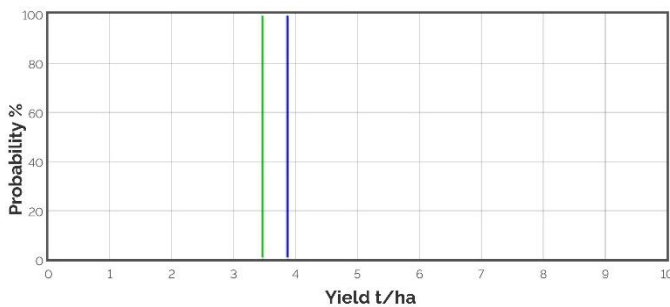
(based on a 50% probability)

Wheat sown May 1: **3.7 t/ha**

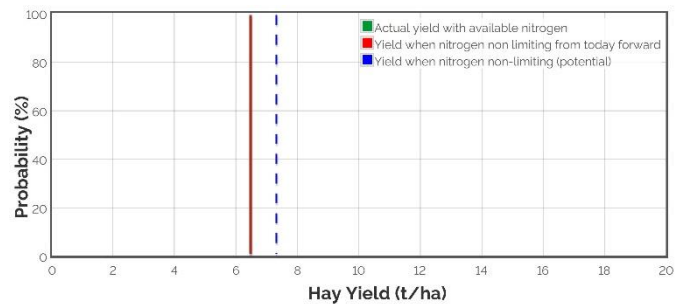
also see graphs below

Wheat sown May 20: **3.0 t/ha**

### Grain yield outcome graph



### Hay yield outcome graph



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

Yield probability curves (left graph) - display two different nitrogen scenarios. The **green line** displays the actual grain yield with the current soil available nitrogen. The **blue 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.

## French & Schultz predictions

This model assumes that there is 11 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (1.7 mm) for the remainder of the growing season.

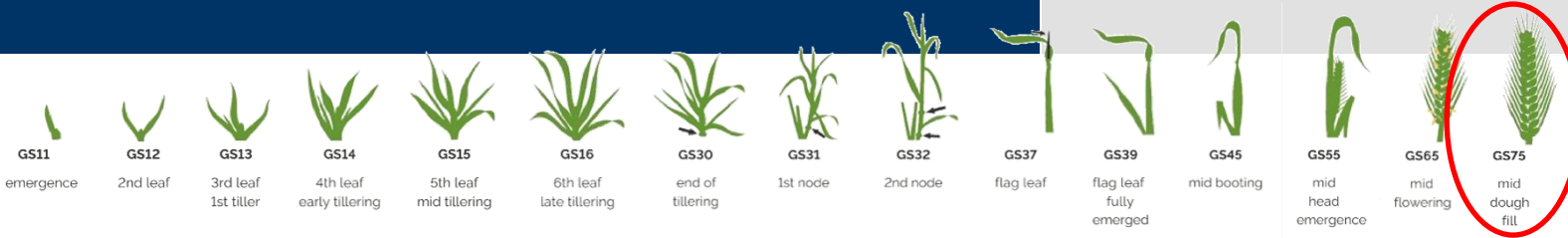
100% WUE **2.7 t/ha**

80% WUE **2.1 t/ha**

Location:

# SPALDING

# HART BEAT



## SPALDING

Soil type: Red brown earth

Date of report: October 29, 2021

### Crop growth

Variety: Scepter wheat  
 Sowing date: May 1, 2021  
 Emergence: June 5, 2021  
 Nitrogen fertiliser: 40 kg N/ha @ seeding  
 + 40 kg N/ha July 21

### The season so far

Annual rainfall to date: 345 mm  
 GSR to date: 315 mm  
 Current GSR decile: 7  
 Current predicted PAW: 18 mm (13% full)  
 PAWC: 143 mm

## Yield Prophet® predictions

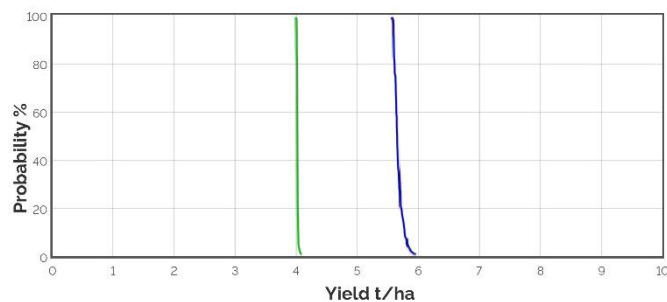
(based on a 50% probability)

Wheat sown May 1: **4.9 t/ha**

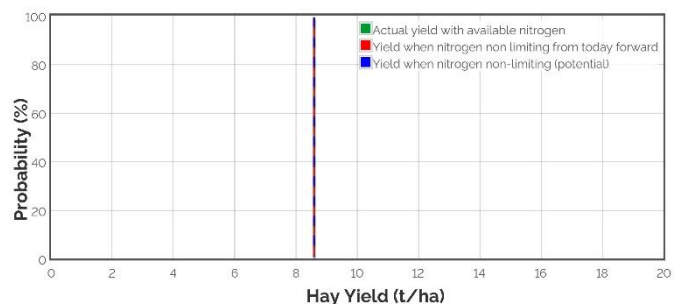
also see graphs below

Wheat sown May 20: **4.9 t/ha**

### Grain yield outcome graph



### Hay yield outcome graph



These graphs 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.

Yield probability curves (left graph) - display two different nitrogen scenarios. The green line displays the actual grain yield with the current soil available nitrogen. The blue 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.

## French & Schultz predictions

This model assumes that there is 9 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (1.7 mm) for the remainder of the growing season.

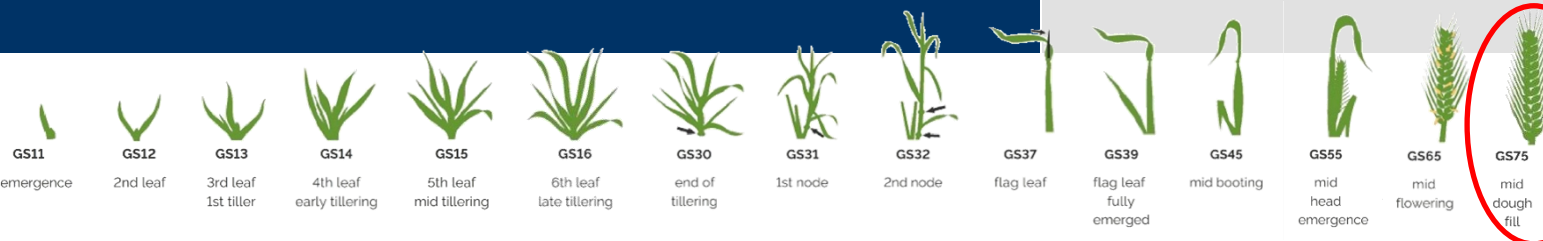
100% WUE **4.3 t/ha**

80% WUE **3.5 t/ha**

Location:

# CONDOWIE

# HART BEAT



## CONDOWIE

Soil type: Sandy loam

Date of report: October 29, 2021

### Crop growth

Variety: Scepter wheat  
 Sowing date: May 1, 2021  
 Emergence: June 4, 2021  
 Nitrogen fertiliser: 30 kg N/ha @ seeding  
 + 40 kg N/ha July 21

### The season so far

Annual rainfall to date: 214 mm  
 GSR to date: 188 mm  
 Current GSR decile: 3  
 Current predicted PAW: 1 mm (1% full)  
 PAWC: 115 mm

## Yield Prophet® predictions

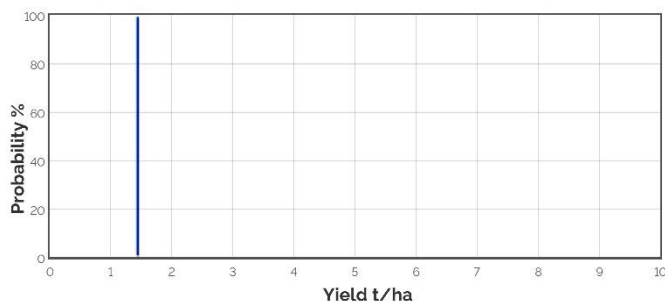
(based on a 50% probability)

Wheat sown May 1: **1.4 t/ha**

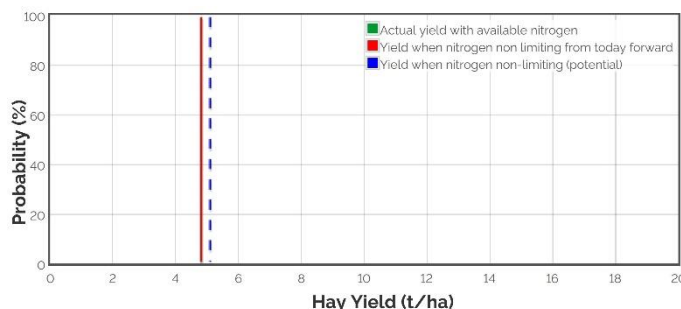
also see graphs below

Wheat sown May 20: **1.4 t/ha**

### Grain yield outcome graph



### Hay yield outcome graph



These graphs 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.

Yield probability curves (left graph) - display two different nitrogen scenarios. The green line displays the actual grain yield with the current soil available nitrogen. The blue 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.

## French & Schultz predictions

This model assumes that there is 8 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (1.4 mm) for the remainder of the growing season.

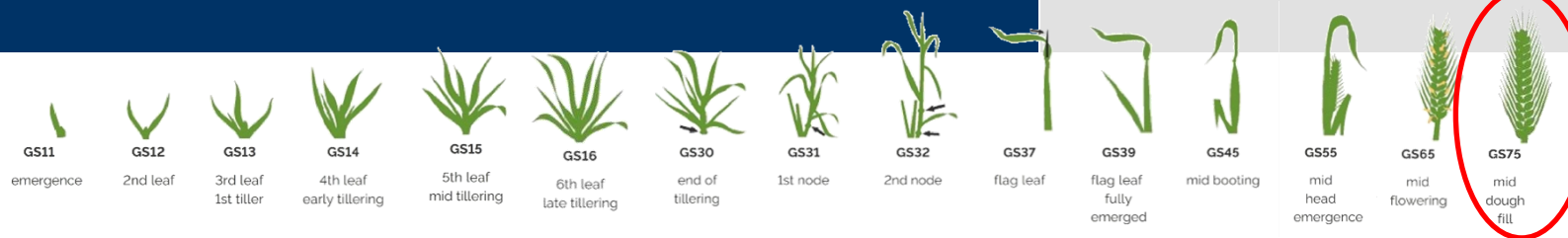
100% WUE **1.7 t/ha**

80% WUE **1.4 t/ha**

Location:

# KYBUNGA

# HART BEAT



## KYBUNGA

Soil type: Clay loam

Date of report: October 29, 2021

### Crop growth

Variety: Scepter wheat  
 Sowing date: May 1, 2021  
 Emergence: May 11, 2021  
 Nitrogen fertiliser: 30 kg N/ha @ seeding  
 + 40 kg N/ha July 21

### The season so far

Annual rainfall to date: 343 mm  
 GSR to date: 309 mm  
 Current GSR decile: 4  
 Current predicted PAW: 44 mm (17% full)  
 PAWC: 262 mm

## Yield Prophet® predictions

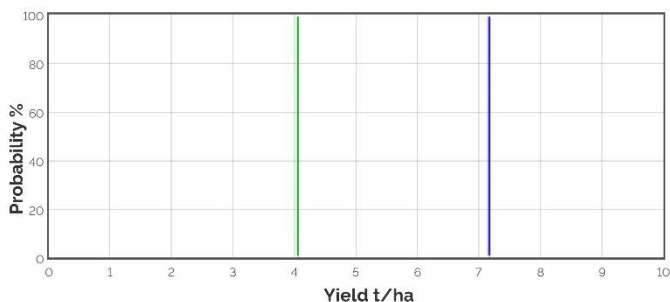
(based on a 50% probability)

Wheat sown May 1: **5.7 t/ha**

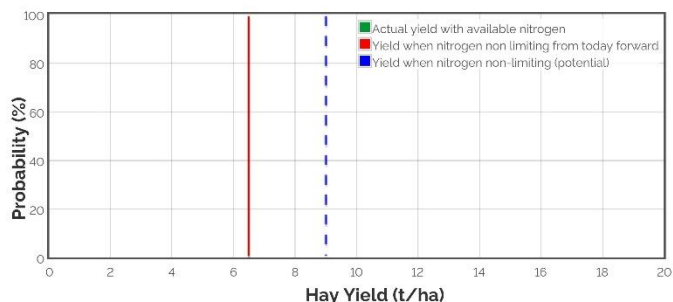
also see graphs below

Wheat sown May 20: **4.5 t/ha**

### Grain yield outcome graph



### Hay yield outcome graph



These graphs 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.

Yield probability curves (left graph) - display two different nitrogen scenarios. The green line displays the actual grain yield with the current soil available nitrogen. The blue 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.

## French & Schultz predictions

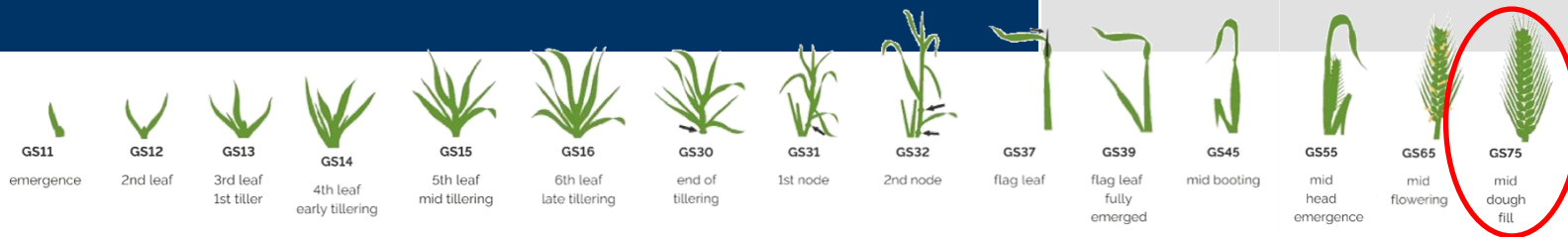
This model assumes that there is 10 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (2.1 mm) for the remainder of the growing season.

100% WUE **4.2 t/ha**

80% WUE **3.4 t/ha**

# Location: FARRELL FLAT

# HART BEAT



## FARRELL FLAT

Soil type: Light clay loam

Date of report: October 29, 2021

### Crop growth

Variety: Scepter wheat  
Sowing date: May 1, 2021  
Emergence: June 6, 2021  
Nitrogen fertiliser: 30 kg N/ha @ seeding  
+ 40 kg N/ha July 21

### The season so far

Annual rainfall to date: 343 mm  
GSR to date: 317 mm  
Current GSR decile: 5  
Current predicted PAW: 31 mm (18% full)  
PAWC: 172 mm

## Yield Prophet® predictions

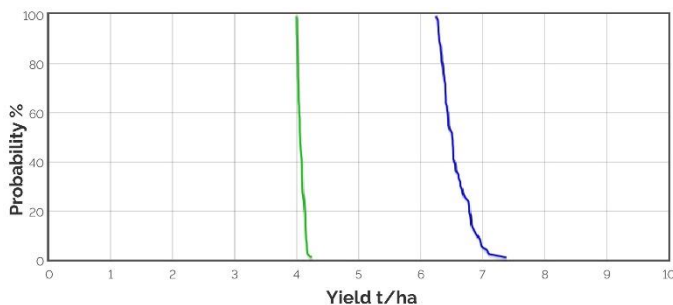
(based on a 50% probability)

Wheat sown May 1: **5.3 t/ha**

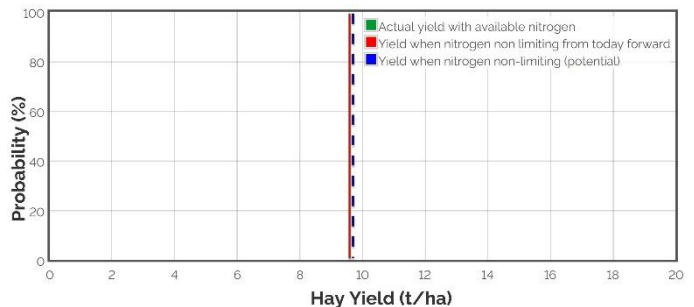
also see graphs below

Wheat sown May 20: **5.3 t/ha**

### Grain yield outcome graph



### Hay yield outcome graph



These graphs 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.

Yield probability curves (left graph) - display two different nitrogen scenarios. The green line displays the actual grain yield with the current soil available nitrogen. The blue 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.

## French & Schultz predictions

This model assumes that there is 8 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (1.8 mm) for the remainder of the growing season.

100% WUE **4.3 t/ha**

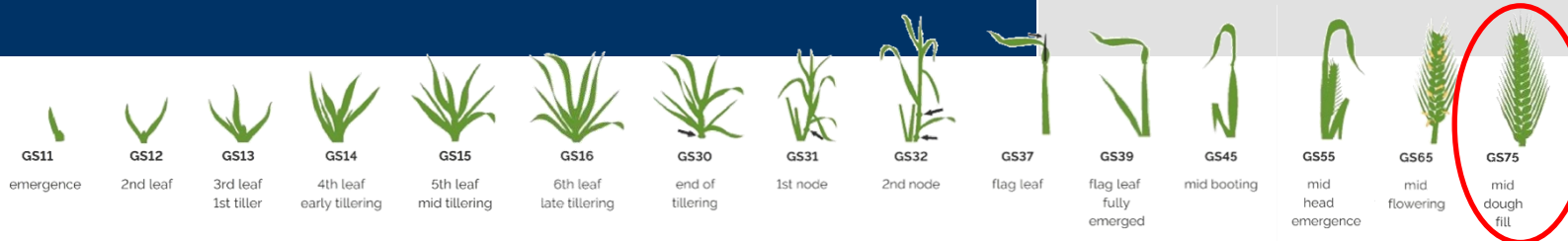
80% WUE **3.5 t/ha**



Location:

# PINERY

# HART BEAT



## PINERY

Soil type: Silty clay loam

Date of report: October 29, 2021

### Crop growth

Variety: Scepter wheat  
 Sowing date: May 1, 2021  
 Emergence: June 4, 2021  
 Nitrogen fertiliser: 40 kg N/ha @ seeding  
 + 40 kg N/ha July 21

### The season so far

Annual rainfall to date: 275 mm  
 GSR to date: 240 mm  
 Current GSR decile: 3  
 Current predicted PAW: 8 mm (10% full)  
 PAWC: 79 mm

## Yield Prophet® predictions

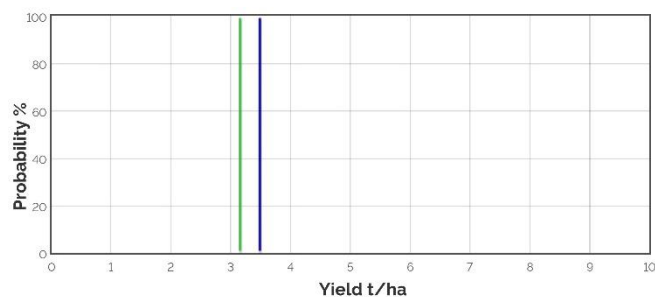
(based on a 50% probability)

Wheat sown May 1: **3.4 t/ha**

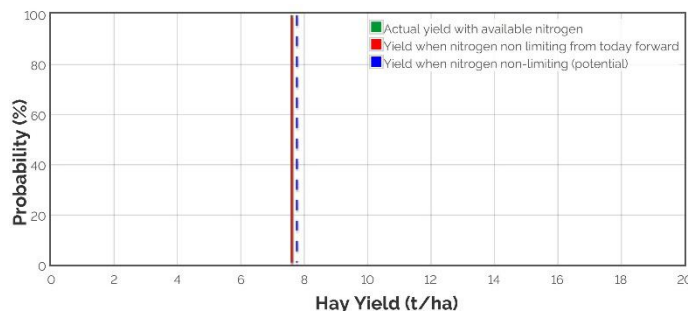
also see graphs below

Wheat sown May 20: **3.4 t/ha**

### Grain yield outcome graph



### Hay yield outcome graph



These graphs 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.

Yield probability curves (left graph) - display two different nitrogen scenarios. The green line displays the actual grain yield with the current soil available nitrogen. The blue 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.

## French & Schultz predictions

This model assumes that there is 11 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (1.8 mm) for the remainder of the growing season.

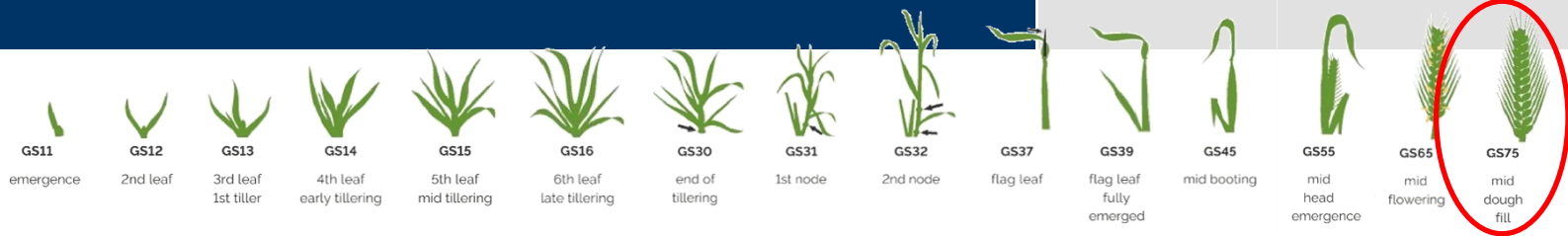
100% WUE **2.9 t/ha**

80% WUE **2.3 t/ha**

Location:

# EUDUNDA

# HART BEAT



## EUDUNDA

Soil type: Gravelly loam

Date of report: October 29, 2021

### Crop growth

Variety: Scepter wheat  
Sowing date: May 1, 2021  
Emergence: June 21, 2021  
Nitrogen fertiliser: 30 kg N/ha @ seeding  
+ 40 kg N/ha July 21

### The season so far

Annual rainfall to date: 363 mm  
GSR to date: 323 mm  
Current GSR decile: 6  
Current predicted PAW: 21 mm (22% full)  
PAWC: 96 mm

## Yield Prophet® predictions

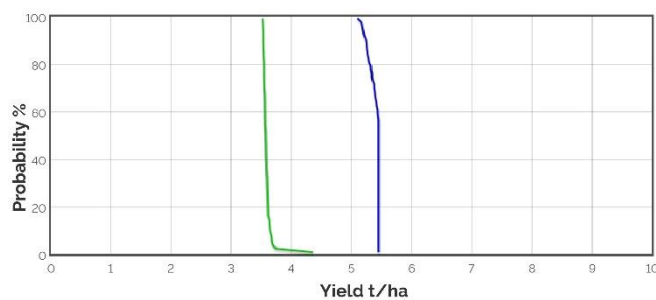
(based on a 50% probability)

Wheat sown May 1: **4.6 t/ha**

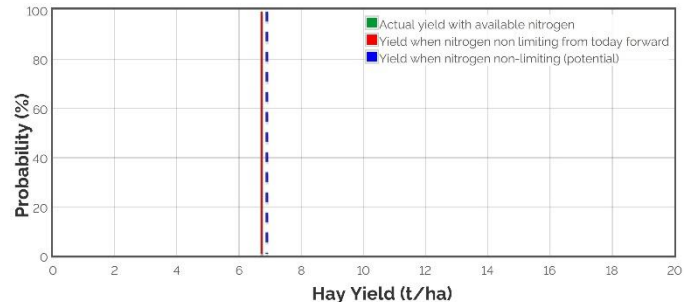
also see graphs below

Wheat sown May 20: **4.6 t/ha**

### Grain yield outcome graph



### Hay yield outcome graph



These graphs 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.

Yield probability curves (left graph) - display two different nitrogen scenarios. The green line displays the actual grain yield with the current soil available nitrogen. The blue 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.

## French & Schultz predictions

This model assumes that there is 12 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (1.8 mm) for the remainder of the growing season.

100% WUE **4.5 t/ha**

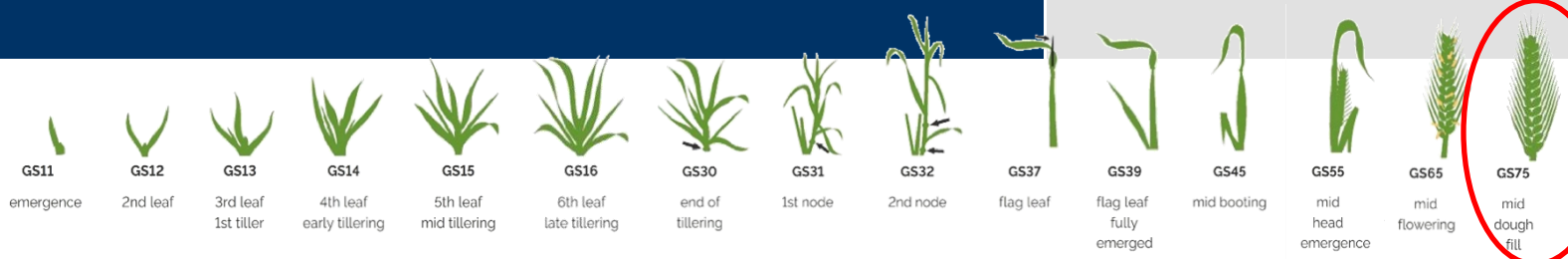
80% WUE **3.6 t/ha**

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

Location:

# TARLEE

# HART BEAT



## TARLEE

Soil type: Sandy loam

Date of report: October 29, 2021

### Crop growth

Variety: Scepter wheat  
 Sowing date: May 1, 2021  
 Emergence: May 11, 2021  
 Nitrogen fertiliser: 40 kg N/ha @ seeding  
 + 40 kg N/ha July 21

### The season so far

Annual rainfall to date: 377 mm  
 GSR to date: 332 mm  
 Current GSR decile: 5  
 Current predicted PAW: 57 mm (50% full)  
 PAWC: 113 mm

## Yield Prophet® predictions

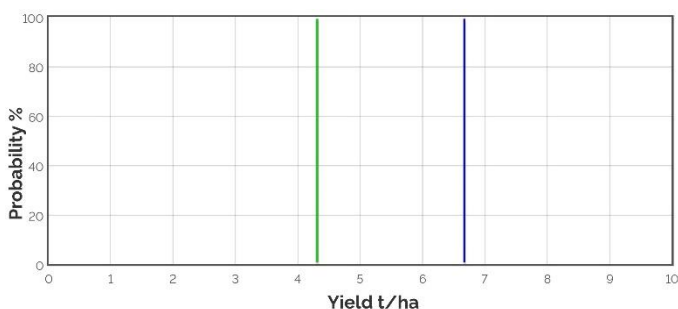
(based on a 50% probability)

Wheat sown May 1: **5.5 t/ha**

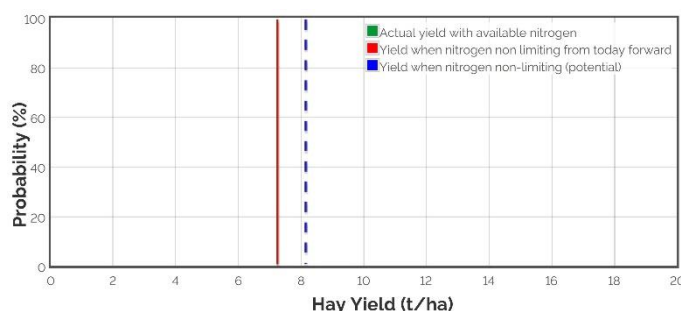
also see graphs below

Wheat sown May 20: **5.3 t/ha**

### Grain yield outcome graph



### Hay yield outcome graph



These graphs 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.

Yield probability curves (left graph) - display two different nitrogen scenarios. The green line displays the actual grain yield with the current soil available nitrogen. The blue 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.

## French & Schultz predictions

This model assumes that there is 14 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (2.3 mm) for the remainder of the growing season.

100% WUE **4.8 t/ha**

80% WUE **3.8 t/ha**

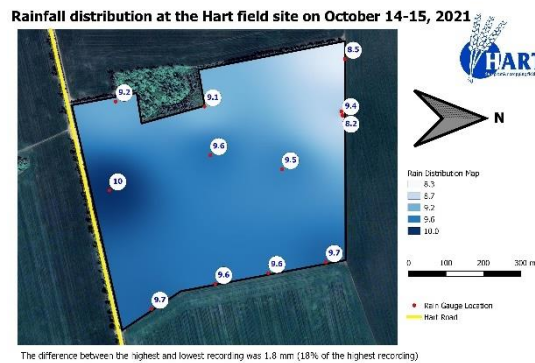
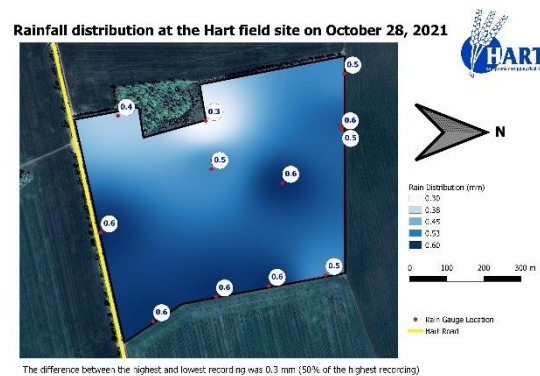
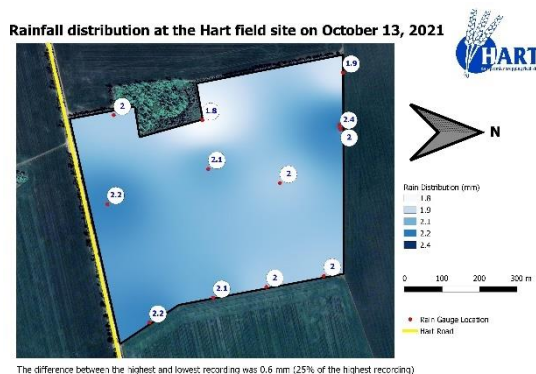
## RAINFALL VARIABILITY TRIAL

<https://www.hartfieldsite.org.au/pages/live-weather/rainfall-variability-trial.php>

### A new trial to Hart in 2021

We're tracking 2021 rainfall variability using the readings from twelve gauges across Hart's 40 ha site. Data is recorded after each rainfall event (plus monthly totals) is presented in easy to interpret maps like those below.

**A map summarising Growing Season Rainfall (GSR - April - October) has also just been added**



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