

Water Management Update and Report – Hunter Gas Project

BCCC Meeting # 22

Presented by: John Ross

26 July 2010

Broke



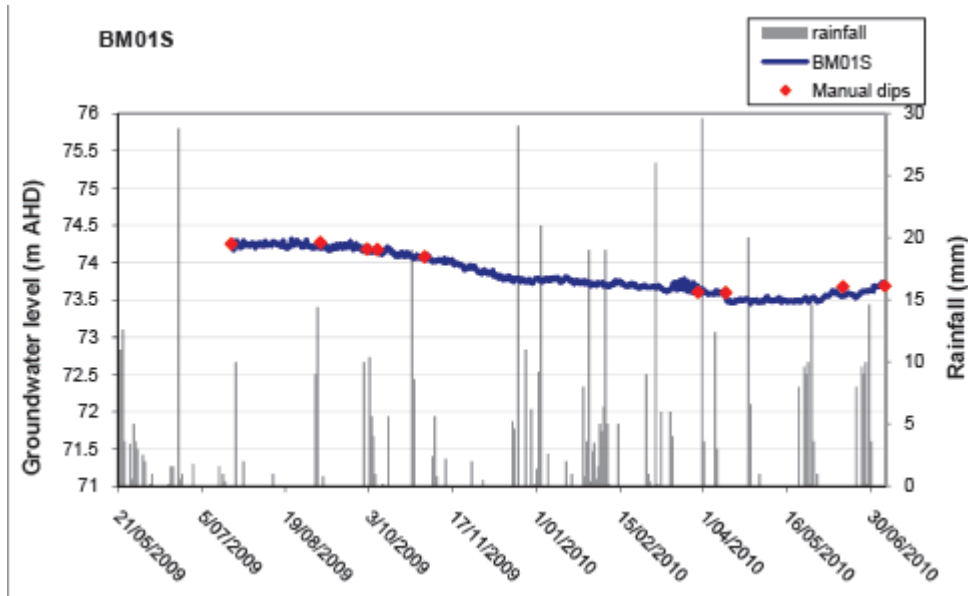
Groundwater update since June Meeting

Broke - HB01 and HB02 Flow testing program

- > PB mid-year report received on WL and WQ data and trends
- > Pumped volumes as at 14 July – HB01 0.68 ML and HB02 0.82 ML – (combined volume 1.5 ML) – rate has reduced to ~1.7 KL/d (0.0017 ML/d)
- > Water level monitoring program (seasonal changes in WL except at P7b):
 - » Continuous WL monitoring at BM01 site (4 bores)
 - » Continuous WL loggers re-installed at BM03 site (3 bores)
 - » Continuous WL logger re-installed in Xstrata piezometer P7b
- > Water quality monitoring program (essentially no changes in WQ) :
 - » All monitoring bores resampled in March
 - » HB01 and HB02 sampled late May – minimal changes : HB01 ~ 18000 EC and HB02 ~5400 EC
 - » Inline WQ monitoring is now working (problems when low flows)
 - » No further PB WQ sampling – AGL is continuing with HB01 and HB02 sampling
- > Discussions with Garry Willgoose about data sets and trends

Groundwater update since June Meeting

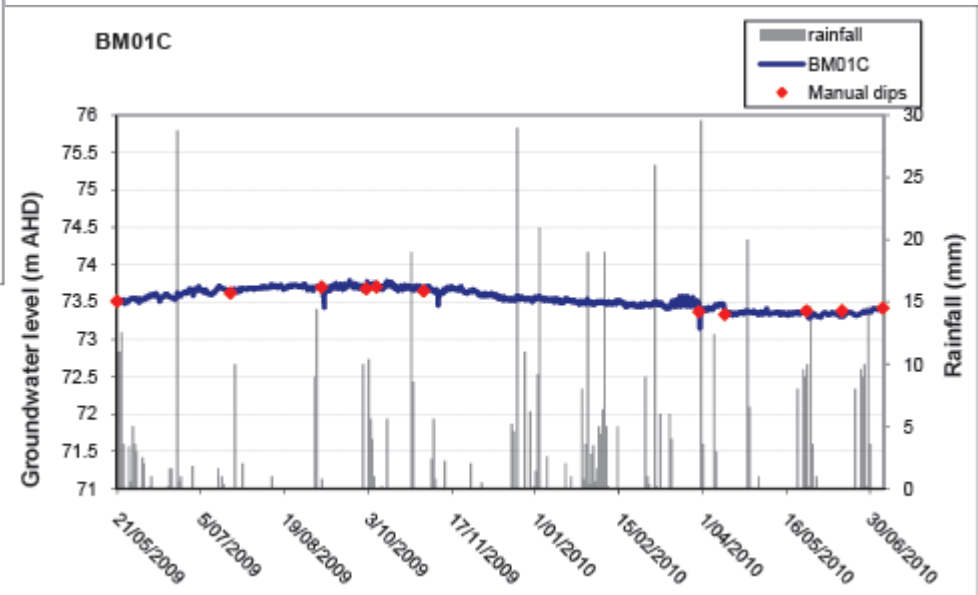
Broke - HB01 and HB02 Flow testing program



**Shallowest alluvium at
BM01 site ~6m deep**

**Wybrow Coal Seam at
BM01 site ~220m deep**

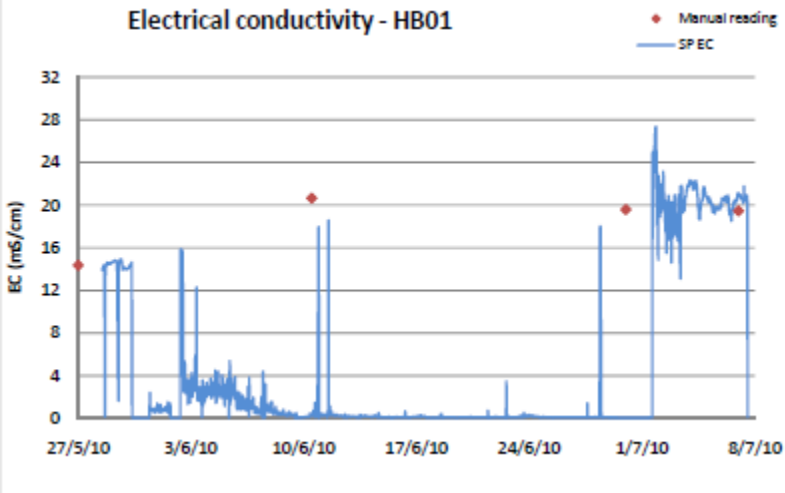
These are examples of the water levels hydrographs from nearby monitoring bores – others in mid year PB report



Groundwater update since June Meeting

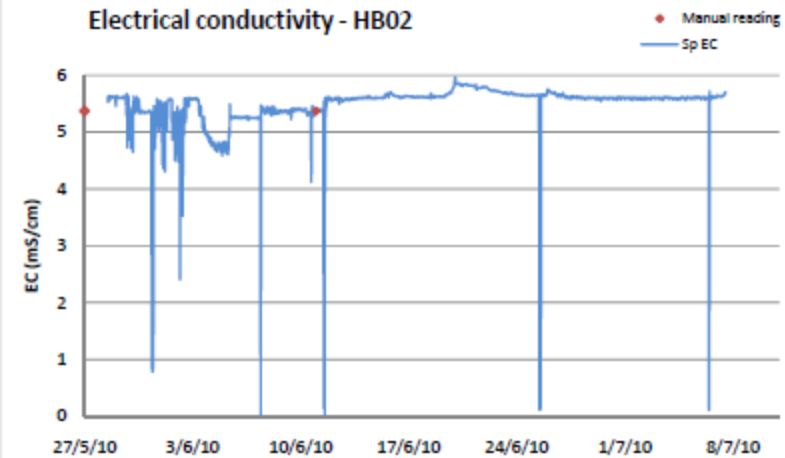
Broke - HB01 and HB02 Flow testing program

Electrical conductivity - HB01

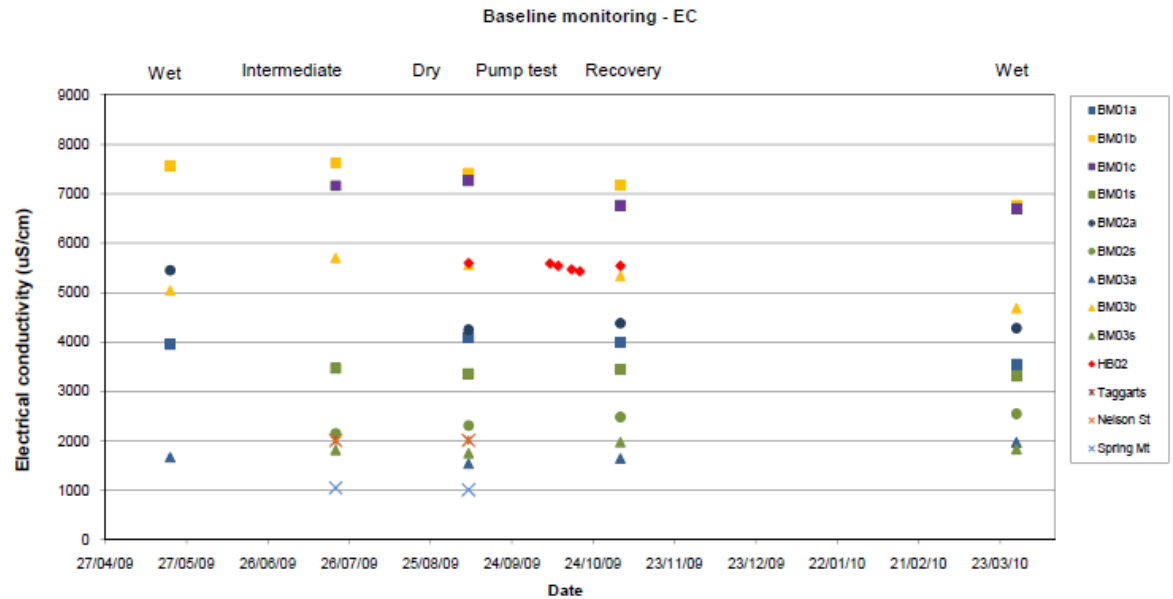


In-line monitoring of EC at HB01 and HB02

Electrical conductivity - HB02



EC across all monitoring events at all monitoring bore sites



Groundwater update since June Meeting

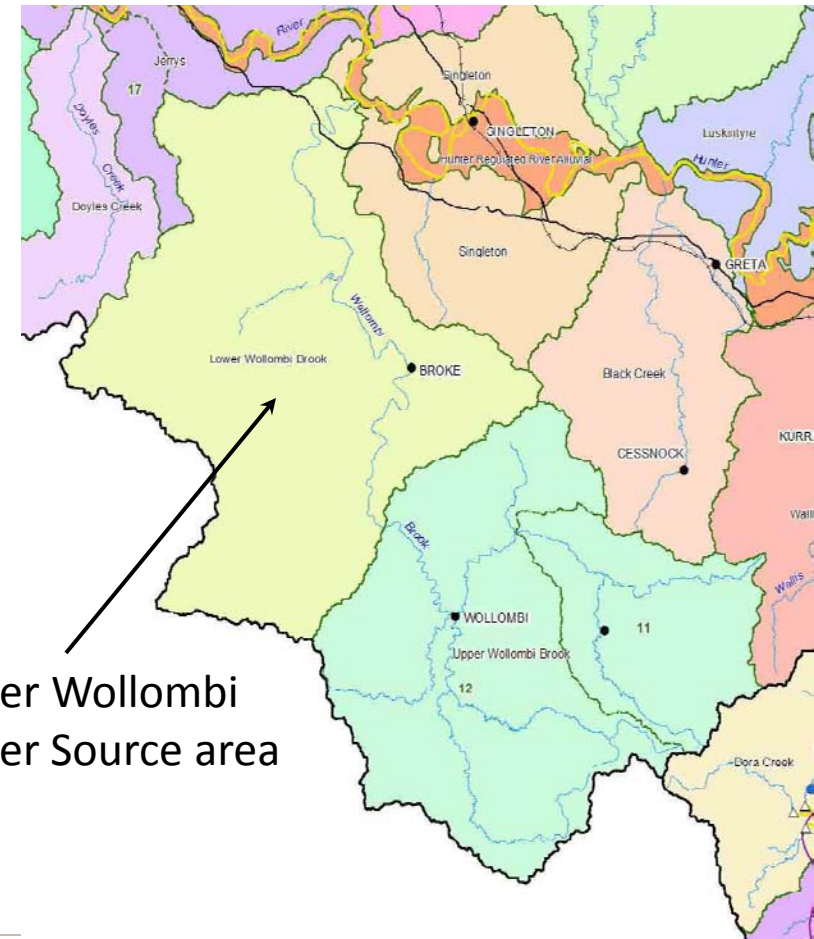
Broke - Monkey Place and Bulga - Windermere Programs

- › Monkey Place (completed 23 June 2010):
 - » 3 monitoring bores (alluvium, first fractured rock, Wybrow CS)
 - » Continuous WL loggers installed in all bores
 - » Baseline WQ samples to be obtained
- › Windermere (likely completion 26 July 2010):
 - » 4 monitoring bores (alluvium, first fractured rock, Wybrow CS, and Wambo CS)
 - » Continuous WL loggers to be installed in all bores
 - » Baseline WQ samples to be obtained
- › Completion report in September

Some Water Resource and Usage Stats.....

Lower Wollombi Brook Water Source

- > Lower Wollombi Brook water source is one of 39 water sources in the Hunter unregulated and alluvial water source WSP
- > Water Sharing Plan commenced on 1 August 2009
- > Broke and Bulga are within the Lower Wollombi Brook water source
- > 962 km² in area
- > Described by NOW as a water source with "limited surface flows and is a groundwater dominated system"



Lower Wollombi
Water Source area

Some Water Resource and Usage Stats.....

Lower Wollombi Brook Water Source

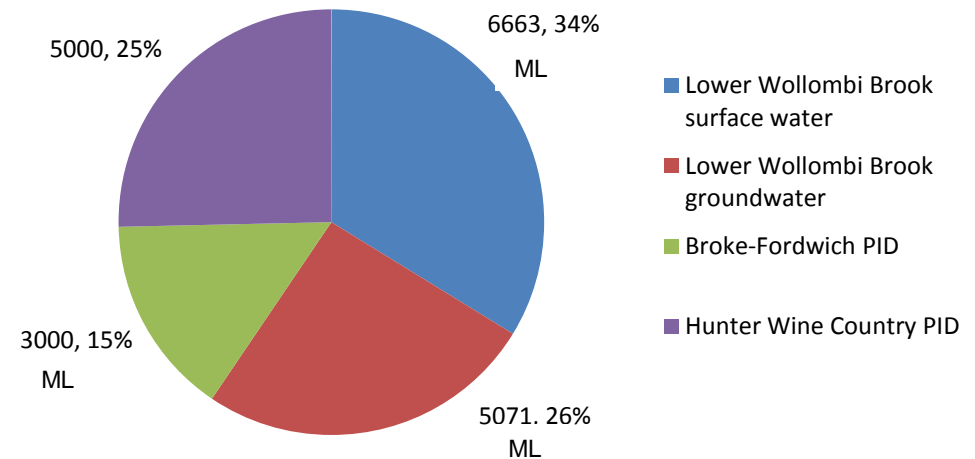
> **Water Availability**

- » Surface water
- » Groundwater (alluvium)
- » Broke-Fordwich PID
- » Hunter Wine PID
- » Hunter Wine PID
- » Fractured rock groundwater not quantified (>20mbgl)

> **Total Water Entitlements**

- » Approx 20,000 ML pa available from multiple sources across the region

Entitlements in ML per year



Some Water Resource and Usage Stats.....

Lower Wollombi Brook Water Source

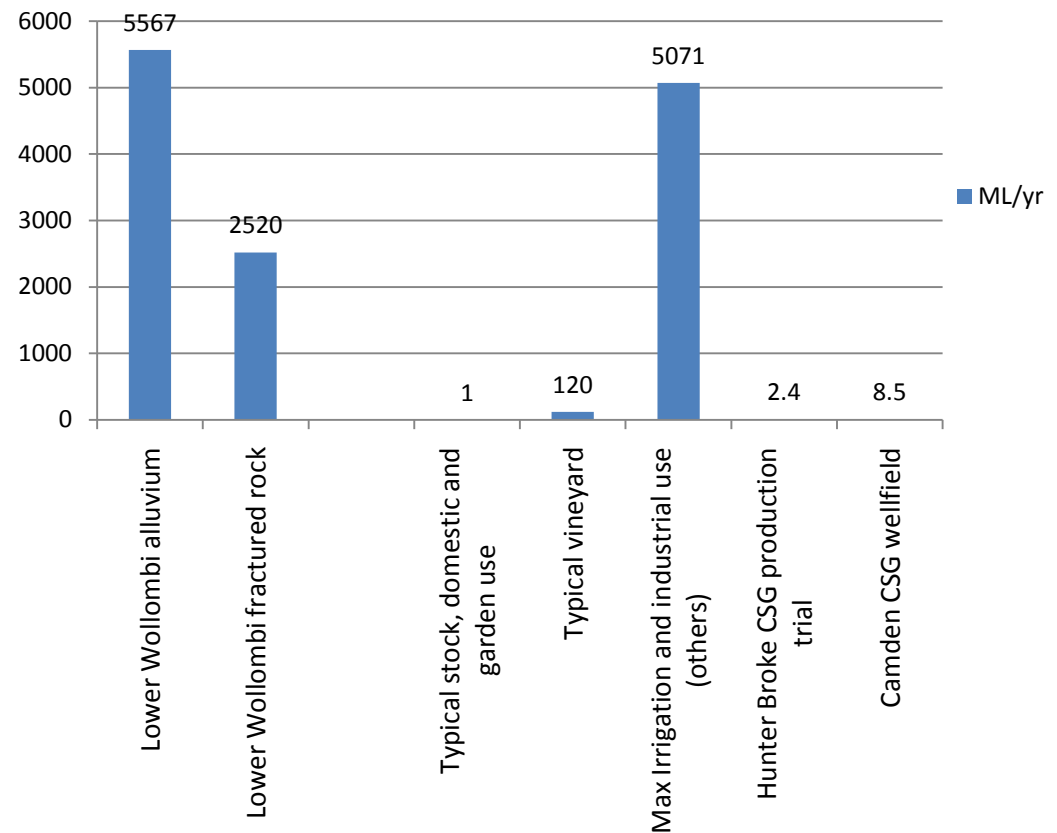
> Water Recharge

- » Lower Wollombi alluvium – 5567 ML pa
- » Lower Wollombi fractured rock - ~2520 ML pa

> Typical water usage

- » S&D bore/well - 1 ML pa
- » Vineyard – 120 ML
- » HB01/02 gas extended flow trial – 2.4 ML pa
- » Camden wellfield – 8.5 ML pa

Groundwater Recharge and Use



Water Reuse - Disposal Opportunities.....

Solutions for small quantities of produced waters

- › **Reuse / Recycling (no treatment options in bold)**
 - » Industrial and mining reuse (**drilling, fracc water, coal washing, dust suppression, cooling**, process water etc)
 - » Primary production (livestock, irrigation, aquaculture)
 - » Raw water for domestic water supply
- › **Disposal (no treatment options in bold)**
 - » Off-site disposal (**wastewater to recycling facilities or STPs**)
 - » Reinjection (**underground mine voids and goaf**, aquifers with similar characteristics)
 - » Environmental flows (**high flow**, baseflows, constructed wetlands)
 - » Evaporation (**open cut voids, evaporation ponds, enhanced evaporation methods**)
 - » Recreation (ornamental ponds and water features)