Surat Underground Water Impact Report 2016 - Summary

Extracting coal seam gas (CSG) involves pumping water from coal seams to release the gas that is attached to the coal particles. This may affect water supply bores accessing the coal formations and, to some extent, bores accessing aquifers above and below the coal formations.

The Queensland *Water Act 2000* (Water Act) requires petroleum and gas tenure holders to carry out baseline assessments of water bores before commencing production, and to 'make good' impairment of bore supplies. If it is predicted that the water level in a bore will be lowered by more than a threshold amount within three years, the bore supply is at higher risk of impairment. The tenure holder must carry out a bore assessment and then, if necessary, enter into an agreement with the bore owner about measures to avoid or mitigate the impairment.

Cumulative Management

The Surat Basin extends over 180,000 square kilometres of southern and central Queensland, where it overlies parts of the Bowen Basin. In the Surat Basin, CSG is produced from the Walloon Coal Measures. In the Bowen Basin, CSG is produced from the Bandanna Formation and potentially from the Cattle Creek Formation.

There are multiple CSG projects within the Surat and southern Bowen basins, and the impacts from these projects can overlap. As a result, a cumulative approach to management is needed. Accordingly, in 2011 the area was declared a cumulative management area (CMA) under the Water Act.

A cumulative assessment of impacts was made and integrated regional management arrangements developed as set out in the Surat Underground Water Impact Report (UWIR) 2012, which has now been superseded by the 2016 Surat UWIR.

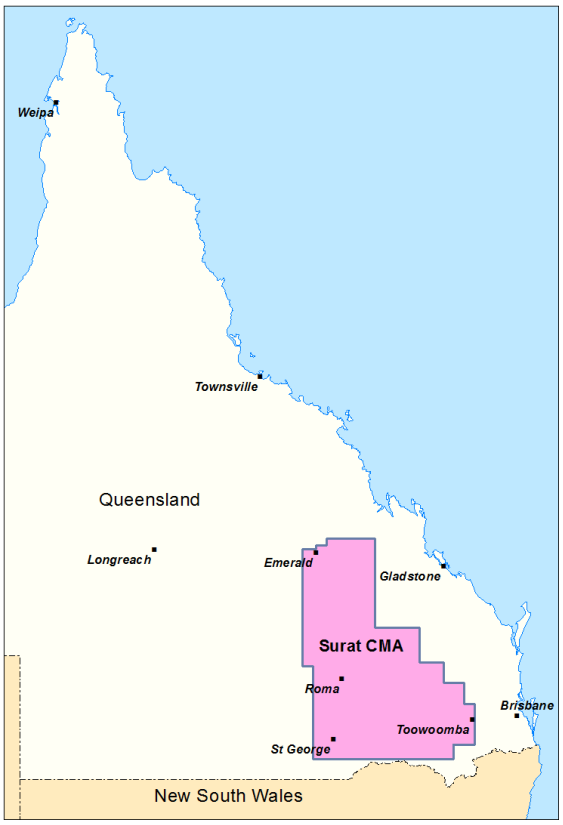

Fig. 1 Surat Cumulative Management Area

The Surat UWIR 2016 is prepared using a revised regional groundwater flow model that uses new techniques and incorporates the latest knowledge about the regional groundwater flow system.

The UWIR 2016 has been prepared by the Office of Groundwater Impact Assessment (OGIA). OGIA is an independent entity housed within the Queensland Department of Natural Resources and Mines (DNRM).

Long-term Affected Areas

The Long-term Affected Area for an aquifer is the area within which water levels are predicted to be lowered by more than the trigger threshold of five metres in the long term as a result of CSG water extraction.

There are 459 bores identified as being in Long-term Affected Areas. This is a reduction from the 528 bores identified in UWIR 2012.

The reduction is due to a contraction of the area of planned CSG development, better information about which aquifer each bore accesses, decommissioning of some bores, and the use of a new groundwater flow model that better represents the movement of water within and between formations.

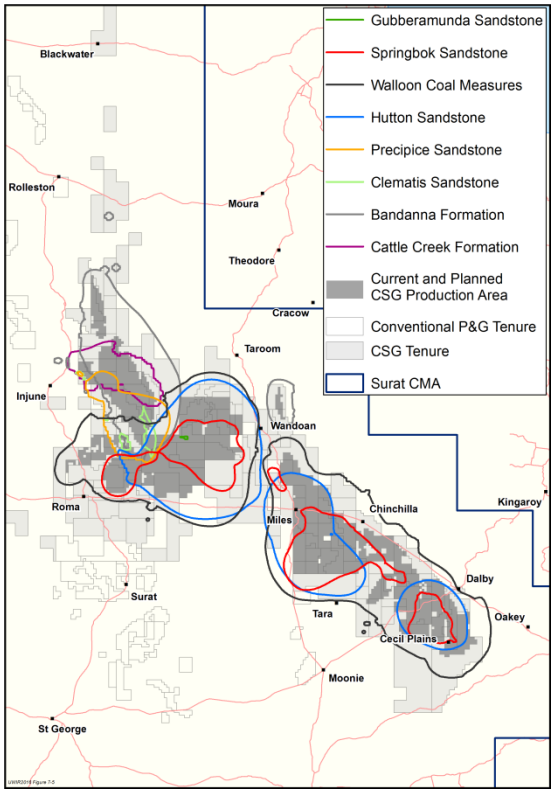

Fig. 2 Extent of Long-term Affected Areas

The Walloon Coal Measures has the largest Long-term Affected Area, containing most of the affected bores. The area is smaller than in 2012 because of a contraction in planned CSG industry development; and an improved understanding of the movement of water within the formation.

The Springbok Sandstone overlies the Walloon Coal Measures. It has a Long-term Affected Area that is smaller than in 2012 because of a contraction in planned CSG industry development; and an improved understanding of the connectivity between the formation and the underlying Walloon Coal Measures.

The Hutton Sandstone underlies the Walloon Coal Measures. It has a Long-term Affected Area that is slightly larger than in 2012 because of improved modelling of pressure impacts at the base of the Walloon Coal Measures.

Immediately Affected Areas

Of the 459 bores predicted to be affected in the long term, 91 are expected to experience a lowering of water levels by more than the trigger threshold of five metres within the next three years.

This figure includes 57 newly identified bores and a further 34 bores that were identified in UWIR 2012 and that are currently recorded on the DNRM groundwater database as remaining in service.

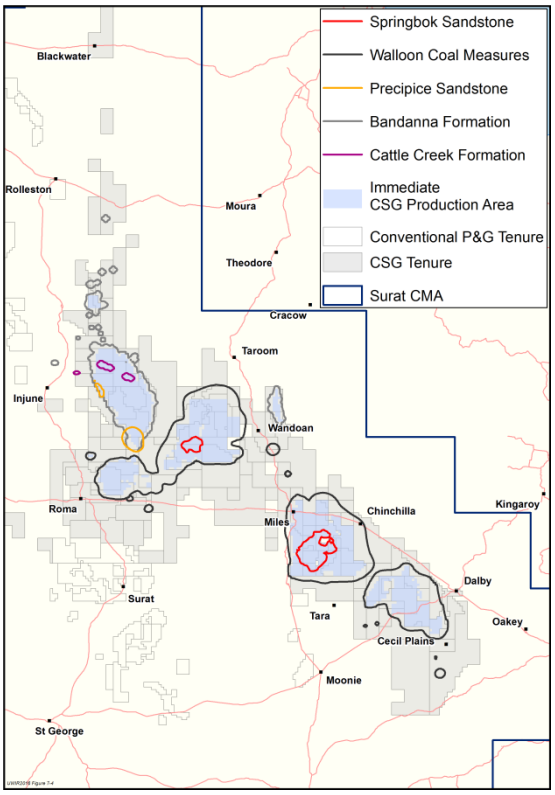

Fig. 3 Extent of Immediately Affected Areas

The extent of the immediately affected areas will grow as the CSG industry continues to develop.

Water extraction

The rate of CSG water extraction is less than initially expected due to the nature of the coal being encountered. The rate of extraction is currently 65,000 megalitres per year. This is likely to peak at about 110,000 megalitres per year in the next few years.

Condamine Alluvium

There is no significant change to predictions made in 2012 about impacts on the Condamine Alluvium. The UWIR 2016 predicts a net loss of water from the Condamine Alluvium of about 1,160 megalitres per year.

This is less than two per cent of the volume extracted for irrigation, and not enough to cause a reduction of levels in water supply bores of more than the two metre trigger threshold for an alluvial aquifer.

Water level monitoring

Monitoring data shows that while water pressures in the CSG target formations are falling, in other formations there are no clear departures from background trends. This is consistent with expectations at this early stage of development of the CSG industry.

In 2012, a monitoring network was specified for progressive installation by the end of 2016. Most of the monitoring points are complete or under construction.

In response to improved understanding of the groundwater flow system and changes in planned development, the monitoring network requirements have been re-specified in the UWIR 2016. The full network will comprise of 675 monitoring points.

Spring management

There are 87 spring complexes containing 387 vents and 40 sections of spring-fed watercourses in the CMA. Some are of national conservation significance as they provide unique ecological habitats and are associated with a range of cultural heritage values.

In 2012, it was assessed that there were five spring sites where impacts in the spring source aquifers were expected to exceed 0.2 metres in the long term. Detailed site investigations have since corrected the identification of the source aquifer at one site; with the result that the spring is no longer at risk. At two sites, plans have been developed to avoid increases in source aquifer impact.

At the remaining two sites, the UWIR 2016 specifies actions to be undertaken by tenure holders to improve understanding of the local groundwater hydrology.

The geological model

A new geological model has been constructed incorporating the latest geological information from all sources, including recently installed CSG wells. The geological model provides the foundation for the regional groundwater flow model.

The geological model has also been used to reassess information about all water bores in the CMA and to improve the identification of the source aquifer for each water bore.

The groundwater flow model

In the Surat Basin, formations containing CSG exist as part of a complex multilayered regional groundwater flow system. A new groundwater flow model has been constructed using new techniques to better represent the groundwater flow.

Permeability values for the groundwater flow model have been established by using geophysical log data, hydraulic test data from CSG wells as well as other sources.

Responsible tenure holders

Petroleum tenure holders are obliged under law to 'make good' impairment of private bore supplies resulting from CSG water extraction. This may be achieved by establishing new bore supplies or by some other measure.

The UWIR sets out rules to determine which petroleum tenure holder is to carry out these activities for a water bore, as more than one tenure holder could be contributing to the impact.

Implementation

Responsible tenure holders will carry out assessments of water bores that are predicted to experience a lowering of water levels of more than five metres within three years as a result of CSG water extraction. Depending upon the outcome of the assessment, tenure holders may enter into agreements with the bore owner about avoiding impairment of water supply.

The responsible tenure holders will also implement required monitoring and spring management actions.

OGIA will review monitoring data and assess the significance of any changes to plans for CSG industry development and report on outcomes annually.

Ongoing technical investigations

OGIA will carry out the following technical activities:

- Progressively update the geological model to incorporate new data as a foundational resource for groundwater flow modelling and more general use by groundwater managers.
- Develop and apply new methods of analysis of output from the regional groundwater flow model to improve the assessment of uncertainty.
- Investigate groundwater flow in sensitive areas through sub-regional assessments.
- Further investigate the causes of long-term background trends in aquifer water pressures.
- Test new spring monitoring methodologies.
- Continue collaboration with a range of universities and other research institutions into aspects of the hydrogeology of the groundwater flow system.

Check your bore

If you are the owner of a registered bore in the Surat CMA, you can find out more about predicted water level impacts relevant to your bore by entering the bore's registered number (RN) at OGIA's website: www.dnrm.qld.gov.au/ogia

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More information

For further information regarding the 2016 Surat UWIR:

visit www.dnrm.qld.gov.au/ogia
email SuratUWIR@dnrm.qld.gov.au
or call 13 QGOV (13 74 68)