

# Surat Underground Water Impact Report – Summary

## Overview

The Surat Basin extends over 180,000 square kilometres of southern and central Queensland, where it overlies parts of the Bowen Basin.

Coal seam gas (CSG) is produced from the Walloon Coal Measures of the Surat Basin and the Bandanna Formation of the Bowen Basin.

Extracting CSG involves pumping water from the coal seams to release the gas that is attached to the coal particles.

The Queensland *Water Act 2000* (Water Act) requires petroleum tenure holders to carry out baseline assessments of water bores before commencing production, and to make good impairment of bore supplies now and into the future.

With the Surat and southern Bowen Basins undergoing a major expansion in CSG production, the region was declared a Cumulative Management Area (CMA) under the Water Act, which gave the Queensland Water Commission (QWC) the responsibility of preparing an Underground Water Impact Report (UWIR). The draft UWIR was released for public consultation.

Issues raised during consultation were included into the amended report submitted to the Department of

Environment of Heritage and Protection (EHP). The UWIR has been approved by EHP.

There are some 21,000 water bores within the Surat CMA with bore water used for grazing, irrigation, industry and urban consumption. Of these, there are 528 bores which are expected to experience a decline in water level of more than the trigger threshold as a result of CSG water extraction.

A regional water monitoring network with 498 monitoring points is being put in place to gather data on water levels and quality.

There are 71 spring complexes within the Surat CMA. In the long term the impact on water levels in the source aquifer is expected exceed 0.2 metres at five of those sites. As it will be some years before any potential impacts occur, there is time to plan and implement mitigation actions for these springs.

In assessing impacts, the UWIR has not taken into account any re-use of CSG water in substitution for water extraction by existing users or the injection of treated CSG water back into aquifers. Such measures have the potential to mitigate the impact of CSG water extraction on water levels in aquifers.

## Context for report

The Queensland Government has adopted a legislative regime to ensure the petroleum and gas industry develops in a responsible way.

Petroleum tenure holders have the right to extract groundwater in the process of petroleum and gas production, including CSG production.

However, the Water Act requires the tenure holders to monitor and manage the impacts on surrounding water supplies and to ‘make good’ impairment of private bore supplies caused by the exercise of these rights.

If there are multiple adjacent gas fields being developed in a region, the impacts of water extraction on groundwater levels may overlap. In these situations a cumulative approach is required to assess and manage those impacts.

Such an area can be declared a CMA. In these areas QWC is responsible for assessing cumulative impacts and establishing integrated management arrangements through the preparation of the UWIR.

As the Surat and southern Bowen Basins are being developed for CSG production by multiple operators, the Surat CMA was established.

**Surat Cumulative Management Area (CMA)**



# Groundwater resources in the Surat CMA

CSG is produced from the Walloon Coal Measures of the Surat Basin and the Bandanna Formation of the Bowen Basin.

The Walloon Coal Measures is a geologic formation of the Great Artesian Basin (GAB). The GAB includes aquifers of economic importance and which feed springs of high ecological and cultural significance. The Condamine Alluvium overlies the GAB and is also an aquifer of major economic importance.

Groundwater is used in the region for grazing, irrigation, intensive stock watering, industry and urban consumption. There are some 21,000 water bores within the Surat CMA extracting approximately 215,000 megalitres per year.

## Groundwater model

In preparing the UWIR, QWC utilised groundwater flow modelling to predict the impacts of water extraction by petroleum and gas operations on water levels.

QWC sought advice from independent experts during the development of the model to ensure it met national standards for groundwater flow modelling.

## Predicted impacts

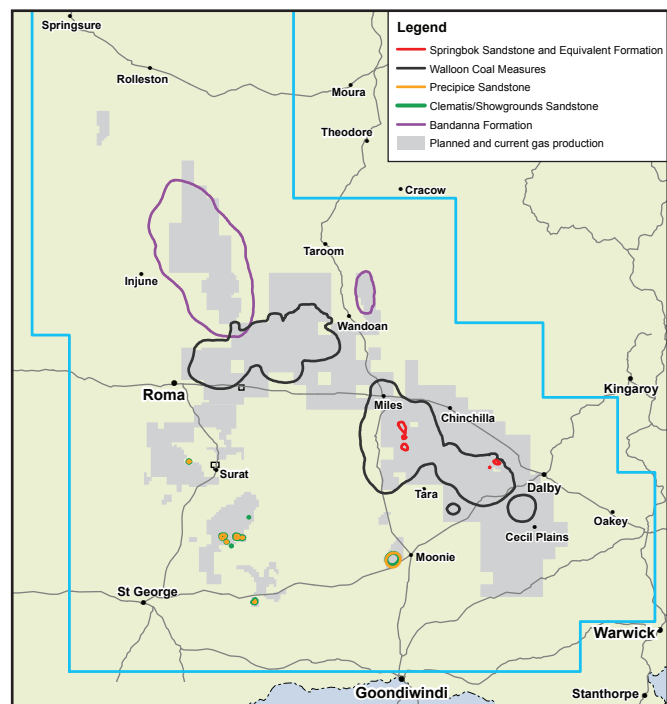
Petroleum tenure holders are predicted to extract approximately 95,000 megalitres of water per year over the life of the industry and this extraction will impact on water levels. The Queensland legislative framework for managing these impacts sets thresholds of water level declines that trigger proactive actions by petroleum tenure holders. The threshold is five metres for consolidated aquifers (such as sandstone) and two metres for unconsolidated aquifers (such as sands).

### Immediately affected areas

The Immediately Affected Area for an aquifer is the area where water levels in the aquifer are predicted to decline by more than the trigger threshold within three years.

The UWIR found that 85 registered water bores in the Surat CMA are predicted to see water levels decline by more than the trigger threshold within the next three years. All of these bores source water from the Walloon Coal Measures.

Extent of immediately affected areas



### Long term affected areas

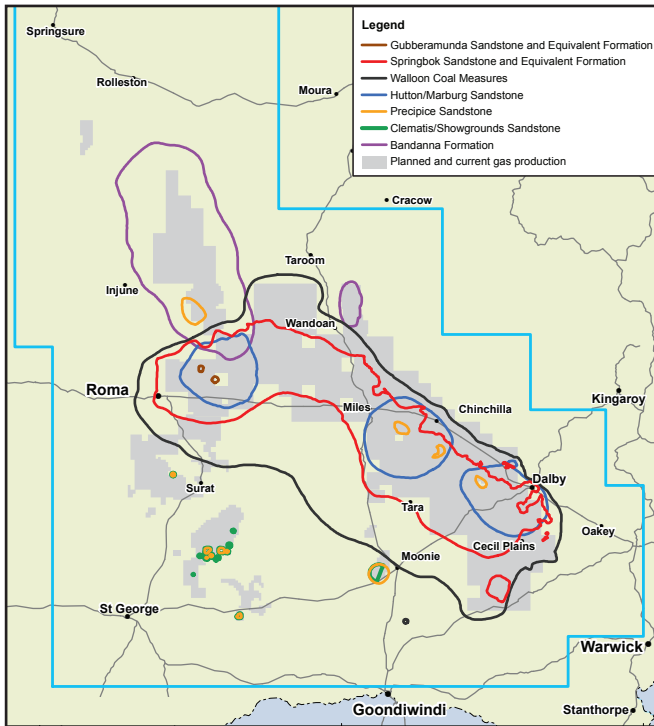
The Long Term Affected Area for an aquifer is the area where water levels are predicted to decline by more than the trigger threshold any time in the future.

The UWIR found that over the long term 528 registered water bores are predicted to be affected. Of these, 400 tap the Walloon Coal Measures, 104 tap the Springbok Sandstone, 23 tap the Hutton Sandstone, and one taps the Gubberamunda Sandstone.

### 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 at QWC's website: [www.qwc.qld.gov.au](http://www.qwc.qld.gov.au)

### Extent of long term affected areas



### Condamine Alluvium

The predicted maximum impact on water levels in the Condamine Alluvium is approximately 1.2 metres on the western edge of the alluvium with an average of approximately 0.5 metres for most of the area. This impact is less than the trigger threshold of two metres for unconsolidated aquifers, and therefore there is no long term affected area for the Condamine Alluvium.

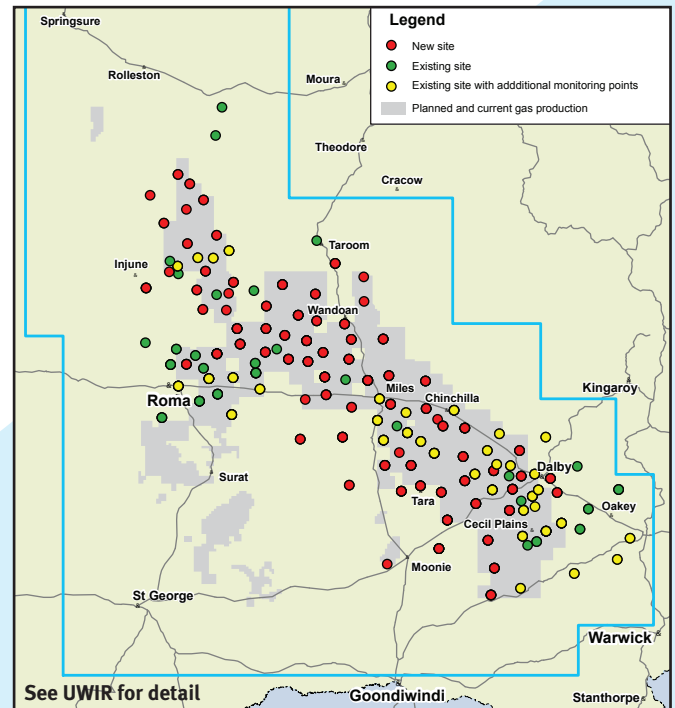
## Water monitoring strategy

The UWIR details an integrated regional water monitoring network to collect data on water levels and basic water quality in the Surat CMA, on an ongoing basis. There are already networks of monitoring bores to collect data in the Surat CMA operated by government or by petroleum tenure holders.

To complete the regional water monitoring network, it is proposed that an additional 392 water level monitoring points will be constructed to complete a total network of 498 monitoring points at 142 geographic sites. Water quality will be monitored at 120 monitoring points. The monitoring works will be constructed by petroleum tenure holders with measuring points set in several aquifers at different depths.

Petroleum tenure holders are already required to carry out baseline assessments of private water bores before production commences. This data assists tenure holders and bore owners to complete 'make good' agreements if necessary. The UWIR requires petroleum tenure holders also carry out these assessments for any additional bores in which a water level impact of more than one metre is expected within the next three years.

### Proposed groundwater pressure monitoring network



## Spring impact management strategy

There are 71 spring complexes (which in total contain 330 spring vents) and 43 watercourse springs in the Surat CMA, some of which are of national conservation significance as they provide unique ecological habitats and are associated with a range of cultural heritage values.

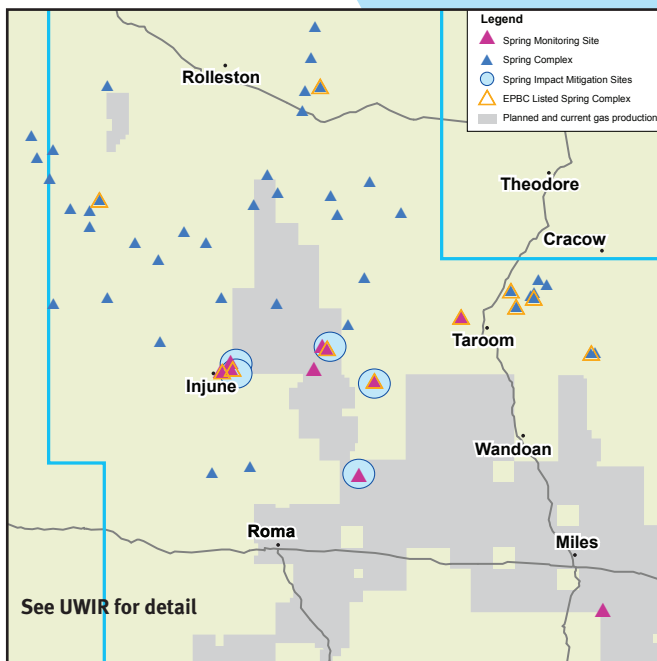
Springs are fed by aquifers. If the water level in the source aquifer is lowered, then the flow of water to the spring will be reduced, potentially affecting spring values. The UWIR predicts impacts in the aquifers beneath the natural springs in the Surat CMA, including the source aquifers for the springs.

Of the 71 spring complexes in the area, there are five where the predicted decline in water levels in the source aquifer for the spring is more than 0.2 metres at the location of the spring. At these sites petroleum tenure holders are required to evaluate potential mitigation options.

Reports evaluating the potential options at each site and identifying the best option are to be submitted to QWC within nine months of the release of the final UWIR. The UWIR will be amended to require implementation of the best option.

Petroleum tenure holders are also required to monitor conditions in springs.

#### Spring monitoring sites



## Responsible tenure holders

Petroleum tenure holders are obliged under law to 'make good' impairment of private bore supplies that result from petroleum and gas activities.

This 'make good' requirement may be achieved by making alterations to the bore, establishing a replacement water supply or by some other measure.

The UWIR sets rules to determine which petroleum tenure holder is to carry out these responsibilities as more than one tenure holder could be contributing to the impact.

The Department of Environment and Heritage Protection (EHP) has the power to ensure petroleum tenure holders carry out their obligations.

## Review and research

QWC is promoting further research, in conjunction with research bodies, to improve knowledge about the groundwater flow system, such as the interconnectivity between aquifers. These learnings will then be fed into improving future groundwater flow modelling, which will support subsequent revisions of the UWIR. QWC will also continue its research into springs.

## What now?

The approved report is a statutory instrument under the Water Act. Tenure holders have responsibilities for directly implementing various aspects of the report while various Government agencies will have a role in ensuring proper implementation of the report.

The responsible tenure holders identified in the Surat UWIR are primarily responsible for implementing the make good obligations; undertaking baseline assessments; and implementing the Water Monitoring Strategy and Spring Impact Mitigation Strategy.

The QWC will provide an oversight to responsible tenure holders in implementing the report and will prepare an annual report on the implementation of the UWIR, including progress of the Water Monitoring Strategy and Spring Impact Mitigation Strategy. The QWC will also obtain regular updates from tenure holders about their plans for development to assess if changes in development will cause changes to impact predictions.

Regulatory oversight is provided by the Department of Environment and Heritage Protection (EHP), the Department of Natural Resources and Mines (DNRM) and the GasFields Commission.