

The Impact of Unconventional Gas on Water Resources:

Replacing Myths with Scientific Evidence

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GROUNDWATER RESEARCH AND TRAINING

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The National Centre for Groundwater Research and Training is a consortium of 12 universities, CSIRO and a number of industry partners with specialisation in groundwater.

National Centre for Groundwater Research and Training was launched at Flinders University on 22 January 2009 by the then Minister for Climate Change and Water, Senator Penny Wong.



In its first five years, the NCGRT completed more than 150 research projects, and graduated more than 200 professionals.

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Water Issues for Unconventional Gas

- 1) Different for Shale / Tight Gas and CSG
- 2) How to get water to the site
- 3) Managing co-produced water (and salt)
- 4) Unplanned fracture propagation
- 5) Well integrity
- 6) Groundwater pollution
- 7) Effective monitoring
- 8) Government controls, regulation and compliance

Possible Negative Water Resource Impacts

Subsurface Issues

- depletion of shallow aquifers
 - impacts on surface water and ecosystems
- contamination of shallow aquifers
 - introduced fluids
 - naturally occurring contaminants (e.g., salts)

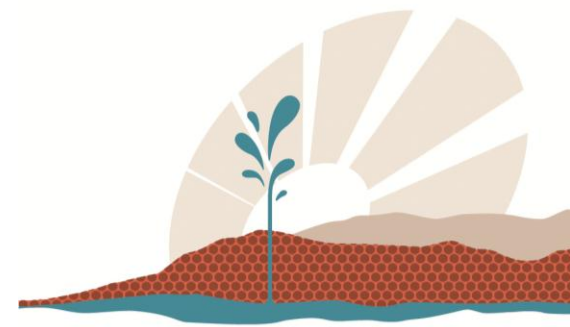
Surface Issues

- surface spills
- disposal of co-produced water

Creation of Subsurface Pathways

Risk Factors

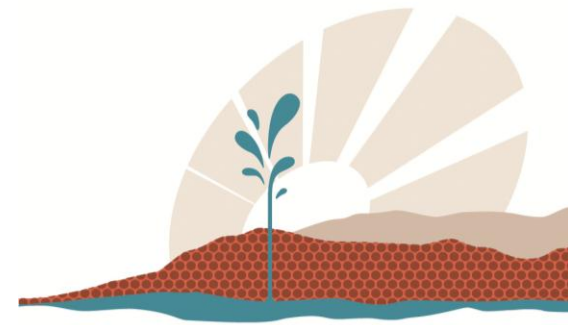
- presence of fractures and faults
- imperfect well construction
- presence of relict, leaky wells
- hydraulic fracturing



We need to quantify these risks!

This can be done using:

- available evidence
- simple calculations
 - typical rate of groundwater movement
 - typical permeabilities of aquitards



Key Review Documents

Engineering energy: unconventional gas production. Report for the Australian Council of Learned Academies, 2013.

The American Experience with Unconventional Natural Gas and Oil. University of Texas at Austin, 2012.

*An analysis of coal seam gas production and natural resource management in Australia: Issues and ways forward,*The Australian Council of Environmental Deans and Directors, 2012.

Water Produced in Coal Bed Methane Recovery, Norwegian University of Science and Technology, 2011.

Scoping Study: Groundwater Impacts of Coal Seam Gas Development – Assessment and Monitoring, Department of Infrastructure and Planning, 2008.

Shale gas extraction in the UK: a review of hydraulic fracturing, The Royal Society and The Royal Academy of Engineering, 2012

Management and Effects of Coal Bed Methane Produced Water in the Western United States, National Academy of Sciences, 2010.

Fact-Based Regulation for Environmental Protection in Shale Gas Development, The Energy Institute, The University of Texas at Austin, February 2012.

Completion Date: December 2015

Scope

- onshore unconventional gas
- induced seismicity
- creation of subsurface pathways
- depletion of shallow aquifers
- groundwater contamination
- disposal of co-produced water and salt
- surface spills

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