

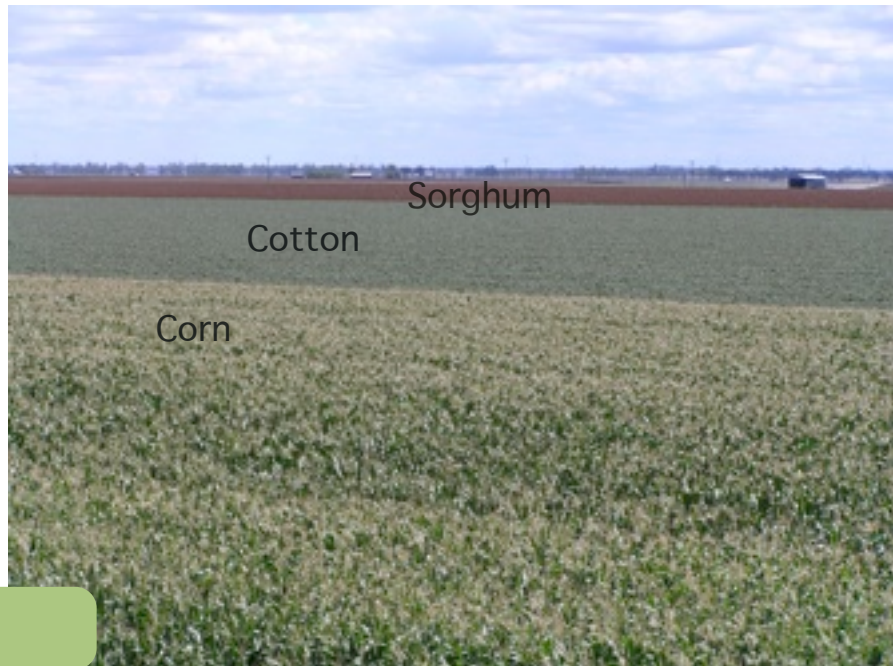
Why Coal Seam Gas Extraction and Intensive Cropping Are Not Compatible

Coal Seam Gas Extraction Will Deplete Underground Irrigation Water Supplies, Contaminate Agricultural Land, Destroy Long Term Food Production and Town Water Supplies.



Irrigated crop production occurs on the deep fertile clay soils along the watercourses of the Darling Downs floodplains. This land is some of the most productive in Australia for grain and cotton.

The main crops grown are corn, sorghum, wheat, barley, canary, cotton and millet, plus large areas of grain legume crops mainly for human consumption such as chickpeas, mungbeans and soybeans. A total of 10 crops are regularly grown.



Very Productive Cropping All Year

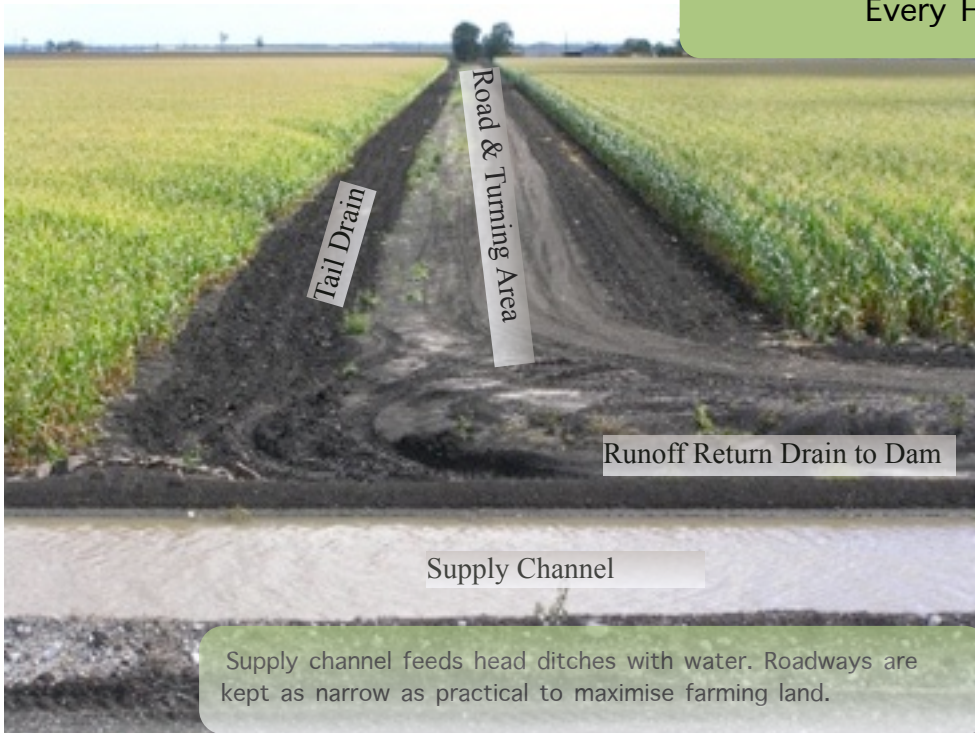
With irrigation and our favourable climate for both summer and winter cropping, two crops per year can be grown on the same land.

This irrigated land is the most valuable “broadacre” farming land on the Darling Downs and in Queensland. It has a market value of \$12,000 - \$15,000/hectare because it generally has an allocation from the Condamine Alluvial Aquifer (CAA) and/or access to high flow water in the river or creeks or overland flows. When adequate rainfall and irrigation water is available

crop yields (corn 12 t/ha and sorghum 11 t/ha cotton 12 bales/ha) are equal to the best in Australia.

These irrigated cropping areas are the financial backbone of the Darling Downs agricultural towns and Toowoomba. This irrigated production is the wealth creator in the drier years when dryland agricultural production is markedly reduced. This creates a lot of employment in the local community.

Every Hectare Is Highly Productive



Because of the high capital costs of the land, infrastructure (dams, bores and irrigation systems) plus machinery, every hectare of land must be productive. Land that is not actually cropped is used for irrigation infrastructure such as water supply channels, head ditches, irrigation bays, machinery turning areas, tail drains, roadways, cotton module building pads and machinery parking areas. All land is utilised.

Supply channel feeds head ditches with water. Roadways are kept as narrow as practical to maximise farming land.

Once these deep clay soils are laser levelled to a uniform slope, they are ideally suited to furrow and overhead irrigation because of their very high water holding capacity. The soil profile can be saturated to approximately 1.4 metres which equates to 3ML/ha.

Paddock uniformity in soil type, slope, nutrition, plant population and irrigation water application are critical to achieving profitable yielding crops.



Head ditch which fills with water to supply water to field via siphons.

Controlled Traffic Farming

Clay soils are very prone to tyre compaction which drastically reduces crop root growth and yields, so the Controlled Traffic Farming System is now imperative and standard practice so as to produce economically viable yields. Soil tillage also damages soil structure so zero tillage is now general practice.

With the Controlled Traffic System, farm machinery uses the same wheel tracks for all operations, and GPS guidance allows very precise application of fertiliser, planting, spraying and harvesting operations.



Fertilising

Fertilising is done before planting with the fertiliser being placed into the soil using discs, which provide very minimal disturbance to the soil, ensuring maximum moisture and groundcover are retained. Utilising GPS allows the fertiliser to be placed directly above where the following crop will be planted, allowing the crop to access nutrients as soon as it is planted.



Planting

Planting is generally done following rainfall, but, as visible here furrows are still present allowing the field to be irrigated if needed to ensure a crop is established, even during an extended dry period.



Harvesting

Even harvest operations occur on the same tracks as other machinery, once again minimising soil compaction and damage to the soil structure. Even following rainfall when fields are still relatively wet, operations can occur without significant damage to the field and soil structure.

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Growers have installed expensive overhead lateral move irrigation infrastructure to further improve their water use efficiency.



Fields are designed by engineers to allow for maximum field sizes while allowing maximum water use efficiency. This allows very little room to install gas infrastructure.

CSG test holes. With cultivation in the background.



CSG Compressor Station. Where does this fit?

Resource Management (or Destruction)

The efficiency of an irrigation system is governed by how well it is designed and constructed to control water flows and rainfall runoff. The system must be designed so as machinery operations minimise soil compaction; even tillage damages soil structure and thus reduces crop growth. Therefore the drilling of gas wells and the associated pits, and the installation of underground pipelines, will be devastating to the soil's productivity and the precisely designed irrigation systems, as well as being a major obstruction to controlled traffic farming operations.



Crop rows planted between permanent machinery wheel tracks.

Zero Till fallow field covered in straw between crops. This time is used for building soil moisture for the next crop.



Most of the problems with soil disturbance affecting water flows on the floodplains, such as extra roads, salt ponds and pipelines and general obstructions to controlled traffic farming, are also a great threat to raingrown cropping areas.

Water flows that are not controlled properly can be very destructive to the land causing erosion. Anything that restricts drainage can cause inundation and high crop production losses. These are 2 examples of what can happen when previously laser levelled areas are disturbed by boring,

building well pads, trenching and uncontrolled traffic wheel tracks.

In short it is like putting many streets through a major city park – some people benefit from the increased accessibility, but not the people who have always used the park.

Only 1.5% (2.6 million hectares) of Queensland is good quality cropping land and of this only 800,000 hectares is irrigated cropping land. **Most of this very productive irrigated land, such as the CAA, is now covered by Petroleum and Gas leases.**

The communities immediate concern is the CAA, however the protection of other strategic cropping land needs detailed consideration prior to any further expansion of the CSG industry.

Work is well under way for identifying Strategic Cropping Lands. A group of Darling Downs Agricultural Consultants have formulated a productivity index table, using valuable government soil information, to rate cropping land.

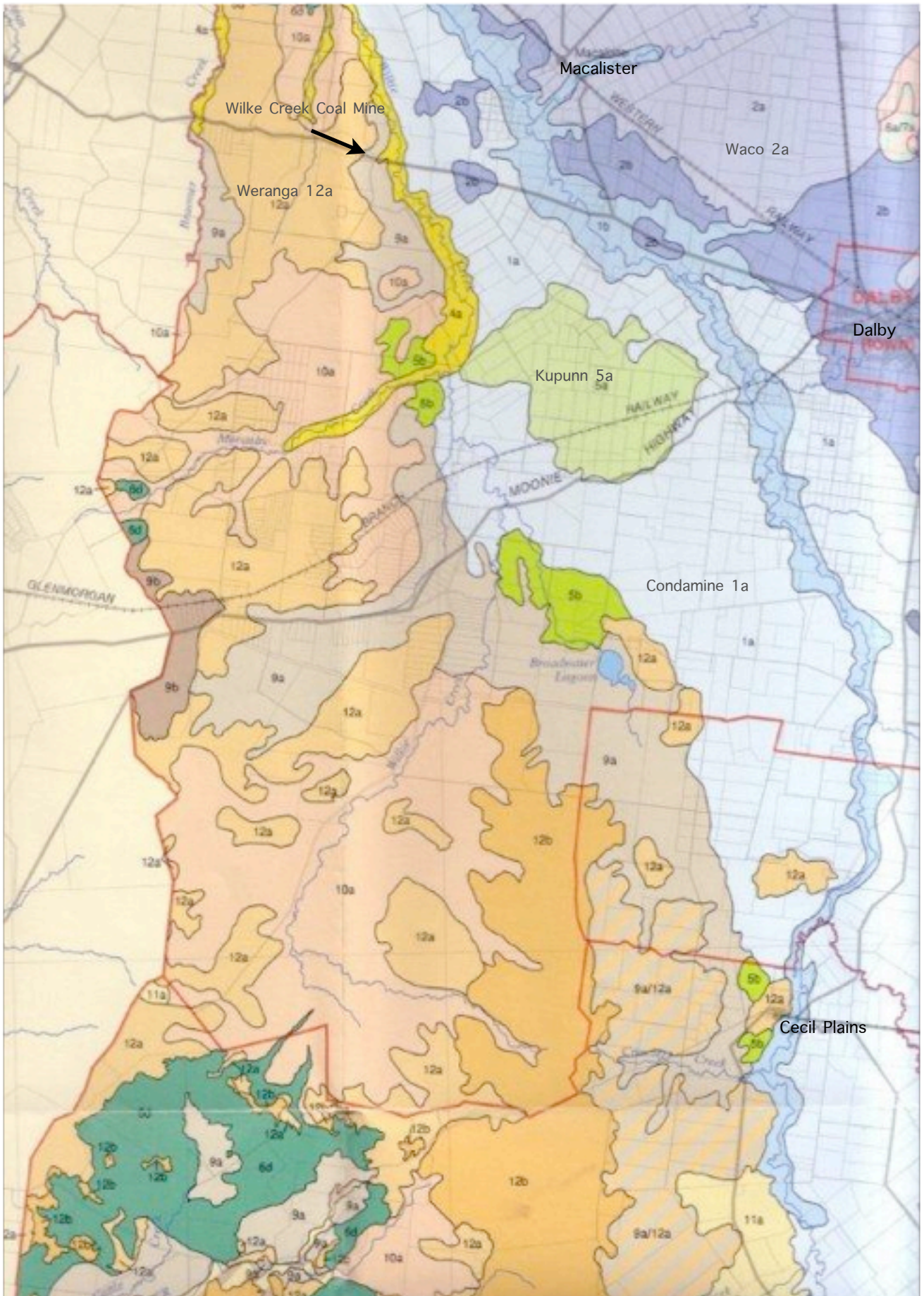
Table 1. Productivity rating system for cropping land.

	<i>Soil Type Classification Examples</i>	Condamine	Waco	Kupunn	Weranga
	<i>District</i>	Nandi	Jimbour	Kupunn	Wilkie mine
	<i>Soil Type Zone</i>	1a	2a	5a	12a
<i>Cropping Suitability Criteria</i>	<i>Criteria Explanation</i>				
Cropping Frequency = 40 points	The ability to produce crops on a consistent and profitable manner. Cropping programs that statistically produce 13 or more crops in a 10 year cycle score 3points each and a maximum score. Eg Darling downs Jimbour plain. Another area as an example in the Fitzroy may be 5-6 crops in 10 years then the score would be 15-18 points.	30	39	39	3
Crops regularly grown = 30 points	3 points for crops grown in the main systems of the area. Crops include: Winter Cereals Winter Pulses Winter Oilseeds Summer Cereals Summer Pulses Summer Oilseeds Fibre Crops Peanuts/navy beans (Mainly the Burnett) Birdseeds Forage/hay production summer and winter	27	27	27	6
Support and Infrastructure = 20 points	Strategic cropping lands need access to input suppliers, labour, Transport, Storage and processing. These cropping enterprises ensure the long term viability of the local economies. < than 50 km from a centre of 3000 population is 20 points 50- 100 km is 15 points 100-150 km is 10 points > than 150 km is 5 points	20	20	20	20
Climate suitability for cropping = 20 points	Need to consider rainfall amount, intensity and time of year. Also considers temperature and evapotranspiration of crops and location. Toowoomba southern downs = 20 points Dalby, Burnett = 17 points Border rivers, Chinchilla and Tara = 15 points Central Highlands, Roma, St George= 10 points Charleville = 5 points	17	17	17	17
PAWC (plant available water capacity) = 50 points	1 point for every 5mm	45	50	46	8
Slope = 20 points	Part of the natural landscape. Needs to be able to drain freely but not desirable to shed and cause erosion and degrade the topsoil. Below .03% = 10 points .04 – 1% = 20 points 1 – 2% = 15 points 2 – 3% = 10 points 3 – 5% = 5 points Above 5% = 0 points	20	20	20	15
Soil Constraints = 20 points	Soil constraints that would be physical on the surface and physical or chemical in the sub soil which then will inhibit crop production to it's full potential No limitations = 20 points Problems below 80 cm = 15 points Problems below 60 cm = 10 points Problems below 50 cm = 5 points Crusting problem only = 15 points	15	20	17	1
Total		174	193	186	70

Less than 100 not to be deemed Strategic Cropping Land.

Soil Type Classification Map

Source: Central Darling Downs Land Resource Map Areas DNR.

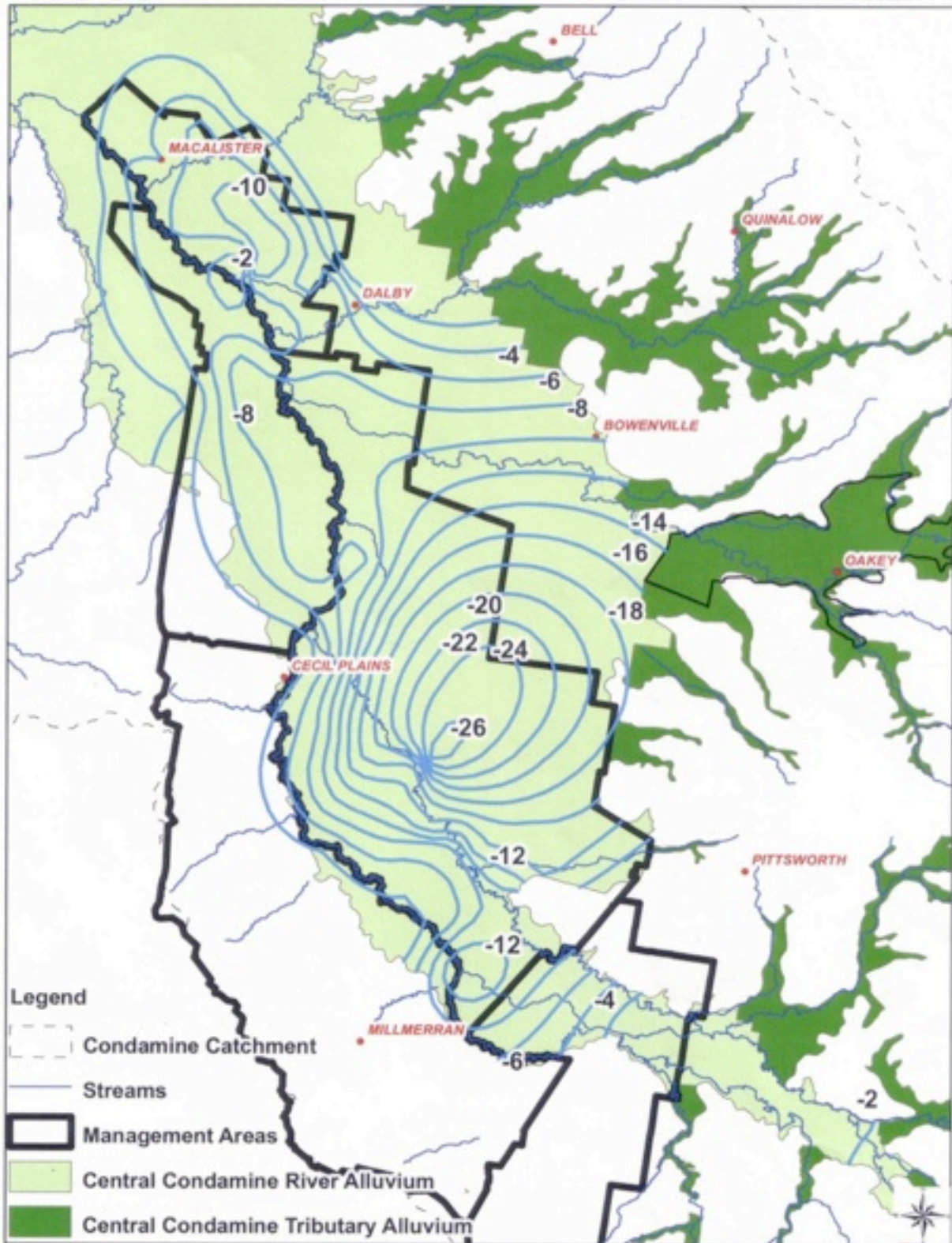


Central Condamine River Alluvium Water Level Changes (1962-1968 to 2008)



Map (sw_alr_08_035)

25th August 2008



Legend

- Condamine Catchment
- Streams
- ▭ Management Areas
- Central Condamine River Alluvium
- Central Condamine Tributary Alluvium

0 5 10 20 30 40
Kilometres

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CAA Usage Already Unsustainable

All users of water from the CAA have taken and will be asked to take further allocation cutbacks. Presently some 66000 ml are been used (Already down from 90000ml of allocation in 2004) and the Sustainable Diversion Limit (SDL) has been indicated at 40000 ml. This means that users are looking at getting only 40-50% of their original allocation, and that could also include towns like Dalby!



Dalby already has major problems with its water supply. Dalby town was totally dependant on CAA water during the summer of 2009/2010 while on level 6 water restrictions. The town bores could only just keep up with the small 4ML per day requirement. At times there was only 8 hours reserve supply.

CSG Exclusion Area - CAA Must Be Excluded Now

The CAA should be excluded from the proposed 1000+ CSG wells, until research and experience can confirm that it is possible to extract gas without impacting on irrigated agriculture and town water supplies because of:

- 1. Economic Importance** - The agricultural sector is the mainstay of this rural area and during the recent financial and mining downturn, it was the only sector to increase productivity and retain jobs. Flow on effects employment as 1 on farm job provides 6 jobs in the respective service industry.
- 2. Only Secure Water** - The CAA is the secure portion of the water supply for many towns in the Condamine Catchment. For Western Downs Regional Council 18 out of 22 towns are dependant on underground water. Groundwater is the only reliable water source for irrigators. It is the backbone of irrigated agricultural production.
- 3. Loss Of Strategic Cropping Land** - Irrigated and dryland farm production will be decreased by CSG operations through the direct loss of land to gas wells pads, salt water dams, roads, and pipelines.
- 4. Lost Productivity** - This is the most productive broadacre food and fibre area in Queensland. Any depletion of the CAA means less irrigated cropping and more dryland cropping, which produces less than half the economic return to farmers and the region.
- 5. Salt, No Solution** - There is presently no solution to dealing with the millions of tonnes of salt that will be brought to surface.

Too Many Unanswered Questions

There are still many questions to be answered about the impacts of CSG wells on farming and underground aquifers.

Where will the salt end up?

What is the solution to disposing of millions of tonnes of salt?

How can the aquifer be replenished after the water drops to the trigger level?

Irrigators have a real concern that if the new trigger levels are exceeded due to drainage from CSG activities, then how would this be rectified.

Are we destroying a very productive long term agricultural system to provide cheap coal seam gas?

Will farmers still be able to irrigate crops using aquifer water when the gas is finished?

Summary

What is needed now is a very well researched future development plan. We must firstly identify strategic cropping lands and be prepared to agree to protect them from any short term/ long term degeneration, such as CSG exploration and production. Not only do these activities inhibit all crop production systems, they also have the potential to severely affect water quality and availability, for crop production and town water supplies.

There has been alarmingly little research into the effects of the CSG industry on irrigated agriculture.

There is absolutely no long term proof in Australia or overseas that coal seam gas extraction is a compatible activity with irrigated cropping.

Where is full rehabilitation of cropping lands being demonstrated for all to see. Surely this issue alone must be a priority if any more development is allowed to happen.

The expansion of the CSG industry into strategic cropping land, such as CAA, should be halted

until more research is done, and all the effects of present gas and water extraction are known.

A Ministerial Media Statement on Feb 10th 2010 regarding the Queensland Government's proposed policy of protecting key food producing land quotes a United Nations report which "estimates that up to 25% of global food production could be lost by 2050 due to climate change, loss of agricultural land and water scarcity."

The report also "estimates that global food production will need to increase by 50% by 2030 and double by 2050."

So will Queensland crop production be increasing by 2050 or are we part of the 25% decline?