Submission from
Basin Sustainability Alliance

Productivity Commission inquiry into Non-financial barriers to mineral and energy resource exploration

March 2013

The Basin Sustainability Alliance (BSA) wishes to make this submission to the Australian Productivity Commission for consideration as part of its 12-month inquiry into the non-financial barriers to mineral and energy resource exploration. (*Productivity Commission Issues Paper Dec 2012: Minerals and energy Resource Exploration*).

This written submission is provided as a follow-up to the in-person meeting BSA representatives David Hamilton, Lyn Nicolson and Anne Bridle held with Productivity Commission representatives on 27 Feb 2013.

The Basin Sustainability Alliance is a Queensland-based group representing the concerns of landholders and rural communities in relation to the unprecedented scale and pace of development underway in the coal seam gas (CSG) industry in Queensland.

BSA's charter is focused on ensuring the sustainability of land and water resources for future generations - particularly highlighting the risk CSG development poses to the Great Artesian Basin. It also plays role as an advocate for landholders who are facing uncertainty and frustration of CSG development in their communities.

BSA members feel strongly that the Coal Seam Gas industry is steaming ahead in Queensland with an alarming lack of monitoring and research. Under the current systems, there is a real danger that CSG development will impact on health and communities and damage vital natural resources, and food and fibre production for future generations.

More information about BSA and its official charter can be found at: www.notatanycost.com.au.

BSA's key concerns are as follows:

Lack of Regulatory powers – ie. does the Qld Government have the power to act?

In November last year, BSA wrote to Queensland Deputy Premier and Minister for State Development Jeff Seeney to ascertain the capacity of the Government to recondition CSG activities that are deemed too environmentally harmful. BSA sought assurance from Deputy Premier Minister Seeney, that the Government has the power to stop CSG activities in a region if the risks are found to be high. (BSA's letter makes reference to a research paper by Nicola Swayne "Regulating coal seam gas in Queensland: lessons in an adaptive environmental management approach?" attached.)

Minister Seeney replied on 11 March stating that he had referred the letter to the Minister for Environment. The current lack of a response to this question is of concern to BSA.

Our question is - if water or any other environmental related impacts are greater than intended/significant or predictions of impact change for the worse – how does the Queensland Government wind back conditions for projects already approved in order to give assurance that water resources are not severely compromised?

Policy changes enabling industry

BSA is concerned that current legislation and policy is geared towards removing barriers to allow more streamlined approach to mining exploration, when it is our view that there is still currently not enough science and baseline information available to assess the true impacts that the coal seam gas industry will have on the future sustainability of our land and water resources.

Queensland State Government regulation leans towards industry self regulation and an adaptive management regime that BSA considers lacking.

Further, BSA is struggling to see linkages between scientific research currently commissioned or proposed and federal and state planning processes. In the face of uncertainty it is critical that new information/ science infers planning processes to the degree that failure to act may ultimately bear liability to governments.

Lack of communication to those bearing impact

Whilst a number of processes allow for public input into CSG development, the continual flood of environmental authority amendment applications (for CSG development) that we are now seeing in Queensland are beyond community capacity to track the potential and changing impacts and square off that the government has conditioned the impacts adequately. By sheer volume and scale of projects, those ultimately bearing the impacts of development are denied a voice.

Notification processes are lacking, where companies are only obligated to advertise "publicly" (ie. metropolitan newspaper public notice), and not make direct contact with landholders related to their tenure until such time as a CCA process commences..

Sustainability of our Water Resource

Landholders and the many communities that rely on groundwater must not have their access to water compromised. As a long term sustainability principle, no one should have reduced access to quality and quantity of water as a result of CSG activity.

In Queensland, CSG and mining proponents have a right of way to use and interfere with water. In the case of Petroleum holders this right is conferred under s185 of the Petroleum and Gas (Production and Safety) Act 1994. There are significant concerns about this right of way, which include, but are not limited to:

- Agricultural and other use in Queensland is highly regulated through resource operations plans and has been significantly curtailed through irrigation entitlement cutbacks to ensure long term sustainability. Current and proposed CSG development adds a major and unlimited water user to the equation in an already stressed system.
- In Queensland, there are no conditions in the Environmental Authority conditioning of Petroleum tenure holders around impact on groundwater.
- There is concern that the industry may not have the capacity to make good water impacts from CSG extraction, that is, in an already stressed system and with water impact to come from CSG industry development, from where will the water come to make-good impacts to water?
- Whilst the government calls on CSG companies to lodge risk management plans regarding their activities, the government does not have the capability nor resources to assess such reports.
- Whilst drilling data is received by government in a timely manner is not incorporated into the water modelling to predict impacts in a timely fashion, which may reduce capacity in modelling water impacts
- There is a time lag between cause (extraction) and affect (water impact).
- Water quality change is only protected by make-good if there is a decline in water that is associated with water quality decline. Otherwise the pathway for redress is through the a civil suit through EPA by water user.
- CSG Water Management Policy: there has been a change to incorporate beneficial use as first priority versus minimise/limit impact
- Beneficial use options put forward for Condamine Alluvium include substitution of licence entitlement for treated CSG water (virtual reinjection) versus reinjection. There is considerable community angst and scientific uncertainty around which method provides or enhances long term sustainability of the water resource.

Impact on our Land

BSA has serious concerns about the impact of CSG on liveability and viability of existing landholders and rural communities. Concerns include:

- CSG companies are inflexible in infrastructure placement (CSG wells, roads, pipelines and associated infrastructure)
- Petroleum tenure holders have the attitude that they hold a right of way inn their development plans and will therefore come in over the top of a landholder's business
- There are still no answers to the disposal of the hundreds of thousands of tonnes of salt to be produced as a waste product of the petroleum activities
- No evidence that some soils can be rehabilitated to the previous use and suitability class
- Fugitive emission is also a concern – some recent preliminary university studies found very high levels of methane in the atmosphere near CSG mines.

Landholder rights – Power imbalance

At the heart of BSA's concern about the land access framework is the imbalance of power. BSA believes that the current framework does not fully recognise or acknowledge that CSG exploration and production infrastructure and activities are not voluntary for landholders.

Issues include:

- Landholders not compensated for all loss (eg trauma and stress aspects)
- Currently some companies are offering "incentive payments" to bypass legal advice, or too get the landholder "over the line"; eg sign by a certain date.
- CCA unsigned: legals and other costs not recouped, therefore a landholder's financial capacity to protect viability could be eroded through inability to claim costs
- Accounting implications of signing CCAs
- Socio-economic impacts - impact on other businesses (eg staff etc)
- Distance from dwellings

Please refer to BSA's submission the Land Access Review for more details (attached).

Research Gaps

BSA has identified a number of gaps in baseline information and scientific research and is continuing to review its concerns in this area. Please refer to the list of Research Gaps prepared by Ruth Armstrong in late 2012 (attached).

CASE STUDY – A Landholder's experience

By way of example, BSA wishes to present the case study of Cecil Plains farmers Dave and Ruth Armstrong (author of this submission). The following outlines the experience of this farming enterprise in the context of the Productivity Commissions brief.

This case study provides comment on issues surrounding coal seam gas exploration in Queensland. The relevant state legislations pertaining to this industry in Queensland, to which this submission refers are as follows:-

- Queensland Petroleum and Gas (Production and Safety) Act 2004
- Queensland Water Act 2000
- Queensland Environmental Protection Act 1994

Ruth's story:

My husband and I are the owners of the property 'Yanco Farms', located on the Toowoomba-Cecil Plains Road between the North Branch of the Condamine River and Norwin on the Central Open Darling Downs in Queensland. The closest town to our farm, and to this unique inner Downs area is Cecil Plains. Our property in an intensively cultivated, fully integrated irrigation farm that grows sorghum, corn, sunflowers, soybeans, wheat, barley, chickpeas and cotton. Horticultural crops have also been grown on occasion

The central open Darling Downs is a dual crop agricultural ecosystem, capable of producing high quality, high yielding summer and winter crops each year. The combination of a mild climate, fertile, moisture retentive soils and access to water for irrigation produces an agricultural ecosystem that is world renowned.

In about 2008 or 2009, residents in our agricultural community east of Cecil Plains began receiving letters in the mail from Arrow Energy, inviting us to attend information sessions and view poster displays about their operations. Our community was generally aware that Arrow was operating a domestic coal seam gas facility at Grassdale, some 20 kilometres to the north-west (Figure 1). I did not attend any of these meetings personally, and very few members of my community did. At this time we were not aware that Arrow held exploration tenure over our farms and a related level 2 Environmental Authority.

In 2009, Arrow drilled two core holes east of Cecil Plains in the intensively cultivated agricultural region where I farm (Figure 1). The core holes were drilled in the railway reserve on state government crown land, so negotiations did not occur with any local landowner, and the first anyone locally knew what was happening was when the drill rigs showed up. It was at this time that our community became aware that the information sessions that Arrow were holding might not be about their domestic activities at Grassdale, and that they were exploring for coal seam gas in our community.

In March 2010, my husband was contacted by phone by an Arrow land liaison officer, who wanted to meet with us regarding Arrow doing a 6 well pilot project on our farm. We met with him two weeks later in April, where we were presented with a map of the proposed location for the pilot and one page of supporting information. We had a two hour discussion about the proposal. The

supporting documentation identified the tenure area as Authority To Prospect (ATP) 683 and described the reasons for drilling as follows:-

"The successful execution of previous drilling programs in the Bowenville block has proved coal thickness and gas contents. The Carn Brea pilot is the next step in field development planning which will gain the necessary production and operational knowledge to progress the development of the area. The project will extend the 2P reserves in ATP683P and demonstrate well deliverability. It will prove development concepts and also de-risk future development. With the ultimate aim of embarking on full scale field development across the Dalby South Block to help meet the domestic contracts and the need s of LNG trains."

After this meeting, I contacted the Department of Environment and Resource Management (DERM) as it was then called and spoke with the delegate of administering authority for the tenure area. I was informed that Arrow only had a level 2 Environmental Authority (EA) at that time, and that they would need a level 1 EA to conduct the pilot project because of the 40 megalitre holding pond required to store the produced water. The delegate provided me with a copy of the level 2 Environmental Authority.

It was only after this phone conversation, and through my own investigations that I identified the geographical extent of ATP683, understood the difference between an ATP and a Petroleum Lease (PL), researched the difference between a level 2 and a level 1 Environmental Authority, grasped which petroleum activities were permissible under level 2 and level 1 EA's, and did some research on the local geology to discover the presence of the Cecil Plains Syncline and the Horrane Trough, which is highly prospective for coal seam gas.

The delegate informed me that Arrow would need to apply to the department in order to obtain a level 1 EA, and that the application would involve a public submission process prior to grant. If I had not been informed of this, or if Arrow had chosen to contact my husband after the grant of a level 1 EA rather than before, then I am sure that I and anyone else in my community would never have had an opportunity to have any input into the approvals process for Arrow's exploration activities.

Throughout this time, Arrow also had a PL Application for part of ATP683 in with the Department of Natural Resources and Mines (DNRM). Our community was only informed of this development once the approval has been granted.

Currently, Arrow is in the EIS phase of their Surat Gas Project. ATP683 and the converted PL258 form part of this wider project. It is my understanding that projects under an EIS process generally proceed to full development if economic factors allow. In my assessment, if exploration uncovers an economically viable resource, and there are no state or federal matters of environmental significance to contend with, then the project will proceed to full scale development. From the perspective of a landowner in an exploration tenement, the entire process is most unsatisfactory.

There are several significant issues for my agricultural community with respect to large scale coal seam gas development. Firstly, the current land use is intensive. All farming businesses in the local area utilise every acre of the property for agricultural purposes. The uniform distribution of high quality soils means that extensive areas are under cultivation. There are no unutilised parts of the

farm that are available for positioning CSG infrastructure on. CSG development will have a direct impact on agricultural production.

The high clay soils will be rendered unusable if they are contaminated by produced CSG water. These soils will also suffer from compaction from large numbers of light and heavy vehicle movements which will result in a further decline in agricultural productivity.

This agricultural area is supported by a shallow alluvium – the Condamine Alluvium Aquifer (CAA). The CAA has been over exploited in the past, and bore owners have had cutbacks in entitlement in the order of 30%-50% in recent years in order to achieve sustainable extraction limits. The CAA is incised into the Walloon Coal Measures (WCM) (Hillier 2010 – report attached), which is the geological layer targeted for CSG production. In some areas there is little to no separation between the CAA and the WCM, and CSG extraction will cause water to move from the CAA into the WCM, creating further stress on the system.

There are also significant social impacts to consider from CSG development in the area east of Cecil Plains. The area is densely populated for an agricultural region, having been broken into 400 to 600 acre parcels when first developed. The district is also an active floodplain, and was historically flat and treeless. Residents have line of sight for five to ten kilometres over 360 degrees, so a gas field under construction and in production is going to have a significant ~~effect~~ impact on visual amenity.

The notion exists that CSG production, as opposed to open cut mining, can coexist with the current land use because it does not obliterate the current land use from the landscape, and per unit area, has a relatively small footprint in comparison. There is no evidence to support such a notion and there are other factors that will determine whether coexistence is possible. These include the intensity of the current land use, the extent to which the land can be returned to its previous use post development, the level of reliance of the current land users on groundwater and the risk posed to that groundwater, the population density of the community and geographic attributes of the landscape that can expose and screen the development.

Whether communities can coexist with CSG development is therefore not answerable with a single syllable. Rather, the various areas, communities and individual properties targeted for CSG development will have varying capacities to coexist and will sit somewhere on a scale depending on the factors mentioned above. It is unfortunately the case for my community that we sit at the high end of the scale for all of the risks – intensive land use on susceptible soils, groundwater dependent on an aquifer that will be negatively impacted, high population density in a landscape that exposes the development. Coupled with this is the fact that the area also contains a significant gas reserve. Andrew Faulkner, Arrow CEO has stated that somewhere between 25% and 40% of Arrow's gas within the Surat Gas Project area is located in the region above the Horrane Trough, east of Cecil Plains (Pers comm.).

Government and industry will argue that the environmental values mentioned above are afforded protection through the conditions of the tenure area's Environmental Authority. However, I find these conditions to be wanting. Firstly, there are no conditions in an EA which provide protection or limits to harm for land use. This is perhaps understandable given that this issue is outside the

scope of the EP Act. However, social impact assessments in proponent Environmental Impact Statements (EIS) consider agricultural land to be industrial land, and therefore they are regarded as low constraint, low risk areas for development, irrespective of their actual capacity to cope with CSG development.

Environmental Authorities will contain conditions which state that disturbed land must be rehabilitated to the previous use and suitability class. However, even though evidence may suggest that rehabilitation is not possible for certain soil types, the EA conditions do not reflect this distinction and activities are approved over the entire tenure area.

In Queensland, there are no conditions in EA's to limit impacts to groundwater from CSG activities, even though groundwater is recognised as part of the environment in the EP Act and is recognised as having environmental value for agriculture and as drinking water supply in the in the EP (Water) Policy 2009. Section 185 of the Queensland Petroleum and Gas (Production and Safety) Act 2004 states *that "A petroleum tenure holder may…..in the area of tenure (a) take or interfere with the water if taking or interference happens during the course of, or results from, the carrying out of another authorised activity for the tenure; Example 2 underground water necessarily or unavoidably taken during petroleum production.."* Because the P&G Act has this section, the Department of Environment and Heritage Protection (DEHP) do not place any conditions in EA's outlining the level of environmental harm that is acceptable to groundwater, both in terms of quantity and quality impacts.

Contrary to this situation, licenced users of the water must comply with their licencing requirements which generally set a volumetric limit on the amount of water that can be taken over a particular timeframe. In the Condamine Alluvium, licenced bore owners have been subjected to cutbacks in allocations of up to 50%, and to quote from the DNRM Central Condamine Alluvium Groundwater Management Area newsletter of 30th June 2012:-

"The groundwater resources of the CCAGMA continue to function in a "mined" condition with use significantly exceeding recharge and long term available supply. As a non-seasonally responsive aquifer, use in excess of recharge within the CCAGMA has and will continue to result in a progressive depletion of system storage, the key strategic asset of the groundwater system.

The only way this trend can be contained is through further water use reduction within the CCAGMA, hence the creation of the management area."

Bore owners in the scheme have been extremely co-operative with the regulator to achieve this end, and do so willingly in the knowledge that the desired result is a sustainable resource that can be enjoyed indefinitely. There is significant distress from groundwater users, both of the CAA and other aquifers of the Great Artesian Basin (GAB) regarding the petroleum industry's right to unfettered take of these resources, particularly in light of cutbacks that have taken place, moratoriums on further harvesting that are in effect and bore capping and piping schemes that have been undertaken in recent years. Either these groundwater systems are being mined unsustainably or they're not. In any case there cannot possibly be two sets of rules for different users, where the same resource is concerned.

There are conditions in EA's placing noise limits on petroleum activities. However, these noise limits can technically be exceeded until a "valid noise complaint" is made. If no complaint is made, then the petroleum activities continue. If a complaint is made, then the proponent must investigate. If it is found that noise limits have been exceeded then the petroleum tenure holder must come to an agreement with the person making the complaint. Options include erecting barriers, moving the activities further away or paying compensation. If the petroleum activities the subject of the complaint are already constructed, then compensation is the most likely mitigation strategy applied and the exceedence of the noise limits continues.

Once a gas field is established and water drawdown and gas extraction has commenced, it is extremely difficult to "switch it back off" without jeopardising the field's capacity to produce at a later date. Coupled with this is the fact that issuing tenure to a proponent is a more powerful exercise of statutory power than amending that right after it has been issued. There are no statutory public interest criteria by which the relevant Minister can refuse an application for grant of tenure. By departmental practice, it is assumed that development of the gas resource is in the public interest and that environmental considerations can be accommodated through conditioning (Geoff Edwards 2006). As the case study and accompanying information provided above shows, these assumptions are incorrect.

From my own personal experience, if the resource is in sufficient quantities and can be extracted economically, then exploration will transition to development. EA's are not adequate to protect environmental values from acceptable levels of harm, and current land uses, particularly in a rural climate, do not even factor in the equation. Significant amendments to the current regulatory regime are required. These include:-

Resource industry should not be exempt from planning instruments and should fall under the same planning authorities as every other land use;

Resource industry should not be exempt from water resource operation plans;

The State must undertake detailed environmental and social assessments for areas the subject of tenure allocation prior to issue of initial exploration tenure.

There has been a noticeable shift in public sentiment surrounding resource development, particularly where it interfaces with agriculture. While the resource extractive industries are considered a valuable part of our economy and society, it is no longer palatable for development to occur wherever there are resources to be harvested. The wider community now considers that resources development should be strategic and give greater regard to other valuable sectors of our society including agriculture and the environment.

It is indefensible that the resource sector is exempt from water resource plans, whilst other legitimate users of those water resources do so under the authority of a licence with the objective to achieve sustainable use and setting of threshold volumetric limits to water extraction. It does not sit well with water users and the wider community that they must achieve sustainable take of groundwater, whilst there is on the other hand no limit to the quantity or quality impacts that petroleum tenure holders can have on the very same water resources.

If the regulator will not introduce mechanisms to halt resources development once threshold limits of environmental harm have been reached, then it is essential that the State undertake comprehensive social and environmental assessments of the risks from resources development prior to the issuing of the initial exploration tenure. Any time after then is too late, if a region is later deemed to be unsuitable for resource activities, other than for the case where issues of national environmental significance are triggered under the EPBC Act. If an area is subsequently made available for tenure allocation, then comprehensive baseline environmental and social data must be obtained and made publicly available. These baseline environmental assessments would necessarily provide information on issues of national environmental significance as per the Australian EPBC Act. This information would be of benefit to explorers that are considering applying for tenure. Knowing that an area was of environmental significance would be a valuable decision making tool for the application.

Are the processes and conditions placed on exploration activities to access private land and Crown land where mining exploration is permitted, unnecessarily onerous? Are there particular examples of such processes and conditions?

From a land owner perspective, the conditions placed on exploration activities are not onerous. Rather they are completely unsatisfactory. Generally, the realisation that a land owner's land is the subject of exploration rights by a resource company occur when the resource company first contacts the land owner seeking access. The land owner will be at a distinct disadvantage. He will not be familiar with the relevant laws governing the activities. He will not understand the nature of the activities proposing to be undertaken. He will be completely taken by surprise and unprepared for the exploration activities proposed. The laws governing the negotiation between the parties regarding access are distinctly one sided, and the land owner may incur costs that are not necessarily recoverable.

It is essential that at the time of grant of tenure that all land owners within the tenure area are notified of the decision, provided with a map of the tenure area and are provided with information about the activities that have been approved. The land owner will then be in a position to do further research on the proposed activities if he so chooses and be prepared for an initial contact if and when it comes.

How can the mineral and energy exploration sector coexist with other types of land use, such as agriculture? Are the additional processes and conditions placed on exploration activities necessary to ensure agricultural production is protected? Are current government policies and legislative responses based on a robust and transparent account of the costs and benefits of different types of land and aquifer use?

The mineral and energy exploration sector cannot coexist with other types of land use, such as agriculture, without first having identified all of the various forms of agriculture that exist in the tenure area. There may be several different types of agricultural land use occurring in a tenure area and each one will have varying issues regarding the capacity for coexistence. Even though

exploration activities are generally less invasive and impactful than full scale production, they will have an impact, and will impact on different agricultural land uses to varying degrees. After the land uses have been identified, an assessment of the potential impacts of the proposed exploration activities on each form of agriculture must be made. This level of detail will inform the location, timing and type of exploration activities to be undertaken and the ability for the impacts to be successfully mitigated.

Generally, the processes and conditions placed on activities with regard to their impacts on agriculture refer to production activities and not exploration activities. However, there is a need for further conditioning of exploration activities where the current land use will be significantly impacted eg. Seismic activity during crop growing, pilot CSG activity on intensive current land use.

It is my understanding that the current government policies and legislative responses do not in any way account for the costs and benefits of different types of land and aquifer use, particularly in regard to exploration. As previously mentioned, no baseline assessments of any kind are conducted prior to issue of exploration tenure.

Page 22 Environmental Issues

"Non-invasive exploration activities, often conducted at the start of projects, may have little or no environmental impact."

I must disagree with this statement. All exploration has an impact and requires the signing of a Conduct and Compensation Agreement between the land owner / occupier and the tenure holder. This in itself is a major impact, and will cost the land owner time and money. The current status of the Queensland legislation gives an explorer the right to access land, even without an agreement in place. A landowner can only recoup his costs after an agreement has been reached, and the very essence of compensation is that it is payment for losses incurred, and not an additional source of income. So all exploration has an impact, and it is a rare land owner that will negotiate an agreement that makes him better off for the access.

Whilst some exploration activities may be considered non-invasive and have little or no environmental impact in some areas, the same exploration activities would be very invasive and have major environmental impact elsewhere. Seismic activities on an intensive cultivation enterprise will be substantially more impactful than the same activities on an extensive rangeland grazing property. Similarly, a 5 well pilot project on a 40,000 acre broadacre dryland cropping farm is substantially less invasive than the same activity immediately adjacent to a feedlot enterprise. (See photos – figures 2 and 3)

Are the environmental approval processes and requirements of the states and territories commensurate with the environmental risks posed?

As has been previously mentioned in this submission, the state environmental approval process and requirements are woefully inadequate for the protection of environmental values. DEHP in Queensland places no conditions in EA's for the petroleum industry regarding impacts on

groundwater, even though the petroleum activities, especially production activities will have significant, and in some cases, catastrophic impacts on groundwater.

It is apparent that there is a natural progression from exploration to production and very little if no ability to halt the progress to production if the resource satisfies the criteria of the tenure holder. At a federal level, the EPBC Act has some capacity to influence the process, but at a state level, the DEHP, through the EA process, seeks only to place limits on environmental harm where it can, and in some instances, not at all.

Further contact

BSA committee members are happy to be contacted further to discuss the matters raised in this submission. The initial contact point should be the author of this submission Ruth Armstrong as per contact details on cover page.

ATTACHMENTS (included as one PDF attachment in email)

1. BSA letter to Deputy Premier, Minister for State Development Hon. Mr Seeney, RE: Power of Government to cease activities that are deemed environmentally harmful, 27th November 2012

2. Reply from Deputy Premier, Minister for State Development Hon. Mr Seeney, 11TH March.

3. Swayne, Nicola (2012) Regulating coal seam gas in Queensland : lessons in an adaptive environmental management approach? Environmental and Planning Law Journal, 29, pp. 163-185.

4. IS THERE A DROP TO DRINK? An Issues Paper on the Management of Water Co-produced with Coal Seam Gas By Geoff Edwards Principal Policy Officer, Mining and Resource Strategy Queensland Department of Mines and Energy

5. Groundwater connections between the Walloon Coal Measures and the Alluvium of the Condamine River, John Hillier, August 2010

6. BSA LAND ACCESS REVIEW SUBMISSION, 19 December 2011

7. Research Gaps – Ruth Armstrong 2012

8. KMZ file – gas wells (Google Earth)

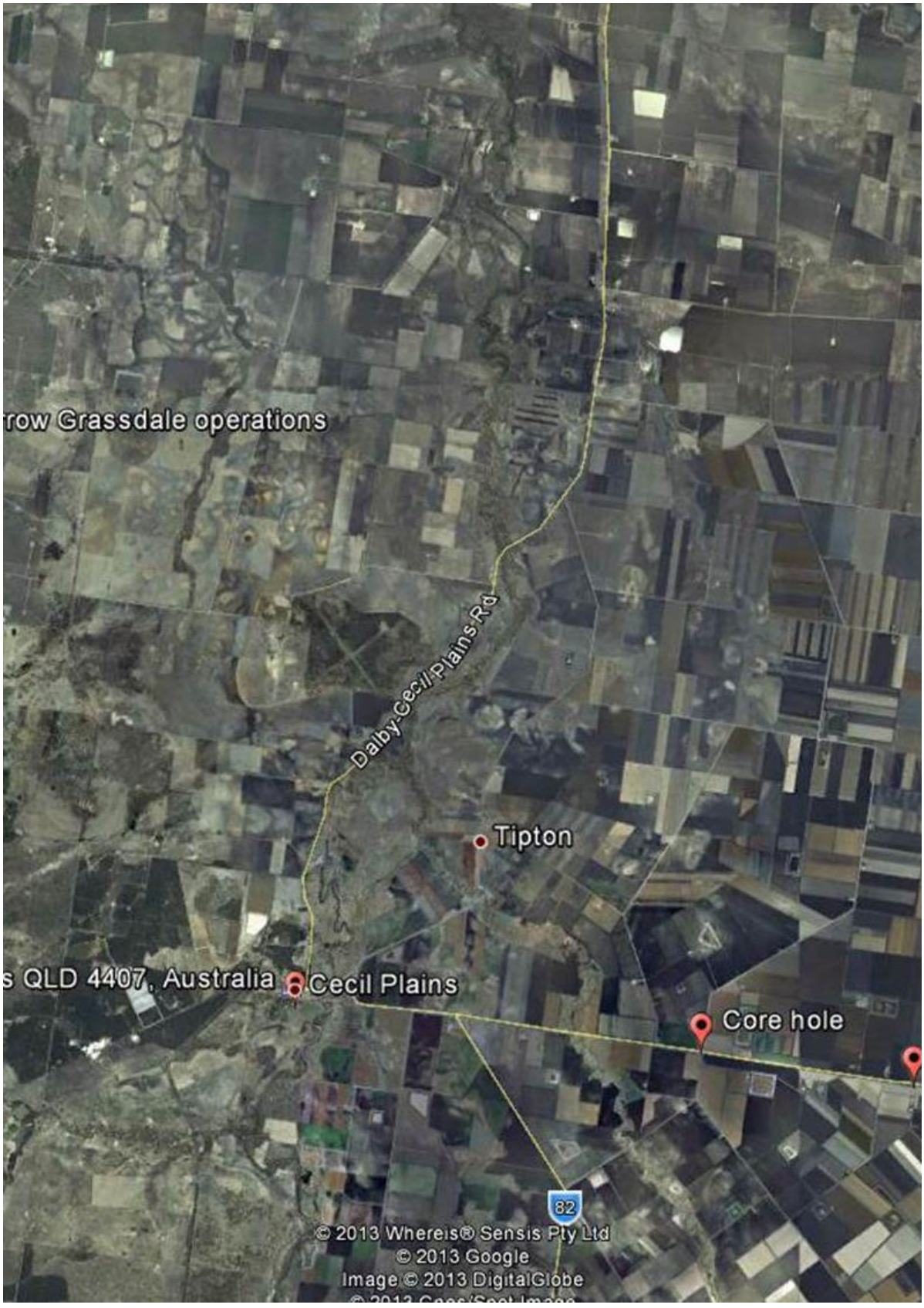
row Grassdale operations
Dalby-Cecil Plains Rd
Tipton
s QLD 4407, Australia
Cecil Plains
Core hole
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Figure 1

Figures 2 and 3: Example of a CSG exploration well footprint. This demonstrates their incompatibility with intensive cultivation.