Submission on the Galilee Coal Project EIS

(Northern Export Facility), also known as the China First Project

Paola Cassoni & Sonya Duus

Photos of Bimblebox Nature Refuge

The Coordinator-General
Attention: EIS project manager, Galilee Coal Project
Significant Projects Coordination
Department of Employment, Economic Development and Innovation
PO Box 15517
City East 4002

19th Dec 2011

Dear Coordinator-General,

We write with comments on Waratah Coal's EIS for its proposed Galilee Coal Project (Northern Export Facility), also known as the China First Project.

In particular, we focus on the destructive impact the proposed development would have on Bimblebox Nature Refuge. If the project were to be approved it would have a devastating direct impact on Bimblebox, while establishing a dangerous precedent for the mining of privately held protected areas across Queensland. It would also highlight the lack of adherence by Australian governments to the guidelines for protected areas set out by the IUCN.[1]

The direct loss of Bimblebox and the broader ramifications of mining a protected area warrant refusal of the project.

Beyond the impacts at the mine site, this project would also result in serious consequences, and long-term remediation costs, for:

- *the region* including a significant negative impact on the quantity and quality of water, substantial increases in the cost of living for non-mining employees, and the loss of employment in agriculture and manufacturing sectors;
- *for the state and nation* including a net loss of high quality biodiversity, substantial risks to the Great Barrier Reef due to an increase in coal carrier transport, and further weakening of other, more sustainable, non-mining sectors; and
- *global climate change* due to the extraction of currently stable, subterranean carbon being dug up and burnt, leading to an inevitable increase in CO_2 emissions.

To account for the impacts above, and particularly the long-term remediation costs, a rigorous cost-benefit analysis would be required. This could determine if the proposal would actually amount to a net-gain for the people of Queensland and Australia. It is notable, and readily apparent, that the current EIS fails to achieve, or in itself provide for, this determination.

[1] http://www.iucn.org/about/union/commissions/wcpa/

The bulk of this submission has been researched and put together by Sonya Duus on a voluntary basis. As such, our comments herein are necessarily limited. Not fully addressed in this submission are the impacts on surface water, environmental and social impacts from the proposed railway, and some of the very serious consequences of an expanded port at Abbot Point and the transport route through the World Heritage listed Great Barrier Reef. Notwithstanding the relatively narrow scope of this submission, the comments below provide an indication of the range and seriousness of the issues at hand.

Please don't hesitate to contact us should you wish further information.

Finally, by way of introducing ourselves:

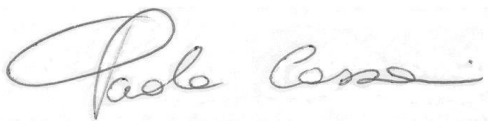
Paola Cassoni is a co-owner of Bimblebox Nature Refuge which would be destroyed by the proposed development. Paola has lived in the region for the past 30 years, while practicing in her daily life a commitment to conservation and sustainable living.

Sonya Duus spent several years living and working in the Alpha region, and was involved with the day-to-day work and research activities on Bimblebox Nature Refuge. She is currently completing a PhD at the Australian National University, and holds a BSc (Resource and Environmental Management) with first class Honours.

The submission has benefitted from the economic analysis undertaken by Economists at Large (see Appendix F of this submission for their full report). Contribution was also made by Michael Collins, a zoology undergraduate and one of the many volunteers who have contributed to, and learned from, the ongoing sustainable land management projects at Bimblebox Nature Refuge.

Please consider our comments with the serious concern they warrant.

Yours faithfully,



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Contents

Summary

The proposed project presents a number of unacceptable risks which have not been adequately assessed in the EIS, or for which insufficient mitigation is proposed. Assessed in total, these risks warrant refusal of the project. They include:

- The impact on local aquifers, including those that make up the Great Artesian Basin;
- The overall costs from the project (a cost-benefit analysis would be required to assess these);
- Impacts from subsidence on remnant vegetation and biodiversity;
- The long-term viability of the area, due to large-scale subsidence and impacts on groundwater, the lack of a rehabilitation plan, and the negative impact on other businesses and sectors;
- The likely changes to local fire regimes;
- The cumulative impacts of the proposed Galilee Coal project together with the other proposed 'mega' mines in the vicinity;
- The larger consequences of mining an IUCN category IV protected area;
- The impact on the global climate, including repercussions for human health and well-being, the environment and economies.

The impacts which are quantified by the EIS demonstrate that the small, mostly private short-term economic benefits of the project are outweighed by the unacceptably large and long term negative impacts resulting in a significant net detriment to Queensland, warranting refusal of the project. The negative impacts are:

- The destruction and degradation of Bimblebox Nature Refuge through open cut and underground mining;
- The net loss of remnant woodland with high biodiversity values ;
- Economic and employment impacts on the region, the state and the nation;
- The contradiction between the proposed project and the national priorities of Ecologically Sustainable Development, as outlined in the National Strategy.

From a broad view, the Galilee Coal/China First development is being proposed in the middle of a mining boom, in an era of unprecedented climate change, and following a renewed commitment from the Queensland Government to protect the state's biodiversity. If approved, the proposed development would contribute further to the negative impacts on other important Australian sectors, to global climate change, and to the destruction and degradation of the state's biodiversity.

At a finer scale, the proposed mine would have significant and lasting negative impacts on the region's water, environment, economics and communities. Through these impacts, and the destruction of Bimblebox Nature Refuge, the project would further fuel public discontent with the conduct and operation of mining companies in Australia.

Bimblebox Nature Refuge

ISSUE: In both the body of the EIS and the Executive Summary, the proponent has failed to acknowledge the significant and largely irreplaceable values of Bimblebox Nature Refuge which would be substantially impacted by the proposed mine.

The proposed open-cut mine would involve the destruction of 52% of Bimblebox Nature Refuge, totalling some 3,926 hectares of remnant native vegetation (section 3.1.8.2, Executive Summary, p.35). The remaining 48% of the property would be subject to underground mining which is likely to cause substantial subsidence 'expected to range between 1.3-1.6 m' and interference with the natural hydrology that supports the overlying ecology (section 6.4.1.2, Vol. 2 Ch. 6, p.187). Further, the proponent has claimed that '*the project will not be viable without coal reserves under the BNR'* (section 1.6.1, Executive Summary, p.20).

The Bimblebox property has a remarkable history and a unique cluster of values which are summarised here.

History and conservation agreements

The 7,912 hectare 'Glen Innes' property was up for sale in 2000, in an era when there was rampant land-clearing in the region, prior to the introduction of the Vegetation Management Act . The property consisted largely of uncleared remnant woodland (7,632 hectares, amounting to over 96% of the total land area), considered to be in excellent condition with high biodiversity values, including sites within the property that contained 'the greatest understorey floristic biodiversity for these vegetation types within the region' (Bimblebox Private Protected Area Establishment Agreement, p.20).

A clearing permit was attached to the title of the land, which drew the attention of a group of concerned families who decided to pool their finances to purchase the property to effectively save it from being cleared. The Federal National Reserve System contributed around $314,600 towards the purchase which it recognised was being acquired 'for the purpose of establishing a private protected area to protect the significant values of the site' (Bimblebox Private Protected Area Establishment Agreement, p.20).

According to the Agreement signed with the Federal Government, the land would be 'managed in accordance with the intent of the IUCN Category IV Habitat/Species Management Area' (Bimblebox Private Protected Area Establishment Agreement, p.20). It was a condition of the provision of federal funding that a conservation covenant also be signed with the State Government, and so in 2003 the Bimblebox Nature Refuge Agreement (IUCN category VI) was signed between the landholders and the Queensland Government. This agreement states that it 'will ensure that management and use of the Land sustains [the] flora and fauna values in perpetuity' (Bimblebox Nature Agreement, p.12). The tenor and unambiguous intention of the Bimblebox Nature Refuge Agreement is represented in the following points listed in Item 5 (Clause 4.6):

The Landholder shall not undertake, consent to or approve…. :

a) the interference with, or destruction or removal of, any native plants including trees, shrubs and grasses;
b) the planting of any trees, shrubs, grasses or any other plants other than local indigenous native flora preferably derived from local seed stock;
c) any act or omission which may adversely affect any indigenous flora or fauna or their related habitats;
d) any deterioration in the natural state or in the flow, supply, quantity or quality of any body of water; ….

A visit from the Premier

In August 2003, Bimblebox Nature Refuge was visited by the then Premier, Peter Beattie on the eve of the State's momentous land-clearing reform. Immediately prior to visiting Bimblebox, Mr Beattie, along with an entourage of advisors and media, inspected a nearby area of roughly 2,000 hectares that had recently been bulldozed and chained. At Bimblebox, it was demonstrated to Mr Beattie that it was possible to graze cattle while preserving biodiversity. It was an important visit which helped convince the Premier to introduce strong laws into Queensland to put an end to broad-scale land clearing, which at the time registered as one of the highest rates in the world.

Importance of Bimblebox Nature Refuge in the region

Bimblebox Nature Refuge is one of the largest tracts of intact remnant woodland in the region. It is situated in the Desert Uplands, considered a biodiversity hotspot,[1] but where less than 5% of the area is held is conservation reserves.[2] While the dominant ecosystems on Bimblebox are not listed as 'of concern', they are barely represented in the regional National Parks.[3] Much of the surrounding land has been cleared and blade-ploughed for cattle grazing. Over 95% of this land primarily consists of the introduced species Buffel Grass[4] (section 5.2.6, Appendix 10, p.42). The contrast is stark, and can be seen in the following photos, taken a short distance from each other:

[1] http://www.environment.gov.au/biodiversity/hotspots/national-hotspots.html
[2] http://www.anra.gov.au/topics/vegetation/assessment/qld/ibra-desert-uplands.html; http://www.anra.gov.au/topics/vegetation/pubs/case_studies/deu_casestudy.pdf
[3] Mitchell, C., Egan, S., and Leverington, A., 2002, *Biodiversity Audit – Bioregional Case Study: Desert Uplands bioregion, Queensland*, Queensland Government, p.26. Available at http://www.anra.gov.au/topics/vegetation/pubs/case_studies/deu_casestudy.pdf (accessed 3.12.11).
[4] The Latin name for Buffel Grass was formerly *Cenchrus ciliaris* but has recently changed to *Pennisetum ciliare*

A view over the northern fence-line of Bimblebox Nature Refuge

In Bimblebox Nature Refuge, a short distance from the northern fence-line

The contrast between Bimblebox and the surrounding land is acknowledged in Appendix 8 of the EIS, a screenshot of which is pasted below, although any reference to this does not appear in the main body of the EIS:

7.1.1 Landscape Receptors

Bimblebox Nature Refuge

7.1.1a: View of north-east corner of Bimblebox Nature Reserve, image by Tract Consultants, 2011.

The land within and surrounding the proposed mine site is predominantly used for low intensity grazing and has been cleared, resulting in a grasslands with some low shrubs and scattered trees. The exception to this is Bimblebox nature reserve which is within the footprint of proposed mine site. Bimlebox Nature Refuge is composed of remnant vegetation of the area and has been reserved for long-term research into a land management practices with low intensity grazing and biodiversity conservation.

Screenshot of section 7.1.1, Vol. 5 Appendix. 8, p.24.

Conservation values of Bimblebox Nature Refuge

Bimblebox Nature Refuge is home to number of threatened and significant species. A flock of the Endangered (EPBC) Black-throated Finch (*Poephila cincta cincta*) was sighted by a Birds Australia observer in May 2011, and they were again heard and audio recorded by three other Birds Australia observers in November 2011. It is an important finding, as explained by Dr Eric Vanderduys, a zoologist with the CSIRO and a member of the Black-throated Finch Recovery Team who was interviewed on ABC Radio National on October 21st 2011:

> It's a significant record because of the southern nature of it. The black-throated finch, the southern sub-species which is the endangered sub-species has disappeared from its range in New South Wales, it disappeared from its range in southern Queensland.
>
> There is virtually no recent records apart from a 2004 record from Rockhampton. To get a record that far south is quite significant in its own way because they have lost so much of their range.[5]

[5] October 21, 2011, 'Endangered birds foul mine plan', AM, ABC Radio National, http://www.abc.net.au/am/content/2011/s3344767.htm

The southern species of Black-throated Finch was originally found from near Townsville down into NSW. The species has suffered a dramatic range reduction, in large part because of land-clearing and the spread of introduced pasture species, which has greatly limited its habitat and access to preferred feed.[6] The NSW population disappeared in the 1970s, and over the past decade in Queensland there have been few confirmed sightings south of Townsville (see figure 4.1, Appendix 10A of the EIS).

The Vulnerable (EPBC) Squatter Pigeon has also been sighted on the property. There have been several sightings of the Near Threatened (DERM) Black-chinned Honeyeater, and the Near Threatened (DERM) Black-necked stork was also recently sighted by a visiting DERM ecologist. A significant population of the Near Threatened plant species, Large-podded Tick-trefoil has also been recorded on the property (see section 5.2.3, Appendix 10, pp. 39-41 of the EIS).

Bimblebox Nature Refuge is also home to at least fifteen EPBC listed marine and migratory bird species. There have also been twelve regionally significant bird species recorded on the property so far (see Appendix A of this submission for a table of these species). Significantly, over 50% of bird species of conservation significance in the Desert Uplands are found on Bimblebox Nature Refuge.[7]

Bird species have received the greatest attention on Bimblebox Nature Refuge due to a number of Birds Australia volunteers regularly visiting the property to conduct surveys over the past eight years. To date, 145 bird species have been recorded on the property (see Appendix B for the full list).

Three individual specimens of the regionally significant Desert Mouse (*Pseudomys desertor*) were recorded on Bimblebox Nature Refuge during the EIS consultant's survey of the mine footprint area, out of a total of four that were trapped (section 5.3.4, Appendix 10 p.52). It is stated that the proposed mine would potentially have a high impact on the species due to the fact that it is:

> …known to be dependent on perennial native groundcovers which are well represented in the [proposed mine's] footprint area and generally less abundant in surrounding areas (section 6.10 Appendix 10, p.66).

Both the Desert Mouse and the Black-throated Finch are dependent on native ground-storey flora (section 5.3.4, Appendix 10, p.52; Black Throated Finch Recovery Team[8]), which are recognised as being abundant on Bimblebox Nature Refuge:

> The understorey [within Bimblebox Nature Refuge] is largely made up of native shrubs, forbs and grasses and the weed cover is less than 5% (section 5.2.1 of Appendix 10, p.37).

[6] 'Why have the Black-throated Finch declines so much?', http://www.blackthroatedfinch.com/frequently_asked_questions.nb

[7] Information on species of conservation significance from EPA, 'Technical Report: The conservation of Biodiversity in the Desert Uplands'

[8] 'What do Black-throated Finches eat?' http://www.blackthroatedfinch.com/frequently_asked_questions.nb

Besides the Desert Mouse, there are four other mammals of conservation significance that have been recorded on Bimblebox. These are: the Common Dunnart, Spectacled Hare Wallaby, Rufous Bettong and Koala. The Common Brushtail Possum and Swamp Wallaby,[9] both of regional conservation significance, were also found by the Waratah Coal consultant's survey although there is no indication if these were sighted on Bimblebox or the neighbouring woodland (see section 5.3.4, Appendix 10, p. 52).

Bimblebox has also been noted to contain a large diversity and number of reptiles. The regionally significant Mulga Snake (*Pseudechis australis*) has been found on the property, although overall reptiles have not been surveyed to anywhere near the same extent as birds.

Bimblebox Nature Refuge's important role as a sanctuary for the rich diversity of flora and fauna species in the Desert Uplands bioregion will be even more crucial in the coming decades. The scale of proposed coal developments in the region is likely to result in many tens of thousands of hectares of remnant vegetation being cleared in both the immediate vicinity of Bimblebox Nature Refuge as well as the broader region. This is occurring less than a decade after the introduction of legislation to end to broad-scale land clearing in Queensland. The likely future impact from the new coal developments increases the value of those declared conservation areas, like Bimblebox Nature Refuge, that currently exist.

Bimblebox Nature Refuge and the precious few other conservation areas with recognised rich biodiversity in the bioregion will also be crucial in buffering the impacts from climate change in the region. An increase of 0.5°C in average annual temperatures has already been observed in central Queensland between 1998 and 2007, and it is projected that this may further increase by up to 4.5°C by 2070 (Queensland Government 2009, p.4).[10]

It is important to note that at a national level:

> … scientists and managers have already documented changes in species, communities and ecosystems that carry a 'climate signal', being consistent with recorded changes in temperature, precipitation, CO_2 concentrations and/or sea level (Biodiversity and Climate Change Expert Advisory Group 2009, p.89).[11]

A table that summarises the direct impacts of environmental changes on flora and fauna is presented in Appendix C of this submission.

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[9] They also reported finding the regionally significant Great Brown Broodfrog (*Pseudophryne major*) on Bimblebox Nature Refuge (section 5.3.4, Appendix 10, p.51), but a photo of the species was inspected by Dr Eric Vanderduys and it was found to be a mis-identification.

[10] Queensland Government, 2009, *Climate change in Central Queensland Region*, Queensland Office of Climate Change. Available at:
http://www.climatechange.qld.gov.au/pdf/regionsummary-cq.pdf
http://www.climatechange.qld.gov.au/pdf/climateqreport/climateqreport-chapter5.pdf (accessed 30.11.11).

[11] Biodiversity and Climate Change Expert Advisory Group (Steffen, W. et al), 2009, *Australia's Biodiversity and Climate Change: A strategic assessment of the vulnerability of Australia's biodiversity to climate change*, Commonwealth of Australia. Available at
http://www.climatechange.gov.au/publications/biodiversity/biodiversity-climatechange.aspx (accessed 30.11.11).

Land management on Bimblebox Nature Refuge

Bimblebox Nature Refuge is one of the precious few examples of conservation-oriented rangeland management in the region. There is a diligent and persevering focus on conservation in the management of the property, with a priority given to the preservation and enhancement of native biodiversity. The variable number of cattle grazed on the property is used strategically to control the spread of exotic grasses, as well as generate sufficient income to cover the costs of running the property. A long-term weeding program has eliminated several noxious species, namely rubber vine, parkinsonia, coffee senna and mimosa. Small scale fire experiments have also been conducted in conjunction with the research undertaken by the Queensland Herbarium. The aim of these experiments is to understand how fire and grazing can be effectively used on a wider regional scale to enhance biodiversity.

Ian Hoch and his son, together with help from co-owner of the property Carl Rudd, and occasional volunteers, undertake the bulk of the work on Bimblebox. They live on the property on a part-time basis and are on call at all times during emergency situations, such the recent extreme fire season when they were in residence on a full time basis. Ian Hoch grew up and has spent most of his life on a property north-east of Alpha. He has been a vocal and active critic of land-clearing in the region and has extensive land rehabilitation experience. Ian's 25 year dedication to eliminating Buffel Grass from selected areas has given him invaluable experience which is probably second to none in Australia. He is conscientious with every management decision, is a keen observer of nature, and is committed to sustainable land management.

Carl Rudd has a PhD in reproductive physiology biology (Tammar Wallaby) and has worked with the recovery program for the endangered Bridled Nailtail Wallaby. Carl's prime interest is in habitat conservation, which has mostly been focussed in Queensland. He initiated the purchase of the Bimblebox property as a means to secure it from land-clearing and to provide a working example of production co-existing with conservation.

The Bimblebox landholders and managers endeavour to minimise the use of fossil fuels on the property, to procure items sustainably, and have developed a fruit and vegetable garden to achieve a degree of self-sufficiency. These attentive actions on the ground at Bimblebox are highly juxtaposed by the prospect of one of the world's largest coal mines being developed on the site.

The sustainable land management practices and attention to detail that is in operation on Bimblebox Nature Refuge are unlikely to be represented in future offset strategies. The loss of knowledge and opportunity to continue these management practices would be to the detriment of biodiversity preservation in Australia.

Moving cattle on horse-back
Bimblebox Nature Refuge

Research on Bimblebox Nature Refuge

A key objective in the establishment of Bimblebox Nature Refuge was to undertake research and monitoring that could demonstrate and evaluate the integration of cattle production with nature conservation (Bimblebox Private Protected Area Establishment Agreement, p.20). A number of research projects run by various organisations and researchers are hosted on Bimblebox, which are aimed at improving land-management in the region (see a summary in Appendix D). A notable example is the fire research being conducted by the Queensland Herbarium, which could contribute substantially to current understanding of the interaction between fire and grazing, and their impacts on biodiversity in the Desert Uplands.

Fire research
Bimblebox Nature Refuge

Bimblebox Nature Refuge in the future

If Bimblebox Nature Refuge survives the current mining threat, it is likely to continue to serve as invaluable intact habitat for numerous species, provide a crucial working example of sustainable rangeland management, and function as a site for cutting-edge land management research for many years into the future.

COMMENT/SUGGESTION: The substantial and irreversible impacts on the significant values of Bimblebox Nature Refuge warrant refusal of the proposed project. In particular it is important to note:

- The ecological condition and richness of biodiversity on Bimblebox has not been shown to be matched by any other property in the vicinity. This includes the fact that Bimblebox is home to a number of threatened and significant species, as well as a large diversity of flora and fauna more generally;
- The value of Bimblebox as a rare example of conservation-oriented rangeland management is significant in the region and cannot be easily replaced;
- The value of Bimblebox as a long-term site for cutting-edge research cannot be easily replaced;
- The proposed development would substantially and fundamentally undermine the agreed values and uses of Bimblebox Nature Refuge. Agreements with both the State and Federal government would be contravened and tax-payers dollars would be wasted. There is a high likelihood that landholders and the general public would lose confidence in conservation covenants signed with the State government and as such Queensland's protected area network could be potentially undermined.

<u>Broader implications of mining Bimblebox Nature Refuge</u>

ISSUE: The proponent has failed to acknowledge that if their mine goes ahead, it would be the first time that a Queensland nature refuge would be entirely affected by mining. In establishing a precedent for the mining of nature refuges, the impacts on biodiversity will be much larger than the 8,000 hectares of Bimblebox. Around 100 nature refuges in Queensland are currently covered by exploration licenses, and this number is likely to increase substantially with the planned expansion of the Nature Refuge system in the state.

In the destruction of an IUCN category IV protected area, this case also has international significance. Given that the ToR (section 3.3.1.1, p.35) states that consideration should be given to World Conservation Union (IUCN) protected area categories, the proponent has also potentially failed to meet the ToR requirements by this omission.

The closing remarks of a recently published on-line journal paper are pertinent to highlighting the significance of protected areas on private land in Australia and the serious dilemma regarding their lack of protection from extractive industries:

> … if conservation is going to be successful in a large, wide-ranging country like Australia, it needs to happen not just in strictly protected areas, but across the landscape and over multiple tenures.
>
> The vast majority of land in Australia (over 60%) is held within private tenure. This means nature refuges and other multiple-use protected areas which implement effective management of biodiversity alongside sustainable resource use are so important.
>
> Private landholders who agree to manage their land for biodiversity through conservation covenants are providing a valuable service to the community. They are also helping Australia to meet its internationally agreed targets under the Convention for Biological Diversity.
>
> But can we really expect landholders to invest time and effort into biodiversity conservation if agreements made to conserve land "in perpetuity" can be so easily undermined by other interests?[12]

Given that the Queensland government recently announced an extension to the Nature Refuge system, with a goal of around 7 million hectares to be covered by Nature Refuge Agreements by 2020,[13] the issues of landholder trust and the genuine protection of these lands are crucial. The following exert from the Queensland Government's recently released Biodiversity Strategy further demonstrates the importance of Nature Refuges in Queensland's protected area estate:

> As at September 2011 there are 398 nature refuges across all bioregions of Queensland, protecting a total of 2.8 million hectares. Nature refuges make a crucial contribution to Queensland's protected area conservation, protecting 215 185 hectares of 46 regional ecosystems that are not represented in national parks or other protected areas. Approximately 40 per cent of the total nature refuges area—1.11 million hectares—also protects 242 regional ecosystems that have only low representation in other forms of protected area.[14]

The lack of protection for this amount of 'protected' land from mineral extraction is of vital significance. If the Galilee Coal/China First project is approved, it is likely to result in a significant loss of landholder confidence to participate in the private conservation scheme. Through the nature refuge program landholders are encouraged and obliged to invest their time, energy and money in biodiversity conservation for the benefit of the public good. However, when landholders' commitment is not matched by governments' will to protect this land from mining, it results in diminished trust and good will on the part of landholders and the public more generally.

It is important to note that the substantial dilemma that private conservation areas are not exempt from mining was foretold over a decade ago by Penelope Figgis, Vice Chair for Australia and New Zealand on the IUCN World Commission on Protected Areas:

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[12] Evans, M. 2011. 'No refuge: When a 'protected area' isn't really protected, *The Conversation*. Available at http://theconversation.edu.au/no-refuge-when-a-protected-area-is-not-really-protected-3363 (accessed 05.12.11)

[13] http://statements.cabinet.qld.gov.au/MMS/StatementDisplaySingle.aspx?id=77727

[14] Queensland Government, 2011, *Building Nature's Resilience: A Biodiversity strategy for Queensland*, Department of Environment and Resource Management, P.31. Available at: http://www.derm.qld.gov.au/wildlife-ecosystems/biodiversity/pdf/biostrategy-web-2011.pdf (accessed 05.12.11).

> The key concern if private land holdings became a major component of a future reserve system is the fact that while mining cannot occur on Categories I-IV areas in publically owned reserves, private lands would not be protected.[15]

Paola Cassoni was among others who submitted comments on this matter to the Queensland Draft Biodiversity Strategy for Queensland.

COMMENT/SUGGESTION: The proponent should be required to acknowledge that the proposed mine would not only seriously jeopardise the ecological integrity of Bimblebox Nature Refuge, but undermine efforts at landscape-scale conservation in Queensland and potentially have much wider ramifications in the precedent it could set in developing mines on significant IUCN Category IV and VI protected areas.

Bimblebox and ecological connectivity in the region

ISSUE: The proposed China First development would clearly jeopardise the biodiversity integrity of the Bimblebox Nature Refuge, through direct destruction and by further fragmenting the connectivity between the nature refuge and other breeding/migration/feeding sites of fauna species. Just east of Bimblebox, is Lagoon Creek, which Waratah Coal propose to deviate, resulting in the loss of 77 ha of remnant woodland (section 6.4.1.1, Vol 2 Ch 6, p.187). Lagoon Creek is described as:

> … including extensive linear strips of mature river red gums that fringe ephemeral and semi-permanent waterholes. This habitat contains a high proportion of large tree-hollows (section 6.3.2.3, Vol 2 Ch 6, p.179).

The cumulative impact on remnant vegetation and other local flora and fauna from the other proposed large mines in the vicinity is likely to further fragment what little remains. Given this outlook for the region, the condition and strategic location of Bimblebox Nature Refuge must be taken into account from a regional, cumulative impact assessment viewpoint.

COMMENT/SUGGESTION: Given the regional context of massive new developments, there is an imperative to both retain Bimblebox Nature Refuge and to reintegrate the property with other areas in the immediate surroundings of the refuge to ensure the longevity, viability, and ecological integrity of habitat in the vicinity. Ample buffer zones would be required to protect these areas from edge effects, coal dust, flood lights, and noise etc. These areas of connectivity and buffering need to be sterile from mining. Properly qualified ecologists who are familiar with the local ecology and with the major planned developments should be engaged to undertake a regional ecological plan for the area.

The importance of Bimblebox Nature Refuge, and its potential to serve as a significant site in a habitat network in the area warrants refusal of the project.

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[15] Figgis, P (1999), *Australia's National Parks and Protected Areas: Future Directions, ACIUCN Occasional Paper 1999, p.67.*

Under-stated and/or misleading representations

ISSUE: The description of Bimblebox Nature Refuge, its values, and the likely impacts on the property from the proposed mine are incompletely, inconsistently, and in places incorrectly, described throughout the EIS. It is problematic that the more accurate descriptions of the property can be found in the consultant's reports, but not in the body of the EIS or the Executive Summary. Given that anyone even moderately interested in this project are unlikely to read past the Executive Summary, the mis-representation of Bimblebox is a major failing of the EIS in its current form.

For instance, in section 3.1.7.1 of the Executive Summary, p.34 it is stated:

> Part of the mine surface clearance footprint occurs in the north and eastern parts of the Bimblebox Nature Refuge (BNR), **an area** gazetted under the Nature Conservation (Protected Areas) Regulation 1994… The BNR is mapped as being of **Local Significance** within the Desert Uplands Biodiversity Planning Assessment (EPA, 2005)….

Whereas in section 6.3, Vol 2 ch 6, p.4 it is stated:

> Part of the mine surface clearance footprint occurs in the north and eastern parts of the Bimblebox Nature Refuge (BNR), **a protected area** gazetted under the *Nature Conservation (Protected Areas) Regulation 1994*… It is mapped as being of **State Significance** within the Desert Uplands Biodiversity Planning Assessment (EPA, 2005)…

Bimblebox Nature Refuge is a formally recognised protected area in the National Reserve System, and is listed as being of State Significance, not Local Significance (EPA 2005, p.21).[16]

Another example is the description of Bimblebox presented in Appendix 10 and used in several sections throughout the EIS:

> EPA (2004) described the site as having high biodiversity values supporting a wide variety of native grass and fauna species. The vegetation in this area was found to range from average to very good condition with evidence of grazing, clearing for tracks, Buffel Grass invasion and patches of dieback present to varying degrees (section 5.2.1, Appendix 10, p.37).

The EPA (2004) reference describes the Bimblebox biodiversity values as such:

> Located between Alpha and Jericho in the Desert Uplands Bioregion, this 7912 ha nature refuge supports several poplar box and silver-leaved ironbark woodland regional ecosystems. With an amazing 96 percent of the vegetation still intact, the refuge includes an extremely diverse array of herbaceous species…[17]

[16] State significance: 'Areas assessed as being significant for biodiversity at the bioregional or state scales. They also include areas assessed as being significant at national international scales'; Local Significance: 'Areas assessed as not being significant for biodiversity at State or Regional scales. Local values are of significance at the local government scale' (EPA, 2005, *Flora, Fauna and Landscape Expert Panel Report*, p.5).

[17] EPA, February 2004, 'Bimblebox Nature Refuge', *Nature Calls*, 1, p.5.

The statement that 'the vegetation in this area was found to range from average to very good condition with evidence of grazing, clearing for tracks, Buffel Grass invasion and patches of dieback present to varying degrees' appears to be based on the flora surveys undertaken by the EIS consultants, of which 5 of the 8 sites were on or near the property boundary, neighbouring highly disturbed paddocks and so prone to edge effects[18] (see our discussion of this on p.79 of this submission). As such, this commonly repeated description of Bimblebox in the EIS is problematic, and not representative of the Nature Refuge's 7,912 hectares.

These, along with other examples given in this submission, suggest that the values of Bimblebox Nature Refuge have been consistently down-played, especially in the Executive Summary which is the document that is most likely to be read by interested parties.

An example of a more accurate description of the property that appears in one of the Appendices, but nowhere in the body of the EIS is the following from section 1.3, Appendix 10A, p.7:

> … Glen Innes station, within the central sector of the study site, supports the Bimblebox Nature Refuge (BBNR). SL2003 No.82 provides the following description:
>
> "The nature refuge supports-
>
> a) 6 regional ecosystems, including poplar box and silver-leaved ironbark woodland; and
>
> b) a large area of intact habitat in a landscape that has been subjected to widespread clearing; and
>
> c) a diverse range of herbaceous species"

Vague descriptions that potentially highlight the crucial importance of Bimblebox in the immediate vicinity, include an example from section 1.3 of Appendix 10A, p.5:

> The predominant land use across the study site is cattle grazing. A significant proportion of the study site has been cleared of native vegetation and is maintained as cleared pasture for cattle grazing… A large part of this area has been subject to blade ploughing and the introduction of exotic pasture grasses. In these areas, Buffel Grass (*Pennisetum ciliare*) is dominant.
>
> In contrast, a notable area of woodland habitats (including native remnant and native regrowth) has been retained throughput the study site (e.g. Glen Innes [ie. Bimblebox] within the central sector, and parts of Cavendish and Lampton Meadows in the west). **Generally, these areas are also subject to cattle grazing, though it is apparent, that there are differences in grazing management practices which are implemented through these remnant woodland areas (e.g. differences in sticking rates, retention native pasture, and weed control)…**

The highlighted section hints at an issue that is of extreme importance for the survival of Threatened and significant species such as the Black-throated Finch and the Desert Mouse. By not mentioning the properties that featured the more intact ecosystems as a result of the management practices, a vital piece of information is neglected in the EIS.

[18] Edge effects are described in section 6.7, Appendix 10, p.63

COMMENT/SUGGESTION: The proponent should be required to accurately describe the area that would be impacted by the proposed mine.

ISSUE: In section 6.3.1.3, on page 172 of Vol2 Chapter 6, it is stated:

> As a Nature Refuge is classed as a Category C Environmentally Sensitive Area in the DERM Codes of Environmental Compliance, DERM may use the Codes to apply extra conditions to activities in the BNR. DERM has in the past successfully conditioned exploration on a number of nature refuges. Waratah Coal have outlined measures to provide appropriate protection of the environmental values above the underground mined sections of the BNR as well as rehabilitation requirements and have also formulated a draft off-set strategy to address the unavoidable impacts to the BNR from the open cut mining that cannot be mitigated.

The above comment is potentially highly misleading. While DERM can indeed require special conditions on exploration activities, and could well have 'successfully conditioned exploration on a number of nature refuges', there has been no instance to our knowledge of DERM preventing or restricting damaging mining activities on nature refuges. This statement gives the impression that there may be legislated security for Bimblebox, which simply does not exist.

Further, we argue elsewhere in this submission (see pages pp.48-61) that it is not possible to offset or compensate for the range of important values of Bimblebox (summarised on pp.4-12).

COMMENT/SUGGESTION: The proponent should not have included mis-leading information or language in its EIS, nor should it in any future publication.[19] Examples of DERM's successful conditioning of exploration on a number of nature refuges should have been provided. The Bimblebox landholders' experience with the Environmental Authorities issued by DERM is that they are not reliably adhered to, and do not require any consultation with landholders. Further, in our experience, exploration conducted under an Environmental Authority is not monitored by DERM until a complaint is lodged. Details of the Bimblebox landholders' experience will be made available on request.

ISSUE: It is stated in section 4.3.2 of Vol2 Ch 4, p.153 that:

> The land [to be affected by the proposed mine] is not considered to have unique agricultural values compared to surrounding areas and as such, the mine would not be expected to have a significant impact on agriculture in the region.

In this statement, the proponent has failed to recognise and communicate the unique and significant agricultural values of Bimblebox Nature Refuge, which serves as an important example of management and research for the co-existence of production and conservation

[19] It is an offence under section 157O of the *State Development and Public Works Organisation Act 1971* to give the Coordinator-General a document containing information known to be false or misleading in a material particular.

for rangelands in the region, as well as more broadly. The visit by Peter Beattie in 2004 on the eve of land-clearing reform is testament to this fact (outlined on p.5 of this submission).

COMMENT/SUGGESTION: The proponent should detail the regionally important values of Bimblebox Nature Refuge; namely its important and unique role as an example of conservation-oriented land management, and its importance as a site for long-term research into enhancing biodiversity in the region.

ISSUE: The proponent has failed to acknowledge that Bimblebox Nature Refuge is a part-time home for the owners and managers, as well as for the researchers and volunteers who work on the property. In the studies of 'noise and vibration' (Vol 2 Ch 11, see Figure 1, p.309; Vol 5 Appendix 20, see Figure 2, p.46) and 'visual assessment' (Vol 5 Appendix 8, pp. 26-27) where the 'sensitive receptors' and 'homesteads' are identified respectively, there is no mention of the residence on Bimblebox Nature Refuge. Also, in section 2.4 of Appendix 23, p.17, it is stated:

> The owners of 'Bimblebox' do not reside on the property.

In contrast to this representation in the EIS, people live on Bimblebox Nature Refuge in two permanent dongas, joined by a roofed hardwood verandah space, on a part-time and up to half-time, basis. A fruit and vegetable garden is also maintained on the property.

It is unreasonable that the Bimblebox residence is not included in all relevant assessments. By neglecting to mention the residence on Bimblebox Nature Refuge, the proponent has diminished the impact on the property and the people who care for it. The failure of the Social Impact study to deal with this component honestly is of particular concern given that professionals undertaking social impact assessment should have an appreciation of 'home' greater than an old fashioned construction of *terra nullius* where a residence does not fit into narrow definitions.

COMMENT/SUGGESTION: The proponent should be required to include the residence on Bimblebox Nature Refuge as a 'sensitive receptor' and a 'homestead' and anywhere else that neighbouring homes are mentioned. Even if it is to say that the residence on Bimblebox Nature Refuge will be directly impacted by the proposed mine to the extent that it will no longer exist. By neglecting to mention it, the proponent gives the impression that it does not exist.

ISSUE: In section 5.5 of Vol 2 Ch 5, p.163 it is stated:

> The presence of the Bimblebox Nature Refuge within the mine creates the greatest visual impact perception, as the two are unlikely to be able to co-exist. Although the above ground works are expected to clear slightly greater than 50% of the reserve, this may lead to public and environmental perception that there is a substantial visual impact even though the site is only partially affected.

This statement is both nonsensical and misleading. For the proponent to claim that Bimblebox Nature Refuge would only be 'partially affected' is counter to the information it provides elsewhere in the EIS, which is that 52% will be cleared and dug up, and the remainder subject to subsidence of the order of 1.3-1.61 metres. For this to be described as 'partially affected' is a blatant mis-truth and raises a serious question of the proponent's integrity and ability to fairly represent the impacts from the proposed mine. The above quote is clearly a distortion of the statement in the consultant's report, in section 10.2, Vol 5 Appendix 8. p.60:

> The National Parks and Nature reserves in the area are deemed to be too far from the proposed mine site to create and significant visual impact. **Bimblebox Nature Refuge is the anomaly to this and is significantly impacted with clearing of about 50% of the present area. The visual impact of this clearing for the mine facility will be a high impact locally**, but will not be seen by the masses, due to existing vegetation, land form, and road positions. However, **this impact creates the greatest visual impact perception, as the two cannot co-exist**. The open cut section of the mine and facilities are not likely to be viewed by many in the population, but **the clearing of this refuge will result in a substantial visual impact in the public and environmental perceptions of the community.**

COMMENT/SUGGESTION: The EIS should be properly edited and the proponent should be required to present information fairly in both the Executive Summary and in the body of the document. The impacts from the proposed mine on Bimblebox Nature Refuge should not be under-stated in any part of the EIS.

ISSUE: Describing the potential impacts and mitigation measures for the proposed mine's impact on Bimblebox Nature Refuge in the Executive Summary, it is stated:

> Assuming widely accepted standards of environmental practice, these indirect impacts are unlikely to occur. Their consequences could potentially be moderate so the impacts associated with these indirect impacts have been determined to be Medium (section 3.1.8.2, Executive Summary, p.35).

It is not at all clear in the context of this statement *which* indirect impacts is it referring to and it is potentially mis-leading as it follows a list of mostly direct, likely, impacts which have been determined elsewhere in the EIS to constitute a 'High (9) Impact' both before and after mitigation measures are undertaken (section 6.13, Appendix 10, p.68).

COMMENT/SUGGESTION: The proponent should be required to make statements that are clear, consistent and not mis-leading, and that do not under-state the scale and range of impacts that would result from the proposed mine.

ISSUE: It is not clear from the EIS what the intention of the proponent would be in regards to the forced acquisition of Bimblebox Nature Refuge. It is stated in section 7.4 of Appendix 23 – Social Impact, p.55 that:

> Approximately one third of the jointly managed cattle/conservation property would be acquired. As the owners are not resident [sic], it is expected that this property could continue to be managed as a

> cattle operation. Waratah Coal is expected to meet any costs that may be required for the property to continue cattle operations…

Given that the proponent has stated elsewhere that it intends to clear and dig up more than half of property, and that the remainder would be impacted by subsidence with unquantified effects on the hydrology and surface function, it would seem that acquiring just one third of the property would be inadequate.

COMMENT/SUGGESTION: The proponent must be consistent with information it provides, and be explicit in its intended dealings with the landholders of Bimblebox Nature Refuge. It should be explained how it expects the property to continue to be managed as a cattle operation, and who they expect would undertake that work.

Insufficient information

ISSUE: In section 1.6.1, p20 of the Executive Summary the proponent claims:

> The coal within the BNR is the highest quality and most shallow coal and contributes over 30% of the coal to be mined. As such, the project will not be viable without the coal reserves under BNR.

However, we have not been able to find sufficient data in the EIS to understand how the proponent can make this claim. If such detailed geological information is indeed omitted from the EIS then it is not possible for the public to be able to scrutinise the geological truth of the proponent's claim that it uses to justify the destruction of an important protected area. It is also stated in the EIS:

> Prior to any mining activities occurring further exploration drilling will occur to better define the coal resource in accordance with Joint Ore Reserves Committee (JORC) requirements for definition of coal reserves (section 1.1.4, Vol 2 Ch 1, p.6).

This comment suggests that the proponent's work to date is insufficient in meeting the JORC requirements,[20] which could be a serious failing of the requirements in meeting the ToR for this EIS. In section 3.2.1.1 of the ToR, p.30, it is stated:

> The location, tonnage and quality of the coal resources within the project area should be described in detail and include the modifying factors and assumptions made in arriving at the estimates The resources should be estimated and reported in accordance with the *Australasian Code for Reporting of Mineral Resources and Ore Reserves* (the JORC Code available at www.jorc.org/main.php) and the principles outlined in the *Australian Guidelines for the Estimating and Reporting of Inventory Coal Reserves* (available at www.jorc.org/pdf/coalguidelines.pdf), as appropriate.

While maps of the geology that appear to be the result of modelling are available in Volume 2 Chapter 1, pp. 16-19, they are not found in Appendix 6 – Soils and Geology, where we would expect to find more detailed information as to the basis of the maps. These maps only

[20] http://www.jorc.org/pdf/1999%20jorc%20code.pdf

cover the proposed open-cut sections of the proposed development, and we have not been able to find sufficient detail to be able to corroborate these against the original bore samples. Crucially, the apparent lack of similar information and modelling for the proposed underground mines is a major omission.

COMMENT/SUGGESTION: While we do not have the geological expertise to fully assess the proponent's claims as to the coal resource in the area, there are indications that the work it has so far undertaken is insufficient to make the claims that it has. A fully independent geologist would be required to assess the basis for the proponent's claims with the existing data, with the results available for public scrutiny. Detailed information and maps for *both* the open-cut and underground portions of the proposed development should have been provided in the EIS.

Request for information

Ian Hoch, caretaker and manager of Bimblebox Nature Refuge, received a visit by DERM ecologists Richard Jonson and David Field in November 2011 who were filing a report on the current condition of the property. As the most recent DERM assessment of Bimblebox Nature Refuge, we request that the original report be made publicly available.

Water Impacts

Our comments regarding the likely impacts on water from the proposed development are unfortunately limited due to insufficient time and resources to investigate this important issue more closely. Not considered here are the significant risks to surface water that would result from the proposed mine.

The likely impacts on both above and below ground water in terms of quantity and quality deserve much closer scrutiny, and independent water experts should be engaged to do this. We strongly believe that payment for such work should *not* be the responsibility of the affected and concerned landholders.

This is a particularly important issue considering the potential impact on the Great Artesian Basin (GAB) and the long-term viability of the region for food production that depends on the availability of safe and secure groundwater resources. Given the proposed mine overlaps with the GAB, it is crucial that proper resources are invested to establish the risks to this most important and iconic of Australia's ground-water resources. This is clearly an issue for a fully independent cumulative assessment of the risks to the GAB from mining and coal seam gas extraction in the Galilee Basin. Further, unlike mining, the grazing industry in the region could be sustained for many centuries into the future, but its operation is wholly dependent on water.

Mapping the GAB

ISSUE: There are several major issues in regard to the GAB and how it is represented in the EIS. In particular, it is of extreme concern that there appears to be confusion within the EIS as to the boundary of the GAB. It is stated in section 2.2, Appendix 14, p. 2-2:

> The [China First Project] is within the Galilee Basin and is outside the eastern boundary of the GAB.

It is also stated in section 6.1.1, Appendix 14, p. 6-1:

> The coal reserves of the mine area are outside the GAB (Figure 3-5).

The reference in the above statement is to a map on p. 3-9, a screen shot of which is presented below:

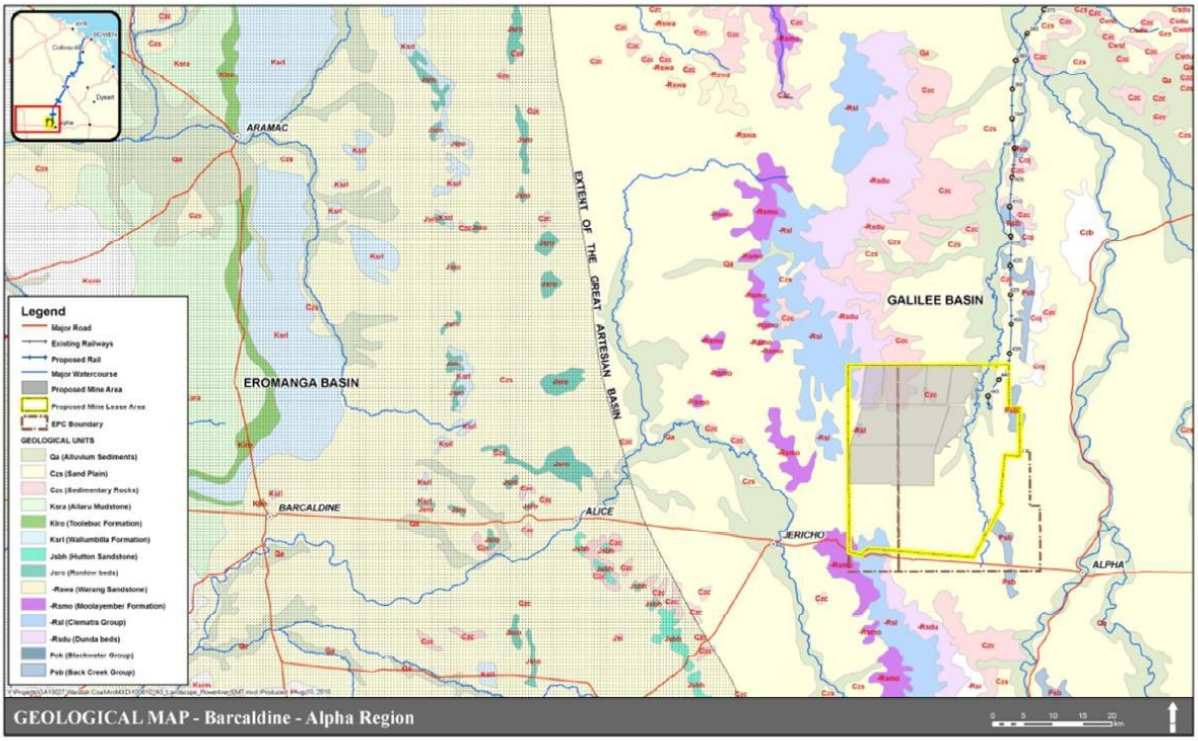
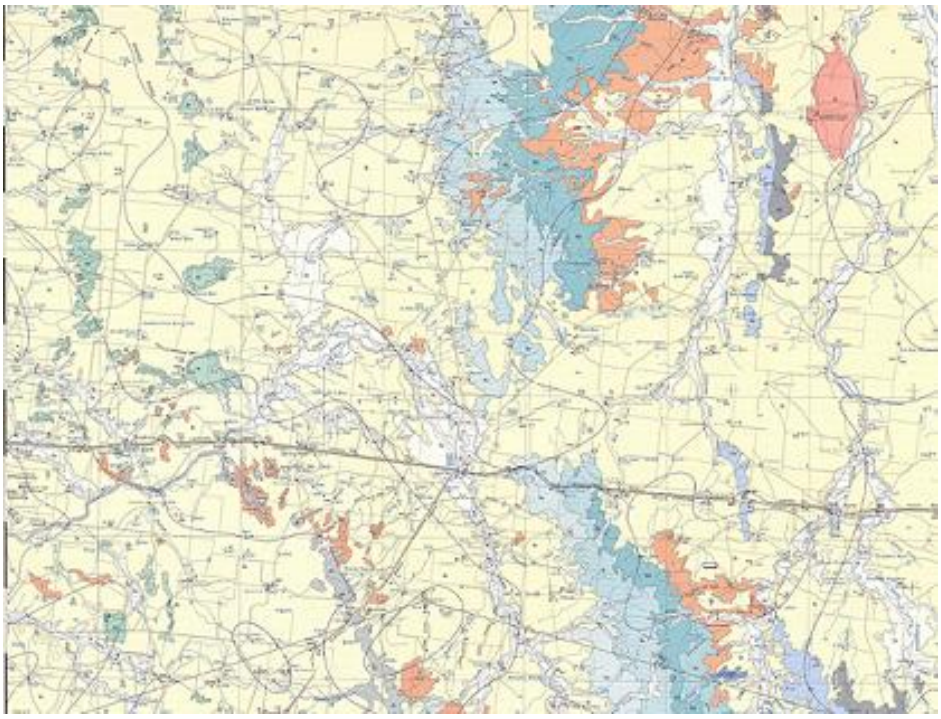


Figure 3-5: Geological Map: Barcaldine – Alpha Region (DERM, Per Comms)

Map from p.3-9, Appendix 14 of the EIS

The above map from the EIS indicates that the 'Extent of the Great Artesian Basin' lies around 30-40 km west of the Waratah Coal 'proposed mine lease area'. The source of the above map is named as 'DERM, Per Comms', but no reference is provided in the Reference list on p.10-1. However, it seems that the basis for the above map is the 1972 1:250 000 map available from the Geoscience Australia website,[21] from which a screen shot of the roughly matching area is provided below. A full image of this map is provided in Appendix E. Note however that there is no such line on the Geoscience map indicating the 'Extent of the Great Artesian Basin'.

[21] Geoscience Australia, http://www.geoscience.gov.au/bin/mapserv36?map=/public/http/www/geoportal/250/index.map&mode=browse&layer=map250&queryon=true



Portion of 1972 'Jericho' 1:250 000 geology map, sheet SF55-14, from Geoscience Australia

While it is very difficult to read the legend on the map provided in Appendix 14, the original Geoscience map reveals that the formations north and south and slightly overlapping the Waratah Coal tenement area include the 'Lower Triassic Dunda Beds' and the 'Lower to mid Triassic Clematis Sandstone', among others (see original for detail on this).[22] The Stratigraphy of the Galilee Basin provided in another section of the EIS helps to explain the relationship between these geological beds:

[22] Geoscience Australia, http://www.geoscience.gov.au/bin/mapserv36?map=/public/http/www/geoportal/250/index.map&mode=browse&layer=map250&queryon=true

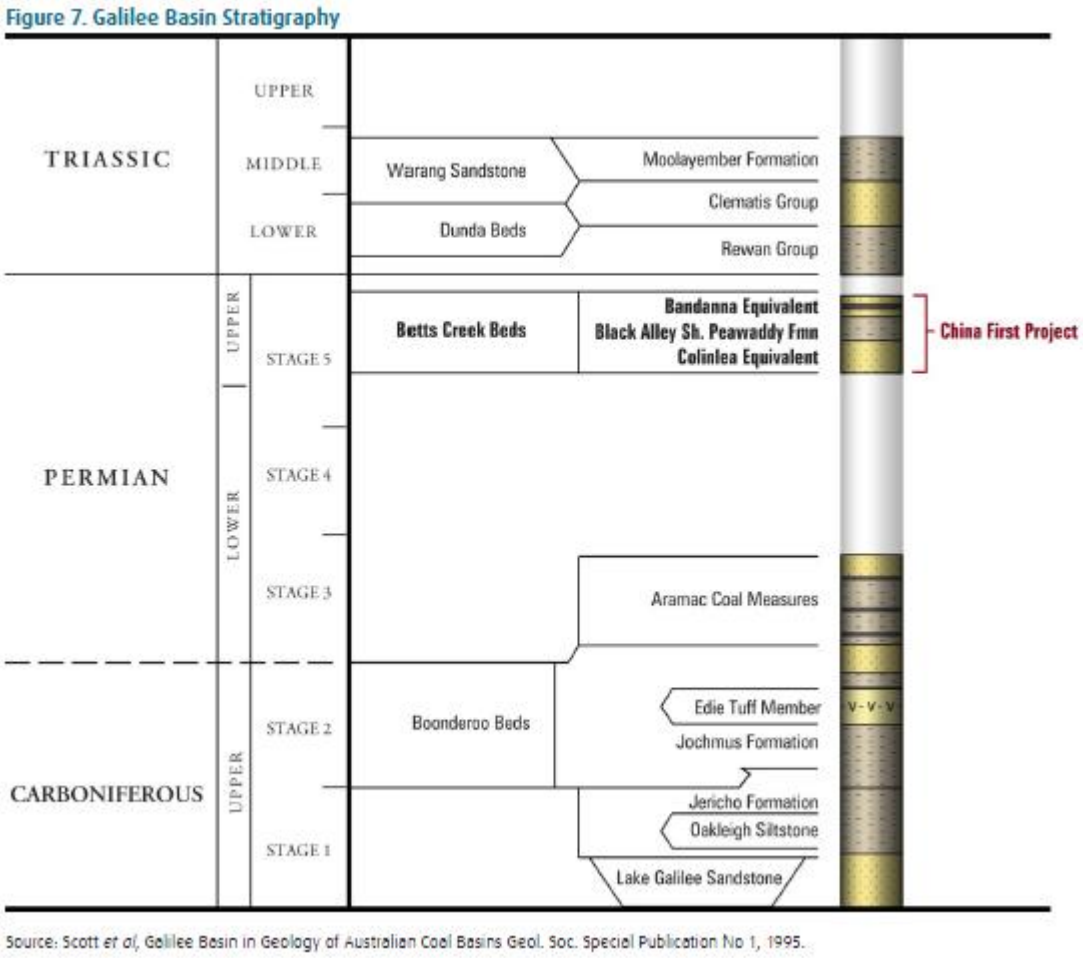


Figure from Vol2 Ch1, p.13 of the EIS, indicating the Triassic elements of the GAB (Moolayember Formation, Clematis Group, Rewan Group)

This figure illustrating the Galilee Basin stratigraphy, documents that both the Clematis Sandstone and the Dunda Beds over-lie the coal seams that the proponent wishes to extract.

Most crucially, it is widely accepted that the Clematis Sandstone form part of the Great Artesian Basin. It is documented in seminal texts such as Habermehl, M. A. 1980, *The Great Artesian Basin*, *Australia*, BMR Journal of Australian Geology and Geophysics, vol. 5, pp. 9–3; and Habermehl M.A. & Lau J.E. 1997, *Hydrogeology of the Great Artesian Basin*, Australia. Australian Geological Survey Organisation, Canberra. A recent reference also makes this clear:

> The Bowen and Galilee Basins underlie, in part, the Surat and Eromanga Basins respectively and comprise continental sediments deposited during the Triassic. The uppermost sandstones in the Triassic sedimentary sequences of these basins (the Clematis and Warang Sandstones) contain aquifers, which have been defined to form part of the Great Artesian Basin (Habermehl 1980) (GABCC 2009, p.43).[23]

[23] Great Artesian Bain Coordinating Committee, 1998,'Background to the Great Artesian Basin', available at http://www.gabcc.org.au/tools/getFile.aspx?tbl=tblContentItem&id=96

So, the boundary of the GAB represented in the consultant's report in Appendix 14, and presumably also the basis for the analysis, is clearly at odds with the widely accepted boundary of the GAB.

COMMENT/SUGGESTION: This Appendix and all related chapters and section of the EIS must be thoroughly revised.

The proponent must provide more information regarding the analysis undertaken by 'E3' consultants. It must be explained what qualifications the consultants have for undertaking the groundwater assessment of the GAB.

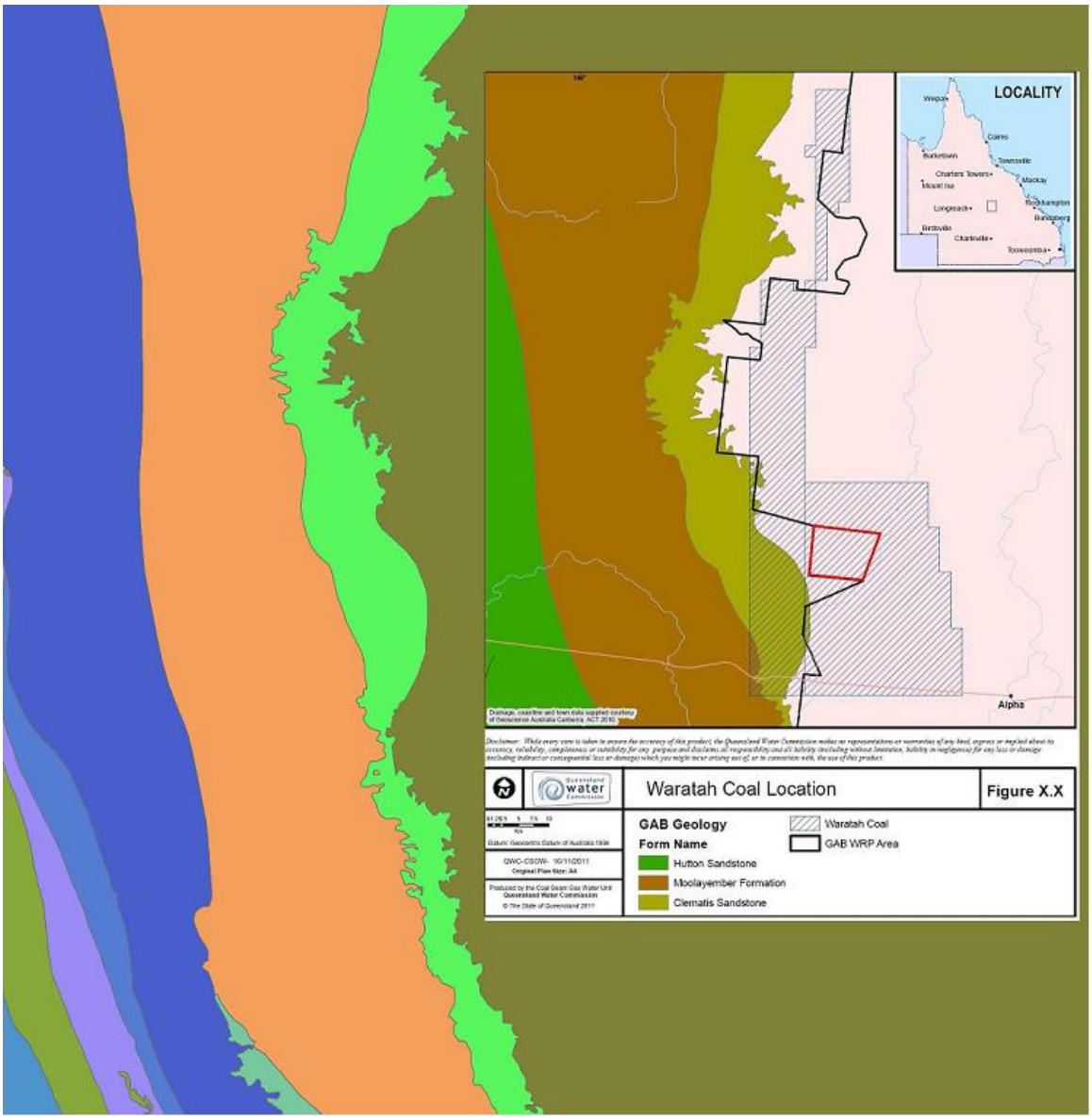
The proponent must provide a clear statement with evidence in regards to the basis of the consultant's groundwater assessment as it relates to the GAB. In particular, it must be explained how the conclusion that 'the mine lies east of the boundary of the GAB' was reached, considering information in its own EIS indicates otherwise.

The proponent must explain how the incorrect map and description of the boundary of the GAB in relation to the proposed development has affected the analysis of the likely impacts from the proposed development.

Given the importance of the GAB and the extent of confusion within the EIS as to its boundary, there should be a properly qualified and fully independent hydrogeologist engaged to assess the claims made by the proponent in the EIS, the overlap between the GAB and Waratah Coal's proposed mine area, and the likely impacts on the GAB should the proposed mine be approved.

ISSUE: A further example of the complexity and the lack of certainty in regards to the location of the GAB boundary is presented in maps below. The underlying map is from Geoscience Australia,[24] and the second overlying map has been generated by the Queensland Water Commission and includes the outline of Waratah Coal's proposed mine (November 2011).

[24] https://www.ga.gov.au/products/servlet/controller?event=GEOCAT_DETAILS&catno=32368. Accessed October 2011.

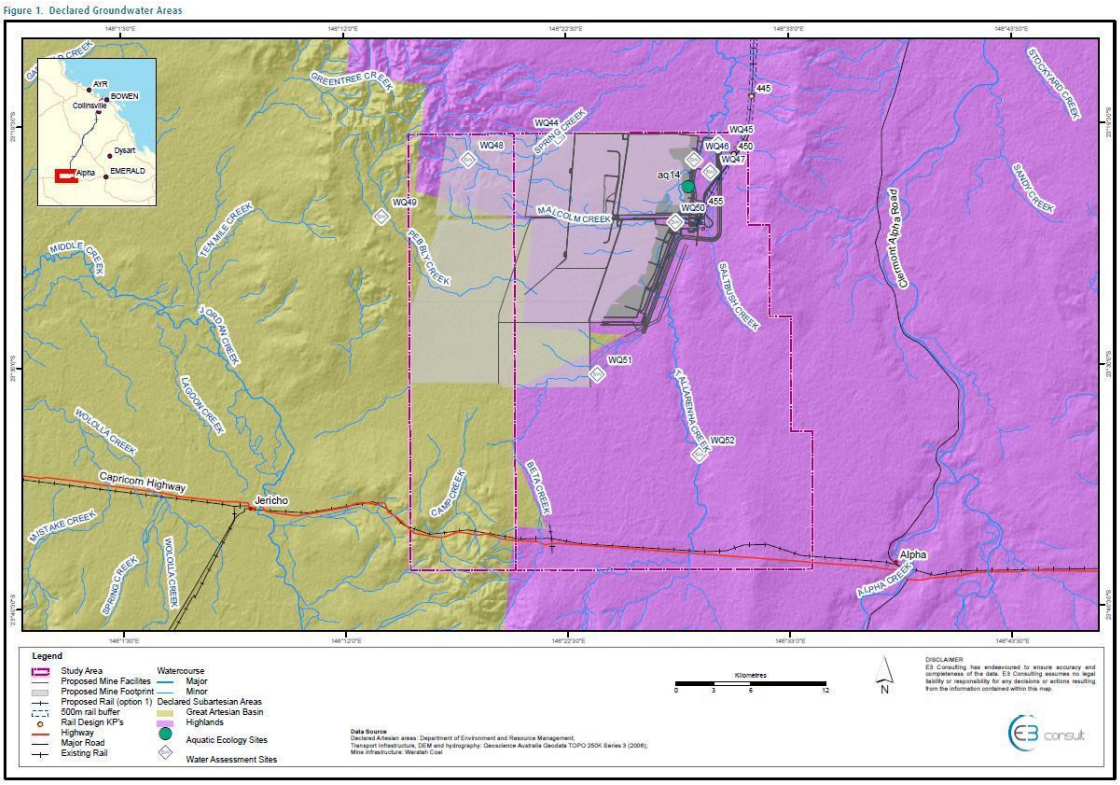


A map of the edge of the GAB in the region of the proposed Waratah Coal mine. The underlying map is from Geoscience Australia, and the superimposed map was generated by the Queensland Water Commission, onto which the outline of Bimblebox Nature Refuge has been added.

These maps are clearly a simplification of the original geological maps. The difference between these two and the original map again points to the fact that much more detailed work needs to be conducted to understand the hydrogeological reality of the region.

However, given that they are the widely accepted maps in use, it is significant that they clearly indicate that Waratah Coal's proposed mine extends into the region of the Clematis Sandstone, a recognised aquifer of the GAB. And thus it again highlights the concerning statement in the EIS that 'the mine lies east of the boundary of the GAB', especially given that the proponent has also included a similar map in Vol 2 Ch 8, p.229, a screenshot of which is presented below. This map has been generated for administrative purposes, as it indicates the boundary of the Great Artesian Basin follows the cadaster boundary, as shown

in the QWC map, and also indicates that a significant portion of the proposed mine would overlap the GAB:



A map from the EIS showing an overlap between the proposed development and the GAB (Vol 2 Ch 8, p.229)

While the inclusion of the above map in the EIS suggests that the proponent has acknowledged the widely accepted boundary of the GAB to some degree, it still appears that the *analysis* of groundwater has been based on an incorrect boundary (the map in Appendix 14). Thus it remains a question as to the relevance and reliability of the analysis. For instance, it is worth highlighting again the conclusion from the consultant's report, section 8, Appendix 14, p. 8-1:

> The assessment found the mine site was the area with greatest potential for impacts to existing groundwater. **The mine lies east of the boundary of the GAB** and includes groundwater in the Galilee Basin. The presence of aquitards at the base of the GAB suggests low potential for impacts from the mine to the GAB. Preliminary modelling suggests the mine will have significant impacts from groundwater to users within 12 km to 30 km of the mine from drawdown around the mine voids.

COMMENT/SUGGESTION: Independent hydrogeological research must be undertaken for the area of concern. In particular, more accurate mapping of the Clematis Sandstone and other GAB elements must be undertaken and publicly presented before any assessment is made of the impacts from the proposed mine. The important details of the groundwater resources in the region, and the likely impacts from the proposed mine, must be understood before any further application to proceed is put before the government.

Evidence from springs

ISSUE: Data requested from DERM relating to springs north of Alpha, indicates a line of permanent Artesian springs in a North-South line directly north of Waratah Coal's proposed mine. According to this data, the most southerly spring is about 60km north of the proposed development. These springs appear to lie to the east of the GAB eastern boundary, and apparently directly overlie the Colinlea Sandstone. However, the presence of springs would seem to indicate a substantial body of groundwater under pressure. The fact that these springs occur directly north of the proposed mine raises questions about whether is it an independent aquifer feeding the springs, or is it connected to the GAB. This information is apparently not available.

COMMENT/SUGGESTION: The presence of springs directly north and within a relatively short distance of the proposed mine further indicates that a far more detailed investigation must be undertaken to properly understand the hydrogeology of the area, and to what extent the local aquifers are connected to each other and to the GAB.

Stratigraphy, cracking, and impacts on the GAB

ISSUE: There are several unresolved issues in regard to other aspects of GAB groundwater in the proposed mine area. It is stated in section 3.2.3 of Appendix 14, p. 3-7:

> … Protection of this significant groundwater resource is a high priority for both local and national government. The coal reserves of the China First mine lease area are outside the GAB as indicated by the GABCC definition of the Rewan Formation as the underlying formation and the map titled 'Geological map of the Barcaldine – Alpha region with coal resource areas' (Figure 3-5).

This statement again refers to the map with an artificial boundary of the GAB, but there are other concerning issues raised by this statement. There is a difference in meaning between 'the mine lies east of the boundary of the GAB' and 'the coal reserves are outside the GAB'. The second statement is probably true in a horizontally layered geological sense, and is again asserted with more detail in the following statement from section 8.4.1, Vol2 Ch8, p.246:

> The coal reserves of the mine area are outside the GAB. The presence of shale aquitards in units between the coal seams and the GAB aquifers and the predominantly easterly groundwater flow, interpreted as being due to drape folds further to the west, suggests a very low to no potential for negative impacts on the GAB groundwater resources resulting from open cut, longwall and underground coal mining.

The 'aquitards' mentioned here are likely to be those of the Rewan formation (mentioned in section 2.3.9, Appendix 14, p.23), in regards to which it is stated elsewhere in the EIS that:

> The Rewan Formation, consisting of Triassic competent [sic] claystones and siltstones, is situated unconformably between the overlying Tertiary and underlying Late Permian Bananna Formation (section 1.1.7, Vol 2 Ch1, p.12).

Without geological expertise it is difficult to fully interpret this, but the fact that the Rewan formation is 'unconformed' suggests that its presence as a reliable aquitard throughout the extent of the nearly 30 000 hectares of the proposed underground mine is questionable.

Of perhaps greater concern is the likely impact that subsidence would have on the aquitard that supposedly protects that GAB from the mining operations. One of the assumptions made in the modelling of groundwater impact is relevant here:

> It was assumed that cracking due to subsidence will not extend to the surface and will not allow rapid movement of water from the rainfall recharge to the goaf (section 2.4.11, Appendix 14, p.34).

This assumption needs to be scrutinised by an independent expert in subsidence. Especially considering that it is also stated that:

> The likely maximum level of subsidence as stated in the Subsidence report section of the EIS is 3.27 m. Cracking of the overlying geology as a result of mining related subsidence is also likely to occur. This cracking could allow rapid infiltration of rainfall to the mined areas, and potentially lead to increased rates of flow into the mined voids resulting via leakage between aquifer layers (section 6.1.4, Appendix 14, p.6-2).

Despite this statement that seems to say that cracking of the aquitards is likely to occur, and also that it would result in further water loss from the local aquifers, potentially including GAB aquifers, it is not further discussed in the groundwater report. This appears to be a major failing of the EIS.

Further, the statement that there is 'predominantly easterly groundwater flow' needs to be fully substantiated and investigated. An easterly groundwater flow could suggest that the proposed mine could have an even greater impact on the GAB if it becomes a drain for GAB aquifers in the area. However, in at least one section of the report there appears to be contradictory information about the direction of flow:

> ..The impact [from drawdown in the area surrounding the mine] is anticipated to be greater to the east as the mine will intercept some of the recharge to the east and dewater aquifers **sloping from the east** (section 6.1.3, Appendix 14, p.6-1).

And finally, if the maps of the widely accepted maps of the hydrogeology for the area can be trusted, and given the stratigraphy of the Galilee Basin as described in the EIS, the dewatering of aquifers overlying the coal seams would in effect amount to dewatering of the GAB aquifers.

COMMENT/SUGGESTION: All assumptions of the groundwater analysis must be scrutinised by an independent hydrogeologist. In particular, the presence or absence of an effective aquitard across the full extent of the mine site must be established. Crucially, the impact that cracking of an aquitard due to subsidence must be commented on. Also, the repeated statements in the EIS that the coal seams are not part of the GAB must be rectified to more accurately describe the true nature of the relationship between the coal seams and the GAB. That is, for at least some portion of the proposed mine area, GAB aquifers overlie the coal

seam. Also, through subsidence, cracking and dewatering, local aquifers, including GAB aquifers are likely to be impacted.

Inconsistency in presentation of findings

ISSUE: Related to the above concern, and besides the question as to the reliability of the analysis, there is serious concern over the accuracy of representing the consultant's report on groundwater. In the consultant's report, in section 6.1.1, Appendix 14, p.6-1 it is stated:

> The presence of shale aquitards in units between the coal seams and the GAB aquifers and the predominantly easterly groundwater flow, interpreted as being due to drape folds further to the west **suggests a low potential** for negative impacts on the GAB groundwater resources resulting from open cut, longwall and underground coal mining.

The above statement is in contrast to the description provided in section 3.1.13.2.1 of the EIS's Executive Summary, p.43, where the proponent has down-graded the 'low potential' for negative impacts to 'very low to no potential':

> The coal reserves of the mine are outside the GAB, a significant source of freshwater for much of inland Australia. The presence of shale aquitards in units between the coal seams and the GAB aquifers and the predominantly easterly groundwater flow (that is, flowing away from the GAB) **suggests a very low to no potential** for negative impacts on the GAB groundwater resources resulting from open cut, longwall and underground coal mining.

A shortened version of this is provided in the main groundwater chapter - in section 8.4.1, Vol 2 Ch 8, p.246:

> The coal reserves of the mine area are outside the GAB. The presence of shale aquitards in units between the coal seams and the GAB aquifers and the predominantly easterly groundwater flow, interpreted as being due to drape folds further to the west, **suggests a very low to no potential** for negative impacts on the GAB groundwater resources resulting from open cut, longwall and underground coal mining.

At best the above inconsistencies could be a result of ignorance and oversight. At worst, the conclusion from the consultant could have been purposely changed to give an impression of a diminished risk of impact to the GAB.

COMMENTS/SUGGESTION: The EIS must be thoroughly reviewed and any inaccuracy be corrected. These corrections should also be publicised in a concise and non-technical document so that the public can clearly see where the original EIS has been misleading.

Paucity of base-line information

ISSUE: It appears that much more detailed hydrogeological investigations need to be undertaken in the Galilee Basin before a realistic assessment can be made of the likely impacts on the GAB and groundwater resources generally from the proposed project.

It is stated in Appendix 14 that:

> A review of available groundwater data on the Galilee Basin indicates that little is currently known about the hydrogeological regime in the area (Executive Summary, Appendix 14, ES1).

And in section 3.2, Appendix 14, p.3-3:

> A data gap analysis for the Galilee Basin was undertaken to evaluate the quality and extent of bore and seismic data in the region (Bradshaw and Bradshaw, 2010). The report concludes that very little was known regarding the geology and stratigraphy of the northern portion of the Galilee Basin. Data is of very low resolution and a significant amount of the existing data was obtained in the 1960s. Existing data for the southern Galilee Basin is more complete than that of the northern Basin; however, data is still very limited.

It is further stated on ES2:

> Further longer term hydraulic testing would be useful to refine predictions of the extent of potential impacts.

These statements firmly suggest that insufficient information currently exists to ascertain the likely impact on groundwater from the proposed development and other developments in the area. This lack of available information may provide some explanation for the confusion apparent throughout the proponent's EIS in regards to the boundary of the GAB, and it also raises the question of the accuracy of the groundwater analysis overall.

It also raises the question as to whether the geological formations that occur north and south of Waratah Coal's exploration tenements (Tertiary Argillaceous sandstone, Lower Triassic Dunda beds and Triassic Clematis Sandstone) according to the original Geoscience Australia map, may also run directly through the proponent's exploration tenement, but haven't yet been mapped.

COMMENT/SUGGESTION: Independent hydrogeological research must be undertaken for the area of concern. In particular, more accurate mapping of the Clematis Sandstone and other GAB elements must be understood before any assessment is made of the impacts from the proposed mine. The results should be presented for public scrutiny and comment.

The consultant's own suggestion that 'further longer term hydraulic testing would be useful to refine predictions of the extent of potential impacts' must also be undertaken before any further consideration is given to this project.

Crucial details of the groundwater resources in the region, and the likely impacts from the proposed mine, must be understood before any further application to proceed is put before the government and public.

Substantial impacts to local groundwater users

ISSUE: The substantial impact of 'drawdown' will extend over a large area and reach many decades into the future. The significance of this for a groundwater dependent region has not been properly assessed or communicated to the degree that its significance warrants. Several key statements are scattered through the report, but this story must be woven together and explained to the communities and landholders who stand to be affected:

> Once an area is excavated and become a drain, it remains as an active drain cell for the entire mine life (section 2.4.11, Appendix 14, p.2-22).
>
> Groundwater recovery was not complete in simulations of 50 years following mining. Given the absence of transient calibration data, the uncertainties in long-term simulations beyond this are considered too large to provide meaningful results…. Current information from monitoring of mines indicates that full recovery of groundwater levels requires many decades (typically in the order of 50-100 years) and in some instances will not fully recover to pre-mining levels (section 3.7.3, Appendix 14, p.3-47).
>
> Groundwater levels around the mine are generally not shallow and will become deeper due to drawdown around the mine (section 6.1.5, Appendix 14, p.6-2).
>
> Preliminary modelling suggests the mine will have significant impacts to groundwater users within 12 km to 30 km of the mine from drawdown around the mine voids (section 8, Appendix 14, p.8-1).
>
> The mine is situated approximately 30 km northwest of Alpha (section 3.1, Appendix 14, p.3-1).

On the back of this scattered information provided in Appendix 14, it would seem there is a reasonable likelihood that the bore-water dependent townships of Alpha and Jericho could be impacted as well as the many properties and landholders in a wide radius around the proposed mine site. However, this is far from common knowledge within the district.

Any kind of promised 'make good' arrangements would fall well short of a safe and secure long-term supply of groundwater for the residents and landholders in the region.

An apparent glaring omission in the EIS is any detail on how residents and landowners in the region will manage in the long-term with the likely degradation in the quantity and quality of their water supply. Given that it is likely to take in the range of 50-100 years for water tables to recover, if at all, and the life-expectancy of the proposed mine is in the order of 20-30 years, there is no certainty as to who will be responsible to deal with the long-term negative consequences on water from this project.

COMMENT/SUGGESTION: The geographically wide and temporally long impacts on the region's groundwater must be fully investigated and communicated to people in the region. 'Preliminary modelling' simply is not good enough when it comes to such a substantial impact on such a vital resource, and it should not be expected that all affected people will turn up to 'consultation' events, or have the time, energy or motivation to read through long and highly technical reports.

Further details are needed on how the proponent is planning to manage the repercussions for groundwater over the life of the impact (50-100 years).

Details must be provided of how conflicts will be resolved as to which mega-mine in the vicinity has caused which impact to the region's groundwater.

ISSUE: In its Social Impact report (Appendix 23), the proponent raises the issue of the water security for the landholders impacted by the likely significant impacts from draw-down and degradation of water quality resulting from mining operations. It is stated:

> Waratah Coal has indicated that it will provide those properties on the mining lease, and their neighbours, with power and improved telecommunications, and water should there be any reduction in the quality or quantity of water as a result of the mine operations (Commitments made by Phil McNamara, previous CEO of Waratah Coal, during the initial public consultations in Jericho and Alpha (8 June 2010)) (Appendix 23, pp.xx-xxi)

However, there are a number of outstanding question that arise from this statement:

- What does it mean for the Waratah Coal to 'indicate' this offer? Is an 'indication' the same as a 'commitment' or a 'guarantee'?;
- Is the statement made by a former CEO still considered valid by the current Waratah Coal board of executives? Will it still be considered valid by future decision-makers in the company responsible for the proposed mine (be it Waratah Coal, a Chinese partner company, or other);
- How will a valid 'reduction in the quality or quantity of water' actually be determined?;
- Given that groundwater recovery is not expected to occur for 50 -100 years, what does the company suggest will serve as the community's water supply after the life of the mine (when presumably the official responsibility of the company for groundwater impacts has expired)?;
- What happens if there is a conflict in owning responsibility for groundwater impacts between the mines in the vicinity? This situation seems likely considering at least two other major mines would be in the radius of influence;
- Considering the townships of Alpha and Jericho are both within the likely impact range from drawdown, what does the proponent suggest it will do if the town's water supply (which is drawn from bores) is impacted? How long will it consider it is responsible for this impact into the future?

COMMENT/SUGGESTION: It appears that a brief sentence in Appendix 23 is the only place where the crucial issue of provision for landholders affected by the loss of groundwater (both quantity and quality) is mentioned in any detail. Elsewhere 'make good' arrangements is stated, but without any detail. All the above questions and more would have to be thoroughly explained, if the project is not rejected outright.

ISSUE: In regard to comparisons between Hancock Pty Ltd and Waratah Coal groundwater modelling it is stated:

> Hancock Prospecting Pty Ltd recently released an Environmental Impact Statement for the Alpha Coal project in the Galilee Basin. The location of the proposed coal mine is approximately 30 km north of the Waratah Galilee Coal Mine therefore investigations for the Hancock mine will be relevant to Waratah Coal's mine. Results outlined in the Groundwater technical chapter of the Hancock EIS have been reviewed and generally support the findings and conclusions of the investigations carried out for the Waratah Coal Project (section 3.7.4, Appendix 14, p.3-47).

However the proponent has failed to provide an explanation for the difference in the predicted time for groundwater recovery between the two projects. It is stated in Hancock Coal Pty Ltd's SEIS that:

> The water table is predicted to recover over a period of ~250-300 years after the start of mining.[25]

Waratah Coal's predicted 50-100 year groundwater recovery is significantly different to the 250-300 year recovery time predicted by Hancock Pty Ltd.

COMMENT/SUGGESTION: A clear explanation must be provided as to the difference between the Waratah Coal and Hancock modelling of groundwater impacts, particularly in regard to the duration of the impacts. The figures that describe the mostly likely extent of impact should be provided in future publications and be clearly explained to those landholders and town-dwellers who are likely to be affected.

[25] Hancock Pty Ltd. Executive Summary, Appendix N – Groundwater and Final Void Report_Issue 4, p.vi.

Cumulative impacts

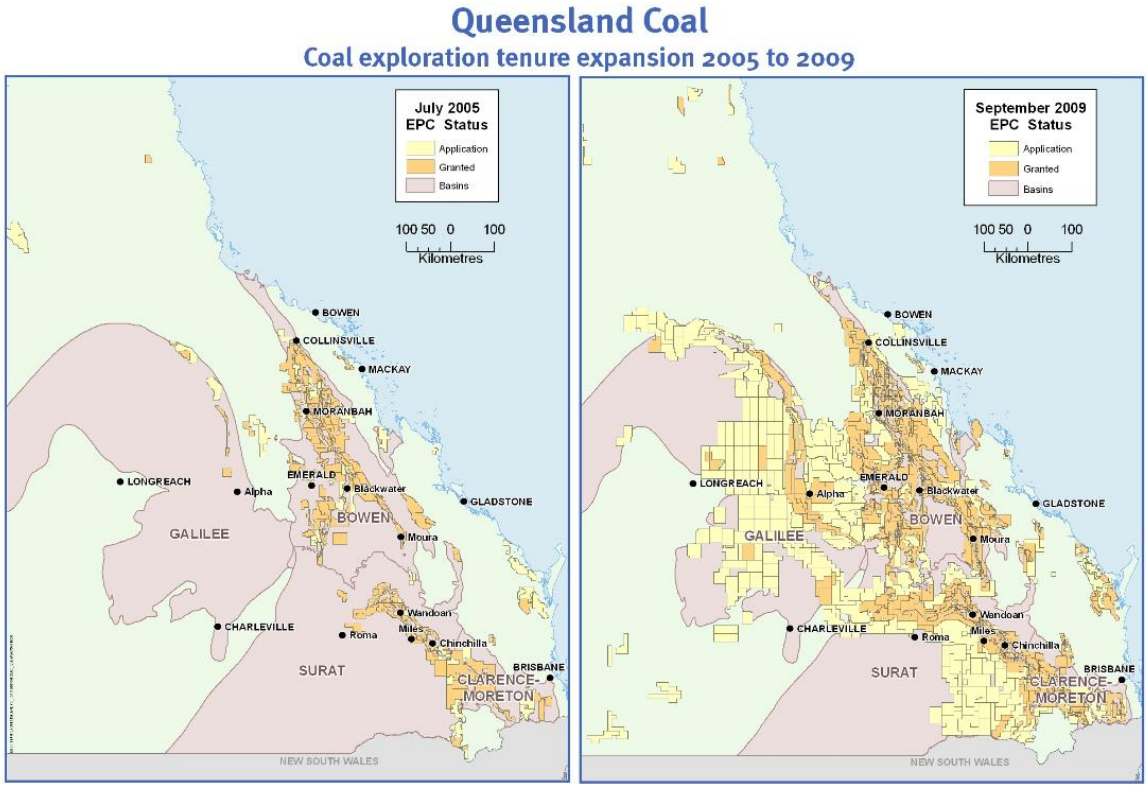
Need for fully independent, comprehensive assessment

ISSUE: The proposal at hand is being made in the absence of any thorough and long-term regional planning. The Galilee Coal Project is only one of a number of 'mega mines' being planned for the Galilee Basin. It is located in a region that has never been mined, but now faces rapid and dramatic impacts on the local ecology, hydrology, economy and social fabric. The Galilee Basin overlaps a significant portion of the Desert Uplands bioregion, which is classified as a biodiversity hotspot, yet only around 2.3% of the area is held in conservation areas.[26] There is a stunning paucity of ecological and hydrological survey data for the bioregion, so there is simply not the base data to properly assess any one of these projects, let alone the six currently planned. Of great concern is the fact that much of this work is being left to mining companies as part of the EIS investigations. Such investigations are ad-hoc in terms of providing a comprehensive regional view, and are potentially unreliable given the vested interests of the companies funding the work.

Considering the range and number of negative cumulative impacts resulting from the proposed mines in the Galilee Basin, there is need for a thorough and comprehensive cost-benefit analysis for the 'opening up' of the basin prior to any of the proposed mines receiving approval from the government. See Appendix F for the Economists at Large analysis of the economic impacts from the Waratah Coal proposal. The principles and conclusions from that report are equally relevant to the Galilee Basin as a whole. In short, the touted benefits from the proposed coal mine come at a great cost to other Australian sectors. These costs must be considered on top of the negative regional impacts to biodiversity and water, including aquifers that form part of the Great Artesian Basin, and the likely long-term remediation costs of this damage. When all these things are considered, it may be found that there is little to no net benefit to Queensland and Australia from the opening up of the Galilee Basin.

Further, considering the explosion of mineral interest and exploration tenements in the Galilee Basin, any cumulative impact analysis is likely to be sorely inadequate in representing the actual impacts of the multitude of coal and coal-seam gas projects, and the associated infrastructure. An indicator of just how comprehensively the region is likely to be impacted is the following image showing the expansion of coal exploration between 2005 and 2009:

[26] http://www.anra.gov.au/topics/vegetation/assessment/qld/ibra-desert-uplands.html



COMMENT/SUGGESTION: A fully independent regional assessment and planning process must be undertaken before approval is considered for any of the proposed mines in the Galilee Basin. The impacts from the multiple proposed mines are of a scale and range that the proposed developments should not be assessed on a mine-by-mine basis through an EIS process. The Namoi Catchment Plan[27] is perhaps an example that can be drawn on in this regard in terms of a more comprehensive evaluation of a region's valuable water supply. Regional plans from South East[28] Queensland and Central West NSW[29]may also provide some example of what would be warranted in the Desert Uplands/Galilee Basin before any development proceeds.

To understand all the overall costs and benefits from the opening up of the Galilee Basin, a fully independent cost-benefit analysis must be undertaken to determine what is the net gain or loss to the region, to Queensland and Australia.

[27] http://www.namoi.cma.nsw.gov.au/52.html?5
[28] http://www.dlgp.qld.gov.au/regional-planning/south-east-queensland-regional-plan.html
[29] http://cw.cma.nsw.gov.au/AboutUs/2011capconsultation.html

Inadequacies of the cumulative impact assessment

Methodology

ISSUE: The proponent's methodology for undertaking its Cumulative Impact Assessment has not been made transparent. It appears that the 37 page chapter on cumulative impacts (Vol 1 Ch 5) is not based on any detailed commissioned study that would one would expect to appear as an Appendix. The lack of a detailed analysis is a major shortcoming of the EIS given the likely serious consequences to the region's water, biodiversity and social fabric (amongst other things) that would result from multiple proposed 'mega-mines'. Some specific comments include:

- The proponent has used the same risk assessment matrix that was used in the Terrestrial Ecology report (Appendix 10), although it is not referenced (see Vol 1 Ch 5, pp.59-60. The same comments we provide on the use of this matrix in Appendix 10 are relevant to its use in the CIA (see p. X of this submission). Namely, that rating any particular issue in this manner results in a level of abstraction in which the *actual* details of the impacts are obscured. Also, the judgements don't appear to be consistently applied. *The appearance of a quantitative rating system hides an extremely subjective decision making process that lies behind the numbers and tables.*

  Through the use of this matrix rating system, the rationale for the underlying sequence of judgements as to the true nature and scale of an impact is left unintelligible. For the everyday 'consumer' of this information, the results would appear far more credible than they really are.

  Of particular concern is the proponent's inevitable 'downgrading' of the impact rating after 'mitigation efforts' have been considered. This appears to have been done without any evidence as to the likely success of the various mitigation measures. Just one example needs to be given to illustrate our point.

  The 'Impacts on neighbouring groundwater users' has been given a Likelihood rating of 4 (Likely- will probably occur) and Consequence rating of 4 (Major – Major temporal and spatial effect). However, it seems that it could just as easily, and perhaps more accurately, been given a Likelihood rating of 5 (Almost Certain – Is expected to occur), and Consequence rating of 5 (Severe – Massive temporal and spatial effect), which would change its assessment from 8 (High), to 10 (Extreme). Incredulously, after 'mitigation' efforts are applied, the impact is judged to be 4 (Low). This judgement, and these apparently highly successful mitigation measures would need detailed explanation.

- The description of the proponent's method of selecting potential projects to be included is incomprehensible:

> To develop a list of potential projects considered relevant for inclusion in the CIA, Waratah Coal reviewed the list of projects that an EIS was required under the following legislation and that the project's potential area of influence included the project's footprint…. (section 5.3.1, Vol 1 Ch 5, p.60).

- The proponent's rationale in short-listing the potential 71 projects down to 8 has not been adequately explained. All that is provided is the following:

> Waratah Coal then undertook a high level review of the available data for each project to assess if there was a potential for material cumulative effects to occur (section 5.3.1, Vol 1 Ch 5, p.60).

COMMENT/SUGGESTION: The assessment of cumulative impacts in the region must be substantially reviewed and re-written. In particular, if a matrix impact rating system is used, the proponent must provide detailed information as to the methodology and rationale for the assessment that it has provided. Full and comprehensive evidence would need to be provided for the ratings both before and after 'mitigation'. All findings must be presented in clear, comprehensible, common language.

ISSUE: The proponent has stated in the EIS that in selecting the final list of projects that were considered in its CIA:

> Where a project could not reasonably and practically be assessed for impacts due to a lack of available information, the project was not considered for any further assessment.

This statement indicates that that the proponent has directly contravened the precautionary principle in its dealing with the likely cumulative impacts from the proposed mine.

COMMENT/SUGGESTION: The proponent's limited appraisal of the likely cumulative impacts from developments in the region is further evidence that a fully independent and comprehensive basin-wide analysis be undertaken.

False claim regarding moderation of ecological impacts

ISSUE: The proponent has falsely claimed that offsets would result in a 'moderation' of the significant cumulative impacts of vegetation clearing that would result from the projects included in the CIA:

> Based on current knowledge, if all projects are to go ahead, it is likely that potential cumulative impacts to significant flora and fauna will be high. It is anticipated that all projects which require the removal of native vegetation will be required to satisfy the legislative requirement for offsetting vegetation losses and that this will result in a moderation of these impacts (section 5.4.3.2, Vol 1 Ch 5, p.70).

We have provided a reasonably detailed discussion about the failures of offsetting on pp.48-61 of this submission. In summary, it can be said that *offsetting would result in a net loss of biodiversity*. Simply 'protecting' areas that are already protected from clearing does not add

any benefit. This is especially because 'protected' offset areas on private land would still be subject to the most dominant threat to remnant vegetation in the region; mining, as it is exempt from all relevant laws that protect remnant vegetation.

COMMENT/SUGGESTION: Considering the failures with 'offsetting', it cannot be conscionably described as a 'moderating' factor for the large scale ecological impacts that would result from the proposed mines in the Galilee Basin going ahead. While environmental offsets may give the impression of some environmental benefit, in reality they lead to a net loss of biodiversity.

Concerns regarding groundwater

ISSUE: The proponent's handling of the likely cumulative impacts from groundwater requires close scrutiny.

- The proponent's description of the likely impacts on groundwater resulting from its individual project is both incomprehensible and highly mis-leading:

> Although it is acknowledge [sic] that in isolation, each of the project components may impact on local groundwater resources, it is unlikely that a cumulative impact will be [sic] occur when considered as a complete project. In general, in the impacts associated with rail and coal terminal components will impact shallow aquifers only (section 5.4.4.1, Vol 1 Ch 5, p.70)

Given that the EIS has elsewhere acknowledged there would be significant drawdown impacts experienced at a radius of up to 30 km around the mine site - which would include the townships of both Alpha and Jericho, as well as multiple properties, all of which are highly dependent on groundwater - the apparent diminishing of these impacts in the above passage is extremely concerning. This section is continued on p.72 where the proponent uses obscure language to distance itself from any responsibility for large impacts on groundwater around the mine site:

> There is strong likelihood that groundwater resources will be subject to cumulative impact through development of projects neighbouring Waratah Coal's mine site…. The open voids are likely to significantly alter the hydrogeological regime of the aquifers they intersect as they act as artificial sinks for groundwater… A similar magnitude of draw down was predicted by Waratah Coal's numerical modelling.

- Importantly, the proponent admits:

> The close proximity of the respective mines will lead to significant overlap between the cones of groundwater drawdown leading to compounded effects on groundwater levels. Supplementary numerical modelling will be required to gain a greater understanding of the likely combined radius of influence of the two projects.

However, it is grossly inadequate for the proponent to state simply 'supplementary numerical modelling' is required to determine the cumulative impacts on groundwater, when the impact discussed could potentially jeopardise the viability of

the entire region in the short, medium and long-term due to the current reliance on groundwater, and the estimation that the groundwater impacts will not recover for 50-100 years, if at all.

- The proponent has failed to consider the contribution to the cumulative groundwater impact from AMCI's proposed South Galilee Mine, despite the project being listed as among those considered as part of the cumulative assessment (table 4 p.61). It has also failed to mention the massive Adani Carmichael mine, which would need to be included in any assessment of cumulative impacts to groundwater in the broader region.

- The proponent has failed to mention the Great Artesian Basin and the likely cumulative impacts on aquifers that make up the GAB. It is clear from maps that are provided elsewhere in its EIS that there would be overlap (for more discussion on this see pp.22-41).

- The proponent lists seven 'mitigation measures' (section 5.4.4.3, Vol 1 Ch 5, p.72). Five of these measures don't actually describe any kind of mitigation to the impact on groundwater, but rather refer to tests and monitoring and compensation agreements.

  Two points that do refer obliquely to actual mitigation measures are 'remediate groundwater contamination caused by the project' and 'implement a management plans [sic] and containment structure for potential contaminants'. However, these are not described anywhere, and there is no evidence provided as to whether such measures are actually technically possible.

COMMENT/SUGGESTION: Groundwater is simply too precious to be given the inadequate level of honesty and attention that it has in the current EIS. Considering its status as a vital resource, especially in inland Australia, the issue of cumulative impacts on groundwater in the Galilee Basin must be given close scrutiny and analysis by an independent expert, and the results made available for public perusal, before any of the current proposed projects are considered for approval. The assessment should, amongst other things:

- Refer to past experiences in other regions (Australia and internationally) of similar scaled projects as well as using 'numerical modelling';

- The scale and duration of impacts should be assessed on a 'worst' and 'best' case spectrum;

- Both temporal and spatial issues need to be considered and detailed;

- All Galilee Basin projects should be included in this assessment; Carmichael, Alpha Coal, Kevin's Corner, China First, South Galilee, China Stone;[30] and any other projects that are proposed for the Galilee Basin;

- Direct and indirect impacts need to be considered, which would require a multi-disciplinary assessment taking into account the multiple interconnected systems. For instance, indirect impacts would include the resulting land use changes due to the reduced availability of bore water for watering stock, and the resulting implications this might have for fire across the region;

- Crucially, the cumulative impact on the Great Artesian Basin must be incorporated into the assessment.

Failure to address climate impacts

ISSUE: The proponent has failed to consider the likely serious cumulative impacts on the global climate as a result of the proposed mines in the Galilee Basin. While 'waste' and 'air quality' impacts have been included in the CIA, albeit with a remarkable lack of detail, perhaps the largest, most enduring, and the most widespread impact from the opening up of a significant new coal basin is not mentioned once. The omission is counter to public expectations on the issue of climate change.

It is important to briefly consider here the contribution the proposed projects would make to global carbon emissions in relative terms. When considering the projected output from the major mines currently proposed, it is likely that in the order of 190 million tonnes of thermal coal will be exported from Queensland, primarily to be used for electricity generation overseas. When burnt, this amount of coal would contribute around 455 million tonnes of CO_2-e every year to the global climate. *In relative terms, this would amount to nearly 85% of Australia's total emissions in 2011.*[31]

COMMENT/SUGGESTION: The cumulative contribution of scope 3 emissions from the proposed mines in the Galilee Basin must be included in any CIA made for the region. Discussion must be provided on how the figures relate to Australia's efforts to reduce CO_2 emissions domestically.

Failure to address impacts on the Great Barrier Reef

ISSUE: Surprisingly, the proponent does not mention the Great Barrier Reef (GBR) as potentially suffering the cumulative impact from the proposed mines in the Galilee Basin. Limiting consideration to the three mines included in Waratah Coal's CIA, there would be a

[30] http://www.theaustralian.com.au/archive/business-old/chinas-biggest-coke-producer-plans-coal-giant-in-galilee-basin/story-e6frg9e6-1226070494944
[31] http://www.climatechange.gov.au/climate-change/emissions.aspx

quantity of around 100 million tonnes of extra coal being shipped every year through GBR. Including also the Kevin's Corner and Carmichael projects, the figure is likely to be closer to an extra 200 million tonnes. All together, these mines are likely to result in thousands more coal carrier passages through the GBR annually.

COMMENT/SUGGESTION: The World Heritage listed Great Barrier Reef should be included in the analysis of the likely cumulative impacts from the opening up of the Galilee Basin. The total number of coal carriers that could be expected to travel through the GBR every year should be provide, as well as an analysis of how many accidents, including oil spills, could be expected.

The likely impacts on the GBR from the development of the proposed Multi Cargo Facility on Abbot Point should also be included in this analysis.

Economic analysis

Review by Economists at Large

The Bimblebox Nature Refuge landholders commissioned Economists at Large to review the Economic Impact Assessment of Waratah Coal's EIS (Appendix 24 of the EIS – Economic Impact). Their report is provided in Appendix F of this submission. The conclusion of their analysis is that:

> The China First Coal project will have impacts on the local and Queensland economies. Some of these impacts will be beneficial, while others will reduce the economic welfare of stakeholders. As the Economic Impact Assessment is focused on measures of impact, such as industry output, export revenues, labour demand, it does not provide an understanding of if the project's benefits outweigh its costs, nor of how any costs and benefits are distributed. What is certain is that participants in the mining industry – investors, employees – will benefit, while non-mining stakeholders, including the agricultural and manufacturing industries will face higher costs and difficulties related to a strong exchange rate. These factors will be exacerbated if similar large projects proposed for the region are approved.
>
> What is needed is cost-benefit analysis, which would allow for a decision to be made in the Queensland public interest. This is the approach preferred by economists and the Queensland Department of Infrastructure and Planning.

Insufficient information regarding overseas' partners

ISSUE: There is crucial information that would seem to apply to an economic analysis of the project that is only mentioned in the Social Impact Statement of Appendix 23 (pp. xviii, 2):

> Contracting
>
> While project construction must contain at least 50% Chinese content (in line with debt financing agreement with Export-Import Bank of China), MCC will give preference during both the construction and operational phases of the project to local contractors and local suppliers wherever possible... (p.xviii)
>
> Waratah Coal has entered agreements with Chinese partners for the financing, construction and marketing of the project. The Metallurgical Corporation of China (MCC) has been engaged to undertake the engineering, procurement, construction and management of the project, although Waratah Coal will have a management team and will maintain a supervisory role during construction, operations and decommissioning. MCC will utilise the expertise and resources of a number of other major Chinese companies, including the China Railway Group, the China Communications Construction Company and the Sino Coal International Engineering Group.
>
> Debt financing is being organised through the Export-Import Bank of China. As part of the agreements, the Export-Import Bank will provide US$5/6 billion in debt finance; project construction will contain at least 50% Chinese content; and all production will be sold to China Power International Development. At the same time, agreement has been reached with MCC that preference during both the construction and operational phases will be given to employees from the local area, Queensland and Australia, in that order, before foreign workers (p.2).

COMMENT/SUGGESTION: The proponent must provide much greater detail about the agreements it has entered with the Chinese partners. In particular, it must provide much greater detailed information about what is exactly meant by:

- 'MCC will give preference during both the construction and operational phases of the project to local contractors and local suppliers wherever possible';
- 'Waratah Coal will have a management team and will maintain a supervisory role during construction, operations and decommissioning';
- 'project construction will contain at least 50% Chinese content';
- 'preference during both the construction and operational phases will be given to employees from the local area, Queensland and Australia, in that order, before foreign workers'.

Further, given Clive Palmer's reported 'false' deal in relation to Chinese funding for this project in February 2010,[32] scrutiny must also be applied to the claim that there is actually an agreement in place. The proponent should be required to provide evidence of this.

[32] Yeates, C. and Garnaut, J. 10/02/2010 'Palmer's $60b claim rejected', *Sydney Morning Herald*. Available at: http://www.smh.com.au/business/palmers-60b-claim-rejected-20100209-nprq.html.

Economic and social impact on the region

It is important to note that there are tangible social and economic impacts that have already occurred in the region, before the proposed mine has even been approved. One example is the increase in property values and therefore rates for houses in the town of Alpha. A house in town that was purchased at its recognised value of $15,000 in 2006, has recently been re-valued at $70,000. These dramatic increases of value are directly the result of the current mining speculation in the region. The associated increase in rates and rent for these properties puts serious financial strain on local, non-mining, workers.

Question of accuracy in public information

ISSUE: There are indications that some of the serious social and economic impacts from the proposed mine have not been communicated to the communities that stand to bear the brunt of the worst impacts, such as rises in costs of living and job losses from non-mining industries etc. The basis for this concern is the contrasting information provided in the economic study (Appendix 24) as opposed to the Social Impact study (Appendix 23). Presumably the analysis in Appendix 24 is more likely to be accurate, and the information in Appendix 23 is what has been communicated during the 'community consultation' process.

For instance, the summary on p. xvi of Appendix 24 –Economic Impact, states that there would be a total of 2,914 jobs generated in the construction phase and around 1,240 jobs in the operation phase of the proposed China First mine, which includes jobs at the mine site, for the rail construction, and at the port.

In contrast, section 3.1 of the Social Impact study - Appendix 23, p.33 indicates that there would be a total of 6,000 jobs in the first 18 months during the construction phase and 1,710 during the operational phase.

This amounts to an exaggeration in the employment figures of around 200% and 140% respectively.

COMMENT/SUGGESTION: The example above indicates that there are grounds to further investigate the accuracy of information provided to the public during the 'community consultation' phase. All information that was delivered should be thoroughly scrutinised and all discrepancies made public in a concise, straight-forward, widely circulated document. Further it should be checked whether the 'costs' to certain sectors resulting from this mine were accurately communicated. A simple survey of people who had attended Waratah Coal's information sessions would provide some answers as to what is understood in the region in regards to the hidden costs of the project.

Inconsistent and misleading claims

ISSUE: It is stated section 4.3.2 of Vol2 Ch 4, p.153 that:

> The loss of grazing land would be offset by the net economic benefits associated with the construction and operation of the mine, which include increased employment, and positive secondary impacts on the local economy through increased local business opportunities.

The ability for 'beneficial' impacts from the mine to offset the loss of grazing land is an unsubstantiated claim. Significantly, it fails to distinguish the distribution of impacts across time and space. While some jobs would be created by the proposed mine, there would also likely be significant losses in employment, which is detailed in the proponent's own economic assessment in the EIS. It is undoubtable that grazing enterprises would find it far more difficult to employ workers who would be attracted to the highly paying mine sites. Further, any such 'benefits' from the operation of the mine would only last for the duration of the mine operations, whereas sustainably managed grazing operations could be operational for the foreseeable future.

COMMENT/SUGGESTION: The proponent should be required to provide a more realistic and detailed assessment of the impacts from the mine, and substantiate any claims that it makes regarding the ability for the mine to offset negative impacts.

ISSUE: In section 1.3, p.13 of the Executive Summary, the proponent suggests that the project would have 'an initial export capacity of 40 Mtpa, with the capability to expand substantially to 100 Mtpa'. In all other cases, including the proponent's website, the 40 Mtpa figure is used. Presumably an increase in production by 2.5 times would substantially alter some of the analyses undertaken for the EIS, including impacts on local employment and industry.

COMMENT/SUGGESTION: The proponent must explain further the anticipated output of coal from its proposed mine, and how a change in the rate of production would impact on the outcomes from analyses undertaken as part of the EIS.

Environmental offsets

Queensland's biodiversity has already been overdrawn. We cannot risk losing what little remains.

In this context, the significant environmental impacts from the proposed development cannot be meaningfully 'offset' and would lead to a net loss of bio-diverse rich remnant woodland in Queensland.

Specifically, Waratah Coal's proposal would lead to a direct loss of the significant multiple values of Bimblebox Nature Refuge that are outlined on pp.4-12 of this submission, and the EIS has failed to present an appropriate offset plan that would guarantee no net loss in Queensland's biodiversity over the long term. While our comments below focus on the offset strategy proposed for Bimblebox Nature Refuge, our concerns apply to all offsets for biodiversity, including the loss of valuable areas along the proposed rail-line.

We do not support offsetting as an appropriate environmental policy instrument. We note there are numerous concerns and criticisms of the notion and current practice of 'offsetting' for environmental destruction and degradation.[33] Moreover there remains no evidence that offsetting actually delivers no net loss of biodiversity values.[34] Many of these concerns are directly relevant to the case at hand:

<u>Some recognised short-comings of offsets in theory and practice</u>

- *Offsets rarely achieve no net-loss of biodiversity:*
    - No net loss requires an offset to be ecologically equivalent to (preferably greater than) the biodiversity values impacted (arguably impossible); to increase the state-wide stock of biodiversity in Queensland; and endure over ecological time (200+ years);
    - Protecting existing habitat as an offset for the destruction of habitat elsewhere results in a state-wide net loss of biodiversity;
    - 'Restoration' projects as offsets suffer from the lag-time in a restoration area being functional as habitat (one example would be the requirement of many species for tree hollows).[35] Further, the proof that restoration can be successful simply doesn't exist in most cases. Even where restoration can be successful, the approach is based on the dubious assumption that the targeted biodiversity will use the area;
    - The fact that offset areas can later be destroyed for development also leads to a net-loss of biodiversity;
    - The inclusion of 'indirect' offset options is an unacceptable biodiversity outcome – it leads to a net loss of biodiversity.

[33] Eg. Bekessy et al. (2010) 'The Biodiversity bank cannot be a lending bank', *Conservation Letters*, 3, 151-158.
[34] Gibbons, P. & Lindenmayer, D., 'Offsets for land clearing: No net loss or the tail wagging the dog?' (2007) *Ecological Management & Restoration*, Volume 8(1), p.30.
[35] Gibbons & Lindenmayer, above n34, p.28-29.

- *No long term security:* There is no way to guarantee that an offset area will be protected and maintained in the long and short term. Over the long term, offsets require ongoing protection from pests and diseases, and natural disasters like floods and bushfires. The scientific uncertainties created by global warming make this task even more difficult. In the short term, offsets must be permanently protected from competing human activities, especially from the threat of mining. The only legal mechanism currently available to guarantee the protection and management of an offset area over the long term is designation as a national park or conservation area under the *Nature Conservation Act 1992;*[36]

- *Direct loss of biodiversity:* Offsets are usually only required for a narrow range of species and ecosystems recognised by particular pieces of legislation, so it is inevitable that the result of offsetting is a net-loss of total biodiversity. Those species that are not 'listed' will inevitably decline through the current approach to offsets;

- *Direct loss of other values:* Offsets are only considered for particular species or habitat, but the importance of experienced and committed land managers (who are connected to particular properties and places) for successful maintenance and restoration of biodiversity is usually ignored;

- *Lack of regulation and enforcement:* There is a poor track record of compliance in the creation and maintenance of offset areas.[37]

There are a large number of failings with Waratah Coal's outlined environmental offset strategy. Many are in corroboration with the weakness identified for environmental offsetting generally, and some are additional to the issues listed above:

<u>Failings of Waratah Coal's proposed offset strategy</u>

Net loss of biodiversity

The result of Waratah Coal's proposed mine going ahead would be a net loss of biodiversity in Queensland.

- If Waratah Coal's proposed development goes ahead it would result in the direct loss of around 7,286 ha of remnant vegetation that would not be replaced:

    - 4,595 ha remnant vegetation would be permanently lost at the mine site, including 3,927 ha on Bimblebox Nature Refuge (section 6.4.5, Vol 2 Ch 6,

[36] Section 27 of the *Nature Conservation Act 1992* expressly prohibits mining and greenhouse gas storage activities within national parks and conservation areas
[37] Gibbons & Lindenmayer, above n34, p.28.

p.190) and 77 ha RE 10.3. for the diversion of Lagoon Creek 12 (section 6.4.1.1, Vol 2 Ch 6, p.189)
    - 2,691 ha remnant vegetation would be permanently lost for the rail development (section 6.4.2, Vol 3 Ch 6, p.278)

- Waratah Coal's proposed mine would also subject at least 3,600 ha of remnant vegetation to subsidence (this is the 'remainder' figure of the area of remnant woodland on Bimblebox after the open cut clearing is subtracted).

  The total area of remnant woodland that would be subject to subsidence outside of Bimblebox does not appear to have been provided in the EIS.

  Subsidence is likely to result in at least some level of degradation to remnant woodland considering the unknown impacts due to unquantified changes to hydrology and the soil profile. In this regard the EIS acknowledges:

  > The underground mine has the potential to cause subsidence and other impacts on the soil profile and hydrology which may then affect the habitat values in the overlying open woodland habitats (section 6.4.7.1, Vol 2 Ch 6, p.191).

  Given the more extensive experience with underground mining in NSW, it is worth noting that the NSW government early in 2011 listed subsidence as a 'major threatening process'.[38]

- Of great concern is the proponent's suggestion that it might use 'indirect offsets' as part of the compensation for the destruction of habitat that would result from the proposed mine:

  > The final Offset Package may include both direct and indirect offsets. As a result of offset analysis and negotiations it may be more appropriate for some particular environmental values, included some endangered fauna species that indirect offset measures are the most appropriate approach to support the conservation of the species **as habitat loss may not be the largest threatening process…** (section 5.2, Appendix 27, pp.29-30).

  This is followed by a suggestion that indirect offsets are being considered specifically for the loss of habitat of the Black-Throated Finch:

  > Indirect offsets for the Project are being explored for the following biodiversity values:
  >
  > > Black-throated Finch habitat – investigate [sic] Waratah Coal supporting the implementation of action identified within the 'National Recovery Plan for the Black-throated finch southern subspecies (*Poephila cincta cincta*)' 2007. This may include research, monitoring or raising public awareness of the species (section 5.3, Appendix 27, p.30).

[38] http://www.environment.nsw.gov.au/threatenedspecies/LongwallMining.htm

The prospect that Waratah Coal could actively contribute to the loss of the habitat of the BTF, and absolve these actions through putting money into 'research, monitoring or raising public awareness of the species' is extremely alarming.

It is stated that:

> The National Recovery Plan for the species will also be considered in identifying whether indirect offset measures would be appropriate to assist in the species conservation (section 4.2.3, Appendix 10A, p.20).

However, it is clear that Waratah Coal's proposal could contribute to four of the seven listed possible threats to the species, and contravene potentially all five of the recommended management practices that are outlined in the National Recovery Plan 2007 (BTFRT *et al*., 2007: pp.13, 24):[39]

The possible threats to the BTF that Waratah Coal's proposed mine could contribute to:

- Clearing and fragmentation of woodland, riverside habitats and wattle shrubland;
- Degradation of habitat by domestic stock and rabbits, including alterations to fuel load, vegetation structure and wet season food availability;
- Alteration of habitat by changes in fire regime;
- Invasion of habitat by exotic weed species, including exotic grasses.

The recommended land management practices that Waratah Coal's proposed mine could contravene:

> Proper management of the habitat of the southern subspecies of the black-throated finch is critical to the survival of the species. Guidelines for habitat management, based on current knowledge of the biology of the finch species, are outlined below.
>
> - management of overgrazing of the riparian grassland that is the main habitat of the species;
> - management of clearing and fragmentation of woodland, riverside habitats and wattle shrubland;
> - management practices aimed at minimising impacts on habitat by domestic stock and rabbits, including alterations to fuel load, vegetation structure and wet season food availability;
> - fire management; and
> - weed management strategies to minimise invasion of habitat by exotic weed species, including exotic grasses.

[39] Black-throated Finch Recovery Team, Department of Environment and Climate Change (NSW) and Queensland Parks and Wildlife Service. 2007. *National recovery plan for the Black-throated finch southern subspecies (Poephila cincta cincta*). Report to the Department of Environment and Water Resources, Canberra. Department of Environment and Climate Change (NSW), Hurtsville and Queensland Parks and Wildlife Service, Brisbane. Available at http://www.environment.gov.au/biodiversity/threatened/publications/recovery/black-throated-finch-southern/

It would be ironic indeed if the project were to proceed, and the 'indirect offset' research and monitoring proposed by Waratah Coal found that the mega mines in the Galilee Basin posed a substantial threat to the southern extent of the species.

Further, Clive Palmer's recent media statements about the Black-throated Finch serve to undermine any commitment that his company might proclaim to have for the conservation of this species. His comments included:

> The Black-throated Finch has wings and can fly. It's found right throughout Queensland…
>
> [The environment protestors are] not really concerned about their fellow citizens. They're not concerned about the people that are unemployed. They're not concerned about the children that want Christmas presents their parents can't afford. They're not concerned about any of those things. They're more concerned about the Black-rooted [sic] Finch. I'm more concerned about the people who want jobs, the community that needs investment and the future that we can offer for people in central Queensland, rather than the Black-throated Finch. And fortunately, if I was the finch I'd be more concerned about them, but I'm not.[40]

- The proponent has also outlined the possibility of rehabilitation being included in its 'offset package':

> Subject to further investigation on the long-term viability of the BNR located above the underground mining, and landholder consultation, **direct offsets may include rehabilitation to improve linkages between the area of the BNR to currently isolated remnant vegetation on the range to the northwest of the site**' (section 5.2, Appendix 27, p.29).

A couple of extremely serious concerns with this suggestion include:

  - The area to the northwest of Bimblebox Nature Refuge coincides with the area of greatest expected subsidence from the proposed underground mine, in order of the range of 3.27m:

> The greatest (maximum) total subsidence will occur in the surface areas which are affected by the operations in both the B-seam and D-seam operations… This areas occurs in the north western section of the underground mine foot print. The total cumulative subsidence in the area is predicted to reach a maximum depth of 3.27 m (section 1.3.6, Vol 2 Ch 1, p.71).

    This area would be an extremely poor choice for any serious rehabilitation due to the unknown and unquantified impacts on the soil, hydrology and vegetation due to subsidence.

  - The area to the north-west of Bimblebox is also currently composed of nearly 100% cleared, blade ploughed Buffel Grass pasture. There is no

[40] Transcript of Clive Palmer on ABC Capricornia, Dec 1st 2011. Audio recording available here: http://www.abc.net.au/rural/qld/northwest/

evidence that this kind of highly disturbed area could be rehabilitated, to any extent.

- A related concern is the reference to 'non-remnant' areas that might be included in Waratah Coal's offset plan:

> Offsets may consist of a combination of remnant and non-remnant areas that are located in biodiversity corridors and adjacent to protected areas or large tracts of bushland to enhance the viability and connectivity of existing habitats' (section 3.4, Appendix 27, p.14).

However, it is not explained what is included in the classification of 'non-remnant areas'. If it refers to regrowth areas, then there is little chance that there would be ecological equivalence with the areas being 'offset'.[41] Remnant areas contain greater biodiversity, and in the Desert Uplands, regrowth could take up to 200 years to reach the form and structure of remnant woodland that would be impacted by the proposed mine.

Of great concern, 'non-remnant' areas could also potentially include cleared, blade-ploughed Buffel pasture, for which there is no evidence of successful rehabilitation.

No long term security (legal)

- There is no way to guarantee security for offsets on private land.

Since broad scale land clearing was finally phased out in Queensland on the 31st December 2006, remnant vegetation is no longer under threat from clearing for agriculture,[42] and offset areas like the ones proposed by Waratah Coal in its Biodiversity Offset Strategy (Appendix 27) cannot be easily legally secured from destruction or degradation from mining, as exemplified by a statement in the proponent's own EIS:

> The Project is not subject to the VM Act as mining activities are exempt from the need to obtain clearing permits under the Act (section 4.2.2, Appendix 27, p.17).

This is despite legal security being a requirement under both the *QGEOP* and the EPBC *Draft Policy Statement 1999*. According to these guidelines:

> … the proposed offsets are required to be legally secured to ensure that all project related environmental impacts are adequately compensated over the long term (section 7.1, Appendix 27, p.39).

It is stated in the EIS, in section 5.2, Appendix 27 p.29:

[41] Gibbons & Lindenmayer, above n34, p.28.
[42] McGrath, C. 2007, 'End of broadscale clearing in Queensland', *Environment and Planning Law Journal*, *24*(1), pp. 5-13. Available at http://www.envlaw.com.au/vegetation5.pdf

> Offset sites could be secured through Nature Refuge conservation agreement or other legally binding mechanisms with the landowner and be actively managed to enhance their biodiversity values. Or Waratah Coal may seek to acquire a property or properties and dedicate to [sic] the State as future protected areas, which is an option currently being explored for the BNR

However, the only way to guarantee that any biodiversity offset created for the loss of Bimblebox Nature Refuge would not be destroyed for mining in the future is dedication of the land to the State as one of the national parks listed in section 27(1) of the *Nature Conservation Act 1992*. The inability to exclude mining on private land is explained in section 7.1.2, Appendix 27, pp.39-40:

> A nature refuge is a voluntary agreement between a landholder and the Queensland Government that allows for the management and preservation of conservation significant land while allowing compatible and sustainable land uses to continue. These agreements attach to land title and are therefore binding on both present and future owners of the property. Landholders with a nature refuge continue to own and manage their land to generate an income and in keeping with their lifestyle. They also have a supporting conservation agreement (a type of management plan) written for the areas subject to the nature refuge which is administered and enforced by DERM. A nature refuge is recognised as a type of 'protected area' in Queensland. Nature refuges comprise the second largest expanse of Queensland's protected areas estate, and actually out number national parks.
>
> **Mining or petroleum leases may be granted over nature refuge areas**, although the presence of a nature refuge **may** lead to additional State imposed condition on the mining or petroleum proponent. In all other situations a nature refuge agreement will only be terminated in exceptional circumstances. **It is the highest level of protection that can be afforded to a freehold or leasehold property in Queensland.**

So, in the proponent's own words, despite Nature Refuge Agreements providing the 'highest level of protection that can be afforded to a freehold or leasehold property in Queensland', 'mining or petroleum leases may be granted over nature refuge areas'. The circumstance of where nature refuges with recognised high biodiversity values can be mined is exemplified in no case clearer than the Waratah Coal proposal over Bimblebox Nature Refuge.

The current proposal by Xstrata to mine its own offset area 'Newlands Nature Refuge'[43] is further evidence of the lack of security for 'protected' offset areas. The current offset framework will quite simply lead to forever diminishing biodiversity.

This implies that the only means by which an offset area could be legally protected is through the creation of a National Park, or equivalent, for which an offset area would have to qualify.

[43] http://www.derm.qld.gov.au/environmental_management/impact_assessment/eis-processes/documents/newlands-extension-ias.pdf

No long term security (management)

- It is implied in the EIS that a conservation covenant would ensure that the offset areas would be managed to 'improve their ecological condition':

> By providing a direct offset it will ensure habitat for these species and ecosystems are protected and managed to improve their ecological condition (section 5.2, Appendix 27, p.29).

And also:

> Offsets will be protected on title and actively managed through sustainable land management practices to enhance their biodiversity values (section 3.4, Appendix 27, p.15).

However, it is extremely unlikely that any offset area could match the efforts and experience of ecological management on Bimblebox Nature Refuge considering that: co-owner Carl Rudd holds a PhD in a related field and has solid experience and strong interest in habitat conservation; the primary manager, Ian Hoch, has 25 years experience of environmental restoration in the Desert Uplands with a proven track-record of commitment and dedication to this task, and; the fact that a number of long-term research projects in collaboration with agencies such as Queensland Herbarium, CSIRO and Birds Australia are hosted on Bimblebox, with the aim of improving biodiversity outcomes in the region.

- The proponent has indicated that it does not foresee that management of offset areas would need to occur for longer than the life of the mine:

> Active management of the offset site is expected to continue for a number of years depending on the condition of the offset. The VMP for each site will specify the key objectives for restoration and ecological criteria that determine when ongoing management will be complete. **It is estimated that management would be undertaken up to a period no greater than 20 years** (section 7.4, Appendix 27, p.41).

This is an inadequate approach to genuine sustainable land management, which requires on-going commitment to deal with the long-term, ongoing pressures on ecological systems of the region, such as the intrusion of Buffel Grass and other environmental weeds, feral animals, fire and the likely impacts from climate change.

Under the current framing of the proponent's offset strategy, once its obligation to the offset areas have expired (which it has suggested is no longer than 20 years), the on-going responsibility and financial burden of properly maintaining an offset area is likely to fall on individual landholders, the State government, and ultimately, tax payers.

No long term security (monitoring and enforcement)

- There is little to no monitoring and enforcement of conservation land management objectives in the Desert Uplands. A commitment might look good on paper, but may make little or no difference in reality.

Direct loss of biodiversity

- The proponent has stated that it will only consider 'key threatened ecosystem types and fauna species impacted by the Project', (section 3.4, Appendix 10A, p.15). This implies that non-'Threatened' species and ecosystems would not be accounted for. Specifically, the 15 migratory and marine species and the 18 regionally significant species, and the scores of other species not recognised on any particular list, would be totally ignored by the proponent's offsetting strategy.

  This approach would further guarantee that there would be a net loss of habitat for both listed and non-listed species as a result of the proposed development going ahead.

  The narrow focus of the proponent in this regard is made even more concerning considering the likely cumulative impact of species in the region due to the multiple planned 'mega' mines.

Failure to comply with State and Federal offset policies

- The proponent's offset strategy in Appendix 27 states that:

  > … all proposed offset sites will meet the intent of relevant State and Commonwealth offset policies… (section 5.1, Appendix 27, p.28)

  However it fails in this obligation in numerous ways as summarised in the following table. Note that we have drawn on the current 2011 Draft EPBC Act Environmental Offsets Policy, rather than the 2007 Draft Policy Statement used in Appendix 27:

	Policy principle	Failure to satisfy the principle due to:
2011 Draft EPBC Act Environmental Offsets Policy[44]		
Requirement 1	deliver an overall conservation outcome that improves or maintains the viability of the aspect of the	It is unlikely that the proposed offset strategy would achieve 'an overall conservation outcome' due to the fact

[44] SEWPaC, 2011, *EPBC Act Environmental Offsets Policy*, Commonwealth of Australia, p.4. Available at http://www.environment.gov.au/epbc/publications/consultation-draft-environmental-offsets-policy.html

	environment that is protected by national environment law and affected by the proposed development	that it would result in a net loss of biodiversity, and because offset areas on private lands would not be secure from future mining or other development
Requirement 2	be efficient, effective, transparent, proportionate, scientifically robust and reasonable	Arguably the strategy would be ineffective for the reasons given above. In regard to the other issues, there is a lack of detail provided in the offset strategy to ascertain if it would meet this requirement
Requirement 2	be built around direct offsets but may include indirect offsets	There is insufficient detail provided in the offset strategy to ascertain if it would meet this requirement, but there are indications that the proposed offsets for the Black-throated Finch may *not* be built around direct offsets (section 5.3, Appendix 27, p.30)
Requirement 4	be of a size and scale proportionate to the impacts being offset	There is insufficient detail provided in the offset strategy to ascertain if it would meet this requirement
Requirement 5	be in proportion to the level of statutory protection that applies to the affected species or community	Indications that the proposed offsets for the Endangered Black-throated Finch may be built around indirect offsets (section 5.3, Appendix 27, p.30) raises questions in relation to this requirement
Requirement 6	effectively manage the risks of the offset not succeeding	There is no indication that this has been considered in the proponent's offset strategy
Requirement 7	have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.	This requirement has been adequately considered in the proponent's offset strategy
Policy principles from the QGEOP[45]		
Principle 1	offsets will not replace or undermine existing environmental standards or regulatory requirements	The offset would be used to justify the destruction and degradation of the State Significant Bimblebox Nature Refuge. The offset would result in a net loss of biodiversity in Queensland
Principle 2	environmental impacts must first be avoided, then minimised, before considering the use of offsets for any remaining habitat	There is no evidence the proponent has considered avoiding or minimising the extent of its proposed damage to habitat
Principle 3	offsets must achieve an equivalent or better environmental outcome	The offset would result in a net loss of biodiversity in Queensland. The numerous values of Bimblebox Nature Refuge, as outlined in this submission on pp. 4-12, would be lost and not replaced

[45] EPA, 2008, *Queensland Government Environmental Offsets Policy*, Queensland Government, pp.11-12, available at http://www.derm.qld.gov.au/environmental_management/planning_and_guidelines/policies_and_strategies/environmental_offsets/

Principle 4	offsets must provide environmental values as similar to those being lost	There is no evidence that the proponent will able to provide environmental values as similar to those being lost
Principle 5	offset provision should minimise the time-lag between the impact and delivery of the offset	The consideration of rehabilitation as part of the offset package would require many decades to provide any kind of meaningful biodiversity outcomes, and would require a level of investment and commitment in management that is unlikely to transpire
Principle 6	offsets must provide additional protection to environmental values at risk, or addition management actions to improve environmental values	It is unlikely that any offset area would receive the level of attention and commitment required to provide 'additional' safeguards and management actions besides those already required by the Vegetation Management Act and obligatory land management review on the renewal of leases
Principle 7	offsets must be legally secured for the duration of the offset requirement	Apart from establishing National Parks or their equivalent, there is no way to guarantee that the offset areas would be secure from one of the key emerging threats to habitat in the region; large-scale mining projects

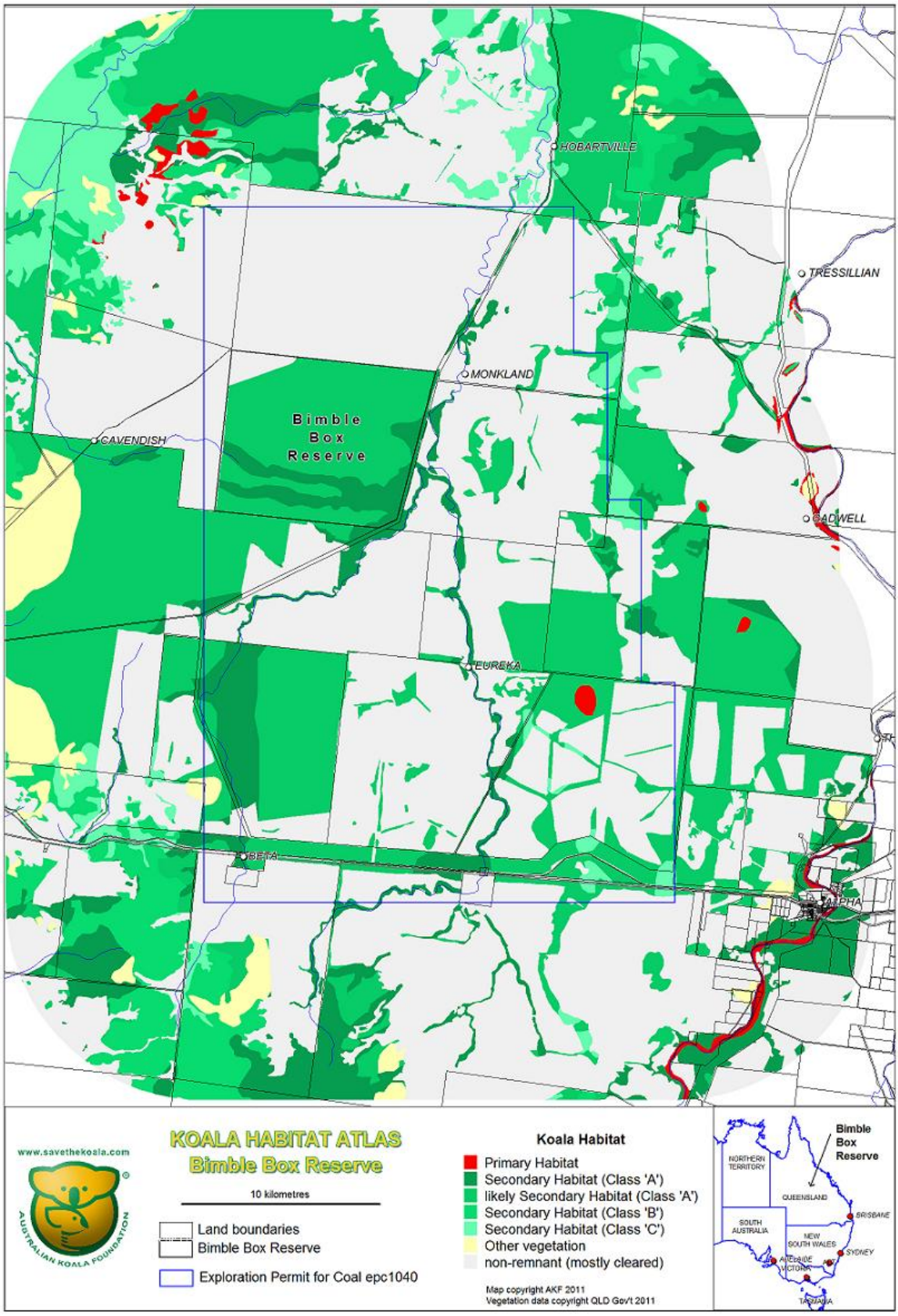
- Koala habitat is not included in the table of 'Offset Liability of the Galilee Coal Project' (Table 4, Appendix 27, p.25-27), despite being one of the three 'specific-issue offset' policies in operation under the Queensland framework is Koala habitat (listed in section 3.3, Appendix 27, p.14).

  Koalas have been observed on Bimblebox Nature Refuge on a number of occasions, and the map on the following page demonstrates the extent of potential koala habitat on Bimblebox (entirely made up of 'Secondary Habitat – Class A' and 'likely Secondary Habitat – Class A').

- The proposal at hand is being considered in the absence of any offset guidelines being available specifically for protected areas. It is stated in the EIS:

  > …No specific offset policy is currently in place for protected areas (Appendix 27, p.15).

  This suggests that both the State and Federal governments are yet to determine how the destruction of protected areas could be appropriately compensated in kind, if at all. Since there has been no adequate or conclusive public discussion of this matter, it would be highly inappropriate to proceed with any action causing significant negative impact on a protected area, including Bimblebox Nature Refuge.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KOALA HABITAT ATLAS
Bimble Box Reserve
10 kilometres
Land boundaries
Bimble Box Reserve
Exploration Permit for Coal epc1040
Koala Habitat
Primary Habitat
Secondary Habitat (Class 'A')
likely Secondary Habitat (Class 'A')
Secondary Habitat (Class 'B')
Secondary Habitat (Class 'C')
Other vegetation
non-remnant (mostly cleared)
Map copyright AKF 2011
Vegetation data copyright QLD Gov't 2011
Bimble Box Reserve
NORTHERN TERRITORY
QUEENSLAND
SOUTH AUSTRALIA
NEW SOUTH WALES
BRISBANE
SYDNEY
TASMANIA

Inadequate offset targets

- The offset strategy proposes only 2,822 ha of offset for the BTF (Table 4, Appendix 27, p.25-27), despite the proponent acknowledging in Appendix 10A that:

> It is apparent from the review of existing information that there have been no systematic or regular surveys in regards to BTF in the Desert Uplands, with most data derived opportunistically and descriptive in nature. In considering the information available at the time of preparing this report, it is clear that there is insufficient information for adequate conservation planning for BTF [in] the bioregion (section 4.1, Appendix 10A, p.21).

  This statement would suggest that there is currently inadequate data and information to ascertain what would be required for a functional 'offset' for this species.

- The offset strategy proposes only 801 ha of offset for the Large-Podded Tick-trefoil (*Desmodium macrocarpum*) (Table 4, Appendix 27, p.25-27), while elsewhere in the EIS the potential habitat for this Near Threatened species on Bimblebox Nature Refuges has been stated as being 3,926 ha (section 6.4.4, Vol 2 Ch 6, p.189). The limited survey effort that was performed as part of this EIS due to 'unfavourable seasonal conditions' (ES, Appendix 10, p.12) further indicates the likely under-representation of this species.

Insufficient basic information provided

- The offset strategy provided in Appendix 27 of the EIS is at such a preliminary stage that it is of little value in terms of offering a realistic indication about what a final offset plan could possibly be offered. It has been based solely on desktop studies set with very broad parameters. As such, the maps and figures that are provided only serve to be misleading as to the actual offset areas available. Only a very general comment is offered:

> The EIS lists broad habitat ranges for the potential impact to the threatened fauna species as defined by SEWPaC. Where information is available these broad habitat ranges have been refined to more accurately define the impact in this preliminary offset strategy. It is likely that these impact areas will be further reduced following more detailed investigations (section 4.2.3, Appendix 27, p. 17).

  Any discussion about habitat identified through satellite data is meaningless without: thorough ground-truthing the broad vegetation classes and the condition of the ground-story flora; surveying for the abundance and diversity of species; excluding all areas that may have extractable minerals beneath them; factoring in the pressures on individual species and habitat from predicted climate change, and; gauging the willingness of the landholders to commit to a stringent conservation agreement in perpetuity, among other things.

Further, it is stated in section 4.2.3, Appendix 10A, p.23 that:

> The proposed approach for compensation is to identify another parcel of land within the same bioregion (Desert Uplands) that is of 'ecological equivalence' to the BNR. Criteria will include an area that contains a mix of the same REs and the same or higher biodiversity values. To assist in determining 'ecological equivalence' DERM's biocondition methodology and **BPA mapping** will be used. It is currently estimated the BNR compensation may be twice the total area (approx. 16,000 ha) and the intent is it will become a future protected area.

An inclusion of the biocondition methodology and BPA mapping would have been a straight-forward 'desktop study' task, yet the proponent has failed to include these results in the offset strategy.

COMMENT/SUGGESTION:

The recently launched Queensland Biodiversity Offsets Policy states:

> The purpose of this policy is to increase the long-term protection and viability of the state's biodiversity where residual impacts from a development, on an area possessing State significant biodiversity values cannot be avoided.[46]

However, the proponent's offset strategy outlined in Appendix 27 does not comply with this policy goal.

The substantial direct loss of remnant woodland and biodiversity in the order of 7,300 hectares, as well as unquantified damage and disturbance to a further 3,600 hectares or more resulting from subsidence, cannot be offset. These areas would not be replaced, so would lead to a net loss of biodiversity. Through the destruction and degradation of Bimblebox Nature Refuge, the proposed development would also result in the loss of a number of other important values.

The lack of effective mechanisms to secure offset areas on private land from future destruction, especially from mining, means that there is unlikely to be guaranteed 'long term protection' of the offset areas.

These issues warrant refusal of the proposed development.

[46] DERM, Oct 2011, Queensland Biodiversity Offset Policy (version1)

Climate Change

Failure to account for environmental impact of proposed development

ISSUE: A significant failing of Waratah Coal's EIS is an insufficient analysis of the climate impact from the proposed development. It is specified in the ToR that:

> Direct, indirect and cumulative impacts must be fully examined and addressed (section 4, ToR, p.11).

Given that the purpose of the proposed mine is to generate thermal coal to be used for electricity generation in China, and that there is currently no commercially viable method of producing electricity from thermal coal without generating greenhouse gas emissions,[47] the inevitable consequence will be a contribution of greenhouse gases to the atmosphere.

However, the current analysis is limited to only scope 1 and 2 emissions, so fails to account for one of the largest indirect environmental impacts that would result from the proposal. Over the life of the mine, the scope 1 and 2 emissions would account for only 6% of the total emissions, when including also scope 3 emissions (the emissions from the end use of the coal).[48] **In other words, the EIS fails to account for nearly 95% of the total climate impact from the proposed development.**

The scale of the climate impact from the Galilee Coal project is outlined below:

- The annual carbon emissions that would result from the burning of the coal from the proposed Galilee Coal project would amount to around 95 million tonnes of CO_2-e. This is equivalent to:
    - around 17% of Australia's annual national emissions;[49]
    - over twice New Zealand's annual emissions;[50]
    - the annual emissions of over 5 million Queensland households;[51]
    - taking at least 18 million cars off the road;[52] and
    - over $2.1 billion worth of emissions trading permits annually.[53]

[47] Carbon capture and storage is not a commercially viable proposition for the foreseeable future, see for example the report of Mr Stanford to the Queensland Land Court in the recent case against the Wandoan Coal Project.
[48] Calculated using figures provided in Appendix 19, and assuming a mine life of 25 years, calculated from the provided figure of 1.4 Bt coal resources, with a 71% wash yield.
[49] 564.5 Mt in 2009 from the National Greenhouse Inventory in 2010.
[50] 36.036 Mt in 2009 from the United National Framework on Climate Change data.
[51] Approximately 17 tonnes per household from Queensland Government (2008) Achieving early and affordable greenhouse gas reductions in Queensland.
[52] Based on average emissions of 5.2 tonnes per vehicle from US EPA (2005) Emission Facts: Greenhouse Gas Emissions from a Typical Passenger Vehicle.
[53] Based on the starting price of $23 per tonne.

- Over the life of the mine, with an estimated resource of 1.4 billion tonnes of raw coal, the total emissions from the coal produced at this mine would be around 2.4 billion tonnes of CO_2-e.[54] This is equivalent to:

    - around 420% of Australia's annual national emissions
    - around 5% of the world's annual emissions
    - around 0.37% of the global budget of 643,000 Mt of carbon dioxide emissions if we are to have a reasonable chance of keeping global warming below the internationally agreed threshold of 2°C warming above pre-industrial levels.[55]

The massive quantity of emissions from the use of the product coal over the life of the mine will significantly increase the adverse impacts of global warming and ocean acidification.[56] Australia is particularly vulnerable to these impacts being the driest inhabited continent with a high coastal population and containing iconic ecosystems at or near their thermal threshold (including the Great Barrier Reef and Wet Tropics World Heritage Areas). As carbon dioxide continues to enhance global warming for thousands of years, the climate impacts of the proposed project will be irreversible on human timescales.

COMMENT/SUGGESTION: The climate impacts that would result from the proposed development amount to an unacceptable adverse environmental impact, and warrant refusal.

If the Coordinator General lacks sufficient information of the impacts to warrant refusal, the proponent should be requested to provide supplementary assessments of:

- all the indirect emission likely to result from the transport and use of the product coal;
- the likely effect of the total emissions from the project, including the transport and use of product coal, on climate change and ocean acidification;
- the impacts on Queensland's environment from contribution of the project to climate change and ocean acidification; and
- the impacts on matters of national environmental significance from contribution of the project to climate change and ocean acidification.

[54] Assuming a 71% wash yield

[55] Meinshausen, M (2011) Contribution of the Wandoan Coal Mine to climate change and ocean acidification, http://www.envlaw.com.au/wandoan12.pdf

[56] The exact scale of impacts is capable of measurement but beyond the scope of this submission. The impacts will be at approximately twice as great as the Wandoan Coal Project as described by Dr Meinshausen and Professor Heogh-Guldberg for Queensland Land Court as part of a recent appeal.

Out of line with current thinking

ISSUE: The 'project rationale' provided in the Executive Summary describes how the product coal from the proposed development will go towards meeting global energy demand, for instance:

> In 2007, 58% of the world's exported thermal coal was imported by Asian countries, which is expected to steadily rise to 65% by 2030. Australia has large proven reserves of thermal coal, including an estimated 14 billion tonnes of inferred coal resource lying untapped within the Galilee Basin. Being well situated geographically to Asian markets, Australia is in a strong position to be a major supplier to these coal dependent countries (section 1.4.1, Executive Summary, p.15).

However, it is no longer acceptable to blandly present the future of coal production and trade without associating it with one of the largest environmental challenges facing the planet. To argue that 'Australia is in a strong position to be a major supplier to these coal dependent countries' puts Australia in an ethically compromised position, and potentially in a position that will leave Australian markets stranded if the world moves away from coal.

It is relevant to note recent conclusions from the International Energy Agency's latest World Energy Outlook (2011):[57]

> **We cannot afford to delay further action to tackle climate change** if the long-term target of limiting the global average temperature increase to 2°C, as analysed in the 450 Scenario, is to be achieved at reasonable cost. In the New Policies Scenario, the world is on a trajectory that results in a level of emissions consistent with a long-term average temperature increase of more than 3.5°C. Without these new policies, we are on an even more dangerous track, for a temperature increase of 6°C or more.
>
> **Four-fifths of the total energy-related CO_2 emissions permissible by 2035 in the 450 Scenario are already "locked-in" by our existing capital stock** (power plants, buildings, factories, etc.). If stringent new action is not forthcoming by 2017, the energy-related infrastructure then in place will generate all the CO2 emissions allowed in the 450 Scenario up to 2035, leaving no room for additional power plants, factories and other infrastructure unless they are zero-carbon, which would be extremely costly. Delaying action is a false economy: for every $1 of investment avoided in the power sector before 2020 an additional $4.3 would need to be spent after 2020 to compensate for the increased emissions.

COMMENT/SUGGESTION: Global efforts to move away from carbon-rich fossil fuels further warrants refusal of the proposed development.

[57] http://www.iea.org/weo/

Approach to sustainability and the natural environment

The proponent presents its approach to environmental responsibility and 'Ecological Sustainable Development' in its Environmental Policy (Vol 1 Ch 1, p.5) and in the chapter called 'Sustainability' (Vol 1 Ch 3). These are crucial sections of the EIS in terms of understanding the proponent's approach to dealing with the massive scale and range of negative impacts that would result from the proposed project, which would cover 70,000 hectares and deliver serious consequences on surface and ground water, terrestrial ecology and the global climate.

Environment Policy

ISSUE: The one-page Environmental Policy in Vol 1 Ch 1, on p.5 states:

> Waratah Coal recognises its responsibilities for implementing sound environmental stewardship of the environment in which it works. We will care for and manage the environment to deliver environmental better practice outcomes. Our Commitment extends to all those who work with and for Waratah Coal.

This statement is very general and it is difficult to comprehend its intended meaning. For instance:

- it is not clear, and it is not described, what 'better practice outcomes' actually means;
- in extending its commitment to 'all those who work with and for Waratah Coal' could imply that those who do not work 'with or for' the company would be exempt from its 'commitment', which is also not explained;
- if the proponent is able to describe its intention to develop one of the world's largest coal mines in an era of dangerous climate change, through destroying a significant conservation reserve as 'responsible environmental stewardship', it is a substantial diminishment of the genuine notion of environmental responsibility. This is a concerning example of the proponent's willingness to use environmentally-friendly jargon to disguise the significant impacts that the proposed project would have on the natural environment.

COMMENT/SUGGESTION: The proponent should be required to provide an honest statement as to its approach to the natural environment on which its proposed development would have a significant impact.

Failings and inconsistencies in respect to the NSESD

ISSUE: As specified in section 5.2 of the ToR (p.65), the proponent is required to '*provide a comparative analysis of how the project conforms to the objectives for 'sustainable development'* as it is framed in the National Strategy for Ecologically Sustainable Development (1992). The proponent is required to address this, as determined by the EPBC Act (Section 3).

It is clear in reading the objectives and principles of the National Strategy that the objectives of a massive new coal development are diametrically opposed to the objects of the National Strategy in most respects.

In large part this dilemma is due to the mixed motives of the Australian government, which is to both generate revenue through mining royalties, and to genuinely pursue the principles of ESD. In the case of large coal developments, these motives are simply mutually exclusive. To attempt to squeeze developments that would result in a range of significant negative impacts into the principles of ESD is to debase the meaning of ESD.

For instance, the core objectives of the National Strategy are as follows:

- to enhance individual and community well-being and welfare by following a path of economic development that safeguards the welfare of future generations;
- to provide for equity within and between generations;
- to protect biological diversity and maintain essential ecological processes and life-support systems.

The proposed Galilee Coal project or any other large new coal mine would actively work against each one of these objectives through:

- its contribution to the current mining boom which is boosting the Australian dollar at a significant cost to many non-mining, arguably more sustainable, sectors; making the cost of living unaffordable for non-mining workers in the region; contributing to an increased disparity between the 'haves and have-nots'; contributing to global climate change which puts at serious risk the welfare of future generations;

- its depletion of a valuable finite natural resource that will not be available for future generations; in its contribution to climate change which would deliver a potentially unsafe climate for future generations;

- its destruction and degradation of over 10,000 ha of remnant woodland, including a significant private conservation area; inadequately compensating for the loss of biodiversity through a faulty offsetting strategy; potentially paving the way for other Nature Refuges to be mined; the undermining of Australia's obligations to uphold the recommended treatment of IUCN category 'protected areas'; the degradation of essential, life-supporting groundwater systems, including aquifers that make up the Great Artesian Basin; the 'liberation' of fossil fuels from a benign state under the ground to a potentially dangerous component of the atmosphere, resulting in negative impact on flora and fauna species.

COMMENT/SUGGESTION: This is a dilemma that needs to be resolved at the level of government policy and priorities. The current contradictory approach by Australian governments of encouraging massive coal exports on the one hand and attempting to address climate change must be resolved in line with its own National Strategy for Sustainable Development.

ISSUE: Besides the larger problem of contradictory aims between the NSESD and the continuing expansion of coal development in Australia, there are serious concerns about how the proponent has undertaken this section of the EIS. In short, the proponent has both failed to properly address the required issues as outlined in the ToR, and has plainly distorted information in places.

The proponent has a patchy and illogical approach to analysing the project's alignment with NSESD guiding principles. This is summarised in the following table, which is followed by more discussion:

Guiding principles of the NSESD[58]	As interpreted in EIS (3.2.2, p.37)	As discussed in EIS (3.5.3, pp. 44-45)
'decision making processes should effectively integrate both long and short-term economic, environmental, social and equity considerations'	'Long term and short term economic, environmental, social and equitable considerations'	'Decision-making considers environmental, social and equity considerations'
'where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation'	'The precautionary principle'	'Precautionary Principle'
'the global dimension of environmental impacts of actions and policies should be recognised and considered'		'Global Dimension'
'the need to develop a strong, growing and diversified economy which can enhance the capacity for environmental protection should be recognised'		'Strong Economy and International Competitiveness'
'the need to maintain and enhance international competitiveness in an environmentally sound manner should be recognised'		
'cost effective and flexible policy instruments should be adopted, such as improved valuation, pricing and incentive mechanisms'	'Improved valuation, pricing and incentive mechanisms'	
'decisions and actions should provide for broad community involvement on issues which affect them'		'Community Involvement'
	'Inter-Generational equity'	
	'Conservation of biological diversity and ecological integrity'	

Table: The proponent's dealings with the guiding principles of the NSESD

[58] http://www.environment.gov.au/about/esd/publications/strategy/intro.html#GoalsEtc

Just a few examples from this discrepancy between the NSESD and the proponents dealing with the topic include:

- The proponent has failed to demonstrate it has an understanding of the precautionary principle, evident through its summary description of the precautionary principle and how it applies to the proposed development. In particular, the proponent states that adhering to the precautionary principle requires:

  > …taking a conservative approach to EIA and management so that the proponent is prepared for the worst case scenario that may arise as a result of the project (section 3.2.2.2, Vol 1 Ch 3, p.37)

  This statement does not seem to relate to the precautionary principle.

- The NSESD principle of:

  > the need to develop a strong, growing and diversified economy which can enhance the capacity for environmental protection should be recognised

  has been interpreted simply as:

  > Strong Economy and International Competitiveness (section 3.5.3.4, Vol 1 Ch 3, p.44)

  This interpretation has dropped out any discussion or acknowledgement of the importance of a diverse economy, which the proposed development would serve to compromise.

- The NSESD principle of:

  > the global dimension of environmental impacts of actions and policies should be recognised and considered

has been addressed under the heading of 'Global Dimension' (section 3.5.3.3, Vol 1 Ch 3, p.44), for which the proponent has identified only three issues, and only one related to the environment:

  - the supply of materials and equipment from overseas suppliers particularly during the construction phase;
  - trade and economic flows between suppliers, the project and customers and;
  - potential impacts to migratory species.

The proponent has failed to acknowledge the most obvious global dimension of environmental impacts from the proposed development, which is the mining and delivery of a highly polluting fossil fuel to the world, a major driver of global climate change.

- In a discussion of 'Social and Community' (section 3.4.3.2, Vol 1 Ch 3, p. 41), the proponent has listed as number one:

> fully engage the community by holding information sessions during planning and using planning and construction phases of the project

It would appear to be a contradiction in terms to suggest that by holding 'information sessions' that the community is being 'fully engaged'. It is quite clear that communities have very few rights and power when it comes to dealing with the mineral industry, which in most cases has right-of-way over their land and whose interests are usually put before community interests. To use the word 'consultation' gives the impression that there is some equal exchange, when in fact there is no equality in this context.

- In section 3.5.2.4 (p.44) - 'Biological diversity' - the proponent states that it will:

> protect diversity and maintain essential ecological processes and life-support systems by adopting sustainable practices including: avoiding areas of high ecological value; minimising impacts to biodiversity in general; progressively rehabilitating disturbed ecosystems, and offsetting unavoidable impacts

In its plan to open-cut mine over half of Bimblebox Nature Refuge and underground mine the remainder, the proponent has clearly *not* avoided areas of high ecological value. The proponent has failed to provide any details about its rehabilitation plan, and has not investigated the possibly substantial impacts on ecological systems from subsidence of up to 30,000 ha, with resulting disturbance to hydrology and the soil profile. Further, its offsetting strategy, as described in Appendix 27, would result in a net loss of biodiversity in Queensland.

- The proponent discusses how its operations align with the NSESD goal (section 3.5.1, Vol 1 Ch 3, p.42):

> [NSESD goal:] Development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends

and asserts that 'the project's purpose aligns with this goal':

> Waratah Coal will create value for our stakeholders by delivering environmentally, socially and economically responsible energy from Waratah Coal's resources in the Galilee Basin. We will achieve this through teamwork, innovation, integrity and the application of safe and sustainable practices that match or exceed industry standards. We will not compromise the safety and well-being of our employees or local communities in delivering our vision

To describe coal as 'environmentally, socially and economically responsible energy' is to deny the near total worldwide scientific consensus of the role that fossil fuels play in significantly driving human-induced climate change, which is likely to result in a plethora of negative consequences for people and the non-human world. No amount of 'teamwork, innovation, integrity and the application of safe and sustainable practices that match or exceed industry standards' can change the basic chemical structure of coal.

Overall, the proponent has failed to deliver an honest or comprehensive '*comparative analysis of how the project conforms to the objectives for 'sustainable development''* as it is framed in the National Strategy for Ecologically Sustainable Development (1992).

It is outlined in the ToR that that in analysing the proposal against the terms of the NSESD that the proponent should consider:

> …the cumulative impacts (both beneficial and adverse) of the project from a life-of-project perspective, taking into consideration the scale, intensity, duration and frequency of the impacts to demonstrate a balance between environmental integrity, social development and economic development.

However, the proponent has demonstrated a narrow and simplistic understanding of the range of impacts that its project is likely to have, and has fallen well short of considering 'both beneficial *and adverse*' impacts of the proposed project.

COMMENT/SUGGESTION: The proponent must comprehensively revise its dealing with the topic of 'sustainability' to present an honest representation of the proposed development.

Terrestrial ecology

The EIS has failed to describe the complex, long-term consequences of the proposed mine on the terrestrial ecology of the region. In particular, the changes to hydrology from 'drawdown' and subsidence, the risks of fire, and the consequences this might have on the individual species and ecological communities have not been adequately addressed. Also of great concern is the absence of any mention of the predicted impacts from climate change on the region's ecological systems. Some general points will be made before more detailed discussion on flora and fauna.

Land management and medium-long term trends

ISSUE: Given the importance of healthy and intact habitat for the survival and flourishing of threatened species, as well as those not yet on the threatened species lists, a more comprehensive and holistic assessment of the terrestrial ecology needs to be made. In particular, the *trends* of ecological health in these ecological communities must be properly considered.

As a minimum, multiple comprehensive surveys would be required over a substantial period of time so as to capture the range of ecological dynamics through different seasons and weather cycles. Data from a specific location would have to be compared against that at the regional level.

Perhaps most crucially, and a significant driver of trends in the health of a system, is the approach of the land manager/s. It is clear that ecological assessments that rely on satellite-derived information are prone to giving a totally false impression of conditions on the ground.

Management decisions by landholders that influence the quality of the habitat include: stocking rates at different stages of under-story growth, the sowing or weeding of exotic pasture species, the retention or not of fallen timber, and the particular fire practices that are utilised, amongst other things. Importantly, the *philosophy and values* of the land manager/s, as well as their experience and skills, are manifested in the conditions for biodiversity on the ground. Any ecological snap-shot of an area that fails to take into account the objectives and outcomes of management risks being totally irrelevant in the medium-long term.

The current terrestrial ecology report is inadequate in providing an understanding of how the ecological systems under question will change in the medium-long term. This is crucial given the likely life-expectancy of the mine of 20-30 years and the on-going pressures on the terrestrial ecology in the long term, 50-100 years and beyond. By failing to mention the *objectives and approaches* of management on the different properties, and how management decisions influence the state of terrestrial ecology,

the EIS has failed to communicate a key driver of ecological health (or otherwise), in the study area.

COMMENT/SUGGESTION: An ecological snap-shot is inadequate to address the true costs of the proposed mine going ahead. The proponent should be re required to provide a holistic and accurate picture of how the condition of the terrestrial ecology across the different properties within the proposed mine area, is influenced by the different management approaches. This would then form the basis for a crucial discussion about the likely state of these areas for individual species and at an ecosystem level, over the medium-long term.

Some of the important questions for this work would include:

- What is the land-management history of an area, in terms of values, priorities, skills and outcomes?
- How have past and current management approaches and decisions influenced the state of terrestrial ecology, as is represented in quantitative survey data?
    - Cover of exotic pasture species
    - Quality of habitat for various species
    - Diversity and abundance of species
- What will be the future management of an area, and how is this likely to influence outcomes for terrestrial ecology, both in terms of individual species and at an ecosystem level?

<u>Subsidence</u>

ISSUE: The EIS has failed to account for some of the potentially large direct impacts on the terrestrial ecology from subsidence. The following extracts from the EIS give an indication of the area and extent of impact from subsidence that would result from the proposed mine:

> The total area to be affected by subsidence is expected to be in the order of 25,161 ha. This area contains both improved pasture and Least Concern remnant vegetation and includes a large part of the BNR… (section 6.4.1.2, Vol 2 Ch 6, p.187).
>
> The total cumulative subsidence in [the north western section of the underground mine foot print] is predicted to reach a maximum depth of 3.27 m. Average subsidence across the bulk of the underground mine areas is expected to range between 1.3 m to 1.61 m (section 1.3.6, Vol 2 Ch 1, p.71).

It is also stated in section 3.1.8.2, Executive Summary, p.35 that:

> … the underground mining area takes up the remaining 48% [of Bimblebox Nature Refuge] and has the potential to cause subsidence and other impacts on the soil profile, hydrology etc. which may then negatively impact on the vegetation .

While this passage outlines the potential impact on the vegetation of Bimblebox Nature Refuge from subsidence and 'other impacts on the soil profile hydrology etc.', there is barely any mention of subsidence and its likely impacts on the terrestrial ecology in the main consultant's report on this topic. In fact, rather than approaching this issue in a rigorous scientific manner, the consultant's report in Appendix 10 – Terrestrial Ecology, dismisses it from the outset. Among the list of assumptions that set the parameters for their investigation the following points are included (in section 4.5, Appendix 10, p.31):

> In undertaking this terrestrial flora and fauna assessment the following assumption have been applied:
>
> - There is not significant alteration of hydrological characteristics of areas adjoining and downstream of the mine
> - No significant subsidence will be caused by the mine and that the hydrological characteristics of the land surface above the underground min areas will not be significantly altered

That is despite the 'potential to alter the hydrological characteristic for the adjoining and downstream areas' being determined to be 'possible' with potentially 'severe' consequences, with an overall 'high' impact (table 12, Vol 2 Ch 6, p.205).

And the report also concludes with:

> The majority of the mine will be underground and is unlikely to impact on terrestrial flora and fauna (section 9.1, Appendix 10, p.81).

There is no evidence presented for these assumption or the conclusion, which in itself is greatly concerning and raises the question as to the rigour of the report overall. Elsewhere in the EIS it is at least acknowledged that there could be a connection between subsidence and impacts on the terrestrial ecology:

> … more work will need to be undertaken to quantify the type and magnitude of the impacts of subsidence on the habitat above the underground mining activities (section 6.4.1.2, Vol 2 Ch 6, p.187).

And also,

> A Subsidence Management Plan will be prepared prior to the commencement of underground mining operations. The plan will be risk based, flexible, responsive and capable of dealing with unexpected changes or uncertainties (section 6.4.1.2, Vol 2 Ch 6, p.187)

But these weak acknowledgements do not go far enough to spell out the potential severe ramifications for terrestrial ecology from subsidence. It is of utmost relevance to note that earlier this year the NSW government made the following important recognition of such impacts:

> 'Alteration of habitat following subsidence due to longwall mining' has been listed by the NSW Scientific Committee as a key threatening process under the *Threatened Species Conservation Act 1995*.[59]

COMMENT/SUGGETION: The proponent must more adequately discuss the issue of subsidence and its potential impacts on terrestrial ecology. Given the large area that is likely to be impacted by the proposed underground mines, a thorough assessment must be made of the potential impacts on the terrestrial ecology from altered hydrological regimes, and soil profiles changes associated with subsidence across the area. This work, as well as a detailed Subsidence Management Plan should be made available for public scrutiny.

Changes to fire regimes

ISSUE: The EIS has failed to properly address the likely changes to fire regimes in and around the proposed mine site, and the impact this could have on terrestrial ecology in the medium to long term. There are many complex factors to take into account on this issue, and just a couple will be mentioned here, but they will hopefully provide an indication of the kind of work that would need to be done to properly account for the range of possible impacts on the terrestrial ecology.

Interrupted grazing regimes leading to increased fire risk: it is stated in the EIS that local aquifers are likely to be substantially impacted from draw down in an area of up to 30km around the mine. This together with a possible degradation in the quality of the water due to aquifer mixing, could lead to a dramatically altered grazing regime in the area due to the difficulty of providing water for cattle. On top of this are some of the unknown consequences of subsidence on the land surface, and again, how this could impact local grazing regimes. These factors are likely to result in an increase in the volume and height of grasses, which for much of the area is composed of the introduced Buffel Grass, a species known to 'burn hot' and which can lead to dramatic changes in the composition and structure of vegetation, thus altering the habitat for innumerable fauna species.[60]

Ground disturbance leading to increased fire risk: Given the amount of land disturbance across the 70 000 hectares of mine site, it is highly likely that the volume of Buffel Grass will increase throughout the area. As per the point above, any increase in the volume of Buffel Grass equals an increase in fire risk which can dramatically impact on whatever remnant woodland remains around the proposed mine site.

[59] http://www.environment.nsw.gov.au/threatenedspecies/LongwallMining.htm
[60] For instance, see http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0005/347153/awmg_buffel-grass.pdf

While it is acknowledged in the consultant's report – in Appendix 1 of Appendix 10, p.102, that there is a potential for increased fire intensity in Bimblebox Nature Refuge if the mining operations result in an increase in Buffel Grass, it suggests as a mitigation measure that a weed and pest management plan be developed. However, there has been no large-scale Buffel Grass eradication program successful anywhere in the world that we have been able to find. The successful removal of Buffel Grass is extremely labour intensive and is unlikely to be undertaken in or around the proposed mine site.

SUGGESTION/COMMENT: If the proposed development is not rejected outright, the proponent should be required to provide a detailed analysis of the complex and long term consequences of changes to the land surface from subsidence and depletion of ground water used for servicing cattle grazing. In particular the long-term associated changes to fire patterns and the impacts on individual species and ecological communities in the region need to be thoroughly addressed.

Climate change modelling and biodiversity impacts

ISSUE: In not mentioning the predicted climate change impacts for the region, the EIS has failed to mention one of the most significant pressures on terrestrial ecology in the medium to long term future. It is no longer possible to assume that the temperature and rainfall regimes that we have lived with in Australia to date are going to resemble those in the future, due in large part to the addition of carbon dioxide to the atmosphere from the burning of fossil fuels. It is an issue receiving active scientific investigation in Australia, represented in the major 2009 report 'Australia's Biodiversity and Climate Change'[61] and programs such as the South Australian initiated 'Transect for Environmental Monitoring and Decision-Making' project.[62]

COMMENT/SUGGESTION: In order for the assessment of impacts to the terrestrial ecology to be comprehensive and valid in the long term, consideration must be given to the predicted changes for the region from climate change. In particular, how the new regime would affect both individual species as well as ecological communities must be addressed in light of the impacts that would result from the proposed mine.

[61] http://www.climatechange.gov.au/publications/biodiversity/~/media/publications/biodiversity/biodiversity-vulnerability-assessment-lowres.ashx

[62] http://www.abc.net.au/radionational/programs/scienceshow/observing-effects-of-a-changing-climate/3709808

Methodology issues

ISSUE: In section 4.5, Vol 5 Appendix 10, p.31 there is a list of the assumptions that were applied in the undertaking of the flora and fauna assessment for the EIS. One of the points is:

> The mine surface clearance footprint will be limited to the area shown in Figure 1

The map in figure 1 is found on p. 16 of Appendix 10 is of a scale that is very difficult to interpret. It is also of a style that is in contrast to the other maps provided in this report, for instance Figure 2 on p. 24, Figure 3 on p. 36 and Figure 4 on p.45. This raises the question as to whether the map was a later addition to the report.

COMMENT/SUGGESTION: The Coordinator General should ask the consultant to certify that the map provided in Figure 1 is that which they used in undertaking the flora and fauna assessment – this is important as is it one of the basic assumptions for the validity of the assessment.

ISSUE: There was an inadequate number and spread of terrestrial ecology survey sites in Bimblebox Nature Refuge. Figure 2 of Appendix 10, p.24, show that most of the sites surveyed in Bimblebox were on, or a short distance from, the property boundaries neighbouring extensively cleared and modified environments. None of the survey sites were near the centre or south of the property. This indicates that the results from the survey potentially only provide a marginal representation as to the terrestrial ecology of the property. More detailed discussion of this issue can be found within the individual 'flora' and 'fauna' sections below.

COMMENT/SUGGESTION: A more comprehensive and extensive survey effort on Bimblebox Nature Refuge would have been required to properly represent the terrestrial ecological vales of the property.

ISSUE: The assessment of significant impacts that would result from the proposed development have been determined through a complex matrix presented in section 4.4, Appendix 10, pp.29-30. This matrix is difficult to understand, has not been adequately explained and is not consistently applied. A general criticism of such risk assessment approaches is that it can end up obscuring and abstracting a serious risk.

As an example, if this assessment method had been accurately applied it would seem that the proponent would have to report an Extreme Impact for the Bimblebox Nature Refuge, considering that the proposed mine would have a Severe (C=5) consequence through the:

> Permanent loss of protected social or cultural values (i.e. not in accordance with agreements in place)

With an 'Almost Certain' likelihood that this consequence would occur. Rather, the impact on Bimblebox is determined to be High (9) in the EIS (section 6.13, Appendix 10, p.68).

Another example is the fact that the likely result for the Desert Mouse of the mine going ahead has been judged to be have simultaneously a 'Moderate Consequence' and a 'High Impact', which is likely be confusing and misleading for people who don't have an understanding of the matrix system and without having a thorough understanding of the rationale behind the ratings, which is not provided (section 6.10, Appendix 10, p.66).

COMMENT/SUGGESTION: The assessment of the potential impact on terrestrial ecology must be clearly and consistently explained. The use of an impact assessment tool, like the matrix, should not stand in the place of adequate and defensible descriptions of particular impacts.

User 'un-friendly' report

ISSUE: It is not insignificant to mention the difficulty in reviewing the 211 page Appendix 10 on Terrestrial Ecology due to an extremely limited term-search function. For instance, to search 'Endangered' does not pick up all mentions of the word (for example in regards to the Endangered bat mentioned on the bottom of p.46), the bird species listed in 'Appendix 7' of Appendix 10 cannot be term-searched, and there are many other examples.

Further, on some computers there is also an extremely slow scroll function for Appendix 10, apparently due to the size and formatting of the document.

COMMENT/SUGGESTION: The lack of a user-friendly version of Appendix 10 should be taken into account as a significant set-back for the public reviewing the EIS. All future publications from the proponent for public review must include a functional term-search capability and be of a size and format that can be handled by various computers. This should be a minimum requirement, out of respect for the time and effort of the directly affected landholders and members of the public who must undertake these tasks in their limited spare time.

Flora

Un-representative sampling

ISSUE: The EIS has failed to adequately assess individual flora species and floristic communities that would be impacted by the proposed mine. General site descriptions and a list of flora were recorded at 31 sites across the study area, but there are shortcomings in regard to the survey coverage, particularly within Bimblebox Nature Refuge.

Based on the map provided on p.24, Appendix 10 (Figure 2), out of the 8 flora survey sites on Bimblebox Nature Refuge:

- 5 were located on the property boundaries, directly bordering cleared areas dominated by exotic pasture grasses. These sites would be influenced by edge effects and therefore unlikely to provide a realistic representation of the species and condition of flora within the nature refuge;
- 1 of the remaining 4 sites was located within 500m of the property boundary so is also probably prone to edge effects;
- The 3 remaining flora survey sites were located at least 1.5 km from the property's boundary. Significantly, all of these sites (BB01, BB05, BB14) were recorded to contain less than 5% weed cover and were found to be in very good (BB01, BB05) and good (BB14) condition (see Appendix 3 of Appendix 10);
- It should be noted that while site BB04 as indicated on the map on p.24, Appendix 10 (Figure 2), is south of the Bimblebox property boundary, it is named as being on the western edge of Bimblebox in Appendix 3 of Appendix 10.

These findings indicate that a more thorough flora survey of Bimblebox Nature Refuge would be required to properly represent the species and condition of flora that exists on the property.

More generally, this inadequate sampling of flora in the proposed mine area is a significant failing of the EIS, considering that the abundance and diversity of flora provide an indication of the overall system health. Crucially, flora also provides key habitat requirements for fauna species. Linking abundance and diversity of flora to management practices would also provide an important indication of the likely future condition of the different properties, including those being considered to form part of the proponent's offset strategy.

COMMENT/SUGGESTION: The likely impacts on terrestrial ecology from the proposed mine cannot be properly assessed due to an inadequate level of understanding of flora species and communities in the area.

Large-podded Tick-trefoil

ISSUE: The extent and significance of the Near Threatened Large-podded Tick-trefoil (*Desmodium macrocarpum)* on Bimblebox Nature Refuge, and the likely impact on the species resulting from the proposed mine, has not been adequately addressed in the EIS. In section 5.2.3 of Appendix 10, p.40, it is stated:

> The WorleyParsons (2009) survey of the Bimblebox Nature Refuge recorded Large-podded Tick-trefoil plants at five locations… one of which had been previously recorded by the Queensland Herbarium (in 2003). The October 2009 and April 2010 surveys were unable to confirm the potential extent of this species beyond these five locations. Conditions for detection of Large-podded Tick-trefoil individuals and groups were problematic during both these periods… Due to the challenges of surveying for this species it is considered likely that additional individuals and groups occur within the study area.

A few issues arise from this:

- 'Unfavourable seasonal conditions' (ES, Appendix 10, p.12) is not a valid reason to overlook the possible extent of this species in the footprint area of the proposed development;
- Little indication has been given in the EIS as to the status of this plant in the region, and therefore it is not possible to gauge the significance of the Bimblebox population. For example, section 5.2.3, Appendix 10, p.41 describes 'the closest populations are known to occur '50 km and 70km northwest and 120 km east of the study area', yet no more detail is provided about the age of these records of the health of those populations;
- If conditions during the survey were not appropriate for the detection of this species, it may be an indication that other threatened and significant plants were not detected for the same reason.

COMMENT/SUGGESTION: A comprehensive flora assessment of the proposed mine site would have to be undertaken in 'favourable' conditions, when flora species are most likely to be detected, before a reasonable assessment could be made of the likely impacts from the proposed mine. A thorough assessment is required of the significance of the population of Near Threatened Large-podded Tick-trefoil (*Desmodium macrocarpum)* on Bimblebox Nature Refuge. This would require a more complete understanding of abundance of this plant in the region.

Fauna

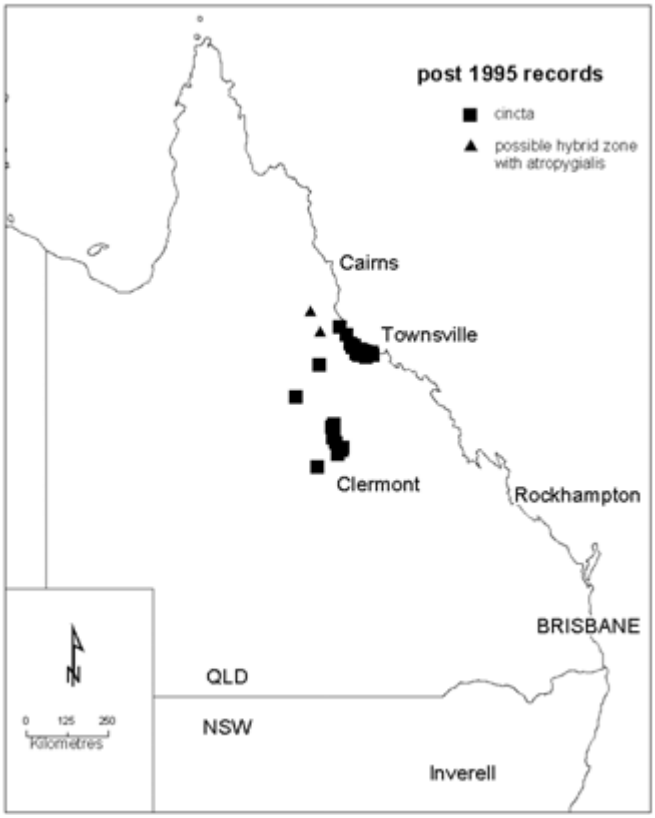
Black-throated Finch

The Black-throated Finch is an Endangered species listed under the EPBC Act. It has been recorded on Bimblebox Nature Refuge by four Birds Australia observers across two visits (in May and November) 2011. It is a highly significant find due to its southerly extent, as testified by the following extract from the National Black-throated Finch Recovery Plan 2007 (p.9):[63]

> Very few black-throated finches have been reported south of Clermont or Aramac in Queensland (23°S) since the late 1970s (Blakers *et al.* 1984). On the coast there are few records south of Ayr (19.5°S). The species was numerous around cattle troughs on properties near Rockhampton in the 1950s (C. Larsen, pers. comm.) but apparently disappeared from most of this area between the early and mid 1970s (Longmore 1978; Blakers *et al*. 1984). There is a record from the Hedlow/Alligator Creek area in 1988-1989 (G. Porter, pers. comm.) and more recent sightings near Rockhampton.
>
> In southern Queensland, the most recent southern records were on private land in the early 1980s and again in the mid 1990s along the Severn River near Ballandean in the New England Tableland bioregion. They have not been seen there since (P. Haselgrove, pers. comm.), although searching may not have been comprehensive. They disappeared from the Murphy's Creek area at the foot of the main range during the 1940s (P. Walker, pers. comm. Via R. Hobson).
>
> In NSW black-throated finches were extending their range along a creek near Inverell until a severe drought in 1967 and there was a record as far south as Gilgandra in 1968 (Baldwin 1975, 1976; McCutcheon 1976). Since then there have been only five records, all from the southern New England Tablelands (Rogers and Lindsey 1977; Morris et al. 1981). The most recent record in NSW was on private land in 1994 below Pindari Dam, near Ashford (Ley and Cook 2001a,b). No birds have been sighted in the last decade, despite specific and general surveys being undertaken during this time.
>
> Over the last 20 years it is estimated that there has been a contraction in the extent of occurrence of the species by approximately 80 percent of its former extent (comparing Blakers et al. 1984 with Barratt et al. 2003). At the same time the area of occupation and, presumably, the population size has also declined. Circumstantial evidence points to an overall decline of more than 50 percent in the population of this species in the past ten years.

The following map is of confirmed sightings of the species since 1995:

[63] Black-throated Finch Recovery Team, Department of Environment and Climate Change (NSW) and Queensland Parks and Wildlife Service. 2007. *National recovery plan for the Black-throated finch southern subspecies (Poephila cincta cincta*). Report to the Department of Environment and Water Resources, Canberra. Department of Environment and Climate Change (NSW), Hurtsville and Queensland Parks and Wildlife Service, Brisbane. Available at http://www.environment.gov.au/biodiversity/threatened/publications/recovery/black-throated-finch-southern/



Map showing the location of sightings of the Black-throated finch since 1995 (Black-throated Finch Recovery Team et al., 2007, p.10)

The birds found on Bimblebox are also the first known report of the species on an existing conservation reserve (Black-throated Finch Recovery Team, 2007, p.11).

There are a number of deeply concerning ways in which this Endangered species has been handled in Waratah Coal's EIS.

ISSUE: As stated in section 4.1, Appendix 10A, p.21:

> It is apparent from the review of existing information that there have been no systematic or regular surveys in regards to BTF in the Desert Uplands, with most data derived opportunistically and descriptive in nature. In considering the information available at the time of preparing this report, it is clear that there is insufficient information for adequate conservation planning for BTF [in] the bioregion.

This statement makes it clear that a comprehensive regional survey and habitat assessment is crucial before it is possible to understand the importance of Bimblebox Nature Refuge for the Black-throated finch in the regional context, or to estimate the full impact on species from Waratah Coal's proposed development.

COMMENT/SUGGESTION: An extensive regional assessment for the species must be undertaken by specialists approved by the Black-throated Finch recovery team and independent from Waratah Coal. This survey must take into account the likely cumulative

impacts from all the proposed mines in the region and in Black-throated Finch habitat corridors. Special attention must be given to the current coverage of native grass feed species within these sites, and the trend of this coverage (eg. if the native grasses are stable, increasing or being rapidly being outcompeted by Buffel Grass in any particular woodland patch). Careful consideration also must be given to the likely impacts of predicted climate change in the region and its impacts on habitat and species distribution and robustness.

ISSUE: In section 6.3.2.6, Vol 2 Ch 6 it is stated:

> Additional work as part of an on-going site survey and habitat assessment program for black-throated finch (southern) (*Poephila cincta cincta*) has revealed a putative record of black throated finch from the BNR. SEWPaC have advised Waratah Coal that they have been in contact with an ornithologist who claims to have recorded black-throated finch on the Bimblebox Nature Refuge, and with Birds Australia.

The sighting of the Black Throated Finch on Bimblebox Nature Refuge in May was accepted by Birds Australia which gave notification to SEWPaC no later than August 10th, which was more than six weeks before the public release of the EIS (on Sept 26th). It is highly negligent of the proponent not to include this information in its EIS, and it raises questions as to the commitment to genuinely representing the range of environmental values of the proposed mine site and the likely impacts from the construction and operation of the proposed mine.

COMMENT/SUGGESTION: The proponent should have included the highly significant find of the Black-throated Finch on Bimblebox in its EIS, and should be required to include it in all future publications. Further, this and all other important errors and omissions that are identified through the public submission process should be publicly released in a concise document for public perusal.

ISSUE: The proponent has failed to fully identify the potential impacts on the Black-throated Finch (*Poephila cincta cincta*) as represented in Table 2 'Significance of Impacts on MNES Fauna', in Appendix 1 of Appendix 10. It has also failed to describe adequate mitigation measures for the impact on the species from its proposed development. Detailed comments are in the table below:

ISSUE: From Table 2. 'Significance of Impacts on MNES Fauna' Appendix 1 of Appendix 10, Assessment against MNES Significance Criteria		**SUGGESTION/COMMENT:**
"An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:		
Lead to a long-term decrease in the size of a population;	This will not occur because pre-clearance survey will be undertaken to confirm the absence/presence of the species. If nesting birds are found to be present clearing activities will be delayed until birds have left the area.	Given the fact that ecologists employed by Waratah Coal failed to discover the species when four Birds Australia observers have, there is a serious question as to their ability to 'confirm the absence/presence of the species' prior to clearing its habitat. Further, the clearing or disturbance of known habitat of the Black-throated Finch is likely to have an impact on the local population, and there are limited areas of appropriate native feed grasses in the surrounding areas. It is also relevant to note: The minimum area of nesting habitat required to sustain a viable breeding colony is unknown (DEWHA 2009b) (section 3.3.4, Appendix 10A, p.18).
Reduce the area of occupancy of the species;	The area of occupancy will not be significantly reduced.	This is not consistent with information in section 4.1, Appendix 10A, p.21: It is apparent from the review of existing information that there have been no systematic or regular surveys in regards to BTF in the Desert Uplands, with most data derived opportunistically and descriptive in nature. In considering the information available at the time of preparing this report, it is clear that there is insufficient information for adequate conservation planning for BTF [in] the bioregion. The fact that there have not been 'systematic or regular surveys in regards to BTF in the Desert Uplands' implies that it is not known what the current area of occupancy is for the species in the region, thus it is impossible to say that it will not be significantly reduced.
Fragment an existing population into two or more populations;	Fragmentation of existing populations will not occur.	This is not consistent with information in section 4.1, Appendix 10A, p.21 (see above). Due to inadequate surveying in the region it is not possible to know what populations exist where, and if the development would fragment them.

Adversely affect habitat critical to the survival of the species;	This will not occur. This species is highly mobile and could potentially utilise adjacent habitats.	This is not consistent with information in Appendix 10A, for instance section 3.4, p.20: > The relatively sedentary lifestyle of the BTF is considered to significantly increase its vulnerability to disturbance, or modification, of any of its three key resources (i.e. water sources, seeding grasses; and tree providing suitable nesting habitat) (DEWHA 2009b). Also, section 3.3.6, p.18: > The BTF is typically associated with large patches of remnant vegetation, though also where suitable seeding grasses exist in areas adjacent to intact habitat. The availability and relationship between the key habitat resources regulates its distribution and any disruption to the connectivity between these resources is likely to have a serious impact on an area's ability to sustain BTF populations (DEWHA 2009b). And from the National Recovery Plan 2007 (p.8): > The species is believed to be sedentary in nature, although it may move around locally (McCutcheon 1976; Blakers *et al*. 1984). These passages indicate that the BTF is neither highly mobile nor able to exist in areas without connectivity between key habitat resources. Without thorough ground investigations, it would be impossible to establish if suitable habitat exists in adjacent areas. In particular, the availability of suitable nesting sites and native grasses must be established. It must also be considered what impact noise, dust and light from the proposed mine operation would have on the species in adjacent areas.
Disrupt the breeding cycle of the a population;	This will not occur. No population of Black-throated Finch is known to occur within the mine footprint area.	This is a false statement. Black-throated Finch were first sighted on Bimblebox Nature Refuge in May 2011 by a Birds Australia observer, and were again recorded in November 2011 by three other Birds Australia observers. Further, the fact that BTF can breed throughout the year (see section 3.3.4, Appendix 10A, p.18) means that there may not be any 'safe' time to destroy its

		habitat.
Modify, destroy remove isolate or decrease the availability or quality of habitat to the extent the species is likely to decline	This will not occur. This species is highly mobile and could potentially utilise adjacent habitats.	This is not consistent with information in Appendix 10A, for instance section 3.4, p.20: > The relatively sedentary lifestyle of the BTF is considered to significantly increase its vulnerability to disturbance, or modification, of any of its three key resources (i.e. water sources, seeding grasses; and tree providing suitable nesting habitat) (DEWHA 2009b). Also, section 3.3.6, p.18: > The BTF is typically associated with large patches of remnant vegetation, though also where suitable seeding grasses exist in areas adjacent to intact habitat. The availability and relationship between the key habitat resources regulates its distribution and any disruption to the connectivity between these resources is likely to have a serious impact on an area's ability to sustain BTF populations (DEWJA 2009b). These passages indicate that the BTF is neither highly mobile nor able to exist in areas without connectivity between key habitat resources. Without thorough ground investigations, it would be impossible to establish if suitable habitat exists in adjacent areas. In particular, the availability of suitable nesting sites and native grasses must be established. It must also be considered what impact noise, dust and light from the proposed mine operation would have on the species in adjacent areas.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat;	This is unlikely to occur.	There is a reasonable risk that disturbance from the proposed mine would increase the abundance of the highly invasive buffel grass (*Pennisetum ciliare* formerly *Cenchrus ciliaris*) in the immediate vicinity, which would both diminish the bird's access to suitable feed grasses as well as increase the risk of fire, which is noted to be a key threatening process for the species (see section 3.4. Appendix 10A, p.19 of the EIS).

Introduce disease that may cause the species to decline, or	This is unlikely to occur.	-
Interfere with the recovery of the species	This is unlikely to occur.	This is an unsupported claim. Given the sighting of the BTF on Bimblebox Nature Refuge this year was the first record to that southerly extent since a 2004 sighting in Rockhampton, and given the general lack of survey data for the species, it is reasonable to consider that the population could be important in efforts to extend the range and recovery of the species in Queensland.

COMMENTS/SUGGESTIONS: The level of uncertainty in regards to the current status of the Endangered Black-throated Finch in the region warrants refusal of the project on the grounds that it could severely interfere with the current existing population and possibly also the recovery of the species. Until a comprehensive survey effort and regional assessment is made of the species, it will not be possible to know the extent of the likely impact. Applying the precautionary principle in relation to this endangered species would most certainly warrant refusal of the project.

Migratory fauna species

ISSUE: The EIS has failed to provide a realistic and comprehensive assessment of the likely impact on migratory animals. The approach is summarised in section 3.1.11.2.3 of the Executive Summary, p.41:

> Migratory species are all high mobile species which may visit the study area periodically. The mine footprint and adjoining areas do not include significant or locally uncommon habitat values and the site would not constitute a critical resource to any migratory species given the availability of similar habitat within the local area. As such, the impacts from the construction of the mine on all these species have negligible consequences and have been determined to be Low.

Whilst migratory animals are by definition 'highly mobile species', this does not necessarily reflect an ability to utilise novel habitat upon the destruction of current sites. Most often migratory species show specific site fidelity, arising from adaptive reinforcement over generations. Fidelity to these sites carries significant influence of the genetic structure of populations, and the destruction of a site can carry highly significant consequences for the persistence of species, either by genetic diversity loss or increased mortality.

Also single sites, such as the proposed project location, are not the complete picture, as many sites along a pathway link to form migration site networks. Different sites along these networks can carry varied significances to the persistence of species, with some acting as a corridor for the majority of individuals and others being sites accommodating a small proportion of the population.

Without knowledge of the degree of linkage between the Bimblebox refuge and other sites along the route of migratory fauna, claims regarding the impact level of the proposed development cannot be validated. Until a time when the migrations of these species have been fully mapped, and site significance has been documented, it is an impossible task to assess the effects that the proposed project will cause.

The statement that, 'the site would not constitute a critical resource to any migratory species given the availability of similar habitat within the local area', shows ignorance of the great extent to which 'similar' habitat types can differ, both in their resource and

habitation potential. Two sites, both comprised of one of the broad habitat types presented in the proposal, may differ slightly in a factor, for example canopy cover, which renders one site more favourable than the other in terms of survivorship. The population may indeed move to frequenting another site, but this may have significant effects on the populations' structure and abundance as a result. Expecting a migratory species to be able to effortlessly utilise another site of the same habitat type when the first choice is destroyed is simply naïve to the complexities of ecosystems and thus this reasoning is not a solid basis for making impact assessments.

(N.B: This sub-section is the work of Mr Michael Collins)

COMMENT/SUGGESTION: Further research would be required to ascertain the significance of Bimblebox Nature Refuge and surrounding woodlands as part of the corridor of suitable habitat for the migratory fauna species found on the property.

Regionally significant fauna

ISSUE: The EIS has failed to provide a realistic and comprehensive assessment of the likely impact on regionally significant fauna species. This is particularly important given that these are the species that would be 'next in line' to appear in the Threatened species lists. An example here is for the regionally significant Desert Mouse (*Pseudomys desertor*). In section 6.10, Appendix 10, p.66 it is stated:

> …However, for the Desert Mouse, the consequence is potentially moderate (C=3) as this species is known to be dependent on perennial native groundcovers (Kutt *el al.* 2004) which are well represented in the footprint area and generally less abundant in surrounding areas. Desert Mouse is known to be sensitive to grazing and fire (Kutt at al . 2004; Kutt and Woinarski 2007). As such the impact on this species is classified as potentially High (8).

The above passage acknowledges that the significant loss of habitat for the Desert Mouse that would result from the proposed mine. However, the report does not elaborate and/or fails to mention the following important aspects:

- the likely change in fire and grazing pressure in the region as a result of changed land-management practices associated with the proposed development. Some aspects of this are discussed on p.75 of this submission;
- the cumulative impact on regionally significant species from all the proposed mines in the region. In particular, the likely impact on habitat corridors must be thoroughly assessed;
- the predicted changes that are likely to impact on the species resulting from climate change.

COMMENT/SUGGESTION: Given the pressure on the region's fauna from the multiple large-scale mining proposals, the predicted climate change impacts, and on-going marginalisation of habitat areas due to the encroachment of Buffel Grass (among other things), regionally-significant species should be given greater attention in an assessment of the likely impacts from the proposed development.

ISSUE: In section 3.1.11.2.2 of the Executive Summary, p.41 it is stated:

> A Significant Species Management Plan for desert mouse, including monitoring and evaluation, will be implemented

COMMENT/SUGGESTION: The Desert Mouse 'management plan' must be made available for public scrutiny, and should be evaluated by an independent ecologist. Also, details must be provided regarding what measures will be taken if it is found through the proposed 'monitoring and evaluation' program that the species has been negatively impacted by the development and/or operation of the proposed mine.

<u>Insufficient survey effort</u>

ISSUE: The case of the Black-throated Finch and its treatment in the proponent's EIS raises a number of concerns.

Given that the Black-throated Finch has now been verified by four different Birds Australia observers (including an audio-recording made of its call) the lack of discovery by the proponent's paid consultants calls into question a range of other species which may have *not* have been discovered during the survey for the EIS.

The Near Threatened (DERM) Black-necked Stork and the regionally significant White-eared Honeyeater were sighted on Bimblebox in November 2011 by a visiting DERM ecologist. Birds Australia observers sighted a further five new bird species (Shining Bronze Cuckoo, Brush Cuckoo, Horsfield's Bushlark, Pelican, Little Pied Cormorant) on two separate visits in November-December 2011. So, seven new bird species were sighted on Bimblebox in the last two months alone.

The Northern Brown Bandicoot was also recently found for the first time by the Bimblebox landholders on the western boundary of Bimblebox in late November 2011. Numerous conical mounds at the head of the burrows of this species have also been found near the centre of Bimblebox Nature Refuge.

These recent finds are testament to the need for genuinely longitudinal ecological survey work to be undertaken to understand the range of species that may inhabit the area. Given the semi-arid nature of the environment in central-west Queensland, and

the often decade-long seasonal trends, genuine ecological survey work would need to be based on a similar timeframe.

Another example of the need for long-term survey work to properly give an indication of the conservation values of the proposed mine site, is the number of bird species sighted over time on Bimblebox Nature Refuge. Birds species have by far received the greatest independent survey effort on Bimblebox Nature Refuge, so provide a useful measure of the ratio between species found during the EIS commissioned survey, and the closer representation of the number actually existing there.

It is stated in section 6.3.2.8 of Vol 2 Ch 6, p.185 that a total of 88 birds species were recorded during the Unidel (2010) survey across the whole proposed mine site. This is in contrast to the 145 species that have been recorded on Bimblebox Nature Refuge over the past 9 years. So, the commissioned survey found less than 61%, of this total. Crucially, they failed to record any of the four Endangered, Threatened or Near Threatened species that have been recorded before or since the Unidel survey (Black-throated Finch, Squatter Pigeon, Black-chinned Honeyeater or Black-necked Stork).

COMMENT/SUGGESTION: The examples presented above indicate that a much more rigorous survey effort in the bioregion, over a number of seasons, is required to establish the importance of the area for a range of biodiversity, including threatened and significant flora and fauna species. If the precautionary principle were to be applied, the inadequate understanding of the range of flora and fauna species that the proposed mine is likely to impact upon would warrant refusal of the project.

ISSUE: Based on the map provided on p.24, Appendix 10 (Figure 2), and on information in Appendix 5 of Appendix 10, there were only 2 sample sites for fauna in Bimblebox Nature Refuge, and one of these was located on the western boundary of the property, bordering a highly modified neighbouring paddock. There was also only one bat recording site on the property. This narrow coverage of fauna sampling on Bimblebox Nature Refuge is likely to have led to an under-representation of the species that exist, or potentially exist, on the property.

COMMENT/SUGGESTION: The likely impacts on terrestrial ecology from the proposed mine cannot be properly assessed due to an inadequate level of understanding of fauna species and ecological communities in the area.

Need for independent scrutineering

ISSUE: The Unidel (2010) have recorded the sighting of the regionally significant Great Brown Broodfrog (*Pseudophryne major*) on Bimblebox Nature Refuge. However, the photos of the frog relating to this record were checked by fauna expert Eric Vanderduys from the CSIRO and it was established that it was a mis-identification (Vanderduys, pers. comm. 07.12.11).

COMMENT/SUGGESTION: The mis-identification of this frog species indicates that the original report and all related documents from the Unidel survey should be scrutinised by an independent ecologist.

ISSUE: The following passage is from section 5.3.3, Appendix 10, p.46:

> The Endangered (NC Act listed) Troughton's Sheathtail-bat (*Taphozous troughton*) was tentatively recorded (ultrasound recording) within the Bimblebox Nature Refuge by WorleyParsons (2009) on the basis of the echolocation call analysis. The calls of this species are very similar to those of a free-tail bat, *Mormopterus sp.3*. and since there are no cave formations within the local region (roosting habitat for *Taphozous*), it is most likely that the echolocation call records are attributable to this latter species which is not listed as threatened under any legislation. Further, preliminary genetic investigation suggest that the name T*. troughtoni* is synonymous with the common and widespread *Taphozous geogianus* in Queensland. For these reasons, the species has been excluded from the report'

COMMENT/SUGGESTION: This justification for excluding that Endangered Troughton's Sheathtail-bat from the report must be scrutinised by a fully independent bat expert. The original WorleyParsons (2009) report must be made available for public scrutiny. If it is already publicly available then location details for access should be provided. More than one bat survey site on Bimblebox Nature Refuge would be required to ascertain the likely diversity and abundance of bats on the property.

Subsidence

Questionable extent of subsidence

ISSUE: There is significant discrepancy in the information provided in the EIS regarding the extent of likely subsidence from the proposed mine.

The figure for the total area that is expected to be affected by subsidence is given in a number of places as being 'in the order of 25,161 ha' (for instance, section 6.4.1.2, Vol 2 Ch 6, p.187).

> This figure is based upon an expectation of subsidence in the areas directly above the underground mine, as well as an additional 'buffer' area of 350 m directly adjacent to the actual mined areas. It should be noted that this 350 m buffer is a very conservative estimate as the level of extension of subsidence outside the limits of extraction is usually assumed to be half the depth of cover (to the coal) in Queensland coalfields (section 6.4.1.2, Vol 2 Ch 6, p.187).

Elsewhere, the figure for the underground longwall area is given as 29,755 ha (section 2.2, Appendix 27, p.9).

However, a simple calculation based on information about the width, length and number of longwall blocks provided in Table 8 on p.71 in Vol 2 Ch 1 (480 X 7,000 X 103) indicates that there would be a **total subsidence area of 34,608ha**, not including any buffer areas.

This indicates that either the stated areas of 25,161 ha, 29,755 ha, or the number and/or dimensions of the underground mine blocks presented in the EIS is wrong.

COMMENT/SUGGESTION: If the proposal is not rejected outright, the proponent should be required to comprehensively revise its EIS. Correct figures relating to the proposed mine must be provided, including the total land area that is likely to be impacted in which way by both the open cut and underground mine. The discrepancies highlighted in the above example questions about what other information may in incorrect or inconsistent throughout the EIS.

Inconsistent claims regarding impact on terrestrial ecology

ISSUE: There are contradictory claims given as to the impacts from subsidence on terrestrial ecology. For instance, in Appendix 10 – Terrestrial Ecology, it is stated that one of the assumptions for the analysis was based on that there would not be a significant impact:

> No significant subsidence will be caused by the mine and that the hydrological characteristics of the land surface above underground mine areas will not be significantly altered (section 4.5, Appendix 10, p.31).

Also,

> The majority of the mine will be underground and is unlikely to impact on terrestrial flora and fauna (Appendix 14, p. 104).

The use of the world 'significant' is not explained. For most people, a drop of 1.3-1.61, and up to 3.27 metres, of their land would be considered significant. These claims from the Terrestrial Ecology report are also contradicted by information elsewhere in the EIS:

> the underground mining area takes up the remaining 48% and has the potential to cause subsidence and other impacts on the soil profile, hydrology etc. which may then negatively impact on the vegetation (section 3.1.8.2, Executive Summary, p.35)

> Whilst the predicted levels of subsidence can be quantified, the impacts of those changes on natural features such as stream flow, groundwater regime, water discoloration, habitat alteration and vegetation die-back are less easily quantified. These changes can lead to alteration of species habitats and the ecological function of communities (section 1.3.6.4, Vol 2 Ch 1, p.72).

> The surface above the underground mining area will not be cleared of vegetation, but it is acknowledged that there may be long-term impacts to the surface vegetation communities due to change in hydrology and subsidence because of the underground operations (section 1.3.6.4, Vol 2 Ch 1, p.72).

> … it is acknowledged that there may be depressions resulting from this degree of subsidence. This could affect surface drainage patterns and possibly create long-term impacts to the surface vegetation communities such as alteration of species habitats and the ecological function of communities. Species and ecological communities dependent upon aquatic ad semi-acquatic habitats are particularly susceptible to the impacts of subsidence. Effects could be temporary or long-term. Given the uncertainties described, more work will need to be undertaken to quantify the type and magnitude of the impacts of subsidence on the habitat above the underground mining activities (section 6.4.1.2, Vol 2 Ch 6, p.187).

And it is important to note the recent listing of subsidence as a key threatening process in NSW:

> 'Alteration of habitat following subsidence due to longwall mining' has been listed by the NSW Scientific Committee as a key threatening process under the *Threatened Species Conservation Act1995*.[64]

COMMENT/SUGGESTION: If the proposal is not rejected outright, the proponent should be required to comprehensively revise its EIS. The proponent must undertake comprehensive analysis as to the likely impacts on vegetation and biodiversity on subsided ground. Experience from NSW and elsewhere should be taken into account.

[64] http://www.environment.nsw.gov.au/threatenedspecies/LongwallMining.htm

The proponent also must be required to present consistent and correct information throughout all future publications.

Questionable description of subsidence impacts

ISSUE: The impact of subsidence on rural properties appears to have been grossly under-stated in the Social Impact report, which is of particular concern given that this information is presumably what was presented during the community information sessions. For instance:

> Subsidence is not expected to cause any discernable change on the surface: a drop of around 1 metre is expected across a 470 metre long-wall panel. This is not expected to impact on vegetation, fences, power lines or roads, although water tanks, pipes and creek beds will be checked after subsidence occurs (section 7.4, Appendix 23, p.54).

In fact, Table 8 on p.71 in Vol 2 Ch 1 details how the **480 m wide panels** would be **7,000 m in length** and that there would be a total of **103 blocks**. Overall, the underground mines would extend over an area of up to 35,000 ha. Also, it is stated elsewhere in the EIS that:

> The total cumulative subsidence in this area is predicted to reach a maximum depth of 3.27 m. Average subsidence across the bulk of the underground mine area is expected to ranged between 1.3 m to 1.6 m (section 1.3.6, Vol 2 Ch 1, p.71).

This depth and extent of subsidence is highly likely to impact on vegetation, fences, power lines and roads as well as water tanks, pipes and creek beds should these be present on the subsided ground.

It is clear that details of the depth and extent of anticipated subsidence, and the impact that this would have on property infrastructure, are not accurately reported in the Social Impact report.

COMMENT/SUGGESTION: The proponent should be required to provide details about what information was presented to the public during information sessions, and an explanation as to why there is incorrect and misleading information presented in the Social Impact report. The proponent must be required to present consistent and correct information throughout all future publications.

ISSUE: It is stated in section 4.3.2 of Vol2 Ch 4, p.153 that:

> During the operation of the mine, existing land uses, such as grazing may be able to continue within the proposed mining lease in areas not directly impacted by the open cut mines and supporting infrastructure… It is important to note that agricultural land uses on surface areas above underground mines is not expected to be significantly affected by mining operations.

However, it is reasonable to assume there would be a significant danger posed to both cattle and workers when working on heavily subsided land, and there is no guarantee that water supply for the operation of cattle grazing would be secured from the impacts of subsidence and draw-down.

COMMENT/SUGGESTION: The proponent must be required to give a more realistic assessment of the future of land use in the area of the proposed mine operation, and discuss the ramifications of cattle being prohibited from the area due to the danger posed by uneven, potentially unstable, subsided ground and the lack of water supply. Notably, an assessment of the increased fire hazard in the area must be identified and analysed.

Rehabilitation

A major failing of the EIS is a lack of a detailed rehabilitation plan. Considering the total mine area extends across around 70,000 ha of land, and would include around 15,000 ha of open cut voids and possibly up to around 35,000 ha of subsided land (section 2.2, Appendix 27, p.9; calculation on p.93 of this submission), the lack of a detailed rehabilitation plan is a major omission.

It appears that the only section in the EIS that deals with rehabilitation is in section 1.3.3 of Vol 2 Ch 1, but this contains only a very general discussion, and relevant information from this section is not provided elsewhere in the EIS where it would seem applicable.

For example, the brief section in the body of the EIS that describes the fact that the open cut voids would remain in the landscape for perpetuity (section 1.3.5.1.1, Vol 2 Ch 1, p.67) includes the statement:

> Final voids are unlikely to be suitable for agricultural use, and will be investigated for alternative beneficial uses such as wetlands.

This statement would need to be elaborated on, providing examples from other retired mine voids, to give people in the region an idea of what this part of their landscape might look like and be used for, for decades and centuries to come.

COMMENT/SUGGESTION: The proponent should be required to provide detailed information about the proposed rehabilitation plan, including:

- The total land area to be impacted by open-cut voids and subsided ground;
- The likely on-going costs associated with the long-term management of the open-cut voids and subsided ground;
- The species anticipated to be used in any revegetation activities;
- The duration of the proponent's responsibility for the post-mining land.

Community consultation

Fundamental power imbalance

ISSUE: There is a fundamental problem in the use of the word 'consultation' to describe mining companies' operations in towns and communities impacted by their activities. To our minds, meaningful consultation would be that which occurs between two or more people or groups/organisations/bodies, where there is equal power to influence the outcome. In the case of mining companies, current legislation in Australia grants them a higher privilege to a wide range of resources (eg. minerals, land, water, vegetation clearing permits). If granted the status of Significant Project Status by the Queensland government, as is the case with the project at hand, the company is able to forcibly acquire property even if the legal owner does not want to give it up. On top of that, mining executives often have the ear of government officials and quantities of money and resources on hand that are simply not matched by the public attempting to scrutinise their proposals.[65] Thus, the power differential between mining companies and local communities is enormous and no genuine consultation is possible.

COMMENT/SUGGESTION: The phrase 'community consultation' should be replaced with more accurate descriptions of what is taking place. Here we will use 'information sessions', which in our experience are usually uni-directional.

Questionable social commitment

ISSUE: The proponent's commitment to providing accurate information and engaging in genuine community 'consultation' is highly questionable. A few examples indicate there could be a problem in the culture at all levels of the company in this regard. A few specific examples illustrate this point:

- Clive Palmer's wildly inaccurate comments that appeared in national media on December 1st 2011 suggest that he is not concerned for presenting accurate information to the public so that the merits of his proposal can be reasonably assessed. It is worth noting a few of his statements in a recorded interview, the false comments are highlighted in bold:

> Clive Palmer: The Black-throated Finch has wings and can fly. **It's found right throughout Queensland**. But really, when you look at the nature reserve, originally it was **a farm, a pastoral area which had devoided all of the vegetation, the main trees and things like that so that the water table had risen substantially**. **It was then donated as a nature reserve. The state government independently assessed it and it was given the lowest classification of any environmental reserve in the state, allowing**

[65] See for instance: http://blogs.crikey.com.au/rooted/2011/09/19/wielding-power-the-rinehart-way/

> **development to take place**. So all that was done not by me, but by the state government independent environment. So it's just another beat up really.[66]

He was also reported widely that day as saying that **9000 jobs would be created in the construction phase of his proposed development**.

A few notes of correction:

- The Black-Throated Finch has a severely retracted range, indicated by its Endangered status. The sighting on Bimblebox was the most southerly sighting since 2004, when it was seen in Rockhampton. The following statement is from section 3.2, Appendix 10A, p.15 of Waratah Coal's EIS:

  > The BTF was previously known from habitats extending from the Atherton Tablelands in north Queensland, to the Northern Tableland and north-west slope regions of New South Wales… Over the last 20 years, it is estimated that the extent of occurrence of the subspecies has contracted by approximately 80% of its former extent… It has been postulated that circumstantial evidence suggests, concomitant with the known contraction in extent of occurrence, an overall decline of 50% in the population of this species has occurred in the past ten years…

- Over 96% of Bimblebox has never been 'devoided' of its vegetation, and all of its 'main trees and things like that' remain perfectly intact;
- There has never been a problem with rising water tables on Bimblebox;
- The property was not donated as a nature reserve, it was purchased by a group of concerned families, whose efforts effectively saved the property from being cleared. In recognition of its conservation values the Federal Government's National Reserve Program also contributed funds for its purchase;
- The Nature Refuge Agreement that covers the entire Bimblebox property is the highest level of protection of private land in Queensland;
- The proponent's own Executive Summary states that there would only be '3,500 direct jobs during construction and 2,360 permanent employees for the long term operation of the mine, rail and port facilities' (section 1.4.2, p.16), and the lower figures of 2,914 and 1,240 are given in the EIS's economic assessment (Appendix 24, p. xvi).

Further, Clive Palmer's other reported comments in the media in regard to 'kicking the state government in the arse' (see p.103 of this submission) to get approval for this project does little to inspire community confidence that he is committed to working in an open and honest fashion with a local community.

[66] ABC Capricornia, in a recorded interview with Megan Hendry, available at http://www.abc.net.au/rural/qld/northwest/

- Waratah Coal Managing Director Nui Harris was recently quoted in a newspaper article:

> Waratah Coal managing director Nui Harris said now the project had gone out to public consultation, they would wait to receive the written submission from Ms Cassoni.
>
> Mr Harris said the company had met with her twice previously to discuss the complex issue…..
>
> "What we will do is be guided by the owners of the Bimblebox operations," Mr Harris said.[67]

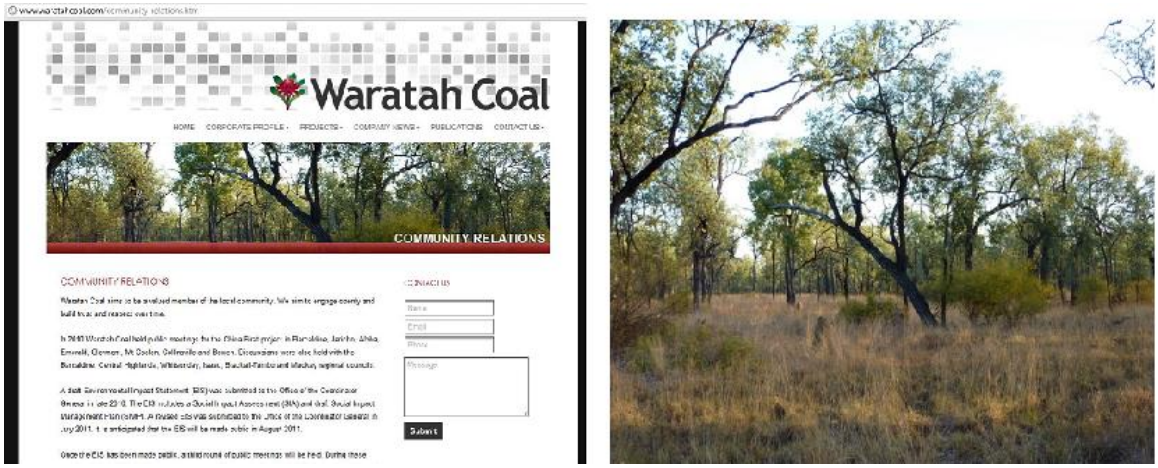
However, Paola Cassoni has never met with Waratah Coal representatives outside of one public information session, at which no private conversation was held. Further, given that the Bimblebox Nature Refuge landholders are opposed to the proposed mine, it would seem that its claim that 'they will be guided by the owners of the Bimblebox operations' would amount to a willingness to shelve the project. There has never been any indication however that that is the case.

- Community information sessions as part of Waratah Coal's 'consultation' process involved scheduled meetings in September 2010, which was the wettest month on record for Queensland, with Alpha recorded as the wettest town.[68] The ability of landholders in the area to leave their properties in these conditions was severely hampered, yet the meetings were not re-scheduled. The experience has made at least some landholder's reluctant to attend other Waratah Coal sessions.

- In a community meeting held in Clermont, in September 2010 (at which several landholders arrived by helicopter due to the wet conditions), a Waratah Coal employee aggressively forbade the filming of the event by an independent film-maker and accused him of lying in front of the assembled group of landholders.

- In May 2011, it was discovered by one of the authors of this submission that Waratah Coal's upgraded website included a photo of Bimblebox Nature Refuge which had presumably been copied from the Bimblebox website, without permission. With almost comical irony, the 'borrowed' photo appears on the page named 'community relations' and the photo was taken in an area on Bimblebox Nature Refuge that Waratah Coal proposed to turn into an open-cut coal mine.

[67] http://www.brisbanetimes.com.au/queensland/fight-to-save-refuge-from-coal-mine-20111020-1ma1p.html#ixzz1gMXTplD1
[68] http://www.abc.net.au/local/stories/2010/10/04/3029089.htm



Screenshot of Waratah Coal's 'community relations' page next to original photo taken by Sonya Duus, one of the authors of this submission, posted on the Bimblebox Nature Refuge website (www.bimblebox.org)

ISSUE: In the conclusion of Waratah Coal's EIS Executive Summary it is stated:

> … Waratah Coal is committed to effective ongoing community engagement throughout the Project's development and operational phases.
>
> Waratah Coal is committed to delivering a project founded on ecologically sustainable principles and commissioned with a social license to operate. Waratah Coal will deliver an environmentally, socially and economically sustainable project which will support and enhance regional advancement throughout its whole project life.

In the Bimblebox landholders' experience of dealing with representatives of the proponent, and to talking to many people in the region, it is clear that commitments outlined in the Executive Summary of the EIS are not matched by their actual performance and behaviour.

COMMENT/SUGGESTION: Given that the company-funding EIS process is the only way through which the effected community and the broader public can learn about the intended actions of the company and the likely consequences of the project, at the very least, it should offer only straight-forward comments and claims that can be backed-up with evidence. Otherwise, the risk is for the EIS process to become a form of glossy advertisement, rather than a source of detailed and accurate information pertaining to the likely significant impacts from a project.

Social licence

ISSUE: There is no indication that the proponent has, or is likely to have, a social licence to operate. It is stated in the EIS:

> Generally speaking, the majority of people support the development of the project, based on expectations for increased local employment and business opportunities and the development of local infrastructure and improvements to public services. However, this support is condition on:
>
> - Adequate environmental practices, particularly in relation to groundwater… surface water … and impacts on wetland and the marine environment
> - The provision of improved infrastructure and services, particularly in the Alpha and Bowen area; and
> - Adequate measures to avoid the negative aspects of mine development, particularly in Alpha, that are typically associated with a mining town…
>
> (section 10.3.1.3, Vol 1 Ch 10, p.298).

Information provided elsewhere in the EIS describes how the groundwater impacts from the mine are likely to extend up to 30km radius from the proposed operation and may not recover for 50-100 years, if at all. There is no guarantee of improved infrastructure beyond those parts which the mines operation requires, such as upgraded roads and airport. It is not clear who will bear the majority of the costs for the upgraded infrastructure and who it will mostly benefit. There is no certainty that the employment and business opportunities generated by the mine would go to locals (see Appendix F of this submission). There are also not adequate mitigation measures proposed in the EIS that would prevent Alpha from suffering the worst characteristics of a mining town.

If public support in the vicinity of the mine is indeed conditional on the above issues, then the proponent has failed to prove that it will be able to win this support, thus will not be operating with a social licence.

In regards to the rail line, the proponent acknowledges that:

> Many people from Collinsville are less supportive of the project ….

And

> … the majority of property owners who will potentially be impacted by the railway are not supportive

So, it seems that if the proposed development were to proceed, it would be actively going against the wishes of the communities that it will most directly impact.

COMMENT/SUGGESTION: The lack of a social licence to operate warrants refusal of the project.

General comments on the project and the EIS process

Non-transparent and questionable actions

ISSUE: It appears that there are multiple ways in which mining executives attempt to influence governmental decision-making in regard to approvals for their projects. The following exert is from the business pages of The Australia on December 15th 2010, and it reveals a shocking approach used by Clive Palmer, Chairman of Waratah Coal, in seeking the approval for the project at hand:

> … Palmer says the only thing stopping him is the state government approval processes.
>
> He has a simple remedy: "We'll just kick them in the arse. We'll kick pretty hard and we'll push pretty hard and there's an election on next year and the Premier wants to have 100,000 jobs. Well, she's not going to get it unless they get these projects going.
>
> "Queensland does lead the world in the worst bureaucratic approvals system.
>
> "We've got small thinkers in the state who've taken over things, not saying what they can do, but worrying about what they can't do.
>
> "The Galilee Basin overall has got 100 billion tonnes of thermal coal, so it's a great reservoir for Queensland in the future, so you'd be crazy not to develop it."[69]

Clive Palmer was also recorded making blatantly false, exaggerated and misleading claims about the employment benefits of the proposed project, and diminishing the value of the Bimblebox Nature Refuge and the impact the mine would have on the Black-throated Finch. For instance:

> "Fortunately the black-throated finch has wings and can fly, but when you look at the nature reserve it was originally a farm and a pastoral area, which had 'devoided' all of the vegetation, the main trees and things like that," he said.
>
> "It was then donated as a nature reserve - the State Government independently assessed it and it was given the lowest classification of any environmental reserve in the state."
>
> … He says up to 4,000 of the 10,000 workers needed to build the Waratah Coal project are likely to come from the Rockhampton region.[70]

[69] Fraser, A. 15.12.10, 'Mining trio poised to prove the critics wrong', *The Australian*. Available at: http://www.theaustralian.com.au/business/mining-trio-poised-to-prove-the-critics-wrong/story-e6frg8zx-1225971157776

[70] Hendry, M. and Robinson, P. 1.12.2011, 'Mine benefits outweigh green fears, Palmer says', *ABC News*. Available at: http://www.abc.net.au/news/2011-12-01/mine-benefits-outweigh-green-fears-palmer-says/3705808?section=business

Every comment that Palmer made in this example is contradicted by information within his company's own EIS. This is further discussed on pp.98-99 of this submission.

COMMENT/SUGGESTION: All of Clive Palmer's dealing with the state and federal government in relation to the project at hand should be transparent and thus subject to public scrutiny.

The public at a significant disadvantage

ISSUE: It has been made clear in numerous forums that the current public comment period is the primary avenue through which the directly-affected landholders, as well as the community more broadly, should formally express their opinions and concerns. However, it is alarming that the onus is on the public to scrutinise such proposed developments. In this case, there are several thousands of pages of document to read (see photo below), but no resources or funding made available to support this work.

The time frame of six weeks to respond to a project of this scale and with potential impacts of such magnitude is entirely inadequate, especially considering that the proponent had several years to prepare the document. Even with the extension of six weeks for the proposal at hand, it has been impossible for members of the public to devote the time that would be necessary to provide the in-depth and comprehensive feedback that is required.

More generally, it is also extremely alarming that in Australia, environmental assessments are undertaken by development proponents, who inevitably have vested interests in a particular outcome. This concern is only exacerbated by the lack of any formal mechanism to ensure the independence and rigour of consultants who are paid by the proponents to undertake analysis. Further, the fact that the intellectual rights of consultants' work are handed over to the proponents who are then free to edit and change their reports does little for the credibility of the process.

The hard copy of the Galilee Coal Project EIS, totalling 79 chapters and several thousands of pages

COMMENT/SUGGESTION: The process of environment impact assessment must be thoroughly reviewed. Ideally, the assessments would be conducted by bodies totally free of any vested interest. As a bare minimum, the current arrangement for assessments should be overseen by an independent ombudsman with the ability to scrutinise both the integrity of consultants' work and the proponents' use and presentation of that work.

The public submission period for the supplementary EIS should be proportional to the size of the document and the number of issues demanding a response.

Inadequate and mis-leading Executive Summary

ISSUE: As specified in the ToR (p.15):

> The function of the executive summary is to convey the most important aspects and options relating to the project to the reader in a concise and readable form. It should use plain English and avoid the use of jargon and esoteric terms. The executive summary should be written as a standalone document, able to be reproduced on request and distributed to interested parties who may not wish to read or purchase the EIS as a whole.
>
> The structure of the executive summary should follow that of the EIS, and **focus strongly on the key issues to enable the reader to obtain a clear understanding of the project and its potential adverse and beneficial environmental, social and economic impacts and the management measures to be implemented by the proponent to mitigate all residual impacts.**

The proponent has failed to provide a balanced representation of the key issues. In some cases it has exaggerated the potential benefits, and down-played or omitted to include the potential adverse impacts. Thus, as a stand-alone document, readers would be unable to get a clear understanding of the project and the range of likely impacts.

For instance, omissions from the Executive Summary include:

- A full description of Bimblebox Nature Refuge and the multiple values that are likely to be impacted by the proposed mine;
- The confirmed sightings of the Black-throated Finch in the area of the proposed mine;
- The likely scale, extent and duration of likely impacts to groundwater, including to aquifers that make up the Great Artesian Basin;
- Adverse impacts on the economy and employment resulting from the proposed project;
- The fact that the agreement reached between the proponent and the Export-Import Bank of China specifies that the project must include 'at least 50% Chinese content'(Appendix 23, p.xviii);
- The total land areas that would be impacted by the open-cut voids and subsidence from underground mining;
- The landscape impacts from the mine that would remain in perpetuity.

Further, the Executive Summary also contains statements that do not appear, and are not further explained, elsewhere in the EIS. As such, they could be regarded as being unsubstantiated. For instance:

- That 'an additional 70,000 indirect jobs is anticipated' as a result of the project (section 1.4.2, Executive Summary, p.16), and;
- That 'the coal within the [Bimblebox Nature Refuge] is the highest quality and most shallow coal and contributes over 30% of the coal to be mined. As such, the project will not be viable without coal reserves under the BNR' (section 1.6.1, Executive Summary, p.20)

COMMENT/SUGGESTION: If the proposed development is not rejected outright, the proponent should be required to provide a thoroughly revised Executive Summary that adequately meets the requirements outlines in the ToR. It should include information that properly reflects the scale and range of impacts from the project.

Failings of the EIS format and usability

Inability to copy and paste

ISSUE: It is not possible to copy and paste from the EIS which has lead to an inordinate amount of time being spent typing sections out by hand. It has meant that far more time has been spent undertaking basic information management than actually reading and commenting on the proposed development.

COMMENT/SUGGESTION: All future documents from the proponent released for public comment should include capability to 'copy and paste'.

Difficulty to navigate and find relevant sections

ISSUE: It has been extremely difficult to understand the proposal at hand due to the EIS not having an index or logical layout. For instance, for substantial topics, such as geology, subsidence and terrestrial ecology, there is information scattered throughout a number of chapters and Appendices, some of which is inconsistent. This makes it nearly impossible for an average member of the public to properly comprehend the proposal and the likely impacts from the proposal as described in this lengthy EIS. This is despite Warren Twist from Waratah Coal providing an assurance at a meeting of 'corridor to coast' landholders that its EIS would be a 'concise, user friendly document'.[71]

COMMENT/SUGGESTION: If the proposed development is not rejected outright, the EIS should be substantially re-written and re-formatted so that the public can easily make sense of what is being proposed. It is essential that there is some way of knowing where information is located in several thousand pages of the EIS. A comprehensive index is the very least that is required.

Errors that lead to difficulty in comprehension and navigation

ISSUE: Instances of out-of-date information, faulty references to other sections within the EIS, and similar errors include:

- In section 1.4.3, p.16 of the Executive Summary it is stated 'The remaining 15% equity ($2.4 Billion AUD) is expected to be funded by cash proceeds from an IPO of Resourcehouse on the Hong Kong Stock Exchange **set for completion mid-2011**'. We cannot find any information that this has occurred to date (the end of 2011);

[71] http://www.paulaheelanphotojournalism.com/articles_186071.html

- Section 1.4.2, p.16 of the Executive Summary it is stated 'The project is committed to **commence early engineering works in late 2010** with final construction due for completion in 2014'. This statement is clearly incorrect;

- In section 1.4.2, p16 of the Executive Summary it is stated that 'The project will assist in driving growth of Central and **North West** Queensland'. It would seem that the proponent meant to say **North East** Queensland. These kinds of errors lead to confusion for the public trying to understand the impact of the proposed development;

- There is a false reference given in section 6.4.1.2, p.187 of Vol2 Ch 6: 'See Section 1.3.5 of Volume 2, Chapter 2 for a more detailed description of the subsidence expected as a result of the project'. However, no such section exists in Vol 2 Ch 2. Clearly the wrong chapter has been mentioned;

- Section '6.3.6' on mitigation is referred to once in the Executive Summary, where it clearly doesn't exists, and also a number of times in Vol 2 Ch 6, where it also doesn't exist, but probably refers to section 6.6. These kinds of errors make it very difficult for the public to make sense of the very large EIS;

- Pages 32 and 33 are missing from Appendix 27;

- On p.8 of Appendix 3 – 'study team', it lists 'Tailing and Rejects Report' as Appendix 6. However, this Appendix has not been made available on the Waratah issued CD of the EIS or on the Waratah website. This would be an important report, but as it stands we have been unable to find the related information anywhere in the EIS. The proponent must explain why the 'Tailing and Rejects Report' was not included in the publicly available appendices, despite it being listed in Appendix 3.

COMMENT/SUGGESTION: All future publications from the proponent must be required to be thoroughly edited to minimise the time spent by the public reviewing the information.

Summary and conclusion

The proposed Galilee Coal/China First development would result in negative impacts of such a range and scale, that they warrant refusal of the project. These include:

- The destruction and degradation of the multiple values of Bimblebox Nature Refuge through open cut and underground mining;
- A net loss of remnant woodland with high biodiversity values ;
- Economic and employment impacts on the region, the state and the nation;
- A significant impact on local aquifers, including those that make up the Great Artesian Basin;
- Unquantified impacts from subsidence on remnant vegetation and biodiversity;
- The larger consequences of setting a precedent in the mining of an IUCN category IV protected area;
- Significant contribution to global climate change, including consequences on human health and the environment.

Crucially, these impacts would not be occurring in isolation, but rather would contribute to the cumulative impact from a number of other proposed 'mega' mines and petroleum and gas projects in the Galilee Basin. Altogether, the impacts on groundwater and other sectors in the region raise serious questions about the long-term health and viability for the region after the short-medium term coal rush is over.

The EIS has largely failed to adequately describe the range of risks posed by the proposed project. Where it has attempted to quantify the negative impacts, it has generally failed to describe adequate mitigation measures. The EIS has also failed to honestly and consistently represent information. Overall, there is insufficient good quality information to properly assess the proposed development. If it is not rejected outright, the proponent should be required to substantially revise and re-write its EIS. It should also be required to conduct a thorough cost-benefit analysis, with the parameters established in consultation with all the potentially affected individuals, communities and sectors.

Further, in some key aspects of the proposed development, it is clear that there is not sufficient information available to be able to judge the impacts and risks from the project going ahead, for instance:

> A review of available groundwater data on the Galilee Basin indicates that little is currently known about the hydrogeological regime in the area (Executive Summary, Appendix 14, ES1).
>
> It is apparent from the review of existing information that there have been no systematic or regular surveys in regards to BTF in the Desert Uplands, with most data derived opportunistically and descriptive in nature. In considering the information available at the time of preparing this report, it is clear that there is insufficient information for adequate conservation planning for BTF [in] the bioregion (section 4.1, Appendix 10A, p.21).

These issues are of national significance, and an application of the precautionary principle would warrant refusal of the project on these grounds alone.

The touted benefits of the proposed development are highly questionable, and overall this is no evidence provided that these benefits would not be outweighed by the likely substantial and long-term negative consequences of the project.

Appendices

APPENDIX A: Regionally significant fauna found on Bimblebox Nature Refuge

Species		Conservation Status
Birds		
Wandering Whistling Duck	*Dendrocygna arcuata*	Marine
Straw-necked Ibis	*Threskiornis molucca*	Marine
Black-necked Stork	*Ephippiorhynchus asiaticus*	**Near Threatened (DERM)**; Conservation Significance for Desert Uplands
Australian Bustard	*Ardeotis australis*	Conservation Significance for Desert Uplands
Whistling Kite	*Haliastur sphenurus*	Marine
Black Falcon	*Falco subniger*	Conservation Significance for Desert Uplands
Bush Stone-Curlew	*Burhinus grallarius*	Conservation Significance for Desert Uplands
Squatter Pigeon	*Geophaps scripta scripta*	**Vulnerable (EPBC)**; Conservation Significance for Desert Uplands
Brown Treecreeper	*Climactereris picumnus*	Conservation Significance for Desert Uplands
Speckled Warbler	*Chthonicola sagittata*	Conservation Significance for Desert Uplands
White-eared Honeyeater	*Lichenostomus leucotis*	Conservation Significance for Desert Uplands
Black-chinned Honeyeater	*Melithreptus gularis*	**Near Threatened (DERM);** Conservation Significance for Desert Uplands
Hooded Robin	*Melanodryas cucullata*	Conservation Significance for Desert Uplands
Grey-crowned Babbler	*Pomatostomus temporalis*	Conservation Significance for Desert Uplands
Great Egret	*Ardea alba*	Marine; Migratory(CAMBA, JAMBA)
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*	Marine
White-bellied Cuckoo-shrike	*Coracina papuensis*	Marine
Horsfield's Bronze-cuckoo	*Chrysococcyx basalis*	Marine
Channel-billed Cuckoo	*Scythrops novaehollandiae*	Marine
Southern Boobook	*Ninox novaeseelandiae*	Marine
Sacred Kingfisher	*Todiramphus sanctus*	Marine
Rainbow Bee-eater	*Merops ornatus*	Marine; Migratory(JAMBA)
Spangled Drongo	*Dicrurus bracteatus*	Marine
Australian (Richard's) pipit	*Anthus novaeseelandiae*	Marine
Black-throated Finch (southern)	*Poephila cincta*	**Endangered (EPBC)**; Conservation Significance for Desert Uplands
Tree Martin	*Hirundo nigricans*	Marine
Rufous (Nankeen) Night Heron	*Nycticorax caledonicus*	Marine
Mammals		
Common Dunnart	*Sminthopsis murina*	Conservation Significance for Desert Uplands
Spectacled Hare Wallaby	*Lagorchestes conspicillatus*	Conservation Significance for Desert Uplands

Rufous Bettong	*Aepyprymnus rufescens*	Conservation Significance for Desert Uplands
Koala	*Phascolarctos cinereus*	Conservation Significance for Desert Uplands
Desert Mouse	*Pseudomys desertor*	Conservation Significance for Desert Uplands
Reptiles		
Mulga Snake (King Brown Snake)	*Pseudechis australis*	Conservation Significance for Desert Uplands
Butterflies		
Wanderer Butterfly	*Danaus plexippus*	Migratory (Bonn)
Plants		
Large-podded Tick-trefoil	*Desmodium macrocarpum*	**Near Threatened (DERM)**

APPENDIX B: Bird species found on Bimblebox Nature Refuge 2003-2011

1	Emu	*Dromaius novaehollandiae*
2	Brown Quail	*Coturnix ypsilophora*
3	Unidentified Button Quail	
4	Little Button-quail	*Turnix velox*
5	Red-chested Button-quail	*Turnix pyrrhothorax*
6	Australian Pelican	*Pelecanus conspicicilliatus*
7	Australasian Darter	*Anhinga melanogaster*
8	Pied Cormorant	*Phalacrocorax varius*
9	Little Pied Cormorant	*Microcarbo melanoleucos*
10	Little Black Cormorant	*Phalacrocorax sulcirostris*
11	Australasian Grebe	*Tachybaptus novaehallaniae*
12	Wandering Whistling Duck	*Dendrocygna arcuata*
13	Plumed Whistling Duck	*Dendrocygna eytoni*
14	Pacific Black Duck	*Anas superciliosa*
15	Grey Teal	*Anas gracilis*
16	Hardhead (White-eyed Duck)	*Aythya australis*
17	Australian Wood (Maned) Duck	*Chenonetta jubata*
18	White-necked (Pacific) Heron	*Ardea pacifica*
19	White-faced Heron	*Egretta (Ardea) novaehollandiae*
20	Great Egret	*Ardea alba*
21	Nankeen (Rufous) Night Heron	*Nycticorax caledonicus*
22	Strawneck Ibis	*Threskiornis spinicollis*
23	Yellow-billed Spoonbill	*Platalea flavipes*
24	Black-necked Stork	*Ephippiorhynchus asiaticus*
25	Brolga	*Grus rubicundus*
26	Australian Bustard	*Ardeotis australis*
27	Bush Stone-curlew	*Burhinus grallarius*
28	Masked Lapwing	*Vanellus miles*
29	Black-fronted Dotterel	*Elseyornis (Charadrius) melanops*
30	Black-shouldered Kite	*Elanus axillaris*
31	Letter-winged Kite	*Elanus scriptus*
32	Black Kite	*Milvus migrans*
33	Whistling Kite	*Haliastur (Milvus) sphenurus*
34	Wedge-tailed Eagle	*Aquila audax*
35	Little Eagle	*Hieraaetus morphnoides*
36	Brown Goshawk	*Accipiter fasciatus*
37	Collared Sparrowhawk	*Accipiter cirrhocephalus*
38	Black Falcon	*Falco subniger*
39	Brown Falcon	*Falco berigora*
40	Nankeen Kestrel	*Falco cenchroides*
41	Peaceful Dove	*Geophelia striata*
42	Diamond Dove	*Geophelia coneata*
43	Bar-shouldered Dove	*Geophelia humeralis*
44	Common Bronzewing	*Phaps chalcoptera*

45	Crested Pigeon	*Ocyphaps (Geophaps) lophotes*
46	Squatter Pigeon	*Geophaps scripta*
47	Red-tailed Black-Cockatoo	*Calyptorhynchus banksii*
48	Yellow-tailed Black-Cockatoo	*Calyptorhynchus funereus*
49	Galah	*Eolophus (Cacatua) roseicapilla*
50	Sulphur-crested Cockatoo	*Cacatua galerita*
51	Rainbow Lorikeet	*Trichoglossus haematodus*
52	Red-winged Parrot	*Aprosmictus erythropterus*
53	Cockatiel	*Nymphicus hollandicus*
54	Budgerigar	*Melopsittacus undulatus*
55	Pale-headed Rosella	*Platycercus adscitus*
56	Pallid Cuckoo	*Cuculus pallidus*
57	Brush Cuckoo	*Cuculus variolosus*
58	Black-eared Cuckoo	*Chrysococcyx osculans*
59	Horsfield's Bronze-Cuckoo	*Chrysococcyx basalis*
60	Shining Bronze-Cuckoo	*Chrysococcyx lucidus*
61	Channel-billed Cuckoo	*Scythrops novaehollandiae*
62	Pheasant Coucal	*Centropus phasianinus*
63	Southern Boobook	*Ninox novaeseelandiae*
64	Barn Owl	*Tyto alba*
65	Tawny Frogmouth	*Podargus strigoides*
66	Australian Owlet-nightjar	*Aegotheles cristatus*
67	Laughing Kookaburra	*Dacelo novaeguinea*
68	Blue-winged Kookaburra	*Dacelo leachii*
69	Forest Kingfisher	*Todiramphus macleayii*
70	Red-backed Kingfisher	*Todiramphus pyrrhopygia*
71	Sacred Kingfisher	*Todiramphus sanctus*
72	Rainbow Bee-eater	*Merops ornatus*
73	Dollarbird	*Eurystomus orientalis*
74	Varied Sitella	*Daphoenositta chryspotera*
75	Brown Treecreeper	*Climacteris picumnus*
76	Variegated Fairy-wren	*Melarus lamberti*
77	Red-backed Fairy-wren	*Melarus melanocephalus*
78	Striated Pardalote	*Pardalotus striatus*
79	Speckled Warbler	*Chthonicola (Sericornis) sagittata*
80	Weebill	*Smicrornis brevirostris*
81	White-throated Gerygone	*Gerygone olivacea*
82	Western Gerygone	*Gerygone fusca*
83	Inland (Broad-tailed) Thornbill	*Acanthiza apicalis*
84	Chestnut-rumped Thornbill	*Acanthiza uropygialis*
85	Yellow (Little) Thornbill	*Acanthiza nana*
86	Buff-rumped Thornbill	*Acanthiza reguloides*
87	Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*
88	Spiny-cheeked Honeyeater	*Acanthagenys rufogularis*
89	Striped Honeyeater	*Plectorhyncha lanceolata*

90	Noisy Friarbird	*Philemon corniculatus*
91	Little Friarbird	*Philemon citreogularis*
92	Blue-faced Honeyeater	*Entomyzon cyanotis*
93	Noisy Miner	*Manorina melanocephala*
94	Yellow-throated Miner	*Manorina flavigula*
95	Singing Honeyeater	*Lichenostomus virescens*
96	White-eared Honeyeater	*Lichenostomus leucotis*
97	Fuscous Honeyeater	*Lichenostomus fuscus*
98	Grey-fronted Honeyeater	*Lichenostomus plumulus*
99	White-plumed Honeyeater	*Lichenostomus penicillatus*
100	Black-chinned Honeyeater	*Melithreptus gularis*
101	Brown Honeyeater	*Lichmera indistincta*
102	Grey-crowned Babbler	*Pomatostomus temporalis*
103	Red-capped Robin	*Petroica goodenovii*
104	Hooded robin	*Melanodryus cucullata*
105	Jacky winter	*Microeca fascinans (leucophaea)*
106	Crested Bellbird	*Oreoica gutturalis*
107	Grey Shrike-Thrush	*Colluricincla harmonica*
108	Golden Whistler	*Pachycephala pectoralis*
109	Rufous Whistler	*Pachycephala rufiventris*
110	Grey Fantail	*Rhipidura fuliginosa*
111	Willie Wagtail	*Rhipidura leucophrys*
112	Leaden Flycatcher	*Myiagra rubecula*
113	Restless Flycatcher	*Myiagra inquieta*
114	Magpie-Lark	*Grallina cyanoleuca*
115	Spangled Drongo	*Dicrurus bracteaus*
116	Olive-backed Oriole	*Oriolus sagittatus*
117	Figbird	*Specotheres viridis*
118	Spotted Bowerbird	*Chlamydera maculata*
119	Black-faced Cuckoo-shrike	*Coracina novaehollandiae*
120	White-bellied Cuckoo-shrike	*Coracina papuensis*
121	Ground Cuckoo-shrike	*Coracina maxima*
122	White-winged Triller	*Lalage sueurii*
123	Masked Woodswallow	*Artamus personatus*
124	White-browed Woodswallow	*Artamus superciliosus*
125	Black-faced Woodswallow	*Artamus cinereus*
126	Dusky Woodswallow	*Artamus cyanopterus*
127	Little Woodswallow	*Artamus minor*
128	Grey Butcherbird	*Cracticus torquatus*
129	Pied Butcherbird	*Cracticus nigrogularis*
130	Australian Magpie	*Gymnorhina tibicen*
131	Pied Currawong	*Stepera graculina*
132	Australian Raven	*Corvus coronoides*
133	Torresian Crow	*Corvus orru*
134	Apostlebird	*Struthidea cinerea*

135	Tree Martin	*Hirundo nigricans*
136	Fairy Martin	*Hirundo ariel*
137	Australian (Richard's) Pipit	*Anthus novaeseelandiae*
138	Horsfield's Bushlark	*Mirafra javanica*
139	Rufous Songlark	*Cincloramphus mathewsii*
140	Brown Songlark	*Cincloramphus cruralis*
141	Double-barred Finch	*Taeniopygia bichenovii*
142	Zebra Finch	*Taeniopygia guttata*
143	Black-throated Finch	*Poephila cincta cincta*
144	Plum-headed Finch	*Neochmia modesta*
145	Mistletoebird	*Dicaeum hirundinaceum*

APPENDIX C: Climate change impacts on flora and fauna[1]

Environmental change	Responses by individual organisms
Temperature	Metabolic and developmental rates in animals, and photosynthesis and respiration in plants, increase with increasing temperature until some upper limit. Increasing temperatures will interact with water stress for both plants and animals, and will affect the timing of important life cycle events such as reproduction and diapause (a quiescent period during a life cycle). Advances in spring events and delays in autumn events are probable for many species, and will result in a lengthening of the vegetative growing seasons in many regions. Animals also respond to temperature by altering their behaviour, for example, by seeking shade, altering the time of day they are most active or changing the position they occupy in the water column. In many reptiles, temperature during development affects sex ratios. Fundamental geographic ranges of many species are thought to be determined mainly by temperature extremes (e.g. hottest day in summer, coldest day or frost incidence in winter).
CO_2	Plants increase photosynthetic rate as the concentration of CO_2 increases in the atmosphere or in water (in the case of algae), until the CO_2 concentration or another factor (such as light, water or nutrients) becomes limiting – this process is known as the 'CO_2 fertilisation' effect (Box 5.1). Increasing CO_2 also reduces stomatal conductance, thereby increasing water use efficiency, particularly in C3 plants. CO_2-driven changes in productivity are usually accompanied by changes in plant chemical composition (such as increasing ratios of carbon to nitrogen, and altering the concentrations of secondary metabolites such as phenolics and tannins), as well as changes in plant structure and the allocation of biomass to various plant parts. Impacts of increasing CO_2 will vary considerably among different plant functional types and different vegetation types, and will depend on temperature and the availability of water and soil nutrients. As CO_2 is gradually absorbed by oceans and fresh water, the water
	becomes more acidic (lower pH), which increases the solubility of calcium carbonate, the principal component of the skeletal material in aquatic organisms.
Water	Water supply is critical for all organisms, and water – together with temperature – ultimately sets the fundamental distributional limit for all species. In plants, stomatal conductance declines as atmospheric CO_2 increases, resulting in lower transpiration rates. In regions where precipitation declines, increasing CO_2 may therefore mitigate water stress to some extent.
Extreme events	Extreme weather events such as floods, droughts, storms and fire can affect population dynamics, species boundaries, morphology, reproduction, behaviour, community structure and composition, and ecosystem processes. Changes in the frequency, intensity and seasonality of extreme events may have larger impacts on many species and communities than the directional shifts in temperature and changes in rainfall patterns.

[1] Biodiversity and Climate Change Expert Advisory Group (Steffen, W. et al), 2009, *Australia's Biodiversity and Climate Change: A strategic assessment of the vulnerability of Australia's biodiversity to climate change*, Commonwealth of Australia, pp.90-91. Available at http://www.climatechange.gov.au/publications/biodiversity/biodiversity-climatechange.aspx (accessed 30.11.11).

APPENDIX D: Summary of Research undertaken on Bimblebox Nature Refuge (Glen Innes)

Anderson, E.R. (Birds Australia).

Trends in avian diversity at 'Glen Innes' [Bimblebox Nature Refuge], Central Queensland

Fourteen long term bird monitoring sites have been established at 'Glen Innes' [Bimblebox Nature Refuge] in the intact eucalypt woodlands to monitor trends in avian diversity due to climate change and land use. The sites have been located to measure the effects of grazing pressure and fire on the property. The sites are also integrated with the other research activities being implemented by EPA and DPI & F. A significant outcome will be the assessment of the potential for birds as surrogates for monitoring biodiversity and ecological health on a landscape scale.

Fensham, R (Qld Herbarium)

Maintaining the open character of eucalypt woodlands with fire

'An experimental trial has been established at 'Glen Innes' [Bimblebox Nature Refuge], with co-funding from Land and Water Australia and the Queensland EPA. The project seeks to weigh the costs and benefits of using fire in conjunction with pastoralism. The project will look at the effects of fire on the structure of woodlands, their biodiversity, and pastoral production.'

McCosker, J (EPA)

Relationships between biodiversity and land condition PhD thesis

'My work involves the assessment of the biodiversity condition of silver-leaved ironbark across 25 properties in the Desert Uplands. The main focus is avian and plant diversity and how this is related to grazing land management on these various properties. My hope is that the work will yield; a simple biodiversity assessment tool, the biodiversity values, and awareness of positive grazing management strategies that are compatible with the maintenance of biodiversity'.

Queensland DPI & F

1. Developing Long-term Carrying Capacity models for the Desert Uplands

This project has customised the procedure for estimating LCC for the climate and soils of the land types in the Desert Uplands. The work involved fine tuning the procedure by working with 9 commercial properties. We have now moved on to the case study stage, working with graziers on-property to assess the usefulness of the procedure in strategic decision making. Glen Innes is one of these properties. Land types and land condition have been assessed. Discussions are on-going with the owners for the potential for a wet season spelling strategy through rotational grazing to assist in the improvement of land condition.

2. Understanding change in Queensland's grazed woodlands (TRAPS woodland monitoring).

The first project consists of five woodland monitoring sites on Glen Innes [Bimblebox Nature Refuge] designed to provide quantitative information on woody vegetation trends for silver-leaved ironbark and poplar box communities in this region. These five sites are part of a larger network of over 100 monitoring sites covering the grazed woodlands within Queensland. These sites provide information to generate a fundamental understanding of the impact of management (grazing, fire), climate and increasing carbon dioxide concentrations in the atmosphere on woodland vegetation. Long term

monitoring is necessary, as woody species can survive 80 years or more and the outcomes of management strategies are not apparent in the short term.

Outputs from the TRAPS monitoring network have been published in a number of collaborative projects through the CRC for Tropical savannas, CRC for Greenhouse Accounting and Meat and Livestock Australia funding. Recent publications include:

- Hoffmann, MB. (2006)Application of tree and stand allometrics to the determination of biomass and its flux in some north-east Australian woodlands. Masters thesis. University of Central Queensland.
- Burrows, WH, Henry, BK, Back, PV, Hoffmann, MB, Tait, LJ, Anderson, ER, Menke, N, Danaher, T, Carter, JO and McKeon, GM (2002)Growth and carbon stock change in eucalypt woodlands in northeast Australia: ecological and greenhouse sink implications. Global Change Biology. 8: 769-784.
- Bray SG, Liedloff A, Sim AK, Back PV, Cook G, Hoffmann M (2007)Comparison of woody vegetation change datasets from the grazed woodlands of central Queensland In 'Proceedings of the Northern Beef Research Update Conference'. Townsville.
- Fensham RJ, Bray SG, Fairfax RJ (2007)Evaluation of aerial photography for predicting trends in structural attributes of Australian woodland including comparison with ground-based monitoring data. Journal of Environmental Management 83, 392-401.

3. Assessment of vegetation change in the Burdekin Catchment of Queensland

The 2nd project was an analysis of woody vegetation change over centennial and decadal time-scales. Being able to assess vegetation change over longer time scales provides information on whether the currently observed tree thickening is above the long term average tree density at a particular location. The tree thickening may be linked to modern land management (e.g. grazing domestic livestock, fire suppression) and/or increased carbon dioxide concentrations in the atmosphere. The technique used analysed soil carbon isotopes which relates to a change in ratio of tree and grass carbon entering the soil carbon over time. Two sites were analysed at Glen Innes (the sites were also TRAPS sites) with another 46 sites assessed in the Burdekin catchment and a site assessed near Longreach. The results of the project are published in:

- Bray SG, Krull ES, Harms BP, Baxter N, Rutherford M, Yee M, Cogle L (2006)'Assessment of vegetation change in the Burdekin Catchment of Queensland – project report. QI06091.' Department of Primary Industries and Fisheries, Queensland, QI06091.
- Krull E, Bray S, Harms B, Baxter N, Bol R, Farquher G (2007)Development of a stable isotope index to assess decadal-scale vegetation change and aplication to woodlands of the Burdekin catchment, Australia. Global Change Biology 13.
- Dr Rudd, C. Ground-storey Vegetation Monitoring (Grass Check)A series of permanent "GRASS Check" (Grazier Rangeland Assessment for Self-Sustainability) and photo points have been established across the property. Monitoring, undertaken annually, is based on ground-cover and species composition. A broad assessment of land condition is made at each site using calculations of pasture yields, tree and shrub density and growth rates. Data is condensed, correlated and addressed so that the impacts of management practices, trials and climatic events can be independently evaluated. This project is designed to detect the less obvious but more important subtle changes and pasture and under-storey vegetation.

Vanderduys, E et al. (CSIRO)

Flora and fauna diversity in cleared and intact woodlands of the Desert Uplands

CSIRO Sustainable Ecosystems currently have a biodiversity monitoring programme in place on 'Glen Innes' [Bimblebox Nature Refuge] and two neighbouring stations. This programme is part of a much larger project assessing the relationship between the grazing practices and biodiversity. BioTools seeks to answer questions such as: How does grazing affect different species of animals and plants in Queensland's rangelands? How do activities associated with grazing, such as woodland clearing and thinning, burning and waterpoint management affect different species of animals in Queensland's rangelands?

From the information we gather in our surveys we hope to be able to provide a series or recommendations, or 'tools', for graziers who may wish to manage for biodiversity on some shape or form on their land. As part of our biodiversity monitoring programme we have established 10 permanent monitoring sites on 'Glen Innes' [Bimblebox Nature Refuge] in a number of different regional ecosystems. These monitoring sites are located in country with little grazing pressure and no tree clearing.

The important point is that they are located in close proximity to other monitoring sites we have established on neighbouring properties where broad-scale tree-clearing has occurred and/or grazing pressure is significantly higher. This provides a unique opportunity to compare the long-term effects of the management practices in place on these neighbouring properties with those in place on 'Glen Innes'.

Coal exploration activities are likely to affect the results of our ongoing monitoring activities, by creating increased human presence in a relatively isolated area, increasing 'edge effects' on woodland fauna, and resulting in significant amounts of clearing.

APPENDIX E: 1:250 000 Geological Map of Jericho Queensland[2]

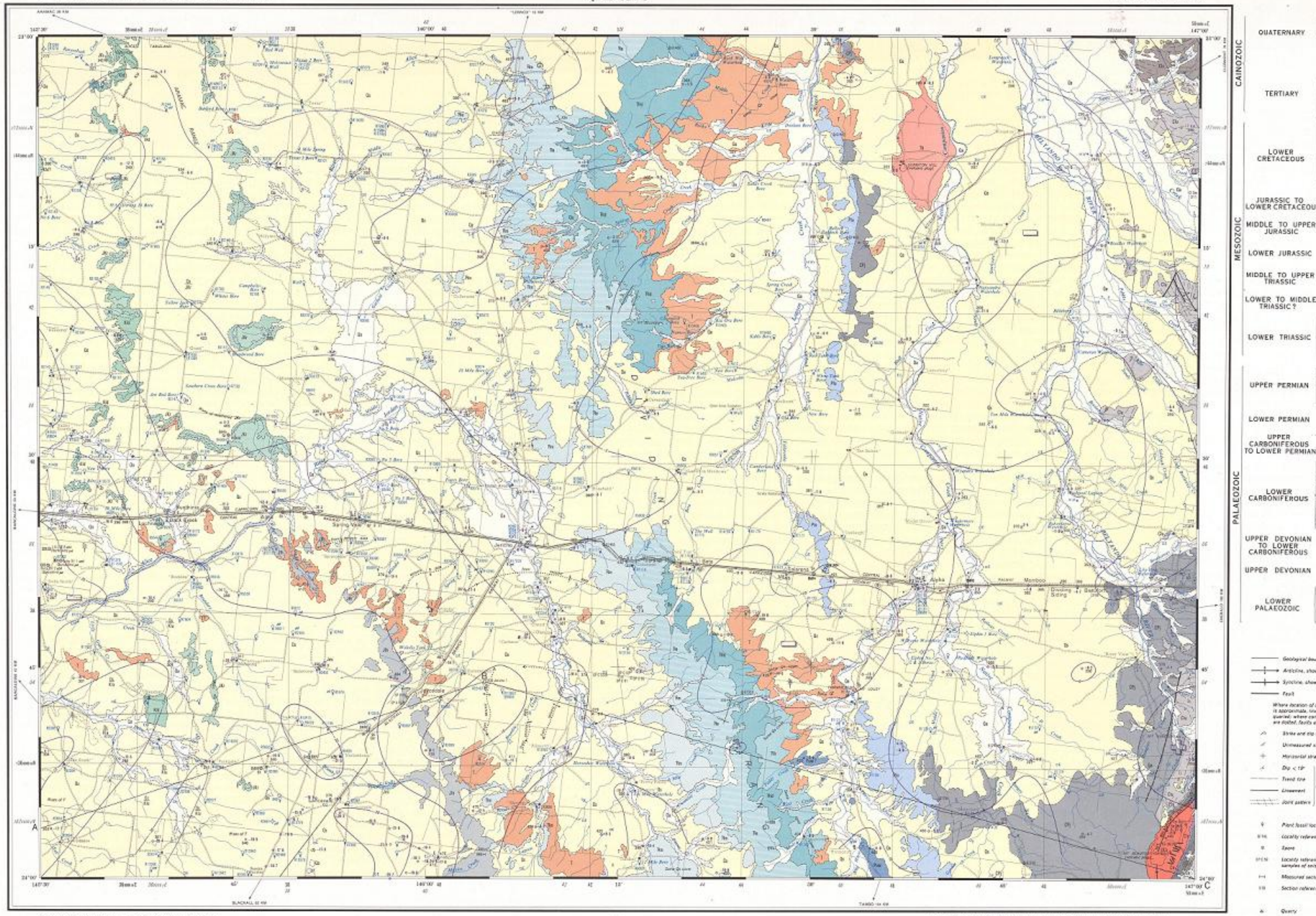
[2] Bureau of Mineral Resources, Geology and Geophysics 1972, 'Jericho Queensland, Sheet SF 55-14', Department of National Development. Available from http://www.geoscience.gov.au/bin/mapserv36?map=/public/http/www/geoportal/250/index.map&mode=browse&layer=map250&queryon=true

AUSTRALIA 1:250,000 GEOLOGICAL SERIES

JERICHO

QUEENSLAND

SHEET SF 55-14



Reference

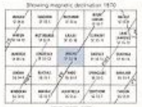
Era	Period	Unit	Symbol	Description
CAINOZOIC	QUATERNARY		Qa	Alluvium, some gravel
			Qs	Sand, gravel, rubble
				Chemically altered (laterized): in part silicified and ferruginized sediments
	TERTIARY		T	Argillaceous sandstone, sandy mudstone, limestone; partly laterized
			Tb	Basalt
MESOZOIC	LOWER CRETACEOUS	Rolling Downs Group: Allaru Mudstone	Klu	Mudstone, siltstone, minor labile sandstone (section only)
		Toolebuc Limestone	Klo	Limestone, calcareous shale (section only)
		Wallumbilla Formation	Klu	Mudstone, siltstone, limestone, calcareous shale (section only)
		Doncaster Member	Kld	Mudstone, glauconitic mudstone and siltstone, limestone
	JURASSIC TO LOWER CRETACEOUS	Ronlow Beds	JKr	Quartz and labile sandstone, mudstone, minor coal
	MIDDLE TO UPPER JURASSIC	Injune Creek Group	Jmi	Labile sandstone, mudstone
	LOWER JURASSIC	Hutton Sandstone	Jlh	Quartz sandstone
	MIDDLE TO UPPER TRIASSIC	Moolayember Formation	Rm	Mudstone, sandstone, siltstone, shale
	LOWER TO MIDDLE TRIASSIC ?	Clematis Sandstone	Rc	Quartz sandstone, minor siltstone and mudstone
	LOWER TRIASSIC	Dunda Beds	Rld	Labile sandstone, siltstone, mudstone
		Rewan Formation	Rlr	Mudstone, siltstone, labile sandstone
PALAEOZOIC	UPPER PERMIAN	Blackwater Group	Puw	Labile siltstone, carbonaceous sandstone, minor limestone and coal
		Peawaddy Formation	Pq	Carbonaceous labile sandstone, siltstone, shale. Section only
	LOWER PERMIAN	Colinlea Sandstone	Pc	Labile and quartz sandstone, minor siltstone and coal
	UPPER CARBONIFEROUS TO LOWER PERMIAN	Joe Joe Formation	CPj	Mudstone, labile sandstone, siltstone, shale
	LOWER CARBONIFEROUS	Drummond Group: Ducabrook Formation	Clu	Interbedded feldspathic sandstone and green and brown mudstone; minor limestone and tuff
		Star of Hope Formation	Cls	Quartz sandstone, minor pebbly sandstone, conglomerate, lithic sandstone, oolitic limestone
		Raymond Formation	Clr	Quartz sandstone, minor siltstone
		Telemon Formation	Clt	Tuff, agglomerate, basalt, conglomerate, algal limestone, feldspathic sandstone, mudstone
	UPPER DEVONIAN TO LOWER CARBONIFEROUS	Silver Hills Volcanics	DCs	Flow-banded and spherulitic rhyolite
	UPPER DEVONIAN	Bushable Formation	DUb	Pink feldspathic sandstone, siltstone, mudstone, varicoloured in part; minor conglomerate (section only)
	LOWER PALAEOZOIC		Pz	Partially welded acid vitric crystal tuff (section only)
		Anakie Metamorphics	Pza	Schist, slate, fine grained sandstone, shale (section only)

Geological boundary
Anticline, showing plunge
Syncline, showing plunge
Fault
Sub-artesian bore or well
Reg. No. (Qld Irrig. Water Supply Comm.)
Earth tank or dam
Locality reference number of bottom-hole samples of seismic shot-holes
Measured section
Section reference number
Quarry
Gravel
Building stone
Drill hole, in stratigraphic hole
Petroleum exploration well—dry, abandoned
Abandoned bore or well
Artesian bore ceased to flow

Published by the Bureau of Mineral Resources, Geology and Geophysics, Department of National Development. Issued under the authority of the Hon. Sir Reginald Swartz, K.B.E., E.D., Minister for National Development. Base map compiled by the Division of National Mapping from aerial photography at 1:48,000 and 1:85,000 scale.

INDEX TO ADJOINING SHEETS

Showing magnetic declination 1970



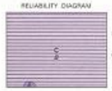
Scale 1:250,000

Section

Cainozoic sediments omitted

Geology and Compilation 1964 by R. P. Vine, W. Jauncey, M. C. Galloway (B.M.R.), D. J. Casey (G.S.Q.)
1966 by F. Olgers, H. F. Doutch (B.M.R.), J. Sfakharnezhad, Geological Survey of Iran
1971 by D. A. Senior (B.M.R.)
Gravimetry 1960 by Geophysical Branch, B.M.R.
1964 by American Overseas Petroleum Ltd
Cartography by Geological Branch, B.M.R.
Drawn by Cartographic Drafting Services, Bendigo, Victoria
Printed by Leigh-Mardon Pty. Limited, Melbourne

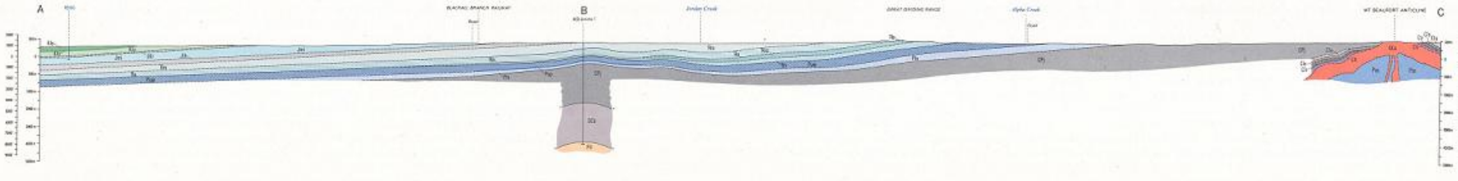
RELIABILITY DIAGRAM



Geology C General reconnaissance: many traverses and air-photo interpretation

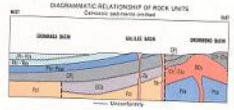
Gravity A Detailed survey

B Reconnaissance



DIAGRAMMATIC RELATIONSHIP OF ROCK UNITS

Cainozoic sediments omitted



FIRST EDITION 1970

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SHEET SF 55-14

APPENDIX F: Review of Economic Impact Assessment (Economists at Large)

Review of Economic Impact Assessment for the China First Project EIS

Prepared by

Economists at Large Pty Ltd

December 2011

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Contents

Introduction

Background

The proposed China First Coal Project is for an open-cut and underground mine on pastoral land and remnant woodland in the Galilee Basin, Central Queensland. The proposal is for a 20-plus-year mine which will produce up to 40megatonnes of thermal coal per year. The proponent is currently seeking project approval and has prepared an environmental impact statement.

The China First Project is one of several mining proposals in this traditionally pastoral area. The Bimblebox Nature Refuge landholders are concerned that the proposed projects will substantially affect the Bimblebox Nature Refuge, as well as impact on water and the community in the local area. Many communities in Australia are facing similar issues and are concerned that the often-touted benefits of the mining boom may be overstated and/or not accruing to local people.

This submission

The Bimblebox Nature Refuge landholders are making a submission on the China First Coal Project Environmental Impact Statement. As part of their submission they have asked Economists at Large to review the Economic Impact Assessment. In this submission:

Part 1:
We have reviewed all the key findings of the Economic Impact Assessment and have found that there are few unambiguous benefits to this project. The impacts of the project, as identified in the assessment, relate to trade-offs between industries and regions, rather than clear benefits.

No part of the economic assessment supports a claim in the EIS executive summary that the project will lead to "an additional 70,000 indirect jobs". This claim seems to be based on a misunderstanding of a finding of the economic impact assessment and should be immediately corrected.

Part 2:
Part of the reason for this ambiguity about the overall costs and benefits of the project relates to the nature of the assessment – it is based on economic impact assessment, not cost-benefit analysis. The entire economics profession, and the Queensland Department of Infrastructure and Planning, is in agreement that cost-benefit analysis is the best tool for decision making and project assessment.

Another issue to bear in mind throughout our report, is that while this assessment reviews the impacts of the project in isolation, many other large coal projects are being proposed in the same region. This is likely to exacerbate negative impacts associated with skilled labour shortages, exchange rate rises and inequitable distribution of benefits.

These problems are symptomatic of a wider planning issue in Australia: the project assessment process has become the project approvals process. The implicit assumption of this difference is that projects are in the public interest or "good for the economy". As we see here, not only are the benefits of the project ambiguous, but the question of is it in the public interest is not addressed.

We believe this issue is at the core of the public perception that mining projects are lacking a "social licence to operate" in farming areas. Conflicts between farming communities and coal and coal seam gas developments are making headlines regularly, with farmers and the broader community

losing confidence that such developments are in the community's best interests. Robust and transparent assessment of this project could help to address this issue.

Review of Key findings of the Economic Impact Assessment

In the executive summary of the Economic Impact Assessment, we are told that "*the China First Project will generate significant positive economic, employment and income impacts at the regional and State levels.*" (p x) This is misleading. The project will have significant economic impacts, some positive and some negative. These positive and negative impacts will not be shared equally. The distributive effects and the net cost or benefit are difficult to gauge from the economic impact assessment. This can be seen in each of the key findings:

> ***Key finding 1.*** *An increase in export revenues of $4.6 billion per annum through the export of 40 Mtpa of high quality thermal coal, representing an increase in Australian thermal coal export revenues of approximately 25.7% and an increase in total Australian exports of 2.0% from 2008/09 levels. The increase in export revenues may provide support for the strength of the Australian dollar.*(px)

An increase in export revenues does not represent an increase in economic welfare. Export revenue is not "free money". When a buyer buys our coal it is not because there is no coal in their country, but because to produce it themselves would require greater inputs of resources to extract it. We too have to put in effort and resources to extract coal, which uses scarce resources that would have been used in other activities. To claim increase in export revenue as the main "positive" economic impact is misleading.

Revenues in excess of costs, profits, do contribute to economic welfare. However what is important is the extent to which these benefits are retained in an economy. This is of great importance to the assessment of a project, as made clear by Eggert (2001) who states that when considering the perspective of local communities "*an analyst must be careful to … eliminate any net benefits that accrue to nonresidents of the community*" (p28). Eggert makes clear that in the case of a national-level assessment: "*a national government would consider profits send abroad as a cost.*" (p27) The ANU's Professor Jeff Bennett agrees, in recent work commissioned by coal company, Aston Resources:

> *Where the shareholders are not citizens, their mine benefits are expatriated and should not be included in the BCA. Careful attention should therefore be given to the register of shareholders and adjustments made to the producer surplus benefit calculation.* (Bennett 2011) (p3)

As mentioned in this key finding, this proposed project, and the many others like it currently before state governments, will strengthen the Australian dollar. This has a deleterious effect on Queensland's other exporting industries, such as tourism, manufacturing and agriculture. Tourism in Queensland has been particularly hard hit by increasing exchange rates, as fewer tourists arrive from overseas and more Australians holiday abroad. Tourism in Australia has shrunk from 3.1% of GDP in 2003-04 to 2.6% in 2009-10 (Richardson & Denniss, 2011).

> ***Key finding 2.*** *An increase in industry output in Queensland of $231.9 million per annum on average during the three year construction period, including an increase in output of $614.5 million per annum on average in the Study Area reflecting a draw of resources from elsewhere in Queensland.*

Industry output is also not an indicator of economic welfare. As stated above, producing output requires inputs, the use of resources that would have been used elsewhere. This is particularly important in this case, as we see that while the study area's output is forecast to rise by $614.5 million, Queensland's output is forecast to increase by only $231.9 million. This expansion takes place at the expense of output elsewhere in Queensland of $382.6 million. A considerable portion of the remainder likely comes at the expense of output elsewhere in Australia. At a national level there may be very little increase in output.

We see on page xiii that this expansion comes at the cost of long-term declines in agriculture and manufacturing industries. The effects of these declines may be greater costs for Queensland communities than are gained by expanding mining output, particularly as mining projects such as China First tend to be serviced by a fly-in-fly-out workforce (see page xviii).

> ***Key finding 3.*** *A $5.2 billion per annum on average boost to industry output in the Queensland economy during the first five years of operation, increasing to an average of $5.7 billion per annum on average thereafter to 2036/37. The majority of this increase in output will be captured by the mine catchment.*

As mentioned above, industry output is not a measure of economic welfare. It is misleading to suggest that any "boost" will be "captured" by the mine catchment. While the output of area may increase, to what extent any benefits accrue to the area is unclear. Benefits will accrue largely to shareholders and mine workers, only some of whom will work in the mine catchment and fewer still will live there. As is made clear in other sections of the assessment, declines in agriculture and small business will occur, making the impact on the economic welfare of the mine catchment difficult to gauge.

> ***Key finding 4.*** *Support and development for local business and industry, through securing local contracts for the supply of goods and services for the project where possible and through other flow-on activities and increased household consumption. Key industries supported by the China First Project include mining, transport and storage, construction and property and business services. A large proportion of goods and services are also anticipated to be sourced from elsewhere in the State, in particular from southeast Queensland.*

Despite being one of the key findings, there is little detail given on how the project will support and develop local business and industry. It is disappointing there is no quantitative assessment of this impact. Later in the report (page 29), only two potential beneficial impacts on local business could be identified, and neither seems convincing:

- *Generating demand for local goods and services.* This seems unlikely given the fly-in-fly-out nature of the workforce. A large proportion of the direct and indirect economic impacts of mining and employment bypass local economies and focus on the larger regional centres.

Such workforces generally get supplies and services from larger metropolitan centres (McHugh, 2009).

- *New rail infrastructure has the potential to assist in easing bottlenecks in the existing rail network....recognised as a common issue by coal companies* [which has a negative] *impact on Queensland's coal export capacity.* While there may be a need for infrastructure improvement in the region is uncertain how this development will assist any industry other than the coal industry. What benefits this development would provide to agriculture or tourism remains unclear, while enhancing export capacity of coal has negative implications to these industries through exchange rate movements and resource crowding out.

Key finding 5.*Increased competition for inputs such as land, labour and capital will result in resources moving to regions and industries that generate the greatest returns. As a result, output from the manufacturing and agricultural industries is estimated to decrease, largely due to increased competition for skilled labour.*

Some of these impacts are quantified in the assessment (page xiii).

Industry	Forecast decline in annual output to 2012-13	Forecast decline in annual output to 2018	Forecast decline in annual output to 2037
Agriculture ($M)	-42.0	-38.0	-15.2
Manufacturing ($M)	-209.3	-1,249.4	-1,050.8

Local residents already understand what this feels like in real terms, as a recent email shows:

Was talking to a local grazier a couple of days ago (15mins out of Springsure) who hasn't been able to get an electrician in to fix his pump from the floods at the beginning of the year. He is now organising to fly in an electrician from Brisbane! Similarly Ergon Energy are losing electricians to the mines at an alarming rate and there is talk that they will have to offer much better conditions and pay in order to retain them. The outcome being higher costs to Ergon and hence to us. (personal communication)

Key finding 6. *An increase in employment in Queensland of 2,975 full time equivalent (FTE) employees per annum on average during the three years construction period, including a draw of labour to the Study Area from elsewhere in Queensland and Australia. During the first five years of operation the China First Project is estimated to support an additional 4,464 FTE employment positions per annum on average in Queensland, and approximately 3,954 FTE employment positions per annum on average thereafter.*

Key finding 8.*A decrease in unemployment and the unemployment rate as a result of jobs created by the China First Project, in particular in the project's Study Area.*

As with the earlier discussion of output, Key Finding 6, finding a net increase in employment, disguises the considerable inter-industry trade offs, with job losses in some sectors – again mainly manufacturing and agriculture – and increases in mining-related sectors. Gains in later years seem dependent on increased employment in the public service as a result of increased royalty revenue. The relationship between royalty revenue and public service employment seems unclear and further examination should be made of this assumption than is provided on page 33. Also note that many of these jobs will be provided at the expense of jobs elsewhere in Australia.

Key Finding 8 does not necessarily follow from Key Finding 6. Job increases in the mining sector are likely to be for skilled positions in an already tight end of the labour market. The assumption on page 42 that 50% of jobs will go to people currently unemployed seems arbitrary, with no justification or source in economic literature. It is misleading to suggest that this project will materially affect Queensland's unemployment rate given the lack of substitutability of labour resources.

Note that Key Finding 6 seems to have been misinterpreted in the EIS executive summary, where it is claimed that:

> *A flow through benefit of an additional 70,000 indirect jobs is anticipated, with the majority of these expected to occur in Queensland.* (EIS Executive Summary p17 and repeated verbatim on p72)

The Economic Impact Assessment by AEC Group provides no backing to this claim. It does not mention "indirect jobs" at all. This claim may have been derived from a misinterpretation of table ES.7, where the project is estimated to increase overall employment by 3,954 relative to a no-project scenario for the years 2018/19 to 2036/37. If taken to mean that the mine increases employment cumulatively by 3,954 jobs every year for 18 years, this comes to 71,172 jobs. This is wrong. Table ES.7 is clearly labelled as "Deviation from the Baseline" not "number of unique jobs created per year". The author of the EIS executive summary has misunderstood the economic impact assessment. This error should be corrected immediately as it grossly overstates the employment impacts of the proposal.

> ***Key Finding 7.****Capacity building and skills development in the local labour force through apprenticeships, traineeships and skills training, as well as ongoing skills transfer between imported and local labour and the permanent migration of some skilled labour.*

These benefits could occur if sufficient coercion is applied by governments to the project proponents and other participants in the industry. However there is nothing in the modelling here to suggest that this will be the case, given the acknowledgement that most workers will be fly-in-fly-out. Expanding training and apprenticeships may also place strain on training and education systems that may not exist currently. While this point should be made in the "mitigation/enhancement strategies" urged, it is misleading to place it in the key findings. No quantification of these benefits exists and they will be contingent on good management of the project and wider industry.

> ***Key finding 9.****An increase in household incomes.*

Key finding 10.*Upward pressure on labour prices due to the increase in demand for skilled labour, particularly in industries experiencing skills shortages, further increasing household incomes. This increase is expected to be over and above any increases in the costs of living, representing an increase in real wages.*

Increases in household incomes will also not be distributed equally. This increase will be primarily felt by mine employees and those in related industries, while people in other industries may experience a decline. The assessment acknowledges that the mining boom has led to a "wealth divide between mining families and other residents (page xxii)" and provide no suggestion that this project will change this.

There is little examination of costs of living in the assessment, other than declining housing affordability. There is no discussion of food, fuel, clothing or other consumer prices in comparison to wage rates and this finding seems to be based on assumption rather than analysis.

Key finding 11.*An increase in*

- *Queensland Government revenues of approximately $364.9 million, primarily in the form of approximately $343 million per annum in royalty payments; and*
- *Australian Government revenues of approximately $709.8 million, primarily through avenues such as company tax (approximately $302.9 million), personal income tax (approximately $237.8 million) and goods and services tax (approximately $158.3 million).*

As with discussion of other revenues and outputs earlier, revenues to governments here are not a measure of benefit. This finding overlooks the fact that substantial subsidies are paid by governments to mining companies. While it is beyond the scope of this review to identify these in the case of the China First Project, common subsidies and tax breaks include:

- Direct subsidies
- tax holidays or concessional treatment with respect to payroll tax, rates and other taxes and levies
- in-kind assistance through the provision of cheap or free water and power
- Tax deductibility of research and exploration expenses
- Fuel rebates

(see (Richardson & Denniss, 2011)

Key finding 12.*Development of rail and port infrastructure, as well as local road infrastructure, an airstrip and utilities infrastructure to support the project. This will provide benefits to the entire study area by providing a link between the abundant resources in the*

Galilee Basin and export infrastructure, assisting in commercialising these resources. This infrastructure will also improve regional business capacity and competitiveness, and will provide positive legacy benefits for the region.

This finding raises three points already mentioned:

- It is difficult to identify how this infrastructure will be of benefit to the community and other industries. Developing infrastructure primarily for use by the coal industry may not provide infrastructure options with the widest economic benefit. This and other mining projects place major strain on existing road and rail infrastructure to the detriment of other users.
- Much of this infrastructure development may be subsidised by tax and ratepayers. The lack of quantification here suggests these benefits are again assumed rather than stemming from deeper analysis.
- As mentioned several times, maximising exports is not the same as maximising economic welfare. Decision makers should not be mislead by this confusion of "benefits" and "exports".

Lack of Cost-Benefit Analysis

The economic assessment of the China First project is based on computable general equilibrium analysis, with no cost-benefit analysis. To assess if the project is in the interests of the state and local communities, the assessment must be revised to include cost benefit analysis. While cost-benefit analysis is not explicitly required of the assessment, section 5.2 of the Terms of Reference for the project require the environmental impact statement (EIS) to:

> *provide a comparative analysis of how the project conforms to the objectives for 'sustainable development'–see the National Strategy for Ecologically Sustainable Development (1992)…This analysis should consider the cumulative impacts (both beneficial and adverse) of the project from a life-of-project perspective, taking into consideration the scale, intensity, duration and frequency of the impacts to demonstrate a balance between environmental integrity, social development and economic development.*

In other words the EIS should assess all the positives and negatives of the whole project in a way that shows whether the project will provide a net benefit to the state.

However, the Economic Assessment provides no analysis that can assist with this decision as it is based on impact assessment not cost-benefit analysis. This is clearly against the recommendations of the Department of Infrastructure and Planning's Project Assurance Framework, which states:

> *The primary method of economic evaluation of public sector policies and projects is cost- benefit analysis.* (Qld DIP 2011,p18)

The evaluation of mining projects with private sector involvement is no different, as is made clear by Eggert (2001):

> *Summing up, a benefit-cost framework for assessing the effects of a mining project is useful, even essential, for evaluating the impact of a mining project on the economic development of a local community or region. Such a framework focuses our attention on a number of critical issues: What is the overall effect of a project? What are the costs, and are the parties bearing the costs being compensated? What are the net benefits and how are they distributed?*

Virtually the entire economics profession agrees that cost-benefit analysis is essential for project assessment, see for example (Abelson, 2011; Dobes & Bennett, 2009; Ergas, 2009) and many others. In other states, cost-benefit analysis would be required for such a project; the NSW Department of Planning's Environmental Assessment Requirements require:

> *A detailed assessment of the costs and benefits of the Project as a whole, and whether it would result in a net benefit for the NSW community*(DoP NSW, quoted in the economic assessment of the Maules Creek Coal Project, (Gillespie Economics 2011, p4).

It is important to understand the difference between cost benefit and economic impact analysis. As the Queensland Department of Infrastructure and Planning explains:

> [Cost-benefit analysis should] *comprehensively identify and estimate as many costs and benefits of a project as can reasonably be measured, including those which can be thought of as social and environmental,* [in order]*to rank project options according to their net economic benefit.*(p18)

Whereas economic impact assessment:

> *typically measures the impact of a project on the volume of economic activity in a region (e.g. on gross domestic product or employment),*(Qld DIP 2011*,* p23)

The NSW Treasury confirms these interpretations:

> *Model based economic impact assessment is not a substitute for a thorough economic analysis of a policy. The appropriate method for analysing policy alternatives is benefit cost analysis (BCA).* (NSW Treasury 2009, p4)

To understand if the China First project is in the interests of the Queensland and local communities it is essential that economic analysis be based on thorough cost-benefit analysis, including consideration of social and environmental, in accordance with the Department of Infrastructure and Planning guidelines before further consideration is given to this project.

Conclusion

The China First Coal project will have impacts on the local and Queensland economies. Some of these impacts will be beneficial, while others will reduce the economic welfare of stakeholders. As the Economic Impact Assessment is focused on measures of impact, such as industry output, export revenues, labour demand, it does not provide an understanding of if the project's benefits outweigh its costs, nor of how any costs and benefits are distributed. What is certain is that participants in the mining industry – investors, employees – will benefit, while non-mining stakeholders, including the agricultural and manufacturing industries will face higher costs and difficulties related to a strong exchange rate. These factors will be exacerbated if similar large projects proposed for the region are approved.

What is needed is cost-benefit analysis, which would allow for a decision to be made in the Queensland public interest. This is the approach preferred by economists and the Queensland Department of Infrastructure and Planning.

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