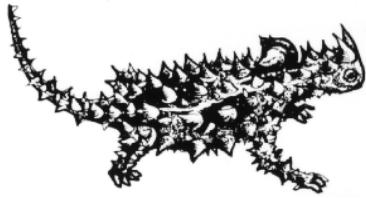


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Declaration of reserved blocks under the Petroleum Act: Arid Lands Environment Centre Submission

The Arid Lands Environment Centre (ALEC) is central Australia's peak environmental organisation that has been advocating for the protection of nature and ecologically sustainable development of the arid lands since 1980. ALEC is actively working to protect the Northern Territory from the acknowledged risks of fracking and considers that there is no acceptable risk to our groundwater, ecosystems and climate. While we will continue to advocate for the entirety of the NT to be a reserved block from unconventional petroleum development, the following submission is made to outline critical areas of high ecological, cultural and water values that need guaranteed protection from petroleum development.

Reserved blocks

Unconventional petroleum development poses a multitude of risks to water and ecosystems through possible contamination, significant volumes required during fracturing, the spread of weeds and habitat disruption through industrialisation of the landscape. Areas of high ecological value and water sites are invaluable to the healthy ecological functioning of the arid zone. Unconventional petroleum is a direct threat to the health of these vulnerable systems and should be reserved from any potential development.

Recommendation 10.2 from the Fracking Inquiry mandates that appropriate setback distances should be developed in consultation with the local community¹. The following comments address this recommendation and determine appropriate setback distances that will protect the strategic water assets of Water Control Districts (WCD), including the Alice Springs Water Control District (ASWCD).

In addition to the WCD this submission outlines a range of factors that should inform the extent of the areas declared as reserved blocks under the *Petroleum Act* throughout the entire NT.

Firstly, the Alice Springs Water Control District should be reserved from unconventional petroleum activities

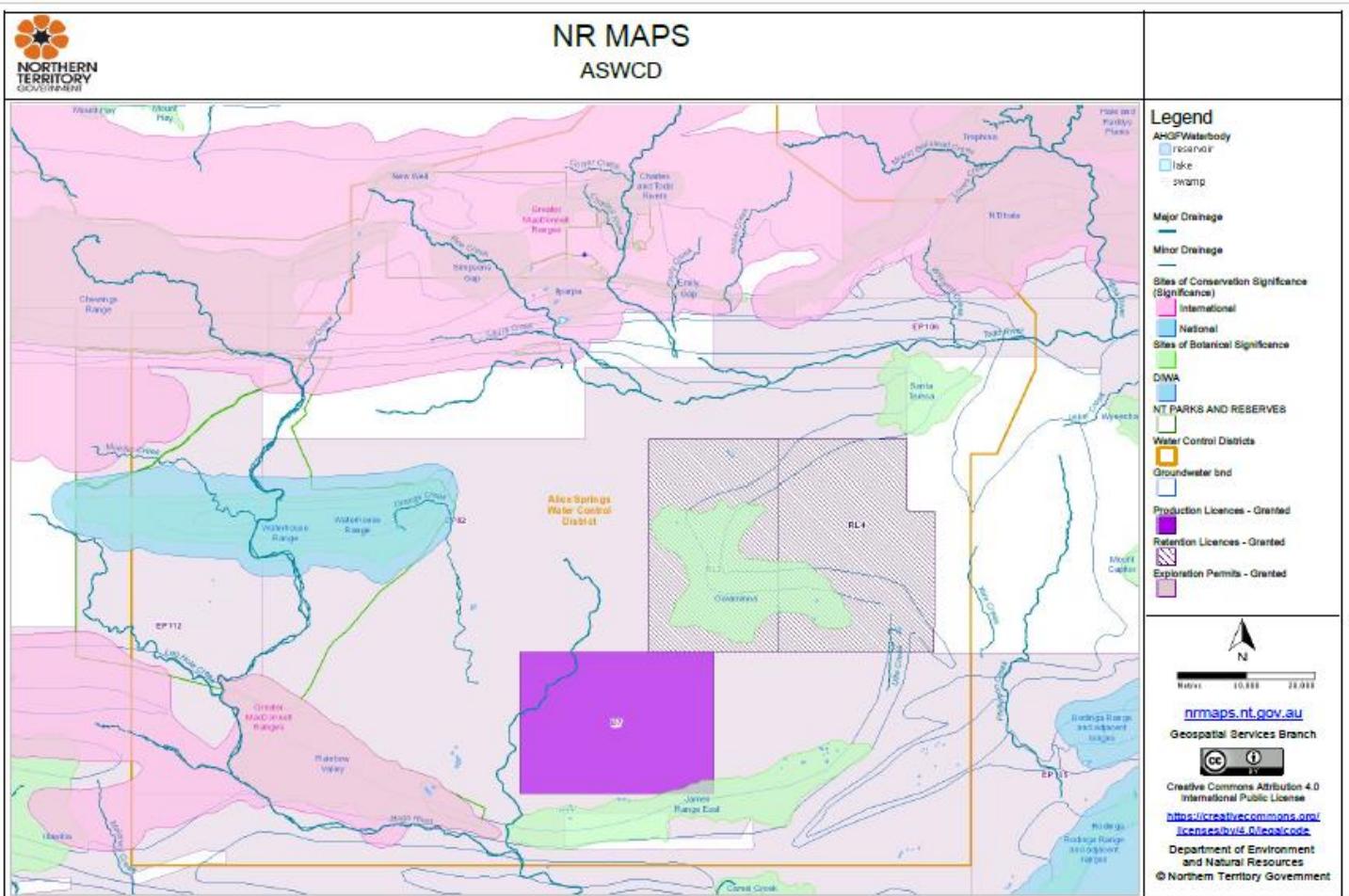
1. The current extent of reserved blocks in the consultation paper does not adequately protect the water resources of the ASWCD.
2. The reserved blocks need to include the entire ASWCD as a precautionary approach to guarantee the ongoing health of the resource for all users, including future generations.
3. Unconventional petroleum development is an economic risk to Alice Springs by dissuading people from moving to the region.

¹Scientific Inquiry into Hydraulic Fracturing, Summary Report, April 2018 <https://frackinginquiry.nt.gov.au/inquiry-reports?a=494327>

Unconventional petroleum presents a risk of serious and irreversible environmental harm. These comments are informed by the precautionary principle which must be operationalised in this instance because of the limitations and uncertainty in hydrogeology, biodiversity monitoring and the location of significant water sites.

There is no safe level of unconventional petroleum development that can occur in the ASWCD. This position is consistent with broad community opposition to the industry in the region. While we acknowledge the long-term existence of conventional petroleum in the region, hydraulic fracturing poses an unacceptable level of risk to water. The development of such a risky industry in the drinking water catchment for Alice Springs threatens the future social and economic viability of the region. The threat or perceived threat to drinking water will discourage people from settling long term.

The map below outlines the area that needs to be declared reserved blocks in order to protect the water sites and ecological values of the ASWCD.



Map produced from Natural Resource Maps Northern Territory showing aquifer boundaries, sites of botanical significance, major drainage lines and the boundary of the Water Control District

The following areas should be declared as reserved blocks to guarantee the protection of water resources and sites with high ecological and conservation values.

- 1. Major drainage lines, recharge zones and appropriate buffers should be designated as reserved blocks.**

The current extent of the reserved blocks does not integrate current scientific understanding about local hydrogeological conditions. The body of research into the aquifers and sedimentary basin in the ASWCD demonstrates a general west to east flow of groundwater. Reserved blocks should incorporate groundwater flow modelling, catchment basins and major drainage lines. Connectivity between aquifer layers is observed across this district and other WCDs that includes interactions resulting from recharge events and higher zones of permeability.

These dynamics must be included in the mapping of reserved blocks to provide the same level of protection afforded to the bore-field sites of WCDs. Protecting bore-fields will therefore also require safeguarding the drainage lines and recharge zones. Major drainage lines, aquifer boundaries and recharge zones should be designated as reserved blocks to protect the health of the water resources in the NT. In the absence of certainty that these systems are not at risk from groundwater drawdown or contamination from petroleum activities these zones should be reserved in their entirety.

It is patently inadequate for the proposed reserved areas to be designated over water bodies without accounting for the connected drainage lines and catchment basins. A reserved block over Lake Woods is ineffective if the creek draining into the lake is contaminated.

The following areas should be declared as reserved blocks:

- Major drainage lines, and second order streams.
- Potential aquifer recharge zones and aquifer boundaries.
- Sinkholes and areas with significant recorded aquifer permeability.

2. Wetlands, waterholes and other significant water sites should be designated reserved blocks to protect their significant ecological and cultural values

Wetlands and surface water sources are incredibly valuable in the arid zone and need to be protected from groundwater drawdown and potential contamination. Springs and waterholes provide critical drought refuges for unique arid zone freshwater biodiversity, including fish and invertebrates. They are also sites of significant social and cultural value.

The understanding of groundwater ecosystems and invertebrates (stygo fauna) is very limited in the NT but there is ample evidence of these ecosystems in various WCDs including ASWAC and Ti Tree. This uncertainty around their extent and prevalence should operationalise the precautionary principle to prevent any development that would risk their health until scientific understanding demonstrates otherwise. This should include a minimum 2km buffer zone.

There are over 20 known sites in the ASWCD that perform critical ecological functions, including as refugia in times of extreme drought and temperatures.² Climate change is going to place increasing stress on arid ecosystems, so it is vital that these water places are protected in order to improve ecological resilience and adaptive capacity to climate change.³

Freshwater refugia are already experiencing disproportionate levels of decline in comparison to other ecological areas in Australia. This is due to a multitude of interacting risks, all of which unconventional petroleum development would exacerbate. The ongoing ecological integrity of the NT rests in part on maintaining and restoring the health of these systems.

² Angus Duguid, "Wetlands of the Alice Springs Water Control District" (2015) Department of Land Resource Management, Technical Report No. 04/2015A

³Thomas P. Albright *et al*, "Mapping evaporative water loss in desert passerines reveals an expanding threat of lethal dehydration" (2017) PNAS vol. 114 no.9:22832288

This is especially important as the climate continues to change and species becoming increasingly stressed. Freshwater refugia will provide places of survival for threatened species and will become a key strategy for natural adaptation under climate change.⁴

Current knowledge on the extent and diversity of important water sites in the NT is limited. They are not comprehensively recorded and mapped and are vulnerable to the risks of petroleum development. There are several types of water sites that have not been acknowledged in the No Go consultation that should be declared as reserved blocks with the appropriate buffer to protect their critical value for arid zone ecosystems. These include; soaks, relict streams, outcrop springs, riverine water holes, stream pools and rock holes. These sites are potentially linked in vast interconnected groundwater systems, the interconnections of which need to be incorporated into reserved blocks in the way that other river systems have been.

The understanding of this interconnectivity and the ratio of rainwater compared to groundwater fed systems is still developing. This provides further weight to the need to operationalise the precautionary principle. Water sites in the WCD must be afforded the highest level of protection in recognition of the refugia these water sites provide for wildlife and therefore resilience in the face of climate change.

The following sites and zones need to be declared as reserved blocks across all WCDs and throughout the NT:

- All freshwater refugia including water holes, soaks, springs, swamps and relict streams.

3. Unconventional petroleum development is acknowledged as a threat to the Lake Eyre Basin and Great Artesian Basin

The Lake Eyre Basin Intergovernmental Agreement explicitly acknowledges unconventional petroleum development as a risk to the values of the system. This system is one of the largest, largely unregulated inland draining systems in the world and therefore requires protection to safeguard immense, biological, cultural and economic value. Community feedback on the second state of the Basin Report confirms that petroleum development is a key threat to the Basin.⁵

The eastern zone of the Simpson desert should be included as a reserved block in recognition of the region's unique environmental values. Permitting unconventional petroleum development in this region poses not only a risk to the values of the basin but also threatens the goodwill between states and our ongoing cooperation in the Lake Eyre Intergovernmental Agreement to safeguard the health of the basin.

Petroleum development is also acknowledged to pose potential threats to the groundwater resources of the GAB. Any risks to this resource are matters of national environmental significance. As a precautionary approach the entire area overlaying the GAB in the NT should be declared a reserved block. This would be consistent with our intergovernmental obligation to properly manage and protect the groundwater resources of the GAB.⁶

⁴ Jenny Davis, Alexandra Pavlova, Ross Thompson and Paul Sunnucks. "Evolutionary refugia and ecological refuges: key concepts for conserving Australian arid zones freshwater biodiversity under climate change" (2013) *Global Change Biology* 19, 1970-1984.

⁵Second review of the Lake Eyre Basin Intergovernmental Agreement (2018) at page 21 <<http://www.lakeeyrebasin.gov.au/SiteCollectionDocuments/second-review-lake-eyre-basin-agreement.pdf>>

⁶ Great Artesian Basin Strategic Management Plan <<http://www.gabcc.gov.au/sitecollectionimages/resources/17686c7e-ebe2-4701-b41d-1397b6c85972/files/strategic-mgt-plan-2000.pdf>>

The area therefore needs to be a reserved block as a precautionary approach because of the high level of uncertainty regarding groundwater impacts, significance of those impacts and the long time lag in which those impacts emerge.⁷

The following areas need to be declared reserved blocks:

- Significant drainage lines within the LEB.
- Areas overlaying the GAB.
- The entire eastern zone of the Simpson desert.

4. Sites of botanical significance and threatened species

The Northern Territory includes an abundance of ecosystems with outstanding ecological value, both nationally and internationally. These ecosystems are integral to the health of the NT and valued by those who live and work here. Any threat to these systems is not only a threat to already vulnerable biodiversity but an economic threat as it undermines the attraction and image of the NT in being home to healthy and intact ecosystems.

Sites of botanical significant, both internationally and nationally should be reserved blocks, including a 2km buffer to guarantee their ongoing protection. Sites of threatened fauna and flora species listed in under the *Territory Parks and Wildlife Conservation Act (NT)* and the *Environment Protection Biodiversity Conservation Act (Cth)* should be reserved areas. The buffer zones for those regions should extend beyond 2km to include drainage basins and upstream areas to protect them from groundwater drawdown and possible contamination.

The NT is developing monitoring programs to map the extent and prevalence of groundwater dependent ecosystems (GDEs). These GDEs are acknowledged to exist throughout the WCDs in the NT and should be declared as reserved blocks as they are highly vulnerable to groundwater drawdown. These areas provide critical habitat and high biodiversity values. GDEs are also protected from excessive groundwater drawdown under the *Water Act NT* and the NT Water Allocation Planning Framework. Declaring reserved blocks around areas of high concentration GDEs is a proactive and precautionary strategy to guarantee their protection from petroleum development.

The following areas need to be declared reserved blocks:

- Areas of national and international botanical significance.
- Areas with high concentrations of GDEs.
- Aquifers with recorded stygofauna populations.
- Habitat and upstream drainage lines of listed threatened species.

5. All homelands, outstations and other premises protected with a 2km buffer

The development of reserved blocks should be informed by a comprehensive search for premises across the NT, including homelands, living areas and outstations. Each recorded place of habitation needs to be a reserved block including a 2 km buffer as recommended by the Fracking Inquiry.

⁷ Future Directions for the Management of the Great Artesian Basin: A Review of the Strategic Management Plan at page 32, < <http://www.gabcc.gov.au/sitecollectionimages/resources/dfd46067-0d59-4056-a51d-29f641bfcc4e/files/gab-future-directions.pdf>>

6. Implement recommendation 14.5 to protect the WCD

Recommendation 14.5 of the Fracking Inquiry provides: “that the Government immediately considers and implements mechanisms to retrospectively apply Recommendation 14.4 to granted exploration permits”. It is our view that the exploration permits within the WCD should be subject to this recommendation as they have been granted over areas of high ecological value (botanical and conservation) and encapsulate recharge zones and other important water sites. Exploration permits within the WCD need to be revoked in order to give effect to the above recommendations and guarantee the ongoing health of these important aquifers systems.

Unless there is certainty of exploration permits being revoked, recommendation 14.4 will be unenforceable and exploration approvals cannot be approved. As a matter of urgency, the government should provide an update on recommendation 14.5 to provide certainty that reserved areas will not be subject to future unconventional petroleum development.

Conclusion

Hydraulic fracturing is acknowledged to pose serious risks to water, ecosystems and the climate. Groundwater supply and quality is critical to the future economic viability and environmental health of the NT. It is imperative that the entire ASWCD is declared as a reserved block (excluding existing conventional petroleum production licences) to safeguard the economic, environmental, cultural and social values of the region.

In addition to the ASWC, reserved blocks should be declared around the following sites and locations including an appropriate 2km buffer throughout the NT:

1. Sites of national and international botanical significance, including upstream areas and catchment basins.
2. Northern Territory and Nationally listed threatened species habitat.
3. Significant water sites including soaks, relic streams, outcrop springs, riverine waterholes, rock holes and recharge zones.
4. Areas with high concentrations of Groundwater Dependent Ecosystems.
5. Area overlaying the Great Artesian Basin and significant drainage lines for the Lake Eyre Basin.
6. All premises including homelands, outstations, living spaces and pastoral properties with the appropriate 2km buffer.