Inquiry into the impacts associated with hydraulic fracture simulation (fracking) in Western Australia: Psychological and community impacts.

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Introduction

What is often overlooked in inquiries of this kind is evidence pertaining to the impacts of such operations on people's health and wellbeing and on the integrity of the communities in which they live. Public health and community wellbeing are complex areas for which responsibility ultimately rests with both government and civil society. In this context, local residents, local governments and expert bodies have raised concerns about the likely adverse impact of fracking on people's health and general wellbeing. Among the concerns are the destruction of precious landscapes as a result of industrial infrastructure, grids and roads crisscrossing the landscape, increased traffic, dust and light pollution and destruction of wilderness characteristics in pristine landscapes and loss of access to biodiverse bushlands and wetlands. These are all changes which are known to adversely affect human health and wellbeing and which should be carefully assessed before any project is approved.

The evidence

The rapid growth of unconventional gas development (UGD or fracking), and proposals to undertake such projects, have provoked widespread community concern and debate about the costs and benefits of such developments. While there is a growing literature on the environmental[1] and economic[2] impacts of such gas fields, research into the social and psychological impacts is still relatively sparse. [3]

Obviously it is inherently difficult to assess the impact of unconventional gas exploitation (and similar resource exploitation) on human wellbeing, especially via changes to culture and community, since multiple influences are in play and effects are likely to take place over long time frames. Where fracking has taken place (in the United States and in Eastern Australia, for example), baseline data, as far as I can discern, have never been routinely collected for the purpose of evaluating later impacts, although there have been recommendations in other jurisdictions that this should occur[4]. In contrast, data on geology, water quality and biodiversity, for example, are routinely assembled ahead of any major resource project.

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[1] Navi, M., Skelly, C., Taulis, M., Nasiri, S., 2015. Coal seam gas water: potential hazards and exposure pathways in Queensland. Int. J. Environ. Health Res. 25 (2), 162–183.;

[2] De Silva, P.N.K., Simons, S.J.R., Stevens, P., 2016. Economic impact analysis of natural gas development and the policy implications. Energy Policy 88, 639–651; Fleming, D.A., Measham, T.G., 2015. Local economic impacts of an unconventional energy boom: the coal seam gas industry in Australia. Aust. J. Agric. Resour. Econ. 59 (1), 78–94.

[3] Jacquet, J.B., 2012. Landowner attitudes toward natural gas and wind farm development in northern Pennsylvania. Energy Policy 50, 677–688.; Jacquet, J.B., Stedman, R.C., 2014. The risk of social–psychological disruption as an impact of energy development and environmental change. J. Environ. Plan. Manag. 57 (9), 1285–1304; Jacquet, J.B., 2014. Review of risks to communities from shale energy development. Environ. Sci. Technol. 48, 8321–8333.

[4] E.g. Maryland, Canada

Most of the evidence on social and cultural impacts is necessarily weakened by the absence of such baseline information, although crude census-type data can be used for the purposes of comparison e.g. on the composition of the population in affected areas. Studies attempting a more precise evaluation of the effects of fracking on people's lives either collect reports from affected communities about the perceived impact of fracking (using interviews and questionnaires) or compare similar communities with and without the experience of fracking. Data derived from the impacts of other, similar resource projects, such as open-cut mining, and natural disasters which transform landscapes and communities, are also relevant.

Despite these problems, there is a growing research literature on these impacts. It is clear that where unconventional gas developments have been undertaken, the mental health and well-being of people in adjacent communities is compromised[5]. Past research has focused mainly on the effects on individuals and social resources such as social capital and social networks[6] , which are likely to result from one of the four areas of risk identified by Jacquet in his 2014 review of risks to communities from shale energy development: rapid industrialisation; uneven distribution of costs and benefits; community conflict and social-psychological stress and disruption, including from place disturbance.

Some of the changes to the physical and social environments that accompany fracking are known from studies in this and other domains of inquiry to produce adverse health and social impacts; for example increases in dust, noise, traffic and light pollution, increased industrial and transport accidents and changing community composition and the associated social problems of "boomtowns". Studies in Colorado and Canada have shown increases in crime, substance abuse and sexually transmitted diseases associated with periods of increased natural gas activity[7]. It can reasonably be inferred that fracking is likely to produce similar impacts both directly and via pycho-social stress in exposed communities.[8]

In fact, stress related health effects have regularly been documented following the introduction of fracking.[9]A three year follow up of the self-reported health effects and stressors occasioned by development of unconventional gas in the Marcellus shale region[10] indicated that stress was the most frequently reported symptom among 59 unique health impacts and 13 stressors. The reported health impacts increased over the study period. Another recent study of residents in a Pennsylvania shale regions found that 22% of the patients visiting a general practice in the area were concerned that the fracking operations

[5] Jacquet and Stedman, 2014, Op cit.
[6] Sattler, D.N., de Alvarado, A.M.G., de Castro, N.B., Male, R.V., Zetino, A.M., Vega, R., 2006. El Salvador earthquakes: relationships among acute stress disorder symptoms, depression, traumatic event exposure, and resource loss. J. Trauma. Stress 19 (6), 879–893.
[7] Witter, R. Z.; McKenzie, L. M.; Towle, M.; Stinson, K.; Scott, K.; Newman, L.; Adgate, J. L. Health Impact Assessment for Battlement Mesa, Garfield County Colorado; Colorado School of Public Health, 2011. http://www.garfield-county.com/public-health/documents/ 1%20%20%20Complete%20HIA%20without%20Appendix%20D.pdfJaquet
[8] Adgate, L., Goldstein, B., McKenzie, L., 2014. Potential public health hazards, exposures and health effects from unconventional natural gas development. Environ. Sci. Technol. 48 (15), 8307–8320.
[9] Perry, L. Simona, 2012. Development, land use, and collective trauma: the Marcellus shale gas boom in rural Pennsylvania culture, agriculture. Food Environ. 34 (1), 81–92.; Perry, S.L., 2013. Using ethnography to monitor the community health implications of onshore unconventional oil and gas developments: examples from Pennsylvania's Marcellus Shale. New solutions. J. Environ. Occup. Health policy 23 (1), 33–53.
[10] Ferrar, J. Kyle, et al., 2013. Assessment and longitudinal analysis of health impacts and stressors perceived to result from unconventional shale gas development in the Marcellus shale region. Int. J. Occup. Environ. Health 19 (2), 104–112.

were affecting their health and that one or more of their current symptoms could be attributed to fracking in their area.[11] Such anxiety was also evident in results from an investigation into five key quality of life indices recorded from two communities in Ohio, where intensive UGD was taking place.[12] Psychological stress was frequently reported, with residents who lived near the UG activities indicating that they were anxious about the possible risks from the operations, as well as being frustrated with the behaviour of oil and gas industry officials, and finding noise and light pollution disruptive and unpleasant.

Responses of this kind have been described by Morgan and his colleagues as resulting from coal seam gas extraction on farm lands in Queensland and New South Wales[13]. Noting that suicide rates among farmers are generally higher than the national rates for employed adults, they examined the impact of stressors from coal seam gas exploitation in the context of the already elevated risks associated with farming, such as debt, weather related factors and time pressures. They noted that the particular concerns farmers had about coal seam gas related to aquifer integrity, sustainability, pollution property access, on-farm privacy, public road traffic and social dislocation. Their study investigated the extent to which these concerns and experiences contributed to farmers' overall stress burdens. Among the 376 farmers they tested, they found that on-farm concerns (farm operations, profitability, and personal privacy) and off-farm concerns (human health, community and the environment) each contributed unique variance to farmers' depression and stress reactivity, after controlling for traditional agricultural stressors.

Degradation of place and local culture

Less attention has been paid by decision making authorities to how the destruction of cherished and familiar landscapes and valued cultural practices, which often accompany major resource development, affect human wellbeing. Despite this lack of attention by governments, there is now systematic evidence that destruction of the natural environments and heritage places which people value generates serious human impacts, including social and health problems.

The systematic investigation of the strong relationships people have with their environments, often understood by reference to the construct "place attachment", indicates that place attachment predicts well-being and that disruption to these attachments is generally harmful. The research literature underlines the importance of a sense of place and feelings of attachment to a place or neighbourhood in shaping our identity, our sense of belonging and our mental health. [14] Conversely, it shows that rootlessness and alienation result when cherished places, spaces, and settings are destroyed

[11]Saberi, P. Navigating Medical Issues in Shale Territory. New Solutions 2013, 23 (1), 209−221, ttp://dx.doi.org/10.2190/NS.23.1.

[12] Michael P. Fisher, Alex Mayer , Kaitlin Volleta, Elaine L. Hill , Erin N. Haynes (2018) Psychosocial implications of unconventional natural gas development: Quality of life in Ohio's Guernsey and Noble Counties Journal of Environmental Psychology 55 90-98.

[13] Morgan, M., Hine, D., Bhullar, D. Dunstan, D & Bartik, W. (2016) Fracked: Coal seam gas extraction and farmers' mental health. Journal of Environmental Psychology, 47, 22-32,

[14] Rollero. C. & De Piccoli, N (2010) Does place attachment affect social well-being? Revue europenne de psychologie applique, 60, 233-238.

or irrevocably changed; most people experience a sense of loss and grief.[15] Social-psychological research has found that disruption or destruction of valued cultural attributes, including place, is likely to result in both acute and chronic stress, adverse psychological outcomes and trauma.[16] It is clear that our health and well-being depend in large measure on our relationship with our environment, broadly conceived - the relationships we have with the people around us and the natural and built environment we inhabit; if this cultural environment is destroyed or degraded or if people are prevented from enjoying it, their health and well-being deteriorate. [17]

Ethnographic studies by Perry and her colleagues [18] of people living near the rapidly developing Marcellus Shale gas fields in Pennsylvania illustrate the trauma which can be associated with transformation of a rural into an industrial landscape. The study team tracked reactions to the corporate behaviour of the gas companies, changes to the local quality of life, to roadways and genealogical landscapes, to soil and drinking water quality and also assessed the psychosocial impacts of these changes. In interviews and focus group sessions, people said that the shale gas developments had "forever altered the connections they had with their family histories, childhood memories, their lands, their neighbours and communities, the past, and the present." (p 88). These changes were experienced as traumatic, even by those who were supportive of the developments. Such "collective trauma" is a well-established consequence of destructive natural disasters.[19]

Similar results were obtained in a 2016 qualitative study undertaken for the State of Maryland as part of the scoping process for a health impact assessment preceding possible fracking operations in Maryland. [20] To inform this assessment, data were collected from communities in a similar area, Doddridge County, West Virginia, where shale gas extraction was already taking place. Respondents reported "deep distress" over the transformations of their landscapes and disruption to their identities, collective and individual, and their sense of place. These findings support other findings of fragmented identities and associated stress in communities along the Marcellus shale formation where fracking is taking place.[21]

Studying the risk of depression in coal mining areas of central Appalachia, Hendryx and Innes-Wimsatt[22] compared people living in areas where mountain top coal mining is practiced (i.e. the landscape is drastically changed) with similar communities where it is not. After correction for the effects of income, education and other risks, the risk of depression

[15] Eusenmann, D., McCaffrey, S., Donatello,I. & Marshal, G (2015) An ecosystems and vulnerable populations perspective on solastalgia and psychological distress after a wildfire, Ecohealth, 12, 602-610.
[16] Giuliani.M.V. (2003). Theory of attachment and place attachment, In Psychological Theories for Environmental Issues, edited by M. Bonnes, T.Lee & M. Bonaiuto. 137-170. Burlington, V.T.: Ashgate
[17] Fried, M., 2000. Continuities and discontinuities of place. J. Environ. Psychol. 20 (3), 193–205.
[18] Perry, 2013, Op cit
[19] Laugharne J, Van de Watt G, Janca A. 2011. After the fire: the mental health consequences of fire disasters. Curr Opin Psychiatry, 24:72–7.; Sattler, D.N., de Alvarado, A.M.G., de Castro, N.B., Male, R.V., Zetino, A.M., Vega, R., 2006. El Salvador earthquakes: relationships among acute stress disorder symptoms, depression, traumatic event exposure, and resource loss. J. Trauma. Stress 19 (6), 879–893
[20] Sangaramoorthy, T., Jamison, A. M., Boyle, M. D., Payne-Sturges, D. C., Sapkota, A., Milton, D. K., et al. (2016). Place-based perceptions of the impacts of fracking along the Marcellus Shale. *Social Science & Medicine*, 151, 27-37.
[21] Willow, A.J., 2014. The new politics of environmental degradation: un/expected landscapes of disempowerment and vulnerability. J. Polit. Ecol. 21, 237–257.
[22] Hendryx, M.& Innes-Wimsatt, K. (2018) Increased Risk of Depression for People Living in Coal Mining Areas of Central Appalachia*, Ecopsychology*, Vol. 5 No. 3, 179-187

was higher for residents in the mountaintop removal areas (odds ratio: 1.40), lending weight to the proposition that people who experience environmental degradation and place destruction are at elevated risk of psychological ill health.

Australian data support these findings. A recent survey of over 500 residents of Gloucester Shire in NSW[23] was designed to assess the perceived losses and gains from UGD; it also included measures of place attachment and emotional response. Results indicated that changes seen as contradictory to desired place attributes to which people were attached lead to undesirable psychological outcomes.

The psychologically adverse consequences of destruction of people's familiar environments as a result of open cut mining have also been documented in NSW[24]. Interviews with people living in the Hunter Valley of found that "the transformation of the environment from mining and power station activities was associated with significant expressions of distress linked to negative changes to interviewees' sense of place, well-being, and control" (p 47), a phenomenon philosopher Glen Albrecht has described as "solastalgia": '*the homesickness one feels whilst still being at home'* [25]. A local example from WA's south west region is the association between the degradation stemming from salinity and hospitalisation rates for depression, an effect that is evident even after taking account of economic variables.[26]

Destruction of Aboriginal Heritage

We know too that forced removal from place and land and the destruction of heritage has been catastrophic for many peoples, including Australia's indigenous peoples, for whom the notions of people and place are inseparably intertwined. Belonging to country is fundamental and the loss of country has resulted in widespread harm: depression and grief. Proposals to exploit unconventional gas in the Kimberley have already sparked strong reactions from local Aboriginal people.

For Aboriginal people in Western Australia, the potential for additional traumatic consequences from fracking is great. Both the 2011 and 2016 national State of the Environment (SOE) reports[27] warned of the already precarious state of protection of Indigenous heritage in Australia. The expert authors of the 2011 report concluded that individual decisions on assessment and development had resulted in the progressive, cumulative destruction of Indigenous cultural resources. Such destruction forms part of a complex history of trauma and disrupted attachments, the ill effects of which have been documented in many places.[28] It's clear from these SOE reports that Indigenous heritage is

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[23] Po-HsinLai, Lyons, K., Gudergan, S & Grimstad, D. (2017) Understanding the psychological impact of unconventional gas developments in affected communities Energy Policy Vol 101, 492-501.

[24] Connor, L., Albrecht, G., Higginbotham, N., Freeman, S., & Smith, W. (2004). Environmental change and human health in Upper Hunter communities of New South Wales, Australia. *EcoHealth*, *1*(2), SU47-SU58.

[25] Albrecht, G. (2005). Solastalgia: A New Concept in Human Health and Identity. *Philosophy, Activism, Nature 3, 41-55.*

[26] Speldewinde, P.C., Cook A., Davies, P. and Weinstein, P.A (2009). Relationship between environmental degradation and mental health in rural Western Australia. *Health & Place* 15: 865–872.

[27] State of the Environment Reports, 2011, 2016: http://www.environment.gov.au/science/soe.

[28] Paradies, Y. (2010). A theoretical review of psychosocial stress and health. International Journal of Psychology Research, 5(1–2), 205–222; https://www.telethonkids.org.au/globalassets/media/documents/aboriginal-health/working-together-second-edition/wt-part-2-chapt-6-final.pdf (see page 104)

confronted by two main threats: the disruption of Aboriginal knowledge and culture and the disturbance and destruction of sites due to urban expansion and resource extraction.

Part of the problem, as outlined in the reports, is that the nature and extent of Indigenous cultural heritage is not widely appreciated or well-documented, with the result that we do not really know what is being destroyed. In fact, surveys and assessments of Indigenous heritage are often funded and undertaken in response to specific threats from development projects. The 2011 SOE report also notes that conflicts about the destruction of indigenous heritage by industry remain common and that "one of the main threats to indigenous heritage places is conscious destruction through government approved development."

Aboriginal heritage, as reviewed in the reports, is described as having two dimensions: the first, evidence of Aboriginal communities from earlier times, including burial sites, middens, rock and cave paintings and scatters of stone tools, some as old as 50,0000 years , others more recent; the second encompassing the places or landscapes that are of spiritual significance to living Aboriginal people. Such areas are often associated with the actions of mythological beings during the creative period of the Dreaming, moving over the land and shaping the form it now takes and the laws and ceremonies that guide people's lives. Both aspects of Indigenous heritage are under threat and could be further compromised by fracking activities.

It is clear that Australia's Indigenous people view their world as an interconnected whole: they make no intrinsic distinction between the lands, waters, the plants and animals and the culturally significant sites and objects linked to the traditional knowledge, which lie at the heart of Indigenous culture and identity handed down through the generations. Such traditional knowledge can only be kept alive through use and application in the country to which it is tied. Protecting land and places and promoting cultural practices (especially languages and creative expression) are both crucial for the maintenance of traditional knowledge.

The protection of this Indigenous culture was key among the reasons the West Kimberley region was placed on the National Heritage list in 2010. The document outlining the reasons for the listing noted that the Kimberley is marked by many overlapping stories, principally those of the Aboriginal people who have occupied the land for over 40,000 years. Indeed, there is informed speculation that this may be where the aboriginal people first set foot on Australian soil. This is the traditional and spiritual home to 13 traditional owner groups who speak more than 30 different Indigenous languages, some unique to the region. It is home, too, to their ancestors and the many creation beings held by Traditional Owners to have shaped and occupied the ranges and plains, rivers and waterholes, seas and islands. Powerful creation beings such as the Wanjina are seen in many different forms; in the rock art, river systems, tidal movements, stone arrangements, geographic formations, animal and plant species and in the stars and planets.

What has come to be known as the "Dreaming" or "Dreamtime" is for Aboriginal people the Law, transmitted through traditional narratives, images, song and dance, weaving together the elements of their social world - their entitlements, responsibilities and obligations. As one Bardi women told the Heritage Council, "they are living stories; they are the spirit of

us". The many Wanjina paintings of large eyed, mouthless, anthropomorphic beings with halo like rings encircling heads and the elegant human-like painted images (the Gwion/Gwion) have attracted a lot of international interest. They form what is considered one of the longest lasting and most complex rock art sequences anywhere on the planet. However, to the aboriginal people, this is not art in the western aesthetic sense but places where creation beings have placed themselves in rock.

Where such use and application of law and culture in such places are disrupted, as is often the case with resource extractive industries, cultural heritage in the broadest sense is under threat. Despite claims to the contrary, what little research there is has shown that "mining and other forms of industrial development can result in profound and often irreversible damage to the cultural heritage of indigenous peoples"[29]. It is fear of such damage that often drives Indigenous opposition to such development, especially since heritage laws have generally proved ineffective in protecting indigenous heritage – for example in the recent experience of the Yinjibarndi people with miner FMG. And, in many cases, the promised economic benefits have not materialised. For example, the Argyle diamond mine in Western Australia completely destroyed a Barramundi dreaming site important and particularly significant to Aboriginal women. O'Faircheallaigh[30] points to the many occasions when exploration activity, for example, bulldozing seismic lines for oil exploration, destroys or damages sites. He stresses that in considering the impact of exploration and mining on cultural heritage, individual sites should be considered as parts of site complexes, "dreaming tracks, that stretch over hundreds and even thousands of kilometres, connect individual sites and mark the routes taken by creation spirits in the Dreaming" (p 8).

Some 60% of resource exploitation in Australia actually abuts or is located on aboriginal land. This is also true of the gas reserves in the Kimberley. Commonly, an application is made by a mining company to undertake activity which may harm Indigenous heritage and the responsible agency will typically require that an Indigenous heritage assessment be undertaken by the applicant before a permit is issued. Western Australia's Indigenous heritage laws allow the responsible Minister to authorise the destruction of such sites. While consultation with relevant Indigenous groups is generally required, it has almost never resulted in the applications being refused. As a result, such decisions are a continuing source of conflict between Indigenous communities and government agencies and corporations.

To compound the problem, there are limited public data on how many and to whom permits or consents are issued authorising harm or destruction of Indigenous sites. The authors of the SOE report indicated that they could find no long-term studies that have systematically assessed the cumulative impact on Indigenous heritage of these decisions to approve destruction; but what evidence there is indicates a perilous situation.

Given this sort of experience, it's not surprising that a survey of traditional Aboriginal owners which asked what they wanted to do with their land found that less than 13 per cent listed economic development as a first priority while more than one-third highlighted

[29] O'Faircheallaigh, C. (2008), Negotiating Cultural Heritage? Aboriginal–Mining Company Agreements in Australia. Development and Change, 39: 25–51. doi: 10.1111/j.1467- 7660.2008.00467.x
[30] O'Faircheallaigh, 2008, Op cit, p 8.

access, residence, land and sea management and cultural heritage.[31] A review of indigenous suicide by Indigenous advocate, Aaron Stuart, attributes the high rates of suicide in some indigenous communities to people "grieving from loss of culture and identity".

Conclusions and Recommendations

Fundamental to any conception of environmental justice is the right to an environment that is not only clean and health promoting, but also retains its natural, cultural and heritage values, including its biodiversity, ecological integrity, aesthetic qualities and historical associations. The exploitation of unconventional gas in Western Australia is likely to violate these rights – not to mention the effects adding more fossil fuel supplies would have on the existing burden of greenhouse gas emissions which are already producing accelerated warming, more frequent extreme weather events and wildfires, ocean acidification and sea level rise, all of which have very destructive effects on human health and wellbeing[32].

In relation to fracking, it is evident that decision makers and governments typically overlook evidence of the deep connections between people and place, and are particularly likely to ignore the effects on people and their communities of destroying valued places, natural environments, native animals and plants. In fact, most of our planning regimes do not routinely assess these relationships; they focus on narrowly defined ecological impacts, rather than assessing proposals for their broader cultural and social consequences. Even though such assessments are difficult, they should be a routine part of any development or planning impact evaluation.

Internationally, there have been some serious attempts to inform policy makers about the importance of undertaking Social Impact Assessments, defined as "the processes of analysing, monitoring and managing the intended and unintended social consequences, both positive and negative, of planned interventions (policies, programs, plans, projects and any social change processes invoked by those interventions".[33] Western Australia once had a Social Impact Unit to ensure that the social impacts of development proposals were systematically included as part of the environmental impact assessment procedures of the EPA. Although it did not have any powers based in legislation, the SIU established a close working relationship with the EPA and before its abolition by the Court government was judged to "have considerable success in persuading proponents to commit to social impact management measures as part of their EISs".[34] In other jurisdictions, such as Finland and Austria health impacts are a mandatory requirement for project approval[35].

Within this framework, 'social impact' is conceptualised as anything resulting from a project that affects any group or its members, encompassing all those things that people value. Consistent with this definition, environmental impacts can also be social impacts, since

[31] Balsamo & Calma: https://www.humanrights.gov.au/news/speeches/site-navigation-19
[32] Special edition of the Lancet on climate change effects on health: https://doi.org/10.1016/S0140-6736(06)68079-3
[33] Vanclay, F., Esteves, A., Aucamp, I. & Franks, D. (2015) *Social Impact Assessment: Guidance for assessing and managing the social impacts of project's,* International Association for Impact Assessment.
[34] Beckwith, J. (1994) Social Impact Assessment in Western Australia at the crossroads. *Impact Assessment*, 12:2, 199-213.
[35] Vanclay, F. & Estevez, A.M. (eds) New Directions in Social Impact Assessment: Conceptual and Methodological Advances, Cheltenham (U.K): Edward Elgar.

people depend on the environment for their livelihoods and, as already indicated, can be strongly attached to the places affected by the proposed projects.

Any consequences for people's health and wellbeing are also included as social impacts, although some prefer to conduct separate health impact assessments. Indeed health impact assessments have been in discussion for a decade or more in Western Australia,[36] and WA's new Public Health Act provides for them.[37] It is generally understood that the loss of cultural heritage, important habitats or biodiversity which are valued by people would also be considered as part of any social impact assessment.

It is suggested that, in the light of the evidence:

1. **There be a permanent moratorium on unconventional gas exploration in W.A.;**
2. **A Social Impact procedure be legislated to allow for the careful consideration of social and health (including mental health) impacts prior to any approvals being considered;**
3. **A new regime for careful protection of Indigenous heritage in Western Australia be legislated as a matter of urgency.**

[36] Department of Health (2007) Health Impact Assessment in WA Summary Document;

[37] Part 7 of the new Act (2016) deals with "public health assessment": in relation to a proposal, means an assessment of any public health risks and any benefits to public health that may result from implementing the proposal. The Chief Health Officer can require that a public health assessment be undertaken by a proponent, and a decision making authority receiving advice or recommendations from the Chief Health Officer "must not make any decision that could have the effect of causing or allowing the proposal to be implemented unless the decision-making authority has had regard to that advice or those recommendations."