



**Supplementary Submission;
Scientific Inquiry into Hydraulic Fracturing in
the Northern Territory Background and
Issues Paper**

April 2017

Introduction

The Amateur Fishermen's Association of the Northern Territory (AFANT) welcomes the opportunity to provide a submission in response to the Scientific Inquiry's Background and Issues Paper. This contribution supplements the submission made in person by AFANT's Executive Officer Mr David Ciaravolo at the Inquiry Hearing in Darwin on March 10, 2017. This paper will in places cover some of the issues raised at the Darwin hearing, as well as expand upon key points, and provide some additional information requested by the Panel at the hearing.

AFANT is the peak body for recreational fishing in the Northern Territory. It is our role to represent the interest of all amateur fishers, including our over 4,300 members, as well as, fishing clubs, associations and related businesses. The most recent estimates available suggest that over one-in-five residents in the Northern Territory participate in recreational fishing each year. In 2010, the highest levels of participation were recorded in children 15 years and under, which indicates a bright future for participation in amateur fishing in the Territory.

The fishing experiences on offer in the Northern Territory are recognised as being world class, with NT Tourism establishing that most visiting fishers are motivated to travel to the Territory specifically for that purpose (NTG, Fishing Segment Tourism). Recreational fishing activities generate significant economic activity, with the NT Government having recently stated that they believe recreational fishing to contribute over \$100M annually to the NT economy.

The high quality fishing in many parts of the NT is inextricably linked to the intact ecosystems that support such vibrant and healthy fisheries. It is therefore, the protection of the natural environment, especially ground and surface water resources, that constitutes the major concerns of the recreational fishing sector. It is with this in mind, that any proposed development of the unconventional gas resources in the Territory is considered.

AFANT, along with many people in the recreational fishing community, recognise the potential for economic benefits promised by the development of unconventional gas resources in the NT (See Appendix A). We are however, not able to support hydraulic fracturing (or the development of unconventional gas resources), unless we can be satisfied through this process, that the consequences of the risks identified in the Background and Issues paper, and those raised by the community, can be adequately addressed and/or mitigated by best practice regulations and forward planning.

Through our involvement in this Inquiry, it is AFANT's ambition to make clear, the significance of what is at stake, should harm come to the ecosystems which support our well established, highly valued and vibrant sector. The next steps for AFANT will in part, be guided by the risk likelihoods attached to the identified consequences by the expert panel in the Interim Report. AFANT will be also be looking closely at draft recommendations relating to regulatory regimes, as well as any comments on areas deemed suitable or unsuitable for development.

Background Paper Suitability and Inquiry Process

AFANT commends the Panel for producing a clear and concise document, which makes a number of the key facts and issues accessible to the general community. It is especially important that it be well understood by the community that this inquiry is concerned with investigating the potential development of unconventional *shale gas* resources in the NT, and not Coal Seam Gas (GSC). A distinction about which there seems to be a significant community confusion.

The transparency and inclusive nature of all parts of the Inquiry process thus far, has been most welcome, and AFANT appreciates the multiple opportunities afforded for input. We are fully supportive of the fact that all submissions, and the final report, will be made public. The regular updates to the resources on the Inquiry web page is of significant value to interested parties as a resource.

AFANT's takes this opportunity to affirm our support for each of the 9 identified risk themes being considered by the panel. Of particular concern to our constituents are;

- Water; water quantity, water quality, Aquatic ecosystems, water amenity. And the economic and cumulative impacts of realised risks upon water resources;
- Public health, especially mental health and well being;
- The regulatory framework, which must in advance of any developments, satisfy and gain consent of the community;
- The potential Economic & social impacts of resource developments.

Audience Appropriate

During our in-person submission to the Panel, AFANT raised some concerns with the simplified examples of the common use of chemicals used in fracking on page 9 of the Paper. At the hearing, the communicative intention of the examples was clarified by Prof. Brian Priestly. It is our wish to reiterate that while the communicative intention of the table is appreciated by AFANT, the *need for the community* (arguably the target audience of the paper) to understand that the context and concentration of involved chemicals (not just the chemical itself), can make all the difference between a benign or harmful presence/application.

Social Impacts: A deeper understanding about potential loss of amenity consequences

At the March 10 hearing, AFANT explained that we are of the view that the loss of amenity, more specifically the loss of access to, and enjoyment of, healthy, high quality natural environments, must be explicitly acknowledged under the Social Risk

Theme. It was clarified by the Chair that this issue was contained in the paper on page 22, yet had been omitted from the Risk Themes Chart on page 15 (presumably in error).

AFANT wishes to briefly elaborate on this matter so as to ensure that the sentiment and gravity of the concept we wish to convey, has been appropriately communicated. The specific concern we have relates to the concept that the enjoyment of the pristine, remote ecosystems of the NT, and the sustainable access to its abundant natural resources, is often a significant factor in Territorians balancing choices about where they are willing to live and work.

Disruption to this balance, through the alteration of access to, and the condition of environments they value, may have the potential to leave individuals and communities with sense of loss and alienation. Depending on the scale and importance of the loss, affected residents may even decide to reevaluate their choices.

This is draws on the notion that rather than being viewed based upon 'three pillars'; sustainable development is better viewed as "nested", that is, with the economy nested within society, which in turn is nested within the environment (Giddings, 2002). Put simply and in context, there is significant risk in developing the Northern Territory economy in ways that threatens the environment and natural resources, especially when a strong connection to the environment and it's services, is a key factor in peoples choices to reside in and contribute to society in the NT.

The Social and Economic Importance of Recreational Fishing in the NT

AFANT wishes to ensure that Panel has a sufficient level of information about the value of recreational fishing to the Northern Territory. We are of the view that a clear appreciation of the scale and importance of recreational fishing to the broader Northern Territory economy and society, will be essential to the deliberations of the Inquiry and its resulting recommendations. It must be noted that ideally up-to-date figures, are unfortunately not currently available. Nevertheless, working with the available information, we intend to reinforce and elaborate upon some of data presented at the Darwin Hearing.

It is acknowledged, that more contemporary figures on participation, and social and economic benefits are required for the recreational fishing sector. New surveys have been identified as the top research priority at the National level, and a Federal Government commitment to develop and implement new studies has been secured. While it is expected that new social and economic surveys will reveal significant growth in the NT recreational fishing sector, these figures will not be available during the term of this inquiry. The most recent reliable figures, albeit somewhat limited in scope, are now over seven years old.

The 2009-10 Northern Territory Recreational Fishing Survey (West *et al*, 2012), estimated that the expenditure of NT residents on recreational fishing was

approximately \$50M in that year. Other studies suggest that interstate and international recreational fishing visitors contribute a similar amount to the economy. To put the above suggestion in context, the economic contribution of the NT Guided Fishing Tour Industry (measured 2008-11) was estimated at \$26 Million annually (NTG, 2014), with 80% of expenditure coming from interstate and overseas visitors. The NT Department of Primary Industries and Fisheries estimated that the combined expenditure of residents and visitors on recreational fishing in 2010 was \$80M (NTG, 2011).

Limitations of the information presented:

AFANT contends that the economic value of the recreational fishing sector (even expenditure) may not be appropriately revealed by the findings of the studies presented above. This is not only because the data is now significantly dated, but also due to the methodologies employed and the existence of some unresolved contradictions. For example, West *et al.* (2012) estimated the resident expenditure on fishing tackle and bait to be \$3.3M for 12 months. This estimate seems exceptionally low when it is considered that there are at least 10 dedicated fishing tackle retail shops in the NT (some of them of an exceptional national standard). In addition, there are at least 55 businesses that sell bait and some fishing tackle.

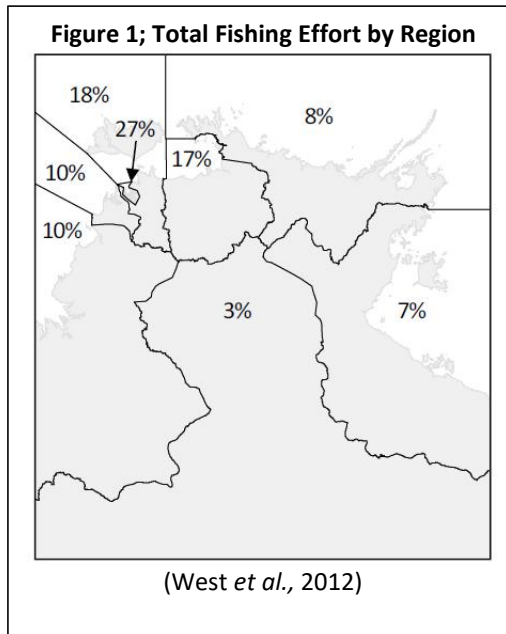
With respect to interstate and overseas tourism expenditure, the NTG figures for the economic contribution from Fishing Guide services (2014), is also somewhat limited. This study was industry focused and therefore did not seek to measure the many visitors who travel to the NT and fish independently, with friends or in the popular annual competitions. Such economic activity was not captured in any of the above studies, yet this regular activity undoubtedly exists.

Despite some gaps in understanding, it is well understood that the recreational fishing sector shares its social and economic benefits widely in Northern Territory community. This is owing to the fact that up to 70% of recreational fishing activity takes place in regional areas (Coleman, 2004, West *et al.*, 2012). It is important to note that such benefits are not confined to the tens of thousands of people who go fishing each year, they are also enjoyed by the towns, communities and businesses that fishers visit for products, services and facilities.

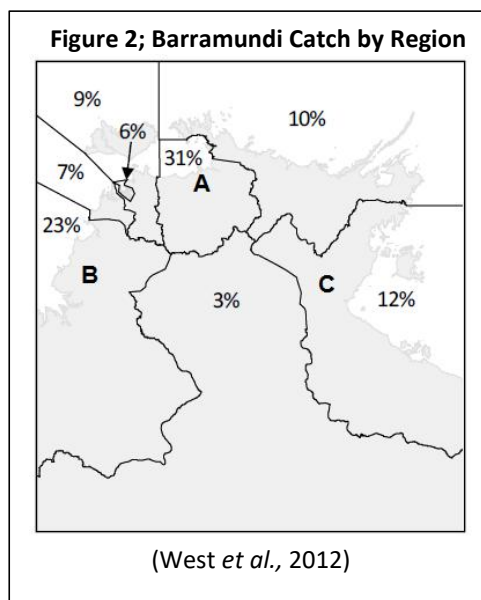
Areas of significance for recreational fishing

Following AFANT's submission at the Mach 10 Darwin hearing, Dr. David Jones asked AFANT to provide information about the areas of the Territory most important for recreational fishing. In this section we seek to satisfy that request and offer some contextual information.

It is estimated that 90,000 people went fishing in the Northern Territory during 2010, (the most recent year for which there are reliable resident and visitor figures) (NTG, 2011). Historically, 72% of all recreational fishing effort takes place in regional areas (West *et al.*, 2012), with Darwin Harbour accounting for the remaining effort.



As shown in figure 1, with the exception of the central and semi-arid/arid areas, all other regions are important for recreational fishing. The importance of individual areas comes to light when specific target species and target experiences are taken into consideration. For example, Barramundi are the iconic NT fish responsible for much of the local interest, as well as visitor travel and economic activity. Highlighting the importance of this species, is the fact that 90% of Barramundi captures come from targeted fishing effort (West *et al.*, 2012).



While Barramundi can be found in many Top End waters, there are specific, iconic, world class recreational fishing areas where fish of significant number and size are targeted and caught by recreational fishers. The areas A, B and C in figure 2, and the associated catch attributions, demonstrate the importance of specific habitat types, where intact ecosystems support high quality barramundi fisheries. In region A, the

Mary River and Alligator river systems are of major significance to the recreational fishing sector, especially with fishers traveling from Darwin. Regions B & C contain the important Daly and Roper rivers, respectively, with the latter being especially important for traveling fishers who live in regional NT.

The Daly and Roper rivers offer exceptional recreational fishing experiences. Both rivers are atypical of Top End rivers, in that they have perennial flow, owing to springs from aquifers which contribute flow during the long dry season. Groundwater base flow during the dry season extends periods of key habitat and food availability for barramundi (Chan, 2012). The unique dry season flow from the aquifers, is therefore linked to the special quality of the fishing on offer.

Issues of Concern

A vibrant recreational fishing sector, healthy fish stocks and intact ecosystems are intertwined. Should serious threats to aquatic environmental health and aquifer systems be realised, it will not be possible for the Northern Territory's valuable recreational fishing sector to remain immune. It is for this reason that AFANT wishes to raise the following issues, as we seek to represent the interests of our constituents and the businesses and communities they support.

A Best Practice Regulatory and Monitoring Landscape

AFANT holds concerns regarding the historical adequacy of the NT's legislative, regulatory and policy frameworks for unconventional gas mining. It is noted that a major finding of the Hawke report (2014) was that the environmental risks associated with hydraulic fracturing may be managed effectively subject to the creation of a robust regulatory regime. It is our considered view that any development of unconventional gas resources in the NT, must only take place once recommendations for a best practice regulatory framework has been adopted. We have the expectation that the Panel will make clear recommendations on this, and we hope to see first evidence of this direction in the interim report.

Minimum Standards - Wells

While AFANT does not have the capacity or expertise to compare all of the known studies in the area of well integrity, we draw attention to one prominent study which compared the integrity of conventional wells with unconventional gas wells (Ingraffea *et al.*, 2014). The study found a 1.6 - 2.7 fold higher risk of leaking/failure in unconventional wells. Such findings, highlight not only the potential risk of well failure (even in a regulated setting), but the need for a serious consideration of which areas should be considered for any development, and the setting of minimum standards for key operational components.

In his submission to the Inquiry at the March 10 Darwin hearing, Lawyer for the NT Environmental Defenders Office, highlighted the lack of minimum standards in the

current objective-based regulatory framework. While AFANT remains opposed to the development of unconventional gas resources in socially and economically important recreational fishing areas, we suggest that the Panel give full consideration to recommending prescriptive minimum standards for key features. Recommendations for minimum standards should in our view, be considered for well construction, waste water management and baseline studies.

Minimum Standards - Baseline studies

AFANT encourage the Panel to make recommendations about the required monitoring of ecosystem, aquifer and atmospheric baseline conditions, prior to individual developments being green-lighted. The need for improved baseline data has been acknowledged in previous reviews, including the Hawke report (2014).

Recent examples from other jurisdictions have brought to light the need for appropriate baseline environmental data. This is because the absence of such data is thought to have lead inconclusive findings from investigations into the perceived environmental impacts of unconventional gas developments. Put simply, it is impossible to fully understand the relativity of changes, unless the starting points of a range of environmental variables are well understood in advance of developments taking place.

It is proposed that the collection of baseline environmental data should be collected by an independent body, appointed by the Northern Territory Government, at the cost of the development proponent. Given that it may not be possible to foresee or measure all necessary baselines, the Panel may also wish to consider the potential of a reversed onus of proof when environmental contamination/pollution is discovered.

Minimum Standards - Waste Water

Failures in the containment and safe storage of waste water, laden with fracking chemicals and by-products, is another major concern. Extreme weather events, including cyclones and monsoonal flooding, common in Northern Territory's wet season. This means that on-site storage is likely to be impractical unless structures are built to endure cyclonic conditions and waste water containment facilities are built in anticipation of extreme rainfall and flooding.

A more practical and environmentally safe option would be to mandate that all waste water be held in secure storage tanks. Waste water should then be either reused for fracking (in order to reduce the overall water use in a development area), or removed from site for storage and treatment. It is noted that even this solution, will involve transporting contaminated water, placing additional pressure on roads and infrastructure, while only moving the problem elsewhere.

Aquifer Extraction

World class recreational fisheries such as those in the Daly (Ooloo aquifer) and Roper (Tindal-Mataranka aquifers) rivers are reliant on groundwater flows, especially during dry season, transition to wet season and the transition to the dry season (King *et al.*, 2015). These groundwater flows help to ensure connectivity of habitat, the health and stock recruitment. A number of key NT aquifers, including the above, are currently fully, and even over-allocated. If all entitlements were extracted, impacts on groundwater river flows and fish stocks would already occur (Chan *et al.*, 2012). While AFANT welcomes moves to have water for mining recognised under the Water Control Act, the reality remains that many for aquifers, the issue of water allocations remains highly contested.

Concluding statement

AFANT is pleased to provide feedback at this stage of the Inquiry, and we look forward to the release of the interim report. In the course of preparing this submission, AFANT made a short attitudinal survey available to our members and supporters. While the sample size is limited (n=85), the results were useful in highlighting areas where there exists both a diversity and commonality of views and values among our constituents (Appendix A). The key results were that a majority of the fishers surveyed (67%) recognised the potential benefits of developing unconventional gas resources in the NT, however only 11% thought the current regulations were satisfactory, with 49% believing is too risky to ever develop unconventional gas resources in the NT (whatever the regulations).

Given the reliance of the NT's world class recreational fisheries upon intact water resources/healthy ecosystems, and the significant, well established and sustainable social and economic benefits of the recreational fishing sector, it is clear that unconventional gas development presents risks that must be taken seriously. As such, AFANT is of the view that development of unconventional gas resources poses an unacceptable risk to surface water and aquifers in the areas/basins of key importance to recreational fishing.

Should the Inquiry seek to develop recommendations to allow hydraulic fracturing under strict conditions, AFANT propose that the Panel investigate options for a unconventional gas regulatory framework which does not allow the development of unconventional gas resources in the areas highlighted as being important to our sector. We are happy to assist with providing further information as required.

Sincerely,



David Ciaravolo
Executive Officer

30/4/2017

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Appendix A

(Sample = 85 Recreational Fishers, AFANT Members and Supporters)

How would you rate your knowledge about the development of onshore shale gas resources being proposed for the NT?

	%
I think I know enough about it	56
I'd like to know more about it	35
I don't know much about it	10

Which of the following best fits your views on the potential BENEFITS of developing the NT's unconventional gas reserves.

	%
I recognise the potential for new jobs and economic benefits	67
I don't think there would be any real economic or employment benefits	33

Which of the following best fits your views on the potential RISKS of developing the NT's unconventional gas reserves.

	%
It is too risky to ever develop unconventional gas resources in the NT	49
Gas resources should only be developed if stronger regulations are in place	40
The current regulations are good enough	11

When it comes to developing the NT's unconventional gas resources, what (if any) issues do you worry about (can choose multiple) :

	%
The potential to damage the general environment	86
The potential to contaminate ground water	79
The potential to impact on fish stocks	71
The potential to loose access to places I value	60
The potential to use too much water	44
Other? Please tell us!	15
I don't have any such concerns	10