On Cumulative Impacts and the Inherent Risk of Narrow Scoping: The NEGI EIS

Environmental Impact Statements (EIS) are usually required prior to the commencement of major projects. However, such Statements are often superficial, subjective and not supported by data and good science. This is highlighted in this discussion of the fauna portion of a recently released EIS for the North Eastern Gas Interconnector (NEGI) https://ntepa.nt.gov.au/news/2016/open-comment-jemena-northern-gas-pipeline.

The 623km NEGI pipeline will link Tennant Creek in the Northern Territory to Mt Isa in Queensland, and open up the development of the NT's gas industry, in particular shale gas. Ultimately, a connection into the East Coast gas pipeline grid will be constructed.

The NEGI EIS has a significant body of omissions, unfounded or unsupported statements and opinion passed ostensibly as findings. Some of the survey efforts (primarily those supported by experts) are plausible, but in many cases foundation assumptions and desktop findings are questionable and not robustly supported, and in some cases not supported at all. The EIS has readily identifiable shortcomings and is an exercise in risk negation rather than authentic risk assessment. The NEGI may or may not result in serious impact to the environment, at this stage it is impossible to tell, as the EIS does not provide the information required for a genuine consideration.

Cumulative impacts

When considering impacts, cumulative impacts are often poorly addressed. With respect to a development application, there are two fundamental levels of cumulative impacts; those interactive effects arising within a project; and those where impacts arising from the project combine with existing or future changes to the environment and which can ramify at a larger and often landscape or regional scale.

Cumulative effects arising within a project

With respect to the NEGI EIS and using their consideration of the Plains Death Adder as a case in point: without any determination of population densities, density patterns, population modelling, or reference to published works in an effort to establish numerically the possible losses through construction and operations phases, the NEGI EIS claims minimal losses can be expected to Plains Death Adder. Not only are these estimates unsupported, but statements such as "*It would be an exceptional circumstance in which the mortality of a few individuals due to vehicle strike would have an impact on this species' population*.", "*It would be an exceptional circumstance in which a few individuals become trapped in the trench and perishing would have an impact on this species' population*" and "*It would be an exceptional circumstance in which a few individuals perishing during trench excavations would have an impact on this species' population*.", are misleading in their isolation, obfuscating the cumulative impact of each in combination.

What is missing from the NEGI EIS, apart from an authentic consideration of losses to each impact, is a consideration to the effect that, "In light of anticipated lethalities arising individually through clearing, through trench excavation, through entrapment in open trenches, and through vehicle strike in both construction and operational phases, there is clear risk of cumulative impacts to Plains Death Adder within the proposed Right of Way (ROW) footprint.".

Using vehicle strike to take the consideration of cumulative impact a step further: in repeatedly referring to the small impact to Plains Death Adders posed by the actual pipeline footprint, the NEGI EIS fails to take into account that Death Adders may range up to a kilometre each night and perhaps several over the period that a trench remains open and certainly over the period that a construction or access road will remain operative.

As such, the potential catchment for Plains Death Adders and by extension the impact zone, is as many as a few kilometres either side of the pipeline, amounting to perhaps as much as 206 km (of linear Death Adder habitat transected by the footprint) by 2km radius or 832 sq km or more! This equates to 5.2% of the estimated habitat area of 16,000 sq km for the Plains Death Adder. Where 5% is generally considered "significant" in statistical analysis, this becomes a "significant" impact risk.

Localised losses within such large areas warrant serious consideration for sink habitat. This has not been considered, examined or modelled.

This expanded impact zone considers only the potential catchment or impact risk zone in one or two nights travel by a Plains Death Adder and from the ROW only. If you consider how far a Plains Death Adder may travel in a week or year, and radiate this distance not only from the ROW, but also from each access road, feeder road and highway portion that will see increased construction and operational traffic specifically as a result of the NEGI, the potential catchment or impacted area expands exponentially. This consideration of true impact risk zone extends to all of the species discussed in the report, the Plains Death Adder is used here only as an example.

Cumulative effects arising from the project compounding existing and future impacts

The NEGI pipeline itself is a cumulative impact over and above existing impacts such as grazing, altered fire regime, networked infrastructure such as roads and even global climate change. Cumulative impacts may be exponential in their effect and there has been no serious consideration of the existing state (of decline or status quo) of the habitat and ecology underpinning the survival of the listed species considered in the report.

Again using the Plains Death Adder as a case in point, statements such as, "*It would be an exceptional circumstance in which the mortality of a few individuals…… would have an impact on this species population*", apart from being unsupported and potentially misleading, fail to take into account that this species is already endangered and by extension, impacted. The loss of a few individuals in a population of common animals residing in habitat with robust and stable ecology may not impact that species or population; but the loss of a few animals, in a population with patchy distribution and low densities, and with respect to a species assessed at State, Commonwealth and international level as in critical decline and warranting conservation listing, in a habitat where the ecology underpinning the survival of that species has not been assessed for its status or rate of decline and is known to be suffering from cumulative effects of grazing, altered fire regimes, infrastructure encroachment and more recently, accelerated climate change, are plausibly critical.

Firstly, there are endless peer-reviewed papers on population modelling. These models and methods are best practice. They are the minimum acceptable standard in assessing likely impact. Findings established from accepted modelling are certainly more reliable than opinion (i.e. "*It would be an exceptional circumstance in which the mortality of a few individuals would have an impact on this species population.*") which is in the NEGI EIS passed off as a finding in a professional, scientific report on a species listed as vulnerable to extinction.

Further, the survivability of endangered species is underpinned by the ecosystem in which they live. This includes not only the physical environment, but also the suite of animals and plants that make up the biodiversity of that site. The inherent biodiversity of an ecosystem is dependant on the processes and services of that ecosystem and these services in-turn are dependent on the biodiversity within; they are inextricably linked.

Though we can't measure the integrity of ecosystem services directly, "evenness" can be a good measure of the intactness, health and sustainability trend of an ecosystem, the environmental process of that ecosystem and biodiversity component of that ecosystem. Where evenness shifts or is atypically skewed to a minor component of the biodiversity or to invasive species, it is often a sign that the ecosystem is under some adverse pressure. If this pressure continues unabated, native biodiversity is likely to diminish.

Where biodiversity diminishes, endangered species, whose ecology is typically already fragile, are most likely one of the first to suffer. Any consideration therefore of the sustainability of, or impact to, an endangered species, which does not fully take into account the existing biodiversity of the site and the evenness of that biodiversity, is inherently flawed.

Without a baseline study and without an understanding of the pre-existing impact trend, it is impossible to authentically gauge impact from a development such as the NEGI pipeline. An authentic consideration of the environmental impact of a project such as the NEGI first requires a study of the

pre-existing health of that environment. It is only then that the impact of the development can be reliably predicted. This pre-existing health can be assessed directly through biodiversity assessment or where historic data exists for an individual species, indirectly for that species through population modelling.

Methods for biodiversity assessment are well documented in open-access survey guidelines and for population modelling, in well established peer-review journals and in both commercial and open source software.

The NEGI EIS has not undertaken or reported on any undertaking to establish biodiversity or to authentically gauge the existing condition of the environments through which the NEGI will pass; nor has it attempted population modelling for the identified conservation critical species.

The Inherent Risk of Narrow Scoping

Another glaring and unquantified risk in the NEGI EIS is the determination of false absences; i.e. species that were not detected, not surveyed for and for which the risk of impacts were not assessed, as they did not trigger in desktop searches.

Desktop surveys are unreliable, particularly in remote areas, areas with low human population densities, or areas that have not been subject to detailed general survey work. Field surveys which look only for species already known to occur are unscientific in that they assume absence (of all species not flagged in a desktop survey) and do not test this assumption. This is in direct conflict with scientific method. Until recently, general fauna surveys were the norm and in remote areas, well executed general fauna surveys routinely identify species not formerly recorded for that area and not present at the time on desktop survey data bases. The risk of reporting false absences is high in a desktop survey.

As a qualifying statement to the veracity of findings with respect to detecting conservation dependent species, the NEGI EIS authors endorse themselves and the EIS by claiming, "*That some threatened species were detected during field surveys attests to the proficiency of the surveyors. There is a high degree of confidence that all occurrences of sensitive vegetation communities and threatened species populations have been identified through the field surveys documented in the Threatened Species Survey Report (Appendix G)*.". Without wishing or intending to discredit the skill or diligence of persons undertaking field surveys, the two statements above are false. Finding a species within its known range in an area where it has previously been detected, when you are specifically looking for it using targeted methods, is neither a particular achievement nor warrant of professional performance, proficiency or adequate scoping.

Further, to state a high degree of confidence that all rare or threatened species or localised populations or incidence of those species has been detected in a survey that has been narrowly scoped for just a few known species is overly optimistic and scientifically unsupportable. Such statements are unrealistic, speculative, and all too often proven false as additional species and incidence of species come to light over time.

Narrowly targeted surveys are inherently biased and where targeting is dependent on desktop survey in a remote area, false absences are inevitable and some of those false absences are likely to be low density conservation specific species. The most reliable method to minimise risk of false absences is to undertake an unbiased and broadly-scoped biodiversity assessment. The standard method to ascertain whether survey effort expended on a biodiversity assessment has been adequate with respect to method is through a species accumulation curve. Only when the accumulation curve approaches an asymptote and where the underlying method is unbiased and adequately scoped, can it be said with any confidence that the risk of falsely determining the absence of a conservation dependent species is low. These are standard methods.

The residual risk (of species being present but not detected) in the NEGI EIS, with only desktop and subsequent targeted and spot surveys in high likelihood areas is more correctly “moderate to high” rather than the unsubstantiated “low” indicated in the NEGI EIS document. Where there is high risk of false absences of conservation-specific species in an EIS, the reliability of that EIS as a document to inform decision-making processes is brought into question. Where scoping, survey design, method and

effort are in keeping with respected guidelines, are well planned and executed, and where findings are supported statistically, there is no need for subjective self-endorsement by the authors.

Does the NEGI EIS reliably report in potential impacts?

If a full baseline study were undertaken, if standard methods for population modelling were used to substantiate impact risk levels, and if cumulative impacts were authentically considered, it would be much harder I suspect to negate impact risk as does the present NEGI EIS.

The object of an EIS is neither to facilitate nor to prevent development. The object of an EIS is to identify impacts and risks and to inform the planning, design and decision making process. Narrowly-scoped impact-negatory documents do not serve this purpose. With authentic information to hand, projects can be designed and planned sustainably and where they can't be made sustainable, informed decisions can be made as to their future. The NEGI may or may not result in serious impact to the environment, at this stage it is impossible to tell, as the EIS does not provide the information required for a genuine consideration.