



Environmental
Defenders Office

**Submission to the Review on seabed mining in the
NT: Environmental impacts and management**

13 November 2020

About EDO

EDO is a community legal centre specialising in public interest environmental law. We help people who want to protect the environment through law. Our reputation is built on:

Successful environmental outcomes using the law. With over 30 years' experience in environmental law, EDO has a proven track record in achieving positive environmental outcomes for the community.

Broad environmental expertise. EDO is the acknowledged expert when it comes to the law and how it applies to the environment. We help the community to solve environmental issues by providing legal and scientific advice, community legal education and proposals for better laws.

Independent and accessible services. As a non-government and not-for-profit legal centre, our services are provided without fear or favour. Anyone can contact us to get free initial legal advice about an environmental problem, with many of our services targeted at rural and regional communities.

Environmental Defenders Office is a legal centre dedicated to protecting the environment.

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Executive Summary

The Environmental Defenders Office (**EDO**) welcomes the opportunity to provide comment on the *Review of seabed mining in the NT: Environmental impacts and management (NT Seabed Mining Review)*. EDO is a national community legal centre specialising in public interest environmental law, with extensive expertise across Australia in providing legal advice on the regulation of environmental impacts. This submission was prepared with input from our scientific advisory team.

We have reviewed the extensive documentation published as part of this review and commend the level of detailed information provided.

Given EDOs specific expertise, this submission focusses on providing feedback on the:

- [Draft Report: Review of seabed mining in the Northern Territory – Environmental impact and management \(2020\) \(Draft EPA Report\)](#)
- [Appendix 3: Legal framework \(2017\)](#)
- [Appendix 5: Social and cultural impacts \(2017\)](#)
- [Appendix 7: Seabed mining in the NT \(2017\)](#)

Our primary conclusion is that the Draft EPA Report and Appendices accurately identify a significant list of environmental risks, a lack of experience and evidence confirming impacts can be managed, regulatory gaps, uncertainties and unknowns in terms of impacts, potential social and cultural impacts, potential economic impacts on other industries, data deficiencies, and potential technical barriers in relation to seabed mining in the Northern Territory (**NT**).

Given this list, we do not support lifting of the moratorium.

EDO welcomed the passage of new legislation – the *Environment Protection Act 2019 (EP Act)* - in the NT, but the existence of improved environmental impact assessment (**EIA**) laws does not necessarily mean that environmental impacts of an activity are now manageable. While the Draft EPA Report indicates that small scale projects in data rich resilient areas might be manageable, still cumulative impacts are unknown. Then there are significant issues about sea Country impacts for cultural heritage.

The high level of risk and uncertainty suggests lifting of the moratorium at this time may be in breach of the precautionary principle.

We therefore recommend the moratorium be kept in place. If the moratorium is lifted (which we do not support), there would need to be a quantum leap in available and reliable data, and a significant range of regulatory requirements and safeguards in place including a compulsory trigger for seabed mining projects and clear no go zones, as well as reforms to related legislation. The material on exhibition identifies that current NT legislation and policy does not include the necessary requirements and safeguards. The Draft EPA Report indicates that there would need to be a commitment from industry to gather at least two years of baseline data before undertaking a full risk assessment. These preconditions may make projects cost-prohibitive and the uncertainties and risks may render projects unacceptable. It would be premature to lift the moratorium at this time, and any future consideration of lifting the moratorium would need to be based on an independent review of evidence of the necessary improvements in data and regulatory reforms to address gaps, as well as extensive consultation with NT coastal communities and First Nations people.

1. Draft Report: Review of seabed mining in the Northern Territory – Environmental impact and management (2020)

Overall, the Draft EPA Report accurately details the potential impacts of seabed mining and correctly describes the level of uncertainty regarding the NT marine environment and therefore high degree of uncertainty and risk involved in accurately determining the scale of those potential impacts.

The recommendations made by the NT EPA articulate the risks and high levels of uncertainty and identify numerous examples of gaps and measures that would be required to ensure impacts are minimised if the moratorium is lifted.

Recommendation 4, states *“Currently, the lack of adequate environmental information and knowledge about the existing condition of environmental values and the potential impacts from seabed mining is a major barrier to the robust environmental impact assessment, approval and appropriate conditioning of seabed mining in the Northern Territory.”*

Given this statement, it would appear that any future development proposal would actually fit into the “unacceptable impacts”, as defined by Recommendation 3 (see Table below).

Recommendation 5 and 6 both point to the necessity of any baseline data or survey work where data is collected being publicly available. This would be essential to any future seabed mining policy. Given the current lack of information available to the public from NT mining operations, and given the high level of uncertainty detailed throughout the Draft EPA Report and the attached appendices, it is vital that the public is kept informed of the data being collected and how that is being utilised to predict and monitor impacts of any future approved seabed mining.

EDO supports the NT EPA’s conclusion presented in Recommendation 7 – which states *“that the use of adaptive management would be highly problematic in managing the high levels of uncertainty and risk associated with the mitigation of potentially significant environmental impacts from seabed mining proposals.”*

EDO supports the NT EPA’s conclusion presented in Recommendation 8, that *“environmental offsets cannot currently be readily or easily applied to seabed mining proposals in NT Coastal Waters”*.

Similarly, we support the NT EPA’s conclusion presented in Recommendation 9 that *“Requirements to achieve environmental protection outcomes must include: extensive baseline information, appropriate financial assurance, progressive rehabilitation, agreed rehabilitation objectives, completion criteria and monitoring of rehabilitation success. These requirements should be captured in specific closure and rehabilitation criteria and guidance developed by government with substantial industry and stakeholder input.”*

The following table extracts the critical findings of the Draft EPA Report with some additional comment by EDO.

Page	Statement
Draft EPA Report	
7/104	<p>List of key findings and conclusions</p> <p>3. Seabed mining activities can be broadly categorised into three classes, based on their potential for significant environmental impact:</p> <ul style="list-style-type: none"> • Manageable impacts – are likely in some relatively data-rich, low sensitivity locations. <p>Potentially significant impacts may be effectively managed under current environmental impact assessment and regulatory arrangements resulting in acceptable proposals.</p>

	<ul style="list-style-type: none"> • Uncertain impacts – are likely in some situations, based on either the impact of seabed mining or the condition/quality of the receiving environment. Potentially significant impacts may be effectively managed based on the extensive collection of new environmental information and knowledge prior to environmental impact assessment. • Unacceptable impacts – are likely in some situations where serious risks and high uncertainty remains and no amount of information or knowledge is likely to adequately address the residual impacts in a reasonable time and at a reasonable cost. The NT EPA considers these proposals are likely to be unacceptable and may trigger a recommendation for early refusal. <p>4. Currently, the lack of adequate environmental information and knowledge about the existing condition of environmental values and the potential impacts from seabed mining is a major barrier to the robust environmental impact assessment, approval and appropriate conditioning of seabed mining in the Northern Territory.</p> <p>....</p> <p>It will be important to communicate to proponents the considerable information requirements necessary for robust environmental impact assessment, including adequate baseline data that encompasses the substantial natural, temporal and spatial variation in marine and coastal environments.</p> <p>EDO comment – it would appear, given recommendation 4, that currently all potential development proposals would fit into the “unacceptable impacts” definition from Recommendation 3.</p>
8/104	5. Any NT seabed mining policy should ensure that data collected for the purposes of understanding the marine environment to support seabed mining must be made available to the broader community. Supported.
8/104	6. Should seabed mining be approved, relevant approvals should require environmental monitoring that informs regulation of proposal-specific management targets, as well as evidence-based understanding of environmental impacts to support future impact assessment and regulation of the industry. Data should be available to the public. Supported.
8/104	7. The NT EPA considers that the use of adaptive management would be highly problematic in managing the high levels of uncertainty and risk associated with the mitigation of potentially significant environmental impacts from seabed mining proposals. Supported.
8/104	8. The NT EPA considers that environmental offsets cannot currently be readily or easily applied to seabed mining proposals in NT coastal waters. The collection of pre-impact baseline data does not qualify as an environmental offset. Supported.
8/104	9. Requirements to achieve environmental protection outcomes must include: extensive baseline information, appropriate financial assurance, progressive rehabilitation, agreed rehabilitation objectives, completion criteria and monitoring of rehabilitation success. These requirements should be captured in specific closure and rehabilitation criteria and guidance developed by government with substantial industry and stakeholder input. (Pg 9) Effective rehabilitation and biological recovery is unlikely to be feasible where seabed mining removes or alters extensive areas of the seafloor or for seabed mining proposals greater than five years duration. Agreed.
9/104	10. Independent expert groups can provide valuable advice to regulators and industry during the planning, assessment, operational and rehabilitation stages of seabed mining projects, should seabed mining proceed in the Northern Territory beyond a limited number of small-scale operations. The cost of funding an expert advisory group would appropriately lie with the proponent with its scope and membership determined by the regulator in line with the ‘user pays’ principle. Supported.
10/104	There is currently limited information about the existing mineral resources and the environmental values of NT coastal waters. This limitation extends to substantial uncertainty about the likely impacts of most known seabed mining methods on the environmental values of the NT and on other resource industries, such as commercial fisheries and tourism. Agreed.
14/104	1.3.1 Seabed mining Seabed mining does not include mining in the intertidal zone, as considered by EPA (2012), but potential impacts from seabed mining on the intertidal zone and their management are recognised as an important component of this review. It is unclear how impacts on the intertidal zone will be assessed and managed, given it is excluded. This should be clarified.

15/104	1.3.3 Ecologically sustainable development Importantly, the precautionary principle, as defined in the EP Act, provides for circumstances where there are threats of serious or irreversible environmental damage. If there are threats of serious or irreversible environmental damage, then the lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. Supported.
16/104	2.0 Seabed mining techniques and experiences Many seabed mining proposals have not progressed to implementation due to the recognised poor state of knowledge of the affected environment and uncertainty around impacts from seabed mining (Miller et al. 2018, ECORYS 2014). Agreed.
16/104	2.1.1 Exploration Although marine seismic surveys do not directly disturb the seabed, the impacts of acoustic emissions on megafauna, marine fishes and benthic and pelagic invertebrates remain uncertain and contested (NOPSEMA 2018b). Agreed.
20/104	2.1.4 Remediation and rehabilitation In areas of direct disturbance where the seabed character has been substantially modified (e.g. changed from soft substrate to hard substrate), remediation and rehabilitation to the natural state are not practicably possible and some impacts are likely to be permanent. Agreed.
35/104	4.2 Marine environmental quality Water quality of the NT's coastal waters shows strong seasonal variation, with greater variability experienced in the wet season. Knowledge of this natural variability and changes within the water column is important in order to determine how changes of marine environmental quality are related to potential impacts from development proposals. For example, DEWHA (2007) identified a coastal boundary layer which traps sediment and nutrients from monsoonal rainfall events resulting in a turbid, eutrophic and highly productive layer extending to depths of 30 m. Despite this mixing, DEWHA (2007) noted that primary production is limited to surface waters due to turbidity. Agreed.
37/104	While the identity and distribution of marine vertebrate fauna is relatively well understood, the long-term trends for these populations, and the environmental processes that determine these, are generally not. Agreed.
37/104	The marine invertebrate fauna is more poorly known, with many species undiscovered and many recognised taxa that are not yet scientifically named. The distribution of benthic communities and habitats, which are important for marine fauna, is particularly poorly known. Agreed.
41/104	It is important to recognise that the high degree of connectivity in marine systems via the water column compounds the complexity of the marine environment and therefore the management of pressures to reduce any impacts of mining. This connectivity means that many pressures and impacts are shared, or partly shared, across the environmental factors described in section 4 and Table 2. A fundamental requirement for predicting and assessing environmental impacts and developing appropriate mitigation measures is an adequate knowledge base, both of environmental values, the processes supporting them and the interaction with pressures arising from development activities. Agreed.

2. The adequacy of NT regulatory requirements for environmental impact assessment – Appendix 3: The legal framework

Appendix 3 sets out the requirements of various Territory and Commonwealth Acts that would potentially apply to seabed mining in the NT, including the main mining and environmental legislation, and related legislation addressing issues including water, Aboriginal land, fisheries, heritage, pollution etc.

The Appendix analysis has a common theme of confirming existing legislation has not been drafted to specifically address seabed mining and there are numerous legislative and policy gaps in the regulatory framework. Many laws designed predominantly for assessing and regulating impacts on land do not necessarily translate to the seabed environment.

We note that the Appendix 3 report was prepared in 2017, prior to the passage and commencement of the new EP Act in the NT. We recommend that the final report address in more detail how the updated legislation may apply and identify how it would need to be strengthened to effectively assess seabed mining. To assist, we provide the following analysis of the EP Act.

Environment Protection Act 2019

For almost 40 years, the principal NT law aimed at protecting the environment from the impacts of major development was the *Environmental Assessment Act 1982 (NT) (EA Act)*. At a mere six pages and not having been amended in any meaningful way since 1982, the EA Act governed how the environmental and social impacts of major projects, such as mines, are assessed and approval decisions made in the NT.

The EA Act consistently failed to adequately safeguard against serious environmental, social and cultural impacts from development in the NT.¹ The EDO had long called for a complete overhaul of this failed system, welcoming the NT Government's delivery of legislative reforms during 2018 and 2019 and engaging closely with the consultation process to deliver a modern environmental protection regime that is more closely aligned with the rest of the country. With many of the EDO's recommendations in place, the EP Act was passed in September 2019 and commenced, repealing the EA Act, on 28 June 2020.² With the commencement of the new Act, the NT reached a hugely significant reform milestone bringing its outdated EIA laws into line with those of other Australian states and territories.

The EP Act represents a significant first step towards a more modern legal framework for the NT. If properly implemented, the EDO is optimistic it will result in far better outcomes for the environment and communities.

Strengths of the new Act that could apply to seabed mining

A key feature of the EP Act is the new environmental approval process. Where a proposed development has the potential to have a significant impact on the environment, it needs to proceed through the EIA process and require an environmental approval, regardless of the type of development. For the first time the Minister for Environment, on the advice of the NT EPA, issues these approvals, imposing conditions to manage the environmental impacts of the projects – and can follow up with compliance action if an approval is not adhered to. Importantly, the NT EPA also has the power to recommend a project be refused if it has unacceptable impact – if that recommendation is accepted by the Minister, the approval must be refused. As discussed above in relation to NT EPA Recommendation 3, it is likely that seabed mining proposals may have unacceptable impacts that would warrant refusal.

¹ EDO has been involved in numerous projects over the years which have illustrated the failure of the EA Act to operate as a proper safeguard including: (1) The approval, despite a recommendation of 'unacceptable impact', of the conversion of the controversial McArthur River Mine into an open cut mine which, in requiring the diversion of the McArthur River, has triggered numerous significant mine management and environmental problems that continue to this day; (2) The construction of Port Melville, off the coast of Darwin, without an NT environmental impact statement or approval, despite its potentially significant impacts on threatened species habitat; and (3) The approval by the Pastoral Land Board of over 20,000ha of clearing of native vegetation at Maryfield Station without any formal environmental impact assessment process, despite this clearing potentially amounting to 18.5% of the NT's annual greenhouse gas emissions.

² The *Environment Protection Act 2019* and the *Environment Protection Regulations 2020* (the **Regulations**) commenced on 28 June 2020. Together, they repeal and replace the *Environmental Assessment Act 1982* and the *Environmental Assessment Administrative Procedures*.

Other significant provisions of the EP Act that may be relevant to seabed mining include:

- Strong guiding objects and principles based on ecologically sustainable development and the best practice 'avoid, mitigate, offset' decision-making hierarchy;
- Emphasis on the importance of participation of Aboriginal people and communities;
- Inclusion of the mandatory consideration of "a changing climate";
- New tools the Minister can use for environmental protection, such as the power to declare protected areas and prohibited actions;
- Prescriptive consultation processes in the EIA process;
- Mandatory publication of information and publication of reasons for decisions; and
- Comprehensive compliance and enforcement powers, and significant financial penalties for breaches and offences.

If the moratorium was to be lifted (which we do not support), seabed mining could be a specific trigger and there could be clear criteria for making early refusal decisions based on unacceptable impacts under the EP Act framework. We note that the EP Act provides for two types of referral triggers, which require a proponent to refer an action to the NT EPA for assessment, including:

- an activity-based referral trigger (which identifies actions that the Minister considers are likely to have a significant impact on the environment)³; and
- a location-based referral trigger (which identifies areas that the Minister considers are of significance because of a feature of the natural or cultural environment and are likely to be subject to significant impact by actions).⁴

The Minister may declare (by notice in the *Gazette*) either or both of the referral triggers,⁵ and may specify circumstances in, and the thresholds above, which, actions are to be subject to the trigger.⁶

While this kind of mechanism would be appropriate for seabed mining, there are concerns about the adequacy of the EP Act to address all issues – these are discussed below

Potential limitations of the EP Act in relation to seabed mining

As noted, the commencement of improved EIA laws does not necessarily mean that environmental impacts of an activity are now manageable. The new legislation is not perfect. A key focus of both the NT EPA and the Department of Environment and Natural Resources (now the Department of Environment, Parks and Water Security) in developing and implementing the EP Act has been on making processes easier for proponents, not an emphasis on environmental protection. This means that the EP Act, while being a significant improvement, may not contain all the necessary safeguards and objective processes to effectively assess emerging activities such as seabed mining.

Disappointingly, the NT Government decided not to include vital third-party merits appeal rights, nor a broad open standing provision for judicial review, which together would support accountable decision-making, reduce corruption risks and support the rule of law and access to justice. In this context, we note that there are a number of recommendations from the *Independent Scientific Inquiry into Hydraulic Fracturing in the Northern Territory* that are

³ *Environment Protection Act 2019* (NT), s 29(2). As per section 11, a significant impact of an action is an impact of major consequence having regard to: the context and intensity of the impact; and the sensitivity, value and quality of the environment impacted on and the duration, magnitude, and geographic extent of the impact.

⁴ *Environment Protection Act 2019* (NT), s 29(3)(a)-(b).

⁵ *Environment Protection Act 2019* (NT), s 30(1).

⁶ *Environment Protection Act 2019* (NT), s 30(2).

relevant to any potential future regulation of seabed mining that should be in a best practice regulatory regime. These include:

- Unrestricted open standing rights for judicial review (recommendation 14.23)
- Third-party merits appeal rights (recommendation 14.24)
- Civil enforcement proceedings for third parties (recommendation 14.31)
- Requirement to consider cumulative impacts in decision-making (recommendations 14.19 and 14.21)
- Inclusion of public interest costs rules (recommendation 14.25), including for judicial review proceedings –
- Chain of responsibility provisions (recommendation 14.3) which would have the effect of ensuring ‘related parties’ to approval holders or those responsible for environmental harm (e.g. parent companies) can be held to be financially liable.

While the EDO acknowledges that many of the above recommendations are, to some extent, provided for in the EP Act,⁷ we would encourage the inclusion of third-party merits appeal rights and the strengthening of existing provisions, particularly if the moratorium is lifted and the impacts of seabed mining will be assessed and regulated under that framework.

In our view, there also remains excessive discretion on the part of the NT EPA in relation to some of its key decisions under the EP Act, especially in determining whether something will have a significant impact (defined in section 11). This is a threshold test, how it is interpreted by the NT EPA will be critical. Appropriate guidance materials are necessary to ensure decisions are made in accordance with the law and the intent of the new regime.

Another area of concern is that most of the requirements under the EP Act are actually provided for in the *Environment Protection Regulations 2020*, not the EP Act itself. Regulations can be amended more easily – it is preferable to have important requirements, criteria and safeguards set out in the Act.

There are also mechanisms under the EP Act to declare environmental objectives, protected areas, prohibited activity etc, but to our knowledge, no steps have been taken by the Minister for Environment to make any declarations under the Act, and we are concerned many positive aspects (like the ability to make these declarations) of the Act will never be utilised.

Although many other NT environmental laws are still in urgent need of reform (for example, and of particular relevance to the NT Seabed Mining Review - mining legislation), the EP Act presents a real opportunity to achieve significantly better – and more just – outcomes for the environment and communities across the NT. However, success of the new regulatory regime – especially if applied to new high risk activities such as seabed mining - will rely significantly on a culture shift on the part of the NT’s regulators, and proponents operating in the NT, to ensure that the new legislation is rigorously implemented, followed and enforced and – therefore – for the EP Act to live up to its promise.

In summary, while the EP Act framework is a significant improvement, in our view it would need further strengthening to adequately regulate an activity as uncertain as seabed mining.

Mining and related legislation

As confirmed by the DENR/Solicitor for the NT report, NT mining legislation - the *Minerals Titles Act (MT Act)* and *Mining Management Act (MM Act)*, were designed to assess,

⁷ See for example EP Act, s 230 (who may bring proceedings), s 236 (other orders), s 239 (order as to costs), s 276 (standing for judicial review) and ss 256-267 (liability).

regulate and approve land-based mines and are therefore not designed to address or manage the very different circumstances of seabed mining in dynamic marine environments.

In relation to the analysis in Appendix 3 of mining and other related legislation, we highlight the key concerns and findings in the following table. The extracts provide examples to illustrate that current NT laws are not able to comprehensively assess and regulate impacts of an activity like seabed mining in a clear, coordinated, and effective manner.

<p>Mining legislation</p>	<ul style="list-style-type: none"> • The MT Act operates in conjunction with the MM Act ...which provides for authorisation and management of the operational aspects of mining activities, including the extraction and processing of minerals, to ensure the protection of the environment. However, it is noted that the principles of ecologically sustainable development are not incorporated into decision making under the MT Act. • P13 - The seabed mining context likely involves technical and practical considerations that may not be appropriately reflected in the MT Act. For example, an extractive mineral permit allows extraction only from the natural surface of the land, but the natural surface of the sea floor may be subject to significant change due to tidal movements, and thus require special provision or limitation. To avoid uncertainty it may be appropriate to tailor specific types of titles to the seabed mining process for different substances. • Despite its application to land and waters, the MT Act also contains certain assumptions specific to land based mining. For example: <ul style="list-style-type: none"> • Certain stakeholders are identified based on their occupation or ownership of land being explored and mined. Because of the different nature of ownership of and interest in the seas, identification of stakeholders for seabed mining may need to be focussed on other matters, for example persons owning land within a particular radius or persons affected by or interested in particular water pollution or seabed mining in general. • Authorised activities include storage of waste on a title area. However, a stockpile of waste rock or dam of tailings on land is quite different from the disposal of waste into waters or onto the seabed, which may require specific provision. • Application of the MT Act as currently drafted to seabed mining may therefore result in uncertainties or unintended authorisation of inappropriate activities.
<p>Enviro assessment – p19 onwards</p>	<ul style="list-style-type: none"> • The MM Act can likely regulate seabed mining without excessive uncertainty. [EDO comment – Do not agree based on the current regulatory framework - this is inconsistent with the findings in the Draft EPA Report]. For example, an Authorisation and mining management plan can be tailored to the particular mining activities and their effects on the underwater environment. On the other hand, an example of some uncertainty can be found in the interplay between the MM Act and the Water Act (Water Act), which refers to waste and polluted water being confined within a mining site... Such confinement is impossible in the context of underwater pollution (caused by dredging for example) due to the tidal movement of water. So, the intended operation of the relevant provisions should be clarified for the seabed mining context. Given the scarcity of seabed mining in the Territory, policies, data and experience dealing with mining in the marine environment are lacking. For example, the Department of Primary Industry and Resources advises that its MM Act security calculation tool uses assumptions based on land rehabilitation strategies such as whether a pit will be backfilled and the associated costs. A methodology for identifying risks and costs in relation to seabed mining will need to be developed. This means data and training on seabed mining issues will be required, and government’s implementation of the MM Act would likely require significant review if effective regulation of seabed mining activities is to be achieved.

	<p>[Agreed]. As discussed below, other jurisdictions have seen fit to specifically provide a framework for offshore mining. Thus Authorisations (and conditions of mineral titles where relevant) need to be carefully drafted to ensure conduct that should be regulated under another Territory law is not inadvertently authorised.</p> <ul style="list-style-type: none"> • Parks & Wildlife Conservation Act – p 30 - Given the likelihood environmental impact assessment would occur where mining activities were proposed in a park or reserve, and the subordination of parks and reserves to mining interests in certain ways, appropriate provision for wildlife should be made in the mining interest under the MT Act and any Authorisation and mining management plan under the MM Act. Coordination between the Ministers for the TPWC Act and MT Act is already provided for in both Acts. Whilst certain protection of the environment would require an operator or mining interest holder to implement appropriate measures in relation to wildlife, to require them to obtain a permit under the TPWC Act where the issues are already dealt with under mining interests and approvals, may be a duplication of 'red tape'. [EDO Comment: This analysis does not give confidence that wildlife would be adequately protected, given the pre-eminence of mining authorisations]. • P36 – None of the primary Territory statutes relevant to seabed mining (being the EA Act, MT Act and the MM Act) give specific reference to decision making based on the principles of ESD. While each piece of legislation has scope to be applied consistent with the principles in the ESD Strategy, this is not mandated and thus the principles may not be applied fully. (The Offshore Minerals Act Cth - The OM Act does not incorporate the principles of ESD (p41) • P43 - In this respect, it is worth considering the nature of rehabilitation of marine environments, and if particular kinds of damage are capable of rectification by a licence holder, perhaps another form of contribution should be sought from proponents, such as an environmental offset or social and community benefits (It is noted that provision of social and community benefits may be the subject of a condition of an Authorisation under the MM Act). [EDO comment – do not support, again this is contradictory to the recommendation of the Draft EPA Report that offsets are not appropriate. Such measures would not actually offset the environmental impacts]
<p>Waste Management & Pollution Control Act – p 48</p>	<ul style="list-style-type: none"> • Government likely needs to develop a policy position as to what if any aspects of seabed mining should be subject to the WMPC Act. In this regard: <ul style="list-style-type: none"> • For the purposes of regulating contaminants and wastes from mining activities, there are obvious practical difficulties identifying whether wastes and contaminants disposed of in the marine environment are 'confined' to an area due to the very nature of marine environments and tidal movements. • The effects of seabed mining activities in terms of pollution of water and will be significantly different in the marine environment than the effects of mining on land. This calls into question whether the WMPC Act provides appropriately for seabed mining, even though ostensibly it applies to coastal waters. For example, it may not be intended that an operator is prohibited from allowing sediment affected water released during dredging to travel beyond the mining site, where the act of dredging itself and associated environmental impacts are addressed under the MM Act. • The WMPC Act may contain assumptions based on land based activities. For example, having regard to the ordinary usage of the term and the definition given in the WMPC Act,264 it is not clear how to delineate 'premises' in an area of ocean.

The inadequacies of the related legislation to address the specific seabed mining context and ensure any development is ecologically sustainable are of significant concern. EDO recommends that the significant reform plans for NT legislation – including mining legislation – must be progressed, consulted upon, and finalised before there is any future review about lifting the moratorium.

3. Consideration of impacts on First Nations and sea country – [Appendix 3 and 5: Social and cultural impacts \(2017\)](#)

EDO works with a number of First Nations communities and clients in the NT on a range of environmental and cultural heritage issues, and is concerned about the impacts of seabed mining on First Nations peoples and their sea Country.

In terms of current legal requirements, we note that Appendix 3 states:

Under the Aboriginal Land Rights (Northern Territory) Act 1976 (Cth) (ALR Act), traditional Aboriginal owners have proprietary rights in Aboriginal land which affect granting of interests in and activities on that land. There is a significant proportion of the coastline of the Territory which is Aboriginal land or under claim to become Aboriginal land. Grants of Aboriginal land abutting coastal and tidal waters are made down to the low water mark. This means that the grants include the intertidal zone between the mean high water and mean low water marks (i.e. where the tide comes and goes). Exploration for minerals on Aboriginal land can be prevented by traditional Aboriginal owners pursuant to a veto power (unless the Governor-General declares the national interest requires the licence to be granted). Part IV of the ALR Act sets out particular processes for the grant of an 'exploration licence' 'exploration retention licence' or 'mining interest' (as defined) on Aboriginal land. These processes generally involve negotiation between the applicant and the relevant Land Council, consultation by the Land Council with traditional Aboriginal owners, agreement of terms and conditions, and determination where an agreed position cannot be reached. When seeking an exploration licence or mining interest, a proponent may only commence negotiations with the Land Council with the consent of the Territory Minister responsible for administration of laws relating to mining for minerals. An interest or right granted in relation to the mining or development of 'extractive mineral deposits' is not generally considered to be a mining interest, but will be an estate or interest in land under section 19(11) of the ALR Act. This means that certain processes and consents are required in order to grant such an interest. Accordingly, where seabed mining involves Aboriginal land, the requirements of ALR Act will apply. This may be the case where a seabed mining operation involves activities above the low water mark, for example if a base of operations is established above the low water mark.

Further, Appendix 3 also sets out the application of the *Native Title Act 1993* (Cth).⁸

Separate to the description of the current legal framework in Appendix 3, and discussion of potential environmental impacts in Appendix 7 (discussed further below), Appendix 5 comprises a detailed literature review identifying many critical issues in terms of the potential social and cultural impacts of seabed mining in the NT, including extensive feedback from previous reviews and submission processes and research.

⁸ The *Native Title Act 1993* (Cth) applies to the whole of Australia and external territories, the coastal sea of Australia and each external territory, and any waters over which Australia asserts sovereign rights under the *Seas and Submerged Lands Act 1973* (Cth). Native title rights and interests could exist in any of these areas, and where operations span the low water mark it is very likely both regimes will apply to an operation. It is highly likely that the Native Title Act will apply to the waters even if the project is not adjacent to Aboriginal land. Accordingly, where seabed mining or its regulation might affect native title rights and interests, the requirements of the Native Title Act will apply. This may be the case for example, where native title is found to exist over a relevant area of the seabed. To the extent a Territory law is capable of operating concurrently with the Native Title Act, the Native Title Act does not affect the Territory law, but if it cannot operate concurrently the Territory law may be overridden. This means that for clarity, any Territory legislative action in relation to seabed mining should be carefully drafted to avoid conflict with the Native Title Act.

The Truth North Report makes two key conclusions:

The primary recommendation arising from this research paper is that regulation is not the answer to complex social and cultural issues. This goes against the lessons of modern policy-making, regulation that is 'responsive' to context (Drahos & Krygier, 2017, p.5) and governments that are responsive to the people, ensuring economic and social policies address their needs and aspirations (Magis & Shinn, 2009 p.10). The answers lie in collaborative learning, dialogue, early identification of issues, proponents with the right attitudes and aptitude and giving impacted communities choice and control. Government can play a key role in assessing whether companies have done this appropriately, been transparent, been responsive to issues raised, earned their social licence to operate and implemented the appropriate studies and management plans.

The second key recommendation is that the Northern Territory Government currently lacks the capacity and skills base to appropriately oversight, regulate or even understand whether companies are adequately addressing social and cultural impacts and, more importantly, how accountable they are in managing impacts post-approvals.

With regard to the first recommendation, we agree that collaborative learning and dialogue is absolutely critical, but we do not necessarily agree that regulation has no role in this context – particularly in terms of establishing clear requirements for free, prior and informed consent, and establishing rights over Aboriginal land including the intertidal zone. These issues are discussed below.

The second recommendation relating to the lack of capacity to understand and regulate social and cultural impacts provides further justification for keeping the seabed moratorium in place.

Free, Prior and Informed Consent

We note that Appendix 5 refers to the need for free prior and informed consent, and notes that in the NT it is the statutory responsibility of the Land Councils to ensure that Aboriginal people have provided free, prior and informed consent to development on their land and seas (p81).

However, it is not explored in detail how this would be done in relation to seabed mining proposals that would impact on Aboriginal land, including the intertidal zone.

Free, prior and informed consent is a vital part of Australia's international law obligations and must be viewed as applying more broadly than just cultural heritage legislation. It must also apply to environmental and development laws (and other associated laws such as water and land administration). Further, First Nations must be the primary decision-makers. Currently, in our view, no relevant cultural heritage, environment or development legislation in Australia adequately reflects the requirements of free, prior and informed consent obligations under our international law commitments, however, we note that the *Northern Territory Aboriginal Sacred Sites Act 1989 (NT Sacred Sites Act)* and the *Aboriginal Land Rights (Northern Territory) Act 1976 (Cth)* are considered to partially achieve the United Nations Declaration on the Rights of Indigenous Peoples (**UNDRIP**) standard.⁹ While not containing a general veto right, the NT Sacred Sites Act does place significant emphasis on the identification of and mandatory consultation with the custodians of sacred sites, together with either their agreement, or a finding by the Aboriginal Areas Protection Authority (**AAPA**) that any potential works do not pose a substantive risk of damage or interference to a sacred site.

⁹ McGrath, P.F and Lee, E. 2016 The fate of Indigenous place-based heritage in the era of native title in McGrath, P.F. (Ed.) *The Right to Protect Sites: Indigenous Heritage Management in the Era of Native Title*. AIATSIS Research Publications, p 134.

Although, there are a number of aspects to the legislation that undermine these provisions, including the power of proponents to appeal to the Minister for an Authority Certificate to be issued, the fact that in operation, the system can result in significant pressure being placed on custodians to provide their agreement, or in some cases, assertions about the incorrect identification of custodians of sacred sites by proponents, as has been identified in respect of the controversial McArthur River Mine Overburden Management Project¹⁰ which is located in the remote Gulf of Carpentaria region in the NT. We would argue that legislation and regulation does play a critical role in relation to these critical rights and determining how to operationalise free, prior and informed consent must be a key part of the NT EPA's final report and any future review of potential seabed mining in the NT.

These issues are explored further in a recent EDO submission to the Inquiry into the destruction of 46,000 year old caves at the Juukan Gorge in the Pilbara region of Western Australia. That submission contains recommendations and best practice standards that are also relevant for the NT seabed mining context including:

- Legislation must be consistent with Australia's international obligations and the UNDRIP.
- First Nations must be the primary decision-makers about their heritage. First Nations decision-making processes must be respected, supported, and properly resourced.
- First Nations must give their free, prior and informed consent in relation to decisions that impact protection of their heritage.
- Determining how to operationalise free, prior and informed consent must be a key part of any review process, and the review must be led by First Nations.¹¹

The analysis contained in Appendix 3 in relation to the legal framework and in Appendix 5 in relation to assessing potential cultural impacts of seabed mining, confirms significant complexities and challenges that are not adequately addressed in the NT, and in our view, evidence the need to retain the moratorium.

In preparing the NT EPA's final report (and in conducting any further review of seabed mining in the NT), EDO considers it is critical to consult directly with all First Nations communities that may be affected by seabed mining proposals to understand their views about the proposals and the aspirations for their Country.

Impacts on the intertidal zone Aboriginal Land

The 2012 NT EPA report did not address the intertidal zone or the Blue Mud Bay case¹² substantively, and under the NT Seabed Mining Review, the intertidal zone has been excluded from the definition. As noted, it is unclear how impacts on the intertidal zone will be assessed and taken into account in the current Review. EDO is concerned that this has significant implications for our clients and First Nations coastal communities in the NT.

This is an issue that needs to be more clearly addressed and consulted upon. Given that the intertidal zone is Aboriginal land, similar to any other sort of land adjoining the sea, there are dangers to that land from offshore mining (for example pollution spills) – and in this case those dangers (for a significant portion (the majority) of the coast of the NT) are disproportionately to Aboriginal land.

¹⁰ See for example, the submissions by the EDO and Northern Land Council in response to the draft Environmental Impact Statement for the McArthur River Mine Overburden Management Project, as annexed to the NTEPA's Assessment Report 86:

https://ntepa.nt.gov.au/__data/assets/pdf_file/0004/553081/mrm_overburden_assessment_report.pdf

¹¹ The full submission is available at: <https://www.edo.org.au/wp-content/uploads/2020/08/200814-EDO-Submission-Inquiry-into-Juukan-Gorge-destruction.pdf>

¹² For further analysis see: <https://auspublaw.org/2017/06/what-happened-to-the-historic-blue-mud-bay-case/>

We note that Appendix 3 discusses the significance of the Blue Mud Bay and Croker Island decisions in 6.3. However, it is important to recognise that due to the continuing amnesty, Traditional Owners in the NT are not currently controlling access to the waters of the intertidal zone as the *Blue Mud Bay Case* determined was their legal right.

Butterly (2020)¹³ summarises the current situations in the following way:

Immediately after the *Blue Mud Bay Case* was handed down, an interim ‘amnesty’ came into operation that was agreed between the NT Government and Traditional Owners (represented by three Aboriginal Land Councils),¹⁰ ‘so that nothing changed in practice “on the water”’.¹¹ Recreational and commercial non-Indigenous fishers ‘could continue to fish and access the intertidal zone without permission from the Traditional Owners’.¹² The Traditional Owners and the NT Government agreed that the best way to move forward was to negotiate. These negotiations have now been ongoing for over ten years. The amnesty has generally been renewed annually (but there have been some regional variations over the years).¹³ In more recent years, the renewal of the amnesty has been contentious. On some occasions, it has been preceded by threats from Traditional Owners to not extend the amnesty and to, therefore, require non-Indigenous fishers to apply for permits to enter the intertidal zone.¹⁴

The transition to negotiation opened a new context that escaped the rigidities of litigation. Negotiations had the potential to provide ‘opportunities as well as rights’.¹⁵ There are two opportunities that appear to have been the focus of Traditional Owners in the Blue Mud Bay negotiations: involvement in broader marine governance, and the ability (legally and economically) to participate in the commercial fishing sector. Both opportunities have been sought beyond the intertidal zone. The *Blue Mud Bay Case* is a ‘bargaining chip’ that has been used to leverage negotiations beyond the rights determined by the High Court. Due to the continuing amnesty, Traditional Owners in the NT are not currently controlling access to the waters of the intertidal zone as the *Blue Mud Bay Case* determined was their legal right. However, the ongoing negotiations, as at mid-2020, demonstrate that the Traditional Owners are powerful actors in possession of strong legal rights.

EDO recommends that even though the intertidal zone is excluded, there needs to be more fulsome consideration of the impacts that seabed mining would have on this Aboriginal land. As noted above, the legal framework must ensure First Nations peoples are the primary decision-makers in relation to their land and heritage.

4. Appendix 7: Seabed mining in the NT (2017)

This part of the submission highlights key concerns and issues identified in Appendix 7 – Seabed Mining in NT.

Appendix 7 recommends on page 116/140 “*In the absence of adequate baseline physio-chemical and biological data, a minimum of 24 months of baseline data should be collected to inform the assessment process and to focus on areas of high scientific uncertainty.*” EDO submits that this is extremely important and **must** be a requirement if the NT decides to lift the moratorium. Further, any scope of works for such baseline studies must be subject to a transparent public consultation process. Without this critical transparency, the public cannot be expected to trust the process will be approached with rigour and free from bias or undue influence from industry or other government agencies with a potential conflict of interest in the outcome.

Similarly, as stated on page 116/140 of Appendix 7 “*the largest and most significant uncertainty is often related to the lack of information about the marine environment itself.*”

¹³ Lauren Butterly, ‘Reconciling Indigenous and Settler-State Assertions of Sovereignty Over Sea Country in Australia’s Northern Territory’ (PhD Thesis, University of New South Wales, 2020).

Without a detailed understanding of the area of interest, it is not possible to undertake an assessment of impact”.

It is not possible for proponents to plan and mitigate impacts if they cannot accurately predict those impacts. In addition, models that would be utilised to create this understanding also contain inherent uncertainties, as “there are currently no industry standards for calibrating the models”, which thus compounds the levels of uncertainty and increases the risks of unidentified or under-predicted impacts occurring.

Specific comments and issues are identified in the following table.

Appendix 7 – Seabed Mining in the NT	
32/140	<p>Sharks, Rays and Sea Snakes</p> <p>EDO comment – Hammerhead sharks are not listed as being present in this report. They are likely to be present and are listed as threatened on the IUCN Red list, however, due to the listing as Conservation Dependent under the <i>Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)</i>, they are not considered a Matter of National Environmental Significance (MNES). This may change with the potential update of the EPBC Act, however, Hammerheads are likely to be found in significant numbers in NT waters, and do rely heavily on inshore coastal habitats for pupping and nursery areas. Due to excessive fishing pressure in Indonesia, it would be important not to further impact on these species in NT waters.</p> <p>Long-fin and short-fin makos are also listed on the Government website (http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl) as likely to occur in NT waters. They are listed as Migratory, and given NT’s proximity to Indonesia, the sharks occurring in this area are likely to be from a shared stock. Impacts on these species have not been considered, however, impacts on these species will be similar to other shark species, and will be impacted by hydrogeological changes, or any water quality impacts that affect the food availability or the bioaccumulation of heavy metals.</p>
34/140	<p>3.2.5 Sawfishes</p> <p>EDO comment – the information relied on in this section is quite out of date. There have been many scientific papers published on the habitat needs and requirements of these species in the past 10 years. Relying on data from 2008 is not appropriate. We note that the NT information sheet about these species contains more accurate information than this report.</p> <p>For example:</p> <p>https://www.publish.csiro.au/MF/MF15427 2016 - Contrasting population structure of three Pristis sawfish with different patterns of habitat use (Phillips et al – CSIRO)</p> <p>https://www.int-res.com/abstracts/esr/v21/n2/p171-180/ - 2013 - Distribution, relative abundance and risks from fisheries to threatened Glyphis sharks and sawfishes in northern Australia (Field et al)]</p>
64/65	<p>4.4.2 Sedimentation</p> <p>Hendrick et al. (2016) demonstrated that the ability for macroinvertebrate species to resist mortality or emerge from burial was dependent on the species and its coping mechanisms, the individual’s size, particle size and duration and depth of burial. Increased duration and depth of burial, along with decreasing sediment size resulted in increased mortality.</p> <p>The review revealed that the literature commonly reports on changes in species composition and distribution, inhibition of settlement and recruitment and the decline/mortality/removal of species as the top three effects attributed to sedimentation on rocky coasts....</p> <p>Corals tend to be more impacted by low-levels of sedimentation than other benthic species and habitats.....</p> <p>A review of sedimentation on corals with an emphasis on dredging, conducted by Erfteimeijer et al. (2012), found that sedimentation rates that can be tolerated by different species ranges from less than 10 mg cm-2 d-1 to more than 400 mg cm-2 d-1 and in some species, are able to tolerate more than a month of high sedimentation, and more than two weeks of complete burial.</p>

	<p>EDO Comment – this section does discuss the impacts on coral and other sessile and benthic species, however it then goes on to discuss the “Ichthys Nearshore Environmental Monitoring Program” for coral and seagrass monitoring. It goes on to suggest that the impacts of sedimentation did not result in any real impacts to coral reefs, as there was no reduction in coral cover.</p> <p>As discussed further down in the report, impacts from sedimentation are more nuanced than just using a reduction in coral cover as a measure of impact. Sensitive corals will be replaced by more hardy corals, so there can be a reduction in biodiversity, as many species are replaced by a few species, such that the other species higher up the ecosystem that rely on those different more sensitive species will also be impacted, and have a reduced habitat and food availability. This is discussed later in the document, but is glossed over in this section. There are many reports from mining operations and scientific reviews that indicate this to be true – as indicated later in the report as well. It is important to ensure that any future policies created do no rely on this single example of coral and seagrass monitoring or utilise loss of coral cover as an appropriate trigger limit or definition of impact.</p>
66/140	<p>4.4.3.1 Organic Enrichment</p> <p>During extraction, or from overspill and screening, organic matter and nutrients bound to sediments will be released into the water column. This can lead to eutrophication, particularly where nitrogen and/or phosphorous is introduced given plankton growth is nitrogen and phosphorous limited (Boesch 2001; Garrison 2007). The increase in nutrients can stimulate the growth of phytoplankton. Once the organisms begin to decay however, they deplete oxygen levels, which can produce hypoxic or anoxic conditions (Charlier 2002; Phua et al. 2004; Garrison 2007; Johnson et al. 2008).</p> <p>.....Decreased oxygen content at the seabed can also arise from the release of contaminated or disturbance of anaerobic sediment layers during extraction (Gubbay 2003; Johnson et al. 2008). Hypoxic (and anoxic) conditions can kill organisms or lead to persistence of stress-tolerant species, reducing the biological quality of the ecosystem (Garrison 2007; Johnson et al. 2008). Community composition may change, as species that have a higher tolerance to organic loading, such as polychaetes may become dominant compared with less-tolerant species, such as arthropods (Lenihan et al. 2003). Hanson et al. (2014) report that dissolved oxygen concentrations below 6 ppm may adversely affect exposed fish or macro-invertebrates. Nutrient enrichment can also lead to increased macroalgal growth in shallow waters with ample light penetration (Boesch 2001). It may also result in blooms of microalgae.....</p> <p>Furthermore, oxygen deficiencies persisted in the furrows, 6-10 months following cessation of dredging. [Birkland and Wijsman (2005)] Agreed.</p>
67/140	<p>4.4.3.2 Release of contaminants</p> <p>Irrespective, where mining involves the extraction of an ore body (rather than sand and gravel) the chemical properties of tailings and waste rock that are disposed to sea require detailed assessment to ensure that release of metals into the water column can be quantified. Agreed.</p>
74/140	<p>4.5 Impacts from Tailings Disposal</p> <p>Potential detrimental effects generally fall into two categories, namely water column effects (i.e. exposure to suspended sediments) and sedimentation effects.....</p> <p>.....onshore disposal at reclamation sites can result in changes to the hydrodynamic, sediment transport and groundwater regimes of the area odour and visual impacts and various ecological impacts, including habitat destruction.</p>
75/140	<p>The study by Asmend and Johansen (1999) provides an example of the short and long term environmental effects from marine tailings and waste rock disposal into the marine environment. The study was based on the discharge of tailings from a lead/zinc mine into sea below 60m water depth, after a land-based tailings disposal system could not be constructed. Widespread contamination of bottom waters ensued as the dissolution of lead and zinc from the</p>

	<p>tailings and waste rock was underestimated, which then led to bioaccumulation of metals in seaweeds and mussels.</p> <p>Other studies such as Stronkhorst et al (2003) assessed the environmental impact of the long-term disposal of moderately contaminated dredged material into dumping sites located in 18-21m water depth in the North Sea.....The study concluded that benthic macrofauna at and near the disposal sites was primarily and adversely affected by physical disturbance (burial, smothering) rather than the presence of contaminants.</p> <p>Overall, the most common observation from disposal operations is a decrease in macrofaunal abundance and species richness at the disposal site (Bolam et al., 2006; Powilleit et al., 2005; Witt et al., 2004) during the disposal activity, followed by recovery that can vary from months to years.</p>
76/140	<p>4.6.1.1 A single operation</p> <p>Any one impact or stressor by itself, may have minimal impact to exposed flora and fauna, however the interaction of several factors are also likely to have a larger, longer-lasting overall effect (Hanson <i>et al.</i> 2004; Halpern <i>et al.</i> 2008). An example of a triggered successional impact is increased turbidity inducing eutrophication, which may lead to hypoxic or anoxic conditions on the seabed (see Section 4.4.3.1).</p> <p>....For example, a species or community already living at its upper tolerance limit may reach a critical limit when subjected to further disturbance such as seabed mining, even if it is just a once off event or operation (Hitchcock and Bell 2004).</p>
76/140	<p>4.6.1.2 Multiple operations</p> <p>Gubbay (2003) notes that recovery times of impacted species may be increased where there is disturbance in adjacent areas. Furthermore, cumulative effects can occur on the seabed where resources are already being exploited. For example, bottom trawling occurs for the Northern Prawn Fishery over extensive areas in the Northern Territory (Deng <i>et al.</i> 2005). Similar to shallow seabed mining, the primary environmental impact of bottom trawling is direct disturbance to the seabed (see Jones 1992 for review) and therefore, cumulative impacts from multiple operations (either occurring concurrently or through time) affecting the seabed may occur and should be considered. Agreed.</p>
77/140	<p>4.6.2 Cumulative Impacts from Seabed Mining in the Northern Territory</p> <p>Multiple and successive environmental impacts from existing pressures combined with the potential impacts arising from future seabed mining may result in significant cumulative impacts that may not have otherwise been expected. Furthermore, impacts to a single organism or species may be less concern compared with the cumulative effects on the wider ecosystem.....</p> <p>However, examples of environmental cumulative impacts that may arise as a result of seabed mining in the Northern Territory can be hypothesised based on the review of environmental impacts and the existing environment. These may include:</p> <ul style="list-style-type: none"> • Modification of seabed topography, increasing wave attenuation and subsequent beach and coastal erosion • Modification of sediment characteristics (such as sediment granulation), altering species richness, biomass and diversity • Increased suspended sediment loading leading to reduced light attenuation, particularly in shallow waters • Introduced marine pest species displacing native species through competition for light and space, thus changing the community ecology of the area • Alterations to predator-prey relationships and distributions as a result of removal or alteration of species' habitats • Modification of the spatial distribution and extent of habitats (through direct removal or fragmentation of habitats) alters the distribution and extent of the fauna that utilise those habitats (i.e. impacts to seagrass meadows affecting critical dugong and turtle feeding grounds)

	<ul style="list-style-type: none"> Exacerbated environmental impacts as a result of several operations within close proximity to each other; or Repeated mining operations through time increase recovery periods, and subsequently the likelihood of the ecosystem returning to its pre-impacted state is reduced. <p>Overall, understanding the effects of these cumulative pressures is extremely challenging as the multiple pressures may interact in complex ways, generating effects which are greater, and much more difficult to predict, than a simple summation of individual impacts (McCook et al. 2015).</p>
82/140	<p>5.3 Modelling to Inform Impact Assessment</p> <p>As stated by Bray (2008), the more sophisticated the models become, the more data is needed for setup and validation.....</p> <p>Quantifying and modelling the transport and fate of sediments released during dredging (and mining) operations is essential to predicting the environmental impact of large-scale coastal developments. Agreed.</p>
83/140	<p>5.3 Modelling to Inform Impact Assessment (cont.)</p> <p>There are currently no industry standards for calibrating the models. Usually hydrodynamic models are calibrated with field measurements of currents, water levels and waves and capable of reproducing the dynamics in the study region. However, sediment transport models are not always calibrated and ways of calibration vary greatly, partly due to differences in quality and quantity of data. Therefore, large uncertainties in modelling results often exist ((Sun et al 2016).</p> <p>EDO comment – This compounds the problems of uncertainty regarding seabed mining. The NT marine environment itself is largely unknown or unstudied, plus, the models that would or could be used to predict impacts have inherent uncertainties within them as well. Being able to adequately account for all the uncertainty would take a lot of resources to capture enough data in the first place, and then to test and verify the adequacy of any models developed that are going to be used to predict the impacts. There would need to be quite onerous management measures in place following an approval to ensure that any impacts created by a project were within the predicted impacts envelope of a model. If they are not, then the project should cease until updated models and impacts are created and the overall project impact is reassessed. This would be quite onerous for industry, and is likely to make such projects unviable.</p>
84/140	<p>5.4.1 Tolerance Limits for Turbidity and Sedimentation</p> <p>Threshold definition is particularly difficult for inshore areas, where there can be naturally high and variable background conditions of turbidity and sedimentation and benthic communities may show high tolerance to increases in turbidity and sedimentation caused by dredging (Ports Australia, 2014). The same report also reiterated that research to develop site-specific thresholds, particularly for subtropical and tropical inshore communities that often naturally experience high levels of turbidity and sedimentation can be time-consuming and expensive. The use of locally-derived tolerance thresholds is generally only feasible for major, long term projects.</p> <p>EDO Comment – Using general thresholds (as has been done in WA, Pilbara region, can present a problem when there is so much natural variation as there is in the NT, as they may not take into consideration site specific sensitivities and means impact or harm could be occurring before any trigger limits have been hit. A thorough knowledge of the marine environment, including adequate baseline data in order to accurately model the possible impacts would be preferable to implementing standard trigger limits in the NT.</p>
89/140	<p>Section 5.4.1.2 – Corals</p> <p>The durations that corals can survive high sedimentation rates range from < 24 hours for sensitive species to > 4 weeks for very tolerant species. T</p>
97/140	<p>Section 5.5.1 - Recovery</p> <p>Therefore, the assemblages most affected by seabed mining in the region will be the benthic macroinvertebrate community and pelagic predators that rely on it. Changes in the</p>

	macroinvertebrate community may have long-term implications, particularly where the physical environment is altered.
98/140	<p>Recovery following seabed mining generally supports ecological theories of succession....</p> <p>...Reef communities or deep-water sand and gravel sites tend to experience little natural disturbance and are therefore characteristic of “K-selected” species and not adapted to or tolerant of disturbance. Subsequently, the recovery of these systems may take many years.</p> <p>EDO comment - This is critical to know prior to authorising seabed mining in particular areas. If the seabed is dominated by species of this nature, there will likely be a shift/loss in biodiversity, where the area will be taken over by species that are more resilient to disturbance, and may hinder the ability of the seabed to return to pre-disturbance states. This is particularly the case with corals, where biodiversity loss, rather than coral cover loss, is the main alteration, where the more sensitive corals are lost, and hardy corals like Acropora will survive. Then all the flow on species that rely on the more sensitive corals will also be affected. This has been demonstrated on a number of coral reefs that have been subject to dredging in nearby waters (Erftemijer et. al (2012)).</p>
99/140	An understanding of the benthic invertebrates that inhabit the proposed mining area will assist in the subsequent recovery of the affected system. Agreed.
100 & 101 /140	<p>Section 5.5.3 – Rehabilitation</p> <p>Rehabilitation of the sea floor following seabed mining is very challenging, given the wide-ranging potential impacts and interrelationship between the varying effects.</p> <p>.....</p> <p>(Page 101)... Cooper et al. (2011) suggest before restoration of the seabed, a site-specific feasibility assessment should be conducted, establishing the:</p> <ul style="list-style-type: none"> • thickness and extent of the overburden resulting from dredging potential for natural recovery • significance of the changes for the health of the wider ecosystem and other legitimate interests • quantity of material required for restoration, compared with the quantity of material extracted over the history of the site • source and nature of the gravel material to be used for gravel seeding and any requirement for screening • impact of the screened sediments on restoration efforts • likelihood of long-term success, accounting for local conditions, and • the financial and environmental costs and benefits of restoration.
103/140	<p>Where there is a threat of serious or irreversible environmental damage and scientific uncertainty as to the environmental damage, there is a need to apply the precautionary principle.....</p> <p>With respect to seabed mining in NT waters, the threats and exposure pathways associated with mining are generally well understood, whereas the baseline scientific knowledge of much of the marine and coastal environments of the Northern Territory remain incomplete and poorly described outside selected areas such as Darwin. Agreed.</p>
104/140	<p>Section 5.7 – Application of Best Practice</p> <p>There are currently no recognised International best practice guidelines for minimising or mitigating environmental impacts from seabed mining.</p>
107/140	<p>The recent work by Short et al. (2017) examined the effects of dredging-related pressures on critical ecological processes for a range of marine organisms. The assessment included identification of potentially critical periods and locations when mitigating scheduling and processes, environmental windows (EWs) could be employed to reduce the impact of dredging on non-coral and non-fish biota, which would also equally apply to seabed mining impacts.</p> <p>EWs, or the cessation of dredging during ecologically sensitive periods, can be an effective management tool if they are set properly. In addition to an understanding of environmental conditions, this requires location-specific knowledge of the timing of sensitive periods in the life histories of the key or dominant habitat forming organisms present</p>
116/140	As mentioned in Section 5.6, the largest and most significant uncertainty is often related to the lack of information about the marine environment itself. Without a detailed understanding of the area of interest, it is not possible to undertake an assessment of impact. This is of

	particular relevance to the NT marine environment as large areas of the territorial sea remain poorly studied or described. Agreed.
116/140	<p>Based on the outcomes of this review, the following guiding principles should be adopted as a starting point in assessing any future proposals involving seabed mining in the NT marine environment:</p> <ul style="list-style-type: none"> • Prohibit mining in areas containing sensitive or unique marine benthic habitats or areas that are of important spawning and feeding significance to commercially important and environmentally significant marine species; Supported • Complete a comprehensive characterization of the proposed seabed mining site and its resources as part of the environmental assessment; • In the absence of adequate baseline physico-chemical and biological data, a minimum of 24 months of baseline data should be collected to inform the assessment process and to focus on areas of high scientific uncertainty; Supported • The optimum dimensions of the seabed mining site should be determined so that the effects on the greater marine environment can be minimised; • The use of conceptual models can be effective in estimating the effect of massive and/or long-term mining on the surrounding marine environment including the seabed, water column and coastal habitats; • Assess the effect of massive and/or long-term seabed mining on the ecological structure of the seabed including a thorough assessment of the spatial and temporal distribution of potential impact; <p>Supported.</p>