



Seabed mining threatens Top End treasures



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Table of Contents

| | |
|--|----|
| Foreword | 3 |
| Executive summary | 4 |
| Seabed mining: The Top End story so far | 5 |
| Environmental impacts of seabed mining | 7 |
| Cultural and social impacts of seabed mining | 16 |
| Economic impacts of seabed mining | 18 |
| Conclusion and recommendation | 25 |
| References | 26 |

Figures

| | | |
|-----------|---|----|
| Figure 1. | Areas most immediately at risk from seabed mining in the Northern Territory if the Moratorium is lifted | 10 |
| Figure 2. | Limmen Bight and Sir Edward Pellew Islands - proposed seabed mining areas and the fishing features that could be impacted | 20 |
| Figure 3. | Groote Eylandt and Blue Mud Bay - proposed seabed mining areas and the fishing features that could be impacted | 21 |
| Figure 4. | Wessel Islands - proposed seabed mining areas and the fishing features that could be impacted | 22 |
| Figure 5. | Tiwi Islands - proposed seabed mining areas and the fishing features that could be impacted | 23 |
| Figure 6. | Hyland, Anson and Fog Bays - proposed seabed mining areas and the fishing features that could be impacted | 24 |

Tables

| | | |
|----------|--|----|
| Table 1. | Mining applications in Territory and Commonwealth waters | 10 |
| Table 2. | Areas most immediately at risk and their habitats and species | 11 |
| Table 3. | Environmental impacts from seabed mining | 12 |
| Table 4. | Marine habitats, animals and ecological processes at risk from seabed mining | 14 |



Limmen River Fishing Camp: fishing camps in the NT's remote areas are threatened by seabed mining.

Foreword

Lorella Springs has been described as ‘in the middle of nowhere’. But for those of us who live here, it’s in the centre of somewhere very special.



Tucked away in the south-west corner of the Gulf of Carpentaria and overlooking Limmen Bight, it is one of Australia's most remote coastal areas.

My family and I first arrived here in the mid-1980s to run Lorella Springs as a cattle station. Today, ecotourism is our focus in what is now the 4000km² Lorella Springs Wilderness Park. This is an area of natural paradise larger than the greater Darwin region.

We might not be members of the royal family, but when we gaze across the vast intertidal flats covered in migratory shorebirds, walk along unspoilt beaches where turtles are nesting, glimpse dugongs feeding on seagrass meadows and swim in hot springs, we all feel like kings and queens in the majesty of this realm. And one of the best parts about living here, is we get to share this magical place with visitors from all over Australia and the world.

It is the region's remoteness, and its diverse, rugged and beautiful landscapes, that attracts more than 10,000 visitors to the wilderness park each year. Visitors describe Lorella Springs as 'such an amazing place', 'a pristine paradise' that is 'stunning' with 'so many beautiful spots' and 'amazing billabongs and hot and cold waterholes'.

Many visitors return, while some wish they could stay for longer; all want to see the region protected. When a road was illegally carved through the park by a mining company a few years back, our visitors were shocked that the desecration could occur in such a beautiful place.

Lorella Springs is a long way from the cities and towns of Australia but nowhere appears too remote for the seabed miners. The Gulf, Limmen Bight and many other areas along the Top End coastline are now at risk as the scheduled end of the seabed mining moratorium approaches in March 2021. There's an application to conduct seabed mining along the coastal area stretching the 27km length of Lorella Spring Wilderness Park. I'm worried about the damage this would do to this precious place, for the fish, the turtles and dugongs. I also worry that tourists will no longer want to come.

Seabed mining would bulldoze and rip apart the seagrass meadows and intertidal flats of Limmen Bight. The construction of roads, jetties and processing plants that could follow would destroy coastal habitats and the region's appeal. The ecotourism lifeblood will be drained from this regional community.

Lorella Springs, Limmen Bight and the Top End coasts are too important to lose, not just for me, my family and our livelihood, but also for Territorians, Australians and the world.

Rhett Walker and his family own and operate the Lorella Springs Wilderness Park.

Executive Summary

The Top End has some of the last intact tropical seas and coasts in the world, of national and international significance and something to be treasured and protected. But this unique mix of seagrass meadows, coral reefs, mangrove forests, estuaries and vast intertidal flats that support the Top End's culture and economy are now under the looming threat of seabed mining.

Although seabed mining applications to explore iconic places, such as Hyland, Anson, Fog and Blue Mud Bays, the Elcho and Wessel islands and Limmen Bight Marine Park, are currently on hold due to the Northern Territory Government's seabed mining Moratorium – the Moratorium is scheduled to end in March 2021. If the Moratorium is lifted, seabed mining applications in these areas will be open to proceed and mining interests would be free to extend to other important areas of the Top End.

The Northern Territory Government first declared a three-year Moratorium on seabed mining in March 2012 and has since extended it twice under both the Country Liberal Party (CLP) and Labor Governments. The Moratorium was declared after the Northern Territory Environment Protection Authority (NTEPA) advised¹ that there was insufficient knowledge about the Top End's marine and coastal environments, the potential impacts from seabed mining and the availability of impact-mitigation measures.

With the Moratorium soon to expire, the NTEPA is again reviewing the issue and has commissioned a number of reports² covering Top End environments, seabed mining processes and potential environmental impacts (Department of Environment and Natural Resources (DENR) and Advisian reports), cultural and social impacts (TruNorth and Cosmos Archaeology reports) and the legal reforms that may be needed were seabed mining allowed to proceed (Department of Environment and Natural Resources (DENR) and Solicitor for the Northern Territory (SFNT) Report). The Keep Top End Coast Healthy (KTECH) alliance has obtained these reports under Freedom of Information (FOI) laws and they form the basis of this report, supported by further desktop research.

The reports obtained under FOI provide comprehensive evidence to the NT Government and Territorians that seabed mining would have an unacceptable impact on the Top End's unique coastal waters, culture and fishing lifestyle. The potential destruction of habitats, the pollution of coastal waters, the disruption to the life cycles of marine animals and plants, and the undermining of ecological processes are clearly laid out in the DENR and Advisian reports.

Although the mining industry may claim that seabed mining will boost regional and remote economies where mining operations occur, the TruNorth report reveals that such promises rarely if ever materialise and are far outweighed by the very real negative cultural and social impacts that could occur in Indigenous communities.

The DENR/SFNT report clearly shows that the mining statutes, the *Minerals Titles Act* and *Mining Management Act*, have been designed around land-based mines and are ill-equipped to cope with the very different circumstances of seabed mining in dynamic marine environments.

The documents, along with other research for this report, reveal that the introduction of seabed mining to the Top End would create unacceptable environmental, cultural and social costs. Open cut strip mining that bulldozes the seafloor would decimate our marine life, pollute our waters, threaten our fishing and destroy sites of cultural significance. What is needed is a permanent ban on seabed mining from Territory seas – to protect our coasts and our treasured Top End lifestyle.



Seabed mining: The Top End story so far

The Top End is one of the world's last intact tropical coast and sea regions, and a remarkable mix of natural and cultural values. This attracts visitors from around the globe and, as environments decline elsewhere, the value of our healthy coasts will only increase. But it is now also seen as a new frontier by the mining industry, part of a worldwide trend that has mining companies seeking to mine seabeds in both coastal waters and the high seas.

Interest in mining the Top End's seabed goes back to the early 1970s and 1980s, when some largely terrestrial exploration licence applications included estuarine and marine areas in Van Diemen Gulf and on the Arnhem coast. There was also unsuccessful exploration for tin and tantalum in the west coast's Bynoe Harbour. In 1993, diamonds were dredged from Commonwealth waters in the Joseph Bonaparte Gulf but follow-up dredging found nothing.

What had generally been only a passing interest in offshore mineral exploration became a surge between 2006 and 2011. Applications for exploration and mining licences were made for Fog Bay, Anson Bay and Hyland Bay, Galiwin'ku (Elcho Island) and the Wessel Islands, Blue Mud Bay, Groote Eylandt and Limmen Bight. The spike in applications (25 in all) for the waters between islands and in bays followed the Northern Territory Government's 2005 reservation from mining of a three-nautical-mile strip along the edge of the Territory's coastal waters. In 2012, exploration began in the waters surrounding Groote Eylandt, searching for an extension of the land-based manganese deposits mined by the Groote Eylandt Mining Company (GEMCO).

Community and government response to seabed mining proposals

Traditional Owners, environment groups, commercial and recreational fishers, tourism operators and marine scientists have voiced their opposition to the push for seabed mining in the Top End, concerned about its ecological, cultural, social and economic impacts. For the Anindilyakwa Land Council on Groote Eylandt:

'Any thought that the sea beds could be disturbed by a mining company is frightening and the impact on culture would be devastating...It would totally destroy the habitat, including pristine coral reefs, seagrass beds and fish habitat'³.

Environment groups have also been vigorously opposed to seabed mining: 'Open cut strip mining of the Territory's seabed would devastate the feeding grounds on which our fish, turtles, dolphins and dugongs depend. Seabed mining is risky business. Shifting ocean currents, sedimentation and disposal of waste materials combine to make mining minerals from the seabed incredibly hazardous'⁴.

The Northern Territory Government responded to community concerns by announcing a three-year Moratorium on seabed mining in March 2012, based on advice in a 2012 interim report from the NTEPA that said it was unable to accurately assess the potential impacts of seabed mining and the effectiveness of any mitigation measures. The Northern Territory Resources Minister at the time, Kon Vatskalis, wanted 'to be satisfied that, when I approve something, it is not going to be adverse to the environment, both social and physical'⁵. He also said:

'We are talking broad-scale mining on a very, very sensitive environment. Mining that may affect sea grasses, wildlife, dugongs, dolphins, turtles, we are very unsure about it.'⁶

The Territory's Amateur Fishermen's Association (AFANT) backed the Government's move but urged it to go further: 'it should be long term and should remove any possibility of seabed mining in environmentally and socially sensitive areas including those areas that are significant to recreational fishers. Intertidal sand mining has a very poor reputation elsewhere and we are not aware of any processes that would allow it to be conducted without very significant environmental disturbance'⁷.

The Moratorium brought the application and approvals processes to an abrupt halt and prevented existing licence holders from activating exploration and mining operations. The Northern Territory Government followed this in 2014 with a reservation from mining to assess the actual or potential impact of seabed mining activities on the fauna and flora⁸ in the coastal waters around Groote Eylandt. As a result of the reservation, the Northern Territory Government negotiated with BHP, Northern Manganese and Yukida Resources⁹ for the surrender of their mineral titles over the waters off Groote Eylandt and along the western shore of Limmen Bight¹⁰. In 2016, the Anindilyakwa Indigenous Protected Area (IPA) was extended to include 7000km² of Territory coastal waters. It should be noted, however, that under current Territory mining laws, exploration and mining could be approved for the waters covered by such a reservation.

Seabed mining review

The seabed mining Moratorium declared in March 2012 has since been extended twice under both CLP and Labor governments but ends in March 2021. According to the NTEPA, the purpose of the Moratorium is to allow an investigation of the Top End's marine environment and the actual and potential impacts of seabed mining¹¹. To conduct that investigation, the NTEPA commissioned five studies to fill knowledge gaps in preparing an advisory report for the Government. Once completed, the advisory report will be released for public consultation¹².

The five commissioned reports describe seabed mining operations and their potential impacts on marine and coastal environments (DENR and Advisian reports), impacts on social and cultural values (TruNorth report) and underwater cultural heritage (Cosmos Archaeology report), as well as existing legal frameworks (DENR/SFNT Report).

To assist with our engagement in the NTEPA's review, Keep Top End Coasts Healthy (KTECH) obtained these five reports under Freedom of Information laws. Based on their contents and a review of other available evidence, this KTECH report describes the nature of seabed mining and its potential environmental, cultural, social and economic impacts in the Top End, and concludes that the current Moratorium should become a permanent ban across the Territory's coastal waters.

Legal framework for seabed mining

The DENR/SFNT report reveals that the mining statutes, the *Minerals Titles Act and Mining Management Act*, primarily address land-based mining operations and are ill-equipped to cope with the very different circumstances of seabed mining in dynamic marine environments.

These limitations relate to policies and processes, stakeholder consultation, waste management and interactions with fisheries and parks legislation¹³, and also the absence of principles for Ecologically Sustainable Development to guide decision making under either statute¹⁴ and uncertainty about rehabilitation requirements¹⁵.

The report also reveals 'the subordination of parks and reserves to mining interests'¹⁶ and says that: 'Generally speaking, prohibitions on works in parks and reserves do not apply to the exploration for, or recovery or processing of, minerals'¹⁷. Where mining is proposed for a joint management park, 'the joint management partners must be given the opportunity to provide an opinion and specify conditions that should be imposed on the mining interest'¹⁸.

In the case of the jointly managed Garig Gunak Barlu Marine Park (Cobourgh Marine Park), mining is not permitted in the sanctuary area, which is above the low tide mark, unless it is approved by the park's board. For mining proposals inside the marine park, the waters below the low tide mark, the board can only provide advice to the Minister responsible for the park who must then pass it on to the Minister responsible for mining laws, with both ministers obliged to consider the advice. What the DENR/SFNT Report shows is that some of our most precious places and fishing hotspots currently protected in marine parks could be opened up to seabed mining.

Environmental impacts of seabed mining in the NT

Offshore and onshore impacts

Whether it is in shallow nearshore waters or the deep sea, seabed mining is just like taking a bulldozer to marine habitats with destructive effects on marine life, water quality and ocean health. Seabed mining breaks up, scoops up and sucks up whatever is living on or beneath the seabed, and its impacts are observable even before this extraction begins.

Mining activity is preceded by exploration that may include drilling and seismic surveys. A growing body of scientific research shows that seismic noise can impact marine life by causing temporary or permanent injury or death, changed behaviours and a reduced ability to socialise or find food. Threatened species such as whales, dolphins and turtles exhibit avoidance behaviour when subjected to seismic-level noise. Whale song patterns have been altered, the hearing of dolphins impaired and zooplankton, the very basis of ocean food chains, is at risk.

A seabed mining operation could also require shore-based infrastructure such as jetties, access roads and processing facilities that use large volumes of freshwater and toxic chemicals¹⁹, and industrialise remote and intact coastal habitats in the Top End.

Rising community concerns in Australia and overseas

The Australian State of the Environment Report 2016 identified only two seabed mining operations in Australia, one in Moreton Bay and the other in Cockburn Sound, Western Australia. The report then explained the limited seabed mining in Australia: 'Other submissions made across jurisdictions to explore and potentially exploit sea-floor resources elsewhere in Australia have been rejected or stalled because of the lack of existing baseline knowledge, lack of community support, and poor understanding of the potential social and environmental impacts of such activities. No national or regional assessments of the likely impacts of marine mining activities have been conducted for Australian waters, and the impacts of marine mining activities cannot be assessed'²⁰.

The lack of existing baseline knowledge referred to in the State of the Environment Report 2016 is a key point from the Advisian Report: 'Overall, the greatest uncertainty associated with understanding potential impacts associated with seabed mining remains the relatively poor current state of knowledge about the NT marine environment'²¹.

In a major study of community perceptions about seabed mining in Australia, CSIRO found that 'the majority of the participants were reluctant to see development of seafloor mining in Australia, primarily because of concerns about the industry's potential environmental impact'²². That community concern is not new and has stopped coral mining in Moreton Bay and supported the NSW Government's rejection of offshore sand mining.

Between 1937 and 1997, the coral reefs of Mud, St Helena and Green islands in Moreton Bay Queensland were mined for use in cement manufacture. The mining operation destroyed the reefs, while mangrove communities were damaged by smothering and foreshore erosion. Rising community concerns about its impacts eventually brought the coral mining to an end.

In 1993 the Greiner Coalition Government in NSW announced it would not approve offshore sand mining, followed by a similar announcement in 2003 by the Carr Labor Government. This resistance to offshore sand extraction continues.

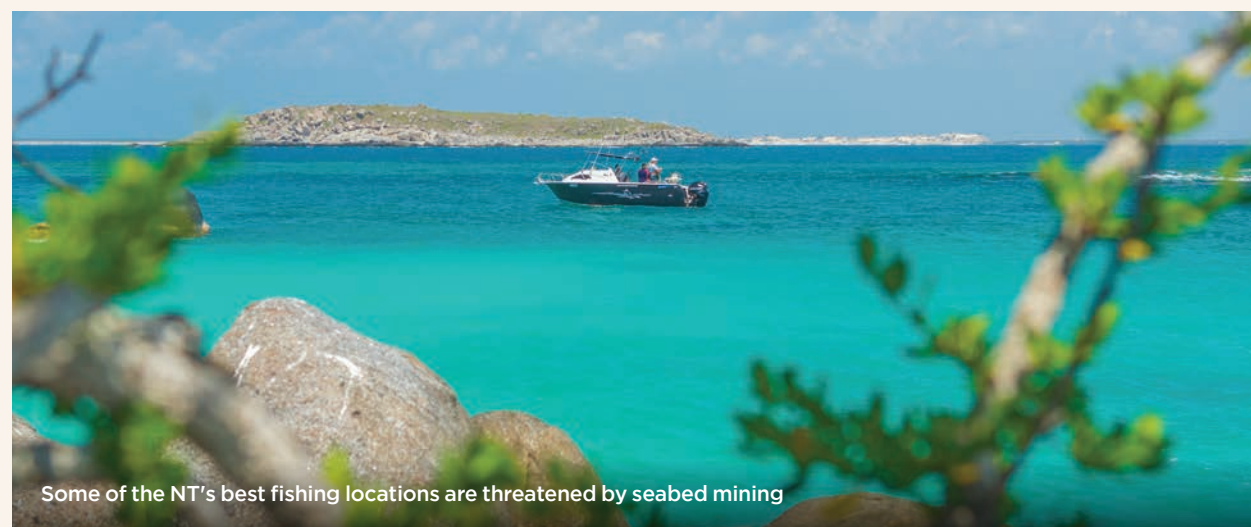
As community resistance to seabed mining grows, miners are looking further offshore and deeper into the oceans.

The Clarion Clipperton Fracture Zone straddles 4.5million km² of waters between Kiribati's Line Islands and the Central American coast. It hosts seabed nodules of manganese, nickel, copper and cobalt²³. However, those deep-sea nodules also support rich marine life including diverse benthic communities. The hard substrate habitat needs 'millions of years' to recover from mining activities. Even after small-scale trawls, 'epifauna did not show significant recovery after decades, indicating that recovery in the deep sea is a very slow process'²⁴.

Scientific evidence of such long-term negative ecological impacts has generated strong community, and some government, opposition to overseas seabed mining projects. In 2017 the European Parliament called for an international Moratorium until the effects on the 'marine environment, biodiversity and human activities at sea have been studied and researched sufficiently and all possible risks are understood'²⁵. Fiji has also called for a 10-year Moratorium on seabed mining in the Pacific, and has been supported by Papua New Guinea (PNG) and Vanuatu²⁶.

Community opposition has stalled or prevented a number of overseas seabed mining projects including:

- a 50-year project proposed by US company Odyssey Marine Explorations would have mined 318 million tonnes of phosphate in Baja California's San Ignacio Lagoon²⁷. It was opposed by local residents, fishers and environment and law groups. Mexico's Secretary of Environment and Natural Resources rejected the application because of its concerns about the project's impact on loggerhead turtles and that the 'economic benefits of the project could not prevail over the protection of the natural resources of Ulloa Bay, particularly in relation to threatened species subject to strict standards of protection'²⁸;
- Namibian Marine Phosphate's Sandpiper deep-sea phosphate mining project was stalled by an 18-month Moratorium declared in 2013 by the Namibian Government. It also failed to receive an environmental clearance certificate from the Environment Minister in 2016, but was successful in an appeal to the Namibian High Court. However, this is now being appealed by the Confederation of Namibian Fishing Associations, the Namibian Hake Association and the Midwater Trawling Association of Namibia, backed by the National Union of Namibian Workers and Trade Union Congress of Namibia.²⁹
- the Solwara 1 project in the Bismarck Sea off Papua New Guinea was to be the world's first commercial deep-sea mining venture, extracting phosphate nodules at 1600 metres depth and pumping them up the water column to the surface where they would be dewatered and loaded onto barges for onshore processing to extract copper, gold and silver. But Nautilus Minerals has now been liquidated and the PNG government has lost the \$AUD174 million it invested in the project;
- in 2014, New Zealand's Environment Protection Authority (NZEPA) refused a mining application by Chatham Rock Phosphate Limited to mine for 35 years across 10,000km² of seabed. The reasons for refusal included the highly destructive and irreversible damage to benthic fauna within what was a benthic protection area, a lack of knowledge that required caution, and the modest economic benefits that would be outweighed by significant adverse impacts that could not be mitigated³⁰;
- in 2014 the NZEPA also refused an application from Trans-Tasman Resources for a 35-year project to mine 50 million tonnes of ironsands from the Taranaki Gulf, after receiving a record number of submissions against the application. But three years later approval was given, again after a record number of submissions opposing approval. That approval was successfully challenged in New Zealand's High Court by 11 appellants that included iwi and community environment groups. Trans-Tasman Resources has appealed the High Court decision and Kiwis Against Seabed Mining and Greenpeace are defending it: 'This is a precedent-setting case, and it's important to get the law as strong as possible, in order to protect our oceans from damage by future seabed miners. We cannot stress the importance of this case enough, in terms of the impact this destructive, untested industry could have on our ocean environment'³¹.



Some of the NT's best fishing locations are threatened by seabed mining



Turtle nesting and foraging sites would be impacted should seabed mining proceed

Top End habitats, species and ecological processes at risk

Were seabed mining to be approved in the Top End, mining operations could extract minerals and sands from iconic sites including Anson, Hyland and Fog Bay, Galiwin'ku (Elcho Island) and the Wessel Islands, Blue Mud Bay and Limmen Bight (see Figure 1 Areas most immediately at risk from seabed mining in the Northern Territory if the Moratorium is lifted, which also shows onshore exploration licence applications under Commonwealth legislation in the south-west corner of the Gulf of Carpentaria).

Table 2 lists some of the marine habitats and species at risk in these areas including breeding areas for waterbirds, feeding areas for migratory shorebirds, dugongs and seabirds, and nesting sites for marine turtles. Applications to explore these areas existed before the 2012 Moratorium was declared. Were the Moratorium to be lifted, and the applications approved, it would likely generate new interest from seabed miners for other parts of the Top End's coastal waters.

Top End coastal and marine environments are some of the last intact tropical habitats in the world and of national and international significance. But they are also under threat from climate change, coastal development, agricultural runoff, dams and water extraction on rivers, overfishing and pollution. As noted in the Advisian Report, these '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'³².

There are more than 150 migratory and marine species that have been identified as threatened under Territory and national laws. These include coastal dolphins, sea snakes, migratory shorebirds and sawfish. Already under pressure, some marine animals may have already reached their tolerance limits. The introduction of additional pressures from seabed mining could push them past these limits and into decline. Those additional pressures include: deep pits and depressions that change wave and current patterns, decreased light availability for seagrasses, and sedimentation from tailing dumps that smother benthic communities. Table 2 describes a more comprehensive list of impacts (from the DENR Report) and their effects.

Table 3 identifies how particular Top End marine habitats, animals and ecological processes could be affected by these impacts.

Most of the Territory's habitats and species could be affected by nearly all of the listed impacts of seabed mining.

Along with their ecological role, some of the Top End's marine animals, such as the saltwater crocodile, dugong, turtle and barramundi, have great cultural and social significance, while fish, prawns and crabs also have commercial and recreational importance.

Mangroves, seagrasses, coral reefs, tidal flats and estuaries are biodiversity hotspots that are sensitive to disturbance. Benthic communities of marine worms, amphipods, bivalves, sponges, sea fans, sea whips, sea stars, sea cucumbers, crabs and prawns are relied upon by migratory shorebirds, fish and other predators. Beneath the seabed surface, microbial communities form the basis of the food web, cycle nutrients and lock up contaminants. These habitats are dependent on ecological processes such as primary productivity and connectivity, each of which could be disrupted by seabed mining.

Figure 1. Areas most immediately at risk from seabed mining in the Northern Territory if the Moratorium is lifted



Table 1. Mining applications in Territory and Commonwealth waters

| Map No. | Type | Status | Company | Area km ² |
|---------|------|---------------------|------------------------------|----------------------|
| 1 | EL | Renew Retained | MZI RESOURCES LTD | 265 |
| 2 | EL | Revised Application | TERRITORY MINERALS LTD | 453 |
| 3 | EL | Application | TERRITORY MINERALS LTD | 128 |
| 4 | EL | Application | WINCHELSEA MINING PTY LTD | 3826 |
| 5 | EL | Application | OCRE ROUGE RESOURCES PTY LTD | 1282 |
| 6 | MA | Application | WINCHELSEA MINING PTY LTD | 1745 |
| 7 | MA | Application | OCRE ROUGE RESOURCES PTY LTD | 535 |
| 8 | OEL | Application | NTM GOLD LTD | 13,640 |

EL=Exploration Lease. MA=Minerals Authority. OEL=Offshore Exploration Licence.

Table 2. Areas most immediately at risk and their habitats and species.

| Area targeted | Natural values |
|---|---|
| Hyland Bay Coastal floodplain including mudflats, estuaries, mangroves and saline flats | <ul style="list-style-type: none">• breeding area for herons, egrets and cormorants• foraging for migratory shorebirds: great knot, lesser sand plover, grey-tailed tattler• estuaries provide important habitat area for saltwater crocodiles• dugong and Australian snubfin dolphin |
| Anson Bay Coastal floodplain (one of NT's largest); estuaries | <ul style="list-style-type: none">• foraging for migratory shorebirds: great knot, black-tailed godwit• turtles nest on sandy beaches (one of the better areas on the west coast)• dugong, Australian snubfin dolphin, bottlenose dolphin, humpback dolphin |
| Fog Bay Sandy beaches; grassy dunes; intertidal mudflats backed by mangroves; estuaries; chain of small islands | <ul style="list-style-type: none">• large numbers of migratory shorebirds including greater sand plover, grey-tailed tattler, great knot, terek sandpiper, black-tailed godwit• significant flatback turtle nesting area, e.g. Bare Sand Island, feeding area for olive ridley, green and hawksbill turtles. Loggerhead turtles also recorded• small seabird breeding colony for black-naped and little terns• important populations of waterbirds including a colony with egrets and herons in mangroves• Australian snubfin dolphin |
| Tiwi Islands Melville and Bathurst islands and several smaller islands; long beaches; rocky headlands; mangrove-lined creeks and rivers; small estuaries and inlets; extensive tidal flats | <ul style="list-style-type: none">• beach nesting sites for flatback, green, hawksbill and olive ridley marine turtles• five seabird breeding colonies including crested (possibly largest known breeding colony in world) and little terns• migratory shorebirds including great knot, red-necked stint, greater and lesser sand plover and bar-tailed godwit• dugong, Australian snubfin dolphin, humpback dolphin, bottlenose dolphin, dwarf spinner dolphin |
| Elcho Islands Low sand dunes and limestone cliffs; mangroves on tidal flats | <ul style="list-style-type: none">• foraging area for large numbers of migratory shorebirds, especially bar-tailed godwit• olive ridley and flatback turtles nest on beaches of outer islands• three seabird colonies: roseate, black-naped and little terns• dugong, Australian snubfin dolphin, humpback dolphin, bottlenose dolphin, dwarf spinner dolphin, false killer whale |
| Wessel Islands Island chains (remnant of land connection to PNG); small areas of paperbark and mangrove | <ul style="list-style-type: none">• nesting sites for green, olive ridley, flatback and hawksbill turtles• 19 seabird colonies• dugong, Australian snubfin dolphin, bottlenose dolphin, humpback dolphin, dwarf spinner dolphin; false killer whale |
| Blue Mud Bay Small bays; inlets; beaches; headlands; cliffs; saline flats; mangroves; estuaries; extensive freshwater floodplains | <ul style="list-style-type: none">• waterbird colonies (66 species) in paperbark and mangroves• foraging habitat for flatback and olive ridley turtles• seabirds nest on rock and sand islands in bay• foraging area for large numbers of migratory shorebirds on tidal flats including black-tailed godwit, lesser sand plover and red-necked stint• little red flying fox colony in mangroves• dugong, Australian snubfin dolphin, bottlenose dolphin, humpback dolphin, dwarf spinner dolphin, false killer whale |
| Groote Eylandt Fourth-largest island in Australia with 40+ small islands (smaller islands low sand and coral and rugged sandstone and granite outcrops); dunes and sand plains along coast; estuaries | <ul style="list-style-type: none">• densest areas of nesting turtles in NT, especially green and hawksbill but also olive ridley and flatback• 17 seabird colonies including roseate tern• dugong, Australian snubfin dolphin, bottlenose dolphin, humpback dolphin, dwarf spinner dolphin, false killer whale |
| Limmen Bight Vast intertidal mudflats (some of the most extensive in NT); mangrove forest at Roper River mouth; several islands; estuaries | <ul style="list-style-type: none">• one of the most important foraging areas for migratory shorebirds in NT: great knot, black-tailed godwit, red knot, grey-tailed tattler and black-winged stilt• large island colonies of seabirds: roseate, crested and other tern species• nesting sites for olive ridley and hawksbill turtles, but especially for green and flatback turtles• three waterbird colonies in mangroves dominated by Australian white ibis, nankeen night heron and intermediate egrets• dugong, Australian snubfin dolphin, bottlenose dolphin, humpback dolphin, dwarf spinner dolphin |
| Sir Edward Pellew Islands Mudflats; mangroves; sand dunes; extensive seagrass communities; large delta system around the mouth of the McArthur River | <ul style="list-style-type: none">• high density nesting of green and flatback turtles, and an important foraging area for green turtles• large numbers of seabirds nest on islets and small islands (more than 20 seabird breeding colonies), including crested and roseate terns• significant dugong habitat area;• important bottlenose dolphin; Australian snubfin dolphin habitat• important refuge area for species threatened (by predation?) on the mainland. |

Source: Department of Natural Resources, Environment, The Arts and Sport, 'Sites of Conservation Significance in the Northern Territory', NT Government, Darwin.

Rehabilitation and recovery unlikely

Were seabed mining projects approved for the Top End, each could last for years and even decades. At the end of mining projects on land, the site is expected to be rehabilitated. But the rehabilitation of seabed mining sites is rare. The Advisian Report states that ‘active rehabilitation of the seabed is not usually feasible and generally relies on natural recovery’³³ or the mining pits are filled by pushing in the surrounding seabed. Allowing a land-based mine site to recover naturally is no longer an option under mining rehabilitation regulations. But even with a mine rehabilitation process, the site never returns to its ‘natural’ state.

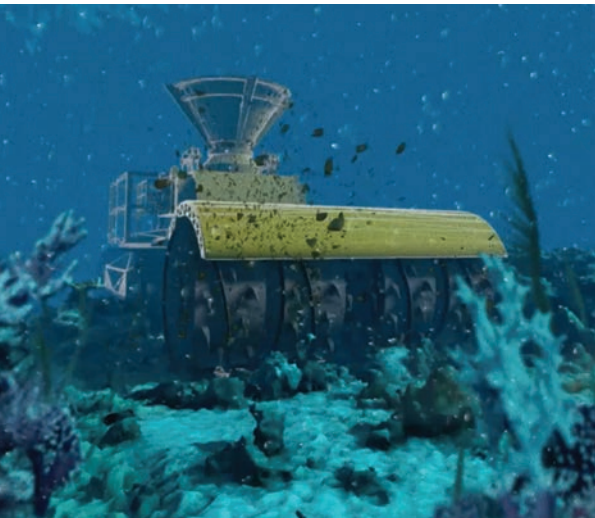
The loss, damage or simplification of impacted marine habitats could be permanent. The Advisian Report notes that: ‘Few detailed accounts of recovery after mineral extraction have been documented, as no exact data on the community prior to the extraction activity are typically available...The recovery of seabed communities is dependent on both the arrival of mobile species and successful recolonization by larvae, which in itself is dependent on neighboring habitats and connectivity.’³⁴ But as Table 3 reveals, that connectivity essential to recovery could have already been compromised on the mine site and in neighbouring areas where mining may also be occurring.

Table 3. Environmental impacts from seabed mining

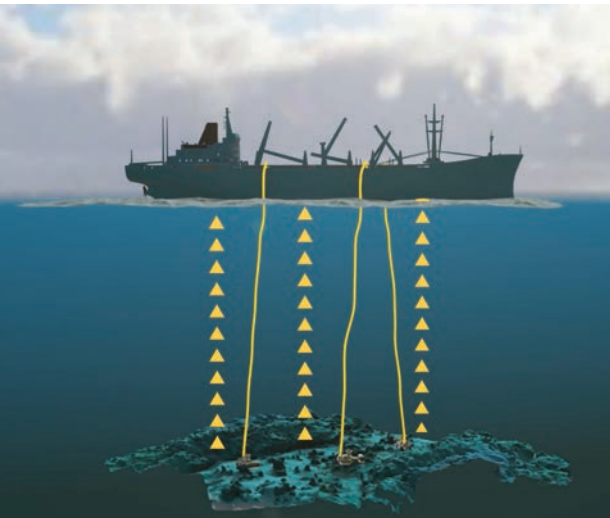
| Impact | Impact effects |
|--|---|
| 1. Habitat removal | Seabed mining removes animals and plants on the seabed (epifauna) as well as the animals in the sediments beneath (infauna), where most benthic animals are found. It can fragment habitats and have wider ecological effects by changing predator-prey relationships, species composition and ecosystem function. |
| 2. Alteration of habitat and species and community composition | Seabed mining reduces the abundance, density and biomass of species, with one study indicating that it ‘can be expected to result in a 30–70% reduction of infaunal species diversity, a 40–95% reduction in the number of individuals, and a similar reduction in the biomass of benthic communities’ ³⁵ . |
| 3. Change in bathymetry | Seabed mining will leave pits and depressions that can be as wide as 100 metres and as deep as 10 metres, although on in Gyeonggi Bay, Korea they were 2–3 kms long ³⁶ . These can persist in low-energy environments, change nearshore wave and current patterns and affect shoreline stability. Areas of large tidal ranges, such as on the Top End’s western and northern coasts, will be most impacted ³⁷ . |
| 4. Change in sediment characteristics | By removing particles of a particular size, the composition of the seabed becomes more homogenous, resulting in uncertain and potentially undesirable changes to community composition, where some species may be introduced or increase while others decline or disappear. One study found that a reduced particle size in the seabed led to an increase in the white furrow shell – it prefers finer sand – and an increase in numbers of its predator, the plaice ³⁸ . |
| 5. Underwater noise | Vessel noise, seismic surveys, dredge noise, pumps, blasting and seabed breakup, along with the loading and dumping of material, will each generate underwater noise. The noise level of trailing suction hopper dredges can be 150dB at 1000 metres, while cutter suction dredges can be heard 20–30 kilometres away ³⁹ . A growing body of research points to harmful impacts from underwater noise on animal behaviour, communications, physiology and mortality. |
| 6. Entrainment and collisions | Seabed mining sucks up benthic animals and fish along with eggs and larvae, especially in spawning areas. Mining operations will increase vessel traffic and the likelihood of collisions with dolphins, turtles, dugongs and whales , potentially causing injury and death. |
| 7. Turbidity | Seabed disturbance, along with the spillover of unwanted material from the surface vessel, will create sediment plumes that increase water turbidity and decrease water quality and light availability. Very fine sediment plumes can stretch up to 11 kilometres from the mining operation, fine sand for five kilometres and coarse sand for 50 metres ⁴⁰ (another study indicates plumes can extend for tens to hundreds of kilometres ⁴¹). The settlement of finer-grained suspended sediment could take from 3–14 years ⁴² . Increased turbidity can affect coral physiologies and reef structures. Reduced light available to seagrasses could affect their biomass, height, growth, reproduction and survival. The filter feeding of animals, such as sea squirts, could become less efficient, while other invertebrates may experience decreased respiration rates or behavioural changes. Suspended sediments have been shown to reduce fish spawning areas, cut fish growth rates, change their migration patterns and reduce foraging success ⁴³ . |

Table 3. Environmental impacts from seabed mining (continued)

| Impact | Impact effects |
|------------------------------------|---|
| 8. Sedimentation | Tailings dumps can increase turbidity, smother habitats, reduce species abundance and richness, kill marine animals and plants, damage fish breeding areas and pollute nearby beaches. Benthic invertebrates and those pelagic animals dependent on them will be the most affected. One study showed that brittle stars, queen scallops and sea squirts were highly intolerant to smothering ⁴⁴ . Brittle stars are found in Anson Bay, an area targeted for seabed mining. On rocky coasts, there are changes to species composition and recruitment is inhibited, while corals can suffer ‘physiological stress, decreased growth, reduction in larval settlement, death of underlying tissue, bleaching and mortality’ ⁴⁵ . The tailings dumps can also alter seabed topography, which can change wave and current patterns and lead to coastal erosion. |
| 9. Organic enrichment | The release of organic matter and nutrients can lead to eutrophication and a reduction in oxygen levels in the water. Anoxic conditions may occur where organic matter accumulates in the dredge pits. Animals more tolerant of such conditions will survive, while those less tolerant may perish and change species composition. |
| 10. Release of contaminants | Seabed mining releases heavy metals from the targeted minerals or from accumulated pollution in sediments e.g. Darwin Harbour and McArthur River. Heavy metals accumulate up the food chain with sublethal effects on benthic and pelagic animals ⁴⁶ . ‘While considerable research efforts have been put into estimating the release of harmful substances from sediments, the fate and bioavailability of contaminants from disturbed sediments is not well understood’ ⁴⁷ . |
| 11. Artificial light emissions | Artificial lighting can lead to avoidance of an area by marine animals, disorient migratory seabirds, cause vessel strikes and affect coral spawning, which uses light as a cue. It can also affect turtle nesting behaviour and disorient turtle hatchlings as they leave the nests on beaches. |
| 12. Air emissions | The seabed mining equipment, surface vessels and processing plants will likely use fossil fuels, impact local air quality and add to greenhouse gases. |
| 13. Chemical discharges and spills | Seabirds, soft sediment seashores and mangroves are highly sensitive to oil spills. Onshore processing plants use large amounts of freshwater but toxic chemicals that could be accidentally released. |
| 14. Invasive species | Seabed disturbance can encourage marine pest invasions. Alien species may also arrive on vessels and other equipment transferred from areas where they have become established. |



Seabed ‘crawlers’ like this are used in some seabed mining operations. It’s like bulldozing the sea floor.



Mined materials are pumped up to a ship, waste and tailings are usually dumped directly on-site or pumped to adjacent areas.

Table 4. Marine habitats, animals and ecological processes at risk from seabed mining

| Habitats/animals | Risks | Impact No. |
|----------------------|--|---|
| Habitats | | |
| Mangroves | Mangrove forests store carbon in their sediments, support subsistence gathering of molluscs, crabs and fish by Indigenous communities and provide habitat for fish of commercial and recreational importance. Mangroves could be at their upper level of tolerance to temperature, salinity and anoxia ⁴⁸ . The impacts from seabed mining, in addition to pollution, agricultural runoff, expanding urban development and climate change, could tip them over the edge. | 1; 2; 8; 9; 10; 13 |
| Seagrasses | Seagrass meadows act as nurseries for juvenile fish and prawns, protect shorelines, cycle nutrients, stabilise sediments and store carbon. They are highly sensitive to increased physical disturbance, excess nutrients and reductions in light availability, each of which is caused by seabed mining. | 1; 2; 7; 8; 9; 10; 13; 14 |
| Coral reefs | Coral reefs provide nursery and feeding grounds for many marine species, protect shorelines, support commercial and recreational fisheries, are popular tourist dive sites and may be a storehouse of new medicines. Studies have shown that coral mining can affect wave paths and energy, reef structures and reef fishes ⁴⁹ . 'Direct removal of coral in the Maldives has led to a transformation in the reef; which has transitioned to filamentous algae covered dead branches and coral rubble ⁵⁰ . It also reduces 'overall biomass and abundance across three trophic levels; planktivores, benthic herbivores and omnivores ⁵¹ . Sedimentation caused by seabed mining could bury coral reefs, while increased turbidity could impact coral reproduction and community structures, reduce coral cover and kill coral polyps | 1; 2; 7; 8; 9; 10; 13; 14 |
| Tidal flats | Tidal mud and sand flats are the most common habitats in the Top End's coastal waters, with benthic animals critically important to the region's ecology and also the main food source for migratory shorebirds. Tidal flats are also a key target of seabed mining, which would reduce water quality and remove or smother benthic habitats. | 1; 2; 7; 8; 9; 10; 13; 14 |
| Estuaries | Many rivers discharge into the Top End's coastal waters and develop estuaries around their mouths where fresh and saltwater mix. The habitats within estuaries, such as saltmarshes and mangroves, filter sediments, nutrients and contaminants. Estuaries also protect important habitats from floods, storm surges and wave erosion. They are critical in the life cycle of mud crabs, fish, such as barramundi, the saltwater crocodile, river sharks and sawfish, support commercial fisheries and attract tourists who use them for fishing and boating. | 1; 2; 3; 4; 7; 8; 9; 10; 13; 14 |
| Animals | | |
| Marine turtles | Marine turtles, such as the olive ridley, hawksbill, green and flatback, nest on sandy beaches and forage in coral reefs, seagrasses and muddy seabeds, all of which would be impacted by seabed mining. | 1; 2; 3; 4; 5; 6; 7; 8; 9; 10; 11; 13; 14 |
| Dolphins | Coastal dolphins, such as the Australian snubfin dolphin, bottlenose dolphin, humpback dolphin and dwarf spinner dolphin, feed and breed in inshore habitats. Key threats include physical habitat modification, noise pollution and chemical pollution, all of which would be exacerbated by seabed mining. | 1; 2; 3; 4; 5; 6; 7; 8; 9; 10; 11; 13; 14 |
| Dugongs | Intact and healthy seagrass meadows are critical to this vulnerable species' survival, a habitat that would be directly impacted by seabed mining. | 1; 2; 3; 4; 5; 6; 7; 8; 9; 10; 11; 13; 14 |
| Migratory shorebirds | The loss of tidal flats from seabed mining would be devastating to the migratory shorebirds, such as black-tailed godwit, lesser sand plover and red-necked stint, already suffering from habitat destruction in Asian countries along the East Asian-Australasian Flyway. | 1; 2; 3; 4; 5; 6; 7; 8; 9; 10; 11; 13; 14 |
| Seabirds | Breeding colonies of various tern species and other seabirds are found on the many islands along the Top End coast, where they use the surrounding waters to feed. The increased noise and artificial lighting from seabed mining could cause them to avoid foraging areas, while reduced water quality and habitat loss would impact on the populations and distribution of their prey. | 1; 2; 3; 4; 5; 6; 7; 8; 9; 10; 11; 13; 14 |
| Sea snakes | Sea snakes are found on coral reefs and in estuaries, mangroves and other sheltered waters where they rely on clear water to find their prey. Increased noise and artificial lighting could force them to avoid feeding areas, increased turbidity would make it difficult to find prey, and increased vessel traffic could lead to more boat strikes. | 1; 2; 3; 4; 5; 6; 7; 8; 9; 10; 11; 13; 14 |

Table 4. Marine habitats, animals and ecological processes at risk from seabed mining (continued)

| Animals | Risk | Impact No. |
|---|--|---|
| Marine invertebrates | Marine worms, crustaceans, bivalves and other invertebrates are critical to the survival of other marine fauna and 'marine ecosystems would collapse without their services ⁵² . Seabed degradation, the associated habitat loss, and changes to ecosystem processes resulting from seabed mining 'are likely to impact on the ability of invertebrates to effectively contribute towards maintaining the ecosystem in its original state ⁵³ . | 1; 2; 3; 4; 5; 7; 8; 9; 10; 13; 14 |
| Fish | Many Top End fish rely on estuarine and coastal waters for feeding and breeding. Mining and its habitat destruction can increase nutrient levels in the water and lead to reduced oxygen supplies, while suspended sediments can clog gills and underwater noise cause the fish to avoid the mined areas ⁵⁴ . For fish species that aggregate to spawn, such as the black jewfish, loss of or damage to spawning areas can affect their reproductive cycles and future populations. Gravel mining in the North Sea has impacted sand-eel, cod and herring stocks, while herring avoided mining areas and laid their eggs in locations where wave action later killed the larvae ⁵⁵ . | 1; 2; 3; 4; 5; 6; 7; 8; 9; 10; 13; 14 |
| Saltwater crocodiles | Already under threat from fishing nets, habitat destruction by water buffalo, and climate change affecting egg production, seabed mining could reduce the numbers of prey (crustaceans, insects, fish, amphibians and mammals) for saltwater crocodiles, limiting the availability of critical food sources. | 1; 2; 3; 4; 5; 6; 7; 8; 9; 10; 11; 13; 14 |
| River sharks and sawfishes | The endangered northern river shark and critically endangered speartooth shark are found in the brackish tidal reaches of Territory rivers. The threatened largetooth sawfish moves down the river to estuaries during its breeding season, while the threatened dwarf sawfish lives in estuaries and coastal waters year-round. Any damage to estuarine habitats and water quality from seabed mining would be devastating for these shark and sawfish species. | 1; 2; 3; 4; 5; 6; 7; 8; 9; 10; 13; 14 |
| Ecological processes | | |
| Primary productivity and nutrient cycling | The Top End's warm and shallow tropical waters have high levels of primary productivity (phytoplankton and zooplankton), driven by the nutrient-laden river discharges during the wet season. Phytoplankton and zooplankton feed consumers directly or through their decomposition, and the nutrients are cycled through food webs. Nutrients released by seabed mining could lead to eutrophication, a reduction in oxygen in the water column and the death of fish and other marine animals. A build-up of organic matter in mining pits could lead to anoxic conditions on the seabed and affect benthic communities. | 1; 2; 7; 8; 9; 10; 13; 14 |
| Hydrology and ocean currents | Tidal flows dominate the Top End's west coast, while ocean currents drive water circulation in the Gulf of Carpentaria. Changes to the seabed's topography can affect local and regional tidal flows and connectivity within and between habitats. | 1; 2; 8; 14 |
| Connectivity | Marine animals and plants are connected by energy flows through food webs from high-order consumers, such as dolphins, to microscopic animals beneath the seabed. Habitat removal, degradation and fragmentation, along with disruption to animal life cycles, will break down connectivity. The impacts of seabed mining could spread well beyond the mine site because of connectivity within and between marine environments. | 1; 2; 5; 8; 10; 13; 14 |
| Climate regulation | Seagrasses, mangroves and tidal flats store carbon in their sediments. Evapotranspiration from mangroves influences cloud formation and rainfall, while surface reflection regulates temperature. The removal or disturbance of these habitats will release carbon to the atmosphere and add to greenhouse gases. | 1; 12 |

Impacts from DENR Report: 1. Habitat removal; 2. Alteration of habitat and species and community composition; 3. Change in bathymetry; 4. Change in sediment characteristics; 5. Underwater noise; 6. Entrainment and collisions; 7. Turbidity; 8. Sedimentation; 9. Organic enrichment; 10. Release of contaminants; 11. Artificial light emissions; 12. Air emissions; 13. Chemical discharges and spills; 14. Invasive species.

Cultural and social impacts of seabed mining

Seabed mining applications exist for Fog Bay, Anson Bay and Hyland Bay, the Tiwi Islands, Galiwin'ku (Elcho Island) and the Wessel Islands, Blue Mud Bay and Limmen Bight. As well as the striking natural landscapes and important fishing grounds in these areas, they are seacountry to many Indigenous communities living on the Top End coast.

To gain an understanding of the potential cultural and social impacts of seabed mining within these communities, the NTEPA commissioned a report from TruNorth Strategic Communication. The TruNorth Report is a comprehensive review of the potential impacts from seabed mining and its associated infrastructure of ports, processing plants, loading and shipping facilities, workers' accommodation and access roads. Those impacts are broad and affect 'traditional knowledge, commonly held values such as respect for elders, oral history, spiritual practices, language, physical heritage resources, traditional dances and songs, place names, spiritual sites and cultural landscapes, traditional land use, values associated with the land and inter-generational relationship patterns'⁵⁶.

According to the TruNorth Report: 'The perceived magnitude of impacts is likely to be influenced by the fact that most of the coastal area is Aboriginal land, with sensitive habitats that have supported traditional economic and cultural activities. The scale of change is likely to be more acute given the small, dispersed populations, high natural values and limited experience of industrialisation'⁵⁷.

The TruNorth Report refers to research by Gareth Lewis and Ben Scambary⁵⁸ to help explain the impacts of seabed mining as "'the collision of interest", where areas of geological and mineralogical significance, in the shape of ore bodies, tend to coincide with places of cultural significance to Aboriginal people, in the form of sacred sites. Minerals often have cultural significance as the "essence" of ancestral beings. Disturbance to these sites can have substantial cultural impacts'⁵⁹.

In more specific terms, the TruNorth Report lists many potential cultural and social impacts of seabed mining that include reduced opportunities for traditional activities such as hunting, camping, foraging, bushfoods and bush medicine gathering; reduced opportunity to pass on knowledge; loss of economic activities, such as small-scale aquaculture or agriculture, fishing; anxiety by custodians with responsibility for the care of country, fear of being blamed; workplace socialisation introduces new norms, including reduced use of traditional languages; time in the workplace reduces ceremonial activities, language use and family time; and reduced connections to land and sea country may lead to feelings of loss of control or reduced self-esteem'⁶⁰.

The increased risk from mining activities can be both onshore and offshore, according to the report: 'Potential risks from onshore activities include increased traffic on local roads, such as travelling through towns at night, coming into contact with drink drivers, children playing on roads, people hunting at night, people drinking on the outskirts of dry zones and not being visible to construction traffic, increased drink-driving by community members associated with cash distribution of compensation monies and increased interaction between local and project vehicles. Offshore, risks include collisions between commercial and recreational traffic and project dredging, offshore facilities or shipping'⁶¹.

For coastal Indigenous communities, who have freehold title to 85% of coastal land, the land and sea are indivisible, with holistic and sustainable management a critical part of culture: 'People's knowledge of these seas is captured in "Songlines", which may be invisible and incomprehensible to an outsider but which are the heart, soul and law that binds Aboriginal people to their ancestors, their kin, their country and the plants and animals that have sustained survival for thousands of years'⁶².

The preservation of culture was at the forefront of the Anindilyakwa Land Council and the Northern Land Council opposition to seabed mining off Groote Eylandt:

'Cultural integrity is paramount to both land councils and protecting the songlines, dreamings and traditional values of our TOs (traditional owners) will always come before anything else'⁶³.

The TruNorth Report notes that: 'Aboriginal people's growing confidence in claiming land and sea rights, and their aspirations to use the inheritance of the seas to provide economic independence are important in understanding the strong cultural, social and economic values that have prompted many seawater people to oppose seabed mining, such as that proposed near Groote Eylandt'⁶⁴.

The need to preserve cultural integrity has helped drive the proactive engagement of Indigenous communities in land and sea management through the establishment of ranger groups and Indigenous Protected Areas (IPAs). The Djelk, Dhimurru, Laynhapuy, Anindilyakwa and Yanyuwa IPAs each have significant marine and coastal habitats, and the IPA management plans stress the significant cultural and environmental values of each region. Opposition to seabed mining has been embedded in the management plan for the Anindilyakwa IPA and is recognised as one of three key threats, the others being weeds and feral animals.

The IPA plan states that seabed mining would 'cut through our Songlines; destroy our sacred sites; destroy dugong and turtle feeding grounds; pollute our waters; lock us out of hunting areas'⁶⁵.

There are also concerns within Indigenous communities about the assessment of major projects that could include seabed mining. When submitting to a recent regulatory review, the North Australian Indigenous Land and Sea Management Alliance (NAILSMA) wrote: 'We are aware of no case in which protection of natural values important to Aboriginal people (has) been given priority in terms of reference for an environmental impact assessment'⁶⁶.

Cultural heritage also exists under the water, submerged when rising seas covered the continental shelf thousands of years ago. Stone artefact scatters, middens, quarries, stone arrangements, rock art and burials⁶⁷, as well as sites associated with Indigenous community contact with Macassans including stone fish traps, weirs and stone lines could be found beneath the surface.

The Cosmos Archaeology Report also details European underwater cultural heritage that includes infrastructure from maritime exploration, transport and trade, resource exploitation, defence, warfare (unexploded ordnance) and sea dumping (chemicals, ammunition, vessels, military discards), shipwrecks, aircraft, abandoned pearl farms and scuttled vessels for artificial reefs. Seabed mining could remove, damage, bury or undermine any of these.

Failure to fully assess the true costs of major projects is known to place undue burdens on people. Justice Thomas Berger, chair of an inquiry into a proposed pipeline in Canada, found: 'the social costs will be borne by the local population and that the financial costs will be borne by industry and the government. There is a strong tendency to underestimate and to understate social impact and social costs, and there is a tendency to believe that, whatever the problems may be, they can be overcome. The approach here is curative rather than preventative'⁶⁸.

Research consistently shows that mining operations require the support of local communities if they are to operate without conflict and tension, and without causing negative social impact in local regions. In their research in mining communities, Kieran Moffat and Airon Zhang found that: 'The mining operation's negative impacts on social infrastructure, community members' perceived contact quality and procedural fairness in dealing with company personnel significantly affected the community's acceptance of the mining operation through inferred trustworthiness of the company'⁶⁹.

It is clear from these reports that seabed mining does not currently hold, and may never hold, a social license to operate in the Northern Territory.



Pollution from seabed mining will impact fish and their habitat.
© Gary Bell/Oceanwideimages.com

Economic impacts of seabed mining

In a report on the economic value of the Northern Territory's marine and coastal environments Crossman et al. estimated that, the Top End's marine and coastal environments contribute around \$2billion annually to the economy and support 6300 jobs⁷⁰. They estimated that aesthetic, amenity and educational values each year contributed up to \$40.3 million to the Top End economy, Indigenous cultural values up to \$412 million, recreational fishing \$76 million, tourism \$691 million and blue carbon storage up to \$468 million. It is a lot to risk if seabed mining is allowed across the Northern Territory's coastal waters.

Coastal tourism, including fishing charter operators, and recreational and commercial fishing each depends on intact and unpolluted marine and coastal environments. So too do the pearl farms in Bynoe Harbour and English Company Islands, the sea cucumber 'ranching' on Goulburn Island and Groote Eylandt, the aquarium fishery, fishing lodges on Groote Eylandt and the Tiwi Islands.

As of February 2019, the 15 wild catch fisheries that depend on a clean and blue environment comprise more than 200 commercial fishing licences, 190 registered fishing vessels and a harvest of approximately 5500 tonnes valued at \$37.3million (excluding prawns)⁷¹ each year. Traditional Owners are also developing commercial fishing ventures, supported by NT Fisheries and the Australian Fisheries Management Authority. The Aboriginal Coastal Licence Program 'draws on traditional knowledge of fishing to provide fresh fish for local consumption as well as selling fresh fish into the Darwin market'⁷² and on 'Groote Eylandt or in the Gulf of Carpentaria people have worked as labourers for fishing and crabbing businesses and are interested in taking control of their own resources from people "who have no personal relationship to the sea and coastal country"'⁷³.

Recreational fishing is important for tourism and regional economies but it is also integral to the Territory lifestyle. The last time Territory anglers were surveyed⁷⁴ in 2009-10, they revealed that each year they spent almost two million hours fishing, mostly to relax and unwind or to be outdoors; only a small percentage were there for the fish⁷⁵.

The survey found that: 'NT residents spent an estimated \$51 million on goods and services related to recreational fishing during the 12-month survey period, of which \$47 million (92%) was directly attributable to recreational fishing – an average of over \$1500 per fisher. Annual attributable expenditure on boats and trailers represented the largest expenditure category (\$33 million), followed by travel expenses (\$7 million) and fishing/diving gear (\$3 million). The vast majority of all fishing-related expenditure (93%) occurred within the NT'⁷⁶.

Recreational fishers – and the Northern Territory economy – would suffer were seabed mining allowed in Top End waters. Figures 2-6 show the recreational fishing features in areas where applications have been made for seabed mining operations. These include Figure 2 Limmen Bight and the Sir Edward Pellew region, Figure 3 Groote Eylandt and Blue Mud Bay region, Figure 4 the Wessel Islands region, Figure 5 the Tiwi Islands, and Figure 6 the Anson Bay, Hyland Bay and Fog Bay region.

Fishing tourism is an important component of recreational fishing, with fishing guides often taking their clients to some of the Top End's more remote and iconic places, many of which will be threatened by seabed mining. In 2012 it was estimated that that 78.8% of those clients were from interstate or overseas, spending approximately \$15 million in total, while fishing tourism's total annual economic contribution was estimated at \$26 million, with approximately 80% coming from interstate and overseas visitors⁷⁷.



The Top End continues to experience increases in domestic and international tourism numbers – 19.5% and 5.6% in 2018-19, while other parts of the Territory are in decline⁷⁸. A major part of Top End tourism is the expanding cruise ship sector. In 2018-19 there were 73 ships and 49,500 passengers adding \$59.7 million to the Territory economy. Expedition cruise ships took visitors to the Tiwi Islands, Elcho Island and Yirrkala⁷⁹, remote communities where seabed mining could impact the tourism experience and visitor numbers.

According to NT Department of Tourism and Culture, its 2017 research indicated that experiencing other cultures is a key reason for travel because it makes a destination authentic – it represents the unspoiled nature of the destination and its personality. The research also found that: 'Of Australians open to visiting the Northern Territory, 85 per cent believed that the Northern Territory was the best place to experience Aboriginal culture, 67 per cent want to visit sacred rock art sites, 64 per cent want to learn about Aboriginal beliefs and connection to land and 60 per cent want to hear stories about the Dreamtime'⁸⁰. However, seabed mining will restrict access to significant areas for Indigenous communities, commercial and recreational fishers and tourists, not just for days and weeks but for years, with obvious economic impacts.

Recently the Territory's economy has been in decline – by 1.5% in 2018-19⁸¹ – and this could be used to influence the NT Government's decision on lifting or extending the seabed mining Moratorium or permanently banning the activity. But according to the then NLC Chief Executive Officer Joe Morrison, 'promises over decades of riches to be derived from developing the north have been about as ephemeral and elusive as Bob Hawke's promise of a treaty. Ever since the north was settled...there has been a cascade of reports which have purported to map various El Dorados, just waiting to be discovered and developed by men of vision'⁸².

The TruNorth Report, commissioned by the NTEPA, observes that: 'Large-scale projects are seen as driven by outsiders' agendas, with economic benefits likely to leak to external developers, financiers, governments and FIFO workforces, while the local community is left with any negative legacies and "with little or no return for those who have and will always live here"'⁸³ and 'A key source of opposition to many seabed projects has been the potential impact on traditional economies. In many cases, people have traditionally hunted and fished and may aspire to apply these skills to commercial enterprises'⁸⁴.



Guided fishing makes a significant contribution to the NT economy and would be impacted by seabed mining activities. © Cobourg Fishing Safaris

Figure 2. Limmen Bight and Sir Edward Pellew Islands - proposed seabed mining areas and the fishing features that could be impacted

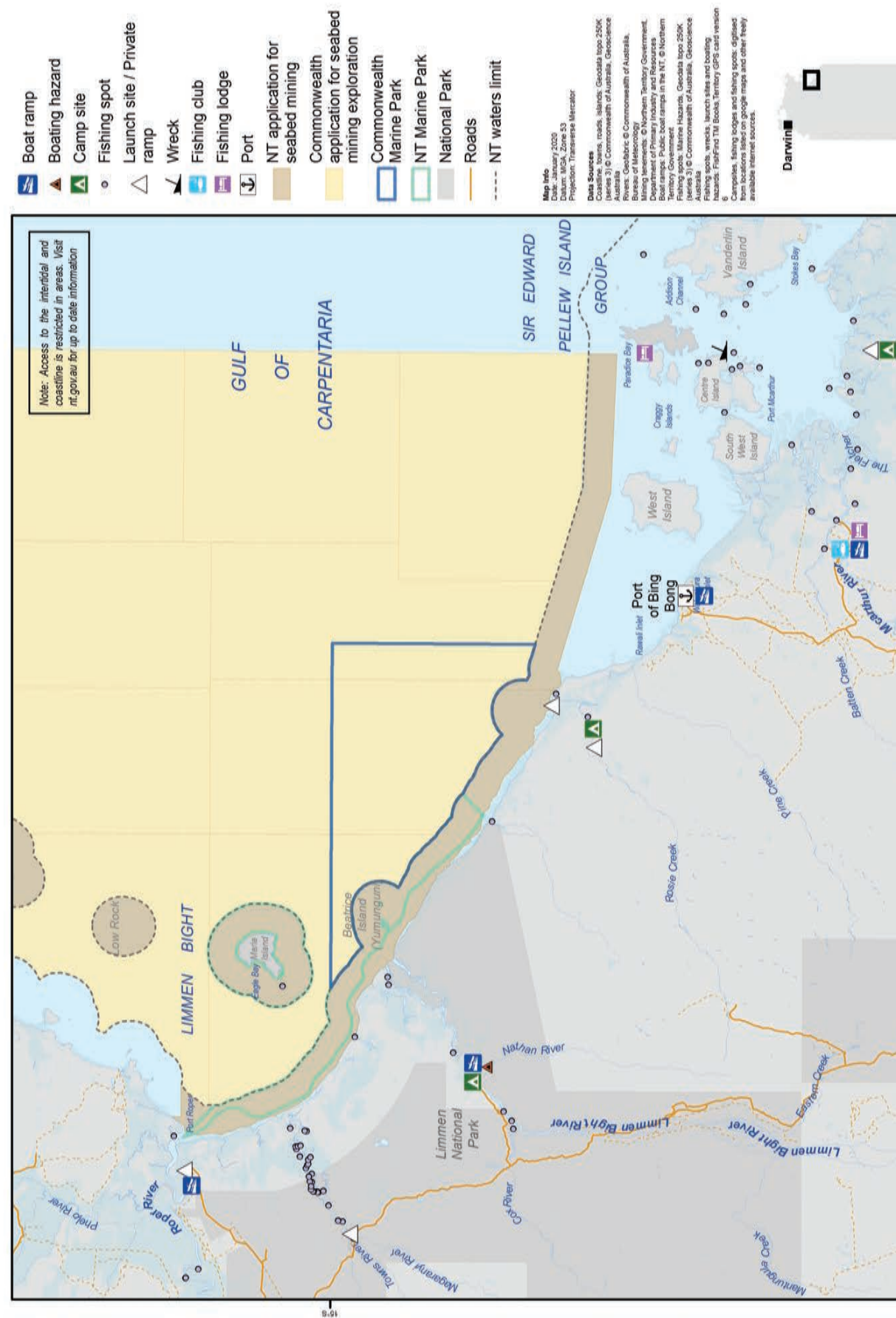


Figure 3. Groote Eylandt and Blue Mud Bay - proposed seabed mining areas and the fishing features that could be impacted

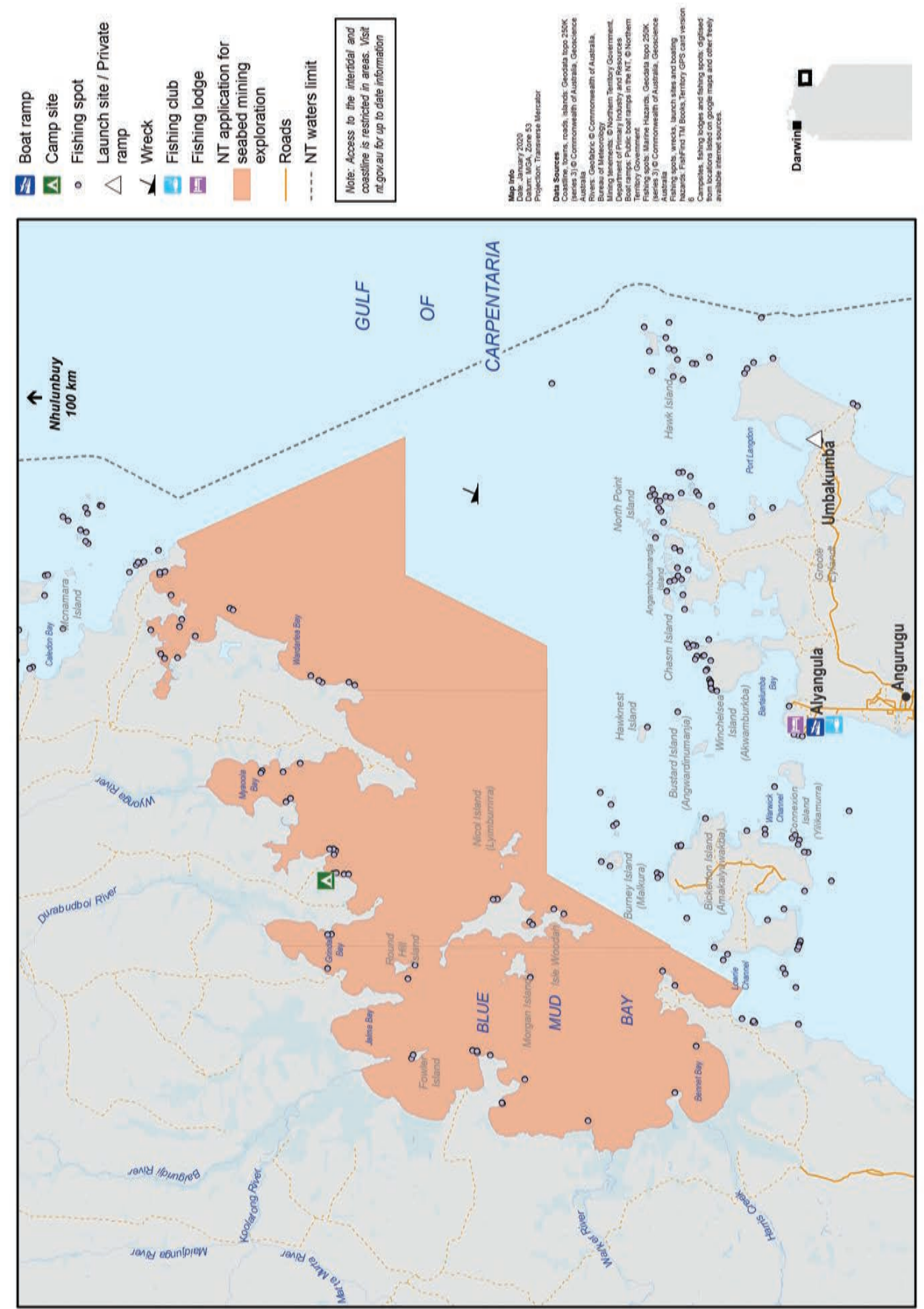


Figure 4. Wessel Islands - proposed seabed mining areas and the fishing features that could be impacted

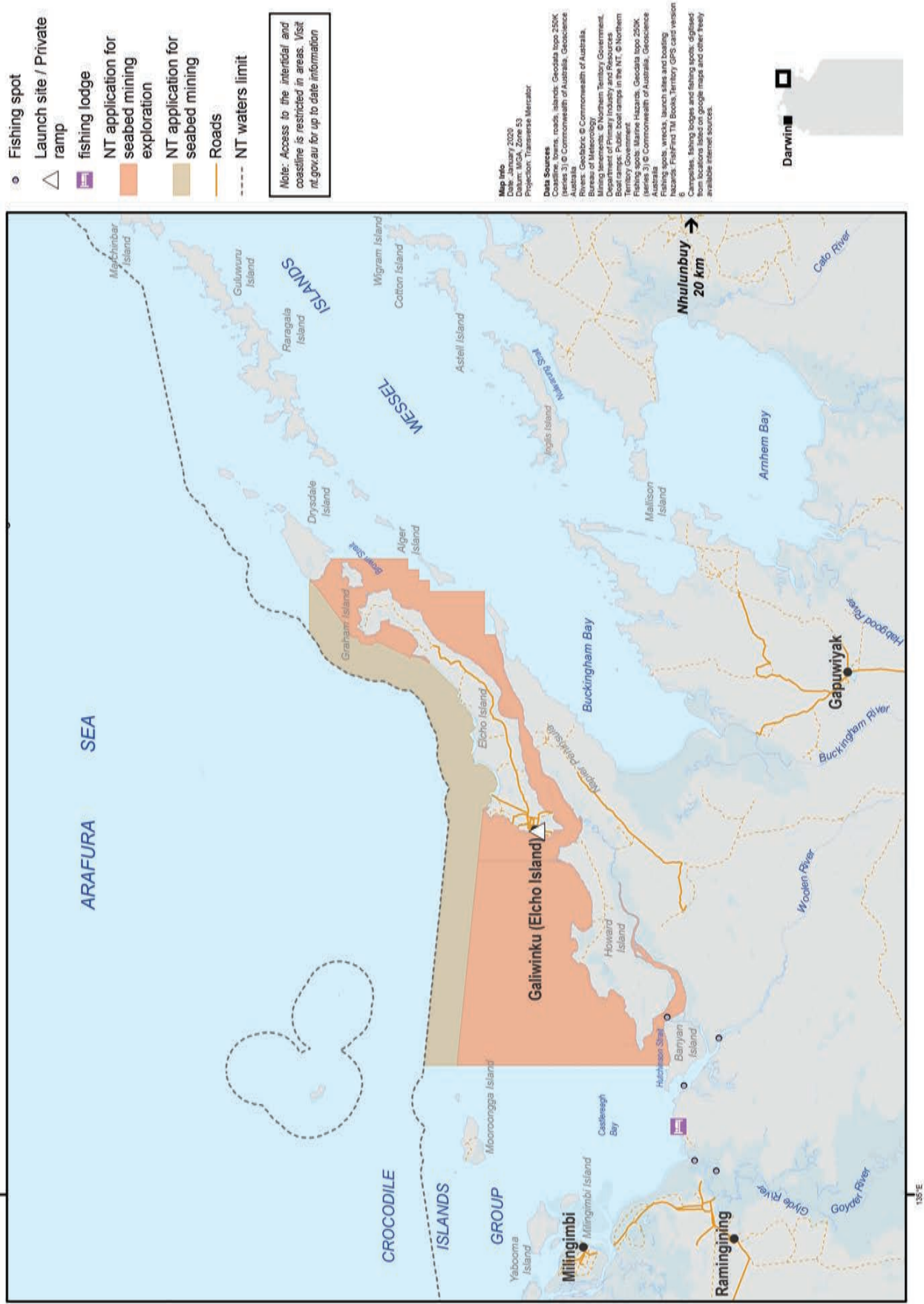


Figure 5. Tiwi Islands - proposed seabed mining areas and the fishing features that could be impacted

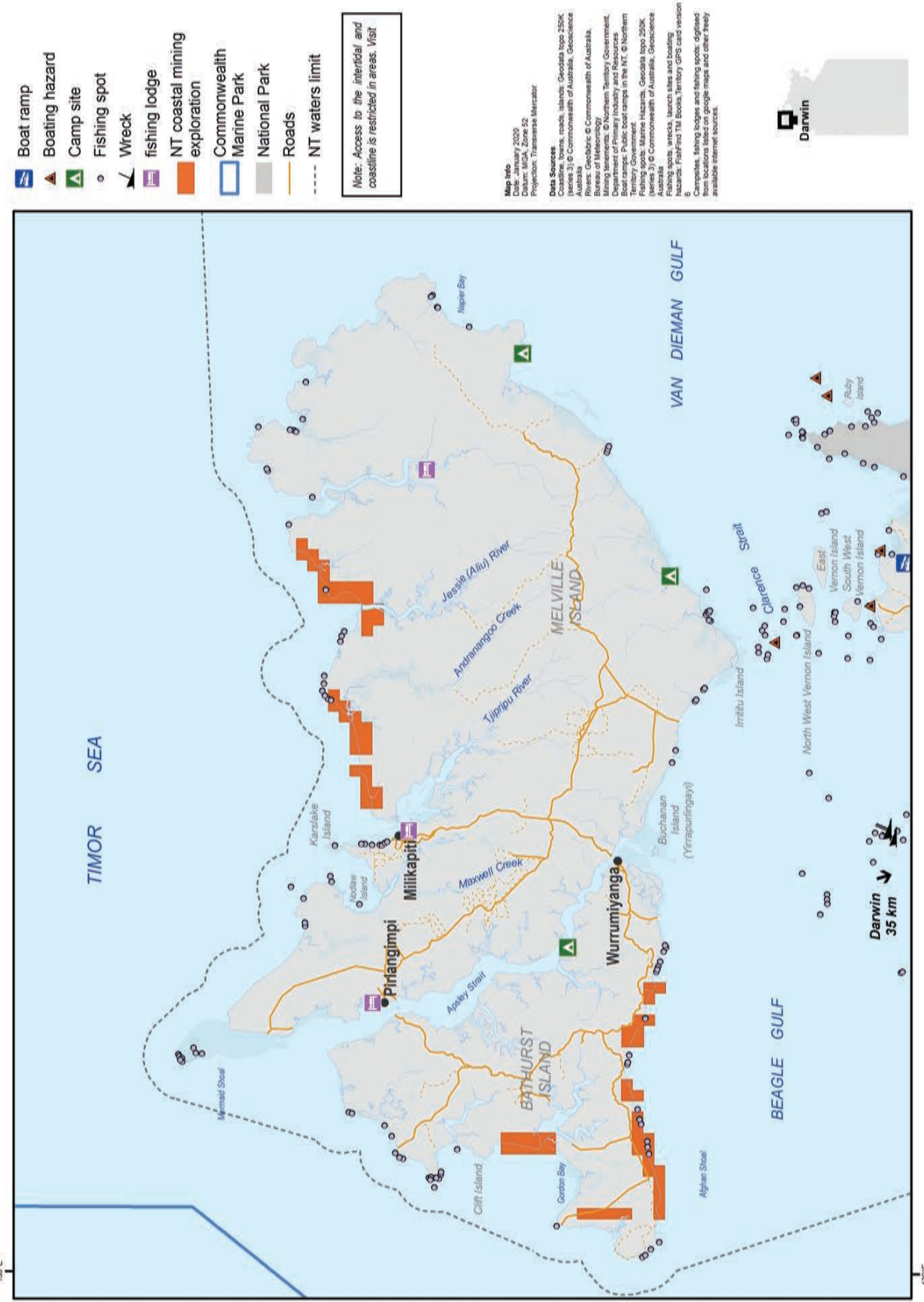
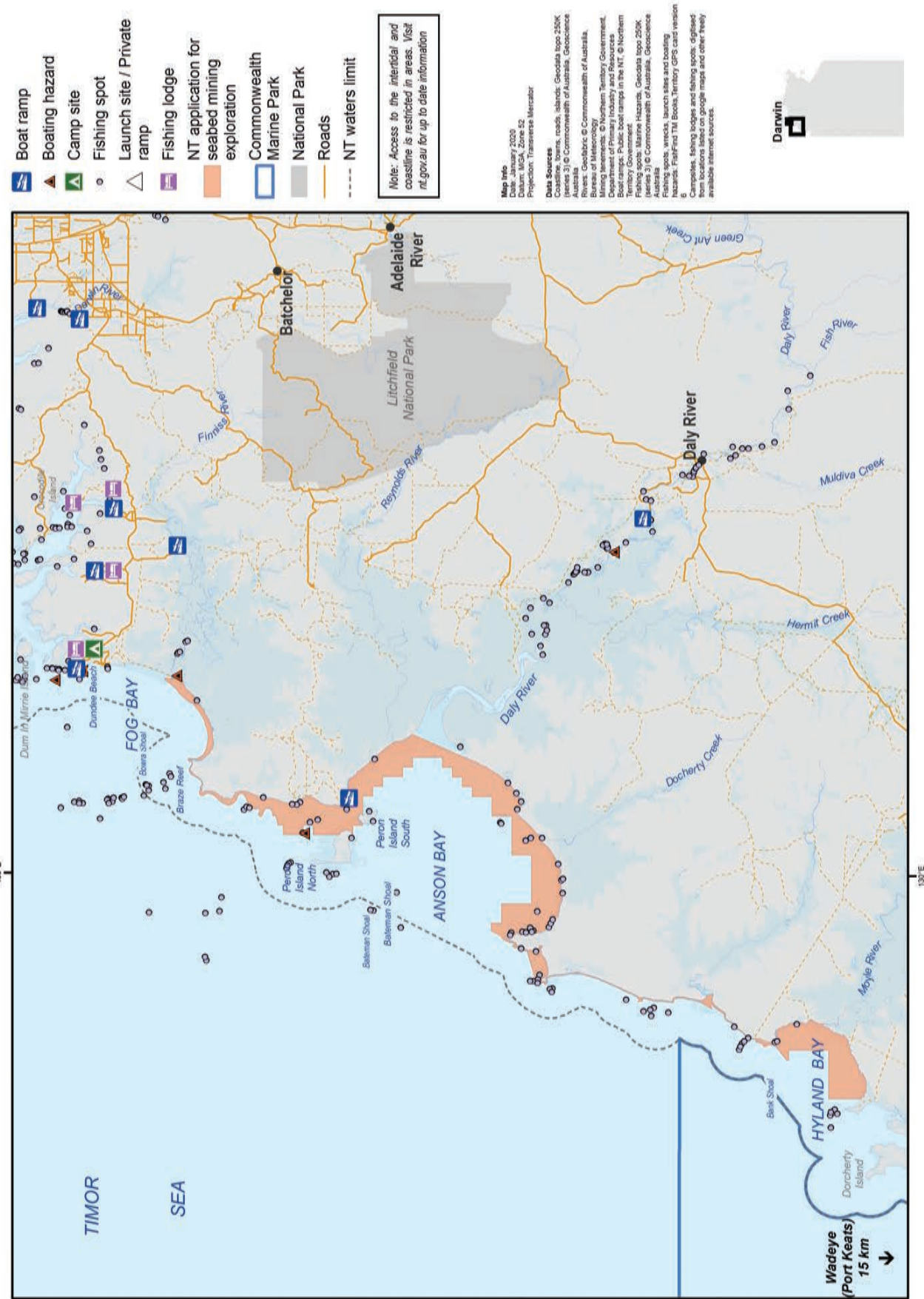
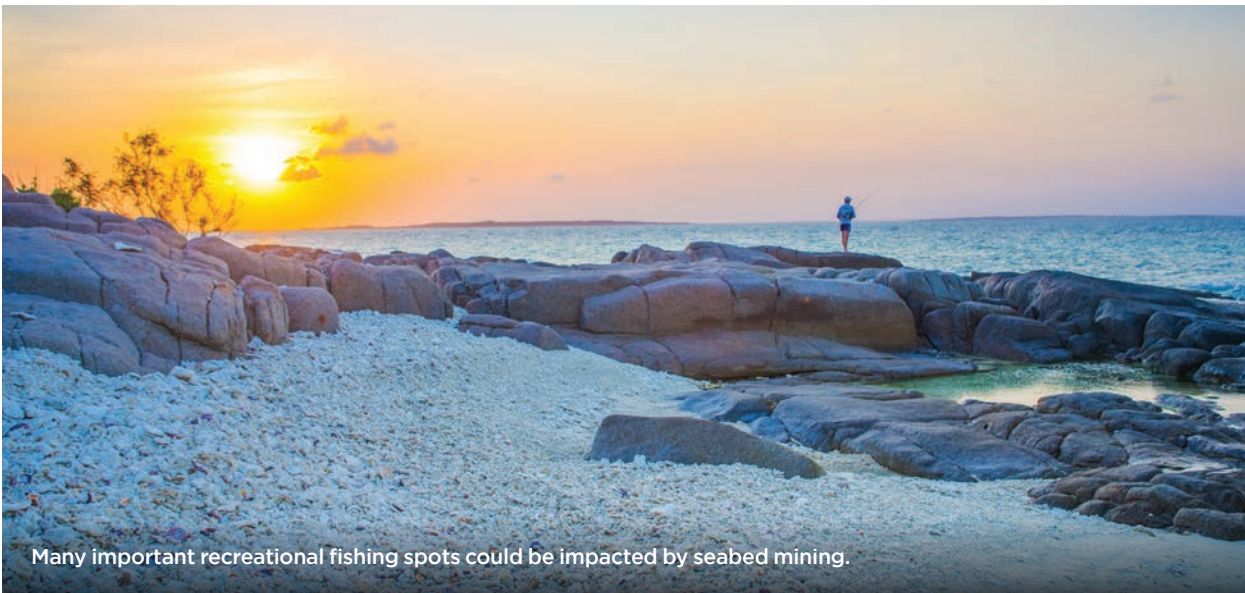


Figure 6. Hyland, Anson and Fog Bays - proposed seabed mining areas and the fishing features that could be impacted



Conclusion and recommendation



Many important recreational fishing spots could be impacted by seabed mining.

The Top End's coasts and seas are a unique mix of nature, culture, livelihoods and lifestyle that are now at risk from the looming threat of seabed mining. Were the Northern Territory Government to lift the Moratorium on seabed mining, this report shows that the impacts would cause unacceptable environmental, cultural, social and economic costs. These are driving communities around the world to oppose seabed mining.

By reviewing five NTEPA-commissioned reports obtained under Freedom of Information laws, along with other Australian and international research, this report concludes that there's a high risk that:

- the Top End's mangroves, seagrasses, tidal flats, coral reefs and estuaries would be devastated by seabed mining in many iconic areas;
- the impacts of seabed mining would occur across a long-term process, beginning with exploration activity, followed by the mining operation, the transport and disposal of tailings, and the development of onshore processing facilities and associated infrastructure such as jetties, accommodation and access roads;
- marine animals, including threatened species of marine turtles, dolphins, dugongs, migratory shorebirds, seabirds and sea snakes, along with saltwater crocodiles, fish and benthic invertebrates, would suffer from habitat removal and fragmentation, reduced water quality and the general decline in the health of the marine environment;
- ecological processes such as primary productivity, connectivity, climate regulation and hydrology would be severely disrupted by seabed mining and further impact Top End marine life;
- Indigenous communities in the areas targeted for seabed mining would experience impacts on many aspects of their lives including traditional knowledge, spiritual practices, physical heritage resources, traditional dances and songs, cultural landscapes and traditional land use;
- the economic benefits from seabed mining would be relatively small compared with its economic impact on tourism, recreational and commercial fishing, and ecosystem services;
- access by Indigenous communities, commercial and recreational fishers and tourists to many of the Top End's important areas would be prohibited by seabed mining operations;
- although the current exploration licence applications already cover large areas of the Top End's coastal waters, approvals would encourage seabed miners to look to expand their operations to other important areas.

This report finds that the Northern Territory should permanently ban seabed mining in its coastal waters.

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