From: [redacted]
To: Exmouth Gulf
Cc: [redacted]
Subject: EPA Strategic Advice for Exmouth Gulf - Consultation - Protect Ningaloo submission
Date: Wednesday, 11 November 2020 3:38:46 PM
Attachments: [redacted]

Dear EPA,

Thank you for the opportunity to comment in this consultation for the EPA's Strategic Advice for Exmouth Gulf. Please find our submission attached. We are happy to answer any questions regarding our submission and look forward to engaging further as the assessment process continues.

Kind regards

[redacted]

Projects and Policy Manager, Protect Ningaloo

[redacted]

www.protectningaloo.org.au

[redacted]

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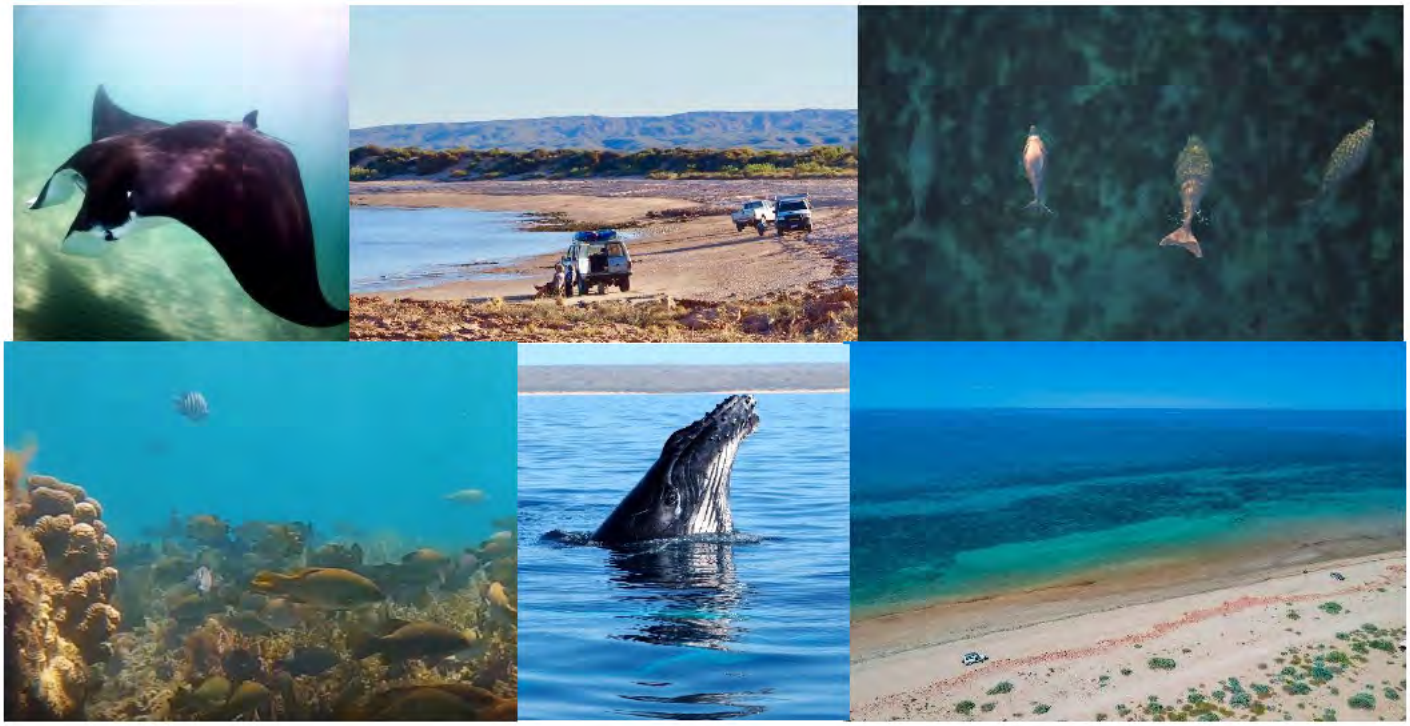
Protect Ningaloo is an initiative of the Australian Marine Conservation Society, the Conservation Council of WA and Cape Conservation Group – Exmouth

EPA Strategic Advice for Exmouth Gulf - Consultation
Protection Ningaloo submission
11 November 2020



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Introduction

Protect Ningaloo is a major, growing conservation initiative that is working to secure a healthy future for Exmouth Gulf. Our priority is stopping industrialisation in the Gulf, Ningaloo's nursery.

Protect Ningaloo is hosted by the Australian Marine Conservation Society (AMCS), Australia's leading marine conservation charity, in alliance with the Conservation Council of WA, the State's peak conservation body, and Cape Conservation Group, the leading conservation group for the North West Cape, based in Exmouth.

The campaign is in response to plans to allow heavy industry to establish in Exmouth Gulf. There is growing, widespread concern in the local Exmouth community, statewide in WA, nationally and internationally about the impacts of this proposed industrialisation on the environmental, social and tourism values of the Gulf, and Ningaloo.

Our aim is to protect Exmouth Gulf-Ningaloo's unique and globally significant environment and to help build a sustainable future for the area.

Protect Ningaloo has galvanised a mainstream support base numbering in the tens of thousands, with wider reach than that in social media. We are strongly grounded and supported in the region, and have deep and growing scientific engagement. We write this submission on behalf of our supporters, including those in the local and broader community, and many local businesses and tour operators.

EPA assessment principles, scope and process

Protect Ningaloo welcomes this strategic advice by the EPA under section 16(e) of the *Environmental Protection Act 1986* (EP Act) on the potential cumulative impacts of the proposed activities and developments on the environmental, social and cultural values of Exmouth Gulf.

We believe this assessment is long overdue and will confirm the globally significant environmental values of the Gulf and the incompatibility and serious risks posed by industrial development in the area.

This is a critical moment for Exmouth Gulf, with so many industrial plans on the table; proposals such as the Gascoyne Gateway deepwater port, Subsea 7's Learmonth pipeline fabrication project and K+S Salt's Ashburton Salt project, which the Minister for Environment acknowledged have the potential to significantly add to environmental, cultural and social impacts in the Gulf.

Decisions that are made now will have profound consequences and will determine Exmouth Gulf's future. This current assessment is an opportunity of real consequence and should help inform the direction the WA Government takes in the proper management of the area over the coming decades.

We present the perspectives below to help ensure the assessment meets its full potential:

- Our expectation, and that of the community, is that the EPA will carry out a comprehensive and robust assessment. We note that the Minister for Environment's letter to the EPA requested a *cumulative impact assessment* for Exmouth Gulf and specifically requested advice on the potential impacts on the Gulf's values from existing activities and developments, and by proposed activities and developments, including, but not limited to, the Subsea 7 proposal, the

Gascoyne Gateway proposal, and the K+S salt proposal. The Minister also requested advice on the compatibility of future developments with the social, cultural and environmental values of Exmouth Gulf.

- Protect Ningaloo seeks to know how the EPA proposes to carry out the cumulative impact assessment. For example, it would be useful and important to know specifically how the EPA will set about assessing the social, cultural and environmental values of Exmouth Gulf, and then assess the cumulative impacts of existing and future developments, as the Minister requested. We note that this public consultation is one part of the process, and an important one. However, we assume there will be parallel processes driven by the EPA to obtain scientific and expert input necessary for the review, and that there will be an opportunity for the community to review and provide comment on the findings of these assessments.

- We also seek to know how the EPA proposes to identify, fill and manage key gaps in information and research that are critical to enable a proper assessment of values and cumulative impacts. Protect Ningaloo is concerned that there is insufficient time in the proposed timeframe to carry out a thorough and robust cumulative impact assessment, including undertaking new research and on-the-ground/in-water surveys to fill critical knowledge gaps (noting, for example, seasonal variations in habitat and species distributions, and their use of the Gulf).

- Given the complex connections between ecosystems in and around Exmouth Gulf, it is important that the geographical boundaries are set sufficiently broadly to enable a meaningful assessment of values and impacts.

- All significant current and anticipated land and marine-based activities and developments that might have an impact on the Exmouth Gulf environment and its socio-cultural amenity should be captured in this assessment. As noted by the World Heritage Committee and scientists, and as outlined below, there are strong ecological connections between Exmouth Gulf and the Ningaloo Coast World Heritage Area. These should be considered in the assessment of the environmental values of the Gulf, and in the identification of activities that might impact on both areas.

- There should also be an accurate description and recognition of the impacts of historic and current activities on the Gulf's ecosystems. This will be particularly relevant when considering cumulative impacts, to understand the current of state of environmental values, to establish meaningful baselines and to ensure any future development does not exacerbate pre-existing stressors and impacts on local and inter-connected ecosystems.

- The assessment should incorporate proper consideration of the current and forecast impacts of climate change on Exmouth Gulf and Ningaloo and how the expected impacts of industrial development will interact with and exacerbate these impacts, particularly for long-lived projects.

Global context

While it is clear that the EPA is focussed on understanding the Gulf's values from a local perspective - and we acknowledge the fundamental importance of that - it is vital that the EPA also considers the wider context as part of its assessment. This global perspective taps important, broader values of the Gulf right across the social, cultural and environmental values spectrum that are crucial for this assessment.

Reports[1] and analysis from some the world's most credible scientific institutions reveal the enormous and accelerating damage that contemporary humans have wrought on the planet. Coastal and nearshore environments are some of the hardest hit. In many places they are under siege.

A series of recent reports warn of the global trends of critical loss of wildlife and habitat, risk of ecosystems collapsing and the failure to meet global biodiversity targets. For example:

- In September this year, a new report from the UN on the state of nature – the fifth Global Biodiversity Outlook – found that the world failed to address the growing global biodiversity crisis or fully achieve any of its agreed biodiversity targets in the last decade. It found that urgent action was needed to reverse the trends of habitat and biodiversity loss and the threat of extinction of as many as one million species.

- Another report[2] released in September by the insurance firm Swiss Re warns that one-fifth of the world's countries are at risk of their ecosystems collapsing because of the destruction of wildlife and their habitats. Their analysis indicated that more than half of global GDP – USD 41.7 trillion – depends on high-functioning biodiversity, providing ecosystem services such as food, clean water and air. Australia was found to be one of the countries most at risk.

- Similarly, WWF and the Zoological Society of London's recent biennial Living Planet Report 2020 found that human activities and overconsumption are driving an unprecedented destruction of nature, which is having catastrophic impacts on wildlife populations but also on human health, food security and livelihoods. On average, populations of mammals, birds, amphibians, reptiles and fish declined by 68% between 1970 and 2016.

Coral reef ecosystems are being degraded at a pace that shocks even seasoned scientists. Mangrove, seagrass and estuarine systems also face considerable stress across the world. These ecosystems provide critical habitat for a wide range of species – such as dugongs, sharks and rays, sawfish, turtles, many cetaceans, migratory shorebirds and many more – which are also in decline. We therefore bear a special, global responsibility for the interconnected Exmouth Gulf-Ningaloo system and the coral, mangrove, seagrass and other critical habitats, and the many species that it hosts. Indeed, this is also an opportunity to consider how the management of Exmouth Gulf's values can materially contribute to arresting the global decline in values that are manifest in this special place.

Exmouth Gulf's habitats also generate enormous economic value for tourism and fisheries, and increasingly are being recognised as a form of natural blue-green infrastructure for sequestering large quantities of carbon, absorbing energy from destructive storm-driven waves and tidal surges, and for a range of other valuable ecosystem services. Exmouth Gulf is already being seen as a research hub for work that has Indian Ocean-wide and global implications.

It is also the case that many people hold the conservation of Exmouth Gulf's values as important to them in a global context. This is the case for many people who live in the region or visit it regularly. They know they are somewhere of unusual and rare natural value. Some bring this perspective from scientific training, others from working in tourism in other places, and many from travel and direct experience. There are also important values that we know many people who live outside of Western Australia hold for the region.

[1] For example, the IPCC's Special Report 1.5 and Oceans and Cryosphere (SROCC) report

[2] Swiss RE Institute, Biodiversity and Ecosystem Services: A business case for re/insurance, September 2020

National and WA context

In the national context, it is widely acknowledged that Federal and state legislation has failed to protect the environment, including threatened species.

The recent Australian National Audit Office review[3] of the EPBC Act found that Australia's environment is in an unsustainable state of decline and laws set up to protect unique species and habitats are ineffective. The review's author said "The EPBC Act is ineffective. It does not enable the commonwealth to protect and conserve environmental matters that are important for the nation, …" and that "Australia's natural environment and iconic places are in an overall state of decline and are under increasing threat. The current environmental trajectory is unsustainable."[4]

The 2016 State of the Environmental Report found that the main pressures facing the Australian environment were climate change, land-use change, habitat fragmentation and degradation, and invasive species; with the interactions between these and other pressures resulting in cumulative impacts, amplifying the threats faced by the environment. It found that some of the key management challenges include the lack of an overarching national policy that establishes a clear vision for the protection and sustainable management of Australia's environment, and insufficient resources for environmental management and restoration.

A report[5] by the WA Auditor General in 2009 found that in many areas, the Government was not effectively protecting and recovering threatened species. It stated that 601 species in WA were listed as threatened with extinction and this number was increasing, with recovery action not happening for most threatened species. It questioned whether the Government had effective management and conservation processes and programs in place to ensure the protection and recovery of WA's threatened species. It is not clear that the situation has significantly improved since then.

A follow-up audit by the WA Auditor General in 2017 found that since the 2009 report, the size of the task had increased, with the number of species listed as threatened up 12% and those possibly threatened up 29%. It found that progress by the Government was disappointing, with considerable work to do to put the information and systems in place to effectively conserve threatened species.

Exmouth Gulf has critical habitat that goes to core of recovery work. Conserving Exmouth Gulf is crucial to this recovery work and the EPA can and should use the opportunity of this assessment to make real and measurable progress on these matters.

Implications for Governments and for this assessment

Australia is signatory to numerous international treaties and agreements, under which it has obligations to protect globally significant species and habitat. Exmouth Gulf's richness in values invokes a whole series of these obligations, including:

- Convention on Biological Diversity (CBD)

[3] Auditor-General Report No. 47 of 2019-20,19–20, *Referrals, Assessments and Approvals of Controlled Actions under the Environment Protection and Biodiversity Conservation Act 1999*, 25 June 2020

[4] Guardian Australia article, 20 July 2020, Australia's environment in unsustainable state of decline, major review finds, https://www.theguardian.com/environment/2020/jul/20/australias-environment-in-unsustainable-state-of-decline-major-review-finds.

[5] Office of the Auditor General Western Australia, Rich and Rare: Conservation of Threatened Species, Report 5, June 2009.

- Convention on Trade in Endangered Species of Wild Fauna and Flora (CITES)
- Convention on Migratory Species (CMS)
- Ramsar Convention on Wetlands
- Agreement between Australia and China for the Protection of Migratory Birds and their Environment (CAMBA)
- Agreement between Australia and Japan for the Protection of Migratory Birds in Danger of Extinction and their Environment (JAMBA)
- Agreement between Australia and Republic of Korea on the Protection of Migratory Birds (ROKAMBA)

In the context of the serious global and national trends, and given Australia's formal obligations, we hold that there is a fundamental responsibility for governments to *reduce* pressure on marine and terrestrial environments and to take steps to build their health and resilience. This should be the starting point for this assessment.

Government agencies at all levels charged with the responsibility for the stewardship of the environment, such as the EPA, should take every means at their disposal to enhance protection, not diminish it (and it follows, should make decisions that don't increase pressure on vulnerable ecosystems).

Therefore, given the global, national and local contexts, we recommend strongly that the EPA confirms that a core, leading principle of this assessment will be to avoid adding new pressures to Exmouth Gulf. Indeed, this is an obligation to reduce pressures and build the Gulf's resilience.

Furthermore, given the combination of ongoing foreseeable environmental change in Exmouth Gulf - from climate change but also from other pressures - and in light of the significant gaps in knowledge, the EPA should be avoiding locking in industrial development with a close-to-permanent physical footprint and largely unalterable, multi-decadal operational impacts. A failure to do this would undermine efforts by governments and the community to pursue adaptive management in this changing environment in the future. We would effectively hamstring future managers of this environment, and would not allow for future scientific research to inform management.

Responses to questions: Concerns about inherent limitations in the questions

Protect Ningaloo notes certain limitations and constraints in the five questions posed in this public consultation. For example, they do not: ask about the expected impacts from proposed projects (particularly the three specifically highlighted by the Minister in his request); ask about cumulative impacts of activities and developments; ask about the compatibility of future developments with the values of the Gulf; inquire about social pressures in Exmouth Gulf; and, they are strongly focused on local views, perspectives and observations. While local input is critical to this assessment, it will need to be combined with that which will also reside outside the small local community.

Protect Ningaloo's responses to the questions represent the views of our broad supporter base (both local and beyond). We have also taken a wider interpretation of the questions, in line with the Minister's brief. We are not experts in all the matters under consideration, and while we have engaged closely with scientists and others, our responses do not attempt to be comprehensive, also due to the inherent time and capacity constraints. Instead, we have highlighted the key values and impacts for Exmouth Gulf. As outlined earlier, we understand the EPA will be obtaining expert and scientific advice beyond this initial consultation and we hope and expect there will be opportunities to review and provide feedback on the findings of these assessments in due course.

1) What are the values (environmental, social and cultural) you associate or identify with in and around Exmouth Gulf?

Environmental values

Exmouth Gulf is an understudied area with major gaps in information but while there is much that is not known about its ecosystems, it has enough obvious values to rank high in global significance.

The conservation values of Exmouth Gulf are recognised in international agreements, in national and state government legislation, and in state and local planning policies and strategies. For example:

- The World Heritage Committee recommended in 2011 that Exmouth Gulf be considered for inclusion in the Ningaloo World Heritage area (see below).

- Exmouth Gulf has been listed an Important Marine Mammal Area (IMMA) by the Marine Mammal Protected Areas Task Force (in connection with IUCN), part of the Ningaloo Reef to Montebello Islands IMMA. The sheltered waters of Exmouth Gulf are noted as an important feeding and nursing/calving habitat for Australian humpback dolphins, dugongs, and Indo-Pacific bottlenose dolphins, as well as an important nursery for humpback whales.

- The WA Government[6] has designated the mangroves found around the Bay of Rest and from Giralia Bay to Yanrey Flats on the Exmouth East Shore as 'regionally significant' with a very high conservation value. The EPA's operational objective for these areas is that no development should take place that would adversely affect the mangrove habitat, the ecological function of these areas and the maintenance of ecological processes which sustain the mangrove habitats.

- In 2001, Environment Australia classified the Exmouth Gulf East subtidal and intertidal regions as a Wetland of National Importance.

- In 2018, the Australian Government Department of Environment and Energy classified the Cape Range Subterranean Waterways that occur along the western and southern margins of the Gulf as Wetlands of National Significance.

- The coast and nearshore waters on the eastern and south-western sides of Exmouth Gulf from Locker Point to around Learmonth (including Heron Point and the Bay of Rest) were recommended for inclusion in a Representative Marine Reserve System for WA by the then WA Government Marine Parks and Reserves Authority in 1994 (Wilson Report). This was for the protection of mangal habitat, prawn and fish nursery areas, turtle and dugong feeding areas and coastal fauna and flora generally.

- The State Planning Policy 6.3 identifies the southern and eastern mangrove areas and adjacent coastal waters of Exmouth Gulf as 'significant environmental areas'.

- The Shire's Exmouth South Structure Plan has an objective to protect the significant environmental and remoteness values of the marine waters of Exmouth Gulf south of Wapet Creek, which include Heron Point. The Plan acknowledges that these near-shore marine waters are identified as a 'significant environmental area', with the section Wapet Creek to Bay of Rest (which includes Heron Point) also classified as 'semi-remote'.

[6] Environmental Protection Authority (2001). Guidance Statement for the protection of tropical arid zone mangroves along the Pilbara Coast, No. 1.

- The Shire of Exmouth Local Planning Strategy also acknowledges the ecological values of Exmouth Gulf for habitat and as breeding grounds, noting the importance of the abovementioned recommended marine protected areas south of Wapet Creek.

Exmouth Gulf is potentially one of WA's most distinctive marine ecosystems, being one of the few arid zone hypersaline estuaries in the State, amongst its many important features. It is a globally unique ecosystem comprised of a shallow, reverse estuary. It is the most diverse, intact and least industrialized example of this coastal ecosystem type in the Pilbara coastal bioregion.

A 2019 report[7] by 16 scientists, based on field surveys and an extensive literature review, comprehensively outlines the values of Exmouth Gulf's ecosystems. For example:

- Globally significant features – including humpback whale nursery; extensive undisturbed and unique arid zone mangrove ecosystem; subterranean stygofauna; and fossil Pleistocene coral reefs.

- Diverse habitats – including subterranean karst limestone waterways of Outstanding Universal Value; Threatened samphire wetlands; extensive mangroves; modern coral reefs; seagrass, soft coral and sponge beds; highly intertidal cyanobacterial mats; macroalgae-dominated reef flats; intertidal sand flats; oyster beds; and undisturbed islands and sandy beaches.

- Providing significant year-round habitat for a range of threatened marine species - including dugongs, manta rays, whales and dolphins, hawksbill turtles, short-nosed sea snakes, migratory shorebirds.

- Support for hundreds of species of fauna, including:
    - 831 species of gastropods, bivalves and cephalopods, 143 species of echinoderms, and 173 species of crustaceans characterised by significant instances of endemism.

    - 790 species of teleost fish and 63 species of sharks and rays, including the Critically Endangered sawfish and its pupping habitat.

    - More than 15 species of sea snakes including endemic, undescribed and Critically Endangered species.

    - Five species of sea turtles including juvenile feeding habitat for Critically Endangered hawksbill turtles and other Endangered and Vulnerable species.

    - 95 species of migratory and resident shorebirds, waterbirds and seabirds and important nesting, feeding and roosting habitat for 36 Migratory, four Endangered, 11 Near Threatened and two Vulnerable species.

A video showing some of the habitats and species found in Exmouth Gulf can be viewed here. Other footage and images of Exmouth Gulf can also been seen on the Protect Ningaloo website here.

[7] Fitzpatrick et al (2019). Exmouth Gulf, north Western Australia: A review of environmental and economic values and baseline scientific survey of the south western region.

While not a comprehensive outline of the environmental values of Exmouth Gulf, some further examples and details are provided below (with a list of reports and articles at the end of this submission).

Benthic communities and habitat

Exmouth Gulf hosts a unique turbid coral reef system, and recently published studies have reported that some turbid reefs appear more resilient to bleaching in the face of rising sea surface temperatures compared to clear water reef systems. The fact that these reef types may be able to endure marine heatwave events, which are predicted to increase in frequency and intensity under a changing climate, means that they may act as a coral refugia and have even greater value in future. The need to reduce unnecessary to such values is self-evident.

Dugongs

- Exmouth Gulf contains a significant dugong population, part of the largest stable population of dugongs in the world, and the only one that is not in decline. Exmouth Gulf is of considerable importance to this species, as it has been recorded as providing significant breeding and feeding habitat. The IUCN lists the dugong as Vulnerable to extinction at a global scale.

- Dugongs are highly sensitive to habitat disruption from direct disturbance to seagrass. Furthermore, vessel traffic can result in increased levels of harassment to dugongs, re-location of habitat, degradation of habitats by increasing turbidity and increased chance of boat strike. Dugongs are especially vulnerable to boat strike as they show a slow response time to speeding vessels. Any disturbance of dugong feeding behaviour can be expected to pose a significant risk to these highly sensitive, slow-breeding animals.

- It is self-evident that in this assessment, the EPA will need to detail the existing and potential cumulative impacts of activity on dugongs, and seagrass habitat.

Dolphins

- While there are large knowledge gaps about the distribution of inshore dolphins in North West WA, three species (Indo-Pacific bottlenose, Australian humpback and Australian snubfin dolphins) are known to inhabit Exmouth Gulf.

- Inshore dolphins have been recognised to be of ecological value to the Ningaloo Marine Park and the Ningaloo Coast World Heritage area, and humpback and snubfin dolphins are listed as Vulnerable by the IUCN.

- With restricted home ranges and these ranges and habitats overlapping with areas of high human activity, inshore dolphins are exposed to a variety of threats, including habitat loss and degradation, acoustic disturbance and vessel strikes. Repeated and cumulative exposure to disturbance over time has the potential to disrupt population critical behaviours that are essential for maintaining a healthy population.

- A study (Hunt et al, 2020) of Australian humpback dolphins in the northern Ningaloo Marine Park found that water depth and distance to coast were the most important variables influencing dolphin presence, with these dolphins showing a preference for shallow waters (5 – 15 m) less than 2 km from the coast. Coastal marine environments are some of the most heavily impacts by human activities, which presents a threat to species that forage, breed, reside

or migrate along the coast. Shallow, coastal waters, such as those found in Exmouth Gulf, are therefore of high value for the conservation of these inshore species.

Humpback whales

- The Gulf is a critical resting area and nursing ground for the world's largest humpback whale population. It provides calm, shallow and sheltered waters for mother-calf pairs, increasing the chance of survival as they continue their migration.

- Research has shown that mother-calf pairs in the Gulf rest both at the surface but also at various shallow depths, making them next to impossible to spot. This resting behaviour makes mother-calf pairs highly susceptible to vessel collisions.

- Studies have shown that the communication calls between mother and calf are fainter than other communications and therefore more susceptible to acoustic masking. The noise from shipping and industrial activities poses a significant risk for the separation of humpback whale calves from their mothers, increasing their risk of falling prey to predators.

Manta rays

- While detailed knowledge about the distribution of manta rays in Exmouth Gulf is limited, aerial surveys, photo-ID and satellite tracking data have confirmed that large numbers of reef manta rays access these waters. Most sightings are seasonal, but have spanned the months of April to October.

- Reef manta rays are listed as Vulnerable to Extinction by the IUCN. In addition, manta ray species are valued globally as the basis of a multimillion-dollar ecotourism industry, with significant tourism value locally along the Ningaloo coastline.

Migratory birds

- Exmouth Gulf is well known to be an important area for thousands of migratory shorebirds for six months every year, over the spring-summer months, with some juveniles, immature and resident species remaining all year. When shorebirds arrive, a high percentage of time is invested in foraging to ingest sufficient energy. Such refuges are increasingly rare due to anthropogenic change, so Exmouth Gulf has an increasingly important role in the survival of these birds.

- In 2012 the Exmouth Gulf was of International Significance to two species: the Grey-tailed Tattler and the Pied Oystercatcher. As a result of ongoing survey work, Exmouth Gulf is now of International significance to an additional four species: the Eastern Curlew (Critically Endangered), Ruddy Turnstones, Sanderling and Sooty Oystercatcher.

- The mangroves are important roosting sites for species such as the Grey-tailed tattler and Terek sandpiper.

Fish fauna and elasmobranchs

- Exmouth Gulf supports 790 species of teleost fish, including juvenile habitat for commercial and recreational species, newly described species, range extensions and a diverse, yet poorly understood seahorse and pipefish assemblage.

- 63 species of elasmobranch (sharks and rays) have been officially recorded including two Critically Endangered sawfish and their pupping habitats, and juvenile habitat for the giant shovelnose ray and leopard whipray.

- The complexity of the benthic habitat provides unique and varied juvenile habitat for fish and elasmobranchs.

Subterranean fauna

- Exmouth Gulf contains the Cape Range subterranean waterways and associated stygofauna, including at least 11 endemic fauna, including the blind cave eel and blind gudgeon.

- These stygofauna are recognised for their Outstanding Universal Value and Inscribed on the World Heritage Register and are protected under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

Flora and vegetation

- The flora values of the Exmouth Peninsula have not been properly understood and are much higher than currently accepted taxonomic treatments suggest (Trudgen, M. 2019).

- There a number of reasons for this, and important here is that it is not widely appreciated that the Cape Range (and presumably the other ranges in the survey area) was first above sea level as an island; a place where evolution could favour the development of new taxa. And, that the Exmouth Peninsula is largely separated from other range habitat by barriers for much of the flora.

Listed Threatened Species, Communities and Migratory Species

Exmouth Gulf contains a significant number of threatened and migratory species:

- The dugong is an EPBC listed marine species and is also listed by the International Union for Conservation of Nature (IUCN) as Vulnerable to extinction at a global scale and is listed as fauna 'in need of special protection' under State Legislation.

- The three dolphin species recorded in Exmouth Gulf are protected under the EPBC Act, with the Australian humpback dolphin and the Australian snubfin dolphin being endemic to Australia and listed as Vulnerable by the IUCN.

- The humpback whale is listed as Vulnerable and the blue whale, which is known to occur in Exmouth Gulf, is listed as Endangered under the EPBC Act.

- The reef manta ray and giant manta ray are protected as listed migratory species and are also listed as Vulnerable to Extinction by the IUCN.

- There are 95 species of birds in the Exmouth Gulf, of which 44 are of significant conservation status. There are four Endangered, 11 Near Threatened, and two Vulnerable species listed by the IUCN. Of these species, 36 are listed as migratory species under the EPBC Act.

- The freshwater sawfish and the green sawfish are listed as Critically Endangered by the IUCN, with the green sawfish listed as Vulnerable under the EPBC Act and being additionally protected under the WA Biodiversity Conservation Act. A further 13 species of rays known to inhabit Exmouth Gulf are listed as Vulnerable by the IUCN.

- Exmouth Gulf is a globally significant sea snake biodiversity hotspot, with 15 of Australia's 38 species, including four of the seven species endemic to the North-west shelf. All sea snake species are Listed Marine Species under the EPBC Act, with the short-nosed sea snake listed as Critically Endangered.

- Exmouth Gulf supports five of the six Australian marine turtles, all of which are listed as Vulnerable or Endangered under the EPBC Act. It provides juvenile feeding habitat for the hawksbill turtle which is listed as Critically Endangered by the IUCN.

- Exmouth Gulf contains the Cape Range subterranean waterways and associated stygofauna, including at least 11 endemic fauna. These stygofauna are recognised for their Outstanding Universal Value and Inscribed on the World Heritage Register and are protected under the EPBC Act.

Ningaloo – Exmouth Gulf interconnection

The World Heritage Committee recommended in 2011 that Exmouth Gulf be considered for inclusion in the Ningaloo World Heritage area. This was on the grounds of ecological linkages between the Ningaloo Reef and the Gulf, in particular the extensive mangrove stands and other shallow water habitats that function as nurseries and adult foraging grounds for many species.

The ecological integrity of these interconnected and mutually supportive ecosystems is paramount to maintaining the Reef's World Heritage values.

Critical habitats within Exmouth Gulf ensure the ongoing stability of many animal populations that also spend significant portions of their life history within the Ningaloo Coast WHA[8].

- **Shovelnose ray pups** are born and feed in the shallow intertidal flats and mangroves of Exmouth Gulf then as adults migrate out into the Ningaloo Reef and beyond.

- **Mangrove jack juveniles** feed and grow in the mangrove creeks of Exmouth Gulf then as adults move out to the offshore reefs and continental shelf (such as Ningaloo Marine Park) to breed.

- **Manta rays** migrate into the Gulf to feed on the productive zooplankton along the western Exmouth Gulf and to access cleaning stations. They subsequently migrate to Ningaloo, supporting ecotourism, then move on to Shark Bay.

- **Humpback whales** rest and nurse their young in Exmouth Gulf in preparation for their annual migration to summer feeding grounds in Antarctica. They travel via Ningaloo Reef where they are predated by killer whales, thus representing a significant source of nutrients to this ecosystem.

[8] Oceanwise Australia

- **Marine turtles**, including hawksbill and green turtle juveniles, sub-adults and adults, rest and feed in the shallow habitats of Exmouth Gulf, then migrate to nesting beaches along the Ningaloo coastline and beyond.

- **Dugongs** from the world's largest intact population feed on seagrasses in Exmouth Gulf, and are known to migrate to and from Ningaloo, the Pilbara and Shark Bay (for example, opportunistic migrations in search of food or to shelter from severe weather). They also use Exmouth Gulf as breeding and mating habitat.

- **Migratory shorebirds** fly to Exmouth Gulf and Ningaloo Coast to rest and feed, and then migrate to remote sites, exporting nutrients.

Heron Point/Bay of Rest

Heron Point (where Subsea 7's proposed pipeline launchway would be located) and the nearby Bay of Rest have high environmental and social importance. Some additional specific values include:

- Sightings of range of threatened species including hawksbill turtles, saw fish, dugongs, whale sharks.
- Coral reefs, intertidal mangroves, and oyster beds.
- Highly productive sedimentary basin.
- A survey undertaken by Hoschke and Whisson in November 2019 identified 86 fish species from 41 families adjacent to Heron Point within a survey area of 300m x 50m.
- A number of critically endangered, vulnerable and endemic birds have been recorded within the Bay of Rest North survey area.
- There are at least three species of tern regularly nesting on the islands south of Heron Point.
- Intact, natural landscapes and grand vistas with an absence of industrial infrastructure.

Qualing Pool

Given the limited data available for Qualing Pool, and the proposed Gascoyne Gateway development in this area, and nearby Mowbowra Creek, Protect Ningaloo commissioned marine science organisation Oceanwise Australia to conduct fieldwork in September 2020 to document opportunistic sightings of marine fauna and to do some initial mapping of nearshore subtidal habitats in these areas.

Aerial surveys and underwater census were conducted over three days. The key findings are outlined below and a sample video showing the area from Qualing Pool to Mowbowra Creek, and some of the habitat/species sighted, can be found here. Further footage is available.

Marine mammals
Two species of marine mammal were directly observed and recorded adjacent to Qualing Pool, humpback whales and indo-pacific bottlenose dolphins. Indirect observations of dugongs at Qualing Pool were made, with photographic records of feeding scars. Lack of visual contact with animals was likely due to the limited survey time, as there are verbal records from locals reporting regular pods of up to four animals. Several dugongs were also encountered at Mowbowra Creek and feeding behaviour was witnessed.

Birds
Many species of birds were encountered (with the area having a high usage by a wide range of species due to the variety in habitats), including:

- Starry finch
- Zebra finch
- Nesting western bowerbirds with young
- Multiple unidentified shorebirds
- Large whistling kite flocks (15-30)
- Rainbow bee eaters
- Singing honeyeaters
- Pied butcherbirds
- Ospreys
- Caspian terns
- Spotted harriers (Mowbowra Creek)
- Juvenile sea eagles (Mowbowra Creek)
- Australian hobbys (Mowbowra Creek
- Nankeen kestrels
- Brahminy kites (Mowbowra Creek)

Reptiles
A high abundance of small green sea turtles was observed feeding throughout the algae and seagrass habitats. These are likely to be sub-adults, not yet reproductively mature. A single small olive sea snake was observed, approximately 0.5m in length, foraging in shallow water seagrass and macroalgae habitat, interspersed with rocky ledges. Considering the size of this animal, it is likely a juvenile or immature adult.

Fish
Due to the variety of habitats, this area is likely of high value to a wide range of fish species. The nearshore sand flats supported large schools of fish including whiting, mullet, tarwhines, blubberlips and scats. Within the coral reef bommies, barramundi cod (*Cromiloptes altivelis*) were observed. A giant groper (*Epinephelus lanceolatus*) was also observed surface-swimming at dusk towards fishing boats. Two NW endemic anemonefish, *Amphiprion milii* and *rubrocinctus* were observed in a large anemone colony, and in smaller ones.

Sharks and rays
Eagle rays, mangrove rays and mask rays were the primary species observed, as they were often visible from the air and either high in the water column or over sand. Furthermore, multiple ray feeding scars were observed during aerial surveys in the shallow sand habitat.

Invertebrates
There is high abundance and diversity of nudibranchs and other gastropod species, which have high social value for the diving community. Intertidal habitats support a wide range of invertebrates (sea cucumbers, spider crabs, decorator crabs, clams, and mantis shrimp were observed) and are also likely to support juvenile octopuses including blue ring and the day octopus. The area likely has high squid abundance due to the presence and diversity of seagrass habitat and the rate at which fishers were observed to be catching them.

Benthic habitats
A wide range of benthic habitats was encountered, including approximately four different seagrass communities, one of which is a known dugong foraging species. The inshore shallow benthic habitat was dominated by these seagrass beds, in some areas reaching 100% surficial seafloor coverage for some communities, while the dugong foraging species dominated the subsurface biomass with their

dense root systems. The percentage cover of seagrass in the shallow benthic community can be calculated using the aerial imagery obtained combined with ground truth imagery.

Macroalgae covered limestone reef is abundant on the fossil coral reef and limestone pavement. There are significant hard coral bommies in multiple different areas, with high species variety, including porites, acropora and more. Coral is mostly situated along the paleochannel edges. Intertidal limestone pavement and rock pools support a wide range of species and juveniles. Extensive sand benthos is utilised by rays for feeding habitat, with many feeding scars observed.

Mangroves
There is a stand of mangroves (*Avicennia marina*) living within Qualing Pool, which is cut off from the Gulf water by the sandy beach. This indicates that there is fresh water supply to Qualing Pool, which originates from a freshwater seep. These mangroves support significant birdlife, including nesting western bowerbirds.

Geomorphology
There is a fossil limestone reef, at the shoreline and 200m inland of the dunes. There is an inland freshwater seep, which feeds into Qualing Pool, supporting an important wetland habitat.

Aboriginal heritage
The freshwater seeps at this site were likely significant as a water source for Aboriginal communities.

Mowbowra Creek

The key observations from the survey work at Mowbowra Creek are summarised below.

Marine mammals
Humpback whales were regularly observed, primarily cows and calves with both resting and feeding behaviour occurring, as close as 750 metres from the creek mouth. Three dugongs were encountered in the nearshore area, within 500 metres of the shore. Feeding behaviour was witnessed as close as 100 metres on seagrass habitat by a large mature adult. Seagrass feeding scars were also observed. A cow and its yearling were observed on sunset travelling, with behaviour being observed by the yearling that appeared playful, including back scratching on macroalgae covered limestone reef.

Birds
There was a high density and diversity of birds of prey observed, with all birds of prey species recorded at Qualing Pool being observed here. Zebra finches, singing honeyeaters and multiple yet to be identified shorebirds were also observed.

Reptiles
Mating green sea turtles were observed offshore of Mowbowra Creek. Many more juvenile green sea turtles were also observed feeding nearshore on algae and seagrass.

Fish
Fish assemblages were similar to those observed at Qualing Pool, however there were not large schools of whiting. The highest diversity was observed along the paleochannel reef edge where the majority of complexity and coral was observed.

Sharks and Rays
A grey reef shark mating chain was observed in the shallows less than 50 metres from the mouth of Mowbowra Creek. An endemic Ningaloo maskray was observed resting in a sand patch surrounded by seagrass. Many other stingrays and eagle rays were recorded, with a high density of stingray feeding scars and feeding behaviour recorded within the nearshore sand habitat.

Invertebrates
A diverse invertebrate community was apparent in the subtidal reefs adjacent to Mowbowra Creek, including sponges, corals, crabs, lobster shrimp, nudibranchs, echinoderms, anemones and soft corals.

Benthic Habitats
A similar diversity of benthic habitats to Qualing Pool was observed, including coral bommies, shallow water macroalgae covered limestone reef, four varieties of seagrass cover, sandy benthos, intertidal limestone reef and deeper water soft sediment covered in macroalgae, sponge and corals.

Geomorphology
Two inland pools in the dry creek beds were apparent, with mangroves in the southern pool. The terrestrial geomorphology is notable, with many karst limestone cave expressions and subterranean waterways supporting unique and endemic fauna.

Aboriginal heritage
This area is likely to be important for Aboriginal heritage with sites of water availability and grinding rocks in the dry creek bed.

East Exmouth Gulf

K+S Salt's Ashburton Salt proposal is located on the eastern side of Exmouth Gulf. According to the EPA's own advice to the Minister for Environment in 2012[9], the environmental values of East Exmouth Gulf are high and include:

- being listed in the Directory of important Wetlands (2008) as a wetland of national importance. The Directory describes the significance of the wetland as "An outstanding example of tidal wetland systems of low coast of northwest Australia, with well-developed tidal creeks, extensive mangrove swamps and broad saline coastal flats."

- being one of the largest and most extensive, outstanding and intact examples of Western Australian arid zone coastal salt flat ecosystems.

- falling into the category of significant 'wilderness' values attributed to near pristine environments and is currently subject to very limited access.

- supporting extensive adjacent benthic primary producer habitats including mangroves, algal mats, seagrasses, algal beds, and coral communities.

- being a key resting area and important habitat value for humpback whales.

[9] EPA Notice of decision to consent to change to proposal during assessment, Ashburton Salt Project, Assessment No. 2101, 18 August 2017

- providing important feeding habitats for other conservation significant species such as marine turtles, dugongs, Australian snub-nose, Indo-Pacific humpback whales, spinner dolphins, sea snakes, sharks (including whale shark) and a diverse range of Indo-West-Pacific affinity species.

- being an important nursery area supporting the prawn and other fisheries in the Gulf.

- providing an internationally significant habitat for migratory shorebirds and waders listed under the under the Japan-Australia Migratory Birds Agreement (JAMBA) and/or the China-Australia Migratory Birds Agreement (CAMBA).

- demonstrating an important marine-estuarine-terrestrial connectivity of the trophic dynamics of the arid tropical system.

Social values

People live in and visit Exmouth Gulf in large part because they value the natural environment. It provides social, physical and psychological benefits to locals and is a significant part of their lives. They choose to live here, in spite of challenges (cost, lack of access to some services and amenities etc), because of the natural wonders of the area and the social benefits that they offer.

Exmouth Gulf is a major ecotourism destination, with tourism being the region's leading provider of employment. This industry has been built on the region's rich biodiversity, as well as its largely unspoilt marine and coastal environments.

The Gulf is valued for its beautiful landscapes, grand vistas and the sense of peace and seclusion that it provides.

Locals and visitors alike value Exmouth Gulf for the many recreational opportunities it provides, including fishing, boating, diving, snorkelling, hiking and birdwatching.

The beaches from Wapet Creek to Heron Point, and the wetlands of the Bay of Rest, are important and popular areas of recreation and relaxation.

Qualing Pool is a popular recreational area. A wide variety of fishers use different methods including netting, line fishing, spearfishing and squidding. People come to relax and recreate, partaking in boating, snorkelling, kayaking, paddle boarding and 4wding. The beach is also used as a boat ramp, one of the only all-tide launching points from the beach on the Gulf. The rock bar adjacent to beach is commonly called Squid Rock, and the cove at Qualing Pool is locally referred to as Barbecue Beach. The diversity of fish and invertebrates, as well as other enigmatic and charismatic animals, makes it a highly attractive area for snorkelers/divers and photographers. The birdlife also presents a considerable attraction for birdwatchers.

The value of Exmouth Gulf to the community, and their concerns about potential industrial development in the area, can be seen on our social media channels[10]. This is also highlighted in interviews with locals which can be viewed here and here by way of example.

It will be important for the EPA to carry out a systematic assessment of how the area is used by local people and visitors, and its social values to them, including through appropriate surveys. We also think it will be important to capture the values of the Gulf for the many people who are not able to live in Exmouth or visit

[10] Protect Ningaloo Facebook, Instagram and Twitter (@protectningaloo)

it but feel a strong connection to it and recognise its global importance. These people, who include many Western Australians and Australians, and people from beyond our shores, should also be reflected in the EPA's assessment.

Cultural values

We presume this question pertains mainly to the ongoing multifaceted, deep cultural values of Aboriginal people in the Gulf region. While these values are of considerable importance, and we seek to make that known in our work, we also are conscious that it is most appropriate for the Aboriginal leadership in the region to speak of these values directly. We would encourage the EPA to take this opportunity to provide support for these leaders to relay information about cultural values on their terms. What follows is a short overview of Aboriginal archaeological values taken on advice from expert researchers in this field.

The significance of Aboriginal sites, and most particularly cave sites in the foothills of the Cape Range, is well established (Morse 1993a,b; Pryzwolnik 2005, Veth et al. 2017), but relatively little is recorded in the literature about Aboriginal and cultural heritage values on the eastern margin of the Cape Range Peninsula or on the western coastal margin of Exmouth Gulf.

A desktop study (Chisolm, S. 2013) provides support for the presence of rock shelters and artefacts along areas of the eastern Cape Ranges. However, no systematic archaeological research has been undertaken on the eastern side of the Cape Range Peninsula or on the western coastal margin of Exmouth Gulf. It is worth noting however that in sailing into and naming both Exmouth Gulf and the Bay of Rest, Philip Parker King (1887:29) noted numerous fires and concluded that these must have related to the activities of Aboriginal people on the nearby peninsula.

Archaeological sites document the presence of Aboriginal people at Heron Point on the coast of Exmouth Gulf prior to settlement of the area by Europeans. The predominance of evidently humanly transported mangrove mollusc shell at these sites (Morse and Jackson 2000) contributes to research indicating that at times in the past, mangroves, and a greater diversity of littoral to shallow sub-littoral habitats, were present on the margins of the peninsula, including Exmouth Gulf (Hesp 1986; Kendrick and Morse 1982; 1990, Morse and Jackson 2000). There is substantive evidence documenting the presence of extensive mangrove swamps on the north western coastline during the early to mid-Holocene (Woodroffe et al. 1985, 1988; 1990, 2018; Allen 1987, 1996), and geomorphological, palaeontological and archaeological evidence from Cape Range Peninsula and more recently from archaeological sites on Barrow Island, suggests that mangroves were a more common environmental feature on the northwest coast than they are today (Ditchfield et al. 2018; Hesp 1986; Kendrick and Morse 1982; 1990; Veth et al. 2017). These sites, together with a number of shell and artefact scatters recently recorded during survey work near the base of Exmouth Gulf (Annie Carson, WA Museum pers.com 2019), and others likely to be discovered on the western margin of Exmouth Gulf, contribute to this emerging picture and are relevant in the context of understanding the potential impact of sea level rise on mangrove communities (cf. Saintilan et.al 2015; Woodroffe 1990, 2018).

The presence of buried human skeletal material at Exmouth Gulf station (DLPH AHIS Site ID 17192) some 10 km southeast of Subsea 7's proposed development area should also be noted. Aboriginal burial sites have been identified in dunes in at least five other locations within the Ningaloo region. There is therefore the possibility of uncovering further buried skeletal material during any ground surface disturbance particularly in coastal dunes.

Aboriginal archaeological sites have also been recently identified on a number of islands in Exmouth Gulf. A reconnaissance survey of gulf islands by DBCA, UWA and the WA Museum (ongoing since 2014) has identified archaeological material relating to Indigenous and maritime historical heritage on both small and large, nearshore and offshore islands (Paterson et al 2018). Identified archaeological material is dominated by shell scatters with stone artefacts. Shellfish include a range of edible and economic species, as well as intact and fragmented baler and syrinx shell. These sites then, are similar to midden sites documented on the western coastal margin of the Cape Range peninsula (Morse 1996, 1999; Pryzwolnik 2002). Stone artefacts made on cherts, quartzite, partially silicified limestone, chalcedony, and fine grained volcanics confirm the transportation of highly curated raw materials to some islands from stone sources presumably in Cape Range. Significantly, flaked bottle glass on nearshore Tent Island, near the base of Exmouth Gulf demonstrates continued use of islands in historical times (Paterson et al 2018).

The Muiron islands, today some 18 km from the tip of the Cape Range peninsula, are a continuation of the Cape Range anticline and formed as rising seas created Exmouth Gulf during the early Holocene (Hesp 1986). Historical records indicate that early in the contact period Aboriginal people were accessing the Muiron islands by boat to hunt sea birds and turtles and collect eggs. Recent archaeological reconnaissance (Paterson et al. 2018) also points to the use of these islands by pearlers or whalers. Significantly, archaeological sites recently discovered, including artefact and shell scatters, suggest the possibility of occupation of the Muiron Islands prior to the formation of Exmouth Gulf (Paterson et al. 2018). Recent archaeological research on Barrow Island (Dortch et al. 2019, Veth 2017, Ditchfield et al. 2018) the north eastern extremity of the Cape Range anticline, clearly demonstrates the remarkable link between these areas and the potential significance of archaeological sites on the Muiron Islands.

The only available radiocarbon dates from the Exmouth Gulf region are from a series of small artefact and shell scatters located in the extensive longitudinal Pleistocene dunes at the base of Exmouth Gulf some 20-25 km from the shoreline. Recorded as part of an archaeological survey of the proposed route of the Bullara-Giralia road (Morse and Fry 1993, 1993b; Morse 1993), these sites which include a baler shell dish and large fragments of baler shell presumably used for the transportation of drinking water, have been radiocarbon dated to late Holocene times some 1500-1600 years ago. Clearly associated with a string of claypans located in the interdunal swales at the base of the gulf, occupation of these sites presumably occurred following seasonal rains when a profusion of plants flourished (Morse 1993:271). The presence of baler shell indicates the transport of shell resources presumably collected in Exmouth Gulf to use at sites some 20-25 km inland.

Together these sites on the islands, and on points along the western gulf coast are starting to extend our understanding of the nature of Aboriginal occupation of the Cape Range peninsula and Exmouth Gulf. Cave sites known in the eastern side of Cape Range have extensive scatters of stone artefacts, marine shell and other material but have not yet been investigated. It is important that the heritage values of this area, although as yet little known, are not underestimated.

2) What activities do you engage with in and around Exmouth Gulf?

Protect Ningaloo represents, and is writing this submission, on behalf of our supporters. We have a large, growing and diverse supporter base, with many supporters in the local community, including local tourism, hospitality, retail and other businesses, as well as recreational divers, fishers, scientists, conservationists and members of the broader, mainstream community who visit and love Exmouth Gulf and others who take pleasure from reading about, and watching video clips and documentaries about it.

There is a broad and diverse range of activities that our supporters and others engage with in and around Exmouth Gulf. These include:

- Diving on the sponge gardens, coral reefs around the islands and the Navy Pier
- Snorkelling in many areas including off Qualing Pool and Heron Point, two particularly popular areas offering highly diverse underwater habitats and wildlife experiences
- Families relaxing on beaches and in the water
- Recreational fishing (fishing charters, fly fishing, personal recreational fishing)
- Bird watching and photography
- Wildlife watching and swimming with mega fauna (eg whale-watch and whale shark charters, personal wildlife spotting from land/in water)
- Boating
- Kayaking
- Sightseeing
- Photography
- Camping (caravans, camper vans etc)
- Station stays and wilderness camping (eg on pastoral stations that adjoin the Exmouth Gulf: Giralia; Bullara and Exmouth)
- Visiting the offshore islands
- Hiking (eg in Cape Range National Park)
- Scientific research
- Citizen science and educational tours (eg Ningaloo Turtle Program and Reef Check Ningaloo)
- Cultural tours

More than 147,000 tourists visit the Shire of Exmouth each year[11]. A 2011 study[12] was carried out of visitors to the Ningaloo coast region. Visitor surveys found that the three activities most commonly undertaken were snorkelling (undertaken by 69% of visitors), sunbathing/laying on the beach (65%) and sightseeing (65%). Other common activities were fishing from shore (49%), fishing from boats (40%) and safari tours/coral viewing (29%).

The study also found that the most popular types of accommodation were caravan parks (53%) and camping (43%), followed by backpackers-style accommodation (11%) and hotel/motels (10%).

3) What environmental pressures do you observe in and around Exmouth Gulf?

The Exmouth Gulf environment is already under pressure from existing and historic human activities and developments. It is also under stress from climate change and these impacts are forecast to increase, with far-reaching effects.

Capacity has been in place through government agencies (with complementary work by community groups) for some time to manage the more immediate contemporary human impacts and pressures including to assess and respond to the pressures on fish stocks, and to manage feral animals and invasive species. However, more needs to be done to monitor and understand these interrelated and cumulative pressures and to properly and holistically manage the impacts, including carrying out priority restoration work.

[11] Tourism Research Australia, Local Government Area Profiles 2018, Shire of Exmouth. Data is based on a four year average from 2015 to 2018.

[12] Jones, Tod & Wood, David & Hughes, Michael & Deery, Marg & Fredline, Liz & Jones, Roy & Fulton, Beth & Pham, Tien & Pambudi, Daniel & Dwyer, Larry & Spurr, Ray & Chapman, Kelly & Lewis, Anna & Chandler, Philippa & Catlin, James. (2011). Ningaloo Collaboration Cluster: Socio-economics of Tourism.

While the Exmouth Gulf environment is under stress and has been depleted in parts, it is still largely intact and has extraordinary environmental value. With proper and urgent management, its values can be preserved and restored. However, it would not be able to withstand the likely significant and cumulative impacts from proposed industrial developments which likely represent a step-change in environmental (and related social) impacts from existing activities. The onus is on the proponents of these activities, and those in government, to demonstrate that this would not be the case.

Many of the Gulf's habitats and the species they support are living at their physiological extremes and biogeographical limits. This means they are susceptible to stress and perturbations from human impacts such as industrial development and climate change, and as such the biodiversity here is of elevated conservation significance.

As outlined in Q1 above, Exmouth Gulf supports a range of threatened species and habitats, including dugongs, manta rays, whales and dolphins, hawksbill turtles, short-nosed sea snakes, migratory shorebirds. As such, it is particularly important that the Gulf's environment is protected so pressures on these species are alleviated and their populations can recover.

The 2019 Fitzpatrick et al report outlines a number of current environmental pressures and threats for species and habitats in Exmouth Gulf. Some examples are included below:

- The marine and coastal landscape and habitats of Exmouth Gulf are susceptible to damage from the increased frequency and intensity of tropical cyclone activity. Nearshore habitats including seagrasses, mangroves and coral reefs in the south of Exmouth Gulf were heavily impacted by Cyclone Vance in 1999 (Paling et al. 2008). This cyclone caused seagrass die-off which resulted in dugongs moving out of the Gulf due to loss of their seagrass foraging habitat (Gales et al. 2004).

- The Cape Range Karst limestone system and associated stygofauna are currently under pressure from freshwater extraction, limestone mining and invasive introduced fish. Groundwater extraction and changes to the hydrology of the area are a high-level concern for stygofauna. The subterranean waterway is in an arid zone environment and relies on rainfall and weather events to recharged. Alteration of surface hydrology has the potential to impact groundwater recharge regimes, sedimentation, and water quality.

- The cumulative impacts of coastal development in shallow marine environments are of serious concern. Habitat degradation and loss, pollution and marine traffic associated with population growth, development and industrial activities pose a serious threat to marine reptiles in shallow water environments, such as Exmouth Gulf.

- Pressures on mangroves presents a threat to sea snakes and turtles, as they provide important feeding and potentially nursery habitat, particularly for threatened juvenile green and hawksbill turtles. Exmouth Gulf is the last largely intact stretch of mangroves in the region, making it a critical habitat refuge for marine reptiles.

- Exmouth Gulf supports many bird species, including those that are Threatened, Vulnerable or Endangered. 4WD recreational vehicle use on beaches particularly along the western coast of Exmouth Gulf is adding pressure to birds that nest and forage on the shore. Feral predators including foxes and cats also pose a threat to vulnerable bird species. Managing such impacts to preserve feeding and breeding habitat for these species, particularly on the intertidal flats, is critical to the conservation of these species.

Some of the key current and historic activities that are placing pressures on the Gulf include:

Increasing shipping traffic, supporting the offshore oil and gas industry – for example Woodside Energy Ltd has been carrying out heavy vessel operations in Exmouth Gulf over a number of years, including for the Greater Enfield Tieback Project (without seeking Federal or state environmental authorisation in notable circumstances). Shipping traffic places significant pressures on the environment, including from underwater noise, potential boat strikes on marine mammals, light, pollution, benthic habitat impacts and the like.

Oil and gas exploration and development – in addition to the shipping impacts outlined above, offshore oil and gas exploration and development activities in close proximity to Exmouth Gulf are placing pressures on the Gulf. These include dredging impacts on benthic habitats, habitat smothering, seismic noise impacts on marine animals, risk of catastrophic rig blow-out and oil spill near a World Heritage Area, and negative visual impacts from the rigs/flares.

The EPA must describe the full impacts of oil and gas operations in the northern parts of the Gulf including the very large dredging program for the Chevron Wheatstone LNG project which a number of local people, including tourism operators and recreational fishers, have indicated diminished the fishing experience on the eastern side of the Gulf; and the cumulative impacts of seismic operations in the northern part of the EPA's assessment envelope.

Limestone mining – there is a large number of mining tenements covering the land surrounding Exmouth Gulf and a range of existing mining operations including Hanson Construction's limestone mining, crushing and screening operation at Wapet Creek. Limestone mining in the Cape Range karst system presents a significant risk to the subterranean waterways and endemic stygofauna, which are protected under the EPBC Act, and are already impacted by other activities, such as extraction of freshwater and invasive introduced species. Limestone mining should not be carried out in proximity to this ecosystem, which has recognised World Heritage values and is highly sensitive to disturbance and pollution.

Pastoralism – pastoral areas are under pressure from historic land clearing, as well as the introduction and spread of invasive species and feral animals. Large populations of feral goats occur in some areas, including on pastoral stations. Goats have a number of impacts on native flora and fauna, including competing with animals (such as the threatened black-flanked rock wallaby) for food, water and shelter; overgrazing and soil erosion; and introducing weeds. Goats may also be increasing nutrient and sediment loads into the waters of Ningaloo Marine Park, as well as the karst subterranean waterways.[13] The potential for changes in land management to exacerbate sediment loads in the Gulf should be part of the EPA's assessment.

Documenting the impacts of historic pastoral activities is an important contextual matter for the EPA to relay as part of this assessment.

Feral animals in the area include cats, rabbits, foxes and goats. Feral cats and foxes prey on native mammals, birds and reptiles. Predation of marine turtle eggs is a key threat for the endangered loggerhead turtles and vulnerable green turtles which nest on Ningaloo's beaches.

Recreational fishing – the increasing popularity of recreational fishing at Ningaloo-Exmouth Gulf warrants close attention from the community, representative bodies and government. The EPA should take this opportunity to apprise itself of the best available science and advice on this matter.

[13] Nyinggulu (Ningaloo) coastal reserves - Red Bluff to Winderabandi - Draft joint management plan 2019

A number of recreational fishers and related interests have approached Protect Ningaloo with concerns about the pressure on stocks, particularly during COVID. There has arguably been insufficient attention paid to understanding recreational fishing effort and suitable education and active management, particularly in recent times. An important note here is that fishing activity can be actively managed and effort can be adjusted over time whereas hard infrastructure as proposed by a number of proponents cannot be in fundamental ways.

Commercial fishing – the EPA has a clear opportunity to understand the impact of commercial fishing on Gulf ecosystems, particularly the benthos and bycatch. Many observers of activity around the Gulf, both locally and outside the region, raise trawling as a concern, and it clearly is an important part of this assessment. Trawling in general is known to damage fragile and important habitat, and the EPA should be able to relay the latest understanding of these impacts in the Gulf. We understand that the Gulf trawl fishery has been investing in more extensive monitoring, and appears increasingly open to discussing means to further reduce its impacts, including as part of the ongoing MSC accreditation process. As above, if modifications are needed in the main trawl fishery in the future, this can and should be done. In contrast, major industrial infrastructure (like wharves or large salt evaporation ponds) and processes (like dragging pipelines) do not lend themselves to adaptive management.

Recreational activities - pressures include damage to dunes, bird roosts and nesting areas, and intertidal habitats from inappropriate offroad four-wheel driving; and pollution from unmanaged camping with poor waste management.

Human settlement – pressures from human settlement include historic land clearing such as clearing of vegetation and critical habitat (possibly including mangroves) for Defence facilities, and impacts on the Cape Range from karst water extraction due to increasing domestic and industrial water consumption (with water shortages from low rainfall, increasing numbers of visitors etc). We would expect the EPA to undertake an assessment of these existing impacts.

Climate change pressures[14]

Many of the Gulf's ecological systems are already bearing the brunt of climate change – from increased water temperatures, acidification, and intensity and frequency of tropical cyclones, as well as changing hydrological regimes - and we know this will increase whatever the global mitigation setting is.

Exmouth Gulf's prevailing environmental conditions such as aridity, sporadic intense rainfall, salinity and other factors mean that habitats (such as mangroves) are likely to respond more acutely to climate change effects.

Projected regional climate change impacts for coming decades include declining annual rainfall, increasing temperatures, evaporation, and intensity of tropical cyclones, and frequency of marine heatwaves.

Subterranean waterways - expected climate change impacts include less frequent recharge of groundwater due to a decline in overall annual rainfall, and thus increasing salinity; while increasingly intense rainfall events are expected to drive higher levels of runoff and pollution into these aquifers. Both the increased extraction and decline in recharge can interfere with natural stratification and lead to saltwater intrusion.

[14] Oceanwise Australia

Mangroves - freshwater supplies from cyclonic floodwaters are essential to the delivery of nutrients and ongoing physiological viability of these mangroves. Increased evaporation and salinity as a result of reduced rainfall and groundwater recharge and rising temperatures are making the mangroves more susceptible to marine heatwaves, where they become stressed and die. Already being exposed to direct impacts from increasingly intense cyclones and coastal storm surges, that have resulted in the loss of mangroves in the recent past. In 1999, Cyclone Vance increased the sediment deposition and smothering of mangroves, destroying an estimated 5,700 ha. All this is likely to occur in habitats that exist at the limits of their physiological tolerance to salinity. Altering surface runoff and extracting freshwater from subterranean waterways in addition to anticipated climate change impacts represent a significant risk to these habitats at this location.

Sea level rise – will have impacts on coastal habitats (sandy beaches, samphire wetlands, supratidal algal mats and mangroves) – especially shallow subtidal and intertidal zones - in addition to exposure to longer periods of arid conditions, which drive greater evaporation, heat and water stress. It will also cause likely flooding of mangrove zones and large-scale dieback of these trees. Other impacts include erosion of sandy beaches and dunes, and altering the tidal inundation regime of supratidal cyanobacterial mats, resulting in saltwater intrusion into subterranean waterways.

Coastal environments - are susceptible to climate change impacts including increasing erosion from storm surge, exposure of intertidal organisms to increased heat, salinity and wave energy, and impacts from sea level rise. Increased aridity would stress wetland plants, further reducing productivity. More intense cyclones would likely result in flooding, erosion and redistribution of sediment, which in the past has smothered plants such as mangroves and seagrasses at this location.

Benthic habitat and communities – marine heatwaves result in stress and bleaching in corals. They result in seagrass mortality, reduction in their reproductive output and resistance to disease. The coral reefs of Exmouth Gulf have experienced climate change-related bleaching intermittently over the last two decades, with significant declines in cover observed at Bundegi Sanctuary. Benthic communities of the Gulf are expected to experience an increase in negative stressors such as ocean acidification, hypersalination and rising sea surface temperatures due to climate change. Increased turbidity and deposited silt and clay sediments impact corals through smothering, suffocation, stunted growth and disease.

Marine fauna – climate change impacts like marine heat waves will elevate temperatures beyond biological tolerances, shifting the ranges of entire ecosystems. This could drive many unique endemic, endangered and commercially valuable species like those found in Exmouth Gulf towards local and global extinctions, for example dugongs, sea snakes, fish, and prawns.

4) What environmental pressures in and around Exmouth Gulf affect you/your sector or business?

As outlined above, Protect Ningaloo represents a broad cross-section of people with a wide range of interests, but who all love Exmouth Gulf and are concerned about the growing pressures on its environment, particularly from the prospect of significant additional industrial-scale development.

These pressures affect and worry people who know and visit Exmouth Gulf, Ningaloo but also people who have not yet had the opportunity to visit the area but who - in the face of so much loss of nature-dominated places and wildlife in the world - appreciate the global and national environmental significance of a place with so much rich biodiversity - being one of the few remaining largely intact places of its kind left.

The environmental pressures particularly affect local people who live and work in Exmouth Gulf because they value the natural environment, and whose wellbeing and livelihoods depend on its continued health.

They are particularly concerned about the likely step-change in pressures that would be placed on the environment by industrial development: about the negative impacts on their local environment, on wildlife, the loss of visual amenity and 'wilderness', reduced access to nature-based recreational activities and the like.

Exmouth Gulf is a major ecotourism destination, with tourism being the region's leading provider of employment. Visitors spent more than $149 million per year on average in the Shire of Exmouth from 2015 to 2018[15]. This was in a range of tourism-related industry sectors, including tourism activities, accommodation, food and transport. These tourists spent an average of more than 1 million visitor nights year in Exmouth in 2018[16].

Many local and family businesses – in tourism operations, hospitality, accommodation and related sectors – are supported by tourism in the area, and these provide much needed local income and jobs.

The tourism industry - and the ecotourism brand - has been built over many years, drawing on the area's rich biodiversity and largely unspoilt marine and coastal environments. Tourism businesses rely on the health of Exmouth Gulf and its ability to provide iconic species and valued nature-based experiences. The people who work in or own these local businesses are concerned about the negative impact on their businesses or employment through new and increasing pressures on the environment.

Pressures and impacts on the natural environment resulting from new industrial development in particular would have significant negative consequences for the tourism industry and the economic and social benefits it brings to the local community and the region. The risks of irreversible damage to local tourism and to the region's nature-based tourism brand are significant.

There are many opportunities for building and diversifying the local economy of Exmouth through the strengthening and development of sustainable, nature-based industries which protect and complement the region's environmental and tourism values. These include new eco-tourism and outdoor activities (eg adventure-style kayaking, wilderness camping, sailing), Indigenous and cultural tourism, Indigenous land management, scientific research, citizen science-based and educational tourism, and school and tertiary education programs and camps.

5) Are there other activities that are proposed (or likely to be proposed) that you are aware of, which will impact the Exmouth Gulf?

There are multiple new industrial-scale projects proposed for Exmouth Gulf. These include Gascoyne Gateway's deepwater port, Subsea 7's Learmonth pipeline fabrication project and K+S Salt's Ashburton Salt proposal, which the Minister for Environment acknowledged have the potential to significantly add to environmental, cultural and social impacts in the Gulf. Protect Ningaloo is also aware of plans by Hanson Construction Materials Pty Ltd to continue and possibly expand its limestone mining, crushing and screening operations at Wapet Creek, sulphate of potash mining

[15] Tourism Research Australia, Local Government Area Profiles 2018, Shire of Exmouth. Data is based on a four year average from 2015 to 2018.
[16] Tourism Research Australia, Local Government Area Profiles 2018, Shire of Exmouth. Data is based on a four year average from 2015 to 2018.

exploration in the supratidal flats location on the eastern margin of Exmouth Gulf, and there may be others.

These proposals are likely to bring significant new and unacceptable pressures and impacts to the environmental, cultural and social values of Exmouth Gulf. Protect Ningaloo's view – and that of our many supporters – is that these industrial proposals are incompatible with the intrinsic values of Exmouth Gulf. Industrial development should be confined to appropriate industrialised areas to the north in the Pilbara, not constructed in the last remaining undeveloped marine and coastal environment in the Pilbara coastal bioregion.

The proposed projects have long lifetimes and large infrastructure footprints, which would not only make adapting to future environmental management requirements significantly more difficult, if not impossible, but also put the burden on existing, more flexible activities to adapt. Over time, it is likely that the tourism sector and recreational users will have to make further concessions as the immovable industrial operations and their cumulative impacts persist.

Given the number of new proposals and their likely interconnected and cumulative impacts on ecosystems, Protect Ningaloo welcomes this cumulative impact assessment by the EPA in place of the usual non-strategic, proponent-driven approach to industrial development in this State. A comprehensive assessment is critical to ensure there are no significant and irreversible impacts to the Exmouth Gulf environment.

Below we provide a summary of some of the key expected impacts from the known proposals for Exmouth Gulf. We note that this is not a comprehensive assessment of impacts, given the timeframe involved and that the details of some of the proposals are not yet known or scientific surveys and assessments of the impacts of the proposals have not yet been carried out or published.

Subsea 7's proposed Learmonth Pipeline Fabrication Facility –

Subsea 7's Learmonth Pipeline Fabrication Facility proposal is a substantial industrial project that is incompatible with the natural, largely undeveloped environment of Exmouth Gulf.

The project would involve:

- Construction of a 380m concrete launchway across an undeveloped beach at Heron Point.

- Bulldozing natural bushland and wildlife habitat to build 2 x 10 km tracks from the facility to the launchway.

- Towing bundled pipelines (up to 10 km in length – the distance from Perth to Cottesloe) up the Gulf and through the Ningaloo Coast World Heritage area at the top of the Gulf.

- Dragging hundreds of ballast chains along the seabed – potentially damaging or disturbing to up to 18 million square metres of seabed – including soft corals and sponge beds – an area equivalent to 1000 football ovals.

Habitat

- There is a risk that elevated turbidity from the launchway construction and pipeline towing could upset the nutrient cycles and biogeochemistry of sensitive habitats including seagrasses, corals, mangroves and sponges.

    - Studies have shown that seagrasses deprived of light, even for a week, start being impacted by changes in their physiology and morphology.

- There are concerns about the impact from changes to hydrology from the construction of two 10 km railway tracks for mangrove, saltmarsh and cyanobacteria mats.

    - These coastal wetlands are extremely sensitive to changes in salinity - in this arid environment, they are living at their physiological limits of salinity tolerance. Any decrease in inundation due to changes in groundwater flows or physical barriers could result in increases in salinity, which could result in large-scale unintended destruction.

    - Mangroves and associated salt flats and saltmarsh ecosystems provide a wide range of important ecosystem services, including food and shelter, refuge from predators, nursery habitat, coastal protection, water purification, nutrient cycling and carbon sequestration.

- There is an unacceptable risk of damage to sensitive benthic habitat (eg coral and sponge gardens) in Ningaloo World Heritage area if Subsea 7 were to lose control of the massive pipelines. This is a hazardous section of ocean with high swells, winds and currents.

Marine mammals

- The proposed launchway construction and the towing of large pipelines poses significant environmental threats for the Gulf's rare and endangered marine species, including from direct vessel strikes and underwater noise generated by the towing vessels. Underwater noise has a negative impact on marine mammals that rely on acoustics for critical behaviours such as communicating, feeding and navigating.

- There is a growing global research base that shows that underwater noise poses a significant threat to cetaceans. Indeed, the active management of underwater noise is considered to be crucial, particularly given the acceleration in other major threats from climate change, habitat modification and the impacts of fishing. It is part of our global responsibility to do our utmost to reduce impacts on cetaceans and other marine wildlife. Reducing or removing the impacts of vessels in this globally important area for cetaceans, and much else, is an intervention well within our reach and obligation.

- Information about the characteristics of the noise is critical to enable a proper assessment of the likely impacts on marine mammals, since studies have shown that increases in anthropogenic noise can cause significant behavioural disruptions.

Humpback whales

- The towing operations would traverse the humpbacks' preferred habitat, disrupting the low-stress environment critical to humpback whales' survival.

- There would be noise and habitat impacts from the six month launchway construction, as well as noise from the towing operations.

- Studies have shown that the communication calls between mother and calf are fainter than other communications and therefore more susceptible to acoustic masking. The noise from the

proposed towing activities poses a significant risk for the separation of humpback whale calves from their mothers, increasing their risk of falling prey to predators.

- Research has shown that humpback whale mother-calf pairs in the Gulf rest both at the surface but also at various shallow depths, making them next to impossible to spot. This resting behaviour makes mother-calf pairs highly susceptible to vessel collisions.

Manta rays

- The construction of the launchway has the potential to interfere with the species' migration along the coast in this region. Construction may also impact important habitat sites such as cleaning stations and foraging areas. The potential for vessel strike is also very real, as manta rays have been observed surface feeding in this region and during this activity they are often less responsive or cautious towards external disturbance.

Migratory birds

- Direct and cumulative threats to shorebird populations include:
    - Loss of suitable habitat for foraging or roosting sites, either onshore or in the mangroves, causing serious disruption to their lifecycle (feeding, migration or resting behaviour).
    - Sediment movement across the intertidal areas is likely to result in these areas no longer being unsuitable habitat for foraging.
    - Erosion of coastal strips that are roosting sites.

- There is a very real risk that turbidity caused by propulsion of the tow vessels and the dragging of chains across the sea floor could result in sedimentation settling in important habitat sites such as the Bay of Rest:
    - The mangroves are important roosting sites for species such as the Grey-tailed tattler and Terek sandpiper. Sediment that settles on the mangrove roots is likely to impact the health of the mangrove system.
    - Turbidity is likely to reduce successful hunting for terns that rely on sight when searching for prey.

Flora and vegetation

- Our view is that there will be impacts to flora and vegetation from the large scale clearing of native vegetation and habitat for mammals, reptiles and birds from the construction of the pipeline fabrication facility, access roads and two 10 km railway lines.

- There is also concern about the invasion of weed species, given their ability to rapidly spread and expand across the landscape.

Subterranean fauna

- The Cape Range Karst limestone system and associated stygofauna are currently impacted by extraction of freshwater, limestone mining and invasive introduced fish. Groundwater extraction and changes to the hydrology of the area are a high-level concern for stygofauna.

- Subsea 7's assessment shows a moderate to high likelihood of impacts to subterranean fauna community inland/low toward the coast. Given the proposed vegetation and dune removal,

railway track construction and operation across existing subterranean waterways, this seems an understatement of the reality – which is that stygofauna have been found within the development envelope and may potentially be impacted by this Proposal.

Inland waters

- We are concerned about the impacts to natural surface water flows and contamination of surface water as a result of the Proposal infrastructure.

- The construction of 10 km bundle railway tracks and roads would clearly change the natural drainage of the area and we are concerned that the proposed open drain and single culvert would not be sufficient to prevent impacts from this alteration, including inundation, erosion, sedimentation and the like.

- This is a particular issue as the area is at high risk of flooding. There is also no reference to the potential impacts of flooding and inundation from rising sea levels, cyclone risk and other impacts from climate change.

- We are also concerned about inundation of inland areas where the dune removal is proposed for the construction of the railway tracks. The risk of pollutants entering the marine or inland waters presents a serious concern regarding marine environmental impacts to fauna and flora.

- The possible impacts to the important Cape Range subterranean waterways and subterranean fauna as a result of the proposed groundwater abstraction must be considered.

Social values

The impacts on the natural environment resulting from the proposal would have significant negative consequences for the tourism industry and the economic and social benefits it brings to the local community and the region. The risks of irreversible damage to local tourism and to the environmental values upon which it relies are significant.

Exmouth Gulf has considerable potential for further sustainable development of its tourism assets, with largely untapped opportunities for adventure-style kayaking, citizen science-based and educational tourism, sailing, wilderness camping, Indigenous and cultural tourism, and more.

The proposal is also likely to have negative social impacts for local residents and visitors, including on the visual landscape and its recreational uses such as fishing, boating, diving, birdwatching and photography.

There is no question that an engineering project of this nature and scale would result in a significant loss of visual amenity and diminish the sense of peace and seclusion of the area. It would also impinge on recreational activities by reducing access to areas of recreation during towing operations and through negative impacts on the valued wilderness experience.

Our view is that Subsea 7 has understated the value many in the community place on the natural environment they live in, and the concerns they have about the proposal and its likely negative impacts on their local environment.

Gascoyne Gateway's proposed multi-use deepwater port -

There are limited details available for Gascoyne Gateway Ltd's proposed multi-use deepwater port at Qualing Pool, 10km south of Exmouth. However, from the proponent's recently launched website, it is understood that it would involve the following:

- Servicing of the following potential users over 50 to 100 years:

    1) **Cruise ships** – to enable day or overnight tourist visits to Ningaloo Reef, Cape Range World Heritage areas and Exmouth township.
    2) **Private yachts and adventure cruises** – vessels that are too large to use the Exmouth Marina.
    3) **Royal Australian & Allied Navies** – ships and submarines to allow for provisions, as well as rest and recreation.
    4) **Australian Border Force** – patrol boats and cutters for maintenance and provisions.
    5) **Agriculture exports** – agricultural exports direct to Asia from growers in the Gascoyne region.
    6) **Support vessels** – provisions for offshore support vessels for oil and gas industry
    7) **Break bulk vessels** – Import of various cargoes to support the construction and operations in the Gascoyne region.
    8) **Cargo vessels** – small scale container exports from the Gascoyne and import of consumer goods and building materials.
    9) **Fuel supplies** – tankers to import fuel to replace the Point Murat import facility, as well as provide fuel for jetty users, RAAF Learmonth and supplies for the local community.

- A rock causeway and pylon wharf structure approximately 900m long and reaching a depth of 12.5m at its deepest point.

- Approximately 50 hectares of landside facilities just north of the Cape Wilderness Estate. Other land on the western side of Minilya-Exmouth Road is identified for a solar farm, storage areas, and facilities that support the port.

While the details of the proposal are unknown, on the face of it and given the expected infrastructure and operations involved in these port uses, Protect Ningaloo has the following concerns about the proposal.

As outlined in Q1, the natural, intact area where the port would be constructed is home to a rich diversity of life including corals, seagrass meadows, sponge gardens, as well as vulnerable dugongs, whales, turtles, dolphins and birdlife. The area is shallow and protected from big ocean swells and is a sanctuary for animals like dugongs and whales, where they nurse their calves.

The construction of a huge rock causeway and pylon wharf structure would involve dredging of the seabed, impacting or destroying precious marine habitat. This is also expected to cause increased sedimentation and turbidity which have resultant impacts on benthic habitat and communities. It would also negatively impact on coastal processes.

The port would draw some of the biggest ships on the seas deep into Exmouth Gulf, including bulk cargo carriers, offshore oil and gas support vessels, fuel tankers, and massive cruise liners. This is no place for major shipping traffic. It would present a significant risk of negative impacts on marine mammals from underwater noise, boat strikes and the like.

There are also strong concerns about the negative environmental and social impacts from the introduction of mass, cruise-based tourism in such a remote and fragile World Heritage environment and small town with limited infrastructure, resources and services (such as water, health services). The negative experiences and impacts from mega-cruise ships elsewhere is well documented. This type of mass tourism is not appropriate for Exmouth Gulf, which is more suited to sustainable, low-key tourism activities that are compatible with the local environment and available/potential infrastructure and services.

Qualing Pool is a highly important and rare oasis of freshwater on the Gulf, and the wide beach there, known affectionately as 'Barbeque Beach,' is one of the most popular in the area. It's a place where locals and visitors enjoy going for a snorkel, fishing or just relaxing. These social and community values would be significantly impacted by the construction of a large port with ongoing shipping traffic.

Other concerns about a deepwater port in this environment include ongoing industrial port noise and light pollution, hydrocarbon or chemical spills, heavy vehicle traffic on land, ongoing dredging to maintain a vessel berthing and turning basin, loss of visual amenity from construction of imposing port infrastructure, and the introduction of invasive marine pests.

K+S Salt's Ashburton Salt project -

K+S Salt's proposal is for a 4.5 million tonne per annum (Mtpa)[17] solar salt project on the east side of Exmouth Gulf, approximately 40 km south-west of Onslow, with a project life of 50 years. The proposal would involve the following:

- Construction of solar salt evaporation and crystallisation ponds; salt wash plant and associated ponds; salt stockpiles and conveyors; bitterns discharge infrastructure (may include channel, dilution pond, pipeline and diffuser); jetty and product loading facilities; access roads; potable water desalination plant; fuel storage sites etc.

- Shipping directly from site off a long jetty, with barges collecting salt and transporting it out to sea for loading onto bigger ships. This will require dredging for berthing pocket for the barges.

- Clearing of up to 18,005 ha within a 67,570 ha project development envelope.

- Clearing of up to 800 ha with a 24,107 ha road development envelope.

- Seawater intake of up to 250 GL per year.

- Marine discharge of up to 10 GL of bitterns per year (pre-diluted volume).

The proponent's environmental surveys and assessments are not yet publicly available to assess. However, given the high environmental values of the area (as outlined in Q1 above) and the expected infrastructure and operations involved and based on the project's Environmental Scoping Document, Protect Ningaloo has concerns about the following potential impacts from the proposal:

- Potential impacts on wetland ecosystem, benthic primary producer habitat, mangroves, algal mats, inshore prawn nursery grounds, and other aquatic species.

[17] 3.5 million tonnes per annum in the Ashburton Salt Project: Environmental Scoping Document

- Erosion/sedimentation and changes to coastal processes from the construction of rock armoured seawalls, jetty, and bitterns discharge infrastructure; seawater intake(s) and from dredging works.

- Elevation in naturally occurring salts or metals above background levels due to bitterns discharge.

- Impacts on marine environmental quality (turbidity, nutrient levels) from bitterns discharge and dredging works with consequent impacts on benthic communities and habitat, and marine fauna.

- Seepage from salt ponds and potential mobilisation of hypersaline groundwater impacting tidal creek and ground water quality, mangroves and/or native vegetation some distance from the ponds.

- Impacts on creek water quality and creek habitats for benthic communities and protected species in relation to the seawater intake points in Urala Creek North and South.

- Spillage of salt product or bitterns causing soil contamination.

- Construction of salt ponds on the salt flats interfering with the ability of the salt flats to act as a compensating basin during flood events and interference with other hydrological and wetland processes with potential effects on the Nationally Important Wetland and Exmouth Gulf ecosystem.

- Salt ponds preventing adequate tidal inundation of the mud flat areas of the wetland, resulting in impacts to mangrove and algal mat communities.

- Changes in surface water and nutrient flows, as well as erosion, smothering and altered inundation due to excavation and construction of salt ponds, roads and support infrastructure.

- Impacts on marine fauna from shipping collisions, shipping/construction noise and light disturbance (eg for resting/nursing humpback whale mothers and calves and nesting turtles).

- Habitat loss from vegetation clearing with impacts on terrestrial fauna (mangroves are habitat for species such as grey-tailed tattlers; mudflats are preferred foraging habitat for migratory wading birds; coastal beaches are preferred roosting habitat for majority of migratory birds).

- Potential loss or disturbance to Aboriginal heritage sites or disturbance to cultural associations within the area.

Hanson Constructions' Wapet Creek limestone mining and processing

Hanson Construction Materials Pty Ltd (Hanson) operates a limestone mining, crushing and screening operation at Wapet Creek, with a production of 3,000 tonnes per year. Earlier this year, Hanson applied for a Category 70 works approval (W6411/2020/1) under Part V of the EP Act to increase production up to 'approximately 30,000 tonnes per year', with the capacity to process up to 100 tonnes per hour (or 160,000 tonnes per year). This was following an application (W6313/2019/1) for processing of 60,000 tonnes per year that was subsequently withdrawn.

The second application was also withdrawn as it was determined that Hanson already held a valid registration for category 70 screening operations for the location. The EPA advised that a future expansion into the areas proposed in the works approval application may require referral to the EPA under s.38 of the EP Act.

While the works approval application was in relation to crushing and screening activities only, Hanson's operation also involves the extraction of materials from the riverbed of Wapet Creek and their transportation to the processing area for crushing and screening via haul roads along the creek bed. This is a significant mining operation and it appears that a major expansion in production is proposed.

Protect Ningaloo is concerned about the potential environmental impacts of the proposed expansion in operations (and any others proposed on the Cape Range peninsula by others). The quarry is located within the ephemeral drainage line of Wapet Creek. This creek is an important waterway and catchment for the area and is listed an Environmentally Sensitive Area (ESA) as described in the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*. The quarry is also located in an area of high conservation and natural heritage values. It is in close proximity to the Cape Range National Park which is a World Heritage Area. It is important that a mining operation of this scale in an area of global and national significance be properly assessed for its potential environmental impacts.

Protect Ningaloo has concerns about potential negative impacts of the extraction and processing activities on the Cape Range karst subterranean waterways and endemic stygofauna, which are protected under the EPBC Act, and are already impacted by other activities, such as extraction of freshwater and invasive introduced species. This ecosystem is highly sensitive to disturbance, damage and pollution[9].

We are concerned about the possible impacts to natural surface water flows, groundwater recharge, sedimentation and water quality as a result of the mining activities altering the land surface and natural drainage regimes. We note that Wapet Creek is a large catchment with only a single outlet to the coast at Exmouth Gulf, with potential impacts on marine environmental quality.

The complexities of the water regime, the dynamics and routes of water through the Cape Range system cannot be understated. The waterways are connected to Exmouth Gulf through its coastal plains and are understood to provide critical groundwater seepage to estuarine vegetation. The Australian Heritage Committee notes that the presence of active karst solution as a result of seawater incursion is rare in Australia. Any impacts to these waterways could adversely affect the sensitive mangrove systems on the western side of Exmouth Gulf. The mangroves found in the south west area of the Gulf including Wapet Creek, Heron Point and Bay of Rest are designated regionally significant with a very high conservation value[4].

The saltwater and freshwater exchanges occur in ancient paleochannels such as Mowbowra Creek, Wapet Creek and Bay of Rest[5]

Wapet Creek is the most northerly of the significant mangal communities on the western side of Exmouth Gulf. Wapet Creek is listed as the largest of five key surface-water catchments (16,640 ha)[6]

[9] Hamilton et al 1998.
[4] Environmental Protection Authority (2001). Guidance Statement for the protection of tropical arid zone mangroves along the Pilbara Coast, No. 1.
[5] Fitzpatrrick et al (2019).
[6] Hyd$_2$o Hydrology (2014) Exmouth Hydrological Study.

for inland water flow from the Cape Range that has a main exit point at Exmouth Gulf. It is also connected to the World Heritage area anchialine subterranean waterway[7] which is reliant on intermittent extreme weather events to recharge the marine water and inland water[8]. The Exmouth South Structure Plan 2013 has an objective to conserve the drainage and multiple use corridors representative of the environmental, landscape and heritage values of significant creeks linking the Cape Range to Exmouth Gulf. These significant creeks include Wapet Creek.

When the creek is flowing, there are likely to be downstream impacts from the mining activities. This includes impacts to the current ecology of the creek and the potential to inundate the marine environment with sediment and pollutants. The area is subject to cyclonic activity and is prone to flooding, which could exacerbate the risks.

The area is situated on the eastern side of Cape Range Peninsula that is dominated by a north-south trending rugged deeply dissected limestone range bordered by outwash plains.

It is likely to be within an area proposed 5(h) Reserve for Conservation and Limestone Resource Management (Western Australian Planning Commission, 1998). This reserve has been proposed under the *Conservation and Land Management Act* 1985. In the 1987 Management Plan for the Cape Range National Park prepared by CALM, it is recommended that the National Park could be extended (Western Australian Planning Commission, 1998). If gazetted this reserve would be managed similarly to Cape Range National Park[21].

The terrestrial fauna of Cape Range comprises a rich vertebrate fauna due to the range of habitats available. The bird and reptile fauna are typical of the semi-arid and arid north-west and interior. Some south-western species are also present. However, many species are represented on Cape Range by populations isolated from the main part of their distributions. The major habitats include floodplain, drainage lines, rocky ranges, low hills and scree slopes, and acacia shrubland. We note that the black-footed rock-wallaby which is listed as Endangered under the EPBC Act has been recorded this year in the gorges near the proposed quarry site[22]. Other species known to inhabit the area are the striped-faced dunnart, common sheath-tail bat and sandy inland mouse, with the greatest habitat affiliation being the shrublands area[23]. Bird species are associated with the floodplain and acacia shrubland and there is the potential for listed species to include rare, threatened with extinction or as having high conservation value to occur in the area.

Limestone mining and processing operations have the potential to impact upon fauna and its habitat as a result of mining the landscape, haul road clearing and construction, truck and large vehicle movements to and from the project site. Operational impacts are noted to occur 24 hours/day, 7 days/week, 365 days/year within this landscape and adjacent to the World Heritage Area.

The Cape Range contains hundreds of species of rare and endemic flora. Certain populations are likely to be of local significance, and many in the area are of particular scientific interest because they may represent disjunct populations, subspecies or newly discovered taxa. Recent flora and vegetation assessments found that the flora and vegetation values, patterns and endemicity of species in the Cape Range subregion of the Carnarvon Bioregion are considered much higher than currently accepted taxonomic treatments suggest. This suggests the probable occurrence of species

[7] Environmental Protection Authority (1999) Environmental Protection of Cape Range Province: Position Statement No.1
[8] Hamilton et al 1998.
[21] Learmonth Limestone Quarry – Environmental Review and Management Program (2001), page 16
[22] Clausen, L. (2020). Department of Biodiversity, Conservation & Attractions. Personal Communication.
[23] Learmonth Limestone Quarry – Environmental Review and Management Program (2001), section 3.9

of conservation significance in the Wapet Creek area and the need for an appropriate survey of the flora and vegetation in the area.

Archaeological sites have been recorded on the western coastal plain of the Cape Range peninsula, but further work needs to be undertaken to bridge the significant knowledge gaps on the east of the Range. Rock shelters and artefacts have been found along areas of the eastern Cape Range. In light of the artefacts found in these areas and the current lack of comprehensive knowledge around human heritage, it is important that the Precautionary Principle be applied so that Aboriginal heritage sites in this area are assessed before any further disturbance is allowed.

Other potential impacts include negative impacts to amenity from dust and noise due to extraction, crushing and screening of materials, to air quality, and to aesthetic values from large-scale quarry mining in close proximity to tourism and local recreational activities. Wapet Creek and environs are of local significance to residents as areas of recreation and to visitors.

Conclusion

Protect Ningaloo welcomes this assessment by the EPA which we believe will demonstrate the globally significant values of Exmouth Gulf and the fundamental incompatibility of the proposed industrial developments with these values.

Protect Ningaloo is looking forward to engaging in this important assessment process and understanding better how the EPA will undertake the cumulative impact assessment. Ultimately, this assessment provides the EPA with the *authority* and the mandate to *protect* this *environment.*

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