



Projectos e Estudos de Impacto Ambiental, Limitada

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And

Serviços Provinciais do Ambiente
Inhambane

Ref.: ... /JA/2023

Mozambique, 5th March 2023

Dear Sir/Madam,

RE: COMMENTS ON SEARCHER GEODATA (SEARCHER”) ENVIRONMENTAL PRE-FEASIBILITY AND SCOPING REPORT (“EPDA Report”) IN THE SAVE BASIN, INHAMBANE PROVINCE, MOZAMBIQUE

I. INTRODUCTION

1. In terms of the article 19 (2) (6) of the Decree 56/2010, 22 November, combined with the article 9 (14) of the Decree 54/2015, 31 December approving the Environmental Impact Assessment, the following Interested and Affected Parties (“I&APs”) submit their comments on Environmental Pre-Feasibility, Scoping Report and Terms of Reference for the environmental impact assessment (“EIA”) for the 3D Offshore Seismic Research Project in Save Basin, Inhambane Province, process being undertaken for the application for an environmental licence (“the Application”) by Searcher to the Provincial Environmental Services with knowledge of the Direcao Nacional do Ambiente (“DINAB”) for the proposed off-shore seismic acquisition and offshore drilling project (“the Project”):
 - 1.1. Justica Ambiental, an association-type legal person, which mission includes protection and defense of the environment and local communities, registered at the Registry of Legal Entities under n.º 100110142, with the statutes published in Boletim da Republica 9, III Série, Quinta-feira, 29 de Setembro de 2004, based in Rua Willy Waddington n.º 102, Bairro da Coop, Cidade de Maputo
 - 1.2. Natural Justice: Lawyers for Communities and the Environment specialising in human rights and environmental law in Africa in pursuit of both social and environmental justice;
 - 1.3. Our Children’s Earth Foundation (OCE), a US non-profit organisation;
 - 1.4. All Rise Attorneys for Climate and Environmental Justice, a South African non-profit law clinic protecting the interests of the environment and the people of Southern Africa;
 - 1.5. Marine Megafauna Foundation (MMF), a US 501c3 non-profit organisation specialising in the research and conservation of marine megafauna;

- 1.6. Re: Wild; An international conservation organization. Re:wild's mission is to protect and restore the wild to build a thriving Earth where all life flourish;
- 1.7. Andrea Marshall Sociedade Unipessoal LDA, a marine consultancy company in Mozambique specializing in marine research and media;
- 1.8. Extreme Marine Expeditions Unipessoal LDA; a marine consultancy specializing in filming, logistics and expeditions;
- 1.9. Mission Blue; led by legendary oceanographer Dr. Sylvia Earle, Mission Blue is uniting a global coalition to inspire an upwelling of public awareness, access and support for a worldwide network of marine protected areas;
- 1.10. All Out Africa Lda. - Travel agent and tourism, Tofo, Mozambique;
- 1.11. Terra Linda Propriedades LDA; Coastal tourism company based in the Vilanculos area;
- 1.12. Odyssea Divers LDA; Coastal tourism company specialising in SCUBA diving based in the Vilanculos area;
- 1.13. CASA BABI guest house; based in the Vilanculos area;
- 1.14. Tilak Lodge - Lodge and restaurant; based in the Vilanculos area;
- 1.15. Danco Lda - Guest house; based in the Vilanculos area;
- 1.16. Moz Legal, Vilankulo; Legal and accounting services company based in Inhambane;
- 1.17. Big Blue; Marine tourism company in Vilanculos specializing in deep sea fishing;
- 1.18. Nova Visao limitada; Veterinary services based in the Vilanculos area;
- 1.19. Villa Santorini LDA; Coastal tourism company based in the Vilanculos area;
- 1.20. Quinta da Bahia; Coastal tourism company based in the Vilanculos area;
- 1.21. Vila Do Paraiso LDA; Coastal tourism company based in the Vilanculos area;
- 1.22. Vilamar LDA; Coastal tourism company based in the Vilanculos area;

- 1.23. Insomnia Sociedade Unipessoal Lda; Tourism company and local bar based in the Vilanculos area;
- 1.24. Baobab Beach; Coastal tourism company based in the Vilanculos area;
- 1.25. Pambele Beach House LDA; Coastal tourism company based in the Vilanculos Coastal Wildlife Sanctuary
- 1.26. Casa Cabana Beach LDA; Coastal tourism company based in the Vilanculos area;
- 1.27. MindWise; Education services in the Vilanculos area;
- 1.28. Gretha De Wet Unipessoal; consultancy in the Vilanculos area;
- 1.29. asDunas - Davrow LDA; Coastal tourism company based in the Vilanculos area;
- 1.30. Island Horse Safari; Coastal tourism company specialising in horse riding based in the Vilanculos area;
- 1.31. Cooltrain, Ltd; Accommodation rentals in Josina Machel, Inhambane Mozambique;
- 1.32. Afonte, Ltd; Accommodation rentals in Josina Machel, Inhambane Mozambique;
- 1.33. Lithonga Lda.; Coastal tourism company specialising in horse riding based in the Tofo Beach area;
- 1.34. Peri Peri Divers, Lda.; Coastal tourism company specialising in SCUBA diving based in the Morrungulo and Tofo areas;
- 1.35. Hanha Kwatsi Lda.; Scientific and management consultancy in the Tofo Beach Area;
- 1.36. Sangue Bom Lda.; Accommodation rentals in Josina Machel, Inhambane Mozambique;
- 1.37. Riomarsol Soc Unipessoal Limitada; Catering;
- 1.38. Machavenga Investimentos LDA; Education Consulting;
- 1.39. Kumba Lodge; Accommodation rentals in Josina Machel, Inhambane Mozambique;

- 1.40. Mozambeat Motel; Accommodation rentals in Josina Machel, Inhambane Mozambique;
- 1.41. Afreaka Lda.; Tourism operator in Josina Machel, Inhambane Mozambique;
- 1.42. Pura Vida Lda.; Tourism including a restaurant and accommodation in Josina Machel, Inhambane Mozambique;
- 1.43. Dathonga, Lda.; Bar & Art Gallery in Josina Machel, Inhambane Mozambique;
- 1.44. Carrick Lda.; Management consultancy in Josina Machel, Inhambane Mozambique;
- 1.45. MAR Consultoria, E.I; Scientific and management consultancy;
- 1.46. Kitesurf Tofo, tourism company based in the Tofo area, Inhambane;
- 1.47. GD Consultoria Lda; management consulting;
- 1.48. Tofo Scuba Lda; SCUBA diving and whale watching in Tofo, Inhambane;
- 1.49. Refugio das Baleis Lda.; Scientific consultancy in Josina Machel, Inhambane Mozambique;
- 1.50. Dentro do Azul Lda.; Accommodation rentals in Josina Machel, Inhambane Mozambique;
- 1.51. SKV Marine Consulting, Sociedad Unipessoal LDA.; Scientific consultancy in Josina Machel, Inhambane Mozambique;
- 1.52. Kaya Concierge T/A Gaya; Accommodation rentals in Josina Machel, Inhambane Mozambique;
- 1.53. SB Servicos de Contabilidade; management consulting;
- 1.54. Liquid Dive Adventures; Coastal tourism company specialising in SCUBA diving based in the Tofo area;
- 1.55. Mergulho Tofo; Coastal tourism operator based in the Tofo area;
- 1.56. Blue Activities; Restaurant and accommodation rentals based in the Tofo area;

- 1.57. Nadia Rifaat; Communication consultancy;
 - 1.58. Happy Nails & Spa; Salon in Tofo Beach;
 - 1.59. Rafiki's Lda.; Restaurant and accommodation rentals based in the Tofo area;
 - 1.60. Casa JVC Unipesada; Tourism lodge in the Tofo Beach Area;
 - 1.61. Consultoria Azul Aquatico; Swim School in the Tofo Beach Area;
 - 1.62. Paul Isham; private individual living in the Tofo Beach area;
 - 1.63. Happy JMS Retreat; Accommodation rentals based in the Tofo area; and
 - 1.64. A number of individual homeowners in the Inhambane area.
2. The I&APs are both directly and indirectly affected by and interested in the Project and its impacts on the social, economic and biophysical aspects of the marine and coastal environment.
 3. In line with the article 117 (2/d) Constitution of Mozambique, legislation, development must be sustainable, safeguarding the environment capacity of regeneration, ecological stability and rights of the future generations. We contend that the Applicant's proposed activities, as described in the EPDA Report, are not sustainable, particularly in the presence of such obvious fatal flaws.
 4. The main objectives of the Scoping Phase are:
 - 4.1. Identify **issues and concerns** regarding proposed activities;
 - 4.2. Identify potentially **fatal issues**;
 - 4.3. Identify and describe the issues that will **need to be investigated** in detail in Phase 3 of the EIA Process;
 - 4.4. Define **the ToR** for the EIA; and
 - 4.5. Present the proposed Project to the **Interested and Affected Parties** ("I&APs") and obtain their concerns and suggestions in public meetings.

5. In essence, our comments relate to the following issues, which are structured under the respective headings and set out in more detail below.
6. THE PROJECT: Our understanding of the Project and identification of information that has not been provided but which we believe is essential for meaningful public participation and informed decision-making.
7. LEGISLATION TO BE CONSIDERED: High level but key legislation that is applicable to the Project and significant shortcomings of the EPDA Report in respect of certain legal requirements which we believe should be addressed before the report is approved by the Provincial Environmental Services and DINAB. Most notable of these shortcomings is the inadequate Terms of Reference (TOR) necessary to guide the EIA in preparing the EIS Report.
8. PROJECT AREA OF INFLUENCE: The EPDA Report, specifically Section 9.1 and Figure 7 sets the physical boundaries of the Area of Influence, particularly for the Area of Indirect Influence (All), far too conservatively.
9. ENVIRONMENTAL IMPACTS AND FATAL FLAWS: We also submit the following comments regarding the impacts and potential fatal flaws associated with the following aspects of the Project and request that they are considered by the Provincial Environmental Services and DINAB when evaluating the EPDA Report and, if approved, by the specialist for inclusion in the in their respective reports, the findings of which should be reported on in the EIS Report.
10. PUBLIC PARTICIPATION PROCESS: The process undertaken so far has been wholly inadequate, so that proposed Project has not been adequately presented to the I&APs.
11. SPECIALIST STUDIES, CLIMATE CHANGE AND THE PRECAUTIONARY APPROACH.
12. REQUEST FOR ADDITIONAL INFORMATION.

II. THE PROJECT

13. The Project is scheduled to be undertaken by Searcher.

14. The Project area comprises the operational area for seismic surveys in deep waters off the coast of Inhambane Province. The Project area is located at a distance of 9 km from the closest point to the coast and at depths ranging from 200m to 2,500 m. The Project Area provides habitat for marine fauna, including marine mammals (breeding, feeding and migratory routes) and sea turtles (migration). Sensitive habitats such as coral reefs, mangroves and seagrass beds occur on the coast and on islands located to the west and outside of the Project area.
15. There are three conservation areas located to the west of the Project area namely,
 - 15.1. Bazaruto Archipelago National Park (8km away)¹;
 - 15.2. São Sebastião Total Protection Zone (9 km); and
 - 15.3. Pomene National Reserve (11 km).²
16. The seismic survey will be carried out in water depths varying between 200 and 2,500 m depths, within the operational area. The proposed operational area for seismic research is estimated to cover approximately 42,814 km² within which, currently up to 18,679 km² seismic data may be acquired.³ Elsewhere in the EPAD REport it states that Searcher plans to acquire 11,000 km² of 3D seismic data from the operational area .⁴ The time taken to complete the survey will be approximately 5 and half months (158 days).
17. While we acknowledge that the information provided in this section is relatively detailed, there is some fundamental information that appears to have been overlooked and we would appreciate you providing the following information to us in the Comments and Response Report⁵:
 - 17.1. Precise information about the distance between BANP and the Project area. On page 5 of the EPDA Report it is mentioned the Project area is at a distance of 13 km from BANP and on page 38 of the EPDA Report the Project area is located at a distance of 8 km from BANP.
 - 17.2. Precise information about the survey area and data that will be acquired. The EPRA Report refers to both 18, 679 km² and 11,000km².

¹ EPDA Report, page 38.

² EPDA Report, page viii, page 8.

³ EPDA Report, page 50 and 57.

⁴ EPDA Report, page 3.

⁵ EPDA Report, page 7.

- 17.3. A map that shows the seismic survey grid and lead areas to be surveyed together with the boundaries of the BANP⁶. Also on the same map, the routes to be used by all vessels including those supporting the Project (for example, supply vessels, patrol vessels, vessels used for discharge) as well as any other past, current or proposed petroleum operations⁷ in the region undertaken by Searcher or any other party.
 - 17.4. The anticipated volume of the drill cuttings and mud fluids resulting from the Project, a description of the hazardous nature of such material and the anticipated rate of discharge.
 - 17.5. The anticipated types of waste and volumes of all wastes (general and hazardous) generated by the Project and the proposed methods for managing and disposing of such wastes.
 - 17.6. The anticipated volume of sea traffic (including number and types of vessels, frequency etc.) associated with the Project as well as the associated emissions from such vessels (substances and concentrations).
 - 17.7. The type and anticipated concentration of substances emitted from flaring gas and/or burning liquid hydrocarbons.
18. Spill prevention, spill containment and cleanup protocols, whether drilling mud/cuttings or petroleum as well as the oil spill contingency plan and emergency response plan for the Project.
 19. All marine monitoring protocols in the project area and the BANP.
 20. It is also requested that the environmental and socio-economic impacts of these components of the Project are also identified and assessed in the EIA phase.

⁶ EDPDA Report, page 24.

⁷ Defined as "all or any of the operations related to exploration, development, production, separation and treatment, storage, transport and sale or delivery of petroleum at the agreed supply point in the country, including the operations of natural gas processing and the closure of all operations concluded".

III. LEGISLATION TO BE CONSIDERED

21. The legislation contains a number of high level rights, concepts and principles pertaining to environmental management and decision-making that need to be borne in mind and applied in the current EIA and environmental licensing process. We have set out the main ones below for ease of reference.
22. Article 45 of the Constitution of Mozambique states that every individual shall have the duty to:
 - 22.1. advocate, in his or her relations with the community, the preservation of cultural values, the spirit of tolerance and of dialogue and, in general, to contribute to civic education and advancement;
 - 22.2. defend and promote health;
 - 22.3. protect and conserve the environment;
 - 22.4. defend and protect the public good and the good of the community.
23. Article 90 of the Constitution of Mozambique enshrines the right of all citizens to live in an ecologically balanced environment.
24. Article 117 states that:-

The State shall promote efforts to guarantee the ecological balance and the conservation and preservation of the environment, with a view to improving the quality of life of its citizens.
25. With a view to guaranteeing the right to the environment within the framework of sustainable development, the State shall adopt policies aimed at:
 - 25.1. preventing and controlling pollution and erosion;
 - 25.2. integrating environmental objectives with sectoral policies;
 - 25.3. promoting the integration of environmental values into educational policies and programmes;
 - 25.4. guaranteeing the rational utilisation of natural resources and the safeguarding of their capacity to regenerate, ecological stability and the rights of future generations;

- 25.5. promoting territorial ordinance with a view to ensuring the correct location of activities, and balanced socio-economic development.
26. The Environmental Law requires that environmental management is based upon fundamental principles that are derivative of the right of all citizens to an ecologically balanced environment that is favourable to their health and physical and mental well-being, namely:⁸
- 26.1. The rational utilisation and management of environmental elements in order to promote the improvement in the quality of life of citizens and to conserve biodiversity and ecosystems;
 - 26.2. The recognition and valorisation of the traditions and the knowledge of the local communities that contribute to the conservation and preservation of natural resources and the environment;
 - 26.3. Precaution, on the basis of which the management of the environment shall prioritise the establishment of system to prevent acts which are harmful to the environment in such a way so as to avoid the occurrence of negative environmental impacts which are material or irreversible, regardless of the existence of scientific certainty concerning the occurrence of such an impact;
 - 26.4. A global, integrated vision of the environment as a grouping of interdependent ecosystems which may be naturally occurring or constructed and which must be managed in such a way so as to maintain their functional equilibrium without exceeding their intrinsic limits;
 - 26.5. The broad participation of citizens as a crucial element of the implementation of the National Programme of Environmental Management;
 - 26.6. Equality which guarantees equal opportunities to women and men for access to and use of natural resources;
 - 26.7. Responsibility, on the basis of which whoever pollutes or in any way degrades the environment shall always have the obligation to repair or compensate the resulting damage; and

⁸ Law No 20/1997, Article 4 (Environmental Law).

- 26.8. International cooperation, to obtain harmonious solutions to environmental problems, the cross-border, global dimensions of these problems are recognised.
27. Importantly, Article 12 of the Environmental Law confirms that:-
- 27.1. All activities which threaten conservation, reproduction, quality and quantity of biological resources, especially those which are threatened with extinction are prohibited.
- 27.2. The Biodiversity Conservation Law No 5/2017, May 11th (“BCL”), which is not mentioned in the EPDA, has the following fundamental objectives:
- 27.2.1. Contribute to biological diversity and genetic resource maintenance in national territory as well as in Mozambican jurisdictional waters;
 - 27.2.2. Protect endangered, rare and endemic species at the national, provincial, district and municipal level;
 - 27.2.3. Contribute to preservation and restoration of diversity of natural, land and aquatic ecosystems;
 - 27.2.4. Promote sustainable development through the sustainable use and benefit from natural resources;
 - 27.2.5. Economically and socially value biological diversity, promoting sustainable activities including hunting, concessions for tourism and fishing, so as to financially endow conservation;
 - 27.2.6. Conserve natural resources necessary for local community subsistence, respecting and valuing the communities’ knowledge and culture;
 - 27.2.7. Promote the use of principles and practices of conservation and natural resource management in the development process, especially with regards to local communities;
 - 27.2.8. Protect the natural and cultural landscape of special beauty as well as natural and cultural heritage, representative of national identity;
 - 27.2.9. Protect and repair waters and wetlands;

- 27.2.10. Incentivize and develop scientific research activities;
- 27.2.11. Promote environmental education and understanding of nature, leisure and recreation, as well as ecotourism in conservation areas⁹.
28. In this context, protected areas were defined as delimited territories, representing natural national heritage, destined for conservation of biological diversity and fragile ecosystems or animal and vegetable species.¹⁰ Among categories of total protection there is the integral natural reserve, national park and cultural and natural monument¹¹. The Western boundary of the Project is situated approximately 8km from the Bazaruto Archipelago National Park (BANP), the first official National Park of Mozambique. "The Bazaruto Archipelago has been formally protected since 1971, when it was declared a National Park by Legislative Diploma 46/71 of May 25, with the primary objective of protecting the populations of dugongs, sea turtles and various species of dolphins and whales that exist in the Bangué Island, Benguerra and Magaruque in the District of Vilankulo."¹² It is illogical to refer to the boundaries of the Project area as though the sound from the seismic blasting will stop at the lines drawn on the map depicting the Areas of Influence.¹³ Nieukirk et al. (2012) analysed 10 years of recordings from the Mid-Atlantic Ridge, finding that seismic airguns were heard at distances of 4,000 km from survey vessels.¹⁴ We submit that the Area of Influence extends well into all three Conservation Areas.
29. It is important to note that under the articles 15 (2/b) and 16 (2/b) of the Biodiversity Conservation Areas activities such as exploration, prospection, drillings or surveys and earthworks are rigidly prohibited.
30. It is not necessary for us to set out the legal requirements for the EIA and environmental licence application process as these are set out in detail in the EPDA Report. However, we draw your attention to the following provisions where we believe that certain requirements for the EPDA and public participation process have not been met. These include:

⁹ Article 12, Biodiversity Conservation Law.

¹⁰ Article 13, no.1, Biodiversity Conservation Law.

¹¹ Article 14 Biodiversity Conservation Law.

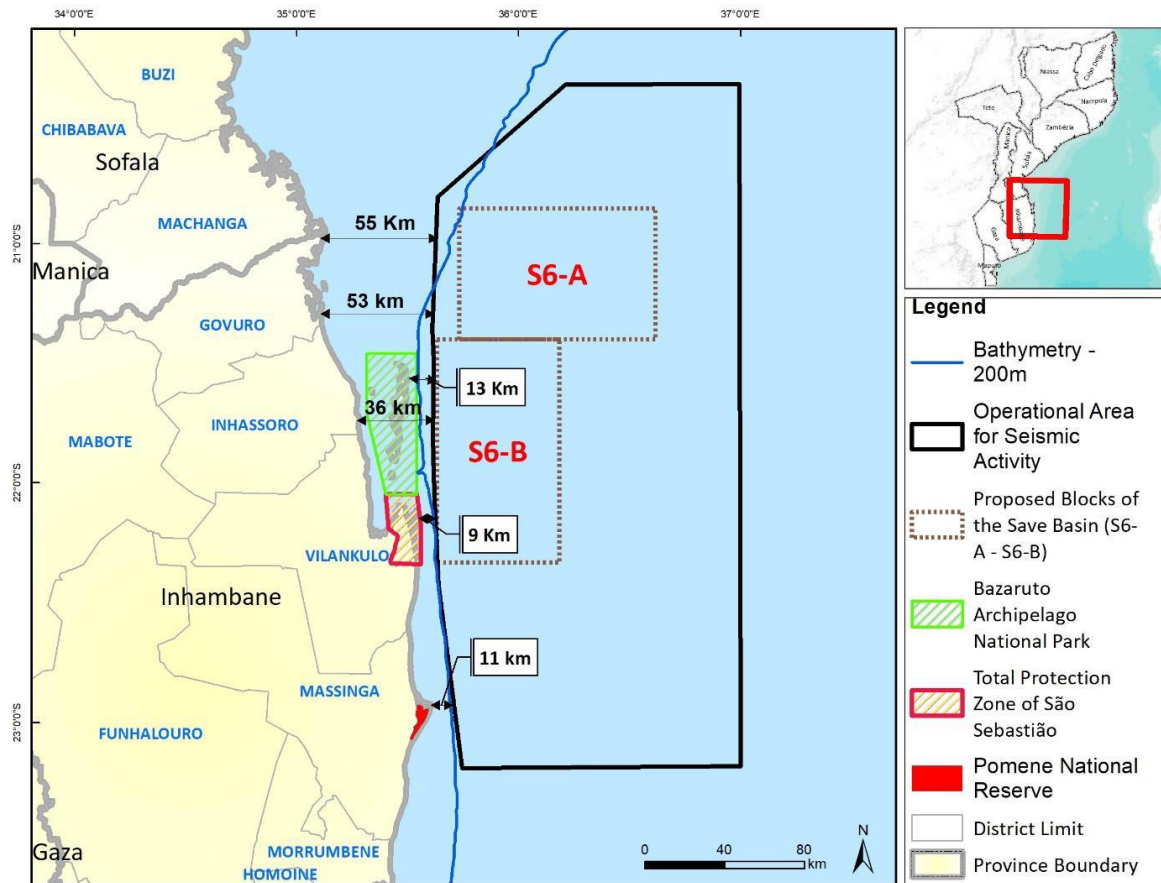
¹² EPDA Report, page 38

¹³ EPDA Report, page 24.

¹⁴ Weilgart, L. (2013). "A review of the impacts of seismic airgun surveys on marine life." Submitted to the CBD: A Review of the Impacts of Seismic Airgun Surveys on Marine Life Expert Workshop on Underwater Noise and its Impacts on Marine and Coastal Biodiversity, 25-27 February 2014, London, UK. Available at:<http://www.cbd.int/doc/?meeting=MCBEM-2014-01>

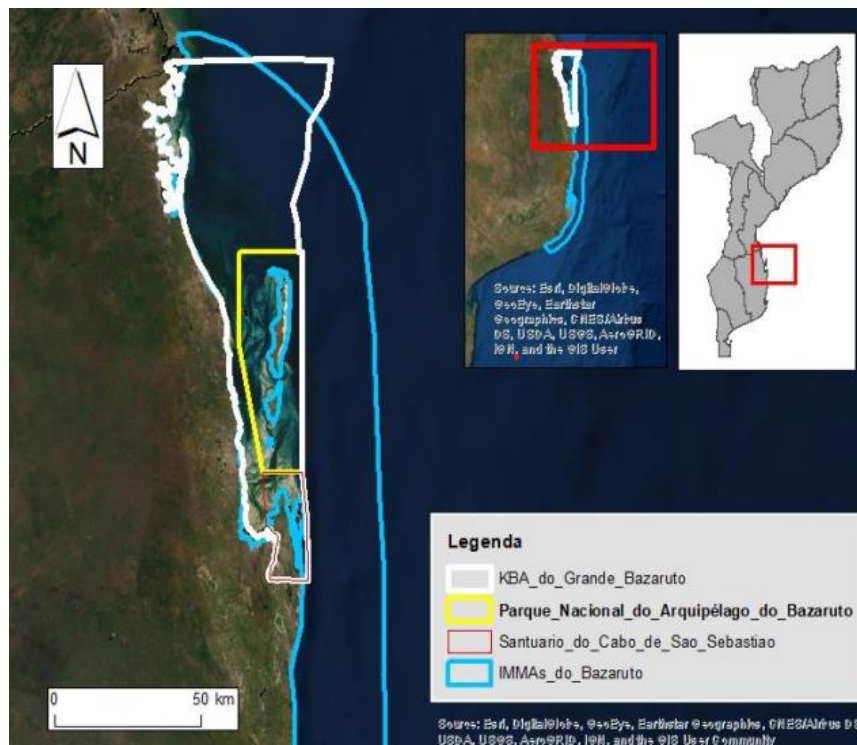
31. Potential fatal flaws or questions have not been identified and properly considered as either precluding the continuation of petroleum operations or, at least, further evaluated in the Environmental Impact Study (EIS Report). These potential fatal flaws as described in Annex V of Decree 54/2015 include:
- 31.1. Activities in total protection or conservation areas.
 - 31.2. Presence of “Species Critically in and/or In Danger” (e.g. dugongs and turtles).
 - 31.3. Presence of a range of endemic or restricted species (e.g. corals and molluscs).
 - 31.4. Presence of “Migratory/Congregatory Species”, where this habitat may be considered a unit of discreet management for those species (e.g. certain cetaceans, prawns species, turtles).
 - 31.5. Crucial area for the provision of services and key ecosystems in the national, provincial or district scale (e.g. seagrass beds, mangroves, coral reefs)
32. The Project is proposed in an area that contains species on the edge of extinction as well as migratory species and, according to page 39 of the EIS Report, the Zone of Direct Influence is extremely close¹⁵ to the Bazaruto Archipelago National Park, the Total Protection Zone of São Sebastião and the Pomene National Reserve; and it is therefore not clear why the Provincial Environmental Services and DINAB have not refused the activity's implementation entirely.

¹⁵ The sound from the blasting cannot be limited to the boundaries of the Zone of indirect and Direct Influence. It must be said that the impact on migratory species will undoubtedly be within the National Park.



33. Furthermore, although the EPDA Report mentioned that mammals such as dugong, dolphins (*Tursiops truncatus*, *Sousa chinensis*, *Stenella longirostris* and *Delphinus delphis*) occur mainly in the protected bay between the islands and the mainland and feed on the extensive seagrass beds there, BANP and Sao Sebastiao Total Protected Zone are located within the Great Bazaruto Key Biodiversity Area and an Important Marine Area¹⁶, though not equivalent to the geographical area of BANP, and Sao Sebastiao Total Protected Area, both are crucial habitats for endangered species and for ecological continuity and solidarity.
34. In the 2021 Report on Key Biodiversity Areas in Mozambique prepared by the Ministry of Land and the Environment, USAID and WSC identified and mapped 29 KBAs for Mozambique, of which 25 are terrestrial, and 4 are marine occupying a total area of 139,947.05 km². The 29 KBAs that were identified and mapped through this project are crucial to guide the preparation of development and land use plans (terrestrial and marine), from the local to the national level. The Grand Bazaruto KBA covers an area of about 5,236 km², encompassing the Bazaruto Archipelago and the Sao Sebastiao peninsula.

35. Recommendations and demand were made for the extension of the BANP and Sao Sebastiao Total Protected Zone to the limits of the Great Bazaruto Key Biodiversity Area “*The present status of KBA at this site enhances the recognition of greater Bazaruto and demonstrates that it is an area not only of national and regional importance, but also of global importance for the persistence of biodiversity.*”¹⁷
36. This area is depicted in the map below. The Project Area clearly falls within the KBA.



37. The article 8 (2/c) of the Decree 54/2015, 31 December, states that the presence of fatal flaw/questions determines the refusal of the project at the Pre-Assessment phase.
38. Article 19 of the Environmental Regulations for Petroleum Operations states that at least 15 days’ notice shall be given for public meetings and entitles all direct or indirectly interested or affected parties to take part in the EIA process. Not all I&APs received sufficient notice of the public meeting or were included on the distribution list notifying them of the Project when the

¹⁶ MTA and WCS Report on Management and Protection of Potential Key Biodiversity Areas in Mozambique.

¹⁷ WCS, Government of Mozambique & USAID. 2021. Key Biodiversity Areas (KBAs) Identified in Mozambique: Factsheets VOL. II. Red List of threatened species and ecosystems, identification and mapping of key biodiversity areas (KBAs) in Mozambique. USAID / SPEED+. Maputo. 70pp.

EIA process commenced. Further detail is provided below.

39. Article 5 (a) of the Law n.20/2019, November 8th, Law of Sea, establish an ecosystem approach principle which states:

“Government's action should take into account the complex and dynamic nature of marine ecosystems, aiming to preserve marine environments and coastal zones.”

The alina e) of the same article states that a sustainable management of the sea translated into, imperative of the national marine environment preservation, and need of exploration for economic purpose. Moreover, the alina h) states an “State obligation to adopt measures to protect, conserve biodiversity and ecosystem sustainability and establish a prevention system for harmful operation.”

40. The Law of the Sea also set out marine zones delimitations, in the sense of the United Nations Convention on the Law on the Sea (UNCLOS). The EPDA report does not indicate the marine zones in which the Project is located as established by the Law of the Sea and has implications in terms of State jurisdictions.

IV. PROJECT AREA OF INFLUENCE

41. The Northern Coast of Inhambane Province has been declared a Priority Area for Tourism Investment (PATI), and it includes the Bazaruto Archipelago National Park (BANP), one of the most important Conservation Areas in Mozambique.
42. The EPDA Report, specifically Figure 7¹⁸, sets the physical boundaries far too conservatively for the Area of Influence, particularly the Area of Indirect Influence.
43. The “Area of Direct Influence (AID) is the area that is directly affected by the activity based on biophysical and socioeconomic characteristics. Thus, it is considered that the AID covers the Operational Area for Seismic Research in the Save Basin. By their own admission, the consultants acknowledge that “it is important to highlight the existence of the Bazaruto Archipelago National Park, the São Sebastião Total Protection Zone and the Pomene National Reserve, with emphasis on the presence of coral reefs and mangroves on the coast

¹⁸ EPDA Report, page 24.

(Figure 7).”¹⁹

44. Area of Indirect Influence (All): area affected by activities or influences not directly linked to Project activities, but which can be triggered by the physical presence of the Project or by activities associated with it (such as a localized oil spill). The Area of Indirect Influence extends through the coastal area Districts of Massinga, Vilanculos, Inhassoro, Govuro (Inhambane Province) where coastal communities dependent on fishing, aquaculture or tourism that may be indirectly subject to impacts arising from of the seismic prospecting activity. A brief description of the biophysical and socioeconomic characteristics of AID and All is provided below. Additional details on the baseline situation of the receiving environment will be presented in the EIA Report, with particular emphasis on components that may be affected by support activities in the area of seismic survey.²⁰ (Our emphasis)
45. The EPDA Report refers to “sensitive habitats including coral reefs, mangroves and seagrass beds will be described. They are habitats that occur in shallow waters, located along the coast and on the islands that constitute the Bazaruto Archipelago, southwest of the Study Area. These habitats do not occur within the Study Area”²¹ and “[a]ccording to the distance from the Study Area to the coast, the coral reefs should not be affected by the project activities, however, this aspect will be better addressed in the EIA phase.”
46. This is vast understatement as these habitats exist on the boundary of the Study Area and, by its very nature, boundaries cannot exist in the ocean. Damage to essential ecosystems, such as coral reef and seagrass beds, which provide shelter and breeding ground for fish populations, caused by drilling fluids and drill cuttings releases, spills, or ocean disposal, domestic waste releases, or petroleum spills are very real impacts from a project of this nature. Sound from seismic blasting travels up to 4 000km and has significant impact on marine life. This is deal with more fully in the section below.
47. The reliance on local fisheries in the region is also recognised: "Livelihoods in rural areas of Mozambique are highly dependent on the use of natural resources and most industries along the coastal zone are associated with large cities such as Maputo, Matola, Beira and Nacala. Economic activities in coastal zones can be grouped into two categories: (i) subsistence activities (small-scale fishing, agriculture, informal trade, etc.) and (ii) income activities

¹⁹ Ibid.

²⁰ EPDA Report, page 24.

²¹ EPDA Report, page 33.

(industrial and semi-industrial fishing, tourism, transport, mining, aquaculture, commercial agriculture, etc.).²²

48. Given the regional and national importance of the environment and the socio-economic dependence on the natural resources within this environment, the indirect zone of influence must be extensively covered and should be included in more detail in the EPDA Report. Seismic sound travels over vast distances. It is important that the areas of influence are expanded so that the respective specialist studies and their resultant findings are not artificially confined to boundaries that have been too narrowly set and are inappropriate, particularly in the marine environment.

V. ENVIRONMENTAL IMPACTS AND FATAL FLAWS

49. We also submit the following comments regarding the impacts and potential fatal flaws associated with the following aspects of the Project.
50. The EIA regulations are clear - fatal flaws require refusal. The Provincial Environmental Services and DINAB must therefore refuse this Project before it goes any further.

Seismic Surveying and Adverse Impacts to Marine Life

51. Seismic surveying is performed to identify the potential for oil and gas reservoirs to exist below the seabed. In the EPDA Report, the seismic surveying that is likely to be used involves the use of a seismic source (to emit the sound signal), recording cables, and positioning cables. During seismic surveys, low-frequency, high-level sounds are directed to the seafloor from sound sources close to the water surface and transmitted from a vessel. Signals reflected from geological discontinuities below the ocean floor are recorded by hydrophones mounted on sound recording cables "streamers". The reflective signals are recorded and transmitted to the seismic vessel for electronic processing. The analysis of the processed sent signals allows the interpretation of geological formations in the marine subsoil. Data processing for this project will be carried out in London. Seismic surveying during the Project is expected to last for approximately five and a half months.²³

²² EPDA Report, page 42.

²³ EPDA Report, page 22.

52. Sound waves generated during seismic surveys in the project area will produce intense noise that can result in a multitude of acute adverse biological impacts to marine life during the approximately four-month timeframe seismic surveying is expected to occur. The EPDA Report does not state the frequency of the sound that will be discharged during the survey. However, seismic exploration activities generate broad band frequency noise (i.e. 5-20,000 Hz), of which only a small range (i.e. 5-100 Hz) is relevant for the collection of the required information (Goold and Fish 1998).²⁴
53. Furthermore, Mozambique has no regulation setting sound quality standards for purposes of biodiversity and ecosystem protection. It terms of the article 1 (21) of the Law 20/97, 1st October, introduction of “sounds, vibrations or any other forms of energy, in way and quantity that affects negatively the environment” is consider pollution and is prohibited under the article 9.
54. The potential for adverse impacts to marine life is enhanced due to the shallow water nature of the project area and the presence of marine life aggregating features, such as coral reefs and seagrass beds.²⁵
55. Adverse biological impacts to marine mammals, such as whales and dolphins, from sound waves generated during seismic surveying can range for tens to hundreds of miles from the survey area and include:^{26,27,28,29}
- 55.1. masking biologically essential marine mammal sounds, such as communication signals, echolocation, and sounds associated with orientation, finding prey or avoiding natural or manmade dangers;

²⁴ Koper, R.P & Plön, S. 2012. The potential impacts of anthropogenic noise on marine animals and recommendations for research in South Africa. EWT Research & Technical Paper No. 1. Endangered Wildlife Trust, South Africa, page 42.

²⁵ International Union for Conservation of Nature, Effective planning strategies for managing environmental risk associated with geophysical and other imaging surveys, A resource guide for managers, 2016.

²⁶ Verfuss, Ursula, K. et. al., Comparing methods suitable for monitoring marine mammals in low visibility conditions during seismic surveys, Marine Pollution Bulletin 126 (2018) 1-18, October 16 2017.

²⁷ Weilgart, L. (2013). “A review of the impacts of seismic airgun surveys on marine life.” Submitted to the CBD Expert Workshop on Underwater Noise and its Impacts on Marine and Coastal Biodiversity, 25-27 February 2014, London, UK. Available at: <http://www.cbd.int/doc/?meeting=MCBEM-2014-01>

²⁸ Gordon, Jonathan, C.D., et. al., A Review of the Effects of Seismic Survey on Marine Mammals, Marine Technology Society Journal.

²⁹ National Research Council of the National Academies, Division on Earth and Life Studies, Ocean Studies Board, Committee on Potential Impacts of Ambient Noise in the Ocean on Marine Mammals, Ocean Noise and Marine Mammals, 2003.

- 55.2. startle and fright;
 - 55.3. increased stress levels;
 - 55.4. temporary reduction in auditory sensitivity;
 - 55.5. cessation of vocalizations;
 - 55.6. altered dive and respiratory patterns;
 - 55.7. restricting access to essential habitats (such as the seagrass beds, which is being important sources of food and shelter for animals such as the Dugong and the Green Turtle, both of which are threatened with extinction.)³⁰;
 - 55.8. reducing availability of food sources due to shifts in behavior of prey species;
 - 55.9. avoidance of critical habitat areas;
 - 55.10. disruption of mating systems;
 - 55.11. disruption of feeding behaviour;
 - 55.12. mother-calf separation due to masking of contact calls;
 - 55.13. permanent hearing damage;
 - 55.14. stranding (also known as beaching) that can result in death.
56. The survivability of marine mammals depends highly on their ability to hear and identify biologically essential sounds. Hearing is the most important sensory modality for marine mammals when they are underwater and any reduction in their ability to hear has the serious potential to adversely impact their survivability.³¹
57. Noise-induced physical hearing losses can result from exposure to high intensity sound generated by the air guns used during seismic surveying that are loud enough to deep into

³⁰ EPDA Report, page 34.

³¹ Gordon, Jonathan, C.D., et. al., A Review of the Effects of Seismic Survey on Marine Mammals, Marine Technology Society Journal.

the ocean floor.³² The intense sound waves generated by air guns used during seismic surveying can be up to 260 decibels,³³ when sound is back-calculated to the source, with a maximum exposure potential to marine life in the range of 235 to 240 decibels.^{34,35} Hearing losses in marine mammals and fish can be temporary, with recovery occurring shortly after sound exposure. Permanent hearing loss in marine mammals and fish can result from either chronic exposure to sound waves or from short-term exposure to intense sound waves.^{36,37}

58. Seismic survey sound waves from the Project will increase background noise levels in the ocean in the vicinity of the project area for approximately four months and can mask the sound signals marine mammals and fish depend on for communication, identifying food sources, and avoiding threats.^{38,39} Masking occurs when both the sound signals generated by marine mammals or fish and the sound waves from seismic surveying air guns and vessels occur at or near the same time and at similar frequencies.⁴⁰ Failure to communicate among members of a species can result in a loss of social organization, an inability for mother whales to locate their calves, or a failure for dispersed members of a group to locate each other and communicate.^{41,42} Background noise from seismic surveys can hamper marine mammals' and fish ability to avoid natural or manmade threats.^{43,44}

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- ³² Weilgart, L. (2013). "A review of the impacts of seismic airgun surveys on marine life." Submitted to the CBD Expert Workshop on Underwater Noise and its Impacts on Marine and Coastal Biodiversity, 25-27 February 2014, London, UK. Available at: <http://www.cbd.int/doc/?meeting=MCBEM-2014-01>
- ³³ Unless otherwise noted, all decibel levels provided in this document are to sound pressure levels using the standard reference pressure for water-borne sounds (1 µPa).
- ³⁴ Yeager, Ashley, The Scientist, Proposed Seismic Surveys Raise Concern Over Health of Marine Life, May 11, 2018. <https://www.the-scientist.com/news-opinion/proposed-seismic-surveys-raise-concern-over-health-of-marine-life-36612>. Accessed October 28, 2019.
- ³⁵ National Research Council of the National Academies, Division on Earth and Life Studies, Ocean Studies Board, Committee on Potential Impacts of Ambient Noise in the Ocean on Marine Mammals, Ocean Noise and Marine Mammals, 2003.
- ³⁶ Gordon, Jonathan, C.D., et. al., A Review of the Effects of Seismic Survey on Marine Mammals, Marine Technology Society Journal.
- ³⁷ McCauley, Robert, D., et. al., High intensity anthropogenic sound damages fish ears, Journal of Acoustical Society of America, January 2003.
- ³⁸ McCauley, Robert, D., et. al., High intensity anthropogenic sound damages fish ears, Journal of Acoustical Society of America, January 2003.
- ³⁹ Gordon, Jonathan, C.D., et. al., A Review of the Effects of Seismic Survey on Marine Mammals, Marine Technology Society Journal.
- ⁴⁰ National Research Council of the National Academies, Division on Earth and Life Studies, Ocean Studies Board, Committee on Potential Impacts of Ambient Noise in the Ocean on Marine Mammals, Ocean Noise and Marine Mammals, 2003.
- ⁴¹ Yeager, Ashley, The Scientist, Proposed Seismic Surveys Raise Concern Over Health of Marine Life, May 11, 2018. <https://www.the-scientist.com/news-opinion/proposed-seismic-surveys-raise-concern-over-health-of-marine-life-36612>. Accessed October 28, 2019.
- ⁴² Natural Resource Defense Council, Impacts of Seismic Airgun Noise on Fish and Marine Invertebrates.
- ⁴³ Gordon, Jonathan, C.D., et. al., A Review of the Effects of Seismic Survey on Marine Mammals, Marine Technology Society Journal.
- ⁴⁴ Natural Resource Defense Coalition, Impacts of Seismic Airgun Noise on Fish and Marine Invertebrates.

59. The ability of marine mammals to locate food sources, such as prey species, can be inhibited by seismic surveying. The sounds generated by air guns have been shown to directly impair foraging success in diverse species of marine mammals^{45,46} as well as to disrupt vocalizations associated with foraging and other essential behavior over large scales.⁴⁷ Seismic surveying activities can also result in the migration of prey species from the project area, making them unavailable as a food source for marine mammals.⁴⁸
60. To avoid the sound waves generated during seismic surveying, marine mammals may vacate the project area, including essential habitats for certain species.⁴⁹ Animals might choose to avoid or even displace themselves from an habitat when they are exposed to disturbing factors, such as anthropogenic noise. Hourglass dolphins (*Lagenorhynchus cruciger*), minke whales, and southern bottlenose whales (*Hyperoodon planifrons*) were reported to change their distribution during the Heard Island Feasibility Test- a trial to test the feasibility of measuring average ocean temperatures by emitting sound through the deep sound channel (Bowles *et al.* 1994, Simmonds *et al.* 2004).⁵⁰
61. The seagrass beds located in the shallow waters of Bazaruto Bay in the project area provide a main source of food and shelter for the dugong, including supporting the largest dugong population in the western Indian Ocean. The dugong is considered a critically endangered species in the region by the International Union for Conservation of Nature (IUCN) Red List of Threatened Species due to declines in its population.⁵¹ The presence and movement of the dugong population in the project area depends strongly on the presence of seagrass beds. Inability to access the seagrass meadows adjacent to the project area due to the presence of seismic survey vessels or abandonment of the area due to the intense sound waves generated during seismic surveying will restrict access to a vital food source and an

⁴⁵ Miller, P.J.O., Johnson, M.P., Madsen, P.T., Biassoni, N., Quero, M. and Tyack, P.L., Using at-sea experiments to study the effects of airguns on the foraging behavior of sperm whales in the Gulf of Mexico, *Deep-Sea Research I* 56: 1168-1181 (2009).

⁴⁶ Pirotta, E., Brookes, K.L., Graham, I.M. and Thompson, P.M., Variation in harbour porpoise activity in response to seismic survey noise, *Biology Letters* 10(5): 20131090 (2014).

⁴⁷E.g., Castellote, M., Clark, C.W., and Lammers, M.O., Acoustic and behavioural changes by fin whales (*Balaenoptera physalus*) in response to shipping and airgun noise, *Biological Conservation* 147: 115-122 (2012).

⁴⁸ Gordon, Jonathan, C.D., et. al., A Review of the Effects of Seismic Survey on Marine Mammals, *Marine Technology Society Journal*.

⁴⁹ Weilgart, L. (2013). "A review of the impacts of seismic airgun surveys on marine life." Submitted to the CBD Expert Workshop on Underwater Noise and its Impacts on Marine and Coastal Biodiversity, 25-27 February 2014, London, UK. Available at: <http://www.cbd.int/doc/?meeting=MCBEM-2014-01>

⁵⁰ Koper, R.P & Plön, S. 2012. *The potential impacts of anthropogenic noise on marine animals and recommendations for research in South Africa*. EWT Research & Technical Paper No. 1. Endangered Wildlife Trust, South Africa. Page 33.

⁵¹ EPDA Report, Pages 54 – 55.

essential habitat for the dugong population.

62. Marine mammals may also suffer long-term adverse impacts due to chronic exposure to sounds waves from not only seismic surveying but drilling of exploration and appraisal wells as part of this project and potentially drilling of petroleum production wells in the future.
63. Seismic surveying can potentially lead directly to death in cetacean populations, such as whales and dolphins, through behavioral changes in response to the intense sound waves generated during seismic surveying. Whale stranding (beaching) incidents have been potentially linked to seismic surveying and it is established that the use of sonar has resulted in whale stranding incidents. Whales stranding themselves on beaches can result in death of the stranded individuals.⁵² Incidents of dolphin deaths in response to behavior attempting to protect themselves from the intense sound waves generated during seismic surveying have also been reported. Deaths of cetaceans in response to seismic surveying are likely underreported, since detection of cetacean carcasses is extremely difficult.⁵³
64. The most severe non-auditory physical impacts of high levels of sound on marine animals include severe damage to body tissues or embolism (i.e. gas bubbles in the bloodstream), which often results in death (Dolman and Simmonds 2005). Explosions, for example, form a shockwave followed by intense oscillations of sound (Jasny *et al.* 2005). As these oscillations pass through an animal the pressure causes vibration of the lungs and viscera, around the natural pockets of air (Jasny *et al.* 2005). Consequently, body tissues may burst their walls and bleed into the cavities, causing internal bleeding and possibly resulting in death (Jasny *et al.* 2005).⁵⁴
65. Fish reproduction potential is reduced by the sound waves produced by seismic surveying. Sound levels of 120 decibels and above have been shown to decrease egg viability, increase embryonic mortality, decrease larval growth, and the ability of fish larvae to avoid predators.⁵⁵ Background noise masks fish mating vocalization, making mating interactions more difficult

⁵² Gordon, Jonathan, C.D., et. al., A Review of the Effects of Seismic Survey on Marine Mammals, Marine Technology Society Journal.

⁵³ Weilgart, L. (2013). "A review of the impacts of seismic airgun surveys on marine life." Submitted to the CBD Expert Workshop on Underwater Noise and its Impacts on Marine and Coastal Biodiversity, 25-27 February 2014, London, UK. Available at: <http://www.cbd.int/doc/?meeting=MCBEM-2014-01>

⁵⁴ Koper, R.P & Plön, S. 2012. *The potential impacts of anthropogenic noise on marine animals and recommendations for research in South Africa*. EWT Research & Technical Paper No. 1. Endangered Wildlife Trust, South Africa, Page 26

⁵⁵ Weilgart, L. (2013). "A review of the impacts of seismic airgun surveys on marine life." Submitted to the CBD Expert Workshop on Underwater Noise and its Impacts on Marine and Coastal Biodiversity, 25-27 February 2014, London, UK. Available at: <http://www.cbd.int/doc/?meeting=MCBEM-2014-01>

to occur.⁵⁶

66. Giant squid (*Architeuthis dux*) has been found stranded along the Spanish coast with severe internal injuries, probably resulting from offshore seismic surveys operating at frequencies below 100 Hz at 200 dB (MacKenzie 2004). Furthermore, Klima *et al.* (1988) reported a positive relationship between the frequency of offshore explosions and the number of dead Kemp's Ridley (*Lepidochelys kempi*) sea turtle strandings, characterized by lung haemorrhages and ruptures in the heart.⁵⁷
67. The Project area is home to populations of loggerhead and leatherback turtles and green and hawksbill turtles. The loggerhead turtle is considered an endangered species. The leatherback turtle is considered a vulnerable species.⁵⁸ The sound waves from seismic surveying have the potential to adversely impact marine turtle behaviour and cause avoidance of the project area. The potential for reduced hearing sensitivity in marine turtles, whose best hearing occurs in low frequencies, also exists due to the intense low-frequency sound waves generated during seismic surveying.⁵⁹
68. Chronic responses refer to sensitization and habituation as well as cumulative and synergistic effects. To be able to indicate chronic responses, animals have to be exposed to controlled stimuli to obtain longitudinal, sequential measurements (Nisbet 2000). Therefore, there is very little scientific evidence to date that marine animals adopt this type of response.⁶⁰
69. The EPDA Report needs to specify the decibel range of the sound waves and document all of the potential adverse impacts to marine animals resulting from the sound waves generated during seismic surveying. The EPDA Report also needs to detail the mitigation measures that will be taken to minimize or avoid adverse impacts to marine animals.

Marine Mammal Surveying and Monitoring

70. A thorough pre-seismic survey screening and evaluation of environmental factors in the

⁵⁶ Natural Resource Defense Coalition, Impacts of Seismic Airgun Noise on Fish and Marine Invertebrates.

⁵⁷ Koper, R.P & Plön, S. 2012. *The potential impacts of anthropogenic noise on marine animals and recommendations for research in South Africa*. EWT Research & Technical Paper No. 1. Endangered Wildlife Trust, South Africa. Page 28.

⁵⁸ EPDA Report, Page 54.

⁵⁹ Weilgart, L. (2013). "A review of the impacts of seismic airgun surveys on marine life." Submitted to the CBD Expert Workshop on Underwater Noise and its Impacts on Marine and Coastal Biodiversity, 25-27 February 2014, London, UK. Available at: <http://www.cbd.int/doc/?meeting=MCBEM-2014-01>

⁶⁰ Koper, R.P & Plön, S. 2012. *The potential impacts of anthropogenic noise on marine animals and recommendations for research in South Africa*. EWT Research & Technical Paper No. 1. Endangered Wildlife Trust, South Africa. Page 36.

Project Area and marine life species that may be adversely impacted by seismic surveying vessels and sound wave production is essential to inform and develop a robust monitoring and mitigation program to minimize adverse impacts to marine life, the environment, and the local population. Critical habitats and threatened and endangered species within and in the vicinity of the project area need to be devoted special attention. Mitigation of acute impacts (e.g. marine mammal collision with vessels involved with seismic surveying activities) is imperative, but monitoring for the short-term and long-term impacts on marine life and developing means to mitigate them is also essential to reducing the Project's impact.^{61,62}

71. The deployment of numerous vessels during seismic surveying presents the risk of collision with marine mammals that can cause death or serious injury. The introduction of airguns and streamers used to perform seismic surveying poses risks of collisions or entanglement that can injure or potentially result in the death of marine mammals.
72. The EPDA Report does not provide sufficient detail on how marine mammals are intended to be kept clear of the survey vessels and Project area and the methods used to identify them in ocean waters.⁶³ Thirty-five species of marine mammals have been recorded in the Western Indian Ocean (WIO) region, including 21 whales, of which 13 are toothed whales, 13 dolphins and one species of dugong.⁶⁴ The dugong population in the project area is estimated at between 250 and 350 individuals and is considered the last viable population in the region.⁶⁵ In total, three marine mammals considered species of Conservation Concern are located in the project area: the dugong; the Indian Ocean Bottlenose dolphin; and Indo Pacific Humpback dolphin.⁶⁶ It is also likely that the Indian Ocean Humpback Dolphin, considered an endangered species, resides in the project area.^{67,68} Given the location of the Project area

⁶¹ Nowacek, Doulas P., et. al., Responsible Practices for Minimizing and Monitoring Environmental Impacts of Marine Seismic Surveys with an Emphasis on Marine Mammals, *Aquatic Animals* 39, pages 356-377, 2013.

⁶² International Union for Conservation of Nature, Effective planning strategies for managing environmental risk associated with geophysical and other imaging surveys, A resource guide for managers, 2016.

⁶³ EPDA Report, page 19 and 21 such as Passive Acoustic Monitoring. "For example, in addition to using the PAM, a Fisheries Liaison Officer (OLP) will be on board the seismic vessel, who will communicate with the maritime authorities, fishing vessels and other users of the maritime space and a Marine Mammal Observer (OMM) to carry out visual observation and detect the presence of marine fauna during the day". .

⁶⁴ EPDA Report, page 37.

⁶⁵ Letter to Searcher from Dr. Donna Kwan, Programme Management Officer – Dugongs, Dugong MOU, Subject: Concern over Sasol Seismic Testing and Drilling in Mozambique, July 15, 2019.

⁶⁶ EPDA Report, Page 56.

⁶⁷ Plön S, Atkins S, Conry D, Pistorius P, Cockcroft V, Child MF. 2016. A conservation assessment of *Sousa plumbea*. In Child MF, Roxburgh L, Do Linh San E, Raimondo D, Davies-Mostert HT, editors. *The Red List of Mammals of South Africa, Swaziland and Lesotho*. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa.

⁶⁸ Cockcroft, Vic, et. al., Comments on the Proposed Sasol 2 and 3D Seismic Exploration and Exploration Well Drilling in Blocks 16 and 19And (sic) Their Potential for Impacts to Marine Mammals.

and the high occurrence of marine mammals, the probability of avoiding marine mammals is unlikely even with monitoring measures in place.

73. This, we submit, is a fatal concern / flaw affecting the Project.
74. Environmental Impact Assessment Process (Decree 54/2015 of 31 December, states that determining the possible existence of “fatal issues” is one of the main objectives of the EPDA. The fatal issue is understood as any environmental problem that, due to its severity, could make a process or activity unfeasible; it is therefore a negative effect that cannot be mitigated to levels considered acceptable in the context of environmental protection and/or health and safety.
75. Marine mammals can be difficult to detect and the unique behavior and characteristics of each different marine mammal in the project area can impact the ability for them to be located and protected. Visual detection alone is insufficient, since marine mammals are typically located below the water surface and come to the surface to replenish oxygen supplies as needed. As a result, non-visual monitoring methods are required, such as acoustic monitoring or thermal infrared monitoring, to increase the ability to detect marine mammals, although all methods are imperfect. Adequate time allowance prior to initiation of seismic surveying activities is essential to detect marine mammals and allow for implementation of protective measures and prevent them from entering the area where seismic surveying is performed, thus requiring a monitoring area larger than just the location of seismic surveying and of areas directly adjacent to seismic surveying.⁶⁹
76. As noted above, seismic airgun surveys can disrupt behavior in marine mammals at distances of tens to hundreds of kilometers, well beyond the range at which the maintenance of near-source exclusion areas is practicable. Additionally, establishing such exclusion areas would not mitigate impacts to many other affected taxa, such as fish. For these reasons, mitigation must include measures that reduce the amount of survey activity, achieve the lowest practicable source levels, and avoid seasons of biological importance to the Area of Impact.
77. The EPDA Report needs to document the species of concern in the project area and detail expected population numbers, seasonal presence, behavioral traits, reproduction time

⁶⁹ Verfuss, Ursula, K. et. al., Comparing methods suitable for monitoring marine mammals in low visibility conditions during seismic surveys, Marine Pollution Bulletin 126 (2018) 1-18, October 16, 2017.

frames and practices, foraging habits, and specific habitat use. Where information essential to impact analysis and a consideration of mitigation is presently unavailable, Searcher must obtain it through wildlife surveys and other research effort. The influence that physical characteristics of the project have on species occurrence in the project area needs to be evaluated in the EPDA Report, including the impacts of ocean currents, storm seasonality, and presence of essential habitats, such as coral reefs and seagrass beds.⁷⁰

78. The EPDA Report fails to detail the specific threats to marine mammals posed by seismic surveying vessels and streamers containing air guns, such as impact by the seismic survey vessels, air guns sound waves, or dangers posed by streamers. The specific threats related to sound wave exposure to marine mammals both acutely and chronically needs to be evaluated to identify mitigation measures. The specific threats of physical injury or death posed by the survey vessels, streamers and air guns need be discussed and specific measures to avoid them need to be detailed in the EIS Report. Mitigation measures should be designed based on the results of the analysis of the specific species anticipated in the project area during seismic surveying and each species unique behavioral traits.⁷¹ For example, while dolphin and whales breach the surface (porpoise) when they come up to breathe, dugong often do not and can stick only the tips of their snouts out of the water when breathing making it difficult if not impossible to see- particularly in turbid or rough waters.
79. During the Project, the only monitoring measure discussed in the EPDA Report is the deployment of one or more support vessel (i) ensure that no fishing activity is carried out while the seismic vessel is passing by dragging its 10 cables of 8km in length, and (ii) observe the environment and ensure that the fauna remains safe.⁷²
80. The specific details of the pre-seismic survey screening and monitoring program to ensure the safety of marine mammals in the project area during seismic surveying activities and mitigate threats to marine mammals needs to be detailed in the EIS Report, including, but not limited to:^{73,74}

⁷⁰ International Union for Conservation of Nature, Effective planning strategies for managing environmental risk associated with geophysical and other imaging surveys, A resource guide for managers, 2016.

⁷¹ International Union for Conservation of Nature, Effective planning strategies for managing environmental risk associated with geophysical and other imaging surveys, A resource guide for managers, 2016.

⁷² EPDA Report, page 20.

⁷³ Verfuss, Ursula, K. et. al., Comparing methods suitable for monitoring marine mammals in low visibility conditions during seismic surveys, Marine Pollution Bulletin 126 (2018) 1-18, October 16, 2017.

⁷⁴ International Union for Conservation of Nature, Effective planning strategies for managing environmental risk associated with geophysical and other imaging surveys, A resource guide for managers, 2016.

- 80.1. the configuration of the smaller boats around the seismic surveying vessel;
- 80.2. the size of the monitoring zone;
- 80.3. the monitoring period to be employed prior to streamer array deployment to ensure no marine mammals are present near acoustic sources when they are initially activated;
- 80.4. number of personnel employed in locating marine mammals and their duties;
- 80.5. procedures and instruments (e.g. binoculars) used to visually locate marine mammals;
- 80.6. procedures and technology used during low-visibility conditions;
- 80.7. non-visual technologies to be employed during pre-seismic surveying species identification and monitoring during seismic surveying activities, such as passive acoustic monitoring and thermal infrared monitoring;
- 80.8. protocols for communication with the seismic surveying vessels when marine mammals are spotted and in potential danger;
- 80.9. protocols the seismic surveying vessel will follow upon identification of a marine mammal that may potentially be endangered by seismic surveying operations;
- 80.10. protocols for freeing any marine mammal caught in the seismic survey streamers;
- 80.11. protocols for responding to any incidents where a marine mammal is injured by a vessel, air gun, or streamer;
- 80.12. protocols for data management and recordkeeping during pre-seismic surveying species identification and monitoring during seismic surveying activities; and
- 80.13. protocols for training staff tasked with performing monitoring, mitigation measures, communicating threats to marine mammals, and data management and recordkeeping.

Adverse Impacts to Zooplankton and the Marine Life Food Chain

81. Seismic surveying has the potential to cause mortality to zooplankton populations in the

project area, a vital link in the marine life food chain.⁷⁵ Healthy populations of marine fish, predator species, and marine mammals are not possible without a healthy zooplankton population. Zooplankton communities also comprise the larval stages of commercial fish species, whose loss can adversely impact commercial fishing, the local population that relies on fishing as an essential food source, and the economy of the local community adjacent to the project area.⁷⁶

82. The EPDA Report states: “Investigations on planktonic communities present in the Mozambique Channel are scarce (Sá et al., 2013; Ternon et al., 2014) and are limited mainly to unpublished studies (ERM, 2006). The abundance and distribution of plankton is strongly dependent on environmental and oceanographic conditions, such as currents, nutrient upwelling and river runoff (Sá et al., 2013). In the marine waters of the Bazaruto Archipelago, schools of pelagic fish, manta rays and whale sharks are frequently sighted. All these species feed mainly on direct consumers of plankton or directly on plankton, which suggests the occurrence of planktonic communities in the area (ERM, 2006). These communities are probably generated by nutrient upwelling and river runoff further north in the Save Delta (ERM, 2006).”⁷⁷
83. If this is not considered to be a fatal flaw, the EIS Report must detail the potential for adverse impacts to zooplankton populations and how these adverse impacts will impact other species in the marine life food chain and commercial fish populations. The EIS Report must then develop measures to mitigate against the adverse impacts seismic surveying may have on zooplankton populations and the resulting adverse impacts to commercial fish populations, the local community, and marine life.

Maritime Traffic

84. It is clear from the figure below that the Project area is directly in the path international and

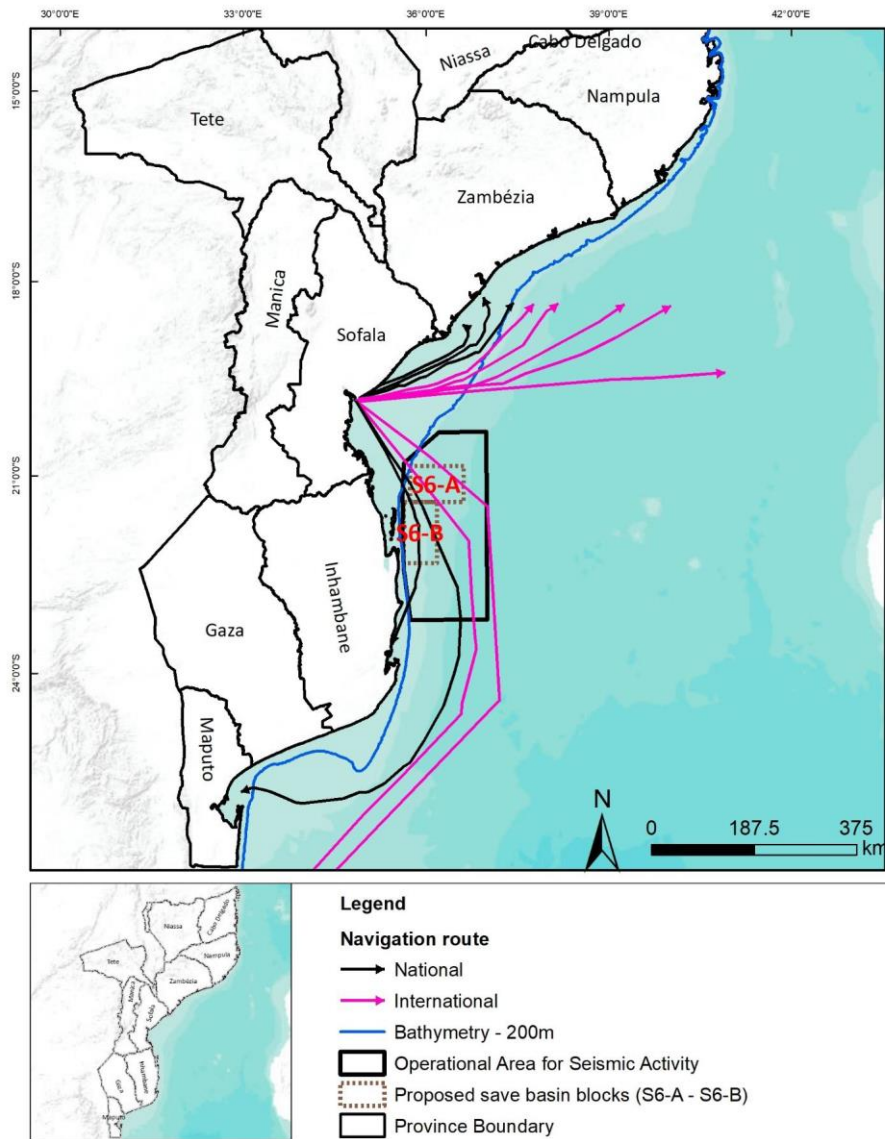
⁷⁵ McCauley, R.D., Day, R.D., Swadling, K.M., Fitzgibbon, Q.P., Watson, R.A., and Semmens, J.A., Widely used marine seismic survey air gun operations negatively impact zooplankton, *Nature Ecology & Evolution* 1: art. 0195 (2017).

⁷⁶ Nature Ecology and Evolution, Volume 1, Article 0195, McCauley, Robert, D., et. al., Widely used marine seismic survey air gun operations negatively impact zooplankton, June 22, 2017. https://www.nature.com/articles/s41559-017-0195-epdf?referrer_access_token=1-Fgzpybx5XwFZSeG05TJdRgN0jAjWel9jnR3ZoTv0PhkxaPiqiQpTdLVOByexK8BTL2kkjm-f-ljrplooVUdIPzaCeUFICGms9jcy-qGr7EQlxZXPAN9SI5CIUiUlsH5K5bRYhHhgazc5t-QrU93PqGFcUvLfGOkmcCQAN4PQjoYXU8KOCIXJcxon-3dJD4cJpFaK33k-G5HbconQBauZ3gZPYk3Q0O7cTVKtVjapmRgN6xB4ytGOu3cl-z-xq0Mj91&tracking_referrer=www.the-scientist.com, accessed, October 28, 2019.

⁷⁷ Page 36.

national marine traffic. According to the EPDA Report, “[t]he marine area between Inhambane and Sofala comprises an important maritime traffic area. Maritime traffic in deeper waters away from the coast tends to link northern ports such as Nacala and Maputo, as well as international ports. Fishing boats or commercial ships sail closer to the coast between the ports of Quelimane, Beira, Inhambane and Maputo. The approximate transport routes for ships are illustrated in **Figure 21**. The Maritime Authority (Instituto Nacional da Marinha - INAMAR) indicated that an average of 1,000 cargo and fishing boats cross a distance of 20 to 35 miles from the coast per year, mainly in transit through the Mozambique Channel. The Port of Beira mainly handles the import and export of goods to and from Zimbabwe, Malawi, Zambia, South Africa, and other countries in the region (Portos e Navios, 200).”⁷⁸

⁷⁸ Pages 53 and 54.



85. The busy shipping route should be highlighted as a fatal flaw in the EPDA Report. Instead, it is identified in the Terms of Reference as requiring a specialist study in the EIA phase of the Project.⁷⁹

Waste Disposal during Seismic Surveying

86. The EPDA report does not discuss appropriate handling, disposal, and treatment methods for wastes generated during seismic surveying, only that “SEARCHER recognizes the need

⁷⁹ Annex 1 – no page number

to minimize waste generation in the course of the proposed Project and to manage such waste in accordance with Mozambican law, industry and international best practices (MARPOL 73/78), and also in compliance with the standards and SEARCHER principles...” and “[i]f some of the waste is to be transported to the mainland for final disposal, a suitable site and/or company specializing in waste management will be identified. If management of waste and hazardous materials is required, a facility to dispose of these wastes will be identified in the early planning stages of operations.”⁸⁰

87. Plastics, such as plastic bags or bottles, that are improperly disposed of into the marine environment can accumulate in coral reefs, block sunlight essential to photosynthesis and can damage corals. Degraded plastics can be consumed by fish, turtles, and other marine mammals. Consumption of plastic trash by marine animals can lead to blocking of digestive tracts and introduction of toxic chemicals into their bodies.⁸¹
88. Raw sewage contains pathogens and nutrients (nitrogen and phosphorus) that are detrimental to the survival of coral reefs.⁸² Coral reefs are adapted to low-nutrient environments and nutrients have the potential to produce harmful algal blooms that block sunlight required for photosynthesis and consume dissolved oxygen that corals rely upon for respiration.^{83,84} Pathogens in raw sewage can cause disease in corals.⁸⁵
89. The local population can also be adversely impacted through potential exposure to pathogens in raw sewage and food-borne illnesses or reductions in local tourist activity and subsequent economic activity due to environmental degradation through improper waste handling and disposal.⁸⁶
90. The EIS Report must discuss the types of domestic wastes generated on the seismic survey vessels and associated vessels and protocols for their proper management, disposal, and treatment (if required). The EIS Report must include protocols for cleaning up and mitigating

⁸⁰ EPDA Report, page 22.

⁸¹ United State Department of Environmental Protection, Threats to Coral Reefs, May 4, 2018, <https://www.epa.gov/coral-reefs/threats-coral-reefs>. Accessed, October 30, 2019.

⁸² United State Department of Environmental Protection, Threats to Coral Reefs, May 4, 2018, <https://www.epa.gov/coral-reefs/threats-coral-reefs>. Accessed, October 30, 2019.

⁸³ United State Department of Environmental Protection, Threats to Coral Reefs, May 4, 2018, <https://www.epa.gov/coral-reefs/threats-coral-reefs>. Accessed, October 30, 2019.

⁸⁴ Phys.org, Researchers show that corals adapt to photosynthetic rates to prevailing environmental conditions, February 5, 2019, <https://phys.org/news/2019-02-corals-photosynthetic-prevailing-environmental-conditions.html>. Accessed October 31, 2019.

⁸⁵ United State Department of Environmental Protection, Threats to Coral Reefs, May 4, 2018, <https://www.epa.gov/coral-reefs/threats-coral-reefs>. Accessed, October 30, 2019.

⁸⁶ EPDA Report, Pages 17 - 18.

the impacts to the marine environment in the event of accidental or intentional releases of domestic wastes generated during seismic surveying activities.

Offshore Drilling

91. Based on the results of seismic surveying, exploration well drilling and testing may commence. If the seismic survey activities prove to be economically viable to exploit hydrocarbon resources, the company(ies) that win(s) the 6th licensing round for the Blocks in question in the Save Basin will be able to proceed immediately with drilling of exploration wells and eventually for the production phase which will include the drilling and installation of production wells, as well as the extraction, storage and distribution of hydrocarbons.⁸⁷
92. There is no information in the EPDA Report regarding Drilling Fluids (Mud) and Drill Cuttings Releases nor the expected chemical and mineral composition of the drill cuttings. It is simply stated that these activities will be subject to a separate EIA process. This is not appropriate and these activities must be assessed during this EIA process.
93. During drilling in the shallow waters of the project area, the potential for drilling fluids releases exists that could result in numerous adverse impacts. In the event of either a release of drilling fluids underwater or a spill at the water surface, all of the chemicals listed, included the listed unknown chemical constituents, and drill cuttings of an unknown chemical and mineral composition removed from the well hole would be released into the marine environment with a multitude of potential adverse environmental impacts. Due to the unknown nature of these chemicals and drill cuttings, the potential adverse impacts they pose to marine life, the marine environment, and the local population cannot be ascertained at this time. Direct discharge of drilling fluids and the resulting cuttings would result in significant impacts. The shallow nature of the waters where drilling would occur can exasperate the impacts of drilling fluid or drill cutting releases to the environment.
94. Coral reefs exist in areas of low sediment deposits and provide habitat for 249 species of fish and are a major tourist attraction. In these districts, the Bazaruto Archipelago National Park and the Zinave National Park are two natural areas classified by the Government of Mozambique. Taking these resources into account, tourism (cultural, landscape/nature and marine) and tourist accommodation also represent economic opportunities for the districts. Furthermore, the Strategic Development Plan for Tourism identifies the

⁸⁷ EPDA report, page 13.

Vilankulo/Inhassoro/Bazaruto area as one of the three Priority Areas at national level for Tourism Investment. The Bazaruto Archipelago National Park (PNAB) offers world-class tourism due to the quality of the tourism that is practiced.⁸⁸

95. Sediment from a drilling fluid release that deposits on coral reefs can smother corals and interfere with their ability to feed, grow, and reproduce.⁸⁹ Coral reefs require conditions that include high light exposure and low turbidity, conditions that a sediment laden marine environment does not provide.⁹⁰ The chemicals in drill fluids could potentially be toxic to coral reefs. Damage to the coral reefs in and adjacent to the project area could also have detrimental impacts on fish populations through habitat loss and the local community through reductions in its ability to fish and economic activity related to tourism.
96. Seagrass beds are located in shallow areas with low rates of sediment deposition. They provide essential food sources to the endangered dugong and to green turtles and support numerous species including crustaceans, echinoderms (e.g. starfish, sea urchins), and mollusks. Seagrass beds act as a refuge for fish and provide important breeding, nursing, and nesting areas.⁹¹ Sedimentation, loss of adjacent supporting habitat, such as coral reefs, and chemical exposure resulting from a drilling fluids release that adversely impact seagrass beds would have a corresponding impact on all of the species that rely upon the seagrass bed as an essential habitat for their survival.⁹²
97. This region is a major feeding ground for globally threatened manta rays, including the endangered giant oceanic manta ray (*Mobula birostris*) and the largest documented population of reef manta rays (*Mobula alfredi*) in Africa (Marshall et al 2011, Venables 2020). This proposed area is also a globally significant critical habitat for whale sharks, with documented feeding areas inshore in close proximity to the proposed project area and offshore. Preliminary data from telemetry studies in the region show that both species of manta rays and whale sharks regularly feed offshore (Rohner et al. 2018, Venables 2020), including within the project area. As filter feeders, that commonly surface feed, these

⁸⁸ EPDA Report, page 43.

⁸⁹ United State Department of Environmental Protection, Threats to Coral Reefs, May 4, 2018, <https://www.epa.gov/coral-reefs/threats-coral-reefs>. Accessed, October 30, 2019.

⁹⁰ National Oceanic and Atmospheric Administration, Oil Spills in Coral Reefs Planning and Response Considerations, July 2010.

⁹¹ EPDA Report, page 34.

⁹² Gullstrom, Martin, et. al., Seagrass Ecosystems in the Western Indian Ocean, Journal of the Human Environment, December 2002.

threatened species could be gravely impacted.

98. The EIS Report needs to include the full list of chemical constituents in drilling fluids and the anticipated chemical and mineral composition of drill cuttings. The EIS Report needs to detail the potential risks they pose to marine life and the marine environment. A failure to include such critical information in the EIS Report would constitute data gaps that would result in an entirely unknown threat to marine life and the marine environment in the project area.
99. The EIS Report needs to detail safeguards for preventing drilling fluid spills from the well hole and protocols for safe handling of drilling fluids and drill cuttings to prevent spills.
100. The EIS Report needs to detail the protocols that will be following in the event of a drilling fluid release at the well hole or spill on the surface to minimize the risk of adverse impacts to marine life, the marine environment and the local community.
101. EIS Report needs to provide a detailed investigation of all land disposal options, including:
 - 101.1. Not limiting the onshore disposal location to areas in the immediate project vicinity.
 - 101.2. Clearly defining the hazard class of drilling fluids and cuttings, which can provide additional details on the potential adverse impacts their release may cause to the marine environment and local population.
 - 101.3. Considering construction of an onshore facility to safely dispose of drilling fluids and cuttings near Beira harbor or other suitable locations.

Petroleum Spills

102. The EPDA Report does not discuss the potential for petroleum spills during well drilling and testing and any safeguards that will be utilized to prevent petroleum spills. The EPDA Report does not discuss protocols and contingencies for responding to a petroleum spill and minimizing its impact. Considering the drilling location in the shallow water, petroleum spills have the potential for severe adverse impacts to marine life, the marine environment, and the local population.
103. An oil spill modelling report must be included in the EPDA and part of the specialist studies for the EIS Report.
104. Adverse impacts on marine animals and the marine environment related to the project area

include, but are not limited to:⁹³

- 104.1. Reduced growth, enlarged livers, changes in heart and respiration rates, fin erosion and reproduction impairment in adult fish;⁹⁴
 - 104.2. Reductions in fish egg and larvae survivability;⁹⁵
 - 104.3. Destruction of the water repellency of bird feathers, thus exposing birds to environmental elements they are unaccustomed to;⁹⁶
 - 104.4. Ingestion of oil by birds or marine mammals, which can result in death;⁹⁷
 - 104.5. Impeded coral reproduction, growth, behavior, development and, potentially, death;⁹⁸
 - 104.6. Degradation and even complete death of mangroves;⁹⁹
 - 104.7. Chronic poor health, failed pregnancies, and increased mortality in dolphin populations;¹⁰⁰ and
 - 104.8. The chemicals used during oil spill cleanups in the ocean pose additional adverse impacts to marine animals and the marine environment.¹⁰¹
105. The EIS Report needs to discuss the potential for petroleum spills from the Project and the associated adverse environmental impacts. The EIS Report needs to detail safeguards included in the Project to safeguard against petroleum spills during drilling operations.

⁹³ National Oceanic and Atmospheric Administration, How does oil impact marine life, June 25, 2018, <https://oceanservice.noaa.gov/facts/oilimpacts.html>. Accessed October 30, 2019.

⁹⁴ National Oceanic and Atmospheric Administration, How does oil impact marine life, June 25, 2018, <https://oceanservice.noaa.gov/facts/oilimpacts.html>. Accessed October 30, 2019.

⁹⁵ National Oceanic and Atmospheric Administration, How does oil impact marine life, June 25, 2018, <https://oceanservice.noaa.gov/facts/oilimpacts.html>. Accessed October 30, 2019.

⁹⁶ National Oceanic and Atmospheric Administration, How does oil impact marine life, June 25, 2018, <https://oceanservice.noaa.gov/facts/oilimpacts.html>. Accessed October 30, 2019.

⁹⁷ National Oceanic and Atmospheric Administration, How does oil impact marine life, June 25, 2018, <https://oceanservice.noaa.gov/facts/oilimpacts.html>. Accessed October 30, 2019.

⁹⁸ National Oceanic and Atmospheric Administration, Oil Spills in Coral Reefs Planning and Response Considerations, July 2010.

⁹⁹ National Oceanic and Atmospheric Administration, Oil Spills in Mangroves Planning and Response Considerations, September 2014.

¹⁰⁰ National Oceanic and Atmospheric Administration, Office of Response and Restoration, Summarizing Five Years of NOAA Research on the Impacts of the Deepwater Horizon Oil Spill on Dolphins, October 30, 2019, <https://response.restoration.noaa.gov/about/media/summarizing-five-years-noaa-research-impacts-deepwater-horizon-oil-spill-dolphins.html>. Accessed October 30, 2019.

¹⁰¹ National Oceanic and Atmospheric Administration, Office of Response and Restoration, How Oil Harms Animals and Plants in Marine Environments, October 30, 2019, <https://response.restoration.noaa.gov/oil-and-chemical-spills/oil-spills/how-oil-harms-animals-and-plants-marine-environments.html>. Accessed October 30, 2019.

Protocols and contingencies for response to a petroleum spill must be included in the Project.

Tourism

106. Tourism in the districts adjacent to the project area is a vital industry and an important aspect of the local economy. The Bazaruto Archipelago National Park (BANP) and Zinave National Park are located adjacent to and/or in the Project area, and these natural areas are drivers of the local tourism industry. The Strategic Development Plan for Tourism identifies the Vilankulo/Inhassoro/Bazaruto area as one of the three Priority Areas at national level for Tourism Investment. The BANP is to preserve endangered species of marine fauna and flora, among which the dugong, sea turtles, among other species that roam around the islands that make up the archipelago stand out.¹⁰²
107. Adverse impacts to the natural beauty of the environment in the coastal regions of the districts adjacent to the project area has the potential to inhibit tourist activity during the Proposed Project and after its completion. The BANP and coral reefs are major tourist attractions. Any impacts from the Project on the aesthetic beauty of the BANP, coral reefs, mangroves, and other natural attractions that drive the tourism industry in the districts adjacent to the project area have the potential to reduce tourist demand in the near-term and long-term. The local population that relies on the tourist industry for employment would be adversely impacted as a result.¹⁰³ Reductions in the long-term growth potential of the tourism industry in the districts adjacent to the project area would adversely impact local economic development and economic opportunities for the local population for years after completion of the Project.
108. Whale watching is a tourist attraction in the project area between the months of July and December.^{104,105} Whales are visible at the surface for only brief periods of time and the presence of seismic survey vessels and the vessels that accompany them on the ocean surface can influence whale behavior.¹⁰⁶ The sounds waves generated during seismic surveying and exploratory well drilling can impact whale movement patterns and may cause

¹⁰² EPDA Report, page 43.

¹⁰³ Press Release, October 28, 2019.

¹⁰⁴ Sunset Dhow Safaria, <http://www.sunsetdhowsafaria.com/whale-watching-bazaruto-archipelago-mozambique/>. Accessed October 31, 2019.

¹⁰⁵ Anantara Hotels Resorts Spas, The Journey of the Humpback Whales in Mozambique, July 9, 2019, <https://www.anantara.com/en/press-releases/0709-the-journey-of-the-humpback-whales-in-mozambique>. Accessed October 31, 2019.

¹⁰⁶ Gordon, Jonathan, C.D., et. al., A Review of the Effects of Seismic Survey on Marine Mammals, Marine Technology Society Journal.

whales to vacate and avoid the project area and the adjacent ocean areas.^{107,108} Changes in whale behavior and movement patterns would reduce the ability of whale watchers to observe whales within the project area and adjacent ocean areas, thus potentially adversely impacting tourist activity related to whale watching and the local economy. In order to minimize adverse impacts on the tourism industry, seismic surveying which generates the strongest sound waves in the ocean associated with the Project, should be prohibited between July and December to minimize impacts on whale watching activity.

109. Tourist activities rely heavily on the pristine nature of the project area, such as snorkeling and underwater diving in the coral reefs.¹⁰⁹ In addition to whale watching, the other marine species common to the project area, including dolphins, sharks, manta rays, sea turtles and the dugong draw tourists to the area.^{110,111} Any interruption the natural movement patterns of these species or the viability and natural beauty of the coral reefs, seagrass beds or mangroves in the project area can adversely impact tourism and the local economy.
110. Scuba diving is one of the main tourist attractions to the BANP. Frequent research and monitoring on SCUBA is conducted by field teams in the region as well by several NGOs and management authorities. The Project has serious implications for the dive industry and for research and management in the region with research showing significant adverse effects may be experienced by divers at distances of up to 27km from the seismic source “which the diver experiences as vibration or a noise analogous to a piling hammer”.¹¹² The EPDA Report fails to address this at all.

Local Community

111. The local community in the vicinity of the Project area is characterized by high levels of

¹⁰⁷ Gordon, Jonathan, C.D., et. al., A Review of the Effects of Seismic Survey on Marine Mammals, Marine Technology Society Journal.

¹⁰⁸ Weilgart, L. (2013). “A review of the impacts of seismic airgun surveys on marine life.” Submitted to the CBD Expert Workshop on Underwater Noise and its Impacts on Marine and Coastal Biodiversity, 25-27 February 2014, London, UK. Available at: <http://www.cbd.int/doc/?meeting=MCBEM-2014-01>

¹⁰⁹ Siyabona Africa, Mozambique Travel Guide to Bazaruto Archipelago, 2017, http://www.mozambique.co.za/Mozambique_Regional_Info-travel/bazaruto-archipelago-travel-guide.html. Accessed November 4, 2019.

¹¹⁰ Siyabona Africa, Mozambique Travel Guide to Bazaruto Archipelago, 2017, http://www.mozambique.co.za/Mozambique_Regional_Info-travel/bazaruto-archipelago-travel-guide.html. Accessed November 4, 2019.

¹¹¹ Venables, Stephanie, et. al., A Giant Opportunity: The Economic Impact of Manta Rays on the Mozambican Tourism Industry, An Incentive for Increased Management and Protection, Tourism in Marine Environments, Volume 12, No. 1, pages 51-68, 2016.

¹¹² Safe Diving Distance from Seismic Surveying Operations: The Diving Medical Advisory Committee DMAC 12 Rev. 2.1 – June 2020. Available here: <https://www.dmac-diving.org/guidance/DMAC12.pdf>

poverty and illiteracy. Access to transportation, electricity, and adequate road infrastructure is limited. The disadvantages faced by the local population can make their participation in the public comment and participation process nearly impossible in many cases, and as important stakeholders who will be impacted immensely by the proposed project, the local population has limited ability to provide input during the Environmental Impact Assessment process.¹¹³

112. Much of the local population relies upon subsistence farming and fishing for sustenance.¹¹⁴ The Project has the potential to adversely impact the local economy and the local population's ability to provide basic sustenance by adversely impacting the availability of fish and access to fishing grounds within and adjacent to the project area.

113. The country has, according to the National Census of Artisanal Fishing in Maritime and Inland Waters (2007), a universe of 350,000 people linked to the activity of artisanal fishing, such as fishermen (with or without boats), collectors, processors, traders, owners of fishing units, ship mechanics and netters, distributed in 1,227 fishing centers spread across fishing communities located along the coastal zone and margins of inland waters such as lakes, ponds and rivers (IDPPE, 2008). For many years, industrial offshore shrimp fishing has been a major component of national exports and income (Volstad et al. 2004). The Sofala bank, located between coordinates 16° 05' to 21° 00' (with its southern limit included in the study area), is responsible for a significant part of the national catches – around 40% of surface shrimp. As in other coastal areas, artisanal fishing plays an important role in Inhambane Province, being part of the economy, society and family diet (Ministério das Pescas, 2005). There are more than 10,613 artisanal fishermen registered and distributed in more than 174 fishing centres in the province (MIMAIP, 2012). Compared with the other fishing sub-sectors, artisanal fishing is responsible for the largest number of direct jobs. Additionally, the generation of employment in artisanal fishing is amplified about 4 times by the processing, commercialization and transport of fishery products¹¹⁵

114. The Districts of Inhassoro, Vilankulo, Massinga and Govuro will all potentially be affected during the four months of seismic surveys when vessels are restricted from operating near the Project activity.

115. The Project also has the potential to reduce the availability of fish in the ocean waters within

¹¹³ EPDA Report, page 36 and 42.

¹¹⁴ EPDA Report, page 44.

¹¹⁵ EPDA Report, page 44- 45.

and adjacent to the Project area in numerous ways in the short and long term including:

- 115.1. Reduction in the zooplankton populations, which form a vital link in the marine life food chain and contain the larval stages of commercial fish populations;
 - 115.2. Damage to essential ecosystems, such as coral reef and seagrass beds, which provide shelter and breeding ground for fish populations, caused by drilling fluids and drill cuttings releases, spills, or ocean disposal, domestic waste releases, or petroleum spills;
 - 115.3. Movement of fish populations away from seismic survey vessels and associated boats in the project area;
 - 115.4. Behavioral changes and adverse health impacts in fish populations caused by sound waves produced during seismic surveying;
 - 115.5. Adverse health impacts resulting from potential oil spills on adult fish populations; and
 - 115.6. Reductions in fish egg and larvae viability resulting from potential oil spills.
116. During seismic surveying, an exclusion zone will be created around the seismic surveying vessel that will inhibit all access by all commercial or private vessels. This is only going to be dealt with in the EIS by the Fisheries expert.¹¹⁶
117. Culturally, the local population has strong connections to the sea and traditional ceremonies are commonly held in the coastal areas. The Project has the potential to disrupt the important cultural connection the local population has with the Project area. This is not addressed in the EPDA at all and is a fatal flaw.

Summary of comments on impacts and fatal flaws

118. The activities are taking place in close proximity to total protection or conservation areas,¹¹⁷ “Species Critically in and/or In Danger” (e.g. dugongs, dolphins, turtles, sharks and rays) are present, a range of endemic or restricted species (e.g. sharks and rays, octopus, corals and molluscs) are present, “Migratory/Congregatory Species”, (e.g. certain shark and ray species

¹¹⁶ EPDA Report, Annex 1

¹¹⁷ Note that the sounds of the seismic blasting is not limited to the boundaries of the Project area. The sound will travel into the total protection and conservation areas.

cetaceans, prawns species, turtles) are present and the area is crucial area for the provision of services and key ecosystems in the national, provincial or district scale (e.g. seagrass beds, mangroves, coral reefs, rocky reefs)

119. These all constitute fatal flaws and the Project cannot proceed on this basis.
120. The Project has the potential for numerous adverse impacts on marine life, the marine environment, the local community, and local economic activity and development. Seismic surveying activities and the sound waves it produces can result in adverse health effects, even death, and behavioral changes in marine wildlife, including a number of endangered and vulnerable species.
121. As with any project that involves drilling oil wells in the ocean, the ever-present risk of petroleum spills to the marine environment and their long-lasting, widespread, and devastating impacts exist for the Project. The local community will be impacted through reductions in their ability to fish, a life-sustaining activity for much of the population. Economic activity and economic growth may be inhibited, due to reductions in tourist activity, the growth of the tourism industry, and commercial and individual fishing activity. This has not been addressed.
122. Culturally, the local population has strong connections to the sea and traditional ceremonies are commonly held in the coastal areas. The Project has the potential to disrupt the important cultural connection the local population has with the Project area. This is not addressed in the EPDA at all and is a fatal flaw.
123. The above constitutes environmental and socioeconomic risks that are fatal flaws to the Project.

VI. PUBLIC PARTICIPATION WHOLLY INADEQUATE

124. Only one round of public consultation meetings was held to present the draft EPDA Report in the districts of Inhassoro, Vilanculos and Massinga and in the City of Inhambane.
125. These meetings were exceptionally badly advertised in the community and were only well attended in areas where certain organisations outside the EAP spread the word about the meetings. In areas such as Massinga, where the EAP was relied upon to adequately inform

the I&APs of the meeting arrangements, very few people attended, as no one knew about the process. The draft EIA report provides no evidence of the I&APs database, the newspapers adverts or any other information circulated to stakeholders about the public participation process.

126. People who attended the meeting in Vilanculos confirmed that the detail of the project was limited, with little to no information on the potential impact of the project on marine life. In fact, the contrary occurred – the EAP assured those present that there would be no impact on marine life. This is an impossible assurance to make and it is submitted that the EAP has misled the public in this regard.
127. Public participation is imperative and mandatory in the environmental impact assessment process, and it is the responsibility of the bidder (Searcher) to provide all information and collect the various sensitivities about the activity to be carried out from the stakeholders and potentially interested and affected parties pursuant article 15 (3 and 6) of the Decree 54/2015, 31 December (Regulamanto do AIA).
128. The public participation process conducted to date is flawed as the meetings were only advertised in one newspaper and not all parties were aware of the public meetings.
129. Article 15 (7) of the EIA Regulation approved by Decree 54/2023, 31 December, states that the invitations to the public consultation meetings must be adversities **at least** 15 days before the meeting and using whatever means that are appropriate.
130. The General Guideline for the EIA Public Participation Process approved by the Ministerial Diploma 130/2006, from 19 July, sets principles on the availability and accessibility of information which requires the applicant to provide adequate information and adequate dissemination of information among the PI&A through media outlets with the widest coverage and circulation in the area where the Project is located and consideration and respect of costumes and traditions of each region (2/c), 4.2.2).
131. Yet under 4.2.2 of the General Guideline for the EIA Public Participation Process, three requirements are imposed on the Project applicants regarding disseminating information about the public consultation meeting and EIA process, including:
 - Depositing documents in public institutions;
 - Clear, simple and accessible information and priority given to local language.

132. Although the document was deposited in a public institution to be accessed by local communities and the general public, all are written in Portuguese and in very technical language. According to UNESCO 2020 Annual Report, only 17% of the Mozambican population speak, read and write Portuguese¹¹⁸ in a country with illiteracy rate of 40%¹¹⁹ and even if the information is available to the public, information is not accessible and understandable by the general public - local communities.
133. We request the following public participation steps be taken in the EIA phase, particularly in view of the voluminous and highly technical reports that are anticipated:
- 133.1. Upfront communication to all I&APs of the public participation proposed for the EIA as this information is missing from the EPDA Report.
- 133.2. A 60-day public comment period for the draft EIS Report, inclusive of specialist studies.
- 133.3. A two-day workshop to be held with specialists at easily accessible venues and suitable days and time, with translation services available, to allow I&APs to engage verbally with the specialists over their findings.
- 133.4. Technical information and specialist findings are presented to local residents in a way that can be easily understood.

VII. SPECIALIST STUDIES, CLIMATE IMPACT & THE PRECAUTIONARY APPROACH

134. The EPDA Report states that “Investigations on planktonic communities present in the Mozambique Channel are scarce.”¹²⁰ This is not acceptable, as this phase of the EIA process is for establishing the baseline data with specialist input on all areas that may be impacted by the Project.
135. Annex 1 of the EPDA Report lists the proposed specialist studies to be undertaken during the EIA phase, which we submit, is inadequate. It only covers Marine Ecology, Socio-economic, Fisheries and Marine Traffic and makes no mention of the need for a specialist

¹¹⁸ <https://news.un.org/pt/story/2020/05/1713762>

¹¹⁹ INE and UNFPA (2023) Educacao em Mocambique available at https://mozambique.unfpa.org/sites/default/files/pub-pdf/educacao_20-07.pdf

¹²⁰ EPDA Report, page 36.

climate change impact assessment. EPDA must Report must also consider a full spectrum of climate impacts associated with an activity, this includes (not an exclusive list):

- The greenhouse gas (GHG) emissions of proposed activities as well as the emissions of associated, upstream and downstream activities i.e. the full lifecycle, ancillary and cumulative GHG emissions of proposed activities as well as the costs of these emissions;
- The ways in which the proposed project activities might be impacted by climate change over their anticipated lifespan(s); and
- The ways and extent to which the project activities could exacerbate climate impacts in the area where the project is proposed. In other words the ways in which the project might impact upon climate resilience and adaptation efforts.

136. Anthropogenic climate change is real and poses a serious risk to the well-being of humans and our society.

137. There is no doubt that Mozambique is already feeling the effects of the climate crisis. The EPDA Report confirms that According to the National Institute of Meteorology (INAM), the operational area for seismic survey is prone to cyclones up to the coast. Of the cyclones that have made landfall in Inhambane Province since 2000, two directly hit the District of Massinga and three the District of Vilankulo (Figure 10). These cyclones caused numerous damages and fatalities in the districts of Massinga and Vilankulo and also in the districts close to the study area.

138. In March 2003, Cyclone Japhet hit the north of Vilankulo District, with Category 2 winds of around 167 km/h. In February 2007, Cyclone Favio also hit the north of Vilankulo District with Category 3 and winds of up to 185 km/h. This was the most intense cyclone to hit Inhambane Province. In February 2017, the District of Massinga was hit by Cyclone Dineo, Category 1, as it reached the Mozambican coast. This cyclone hit the south of the district with winds of up to 139 km/h and its strong effects were also felt in Massinga, in addition to some other coastal districts of Inhambane Province. In January 2019, tropical depression Desmond reached the north of the District of Massinga with winds of 37 km/h, having advanced towards the District of Vilankulo with winds of around 37 km/h.¹²¹

139. Intense Tropical Cyclone Kenneth was the strongest tropical cyclone to make landfall

¹²¹ EPDA Report, page 27.

in Mozambique since modern records began,¹²² hitting northern Mozambique with a windspeed of 220km/h (140mph) on 25 April 2019, flattening thousands of homes flooding low-lying areas. It may be the strongest storm to ever hit Africa's East Coast. This occurred just 5 weeks after Cyclone Idai killed over 1000 people in Mozambique, Zimbabwe and Malawi. The UN World Meteorological Organization projects the disaster could be among the worst weather-related disasters in the southern hemisphere with the destruction of more than 360,000 hectares (900,000 acres) of crops, damage to at least 17,000 houses, and affecting nearly 2 million people.¹²³The Post Disaster Needs Assessment, prepared by the Government of Mozambique in partnership with the World Bank, United Nations System and European Union estimates that Cyclone Idai caused about 1.4 billion US dollars in total damage, and 1.39 billion US dollars in losses, making a total cost of recovery and reconstruction is estimated at 2.9 billion US dollars for Inhambane, Solafa, Manica, Zambezia and Tete. Additional need in Cabo Delgado and Nampula which were affected by cyclone Kenneth, raise the total recovery needs to 3.2 billion USD, only in Mozambique¹²⁴

140. Mozambique has high levels of climate variability and extreme weather events such as droughts, floods, cyclones, among others. Floods and droughts mainly affect the southern and central regions and cyclones are more frequent in coastal and marine areas. Droughts are the most frequent disasters in Mozambique, occurring regularly every three to four years, and are an impediment to development and livelihoods, as a large part of the population lives in rural areas and depends on rainfed agriculture. There are also cyclical floods that pose a threat to the human population, agriculture and infrastructure, especially when they occur in conjunction with cyclonic storms.¹²⁵
141. Statistically, Inhambane Province is prone to the occurrence of cyclones, with the districts close to the operational area for seismic surveys classified as having a high risk of being hit by a cyclone (Figure 11). Recently, Cyclone Freddy made its first landfall in Inhambane on 24th February affecting 171,400 people, including 10 deaths and more than 5,100 displaced by heavy rains and floods. More than 30,000 houses were affected (INGD, March 2023).¹²⁶

¹²² Linfei Bai, Haibin Lü, Haojie Huang, Shahzad Muhammad Imran, Xiaoqi Ding, Yuanzhi Zhang, Effects of Anticyclonic Eddies on the Unique Tropical Storm Deliwe (2014) in the Mozambique Channel, *Journal of Marine Science and Engineering*, 10.3390/jmse11010129, 11, 1, (129), (2023) Found here: <https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2020GL088715>

¹²³ <https://www.nature.com/articles/d41586-019-00981-6>

124 Gabinete de Reconstrução Post Idai (2019) Mozambique Cyclone Idai, Post Disaster Needs Assessment, page 6.

¹²⁵ EPDA Report, page 28.

126 OCHA, Southern Africa: Tropical Cyclone Freddy, Flash Update 7, 2023

With regard to floods and droughts, the risk of occurrence of these events in these districts is classified as high (MICOA, 2007).¹²⁷

142. Recognising the risk of extreme weather events, governments of the world have agreed to limit warming to 1.5-2°C under the Paris Agreement. Mozambique is signatory to this Agreement. To have any chance of meeting the Paris 2°C target, carbon emissions around the world need to be decreasing rapidly. Opening up and using new fossil fuel reserves or resources increases carbon emissions, in conflict with what is required under the Paris Agreement. There is no room for any new fossil fuel development.
143. It is a reasonably foreseeable future activity that Searcher plans to engage in the extraction of fossil fuels. The entire purpose of this exploration is to seek out oil and gas with a view to drilling and producing it in one of the most pristine marine environments in the world. Mozambique should be joining global efforts to address the climate crisis, both for the good of the planet as a whole but also for the well-being of its people. As set out above, the people of Mozambique are already suffering from extreme weather events caused by the climate crisis. This is a huge concern and must be understood in the context where domestic and international law is increasingly recognising the rights of indigenous people to self-determination. Searcher proceeds without any recognition of these rights nor of the risks it is creating for the people of Mozambique.
144. Therefore, it is necessary for stakeholders and decision-makers to understand the climate impacts of the production phase prior to a licence for this phase. Failure to do so would allow Searcher to argue that, since it has already invested large sums of money for exploration, then it should be allowed to engage in production regardless of the costs of the climate impacts.
145. No consideration is given to this in the EPDA Report. There is specifically no consideration of whether the harms the survey will cause are justifiable in the context where production would intensify climate change. There is no climate impact assessment listed for investigation in the EIS Report. Climate change is a relevant consideration when granting an environmental licence, and a formal expert report on climate change impacts is the best evidentiary means to consider climate change impacts in their multifaceted dimensions.
146. The precautionary principle features widely in environmental legislation around the world,

¹²⁷ EPDA Report, page 28.

including Law No 20/1997, Article 4 and Law of the Sea, article 5 (h). Precaution entails that where there is a threat of serious or irreversible damage to a resource, the lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. It is based on the theory that it is better to err on the side of caution and prevent environmental harm which may become irreversible.

147. Aside from a climate impact assessment study, other specialist studies, or components that appear to be missing from the EDPA Report / TOR include:

147.1. Baseline assessments;

147.2. Marine mammals;

147.3. Endangered species including sharks, rays, dolphin and dugongs;

147.4. Maritime heritage;

147.5. Oil spill modelling;

147.6. Cutting modelling;

147.7. Oil spill contingency plan; and

147.8. Cumulative impacts.

148. There should also be independent reviews of the above and proof of financial provision for environmental clean-up, contingency and closure.

VIII. REQUEST FOR ADDITIONAL INFORMATION

149. In addition to our comments on the EPDA Report and request for additional technical Project information, we also request the following:

150. A copy of the screening/pre-assessment application;

151. A copy of the official outcome of such pre-assessment application;

152. A copy of the officially adopted minutes of any meetings held between Searcher's environmental team and officials of the National Director for Environment;

153. Monitoring and/or audit reports for Searcher's previous exploration activities in the region as this will assist in the identification and evaluation of the proposed activities.
154. The name and curriculum vitae of the consultant and the other experts we have requested be appointed to review the respective specialist studies.
155. Details of the public participation process to date including:-
 - 155.1. A list of all stakeholders identified;
 - 155.2. Proof of notification to such stakeholders of public meetings;
 - 155.3. List of places where EPDA Report was distributed;
 - 155.4. List of community meetings held;
 - 155.5. Copies of register of attendance at public meetings.
 - 155.6. Copy of the Comments & Response Report once prepared.
156. Details as to when the seismic surveys and drilling could safely occur without unnecessary risk or impact given that:
 - 156.1. Cyclone season is from December to March;
 - 156.2. Turtle breeding season is approximately November to March.
 - 156.3. April and May are Giant Manta season (also to be uplisted to endangered); and
 - 156.4. Whale season is from July to September/October; and
 - 156.5. Whale shark (an endangered species) season is during October and November.
157. Climate change projections for the coming years, particularly when looking at precipitation, winds and cyclones as proposed - and impact on the project itself and communities and local ecosystem's resilience to climate impacts;
158. An electronic copy of the final version of the EPDA Report once it has been submitted to the Provincial Environmental Services and DINAB, in which the changes to the EPDA Report dated August 2023 are highlighted (for example in a different colour text) for ease of reference.

IX. CONCLUSION

159. For the multiple reasons provided above, we submit that the Provincial Environmental Services and DINAB should reject the EPDA Report and only allow the EIA to proceed and EIS Report to be prepared once these procedural and content non-compliances have been addressed in a new EPDA Report that undergoes another round of public participation.
160. In the event that the Provincial Environmental Services and DINAB allows Searcher to proceed to the next stage, we reiterate our concerns with the EPDA Report and the vital aspects that need to be included in the EIS Report.
161. Lastly, we remind Impacto of its obligations, as an independent consultant, to be objective, even if this results in views and findings that are not favourable to the application, and to disclose all material information to the authorities and I&APs that reasonably has or may have the potential of influencing any decision to be taken by the Provincial Environmental Services and DINAB and the objectivity of any report.
162. Kindly acknowledge receipt hereof.

Yours faithfully,