IMPACTS TO MARINE ECOLOGY STUDY

INTRODUCTION

Purpose of the Study: To determine potential impacts on marine ecology generated by the exploration drilling activities including the disposal of drilling muds and cuttings to the seafloor.

This poster summarizes the impacts from planned activities that were assessed as **Minor, Moderate** or **Major** prior to mitigation. Refer to **Other Impacts Poster** for other impacts to marine ecology.

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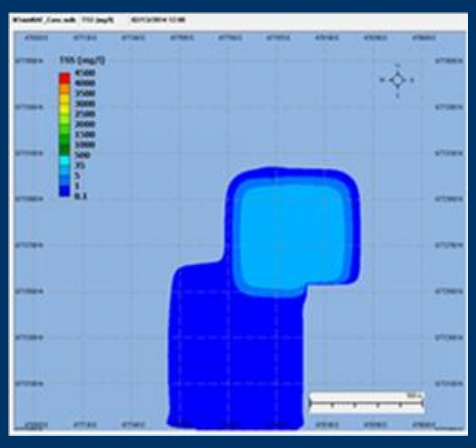
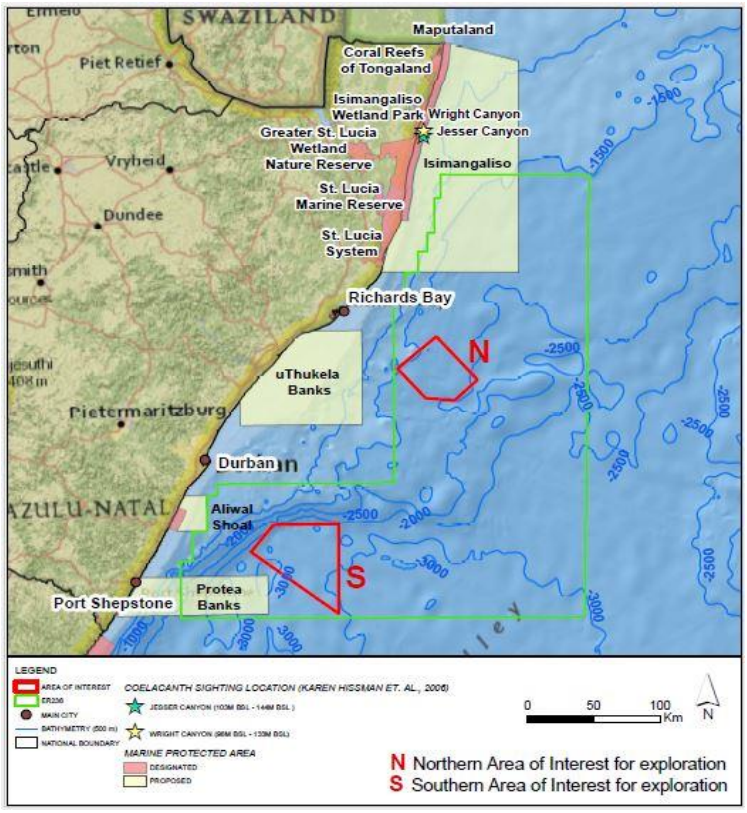
KEY FINDINGS

Impacts related to drilling cuttings and muds on normal and sensitive benthic communities from smothering and bioaccumulation of Non-Aqueous Drilling Fluid (NADF)

- The disposal of drill cuttings and muds to the seabed could cause smothering of sensitive sessile benthic fauna, if present, such as deepwater corals and physical alteration of the benthic habitat <200m from the well
- In order to avoid impacts to sensitive habitats Eni will conduct a pre-drilling ROV survey to determine if there are any sensitive habitats present on the seabed and position the well at least 500 m from the sensitivity.
- Areas of deposition of <5mm thickness will be mainly isolated to within a 100m radius of the wellhead
- Discharged cuttings will contain less than 5% of drilling fluid by weight. The adoption of dryer system will minimize the presence of residual NADF mud adhered to cuttings.
- The overall footprint deposition, > 1 mm, impacts a maximum area of 7km^2 around the well site.
- Mobile benthos will recolonise the impacted area relatively quickly



Source: ERM, 2018



Source: ERM, 2018

Impacts of helicopter noise associated with drilling on marine fauna and seabirds

- Noise generated by helicopters undertaking crew transfers between helipad and the drillship could affect seabirds in breeding colonies and roosts on the coast. Negative effects of disturbance to seabirds by aircraft include reduction of usable habitat, increased energy expenditure, reduced food intake and resting time and ultimately affect breeding success.
- Reactions to aircraft flyovers vary both within and between species, and range from no or an observable behavioral response

Impacts of underwater noise generated by drilling and vessels on marine fauna masking behaviour

- The sound level generated by drilling operations and vessels fall within the 120 to 190 dB re 1 µPa range, comparable with common noise range of shipping and commercial vessels
- The underwater noise generated by drilling operations falls within the hearing range of most fish and marine mammals
- Noise impacts could result in localised behavioral changes or masking of biologically relevant sounds in marine fauna. Marine fauna may either respond by retreating from the noise or could be attracted to the source.
- The species most vulnerable to noise disturbance in the project area are turtles, pelagic seabirds, large migratory pelagic fish and both migratory and resident cetaceans.

FINDINGS OF IMPACT ASSESSMENT FOR PLANNED ACTIVITIES AND KEY MITIGATION MEASURES

Impact Description	Pre-mitigation Significance	Key Mitigation	Post Mitigation Impact
Direct physical impact of disposal of muds and cuttings at the seabed on sensitive benthic fauna	**Moderate**	Ensure drill site is located more than 500 m from any identified vulnerable habitats with a pre-drill ROV survey.	**Minor**
Biochemical impacts related to cuttings discharge with NADF adhered mud residuals to marine fauna present in the water column and seabed	**Minor**	Eni's specifications, based on international good practice, for discharge of NADF retained on drill cuttings includes: • Discharge of cuttings at more than 15m below the sea surface • Only discharging cuttings overboard in water depth greater than 30m • Maximum residual non-aqueous phase drilling fluid 5% (C16-C18 internal olefins) or 9.4% (C12-C14 ester or C8 esters) on wet cuttings • Mercury (Hg) : max 1 mg/kg dry weight in stock barite. • Cadmium (Cd): max 3 mg/kg dry weight in stock barite. • Ship-to-shore if the above are exceeded.	**Negligible**
Disturbance of marine fauna by the masking of biologically relevant sounds by underwater noise associated with drilling operations	**Minor**	Vessels engine and drillship dynamic positioning system should undergo regular maintenance regime to reduce noise, which includes the cleaning of propeller and underwater hull.	**Minor**
Impacts of helicopter noise associated with drilling on marine fauna.	**Moderate**	Avoid extensive low-altitude coastal flights (<914 m and within 2 km of the shore) to minimize impact on birds and marine fauna at sea surface.	**Minor**