Woodside

SANGOMAR FIELD DEVELOPMENT – PHASE 1

PROTECTING THE MARINE ENVIRONMENT

MAY 2021

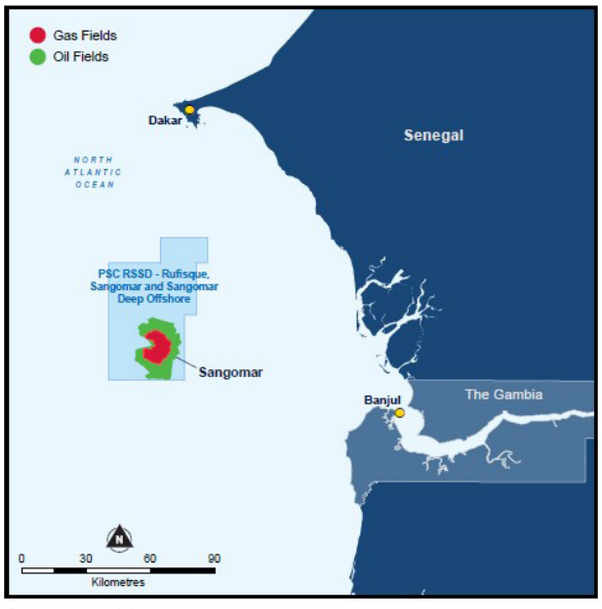
The Sangomar Field Development Phase-1 (the Sangomar Field Development) is expected to be Senegal's first offshore oil development and is anticipated to deliver significant benefits for the country.

The Sangomar Field Development will be located in deep waters approximately 90 km from the Senegalese coast. As part of the Sangomar Field Development – Phase 1, a number of activities will take place within the development area including:

+ Drilling of wells up to 3 year period using a mobile offshore drilling unit (MODU);
+ Installation of infrastructure such as pipelines and modules on the seafloor;
+ Production from the Sangomar Field Development – Phase 1 field by a floating production storage and offtake vessel moored to the seafloor.

Woodside commissioned a comprehensive Environmental and Social Impact Assessment to identify the baseline conditions present in the offshore and coastal marine environment, and to evaluate the Sangomar Field Development – Phase 1 activities interaction with the environment in order to identify potential environmental impacts. This assessment has also included consultations with local authorities and fishermen, in particular with several Conseil Local de Peche Artisinale (CLPA) throughout the Dakar, Thies and Fatick regions. As a result, a number of management and mitigation measures will be implemented during the proposed activities to minimise potential impacts to the marine environment.

The findings of the environmental impact assessment are summarized in this fact sheet and are described in further detail within the Environment and Social Impact Assessment Study (Chapter 5 and 9).



Sangomar Map

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OVERVIEW OF THE MARINE ENVIRONMENT

A comprehensive understanding has been compiled of the marine environment in the vicinity of the Sangomar Field Development – Phase 1, which draws upon surveys and studies carried out since exploration started, in addition to published studies and consultation with key stakeholders.

Woodside commissioned a site specific marine survey in 2017, including sampling of the seabed and seawater as well as observations of marine wildlife. Based on the collated scientific data and consultation, it has been possible to identify the key ecological sensitivities relevant to the Sangomar Field Development – Phase 1.

The following key ecological attributes have been identified through targeted and comprehensive baseline surveys, stakeholder consultation and literature reviews and have been used to inform the Environment and Social Impact Assessment.

Seabed Habitat

The seabed off Senegal gradually slopes along the continental shelf to a water depth of approximately 100-200 m, where the water depth increases more rapidly. The Sangomar Field Development – Phase 1 is situated off the continental slope in deep waters of approximately 700 to 1400 m.

A prominent canyon, up to 3.5 km wide and 160 m deep is located within the development area.

A survey of the seabed in the area, found the dominant habitat type to be 'deep sea mud'. The type and abundance of seabed fauna varied across the survey area, however no areas of critical habitat were identified.

Ocean Currents

The entire Senegalese offshore environment lies within the Canary Current Large Marine Ecosystem (CCLME), which is extremely productive due to the major seasonal upwelling of nutrient rich, cold oceanic waters. Periods of upwelling correspond well with higher primary productivity and plankton abundance.

Offshore Fish and Sharks

The region supports a wide variety of pelagic and demersal fish species which are targeted by the fishing sector. Oceanic pelagic species are highly migratory, large species include skipjack, bigeye and yellowfin tuna, while smaller pelagic species in the area are typically schooling fish such as sardinella and mackerel.

Demersal species of interest are hake and deep-water shrimp but do not include several coastal species (e.g. bream and white grouper) which are not common in deep water.

There are no habitats in the Sangomar Field Development – Phase 1 area which are suspected to be regionally important fish spawning grounds. There is also a high diversity of oceanic sharks in the offshore area.

Tuna is an example of pelagic fish found offshore Senegal

Marine Turtles

Turtle nesting beaches are found all along the coasts of Senegal and The Gambia. Hawksbill, Leatherback and Loggerhead turtles may occur in the deep waters offshore Senegal.

Marine Mammals

Twenty five species of whale and dolphin are thought to occur in Senegalese waters. Deepwater cetaceans are likely to be resident species along the shelf slopes and canyons offshore Senegal.

Manatees and monk seals may be present within the Senegalese coastal waters but are not likely to be encountered in the Sangomar Field Development – Phase 1 Area.

Birds

The inland and coastal wetlands attract a large number of migrating birds to Senegal, where over 612 species are believed to be present. A smaller portion of pelagic seabirds venture into deeper waters in search of food and may occur within the development area. Large migrations are known to occur primarily over the coastal shelf area of West Africa.

Coastal Environment

Senegal's coastal marine environment includes habitat of high conservation value, such as mangroves, seagrass beds and estuarine environments, which provide important ecosystem services such as raw materials and food, coastal protection, erosion control, carbon sequestration, tourism and recreation.
A key feature along the Senegal coastline are the various mangrove forests, with approximately 400 hectares found in the delta of the Senegal River, 90 kilometers west of the Sangomar Field Development – Phase 1. These mangrove forests provide critical habitat, spawning areas and a source of food for various fisheries and protected species such as marine turtles and manatees.
The Sangomar Field Development – Phase 1 area does not lie within any protected marine area. Sangomar Marine Protected Area is located approximately 80 km away.

A pod of the common short-nosed dolphin, similar to the species found offshore Senegal

SUMMARY OF SANGOMAR FIELD DEVELOPMENT – PHASE 1 ENVIRONMENTAL IMPACTS

The detailed Environmental Impact Assessment process has shown that, where potential impacts could occur, they will mostly be minor given the mitigation measures adopted. Impacts to coastal environments are not expected to result from planned activities.

The environmental impact assessment findings are summarized below, including the key mitigation and management measures which will be used to eliminate or reduce environmental impacts.

ENVIRONMENT RECEPTORS	IMPACT SUMMARY
Seabed habitats and communities	The installation and operation of subsea infrastructure on the seafloor will modify the existing seabed habitat and create artificial habitat. The drilling of wells in the area will also result in the deposition of rock cuttings and cement on the seafloor surrounding the well. The overall impact is expected to be minor because areas of known high value habitat will not be impacted and the total area disturbed is small when compared with the total area of similar habitat available in the region.
Greenhouse Gas Footprint	Emissions generated by the Sangomar Field Development will contribute to global greenhouse gases. Emissions will primarily be generated through fuel combustion for power generation, flaring during start up and commissioning, and vessel use. It is expected there will be no measurable effects on local air quality.
Marine Water Quality	Offshore marine water quality in the area nearest to the Sangomar Field Development will be subject to discharges associated with drilling, commissioning, production and decommissioning discharges. All discharges to sea are subject to stringent management requirements to ensure they meet certain quality standards and impacts are limited to a highly localised mixing zone in the immediate vicinity of the Sangomar Field Development – Phase 1 facilities.
Marine mammal, marine reptile and fish Biodiversity	Modification of a small area of seabed habitat will occur as a result of the Sangomar Field Development, but will not cause significant effects to biodiversity within the region, as the habitat type is widely represented in the offshore waters of Senegal. Marine water quality will also be locally impacted by discharges, some of which will be temporary or continuous. Management measures will be implemented to ensure impacts to water quality are restricted to the area immediately surrounding the Sangomar Field Development – Phase 1 facilities and therefore impacts to biodiversity will be reduced. Impacts associated with artificial light generated by the Sangomar Field Development – Phase 1 facilities will be highly localised and is not expected to have significant effects to populations of marine species, however lighting is likely to cause some attraction of fish and predators.
Bird biodiversity	Significant vessel activity already existing in the region of the Sangomar Field Development and increases in light emitted by the Sangomar Field Development – Phase 1 facilities is not expected to significantly impact migratory or seabird species in the area. Disturbance to birds resulting from helicopters flying to and from development facilities is also not expected to be significant due to the distance from important bird habitats.
Waste Generation	Solid wastes will be generated over the life of the project and will require the use of onshore facilities to ensure the safe processing, recycling and disposal of wastes. Wastes typical of offshore development include general hazardous and non-hazardous wastes and through appropriate management they pose low risk to the environment.

KEY MANAGEMENT AND/OR MITIGATION MEASURE
+ The subsea infrastructure layout will be designed to avoid sensitive habitats. + The Sangomar Field Development – Phase 1 construction vessels and MODU will be equipped with dynamic positioning systems to avoid the use of anchors. + Subsea infrastructure will be surface laid, rather than trenched where technically feasible to reduce seabed disturbance.
+ Flaring will be minimised to a level required for safe and reliable operations. + Greenhous gas emissions will be recorded and reported annually in a public report. + Excess gas will be reinjected to the reservoir for future gas export.
+ All routine marine discharges (drainage water, cooling water, sewage etc) will be managed in accordance with regulatory requirements; + Chemicals will be selected for use to minimise environmental impacts to as low as reasonably practicable. + Produced water will be treated to applicable standards prior to discharge and will undergo continuous monitoring. + Drilling cuttings will be treated to applicable standards and discharged below the water line.
+ Marine fauna interaction procedures will be developed to minimise impacts resulting from piling activities. + Full toxicity assessments of produced water will be conducted and impacts to the marine environment will continually be assessed. + Subsea equipment will be designed to reduce volumes of control fluids released. + Drilling cuttings treatment will reduce discharge of drilling chemicals through the reuse and recycling of drilling mud.
+ Lighting will be minimised to the level required for safe operations. + Helicopter flight paths will be planned to avoid important bird habitat where practicable
+ Wastes generated by the Sangomar Field Development will be managed in accordance with Woodside's Waste Management Strategy + Wastes will be managed and disposed of in a safe and environmentally responsible manner that prevents accidental loss to the environment. + Wastes will be minimised and recycling prioritised.

IMPACT TO FISHIERIES

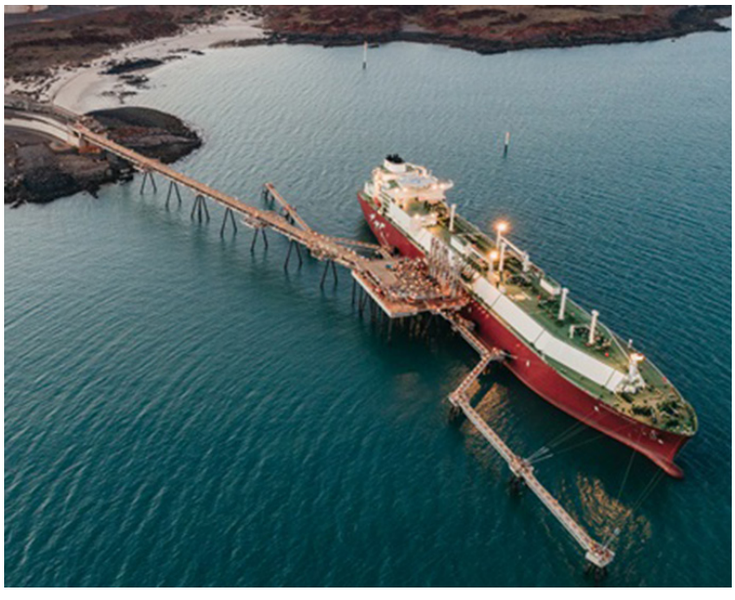
Woodside recognises the importance of fisheries for the Senegalese people, and through a robust understanding of the marine environment and the integration of good industry practice in the planned design, construction and operations of the Sangomar Field Development will ensure that all these activities will have a minimal impact on this important industry.

Intensive artisanal and commercial fishing typically takes place in between the Senegalese coast and the continental shelf, beyond which the Sangomar Field Development is located. Whilst fishing is generally limited to these areas, fishermen are also known to venture to the high seas where the Sangomar Field Development is located.

The environmental impact assessment has examined potential interactions with fish species resulting from development activities. However, impacts to the abundance and biomass of fish stocks are not expected to result from Sangomar Field Development activities.

A detailed Environment and Social Management Plan is included in the Environment and Social Impact Assessment, which includes a comprehensive monitoring program to verify predicted impacts on the marine environment and marine users, confirm the effectiveness of our mitigation measures and to report such results regularly to DEEC.

A HISTORY OF ENVIRONMENTAL EXCELLENCE



Woodside has a long and successful history of constructing and operating deep-water oil projects in sensitive marine environments.

Woodside is committed to sustainable development and has demonstrated itself as a safe, reliable and responsible operator who is focussed on designing facilities and preparing for construction and operational activities that consider and manage the full range of potential environmental impacts.

Woodside's approach to environmental management is to understand the environments in which we work, minimise our impacts upon them and transparently report performance

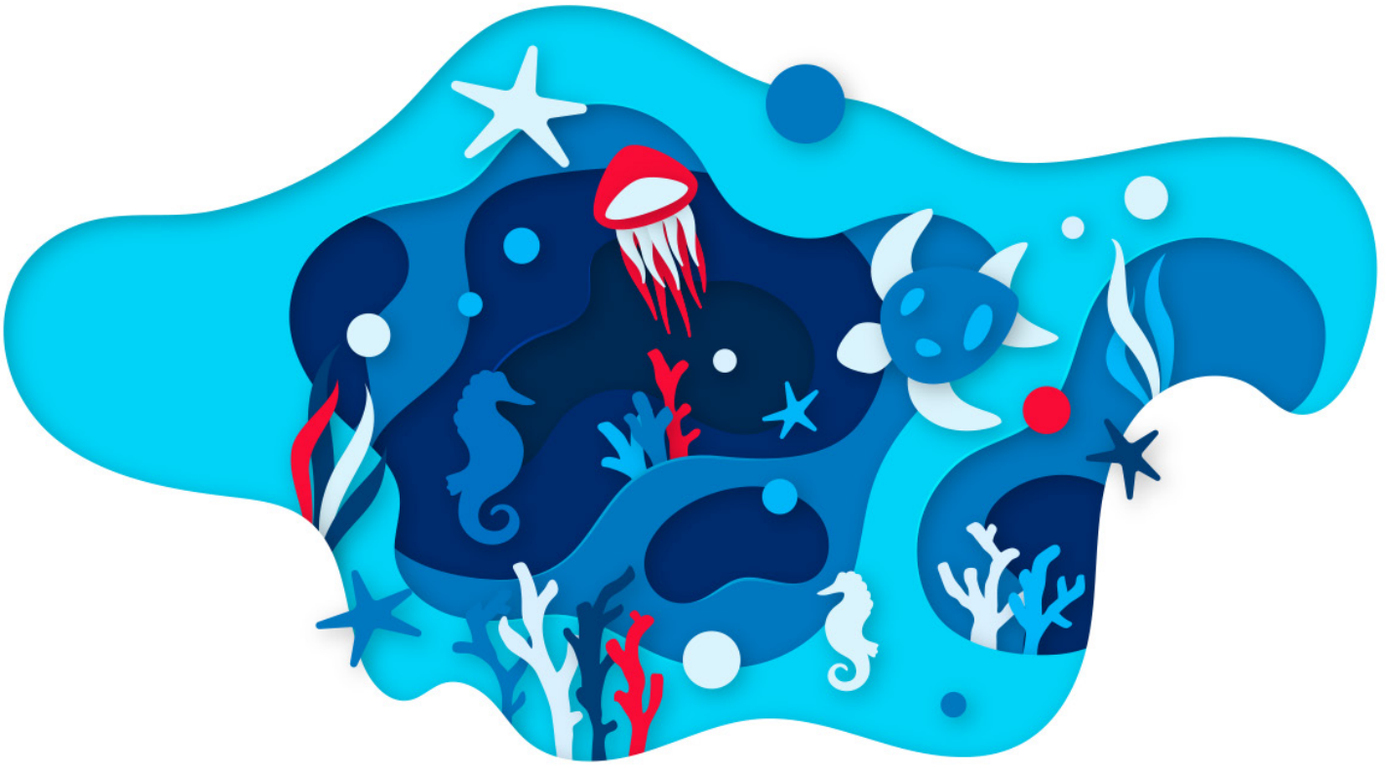
Woodside has a strong history of safe, reliable and efficient operations in sensitive marine environments and has not been involved in a major hydrocarbon spill. Spills are not predicted to occur as part of planned activities, but it is recognised that there is an inherent risk of spills occurring due to the movement of hydrocarbons through all stages of the Sangomar Field Development .

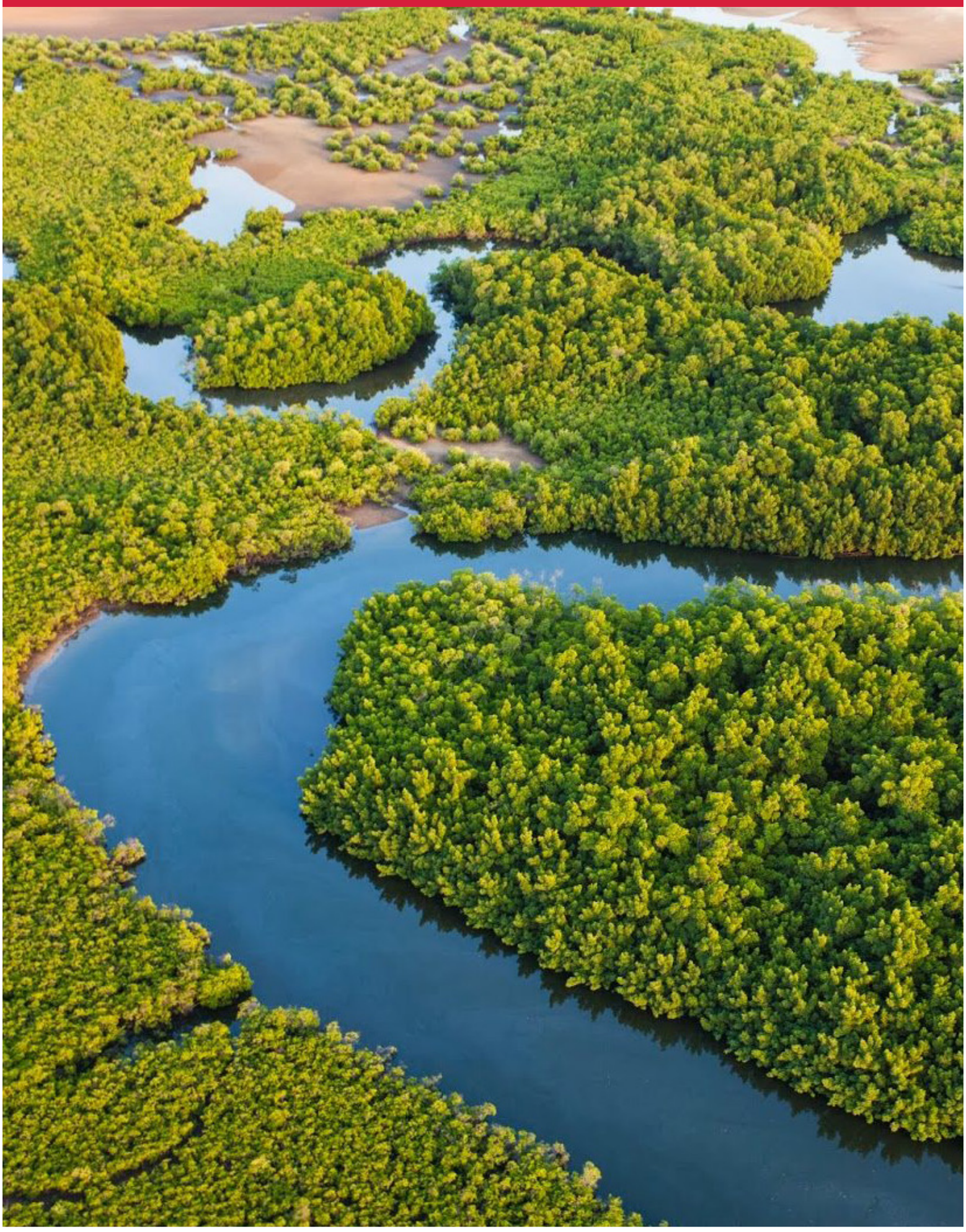
The Sangomar Field Development will implement stringent industry standards and controls to reduce the risk of an accidental chemical or hydrocarbon spill. A detailed assessment of the potential risks to the biological and socio-economic environment has been detailed in the ESIA, for the largest credible spill scenario. The greatest risks are associated with a well blowout leading to a large oil spill, however the potential of such a spill occurring is highly unlikely. Appropriate management measures to prevent spills of any nature have been identified.

ONGOING CONSULTATION WITH MARINE USERS

Woodside is committed to engaging with a wide range of stakeholders including Government authorities, CLPAs and local communities to ensure that all stakeholders understand the potential impacts of our activities. Through the ESIA process and planned stakeholder engagements, Woodside will use various communication tools and consultations to ensure affected communities are regularly kept abreast and consulted on activities related to the Sangomar Field Development. Woodside's communication materials will be developed in French and local languages to ensure that all stakeholders are actively engaged in communications throughout the Sangomar Field Development.

Woodside will maintain a community grievance mechanism for the life of the Sangomar Field Development. The community grievance process aims to resolve complaints as quickly as possible at the local level through company processes, or if that is not possible, outline procedures for appeal. While Woodside will ensure every effort is made to resolve conflicts through agreement, engagement of a third party for assistance may be required.





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