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Early Warning on the Risks of Oil Spills from Ships

BACKGROUND:

On 25th July 2020, the bulk carrier MV Wakashio ran aground on a reef barrier in southeast Mauritius, spilling an estimated 1,000 tonnes of oil into the ocean, see Figure 1. Satellite AIS data showed that the vessel was travelling at 11 knots, a standard speed for bulk carriers, but crucially, it did not slow down before the impact. The spill affected two UNESCO Wetlands, two Marine Protected Areas, and one nature reserve. The MarCOSIO Ship Traffic Monitoring (STM) service (developed by CSIR and funded by the GMES and Africa - MarCOSIO Project) can identify and locate vessels in oceans, coasts, and ports. AIS messages are decoded, filtered, and stored in an indexed spatial database optimised for quick retrieval of historical AIS messages. Deliberate oil spills are often caused by vessels illegally discharging oily waste during cleaning operations. To minimise the ecological impact of oil spills, a rapid response from authorities is necessary.

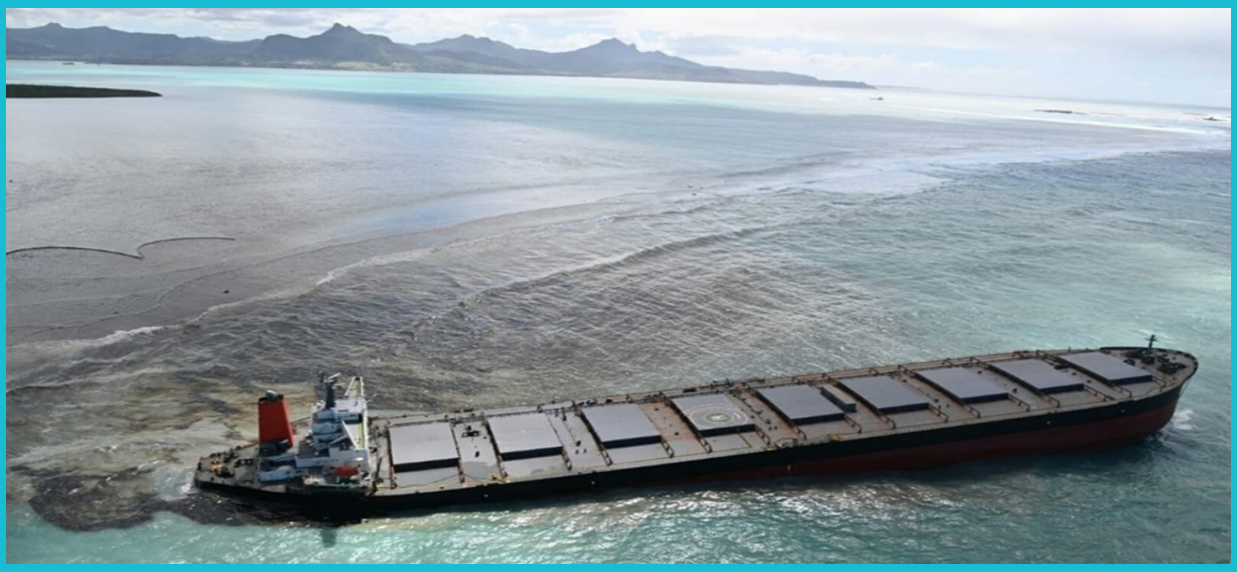

Figure 1. Bulk carrier MV Wakashio ran aground on the 25th July 2020 on the reef barrier in the southeast of Mauritius.

MarCOSIO

KMFRI · National Sea Rescue Institute · Universidade Eduardo Mondlane · WIOMSA · reef conservation · ABALOBI · Benguela Current Convention · CORDIO East Africa

END-USER'S PROFILE (BENEFICIARY ORGANIZATION):

The Benguela Current Convention (BCC) established the Benguela Current Commission (BCC) in 2007 as a permanent inter-governmental organisation. This Convention is a formal treaty between the governments of Angola, Namibia, and South Africa, aimed at promoting a coordinated regional approach to the long-term conservation, protection, rehabilitation, enhancement, and sustainable use of the Benguela Current Large Marine Ecosystem (BCLME) for economic, environmental, and social benefits (see Figure 2). The governments signed the Convention in Benguela, Angola, on 18 March 2013.

Figure 2. The Benguela Current Large Marine Ecosystem (BCLME) borders Angola, Namibia and South Africa and encompasses the full extent of the cold Benguela Current.

END-USER'S NEEDS:

The Benguela Current Commission (BCC) countries are dedicated to the long-term conservation and sustainable use of the Benguela Current Large Marine Ecosystem (BCLME). Section 5.4.3 of the Benguela Current Commission Strategic Action Programme (SAP), adopted in 2013, emphasizes the need to "Prevent, abate, and prepare for oil spills." The SAP prioritizes the development of a regional oil spill contingency plan, which includes:

- Information on available infrastructure and technology to address oil spills.
- Procedures for sharing resources among the BCC countries.

The BCC requested support for the Spill Contingency and Ballast Water Management Task Team by providing data for the BCLME Oil Spill Risk Assessment (see Figure 3). The goal was to evaluate whether existing preparedness and response arrangements are sufficient to address significant oil spills individually or through mutual assistance. The CSIR, through the MarCOSIO Project, was identified as crucial to this assignment.

Figure 3. The BCLME Oil Spill Risk Assessment, Preparedness and Response.

INFORMATION PROVIDED:

Thus, STM team was requested to assist the Spill Contingency and Ballast Water Management Task Team with the necessary support and information. The CSIR provided access to vessel

activity information/data acquisition for the BCC Oil Spill Risk Assessment to enhance regional oil spill preparedness. To represent Namibia's and South Africa's BCLME oil risk profiles, the CSIR prepared detailed data on vessel activities for several zones in the BCLME (Figure 3) . The Zones include Kunene Zone 5, Erongo Zone 6, Hardap Zone 7, Karas Zone 8, West Coast Zone 10, Cape Town Zone 11, and Garden Route (Ngqura/Gqeberha) Zone 12. This data was be used to:

1. **Identify high-risk areas** for oil spills that could impact coastal populations, marine habitats, and critical infrastructure.
2. **Support the creation of a comprehensive regional oil spill contingency plan**, ensuring preparedness and effective response to oil spill incidents.

Figure 4. The zonation of the BLCME.

USAGE:

The provided information supported the development of the BCC risk assessment model. The team delivered a detailed, clear, and concise presentation of the information. The end-user also received access to the MarCOSIO STM web-based service for resource management and oil spill preparedness (Figure 4). The STM team offered service training, demonstrations, targeted user training programs, an online user manual, and videos.

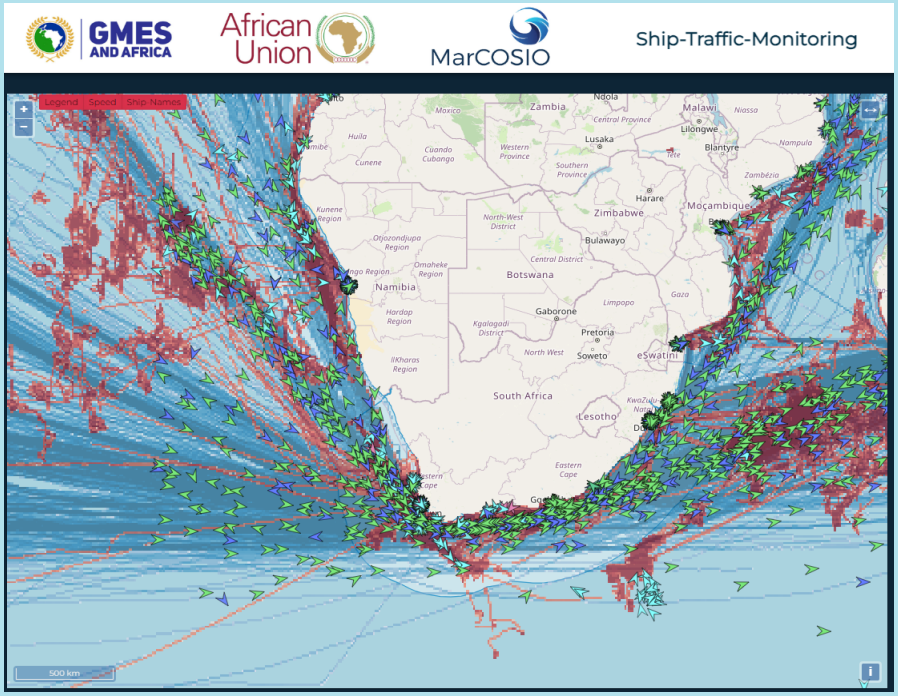

Figure 5. MarCOSIO Ship Traffic Monitoring Service.

IMPACT:

The information supported the development of a risk assessment model addressing the likelihood of an incident and its potential consequences in specific regional areas, see Figure 5. The information provided has aided in:

- Preparedness for increased vessel activity in the region.
- Access to the Ship Traffic Monitoring system for real-time vessel information.
- Providing additional information for validation, decision support, and near real-time monitoring.

Figure 6. Oil Risk Assessment Published Online (https://www.benguelacc.org/download/oil-risk-assessment-for-namibia-and-south-africa/).

The assessment results indicated serious oil spill risks in the mid-BCLME (Namibia) and the South BCLME (South Africa). It also found significant shortcomings in existing preparedness and response arrangements to tackle significant oil spills adequately. As part of the response to the oil spill, the report emphasised the need for an early warning system with surveillance monitoring and reconnaissance capabilities. The finalised Oil Risk Assessment is published and available online for download (https://www.benguelacc.org/download/oil-risk-assessment-for-namibia-and-south-africa/).

OUTREACH:

The BCC has been part of the consortia since GMES Phase 1. Ongoing virtual meetings and email communication have been conducted to support partners' needs. The MarCOSIO consortia engage in several outreach mechanisms, including:

- Online: Social media, blog posts, website.
- Events: Workshops, symposiums.
- Publications: Reports, academic/research publications.

Both South Africa and Namibia currently lack a functional and integrated early warning system for oil spills, which is essential for early containment and minimizing environmental damage. The uptake of MarCOSIO services has been considered to support the BCLME region.