SEARCULAR
Circular Solutions for Fishing Gears

RESULTS SUMMARY

Tracking and mapping the accumulation of lost and abandoned dFADs in the Indian Ocean

Within the SEARCULAR project, this study assessed the transport dynamics, accumulation patterns and beaching risk of drifting Fish Aggregating Devices (dFADs) in the Indian Ocean using a combination of observational datasets and Lagrangian modelling (tracking objects through time and space) approaches.

Background

In the Indian Ocean dFADs are increasingly used in purse seine tuna fisheries. As they are made from durable plastic materials, these devices once lost or abandoned can accumulate and persist in vulnerable marine ecosystems such as coral reefs or mangrove forests.

It is already known that the frequency of dFAD stranding varies along the Indian Ocean's coastlines as a result of currents and geographic features. **However, a knowledge gap remains for where a large proportion of lost or abandoned dFADs drift to, accumulate, and/or strand, and the conditions that determine their transport and their persistence.**

SEARCULAR's BIOFAD model being prepared for Mediterranean sea trials

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Our Research

SEARCULAR sought to address this knowledge gap by drawing on existing data to develop, test and use a Lagrangian model for predicting the connectivity, movement and destinations of lost or abandoned dFADs. Additionally the project assessed how BIOFADs can help to minimise the environmental impacts of dFADs (See image above of a BIOFAD model in sea trials).

Our research involved three key stages:

1. Analysing existing data on where fisheries deployed dFADs and where they were found to have accumulated or stranded.
2. Adapting a model able to simulate the drift of dFADs under realistic environmental conditions and testing it by seeing how accurately it could reconstruct known past trajectories of dFADs.
3. Using the model to run large-scale simulations of dFAD drift, accumulation and stranding across the Indian Ocean.

The model results revealed that the more durable a dFAD is, the more likely it is that it will eventually reach and strand in a coastal area. In parallel, the model showed that **biodegradable dFADs are far less likely to reach vulnerable marine ecosystems due to their shorter lifespans.**

SEARCULAR has developed a tool to better map the connectivity, accumulation, and beaching risk of devices and inform management of lost or abandoned dFADs in the Indian Ocean. The tools and risk indicators SEARCULAR has developed can enhance our understanding how dFADs persist in and affect the marine environment, and offer practical guidance to decision-makers seeking to implement measures to reduce marine litter and protect vulnerable ecosystems.

SEARCULAR aims to reduce marine litter and microplastic pollution originating from European fisheries. This report presents the work and outcomes of Work Package 3 (Deliverable D3.4). More information about our work on biodegradable FADs can be found on our website.

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