# MARINE FORESTS DISTRIBUTION

Monitoring natural areas with seagrass meadows, giant algae forests and gorgonian gardens in the Professor Luiz Saldanha Marine Park. BIOMARES Programme Task start: 2007

# **INTRODUCTION**

It is very important to know the status of marine forest habitats as they are the basis of important ecosystems and provide many services to humanity. Marine Forests is a name that can be applied to large forests of giant algae but also to marine prairies and coral gardens, such as gorgonians. They influence currents, retain nutrients and sediment by cleaning the water, provide shelter for many species to reproduce and live, contribute to trophic networks, contribute to the sequestration of carbon from the atmosphere, reducing the greenhouse effect that causes climate change. The Marine Park has valuable marine forests that must be conserved.

# GOAL

To understand the status of marine forests in the Professor Luiz Saldanha Marine Park, namely natural areas with seagrass meadows, forests of brown algae and gardens of gorgonian coral (which, despite being animals, also form underwater forests).



## **METHODS**

As these are species that occupy very different areas of the park (seagrass mobile substrate, shallow rocky reef algae forests, deeper rocky reef gorgonians) the methodologies varied between groups.

For seagrasses, a map of the distribution of the total area is made, the maximum leaf height is measured and the density (number per area) for each species is determined.

The algae are mapped in order to create a map of the presence of different species throughout the park, their density and height of their basal part.

The rocky reefs where gorgonians occur were already known, the composition of each coral garden in species was determined, the height of the corals and their density.

## PERIOD

- Seagrasses: between 2008 and 2011, having been resumed from 2017 to the present.
- Algae forests: since 2016; it has been repeated annually (in the summer) to date.
- The gorgonians (corals) were the subject of a study in 2011, which was repeated in 2019 so that there could be a comparison of before and after the implementation of the Marine Park. The time series is 8 years between the two monitoring periods as these species have a slow growth and the positive effects can take years to be noticed.



#### **MAIN RESULTS**

#### Seagrasses

There was a decrease in the area of a specific seagrass meadow in 2010/2011 in Ponta do Adoxe, which reduced from almost 3 ha to zero in a few months. After a few months it started to reappear through seeds (Figure 1) in the sediment and after a year it occupied an area similar to the initial one (Figure 2), recovering completely after 3 years. This work proved that the sexual contribution to the recovery and maintenance of marine prairies (which are generally clonal) is very important (Paulo et al 2019).









#### Figure 2. Presence of marine plants in Ponta do Adoxe

over time. The disappearance of all vegetation between July 2009 and April 2010 is notorious. The presence of plants is recorded again in June 2010 and returns to the initial density in July 2013.





Figure 3. Researchers measure the leaf height of marine plants at the tip of Adoxe.



## **Brown algae**

A species catalog and an occurrence map (Figure 4) of the main areas and respective densities (Figure 5) were made for the brown algae species in the Marine Park (Figure 6).



Figure 4. Sampled area and main points identified.





Figure 5. Average density (m2) of Laminaria ochroleuca, Saccorhiza polyschides and Cystoseira sp. by sampling location. The acronym "LO" refers to the species Laminaria ochroleuca, the acronym "SP" refers to the species Saccorhiza polyschides and the acronym "C" refers to Cystoseira sp.





*Figure 6.* Researcher counts the density of brown algae in the Professor Luiz Saldanha Marine Park.



# Gorgonians

The species of gorgonians were monitored, by recording their density and size, in all rocky reefs in the Marine Park (Figure 7). The populations in 2007 and 2019 were compared. The abundance of gorgonians increased or decreased in a variable way in the studied sites (Table 1). The relative abundance per species changed from 2007 to 2019, increasing significantly for *Eunicella* spp (Figure 8). The density and height of the communities' canopy did not change. Have been detected differences within some of the sampled locations between the two sampling dates (the description of this work will be published shortly in a scientific article).



*Figure 7* Gorgonians at Professor Luiz Saldanha Marine Park.



		2007		2019		
SITE	P_TYPE	Ν	%	Ν	%	INCREMENT (%)
PME	CP2	203	23%	205	20%	1%
ANC	PPI	105	12%	54	5%	-49%
ARC	PPI	37	4%	94	9%	154%
BAL	PPI	111	13%	19	2%	-83%
PML	PPI	65	7%	128	13%	97%
BAR	PP2	42	5%	158	16%	276%
JDG	PP2	130	15%	198	19%	52%
3MS	PP3	108	12%	19	2%	-82%
PBN	TPI			88	9%	
RIS	TPI	68	8%	55	5%	-19%
ALL_ST		869		1018		17%

ABUNDANCE

Table 1. Abundance of Gorgonians in the sampled sites (SITE) that were distributed among the different protection areas of the Marine Park (CP Complementary Protection; TT Total Protection; PP Partial Protection). The abundance is compared between the year 2007 (before the implementation of the Marine Park) and in 2019.





Figure 7. Percentage of species (EG -Eunicella gazella; ESP - Eunicella spp; LS - Leptogorgia sarmentosa and NA unidentified species) in 2007 and 2019 for all sites in the Marine Park.



# Task implementation: 2007

Factsheet last updated in October 2020

## REFERENCES

Paulo, D., Diekmann, O., Ramos, A. A., Alberto, F., & Serrão, E. A. (2019). Sexual reproduction vs. clonal propagation in the recovery of a seagrass meadow after an extreme weather event. *Scientia Marina*, *83*(4), 357-363.

