

An underwater photograph showing two divers in black gear working on a seagrass bed. The diver in the foreground is using a long ruler to measure a patch of green seagrass. The diver in the background is also working on the seabed. The water is clear and blue.

SEAGRASS RESTORATION

Recovering seagrass habitats in the
Professor Luiz Saldanha Marine Park.

BIOMARES
Programme
Task start:
2008

INTRODUCTION

Seagrasses are extremely productive habitats, important structural species of the ecosystem. They contribute to carbon retention and increased biodiversity, forming habitats for other species to reproduce and feed. They also decrease the effect of currents, decreasing the effect of coastal erosion.

At the Professor Luiz Saldanha Marine Park, seagrass meadows are the target of direct human impacts that destroy them (fishing, recreational boating moorings and other aquatic activities) and indirect impacts (changes in their environmental conditions). As a consequence, a decrease in seagrass populations in the Marine

Park has been detected for decades. This decrease reached the point of completely extinguishing some seagrass meadows. For this reason, the BIOMARES program was started in 2007, which among other actions replanted seagrass habitats. In 2018, with the Inforbiomares project, this seagrass transplantation effort was continued.

GOAL

To recover seagrass habitats in the Professor Luiz Saldanha Marine Park.



METHODS

Seagrass were collected with the surrounding sediment in the Ria Formosa (Ilha da Culatra) and in the Sado Estuary (Ponta do Adoxe) and transplanted to the area of Portinho da Arrábida - Praia dos Coelhos (Figures 1 and 2). The native species to Arrábida which was restored is called *Zostera marina*.

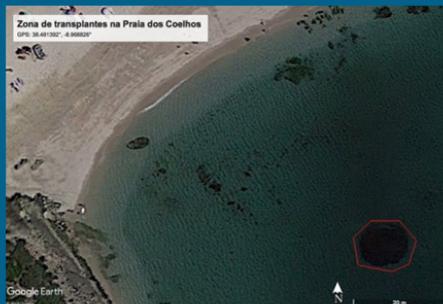


Figure 1. Polygon identifying the prairies transplanted at Praia dos Coelhos. Image taken from Google Earth Pro, with satellite data from the year 2016.

PERIOD

This work started in 2008 and continued in 2020 (date of the last update of this factsheet).



Figure 2. A) Technician of the Algarve Center for Marine Sciences (CCMAR) transports a box with *Zostera marina* for transplant; B) Transplantation; C) Monitoring of the transplanted area at Praia de Coelhos in the Marine Park.

MAIN RESULTS

Monitoring

Donor populations

Monitoring was carried out on the populations of Ilha da Culatra and Ponta do Adoxe, to study the initial and final status of the donor populations.

The population of *Zostera marina* on Ilha da Culatra in the spring of 2018 had an area of approximately 68,000 m² and occurred with two other species of seagrass (*Cymodocea nodosa* and *Zostera noltei*). In areas where only *Zostera marina* occurred, the average leaf

height was about 39 cm and the density was 280 feet per m². In the spring of 2019, the population of Ilha da Culatra was fragmented, there were no areas with only *Zostera marina*, and the presence of a potentially invasive alga was detected, *Caulerpa prolifera* in all prairies, so it stopped using this prairie as a donor.

The population of Ponta do Adoxe in spring 2018 had an area of approximately 10879 m², with an average leaf height of 42 cm and a density of 79 feet per m². In 2019 this population had an approximate area of 27147 m² with an average leaf height of 88 cm and density of

176 feet m². This population is genetically very diverse and suffered total mortality in 2011, having fully recovered after that event (Paulo et. Al 2019). Because of these characteristics, it was decided to continue the transplants using the population of Ponta do Adoxe.



Survival

Transplants 2018

Transplants were performed in the spring and monitored periodically until October 2019. Of the six transplants (PU) performed in 2018, three from Ilha da Culatra and three from Ponta do Adoxe, two from Ilha da Culatra remained in Praia dos Coelhos until the last monitoring (end of summer 2019). We recorded a survival of 66.6% in transplants from Ilha da Culatra to Praia dos Coelhos, in a period of 2 years.

Transplants 2019

Of the three transplants performed in the spring of 2019 at Praia dos Coelhos originating from Ponta do Adoxe, one remained until the end of Summer 2019. A 33.3% survival was recorded in transplants from Ponta do Adoxe to Praia dos Coelhos between spring and the summer of 2019.

Transplanted area

A total of 69.79 m² of marine plants were transplanted in the InforBiomares project: 44 m² (63%) from Ponta do Adoxe in Troia and 25.79 m² (37%) from Culatra Island in Ria Formosa. There were already 110 m² transplanted in 2011 from Ilha da Culatra. At the date of the last monitoring, at the end of the summer of 2019, 3.36 m² remain originating from the tip of the Adoxe; of the 2018 transplants from Ilha da Culatra, 15.9 m² remain and an area that is not possible to calculate because it ended up joining the pre-existing one in 2011; the area transplanted in 2011 in

conjunction with one of the 2018 transplants has an area of 77.5 m². When we analyze the net variation of the transplanted areas (Figures 3 and 4), the transplants with area growth are those from Ilha da Culatra transplanted in 2018 and in 2011.

The growth of the transplanted area in 2011 was stable from the spring of 2018 until the spring of 2019, suffering a reduction in the summer of 2019. This reduction is due to a hole in the central area of the prairie possibly created by a vessel anchor, which it increased in

size and ended up leading to the loss of about 30m² of prairie. It is important to implement protective measures for this area, which limit the anchoring of recreational vessels, as well as any other activity that has an impact on the bottom.



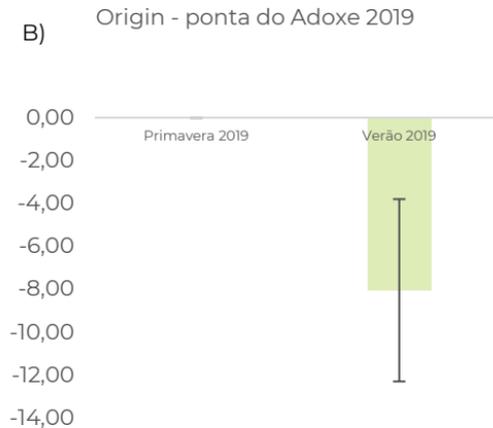
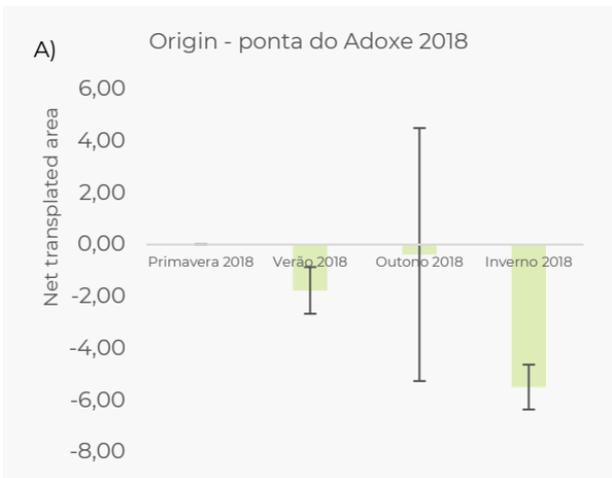


Figure 3. Representation of the variation of the net transplanted area from the tip of the Adoxe over the monitoring periods. A) Transplants 2018, B) Transplants 2019

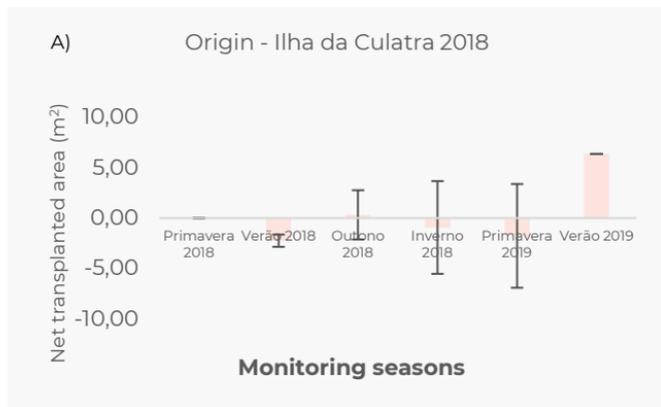


Figure 4. Representation of the variation in the transplanted liquid area of Ilha da Culatra over the monitoring seasons. A) Transplants of 2018, B) Transplants of 2011 from the existing transplant since 2011.

Canopy height and density

Differences in canopy height were recorded for all transplants. Many of these differences are due to changes between seasons in the quantity and quality of light. These changes can be seen in the net variation in density over the different monitoring periods (Figure 5). Other changes in height, when very drastic, have to do with the senescence of the transplant and are in line with the decrease in density and area.



Figure 5. Net variation of canopy height (cm) in transplants from Ilha da Culatra performed at Coelho beach in the Marine Park in 2018 and 2011.

The density also has seasonal changes, which are normal (Figure 6). However, just as at the time of the canopy, decreases in density were recorded, which are in line with the decrease in area and canopy, indicative of the senescence of transplants.



Figure 6. Net variation in density (plants / m²) in transplants originating from Culatra Island performed at Coelhos beach in the Marine Park in 2018 and 2011.

CONCLUSIONS

The Inforbiomares project, under the BIOMARES program, contributed to the maintenance of the prairies in Praia dos Coelhos, increasing the total transplant area.

During the project it was possible to confirm that the plants originating in Ria Formosa are successfully transplanted in Praia dos Coelhos and that plants originating in the Sado estuary do not survive the transplant.

It was also proven that the initial transplant area is essential and must be greater than 6m² (Paulo et al 2019).

A problem has been identified in the donor population, Ria Formosa, which may condition future transplants, which was the presence of the invasive algae. This algae, *C. prolifera*, is a threat to biodiversity and an effort must be made not to contribute to its spread (Cunha et al. 2013).

The availability of suitable donor populations can be a limiting factor for the maintenance and recovery of marine prairies in the Prof. Luiz Saldanha Marine Park. The future solution may involve the production of seagrass in aquaculture systems to obtain the biomass necessary for a transplant. This requires funding

for the development of efficient farming techniques.

The monitoring program adopted for the seagrass meadows of Praia de Coelhos should be maintained every three months in order to

make timely management decisions. Monitoring should consist of measuring canopy, density and total area of coverage, as well as notes on visible impacts on the seagrass meadows.

Task implementation: 2008

Factsheet last updated in
October 2020

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