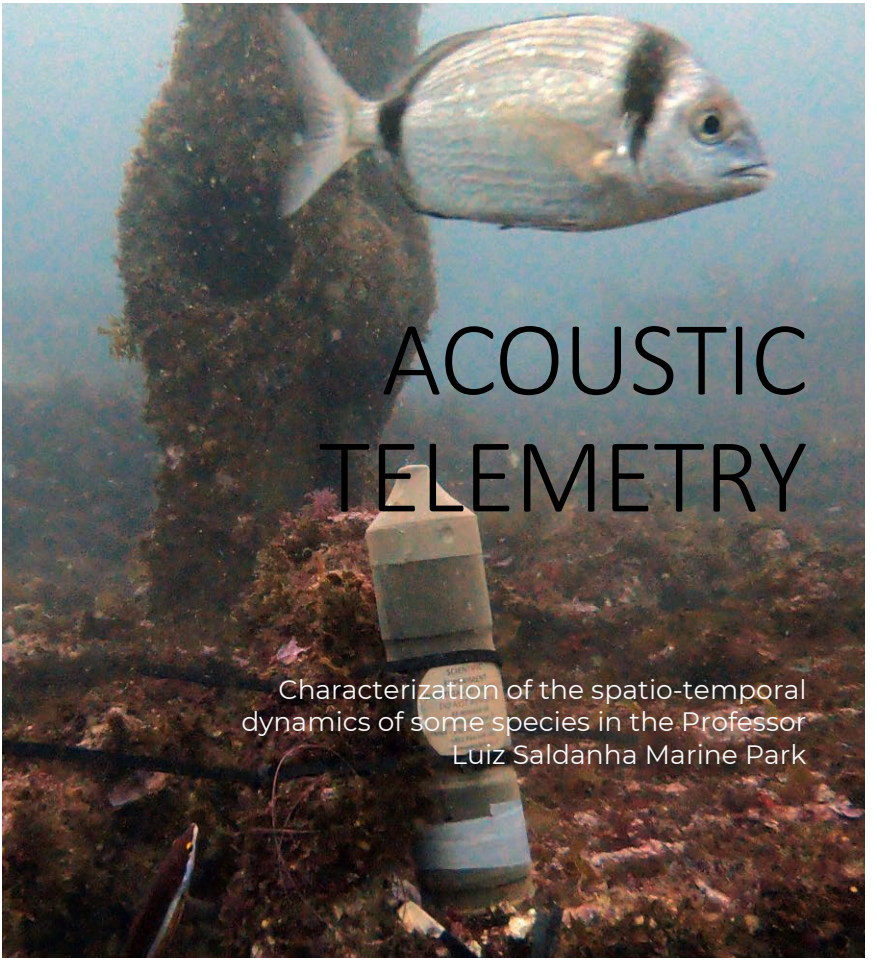


ACOUSTIC TELEMETRY

Characterization of the spatio-temporal dynamics of some species in the Professor Luiz Saldanha Marine Park

BIOMARES
Program
Task start:
2010

INTRODUCTION

Understanding the way each species uses the space is essential to determine the effectiveness of the protection offered by the Marine Park. For this reason, it is important to determine aspects such as the size of the areas used, preferred habitats and the residence time within the different areas of the Park. This information makes it possible to determine the degree of protection offered by the Park as well as the identification of measures that could lead to greater protection for the species in question, in addition to a better understanding of the spatio-temporal ecology of the species.

OBJETIVE

Understanding the spatio-temporal dynamics of some species of fish and molluscs within the Marine Park.

programa **biomares**
No mar da Arrábida desde 2007

METHODS

Acoustic telemetry is based on the detection of sound signals emitted by small transmitters that are implanted in animals (Figure 1).

Figure 1. **Ray to which a small acoustic transmitter has just been implanted.**

Depending on the species, implantation can be done internally (abdominal cavity) or externally, through minor surgery. The size of the transmitter depends on the size of the animal to be marked, and, as a rule, larger transmitters have a longer duration. The duration of the marks used so far varies between 95 and 1317 days.

A network of several acoustic receivers, spread over the Marine Park, allows the detection of the sound signals emitted by the transmitters (Figure 2). These receivers detect the presence of marked animals within a radius of approximately 300m and in addition to the identification of the transmitter, they also record the date and time and, in some cases, information about the depth of the animal.

The telemetry network was active between April 2010 and July 2017. It was subsequently reactivated and increased in July 2018, remaining active until today.

programa **biomares**
No mar da Arrábida desde 2007

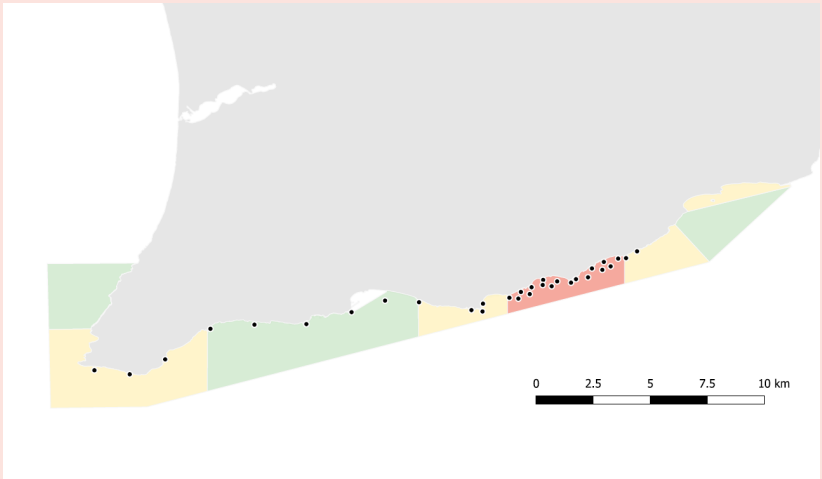


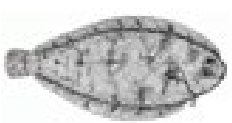
Figure 2. **Map of the network of acoustic receivers positioned in the Professor Luiz Saldanha Marine Park (2020).**

programa **biomares**
No mar da Arrábida desde 2007

MAIN RESULTS

White sea bream *Diplodus sargus* – They occupy reduced areas, for long periods, in rocky areas. A change in spatial behavior during the breeding season was identified with a slight increase in the area used and the number of incursions to areas beyond the usual area. These data suggest that the Marine Park may have an important role in the protection of this species, which is in agreement with the data obtained through visual censuses that demonstrate an increase in the abundance and average size of the individuals.

Senegalese sole *Solea Senegalensis* – About half of the marked individuals occupied relatively small areas, preferring medium sand bottoms (259-492 µm). However, movements and migrations of some individuals to areas outside the Marine Park were also recorded suggesting some degree of spillover. This species was found to be more active at night. Some changes in habitat use were also observed during the reproduction period (see charts 1 and 2).



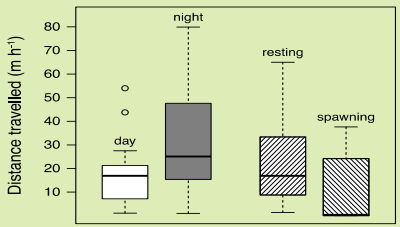


Chart 1. **Boxplot representing the distance travelled by *Solea Senegalensis*** (m h^{-1}; B) during different diel phases and reproductive seasons.

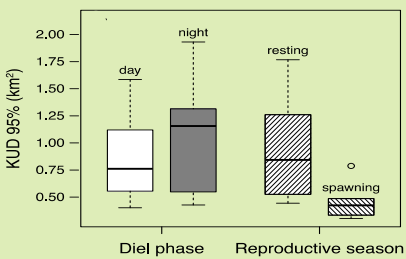
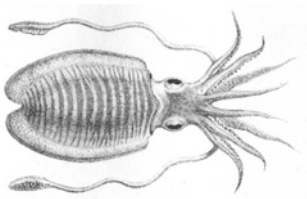
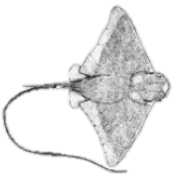


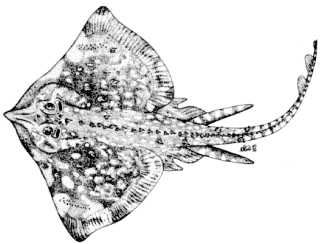
Chart 2. **Boxplot representing *Solea Senegalensis* home range areas** (KUD 95%; E) during different diel phases and reproductive seasons.

Cuttlefish *Sepia officinalis* - They travel relatively large and stay for a short time in the Park area. As such, small MPAs, like the Professor Luiz Saldanha Marine Park, are not a very effective tool for the management / conservation of this species.



In addition to these species, studies are also underway with the european sea bass, common stingray, thorneback ray, white skate and common eagle ray (Figure 3). There was also an exploratory study with salemas and a study in captivity to test different types of marking on octopus.





FAO

programa **biomares**
No mar da Arrábida desde 2007

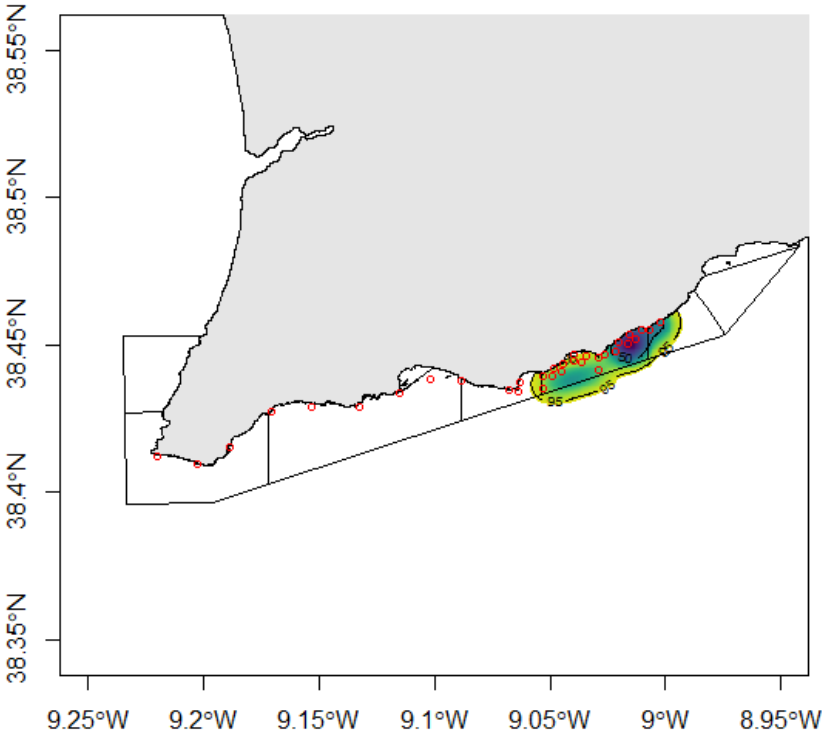


Figure 3. **Thornback ray *(Raja clavata)* home range area during 210 days.**

programa **biomares**
No mar da Arrábida desde 2007

Implementação da tarefa: 2010

Última atualização desta ficha de tarefa: outubro 2020

References

- Abecasis D, Afonso P & Erzini K. 2014. Can small MPAs protect local populations of a coastal flatfish, *Solea senegalensis*? Fisheries Management and Ecology 21: 175-185. https://doi.org/10.1111/fme.12061.
- Abecasis D, Afonso P & Erzini K. 2015. Changes in movements of white seabream (*Diplodus sargus*) during the reproductive season. Estuarine, Coastal and Shelf Science 167: 499-503. https://doi.org/http://dx.doi.org/10.1016/j.ecss.2015.10.032.
- Abecasis D, Afonso P, O'Dor RK & Erzini K. 2013. Small MPAs do not protect cuttlefish (*Sepia officinalis*). Fisheries Research 147: 196-201. https://doi.org/10.1016/j.fishres.2013.05.004.
- Abecasis D, Horta e Costa B, Afonso P, Gonçalves E & Erzini K. 2015. Early reserve effects linked to small home ranges of a commercial fish, *Diplodus sargus*, Sparidae. Marine Ecology Progress Series 518: 255-266. https://doi.org/10.3354/meps11054.
- Baeyaert J, Abecasis D, Afonso P, Graça G, Erzini K & Fontes J. 2018. 'Solo datasets': unexpected behavioural patterns uncovered by acoustic monitoring of single individuals. Marine and Freshwater Behaviour and Physiology 51: 183-201. https://doi.org/10.1080/10236244.2018.1517018
- Gandra M, Erzini K & Abecasis D. 2018. Diel and seasonal changes in the spatial behaviour of a soft-sediment fish (*Solea senegalensis*) inside a marine reserve. Marine Environmental Research 135: 82-92. https://doi.org/https://doi.org/10.1016/j.marenvres.2018.01.015.
- Sousa I, Baeyaert J, Gonçalves JMS & Erzini K. 2019. Preliminary insights into the spatial ecology and movement patterns of a regionally critically endangered skate (*Rostroraja alba*) associated with a marine protected area. Marine and Freshwater Behaviour and Physiology 1-17. https://doi.org/10.1080/10236244.2019.1705805