

LARGE-SPOTTED DOGFISH TRACKING: Fate of reintroduced large-spotted dogfish through acoustic telemetry

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Introduction

The large-spotted dogfish (*Scyliorhinus stellaris*) is listed as threatened with populations decreasing according to the IUCN Red List (IUCN Red List, 2024). This conservation status and decline led to the establishment of the "Petits Taurons" project, which aims to breed and raise this species in captivity, reintroduce juveniles, and conduct fundamental research to improve understanding of their biology. In this study, we present the initial results of two different experiments conducted in the Balearic Islands to assess the fate of reintroduced juveniles through acoustic telemetry.

Materials and methods

The total of 36 juvenile large-spotted dogfish (*Scyliorhinus stellaris*) that were born in captivity, were tagged with acoustic transmitters as part of this study. Following standard dosing protocols to ensure minimal stress and rapid recovery, all the large-spotted dogfish were anesthetized using MS-222 (tricaine methanesulfonate). Once anesthetized, a simple surgical technique was done to implant the acoustic tags into the coelomic cavity. Two acoustic telemetry experiments were conducted to track the reintroduced individuals. In both cases, the reintroduced individuals were detected using acoustic receivers from the Balearic Tracking Network. Signals from the implanted tags were picked up by these receivers, enabling continuous data collection on swimming speeds, activity levels and short-term survival.

Short-term monitoring

In the Cabrera Archipelago, the behavior of 16 individuals was tracked using a dense array of receivers over a short period (3-33 days).

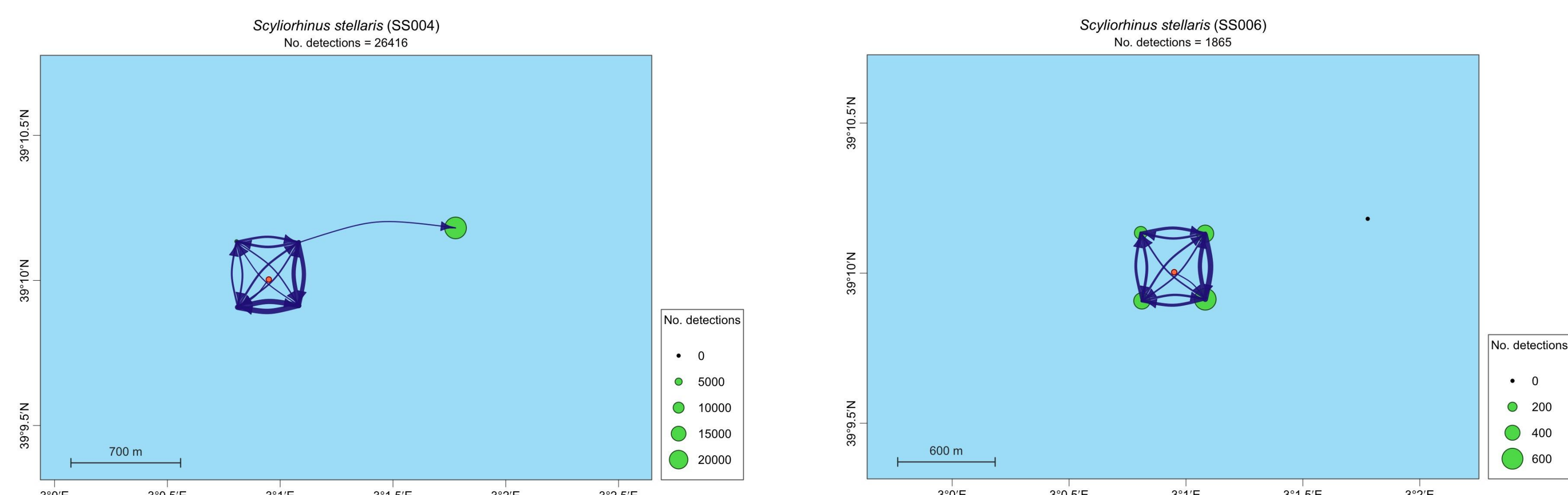


Fig. 1 and Fig. 2 – Plots estimating speed and behavior the first few days after release.

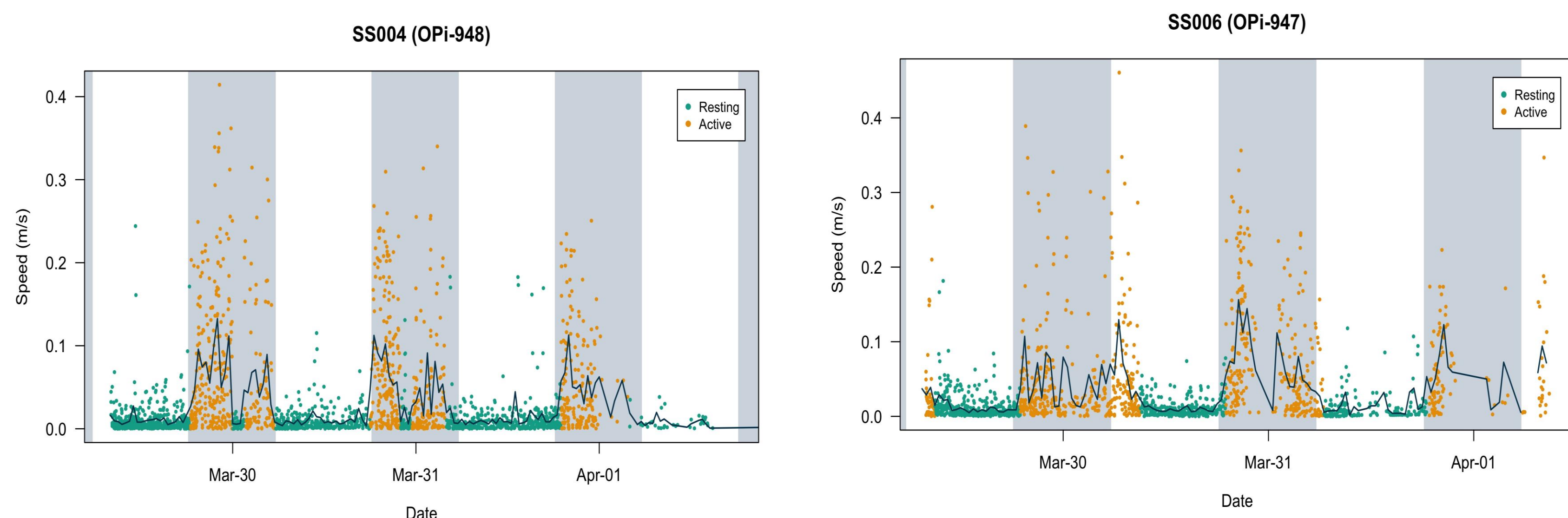


Fig. 5 and Fig. 6 – These plots has been generated from the initial detections in Cabrera and are based on the degree of movement, segmented into active and non-active states. Orange dots indicate moments of activity (speed > 0.0 m/s) and green dots represent resting periods.

Long-term monitoring

For the second group of 20 individuals released at the Isla del Toro Marine Reserve, their movements are being tracked by the Balearic Tracking Network over a longer period, with transmitter lifespans estimated at 7 years.

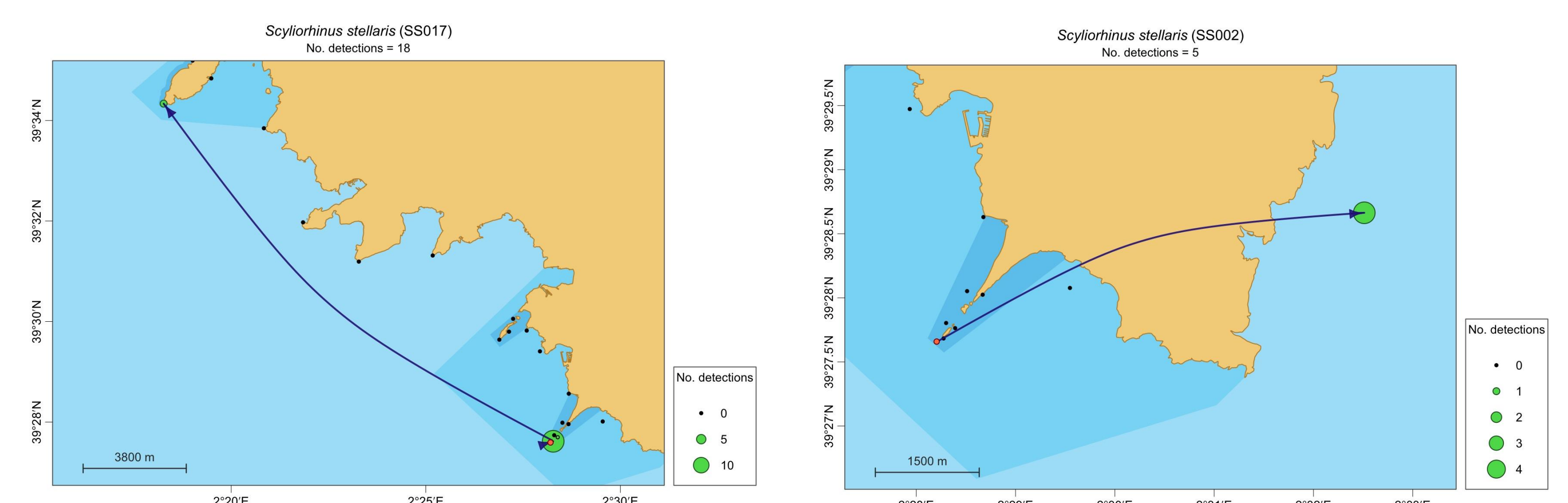


Fig. 3 and Fig. 4 – Detections of 2 individuals released in Isla del Toro.

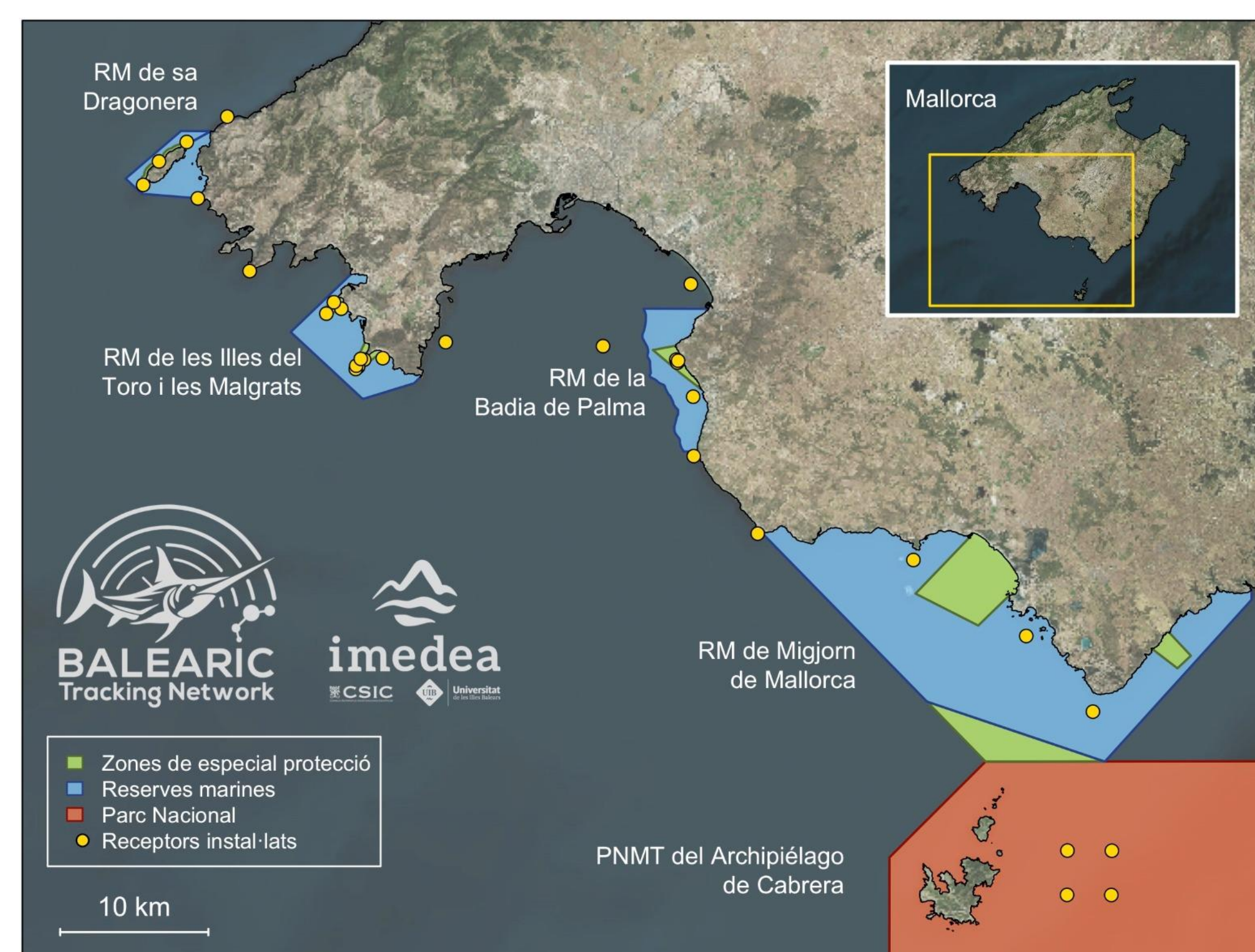


Fig.7 – Balearic Tracking Network receptors and marine reserves map.



Fig.8 – Balearic Tracking Network receptors.

Results and discussion

The preliminary results from the short-term experiment show that the reintroduced large-spotted dogfish were detected for an average of 5 days, with only one individual being tracked for 33 days. (Fig 1 and 2). This suggests that the sharks did not remain near the release site for long periods.

The short-term data indicate distinct day-night cycles of activity, with daytime swimming speeds averaging 0.015 m/s and nighttime speeds averaging 0.071 m/s (Fig.5 and 6). This difference could reflect higher nighttime activity, likely associated with foraging and short-distance movements. In contrast, long-term monitoring has detected individual movements several kilometers from the release site, but further data is needed from the Balearic Tracking Network to confirm these findings.

Acoustic telemetry has provided key insights into the behavioral ecology and short-term adaptation of *S. stellaris*, helping inform future conservation efforts.

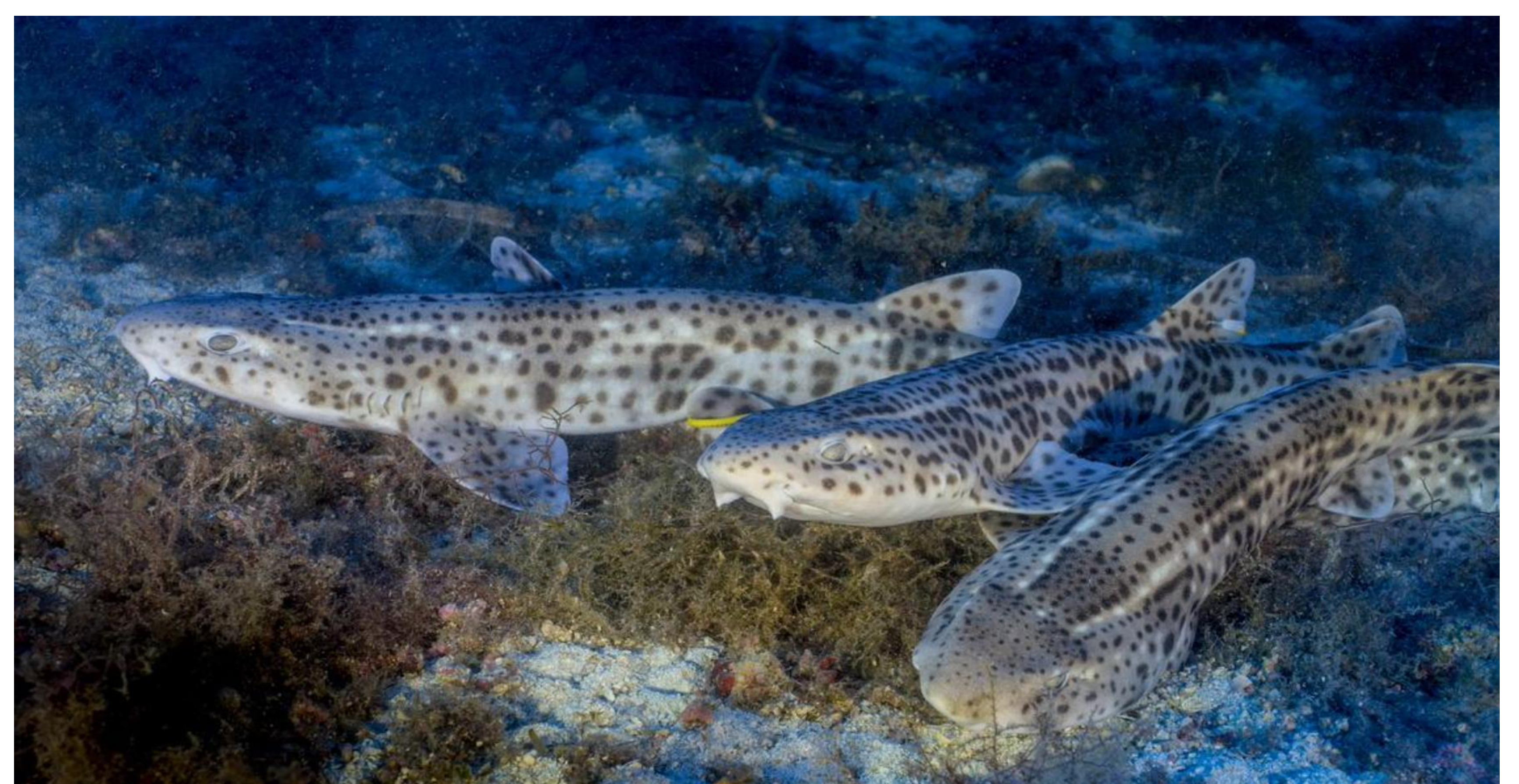


Fig. 8 – *S. Stellaris* at the moment of their release

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