



THE KEY ROLE OF MARINE CITIZEN SCIENCE IN EARLY DETECTION AND MONITORING OF EXOTIC SPECIES: THE CASE OF REDPROMAR IN THE CANARY ISLANDS

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INTRODUCTION

The current state of the oceans and their biodiversity is a matter of global concern. **Species introduction is considered one of the main threats**, capable of generating significant ecological, economic, and social impacts. In this context, collecting data on the presence and distribution of these species is crucial for their management.

Marine citizen science emerges as a promising global tool, capable of expanding the spatio-temporal scale of exotic species records. This study evaluates the contribution of citizen science through the Marine Environment Observers Network in the Canary Islands (**RedPROMAR**) as an early detection and monitoring system for exotic species in the archipelago.

RESULTS

- Over a period of 12 years (2012-2024), **more than 1200 sightings** of exotic marine species have been recorded on the citizen science platform RedPROMAR (Figure 1).
- The sightings include **53 different exotic marine species**, 7 of which are considered invasive, comprising 490 out of the total sightings.
- The number of reported sightings of exotic species has been **increasing over the years**, with approximately 50% of sightings recorded between 2022 and 2023.
- The sightings were reported by from various backgrounds and distributed across the various islands of the archipelago.

Sightings of exotic species reported in RedPROMAR: trends, distribution, and groups

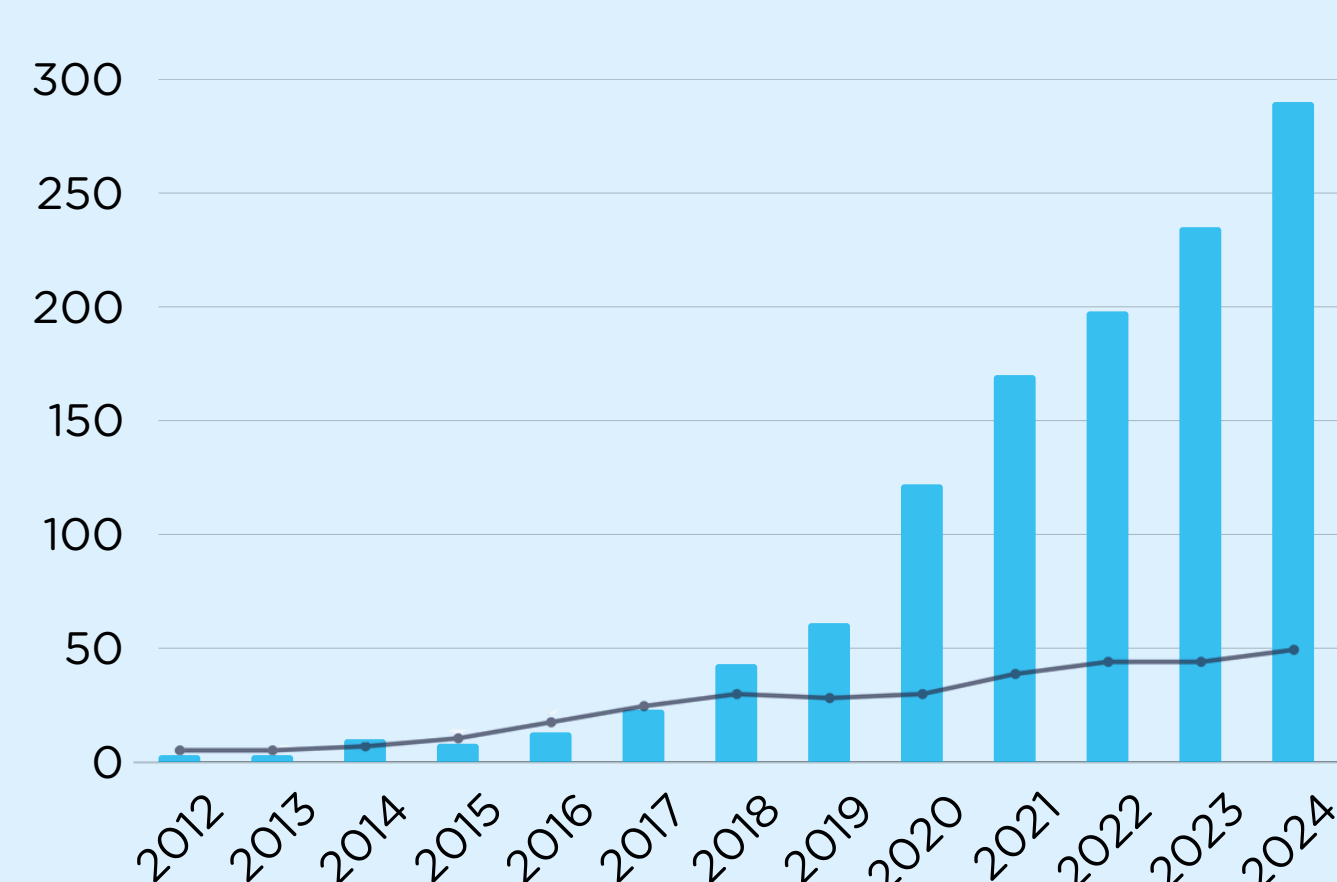


Figure 1. Total sightings of exotic species and different species reported on the RedPROMAR platform within the Canary Islands. ● Total sightings. ● Total species.

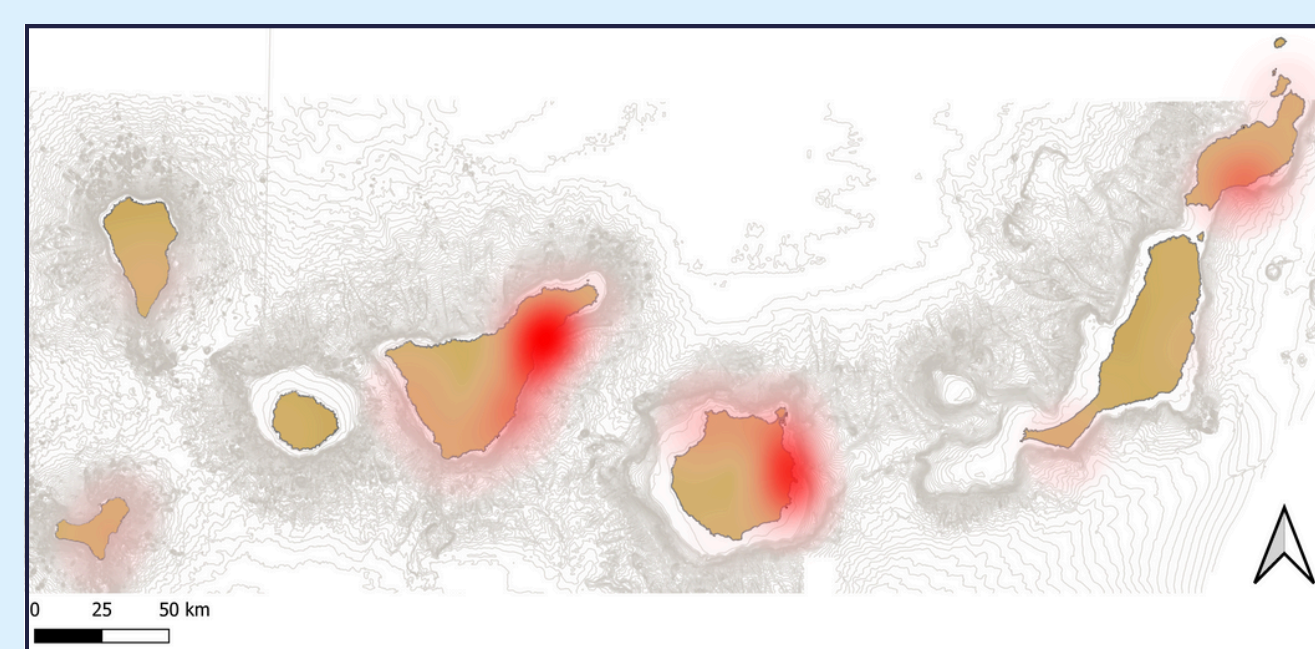
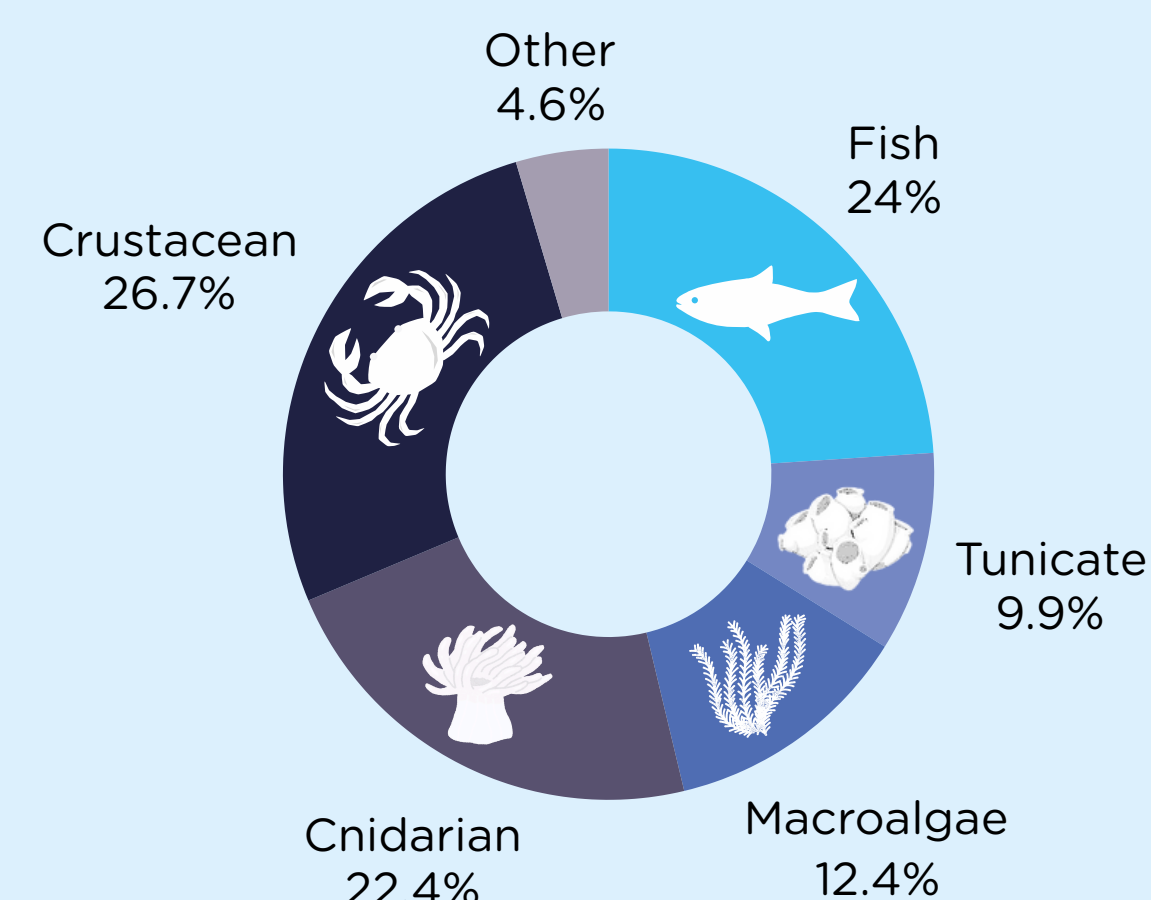


Figure 2. Heat map of sightings of exotic species reported on the RedPROMAR platform within the Canary Islands.



Pending expert confirmation 15.1 %

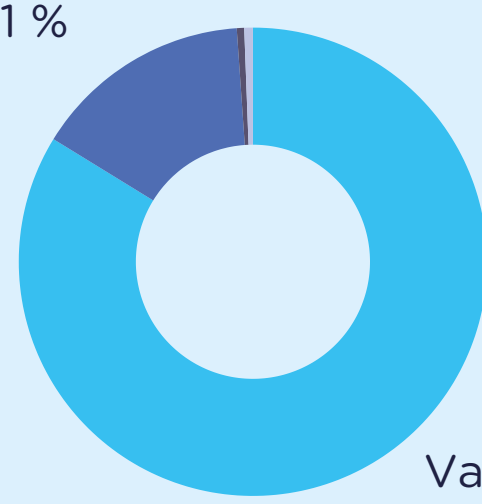


Figure 3. (Top) Percentages of the number of sightings reported on the RedPROMAR platform for the main taxonomic groups within the Canary Islands. (Bottom) Percentage of the validation status of sightings: validated, pending expert confirmation, and not validated.

Examples of noteworthy sightings of exotic species reported on RedPROMAR

Tubastraea coccinea

30.08.2020 - Tenerife
Introduced invasive



Sixto Cozzi

Acanthurus monroviae

18.12.2022 - Fuerteventura
Introduced with data deficiency



Club Deportivo Oxígeno

Sargassum muticum

14.02.2023 - Lanzarote
Introduced with invasive potential



Diego Rabal

Xenia sp.

30.05.2023 - Tenerife
Introduced



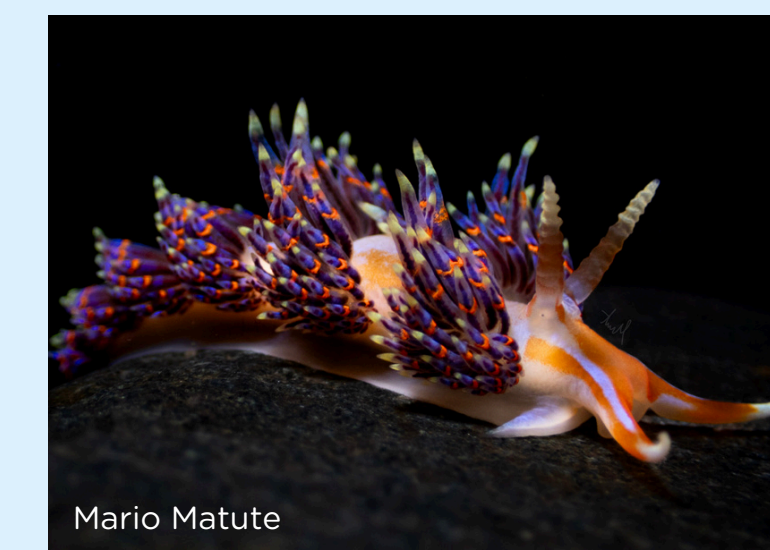
Marc Martín

Actions for monitoring and eradicating colonies



Godiva quadricolor

22.06.2024 - Gran Canaria
Introduced with data deficiency



Mario Matute

Kuhlia caudavittata

15.08.2024 - Tenerife
Introduced non invasive



Bartol Falcón

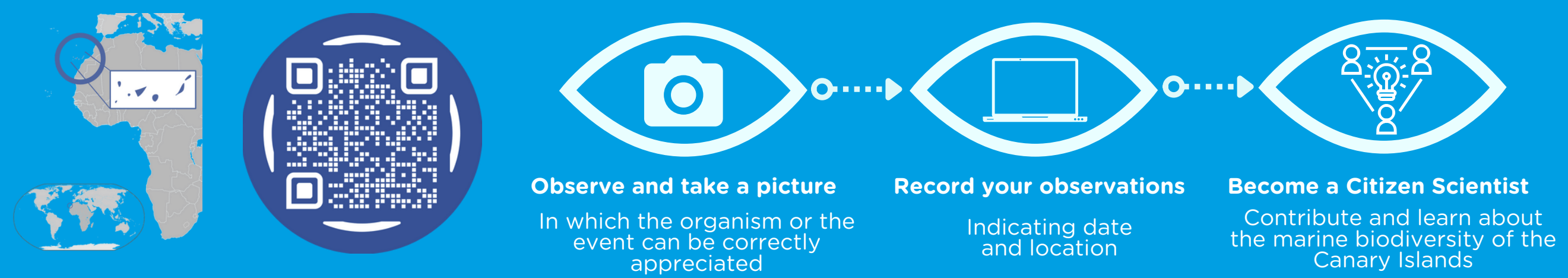
Figure 4. Examples of noteworthy sightings of exotic species reported on RedPROMAR, respectively: *Tubastraea coccinea*, *Acanthurus monroviae*, *Sargassum muticum*, *Xenia* sp., *Godiva quadricolor* and *Kuhlia caudavittata*.

CONCLUSIONS

- The capacity of **marine citizen science** to make a significant contribution to understanding and monitoring marine biodiversity is reaffirmed. In this case, the focus has been on exotic species, but it could be extrapolated to other groups.
- Despite occasional shortcomings, citizen science remains capable of providing **novel and valuable data** that is often highly interesting to the scientific community and can inform public policy and management decisions.
- At the same time, it can reveal **gaps in knowledge** within certain taxonomic groups, sometimes even advancing beyond current scientific understanding.
- This highlights the importance of dedicating **outreach efforts to training users** in detecting and reporting relevant information, thereby increasing their knowledge and awareness of local marine ecosystems.
- If you have spotted any exotic marine species in the Canary Islands,

METHODOLOGY

- Sightings of marine species in the Canary Islands have been compiled through the **RedPROMAR citizen science platform** (www.redpromar.org) and its project "Monitoring Introduced Species in the Canary Islands" (QR code).
- The sightings have been recorded between 2012 and 2024 and have undergone a rigorous **validation process** in which all information has been verified by multiple taxonomic specialists.



- Tenerife accounts for the majority of sightings (~51%), followed by Gran Canaria (~26%)** (Figure 2), coinciding with the islands with the highest port facilities and maritime traffic.
- The sightings correspond to the following **taxonomic groups**: 26,4% crustacean, 24% fish, 22,4% cnidarian, 12,4% macroalgae, 9,9% tunicate and 4,6% other invertebrates (Figure 3).
- The majority of sightings (83.8%) have been validated at the species level.
- Among all the sightings, there are **records of recent or little-known exotic species** in the archipelago (Figure 4), with some of them showing certain trends of increasing sightings over the years (Figure 5).

Specific cases showing trends in sightings of exotic species reported through RedPROMAR

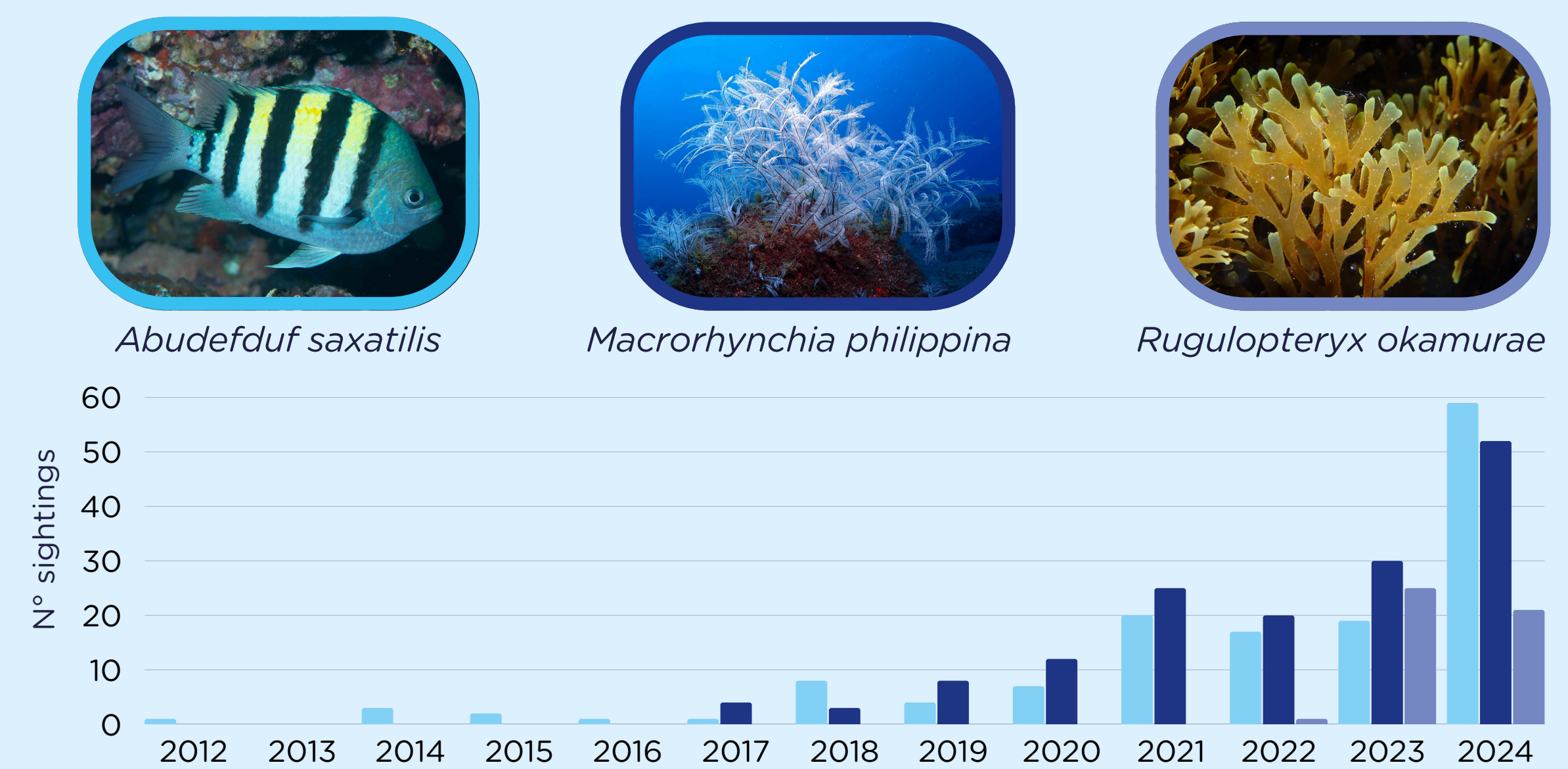
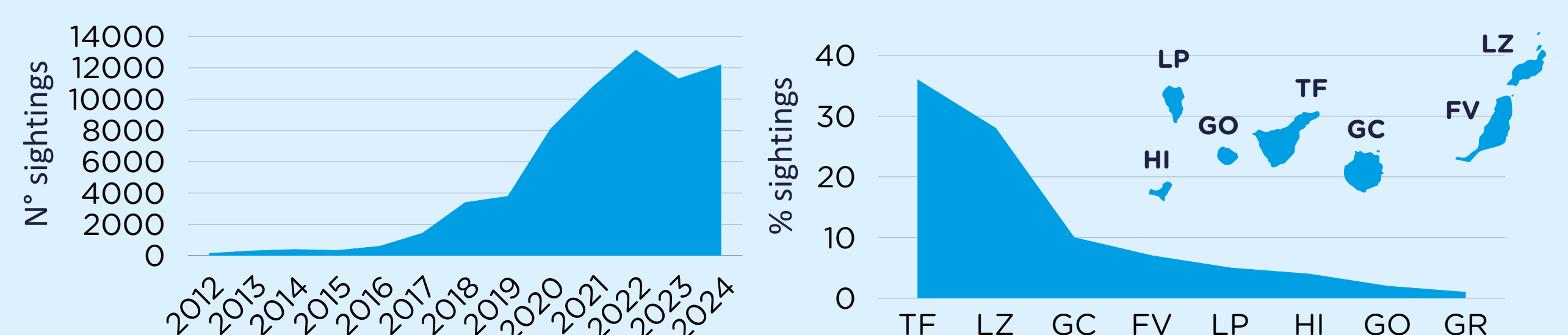


Figure 5. Evolution of the number of sightings of exotic species on the RedPROMAR platform, respectively: *Abudedefduf saxatilis*, *Macrorhynchia philippina* and *Rugulopteryx okamurae*.

Historical record of sightings on the RedPROMAR platform (2012-2024)



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ACKNOWLEDGMENTS

Grateful acknowledgment to all users of the RedPROMAR who reported sightings of these species in the archipelago (www.redpromar.org/projects/3)

