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# Current status and perspectives of the pen shell (*Pinna nobilis*) in the western Mediterranean Sea; a species highly threatened with extinction

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## MEDITERRANEAN SEA

### Before 2016

*Pinna nobilis* was present throughout the **Mediterranean Sea** coastal areas

### Autum 2016

A Mass Mortality Event (MME) associated with a parasite was first detected in the southeast of Spain (Vázquez-Luis et al. 2017)

### 2017

*Haplosporidium pinnae* (Catanese et al. 2018) is detected as the main responsible pathogen

The MME rapidly spread throughout the entire Mediterranean

### 2017-2019

First Spanish rescue programs to maintain individuals in captivity and study the MME

### 2019

*Pinna nobilis* entered the IUCN Red List as a critically endangered species

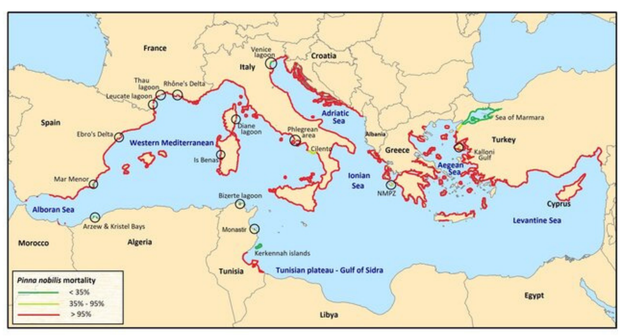
Other opportunistic pathogens such as *Mycobacterium* spp (Carella et al. 2019) and/or *Vibrio* sp. (Prado et al. 2021) could have acted synergistically in the mass mortality

### 2020-2021

Pen shell populations in Ebro Delta were afected by severe storms

### 2021 - Current situation

The total population size experienced a decline with estimated mortalities in the open sea of *ca*. 100% (García-March et al. 2020)




(Katsanevakis et al. 2021)

In **Spain**, the only remaining population are hosted in estuarine bays in **Ebro Delta** and the coastal lagoon of the **Mar Menor**

### 2021-2024

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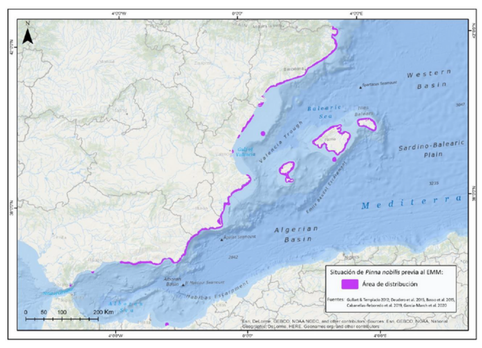
## SPANISH COAST




(Álvarez-Perez et al. 2022)

Populations in the **western Mediterranean Sea** were estimated to be about:

- 90,000 individuals in Alfacs Bay (Ebro Delta) (Prado et al. 2014)
- 1.8 million in Mar Menor lagoon (Giménez-Casalduero et al. 2020)

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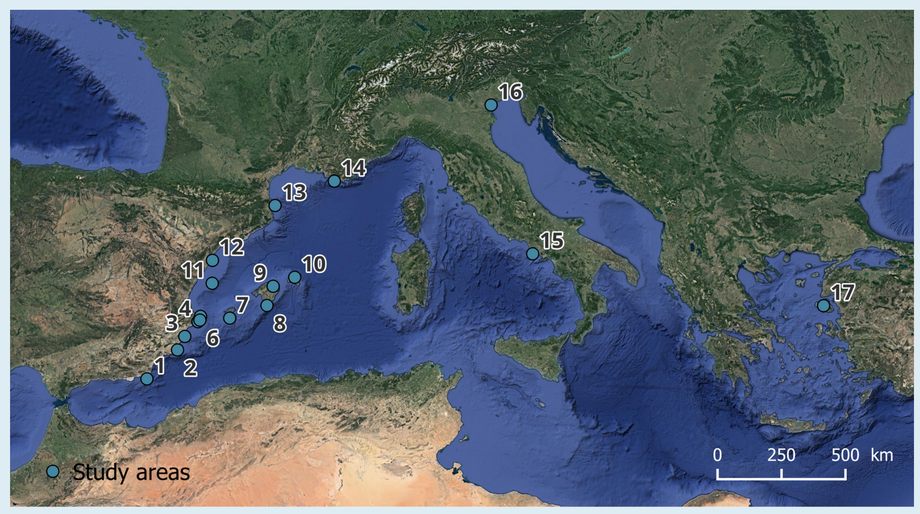
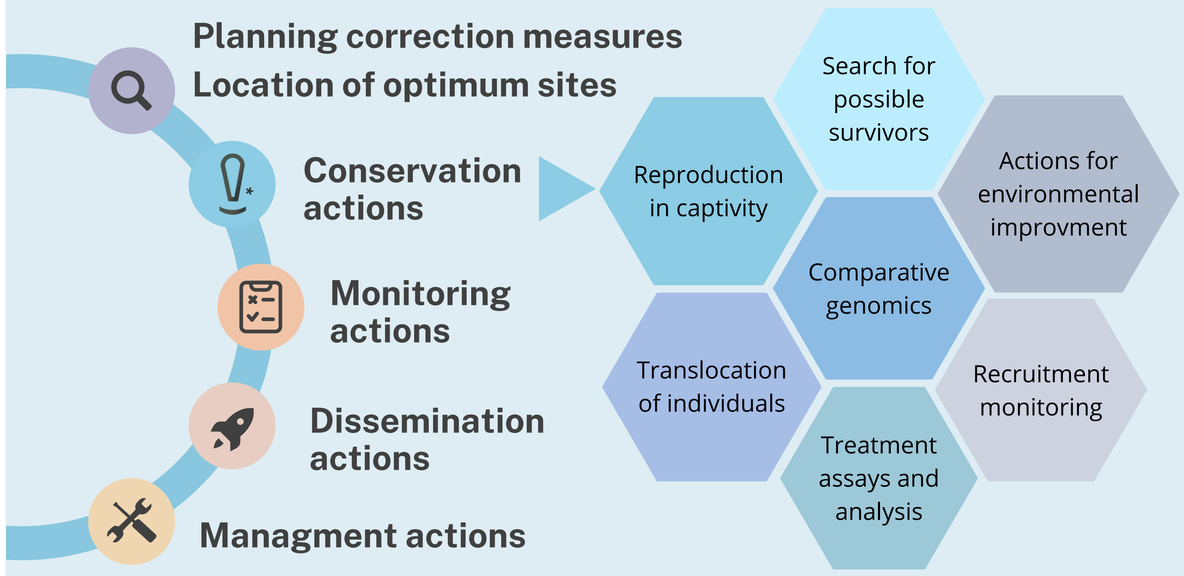
## Protection and restoration of *Pinna nobilis* populations as a response to the catastrophic pandemic started in 2016

Coordinated by: Associated Beneficiaries:




Compile all available information on remaining populations and resistant individuals into a integrated database, while concurrently implementing active recovery actions




## Future prespectives

To gain a better understanding of the key aspects of the species and to develop effective conservation and management strategies, there is an urgent need to/for:

- Identify **resistant survivors**, enhance **genetic diversity**, and understand the factors enabling fan mussels survival
- Refine the **mechanisms controlling the pathogens** in the environment and its dispersal capacity
- Understand how to **breed, reproduce**, and **sustain larvae until maturity** to facilitate reintroduction
- Further studies on **picornavirus infection**, which is likely to cause immunosuppression, making individuals more susceptible to opportunistic infections

## References

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