



## Background

In Boka Kotorska Bay there is an inadequate implementation of regulations in the marine environment. There are too many examples of soil disposal in seawater as a consequence of construction activities along the coast. Also, the city of Kotor, as regional nautical tourism destination, contributes to increased number of cruisers with the consequence of rapid deterioration of seawater quality by sediment re-suspension. Considering the unfavourable trends in terms of environmental protection of the sea in Montenegro, it is necessary to implement the protection of emblematic endangered marine species present in Kotor Bay such as *Pinna nobilis* and the endangered marine environments where they live (seagrasses of *Posidonia oceanica* and *Cymodocea nodosa*). Accordingly, it is necessary to increase social awareness on the urgent necessity of marine environment protection. *P. nobilis* is the largest bivalve of the Mediterranean Sea and one of the largest of the world.

The Mediterranean endemic mollusc *P. nobilis* is the largest bivalve of this sea and one of the largest of the world. The deterioration of the marine environment, the collection of shells for food, fishing and souvenirs, the excessive sediment re-suspension, pollution, biological contamination and the recent mortality of the species occurring in Spain, have reduced the numbers of this emblematic species. Nowadays, the species is endangered and has been protected in many countries and by

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# PinnaSPOT

**THE STUDY, PROTECTION AND POSSIBLE  
BREEDING OF PEN SHELL (*PINNA  
NOBILIS*) IN THE BOKA KOTORSKA BAY**



**INSTITUT ZA  
BIOLOGIJU MORA**



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PAUL RICARD**



 **PinnaSPOT**

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EU laws (ANNEX II of the Protocol Concerning Specially Protected Areas and Biodiversity in the Mediterranean of the Barcelona Convention and ANNEX IV of Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (EC Habitats Directive).

However, there are no studies on the ecology and ecophysiology, genetics and population dynamics of *P. nobilis* in Boka Kotorska Bay so far. Our challenges are to study its populations in a global context (comparing the results with monitoring programs in Monaco, France and Spain), educate the public, and collaborate with the different stakeholders in the development of protection and conservation strategies of the marine environment of Boka Kotorska Bay.

## Objectives

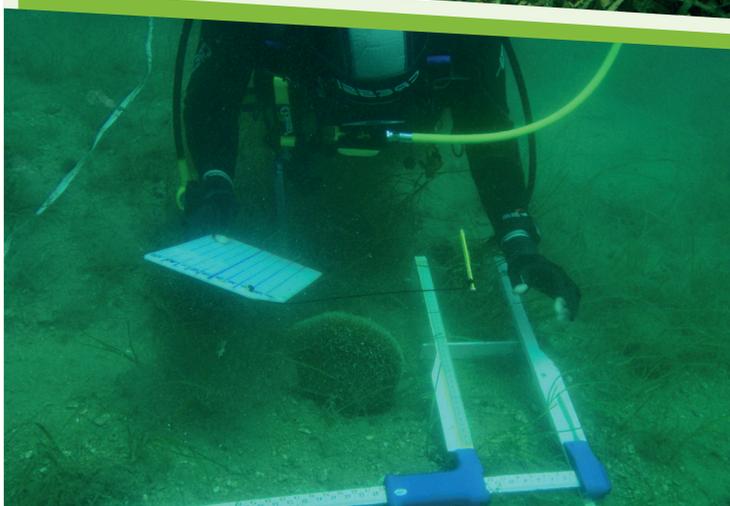
The overall project goal is improving the knowledge on the endangered Mediterranean endemic bivalve *P. nobilis* and the valuable environments where it inhabits in Boka Kotorska Bay for the implementation of regulations in the context of environmental impact assessment procedures.

### SPECIFIC OBJECTIVES:

- Studying the population structure, population dynamics and the ecophysiology of *P. nobilis* as a response to the main environmental stressors occurring in Boka Kotorska Bay
- Monitoring of the environmental parameters of the sites where *P. nobilis* inhabits
- Comparative study of *P. nobilis* genetics
- Implementing educational and divulgation programs involving the public and the different stakeholders
- Implementation of the conservation strategy

## Activities

- Census of *P. nobilis* individuals in Boka Kotorska Bay, Monaco, France and Spain. Collection of empty shells for growth studies
- Installation of larvae collectors in Boka Kotorska Bay, Monaco, France and Spain
- Study *P. nobilis* hatchery in captivity and studying the response of *P. nobilis* to variations in salinity
- Characterising sediment type, intensity of re-suspension of the sediment and its percentage of organic matter
- Studying the structure and condition of the seagrasses of *Posidonia oceanica* and *Cymodocea nodosa* inhabited by the populations of *P. nobilis* monitored in the present project



- Studying the annual variations of temperature, salinity and O<sub>2</sub> concentration in water
- Characterising the genetic diversity and variability among the populations of *P. nobilis* living in Montenegro, Monaco, France and Spain
- Schools will be invited to the Research Institutes where talks and activities will be implemented to inform about the project and about the necessity of protection of the marine environment
- We will work together with national governmental institutions on the preparation of management and protection plans for *P. nobilis* in Boka Kotorska Bay, according to the data gathered in the project

Scientific research project PinnaSPOT is the product of international collaboration established between the Institute of Marine Biology, University of Montenegro (leading partner), partners from Spain (The Catholic University of Valencia "San Vicente Martyr" - Marine Research Institute IMEDMAR) and France (Oceanographic institute Paul Ricard), and also the Petrovic Njegos Foundation from Montenegro as honorary partner. The project is approved for funding by the Prince Albert II of Monaco Foundation in amount of 270.000 euro, while the total value of the project is 551.250 euro. Realization of the project started on April 1<sup>st</sup>, 2016 and it will end on March 31<sup>st</sup>, 2019.