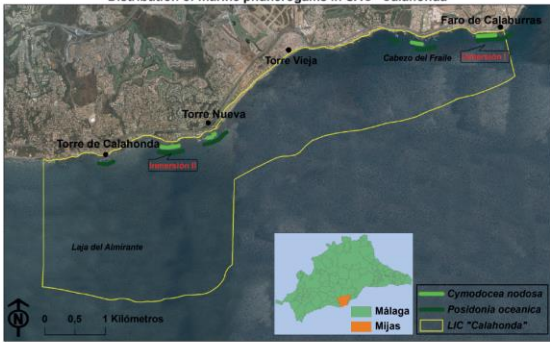


Distribution of marine phanerogams in SAC "Calahonda"



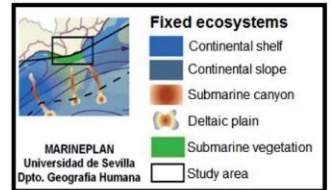
## INTRODUCTION

Special Area of Conservation (SAC) Calahonda is a hot spot of biodiversity in the world, surrounded by the Alboran Sea, which presents a great diversity due to hydrology and topography of the basin. It is a place of meeting and coexistence of Atlantic and Mediterranean species and European and African species.

SAC Calahonda (code ES6170030) has an approximate area of 1404.17 ha, with 98% of the sea surface and 2% of land [1]. It is located between Fuengirola and Marbella, from beach of Calahonda (west) to Punta de Calaburras (east).

*Posidonia oceanica*, an endemic marine phanerogam of the Mediterranean, was responsible for the recognition of Calahonda as Site of Community Importance (SCI), which is one of the few natural rocky outcrops, where is remarkable the presence of a marine crag called "Laja del Almirante" or "Laja de las Gorgonias" [2] and a submarine canyon [3].

This project has as purpose to show biological wealth offered by Calahonda, to report on present and future threats, like the Siroco Project to oil exploration in this coastal area, and to offer proposals related to disclosure and environmental awareness for conservation of this area. Therefore, it focuses on the most sensitive zones in the area studied, which collect maximum diversity and we should protect it. In addition, it exposes an environmental assessment of the site with aid of a SWOT matrix.



## METHODOLOGY

Objectives	Techniques
<b>Description of abiotic, biotic and socioeconomic areas.</b>	<ul style="list-style-type: none"> <li>- Bibliographic and documentary review (scientific articles, papers sectoral and territorial planning and technical reports), including legislation.</li> <li>- Obtaining data through the application of information to the Mijas Town Hall.</li> </ul>
<b>Georeference natural resources</b>	<ul style="list-style-type: none"> <li>- Using Geographic Information System "ArcGis" with information obtained from the Spatial Data Reference of Andalusia (DERA) and the Environmental Information Network of Andalusia (REDIAM).</li> </ul>
<b>Fieldwork</b>	<ul style="list-style-type: none"> <li>- Planning and carrying out two dives in representative areas of SAC with self-contained breathing equipment.</li> <li>- Collecting of the most predominant algae for the production of an algaarium.</li> <li>- Photographing some attractive species in the area.</li> </ul>
<b>Develop a SWOT matrix</b>	<ul style="list-style-type: none"> <li>- Making an environmental assessment of the area using the information obtained through the bibliographic, mapping and fieldwork.</li> </ul>
<b>Offer different proposals</b>	<ul style="list-style-type: none"> <li>- Generating proposals for the management and conservation of SAC after analyzing the SWOT matrix.</li> </ul>
<b>Report potential impacts that would have caused oil exploration</b>	<ul style="list-style-type: none"> <li>- Gathering information on the possible damage that had triggered oil exploration in the study area, including other possible alternatives more viable.</li> </ul>



## RESULTS

### WEAKNESSES

- Highly urbanized coastal area.
- Tourist attraction.
- Zones of special fishing wealth.
- Lack of awareness, information and environmental education.
- Contamination on beaches.
- Presence of hydrocarbon fields.
- Geographical situation: maritime traffic.
- Difficulty to publicize marine natural resources.



### PROJECT SIROCO

Siroco project, from 2004, has had the aim of carrying out oil exploration in the study area, an option that would avoid partly external dependence on fossil fuels. However, it would cause negative effects on organisms due to acoustic impact caused by compressed air guns in marine seismic exploration process, in addition to own ecosystem and the fishing sector. Finally, it was rejected in August 2015 by the multinational Repsol opting for more profitable projects [4].

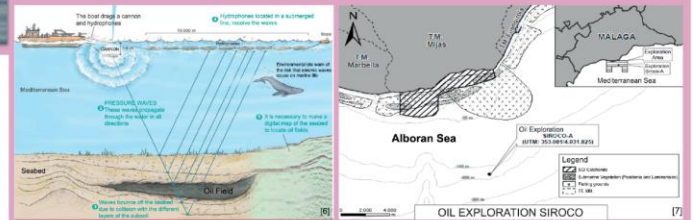


### THREATS

- Overfishing, trawling and fishing of immature fish.
- Unsustainable urban and tourist pressure.
- Discharges.
- Creation of coastal infrastructure not respectful with the environment.
- Ocean acidification and warming of water bodies.
- Sand and gravel mining activities.
- Inappropriate scuba diving.
- Collection of living organism in order to aquarium hobby and trade.
- Aquaculture.
- Administrative mismanagement of the coastal area.
- Invasive species.
- Oil exploration project.

### STRENGTHS

- Conservation programs for threatened species.
- Efforts of conservationist associations.
- Environmental monitoring program.
- Strategic area in the Alboran Sea.
- Acknowledgement of SAC.
- Beaches with Blue Flags.
- Investigation.
- Biodiversity.
- Tourist attraction.
- Rocky outcrops.



### OPPORTUNITIES

- Possible granting of SPAMI.
- Investigation.
- Creating of Protected Marine Reserves.
- Interpretation Center.
- Aquatic activities.
- Environmental education.
- Marine ecotourism.
- Actions for conservation with volunteer activities.
- More information through media.
- Legislation.
- Installation of artificial reefs as refuge places.
- Growth versus conservation.



## PROPOSAL OF MANAGEMENT

### Environmental education

- Create new centers of interpretation.
- Promote better training of environmental agents.
- Encourage recycling through financial compensation.
- Environmental reports more understandable and accessible with fast dissemination.

### Prevention and environmental control

- Increase monitoring and control environmental units.
- Implement environmental monitoring plans using bioindicators.
- Clean the hulls of ships to prevent invasive species.
- Impose higher requirements on the proper functioning of the purification systems.
- Respect the buffer area and clean the canals of the rivers to reduce sediment supply.
- Check the quota of people to avoid overcrowding and impacts in this area.

### More sustainable and viable projects

- Build ecological mooring buoys.
- Build wooden boardwalks minimizing the impact to the shoreline.
- Create more fish stocks.
- Present an overview of the north-south basins to make the management for Alboran Sea a reality.

## CONCLUSION

In August 2015, it was approved the extension of protection of Site of Community Importance (SCI) of Calahonda to a Special Area of Conservation (SAC) [5], a decision that would have been affected if Siroco Project would have gone ahead. Therefore, thanks to research projects and dissemination of biodiversity of this place, it has been achieved confront certain threats and increase protection of natural areas, such as the present study.

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