Shelf of the Gulf of Lion Important Marine Mammal Area - IMMA

Description

The Gulf of Lion is a passive, protruding continental margin that extends from Cap de Creus in Spain to Toulon in France. It is characterized by having an unusually broad continental shelf for the Mediterranean basin, reaching lengths of up to 72 km in its widest locations. Its shelf break is well defined at 100-200 m depth and incised by a complex network of submarine canyons, which converge towards the base of the slope, with tributaries of different orders reaching depths of almost 2,000 m. Due to differences in shelf width along the continental margin, some of these canyons can be found relatively close to the shore, just a few kilometres from land (for example Cap de Creus canyon in the western part of the gulf), while others appear relatively far offshore (e.g. Grand and Petit Rhône canyons in the eastern part of the gulf). The currents in the Gulf of Lion are largely influenced by the Mediterranean Northern Current along the continental slope of the northeast to the southwest. This current enters the shelf to its east part (entrance of the system), in the centre and also in the west part (exit of the system).

The dominant current system on the Gulf of Lyon flows then towards the southwest. Hence, the associated freshwater plume produced by the Rhône river sediment discharge tends to get deflected southward by the general water-mass movement. River plumes usually expand over the continental shelf at a relatively short distance from the coast. In situations when Mistral and Tramontana winds blow, the brackish waters produced by the Rhône can reach the outer part of the shelf and slope, located a few kilometres away from the coastline. This situation creates a wind induced coastal upwelling of deeper and
denser waters. So, the north-western wind blows (Mistral, Tramontana) are common in this region and generate coastal upwelling (i.e. upwelling to the surface rich in nutrients) in six areas of the Gulf of Lion. Anticyclonic eddies of several weeks can be observed in summer in the western part of the Gulf of Lion, combined also with Mistral wind blows.

This area is located on the French Mediterranean coast. The Gulf of Lion stretches 250 kilometres from west to east and 150 km from north to south, from the Pyrenees to Marseille. It consists of a semi-circular shelf occupying about 14,000 square kilometres, with a width of 70 km from Sète and an average depth of fifty meters. It is a recognised biogeographic entity as its own. A great part is under national jurisdiction (12 NM) and the other part lies under the French EEZ. The existing complex of currents in the Gulf of Lion and his countenance make a regularly enriched region in nutrients conducive to the development of marine life. The Gulf of Lion is an area rich in marine biodiversity and widely exploited by human resources as the main French Mediterranean fishing ground.

The Gulf of Lion appears to host the most important number of common bottlenose dolphins along this stretch of coast. A study of two years, all seasons, investigated the whole French Mediterranean coastline focusing on this species (GDEGeM, GIS3M). The photo-ID study identified 834 different individuals within the Gulf, with a 53% recapture success. A mark-recapture analysis provides a global population of at least 655 ind. (95% IC: 385 - 1,095) *Tursiops* living in that area year-round, among them 53.2% are resident (Di-Méglio et al., 2015). The numbers reached a maximum in the summer and a minimum in winter with a mean density of 0.047 ind./km². These numbers are coherent with the results of the French aerial survey that occur in 2011-2012 (Laran et al., 2016) which cover among other French EEZ areas, the Gulf of Lion, and give almost the same densities as the precedent study for the same seasons (0.07 ind./km² in summer and 0.01 ind./km² in winter). The social structure show that three different groups use the Gulf of Lion and some individuals have also been seen along the neighbouring Provençal coast (Labach et al., 2015).

**Criterion C: Key Life Cycle Activities**

**Sub-criterion Ci: Reproductive Areas**

During the two years of study we saw new-borns all year round, from 5.3% of individuals in summer to 0.7% in winter (from 92 sightings and 1,545 individuals). Female and young use the shelf as a whole, having been seen from one side to the other within a
month or more (photo-ID recaptures; Di-Méglio et al., 2015).

**Criterion C: Key Life Cycle Activities**

**Sub-criterion Cii: Feeding Areas**

38.5% of 92 sightings were animals engaged in feeding activities, and animals feeding have been seen during all seasons. Also, they are known to interact with bottom trawlers (Di-Méglio et al., 2015).

**Supporting Information**


**Acknowledgements**

The participants of the 2016 IMMA Regional Expert Workshop held in Chania, Crete, for the Identification of IMMAs in the Mediterranean Sea. Léa David.
Annex I
Supplementary Maps

The information on this map was derived from the work of regionally assembled experts for the region. Care was taken in the creation of this map and it utilizes the Global Self-consistent Hierarchical High-resolution Geography (GSHHG) Version 3.14, August 30, 2010, which is distributed under the License (Public) with the National Geospatial-Intelligence Agency. Bathymetric information on this map was made available under a Creative Commons Attribution License by NOAA, using the GTOPO30 (M4) grid version 20000914. www.geotools.com. The authors cannot accept any responsibility for errors, omissions, or positional accuracy. Not to be used for purposes of navigation.

Shelf of the Gulf of Lion IMMA

Area meeting the IMMA Selection Criteria

Advised buffer for use in the development of appropriate place-based conservation measures
## Annex II

### List of Primary and Secondary Species

#### Primary Species – Meet the IMMA Selection Criteria

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name of Species</th>
<th>Population / Subpopulation Name</th>
<th>IUCN Red List Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Tursiops truncatus</em></td>
<td>Common bottlenose dolphin</td>
<td>Mediterranean Subpopulation</td>
<td>Vulnerable</td>
</tr>
</tbody>
</table>

#### Secondary Species – Do not individually meet the IMMA Selection Criteria but are present within the area

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name of Species</th>
<th>Population / Subpopulation Name</th>
<th>IUCN Red List Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Balaenoptera physalus</em></td>
<td>Fin whale</td>
<td>Mediterranean Subpopulation</td>
<td>Vulnerable</td>
</tr>
<tr>
<td><em>Tursiops truncatus</em></td>
<td>Common bottlenose dolphin</td>
<td>Mediterranean Subpopulation</td>
<td>Vulnerable</td>
</tr>
<tr>
<td><em>Stenella coeruleoalba</em></td>
<td>Striped dolphin</td>
<td>Mediterranean Subpopulation</td>
<td>Vulnerable</td>
</tr>
<tr>
<td><em>Grampus griseus</em></td>
<td>Risso’s dolphin</td>
<td>Mediterranean Subpopulation</td>
<td>Data Deficient</td>
</tr>
<tr>
<td><em>Ziphius cavirostris</em></td>
<td>Cuvier’s beaked whale</td>
<td>Mediterranean Subpopulation</td>
<td>Data Deficient</td>
</tr>
<tr>
<td><em>Physeter macrocephalus</em></td>
<td>Sperm whale</td>
<td>Mediterranean Subpopulation</td>
<td>Endangered</td>
</tr>
</tbody>
</table>