Western Mediterranean ecoregion (WME)

Maritime Transport

Definition

Maritime transport relates to the carriage of goods or/and passengers by sea by a person for commercial purposes, either in return for payment (i.e. for hire and reward) or on an organization’s own account as part of its wider economic activity. Goods transportation refers to the volume of containerized, dry bulk, liquid bulk and roll on-roll off (Ro-Ro) type of cargo handled by the ports while passenger traffic refers to the number of national, international and cruise passenger volumes transported through ports.

Regional context

The Western Mediterranean is crossed by a significant number of main routes of oil tankers crossing the Mediterranean Sea. In addition to the main shipping routes, other types of transport mainly ferry routes are very frequent in certain areas regularly or seasonally. The Mediterranean region is also important to the European cruise sector that has grown considerably in the last decade and is expecting to continue. This importance can be illustrated by the large number of Western Mediterranean ports being members of the two major cruise industry-oriented trade associations, MedCruise and Cruise Europe. The European cruise sector is, to a large extent, destination-led and the Mediterranean area is an attractive area to a significant share of the cruise tourists.

The figure below provides insights into the merchant shipping and passenger ferry routes in the Pelagos Sanctuary (e.g. Ligurian Sea).

Merchant shipping (a) and passenger ferry routes (b) in the Pelagos Sanctuary.

Source: Policy Research Corporation based on IUCN, Maritime traffic effects on biodiversity in the Mediterranean Sea.
Handling a total of around 252 million tonnes, four Western Mediterranean ports are listed among the twenty most important main ports in Europe in 2012. Moreover, with regard to container traffic, the following figure illustrates that several Western Mediterranean container ports in Spain (i.e. Valencia and Barcelona), France (i.e. Marseilles) and Italy (i.e. Genoa, La Spezia, Livorno and Cagliari) are considered of importance to both the region and Europe as a whole. In addition, both Marseilles and Genoa were listed in the top-20 ranking of Short Sea Shipping ports in 2008. The high frequency of certain transport routes in the region is expected to be linked with pressure on marine environment in these regions. Italy as a whole accounted for the second largest country of Short Sea Shipping of goods in the EU.

The Mediterranean region is also important to the European cruise sector. The cruise sector is continuously strengthening around the world mostly due to the dynamism of the Mediterranean market, which is the second market in the world (after the Caribbean), with 21.7% of global deployment shares in 2013. This trend indicates that, beyond the increased demand for destinations, ports and other factors have worked in an effective way to promote cruise activities increasing such demand. Western Mediterranean countries (Spain, France and Italy) are the ones most enjoying the growth of this sector. Italy presented, in 2013, 28.8% of the total European expenditures generated by the cruise industry, namely 4.46 billion Euros (15.5 up).

In 2013, 7 out of 10 of the top Mediterranean cruise ports in terms of passengers belonged to the Western Mediterranean ports. Barcelona was ranked first with 2.6 million passengers, then Civitavecchia with 2.5 millions. Balearic Islands were number 4 with 1.5 million, and Marseilles and Naples number 6 and number 7. Western Mediterranean ports were the most dynamic during the period 2009/2013, with an increase of passengers of 88% in Marseilles, 56% in Genoa, 41% in Civitavecchia and 32% in Savona.

In 2013, the WME welcomed around 71% of the passengers (18.8 million), compared to 19% in the Adriatic (5 million) and 10% in the Eastern Mediterranean (2.8 millions).
Related Pressures

The intensive maritime transport activity in the WME implies ships and port emissions, risks of accidents, acute pollution events and the introduction of invasive alien species through ballast water discharges (EC, 2012).

Abrasion
The damage caused from grounding and anchoring of ships in the sea ground; UNEP/MAP/Plan Bleu 2014.

Underwater noise
Maritime traffic is an important source of anthropogenic noise especially in the Ligurian Sea. Excessive noise makes it harder for whales to communicate with each other or to receive acoustic cues, for example to detect approaching vessels or other hazards (UNEP/MAP/Plan Bleu 2014).

Marine Litter
While sea and waterway activities account for only five percent of marine litter in the Mediterranean, problems still exist in relation to the operation and use of port reception facilities (UNEP/MAP 2009).

Introduction of non-indigenous species and translocations
Maritime transportation and aquaculture are the main ways non-indigenous species enter the Western Basin of the Mediterranean. Migration through the Suez Canal is responsible for most non-indigenous species in the Eastern Basin introduced from the Red Sea. The introduction of non-indigenous species results also from ballast water discharged in the Mediterranean (UNEP/MAP 2012).

Introduction of synthetic compounds
Biocides (mainly organotin compounds such as tributyltin, known as TBT) used in antifouling paints and polycyclic aromatic hydrocarbons (PAHs) resulting from hydrocarbon oil discharges and accidental spills. Distribution data are poor but adequate to show that TBT was detected in all water and sediment samples analysed in the Alboran Sea, Northwestern Mediterranean, the Tyrrhenian coast of Italy, the Venice lagoon, the Gulf of Saronikos (Greece), the southern coast of Turkey, the coasts of Israel and Alexandria (UNEP/MAP 2012).

Introduction of non-synthetic substances and compounds
Introduction of non-synthetic substances and compounds as marine transport is a main source of petroleum hydrocarbon (oil) and PAH pollution in the Mediterranean Sea. According to certain studies, approximately 0.1 % of the crude oil transported ends up deliberately dumped every year in the sea as the result of tank washing operations. All other types of vessels are also potentially a source of discharge of oily waste. Other releases of oil from ships include amongst others loading/discharging, bunkering, dry-docking operations and discharging of bilge oil. In the last decade, nearly half of the accidents leading to significant spills (of more than 100 tonnes) that were reported to REMPEC occurred in the Western Mediterranean Sea (seven accidents representing 47 % of all accidents during this period). A third of the accidents occurred in the Eastern Mediterranean (five accidents representing 33 % of the total) and a fifth of the accidents (20%) occurred in the Central Mediterranean.

Highlighted features
The map represents the estimated intensity of pollution by maritime transport, based on shipping tracks, port influence and oil spills. High pressures are observed in North Western Mediterranean (Gulf of Lion and Sardinia) as well as in the Southwest, especially in regions near the port of Algeciras. The main accumulations of pollution shown in the map are a result of important oil spills that occurred in the region mainly as a result of accidents.

Data/Indicator used
The indicators developed are based on three variables: vessels traffic, port activity and oil spills. Shipping data (Halpern et al., 2008) provide an estimate of the occurrence of ships at a particular location, and therefore an estimate of the amount of pollution they produce (via fuel leaks, oil
discharge, waste disposal, etc.), under the assumption that traveling ships primarily affect their immediate waters. The dispersal of port-derived pollution was modeled as a diffusive plume based on Eurostat data of transport of goods (thousand tonnes) and passengers (thousand passengers). Pressure generated by oil spills is represented as a density layer based on data registered by the Mandate of the Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea (REMPEC) for the period 1977-2011.

**Gaps**

N/A

**Limits of methodology**

The pollution by ships estimation is based on a global model with its inherent uncertainty. Hence a more regionalized modeling approach may provide some more adapted information. No distinction is being made between cruisers, ferries and commercial good ships. Oil spills pollution does not consider ocean currents and dispersion of pollution produced by them.

**Highlighted features**

The following map shows the number of invasive species introduced through transport activities, i.e. through ships. It clarifies that the intensity of invasive species introduction in the Western Mediterranean is concentrated at over the coasts, indicating the impact of ships’ ballast waters close to the ports.

**Data/Indicator used**

Data are taken from the EASIN database, elaborated by EC’s Joint Research Centre (see also Katsanevakis et al. 2014) at a resolution of 10 km.

**Gaps**

N/A
Limits of methodology
Model-based approach with low degree of uncertainty, as based on species databases and peer-reviewed literatures.

List of proposed indicators
The following table lists the indicators developed and mapped within Med-IAMER on the impacts of maritime transport on coastal (land) and marine environments. All maps, identified by the indicator ID, can be found at the project’s web page: http://www.medmaritimeprojects.eu/section/med-iamer-redirect/outputs

<table>
<thead>
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<th>ID</th>
<th>Indicator description</th>
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<td>TP01</td>
<td>Marine exposure due to port activity: goods transport</td>
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<td>TP02</td>
<td>Marine exposure due to port activity: passenger transport</td>
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<tr>
<td>TP03</td>
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<td>Invasive species related to transport activity</td>
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<td>ML02</td>
<td>Marine litter by transport influence</td>
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