

CO-EVOLVE

Promoting the co-evolution of human activities
and natural systems for the development of
sustainable coastal and maritime tourism

Deliverables 3.7.1/3.13.1

**Synthesis report on threats to
sustainable tourism at
Mediterranean**

**Synthesis on enabling factors for
sustainable co-evolution in
touristic areas - Mediterranean
scale**

Activities 3.7/3.13

Threats to co-evolution - Mediterranean scale:
synthesis

Enabling factors for co-evolution -
Mediterranean scale: synthesis

WP3

CNR-ISMAR and PAP/RAC



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Table of content

1. Introduction	4
2. Coastal and Maritime Tourism in the Mediterranean.....	9
2.1 Coastal and maritime tourism: state of the art and recent trends in the MED	9
2.2 Coastal tourism destination types for CO-EVOLVE analyses.....	11
3. Threats and Enabling Factors to/for Sustainable Tourism.....	16
3.1 Threat 1: Climate changes and morphological stability	18
3.2 Threat 2: Littoralization and urbanization.....	29
3.3 Threat 3: Touristic fluxes and carrying capacity	38
3.4 Threat 4: Pollution and other anthropogenic pressures to ecosystems	53
3.5 Threat 5: Conflicts among different uses on land and at sea and land-sea interaction	67
3.6 Enabling factor 1: Coastal protection measures	74
3.7 Enabling factor 2: Ecosystems Protection	81
3.8 Enabling factor 3: Water Supply and Depuration	94
3.9 Enabling factor 4: Transport and accessibility	100
4. Integrated analysis of Threats and Enabling Factors.....	107
4.1 Interactions among Threats and Enabling Factors	107
4.2 Spatial interactions among T&EF in the Mediterranean.....	109
4.3 Time trends of interactions among T&EF in the Mediterranean.....	113
5. Examples from the local scale: Threats and Enabling Factors.....	115
5.1 Overview on CO-EVOLVE Pilot Areas.....	115
5.2 Representative Examples from the Pilot Areas	120
5.3 Discussion	133
6. From Threats to Enabling Factors – Proposition for improvements.....	135
7. References	149

1. Introduction

Tourism is a major economic driver and employment producer in the Mediterranean, where it accounted for 11.3% of Gross Domestic Product (GDP) and 11.5% of employment in 2014 with expected significant growth through 2025 (Plan Bleu, 2016). In the Mediterranean, tourism supply and demand tend to be concentrated in coastal areas. It has a particular importance in countries with limited industrial and agricultural development. As such, the activity has a crucial role to play in the sustainable development of the region, potentially contributing to economic growth, social inclusiveness, employment and poverty reduction, resource efficiency and environmental protection, safeguarding of cultural values, diversity and heritage, mutual understanding, and peace and security (Figure 1; UNWTO, 2017).

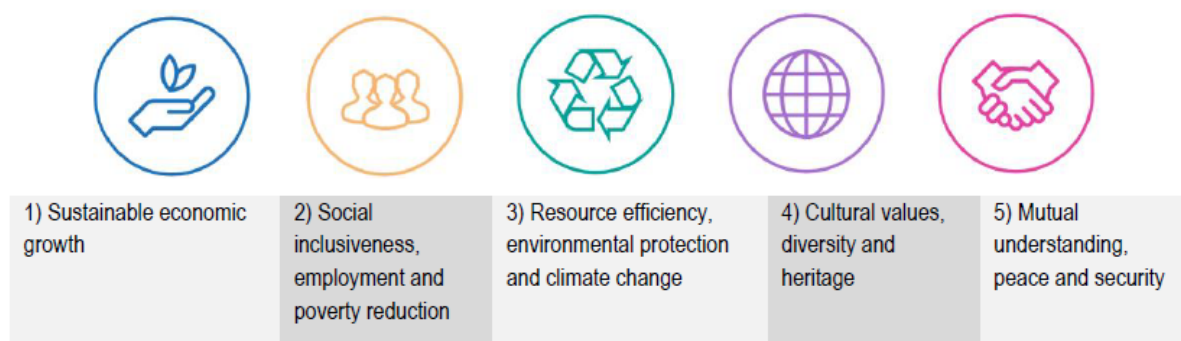


Figure 1 – Potential tourism contribution to sustainable development (UNWTO, 2017).

However, the continuous growth of tourism in Mediterranean coastal areas exerts pressures on environmental and cultural resources of the coastal zones, and affects negatively social, economic and cultural patterns of tourist destinations. Tourism is also one of the main causes for littoralization. Moreover, there is an inevitable tendency in any local community to substitute gradually its traditional production activities for tourist activities, the profitability of which is generally much greater than that of traditional activities (farming, fishing, etc.). This leads to a monoculture of tourist activity, which results in abandonment of farms that eventually degrade or disappear. From the cultural point of view, traditional knowledge disappears so that the new generations gradually lose this know-how until it completely disappears (IUCN, 2010).

This is why one should always keep in mind that it is necessary to avoid excessive dependence on one economic activity, and that tourism is only one of the numerous uses of the coastal zone by different actors (Figure 2).

Differentiation in tourism needs environmental and cultural preservation, also in the light of climate change impacts.

Sustainable tourism is defined by World Tourism Organization (2005) as follows: “*Tourism that takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities*”.



Figure 2 – Tourism as one of the multiple uses on the coastal zone (Ramierie et al., 2014).

Sustainable tourism should:

- “1) Make optimal use of environmental resources that constitute a key element in tourism development, maintaining essential ecological processes and helping to conserve natural heritage and biodiversity.*
- 2) Respect the socio-cultural authenticity of host communities, conserve their built and living cultural heritage and traditional values, and contribute to inter-cultural understanding and tolerance.*
- 3) Ensure viable, long-term economic operations, providing socio-economic benefits to all stakeholders that are fairly distributed, including stable employment and income-earning opportunities and social services to host communities, and contributing to poverty alleviation”.*

The **Mediterranean Strategy for Sustainable Development 2016-2025** provides a strategic policy framework, built upon a broad consultation process, for securing a sustainable future for the Mediterranean region consistent with Sustainable Development Goals. It aims to harmonize the interactions between socio-economic and environmental goals, to adapt international commitments to regional conditions, to guide national strategies for sustainable development, and to stimulate regional cooperation between stakeholders in the implementation of sustainable development. The Strategy is underpinned by the conviction that investment in the environment is the best way to secure long-term sustainable job creation and socio-economic development.

The Strategy follows a structure based on six objectives that lie in the interface between environment and development, and that were chosen to provide scope for an integrated approach to address sustainability issues.

The three first objectives reflect a territorial approach, while the other objectives are cross-cutting ones, addressing key policies and areas, as follows:

1. Ensuring sustainable development in marine and coastal areas;
2. Promoting resource management, food production and food security through sustainable forms of rural development;
3. Planning and managing sustainable Mediterranean cities;
4. Addressing climate change as a priority issue for the Mediterranean;
5. Transition towards a green and blue economy;
6. Improving governance in support of sustainable development.

The approach of the Integrated Coastal Zone Management (ICZM) is perceived by European Union (EU) and numerous international organizations as the most appropriate approach for the sustainable development and the management of coastal zones (European Commission, 2012). ICZM is defined as *"a dynamic process for the sustainable management and use of coastal zones, taking into account at the same time the fragility of coastal ecosystems and landscapes, the diversity of activities and uses, their interactions, the maritime orientation of certain activities and uses and their impact on both the marine and land parts"* (UNEP/MAP/PAP, 2008). It aims at comprehensive understanding of the relationships among coastal resources, their uses, and the mutual impacts of development on the economy and the environment. Besides, it helps preventing *ad hoc* and incompatible coastal development and it yields many benefits. ICZM can also augment the environmental, economic and social benefits of tourism, and enable identification and resolution of conflicts over resource use. For all these reasons, UNEP/GPA (2007) advocates the *"integration of tourism development into ICZM programmes [in order to ensure] that development is within the environmental carrying capacity of the area and conflicts with other coastal activities are minimized"*.

The main legal instrument for implementing ICZM in the Mediterranean is the Protocol on Integrated Coastal Zone Management in the Mediterranean (ICZM Protocol). It is the seventh Protocol in the framework of the Barcelona Convention, and it completes the set of Protocols for the Protection of the Marine Environment and the Coastal Mediterranean Region. It allows the Mediterranean countries to better manage and protect their coastal zones, as well as to deal with the emerging coastal environmental challenges, such as climate change. It is a unique legal instrument on ICZM in the entire international community.

From the EU perspective, the ICZM Protocol is considered as an international agreement where both the Member States and the EU have a common obligation to share competences for its implementation. The legal basis provided by the ICZM Protocol constitutes a framework to regulate economic activities along the coast, and it is therefore a valuable governance tool for improving the sustainability of tourism.

In the marine part of the coastal zone and beyond the limit of territorial sea (which is corresponding to the limit of the coastal zone), Maritime Spatial Planning (MSP) completes the ICZM Protocol. MSP can be defined as *"a process through which human activities can be analyzed and organized in coastal and maritime areas in order to achieve ecological, economic and social objectives (Directive 2014/89/EU). Essentially, MSP is a public process of analyzing and allocating the spatial and temporal distribution of human activities in marine*

areas to achieve objectives usually specified through a political process” (Ehler and Douvere, 2009). Given the intrinsic relations in between land and the marine part of the coastal zone, explicitly recognized by art. 7 “Land-sea interactions” of the Directive, MSP can be fully considered as a tool for the implementation of the ICZM Protocol on the marine part of the coastal zone (PAP/RAC, 2016). The MSP approach is entirely consistent with the ICZM Protocol’s principles. These last decades tourism activity largely extended on the sea, as global cruise market experienced exponential growth and recreational boating gained popularity.

Recognizing these principles, the CO-EVOLVE project aims at analyzing and promoting the co-evolution of human activities and natural systems in touristic coastal areas of the Mediterranean, thus laying the foundations for a more sustainable tourism based on the principles of ICZM/MSP.

CO-EVOLVE is divided in two main phases: the Studying phase (November 2016-January 2018) and the Testing phase (February 2018-October 2020). The main objective of the Studying phase is to produce an analysis at Mediterranean scale of Threats to and Enabling Factors for sustainable tourism, with local studies on representative Pilot Areas. The main goal of the Testing phase is to demonstrate the feasibility and effectiveness of an ICZM/MSP-based planning process to promote sustainable coastal tourism.

The present document is one of the main results of the Studying phase: in fact, it outlines an integrated analysis at Mediterranean scale of the main Threats and Enabling Factors (T&EF) for a sustainable and ecosystem-based coastal tourism development.

The selected Threats are the following:

1. Climate change and morphological stability
2. Littoralization and urbanization
3. Touristic fluxes and carrying capacity
4. Pollution and other anthropogenic pressures affecting ecosystems
5. Conflicts among different uses on land and at sea and land-sea interaction.

The selected Enabling Factors are the following:

1. Coastal protection measures
2. Ecosystem protection
3. Water management
4. Transport and accessibility.

The development and implementation of sound policies and the establishment of effective governance systems are seen and discussed within the Studying phase as a key factor linking Threats to Enabling Factors and, as such, as a sort of overarching Enabling Factor for sustainable tourism.

Each of the T&EF has been described and analyzed in specific tasks of CO-EVOLVE; in this way individual reports for each T&EF were produced (see <https://co-evolve.interreg-med.eu/> and references in Chapter 7). The present document synthesizes the main findings of the reports, and it constitutes the basis for the development of policies and coordination of strategies between territories at interregional and transnational level over the Testing phase, during which its conclusions will be translated into practice, setting the conditions for a sustainable tourism development in the Pilot Areas.

This document is structured in the following way:

- Chapter 2 includes a baseline description of coastal and maritime tourism in the Mediterranean using available standard criteria and indicators. Besides, it includes an identification of tourism typologies to address the analysis of Threats and Enabling Factors.
- Chapter 3 presents the state of the art of Threats and Enabling Factors, focusing on their relation with tourism activity. Recent trends and expected evolution are analyzed, and knowledge gaps are identified.
- Chapter 4 consists into an integrated exploration of Threats and Enabling Factors, focusing on hotspots identified during the analyses. Current state and future trends of interactions among Threats and Enabling Factors are also described.
- In Chapter 5, T&EF analysis at Pilot Area scale (Figure 3) is briefly presented, focusing on some examples.
- Chapter 6 contains policy and governance recommendations for improving the existing situation with legal, administrative and financial measures, all in line with the ICZM Protocol and MSP principles.



Figure 3 – The CO-EVOLVE Pilot Areas.

Gathering data at the Mediterranean scale is often challenging as some countries are more willing or able to share environmental and socioeconomic data than others. The European Union has recently adopted a large number of provisions, all in the direction of greater openness of public information, including environmental information (as for instance through the INSPIRE Directive). As a result, the quantity and quality of available information for European countries is higher than for the other Mediterranean countries, fact that explains why the present report tries to maintain as much as possible a full Mediterranean view, but it sometimes focuses more on the northern rim of the Mediterranean.

2. Coastal and Maritime Tourism in the Mediterranean

2.1 Coastal and maritime tourism: state of the art and recent trends in the MED

Approximately one third of the Mediterranean population is concentrated in its coastal regions, whereas more than half of the population resides in the coastal hydrological basins. According to Plan Bleu (2013) the population in the Mediterranean coastal regions is estimated at 150 million inhabitants and that of its hydrological basins totals approximately 250 million people, which represent 33% and 55% of the total population of the riparian states, respectively. This percentage reaches 65% for the southern countries of the region, with around 120 million inhabitants (Plan Blue, 2013).

The Mediterranean Basin attracts more than 30% of the international tourist arrivals, especially during summer months (Piante and Ody, 2015). The average annual rate of increase in foreign tourist arrivals exceeded 3.3% between 1981 and 1994, with tourist arrivals increasing from 110 million to 169 million. In the same period, the average rate of income from international tourism in the area was rapidly increasing and reaching up to 18.50% (Satta, 2004). In 2012 nearly 300 million international tourists visited the region, substantially contributing to the economy of the Mediterranean countries (especially Malta, Cyprus and Croatia).

Coastal and maritime tourism is an essential economic activity for Mediterranean countries. In fact, approximately half of arrivals are located in coastal areas, with coastal tourism representing the largest sea-related economic activity in the Mediterranean (EUNETMAR, 2014). Southern EU countries such as Spain, France and Italy have a leading role in the distribution of international arrivals in the Mediterranean region, with total market share over 60%, followed by the rapid growth rates of the Southern and Eastern Mediterranean countries (Satta, 2004; Piante and Ody, 2015). Turkey is the top non-EU destination with 40 million visits recorded in 2014 (Plan Bleu, 2016).

The share of coastal tourism employment can differ substantially between countries, but also within countries. Whilst coastal tourism (excluding maritime) amounted for just 1.1% of all EU27 employment, this dependence is considerably higher in a number of Mediterranean countries, notably Cyprus (8.6%), Malta (7.2%), Greece (3.7%) and Spain (3.3%) (Ecorys, 2013).

The Mediterranean tourism industry is facing increasing global competition, with emerging or developing countries attracting increasing numbers of tourists. However, UNEP/MAP (2012) still forecasts positive trends in coastal tourism flows for the next years, reaching up to 500 million of international tourist arrivals, especially in Croatia, Greece and Morocco (average annual rate up to 2.6% until 2030). In this view, coastal tourism has been identified as one of the five priorities of the EU Blue Growth Strategy (EU Commission Staff Working Document, 2017).

Significant growth rates were also recorded in maritime tourism activities, especially in cruising and recreational boating. The Mediterranean Sea is among the most important cruise and yachting destinations in the world, but also a rapidly emerging destination for recreational boating (Piante and Ody, 2015). In 2011, the share of the Mediterranean Sea as a global destination for cruise tourism grew from 17.6% in 2008 to 21.7%, while growth rates in the sector kept an upward trend for the last decade. Approximately 75% of cruise ports in the Mediterranean are located in Italy, Spain, France, Greece, and Croatia and 9% in Turkey and Cyprus (Figure 4; Piante and Ody, 2015). In this context and considering the level of flows in the Mediterranean, the main ports related to cruising activities are Barcelona and Palma de Mallorca (Spain), Napoli, Livorno and Civitavecchia (Italy), Piraeus (Greece) and Malta (ESPON, 2013).

Recreational boating is an important and rapidly growing economic activity in the Mediterranean Basin, especially for France, Italy and Greece. For instance, in Italy, 32 of 34 new port structures created between 2000 and 2007 were for tourism (EU Commission Staff Working Document, 2017). There is a growing demand for spatial expansion of marinas and recreational ports in the Mediterranean coast, which is however restricted by the enforcement of environmental protection legislation (Figure 5).

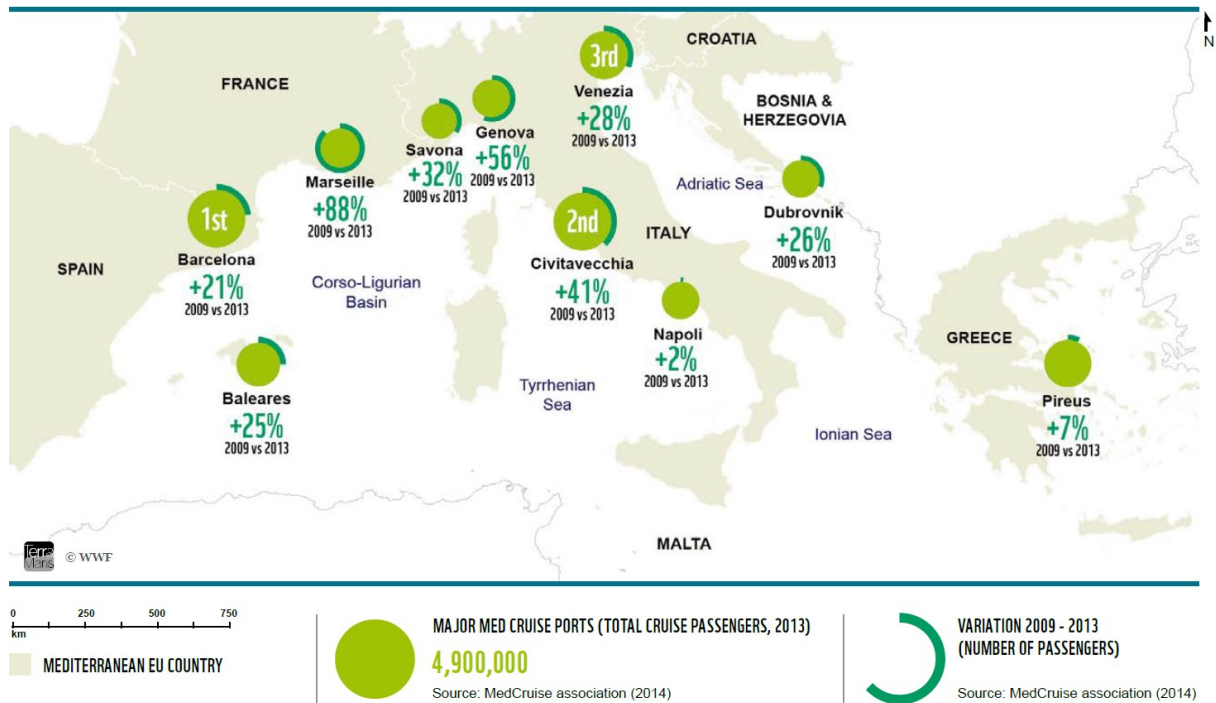


Figure 4 – Growth of Mediterranean ports in number of cruise passengers between 2009 and 2013 (Piante and Ody, 2015).

Over 900 marinas were identified in the Mediterranean coast in 2010, with most of them being located in Italy, Spain and France, while several new marina projects were identified in Greece, Spain, Malta and Italy in 2015 (Piante and Ody, 2015).

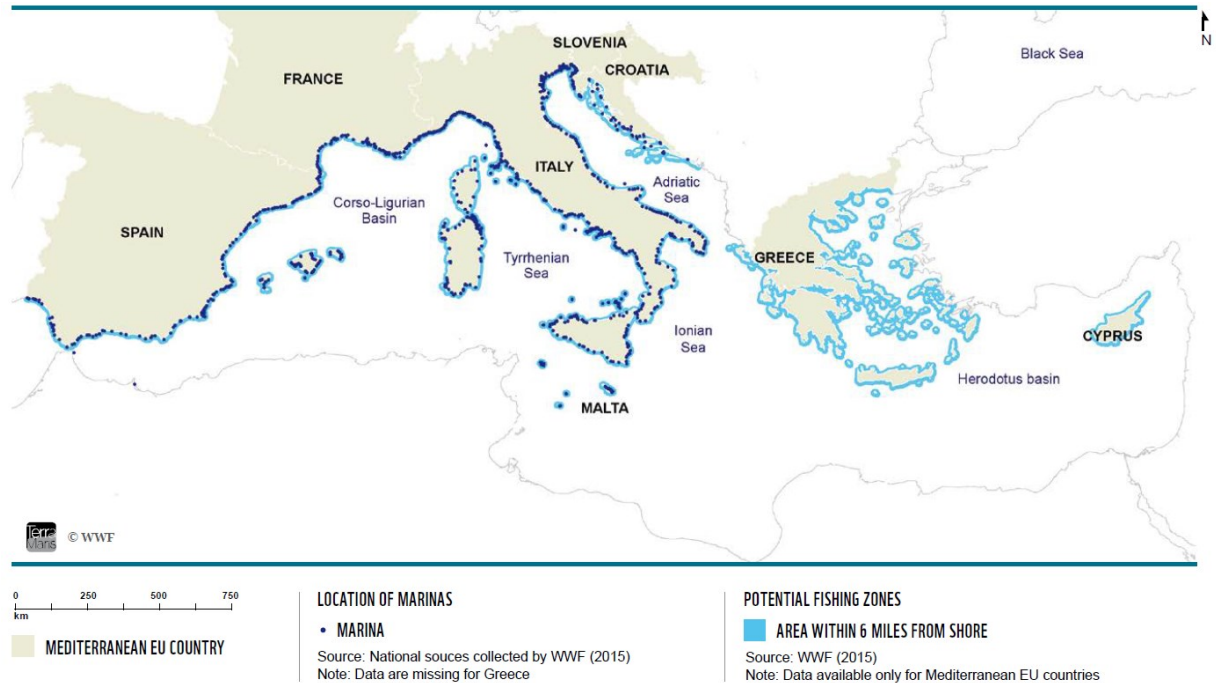


Figure 5 – Distribution of marinas and potential recreational fishing zones in the EU countries of the Mediterranean in 2010 (Piante and Ody, 2015).

2.2 Coastal tourism destination types for CO-EVOLVE analyses

CO-EVOLVE used two different classifications to carry out its analysis and to discuss interactions and relevance of the different Threats and Enabling Factors.

Coastal destinations can be classified according to the dominant type of tourism they support. Following Ecorys classification (2013), the dominant types of tourism identified in Mediterranean coastal areas and adopted in CO-EVOLVE are:

1. Beach/Maritime tourism;
2. Urban/Cultural tourism;
3. Cruising;
4. Recreational boating (Yachting/Marinas);
5. Nature/Ecotourism.

Moreover, in the CO-EVOLVE project a specific classification able to address restricted data availability and tourism destinations' challenges and potential at the lowest possible spatial scale was developed (Coccossis and Koutsopoulou, 2017e). The chosen classification derives from two indicators. The first indicator refers to the average share of overnight stays at each destination against the total overnight stays in the Mediterranean destinations' sample. The second indicator refers to the average annual growth of overnight stays at each destination. The destination level corresponds to the lowest spatial scale for which data for the two indicators is available, namely the NUTS III level for the period 2010-2015 (average).

The integration of the two indicators led to the creation of a Growth-Share Matrix (GSM), which classified all the chosen NUTS III regions. The classification of the regions into the different destination types was conducted by setting thresholds emanating from the sample's data. More precisely, the regions were classified into two different types of overnights share

according to the average overnight share of the sample (0.68%). Additionally, regions were classified into three different types according to their annual growth rates. The first type was composed by the regions that present negative growth trends during the period 2010-2015. Then, the regions with positive average annual growth trends were classified into two types taking as the threshold the average annual growth rate (3%). The above mentioned thresholds returned six main destination types, which are depicted in the GSM in Figure 6.

The general characteristics of the destinations for each of the six types of destinations are briefly presented and discussed below.

Developing destinations with low prospects in tourism development (Low Share - Negative Trends)

This type of destinations present low potential for tourism activities. Either because of the lack of tourism assets or lack of effective promotion, these destinations have not managed to attract a capable number of touristic fluxes while the trends of the period 2010-2015 do not provide hints for reversing this state. In general, if this trend is not reversed tourism could not be considered as a major driving factor of environmental pressures since neither the scale of tourism activities nor the future potential of the tourism fluxes seem to pose a serious threat on the environment. On the governance side, this should be mostly targeted on the exploitation of assets in order to enhance tourism development and, to a lesser extent, environmental and protection aspects.

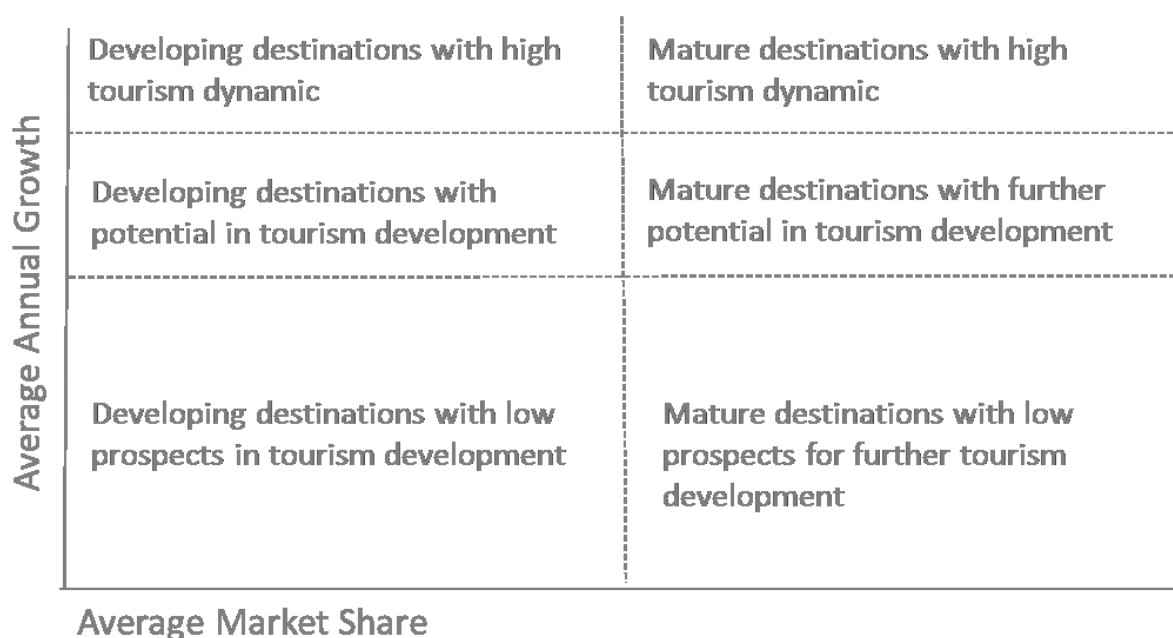


Figure 6 – Types of destination using average tourism market share and annual growth.

Developing destinations with potential in tourism development (Low Share - Medium Positive Trends)

These destinations, although hosting a relatively low number of tourists in an annual basis than the Mediterranean average, nevertheless they still present a good potential for attracting more touristic fluxes. In general, environmental pressures at these destinations could not be considered as a major threat although if fluxes continue their upward trend then environmental aspects regarding tourist development may arise in the near future. Thus,

these destinations should focus on how to strengthen tourism activities whilst setting the basis for promoting more environmentally friendly tourism products.

Developing destinations with high tourism dynamic (Low Share - High Positive Trends)

These destinations are presenting a high potential for tourism development. Despite their low market share, the high positive trends of touristic fluxes render the comprehensive planning of the tourism sector as a priority.

Mature destinations with low prospects for further tourism development (High Share - Negative Trends)

This type of destinations presents negative trends, still possessing a large market share of Mediterranean tourism sector. The priority of these destinations should be focused on reversing the negative trends in a sense of promoting new diversified and sustainable tourism products that will re-enhance tourist fluxes without adding significant pressures on the local natural and built environment.

Mature destinations with further potential in tourism development (High Share - Medium Positive Trends)

These destinations are dealing with both scale and growth effects. Although successful in attracting a large part of demand and presenting a high potential for strengthening their market share, these destinations are also facing or expected to face issues regarding the exceeding of their carrying capacity. Thus, actions should target to the limitation of tourism negative externalities and to the promotion of more sustainable tourism products.

Mature destinations with high tourism dynamic (High Share - High Positive Trends)

The destinations under this type have capitalised their full potential as tourism host regions. Nevertheless, pressures are expected to be intensified as the touristic volumes keep their upward trends. Direct and effective policy actions are considered as essential in order for the tourism sector to keep growing in a sustainable pattern.

Based on these six destination types, Table 1 and Figure 7 show the classification and the spatial distribution of the 149 NUTS III coastal regions of EU Member States selected in CO-EVOLVE.

Table 1: Classification of CO-EVOLVE NUTS III regions according to the six destinations types.

Low Share - Negative Trends	Low Share - Medium Positive Trends	Low Share - High Positive Trends	High Share - Negative Trends	High Share - Medium Positive Trends	High Share - High Positive Trends
Evros	Xanthi	Rodopi	Savona	Cyprus	Zakynthos
Drama	Imathia	Kavala	Salerno	Chalkidiki	Attiki
Pella	Pieria	Thessaloniki	Ravenna	Kerkyra	Dodekanisos
Serres	Thesprotia	Kilkis	Forli-Cesena	Barcelona	Irakleio
Larisa	Lefkada	Kefallinia	Rimini	Girona	Lasithi
Magnisia	Aitoloakarnania	Ileia	Lucca	Alicante/Alacant	Rethymni
Arta	Lakonia	Fokida	Roma	Valencia/València	Chania
Preveza	Samos	Argolida		Hérault	Tarragona
Achaia	Chios	Messinia		Alpes-Maritimes	Balears, Illes
Voiotia	Castellón	Lesvos		Bouches-du-Rhône	Granada
Evvoia	Almería	Kyklades		Var	Málaga
Evrytania	Cádiz	Melilla		Genova	Istria
Fthiotida	Murcia	Primorje		Lecce	Napoli

Table 1: (continues)

Low Share - Negative Trends	Low Share - Medium Positive Trends	Low Share - High Positive Trends	High Share - Negative Trends	High Share - Medium Positive Trends	High Share - High Positive Trends
Arkadia	Gard	Lika		Palermo	Malta
Korinthia	Šibenik	Zadar		Messina	
Ceuta	La Spezia	Split		Olbia-Tempio	
Aude	Caserta	Dubrovnik		Venezia	
Pyrénées- Orientales	Foggia	Brindisi		Padova	
Corse-du-Sud	Bari	Potenza		Udine	
Haute-Corse	Crotone	Matera		Livorno	
Imperia	Vibo Valentia	Reggio Calabria			
Teramo	Trapani	Catania			
Pescara	Caltanissetta	Ragusa			
Chieti	Rovigo	Siracusa			
Campobasso	Gorizia	Sassari			
Benevento	Ferrara	Nuoro			
Avellino	Massa-Carrara	Oristano			
Taranto	Pisa	Ogliastra			
Barletta-Andria- Trani	Grosseto	Treviso			
Cosenza	Pesaro-Urbino	Trieste			
Catanzaro	Ancona	Gozo and Comino			
Agrigento	Macerata	Primorsko- notranjska			
Enna	Ascoli Piceno				
Cagliari	Goriška				
Medio Campidano	Obalno-kraška				
Carbonia-Iglesias					
Pordenone					
Fermo					
Viterbo					
Latina					
Frosinone					

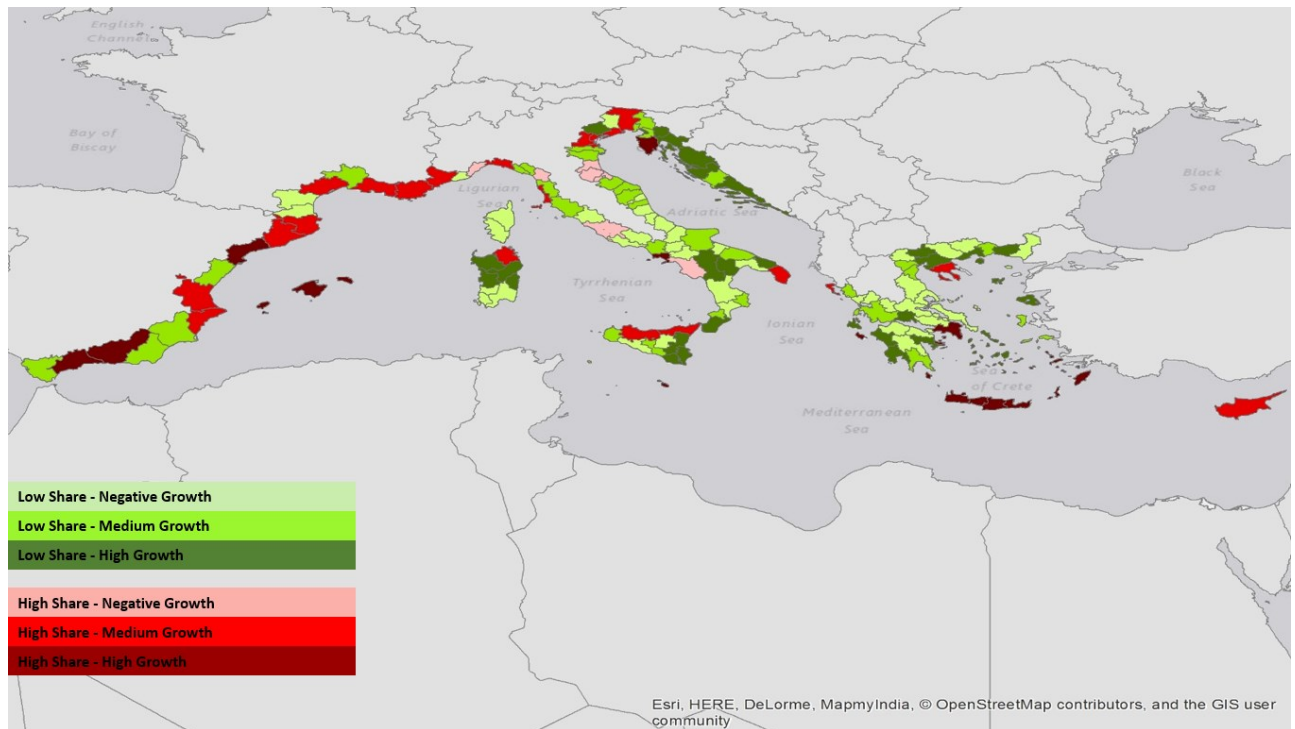


Figure 7 – Distribution of the six types of destination for the NUTS III regions of northern Mediterranean.

After having defined the classification of NUTS III Mediterranean coastal regions according to six types of destinations, based on their tourism market share and annual growth, the second phase of the analysis examined in depth the Threats to and Enabling Factors for Mediterranean sustainable coastal tourism. This assessment included also the development of a Tourism Sustainability Toolkit (Coccossis and Koutsopoulou, 2017f), which aims at enriching the European Tourism Indicator System (ETIS, 2016), by proposing specific indicators for measuring coastal and maritime tourism sustainability.

3. Threats and Enabling Factors to/for Sustainable Tourism

In the framework of CO-EVOLVE project, an in-depth analysis of Threats to and Enabling Factors for the co-evolution of human activities and natural systems aimed at the development of Mediterranean sustainable coastal and maritime tourism was carried out. The selected five Threats and four Enabling Factors are the most significant for the purpose of the analysis (Figure 8).

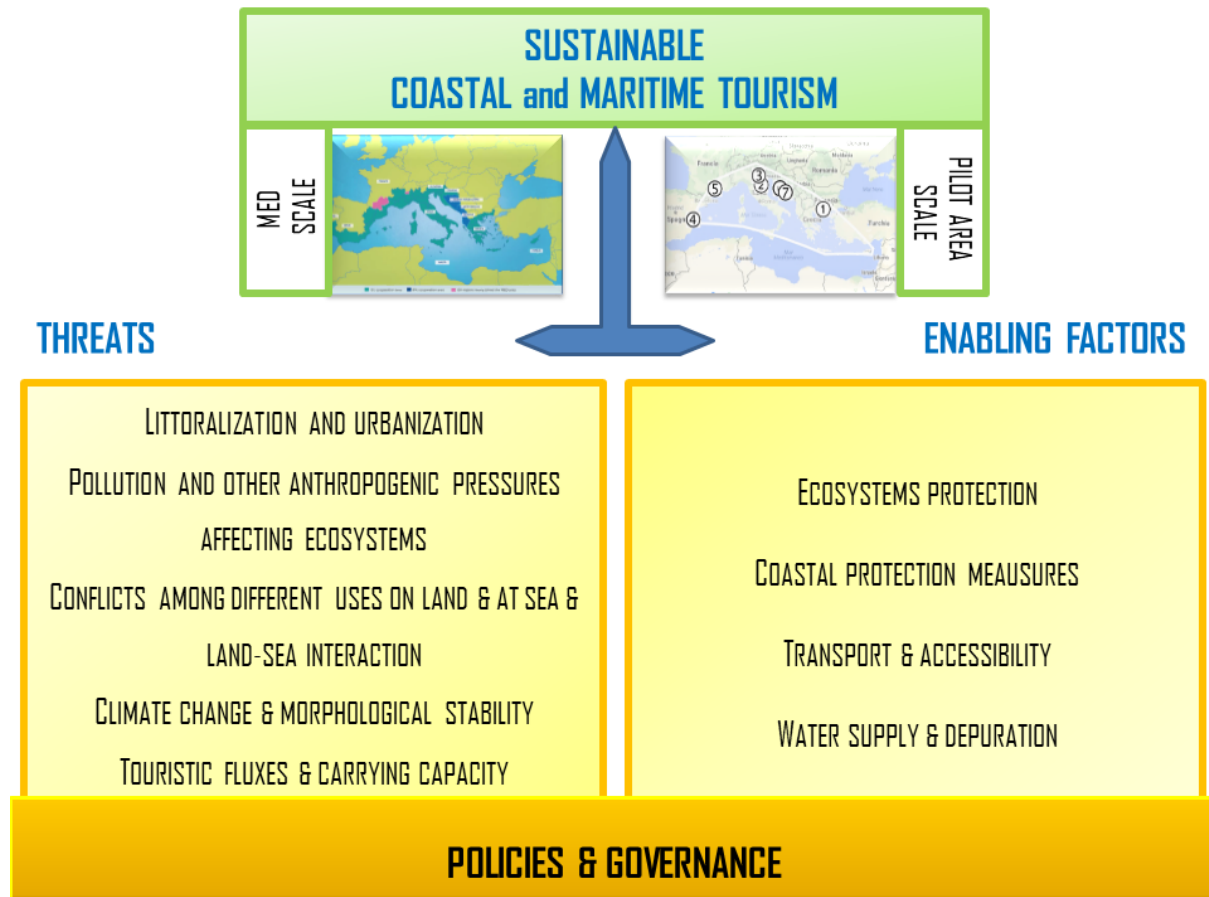


Figure 8 – Conceptual framework for Threats and Enabling Factors analysis within CO-EVOLVE.

They are:

- Threat 1. Climate changes and morphological stability

This threat concerns coastal erosion, soil subsidence, and coastal flooding.

- Threat 2. Littoralization and Urbanization

This threat concerns the urbanization of the coastal area, which takes up the space of natural ecosystems, it degrades the coastal natural environment and resources, and it increases the vulnerability to climate change and morphological instability.

- Threat 3. Touristic fluxes and Carrying Capacity

This threat deals with all problems related to touristic fluxes affecting Tourism Carrying Capacity, focusing on this latter assessment as a tool to optimise tourism fluxes considering the availability of natural resources and existing coastal development.

- Threat 4. Pollution and other anthropogenic pressures affecting ecosystems

This threat deals with all the negative impacts of tourism on the natural environment, as energy and water consumption, water and air pollution, habitats/ecosystems deterioration and impacts on wildlife. On the other hand, threats to tourism from poor environmental quality are also considered.

- Threat 5. Conflicts among different uses on land and at sea and land-sea interaction

This threat includes conflicts concerning the use of space, exploitation of common coastal and marine resources, and conflicts related to the degradation of natural ecosystems.

- Enabling Factor 1. Coastal protection measures

This enabling factor is about coastal works, soft measures and relative policies/planning instruments for managing coastal erosion phenomena and also for limiting future vulnerability to coastal erosion. It can be considered a direct response to Threat 1 “Climate change and morphological stability”.

- Enabling Factor 2. Ecosystems protection

This enabling factor concerns the promotion of ecotourism, the management of protected areas, the adequate management of pollution generated by tourism (litter, waste, wastewater, recycling) and the “strengthening” of the coevolution between ecosystem protection and tourism by building up common planning instruments and strategies. It can be considered a direct response to Threat 4 “Pollution and other anthropogenic pressures affecting ecosystems”.

- Enabling Factor 3. Water supply and depuration

This enabling factor includes the promotion of strategies for securing the necessary water resources for tourism activities (e.g. building reservoir dams, introducing seawater desalination systems, reusing wastewater, changing farming practices, limiting water losses, limiting water consumption) and for reducing the impacts on the environment and on tourism activities themselves.

- Enabling Factor 4. Transport and accessibility

This enabling factor includes the existing development of means of transport and infrastructure to travel to a destination and to travel within a destination.

A fifth Enabling Factor concerns the development and implementation of sound policies and the establishment of effective governance systems. It is a sort of overarching factor for sustainable tourism, linking Threats and the other Enabling Factors. As such, in the frame of this synthesis its cross-contents are presented within Chapter 6.

The full description and analysis of each Threat and Enabling Factor to/for maritime and coastal tourism at MED scale is available within the reports of Activities 3.2-3.6 (for Threats) and 3.8-3.12 (for Enabling Factors) on CO-EVOLVE website, [Deliverable library](#) section.

The following paragraphs present and discuss each of the Threats and Enabling Factors according to common attributes, slightly adapted between the two groups: theoretical insight, state, spatial distribution, recent trends and expected evolution, driving forces and pressures, responses, impacts on tourism, knowledge gaps, recommendations, indicators.

3.1 Threat 1: Climate changes and morphological stability

Theoretical insight

Maritime-coastal tourism destinations are globally threatened by coastal erosion and flooding, as a result of anthropogenic development and climate change effects.

Coastal erosion is defined as *“the encroachment upon the land by the sea and is measured by averaging over a period, which is long enough to eliminate the impacts of weather, storm events and local sediment dynamics”* (EUROSION, 2004).

Coastal erosion and flooding represent two of the main threats to the beach-based tourism, causing land loss and serious damages. However, they are responsible for impairment not only on tourism-related activities but also on agriculture, coastal cities and settlements, fisheries and aquaculture, industry, maritime transports, energy extraction, protected and natural high-value coastal areas.

The shoreline evolution, for instance, regulates shape, width and extension of the emerged beach, which is the portion of coastal area with the highest economic value for beach tourism and eco-tourism (e.g. the 75% of tourists visiting Spain head for coastal areas).

Undoubtedly, climate change ([BOX T.1.1 WHAT IS CLIMATE CHANGE?](#)) has a great impact on coastal erosion as it causes modifications both on weather conditions and hydrodynamic processes (e.g., sea-level rise, increase of storm surges, and increase of frequency and height of high tides).

Climate and weather are important factors in tourists' decision making, as well as safety, and they influence the successful operation of tourism businesses (Becken, 2010), destination choice and, as a consequence, tourist flows. Increasing attention has been paid to how climate change might affect tourist destinations (Wall and Badke, 1994) and how these might adapt to minimise risks and maximise opportunities (Becken and Hay, 2007).

State

Nine categories of coastal morphologies were defined in the frame of CO-EVOLVE project (mod. EUROSION and SHAPE projects).

The most prevalent geomorphological type of the Mediterranean coasts is the “cliff/rocky shore”, with (47%) or without (23%) beaches, followed by the sandy beach category (13%). Artificial coasts cover 6% of total length.

This distribution changes when focusing only from Morocco to Turkey, where the percentage of cliff/rocky shores with beaches rise owing to the weathering of the cliffs and rocky littorals. Moreover, along the southern Mediterranean coasts, the presence of wide river mouths (e.g. Nile Delta) increases the contribution of this geomorphological category (11%).

Coastal erosion state is expressed in terms of erosion, progradation or stability. Along the Mediterranean, around 30% of the investigated coasts suffer from erosion ([BOX T.1.2 MED COASTAL GEOMORPHOLOGIC AND EVOLUTIONARY STATE](#)).

Spatial distribution

Few small and scattered stretches of the Mediterranean coast show progradation, whilst erosion and stable conditions are basically the main features along the whole basin. Erosion is widespread in southern and central Spain, western France, Italy and eastern Greece. Isle

of Crete, Barcelona and the southern provinces of Andalusia can be considered as hotspots for coastal erosion ([BOX T.1.3 MAPS OF MED COASTAL GEOMORPHOLOGIC AND EVOLUTIONARY TRENDS](#)).

Coastal erosion is often locally coupled to coastal flooding, as the vulnerability to coastal flooding depends on the width, morphology and spatial variability of the beach (including the presence of dune systems) in relation to the intensity of the ocean's forcing and to sea level rise. EU countries are presently producing, by implementing Directive 2007/60/CE, a detailed picture, still not available at Mediterranean scale, of coastal flooding hazard and risk.

Recent trends and expected evolution

If in the last decades the broad erosion along the Mediterranean coasts has been basically related to the anthropogenic development, which altered the overall sediment budget and the natural balance of littoral sand nourishment, the future erosion trends will also largely depend on the climate change effects (sea level rise and extreme events). Low-lying sandy and highly subsiding coastal areas will be the most exposed. Coastal tourism is very sensitive to climate change; consequently, if these low lands are also developed touristic hot-spots, the vulnerability to climate impacts increases as well.

At different degrees and scales, all Mediterranean countries would experience the flooding of coastal areas due to climate changes effects and would need to develop adaptation plans ([BOX T.1.4 FOCUS ON NILE DELTA REGION](#)).

Driving forces and pressures

Coastal erosion is usually the result of a combination of factors - both natural and human induced - that operate on different scales (Eurosion, 2004).

River basin regulation works and dams construction are the historical and prior causes of coastal weakness, subtracting the natural sediment sources to the coastal system.

In addition, the recent exacerbation of the climate change effects has produced an increase of flooding, with consequent coastal erosion, overall along sandy and low-lying coastal areas, mainly as a result of extreme precipitations and storm events.

Human driving forces are mainly:

- river basin regulation works/dams;
- coastal works;
- land claim;
- gas mining and water extraction;
- dredging;
- vegetation clearing.

Natural driving forces are mainly:

- extreme events (sea storms and rainstorms);
- sea level rise;
- slope processes;
- tides;
- waves and nearshore currents.

Responses

Direct responses to coastal erosion consist in adaptation and protection measures, like coastal protection plans and interventions of coastal defence.

Most Mediterranean countries are engaged in different ways (e.g. Directive 2007/60/CE) in developing scenarios on climate change effects and adaptation plans (flooding maps, vulnerability risk assessment, flood risk management plans, etc.).

The long-term strategical response to coastal erosion is, where possible, the restoration of the sediment flow from inland to the coastal area (TNEC, 2016).

The short-term operative response is the planning of coastal defence and protection measures, which become the direct enabling factor for the coastal touristic development (cf. Enabling Factor 1).

Impacts on tourism

Coastal erosion and flooding results in three different types of impacts, all of them connected to tourism activity (EuroSION, 2004):

1. Loss of land with economic, societal or ecological value

Effect on tourism: reduction/degradation of areas available for coastal tourism.

2. Destruction of natural sea defences (usually a dune system) as a result of a single storm event

Effect on tourism: increased vulnerability to flooding and loss of attractiveness of high valued natural coastal habitats, and lack of beach nourishment.

3. Undermining of artificial sea defences, potentially also leading to flood risk

Effect on tourism: less efficiency and safeness of coastal protection measures and related higher exposition of coastal touristic destinations and infrastructures to flooding events.

Coastal erosion and flooding, indeed, besides its various environmental impacts poses a significant threat to coastal economies where the market for tourism services is a key factor for economic growth ([BOX T.1.5 IMPACTS ON MED TOURISTIC DESTINATIONS](#)).

Knowledge gaps

EUROSION project (2004) is even now the lone consistent and homogenous reference source of data on coastal erosion, but limited to the EU coast of Mediterranean.

CO-EVOLVE project has provided new information on the evolutionary trends for 6,962 km (15%) of the entire Mediterranean coast. Of these, 3,120 km of coastline have been updated compared to EuroSION analysis, whereas new data on trends have been provided for 3,842 km of coastline formerly not considered within EuroSION.

In a glance, 78% of non-European MED coastline is still not covered by evolutionary trend data and 35% of European MED coastline ([BOX T.1.6 FILLING KNOWLEDGE GAPS](#)).

The irregular and patchy distribution of available information at regional and local scale, the different reference periods of data collection and the diverse methods and approach of measurement, result in a non-homogeneous, non-synoptic and not comparable frame of Mediterranean coasts and their evolutionary trends.

The coastal risk assessment in view of the expected climate change is often based on scenarios produced at a too small scale, thus inadequate to predict reliable future trends of coastal touristic destinations.

Lack of information on drivers and pressures and even states concerning river sediment discharge, meteo-climatic forcing, and detailed morphological evolution does not permit efficient planning and the relative implementation of suitable measures against erosion.

Indicators

Seven specific indicators to analyse and evaluate the threat “Climate changes and morphological stability” have been selected in the frame of CO-EVOLVE project (Task 3.16).

This selection comes from the capitalisation and customisation of indicators developed in the frame of former studies and analyses on coastal sustainable development, experienced both at global and European level respectively by WTO (2004) and the European Commission (Deduce project 2007, ETIS 2016), with the aim of implementing the supplementary indicators of ETIS toolbox for Maritime and coastal tourism (ETIS 2016). The seven indicators and their related measure units are herewith proposed and optimised to make them fully representative for the assessment and monitoring of sustainable management of Mediterranean maritime-coastal touristic destinations as far as the climate changes and morphological stability issues it concerns.

Considering the impacts of coastal erosion and flooding effects on touristic destinations, the suggested scale of assessment, monitoring and data gathering is the local administrative level (municipality), possibly cumulated at a regional scale for strategical planning actions.

	Id	Indicator	Measure
<i>P.A1.Climate changes and morphological stability</i>	P.A1.1.	Annual change in measured shore/beach area (in %)	Percentage
	P.A1.2.	% shoreline subjected to erosion	Percentage
	P.A1.3.	Coastal area in degraded condition (low/medium/high)	Low/Medium/High
	P.A1.4.	Size, density and proportion of the population living in coastal areas (year average and peak month)	Number and percentage
	P.A1.5.	Extreme events on the coast per year(number)	Number
	P.A1.6.	Coastal flooding events per year(number)	Number
	P.A1.7.	Estimated sea level rise (low, medium, high)	Low/Medium/High

BOX Threat 1

BOX T.1.1 WHAT IS CLIMATE CHANGE?

The Intergovernmental Panel on Climate Change (IPCC, 2014) has defined the climate change as “a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings such as modulations of the solar cycles, volcanic eruptions and persistent anthropogenic changes in the composition of the atmosphere or in land use”.

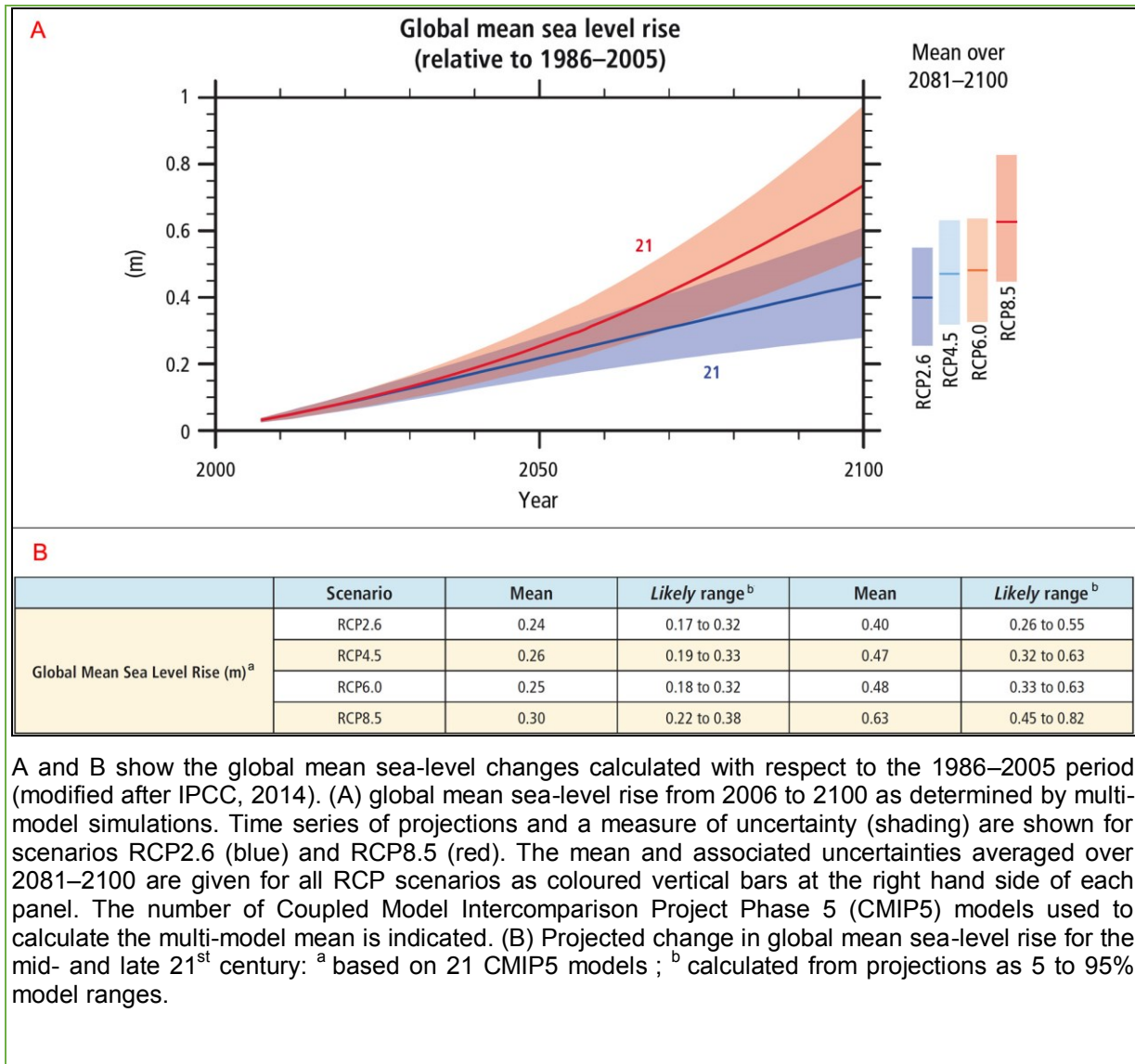
At present, the planet is experiencing fast climate change, including an increase of land and sea average temperatures, sea-level rise, ice-mass loss in the oceans and mountain glaciers, and extreme weather events. The global warming occurred since the mid-20th century has been mainly due to greenhouse gas emissions deriving from human activities (IPCC, 2013) and its future trend will depend primarily on the amount of produced heat-trapping gases.

Sea-level rise and storm events represent serious threats to coastal regions. Melting ice and thermal expansion of water, both deriving from global warming, are the main responsible for sea-level rise, which can be locally counteracted or amplified by vertical land displacements (uplift or subsidence) (Wong et al., 2014). Global mean sea-level rise will continue during the 21st century, very likely at a faster rate than observed from 1971 to 2010 (IPCC, 2014). For the period 2081–2100, the rise will likely be in the ranges of 0.26 to 0.55 m for RCP2.6, and of 0.45 to 0.82 m for RCP8.5 (medium confidence) (Figure A). Moreover, by the end of the 21st century, it is expected that about 70% of the coastlines worldwide will experience a sea-level change within $\pm 20\%$ of the global mean (IPCC, 2014).

Some more recent studies have highlighted the contributions to recent sea-level rise from ice sheet melting that were not included in the models reviewed in the AR5 estimates (European Environment Agency, 2017, and references therein). These different assessments have resulted in higher estimates for sea-level rise during the 21st century, i.e. 0.4–0.6 m for the low forcing scenario (RCP2.6) and 0.7–1.2 m for the high forcing scenario (RCP8.5)¹ (Horton et al., 2014; Kopp et al., 2014; Johansson et al., 2014). Even if regional and local sea levels can differ from the global mean owing to large-scale factors, such as changes in ocean density and circulation, relative sea-level changes along most of the European coastline are projected to be reasonably similar to the global average (European Environment Agency, 2017). The main exceptions are the northern Baltic and the northern Atlantic coasts, which are experiencing considerable land rise because of post-glacial rebound.

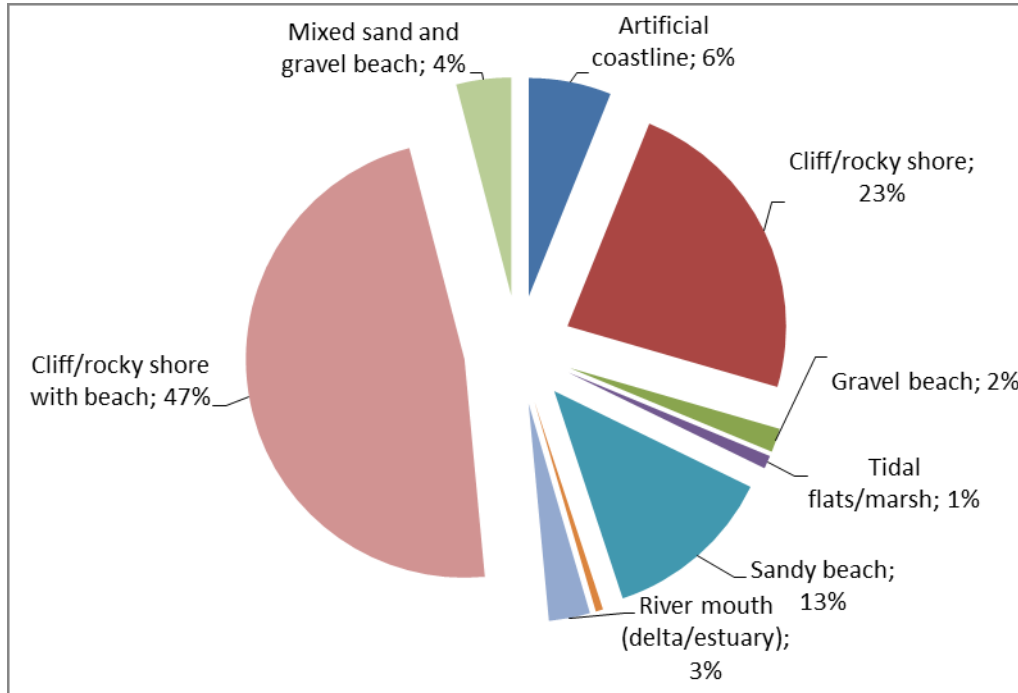
¹ Primary characteristics of the four representative concentration pathways (RCPs) established by IPCC (European Environment Agency, 2017):

- RCP8.5: is a high-emissions scenario in which total radiative forcing reaches approximately 8.5 watts per square metre (W/m²) in 2100 and continues to increase afterwards. Its extension, ECP8.5, stabilises at approximately 12 W/m² in 2250.
- RCP6.0: stabilisation scenario in which total radiative forcing is stabilised at approximately 6.0 W/m² shortly after 2100, without overshoot, by the application of a range of technologies and strategies for reducing greenhouse gas emissions.
- RCP4.5: stabilisation scenario in which total radiative forcing is stabilised at approximately 4.5 W/m² shortly after 2100, without overshooting the long-run radiative forcing target level.
- RCP2.6: is a 'peak-and-decline' scenario that leads to very low greenhouse gas concentration levels. Its radiative forcing level first reaches a value of around 3 W/m² by mid-century, and returns to approximately 2.6 W/m² by 2100. In order to reach such radiative forcing levels, greenhouse gas emissions (and, indirectly, emissions of air pollutants) are reduced substantially, leading to net negative carbon dioxide emissions at the end of the 21st century.

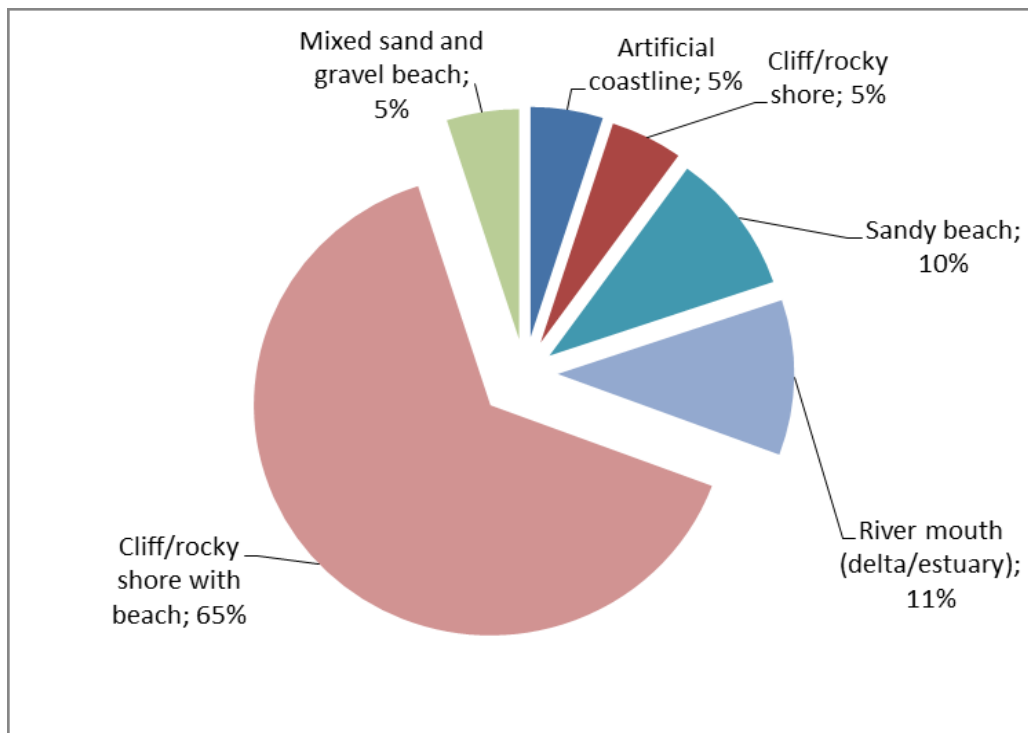


BOX T.1.2 MED COASTAL GEOMORPHOLOGIC AND EVOLUTIONARY STATE

According to the nine geomorphological categories set up by the CO-EVOLVE project (mod. EUROSION and Shape projects), the Mediterranean coastline shows the predominance of the "Cliff/rocky shore with beach" category, which increases focusing only on the southern Mediterranean stretch. The figures of the evolutionary trends of Mediterranean coastline are also presented.



Percentage distribution of geomorphological categories of Mediterranean coasts



Percentage distribution of geomorphological categories of southern Mediterranean coasts

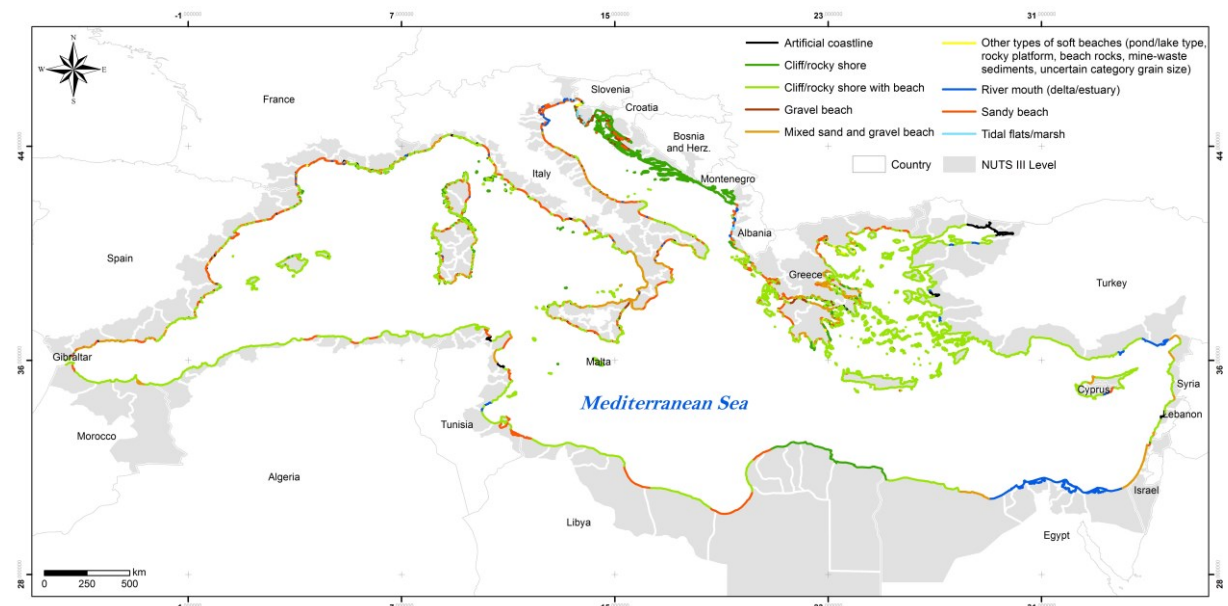
	Tot length	No information	Erosion	Progradation	Stable	Artificial coastline
	(km)	(%)	(%)	(%)	(%)	(%)
Mediterranean coast	46440	44	29	5	52	14
European Mediterranean coast	35364	34	30	5	55	11
Non-European Mediterranean coast	11076	78	28	6	28	38

Percentage of coastal evolutionary trends in the Mediterranean. Erosion / Progradation / stable / Artificial coastline are calculated on coastal stretches with available information.

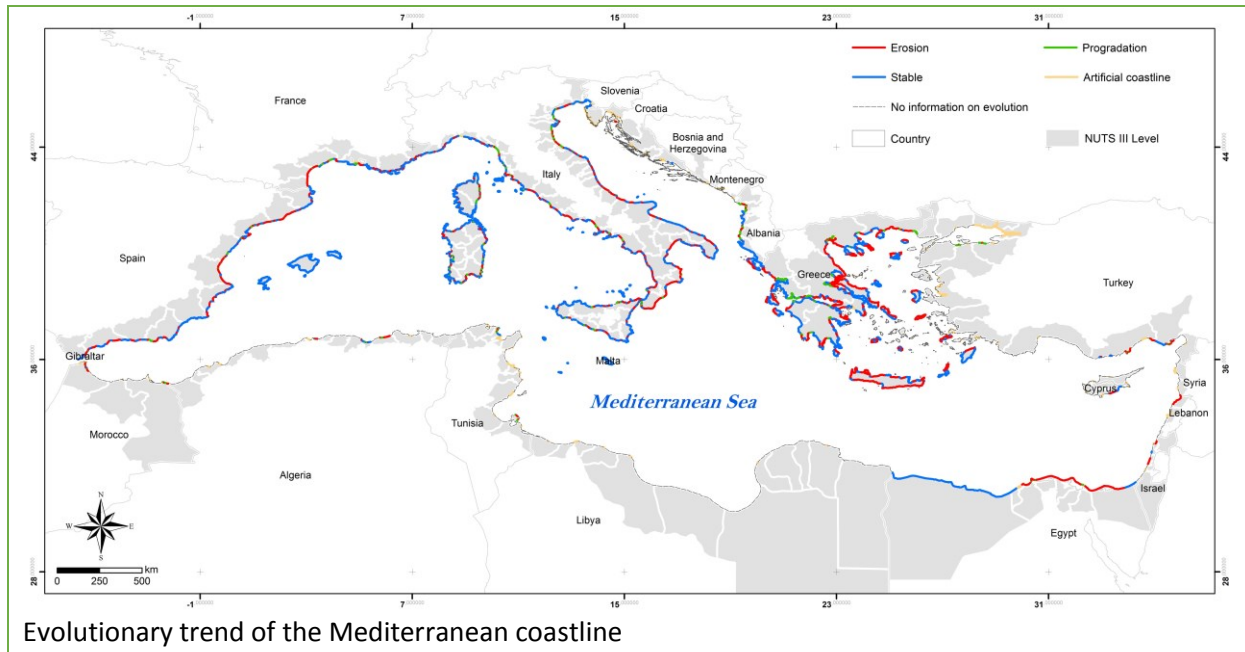
BOX T.1.3 MAPS OF MED COASTAL GEOMORPHOLOGIC AND EVOLUTIONARY TRENDS

The morphological map of the Mediterranean coast shows the geomorphological and sedimentological characteristics of the littorals. Sources of information are the EuroSION (2004) and SHAPE (2014) projects, integrated by data from satellite observations, scientific papers, and reports at different scale in areas not analyzed within the two above mentioned studies, so covering the 100% of the Mediterranean coast.

The map of the coastal evolutionary trends shows the coastal stretches that undergo erosion, progradation or stability. Data derived from the EuroSION project (2004) has been considered as the starting point; they have been updated along 11% of the coastline by information from more recent studies and integrated with new data (where available) along the coastal stretches not considered within EUROSION.

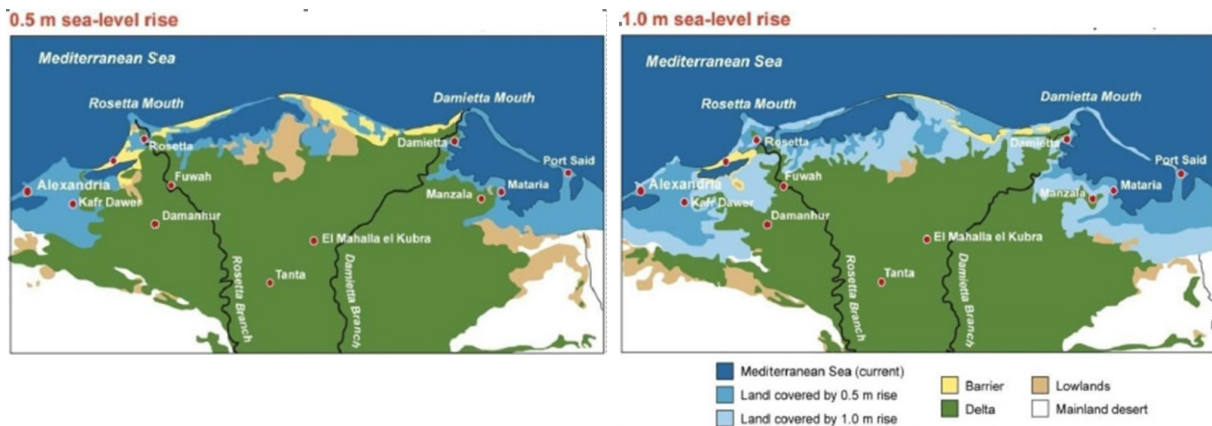


Morphological map of the Mediterranean coasts



BOX T.1.4 FOCUS ON NILE DELTA REGION

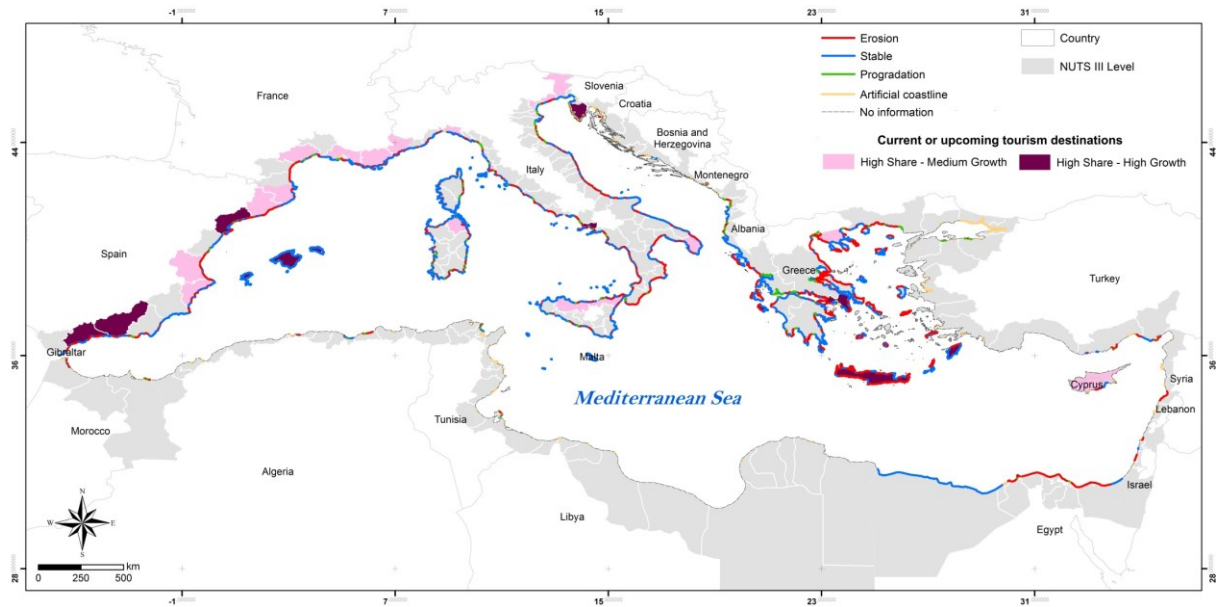
According to Fitzgerald et al., 2008, the expected impacts of climate change effects on Nile delta region are considerable: an area between 1,800-4,500 km² of Nile delta would be affected by inundation with two scenarios of sea-level rise (0.5-1.0 m), impacting on 3,800-6,100 population of coastal cities.



Potential direct inundation of the Nile delta region with two scenarios of sea-level rise indicating vulnerable cities of the delta (Fitzgerald et al., 2008).

BOX T.1.5 IMPACTS ON MED TOURISTIC DESTINATIONS

The map shows the spatial correlation between coastal stretches under erosion and NUTS III areas classified as High Share–Medium Growth or High Share–High Growth, allowing a qualitative estimation of the impact of erosion on coastal tourism.



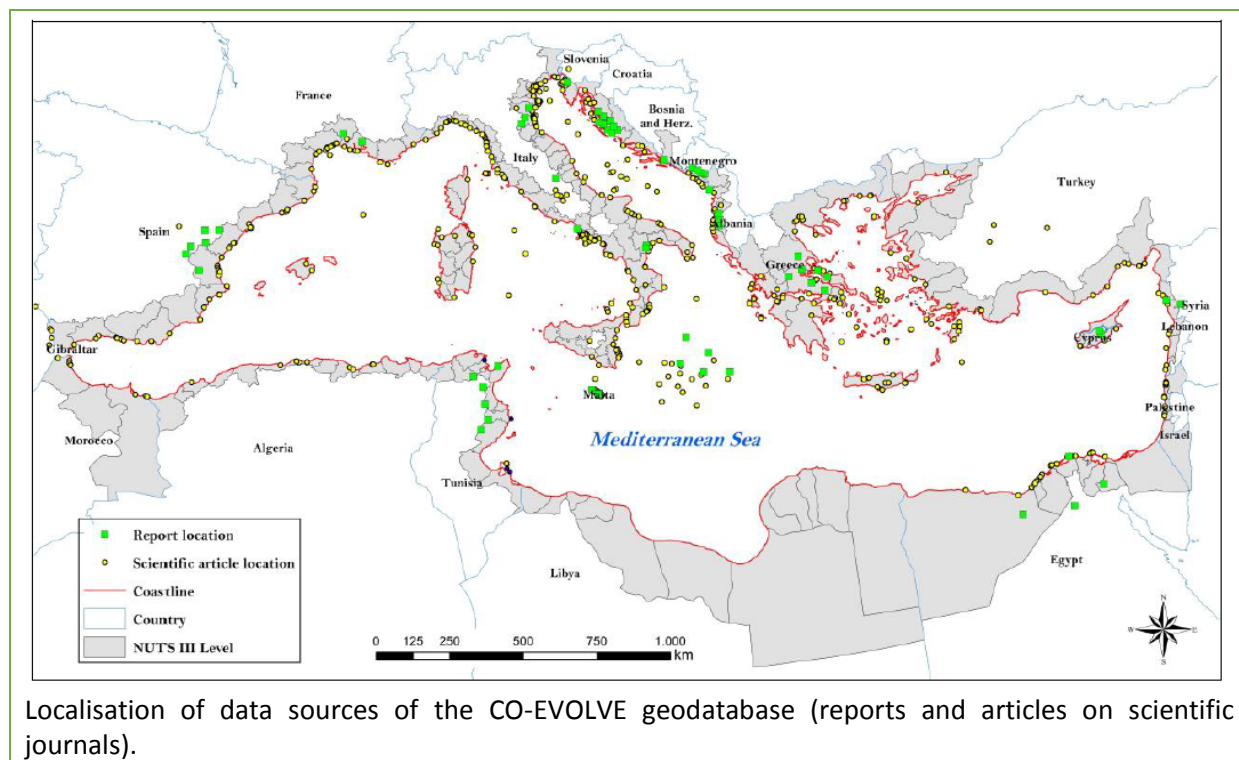
Evolutionary trend and current or upcoming tourism destinations HS-MG and HS-HG (CO-EVOLVE elaboration).

BOX T.1.6 FILLING KNOWLEDGE GAPS

CO-EVOLVE developed a geodatabase (from Mediterranean to NUTS III scale) containing information about coastal morphodynamics and oceanographic and climate conditions, necessary to analyse and identify threats to the coasts and related touristic activities. Stored data are:

- beach characteristics (geomorphology, lithology, sedimentology),
- coastal evolutionary trends,
- subsidence/uplift,
- coastal defence measures,
- hydrodynamic conditions,
- climate conditions
- other driving physical natural processes and human activities/interventions that affect the littorals,
- land-use,
- tourism,
- coastal hazards.

Data sources (reports and articles on scientific journals) are presented below. The points located in the sea represent studies performed at Mediterranean scale, whereas those placed inland refer to researches carried out at NUTS 0 and NUTS I scale.



3.2 Threat 2: Littoralization and urbanization

Theoretical insight

Coastal urbanization is “an unprecedented global trend in which populations are migrating to and concentrating in cities and metropolitan areas in coastal regions, transforming them into some of the most valuable and densely developed land around the world” (Urban Land Institute, 2013).

Coastal urbanization is also termed as littoralization – “the process, in which people, activities, infrastructures and facilities are concentrated close to the coast” (Barragán 1994 cited by De Andrés et al., 2017).

Coastal urbanization/littoralization can be considered both a threat to and a main component of the touristic destinations development.

The strategical urban planning of Mediterranean coastal areas becomes one of the prior challenges to ensure sustainable maritime and coastal tourism.

State

Along the Mediterranean around 290 millions people live within 100 km of coast (UNEP/MAP, 2012). In the Mediterranean region 48% of the population lives in cities, 32.97% in towns and suburbs and 21.40% in rural areas ([BOX T.2.1 POPULATION DENSITY IN THE MEDITERRANEAN BASIN AND THE RELATIONSHIP WITH TOURISM](#)). Today, almost six out of ten European cities where sprawl is growing fastest are located in the Mediterranean.

According to European Environment Agency-CORINE Land Cover Data (2013), EU Mediterranean coastal areas (0-10 km) are facing a running artificialisation process, from former agricultural areas, forest and semi-natural areas, wetlands or water bodies.

Mature touristic destinations with high tourism dynamic (HS-HG) show the highest degree of coastal urbanization/littoralization.

Spatial distribution

Currently, the distribution of population living within 100 km of coast is quite balanced between northern and southern countries of the Mediterranean, with a prevalence (about 31 millions) in southern countries (UNEP/MAP, 2012).

The European Mediterranean coastal strip (0-10 km) reveals high degrees of littoralization: in the years 2000-2006 the 31% of the coastal strip was artificialised ([BOX T.2.2 DISTRIBUTION OF URBANIZATION ALONG EUROPEAN MEDITERRANEAN COUNTRIES \(NUTS III\)](#)). Several European Mediterranean countries, like Malta, Spain and Cyprus show high level of urbanization/littoralization (hot spots). They are all mature touristic destinations with High Share-High/Medium positive trends.

Recent trends and expected evolution

Littoralization in the Mediterranean has been a general trend over the last two centuries. This is mainly due to its physical features (e.g. vast areas of hills, plateaux and mountains) that characterize the inland areas of the Mediterranean region, which present considerable

structural handicaps for urbanization. Moreover, littoralization has intensified mostly by the end of the 20th century due to developing international tourism on the shores of the Mediterranean.

From 1975 to 2005 population living within 100 kilometers of the Mediterranean coast has increased almost 1.5 times (UNEP/MAP, 2012).

Mediterranean non-EU countries reveal significantly stronger growth than Mediterranean EU countries.

The population density along the European coast of Mediterranean is continuously increasing, but with lower growth rate over the years (Eurostat Data, 2016). Coastal population density is higher and continues to grow faster than the hinterland population (Iglesias-Campos et al., 2015) ([BOX T.2.3 LITTORALIZATION AND URBANIZATION TRENDS OF MEDITERRANEAN COUNTRIES](#)).

Mediterranean urbanisation is a factual data: between 1950 and 2010 the Mediterranean urbanisation rate increased from 42.86% to 65.63%.

By 2050, 73.96% of the Mediterranean population will live in urban areas, exceeding somewhere 90% (e.g. Malta, France).

If the urbanization rate of European countries is expected to increase by a moderate degree by 2050, North African countries' rate will grow even more rapidly (Salvati, 2014).

Driving forces and pressures

In the Mediterranean as a whole, the drivers which led to the current degree of urbanisation, range from demographic and social to economic and political and their interrelations.

Generally, one could state that “modernization” in all fields of life is a basic urbanization driver: significant population growth and persisting migration flows from low-productive rural areas to the more economic-attractive and technological-developed urban settlements are the primary causes of urbanization (Secretariat of the Union for the Mediterranean, 2013).

During the industrialization and commercialization, cities became the locomotive of economic development, and coastal economies shifted their orientation towards the services sector and particularly tourism. Maritime activities, indeed, offer a variety of economic benefits (EEA, 2013), attracting population to coastal areas. Ports and port-related activities as well as coastal attractions heighten the economic appeal of coastal cities (UNU-IHDP, 2015).

The massive development in coastal tourism accommodation and housing (legal and illegal) also contributed to increase the littoralisation of coastal zone (UNEP/MAP, 2012).

Responses

Even if there is not a common Mediterranean policy and strategy exclusively relates to urbanization, several instruments of the European Union and UNEP/MAP, in the framework of the Barcelona Convention, include issues that are directly or indirectly connected to urbanization processes in coastal areas.

The Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (1995), the “Barcelona Convention”, is the main instruments at basin scale. The Protocol on Integrated Coastal Zone Management (2008) establishes a common framework for the integrated management of the Mediterranean coastal zone. At Art. 8 it declares that the Parties of the Protocol “*shall establish in coastal zones, as from the highest winter waterline, a zone where construction is not allowed. Taking into account, inter alia, the*

areas directly and negatively affected by climate change and natural risks, this zone may not be less than 100 meters in width. Stricter national measures determining this width shall continue to apply”.

To a different extent, all Mediterranean countries have developed a strategy or measures to plan and manage land use in their coastal areas, with the final aim of promoting their sustainable development ([BOX T.2.4 MEDITERRANEAN STRATEGIES AND MEASURES REGARDING URBANIZATION](#)).

Impacts on tourism

Coastal land use change is the main impact from littoralisation. Artificialization is the dominant effect of coastal zone urbanisation, mostly at the expense of former agricultural land and natural habitats (EEA, 2013).

Entire portions of Mediterranean coastal zones have been built-up, causing irreversible damage to landscapes, habitats and biodiversity (Plan Bleu, 2006).

Permanent landscape alteration, habitat loss, reduction of freshwater and sediment discharges by rivers, salinization of coastal aquifers, soil and coastline erosion, pollution and eutrophication of coastal waters are the main multiple impacts on coastal area caused by urbanisation if this process develops without proper governance ([BOX T.2.5 IMPACTS OF URBANIZATION AND LITTORALIZATION ON COASTAL AREAS](#)).

Knowledge gaps

There is presently a lack of reliable data on urbanization and littoralization state for the MED eastern – southern rim countries.

Data availability about trends of urbanization and littoralization is still fairly limited for the European countries and even more for the southern and eastern countries of the Mediterranean Basin. It is, therefore, very difficult to make comparisons on a national or regional level, especially considering the lack of data integration (Plan Bleu, 2003), or lack of suitable, integrated and synoptic information of the geographical distribution of urbanisation/littoralisation impacts at small scale doesn't allow to understand the environmental status of NUTS III Mediterranean coastal areas.

Lack of suitable, integrated and synoptic information of the geographical distribution of urbanisation/littoralisation impacts at small scale does not allow understanding the environmental status of NUTS III Mediterranean coastal areas.

Indicators

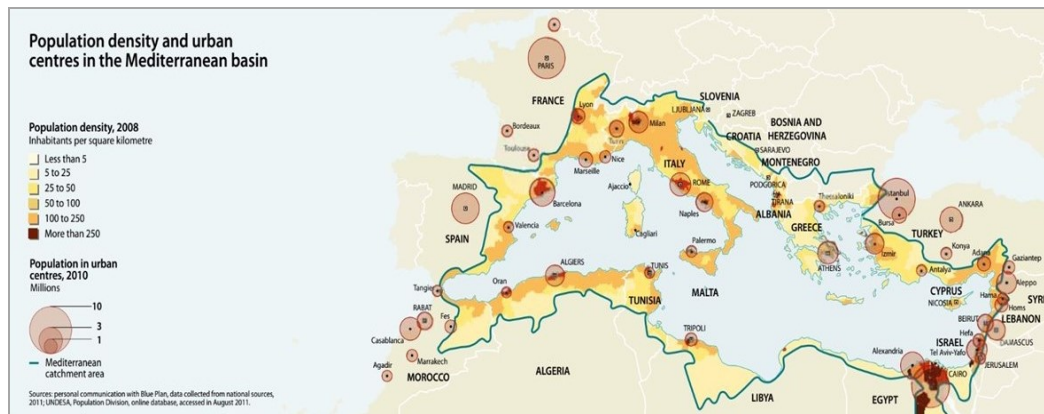
Four specific indicators to analyse and evaluate the threat “Littoralization and urbanization” have been selected in the frame of CO-EVOLVE project (Task 3.16). They are adapting and integrating two indicators regarding land use/change proposed within the Ecosystems Approach (EcAp) of the Barcelona Convention (Ecological Objectives EO8):

- common indicator 16: “Length of coastline subject to physical disturbance due to the influence of man-made structures”;
- candidate indicator 25: “Land use change” (UNEP/MAP 2016a).

	Id	Indicator	Measure
P.A2.Littoralization and urbanization	P.A2.1.	Land occupied by artificial surfaces within the first 500m of coast (in %)	Percentage
	P.A2.2.	% of area designated for tourism purposes	Percentage
	P.A2.3.	% of total coastal capacity used (average and peak)	Percentage
	P.A2.4.	Ridgeline or coastline continuity (% intrusion on ridge and coastline)	Percentage

BOX Threat 2

BOX T.2.1 POPULATION DENSITY IN THE MEDITERRANEAN BASIN AND THE RELATIONSHIP WITH TOURISM



Population density and urban centers in the Mediterranean Basin (UNEP/MAP, 2012).

	High share – Negative trends	High share - Medium positive trends
High share - High positive trends	0,20	0,13
Low share - High positive trends	-0,02	0,04
	Low share – Negative trends	Low share - Medium positive trends
	-0,02	

Population density change (average) 1995-2015 and CO-EVOLVE tourism typology (Eurostat 2017, CO-EVOLVE elaboration)

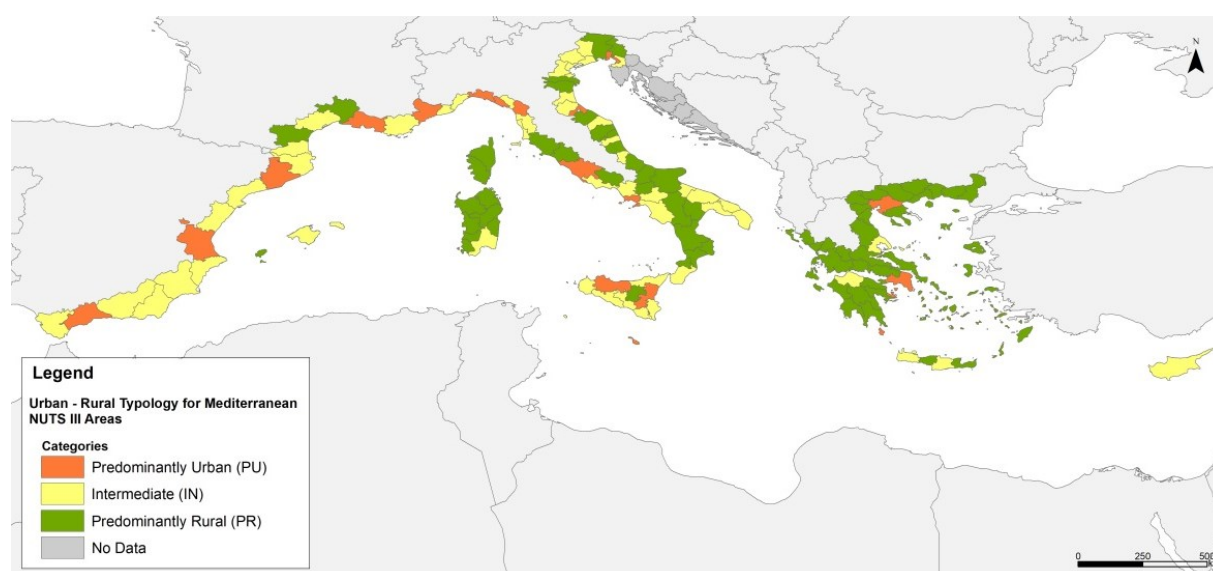
The increase in average population density is common in all types of tourism development, except for 'Developing destinations with high tourism dynamic' (Low share-High positive trends) and 'Developing destinations with low prospects in tourism development' (Low share-Negative trends) where population density declined. The highest increase is observed for 'Mature destinations with high tourism dynamic' (High Share - High positive trends).

	High Share - High trends	High Share - Negative trends	High Share - Medium trends
Intermediate Urban (%)	39,29%	50,00%	50,00%
Predominantly Urban (%)	25,00%	25,00%	40,00%
Predominantly Rural (%)	32,14%	25,00%	10,00%
No Data	3,57%	0,00%	0,00%
	Low Share - High trends	Low Share - Negative trends	Low Share - Medium trends
Intermediate Urban (%)	10,00%	13,04%	14,29%
Predominantly Urban (%)	10,00%	4,35%	0,00%
Predominantly Rural (%)	60,00%	82,61%	85,71%
No Data	20,00%	0,00%	0,00%

Degree of urbanization (urban-rural typology) and CO-EVOLVE tourism typology (Eurostat 2011, CO-EVOLVE elaboration)

Tourism destinations with “high share” are mainly intermediate urban, while the majority of “low share” or “medium share” destinations are predominantly rural.

BOX T.2.2 DISTRIBUTION OF URBANIZATION ALONG EUROPEAN MEDITERRANEAN COUNTRIES (NUTS III)



Spatial distribution of the degree of urbanization (urban-rural typology 2011), Mediterranean NUTS III (Eurostat 2011, CO-EVOLVE elaboration)

Hotspots:

Malta is the most urbanized country of the Mediterranean Basin (among European, Middle-East and African countries). Urbanization has expanded mostly around the coast; Malta has a coastline of 190 km, 43 % of which is heavily utilized (El-Kholy et al., 2012). The island has an intense and diverse use of coastal land use ranging from towns, villages, recreational areas, harbors, military land use and industrial and servicing areas (Biolchi et al., 2014). The built-up areas comprise 24 % of the coast which entails a very high population density (1,300 persons/km²) (El-Kholy et al., 2012). The southern

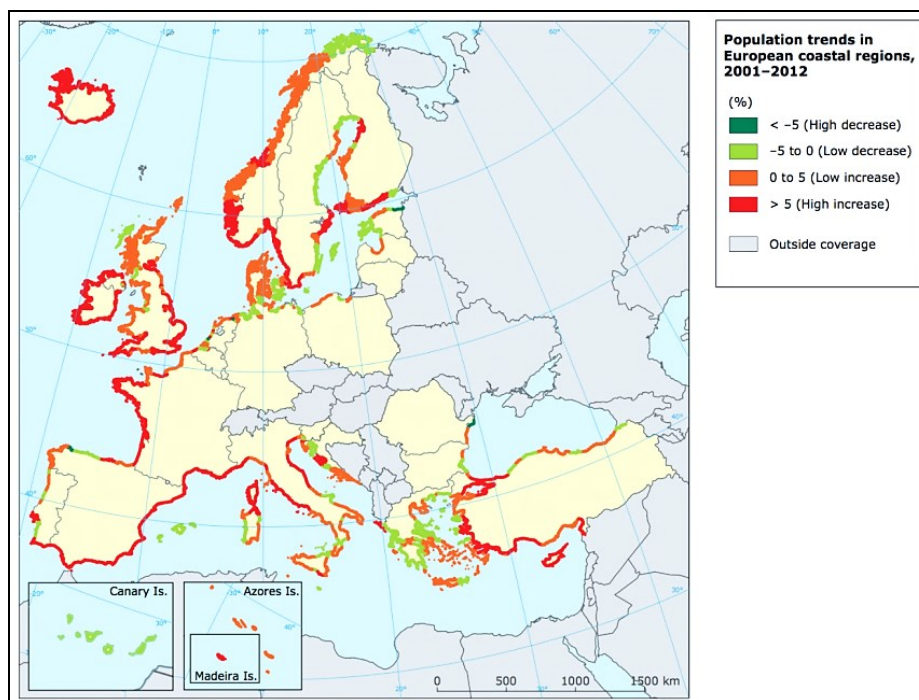
part of Malta is the most urbanized as the majority of human activities and consequently the major environmental problems are concentrated there (El-Kholy et al., 2012).

Spain coastal areas are among the most urbanized y of the Northern Mediterranean. This is evident from the statistic data which show that:

- 20% of the Spanish shoreland is occupied by urban entities;
- 29 urban areas in the coastal zone have a high urban development index;
- 80% of coastal urban areas are implicated in ICZM actions.

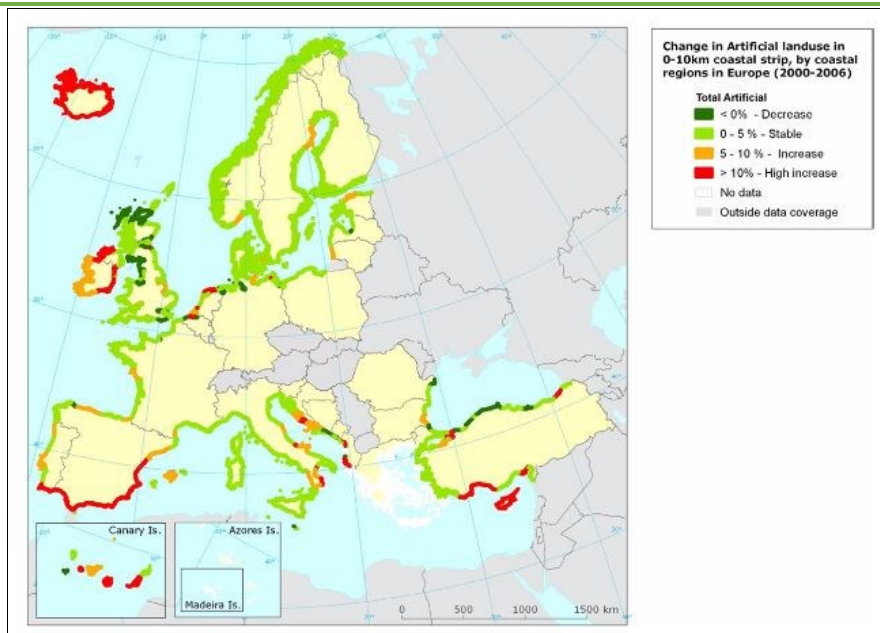
In 2014, 56% of the population (over 20 million people) resided in coastal urban zones. However, coastal urbanization is not equally intensive among Spanish coastal areas, as the South and East are completely occupied by urban areas, in contrast to the north coast which is less urbanized (De Andrés et al., 2017). Especially for countries, such as Spain, where tourism is one of the main economic activities, the building rate for tourist resorts and second homes is very high (El-Kholy et al., 2012).

BOX T.2.3 LITTORALIZATION AND URBANIZATION TRENDS OF MEDITERRANEAN COUNTRIES



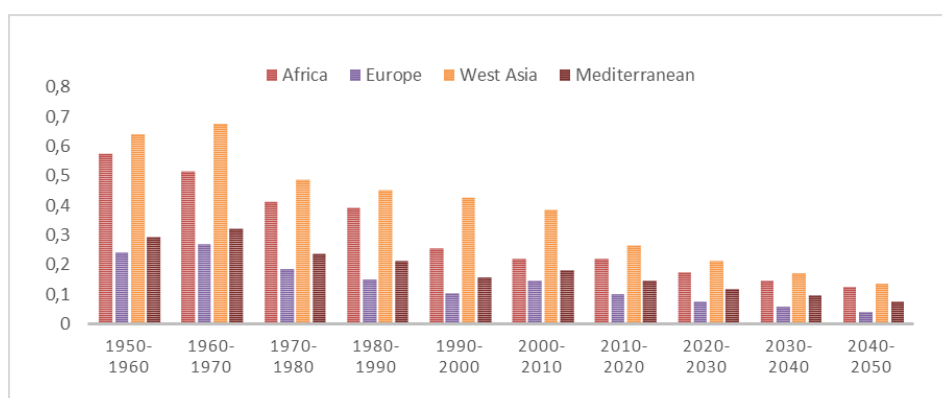
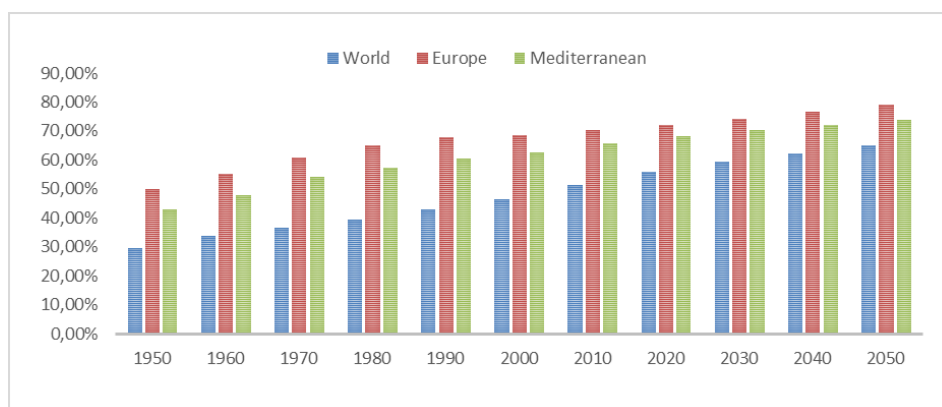
Population trends in European coastal region, 2001-2012 (EEA, 2013)

Increase of population caused an increase of artificial against natural land, which has occurred all across the European Mediterranean coast. The changes in land coverage in coastal areas is similar to the change observed at a European level, namely the artificialization is the dominant driver of coastal zone development, mostly at the expense of former agricultural land (EEA, 2013). Focusing on coastal areas (0-10 km), the changes are similar, meaning that the hinterland and coastal areas are characterized by comparable pattern and trends of artificialization.



Change in artificial land use in 0-10 km coastal strip, by coastal regions in Europe (2000-2006) (EEA, 2013).

Urbanization trends in the Mediterranean are similar to other areas of the world, with decreasing rates in the next decades.



Population residing in urban areas (%) and Urban Population Growth Rate in the Mediterranean and worldwide (United Nations Environmental Programme Data Set (2015), CO-EVOLVE elaboration).

BOX T.2.4 MEDITERRANEAN STRATEGIES AND MEASURES REGARDING URBANIZATION

Several strategies or measures have been developed by Mediterranean countries on urbanization, referring to EU and UNEP/MAP policies. They are then used at regional and local scale to inform general and detailed land use plans.

	Specific Legislation related to coastal zone	Framework Law	Definition of littoral zone/ Construction Limits set by law
Algeria	Yes	Yes, 2002	Littoral zone is from 800 m to 25 km. Also defines littoral plain of 3 km. No construction within 100-300 m.
Bosnia-Herzegovina	No		No limits set by law. Construction limits defined by regulation plans
Croatia	Yes, 2004 Regulation (2008, part of Physical Planning Law)		Marine property is a 6-metre strip. Regulation of 2004 defines coastal zone of 1.000 m. No construction within 70 m. (housing) and 100 m. (tourism) in urban areas and 100 m. in other areas.
Egypt	Yes		Very general littoral zone (up to 30 km.). No building normally within 200 m. Building within 200 m. requires an EIA.
France	Yes	Yes, 1986	Littoral zone is defined by coastal municipalities. No building within 100 m.
Israel	Yes		Varies from 1-2 km. No building allowed within 100 m.
Italy	Yes		Varies according to ecological region. No building within 300 m. Some regional variations (e.g. Sardinia).
Malta	No		Littoral zone is 250 m. No construction within zone of variable depth.
Morocco		Draft Law	No construction within 100 m. besides for activities that require the nearness of the sea.
Spain	Yes	Yes 1988	Land bound limit is 500 m. Construction allowed within 100-200 m. is restricted but not banned.
Tunisia	Yes		Limits vary from site to site. No construction is permitted within 100 m. Within settlements construction is permitted within 25 m.
Turkey	Yes	No	Landward limit is 100 m and is uniform along the whole coast. Construction prohibited within 50 m. but exceptions are made.

Coastal regulation in Mediterranean countries (PAP/RAC from Markandya et al., 2007-Retrieved from UNEP/MAP, 2009)

BOX T.2.5 IMPACTS OF URBANIZATION AND LITTORALIZATION ON COASTAL AREAS

Marine and coastal ecosystems have weakened, impairing the overall ecosystem health, due to the impacts of coastal urban sprawl and artificialisation of last 70 years:

Marine and coastal component	Impacts
Land	Specifically on land use and geomorphology, with significant loss of natural areas and highly fertile soil, degraded quality, soil erosion, soil compaction, soil sealing, stabilization of slopes and desertification because of the growing artificialization.
Landscape	Affected through three main processes: transformation, degradation and fragmentation. Increasing penetration of the landscape by built-up areas.
Climate change	Microclima modification and its effect, known as "heat island effect", and modification of climate conditions (e.g. variability in temperature, humidity or moisture).
Energy	Increase of the environmental footprint due to the uncontrolled population concentration, tourist and industrial activity and transport.
Pollution	Traditionally a common phenomenon in Mediterranean coasts with various dimensions and often with harmful aftereffects for air, water, sediments and biota.
Water	Water systems and hydromorphology modifications: alterations of watersheds as a result of the reduction of the quantity and quality of groundwater, diminished hydrological dynamics of wetlands around cities, modification of surface water course.
Biodiversity	Weakening of dynamics and maintenance of the Mediterranean biodiversity; a number of coastal habitats and species are at risk. Loss of species or 'ecological extinctions' of local population from complex ecosystems.

EEA, 2013

3.3 Threat 3: Touristic fluxes and carrying capacity

Theoretical insight

Touristic fluxes are defined as the volumes and rates of tourist arrivals/overnight stays on a touristic destination. Touristic fluxes and their dynamics are the main component featuring the carrying capacity of a touristic destination since primary cause of pressures and potential threats.

Carrying capacity – as adopted by MAP's Priority Actions Programme (2003) - is “*the maximum number of people that can visit a tourist destination at the same time, without causing destruction of physical, economic or sociocultural means and an unacceptable reduction in the quality of the satisfaction of visitors*” (BOX T.3.1 CARRYING CAPACITY AND TOURISM CARRYING CAPACITY ASSESSMENT).

State

Around one-third of all international tourists arrive in the Mediterranean, making it the world's most visited region (WTO <http://www2.unwto.org/>), with more than 250 million tourists per year. The European Mediterranean touristic destinations receive annual flows that range from below 100.000 to exceeding 10 million tourists.

The two European Mediterranean countries with top-destinations for overnights stays are Italy (4 destinations, 62 millions) and Greece (4 destinations, 35 millions), followed by Spain (3 destinations, 23 millions) and France (two destinations, 14.5 millions).

The most popular touristic destination is Rome with more than 22.5 million average overnight stays per year (2010-2015). Greece is the top country for the highest number of destinations with growth rates (2010-2015) (BOX T.3.2 RANKING LIST OF THE MOST POPULAR TOURISTIC DESTINATIONS IN EU MEDITERRANEAN).

Spatial distribution

At basin scale, touristic fluxes (overnight stays) of Western Mediterranean destinations weight more than Eastern Mediterranean, with rather continuity of high-fluxes destinations from Spain to Italy (Tyrrhenian coast) (BOX T.3.3 MAPS OF EU MEDITERRANEAN TOURISTIC DESTINATIONS (NUTS III)).

The most popular destinations are located at the Western part of the Mediterranean with Spain, France, Malta and Italy having the highest average number of overnight stays per destination. Lowest fluxes can be observed over the Croatian and Slovenian destinations.

Italy is a considerable hotspot in the Mediterranean Basin: in the period 2010-2015, the Italian touristic destinations have accomodated almost the 50% of touristic fluxes along the European Mediterranean coast with more than 151 millions overnight stays.

The Dalmatian coast reveals a continuous belt of high-growth rate (overnight stays) touristic destinations, whilst Cyprus, France and Italy show a low growth/stability of touristic fluxes rates. The most spatially balanced touristic fluxes allocation occurs in French destinations, where the min/max difference is around 7.7 million overnight stays, with the national average ranging at about 3.1 million stays.

Recent trends and expected evolution

In the European Mediterranean, the growth trends of touristic destinations present a relatively balanced distribution: almost half of the NUTS III areas (49.6%) present higher annual growth rates than the Mediterranean average (1.3%).

The European Mediterranean region goes towards a more balanced tourism development and allocation of touristic fluxes, since low-fluxes countries such as Slovenia and Croatia are progressively gaining ground (increasing annual growth rates). In fact, all the touristic destinations of both Croatia and Slovenia present growth rates (2010-2015).

In the next years, the touristic fluxes in the Mediterranean are expected to increase, mostly in the European countries. *Along the southern rim figures are declining sharply, until the present political and social upheaval and terrorism risk will be overcome.*

Future scenarios indicate that in 2030, Southern and Mediterranean Europe is projected to receive 103 arrivals per 100 of population (UNWTO, 2011) ([BOX T.3.4 FUTURE TRENDS OF TOURISTIC ACCOMODATION IN EU MEDITERRANEAN \(NUTSII\)](#)).

Driving forces and pressures

Most of Mediterranean countries set up huge investments in international marketing to tempt and attract worldwide holidaymakers, and traditionally northern Europe people, to their warmer sea and beaches. Still, the appealing of “SeaandSun” brand is the main driver for touristic fluxes to the Mediterranean coasts, together with the attractiveness of coastal cities such as Venice, Rome, Barcelona, Athens, etc.

In addition to the total amount of tourists arriving on destinations, which can be *per se* unsustainable, the main issue is the distribution and management of tourism flows, which are often mainly concentrated during the summer period and are concentrated on a few destinations.

Responses

The Tourism Carrying Capacity Assessment (TCCA) is a valuable decision-making tool for maritime and coastal tourism destinations planning.

Having selected the TCCA method among the different approaches available, the challenge for an effective outcome is to ensure that the TCCA results will be utilized in order to feed the general management and planning processes of the destination such as spatial plans, MSP, ICZM etc. In addition, having in mind that the conditions under which tourism development is taking place change over time and that some of the tourism generated impacts are realized in the long term, TCCA should entail a dynamic character, ensuring that it can be adjusted on future needs and challenges. In order to achieve this target TCCA should be enriched with a comprehensive monitoring and evaluation system directly linked to the respective system of the local general planning framework.

Diversification of the touristic offer, deseasonalization and distribution of the flows on wider areas are all key actions to reduce the pressure from touristic fluxes.

Impacts on tourism

Massive touristic fluxes can alter and compromise tourism destinations causing several potential direct and indirect impacts, strictly linked to the increasing need of local resources,

space and to the over-production of waste/pollution ([BOX T.3.5 POTENTIAL IMPACTS FROM TOURISM DEVELOPMENT ON DIFFERENT DESTINATIONS](#)).

Knowledge gaps

Data available on tourism are often not sufficient nor harmonised to support detailed analysis aimed at informing general policies and detailed plans. This regards several aspects, such as:

- Spatial resolution (e.g. EUROSTAT provides data on tourism only for NUTS II regions, while National Statistical Authorities can provide data at NUTS III level);
- Temporal resolution and coverage (e.g. monthly data and yearly trends, long time series);
- Spatial coverage (e.g. for non-EU countries data on regional level are not available, either because statistical offices do not provide such data or countries are not divided in regions);
- Related socio-economic aspects (e.g. direct and indirect incomes and employment divided by sectors).

Indicators

Four specific indicators to analyse and evaluate the threat “Touristic fluxes and carrying capacity” have been selected in the frame of CO-EVOLVE project (Task 3.16).

Moreover, to support the integration of TCCA into wider planning processes, a system of metrics for TCCA was proposed and customised to the characteristics of the five types of tourism considered in CO-EVOLVE: beach tourism, urban/cultural tourism, cruise tourism, recreational boating, and nature/ecotourism [BOX T.3.6 PROPOSED METRICS FOR TCCA IN DIFFERENT TYPES OF DESTINATIONS](#)).

	Id	Indicator	Measure
<i>P.A3. Touristic fluxes and carrying capacity</i>	P.A3.1.	Total tourist numbers (mean, monthly, peak) (categorized by their type of activity)	Number
	P.A3.2.	Number of tourists per square meter of key site (e.g., at beaches, attractions), per square kilometer of the destination, - mean number/peak period average	Number
	P.A3.3.	Water use (total volume in liters or m3 consumed and liters per tourist per day)	Liters or m3
	P.A3.4.	Number of shortage incidents per year or number of days per year where there are water supply shortages	Number

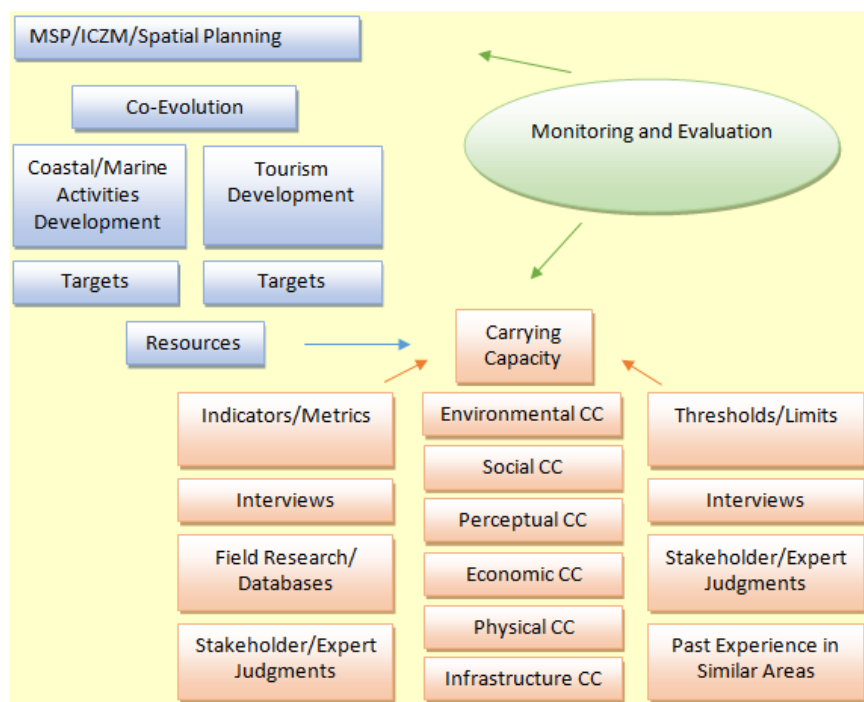
BOX Threat 3

BOX T.3.1 CARRYING CAPACITY AND TOURISM CARRYING CAPACITY ASSESSMENT

Carrying Capacity is the extent to which a destination is saturated in terms of tourist arrivals and activities, challenging its own attractiveness.

The incorporation of Tourism Carrying Capacity Assessment (TCCA) in planning strategies is of particular importance in coastal areas where public and private stakeholders' interests, in terms of protecting tourism resources and profitability of the market, often affect each other. The destinations' tourism resources should be exploited at the most effective level, in order to support sustainable tourism development.

Taking into account that tourism activities as well as other coastal activities are utilizing common shared resources, the co-evolution of activities should take place under a controlled context in order to avoid any conflicts and negative externalities.



CO-EVOLVE Tourism Carrying Capacity Assessment Framework for Coastal Destinations

BOX T.3.2 RANKING LIST OF THE MOST POPULAR TOURISTIC DESTINATIONS IN EU MEDITERRANEAN

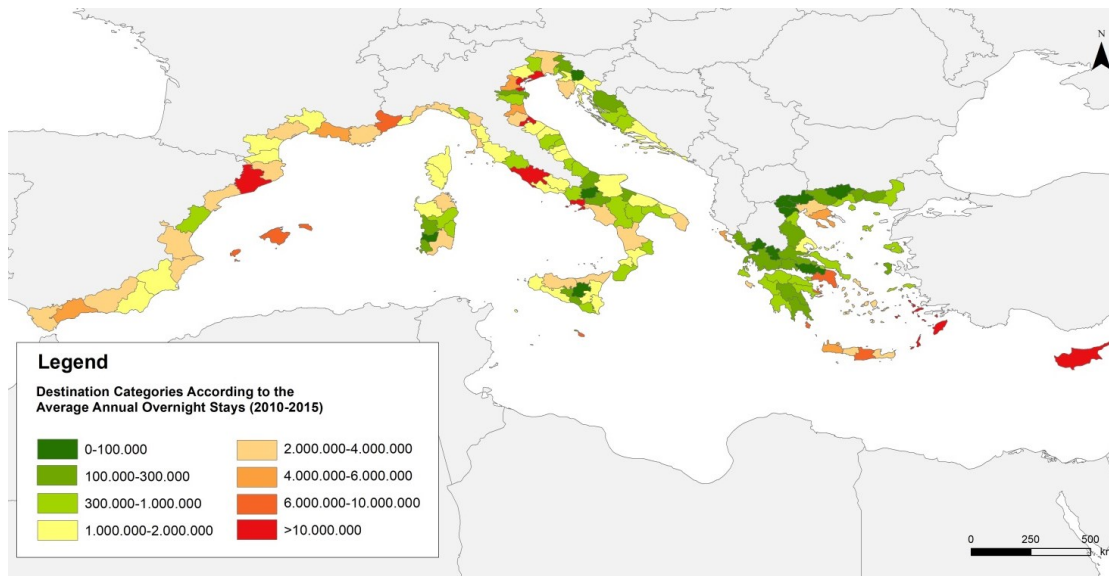
Country	NUTS III	Mean Annual Overnight stays (2010-2015)
Greece	Chania	4,501,623
Spain	Málaga	4,518,989
France	Bouches-du-Rhône	5,539,613
Greece	Attiki	6,933,847
Malta	Malta	7,143,580
Spain	Balears, Illes	8,360,572
Greece	Irakleio	8,369,798
France	Alpes-Maritimes	8,889,568
Spain	Barcelona	10,046,528
Italy	Napoli	10,390,136
Cyprus	Cyprus	12,794,833
Italy	Venezia	14,517,177
Italy	Rimini	14,531,820
Greece	Dodekanisos	15,023,861
Italy	Roma	22,555,161

Top-15 European Mediterranean touristic destinations according to the Average Annual Overnight stays (2010-2015) (CO-EVOLVE elaboration based on Data of National Statistical and Tourism Authorities)

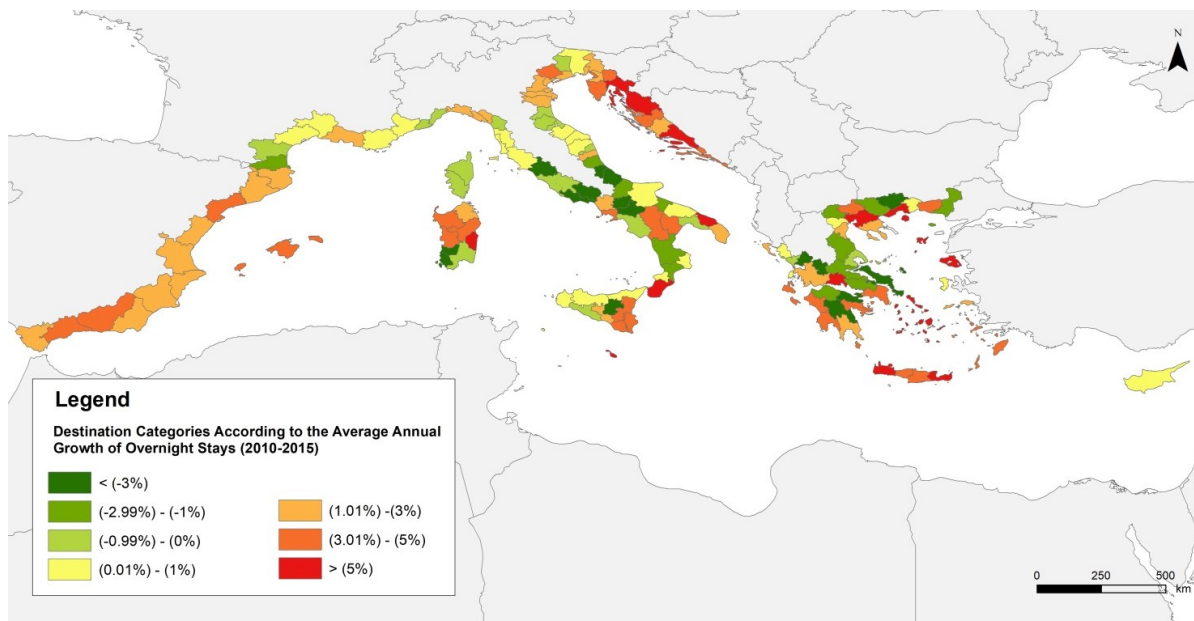
Country	NUTS III	Average annual Growth Rate 2010-2015
Italy	Brindisi	5.0%
Italy	Reggio di Calabria	5.1%
Malta	Malta	5.1%
Croatia	Lika	5.5%
Malta	Gozo and Comino	6.3%
Greece	Kyklades	6.5%
Croatia	Primorje	6.6%
Greece	Thessaloniki	6.6%
Greece	Chania	6.9%
Greece	Lasithi	7.2%
Greece	Fokida	7.2%
Greece	Lesvos	7.3%
Croatia	Split	7.8%
Greece	Kavala	8.3%
Italy	Ogliastro	18.1%

Top-15 European Mediterranean touristic destinations according to the Average Annual Growth Rate of Overnight Stays (2010-2015) (CO-EVOLVE elaboration based on Data of National Statistical and Tourism Authorities)

BOX T.3.3 MAPS OF EU MEDITERRANEAN TOURISTIC DESTINATIONS (NUTS III)

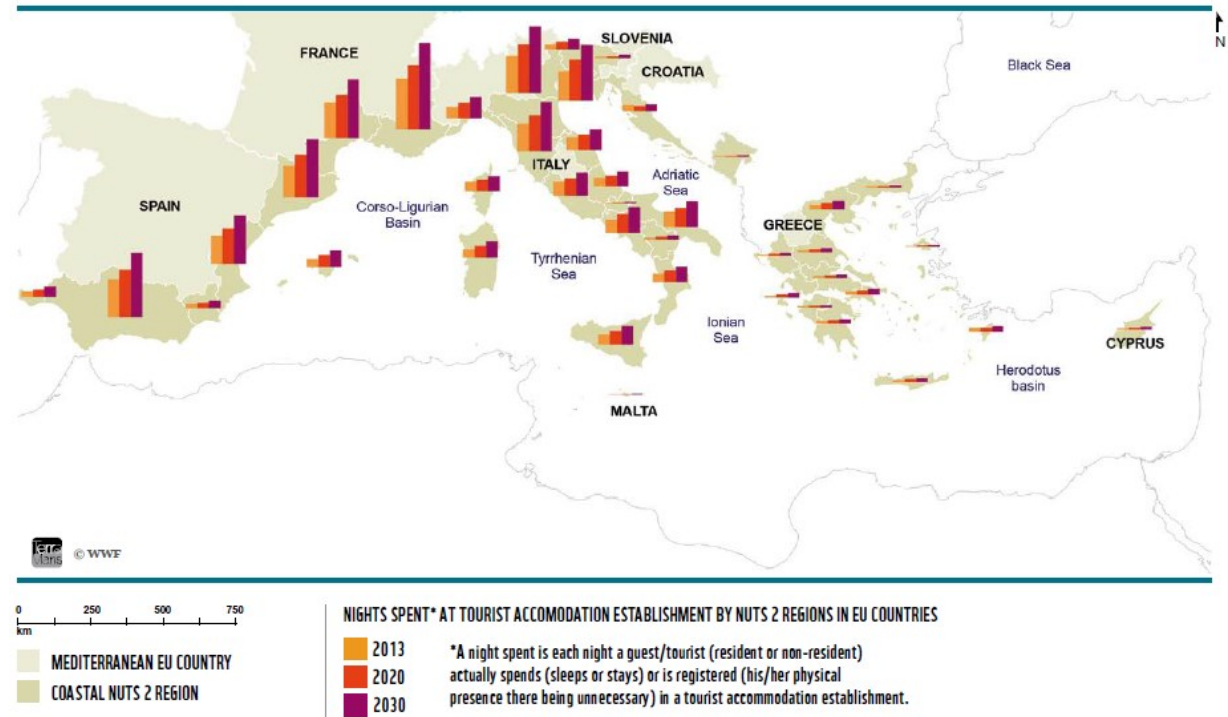


Map of destination categories according to the Average Annual Overnight Stays (2010-2015) (CO-EVOLVE elaboration based on Data of National Statistical and Tourism Authorities).



Map of destination categories according to the Average Annual Growth of Overnight Stays (2010-2015) (CO-EVOLVE elaboration based on Data of National Statistical and Tourism Authorities).

BOX T.3.4 FUTURE TRENDS OF TOURISTIC ACCOMODATION IN EU MEDITERRANEAN (NUTSII)



Past and future trends of nights spent at tourist accommodation in EU Mediterranean countries (2013, 2020 and 2030) (Piante and Ody, 2015)

BOX T.3.5 POTENTIAL IMPACTS FROM TOURISM DEVELOPMENT ON DIFFERENT DESTINATIONS

Destination	Main impacts from tourism	Carrying Capacity main issues
Coastal areas	- Environmental problems (50% of the ecologically richest and most sensitive areas in EU are located in coastal areas.) - Consumer of natural resources (e.g. Land) - Increased urbanization and population densities - Significant load of waste - Threats to other coastal uses (conversion of natural and agricultural land into tourism facilities) - Over-consumption of groundwater resources - Reduction of biodiversity (loss of habitat areas, coastal erosion etc)	- Tourist density - Coastal land use and infrastructure - Congestion of facilities - Sea pollution
Islands	- Limited resources - Fragile relationship between economy-society and the environment - Change of local identity (architecture and landscape) from widespread urbanization - Environmental degradation - Over-exploitation of key island resources –coasts, fresh water, agricultural land, marine resources	- Relationships between tourism and local society - Impacts on local production system - Impacts on resources (mainly water and energy) - Waste management - Tourist flows and spatial patterns of concentration - Impacts on ecosystems - Quality of visiting experience
Protected areas	- Vulnerable to environmental degradation from the development of recreational activities - Overload of visitors - Increased pressures from the development of the adjacent areas - Excessive use of passenger cars	- Tourist flows and spatial concentration patterns - Impacts on local society and culture - Impacts on rural economies
Rural areas	- Impacts for the continuation of traditional farming practices, nature conservation and landscape management - Costs related to the development of required infrastructure (road network, water supply, waste disposal) - Crowding-out of normal economic activities - Recreational activities posing environmental threats (e.g. Golf and hunting) - Noise and fragmentation of habitats - Erosion of mountain slopes (deforestation, leveling of steep slopes) - Deterioration of landscape - Significant energy consumption (artificial snow making, lifts etc.) - Loss of habitats and disturbance of endangered species	- Environmental impacts from large scale infrastructure - Landscape degradation - Soil erosion and loss of habitats - Waste management - Congestion of facilities - Congestion of facilities - Urban fabric changes - Waste management
Mountain resorts		
Historical settlements	- Traffic congestion, degradation of buildings and heritage sites - Excessive tourism pressure on heritage sites - Conflicts between normal and tourism activities	

Impacts from tourism development on destinations (Coccossis et al., 2002).

BOX T.3.6 THE FIVE SYSTEMS OF METRICS FOR TOURISM CC ASSESSMENT

A system of metrics for a logical assessment of TCC on the five typologies of maritime and coastal tourism in the Mediterranean (Ecorys, 2013) has been developed and proposed in the frame of CO-EVOLVE:

- Metrics for TCCA in beach/maritime tourism destinations
- Metrics for TCCA in urban/cultural tourism destinations
- Metrics for TCCA in cruising destinations
- Metrics for TCCA in recreational boating destinations
- Metrics for TCCA in nature/ecotourism destinations

Metrics for TCCA in beach/maritime tourism destinations

Carrying Capacity	Proposed Indicators	Description of Basic Estimation Methods and notes on Indicators
<i>Physical Carrying Capacity</i>	<u>Indicators from 3.16.1</u> D1.B4 Number of persons per hectare (or square meter) on the beach (for annual averages, and peak day, peak month) D1.C1 Total km of beaches (and free beaches relative to total km of beaches) <u>Additional Indicators</u> Maximum capacity of site of interest (No of tourists/(per site) or (per hectare)) No of days for which weather conditions allow the use of the place of interest (No of days/Year)	Estimation of Physical Carrying Capacity, Real Carrying Capacity, Effective Carrying Capacity could be based on the formulas described in Section 2. Carrying capacity assessment should be conducted in places of interest for which overcrowding phenomena arise or are expected to arise. In order to estimate the three types of Physical Carrying Capacity, data on site capacity, tourist flows and other limiting factors (resource management, weather conditions etc.) should be extracted. The proposed indicators may be used as a basis for acquiring the essential data for estimating PCC. In addition, more indicators could be employed by each destination according to its particular characteristics and challenges.
<i>Economic Carrying Capacity</i>	<u>Indicators from 3.16.1</u> C. B1.3 Relative contribution of tourism to the destination's economy per year (% GDP) C.B3.1 Direct tourism employment as % of total employment in the destination per year C.B3.2 % of jobs in tourism that are seasonal C.B4.1 % of locally produced food, drinks, goods and services sourced by the destination's tourism enterprises <u>Additional Indicators</u> Relative contribution of sectors to the destination's economy per year (% GDP) Direct employment as % of total employment in the destination per sector and per year Average Coastal Land Prices per year (€ per year)	Estimation of Economic Carrying Capacity could be conducted with the use of surveys or with the use of longitudinal economic data for all the sectors of the local economy. In destinations where tourism activities lie at the core of the economy, negative externalities to other economic sectors are very possible to be observed. These situations are expected to come up especially in destinations where the sun and sea model prevails. Thus, for destinations where beach tourism is highly developed ECC should be assessed and reviewed in a systematic context. The proposed indicators are expected to capture the relative performance of local economic sectors in a dynamic context. By doing so, the possible negative externalities of tourism on other sectors performance could be revealed. Then it is on the local community to define the threshold for tourism development.
<i>Social Carrying Capacity</i>	<u>Indicators from 3.16.1</u> C.A2.1 % of tourists and same-day visitors that are satisfied with their overall experience in the destination C.C1.1 Number of tourists/visitors per 100 residents C.C1.2 % of residents who are satisfied with tourism in the destination (per month/season) C.C4.1 % of residents that are satisfied with the impacts of tourism on the destination's identity	Estimation of Social Carrying Capacity and Perceptual Carrying Capacity could be conducted with the use of dedicated surveys. In order for Social Carrying Capacity to be reviewed in a logical timeframe it is advisable that surveys are conducted periodically in an annual basis. This procedure may prove to be helpful towards the definition of SCC thresholds. The proposed indicators may be used in order to form the structure of the surveys and extract the essential metrics for the longitudinal analysis of Social Carrying Capacity
<i>Environmental Carrying Capacity</i>	<u>Indicators from 3.16.1</u> C.D3.1 Waste production per tourist night compared to general population waste production per person (kg) Di. B3 Level of contamination per 100 ml (fecal coliforms, campylobacter) D1.C2 % of beaches awarded the Blue Flag	Environmental Carrying Capacity should rely on real data and observations. Nevertheless, perception of users and residents/stakeholders towards environmental state of the destinations may also be used in a complementary context. In beach tourism destinations, particular attention should be paid to the state of beaches and their waters. Thus metrics should target on the environmental quality of both coast and marine space.

<i>Infrastructure Carrying Capacity</i>	<u>Additional Indicators</u> Litter collection per beach or coast (Kgs per hectare)	The proposed indicators should be reviewed constantly. The thresholds could be shaped through a participatory approach and with the use of the relevant literature. Infrastructure Carrying Capacity should take into account all infrastructures associated with tourism activities either directly or indirectly. The aim of Infrastructure Carrying Capacity assessment is to quantify and control the additional pressure that tourism puts on the utilization of existing infrastructures. The proposed indicators should be reviewed constantly. The thresholds could be shaped through a participatory approach and with the use of the relevant literature.
	<u>Indicators from 3.16.1</u> C.B2.2 Occupancy rate in commercial accommodation per month and average for the year C.D4.1 % of sewage from the destination treated to at least secondary level prior to discharge C.D5.1 Water consumption per tourist night compared to general population water consumption per resident night C.D6.1 Energy consumption per tourist night compared to general population energy consumption per resident night <u>Additional Indicators</u> % occupancy in tourism sites. Daily traffic per day.	

Metrics for TCCA in urban/cultural tourism destinations

Carrying Capacity	Proposed Indicators	Description of Basic Estimation Methods and notes on Indicators
<i>Physical Carrying Capacity</i>	<u>Indicators from 3.16.1</u> Dii.B1. Total number of tourists per square Km in key sites (crowding/spatial distribution) Dii.A5. % of key sites operating all year <u>Additional Indicators</u> Intensity of use – peak period (persons/hectare)	Estimation of Physical Carrying Capacity, Real Carrying Capacity, Effective Carrying Capacity could be based on the formulas described in Section 2. Carrying capacity assessment should be conducted in places of interest for which overcrowding phenomena arise or are expected to arise. In order to estimate the three types of Physical Carrying Capacity, data on site capacity, tourist flows and other potential limiting factors (spatial distribution, crowding) should be extracted. The proposed indicators may be used as a basis for acquiring the essential data for estimating PCC. In addition, more indicators could be employed by each destination according to its particular characteristics and challenges.
	<u>Indicators from 3.16.1</u> C. B1.3 Relative contribution of tourism to the destination's economy per year (% GDP) C.B3.1 Direct tourism employment as % of total employment in the destination per year C.B4.1 % of locally produced food, drinks, goods and services sourced by the destination's tourism enterprises Dii.A1. Number of tourism-related MSMEs operating in the destination <u>Additional Indicators</u> Direct employment as % of total employment in the destination per sector and per year	
<i>Economic Carrying Capacity</i>		Estimation of Economic Carrying Capacity could be conducted with the use of surveys or with the use of longitudinal economic data for all the sectors of the local economy. In destinations where tourism activities lie at the core of the economy, negative externalities to other economic sectors are very possible to be observed. In urban/cultural destinations, special attention should be given in hotspots where mass tourism arrivals are observed. The proposed indicators are expected to capture the relative performance of local economic sectors in a dynamic context. By doing so, the possible negative externalities of tourism on other sectors performance could be revealed. Then it is on the local community to define the threshold for tourism development.
<i>Social Carrying Capacity</i>	<u>Indicators from 3.16.1</u> C.A2.1 % of tourists and same-day visitors that are satisfied with their overall experience in the destination	Estimation of Social Carrying Capacity and Perceptual Carrying Capacity could be conducted with the use of dedicated surveys. In order for Social Carrying Capacity to be reviewed in a logical timeframe it is advisable that

	C.C1.2 % of residents who are satisfied with tourism in the destination (per month/season) C.C3.3 % of tourist attractions that are accessible to people with disabilities and/or participating in recognized accessibility information schemes C.C4.1 % of residents that are satisfied with the impacts of tourism on the destination's identity C.C4.2 % of the destination's events that are focused on traditional/local culture and heritage	surveys are conducted periodically in an annual basis. This procedure may prove to be helpful towards the definition of SCC thresholds. The proposed indicators may be used in order to form the structure of the surveys and extract the essential metrics for the longitudinal analysis of Social Carrying Capacity.
<i>Environmental Carrying Capacity</i>	<u>Indicators from 3.16.1</u> C.D1.2 % of tourists and same-day visitors using local/soft mobility/public transport services to get around the destination C.D3.1 Waste production per tourist night compared to general population waste production per person (kg) Dii.C3. % of district under protection Dii.C4. % of sites under a management and monitoring system for protection of cultural sites <u>Additional Indicators</u> Garbage disposal and control at cultural heritage sites	Environmental Carrying Capacity should rely on real data and observations. Nevertheless, perception of users and residents/stakeholders towards environmental state of the destinations may also be used in a complementary context. In urban/cultural destinations, particular attention should be paid to preservation of cultural heritage, city restoration and congestion control. The proposed indicators should be reviewed constantly. The thresholds could be shaped through a participatory approach and with the use of the relevant literature.
<i>Infrastructure Carrying Capacity</i>	<u>Indicators from 3.16.1</u> C.D4.1 % of sewage from the destination treated to at least secondary level prior to discharge C.D5.1 Water consumption per tourist night compared to general population water consumption per resident night C.D6.1 Energy consumption per tourist night compared to general population energy consumption per resident night <u>Additional Indicators</u> % occupancy in tourism sites.	Infrastructure Carrying Capacity should take into account all infrastructures associated with tourism activities either directly or indirectly. The aim of Infrastructure Carrying Capacity assessment is to quantify and control the additional pressure that tourism puts on the utilization of existing infrastructures. The proposed indicators should be reviewed constantly. The thresholds could be shaped through a participatory approach and with the use of the relevant literature.

Metrics for TCCA in cruising destinations

Carrying Capacity	Proposed Indicators	Description of Basic Estimation Methods and notes on Indicators
<i>Physical Carrying Capacity</i>	<u>Indicators from 3.16.1</u> Diii.A4. Number of ship visits per year (by month) Diii.A5. % annual ship visits arriving in peak month/ season Diii.C1. Maximum capacity of docking facilities (number) <u>Additional Indicators</u> % Use of current shore docking capacity	Estimation of Physical Carrying Capacity, Real Carrying Capacity, Effective Carrying Capacity could be based on the formulas described in Section 2. Carrying capacity assessment should be conducted in places of interest for which overcrowding phenomena arise or are expected to arise. In order to estimate the three types of Physical Carrying Capacity, data on site capacity, tourist flows and other potential limiting factors should be extracted. The proposed indicators may be used as a basis for acquiring the essential data for estimating PCC. In addition, more indicators could be employed by each destination according to its particular characteristics and challenges.
<i>Economic Carrying</i>	<u>Indicators from 3.16.1</u>	Estimation of Economic Carrying Capacity could be conducted with the use of surveys or with the

<i>Capacity</i>	C.B1.3 Relative contribution of tourism to the destination's economy per year (% GDP) Diii.A2. Total jobs directly attributable to cruise industry Diii.A7. Total and average port fees and charges received per ship visit Diii.A8. Average spending per cruise ship visitor (€)	use of longitudinal economic data for all the sectors of the local economy. In destinations where tourism activities lie at the core of the economy, negative externalities to other economic sectors are very possible to be observed. In cruise destinations where the economic benefits are of major importance, ECC should be assessed and reviewed in a systematic context. The proposed indicators are expected to capture the relative performance of local economic sectors in a dynamic context. By doing so, the possible negative externalities of tourism on other sectors performance could be revealed. Then it is on the local community to define the threshold for tourism development.
<i>Social Carrying Capacity</i>	<u>Indicators from 3.16.1</u> C.A2.1 % of tourists and same-day visitors that are satisfied with their overall experience in the destination C.C1.2 % of residents who are satisfied with tourism in the destination (per month/season) C.C4.1 % of residents that are satisfied with the impacts of tourism on the destination's identity Diii.A9. Peak day passengers discharged (total number, ratio of passengers discharged to local population)	Estimation of Social Carrying Capacity and Perceptual Carrying Capacity could be conducted with the use of dedicated surveys. In order for Social Carrying Capacity to be reviewed in a logical timeframe it is advisable that surveys are conducted periodically in an annual basis. This procedure may prove to be helpful towards the definition of SCC thresholds. The proposed indicators may be used in order to form the structure of the surveys and extract the essential metrics for the longitudinal analysis of Social Carrying Capacity
<i>Environmental Carrying Capacity</i>	<u>Indicators from 3.16.1</u> Diii.B5. Number of discharge violations (Ballast water) Diii.B6. Level of contamination of seawater per 100ml (heavy metals)	Environmental Carrying Capacity should rely on real data and observations. Nevertheless, perception of users and residents/stakeholders towards environmental state of the destinations may also be used in a complementary context. In cruising destinations, special attention should be paid to metrics related to the operation of the ships and water quality records. The proposed indicators should be reviewed constantly. The thresholds could be shaped through a participatory approach and with the use of the relevant literature.
<i>Infrastructure Carrying Capacity</i>	<u>Indicators from 3.16.1</u> Diii.B1. Volume of fresh water on-loaded at port (m³) Diii.B2. Volume of waste accepted for disposal (solid, liquid) at port (m³)	Infrastructure Carrying Capacity should take into account all infrastructures associated with tourism activities either directly or indirectly. The aim of Infrastructure Carrying Capacity assessment is to quantify and control the additional pressure that tourism puts on the utilization of existing infrastructures. Especially in cruising destinations, thresholds should be defined in relation to infrastructure capacities (water, discharges, energy, etc) in order to mitigate negative externalities (water limitations, waste treatment capacity, etc.). The proposed indicators should be reviewed constantly. The thresholds could be shaped through a participatory approach and with the use of the relevant literature.

Metrics for TCCA in recreational boating destinations

Carrying Capacity	Proposed Indicators	Description of Basic Estimation Methods and notes on Indicators
<i>Physical Carrying Capacity</i>	<u>Indicators from 3.16.1</u> Div.A2. Number of yachts per year (by month)	Estimation of Physical Carrying Capacity, Real Carrying Capacity, Effective Carrying Capacity could be based on the formulas described in Section 2

	Div.A3. % annual yachts arriving in peak month/ season Div.C1. Number of berths and moorings for recreational boating	Carrying capacity assessment should be conducted in places of interest for which overcrowding phenomena arise or are expected to arise. In order to estimate the three types of Physical Carrying Capacity, data on site capacity, tourist flows and other potential limiting factors should be extracted. The proposed indicators may be used as a basis for acquiring the essential data for estimating PCC. In addition, more indicators could be employed by each destination according to its particular characteristics and challenges.
<i>Economic Carrying Capacity</i>	<u>Indicators from 3.16.1</u> C.B1.3 Relative contribution of tourism to the destination's economy per year (% GDP) Div.A5. Total and average port fees and charges received per boat (€) <u>Additional Indicators</u> Total purchases of local goods (e.g., foodstuffs, beverages, souvenirs) per boat	Estimation of Economic Carrying Capacity could be conducted with the use of surveys or with the use of longitudinal economic data for all the sectors of the local economy. In destinations where tourism activities lie at the core of the economy, negative externalities to other economic sectors are very possible to be observed. Special attention in recreational boating destinations should be given in potential interlinked economic activities and commercial services. The proposed indicators are expected to capture the relative performance of local economic sectors in a dynamic context. By doing so, the possible negative externalities of tourism on other sectors performance could be revealed. Then it is on the local community to define the threshold for tourism development.
<i>Social Carrying Capacity</i>	<u>Indicators from 3.16.1</u> C.A2.1 % of tourists and same-day visitors that are satisfied with their overall experience in the destination C.C1.2 % of residents who are satisfied with tourism in the destination (per month/season) C.C4.1 % of residents that are satisfied with the impacts of tourism on the destination's identity	Estimation of Social Carrying Capacity and Perceptual Carrying Capacity could be conducted with the use of dedicated surveys. In order for Social Carrying Capacity to be reviewed in a logical timeframe it is advisable that surveys are conducted periodically in an annual basis. This procedure may prove to be helpful towards the definition of SCC thresholds. The proposed indicators may be used in order to form the structure of the surveys and extract the essential metrics for the longitudinal analysis of Social Carrying Capacity
<i>Environmental Carrying Capacity</i>	<u>Indicators from 3.16.1</u> Div.B5. Number of reported pollution or contamination events per annum (by month) in watercourses receiving effluents (in tourist harbours/marinas) Div.B6. Number of discharge violations (Ballast water) Div.B7. Level of contamination of seawater per 100 ml (heavy metals)	Environmental Carrying Capacity should rely on real data and observations. Nevertheless, perception of users and residents/stakeholders towards environmental state of the destinations may also be used in a complementary context. In recreational boating destinations, special attention should be paid to metrics related to the operation of the ships and water quality records. The proposed indicators should be reviewed constantly. The thresholds could be shaped through a participatory approach and with the use of the relevant literature.
<i>Infrastructure Carrying Capacity</i>	<u>Indicators from 3.16.1</u> Div.B1.Volume of fresh water on-loaded at port (m³) Div.B2.Volume of waste accepted for disposal (solid, liquid) at port (m³)	Infrastructure Carrying Capacity should take into account all infrastructures associated with tourism activities either directly or indirectly. The aim of Infrastructure Carrying Capacity assessment is to quantify and control the additional pressure that tourism puts on the utilization of existing infrastructures. In recreational boating destinations, thresholds should be defined in relation to infrastructure capacities (water, discharges, energy, etc) in order to mitigate negative externalities (water limitations, waste treatment capacity, etc.). The proposed indicators should be reviewed constantly. The thresholds could be shaped through a participatory approach and with the use of the relevant literature.

Metrics for TCCA in nature/ecotourism destinations

Carrying Capacity	Proposed Indicators	Description of Basic Estimation Methods and notes on Indicators
<i>Physical Carrying Capacity</i>	<u>Indicators from 3.16.1</u> Dv.A3. Total number of visitors to parks and to key sites Dv.A4. Number of tourists per square meter of the site (mean number/peak month average/peak day) Dv.B5. N° of visitors acceptable, according to the capacity of the equipment and facilities of the site (depends on capacity studies establishing limits) <u>Additional Indicators</u> % of area subject to control	Estimation of Physical Carrying Capacity, Real Carrying Capacity, Effective Carrying Capacity could be based on the formulas described in Section 2 Carrying capacity assessment should be conducted in places of interest for which overcrowding phenomena arise or are expected to arise. In order to estimate the three types of Physical Carrying Capacity, data on site capacity, tourist flows and other potential limiting factors should be extracted. The proposed indicators may be used as a basis for acquiring the essential data for estimating PCC. In addition, more indicators could be employed by each destination according to its particular characteristics and challenges.
<i>Economic Carrying Capacity</i>	<u>Indicators from 3.16.1</u> C.B1.3 Relative contribution of tourism to the destination's economy per year (% GDP) C.B4.1 % of locally produced food, drinks, goods and services sourced by the destination's tourism enterprises <u>Additional Indicators</u> Employment of local residents in site management and tourism operations (numbers, income levels)	Estimation of Economic Carrying Capacity could be conducted with the use of surveys or with the use of longitudinal economic data for all the sectors of the local economy. In destinations where tourism activities lie at the core of the economy, negative externalities to other economic sectors are very possible to be observed. In nature/ecotourism destinations, economic relations between tourism activities and local communities should be regularly recorded. The proposed indicators are expected to capture the relative performance of local economic sectors in a dynamic context. By doing so, the possible negative externalities of tourism on other sectors performance could be revealed. Then it is on the local community to define the threshold for tourism development.
<i>Social Carrying Capacity</i>	<u>Indicators from 3.16.1</u> C.A2.1 % of tourists and same-day visitors that are satisfied with their overall experience in the destination C.C1.2 % of residents who are satisfied with tourism in the destination (per month/season) C.C4.1 % of residents that are satisfied with the impacts of tourism on the destination's identity <u>Additional Indicators</u> Level of satisfaction of residents regarding tourism development in the area - particularly regarding that targeting natural systems Existence of a participatory process for community and protected area collaboration in planning and management	Estimation of Social Carrying Capacity and Perceptual Carrying Capacity could be conducted with the use of dedicated surveys. In order for Social Carrying Capacity to be reviewed in a logical timeframe it is advisable that surveys are conducted periodically in an annual basis. This procedure may prove to be helpful towards the definition of SCC thresholds. Especially in nature/ecotourism destinations where active participation and agreement of local communities is fundamental, SCC should be assessed and reviewed in a systematic context The proposed indicators may be used in order to form the structure of the surveys and extract the essential metrics for the longitudinal analysis of Social Carrying Capacity
<i>Environmental Carrying Capacity</i>	<u>Indicators from 3.16.1</u> C.D3.1 Waste production per tourist night compared to general population waste production per person (kg) Dv.B1. Number of sites/ecosystems/assets considered to be damaged or threatened (% of all defined systems/assets in protected area) Dv.B2. % of protected area in eroded or degraded state <u>Additional Indicators</u>	Environmental Carrying Capacity should rely on real data and observations. Nevertheless, perception of users and residents/stakeholders towards environmental state of the destinations may also be used in a complementary context. In nature/ecotourism destinations, special attention should be paid to recording changes in the ecosystems. Thus, metrics should target on measuring, recording and monitoring ecological values and protection level of the ecosystems. The proposed indicators should be reviewed constantly. The thresholds could be shaped through a

	Amount of litter in natural areas (seasonality of waste can relate to tourist numbers) Noise pollution due to motors: visitors perceiving annoying motor noises (cars, launches, motorcycles, planes, generators, etc.) in natural areas <u>Indicators from 3.16.1</u> C.D5.1 Water consumption per tourist night compared to general population water consumption per resident night C.D6.1 Energy consumption per tourist night compared to general population energy consumption per resident night Dv.C5. N° of access routes in good condition for tourism use <u>Additional Indicators</u> % occupancy of camping sites and accommodation	participatory approach and with the use of the relevant literature.
<i>Infrastructure Carrying Capacity</i>		Infrastructure Carrying Capacity should take into account all infrastructures associated with tourism activities either directly or indirectly. The aim of Infrastructure Carrying Capacity assessment is to quantify and control the additional pressure that tourism puts on the utilization of existing infrastructures. The proposed indicators should be reviewed constantly. The thresholds could be shaped through a participatory approach and with the use of the relevant literature.

3.4 Threat 4: Pollution and other anthropogenic pressures to ecosystems

Theoretical insight

Coastal tourism can potentially affect coastal ecosystems through manifold pressures, which can pollute air and water, can cause noise and light nuisance, and can alter the health of wildlife populations via overexploitation or disturbance.

On the other hand, degraded ecosystems can put at risk coastal touristic development itself.

A wide range of anthropogenic activities whose effects add up to those produced by coastal tourism sector causes such ecosystem degradation.

Discharge of untreated or partially treated sewage from coastal cities as well as from industrial sites into the immediate coastal waters can compromise bathing, by decreasing water quality and thus its touristic attractiveness.

If at land vehicles queuing up on crowded seaside roads can generate relevant air emissions, at sea cruise and yachts can not only be responsible for air quality degradation, but they can also contaminate waters and interfere with marine fauna. The impacts of water contamination and underwater noise multiply when considering land-based trade transportation and industrial shipping. In turn, eco-touristic activities such as whale watching can be negatively affected.

Long distance cruising and international shipping can also favour the introduction of invasive species, which pose a threat to ecosystem integrity by competing with and gradually substituting native species. The adverse effects of this transition for resorts whose economy lives on local seafood can be relevant.

Coastal urban sprawl generated by littoralization and industrialization implies the irreversible reduction of natural coastal habitats. Correspondently, prospecting and drilling for underwater oil and gas reserves damage sensitive marine habitats. Habitat degradation and loss lead to the decline of all those species not capable of a rapid adaptation to new environmental conditions.

Moreover, major coastal cities generate high amounts of solid waste, which, if not properly managed and recycled, can end up in the sea contributing to the increase of marine litter, with severe effects on biota. Conversely, the impact of marine debris on seaside tourism can be economically significant: while local authorities invest each year substantial resources in beach cleaning, tourists tend to avoid polluted shores.

State

The Mediterranean is recognized as one of the world's 25 top biodiversity hotspots. Its biodiversity represents between 4% and 18% of the world's known marine species, in an area covering less than 1% of the world's oceans (Meyers et al. 2000) ([BOX T.4.1 DISTRIBUTION OF MEDITERRANEAN COASTAL ECOSYSTEM TYPES](#)).

Species richness is under threat due to two main drivers: habitat degradation and loss and biological invasions.

The Mediterranean with its geographical specificities has been exceptionally susceptible to invasions by species throughout history. In addition to the Strait of Gibraltar, the opening of the Suez Canal in 1869 has fostered over the years the introduction of alien species of Indo-Pacific and Red Sea origin into the eastern Mediterranean Sea (MIO-ECSDE 2013). As a result, nearly 1000 species (~10-15% of all species inhabiting the Mediterranean Sea) have experienced a successful introduction into the Mediterranean Sea (Cuttelod et al. 2008).

Land use change towards urban areas has occurred massively during the XX century, leading to impairment of most estuarine and near-shore coastal habitats. Consequently, 80% of coastal habitats have disappeared from many Mediterranean regions (Airoldi and Beck 2007).

Other threat factors jeopardize Mediterranean habitats and species: solid waste and marine litter production; air emissions and noise pollution; water pollution and eutrophication; wildlife disturbance and overexploitation; light pollution.

The Basin has been described as one of the areas most damaged by marine litter in the world (Eriksen et al. 2014): the average concentration of marine litter found in the Mediterranean Sea is comparable to the high values found in subtropical gyres (Cózar et al., 2015; Suaria et al., 2016).

Moreover, resources for Mediterranean fisheries are in a state of overexploitation driven by rising prices and demand in the past decades. Both factors strongly impinge on the state of the highly diverse Mediterranean marine fauna. Most of the Mediterranean marine species are affected by accidental capture in fishing gear, also called “bycatch”. This is considered to be a major threat for sharks, rays, dolphins and marine turtles. Illegal trade is also of major concern in the Mediterranean (Cuttelod et al. 2008).

Air and noise pollution are a constant and underestimated issue in major coastal Mediterranean cities, mainly due to heavy road transportation, which reaches unsustainable levels in summertime that can disturb fauna. In parallel, underwater noise produced by the high traffic of cruises and yachts throughout the Mediterranean Basin can damage cetaceans’ orientation (Williams et al. 2015).

Wildlife behavioural patterns can also be negatively influenced by light pollution, which hit most of Mediterranean shorelines with peaks in correspondence to major coastal cities.

Mediterranean seaside tourists enjoy good bathing water quality, although nutrients loads can concentrate in correspondence with the largest river mouths, leading to high levels of eutrophication (PERSEUS – UNEP/MAP Report 2015) ([BOX T.4.2 GLOBAL AREAS OF CONSERVATION CONCERN IN THE MEDITERRANEAN SEA](#)).

Spatial distribution

Water pollution and eutrophication

Western European Mediterranean Basin is overall characterized by good bathing water quality conditions, while Eastern Mediterranean Basin presents a more variegated state. Hotspots for water contamination are located throughout Italian, French and Spanish coastlines (EEA 2016) ([BOX T.4.3 BATHING WATER QUALITY IN THE EU MED](#)).

The river water discharge in the Southern Mediterranean Sea accounts only for 7% of all Mediterranean Rivers (3% excluding the Nile). In the Northwestern Mediterranean Sea and Northern Adriatic Sea the impact of nutrient emissions should be stronger as high precipitation increases the nutrient leaching from soil to the river mouth. In the areas around the Aegean Sea and Northern Levantine Sea there is an intermediate situation with a relatively large demographic and agricultural growth and moderate leaching rate of nutrients (PERSEUS – UNEP/MAP Report 2015).

Light pollution

Artificial light brightness hot spots are found in major Mediterranean coastal cities such as Athens, Rome, Naples and Barcelona. In addition to cities, some islands show worrisome light pollution levels (e.g. Malta). Western Mediterranean night skies are more polluted than the Eastern and the Southern rim, where the major sources of light pollutions are Arzew and

Algeri in Algeria; Tunisi in Tunisia; and Tripoli and Misurata in Lybia ([BOX T.4.4 ARTIFICIAL LIGHT POLLUTION IN THE EU MED](#)).

Solid waste and marine litter

Urbanized areas are also responsible for the generation of large amounts of solid waste, which can be transported off shore, when not properly collected and treated. Marine litter can therefore gather very far away from its origin, due to currents. Underwater marine litter hotspots are the areas south of Palma de Mallorca, the area south of Crete and the Central Mediterranean Sea (Pham et al 2014) ([BOX T.4.5 MARINE LITTER AND CETACEANS IN THE PELAGOS SANCTUARY](#)).

Habitat loss

Most of Greek and Dalmatian regions still maintain their natural integrity both on coasts and inland. The exceptions to this in Greece are Thessaloniki, Langadas and Xanthi, whose coastal naturalness is in unfavourable state. The other Greek region where natural habitats have been lost is Attika (the region of Athens).

On the other hand, the Western Mediterranean regions have lost much of their native coastal ecosystems in favour of urbanization. This is particularly true for the entire Adriatic and the Ionian Italian coastlines. In particular, only Foggia in the Gargano region still hosts large natural areas in its coastal territory. The Tyrrhenian coast is variegated, with the highest naturalness in Grosseto and Potenza NUTS III regions, and the lowest in Naples.

Recent trends and expected evolution

While some threats to coastal Mediterranean ecosystems appear to decline, others are just at the beginning. For instance, **water pollution** on the EU Mediterranean coastline has seen a constant reduction in the last years, as the share of bathing water sites with excellent quality shows (from 81.3 % in 2011 to 85.8 % in 2015; EEA, 2016).

Although **eutrophication** is more intense in the northern part of the Basin, special attention for the coming future must also be given to the southern part: here, the population is steadily growing, certain agricultural and industrial activities are rapidly developing, and sewage treatment facilities are still lacking (EEA, 2014).

Marine Litter produced by coastal tourism and specifically by recreational sailing appears to be on the increase (Piante and Ody, 2015).

According to the European Environmental Agency (EEA), the average amount of municipal **solid waste** produced in the EU of 520 kg per person/year is projected to increase to 680 kg per person/year by 2020. While solid waste generated in non-EU Mediterranean countries is still approximately half the per capita level in the EU, waste generation in the southern Mediterranean region has grown approximately 15 % over the last decade, mostly due to a growing population and increased consumption.

Bad news come from **invasive species** as well: the Mediterranean Sea is considered to be one of the main hotspots of marine alien species invasions on earth and the rate of introductions appears to be steadily growing in the near future (MIO-ECSDE, 2013).

Anthropogenic underwater noise is also expected to increase, following maritime transport positive trends in the whole Mediterranean Basin (ACCOBAMS, 2016).

Habitat loss and degradation, followed by fishing impacts, pollution and climate change is expected to grow in importance in the future (Coll et al., 2010), if not properly managed according to existing environmental policies.

Driving forces and pressures

Coastal tourism forms exert a wide range of pressures to coastal and marine ecosystems ([BOX T.4.6. CONCEPTUAL FRAMEWORK CONNECTING COASTAL TOURISM, OTHER HUMAN ACTIVITIES AND ECOSYSTEM SERVICES](#)). Here are some examples:

1. Beach tourists step on delicate habitats such as sand dunes, while cleaning of strandlines for lidos can remove these habitats.
2. Mass tourism in cultural cities produces high quantities of garbage and causes peaks of air pollution during summertime.
3. The cruise industry has the potential to affect air quality through engine emissions, but also produces toxic chemicals and hazardous waste from dry-cleaning procedures, used batteries, and paint waste from brush cleaning.
4. Recreational boating can cause damage to marine habitat and animals such as seagrass beds and corals by running aground or dragging anchor over the habitat.
5. The movement of eco-tourists' vehicles can adversely affect wildlife by separating the young from their parents.

Apart from coastal tourism, other human activities impinge on coastal ecosystems, thus accumulating impacts and potentially compromising tourist use of coastal areas. For example:

Shipping activities as well as aquaculture and mariculture are the most important pathway of alien species in the Mediterranean including escaped fish species, their parasites and diseases and self-dispersal of larvae and spawn.

Marine mining and oil and gas exploration and extraction for energy production cause physical damage of the seabed habitats and underwater noise, while recreational and **professional fisheries** not only extract selected species but also unintentionally damage others, through by-catch. The geographical distribution of pollution 'hot spots' is related also to the density of shipping traffic on the various Mediterranean routes.

Intense agricultural activity is carried out in the limited coastal plains, often as a result of reclamation of wetlands. In most Mediterranean countries, all types of agricultural practices lead to diffuse pollution of water and, hence, are difficult to quantify. Other impacts from intensive agriculture are soil erosion and nutrient surplus (eutrophication) when excessive fertilisers are applied.

Responses

TARGETED RESPONSES TO THREATS FROM TOURISM

MARINE LITTER: International beach cleaning days, regional research projects and highly visible awareness-raising stunts. Of particular interest for the Mediterranean Basin is the Implementation of the Marine Litter Regional Plan.

INVASIVE SPECIES: The International Convention for The Control and Management of Ships Ballast Water Ballast Water and Sediments has the aim of protecting the marine environment from the transfer of harmful aquatic organisms in ballast water carried by ships. It entered into force on 8 September 2017.

The Delivering Alien Invasive Species In Europe (DAISIE) project, funded by the sixth framework programme of the European Commission, provides valuable information on biological invasions in Europe. Moreover, the Marine Alien Invasive Species Strategy for the

Mediterranean MPA network aims at giving answers to “actions on all non native marine species”.

WATER POLLUTION: Reduction of pollutant loads from point and non-point sources, acting at watershed scale. In particular, on coastal areas, installation of urban wastewater treatment plants in most of the Mediterranean urban areas hotspots. In addition, according to the provisions of the EU's revised Bathing Water Directive (2006/7/EC), all EU Member States monitor each year their bathing sites.

AIR POLLUTION: The establishment of Emission Control Areas, reducing cruising speed of vessels (slow steaming) as well as switching to cleaner fuels are all regional measures to reduce air emissions from cruise vessels (Campling et al. 2013). Management plans for terrestrial transports, particularly in highly congested tourist areas/cities.

Impacts from and to tourism

Although data availability is not homogeneous and much depends on the intensity of flows and pressures, some touristic typologies negatively affect the coastal ecosystems clearly more than others do (**BOX T.4.7 THE RELATIVE ENVIRONMENTAL IMPACT OF THE FIVE COASTAL TOURISTIC TYPOLOGIES**). While cruising is probably one of the most impacting coastal touristic typology, ecotourism has the lowest total environmental impact, if performed in a respectful way.

Coastal tourism impinges on coastal ecosystems through manifold environmental impacts, which threaten ecosystem integrity and functionality.

In addition to coastal tourism, many other human pressures disturb coastal ecosystems.

Therefore, coastal tourism development is *indirectly* affected by other human activities, as both depend on the same resource. In addition, coastal tourism can be also *directly* damaged by other anthropogenic factors, for instance water pollution generated by intensive agriculture or industry (**BOX T.4.8 FEEDBACK OF ENVIRONMENTAL IMPACTS ON COASTAL TOURISM**).

Only ecosystem integrity maintenance can assure the ecological services ecosystems provide, including the attractiveness for tourists (the so-called recreational value).

Knowledge gaps

Although many efforts have been recently made to enhance the knowledge related to the most pressing threats affecting Mediterranean ecosystems, studies on the cumulative environmental impact of coastal tourism are still very scarce. Such lack of knowledge is particularly true for the Southern Mediterranean countries.

The cumulative effect (at present and in the long term) of pressures (tourism and other coastal and marine human activities) on the health of coastal and marine ecosystems needs also further investigation.

More research is necessary to understand the contribution of touristic activities, land and sea-based, to marine litter and to investigate the damage of microscopic plastic particles on marine fauna and the marine food web as well as how light and noise pollution impinge on wildlife behaviour.

Information at country level on alien species distribution and their invading strategies is growing fast; however, no lower spatial detail currently exists.

Insight over air and water emissions produced by recreational boating and cruise are still insufficiently known, but recent studies give cause for concern.

Indicators

A wide range of indicators describing the manifold threats to coastal ecosystems derived from and impinging on tourism was identified in the framework of CO-EVOLVE. However, only for some of them adequate and standardized data could be found. The Table below shows the indicators which could be populated and mapped at EU MED level. All of them can be applied at NUTS III or lower spatial scale.

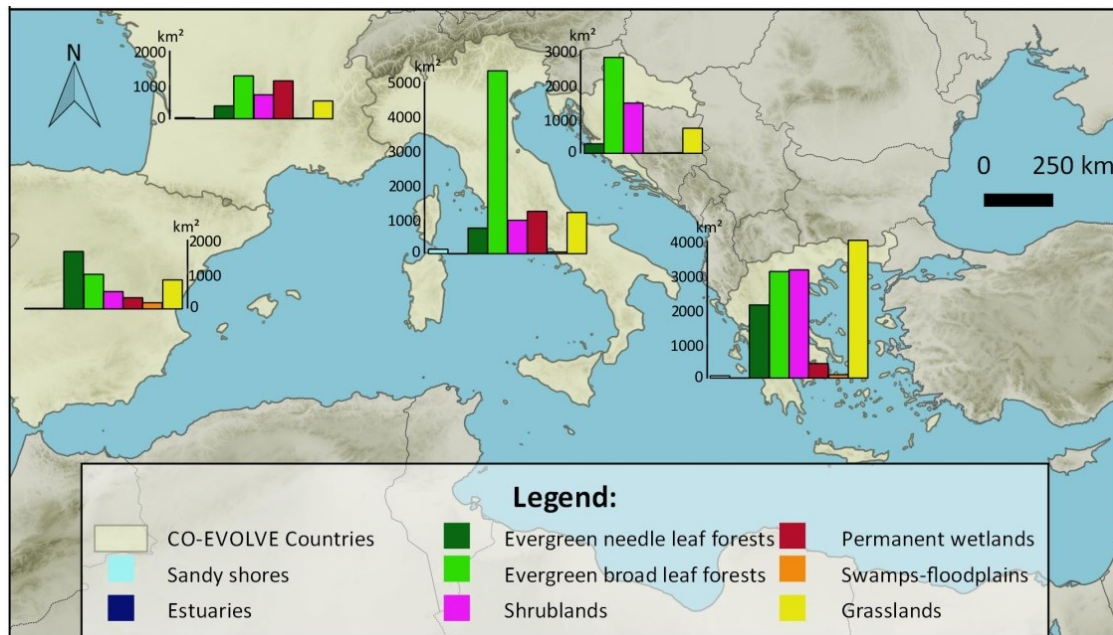
Other potentially suitable indicators, for which no homogenous information is currently available are:

- Annual N. of litter items collected (per NUTS III);
- N. alien invasive species (per NUTS III);
- N. endangered species (per NUTS III).

	Id	Indicators	Measure
<i>P.A4.Pollution and other anthropogenic pressures affecting ecosystems</i>	P.A4.1.	Percentage of artificial land cover classes with respect to total surface	Percentage
	P.A4.2.	Percentage of bathing sites with excellent water quality	Percentage
	P.A4.3.	Artificial sky brightness	mcd/m2
	P.A4.4.	Natural land cover classes/artificial land cover classes	Number
	P.A4.5	Percentage of people exposed to road noise	Percentage
	P.A4.6	Municipal waste per capita annually produced	kg/year

BOX Threat 4

BOX T.4.1 DISTRIBUTION OF MEDITERRANEAN COASTAL ECOSYSTEM TYPES



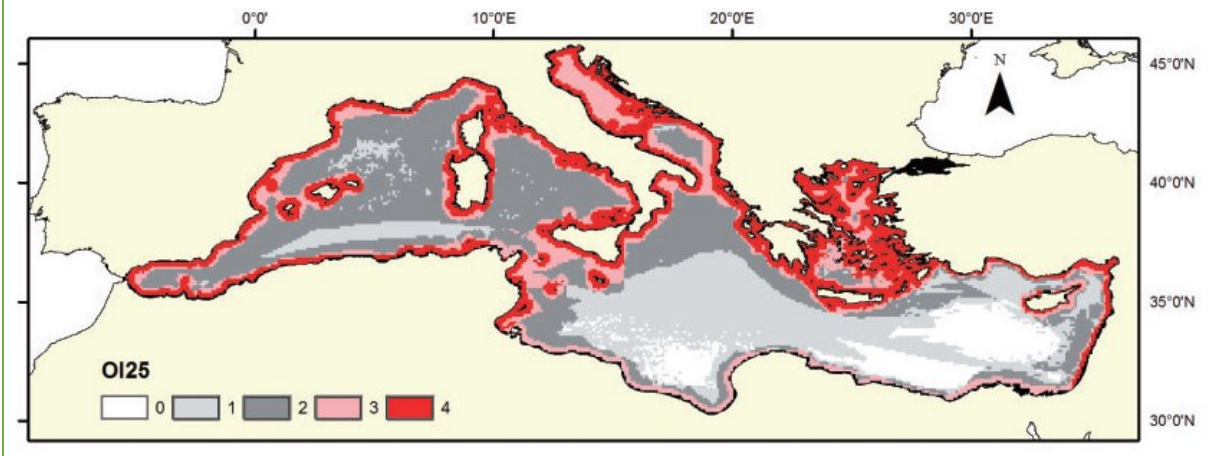
Coastal ecosystems are distributed **unevenly** along the EU Mediterranean coastline.

Evergreen broad-leaf forests extend largely along Italian, Greek and Croatian coasts, while **evergreen needle-leaf forests** are present mostly in Spanish and Greek coastal areas. **Coastal grasslands** occur massively along Greek coastal strips. French Mediterranean shoreline hosts a considerable portion of **permanent wetlands**. **Sandy shores** and **estuaries** are in essence very restricted coastal ecosystem types.

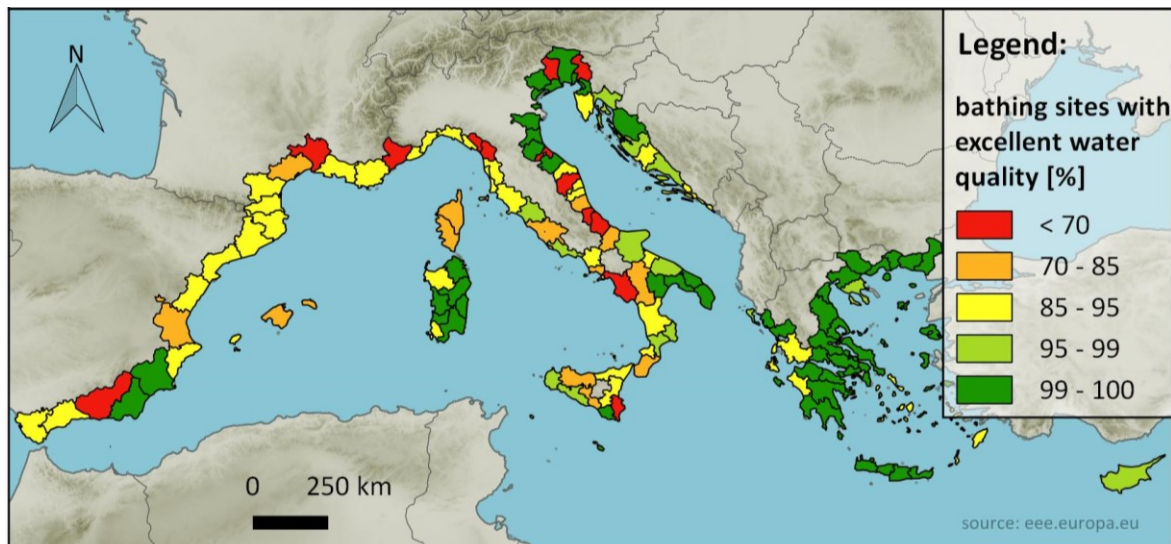
BOX T.4.2 GLOBAL AREAS OF CONSERVATION CONCERN IN THE MEDITERRANEAN SEA

High biodiversity of invertebrates, fishes, marine mammals and turtles, seabirds, and high threats overlap mostly along all Mediterranean coastal strips.

The *overlap index* (OI) indicates areas where both species diversity and intensity of cumulative threats were $\geq 25\%$. 0 = no groups (of the four biodiversity groupings studied: invertebrates, fishes, marine mammals and turtles, and seabirds) show high diversity and high cumulative threats; 1 = only one group shows high diversity and high threats; 2 = two groups of the four show high diversity and high threats; 3 = three groups of the four show high diversity and high threats; and 4 = all groups show high diversity and high threats. Black circles indicate cells with data. (Coll et al. 2012)



BOX T.4.3 BATHING WATER QUALITY IN THE EU MED



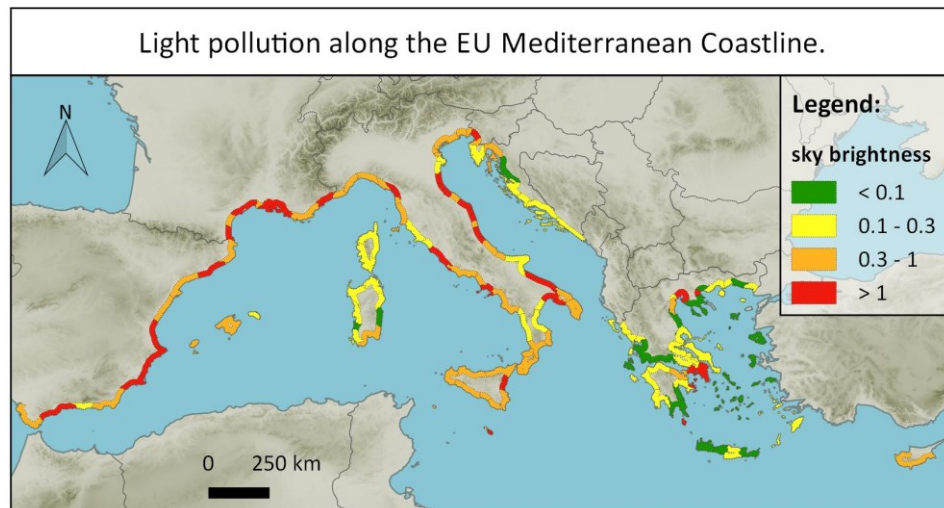
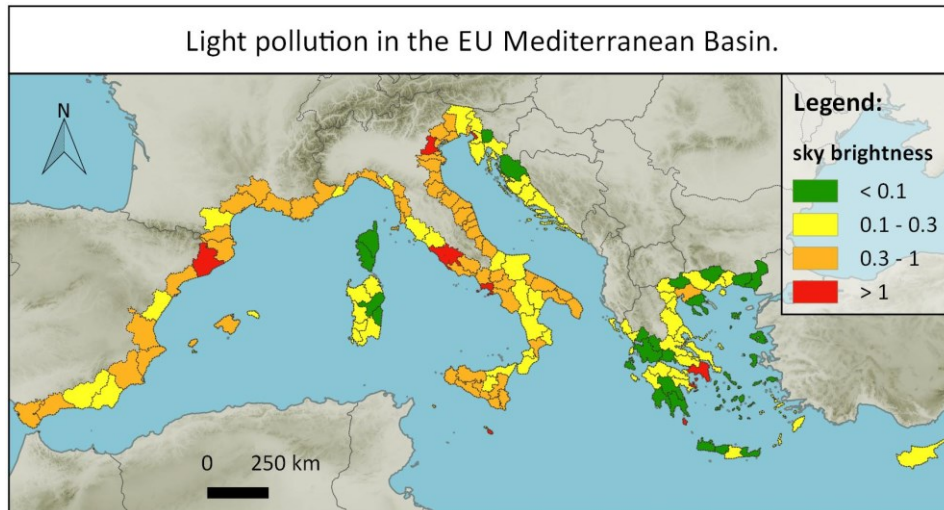
Most of **Greek** coastal regions have almost all (99-100%) bathing sites in excellent condition. Dalmatian and Slovenian coastlines are also in middle to good ranking (with the regions of **Istria**, **Šibenik** and **Dubrovnik** showing the worst values). The **Italian Peninsula** presents a very inhomogeneous situation, with most of Sardinia, NE Adriatic coast and Apulia and Basilicata characterized by excellent water quality in 99-100% of bathing sites, while **Tyrrhenian** coastlines range from 70% to 95% of excellent bathing sites. The regions characterized by lower values are **Salerno** and **Syracuse**. **French** and **Spanish** coastal NUTS III regions have a similar variegated condition to Tyrrhenian coastline, with the exception of **Almeria** and **Murcia** (99-100% of excellent water quality sites) and **Granada** (lowest percentage < 70%). In France, the “worst” regions (< 70% of excellent bathing sites) are **Gard** and **Alpes-Maritimes**. **Balearic Islands** and **Corsica** present 70-85% of bathing sites with excellent water quality. In Cyprus, 95-99% of bathing sites have excellent water quality, while **Malta** is ranked on the top.

THE EU BATHING WATERS DIRECTIVE

The EU Bathing Waters Directive requires Member States to identify popular bathing places in fresh and coastal waters and monitor them for indicators of microbiological pollution (and other substances) throughout the bathing season which runs from May to September. The map above was built based on the latest information as reported by the Member States for the 2016 bathing season.

BOX T.4.4 ARTIFICIAL LIGHT POLLUTION IN THE EU MED

The map of artificial light pollution built at NUTS III level and the one considering the coastline level only show different scenarios. Overall, EU Mediterranean coastline appears much more exposed to artificial light brightness than inland. This fact shows how far coastal urbanized areas influence mean values obtained from the assessment at NUTS III level.



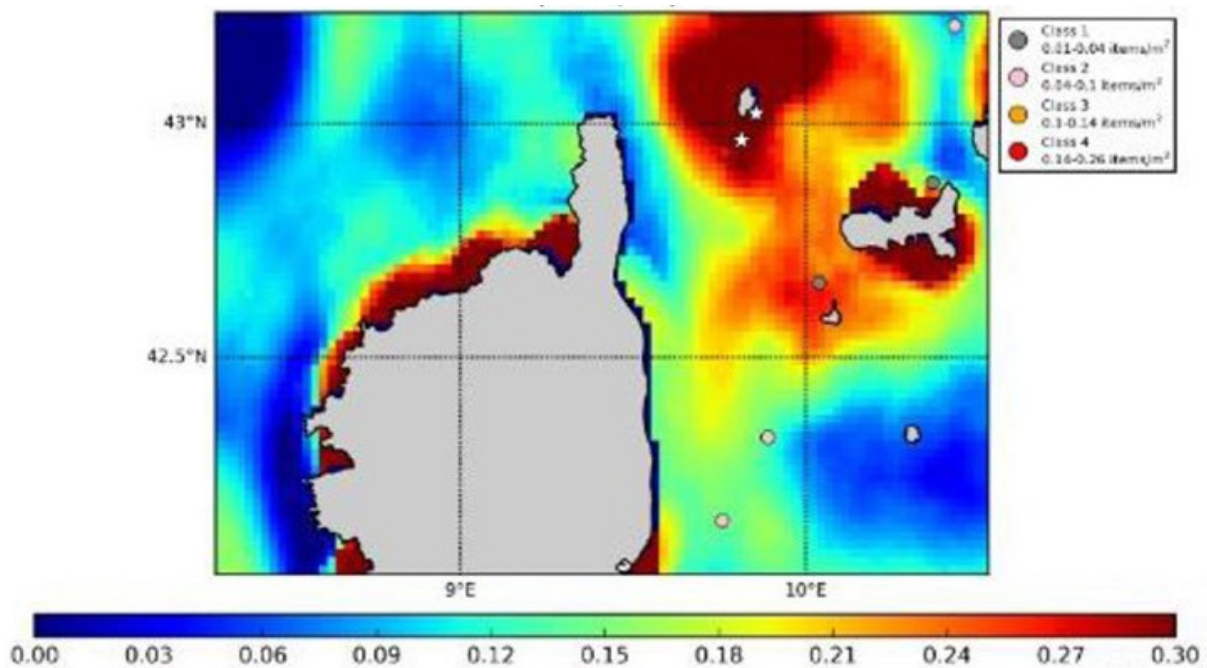
WHAT IS LIGHT POLLUTION?

Light pollution refers to the presence of anthropogenic light sources in the dark sky. Excessive levels, misdirected, or obtrusive lights can alter natural conditions and have serious consequences on animals' physiology and behaviour (Hölker et al., 2012). Besides, anthropogenic light washes out starlight in the night sky, interferes with astronomical research, disrupts ecosystems and wastes energy.

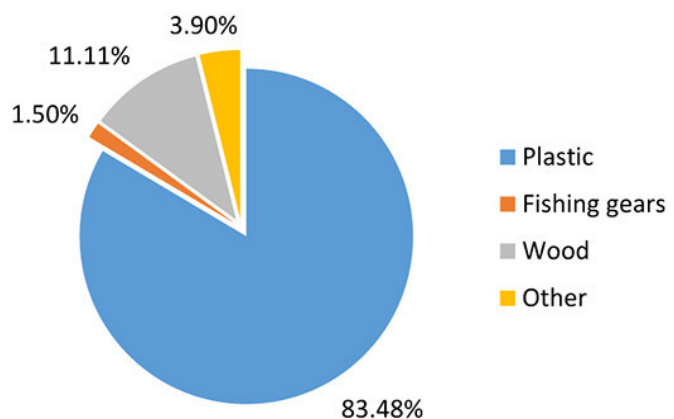
BOX T.4.5 MARINE LITTER AND CETACEANS IN THE PELAGOS SANCTUARY

Pelagos Sanctuary is the only pelagic Marine Protected Area in the Mediterranean Sea, designated as one of the Specially Protected Areas of Mediterranean Importance (SPAMI). This marine area, located in the north-western Mediterranean Sea, is characterized by high offshore productive frontal features that attract a variety of large marine vertebrates. Since litter particles are not uniformly distributed, a possible overlap between plastic debris accumulation areas and charismatic mega-fauna feeding grounds may occur.

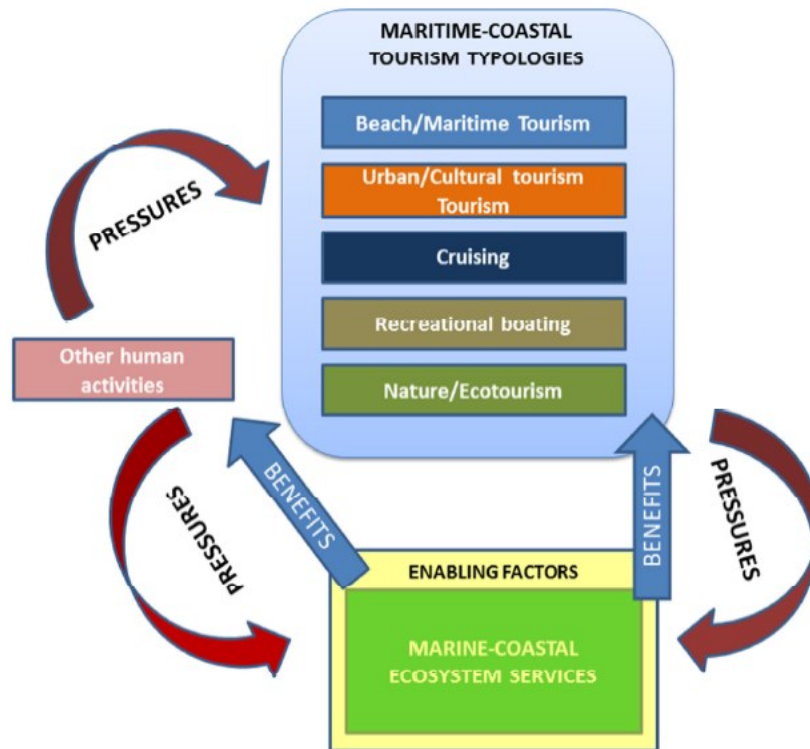
The fin whale feeding grounds and the areas of high floating plastic debris concentration can overlap in the north of Elba, the largest island of the Tuscan Archipelago (Fossi et al., 2017). Fin whales can be exposed to microplastic ingestion especially in the summer when the whale population is concentrated (Druon et al., 2012).



The Macrolitter found in
 the Pelagos Sanctuary is
 mainly composed by
 plastic (Fossi et al. 2017).



BOX T.4.6 CONCEPTUAL FRAMEWORK CONNECTING COASTAL TOURISM, OTHER HUMAN ACTIVITIES AND ECOSYSTEM SERVICES



Coastal tourism on one hand and other human activities on the other hand exert manifold pressures on the marine and coastal ecosystem services, which in turn provide valuable benefits.

For instance, ecosystem services deliver clear water, purify air, and provide fauna. Coastal tourism instead can pollute water, contribute to air emissions and overexploit fauna. In addition, other human activities can also exert pressures on coastal tourism, limiting its development, and on coastal ecosystems, limiting their services provision.

BOX T.4.7 THE RELATIVE ENVIRONMENTAL IMPACT OF THE FIVE COASTAL TOURISTIC TYPOLOGIES

Although availability of reliable information on the environmental impact of coastal tourism is still too scarce, and much depends on the pressure intensity, an expert-based assessment carried out in CO-EVOLVE revealed that **cruising** is the tourism typology, which can have the greatest environmental impact. **Beach tourism** and **urban tourism** come second. **Ecotourism** and **recreational boating** seem to have lower environmental impact. Cruise, beach, and urban tourism are more responsible for air pollution and solid waste than recreational boating and ecotourism. Cruising also produces highly negative effects on water quality. Light pollution is mainly a consequence of urban tourism, followed by beach tourism and cruising. All touristic typologies have a medium environmental impact produced by noise pollution except cruising, for which a high impact was assigned. Beach tourism is responsible for favouring the invasion of alien organisms through ecosystem degradation and fragmentation.

THREAT CATEGORY	CRUISE	BEACH	URBAN	ECO	BOATING
AIR POLLUTION	★ ★ ★	★ ★ ★	★ ★ ★	★	★ ★
SOLID WASTE	★ ★ ★	★ ★ ★	★ ★ ★	★	★
ECOSYSTEM DEGRADATION	★ ★	★ ★ ★	★ ★	★	★ ★
WATER POLLUTION	★ ★ ★	★ ★	★ ★	★	★ ★
NOISE POLLUTION	★ ★ ★	★ ★	★ ★	★ ★	★ ★
LIGHT POLLUTION	★ ★	★ ★	★ ★ ★	★	★
WILDLIFE EXPLOITATION	★ ★	★ ★	★ ★	★ ★	★ ★
ALIEN SPECIES	★ ★ ★	★ ★	★	★	★

BOX T.4.8 FEEDBACK OF ENVIRONMENTAL IMPACT ON COASTAL TOURISM

Examples of impacts on coastal ecosystems generated by coastal tourism, and the consequent negative feedback effects.

Threats to coastal ecosystems	Exemplary impacts FROM coastal tourism	NEGATIVE feedback ON coastal tourism
WILDLIFE OVEREXPLOITATION	Recreational spear fishing, and crabs, octopus, and lobster collection reduces population size and its vitality and it influences wildlife behavioural patterns and fitness	Destinations whose economy is based on seafood resources can't sustain demand in the long term
HABITAT DEGRADATION	Recreational boating can cause damage to marine habitat and animals such as coral and seagrass beds by running aground or dragging anchor over the habitat	Destinations hosting degraded habitats loose attractiveness
UNDERWATER NOISE	The noise made by boat engines and propellers interferes with the whales' communications systems	Popular eco touristic activities such as whale watching are negatively affected
MARINE LITTER	Marine debris produced by crowded beaches can cause damage to coral reefs and change the structure of the seabed, affecting the plants and animals that live there	Destinations hosting polluted habitats lose attractiveness, especially for ecotourism
WATER POLLUTION	Significantly higher faecal coliform counts tend to be found in waters with a high recreational boating population during peak usage (summer)	Sea side resorts whose water bathing quality decreases are no longer competitive
ALIEN SPECIES	Cruises release non native species through discharge of ballast water, that can disrupt the food web of marine ecosystem	Alien species can clog water treatment facilities, compromising bathing in coastal waters

3.5 Threat 5: Conflicts among different uses on land and at sea and land-sea interaction

Theoretical insight

The Mediterranean has long been the focal point of interactions between different coexisting and often conflicting socio-economic activities ([BOX T.5.1 HOTSPOTS OF LAND-SEA INTERACTIONS IN THE MEDITERRANEAN](#)). Maritime and coastal tourism is one of the main activity standing on the coastal zone: *“of all the activities that take place in coastal zones and the near-shore coastal ocean, none is increasing in both volume and diversity more than coastal tourism and recreation”* (Hall 2001).

Other relevant land-sea uses interacting each other and with maritime and coastal tourism are:

- Fisheries and Aquaculture;
- Energy extraction and exploration;
- Agriculture;
- Maritime transport.

The key areas of conflict regarding the coexistence of touristic activities and other economic sectors are (Piante and Ody, 2015):

- Conflicts concerning the use of space;
- Exploitation of the same coastal and marine resources;
- Conflicts related to the degradation of natural ecosystems.

Cumulative impacts from socio-economic activities and the constant competition over the allocation of natural resources led to severe alterations in the balance of the Mediterranean coastal and marine ecosystems, threatening the touristic value and appeal of destinations ([BOX T.5.2 SPATIAL INTERACTION BETWEEN COASTAL TOURISM AND OTHER COASTAL AND SEA USES](#)).

State

- Maritime and coastal tourism is the largest sea-related economic activity in the Mediterranean region. 150 million of international tourists visited the coastal region in 2012, representing 15% of total world tourists for that year (Piante and Ody, 2015).

- Fisheries and Aquaculture: around 73,000 fishing vessels operate in the Mediterranean Sea. Small-scale artisanal vessels clearly predominate, accounting for 80% of total fishing boats in the Mediterranean Sea (Plan Bleu, 2014).

- Energy extraction and exploration: while energy production from renewable sources (wind, currents and waves) is almost absent in the Mediterranean Sea, Oil and Gas search and exploitation is present and potentially under expansion in several areas of the Basin (Piante and Ody 2015).

- Agriculture: Approximately 85% of Mediterranean agricultural production includes cereals, vegetables and citrus fruits. A downward trend is noted in the annual average growth rate of the main agricultural production, from 2.25% in 1961-1983 to 1.62% in 1984-2007. Mediterranean agriculture accounts for almost one third of the total EU agricultural land (UNEP/MAP, 2012).

- Maritime transport: the Mediterranean represents a major waterway in the world transport industry as an exchange route for products, energy and passengers. International fluxes are dominant in the major traffic routes, mostly by crude oil and container shipments (Piante and Ody, 2015).

Spatial distribution

- Coastal tourism: it reaches its higher numbers in France, Spain and Italy. In the Central and Eastern Mediterranean, Croatia, Greece, Egypt and Turkey host the highest tourist arrivals (UNWTO Tourism highlights 2014).

- Fisheries and Aquaculture: Professional fisheries are mostly located in the whole Adriatic Sea and along the coastal waters of the Mediterranean Basin (Sacchi, 2011; Plan Bleu, 2014). Half of the fishing fleet operating in the Mediterranean Sea comes from EU countries with Greece and Italy accounting for more than one third of the total operating vessels. Only Greece accounts for more than 20% of the total number of fishing vessels in the Mediterranean Sea, most of them operating in the Aegean Sea (Piante and Ody, 2015). In terms of aquaculture production, six countries - Egypt, Greece, Italy, Spain, France and Turkey - account for the 95% of the total production (both freshwater and marine aquaculture) in the Mediterranean region (Piante and Ody, 2015).

- Energy extraction and exploration: Off shore oil and gas industry are mainly located along Tyrrhenian, Adriatic and Ionian Seas. Eastern Mediterranean is less influenced by these infrastructures than Western Mediterranean. More than 90% of the reserves are held by Libya, Algeria and Egypt. However, EU Mediterranean countries play an important role in linking African supply to European demand, through the operation of several gas pipelines in the Mediterranean Sea (Piante and Ody, 2015).

- Agriculture: The Southern Mediterranean rim has still a stable or increasing agricultural production, as well as Albania and South Italy. On the contrary, the Northern Mediterranean rim has seen a constant decrease in people employed in agriculture (UNEP/MAP 2012).

- Maritime transport: Some of the most accident-prone areas in the Mediterranean in terms of intense maritime traffic are the Strait of Gibraltar and Messina, the Sicilian Channel and several ports like Genoa, Livorno, Venice, Trieste, Piraeus and Limassol (European Environmental Agency, 1999. Davenport and Davenport, 2006. ESPON, 2013. Piante and Ody, 2015).

Recent trends and expected evolution

The interactions and potential conflicts among different land-sea uses is expected to grow, given the estimated upward trend in all coastal and maritime sectors in the future – besides fisheries. Such interactions may vary from positive to negative effects, conflicting or competing interests or even synergies between sectors (Piante and Ody, 2015).

Coastal tourism: Future scenarios indicate that in 2030, Southern and Mediterranean Europe is projected to receive 103 arrivals per 100 of population (UNWTO, 2011).

Energy extraction and exploration: based on current offshore oil and gas exploration and production contracts in the Mediterranean and on expected energy demand, the forecast is for an increased exploitation of offshore oil and gas deposits (Piante and Ody, 2015).

Maritime transport: 4% per annum growth rate in global trade over the next decade can be anticipated and will be reflected on international maritime traffic routes at the Mediterranean

regional level (Suez- Gibraltar axis, Aegean Sea, Adriatic Sea, and to a lesser extent the North-Western Mediterranean) (Piante and Ody 2015).

Fisheries and Aquaculture: Forecast of fish aquaculture production in the Mediterranean countries of the EU anticipates a 112% increase between 2010 and 2030. Production should jump from 280 000 tonnes to nearly 600 000 tonnes. (Piante and Ody 2015).

Agriculture: Environmental pressure from intensive irrigated agriculture and tourism's expansive trends are expected to aggravate in view of climate change impacts (European Environment Agency, 1999. Roson and Sartori, 2012).

Driving forces and pressures

Sea-land economic activities in the Mediterranean are driven mainly by a very steep population growth. The population of riparian states in fact grew from 276 million in 1970 to 466 million in 2010, and is predicted to reach 529 million by 2025 (Plan Blue 2013).

The potential for economic opportunities in coastal cities remains a strong attractive force, attracting populations from the hinterland and fuelling immigration from often economically depressed rural areas. These new coastal cities' inhabitants demand employment, food, water, energy, housing, and other goods and services, exerting further pressure on land use.

Responses

Main responses to the threats to coastal tourism produced by other coexisting and conflicting activities are represented by the application to planning and management of the approaches and principles of ICZM and MSP. They refer now directly to two policy instruments (Directive 2014/89/EU and ICZM Protocol under the Barcelona Convention) and for EU Member States will be reflected by March 2021 in the spatial plans of their "marine waters", according to the mentioned Directive.

Specific methodological frameworks for assessing the interactions and potential impacts between coastal and maritime activities - especially in relation to tourism - at local scale will be needed, by reviewing existing approaches in land-use conflicts assessment and taking into account spatial, economic and environmental criteria.

Impacts on tourism

Off-shore oil and gas infrastructures can negatively impinges on coastal tourism, particularly on cruising and recreational boating (Piante and Ody 2015), although there are examples where the two activities are coexisting without conflicts since decades (Clò and Orlandi, 2014).

The regions of Tarragona and Istria are hotspots for cumulative pressures from tourism and energy extraction.

Coastal tourism can have negative interactions with marine aquaculture (conflicts of use of space and local degradation of ecosystems). The two activities are often conflicting since aquaculture facilities significantly alter the aesthetics of the coastal landscape with large structures visible from tourism resorts and beaches. The combined impacts from both activities can also be expected to grow in the future.

Most key areas for further study in terms of potential pressures between intensive agriculture and coastal tourism seem to be located in Italy and Greece (with at least 25% of coastal land occupied by agricultural activities).

Coastal tourism often develops at the expenses of professional fishing activities (i.e. increase in land values around fishing ports), although the two activities can perfectly coexist and also develop synergies (e.g. pesca-tourism). Hotspots from cumulative pressures of tourism and fishing activities are mostly located in Spain and Italy.

Impacts from maritime transport may pose serious barriers to tourism development, by threatening valuable environmental assets, which are essential to the sustainability of tourism industry. The density and influence of ports infrastructure seems to be intensified in Italy, Greece and Spain compared to the rest of the Mediterranean basin (Med-IAMER 2015).

Knowledge gaps

Data on coastal and sea uses are in general only partially available, inhomogeneous and poorly accessible. The ongoing activities in the EU Member States to prepare the marine spatial plans are expected to greatly contribute to fill these gaps.

Moreover, similar difficulties concern environmental data, which are essential to understand the connection between pressures and impacts and apply ecosystem-based planning and management measures.

Gaps and difficulties are in general wider in non-EU countries.

Indicators

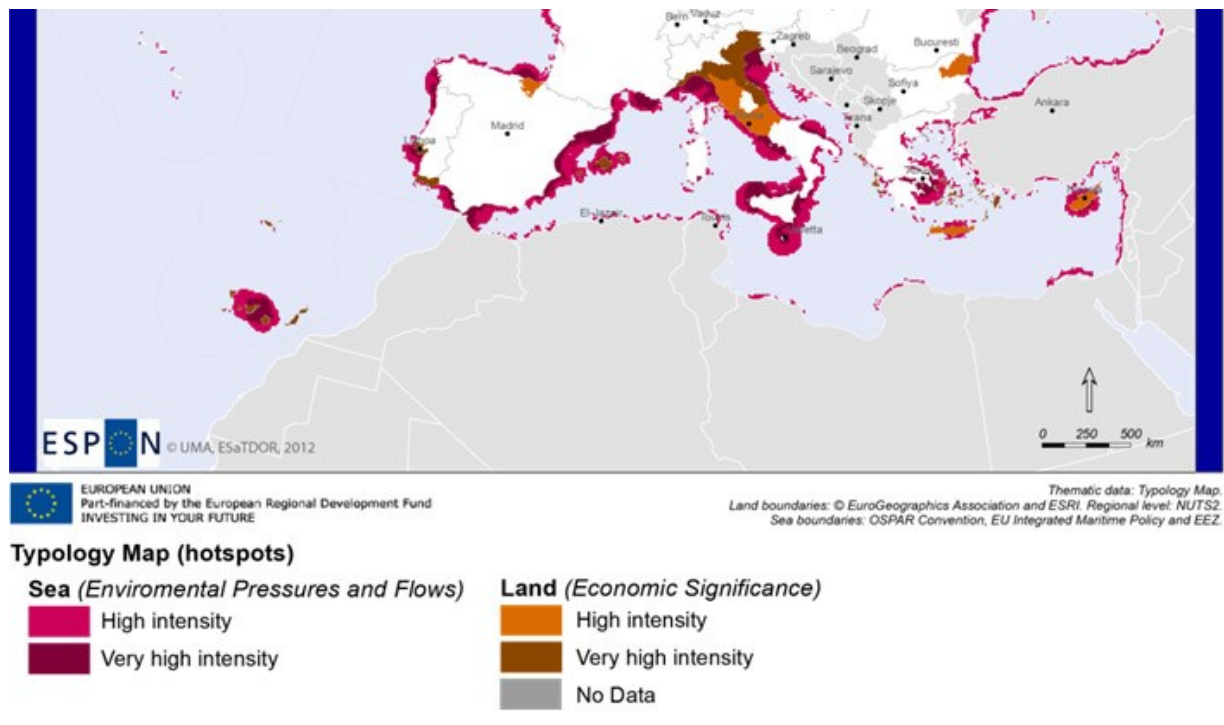
Three specific indicators to analyse and evaluate the threat “Conflicts among different uses on land and at sea and land-sea interaction” have been selected in the frame of CO-EVOLVE project (Task 3.16).

P.A5.Conflicts among different uses on land and at sea and land-sea interaction	Id	Indicator	Measure
	P.A5.1.	Total use of water by tourism sector (Tourism as a % of all users)	Percentage
	P.A5.2.	Energy use by tourism industry as % of total	Percentage
	P.A5.3.	% increase/decrease in land and housing prices over time	Percentage

BOX Threat 5

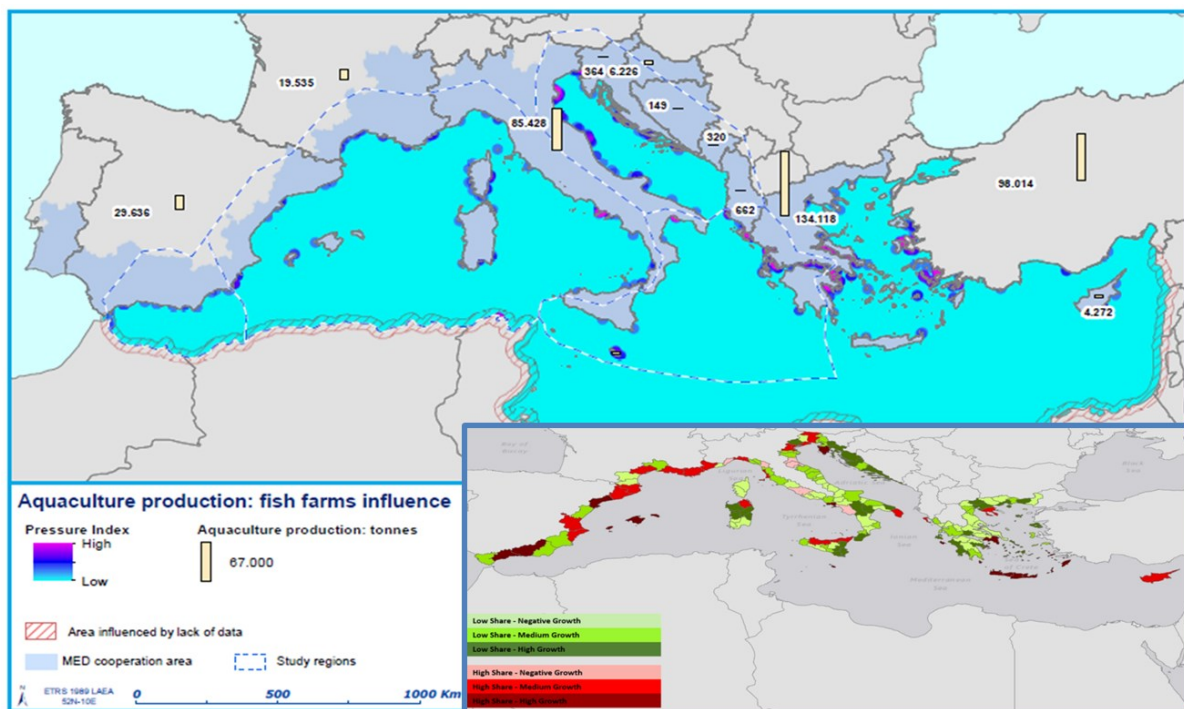
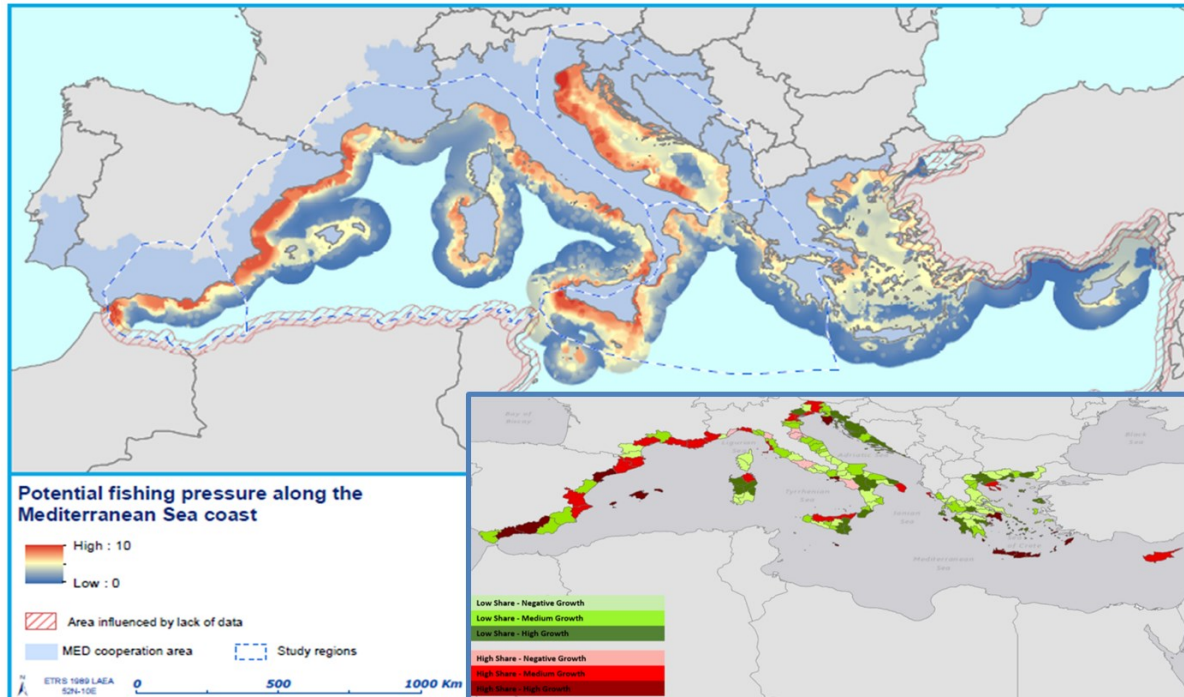
BOX T.5.1 HOTSPOTS OF LAND-SEA INTERACTIONS IN THE MEDITERRANEAN

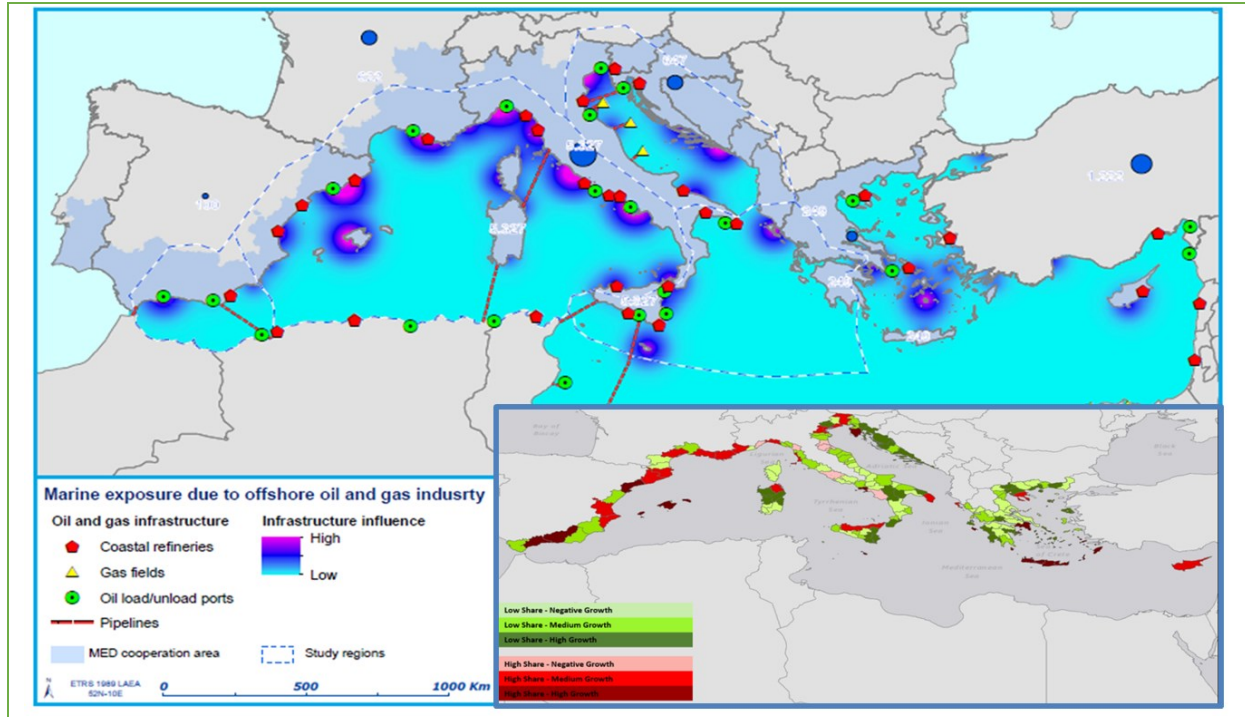
The map shows where land-sea interactions are more intense in the Mediterranean Sea. The effects of the sea on land is measured in terms of economic significance (employment in maritime sectors). The effects of anthropogenic activities on the sea are represented by environmental pressures (pollution from pesticides and fertilisers, incidence of invasive species introduced by shipping) and flows (of goods, including container traffic and liquid energetic products, people, from cruise ships and information, from telecommunications cables) (ESPON, 2013). Land-sea interactions are higher in Western and Central Mediterranean coastlines, compared to Eastern Mediterranean coastlines. There is also a significant discrepancy between Northern and Southern rim.



BOX T.5.2 SPATIAL INTERACTION BETWEEN COASTAL TOURISM AND OTHER COASTAL AND SEA USES

The maps show the areas of higher potential interaction between tourism and some important coastal/sea uses (fisheries, aquaculture, energy from oil and gas, maritime transport), through the joint representation of areas of influence and NUTS III tourism classification according to share and growth rate.





3.6 Enabling factor 1: Coastal protection measures

Theoretical insight

As developed in the description of the Threat 1 “Coastal morphodynamics under climate change conditions”, coastlines, which are naturally dynamic, are often subject to cycles of erosion, important feature of their ecological character. Ocean forcing agents, as wind, waves and currents, can easily move the unconsolidated sand in the coastal areas, inducing rapid changes in the shoreline position.

Human activities along the coast in combination with these natural forces often increase the coastal erosion rate and reduce opportunities for coastal zones to achieve socio-economic and ecological roles.

Coastal erosion is one of the most serious challenges for many Mediterranean Countries, where more than 25% of the coasts are subjected to this pressure, and the highest value among all the European coastal patterns.

Regarding the effects of climate change, the low tidal range of the Mediterranean suggests that they will be more vulnerable to sea-level rise than the other seas (Nicholls and Klein, 2005; Zanuttigh, 2016).

The development pressure on land in combination with the progressing coastal erosion and other pressures induced by climate change lead to a need for coastal protection.

State

Besides the ICZM Protocol, which deals with coastal erosion in its chapter 23, there is no legal framework for coastal erosion applied at the Mediterranean scale.

At the European level, EU has adopted the following legislative instruments to deal with the protection of the coastal and marine environment:

- Environmental Assessment Directives (Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA));
- the 2000/60/EC Water Framework Directive (WFD);
- 2007/60/EC Floods Directive (FD)
- the 2008/56/EC Marine Strategy Framework Directive (MSFD);
- the recommendation on ICZM.

They offer a comprehensive and integrated approach to the planning and management for the protection of all the European coasts and marine waters.

Though legislative background developed at the national and sub-national level complete the above-mentioned frameworks, they also present important differences, which may result in very dissimilar management policies ([BOX EF.1.1 EXISTING PLANS ADOPTED BY CROATIA, FRANCE, ITALY, MALTA AND SPAIN FOR COASTAL PLANNING AND MANAGEMENT](#)).

The significant presence of hard defence structures is observed in several Mediterranean areas characterized by sandy beaches and high urban development. Well-designed defence structures generally reduce erosion rate of the protected beach, and are often combined with sand supply, dredging and nourishments solution in the framework of ICZM policy development.

Breakwaters and groins are the most common techniques adopted within the Mediterranean Sea, in order to moderate loss of beach areas and protect them, especially where “sun-bath” tourism is mainly developed.

Sand nourishment is one of the defence measures that has the advantage of maintaining the beach system in a near-natural condition and providing ecological benefits (Dean and Rosati, 2010).

Spatial distribution

The spatial distribution of some coastal protection measures is shown in [BOX EF.1.2: SPATIAL DISTRIBUTION OF COASTAL PROTECTION MEASURES ON THE EUROPEAN MEDITERRANEAN COAST](#).

Impacts on tourism

Mediterranean coastlines are protected by human-made structures and measures up to a considerable extent. Feedbacks between these enabling factors and the recreational and tourism activity depend on the typology of adopted protection measures. For instance, measures like nourishment or dune protection provide direct benefits to the sun-bathing or natural tourism activities; on the other hand, the construction or maintenance of breakwaters or revetments rarely influence sun-bathing activities in a direct way, due to large spatial and temporal scale effects, while they have positive effects in snorkelling or scuba diving activities.

In principle then, each typology of tourism calls for the adoption of different coastal protection techniques. Another example is provided by the case of marina tourism, where sailing is enabled by the presence of hard protection measures (breakwaters, revetment, and seawalls) and sand bypassing that influence hydrodynamics patterns inside and around marinas (currents, wave transmission and diffraction) and navigability (sand by-passing, nourishment).

Despite the enabling effects of coastal protection measures, possible drawbacks of not well-designed measures or coastal planning may turn out not to positively influence tourism development. Negative effects of coastal protection measures can be represented by the development of tombolo/salient structure, or by the generation of rip currents, extremely dangerous for swimmers (as possible consequence of breakwaters construction), or lead to a reduced accessibility to the beach (as possible consequence after seawall building).

Knowledge gaps

The extensive comparative survey carried out in the framework of this Project allowed an overall assessment of the efficiency of several protection measures in response to different natural and anthropogenic forcing. This notwithstanding, the collection of information and the depiction of a consistent overview of coastal protection in the Mediterranean Basin suffer from a number of limitations.

First, a complete database of the coastal protection measures is presently missing, causing fragmentation and inhomogeneity on the available information. This is sharpened by the lack of structured and common procedures for coastal system monitoring and for the evaluation of the effects of coastal protection measures (more generally, of engineering works affecting the coastal zone), in terms of physical, ecological and socio-economical implications. The definition of ad hoc indicators, such as those defined in this Project with special reference to touristic areas, surely provides an indication of the quantities to be primarily taken into

account, although a clear and shared definition of survey and monitoring methodologies is necessary for improving the assessment of the existing situation, the comparison of the outcomes of previous measures, the projection of different intervention scenarios, and the implementation of new interventions. It is thus clear how this would strongly benefit from a progressive shift towards a coordinated planning paradigm, to be supported by proper regulatory interventions.

A final warning should be raised concerning the partial discrepancy that occasionally occurs between the time scale at which the survey/monitoring activity takes place, and the one at which the protection activity is planned. This should be treated with care, since it can potentially lead to sub-optimal intervention efficiency.

Recommendations

Although the technique of beach nourishment is nowadays becoming much more adopted in the Mediterranean regions and it is recommended in all the policy documents mentioned above, it is often applied as a strategy of remedial rather than a preventive measure.

Therefore, an overall long-term planning, coastal management, regular monitoring of the coastline should be included in the planning of this typology of measures as part of ICZM policy.

Efforts by authorities and stakeholders to implement ICZM recommendations are always desirable and suitable.

Indicators

Eight specific indicators for the management and the impact of defence measures as an enabling factor for sustainable tourism development have been defined. Adapted from indications by WTO (2004), European Commission (2007) and European Union (2016), the following indicators may help to identify whether a defence measure may represent an enabling factor for the sustainable tourism and how this function could be promoted.

	Id	Indicator	Measure
<i>P.B1.Coastal protection measures</i>	P.B1.1.	Existence of a planning management system	Yes/No
	P.B1.2.	Length of protected and defended coastline	km
	P.B1.3.	Tourist area and infrastructure with sea defenses	Percentage
	P.B1.4.	Cost of erosion prevention and repair measures per year	Euros/year
	P.B1.5.	Typology of coastal defence measures	To be selected from the list of the defence techniques described in Report 3.8.1
	P.B1.6.	Cost for the maintenance of defence measures per year	Euros
	P.B1.7.	Sites where coastal protection measures limit access to beach	Percentage
	P.B1.8	Influence (positive or negative) of defence measures presence on tourist appeal of the area (Low/medium/high influence)	Qualitative, based on interviews, questionnaires etc.

BOX Enabling Factor 1

BOX EF.1.1: EXISTING PLANS ADOPTED BY CROATIA, FRANCE, ITALY, MALTA AND SPAIN FOR COASTAL PLANNING AND MANAGEMENT

In the framework of CO-EVOLVE project, information on plans regarding coastal planning and management has been gathered in a certain number of European countries (Croatia, France, Italy, Malta and Spain). The results are presented in the table below.

The available information on the implemented regional policies are listed at NUTS II levels (except basin plans on River Management and Flood Risk, implemented at district scales for the majority of the Countries).

Country	Mediterranean regions	Regional plan	Coastal defence plan	ICZM plan
Croatia		National Law on coastal planning (1994)		
France	Languedoc-Roussillon	Sediment management plan (2011)	Coastal sustainable development plan (2003)	
	PACA			
	Corse			
Italy	Liguria	Territorial plan for coastal coordination	2004	
	Veneto	Technical Directive for sand nourishment (2010)	Guidelines (2016)	2013
	Friuli-Venezia			
	Emilia-Romagna	Littoral State (2000, 2007, 2012)	Coast Plan (1981, 1996)	Guidelines for ICZM (2005)
	Toscana	Hydrogeological structure ICZM plan	2004	
	Marche		2005 and updates in 2015	ICZM plan (2004)
	Lazio	Plan for nourishment	Guidelines	Monitoring ICZM Centre
	Abruzzo	Plans for vulnerable area risk (2006) and nourishment (2006)	2003	
	Molise	Coast Safety Plan (2011)		
	Campania	Erosion plan		
	Puglia	Territorial landscape plan (2010)	Coast Plan (2011)	
	Basilicata		Coast Plan (2016)	
	Calabria	Integrated management plan	2005	2006
	Sicilia	Hydrogeological structure plan	2004	
	Sardegna	Regional landscape plan (2006, 2013)	Plan Action Coast (2013)	Guidelines (2013)
Malta		National Storm Water Project (2010)	Coastal Management plan (2005)	
Spain	Cataluña	Landscape Protection, Management and Planning Law (2005)		2004
	Valencia	Spatial Planning and Landscape Protection Law (2014)		Territorial Strategy (2011) and Plan for the Green Coastal Infrastructure (2017)
	Balearic Islands	Strategic T Decree regulating		Strategy for ICZM

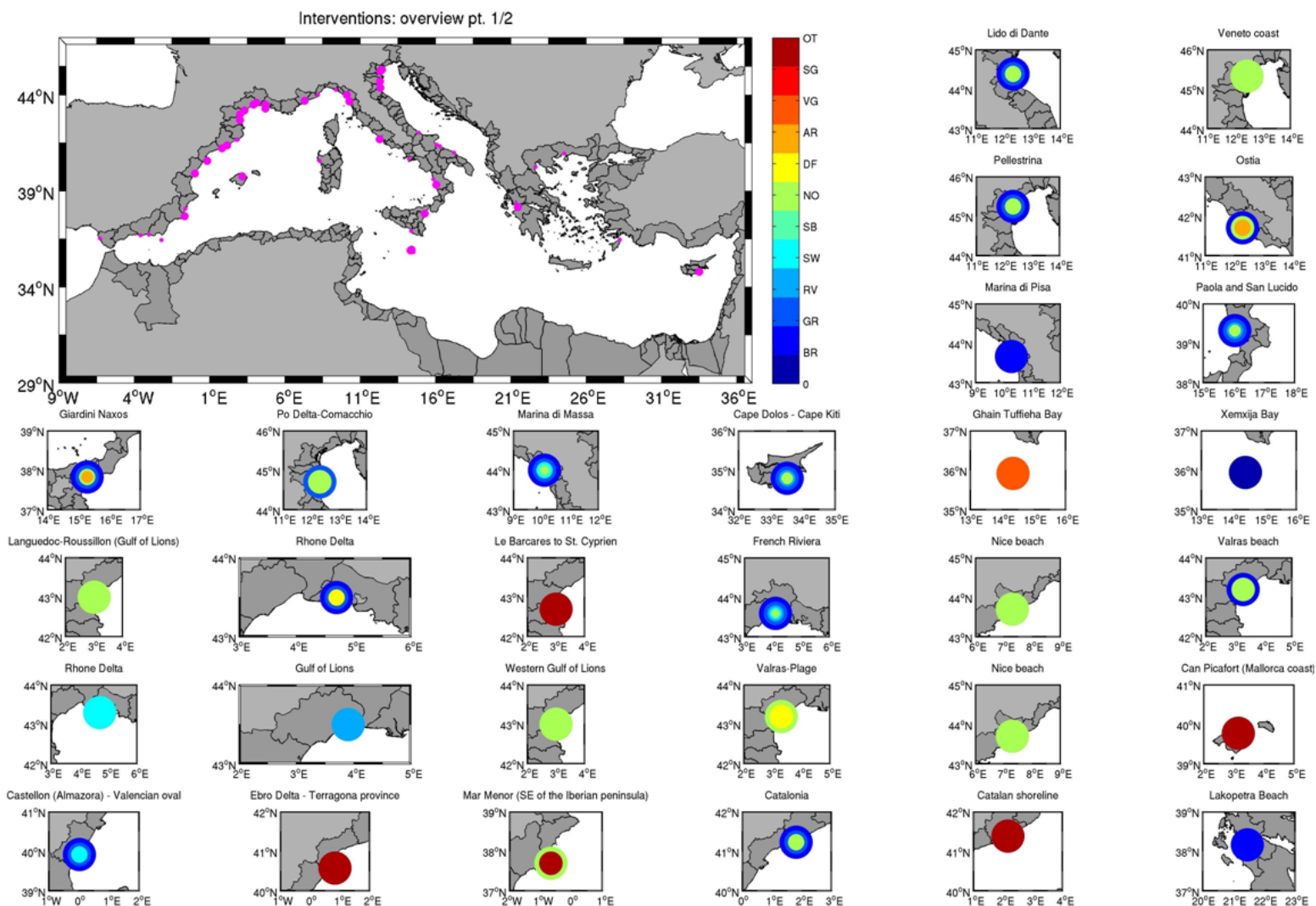
		minimum safety and protection measures for beaches (2005) Tourism Plan (2015)		(2004)
	Andalucia	Territorial Plan (2011)		2007
	Murcia	Strategic Tourism Plan (2015)		Strategy for ICZM (2016)

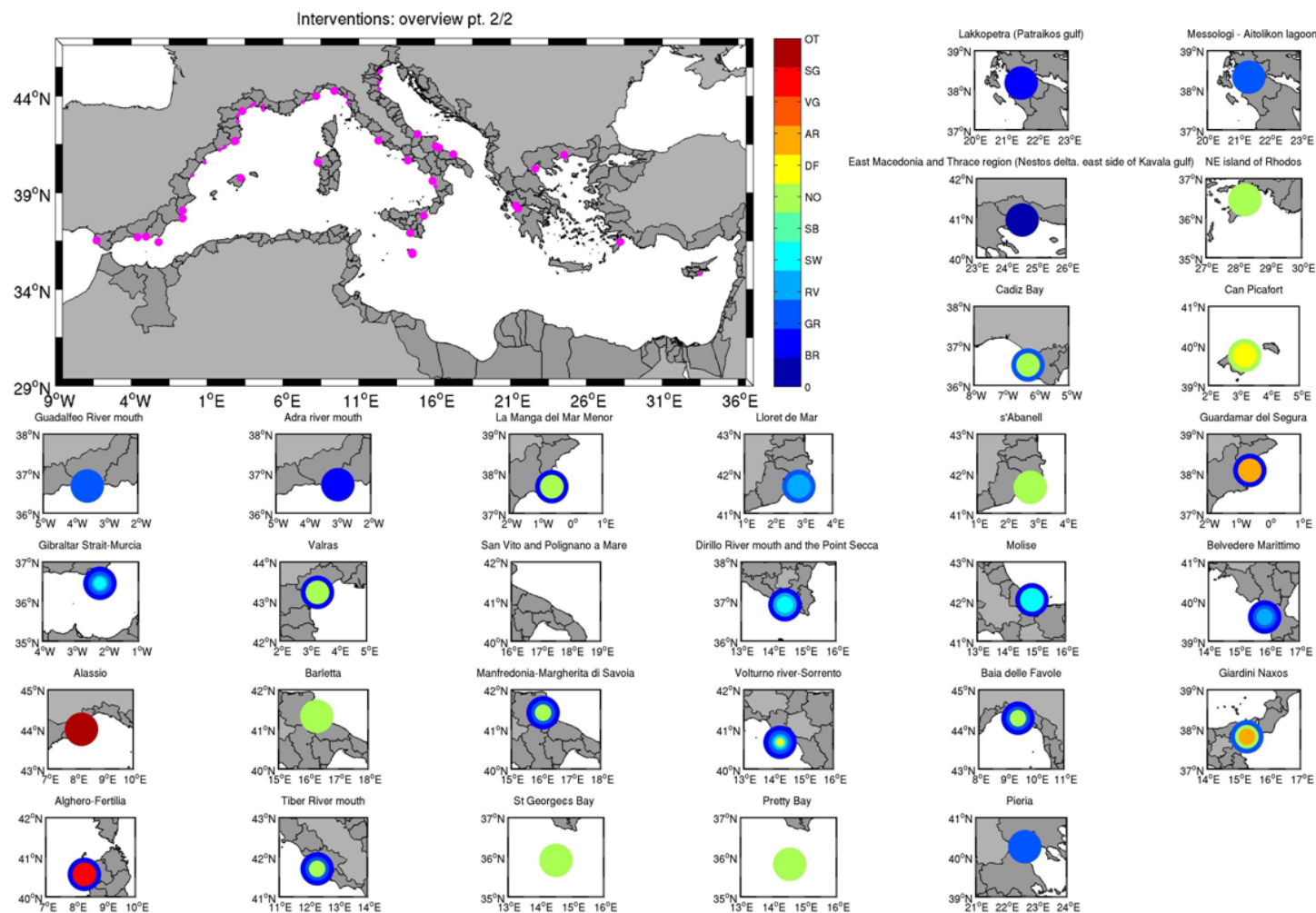
BOX EF.1.2: SPATIAL DISTRIBUTION OF COASTAL PROTECTION MEASURES ON THE EUROPEAN MEDITERRANEAN COAST

The database organising the information collected and described from the documents listed in the Deliverable D3.8. has been used to prepare a Thematic Atlas, a visual tool aiming at providing an overview of coastal practices in relation to coastal tourism development and protection from erosion and flood risks. A set of maps has been produced in MATLAB environment based on the data collected in an Excel spreadsheet, organising the information.

The spatial distribution of the interventions on the European Mediterranean coast is presented below, according to the following scheme:

Abbreviation	Coastal protection measure
BR	Breakwater
GR	Groin
RV	Revetment
SW	Seawall
SB	Sand bags
GB	Gabions
NO	Nourishment
BD	Beach drainage
DF	Dune fencing
AR	Artificial reef
VG	Vegetation planting and/or stabilization
SG	Seagrass meadow planting
MU	Mudflat recharge
BS	Beach scraping





3.7 Enabling factor 2: Ecosystems Protection

Theoretical insight

Policy instruments and strategies for coastal environmental protection existing at various spatial scales, from international to national up to local level, are key tools for guaranteeing healthy coastal ecosystems.

However, various economic sectors cause pressure for alternative uses of natural land and for the exploitation of natural resources, thus impairing the effective implementation of environmental laws.

Coastal tourism indeed includes activities, which can affect ecosystems; on the other hand, coastal tourism can also be a means for promoting their high value, if appropriate measures to minimize environmental impacts are taken ([BOX EF.2.1 ECOSYSTEM SERVICES AND LEGISLATION: KEY FACTORS FOR COASTAL TOURISM](#)).

Healthy coastal ecosystems provide multiple benefits to coastal tourism. They support recreation, wellbeing, aesthetic experiences, and intellectual stimulation. These so-called “cultural ecosystem services” rely on other services provided by coastal ecosystems and crucial for tourism development, such as for instance micro-climate regulation and protection from coastal erosion ([BOX EF.2.2 COASTAL ECOSYSTEM SERVICES](#)).

Considering the centrality of ecosystem services for coastal tourism, current regulations such as for instance the Maritime Spatial Planning Directive (2014/89/UE) need to be supported and guided by an ecosystem approach which takes into adequate consideration also the role of ecosystem services (Liquete et al. 2016).

Adequate legislation addressing conflicts for resources and environmental protection coupled with an ecosystem approach are crucial enabling factors to improve the sustainability of coastal tourism.

State

Besides the Conventions at the global level, aiming at preserving ecosystems, such as the Convention on Biological Diversity (CBD), the Convention on Migratory Species (CMS), and the World Heritage Convention (WHC), and the Ramsar Convention, legal acts have been developed at the Mediterranean level as well as at the European scale.

At the Mediterranean scale, the two milestones for the preservation of the marine and coastal environment are the **Barcelona Convention** and the **Mediterranean implementation of the Ecosystem Approach** (EcAp Med), which arose from the Barcelona Convention.

The Barcelona Convention and the seven Protocols elaborated in the framework of this Convention aim “to reduce the pollution in the framework of the Mediterranean Sea and to protect and enhance the marine environment in the area, thereby contributing to its sustainable development”. The Barcelona Convention and its protocols form the basis of the Mediterranean Action Plan (MAP).

The Ecosystem Approach is the guiding principle of the MAP Programme and of all policy implementation and development undertaken under the auspices of UNEP/MAP Barcelona Convention.

EcAp Med's ultimate objective is to achieve by 2020 the Good Environmental Status of the Mediterranean Sea and its coasts, in accordance with the objectives of the Marine Strategy Framework Directive developed by the European Union.

At the European level, there are numerous directives having positive impacts on ecosystem protection ([BOX EF.2.3 LEGISLATION AND STRATEGIES FOR MEDITERRANEAN MARINE ECOSYSTEMS](#)). The most relevant are:

- the Birds Directive
- the Habitats Directive (and its Natura 2000 Network)
- the Water Framework Directive
- the Directive on Quality Required of Shellfish Waters
- the Quality of Bathing Water Directive
- the Environmental Impact Assessment Directive
- the European Parliament and the Council recommendation concerning the implementation of Integrated Coastal Zone Management in Europe
- the Marine Strategy Framework Directive ([BOX EF.2.4 LEGISLATION CONTRIBUTING TO THE MSFD OBJECTIVES](#)).

Spatial distribution

Conservation measures are concentrated more in the EU Northern Basin (Corso Ligurian Basin) and in the Central Basin (between Tunisia and Sicily), compared with southern Mediterranean Basin ([BOX EF.2.5 MPAs AND PRIORITY AREAS FOR CONSERVATION IN THE MEDITERRANEAN](#)).

The EcAp approach is implemented via two main projects: EcAp Med I (2012-2015) and EcAp Med II (2015-2018). EcAp Med I strongly contributed to the achievement of the first steps of the EcAp roadmap, especially in relation to the development of the Integrated Monitoring and Assessment Programme for the Mediterranean, while EcAp-MED II project, which is still running, seeks to support the Southern Mediterranean Contracting Parties to the Barcelona Convention in the implementation of the EcAp.

Natura 2000 Network is been built at different rates in the Mediterranean countries: Italy, Greece and France still have to complete their designation and the adoption of Management Plans, which are the fundamental tool for each Natura 2000 site. In addition, there are still significant differences in the application of Natura 2000 network between the terrestrial and the marine domain.

The implementation of MSFD at national level differs also quite substantially. For instance:

- Italy has transposed the MSFD in its national legislation through the Legislative Decree n. 190 of the 13th October 2010.
- In 2012 MSFD environmental objectives and associated indicators were approved for the five Spain's marine sub-regions (LTD/N2K GROUP 2015).
- The Commission is currently assessing the conformity of Croatian legislation with the MSFD (Commission Staff Working Document 2017c).
- In France, the implementation of the MSFD (Commission Staff Working Document 2017b) in the national legislation was materialised by the law of the 12 July 2010.
- Greece has not yet reported on its monitoring programme under the MSFD.

Impacts on tourism

Environmental policy has great influence on the sustainable development of coastal and maritime tourism ([BOX EF.2.6 COASTAL TOURISM AND ENVIRONMENTAL POLICY](#)).

In the framework of the CO-EVOLVE project, the connection among the five dominant types of tourism in Mediterranean coastal areas and the existing environmental legislation was assessed. For each type of coastal tourism typology, sustainable indicators were analysed on the basis of four main topics: (a) Socio-economic, (b) Environmental, (c) Management and optimization of key assets to destination type, and (d) Governance. As a result, a list of "destination indicators" was then identified. The destination indicators were then translated into ENVIRONMENTAL DESCRIPTORS for each type of coastal tourism, in order to better join them to the relevant piece of legislation.

Knowledge gaps

According to the 2012 Status of Marine Protected Areas in the Mediterranean Sea published by the MedPAN association, Mediterranean MPAs, including Natura 2000 sites designated under the EU Habitats and Birds Directive, covered only 1.08% of the Mediterranean Sea in 2012 ([BOX EF.2.7 FITNESS CHECK FOR NATURA 2000 MARINE WATERS](#)).

Within the Mediterranean Regional Sea Convention (RSC) and the Barcelona Convention (UNEP/MAP), only one third of Contracting Parties are EU Members and the diversities of the Mediterranean countries are substantial. The "geopolitical" complexity may affect the achievement of environmental objectives, and the implementation and compliance with EcAp of non-EU Member States because of limited human resources, and in some instances limited technical or economic capacity.

EcAp's actions and related timing are gradually improving but, at the moment, they are not sufficient for the Mediterranean Members to achieve the necessary coordination in due time.

The lack of harmonization in monitoring of MSFD indicators has resulted in heterogeneous data gathered and in difficulties when comparing data among Member States. Moreover, the limited communication between scientists within and between Members States has negative effects on both interdisciplinary cooperation and the transfer of relevant scientific information to policy makers.

Recommendations

To facilitate addressing and applying the important principles and actions of the MSFD to the entire Mediterranean marine region, the EcAp should be followed by all Mediterranean countries. In fact, a standardized stepwise process is needed to ensure consistency in the development of management measures to address legislative and regulatory requirements.

The Citizen Science approach shall be also an interesting way to develop awareness of environmental issues, and to acquire more insights into marine biodiversity ([BOX EF.2.8 INVOLVING COASTAL TOURISM IN CITIZEN SCIENCE INITIATIVES](#)).

In addition, given the wide diversity of marine ecosystems and the multitude of pressures affecting them, it is all the more important to understand cumulative impacts from stressors produced by human activities, in order to take the proper management measures.

Environmental regulation is now beginning to include cumulative effects because there is consensus that among scientists and managers regarding the importance of these effects on ecosystems and the need of an integrated approach to science and management which

considers the entire ecosystem, including cumulative effects of all human activities ([BOX EF.2.9 THE ECOSYSTEM APPROACH](#)).

Indicators

A wide range of indicators describing relevant aspects measuring or expressing ecosystems protection was identified in the framework of CO-EVOLVE. Most of them were populated at Pilot Area scale, thus proving their suitability.

	id	Indicator	Measure
P.B2.Ecosystems Protection	P.A5.1.	Extent of protected area(s) in km ² (classified by level of protection, according to IUCN categories)	Percentage
	P.A5.2.	Area of natural and semi-natural habitat (based on Natura 2000 sites and EU habitats - in km ²)	Percentage
	P.A5.3.	Health of population of key indicator species (measuring rise or fall of key indicators species - counts, sightings)	Percentage
	P.A5.4.	% of tourism establishments (or accommodation) on (suitable) treatment systems	WTO (2004)
	P.A5.5.	Municipal waste recycled per year	kton/year
	P.A5.6.	Implementation of Natura 2000 management plans	YES/NO

BOX Enabling Factor 2

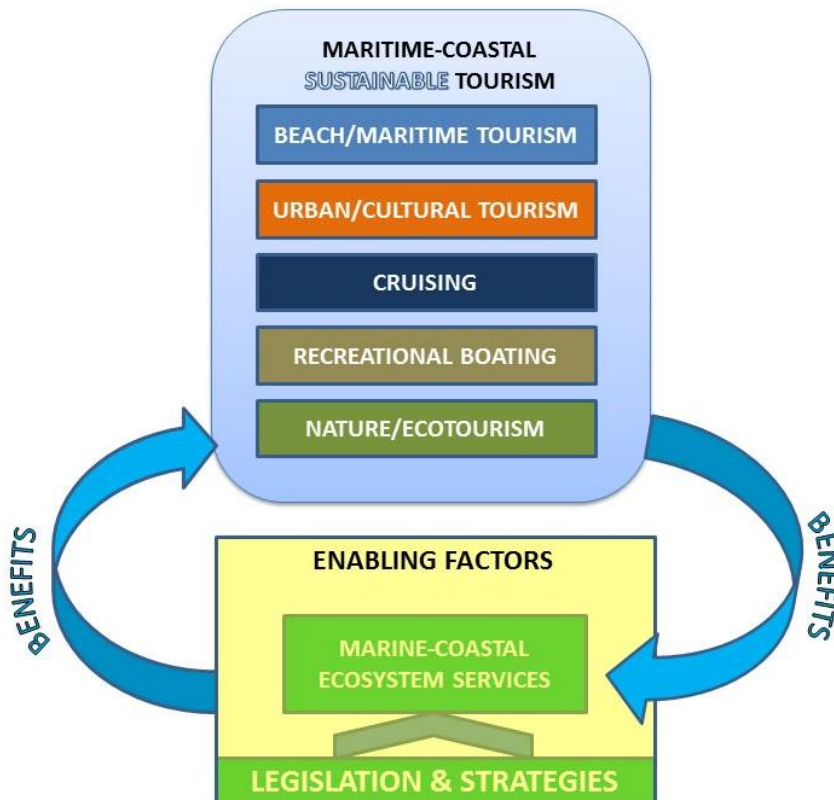
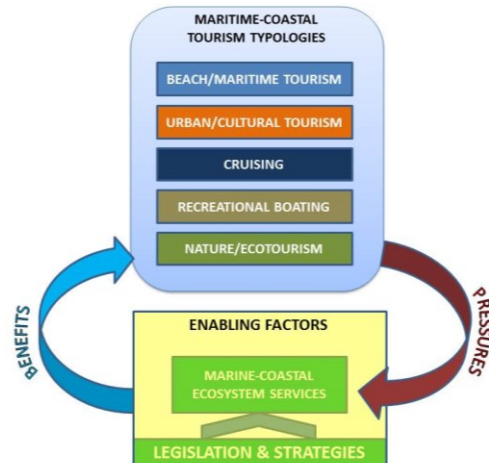
BOX EF.2.1 ECOSYSTEM SERVICES AND LEGISLATION: KEY FACTORS FOR COASTAL TOURISM

Cultural ecosystem services provided by coastal ecosystems are essential for coastal tourism to exist and to thrive. However, these services can be maintained only if coastal ecosystems are assured adequate protection levels.

Protection is in turn guaranteed by legislation tools.

Coastal tourism can cause pressures to coastal ecosystems, which may deplete cultural ecosystem services.

On the contrary, sustainable coastal tourism has the capacity to promote the value of coastal ecosystems and their services.



BOX EF.2.2 COASTAL ECOSYSTEM SERVICES

A wide range of ecosystem services is provided by Mediterranean coastal ecosystem types. In particular, all ecosystem types provide the cultural ecosystem service “Recreation and tourism”, as shown in the table below.

<i>Coastal ecosystem types</i>	<i>Coastal ecosystem services</i>		
	<i>Provisioning</i>	<i>Regulation</i>	<i>Cultural</i>
Sandy shores	Pollination Habitat/Refugia Raw material Storm protection	Disturbance regulation Erosion control	Recreation Inspiration
Estuaries	Habitat/Refugia Food production Raw material Storm protection	Disturbance regulation Nutrient cycling Biological control	Recreation Inspiration
Coastal shelf	Food production Raw material	Nutrient cycling Biological control	Inspiration
Evergreen needle leaf forests	Climate regulation Food production Raw material	Waste treatment Biological control	Inspiration
Evergreen broad leaf forests	Water supply Food production Raw material Genetic resources	Climate regulation Disturbance regulation Water regulation Erosion control Nutrient cycling Waste treatment	Recreation Inspiration
Shrublands	Pollination Food production Raw material Genetic resources	Gas regulation Waste treatment Biological control	Recreation
Permanent wetlands	Water supply Food production Habitat/Refugia Raw material Storm protection	Gas regulation Disturbance regulation Waste treatment	Recreation Inspiration
Coral reefs	Habitat/Refugia Food production Raw material Storm protection	Disturbance regulation Waste treatment Biological control	Recreation Inspiration
Sea grass	Raw material Storm protection	Nutrient cycling	
Swamps-floodplains	Habitat/Refugia Raw material Food production	Gas regulation Disturbance regulation Water regulation Water supply Waste treatment	Inspiration Recreation
Grasslands	Pollination Food production Raw material Genetic resources Storm protection	Gas regulation Climate regulation Water regulation Erosion control Waste treatment Biological control	Recreation

BOX EF.2.3 LEGISLATION AND STRATEGIES FOR MEDITERRANEAN MARINE ECOSYSTEMS

With specific regard to the marine ecosystem protection, crucial measures are the following:

1. The Convention on Biological Diversity has set the objective of reaching 10% of coastal and marine areas conserved through Marine Protected Areas (MPA) by 2020.
2. In addition to the decision of prohibiting bottom-trawling activities in waters deeper than 1000 taken in 2005 by the General Fisheries Commission for the Mediterranean (GFCM), four Fisheries Restricted Areas (FRAs) were established in 2006 and 2009 to ensure the protection of deep sea sensitive habitats.
3. Priority areas for conservation of cetaceans, as identified under the Agreement on the Conservation of Cetaceans in the Black Sea Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS) (Today, the Pelagos Sanctuary is the only designated area for the conservation of Mediterranean marine mammals);
4. Areas of high conservation value for Mediterranean seabirds, as identified by UNEP/MAP RAC/SPA;
5. Priority areas for the conservation of demersal and pelagic fisheries, as identified by UNEP/MAP RAC/SPA
6. Undersea features: the Mediterranean deep sea is host to undersea features such as seamounts, hills, canyons, trenches, banks and mud volcanoes which are home to many species. Some are hotspots of demersal biodiversity. The GEBCO Sub- Committee on Undersea Feature Names (SCUFN) maintains and makes available a digital gazetteer of the names, generic feature type and geographic position of features on the sea floor.

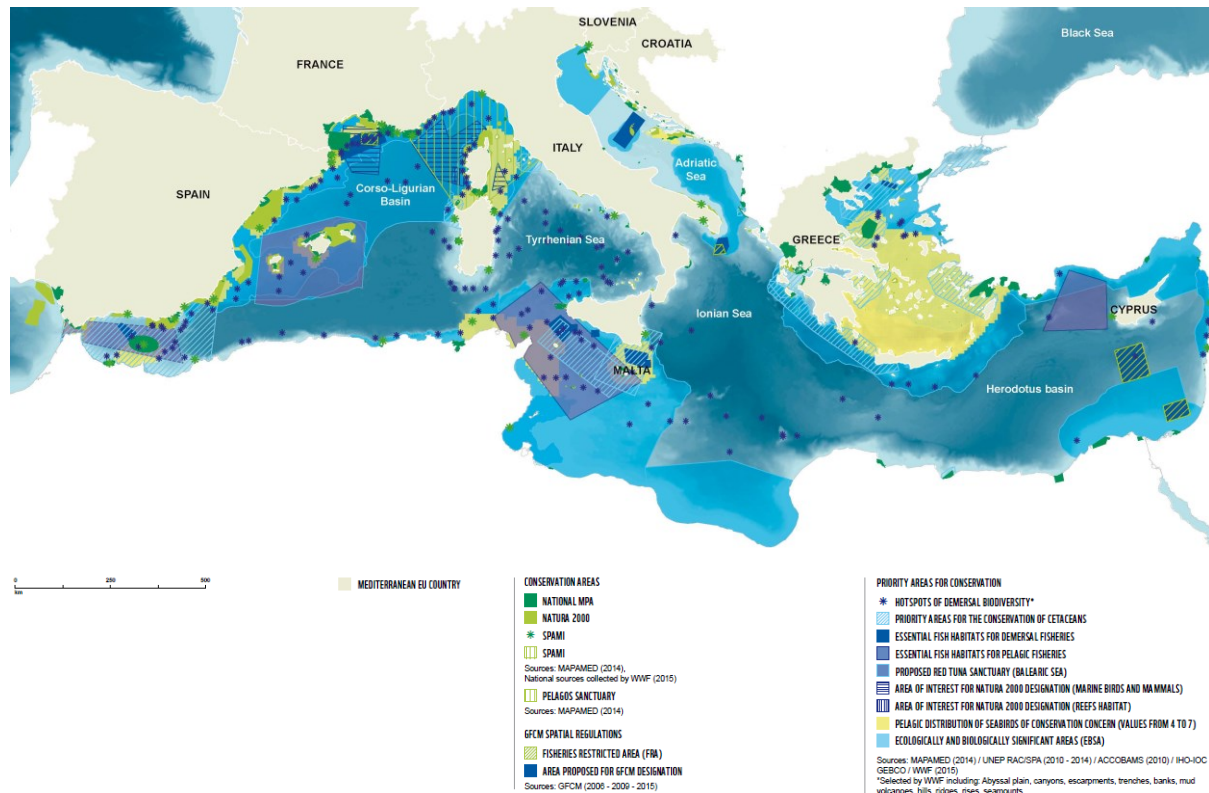
BOX EF.2.4 LEGISLATION CONTRIBUTING TO THE MSFD OBJECTIVES

List of legislation contributing to the MSFD objectives for each environmental descriptor apart from “food webs” (modified from DG Environment, 2014).

Descriptor	Related EU legislation
Biological diversity	Habitat Directive (Directive 92/42/EEC) and Bird Directive (Directive 2009/147/EC)
Non-indigenous species	Regulation 708/2007 concerning use of alien and locally absent species in aquaculture; Commission proposal for EU legislation to address invasive alien species and protect biodiversity
Commercial fish and shellfish	CFP (Regulation (EU) 1380/2013) and its related legislations (e.g. Regulation 1967/2006, all technical measures, on fishing efforts)
Eutrophication	Water Framework Directive (Directive 2000/60/EC), Urban Waste Water Directive (Directive 91/27/EEC), Nitrate Directive, Nitrate Directive (91/676/EEC), National Emission Ceilings Directive (2001/81/EC)
Sea-floor integrity	Water Framework Directive (Directive 2000/60/EC), Habitats Directive (Directive 92/42/EEC) and Birds Directive (Directive 2009/147/EC), SEA Directive (2001/42/EC), EIA Directive (85/337/EEC), Renewable energy Directive (85/337/EEC)
Hydrography	Water Framework Directive (Directive 2000/60/EC), SEA Directive (2001/42/EC), EIA Directive (85/337/EEC)
Contaminants	Water Framework Directive (Directive 2000/60/EC), Directive on Environmental Quality Standards (Directive 2008/105/EC) as amended by Directive 2013/39/EU, Directive on industrial emissions (Directive 2010/75/EU), Chemical legislation including Reach Regulation (Regulation 1907/2006) and biocides Regulation (528/2012), Directive on ship-source pollutions (Directive 2009/123/EC), sulphur Directive 2012/33, Directive on alternative fuel infrastructure (adoption any day now)
Contaminants in seafood	Seafood legislation: Regulation 188/2006, Regulation 2073/2005, Regulation 178/2002, Regulation 852/2004, Regulation 854/2004, Regulation 853/2004
Litter	Waste Framework Directive (Directive 2008/9/EC), Directive on Port Reception Facilities (Directive 2000/59/EC), Urban Waste Water Directive (Directive 91/27/EEC), Directive on ship-source pollutions (Directive 2009/123/EC), Bathing Directive (DIRECTIVE 2006/7/EC)
Energy, incl. underwater noise	SEA Directive (2001/42/EC), EIA Directive (85/337/EEC)

BOX EF.2.5 MPAs AND PRIORITY AREAS FOR CONSERVATION IN THE MEDITERRANEAN

The Mediterranean Basin is currently protected through a range of conservation measures which are concentrated more in the EU Northern Basin (Corso-Ligurian Basin) and in the Central Basin (between Tunisia and Sicily). Aegean Sea is also preserved thanks to partially overlapping measures. Hotspots of demersal biodiversity are more scattered in the Eastern Basin compared to the Western Basin.



Piante and Ody, 2015

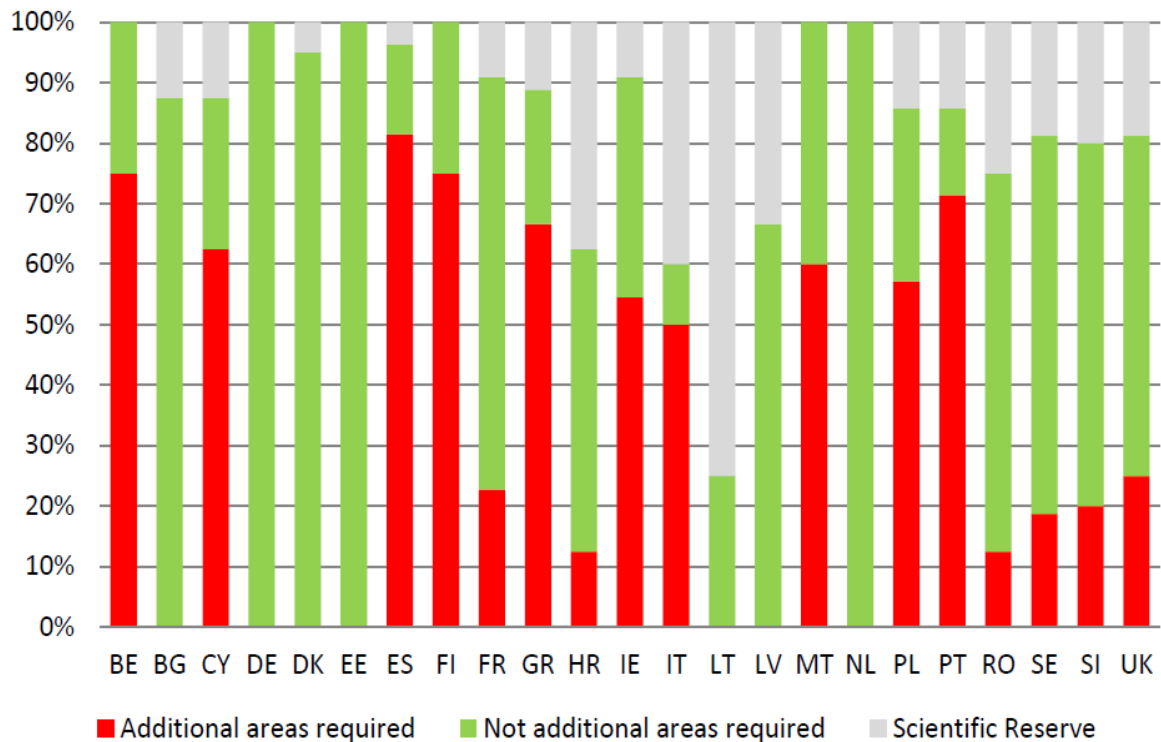
BOX EF.2.6 COASTAL TOURISM AND ENVIRONMENTAL POLICY

Destination indicators expressed by descriptors and Conventions/Directives which apply to them.
 CBD: Convention on Biological Diversity, CMS: Convention on Migratory Species of Wild Animals,
 WHC: World Heritage Convention, RC: Ramsar Convention, QBW: Quality of Bathing Water Directive,
 QSW: Directive on Environmental Quality of Shellfish Waters, WFD: Water Framework Directive, EIA:
 Environmental Impact Assessment Directive, MSFD: Marine Strategy Framework Directive, HD:
 Habitats Directive, BD: Birds Directive.

Descriptors related to tourism typologies	Conventions and Directives										
	CBD	CMS	WHC	RC	QBW	QSW	WFD	EIA	MSFD	HD	BD
Beach/Maritime tourism											
Habitat degradation	X	X	X	X				X	X	X	X
Scenery		X	X	X				X			
Touristic population	X	X	X		X	X		X	X		
Water quality				X	X	X	X	X	X		
Urban/Cultural tourism											
Cultural landscape			X								
Touristic facilities			X					X		X	X
Cruising											
Cultural landscape			X								
Infrastructure			X					X	X		
Scenery			X					X			
Waste management			X	X							
Water consumption				X				X			
Water quality				X	X	X	X	X	X		
Recreational boating											
Fishing	X	X		X					X	X	X
Infrastructure			X					X		X	X
Scenery		X	X	X				X			
Touristic population	X	X	X		X	X		X	X		
Waste management			X	X				X	X		
Water quality				X	X	X	X	X	X		
Eco-tourism											
Habitat degradation	X	X	X	X				X	X	X	X
Protected areas				X				X		X	X
Rare and protected species	X	X		X						X	X
Scenery		X	X	X				X			
Touristic population	X	X	X		X	X		X	X		
Water quality				X	X	X	X	X	X		

BOX EF.2.7 FITNESS CHECK FOR NATURA 2000 MARINE WATERS

Mediterranean MPAs, including Natura 2000 sites, covered only 1.08% of Mediterranean Basin in 2012. This condition is very far from the threshold set by the Convention on Biological Diversity of 10% of coastal and marine areas conserved through MPAs by 2020 (Aichi objective n°11). Therefore, most of the EU Member States have to invest more effort for establishing additional areas.



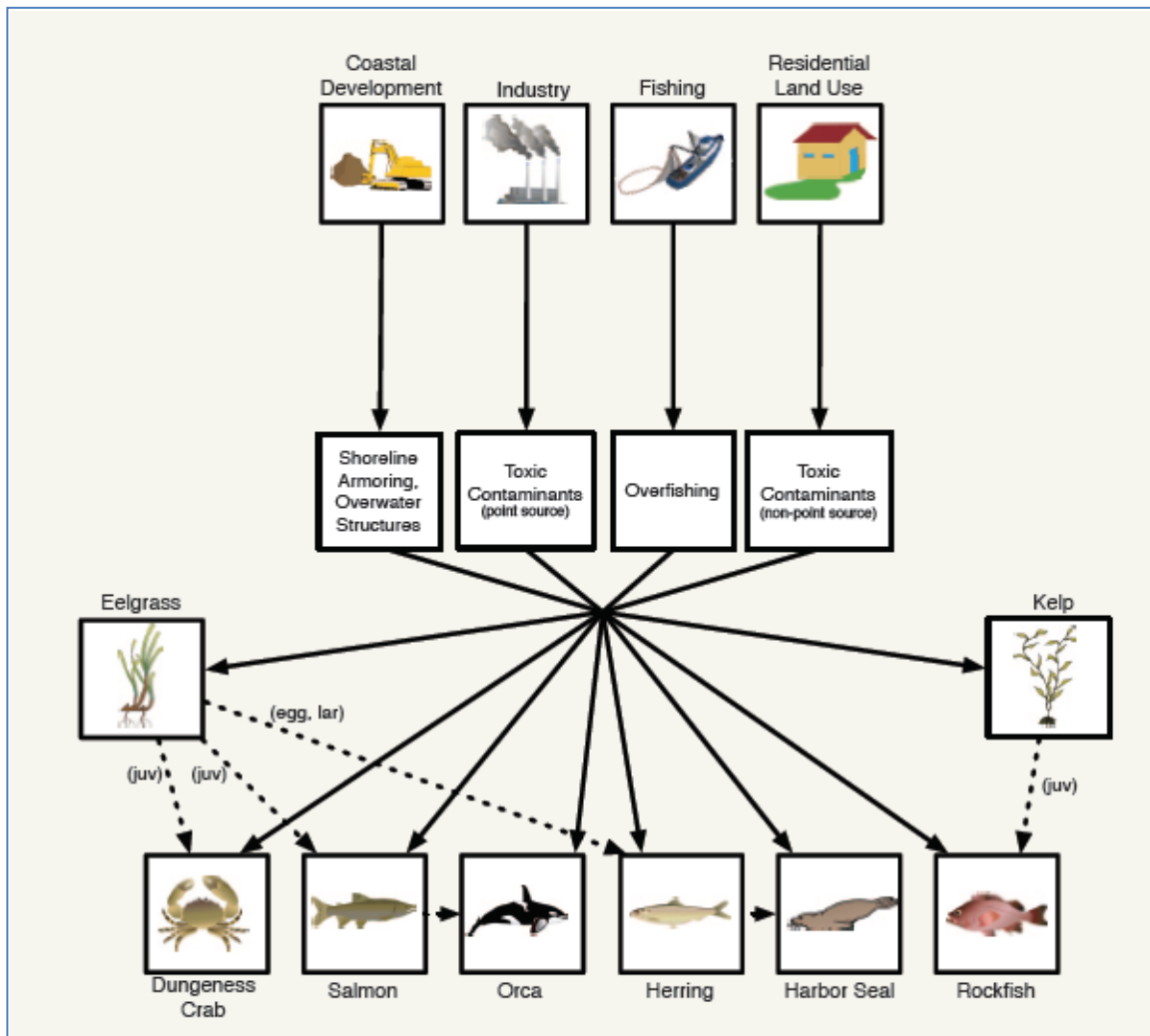
BOX EF.2.8 INVOLVING COASTAL TOURISM IN CITIZEN SCIENCE INITIATIVES

Coastal touristic typologies associated with examples of data collected in marine citizen science programmes (modified from Garcia-Soto et al. 2017). Abbreviations: Beach/Maritime tourism (MAR), Urban/Cultural tourism (CUL), Cruising (CRU), Recreational boating (Yachting/Marinas) (RBO), Nature/Ecotourism (NAT).

On land and along shorelines	
Online identification of organisms and features etc. from image banks and archives	MAR, NAT, RBO, CRU
Microclimate monitoring	MAR, NAT
Monitoring of beach morphology changes	MAR, NAT
Reports on shoreline changes (sand, water level)	MAR, NAT
Reports on stranded organisms (fish, cephalopods, gelatinous organisms, marine mammals) during periodic visits to the shoreline	MAR, NAT
Monitoring of fresh fish catches for invasive species	MAR, NAT CUL
Beached seabird observations	MAR, NAT
Mammal and turtle observations	NAT
Reports on stranded litter and organic matter (wood, flotsam)	MAR
In shallow waters	
Surveys of shallow water hotspots by diving clubs or other watersports associations	MAR, NAT, RBO
Long-term monitoring programmes of Marine Protected Areas	NAT
Monitoring of changes in protected benthic communities	MAR, NAT
Reporting on anthropogenic damage to shallow water communities	MAR, NAT
Coral and artificial reef monitoring	MAR, NAT
Night observations of shallow water biodiversity	NAT
Invasive species observations	MAR, NAT, RBO
Studies of diverse but accessible habitats	NAT, RBO
Extensions of fish and seafood databases by divers and anglers	MAR
In the open sea	
Sampling from ships of opportunity	RBO
Mobile applications to determine water colour, reflectance, clarity	
Collaborations with eco-volunteer organisations for survey and sampling	NAT, RBO, CRU
Use of drones for observations of mammals and floating debris or coastal and intertidal habitats	MAR, NAT, RBO, CRU
Ferry boxes for underway sampling	RBO
Use of tethered underwater robots	CRU

BOX EF.2.9 THE ECOSYSTEM APPROACH

Human activities indeed produce a range of stressors that may interact and have greater impacts than expected, compounding direct and indirect effects on individuals, populations, communities and ecosystems. In addition, natural variability in ecosystem processes may affect the manifestation of resulting impacts. Assessment of cumulative effects on marine ecosystems requires extensive scientific research that directly tests the effects of multiple stressors; however, our knowledge of cumulative effects is largely based upon studies of single stressors on single ecological components that are combined to estimate the effect of multiple stressors. Therefore, advancing cumulative effects knowledge and assessments requires embracing the complexity, uncertainty, and natural variation in ecosystems and applying the best available science to evaluate and predict cumulative effects.



3.8 Enabling factor 3: Water Supply and Depuration

Theoretical insight

Natural water resources are distributed extremely unevenly between countries along the North and East shores of the Mediterranean and those on its South coast. This uneven distribution is both due to differences in hydrography and rainfalls, as the South shores receive just 10% of the Mediterranean Basin's annual rainfall. These figures explain why 60% of the world's total population living in water-scarce countries can be found in the Mediterranean Basin. This pressure on water resources has a direct impact on the pollutant content of water discharged into the sea – since these flows are increasingly scarce, they contain higher levels of pollutants (BOX EF.3.1: NATURAL RENEWABLE WATER RESOURCES PER INHABITANT IN THE MAIN MEDITERRANEAN WATERSHEDS).

The situation is going to get even more critical in the years to come because of the consequences of climate change (BOX EF.3.2: CURRENT STATE OF MEDITERRANEAN WATER RESOURCES AND FUTURE TRENDS UNDER CLIMATIC AND ANTHROPOGENIC CHANGES).

Tourism has a major environmental impact, driving water consumption above production and supply capacities, which can cause irreversible damage to the environment. The persistent lack of infrastructure for liquid waste collection and treatment further compounds the problem. Most of the impacts of tourism on water resources are linked with:

- seasonality, with peak demand coinciding with the dry season (summer);
- spatial concentration along the coast, at locations with scarce local water resources (islands) and often in fragile natural environments;
- conflict among uses (drinking water, agriculture, industry, ecosystems);
- a preference among tourists for facilities that consume excessive amounts of water, such as golf courses, pools and water parks, which requires water to be piped from inland areas, increases reliance on non-conventional water sources (such as desalination in Malta, the Balearics and Djerba, and wastewater reuse in Morocco and Tunisia), and causes water piping and wastewater treatment facilities to be oversized because tourist numbers are unevenly distributed across the seasons;
- oversizing of water infrastructures related to the needs for water transfer;
- need for high performance depollution equipment to achieve quality objectives (bathing water).

State

Most of the coastal towns and cities with a population exceeding 10,000 which are not connected to wastewater treatment plants are situated in countries where water resources are scarce. 25% of coastal towns and cities do not have any wastewater treatment plant, while 6% are in the process of building one. Of the existing plants in the Mediterranean, 15% use tertiary treatment, 55% use secondary treatment, and 18% use primary treatment (BOX EF.3.3: THE COASTAL CITIES WITH AND WITHOUT A WASTEWATER TREATMENT PLANT IN THE MEDITERRANEAN).

Spatial distribution

The orientations and objectives of national water policies in the Mediterranean region reflect more the differences of state and perspective between North and South than common problems. In the North, where water demand is stable or decreasing (and uncompetitive), water policies are mostly in line with EU directives which aim to preserve the quality of water and the ecosystems. States tend to disengage and to delegate water management of public water supply and sanitation services.

While the supply-driven approach was for a long time the most common approach applied, recent trends are placing priority on demand management, savings in water use and improvements in the efficiency of uses, in order to take into account the risks of impoverishment of water resources, and also environmental objectives. This is especially the case in Europe where countries have to implement the EU directives.

In southern countries, as well as in Turkey, where water demand is still increasing and resources are most threatened by climate change (and have to be shared between neighbouring countries), supply-side policy, mainly for development purposes, is still predominant. Public authorities have a major role, as they must coordinate the work of different water administrations (regional /river basin), extend transfers between basins, and develop unconventional resources (desalination, reuse). Overexploitation of groundwater is still unequally mastered.

One of the main objectives of water policies is to prevent the consequences of drought and the risk of water shortage as well as the current and future “water crisis” caused by climate change.

Impacts on tourism

Tourism is a strong argument for maintaining high water quality, which is increasingly being recognized as such by water management agencies and local public authorities.

The quality of fresh water has an influence on landscapes, bathing water, as well as on leisure activities such as water sports and wellness tourism. Running them may be problematic when, for example, water levels drop in summer or bathing water is of poor quality, thereby making a destination less attractive to tourists.

In high season, conflicts can arise between those sectors that use water, such as agriculture, hydropower production and household consumption. In some cases, tourist facilities may be favoured, making less water available for farmers and households (water service interruptions, quotas) ([BOX EF.3.4: WATER AND TOURISM](#)).

Knowledge gaps

One of the main knowledge gap related to the issue of water in the context of sustainable tourism concerns the data coverage and availability.

Right now, across all countries, most statistical information about nature, trends and the impact of tourism are based on international arrival and overnight stay figures, as well as balance of payments data.

The fact that tourism-related activities are not precisely identified and documented in national and international classifications makes it more difficult, or even impossible, to collect comprehensive information.

At a time when environmental issues are rising ever higher up the agenda, governments, local authorities and tourism businesses lack the statistical tools they need to assess and monitor the impact of tourism on water resources, and on the environment and natural resources more generally.

Recommendations

The following recommendations have been considered as the most relevant for improving the sustainability of water management in tourism context in the Mediterranean:

- Adapt to the effects of climate change, with more efficient water consumption modes;
- Regarding the issue of summer peaks in tourism, it is important to increase water security, interconnecting resources and seeking alternative resources (for instance RUSE);
- Fight against the pollution induced by spatial concentration on the coastline, in particular of dangerous substances;
- Reach the quantitative balance by enhancing the sharing of the water resource and anticipating the future in order to prevent use conflicts;
- Regarding leisure equipment requesting a higher water consumption (such as golf, swimming pools, aquatic centers, etc.): favour a closed circuit operation with water saving and recuperators;
- Strengthen water management by water basins and ensure coherence between land use and water management;
- Strengthen the implementation of the principle of non-degradation of aquatic environments.

Also, as highlighted in MEDSAT II report (2005), there is a need:

- for governments and local authorities: for knowledge about tourism-related water consumption, seasonal distribution, and distribution across different water resources and different sub-sectors of the tourism industry (accommodation, facilities, activities, etc.), to inform programme priorities (water savings, demand control).
- for tourism companies: for benchmarks to enable companies to compare their consumption against similar entities, to set their priorities (water consumption by rooms, gardens, amenities, etc.), to track performance over time, and to introduce appropriate management strategies.

Indicators

Four indicators for the management of water resources have been identified as relevant in the framework of Co-Evolve project. These indicators are all adapted from WTO (2004).

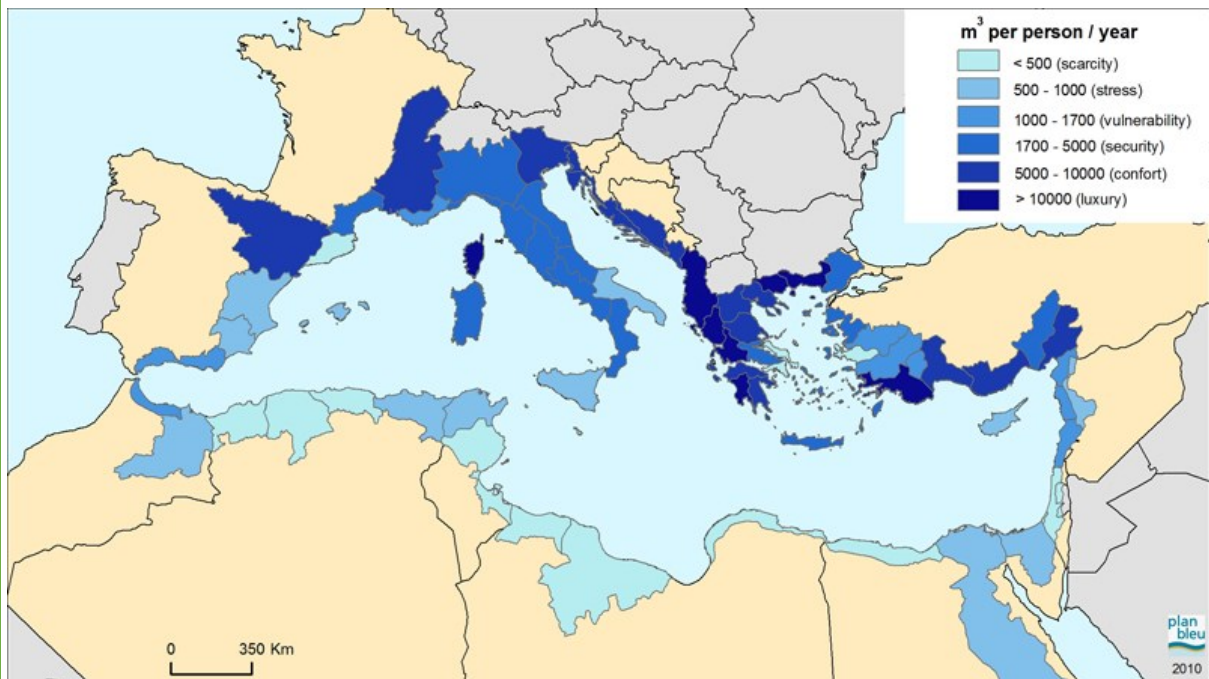
	Id	Indicator	Measure
<i>P.B3. Water cycle and depuration</i>	P.B3.1.	Water saving (reduced, recaptured or recycled)	Percentage
	P.B3.2.	Loss from reticulated system	Percentage
	P.B3.3.	Water supply imported to region	Percentage
	P.B3.4.	Tourism establishments with water treated to international potable standards	Percentage

BOX Enabling Factor 3

BOX EF.3.1: NATURAL RENEWABLE WATER RESOURCES PER INHABITANT IN THE MAIN MEDITERRANEAN WATERSHEDS

The figure below clearly shows the inequalities in terms of the distribution of water resources in the Mediterranean Basin. This uneven distribution stems from marked differences in both hydrography (the Alps, Pyrenees, Anatolian and Dalmatian mountain ranges) and rainfall (the South shore receives just 10% of the Mediterranean Basin's annual rainfall).

Yet, there are also differences between countries along the South coast – Morocco has a high-altitude mountainous hinterland when Libya does not; and major rivers (such as the Nile) do not flow through all countries.

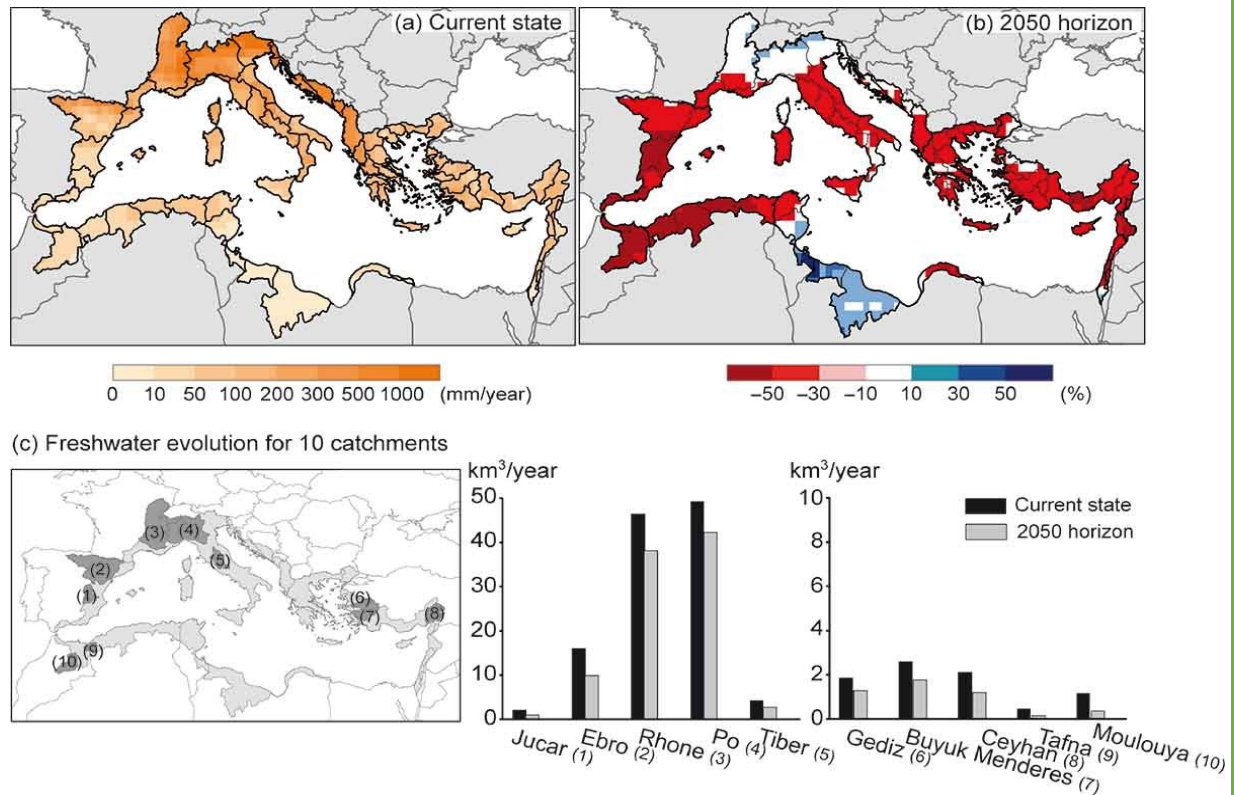


Plan Bleu, 2010

BOX EF.3.2: CURRENT STATE OF MEDITERRANEAN WATER RESOURCES AND FUTURE TRENDS UNDER CLIMATIC AND ANTHROPOGENIC CHANGES

According to IPCC most pessimistic scenario, water resources in all the Mediterranean but in Libya could drastically reduce by 2050.

Freshwater variation rate over the Mediterranean basin: (a) current mean annual freshwater availability; (b) evolution rate in freshwater availability by the 2050 horizon; (c) evolution of freshwater resources availability over ten Mediterranean catchments.



Milano et al., 2013

In 2003, most of the cities of more than 10,000 inhabitants without a wastewater treatment plant were situated in the South of the Mediterranean Basin, where the water is scarcer than in the North.



The following figure combines the water resources in Mediterranean countries with the number of tourist arrivals.



3.9 Enabling factor 4: Transport and accessibility

Theoretical insight

A straightforward description of accessibility is related to connectivity (Baradaran and Ramjerdi, 2001). A location is assumed to be accessible if it is connected to other locations via a link to a road or railroad network (Bruinsma and Rietveld, 1998) or to an airport or harbor (Lekakou and Vitsounis, 2011). Wilmsmeier and Sánchez (2008) defined transport connectivity as the access to regular and frequent transport services and the level of competition in the service supply.

State

Optimization of intermodal transport and market integration has been set as one of the goals of 2011 White paper (COM 144 2011), promoting collective transport and intermodal journeys as an easy and reliable alternative to the private transport, through insurance of uniform access conditions for passengers, insurance of service quality at a basic level and through better mobility planning.

- Cruise ports: Mediterranean is the world's second biggest cruise region and 16% of the global cruise ships deployment is hosted by its ports (Pallis et al., 2016b). The Mediterranean also accounts for the highest cruise passenger visits within Europe (Ryckbost et al., 2016) ([BOX EF.4.1: NUMBERS OF IDENTIFIED CRUISE PORTS WITH PASSENGER INTERMODALITY OPTIONS](#)).

The shares on the cruise passenger numbers recorded by the ports dictates the West Med Region as the largest cruise region within the Mediterranean as it welcomed more than half of the total passenger movements (72.1%) in 2015, which is almost nineteen million passengers (Pallis et al., 2016a). Adriatic Region follows the lead (16.5%) with more than five million passengers (Adriatic Sea Tourism Report, 2017).

The identified cruise ports have observed a progression from almost 8.6 million passenger movements in 2000 to over 27 million in 2015 and since the last 10 years, a 72.3% rise in cruise passenger movements (Pallis et al., 2016b). In 2016, Mediterranean cruise ports welcomed more than 34 million cruise passengers, which includes the non MedCruise Member Ports as well (Adriatic Sea Tourism Report, 2017). While Barcelona is the top Mediterranean cruise port in terms of passengers handled, it is also the European leader (MedCruise, 2017).

- Passenger ferry ports: Ferry traffic is a crucial aspect of tourism in many countries as the ferry ports are the gates and sometimes even the only way to access many touristic islands (Ryckbost et al., 2016). The ferry tourist's main goal is to reach the destination as quickly as possible. Therefore, ferry ports must offer the smoothest and cheapest way to embark or disembark and must provide smooth connections with the highway.

As many of the identified cruise ports also serve as ferry passenger ports (58 out of 79), the hinterland accessibility analysis based on the cruise ports also serves the ferry ports for particular cases. As more than half of the identified cruise ports (48) are located within less than 500 meters from the city center, the bulk of the Mediterranean cruise ports enjoy excellent locations which grant passengers easy access to the hinterland to begin with their touristic experience. In cases where the distance is further than 500 meters, most of the ports provide accessibility to intermodal transports to reach the city center of other touristic sites of interest. Growth analysis carried on the identified Mediterranean ferry ports ranking within the top 20 EU non-cruise passenger ports suggests relatively steady annual growth.

(BOX EF.4.2: MED COUNTRY-WIDE NATIONAL AND INTERNATIONAL FERRY PASSENGER MOVEMENTS AND GROWTHS).

- **Airports:** Sixty-one airports have been identified based on the proximity from the identified cruise ports across the Mediterranean coastal NUTS 3 Regional scale. Similar to the cruise ports, the passenger intermodality offered by these airports includes a variety of choices from taxi service and car rentals to public transport bus. Shuttle service and public bus can be accessed in two thirds of the identified airports. Whereas metro and train services can be availed by respectively six and nine of the identified airports, none of the airports offer the tram service (BOX EF.4.3. MAIN AIRPORTS WITH TOTAL NUMBER OF PASSENGERS AND ANNUAL GROWTH IN 2015).

Spatial distribution

The mean level of quality of the Adriatic passenger ports and marinas together with the impressive array of services on offer along its coastlines are satisfactory in both quantitative and qualitative terms, which represents a logistical solution favoring the combined onshore and offshore touristic experiences (Adriatic Sea Tourism Report, 2017).

The accessibility features for the cruise ports together with their excellent overall port-city relationships (i.e. close proximity and accessibility) suggest an overall positive trend for the Mediterranean EU Member States. Similarly, the airports also offer a wide range of intermodal transport and accessibility features as an enabling factor, providing access to the Mediterranean coastal touristic sites (BOX EF.4.4: SYNTHESIS MAP OF PASSENGER PORT INTERMODAL TRANSPORT OPTIONS).

In terms of the cruise ports analysis, Spain and Italy are spearheading in the Mediterranean as well as in the Europe. However, a ferry passenger analysis was performed for CO-EVOLVE which suggests Italy and Greece are leading the Mediterranean by welcoming passengers more than any other countries. This may be directly linked to the tourist influx on the coastal regions of these countries. The analysis on the main airports also suggests a similar trend for Italy, Spain and Greece.

Based on the available data and analysis carried out by this study, future developments on cruise tourism can be foreseen as new ports are joining the cruise itineraries, especially for the case of Italy. Also Maltese Authorities are expecting a rise in the number of cruise passengers and calls in the coming years. The West Mediterranean Region ports may be predicted for an overall steady growth as well. Concerning the developments on ferry passenger ports and marinas, a rise is expected for the Adriatic Region in 2017.

Impacts on tourism

Transport can be considered a key factor in the success of sustainable tourism development (Gossling et al., 2009; Page and Connell, 2009). Accessibility for a touristic destination in order to attract tourists largely depends on the availability and efficiency of transports needed to travel to that destination (Duval, 2007). In the contrary, the extent of influence of poor accessibility on destinations can discourage visitors from attempting to reach these places altogether (Dickinson and Dickinson, 2006).

In rural areas, transport systems also lend themselves to a provision of access for tourism (Hall et al., 2005; Page and Ge, 2009) and rural transport may be characterized and driven by tourism requirements in regions where there is a high level of importance attributed to the revenue leisure visitors can bring to peripheral areas (Payet, 2010). This presents an argument to support increased attention on transport services in rural communities while the

tourism market in urban areas has little influence on public transport, which is generally centered on the local population requirements (Thompson and Schofield's, 2007).

Industry consolidation can have an impact on mobility (Lekakou and Vitsounis, 2011). The structural distinction of the transport industry, which is heavily influenced by public sector intervention, contrasts with the complex network of independent Small and Medium-sized Enterprises (SMEs) that make up the tourism industry (Currie and Falconer, 2013). This was the case for the airlines industry in the United States, where reduced competition led to fare increases and reduced availability of access to services for the general public (Tam and Hansman, 2003). As a consequence, smaller, low-growth and low-demand markets were threatened when transport companies threatened the connectivity by abandoning several routes. The lack of competition in the industry means consumers endure higher prices and have poorer quality which lowers the accessibility (Lekakou and Vitsounis, 2011).

In the case of maritime transport, reduction in the number of companies and ship calls while raising transport cost per passenger impacts upon offered quantitative and qualitative features and even innovation (Vickers, 2005). While the air transport paradigm suggests that travelers in concentrated markets, with single-carrier domination, tend to pay higher fares (Goetz and Vowles, 2009), equivalent evidence from coastal shipping markets are largely absent in the international literature (Lekakou and Vitsounis, 2011).

Accessibility and the requirement of good transport links to reach remote regions are pivotal and reflect the feasibility of tourism development in archipelagos (Currie and Falconer, 2013). A reliance on transport is heightened in island areas since visitors are unable to reach these peripheral destinations by land (Currie and Falconer, 2013). Transport provisions tend to serve primarily the island communities who inhabit these regions, thus they are a service critical not only to tourism but also for the sustainability of the local population (Currie and Falconer, 2013).

Knowledge gaps

Data inadequacy and harmonizing discrete data from various sources regarding TandA can be problematic. Lack of data on public transport services suggests necessary improvements may be needed in some smaller municipalities or in rural areas with sites of touristic interests.

Recommendations

- A monitoring mechanism may be needed either for specific services or for the entire ferry system to safeguard accessibility and competition. Such a tool can prove valuable not only for evaluating the performance of individual services but also for evaluating the effectiveness of policy measures in the context of the provision of what is deemed as essential public services for accessibility (Lekakou and Vitsounis, 2011).
- In order to increase the number of people using public transport, it is important to make it more attractive by simplifying the transportation (Stupalo et al., 2013). For example, by offering passengers one ticket for the entire trip even when using several transport modes and by assuring integrated schedules of different transport modes to provide quick, qualitative, reliable and flexible transport service.
- The information about the multimodal journey can be provided by the online multimodal journey planners, such as the TransDirect (UK), 9292 (Netherlands) or Reiseauskunft (Germany) providing door-to-door travel information and ticketing services.
- Travelling times vary significantly due to changes in ship types and improvement in ports or road networks (Luis, 2002). Therefore, temporal accessibility may be improved by

minimizing sea distances and introducing fast ferries capable of carrying both passengers and vehicles at speeds of 35-38 knots to shorten overall journey times.

- It may be needed to develop national transport policies that take into consideration the particular characteristics of the insular and peripheral regions (Lekakou and Vitsounis, 2011).

Indicators

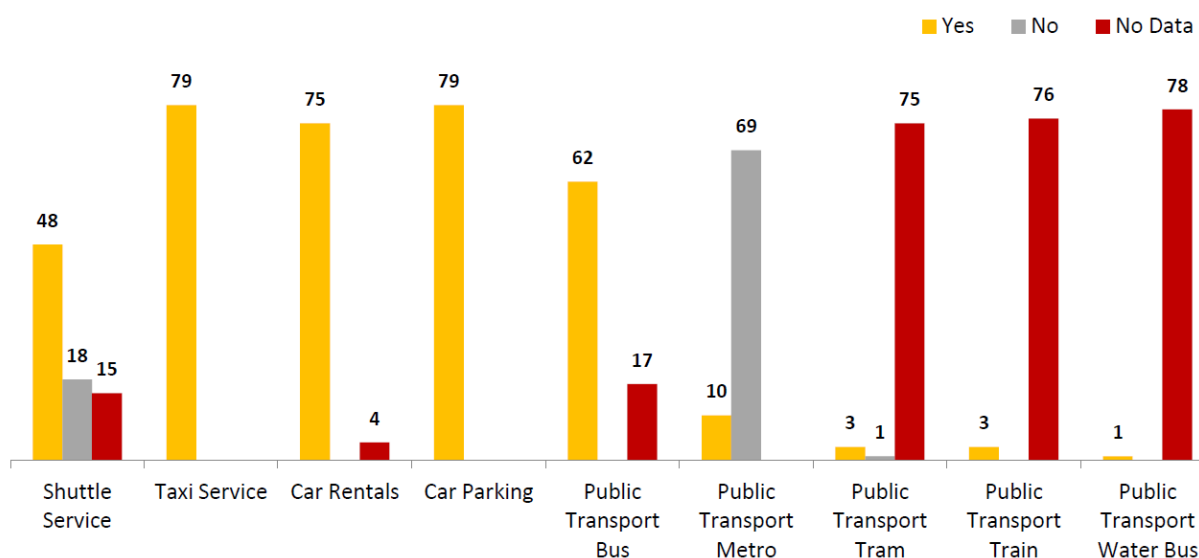
Six indicators for transport and accessibility have been defined, all of them being adapted from a WTO publication (2004).

	Id	Indicator	Measure
<i>P.B4. Transport and accessibility</i>	P.B4.1.	Density of public transport	Route kms per km ²
	P.B4.2.	Modes of transport used by tourists to reach destination	Number of airplane, car, rail, bicycle, walking, other
	P.B4.3.	Passengers transported by local public transport for tourism / leisure purposes compared to number of tourists using individual transport	Percentage
	P.B4.4.	Accommodations, tourism facilities and other tourist attractions accessible by public transport	Percentage
	P.B4.5.	Ratio of travel expenses by public versus private transport inside the destination	Percentage
	P.B4.6.	Implementation of an integrated environmentally sound transport planning strategy	Yes/No

BOX Enabling Factor 4

BOX EF.4.1: NUMBERS OF IDENTIFIED CRUISE PORTS WITH PASSENGER INTERMODALITY OPTIONS

This figure has been elaborated based on data for the all Mediterranean Basin. The passenger intermodality options provided by the cruise ports include a wide range of choices from taxi service and car rentals to the public transport bus.



Elaboration from MedCruise (2017), Global Ports Holding and Google Maps

BOX EF.4.2: MED COUNTRY-WIDE NATIONAL AND INTERNATIONAL FERRY PASSENGER MOVEMENTS AND GROWTHS

MED Country	2014				2015				Total growth rate 2014-2015 (%)
	Total PAX (x 1,000)	of which %			Total PAX (x 1,000)	of which %			
		National	International			National	International		
			Intra EU	Extra EU			Intra EU	Extra EU	
Greece	32,744	95	5	0	32,060	95	5	0	-2.1
Spain_Mediterranean and Canary Islands	14,229	66	5	29	14,938	67	4	29	+5.0
France_Mediterranean	7,312				7,102				-2.9
Croatia	11,578	95	5	0	13,272	96	4	0	+14.6
Italy	38,604	87	10	2	37,411	87	10	3	-3.1
Malta (2)	4,643	100	0	0	4,740	100	0	0	+2.1
Turkey_Mediterranean	1,567				1,601				+2.2
Albania (1)					1,186				
Montenegro (1)					39				
Slovenia					11				

(1) 2015 Provisional estimates

(2) International passenger transport to/from Valletta not included

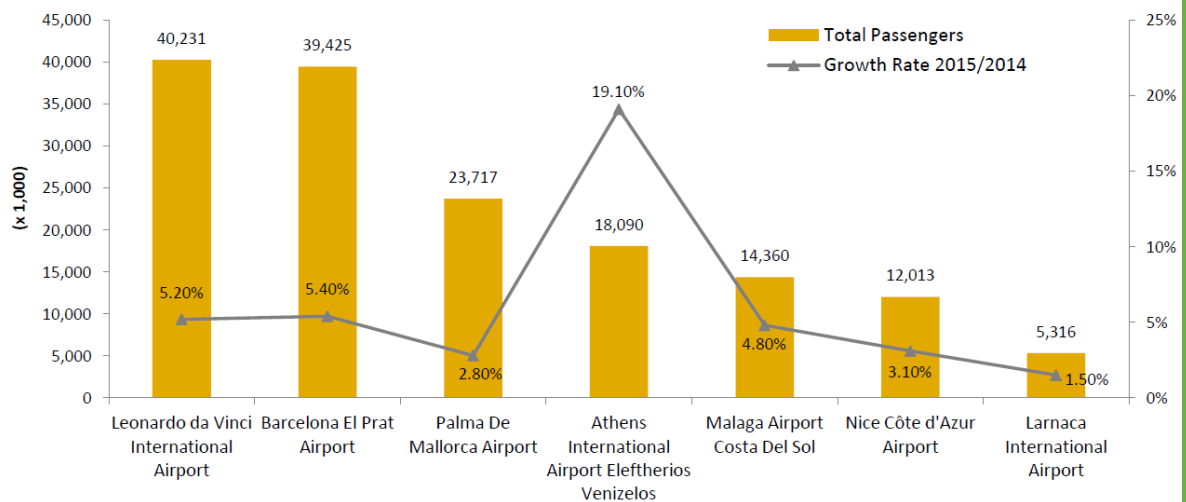
Elaboration from EUROSTAT data and Adriatic Sea Tourism Report (2017)

BOX EF.4.3: MAIN AIRPORTS WITH TOTAL NUMBER OF PASSENGERS AND ANNUAL GROWTH IN 2015

Based on the number of total passengers handled in 2015 among the identified airports, the top seven Mediterranean coastal airports have been identified and their growth analyzed.

Airport	Country	EU Rank
Leonardo da Vinci International Airport	Italy	8
Barcelona El Prat Airport	Spain	9
Palma De Mallorca Airport	Spain	13
Athens International Airport Eleftherios Venizelos	Greece	23
Malaga Airport Costa Del Sol	Spain	26
Nice Côte d'Azur Airport	France	28
Larnaca International Airport	Cyprus	62

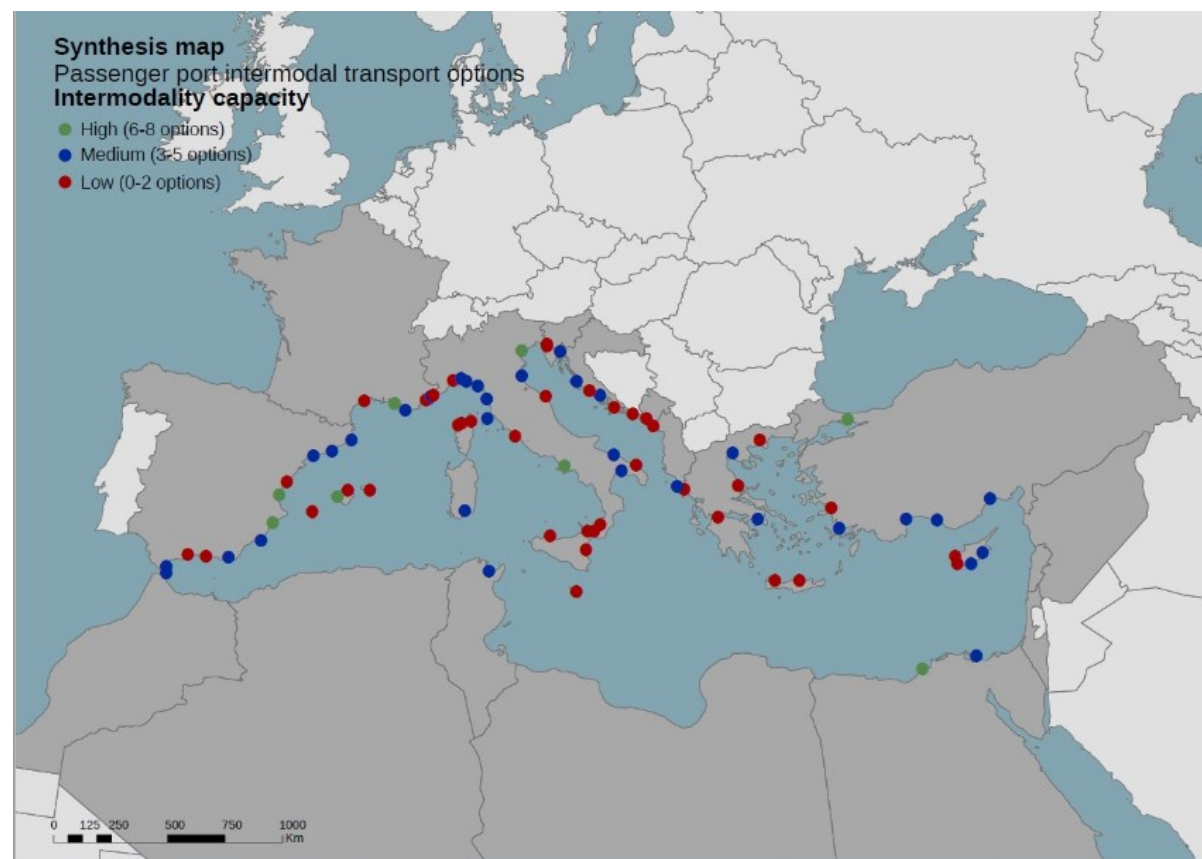
Elaboration from EUROSTAT data (2017)



Total number of passengers and annual growth in 2015 in the identified airports.

BOX EF.4.4: SYNTHESIS MAP OF PASSENGER PORT INTERMODAL TRANSPORT OPTIONS

Intermodality capacity, expressed by the number of available means of transport in the vicinity of each passenger port, is higher in Western Mediterranean compared to Eastern Mediterranean.



4. Integrated analysis of Threats and Enabling Factors

Threats and Enabling Factors have been described and analysed individually in the previous chapter. This chapter intends to show and briefly discuss their conceptual interactions and some of their main spatial and temporal relationships. Strong interactions put an emphasis in the need to monitor, plan and manage together the involved T&EF, within a wider ICZM-MSP approach.

4.1 Interactions among Threats and Enabling Factors

The pool of interactions is summarized in Table 2, attributing to each combination an intensity value (low – medium – high), and indicating the main direction of the interaction (who is influencing who, or if there is mutual interference).

Climate changes and morphological stability mainly (blue cells) influence littoralization and urbanization (coastal cities and infrastructures can be at risk), touristic fluxes (that respond to availability of good beaches where “beach and sun” is the main feature of the tourism destinations) and ecosystem protection measures (that can be triggered in coastal areas by erosion and flooding events). The highest interactions (orange cells) concern coastal protection measures (that are triggered by erosion and flooding events and are counteracting the threat).

Littoralization and urbanization has high interaction (orange cells) with touristic fluxes (both being the consequence and the precondition of high fluxes) and pollution and other anthropogenic pressures (that are the results of the high number of inhabitants and of urbanised areas). Moreover, significant interactions (blue cells) involve climate change and morphological stability (and related flooding issues), other land-sea uses, coastal protection measures (that often respond to the presence settlements to defend), ecosystem protection measures (that react to and tends to regulate, among others, soil use), water management (both as water supply and as wastewater treatment) and transport and accessibility.

Touristic fluxes are both strongly influencing and being influenced by littoralization and urbanization, pollution and anthropogenic pressures, water management and transport and accessibility. At the same time (blue cells), they can trigger or require ecosystem protection measures (to counteract the generated pressures) and morphological stability.

Pollution and other anthropogenic pressures affecting ecosystems have three strong interactions (orange cells) with ecosystem protection measures (responding to anthropogenic pressures and mitigating their impacts), water management (mainly related to wastewater collection and treatment) and littoralization and urbanization.

Conflicts among uses and land-sea interactions have mainly (orange cells) relationship with water management (e.g. different uses competing for water resources) and with transport and accessibility (e.g. infrastructures on the coast for mobility and transport).

Coastal protection measures have a strong (orange cells) direct interaction only with climate change and morphological stability, but in fact affect indirectly other T&EF that are influenced by erosion and flooding in coastal areas.

Ecosystem protection measures often (orange cells) include water management measures, both on water resources management and in mitigating the effects of the discharge of used waters, while it was already mentioned the clear and direct connection

with pollution. Other connections already mentioned concern morphological stability, urbanization and tourism fluxes.

Water management is the EF with stronger interactions with other T&EFs (tourist fluxes, pollution, other uses and land-sea interactions, ecosystem protection measures).

Finally, **Transport and accessibility**, as already emerging from the above presentation of Table 2, is mainly interconnected with tourism fluxes and coastal infrastructures.

Table 2 – Interaction matrix among T&EF. Cells with bold boundaries identify the interactions where spatial analyses were carried out.

[illegible]

4.2 Spatial interactions among T&EF in the Mediterranean

The analysis of the interactions among T&EF can be refined by investigating where and how such interactions currently exist, and by identifying possibly hot spots in need of further investigations and actions.

The analysis focused on six interactions from medium to high (blue or orange cells of Table 2), where spatial data were available, selecting representative indicators for each of the T&EF involved.

Climate changes and morphological stability versus touristic fluxes

About one fourth of the total overnight stays in the EU Mediterranean coast is exposed to erosion and coastal defence problems, which are expected to increase due to climate change. Hot spot areas are significant parts of the Spanish coast (e.g. Valencia, Barcelona), the Adriatic-Ionian coast (e.g. Rimini), with emphasis on its northern part, and the island of Crete (Chania and Irakleio) (Figure 9). The eastern coast of Greece also suffer from erosion, but tourism pressure is still low (e.g. Xanthi and Larisa) (Figure 9).

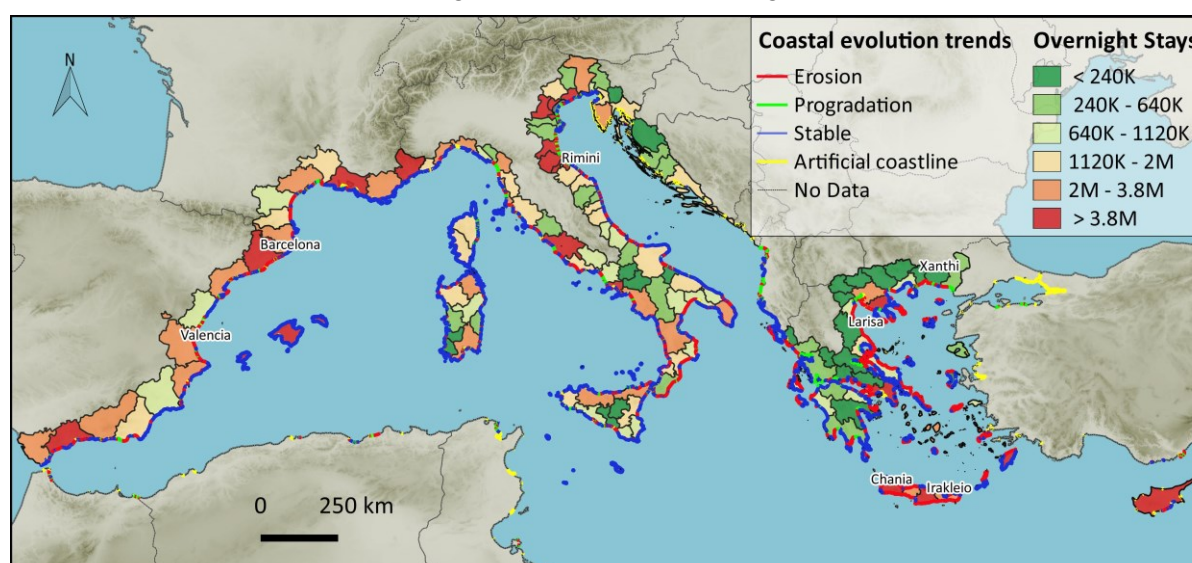


Figure 9 – Coastal evolution trends and NUTS III overnight stays (average 2010-2015) in the Northern Mediterranean.

Littoralization and urbanization versus touristic fluxes

Not surprisingly, most NUTS III areas with the highest touristic fluxes became highly urbanised over time (e.g. Attiki, Rome, Barcelona, Malaga), while regions characterized by low to medium pressure are still predominantly rural (e.g. Evros, Rovigo, Ogliastra). Many NUTS III areas still show an intermediate condition between urban and rural, also where medium to high fluxes are present (e.g. Cyprus, Irakleio, Var) (Figure 10).

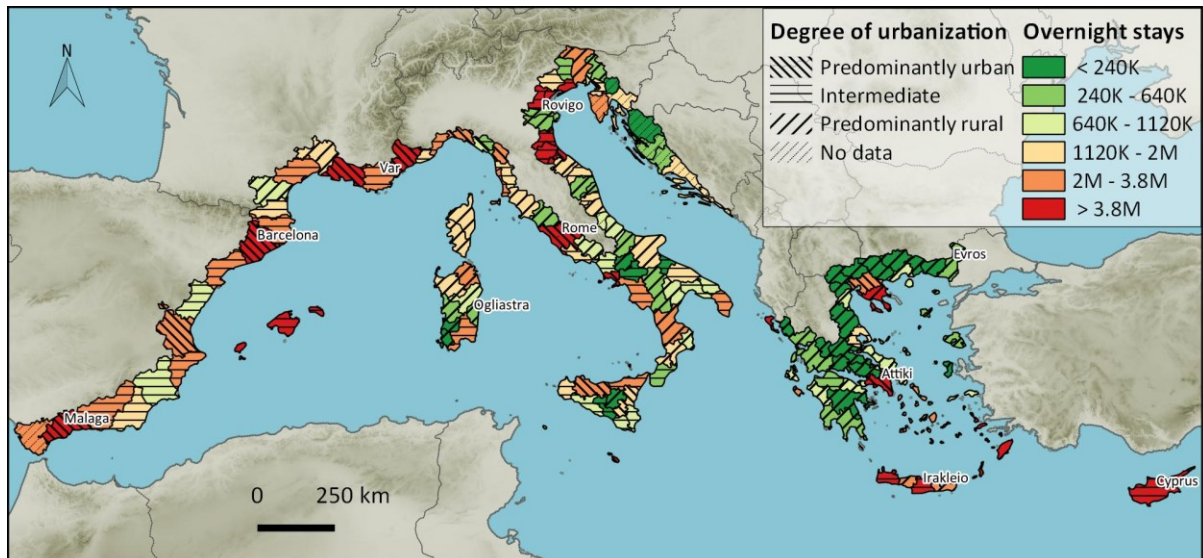


Figure 10 – Degree of urbanization and NUTS III overnight stays (average 2010-2015) in the Northern Mediterranean.

Littoralization and urbanization versus ecosystem protection

Ecosystem protection measures are here expressed through one of the possible indicators, i.e. the network of Natura 2000 sites. The map in Figure 11 qualitatively shows a poor relationship between the degree of urbanization and the extent of protected sites, with highly urbanized areas comprising large portions of Natura 2000 network (e.g. Malaga, Valencia, Barcelona, Alpes-Maritimes, Palermo, and Thessaloniki). The NUTS III scale might not be the most appropriate one to carry out such analysis, while other ecosystem protection measures related to urbanization and littoralization shall be considered.

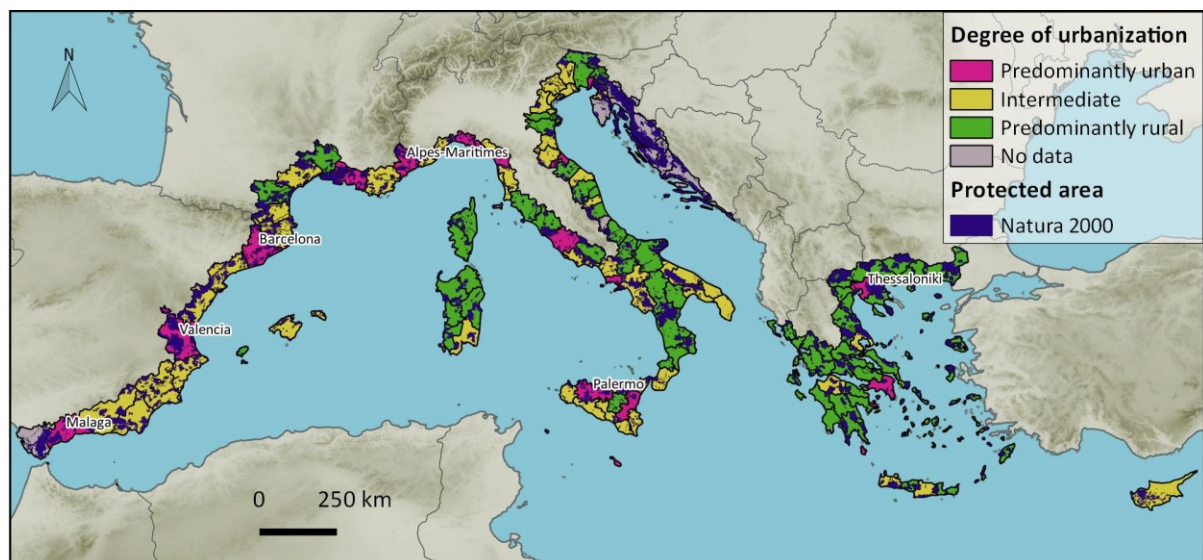


Figure 11 - Degree of urbanization and Natura 2000 sites in the Northern Mediterranean.

Touristic fluxes versus pollution and other anthropogenic pressures

The touristic pressure at NUTS III level is here compared with the quality of coastal waters, represented by an indicator highly relevant for tourism, i.e. the percentage of bathing sites with excellent water quality referred to bathing season 2016. The map (Figure 12) shows quite clearly that there is a general spatial relationship between touristic fluxes and bathing water quality (e.g. Naples, Alpes-Maritimes, Granada, Hérault). However, a significant role is played by the oceanographic conditions (i.e. semi-enclosed versus open seas) and of course by management of sewage and treatment systems in place. Therefore, for example, high touristic fluxes and high bathing water quality are recorded in the Northern Adriatic (e.g. Venice) and in Greece (Attiki and Chania).

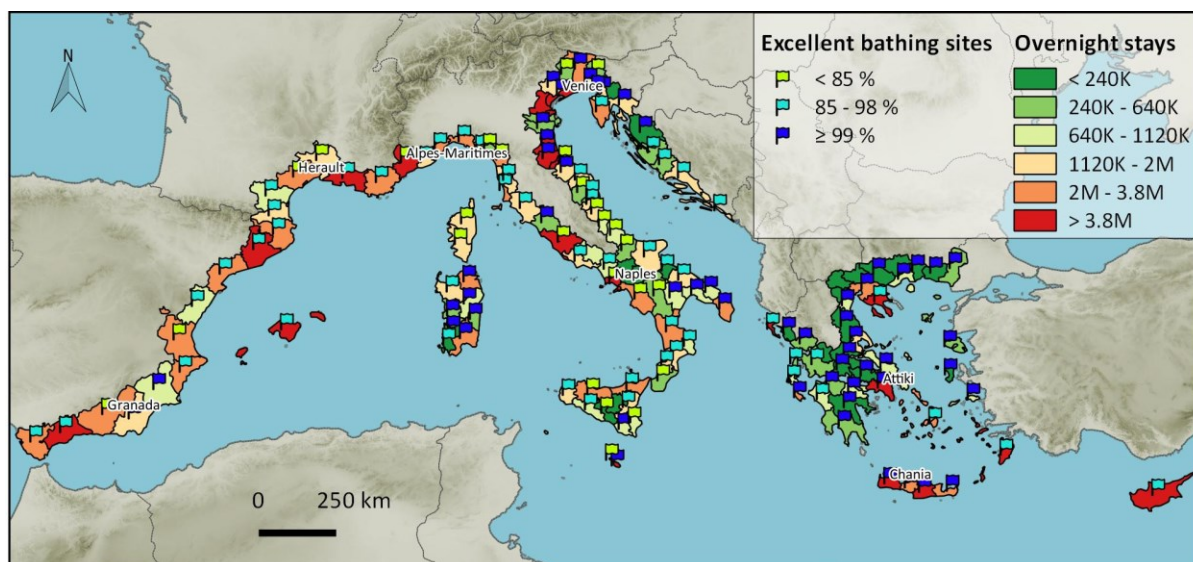


Figure 12 – Bathing water quality and NUTS III overnight stays (average 2010-2015) in the Northern Mediterranean.

Touristic fluxes versus water management

The map of Figure 13 evidences possible relationships regarding availability of water resources and high touristic pressure. While areas like northern Italy or Greece do not appear to suffer from water scarcity, the issue of water scarcity seems relevant in most of the Spanish coast (Barcelona, Alicante), in southern Italy (Lecce) and on several islands (e.g. Balearic Islands, Palermo, and Cyprus).

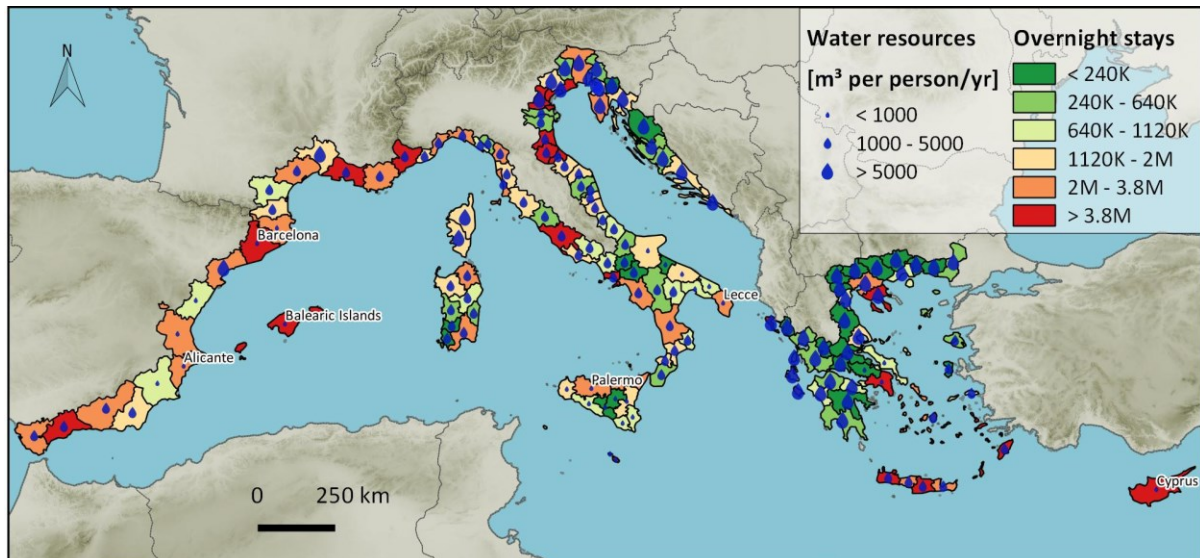


Figure 13 – Water resources availability and NUTS III overnight stays (average 2010-2015) in the Northern Mediterranean (Elaboration from Plan Blue, 2010).

Touristic fluxes versus transport and accessibility

The map of Figure 14 shows the relationship between the touristic pressure at NUTS III scale and the existing transport and accessibility system, represented here by passenger ports and airports and their intermodal capacity (the overall numbers of available intermodal transport options). While there is a quite diffused network of ports and airports having medium intermodal capacity, low intermodal capacity is revealed in some ports/airports serving in highly touristic areas in Cyprus, France (Var, Hérault) and Italy (Savona, Messina). On the other side, other regions with high touristic pressure offer high intermodal capacity (e.g. Bouches-du-Rhône, Venice, Barcelona, Attiki, Malaga, Rome, and Bouches du Rhône).

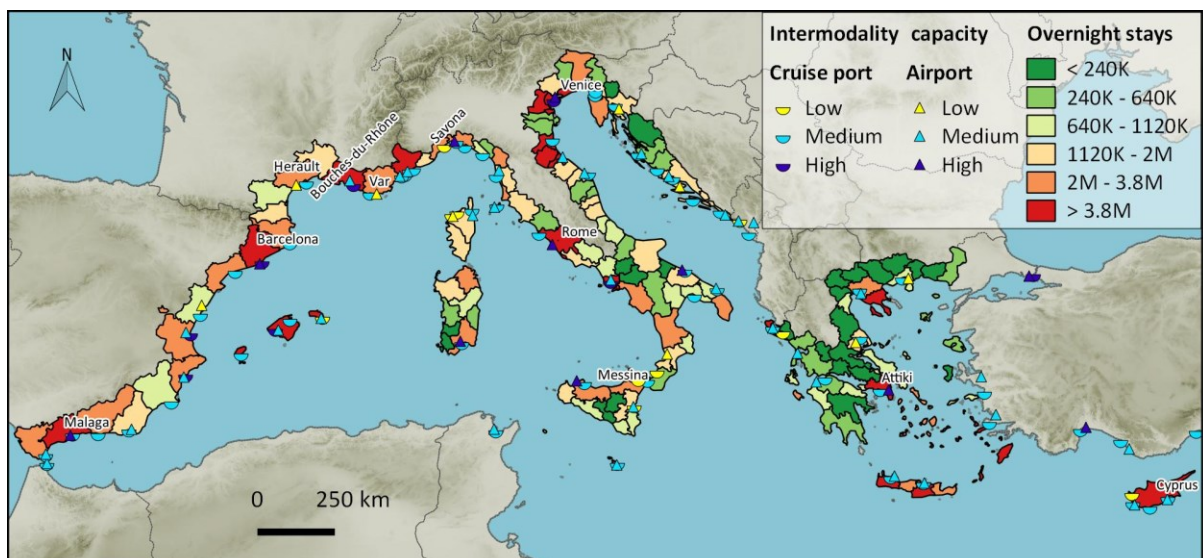


Figure 14 – Intermodal capacity for cruise ports and for airports, and NUTS III overnight stays (average 2010-2015) in the Northern Mediterranean.

4.3 Time trends of interactions among T&EF in the Mediterranean

The interactions above illustrated are highly dynamic and can significantly vary in nature, intensity, spatial distribution and effects, depending on the trends of each of the T&EF considered. Based on the description of main ongoing and expected trends described in chapter 3 and the Co-Evolve deliverables behind it, we can briefly infer here on how the interactions will evolve. This is shown qualitatively (- / = / +) in Table 3.

All T&EF are expected to increase in the near future, although at different speed and intensity, with the exception of “pollution and other anthropogenic pressures affecting ecosystems” which are here considered as constant, because of good environmental policies and practices. In general, the intensity of the interactions is increasing, with the three main drivers being: i) the morphological instability of coastal areas, also due to climate changes; ii) the increase of touristic fluxes; iii) the protection measures on coasts and ecosystems to put in place to respond to threats and allow sustainable tourism development. The expected increase of other uses of the coast and the sea within a general expansion of sea economy and their coexistence with tourism will be another major issue.

This analysis, although simplified, clearly shows the importance of a multidisciplinary, integrated and long-term view and effort on policy and governance.

Table 3 - Expected trends of interactions among T&EF.

		Climate changes and morphological stability	Littoralization and urbanization	Touristic fluxes and carrying capacity	Pollution and other anthropogenic pressures affecting ecosystems	Conflicts among different uses on land and at sea and land-sea interaction		Coastal protection measures	Ecosystem protection measures	Water management	Transport and accessibility
Climate changes and morphological stability	+		+	+	=	+		+	+	=	=
Littoralization and urbanization	+			+	=	=		=	+	+	=
Touristic fluxes and carrying capacity	+				+	+		=	+	+	+
Pollution and other anthropogenic pressures affecting ecosystems	=					=		=	+	+	=
Conflicts among different uses on land and at sea and land-sea interaction	+							=	+	=	=
Coastal protection measures	+								+	=	=
Ecosystem protection measures	+									+	=
Water management	+										=
Transport and accessibility	+										
			low								
			medium								
			high								

5. Examples from the local scale: Threats and Enabling Factors

This Chapter deals with the downscaling of Threats and Enabling Factors analyses at the level of Pilot Area, and it capitalizes on the results of Tasks 3.14/3.15 and related deliverables (Chouli et al. 2017). Its aim is to demonstrate how the frame built up at MED scale can be adapted and applied to the coastal-maritime touristic destinations of the Mediterranean Basin, by depicting both the threats to co-evolution and the potential of these destinations in achieving touristic sustainability within the principles of MSP and ICZM.

The assessments here reported originated from the joint efforts of Pilot Area Coordinators' experience and Task Leaders' expertise. As such, they are not intended to cover all factors relevant for the sustainable development of coastal tourism in the Mediterranean Basin, but rather to highlight some crucial issues for which action at local scale is needed.

5.1 Overview on CO-EVOLVE Pilot Areas

The ten Pilot Areas identified within CO-EVOLVE are localized in seven different Mediterranean Regions and five different Mediterranean countries.

The Pilot Areas are:

- 1A Alexandroupoli (Region of East Macedonia-Thrace, Greece)
- 1B Keramoti (Region of East Macedonia-Thrace, Greece)
- 2A Cattolica harbor and coastal area (Region Emilia Romagna, Italy)
- 2B Comacchio – Lido di Spina (Region Emilia Romagna, Italy)
- 3A Rosolina Mare (Veneto Region, Italy)
- 3B Polesine Camerini (Veneto Region, Italy)
- 4 Port of Valencia (Valencia Region, Spain)
- 5 Orb River Delta (Languedoc-Roussillon, France)
- 6 Kaštela Bay (Split- Dalmatia, Croatia)
- 7 Neretva River Delta (Dubrovnik-Neretva, Croatia)

The ten Pilot Areas cover all the five touristic typologies chosen in CO-EVOLVE (see Chapter 2): beach tourism (e.g. Rosolina Mare and Alexandroupoli); cruising (e.g. Port of Valencia); recreational boating (e.g. Orb River Delta); eco-tourism (e.g. Neretva River Delta and Polesine Camerini); and urban/cultural tourism (e.g. Kaštela Bay).

With respect to the NUTS III tourism destination classification adopted in CO-EVOLVE and based on the two parameters *“average share of overnight stays at each destination against the total overnight stays in the Mediterranean destinations’ sample”* and *“average annual growth of overnight stays at each destination”* (for further details see Del. 3.16.1), five out of the six touristic destination typologies are represented by the Pilot Areas (Figure 15). In fact, no Pilot Area is classified as “High Share - High Growth” touristic destination.

The ten Pilot Areas are classified as below:

- 1A Alexandroupoli (Evros) → Low Share – Negative Growth
- 1B Keramoti (Kavala) → Low Share – High Growth
- 2A Cattolica harbor and coastal area (Rimini) → High Share - Negative Growth
- 2B Comacchio – Lido di Spina (Ferrara) → Low Share – Medium Growth
- 3A Rosolina Mare (Rovigo) → Low Share – Medium Growth
- 3B Polesine Camerini (Rovigo) → Low Share – Medium Growth
- 4 Port of Valencia (Valencia) → High Share – Medium Growth
- 5 Orb River Delta (Hérault) → High Share – Medium Growth
- 6 Kaštela Bay (Split) → Low Share – High Growth
- 7 Neretva River Delta (Dubrovnik) → Low Share – High Growth

Apart from factors like the current tourism capacity and the recent touristic growth, the Pilot Areas differ in many other aspects, such as physical characteristics, geographic scale, objectives, and involved stakeholders. While Cattolica, Alexandroupoli and Valencia are mainly urban Pilot Areas, which have to deal more with typical urbanization-related pressures such as littoralisation, coastal erosion and land use conflicts, other Pilot Areas comprise mainly natural habitats such as delta systems (Neretva, Orb and Comacchio) or beaches (Keramoti and Rosolina Mare) for which a trade-off between environmental protection and touristic development is of outmost importance.

The physical and cultural characteristics of the Pilot Areas determine their objectives and visions of sustainable coastal tourism development.

In Kaštela Bay, for instance, the very narrow coastal zone is not conveniently organized to face with sea level rise and wave strikes, putting at risk its highly valuable cultural heritage. For this reason, great efforts shall be made to adopt adequate coastal protection measures.

The extended sandy beaches of Rosolina Mare are not only undergoing the effects of climate change, but also the effects of urban sprawl from increasing sea-side tourism and eco-tourism, for which suitable urban planning is necessary.

The Pilot Area comprising the Orb River Delta is an already established touristic resort, for which a crucial factor to tackle is drought. When the tourism peak coincides with a drought period, natural resources experience great pressure, with consequent problems of salinization of the groundwater table and decreasing bathing water quality.

Threats and Enabling Factors at Pilot Area Scale: Relevance and Priorities

The analysis performed at Pilot Area scale in CO-EVOLVE revealed the level of relevance (from 1 to 5) for sustainable coastal tourism Pilot Area Coordinators assigned to each Threat and Enabling Factor (Table 4).

The Threat **Climate change and morphological stability** and the correspondent EF **Coastal protection measures** were acknowledged a very high relevance. Much information is available from prior projects and monitoring programs, as climate change and morphological stability are recognized at MED scale as an important threat to sustainable tourism development and much work has been done on local level to establish and improve coastal protection works and strategies.

Governance received the second highest score. Governance is therefore an important issue for most Pilot Areas, but very difficult to quantify. Local management plans exist, but most of the times they do not include all aspects of sustainable tourism. Fragmented jurisdictions and building common visions are other important aspects of governance. The management of CO-EVOLVE Threats and Enabling Factors for Sustainable tourism is spread over many different entities on local and regional level.

Littoralisation and urbanization were ranked third. These issues are considered particularly pressing in most of the Pilot Areas but Valencia and Keramoti. In fact, most of the Pilot Areas lacked adequate spatial planning, and consequently have or are still suffering from a disorganized coastal urban sprawl and artificialization of the coastal strip.

Interestingly, although **Pollution to coastal ecosystems** wasn't recognized as a very relevant factor, **Ecosystems protection** received attention. Biodiversity preservation is an important issue that has been set as prerequisite for the sustainable development of all activities on EU level. Pertinent EU Directives have set the general objectives and the "minima" every country has to achieve in order not to jeopardize sustainable development. In this framework, monitoring of these issues is mandatory and data are available on EU, national, regional and local level. Furthermore, local and regional "management plans" for the effective management of Natura 2000 sites and other protected areas are also required.

Conflicts among different uses and **Transport and accessibility** deserved similar attention according to the Pilot Area Coordinators. The conflicts for the use of limited space and/or of the same resources are pressing only for Kaštela Bay, Keramoti and Neretva River Delta, three sites whose naturalness level is still high. Their interest in protecting their natural capital might explain their particular concern for competing uses. The EF Transport and accessibility was ranked of high relevance by the Pilot Area Coordinators of Valencia and Keramoti. According to the other Pilot Area Coordinators, the main issue is to attract more quality tourism, as there are no problems of accessibility.

Tourism fluxes and carrying capacity is generally a crucial issue for the sustainability of Mediterranean coastal tourism. However, only Valencia considered it a priority aspect to address, because this Pilot Area has to tackle persisting strong seasonality of high touristic fluxes, which make up the 13% of regional GDP.

Water supply and depuration were considered the least important issues, except for Orb River Delta. This perception might reflect a general lack of awareness with regards to water scarcity (and related water quality) in the Mediterranean Basin.

It is important though to recall that all the Pilot Areas are located in North Mediterranean countries; it is likely that the prioritization of Threats and Enabling Factors would have been different if countries from the southern Mediterranean had been part of the assessment. For instance, it has emerged that the management of water resources is not one of the priorities in the studied Pilot Areas. Instead, this issue would have probably been considered very relevant in numerous areas of the southern Mediterranean.

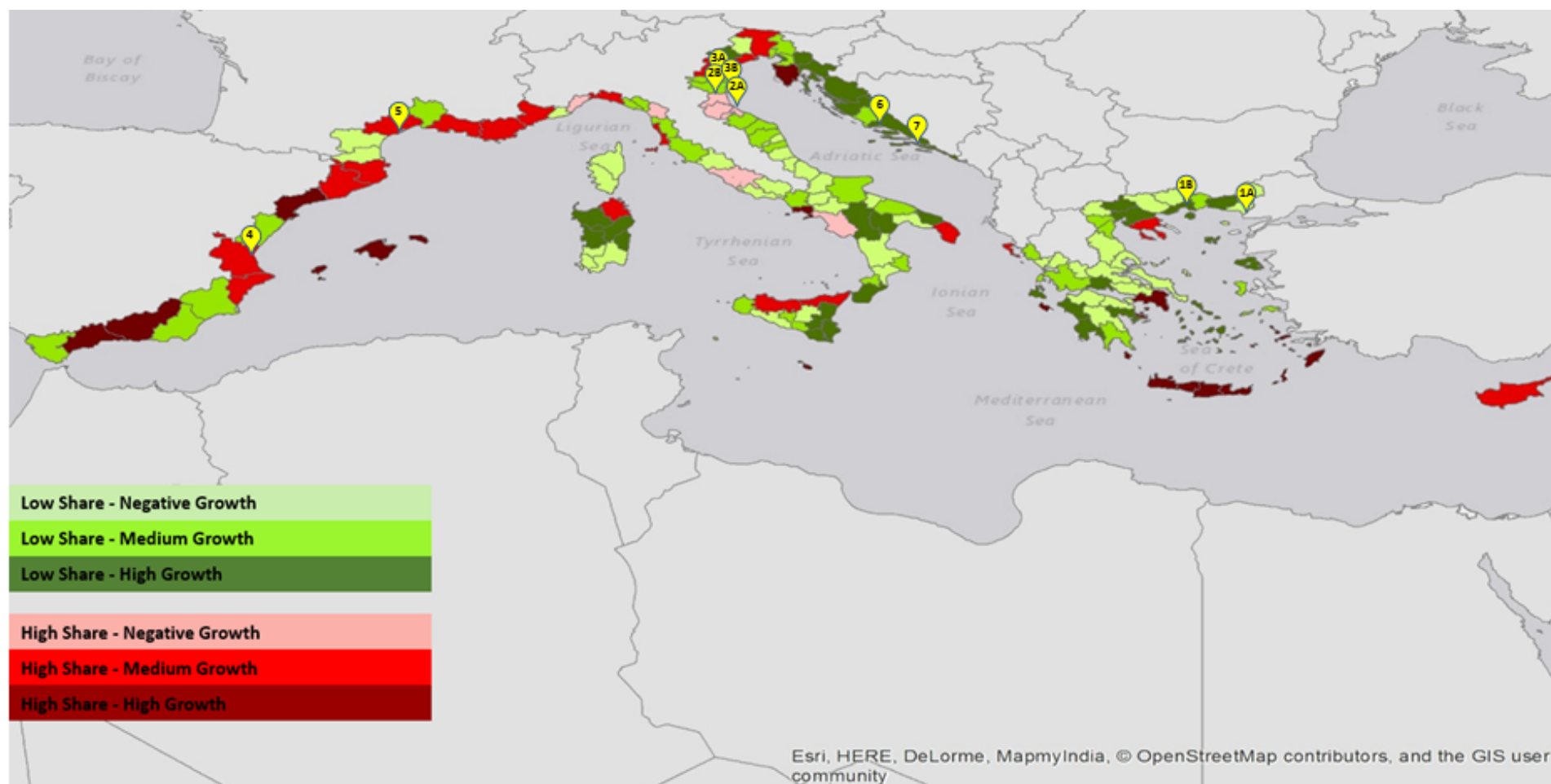


Figure 15 - The ten Pilot Areas (identified with a yellow standpoint symbol) are representative of the different touristic destination typologies. 1A: Alexandroupoli (Region of East Macedonia-Thrace, Greece). 1B: Keraмоти (Region of East Macedonia-Thrace, Greece); 2A: Cattolica harbor and coastal area (Region Emilia Romagna, Italy); 2B: Comacchio – Lido di Spina (Region Emilia Romagna, Italy); 3A: Rosolina Mare (Veneto Region, Italy); 3B: Polesine Camerini (Veneto Region, Italy); 4: Port of Valencia (Valencia Region, Spain); 5: Orb River Delta (Languedoc-Roussillon, France); 6: Kaštela Bay (Split-Dalmatia, Croatia); 7: Neretva River Delta (Dubrovnik-Neretva, Croatia).

Table 4 - The level of relevance (from 1 to 5) assigned by Pilot Area Coordinators to each T&EF.

T&EF	Pilot Areas										SCORING
	1A	1B	2A	2B	3A	3B	4	5	6	7	
Climate change and morphological stability	5	5	5	5	5	5	3	5	1	2	41/50
Governance	5	2	4	4	4	4	5	2	4	4	38/50
Coastal protection measures	4	1	5	5	5	5	1	3	5	2	36/50
Littoralisation and Urbanization	4	2	4	4	4	4	1	3	4	5	35/50
Ecosystems protection	1	5	2	3	3	3	3	5	3	5	33/50
Conflicts among different uses on land and at sea and land-sea interaction	3	4	1	2	3	3	2	1	5	4	28/50
Transport and accessibility	3	4	3	2	2	2	4	1	2	3	26/50
Pollution and other anthropogenic pressures affecting ecosystems	2	1	2	1	2	2	4	4	3	3	24/50
Touristic fluxes and Carrying Capacity	1	3	3	3	1	1	5	2	2	1	22/50
Water supply and depuration	2	3	1	1	1	1	2	4	1	1	17/50

5.2 Representative Examples from the Pilot Areas

Three Pilot Areas are described more in depth in this section, with the aim to provide an overview on typical issues related to Mediterranean sustainable coastal tourism. The three Pilot Areas are the Port of Valencia, Alexandroupoli and Neretva River Delta. They can be characterized along two opposing gradients: level of naturalness and level of complexity of T&EF (Figure 16).

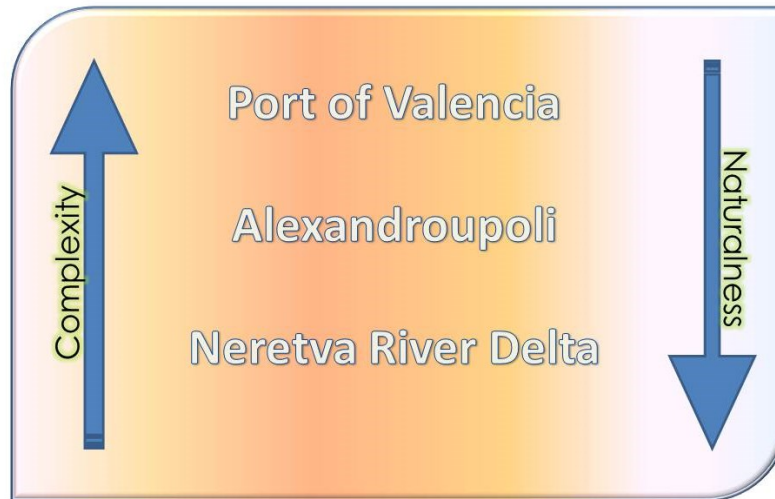
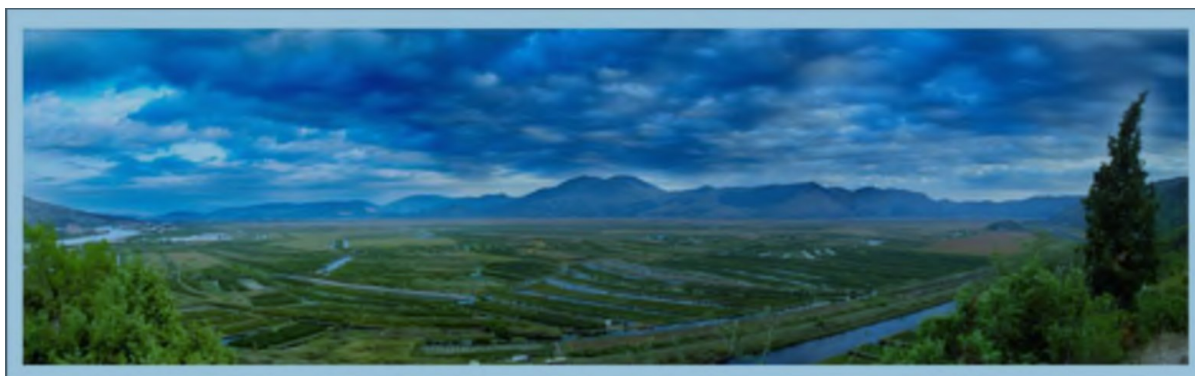


Figure 16 - The two gradients characterizing the three chosen Pilot Areas.

Pilot Area 7: NERETVA RIVER DELTA



KEY PRIORITIES AND CHALLENGES IN RELATION TO COASTAL TOURISM

1. Preservation of protected natural sites
2. Sustainable tourism development - natural sites as a natural capital
3. Tourism development plan outside the urban areas

GENERAL DESCRIPTION

The region belongs to the “**Low Share – High Growth**” destination typology, which means that its small tourism potential is steadily increasing.

The Pilot Area NERETVA RIVER DELTA extends for ca. 120 km², and it includes seven local government units: three cities (Ploče, Metković, and Opuzen) and four municipalities (Slivno, Zažablje, Kula Norinska, Pojezerje).

Neretva River flows through Bosnia and Herzegovina and Croatia into the Adriatic Sea. **It is the only river in this region with a delta system.** Its delta is characterized by a **diversity of wetland habitats** mixed with agricultural land surrounded by karst hills.

In spite of the conversion of wilderness into tamed waters and arable land, the landscape around **the Neretva delta has preserved its beauty** and romance. The alluvial plains in the Karst setting have become both the inspiration for artists and a topic of scientific research. The unique landscape and the specific culture have made the Neretva delta an attraction for both Croatian and international tourists.

The backbone of the economy in this area is cargo seaport in Ploče, second in Croatia by the amount of trans-shipment, which handles almost all kinds of commodities represented in international maritime transport. An integral part of the port of Ploče is Metković port, which is located 20 km upstream on the river Neretva. It specializes in the trans-shipment of cement and granulated stone. The total annual cargo handling capacity of the port of Ploče is estimated at more than 5 million tons of general and bulk cargo (excluding terminal under construction), while the total storage volume of liquid cargo is around 600,000 tons.

THE MAIN ISSUES WITH REFERENCE TO COASTAL TOURISM

The area of the Neretva Valley has all the potential for considerable benefits from dynamism of **tourism development**, due to its quality of **natural attractions**, with particular reference to the watercourse/delta Neretva, a **relatively long and usable seacoast**, the Baćina lakes, a **favorable climate**, fish/ornithological reserves and **interesting protected**

wetland areas. In addition, it hosts numerous **caves and karst phenomena**, the **centuries-old tradition of life and work culture**, interesting history and peculiar material and immaterial cultural heritage. Delta Neretva is also **the connection point of main roads**, rail and maritime transport.

Nevertheless, tourism in this area is under-developed. **Agriculture is the most important economic activity in Delta Neretva**, due to mild climate, fertile alluvial soil and plenty of water, which allow multiple harvesting both in open air and in green house. Unfortunately, **the extensive land reclamation and drainage works**, which took place about thirty years ago with the financial support of the Food and Agriculture Organization (FAO), **was conducted in the absence of any ecological studies**. As a result, **a significant proportion of the area has been completely transformed from wetland into agricultural land**.

Although **the region of Neretva delta** has always had an extraordinary biological and ecological importance, it **is still relatively insufficiently explored**. This fact greatly hinders an accurate assessment and protection of this highly endangered region. The further expansion of the port and settlement of Ploče, building of holiday homes, industry, and **the pollution of water from neighboring countries** and other sources still **endangers the marshy valleys of the Neretva River**. Man has caused a series of adverse changes in the hydrography and biota, with reflections on the quality of life.

VISION

The future of this area should be based **on balancing the need for further development and the need to protect natural resources**. It is also necessary to **coordinate the development of different and sometimes conflicting activities** and needs, such as agriculture, tourism, water management, infrastructure construction, industry, with the aim to increase the quality of life.

THREAT and ENABLING FACTORS HIERARCHIZATION

According to the Pilot Area Coordinator, the level of relevance of each T&EF is as follows:

THREATS relevance (from 5 to 1):

- 5: Littoralisation and urbanization
- 4: Conflicts among different uses
- 3: Pollution and other anthropogenic pressures
- 2: Morphological stability
- 1: Tourism fluxes and carrying capacity

ENABLING FACTORS relevance (from 5 to 1):

- 5: Ecosystems protection
- 4: Governance
- 3: Transport and accessibility
- 2: Coastal protection measures
- 1: Water supply and depuration

ASSESSMENT ON THE TWO MOST RELEVANT THREATS

Littoralisation and urbanization

Today the coastal area of Neretva River delta is not urbanized because it is a protected area under different international and national strategies: Ramsar Convention, Ecological Reserve and Ornithological Reserve, and Natura 2000 Network. However, littoralisation could be an issue in the future and that is why it is important to work with local stakeholders and the County on the spatial planning process. The main idea is to give to local people guidelines for development of sustainable touristic activities focused on rural traditional villages that host rich cultural and natural heritage. In this way tourism activities can be developed towards inland and not on the sensitive coastline.

Conflicts among different uses on land and sea and land-sea interaction

Today agriculture and nature protection co-exist without conflict. However, future conflicts between tourism and nature protection for competing land use will be an issue. Indeed, Croatia is one of the Mediterranean countries where coastal tourism will thrive exponentially in the near future. Therefore, a spatial planning document keeping eco-tourism activities and infrastructure away from the coastal line would hopefully solve such conflict for space by preserving the coastal strip and developing inland.

ASSESSMENT ON THE TWO MOST RELEVANT ENABLING FACTORS

Ecosystems protection

According to Pilot Area Coordinator, nature protection should be the main Enabling Factor for future ecotourism development in the Neretva River Delta.

The area in fact is an important Natura 2000 site (ha 23,814), and it is also listed as Ramsar site, ecological and ornithological reserve and also as an ichthyologic and marine reserve. The Natura 2000 site management plan is implemented by the Public Institute for the management of protected areas of the Dubrovnik Neretva County. The Natura 2000 site contains 15 EU habitat types.

In the Neretva Delta, at least 313 bird species have been registered. Altogether there are around 193 regularly occurring species out of which around 89 are breeding birds. The area is important stop-over place during migrations of birds from Middle and NE Europe to Africa, situated on the route of Central European (Black Sea/Mediterranean) Flyway. It is also of great importance for wintering. About 1/3 of registered species are wintering birds, accompanied with residents during the winter.

Neretva and its tributaries are exceptionally rich in fish species. Out of almost 150 species that use watercourses and/or estuary in some stage of their life, 49 are freshwater fish and out of them even 19 are endemic for Eastern Adriatic catchment area while 4 are endemic for Croatia. The delta, lagoons and bodies of brackish water present spawning sites and nurseries for fish and crayfish which spend the rest of their lives in fresh or salt water. These waterbodies are important for many species concerning their migrations, like the European eel (*Anguilla anguilla*).

Although the Pilot Area includes well-protected habitats, additional effort is needed in other sectors such as waste recycling. In fact, the Dubrovnik Neretva County Environmental Report states that only about 7% of municipal waste is recycled.

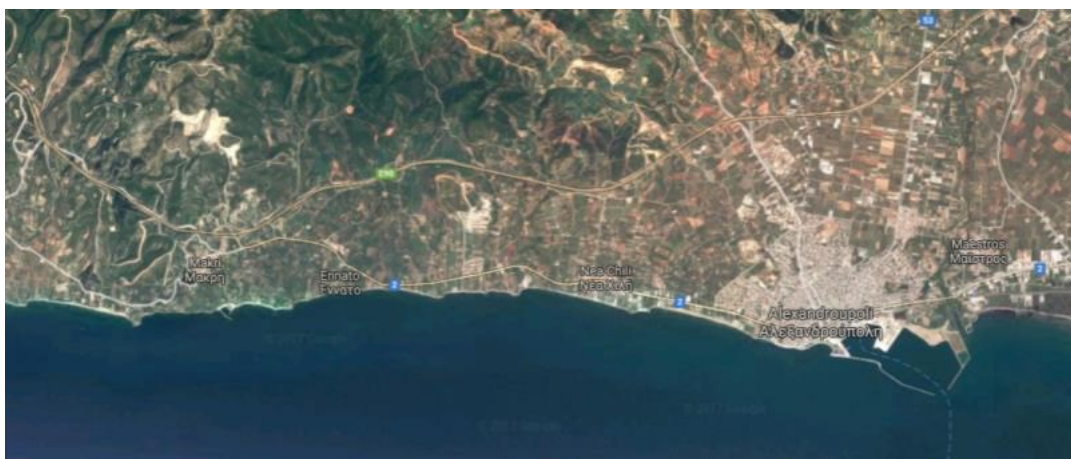
Regarding noise pollution, at national level, there is a Law on noise protection; however, there is no local information regarding underwater noise.

Governance

Governance is a very important issue in the Pilot Area. In fact, a management plan for the protected areas is in progress and almost finished. Therefore, during the Pilot Testing phase this plan will be available.

The seven local governments on the Pilot Area have no common planning documents. The County of Dubrovnik has just completed a new spatial planning document. The Pilot Area Coordinator intends to work in collaboration with the County and the seven local governments on the “specifications” of spatial planning for the villages within the Pilot Area, so to give technical specification for eco-tourism establishments and relative infrastructure. The main idea is to promote eco-tourism within and near the existing settlements and away from the coastline and the protected areas. The building infrastructure and the private investments will have to respect local traditional architecture and the landscape.

Pilot Area 1A: ALEXANDROUPOLI



KEY PRIORITIES AND CHALLENGES IN RELATION TO COASTAL TOURISM

1. Development of the urban and peri-urban tourism: manage conflicting land uses, coastal erosion, and urban rehabilitation
2. Measures for land degradation due to coastal urban sprawl and port expansion
3. Build a long-term coastal management plan, where future urbanization expands at a safe distance from the erosion zone

GENERAL DESCRIPTION

The region belongs to the “**Low Share – Negative Growth**” destination typology, which means that its small tourism potential is recently decreasing.

The Pilot Area ALEXANDROUPOLI extends for ca. 30 km², and it is included into a municipality.

The municipality comprises a **multitude of rivers and streams**. **Evros River** has a delta of 188 km² and therefore it **is among the most important wetlands in the Balkans**. The land use/land cover of the municipality is divided as follows: 39.74% agricultural land, 47.19%, forests and semi-natural areas, 8.5% wetlands/water bodies, and 9.81% artificial land.

The area lives mainly on tourism, trade, fishery and aquaculture. The economically active population is 41.4% (2011), while the unemployed population is 17.12% (2011). The employment by sector (2011) is divided as follows: 7.57% primary sector, 12.77% manufacturing industry and 79.66% service sector.

The city of Alexandroupoli is the most populated of the Region of Eastern Macedonia and Thrace (REMTH) and the nearest to the Turkish borders and the Dardanelles. As such, it attracts many activities of regional, national and international importance (university campus, regional hospital, international airport, international port etc.).

THE MAIN ISSUES WITH REFERENCE TO COASTAL TOURISM

The municipality of Alexandroupoli shows high number of arrivals but **few overnight stays**, as many tourists visit Alexandroupoli on their way to other tourism destinations (REMTH coastal area, REMTH islands, Aegean sea islands etc.). In the past decades, **investments**

on tourism infrastructure (vacation houses, hotels/conference centres, camping sites etc.) have not enhanced touristic fluxes.

Alexandroupoli offers **different forms of coastal tourism**: seaside tourism as predominant form of tourism, but also ecotourism and wellness tourism. Since most of tourism today is “sea and sun” oriented, there are **hotel resorts** and camping sites built in the coastal area, which have led to **land degradation**. The challenge is to **enhance the current level of touristic offer** and to **harmonize it with the other activities** of the area. Alexandroupoli has a developed touristic infrastructure, which has **difficulties in attracting international tourism**.

The Pilot area lies in vicinity to the vast Natura 2000 site Evros River Delta, which is part of a protected area (the Park of Evros Delta).

Along the coastal strip between Makri and Alexandroupoli **multiple uses exist** and are in contrast one with each other. In particular, on the one hand there is **pressure for further urban development and littoralisation** and on the other hand there is need for developing sustainable coastal tourism.

Therefore, the main issues relevant for the Pilot Area are **urban sprawl** (residential/tourist settlements) over the coastal zone, the **conflicts between tourism and** the other sectors, especially **fishery and aquaculture**, and **coastal erosion**, which threaten the development of tourism. Moreover, **the current quality of touristic offer** should be enhanced.

VISION

The municipality wishes to improve the touristic product with the **rehabilitation of the urban coastal area**, the **expansion of the port**, in order to attract cruise tourism and yachting tourism, and an organized urban expansion, which will include tourism infrastructure and vacation housing.

The **advancement of eco-tourism** within the protected area Evros River Delta **could promote sustainable local tourism** and differentiate the touristic fluxes. A **MSP-ICZM Local Plan** will involve all main actors (Municipality of Alexandroupoli, Port Authority of Alexandroupoli and Managing Authority of the Evros Delta Protected Area), thus leading to **balanced tourism development**.

According to the Pilot Area Coordinator, the level of relevance of each T&EF is as follows:

THREATS relevance (from 5 to 1):

- 5: **Climate changes and morphological stability**
- 4: **Littoralisation and urbanization**
- 3: **Conflicts among different uses on land and sea and land-sea interaction**
- 2: **Pollution and other anthropogenic pressures affecting ecosystems**
- 1: **Tourism fluxes and carrying capacity**

ENABLING FACTORS relevance (from 5 to 1):

- 5: **Governance**
- 4: **Coastal Protection Measures**
- 3: **Transport and accessibility**
- 2: **Water Cycle and Depuration**
- 1: **Ecosystems Protection**

ASSESSMENT ON THE TWO MOST RELEVANT THREATS

Climate change and morphological stability

The coast of the Region of Eastern Macedonia and Thrace (REMTH) can be considered as an example of urbanized littoral subjected to erosion and thus flooding events.

It is mainly low and flat (around 85%) with sandy beaches, but there are also low rocky shores and cliffs with accumulations of gravel and pebbles. The shoreline is affected by a general retreat, whereas accretion is restricted to local areas. In the Pilot Area, 65% of shoreline is subjected to erosion (Xeidakis et al. 2006; 2007). The coastal area is estimated in medium degraded condition based on findings from various projects, in particular the ESPON Climate (<https://www.espon.eu/programme/projects/espon-2013/applied-research/espon-climate-climate-change-and-territorial-effects>) and the EUROSION Project (<http://www.euroSION.org/>). Estimations are mostly based on vulnerability to climate change, and overall capacity to adapt to climate change.

The Pilot Area is under erosion mainly due to the construction of the Alexandroupoli port and its navigation channel. These works have cut-off the long shore sediment transport from East to West (from the Evros River Delta). In the last years coastal protection works took place in the city coastal front. However, the erosion problem has not stopped and it is moving from East to West and from the city to more sub-urban areas. Coastal flooding events (events per year: 5-15) have been documented connected with south winds and high tide.

Littoralisation and urbanization

The city of Alexandroupoli is a coastal city. The urbanization towards the east is limited because of the Evros River Delta. This area is “not attractive” because it is lowlands prawn to flooding and protected area with limitations to developments.

The city itself is built on the sea front and the main coastal road is partially built on seawall which was reconstructed in 2016 because of erosion problems, with addition of revetment for wave energy dissipation (560m total length of the works).

West of the city of Alexandroupoli and towards Makri settlement there is pressure for littoralisation and urbanization along the coast. Planning procedures are trying to “push” the urbanization landwards and to protect the coastline and beach zone.

ASSESSMENT ON THE TWO MOST RELEVANT ENABLING FACTORS

Governance

The municipality of Alexandroupoli disposes of an operational plan (2015-2019) covering all development aspects under their jurisdiction: urban development, public transport, tourism development, social services, environmental protection, water and wastewater services, and waste management.

The development of the port is under the jurisdiction of the Alexandroupoli Port Authority. The two entities have excellent relations and share many common ideas and objectives. Part of the Port activity will be probably given in concession to the private sector very soon.

Both the municipality and the Port Authority have detected a lack of data and monitoring of coastal erosion and lack of an integrated coastal zone management plan and they are working together in order to cover this gap which is mainly due to the existing national legal and administrative framework.

Coastal Protection Measures

As mentioned earlier, in the recent years coastal protection works took place in the city coastal front (reconstruction of the old seawalls and addition of revetment protection, 560m total length of the protected zone) and were completed in 2016. However, the erosion problem has not stopped and it is moving from East to West and from the city to more sub-urban areas.

Due to estimated future erosion, in the new urban district west of the city of Alexandroupoli a policy of “managed retreat” has been adopted: the new “coastal” road and building lots are planned landwards so as to leave space for the future erosion and prevent new expensive coastal protection works. This area has not been developed yet.

The Pilot Area also includes the port in the east of the city, which is 100% artificial.

An important issue for the Pilot Area is how to adopt soft measures as sand nourishment, so as to manage the erosion problem without the construction of new hard measures and to minimize the cost of future maintenance of defense measures.

Pilot Area 4: PORT OF VALENCIA



KEY PRIORITIES AND CHALLENGES IN RELATION TO COASTAL TOURISM

1. Increase of "sustainable" awareness and search for quality. But tourists look for 'authentic experiences'; promotion of only 'sustainability' is not enough
2. Ageing society and evolutions in spending capacity
3. Persisting strong seasonality of visits poses issues of sustainability

GENERAL DESCRIPTION

The region belongs to the “**High Share – Medium Growth**” destination typology, which means that its already established touristic capacity is steadily increasing.

The Pilot Area PORT OF VALENCIA includes the Port of Valencia, which has a total Area of 5.486.000 m² and a floating Area of 5.851.000 m².

The city of Valencia has an **urban population of 791.632 inhabitants** (2016), while the population of Valencia Community counts 4.953.482 inhabitants (2016).

The Valencian Community has a GDP of 105,000 million € (2016), and a GDP per capita of 21,296 € (2016). Services weighed 71% of the regional GDP in 2016. **Tourism represents a high share** (ca.13% of GDP). The industrial sector represented 20% of the regional GDP in 2016. The industrial base includes automotive, food and beverages, chemical, building materials and textile companies. The automotive industry represented 28% of regional exports. Highly-intensive in exports, compared to Spain: 27% of Valencia's GDP (vs 23% in Spain).

The port is one of Valencia's most important institutions for both the city and the region. Historically, port activities have been responsible for the economic growth of the region through trade exchanges, passenger movements and maritime services from which the modern city of Valencia has developed. Through the years, **the Port of Valencia** has grown and changed. The port **has grown towards the sea creating breakwaters** and other protection works making possible the construction of new basins. At the same time, some already-existing **inner basins have been reshaped** for urban related activities such as **leisure ports**.

THE MAIN ISSUES WITH REFERENCE TO COASTAL TOURISM

Over the last decade, and especially **during the last five years**, the **Port of Valencia has succeeded in attracting** a new market of **international cruise passengers**. The city of Valencia is becoming an attractive tourist destination by itself so the Port of Valencia call for cruises liners operating in the Mediterranean. **This fact would have a significant economic impact** on both the city and the region with a feedback effect on the tourist sector **but also has an environmental impact** and several pressures coming from society.

Obviously, cruise vessels is a key source of revenue for the MED coastal Areas and particularly for the Valencian Region, but this kind of tourism is also pointed out as a source of pressure and environmental impacts. The vessel impact at ports and nearby areas affecting negatively to the city in terms of environment. In this sense, **the coexistence between ports and cities has had many problems related to the territory sharing**. Ports receive pressure from the city about high noise levels, ships emissions, visual impacts, heavy traffic near the port-city accesses, etc. In this sense, there are **identified environmental impacts** in the Pilot Area in **several projects** such as SIMPYC (Port – city environmental integration system (LIFE), CLIMEPORT (Climate change mitigation by Port and city) and GREENBERTH (Green berths in city areas) (MED): among others, greenhouse gas emissions (CO₂, NO_x, CH₄) and pm₁₀, pm_{2,5} from vessels, waste management, high noise levels, dirty waters, etc. in terms of **conflicts regarding the port-city area**.

VISION

The pilot action aims to **improve governance** and facilitate the mainstreaming into public action of the guiding principles set out in the ICZM Med Protocol. A Port sustainable generic methodological framework will focus on the environmental impacts through **an ECO-cruise port/city tool for assessing the impact of cruise activities within the port and city area**, in a systemic way as well as linked with a setup of good environmental practices. This structured approach will enable the identification of existing inefficiencies and gaps as well as potential good practices for improvement where targeted measures may be implemented for enhancing the sustainability of cruise activities

This tool aims to improve the city-port relationship by reducing the environmental impacts and **promoting sustainability awareness** between port and city.

According to the Pilot Area Coordinator, the level of relevance of each T&EF is as follows:

THREATS relevance (from 5 to 1):

- 5: **Tourism fluxes and carrying capacity**
- 4: **Pollution and other anthropogenic pressures affecting ecosystems**
- 3: **Climate changes and morphological stability**
- 2: **Conflicts among different uses on land and sea and land-sea interaction**
- 1: **Littoralisation and urbanization**

ENABLING FACTORS relevance (from 5 to 1):

- 5: **Governance**
- 4: **Transport and accessibility**
- 3: **Ecosystems Protection**
- 2: **Water Cycle and Depuration**
- 1: **Coastal Protection Measures**

ASSESSMENT ON THE TWO MOST RELEVANT THREATS

Tourism fluxes and carrying capacity

According to the Pilot Area features, touristic fluxes and carrying capacity are relevant. Its relevance does not rely on threats over ecological systems, since on the one hand the area is already developed (it is part of the city) and on the other hand urban services (i.e. water supply and depuration systems, energy, etc.) are not significantly overcharged because of tourism demand.

However, on the cultural and socio-demographic side some threats can be identified, as for example those linked to the concentration of tourist demand on interesting sites, particularly on cultural heritage sites and old parts of the city.

In this sense, this threat is somehow related to the effects of conflict of uses and to strategies for setting up alternative touristic experiments.

Visitors' carrying capacity is important for cruise tourism and specifically for transit ports, as they let large numbers of visitors converge within the destination and its attractions for a very short period.

Pollution and other anthropogenic pressures affecting ecosystems

Taking into account that the Pilot Area is focused on cruise activity in the Port of Valencia and the City, the main environmental aspects to consider are:

- Air emissions:
 1. from ships (the most relevant are NOx, CO2, SO2, PM2.5/10)
 2. emissions from cruisers trips in the city.
- Waste generated on activities on board by passengers and crew (urban and similar, and dangerous waste) which could cause pollution in coastal and marine ecosystems
- Waste water (lack and grey water that comes from showers, sinks and activities on-board) and ballast water (needed for the balance of the ship)
- Noise (from cruise ships during berthing)
- Saturation problems in certain areas with tourist attraction.

In addition, the NUT3 region to which the Pilot Area belongs is already highly artificialized, with natural areas in fewer extent compared to artificial areas. Habitat loss is also very alarming. Bathing water quality at NUTS III region level is lower than in all the other Pilot Areas, mainly due to cruise and other vessels in the port and surrounding areas.

The Pilot Area has extremely high light pollution, in comparison with the other Pilot Areas.

ASSESSMENT ON THE TWO MOST RELEVANT ENABLING FACTORS

Governance

This Enabling Factor is very relevant since it is a cross cutting factor, especially when the powers over the topics addressed rely in several bodies and there is a wide range of stakeholders involved. In the Pilot Area of Valencia this is the case. From a spatial perspective, two different physical and administrative entities (port and municipality) share the waterfront, and from a thematic point of view, all the threats and even some of the other Enabling Factors fulfill the above-mentioned characteristics. (e.g. mobility and tourism planning and management, where different administrations and stakeholders involved play different roles).

On the other hand, although multilateral bodies have been set up, there is still margin for development in terms of tools implementation.

The existing tourism plans and policies for the area are:

- *Plan Nacional Integral de Turismo* (Integrated National Plan for Tourism) (National level)
- Region of Valencia Global Strategy for Tourism 2010 – 2020 (Regional level)
- Valencia tourist, towards 2020 (Local level)

The degree of stakeholder participation in the planning process can be judged as medium, since the experiences of participatory processes in coastal management have been rare and mostly of a local nature. However, there seems to be increasing interest in facilitating these processes of participation, incorporating the user in managing their own environment.

All three kinds (Land and sea coordination, Horizontal coordination and Vertical coordination) of coordination mechanisms for ICZM optimal functioning exist at the National level.

Transport and accessibility

Valencia Port is one of the renowned cruise ports in the Mediterranean. Due to its close vicinity to the Valencia city, this Pilot Area may provide very easy accessibility, well managed and sufficient transport infrastructure. The nearest airport providing access to this Pilot Area is the Valencia airport, only about 5 km away. Besides bus, public transport within the Valencia city includes tram and metro, which is unique among all other Pilot Areas. This Pilot Area also hosts marinas with the highest number of mooring capacities among all the Pilot Areas (more than 850 mooring capacities altogether), providing accessibility to nautical tourism and recreational boating activity.

On one hand, accessibility to Valencia as a tourist destination from abroad is a significant factor to be taken into account for the development of a cruise tourism destination, especially for a successful positioning as a home port. On the other hand, despite the tourism market in urban areas has little influence on public transport, accessibility and transport within the Pilot Area and its closest metropolitan hinterland can be considered as key for its co-evolution.

In this sense, in line with the threats and opportunities shared by Mediterranean port cities in the field of sustainable mobility, the set-up of particular tourism-oriented mobility strategies is able to favorably impact the quality of life in the city both for tourists and locals. The Interreg Med project SUMPORT is making progresses in this field. These particular mobility strategies could contribute to connect alternative points of interest with the waterfront and the downtown through new tourist trails, expanding and improving the tourism offer and benefiting other city areas as well as the day to day mobility for locals. In the case of Valencia some of these alternative points have been identified within the Interreg Med project Alter-Eco.

5.3 Discussion

As we have seen in this Chapter and more broadly in Chouli et al. (2017), each of the Pilot Areas has different priorities, which reflect the diversity of local contexts. The work performed by PA coordinators, who identified key priority fields for intervention, provides a solid basis for them to start with the planning of sustainable tourism for their area according to ICZM/MSP principles.

To start this process, an interesting approach is provided by the Drivers-Pressures-State-Impact-Responses (DPSIR) concept, for which the findings of this analysis stage would be particularly relevant. The DPSIR framework is an instrument (Figure 17), allowing the description of environmental issues by defining the relationships between anthropogenic activities and the environment. The general idea from DPSIR is that human activities (i.e. the drivers) exert pressures on particular parts of the natural environment, causing a change in its components and/or in its overall state. The process results in an environmental impact, which usually results in certain answers by society. The response can be of political, of socio-economic or of purely economic nature. Eventually, responses can modify the nature of the driving forces (thus mitigating or even enhancing the actual pressure) and/or compensate for the impact. Finally, the driving forces may also directly be altered by the impact.

This framework could then be useful in order to determine how the Threats and Enabling Factors identified in this section are interrelated, and how they interfere on each other on the local level.

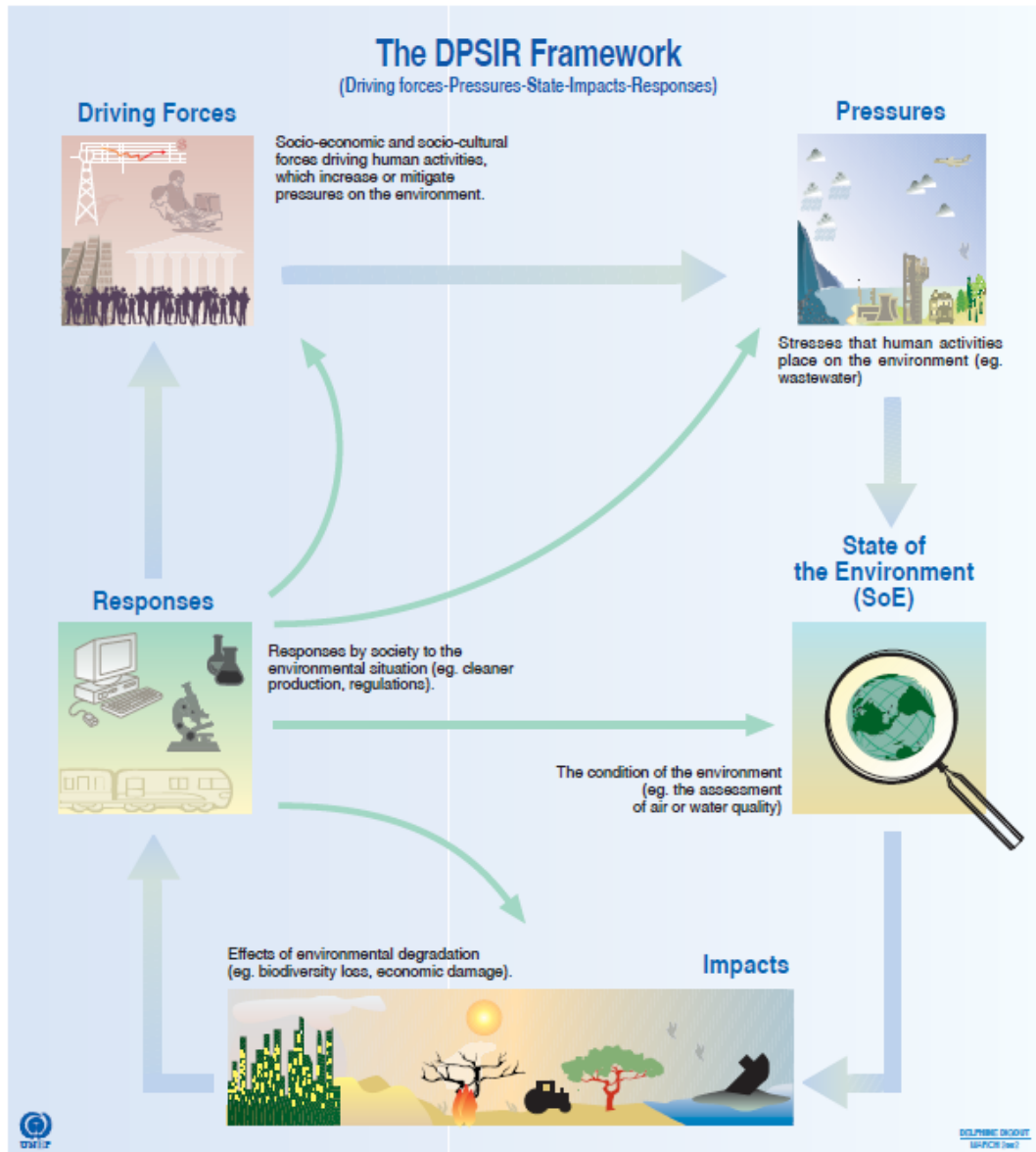


Figure 17: DPSIR framework for State of Environment Reporting (UNEP/GRID-Arendal 2002).

6. From Threats to Enabling Factors – Proposition for improvements

As pointed out in this synthesis, tourism is a promising activity in terms of economic prospects which however puts a lot of pressure on the natural, social and cultural environment of the destinations. The traditional type of mass tourism in the Mediterranean region which is mostly related to the „sun and beach” model cannot anymore be considered as an option for the entire Mediterranean Basin. Without a long-term vision for sustainable development, the Mediterranean Sea will not be able to sustain our economy and our well-being. In fact, not only tourism, but also the other sea-related activities are predicted to expand substantially over the next 15 years (Plan Bleu, 2016).

Even though they cannot be considered as “silver bullets”, the ICZM Protocol and MSP principles can be considered as major tools for the improvement of sustainability in tourism for it addresses all the crucial issues which the Mediterranean basin is facing. Consider tourism by their prism can also help adopting a holistic approach which is essential in order to balance the uses of the coastal zone, as well as to reduce the conflicts in between them. The contribution of the ICZM Protocol, as a tool for the entire Mediterranean region, to improve the sustainability of tourism is described in detail in the Co-Evolve’s deliverable 3.12. Regarding MSP, there is currently no legal instrument covering the entire Mediterranean Basin. In 2014, the European Union has adopted the MSP Directive which is presently being implemented through the elaboration of Marine Spatial Plans in the Member States. However, in December 2017, a Conceptual Framework for MSP (CFMSP) in the Mediterranean has been adopted by Contracting Parties to the Barcelona Convention, establishing common principles and contents for the Mediterranean Basin. Those principles were used to support recommendations in the framework of this study. Co-Evolve pilote areas being all located in European Member States, the relevant articles from the MSP Directive are mentioned as well.

This chapter has been divided in two main parts. In the first part, the approach adopted is top-down, starting from the main strategic documents and analyzing how they can contribute to the sustainability of tourism in the Mediterranean region, while it switches to a bottom-up approach in the second part, analysing how the main threats to sustainability of tourism identified in the chapter 3 can be grouped in main obstacles, and identifying orientations on how to overcome them based, when possible, on the three instruments.

1. Overarching ICZM and MSP principles for tourism’s governance improvement

In its Art. 9, par. 2d, the ICZM Protocol directly refers to coastal tourism and asks the Contracting Parties:

- “(i) to encourage sustainable coastal tourism that preserves coastal ecosystems, natural resources, cultural heritage and landscapes;*
- “(ii) to promote specific forms of coastal tourism, including cultural, rural and ecotourism, while respecting the traditions of local populations;*
- “(iii) to regulate or, where necessary, prohibit the practice of various sporting and recreational activities, including recreational fishing and shellfish extraction”.*

Based on the spirit and content of these three documents, as well on the results of the analysis performed in the studying phase of Co-Evolve, some overarching principles can be identified to support sustainable tourism planning:

- Strategic planning

There is a need of having strategic documents in order to ensure coherence in the approach to coastal and marine issues at the regional, national and local level (ICZM Protocol Art. 18, MSP Directive Art. 8). The ICZM Protocol calls for the elaboration of ICZM strategies and plans while the MSP Directive prones the elaboration of maritime spatial plans. In the same way, sustainable tourism requires national strategies and local plans focusing specifically on tourism and providing a direction for its development based on careful assessment (UNWTO, 2013). It is important when elaborating tourism strategies and plans to take adequately into account the ICZM and MSP strategies/plans.

Climate change puts the coast in danger, so that there is a need to take it into account when planning economic activities on land and at sea (ICZM Protocol Art. 22, MSP Directive Art. 5, par.2). The ICZM Protocol warns, inter alia, on the likely increase of the sea level, which could have major consequences on coastal ecosystems and on built environment. It recommends the implementation of adaptation measures in order to reduce its negative impacts. Art. 8 of the ICZM Protocol is laying down the establishment of a 100 metre setback zone in Mediterranean coastal areas. This setback zone is particularly relevant in the context of climate change, as the first hundred metres of the coastal zones are considered as pronouncedly vulnerable to its potential impacts. Coastal Mediterranean tourism destinations are increasingly threatened by the environmental disasters brought on by the quick onset of natural events induced by climate change such as floods or storm surges. The implementation of Art.8 is therefore of utmost importance in order to avoid having additionnal damages and costs.

Water resources will be particularly impacted by climate change and accent should be placed on preventing overuse of this resource when planning tourism development (Art. 5, par.1c). The fact that summer pics of tourism coincides with the periods were water resources are at the lowest level in the year and when there are the least precipitations should always be adequately taken into account.

- Coordination

Envisaging coastal tourism through an ICZM/MSP perspective will allow stakeholders to get a full picture of the stakes on the coast and in the sea, and to plan its development in a sustainable way. To do so, coordination among sectors and level of government as well as in between land of sea parts of the coastal zone (ICZM Protocol Art. 7, CFMSP Common Principle (CP) 4.3). An efficient coordination helps obtaining better information and comprehension, coherence and avoiding inappropriate policies, strategies, investments and activities that are incompatible and mutually inhibiting, distracting, overlapping or simply repeating each other (UNEP-MAP-PAP/RAC, GWP Med and UNESCO-IHP, 2015). The ICZM Protocol also insists on the importance to “achieve coherence between public and private initiatives”.

- Monitoring and data availability

Sound planning of economical activities on the coast and on the sea request to have access to good quality data on their environment, society and economic in order to enable decision makers to make the appropriate choices. The ICZM Protocol (Art.16) calls its Parties to prepare and regularly update national inventories covering information on resources and activities, as well as on institutions, legislation and planning that may have an influence on coastal zones. MSP Directive (Art 10) calls for its part “Member States [to] make use of the best available data and information by encouraging the relevant stakeholders to share information and by making use of existing instruments and tools for data collection”. Besides, The ICZM Protocole (Art. 16, par. 4) also insists on the necessity to “ensure public access to the information derived from monitoring and observation mechanisms and networks”.

- Participatory approach

Whether in the framework of ICZM/MSP planning or sustainable tourism planning, stakeholders should have the opportunity to participate to the exercise in order to guarantee the preservation of each one's interests (ICZM Protocol, Art. 14, MSP Directive Art.9). Besides, the presence of stakeholders at the local level may help taking adequately into account the specificities of coastal zone. When implementing a participatory process, stakeholder participation should be considered from the very beginning of the project, starting from concept development and planning, through implementation, to monitoring and evaluation of results. Early stakeholder engagement in decision-making is essential if participatory processes are to lead to high quality and long-lasting decisions (Reed, 2008).

- Environmental assessments

The ICZM Protocol and the MSP Directive insist on the necessity to plan economic activities taking into account their impact on the environment. The ICZM Protocol suggests the use of Environmental Impact Assessment (EIA) and Strategic Impact Assessment (SIA) to do so. EIA focuses on proposed physical developments such as highways, water resource projects or large-scale hotel resorts, while SEA focuses on proposed actions at a "higher" level such as new or amended laws, policies, programmes and plans. In many countries, EIA is the only tool of environmental assessment required by law, and whose results are publicly shared. As such, it is a precious source of information. Nevertheless, it is important that the legislation regarding EIA largely differs from one country to the other in the Mediterranean Basin.

This short list is of course not exhaustive as the documents in their entirety are aiming at the sustainable use of the coast. Though, in order to stay focused on Co-Evolve's target, i.e. to produce tourism-driven action plans based on the principles of ICZM/MSP, the second part of this chapter focuses more precisely on the transversal issues resulting from the analysis performed in Co-Evolve and provides more targeted recommendations.

2. Policy orientations and recommendations for sustainable tourism in the Mediterranean

The results of the studies elaborated by CO-EVOLVE partners in this studying phase allowed to identify five main obstacles to sustainable tourism which are cross cutting:

1. Country's/destination's overdependence on tourism as an economic activity;
2. Misbalance between destination's carrying capacity and demand volume;
3. Seasonal concentration of demand;
4. Overuse and pollution of (natural and cultural) resources by tourists and suppliers;
5. Illegal activities by tourism stakeholders (supply and demand).

Obstacle 1: Country's excessive orientation and over - dependence on tourism as an economic activity

Tourism primary task is to gain economic benefits to a destination, in terms of more employment, more money gained out of tourism consumption, higher GDP and standard of living for the whole community, more investments into different facilities and infrastructure, etc. However, despite its obvious benefits, it also causes direct costs such as: higher costs of living due to tourism generated growth of prices (of goods, real-estates, etc.), costs caused by the loss of other economic opportunities caused by tourism generated crowding-out effect, etc.), but also a number of indirect costs related to socio-cultural and environmental changes/damages in a destination.

Economic theory and practice have proved a number of times that orientation to only one industry or activity inevitably leads, in the long term to slow-down or, in case of sudden catastrophes or crises, to a break-down of national/local economy.

The more country is dependent on tourism, the more vulnerable is to any sudden problem that hits international tourism. In 2016, Malta's share of tourism in total GDP was estimated of 26,7% , , Cyprus' was 26,4% , Croatia's share was 24,7% , while in Spain it was around 14,6 % , in Italy 11,1% and in France - 8,9% . It is important to stress that these numbers relate to total, direct and indirect impacts of tourism on the GDP which make them significantly higher than if only direct impacts of the main tourism activities is taken into account. It should also be taken into account that data on tourism share in GDP formation may also differ with regard to different sources of information. However these numbers are indicative and imply some countries excessive orientation to tourism.

Such a "mono-cultural" orientation leading to a country's overdependence on just one activity (sector) has many causes but their elaboration is not an issue in this project. However, it is important to explain that such an orientation causes some direct repercussions, which ultimately lead towards specific behaviour of tourism supply and demand stakeholders (Figure 18).

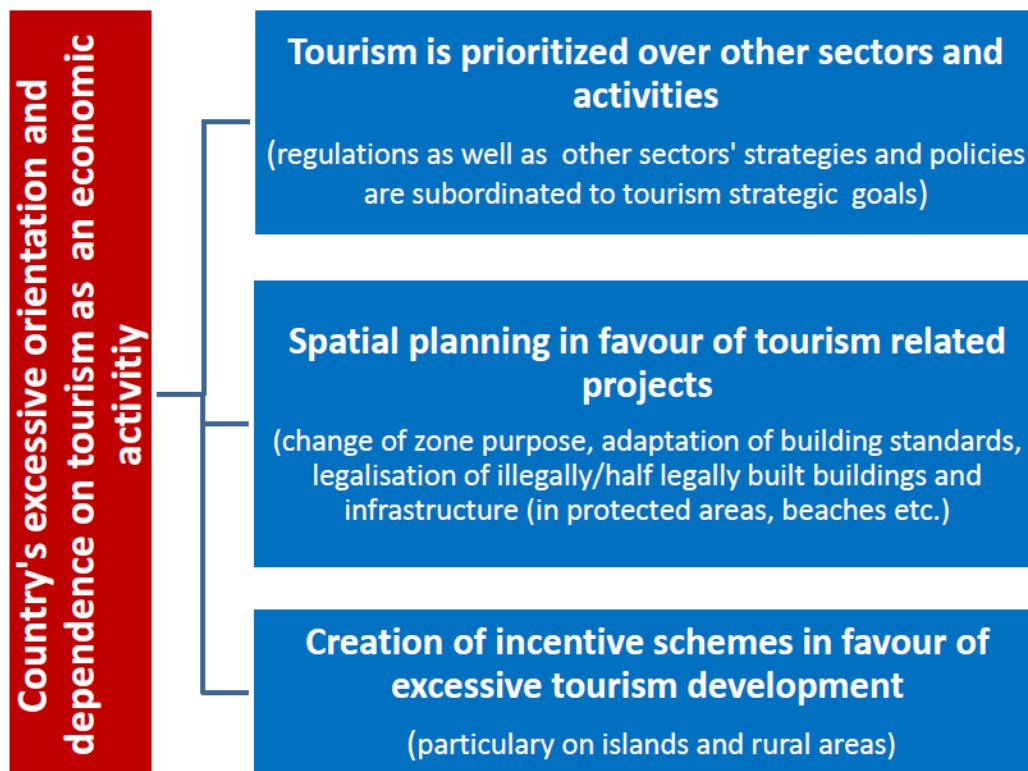


Figure 18 - Direct repercussions of a country's excessive dependence on tourism as an economic activity

All the three of above numbered repercussions may ultimately lead to a number of negative impacts in socio-cultural, economic and environmental spheres as it is very clearly illustrated in chapter 3. Keeping in mind that this obstacle results from a poor national level governance, it is obvious that an effort has to be made at this level.

For that purpose a few strategic directions aimed to national level governance may be proposed:

1. National governments should take care that not any single activity/industry is so dominant in the national economy that it endangers other possible solutions; to this end national development strategies (master plans) should be developed with the clear orientation on sectors/activities/scenarios by which its strategic goals will be realized (not just by tourism) (ICZM Protocol, Art. 18; MSP Directive, par. 19);
2. National legislation, related to sectoral as well as spatial planning laws and bylaws, must not support tourism development to such an extent that other industries are threatened and their stakeholders endangered.
3. National governments should, by more strict laws and consequently by policy measures shape behaviour of tourism stakeholders (both suppliers and visitors) to act in a more responsible way. To this end national legislation should:
 - a. protect more efficiently public goods used in tourism industry (more effective resource management tools, more rigorous penalties to those who act improperly, as well as more supports to those who adopt and promote good practices, more efficient monitoring, etc.) (ICZM protocol: Art. 8; par. 3 ; Art. 9, par. 1);
 - b. make public goods management more transparent and participative (ICZM Protocol: Art. 14; par. 1- 3; MSP Directive Art. 9);
 - c. protect the right of public to have free access to open spaces, beaches and other alike goods (ICZM protocol: Art. 8; par. 3. c)
4. Special care should be took about islands and the impacts tourism industry generates there; national governments may designate islands as areas with special treatment and specific set of policy measures should be introduced aiming at keeping island tourism sustainable (within limits of its carrying capacities) and responsible (ICZM protocol: Art. 12).
5. It would be useful if the governments of the Mediterranean countries should agree upon the use of certain general economic instruments (taxes, fees, etc.) related to tourism industry regulation (ICZM protocol: Art. 21).
6. Governments should carefully plan macroeconomic policy measures, i.e. incentive schemes (such as those related to taxes, subsidies, employment, etc.) aimed at enhancing and fostering tourism development, in particular those aimed at building of accommodation facilities and certain types of tourism infrastructure, such as nautical ports) with clear intention of keeping supply and consequently demand within acceptable limits (ICZM protocol: Art. 21; Art. 9, par. 1 e).
7. National governments should be more eager to promote at all levels the need for more responsible tourism development and to support such tourism types and models of development that are more oriented to quality than quantity, despite the pressures of different tourism industry lobbies. (ICZM protocol: Art.9; par. 2 d);
8. National governments should promote and support creation of locally embedded supply chains (especially important is to include local food producers) with the purpose of achieving more socially sustainable development model of tourism;
9. Governments should prevent creation of multiple agencies, institutes, committees, and such like, charged with developing and overseeing strategies and programmes in different areas, often with overlapping, competing and multiple mandates, thus causing difficulties to local communities that are usually understaffed and underfinanced to choose the right strategic direction and properly implement measures proposed (ICZM protocol: Art. 7; par. 1).

Obstacle 2: Misbalance between destinations's carrying capacities and demand volume

It is a very common situation that visitors are considered to have their share of responsibility in morphological changes of the coastal area, in excessive use and pollution of resources, in crowds and congestions, and other problems related to the use of space. However, the truth is that destination's authorities and existing legislation are the ones "to blame" for non-compliance of demand volumes (and demand behaviour) with carrying capacities of a destination. In this sense government authorities should act on a strategic and operational level so as to overcome this threat by creating proper strategic documentation (plans, programmes, etc.) and operational measures aimed at regulation of the tourism operators' behaviour.

Strategic level directions:

- On a national governance level:
 1. National level governments should introduce legal obligation for local destinations to implement Carrying Capacity Assessment in their tourism development and spatial strategies and plans to avoid exceeding destination's spatial capacities in a due time.
 2. National laws related to tourism, environmental protection, planning and many other sectoral laws dealing with management of different assets (such as water, soil, woods, heritage, etc.) must be compliant not only horizontally but also with all the relevant EU declarations, charters and protocols such as the ICZM Protocol (Art. 6 – General principles of ICZM; par. e) and MSP Directive.
- On a destination governance level
 1. Tourism (coastal) destinations, i.e. their Destination Management Organisations (DMOs) must establish long-term strategic planning processes to guide management, development and marketing of tourism with respect to a destination's carrying capacities, for the purpose of achieving its overall sustainability (ICZM protocol, Art. 18).

To this end they have to implement a number of operational measures (aligned to ICZM protocol, dominantly with Art. 7; 9-par.2 d; Art. 14; Art.15; Art.16; Art 18, par. 3, 4; Art 20; Art.25 and MSP Directive par. 19 and 21) being as follows :

- 1.1. Develop strategic and operational plans to guide the development, management and marketing of tourism;
- 1.2. Based on an analysis of the existing situation define appropriate indicators related to a tourist destination carrying capacities (physical/infrastructural, environmental, social and economic ones);
- 1.3. Define and implement proper visitor management tools (economic, managerial, institutional and technological) with respect to carrying capacities;
- 1.4. Integrate with local, regional and state government plans and policies, e.g. natural resource management, town and land use, social, cultural and economic development, infrastructure and risk management plans;
- 1.5. Seek the support of local community champions or visionary leaders that have technical, communication and facilitation skills, are well respected by the community, and that can effectively tap into local networks to lead the strategic planning process;

- 1.6. Engage experienced tourism consultants if tourism planning expertise is lacking at a destination level;
- 1.7. Seek the support of governments (local, regional and state), industry (business groups) and community stakeholder organisations;
- 1.8. Establish effective consultation processes to engage and consult with interested stakeholders;
- 1.9. Engage the community in all stages of the planning process to ensure community ownership of tourism plan;
- 1.10. Establish and communicate a shared vision for tourism amongst all stakeholders;
- 1.11. Undertake and utilise research to inform decision-making;
- 1.12. Undertake an assessment of the current and future market situation;
- 1.13. Develop proper marketing strategies to create tourism products adjusted to destination's overall carrying capacities and promotional plan to attract acceptable tourism niches (eco tourism and other small scale types of offer).

Obstacle 3: Seasonal concentration of demand

Seasonality in tourism is as old as tourism itself. It is a result of a number of factors from both demand side as well as from supply side. Namely, if looked at the demand side, most of the journeys are conditional on the employee's annual leave and/or school breaks. From the supply side, one of the main causes of seasonal peaks is related to climate conditions, be it related with bathing or skiing season. With regard to this, local operators adjust their offer.

It is unlikely that two basic causes of seasonality will be changed in a short term, which means that local DMOs have to employ other strategies and measures to reduce impacts of seasonality, especially those related to coastal, bathing or "sun-sea-sand" type of tourism.

To this end DMO should employ marketing strategies and measures, such as:

1. Develop strategic marketing plan in consultation with local stakeholders to assess their views and preferences (government, business and community) to determine a vision and direction for destination marketing;
2. Undertake a regular tourism product audit process to monitor product offerings and to identify opportunities for new product development, that might extend the season i.e. attract new, diversified tourist niches (ICZM Protocol Art.9 par. 2, dii);
3. Regularly survey potential and current visitors to determine views about existing products and experiences, to identify new opportunities and to ensure that product development matches needs and expectations of visitors;
4. Develop a diverse range of appropriate visitor activities to complement their iconic attractions including: a range of accommodation types to suit different visitor markets, high quality food and beverage experiences, cultural and heritage experiences, festivals and special events, nature-based experiences, and recreational and leisure activities;
5. Support and encourage entrepreneurs to establish innovative visitor experiences that complement community and environmental values and extend season;
6. Maintain a good and consistent standard of product that meets or exceeds the expectation of guests.

Obstacle 4: Over-use and pollution of (natural and cultural) resources by tourists and tourism operators

There is a wide range of resources used by tourism operators in the coastal areas to satisfy tourist needs. In the economic theory resources are usually divided into: natural resources, labour and capital, by which enterprises produce different goods and services. In tourism industry labour and capital are also common production resources, but when it comes to natural (as well as cultural) resources, they are not considered to be just “raw material” but more as goods having ability to attract visitors and satisfy their needs after more or less comprehensive adjustments.

Natural and cultural resources are considered to be the main attractions and sources of destination's comparative advantages. However if not properly used (which may cause their degradation and/or loss), destination may lose its market position. Problems that may arise out of improper use of resources in tourism are, among others, morphological changes on the coastal landscape and beaches, sea, water and air pollution, litter and waste production, loss and/or change of biodiversity, damages on heritage etc.

Strategies and policies to overcome this obstacle and its related impacts are numerous, but the easiest way to present them is with regard to a specific type of a resource/asset. However it has to be kept in mind that strategies may be created on both, national as well as local level, while practical, operational measures are usually brought and implemented by local authorities. As for the responsible actors who implement these measures, they are on the first place public authorities and local DMOs but also other stakeholders from tourism and other sectors who share the same resources.

As for the national government level, strategies have to be aligned with all the important EU directives, conventions, strategies and protocols, those issue oriented (such as on water quality) as well as those which have embraced a wider vision of the preservation and sustainable management of coastal systems (such as the Habitats Directive, the Water Framework Directive, the Environmental Impact Assessment Directive, the European Parliament and the Council recommendation concerning the implementation of Integrated Coastal Zone Management in Europe, and the Marine Strategy Framework Directive). Besides of relevance is also the EU Integrated Maritime Policy.

The Integrated Maritime Policy seeks to provide a more coherent approach to maritime issues, with increased coordination between different policy areas. It focuses on issues that do not fall under a single sector-based policy e.g. "blue growth" (economic growth based on different maritime sectors). The strategy consists of three components:

- Develop sectors that have a high potential for sustainable jobs and growth, such as: aquaculture, coastal tourism, marine biotechnology, ocean energy, seabed mining.
- Essential components to provide knowledge, legal certainty and security in the blue economy;
- Sea basin strategies to ensure tailor-made measures and to foster cooperation between countries.

Within first component special care is focused on coastal tourism and the need for its sustainable development. The European Commission has proposed several strategic directions aimed at member state governments among which following two refer to resources management:

1. Promote ecotourism and encourage linking to other sustainability actions.
2. Promote strategies on waste prevention, management and marine litter to support sustainable coastal and maritime tourism.

EU Communication on Tourism (COM(2010) 352/99 and COM(2014)86 for coastal and maritime tourism stress the need for sustainability enhancement within tourism, and suggests the responsible use of natural resources, accounting for the environmental impact of activities (e.g. production of waste, pressure on water, land and biodiversity) and using 'clean' energy.

1. For the purpose of protecting basic resources used by tourism industry at the local level, i.e. the coastal destination level, where different types of tourism are being developed, local DMOs together with local authorities must act strategically (ICZM Art.14, 15) leaning on the above mentioned (and other) EU and national level strategies. To this end they have to:
2. Work cooperatively with relevant stakeholder groups and higher level government authorities to enhance and preserve all relevant resources/attractions (ICZM Protocol Art.14, MSP Directive Art.9);
3. Require effective environmental management practices for tourism developments;
4. Cooperate in integrating planning for the preservation of natural, heritage, built, social and cultural resources in strategic tourism planning processes and other relevant local government plans and strategies (ICZM Protocol Art.18; par.3)
5. Work with natural resource management and environmental agencies to assess and plan for visitor impacts;
6. Provide the freedom of access by the public to the sea and beaches (ICZM protocol: Art. 8; par. 3);
7. Investigate accreditation models that encourage and improve environmental performance and efficiency of tourism businesses;
8. Develop Renewable Energy Schemes;
9. Establish an environmental management framework that defines sustainability indicators to monitor environmental impacts (natural, social and economic) (ICZM Protocol Art. 18, par.4);
10. Cooperate in planning for the sustainable management systems of natural resources (e.g. sewage, marine litter and water management);
11. Support and encourage tourism operators to embrace the concept of Corporate Social Responsibility and to achieve environmental accreditation. (ICZM Protocol Art 15.; par.1-3);
12. Develop incentive schemes for improving environmental performance and efficiency of tourism businesses (ICZM Protocol Art. 21);
13. Increase understanding of marine and coastal environments, their natural processes, the impact that tourism and other human activities have upon them, how to minimise those that have an adverse effect and improve the quality of decision-making. (ICZM Protocol Art 15; par.1-3);
14. Promote and encourage sensitive use of natural resources to ensure long-term environmental, social and economic benefits. (ICZM Protocol Art. 15; par.1-3, MSP Directive Art. 5);
15. Work with schools to generate greater understanding of the value of marine and coastal environment (ICZM Protocol Art. 15; par.1-3);
16. Promote codes of good practice among all groups of stakeholders (operators, NGOs, visitors, community members) (ICZM Protocol Art. 9, par.1f).

As for the operational measures, they are elaborated by specific resources/assets or activities.

With regard to the beaches/coastal erosion protection operational measures (ICZM protocol, Art. 8), they are usually not developed by tourism authorities and operators alone as they are not the sole users of the beach/coastal assets.

Measures regarding coastal erosion

Being mostly public goods, they require participation of local authorities, other sectors and experts in coastal zone management, who should:

1. Develop coastal management plan (with regard to the local specifics) aiming to address coastal erosion with techniques and measures elaborated in detail (ICZM Protocol Art. 23, par.2);
2. Develop beach management plan with regard to tourism industry and community needs and requirements; select a solution which fits the type of coastline/beach and which fulfils goals set by the tourism and other stakeholders and the authorities;
3. Regulate or where necessary prohibit the practice of various sporting and recreational activities (such as jet skiing, or jeep driving) (ICZM Protocol Art. 9, par.2 d, III, MSP Directive par. 13);
4. Enhance the aesthetic appearance, e.g. by minimising the number of structures; allow only projects which deal with an entire management unit cell and which have maximum shore protection (ICZM Protocol Art. 23, par. 2);
5. Secure good bathing water quality and minimise the risk of trapping debris and seaweed (ICZM Protocol Art. 23, par. 1);
6. Secure safety for swimmers by avoiding structures generating dangerous rip currents.

As with regard to operational measures regarding water, tourism authorities and operators are not responsible for the creation of specific measures for water management on a local level but are responsible for the implementation of basic measures such as:

Measures regarding water

1. Develop master plans and response plans: e.g., water supply planning (in drought susceptible destinations), risk assessment and preparedness strategies, and implementation of early warning systems (e.g., flooding);
2. Install urban wastewater treatment plants;
3. Improve necessary infrastructure (e.g., rainwater collectors);
4. Monitor quality of water on a regular basis;
5. Enhance recycling measures (e.g. use of treated water in hotels for irrigation);
6. Reduce inputs of nutrients and hazardous chemicals and materials from boat-based sources to improve the water quality of marine and coastal waters;
7. Examine ways to encourage use of reception facilities in ports, harbours and marinas for pumping out and for litter in order to discourage recreational water craft from emptying their waste into the sea;

8. Take necessary measures to establish adequate urban sewer, wastewater treatment plants to prevent run-off and riverine inputs;
9. Educate tourism operators and tourists (as well as other stakeholders) to use water responsibly;
10. Develop incentive schemes for responsible water use;
11. Help accommodation (and other) facilities to implement environmental accreditation schemes.

Since air is a specific common/public good, strategies and policies aimed at reducing its pollution are mostly defined at the international level (based on a number of international protocols and directives) and countries are obliged to act accordingly.

Measures regarding air pollution

1. Act to reduce fuel use through improved operations and air traffic management;
2. Enhance researches on the use of alternative fuels and engine's efficiency;
3. Reduce energy use (i.e., energy conservation);
4. Improve energy efficiency: this refers to the use of new and innovative technology to decrease energy demand;
5. Increase of the use of renewable or carbon neutral energy: substituting fossil fuels with energy sources that are not finite and cause lower emissions, such as biomass, hydro-, wind-, and solar energy
6. Implement mitigation measures including technological improvements, environmental management, economic measures, and behavioural change.
7. Reduce cruising speed of vessels (slow steaming) as well as switching to cleaner fuels (this should be internationally accepted measure to reduce air emissions from cruise vessels.
8. Enhance "polluter pays" principle by introducing a number of economic and other tools (taxes, charges, voluntary schemes, etc.)

Cultural heritage being one of the most important assets for tourism development is usually very sensitive to demand driven threats and therefore has to be carefully used and managed (ICZM Protocol Art. 13, par 1-3, MSP Directive Art.8 par. 2). To this end a set of strategic directions at a local level is suggested so as to keep them preserved and to enhance their value for tourism.

Measures regarding cultural heritage

1. Prevent destruction of sites and dispersal of artefacts by denying permits to exploiters seeking private financial gain;
2. Create inventories of the sites;
3. Reconstruct and stabilize historic assets (such as architecturally rich buildings and archaeological sites) using a combination of traditional materials and skills (to preserve their historic aesthetics and attraction), and modern engineering techniques to enhance their longevity;

4. Protect and interpret sites in situ whenever possible; interpret sites properly keeping in mind that they represent a part of larger historical (coastal) landscape (ICZM Protocol Art. 11, par 1).
5. Excavate sites only when there are scientific objectives or interests for public enjoyment, adequate funding, professional staff, and provisions for documentation, conservation, curation, reporting and publication;
6. Build proper infrastructure to make sites accessible to public;
7. Be sure that all the necessary infrastructure is environmentally friendly;
8. Whilst many coastal heritage assets are identified and known, knowledge of marine sites is limited; to this aim put an effort to make information about underwater archaeological sites public;
9. Engage tourists and local diving community in building up the knowledge base of the underwater cultural heritage where possible;
10. Educate tourism stakeholders and a local community on the value of historical assets and opportunities to make economic benefits based on their valorisation.
11. Introduce proper visitor management tools (if necessary even the measures for limiting or prohibiting access on a temporary or permanent basis).

Marine habitats preservation strategies and measures are, amongst other things, of utmost importance for tourism destinations' attractiveness. Based on these assets different tourism activities and products have been developed such as snorkelling, scuba diving, submarine sightseeing, etc. With this regard and based on the Birds and Habitat Directive, ICZM Protocol, Art. 10, par. 2 as well as on Marine Strategy Framework Directive, operational measures can be suggested to keep marine habitats in a good status.

Measures regarding marine habitat preservation

1. Develop a Marine Biodiversity Action Plan with targets for marine and coastal habitats and species;
2. Reduce the impact of fishing activities on non-target species and habitats by introducing fishing management techniques and technical measures that are more selective and/or are less damaging to the seabed;
3. Identify the highest and most potentially impacting species that are easy to identify and should be subjected to more attentive monitoring and surveillance;
4. Promote better access to information about invasive alien species, especially for interested groups such as diving clubs or recreational boats using new social media and new technologies;
5. Prepare educational materials for general public and key selective groups such as tourists and implement communication campaigns to increase their participation and minimize the introduction and spreading of invasive species;
6. Coordinate with partners a centralised long term database for mapping and reporting invasive that includes distribution maps in Marine Protected Areas as well as information through other sources on invasive distribution;
7. Once the species are identified, develop programmed activities with stakeholders that could address vectors and pathways of introduction.

Strategies and measures aimed at waste and marine litter prevention may also be developed on a national as well as at local level. As for the national level, some strategic directions may be offered.

Measures related with waste and marine litter prevention

1. Explore and implement prevention measures related to producer responsibility strategy by making the producers, manufacturer brand owners and first importers responsible for the entire life-cycle of the product with measures prioritizing the hierarchy of waste management in order to encourage companies to design products for reuse, recycling and materials;
2. Explore and implement to the extent possible prevention measures related to sustainable procurement policies contributing to the promotion of the consumption of recycled plastic-made products;
3. Explore and implement to the extent possible prevention measures related to establishment of voluntary agreements with retailers and supermarkets to set an objective of reduction of plastic bags consumption and/or establishment of plastic bag taxes;
4. Implement to the extent possible prevention measures related to establishment of mandatory deposits, return and restoration system for expandable polystyrene boxes in the fishing sector

At a local level following operational measures may be suggested:

1. Invite stakeholders to participate in a voluntary scheme to help reduce marine litter through both collection and helping to change attitudes;
2. Improve solid waste management;
3. Implement adequate waste reducing/reusing/ recycling measures in all tourism and other stakeholders in order to reduce the fraction of plastic packaging waste that goes to landfill or incineration ;
4. Enhance public awareness and education (ICZM Protocol Art.15);
8. Take necessary measures to establish adequate waste management systems (ICZM Protocol, Art.9.1.c);
9. Take necessary measures to close the existing illegal dump sites in the geographical area.

Obstacle 5: Illegal activities by tourism stakeholders (supply and demand)

Despite the fact that institutional and regulatory framework for the coastal management seem to be adequately developed, there are still quite a lot of situations when tourism stakeholders, from both, demand side as well as from supply side, act illegally, i.e. against the existing rules/laws. Such acts may be registered in everyday activities of tourists who, depending on the type of tourism activity they perform (trekking, hunting, diving, yachting, etc.) may act improperly or against the law, causing many direct and indirect impacts:

- Pick up flowers and/or collect insects or corals and other sea animals and plants (including protected species);
- Fish or hunt without permissions;
- Drop the boat anchor in a prohibited area (outside official marinas or ports);
- Collect land and underwater archaeological artefacts with no permissions;

- Set the fire for barbecue when and where not allowed, etc.

Apart from such activities performed by tourists, more dangerous are activities performed by tourism operators, among which especially problematic are:

- Illegal (or half legal) building of houses and apartments aimed at tourist accommodation;
- Illegal (or half legal) building of infrastructural facilities such as concrete beach plateaus, ports, beaches, etc.;
- Illegal discharge of solid and liquid waste by cruisers, etc.

From the economic theory point of view above activities may be defined as negative externalities. Externality is the cost or benefit that affects a party who did not choose to incur that cost or benefit.

To avoid externalities, both negative as well as positive, governments have to adopt policies that "internalize" an externality, so that costs and benefits will affect mainly parties who choose to incur them. They are aimed mostly at implementation of economic instruments such as taxes and /or charges (for negative externalities punishment) (ICZM Protocol Art. 21).

However, apart from economic instruments (which belong to the national level strategic measures, shaped by strict regulations), it would be also useful to implement following measures at the local level:

- Enhancement of monitoring and observation mechanisms and networks (ICZM Protocol Art. 16)
- Awareness-raising and education of tourism and other stakeholders on the necessity to act on a responsible and sustainable way in performing their economic and /or recreational activities (ICZM Protocol Art.15)

7. References

CO-EVOLVE DELIVERABLES

Activity 3.2

Rizzetto F. and Vacca C., 2017a. Coastal morphodynamics in Mediterranean touristic areas under climate change conditions. Deliverable 3.2.1

Rizzetto F. and Vacca C., 2017b. Mapping of coastal morphodynamics descriptors in Mediterranean touristic areas. Deliverable 3.2.2

Activity 3.3

Coccossis H., Stavridou K. and Koutsopoulou A., 2017. State of the Art. Deliverable 3.3.1

Activity 3.4

Coccossis H. and Koutsopoulou A., 2017a. Thematic Data Collection. Deliverable 3.4.1

Coccossis H. and Koutsopoulou A., 2017b. Review and analysis of carrying capacity approaches. Deliverable 3.4.2

Activity 3.5

Drius M., Bongiorno L. and Pugnetti A., 2017a. Review on the current status of coastal ecosystem services. Deliverable 3.5.1

Drius M., Bongiorno L. and Pugnetti A., 2017b. Ecosystem threats from tourism and future trends. Effects of ecosystem quality. Deliverables 3.5.2-3.5.3

Drius M., Bongiorno L. and Pugnetti A., 2017c. Atlas of Maps of ecological risks related to main tourism typologies. Deliverable 3.5.4

Activity 3.6

Coccossis H. and Koutsopoulou A., 2017c. State of the Art. Deliverable 3.6.1

Coccossis H. and Koutsopoulou A., 2017d. Comparative Analysis. Deliverable 3.6.2

Activity 3.8

Carniel S., Gaeta M.G. and Bonaldo D., 2017a. Review and analysis of coastal protection planning and management in touristic areas. Deliverable 3.8.1

Carniel S., Bonaldo D. and Gaeta M.G., 2017. Thematic Atlas of coastal protection plans and measures in Mediterranean touristic area. Deliverable 3.8.2

Carniel S., Gaeta M.G. and Bonaldo D., 2017b. Guidelines and recommendations for coastal protection strategies and management options. Deliverable 3.8.3

Activity 3.9

Drius M., Campanaro A., Bongiorno L. and Pugnetti A., 2017. Analysis on existing strategies and measures facing relevant threats to ecosystems. Deliverable 3.9.1

Bongiorno L., Drius M., and Pugnetti A., 2017. Key pressures and tools to estimate their cumulative impacts and support decision-making. Tradeoffs in ecosystem protection and tourism sustainability. Deliverables 3.9.2-3.9.3.

Campanaro A., Drius M., Bongiorno L. and Pugnetti A., 2017. Guidelines to involve tourists in citizen Science activities. Deliverable 3.9.4

Activity 3.10

Kennou H., Miquel S., Burak S., Margat J., and Dubreuil C., 2017. Water resources management and tourism in the Mediterranean. Synthesis. Deliverable 3.10.1

Activity 3.11

Sakib N., Musco F., and Gissi E., 2017. State of the art and future development of Transport and Accessibility at Mediterranean Scale. Deliverable 3.11.1

Sakib N., Maragno D., Innocenti A., Magni F., Musco F., Appiotti F., and Gissi E., 2017a. Database of transport and accessibility at Mediterranean scale. Deliverable 3.11.2

Sakib N., Maragno D., Innocenti A., Magni F., Musco F., Appiotti F., and Gissi E., 2017b. Mapping of transport and accessibility at Mediterranean scale. Deliverable 3.11.3

Activity 3.12

Evers V., Petric L. and Prem M., 2017. Enabling factor – Governance: Legal, administrative and financial resources and mechanisms – All specified by the ICZM Protocol. Deliverable 3.12.1

Activities 3.14-3.15

Chouli E., Aftias M., and Chamitidou M., 2017. From General to Local - Adapting Threats' Analysis to Pilot Areas & Evaluating co-evolution threats at Pilot Areas. From General to Local – Identifying enabling factors at focus areas & Evaluating enabling factors at Pilot Areas. Deliverables 3.14.1-3.15.1

Activity 3.16

Coccossis H. and Koutsopoulou A., 2017e. Building a common approach in tourism sustainability evaluation. Deliverable 3.16.1

Coccossis H. and Koutsopoulou A., 2017f. Tourism Sustainability Toolkit. Deliverable 3.16.2

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