



**Co-Evolve4BG**

# Cultural and Natural Heritage sites

- Mediterranean Scale -



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## OVERVIEW

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# Abstract

The growth of tourism in the Mediterranean, especially in coastal areas, and the effects of climate change will continue to affect landscapes. Tunisia, Italy, Greece, Spain, and Lebanon which are located on the Mediterranean coast are directly affected by this phenomenon.

This report aims to analyze and promote the co-evolution of human activities and natural ecosystems in tourist sites and present some archaeological sites that are put under pressure by soil stability and coastal erosion, in order to formulate an effective strategy to protect them and their value and to allow them to become tourist destinations. A comparison them with the rest of the Mediterranean is also provided.



# I. Introduction

On the eastern shore of the Mediterranean, countries like Greece, Tunisia, Lebanon, Italy and Spain are considered distinguished countries, historically and archaeologically, as archaeological evidence has shown that their history dates back to prehistoric times. These archaeological and historical heritages must be protected to ensure its survival for future generations.. Mediterranean countries (Greece, Tunisia, Lebanon, Italy and Spain) focus on the protection of archaeological and cultural sites in order to minimize threats and risks to heritage sites.

In the wake of the disaster and devastation, the urgency of protecting heritage and natural sites that represent symbols of all humanity has become apparent. In response to the realization that cultural and natural heritage is increasingly threatened by social and economic activities and natural disasters, the General Conference of the United Nations Educational, Scientific and Cultural Organization (UNESCO) adopted the World Heritage Convention in 1972. Given the “outstanding universal value” of these properties, and the impoverishment of the world as a result of their disappearance, it is practically incumbent upon “the international community as a whole to engage in heritage preservation” (UNESCO, 2009).

While protecting “special” properties and sites, World Heritage aims to bring these sites to people, especially tourists. Cultural and natural heritage enhancement strategies are then developed to attract tourists to the areas where these sites are located. For some communities whose particular properties or places are recognized by UNESCO, inscription on the World Heritage List is an opportunity to attract more tourists to their territories. Given that World Heritage is supposed to protect these particular properties or sites in the first place, it is questionable to what extent these sites can be enhanced without endangering them. Indeed, while the objectives of protecting World Heritage properties and sites appear to be in line with sustainable development, tourism promotion developed on the basis of the exceptional character of the protected properties and sites could affect the protection of this World Heritage. Attracting a large number of tourists can generate tourist revenues, but it can also destabilize the local population and weaken the integrity of these sites.

## **II. State and trends**

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Of the 49 sites, located along the Mediterranean, and classified as World Heritage Sites by UNESCO (Reimann, et al., 2018), 37 would be engulfed today in the case of a major flood (a flood that occurs every 100 years) and 42 are already suffering the effects of coastal erosion. Among these threatened sites are the medieval city of Rhodes, Venice and its lagoon, the Kasbah of Algiers, Syracuse and the rocky necropolis of Pantalica or the archaeological sites of Pompeii (Giannakopoulos, et al., 2022).

But it could be much worse in the future. The researchers simulated the rise in water levels in the Mediterranean basin by 2100. In the worst case scenario, where the maximum flood height would increase by 1.5 meters and the exposed surface area by 24%, the risk of flooding would increase by 50% and the risk of erosion by 13% in the entire region. Only two sites would then be spared by both phenomena (the Medina of Tunis and the ancient sanctuary of Leto, in Turkey).

Concerning floods, the sites most at risk are Venice and its lagoon, the renaissance city of Ferrara and its Po delta, as well as the patriarchal basilica of Aquileia in Italy. Located on the Adriatic Sea, where the rise in water level is particularly important, they are also subject to more frequent storms, thus increasing the risk of being invaded by the sea.

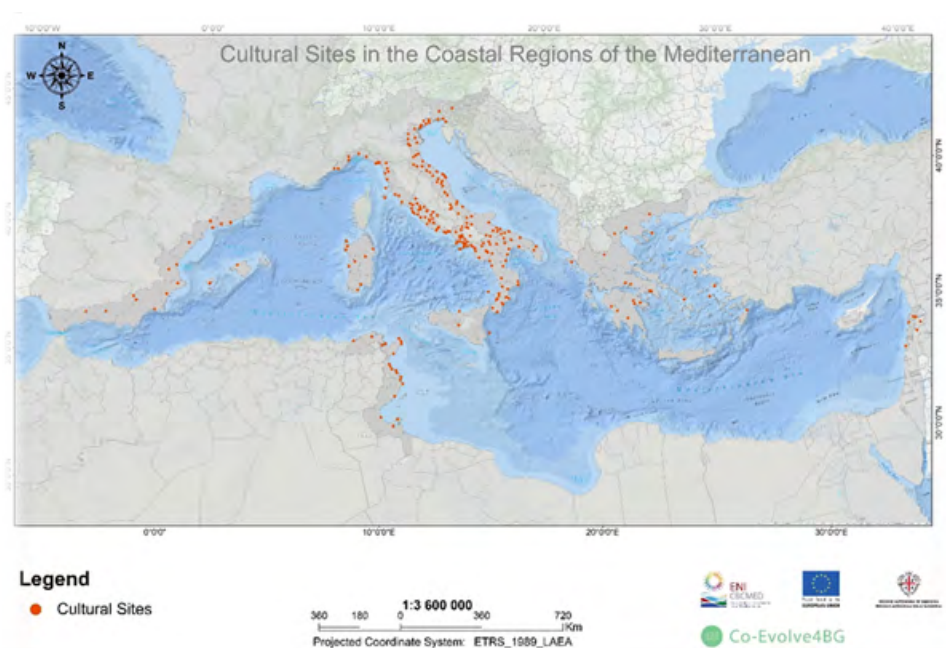


Figure 1. Cultural sites in the coastal regions of the Mediterranean.

An archaeological site is a place (or a set of places) in which are preserved testimonies of past human activities (prehistoric or historical, or even contemporary) in the form of archaeological artifacts ([Echo-Hawk, R.C., 2000](#)), corresponding to the set of structures and objects or materials produced by man in the past times the traces have been buried. In the Mediterranean Sea, there are 5 countries that concern us their archaeological sites as Greece, Tunisia, Lebanon, Italy and Spain. According to this map and the graph represented in the figures above, we notice that Italy is the country that has the greatest number of cultural sites following the distribution on the map but also on the graph, in fact, Spain and Greece have a somewhat similar effect on the graph and on the map on the number of cultural sites following the record of Italy. Finally, Lebanon and Tunisia are the countries that have the smallest number of archaeological sites according to a readable and analytical visualization of the map and the graph presented under figure (Figures 1,2).

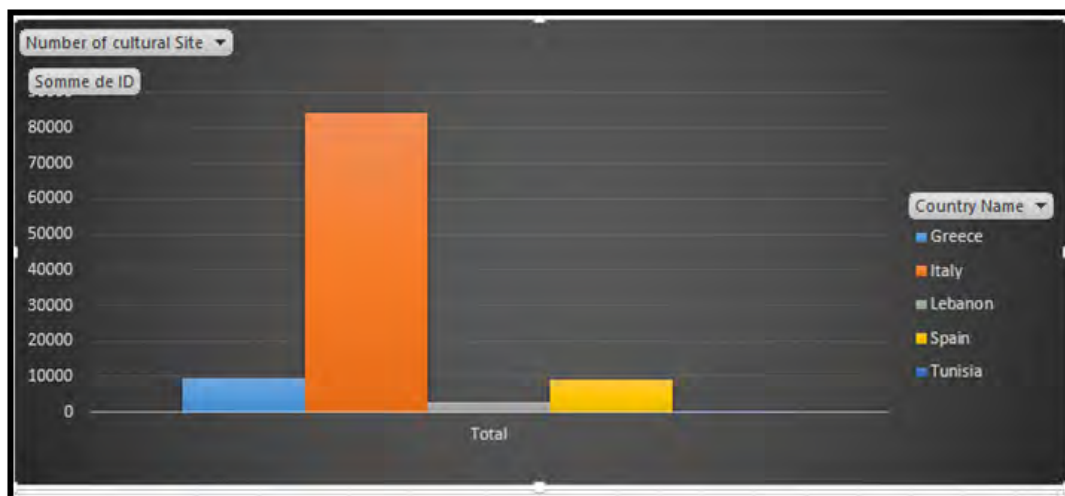


Figure 2. Graph of number of cultural sites

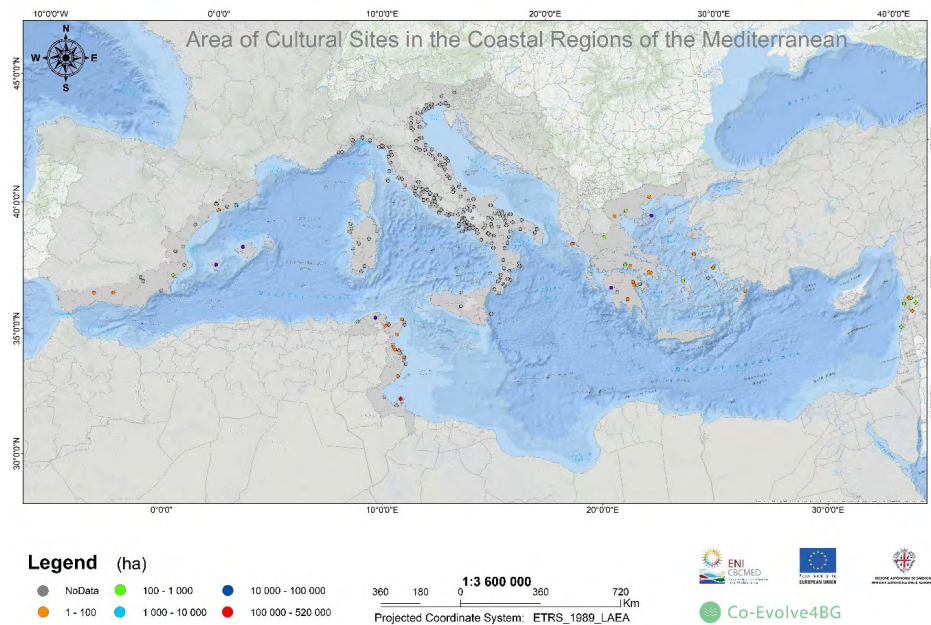


Figure 3. Area of cultural sites in the coastal regions of the Mediterranean.

According to this map and the graph of the surface of cultural site we show that Tunisia has a high surface of cultural site than the other countries (Figure 3). Then, most of the city of the 4 countries have an average surface of cultural site except Italy and we notice on the map and the graph also that Italy has no information or data of surface of cultural site (Figure 4). and other city of the countries like (Greece, Tunisia, Spain), the gray color indicates us (NoData).

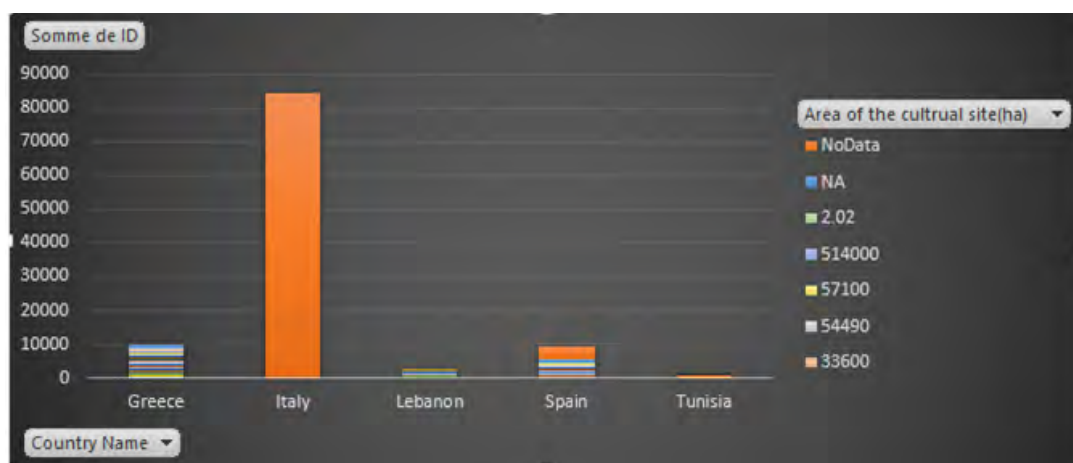


Figure 4. Cultural sites surface graph



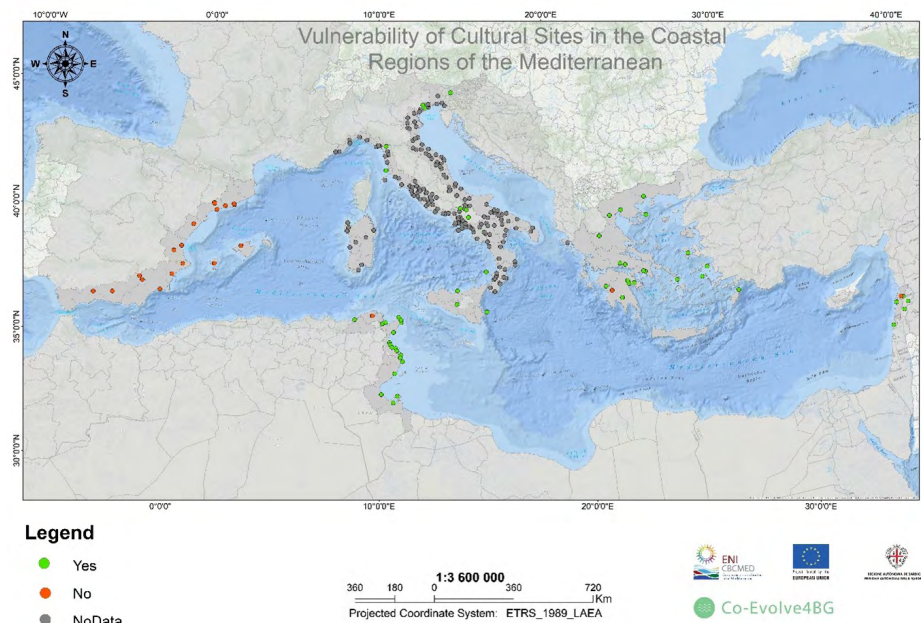


Figure 5. Vulnerability cultural sites in the coastal regions of the Mediterranean

Vulnerability describes the character of something fragile, vulnerable or sensitive. It is more generally a weakness. This map above represents the vulnerability of cultural sites (Figure 5).. This last one as we notice, we distinguish two type of vulnerability of the Mediterranean sea so the strong vulnerability is indicated as the green color (yes) in the map and on the graph in yellow. Tunisia, Greece, Lebanon and some city of Italy are the countries of strong vulnerability. Then, the non-vulnerable countries are represented in the map in red (No) and on the graph in blue, the country concerned is Spain but unfortunately we have no information of any data, this is indicated in the map and graph the gray color (NoData) Italy is the country concerned (Figure 6).

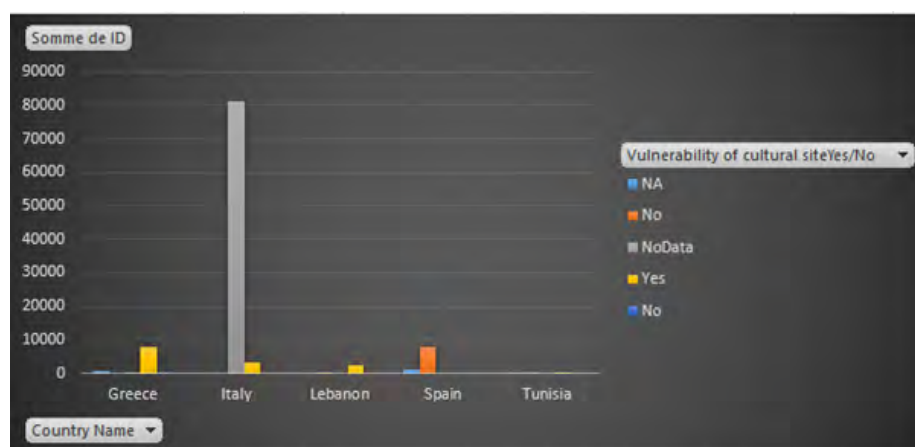


Figure 6. Cultural sites vulnerability graphic

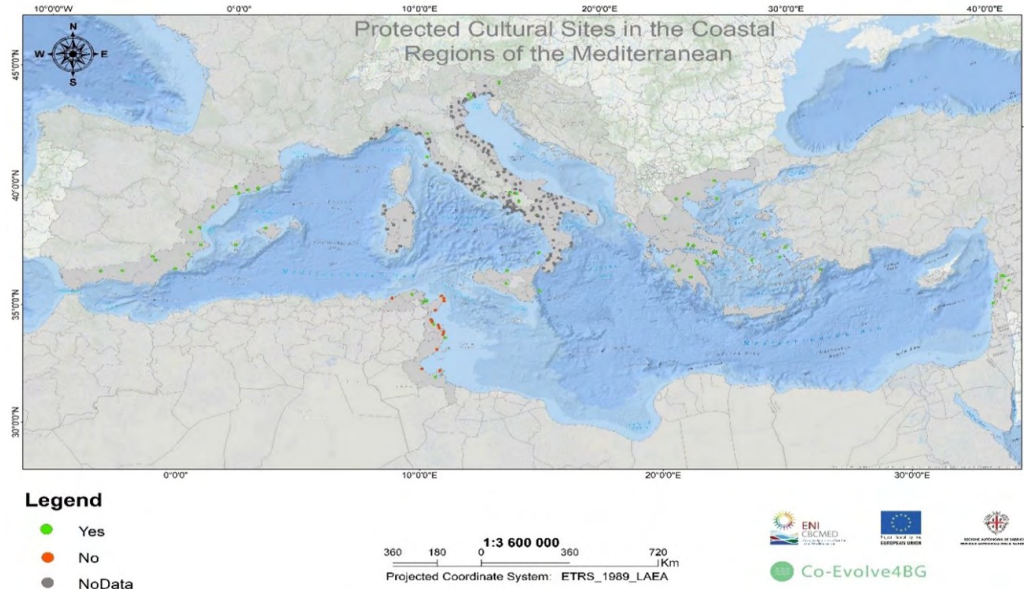


Figure 7. Protected cultural sites in the coastal regions of the Mediterranean.

Protection is the set of measures taken to protect people and property. The protection of heritage is also a question of security (Figure 7). This map and the graph represent the protection of cultural site. The Mediterranean country with the highest level of cultural heritage protection is shown in Figure 8. The map highlights archaeological sites in green (Yes) and identifies countries such as Spain, Greece, Lebanon, and some cities in Italy and Tunisia with protected sites, while Tunisia has unprotected heritage sites. For most cities in Italy, no data on the protection of cultural sites is available, and they appear as gray areas (NOData)

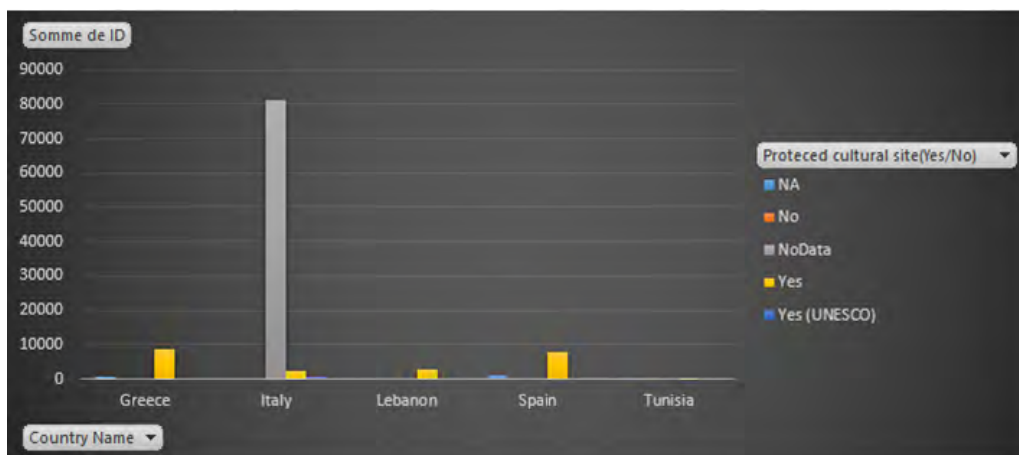


Figure 8. . Cultural site protection graphic

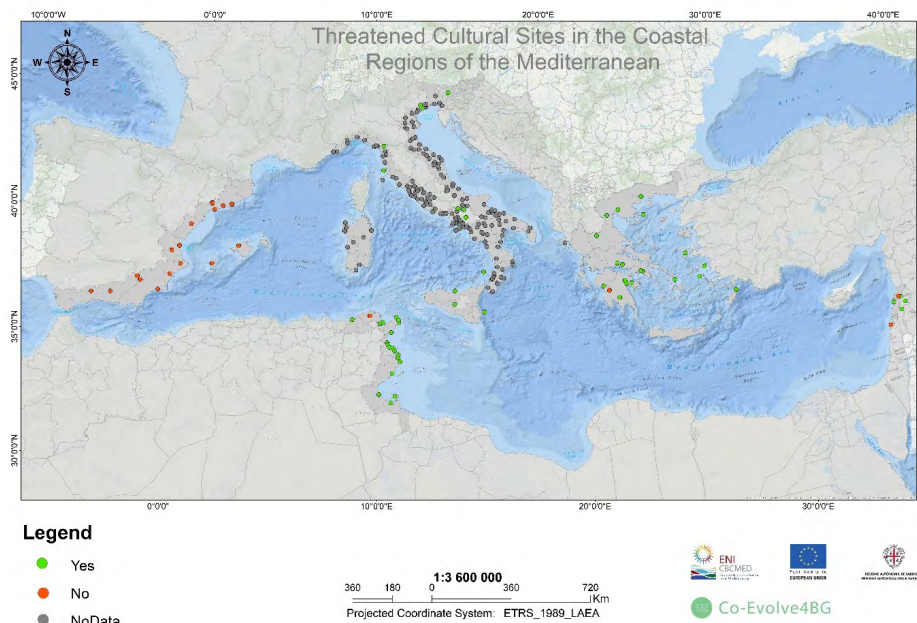


Figure 9. Threatened cultural sites in the coastal regions of the Mediterranean.

A menace is a manifestation signifying a hostile intention, it is not only the islands of the Pacific that are at risk of disappearing under the rising waters. Several emblematic sites of the Mediterranean coast are also under the threat of flooding and coastal erosion. This map and graphic (Figure 9 and Figure 10) represent the threat of cultural sites in countries located in the Mediterranean Sea. In a first indication the green color (yes) represents the country that their archaeological sites are the most threatened like Tunisia, Greece and other countries (Lebanon and Italy). Secondly, the red color (No) indicates that there are no menaces on the cultural sites of these countries like Spain and other countries. Finally, there is no data or information about Italy, it is represented as gray color (NoData) on the map and graph.

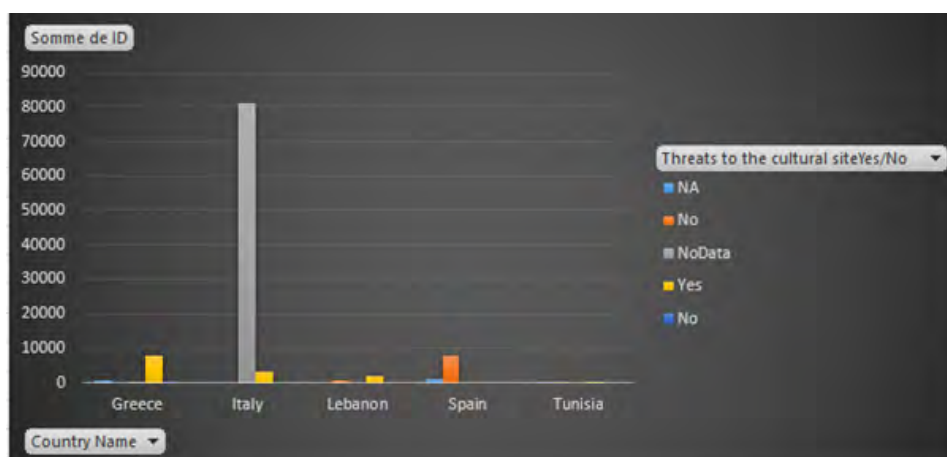


Figure 10. Cultural sites threat graphic



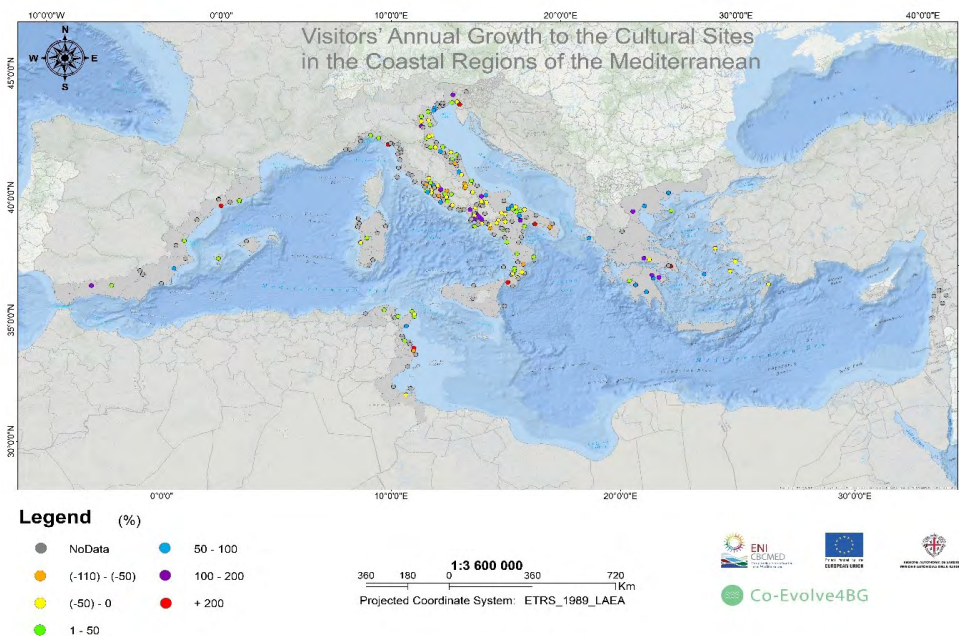


Figure 11. . Visitor's annual growth to the cultural sites in the coastal regions of the Mediterranean

This map shows the annual growth of the number of visitors of cultural sites of the following countries: Greece, Spain, Italy, Tunisia and Lebanon. In this map we notice that Italy, Greece and Tunisia have a homogeneous annual growth of number of visitors like both negative and positive growth except Lebanon and Spain, because Spain has a positive annual growth of number of visitors while Lebanon has no information of annual growth of number of visitors especially the information is the most detailed on the graph.

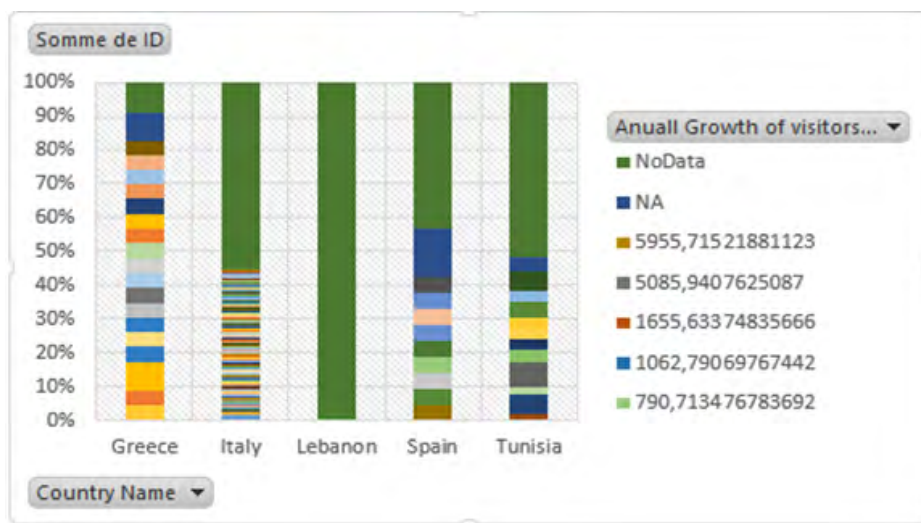


Figure 12. Graph of annual visitor growth.

### **III.**

## **Key Issues: Threats and Enablers**

### III. Key Issues: Threats and Enablers

The conservation of heritage properties or places, monuments and sites (what many call “restoration”), deal with the current state of them to ensure their transmission to future generations, just as our generation has received them from previous ones. However, we care for these places or material objects because of the meaning and values we recognize in them. Even if these values change over time, maintaining the physical existence of these monuments, sites or other heritage places is important in the sequence of generations.

Therefore, documenting and monitoring the level of conservation and risk requires an appreciation of the impact that natural conditions or human activities have on these values and the physical elements that are conserved. It is more than a statistical exercise. While it is true that one can measure, for example, the rate of degradation of a material subjected to pollution or count the number of buildings demolished each year, one cannot express in numbers the confusion or loss of meaning or patina of a heritage place or the erosion of traditional skills. This report recognizes this duality and stresses the importance of developing indicators adapted to the reality of heritage. In this sense, it looks at trends as much as at individual cases.

#### III.1. Global trends affecting cultural heritage

From the case study national reports, a number of major trends affecting heritage have emerged.

- Rising sea levels
- Construction of dams on rivers
- Illegal construction
- Natural factors (wind, waves, sea storms)
- Property issues
- Loss of biodiversity due to climate change
- Transportation/Infrastructure
- Buildings and developments
- Land use planning
- Relative humidity
- Lack of management plan
- Lack of protection
- Open grazing

The main sources of threats identified through this report are

- Urban expansion
- Climate change
- Natural factors (coastal erosion, water pollution)
- Tourism impacts
- Degradation

Large historic residences, houses and mansions and their contents and estates are threatened by the dispersal of furnishings and collections, by subdivision of sites, by lack of maintenance, by internal alterations to accommodate modern standards of comfort or use, or by demolition. Urban heritage is affected by a wide variety of economic and social forces that transform it. Here, it is small actions such as the installation of new materials that spread and erode the built landscape. In other places, entire neighborhoods are demolished to meet what we like to call progressive standards. The actual threat varies greatly. Here, these buildings are demolished or renovated with materials that are insensitive to their qualities, to meet modern standards of comfort.

Archaeological sites form a valuable, mostly invisible and unexpected archive of our heritage. In many cases, these heritage resources are the only surviving evidence of entire lifestyles or cultures. However, archaeological assets are highly vulnerable to intensive and industrialized agricultural practices, urban sprawl, transportation or hydroelectric infrastructure, or smaller structures such as underground garages. In the case of sites that have been excavated, their maintenance, care and interpretation are not always adequately resourced, threatening the physical and scientific integrity of the sites and their associated objects. Looting of archaeological heritage is a major threat that affects underwater heritage in particular, while treasure hunters are facilitated by new technologies and legal loopholes in international conventions and national laws. Buildings, archaeological sites or cultural landscapes have a heritage value as immovable property that benefits from the value of the objects found there. However, all too often, protection or conservation actions focus exclusively on the built environment. In this context, furniture, art objects or objects of ethnological interest, archives associated with heritage places or even objects involved in landscaping are neglected or dispersed, thus depriving the immovable monument of its full meaning. This concern also applies to materials produced to enhance knowledge and appreciation of a historic place, such as archives or collections of archaeological sites or other documentation.

### III.2. Risks from natural processes

It is more conceivable to anticipate natural phenomena thanks to the progress of scientific knowledge and technology. Over time, societies have provided some answers in traditional rituals and construction methods. Natural processes do not threaten heritage only in the form of devastating catastrophes. They also act as a permanent condition of the environment in which the heritage asset is located and result in the natural aging or wear and tear of the building, the effects of which are contained through maintenance. Some examples of these conditions are listed below:

#### Natural conditions

- Humidity (rapid variations)
- Cold, heat
- Wind, pressure, sand, etc.
- Soil characteristics, presence of water or salt, etc...

#### Natural processes

- Natural degradation of materials, rot, corrosion
- Insects, intrusive vegetation, fungal attack, algae
- Migration of salts
- Erosion, changes in river courses or shorelines, dunes
- Aging
- Soil compaction

#### Natural hazards

- Ground movements, landslides, earthquakes, mine collapses, volcanoes, etc.
- Floods, torrential rains, etc.
- Forest fires, lightning, etc.
- Storms, hurricanes, etc.

## **IV. Conclusion**

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The Mediterranean Sea represents only 1% of the world's ocean surface but is the source of 20% of the world's marine production. The Mediterranean is a rare pearl in the history of humanity. It has served as the cradle of the greatest civilizations and empires of the ancient world. However, the report also reveals that many of the resources of the Mediterranean Sea are in decline due to unsustainable exploitation, as well as the accelerated use of these resources.

To achieve a sustainable future for the Mediterranean, we sets six priorities:

- Implementing coherent, ecosystem-based maritime management and planning
- Building a sustainable blue economy
- Achieving a climate-friendly and carbon-neutral economy
- Unlocking the productive potential of natural heritage through public and private funding
- Reduce the footprint of mass tourism and seek more sustainable tourism models
- Supporting sustainable fishing

The risk of erosion particularly concerns sites located directly on the coast: 31 of them are already less than 10 meters from the coast and this should concern 39 sites in 2100 in the “high” scenario.

The archaeological remains of Tyre in Lebanon, right on the water's edge and built on the sand, are the most threatened ([Westley, et al., 2021](#)). The archaeological complex of Tarragona in Spain, Pythagoreion and Heraion of Samos in Greece are also classified as high risk by the study. Italy, Tunisia and Greece are the Mediterranean countries whose heritage is most exposed to rising waters. This was just revealed by a team of British and German researchers in the journal Nature in October 2018.

They compiled a list of 49 Mediterranean World Heritage sites that are less than 10 m above sea level - and therefore potentially at risk. Regardless of the predictive model considered, the study shows that 93% of the sites are at risk of flooding. Thirty-seven could even be affected by 100-year floods, a flood with a 1% chance of occurring every year by the end of the century. If we take into account the most alarmist scenario, Venice and its lagoon, in Italy, the sites of the Adriatic coast, including the Punic city of Kerkouane and its necropolis, in Tunisia, would be particularly affected by this phenomenon.

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