



# NOSTRA project – Baseline study

## Strait of Messina



Source: Nostra website



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The views expressed in this report are purely those of the authors and may not necessarily reflect the views or policies of the partners of the NOSTRA network. The methodological approach that was applied during the baseline study is presented in the final report of the study. The analysis that is provided in this report is based on the data collected and reported by the Nostra partners, a complementary literature review conducted by the consultants, and the results provided by the methodological toolkit developed in the framework of the baseline study.

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**Limitations of the analysis:**

The consultants faced a limited amount of data.

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# 1 General presentation of the strait



## 1.1 Geographical area

The Strait of Messina, formerly known as the Strait of Scylla and Charybdis, is now geographically defined as the region between the coordinates 38 ° 00 ' - 38 ° 20' North and 15 ° 30 ' - 15 ° 40' East.

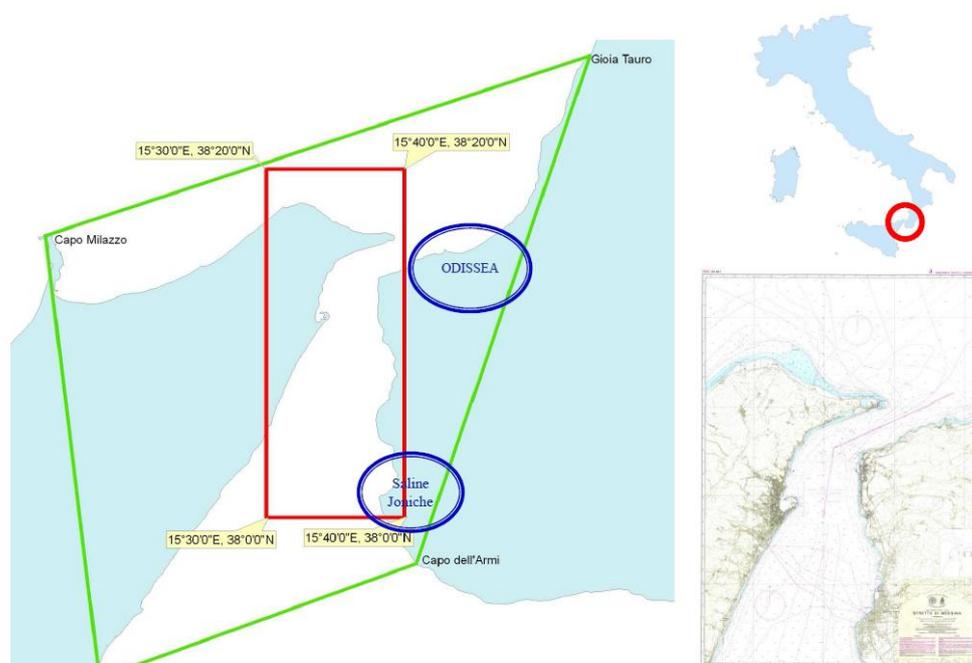


Figure 1: Messina's strait area

Both history and myth intertwine in the Strait of Messina which divides and connects two ancient cities of Magna Graecia: Zancle (the Messina of today) and Reghion (currently Reggio Calabria). It forms a link between the eastern and western civilizations in a natural environment famously depicted in the Homeric poems.

These boundaries do not take into account the complex hydrodynamic phenomena that take place in the wider region where the two seas of Tyrrhenia and Ionian meet. Each sporting different physical and chemical characteristics, their mingling affects the entire biological composition of the Strait. This gives birth to an extraordinary ecosystem, unique in the Mediterranean for its biodiversity.

A just definition of the boundaries of the Strait of Messina would include to the south, a line connecting Cape Taormina in Sicily and Capo dell'Armi in Calabria. And to the north, the limit would be drawn between Capo Milazzo in Sicily and the arc of the Aeolian Islands and Gioia Tauro in Calabria (Figure 1).

Please note that we only consider the Calabrian side of the strait in this factsheet.

The area of the strait is quite unique in terms of geomorphology. In the span of less than a few kilometres, the altitude will soar from 5 to 1,800 m, while different climates abound: typically dry on the Ionian side but wet and humid on the other, which for instance, implies major differences in terms of agriculture or maintenance of road infrastructure.

Table 1: Key geographical data

Key geographical data	Unit	Reggio Calabria, Italy
Landscape area	Ha	48,999.5
Seascape area	Ha	118,373.6
Length of coastline	Km	88,447
Maximal depth of the strait	M	960 <sup>1</sup>
Urbanized areas	km <sup>2</sup>	n/a
Width of the strait	Km	3.2

## 1.2 Socio-economic background

Table 2 : Key socio-economic data<sup>2</sup>

Key population data	Unit	
Number of inhabitants in the landscape area	(x 1,000)	550
Population by mother tongue	96%	-Greek minority present - 22,105 foreigners (4%)
GDP per capita in the region	not available as such	-27.6 % compared to the national indicators on socio-economic
Employed	%	41.2 (2012) <sup>3</sup>
Unemployment rate in the region	%	19.7 (2012) <sup>4</sup>
Unemployment rate in the country	%	10.7 (2012) <sup>5</sup>

### 1.2.1 Cities

- Reggio Calabria, inhabitants: 180,305
- Palmi, inhabitants:18,707
- Villa S. Giovanni, inhabitants: 13,782

<sup>1</sup> The strait's depth ranges from 800 m in front of Pellaro to 400 m around Reggio de Calabria.

<sup>2</sup> "Rapporto sull'economia della Provincia di Reggio Calabria del 2008" -Camera di commercio

<sup>3</sup> ISTAT

<sup>4</sup> ISTAT

<sup>5</sup> ISTAT

- **Melito di Porto Salvo, inhabitants: 11,104**

## 1.2.2 Infrastructure

Main infrastructures include:

- **Railways**
  - **Ferrovie dello Stato (Stazioni di Messina, Reggio Calabria, Villa San Giovanni e stazioni minori)**
- **Highways**
  - **Autostrada A3 – Salerno Reggio Calabria; => VIA disponibile**
  - **Autostrada A18 – Messina Catania;**
  - **Autostrada A20 – Messina Palermo;**
  - **Porto di Villa San Giovanni;**
  - **Porto di Reggio Calabria;**
  - **Porto di Messina (FFSS)**
  - **Rada San Francesco (ME);**
  - **Rasa Tremestieri (ME)**

One specificity of the Messina strait must be highlighted: its position between two regions of one country sharing a common cultural and socio-economic background. In particular, local authorities highlighted the difficulties in transportation between the two sides of the strait, a daily commuter route for locals who work on the other side that they live, but also serving as an important commercial passage to Sicily<sup>6</sup>. The current link is ensured by ship (from Messina to Reggio Calabria and from Messina to Villa S. Giovanni), being relatively slow and considered expensive.

With a distance of only 3km between the two sides of the strait, a bridge construction project has been debated for decades. In 2006, the project was cancelled under Prime Minister Romano Prodi. However, plans to construct the Messina bridge were revived on 6th March 2009. As part of a massive new public works program, Silvio Berlusconi's government pledged a contribution of EUR 1.3 billion towards the estimated total cost of EUR 6.1 billion. Some 3.3 km long and 60 m wide, the bridge was to be supported by two 382 m long pillars, each taller than the Empire State Building, and was expected to accommodate six freeway lanes, a railway (for up to 200 trains a day) and two walkways. Berlusconi claimed in 2009 that work would be completed by 2016. The Region and the National Government are responsible for transportation between the two sides of the strait and the Messina bridge project has also been impeded by the continuous shift of coalitions in the Italian government. However, the bridge is considered technically feasible and 60-70% of the local population is in favour of its construction: many people perceive the bridge as a huge job-creation scheme and a boost for tourism to the island. Opponents see it as an ecological disaster, a structure at risk due to especially strong winds and earthquakes (the area having an intense seismic record), and a boon for Sicilian and Calabrian organized crime.

Other transportation issues are connectivity between Sicily and the Reggio Calabria airport and the intra-Calabrian connectivity, notably in terms of the railway network (managed by the Region of

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<sup>6</sup> Two studies presenting the different transport flows in the strait is available here:

[www.unideadicitta.it/articoli-unidea-di-citta/7-unidea-di-citta-aprile/16-trasporto-metropolitano-stretto.html](http://www.unideadicitta.it/articoli-unidea-di-citta/7-unidea-di-citta-aprile/16-trasporto-metropolitano-stretto.html)

[http://books.google.it/books?id=n\\_\\_fkVoDBKcC&pg=PA29&lpg=PA29&dq=flussi+di+traffico+stretto+di+messina&source=bl&ots=-O\\_\\_e-1JA&sig=Hzh4x94ucjXLPecYHc12HAslp2c&hl=it&sa=X&ei=W1mDUtrJKs6Shgf3lHoDA&ved=0CDQQ6AEwAQ#v=onepage&q=flussi%20di%20traffico%20stretto%20di%20messina&f=false](http://books.google.it/books?id=n__fkVoDBKcC&pg=PA29&lpg=PA29&dq=flussi+di+traffico+stretto+di+messina&source=bl&ots=-O__e-1JA&sig=Hzh4x94ucjXLPecYHc12HAslp2c&hl=it&sa=X&ei=W1mDUtrJKs6Shgf3lHoDA&ved=0CDQQ6AEwAQ#v=onepage&q=flussi%20di%20traffico%20stretto%20di%20messina&f=false)

Calabria). Starting from July 2014, Reggio Calabria is planned to be included in the project “Città Metropolitane<sup>7</sup>” which could help solve management issues in regards to public transportation. Through the implementation of “Città metropolitane,” urban boundaries will be naturally extended and might aid in reflection over different longitudinal areas showing distinct land-use characteristics: coastal zones, urban areas, hills and mountainsides.

The harbour of Gioia Tauro cannot be left out when mentioning infrastructure. This port has a special story. The 5th iron center which it was intended to service, was never built because of national and worldwide economic crises. But now, thanks to the efforts of the Genoa entrepreneur Ravano, the port has grown into the largest terminal for transshipment in the Mediterranean sea (Figure 2).



Figure 2: Gioia Tauro harbour<sup>8</sup>

In 1957, a 220-kV overhead power line was built across the Strait of Messina. Its pylons are among the highest in the world. The power line has now been replaced by a submarine power cable, but the pylons remain and are protected as historical monuments.

**1.2.3 Main economic activities**

Table 3: Main economic activities

Type of activity	
Maritime transport of goods	√
Maritime transport of passengers	√
Ports (fisheries and trade)	√
Onshore energy production	-
Onshore production of renewable energy	-
Onshore industry and infrastructure	√
Onshore agriculture	√
Building and construction	√
Tourism	√

The economic added value per sector shows the importance of the service sector (80.4%), constituted mainly of commercial activities, legal and administrative consulting, public administration, mobility and

<sup>7</sup> ‘Metropolitan Cities’: Legislative proposal available at : <http://www.camera.it/ dati/leg17/lavori/stampati/pdf/17PDL0009111.pdf>  
<sup>8</sup> Source : <http://www.portodigioiatauro.it/info.php>

logistics. About 4.5% of economic activity is due to agriculture, with another 15.2% coming from industry (mainly manufacturing and construction)<sup>2</sup>.

The main aim of the strait's mobility plan is to integrate all four modes of transport – road, rail, sea and air– thus guaranteeing continuity which it currently lacks and contributing to the creation of a gateway to national and European markets. The strait includes six ports: Gioia Tauro, Milazzo, Messina, Villa San Giovanni, Reggio Calabria and Tremestieri. Each facility is specific in its own way, but they should all be considered as part of a single network. The strait therefore represents a gateway region offering high quality service in terms of both local and international transportation thanks to its strategic position in the Mediterranean Sea.

In this sense, the “Sea Highway”, particularly the fast link between Messina and the Airport of the Strait in Reggio Calabria, plays a significant role in reinforcing the connection between the two shores as well as making this area more accessible to tourists. The strategic position of the strait at international level represents a key value to transform this area into a logistics platform in relations at local and global levels.

According to the local authorities, the Messina strait could be further developed from a touristic point of view. A lack of political action to develop tourism was also noted, in an area that presents an extremely heterogeneous wealth of cultural heritage (Byzantine, Greek, Jewish, Albanese historical sites). Natural aspects could also be further promoted, i.e. marine turtle breeding grounds on the Ionic coast, or agricultural specificities (unique site in Europe for the production of Bergamot<sup>9</sup>, a very important ingredient in the perfume industry, cultivated in “fiumare”).

About 2,746 tourist establishments exist in the Reggio province, of which 631 are own and operated by young people (under 35 years old). A strong growth rate has been observed in the last year (+6% overall in the number of enterprises, +23% in the number of start-ups). In the strait area, coastal sports also make a big contribution to tourism (wind surfing, kite surfing, diving, etc.). About 20 sport federations are present, hiring around 100 people. Sport activities in the inlands of the strait (horse riding, football, etc.) ensure to the livelihoods of 400 people.

The major bottlenecks for the development of tourism are considered to be transportation (the flow of mainstream tourists in Calabria stops in Vibo Valencia) and a lack of marketing of tourist opportunities in the strait. Another barrier can be found in the competition between different provinces (Reggio Calabria, Cosenza, etc.) and the respective local authorities responsible for tourism, showing little collaboration amongst each other. Another roadblock is the national firm of air transportation's monopoly on connections to the Reggio Calabria airport, which is known as the ‘airport of the strait’. This makes the cost of travelling particularly high in the area. Therefore, there is a need to develop an integrated vision of transport in the area.

The big harbour of Gioia Tauro is not seen as much of a benefit to the local economy. There is a need to ameliorate transportation in the area, notably for railways and ships. For now, most of the available financial resources are dedicated to automotive transportation (enlargement of the highway Salerno-Reggio Calabria). Other improvements can also be made to facilitate access to the natural park of Aspromonte (out of the strait area).

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<sup>9</sup> <http://turismo.reggiocal.it/GenericContent.aspx?id=44&idtoshow=542&lang=en-US>

## 2 Significance and sensitivity of biodiversity and natural environment in the strait

The intense hydrodynamism and the chemical makeup of the strait's waters deeply affect the natural environment. This leads to an extraordinary ecosystem, which is unique in the Mediterranean Sea for its biocenosis and abundance of species. This is why the Strait of Messina constitutes a unique source of biodiversity.

### 2.1 Remarkable landscapes

A naturalist approach to history would point to the strong marine currents carrying nutrients into the strait as the origins of the myth of Scylla and Charybdis in Homer's Odyssey. The biodiversity on the Calabrian side is very different from that of the Sicilian side and the species also differ from those found in the Aeolian Islands. The presence of a number of marine volcanoes also add their specific touch to the marine habitat and biodiversity. Data on the strait is found in a few academic publications focused mainly on inland areas, rather than the coast.

### 2.2 Type of Habitats and Biodiversity in the strait

Table 4: Main land covers of the strait

Land cover (CORINE Land cover Nomenclature)		Presence	Surface (ha)
<b>Artificial surfaces</b>	Urban fabric	√	4507.07
	Industrial, commercial and transport units	√	607.4
	Mine, dump and construction sites	√	118.9
	Artificial non-agricultural vegetated areas	-	
<b>Agricultural areas</b>	Arable land	√	5472.6
	Permanent crops	√	22297.5
	Pastures	√	106.9
	Heterogeneous agricultural areas	√	5097.5
<b>Forest and semi-natural areas</b>	Forests	√	4616.5
	Shrub and/ or herbaceous vegetation association	√	5726.2
	Open spaces with little or no vegetation	√	36.8
<b>Wetlands</b>	Inland wetlands	-	-
	Coastal wetlands	-	-

Source: data from toolkit

## 2.2.1 “Remarkable” ecosystem or habitat types

Seismic activity and strong tidal currents create an erosive effect on the Strait of Messina at least down to 300-350 m<sup>10</sup> below sea level. The rocky seafloor of the straits is inhabited by rich benthic communities and some particular assemblages that are unknown in other regions of the Mediterranean Sea<sup>11</sup>. According to the toolkit, out of 26 remarkable habitat types, 5 are marine.

Table 5: Main habitat types accordingly extracted from the toolkit

Terrestrial & fresh water
1210 - Annual vegetation of drift lines
1240 - Vegetated sea cliffs of the Mediterranean coasts with endemic <i>Limonium spp.</i>
1420 - Mediterranean and thermo-Atlantic halophilous scrubs ( <i>Sarcocornetea fruticosi</i> )
2110 - Embryonic shifting dunes
2120 - Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ('white dunes')
2190 - Humid dune slacks
2210 - <i>Crucianellion maritimae</i> fixed beach dunes
2230 - <i>Malcolmietalia</i> dune grasslands
3290 - Intermittently flowing Mediterranean rivers of the <i>Paspalo-Agrostidion</i>
5330 - Thermo-Mediterranean and pre-desert scrub
6220 - Species-rich <i>Nardus grasslands</i> , on silicious substrates in mountain areas (and submountain areas in Continental Europe)
6420 - Mediterranean tall humid grasslands of the <i>Molinio-Holoschoenion</i>
7220 - Petrifying springs with tufa formation ( <i>Cratoneurion</i> )
8210 - Calcareous rocky slopes with chasmophytic vegetation
8220 - Siliceous rocky slopes with chasmophytic vegetation
9330 - <i>Quercus suber</i> forests
9340 - <i>Quercus ilex</i> and <i>Quercus rotundifolia</i> forests
9560 - Endemic forests with <i>Juniperus spp.</i>
Marine (1)
1110 - Sandbanks which are slightly covered by sea water all the time
1120 - <i>Posidonia</i> beds ( <i>Posidonion oceanicae</i> )
1150 - Coastal lagoons
1170 – Reefs
8330 - Submerged or partially submerged sea caves

<sup>10</sup> Colantoni P., 1995. Seafloor morphology and sediment dynamics in the Straits of Messina. In: The Straits of Messina Ecosystem. Proceedings of the Symposium held in Messina, 4-6 April 1991. Guglielmo L., Manganaro A. & De Domenico E. (eds.): pp 83-94.

<sup>11</sup> Drew E.A., 1972. Growth of a kelp forest at 60 meters in the Straits of Messina. *Memorie Biol. Mar. Oceanogr.*, 2 (6): 135-157; Arnaud P.M. and Zibrowius H., 1979. L'association *Pedicularia sicula* - *Errina aspera* en Méditerranée (Gastropoda Prosobranchia et Hydrocorallia Stylasterina). *Rapp. Proc. Réun. Comm. Intern. Explor. Sc. Mer Médit.*, 25-26 (4) : 123-124

## 2.2.2 Rare and threatened species

The Strait of Messina, is placed between the West and East basins of the Mediterranean, being an important migratory point for species that are found on either side. In this area, planktonic and benthic communities from both merge with those coming from the Atlantic Ocean. In regards to fauna, the Strait of Messina is considered a "Paradise for Zoologists" for the enormous biodiversity to be found. Among the many species present, benthic invertebrates arouse greater interest as the ranks are enriched by a great variety of forms and colours due to the abundance of Coelenterati (sea anemones, madrepora and corals). A good example is the "forest" of yellow and red gorgonie *Paramuricea clavata*. These, joined to the substrate, create a thick forest which is the ideal benthic environment to accommodate numerous other species.

Benthic species of importance are *Pilumnus inermis*, previously considered as exclusively Atlantic and *Errina aspera* (Hydrozoa), a famous species endemic to the Strait of Messina. Other typical species are *Ophiactis balli*, the crustaceans *Parthenope expansa* and *Portunus pelagicus* and the giant barnacle, *Pachylasma giganteum*. Great biological and ecological importance is also attached to the already cited Laminariales of the Strait: *Sacchoryza polyschides* and *Laminaria ochroleuca*. The immense prairies of *Posidonia oceanica* which covers wide areas both vertically and horizontally, are also of notable importance.

Of extreme importance, because they are found only in small pockets elsewhere in the Mediterranean, are *Phyllariopsis brevipes*, *Phyllariopsis purpurascens*, *Desmarestia dresnayi*, *Desmarestia ligulata*, *Desmarestia ramose* and *Cryptopleura species*.

Typical fishes species of the Mediterranean sea are also very well represented including *Thunnus thynnus*, *Thunnus alalunga*, *Sarda sarda*, *Tetrapturus belone* and *Xiphias gladius* (swordfish). The fishing of swordfish has been documented in the area since Phoenician times.

Moreover, the strait is an obligatory path for many migratory species, including sharks (*Carcharodon carcharias*, *Hexanchus grisou*) and cetaceans which pass through the strait to reach the Aeolian Islands for reproduction.

Several hundred of species were reported in the toolkit, however certainly more exist. In 2006, black coral was discovered in the marine area in front of Scilla, and the protected area (ZPS Natura 200) was enlarged to accommodate.

In addition, the marine turtle *Caretta caretta* breeds in this area.

Table 6: Summary of the species categories as listed in the Toolkit

Number of threatened species	43
Number of species protected under international designations	106
Number of species protected under European designations	70
Number of species protected under national designations	183
Number of species protected under regional designations	30
Presence of fish spawning and nursery grounds ?	Yes
Presence of migratory routes?	Yes

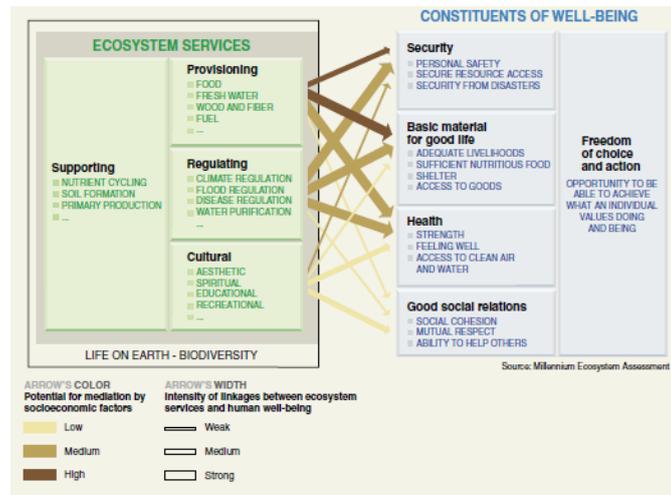
### 2.2.3 Protected areas

Name	Type	Site of European Interest	Total area of the protected site (ha)
IT9350131 Pentidattilo	Terrestrial	Natura 2000 (HD): SCI/SAC	103,70
IT9350132 Torrent Melito	Terrestrial	Natura 2000 (HD): SCI/SAC	31,36
IT9350139 Pentimele hill	Terrestrial	Natura 2000 (HD): SCI/SAC	123,57
IT9350140 Capo dell'Armi	Terrestrial	Natura 2000 (HD): SCI/SAC	68,53
IT9350143 Saline Joniche	Terrestrial	Natura 2000 (HD): SCI/SAC	29,84
IT9350145 Torrent Amendolea	Terrestrial	Natura 2000 (HD): SCI/SAC	6,29
IT9350149 Sant'Andrea	Terrestrial	Natura 2000 (HD): SCI/SAC	34,62
IT9350158 Costa Viola and Mount St. Elia	Maritime	Natura 2000 (HD): SCI/SAC	108,00
IT9350158 Costa Viola and Mount St. Elia	Terrestrial	Natura 2000 (HD): SCI/SAC	342,70
IT9350162 Torrent S. Giuseppe	Terrestrial	Natura 2000 (HD): SCI/SAC	23,67
IT9350165 Torrent Portello	Terrestrial	Natura 2000 (HD): SCI/SAC	30,08
IT9350172 Depths from Punta Pezzo to Capo dell'Armi	Maritime	Natura 2000 (HD): SCI/SAC	18064,00
IT9350173 Depths of Scilla	Maritime	Natura 2000 (HD): SCI/SAC	264,20
IT9350177 Mount Scrisi	Terrestrial	Natura 2000 (HD): SCI/SAC	321,00
IT9350181 Mount Embrisi and mount Torrione	Terrestrial	Natura 2000 (HD): SCI/SAC	0,59
IT9350183 Catona Beach	Terrestrial	Natura 2000 (HD): SCI/SAC	9,52
IT9350300 Costa Viola	Terrestrial	Natura 2000 (BD): SPA	12429,20

IT9350300 Costa Viola	Maritime	Natura 2000 (BD): SPA	10887,10
Aspromonte National Park	Terrestrial*		1199,00

## 2.3 Significance of ecosystem services to the local livelihood

An ecosystem is a dynamic complex of plant, animal, and microorganism communities and the nonliving environment interacting as a functional unit. Ecosystem services are the benefits people obtain from ecosystems. These include *provisioning services* such as food, water, timber, and fiber; *regulating services* that affect climate, floods, disease, wastes, and water quality; *cultural services* that provide recreational, aesthetic, and spiritual benefits; and *supporting services* such as soil formation, photosynthesis, and nutrient cycling<sup>12</sup>. The figure is taken



Linkages between Ecosystem Services and Human Well-being Source: MEA, 2005: pp vi

well-being that are commonly encountered, and includes indications of the extent to which it is possible for socioeconomic factors to mediate the linkage (for example, if it is possible to purchase a substitute for a degraded ecosystem service, then there is a high potential for mediation). The strength of the linkages and the potential for mediation differ in different ecosystems and regions. In addition to the influence of ecosystem services on human well-being depicted here, other factors—including other environmental factors as well as economic, social, technological, and cultural factors—influence human well-being, and ecosystems are in turn affected by changes in human well-being.

The natural capital of the strait is very important for touristic activities. For instance, on the Ionic coast marine turtles come to deposit eggs and tourists can come to see the turtles laying their eggs. Private boats come to see the sea caves, the *Posidonia* beds and the black coral reefs. Local biodiversity is also important for agricultural activities: the strait is the only site in Europe for the production of Bergamot<sup>13</sup>, a very important ingredient for the perfume industry. The bergamot plants are traditionally cultivated close to small rivers called 'fiumare'. The presence of unique habitats in the strait area, also boost the development of touristic sport activity, notably on the coast (wind surfing, kite surfing, diving, etc.), but also further inland (horse riding and trekking). The natural capital is therefore a crucial source for a number of economic activities (see data presented in the previous section of economic activities) and for sustainable development of the region. Even if it is difficult to quantify the exact contribution to local economic development and cultural heritage, this contribution should be considered in comparison to other economic activities providing benefits that are easily quantifiable but do not necessarily contribute at a local level.

<sup>12</sup> MEA, 2005

<sup>13</sup> <http://turismo.reggiocal.it/GenericContent.aspx?id=44&idtoshow=542&lang=en-US>

## 2.4 Main biodiversity pressures and related impacts

### 2.4.1 Human activities

Strong pressures on biodiversity exist in the area: marine transport towards the harbour in Gioia Tauro, fishing and use of illegal fishing tools (long nets), insufficient treatment of wastewater (not efficient or non-existing), illegal construction of buildings on the coast, salt production, soil erosion, light and noise disturbance. The project to build a bridge over the strait, if approved, will have major impacts on the marine ecosystem. Notably the shadow of the bridge projected on the water surface may disturb migratory patterns by sending a false signal to fish in migration.

### 2.4.2 Natural pressures

The presence of invasive species related to maritime transport and aquaculture activities has been identified as a 'pressure' on biodiversity in the strait. However, no information is provided in the toolkit regarding the specific species that are concerned (only one example given: *Caulerpa taxifolia*).

### 3 Responses to pressures and impacts

An agreement between the Province of Reggio Calabria (Calabria's side) and the Province authority of Messina (Sicilian side) for integrated development in the context of the E.S.I (European Straits Initiative) network was stipulated the 21st of May 2013<sup>14</sup>. The two competent authorities agreed in collaborating towards identifying tools of local governance focused on environment, economic development, sustainability of transportation and tourism. The objective of this agreement is in line with the general aim of the ESI project to highlight the specificities of 'straits' in Europe, in view of the structural funds for the period 2014 – 2020. The two entities were also engaged to share the results obtained in the context of the NOSTRA project.

In the same year, the city of Messina decided to launch a procedure to have this area designated an UNESCO world heritage. Since the process is expected to be very long and complex, the city administration has sent a partnership request to other involved towns and cities (including Reggio Calabria), but also the airport authority, the ports authorities, the local University and Research centre, as well as several NGOs<sup>15</sup>.

The EU project ODISSEA was developed to ensure the EMAS certification of a number of towns and villages which did not continue to adhere to this direction once the authorisation was obtained. The project was aimed to promote environmental restoration and sustainable development perspective along the axis of the Tyrrhenian coast and Aspromonte, including the municipalities of Reggio Calabria, Santo Stefano in Aspromonte, Scilla and San Roberto.

One of the agreements that has been put into practice is the creation of the Strait of Messina Maritime Authority, which is responsible for security, surveillance and monitoring of maritime traffic. In terms of governance, the Province of Messina and the Province of Reggio Calabria can play an important role in bringing significant political change, thanks to projects aimed at creating «The Strait Region» (see section on initiatives).

The individual initiatives previously presented could be better appraised and communicated as model examples. The project NOSTRA is viewed as an opportunity to start an internal debate and develop future initiatives in a more collaborative environment.

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<sup>14</sup> [www.strill.it/index.php?option=com\\_content&view=article&catid=40%3Areggio&id=165163%3Areggio-sottoscritto-protocollo-dintesa-nellambito-della-rete-esi-european-straits-initiative&Itemid=86](http://www.strill.it/index.php?option=com_content&view=article&catid=40%3Areggio&id=165163%3Areggio-sottoscritto-protocollo-dintesa-nellambito-della-rete-esi-european-straits-initiative&Itemid=86)

<sup>15</sup> <http://www.tempostretto.it/news/ombelico-mare-nostrum-stretto-messina-patrimonio-umanit-amministrazione-cerca-partners.html>

# 4 Governance

## 4.1 Actors mapping

Concerned territory		Institution		Role
<b>Calabria region</b>		Calabria authority	Region	Ecolabel and EMAS certifications Environmental protection and conservation Pollution prevention and mitigation Environmental impact assessments Water quality Waste management Polluted sites decontamination Protected areas N2000 Sustainable development Awareness raising on environmental issues
<b>Reggio province</b>	<b>Calabria</b>	Reggio province	Calabria authorities	Water quality Authorisation for waste water emissions Authorisation for agricultural use of wastewater mud Waste management (action plan, observatory, etc.) Monitoring of environmental status (focused on freshwater) Environmental education Authorisation waste treatment plants Air quality Energy use and production (authorisation for energy producing plants)
<b>Reggio Calabria city</b>		Reggio hall	Calabria city	Environmental protection and conservation (soil coast, mountains, marine habitats etc.) Pollution Sustainable development Energy use

The fragmentation of governance responsibilities at the local level is often at the origin of conflicts. This further leads to a shortfall in management, lacking a global and coherent vision, taking into account existing initiatives and the needs of the area, particularly in concern to nature and biodiversity. In addition, the lack of integration between terrestrial (Province) and marine (Harbour authorities) management is also pointed out as a major issue.

## 4.2 Level of cross-border cooperation

A good level of cooperation is shown by the two bi-lateral agreements reported in the 'initiatives' section.

Mr. Giorgio Panuccio from the Reggio Calabria province competent authority assumed his responsibilities for the NOSTRA project in July 2013. Since then he is in charge of the administrative aspects and participated at the workshop in Finland. The main results of these exchanges with other straits are the exchange of best practices, notably in terms of managing harbours and transport infrastructures. He hopes that the project NOSTRA will be a starting point for reflection on the development of a unique governance entity for straits in Europe having a role of coordination among the different local authorities, in order to ensure efficiency and homogeneity in integrated management. This authority could centralise and communicate on best practices and prepare dedicated Regulations and Directives, ensuring an homogenous approach at the legislative level as well. A current major problem in the strait is the incongruity of regulation and management approaches among different local authorities: municipalities, regions, provinces, harbour authorities, etc.

# 5 Conclusions of the analysis

## 5.1 Analysis of the situation at the strait level

### **Socio-economic background of the Strait**

The economic added value per sector shows the importance of the services sector (80.4%), comprising mainly commercial activities, legal and administrative consulting, public administration, mobility and logistics. About 4.5% of the economic activity is due to agriculture, 15.2% from industry (mainly manufacturing and construction).

The main aim of the strait's mobility is an integrated type of mobility combining all four modes of transport – road, railway, ports and airports– which can guarantee a continuity lacking today and can contribute to the creation of a gateway to national and European markets.

In this sense the “Sea Highway”, particularly the fast link between Messina and the Airport of the Strait in Reggio Calabria, plays a significant role in reinforcing the connection between the two shores as well as making this area more accessible to tourists. The strategic position of the strait at international level represents a key value to transform this area into a logistics platform in the local-global relations.

Accordingly to the local authorities, from the touristic point of view, the Messina strait could be further valued.

### **Significance of biodiversity and natural environment in the Strait**

The intense hydrodynamism and the chemical characteristics of the strait's waters affect the entire environment to the point of creating an extraordinary ecosystem, which is unique in the Mediterranean Sea for its biocenosis and abundance of species. This is why the Strait of Messina constitutes a unique source of biodiversity.

### **Human and natural pressures exerted on biodiversity and natural environment**

Strong pressures on biodiversity exist in the area: marine transport towards the harbour in Gioia Tauro, fishing using illegal fishing tools (long nets), insufficient treatment of wastewater (not efficient or non-existing), illegal construction of buildings on the coast, salt production, soil erosion, and luminous and noise disturbance. The project of a bridge on the strait, if approved, will have important impacts on the marine ecosystem, notably because of the shadow projected on the water, being a contradictory signal for fishes in migration.

The presence of invasive species related to maritime transport and aquaculture activities has been identified as a ‘pressure’ on biodiversity in the strait. However, no information is provided in the toolkit regarding the specific concerned species (only one example given: *Caulerpa taxifolia*).

### **Policies, actions and initiatives contributing to an integrated management of biodiversity**

The Messina city hall decided to start a procedure to include this area in the UNESCO world heritage list. Since the procedure is expected to be very long and complex, the city administration has sent a partnership request to other involved towns and cities (including Reggio Calabria), but also the airport authority, the ports authorities, to the local University and Research centre and several NGOs.

The EU project ODISSEA was developed to ensure the EMAS certification of a number of town-villages which did not continue to work in this direction once the authorisation was obtained. The project was aimed towards environmental restoration, and sustainable development of standpoint, the axis of tyrrhenian coast -Aspromonte included in the municipalities of Reggio Calabria, Santo Stefano in Aspromonte, Scilla and San Roberto.

One of the agreements that has been put into practice is the creation of the Strait of Messina Maritime Authority, which is responsible for security, surveillance and monitoring of maritime traffic. The Province of Messina and the Province of Reggio Calabria, in terms of governance can play an important role in bringing a significant political change thanks to projects aimed at creating «The Strait Region».

## **5.2 How responses have addressed key pressures on biodiversity and natural environment**

The responses that have been implemented in the Strait are mapped on the following tables.

Table 7: Responses to address risks and pressures exerted on biodiversity and natural environment – Strait of Messina (1/2)

	Adding value to the local livelihood			Creating risks and pressures, and impacting biodiversity and natural environment	Existing responses to address risks and pressures exerted on biodiversity and natural environment		
	Creating jobs	Creating revenues	Creating Identity & culture		Calabrian side	Sicilian side	Cross-border
Maritime Transportation (crossing)	✓	✓		Boat collision and risk of release of hazardous substances transported by boats	• Legislation compliant with the International Regulations for Preventing Collision at Sea		• The Strait of Messina Maritime Authority
				<i>Invasive species</i>			
				<i>All pressures / transversal</i>			• Sustainable practices of the ferry boat company
Fishing	✓	✓		Fish stock depletion			
Agriculture	✓	✓	✓	Reducing biodiversity			
Terrestrial / Coastal tourism	✓	✓		Urban development, artificialisation of land, disturbance of natural balance, destruction of ground vegetation			
Maritime tourism	✓	✓		Disturbance of natural balance			
				Invasive species			
Urbanisation / building	✓	✓		Artificialisation of soils, soil erosion, limitation of water infiltration			
Cultural heritage			✓			Procedure to include the area in the UNESCO world heritage	

Table 8: Responses to address risks and pressures exerted on biodiversity and natural environment – Strait of Messina (2/2)

	Creating risks and pressures, and impacting biodiversity and natural environment	Existing responses to address risks and pressures exerted on biodiversity and natural environment		
		Calabrian side	Sicilian side	Cross-border
Urban planning / territorial planning	Artificialisation of land Coastal development, coastal erosion, impact on marine ecosystems			
Marine planning				
Improving governance between actors and joint strategies				<ul style="list-style-type: none"> <li>• Integrated development in the context of the European Straits Initiative</li> <li>• the Strait of Messina Maritime Authority</li> </ul>

# 6 Recommendations

## GOVERNANCE

- The heterogeneity of the governance is notably due to a lack of integration between terrestrial (Province) and marine (Harbour authorities) management. Preferably, a single entity for strait management should be created.
- Via the NOSTRA project, the EU could help by starting coordination at the local level. Initiatives may include aid for training local youths to recognise the cultural and natural heritage of the area as something to be valued and developed, and helping young people to join the local authorities bringing with them a fresh and different view.

### 6.1 Towards the implementation of good practices developed by other NOSTRA partners

During the workshop that took place in Reggio Calabria in February 2014, the NOSTRA partners were asked to identify the best practices developed by other partners of the Network they would like to implement in order to achieve their ideal Strait. However, the partners of the Messina Strait did not submit the best practices they may have chosen.

## 7 References

### **Interviews**

Giorgio Panuccio – Responsible of European Union Policies at the Reggio Calabria's Province, contact point for NOSTRA project

Domenica Catalfamo – Responsible of Transport and Road access at the Reggio Calabria's Province

Laura Marinelli - Responsible of Tourism at the Reggio Calabria's Province

Francesco Forestieri - Responsible of Environment at the Reggio Calabria's Province