



EUROPEAN UNION
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Marine spatial plan for the cross-border area Mangalia Shabla



Current situation analysis



EUROPEAN COMMISSION

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European Maritime and Fisheries Fund (EMFF)

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Volume 1

Current situation analysis - topic paper

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1. Introduction to specific problems of the area

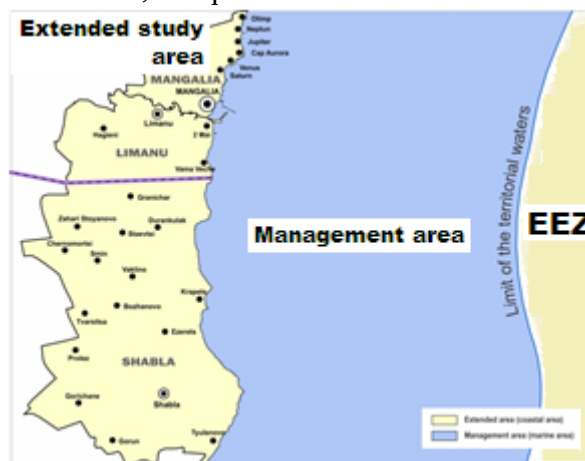
The marine spatial plan for Mangalia-Shabla area was conceived as a pilot project included in MATSPLAN -BS project in order to test the capacities of the two countries to develop and adopt a concrete instrument for the management of the marine area. This plan takes into consideration the existing data describing the processes of the natural marine areas as well as the human activities developed in this area in order to establish balance between human actions and ecosystems subsistence.

The plan is meant also to put into practice the EU Directive for MSP, creating an institutional framework for MSP implementation in Romania and Bulgaria, enhancing the cross-border cooperation and exchange of information between the two countries.

1.1 Plan area delimitation

The spatial plan area is located at the border between Romania and Bulgaria, its delimitation took into consideration two types of zones: the territorial waters (the **management area**) and coastal area and EEZ (the **extended analyse area** for the study of interactions).

The coastal area includes the municipalities Mangalia and Limanu (in Romania) and Shabla (in Bulgaria). The management area is 1,093,389 sqkm, from which the Romanian area is 417,084 sqkm and the Bulgarian part is of 672,93 sqkm.



The spatial plan area

The management area expands on East -West direction from the shoreline (baseline) to the limit of the territorial waters of the two countries, being delimited at North and South by the extension of the Mangalia and respectively Shabla municipalities' limits.

The rationale for choosing the pilot plan area was its location in the cross-border area, its heterogeneity (the Romanian part is urbanised and more populated and developed; the Bulgarian area is more natural, sparsely populated and developed) which could offer a large variety of challenges for the plan's strategic decisions.

The **external context analysis** of the plan area will take into consideration the area contained by the boundaries of the NUTS III units, adjacent to the country border and the Economic Exclusive Zone limit, in order to identify sources of influence (e.g. pollution sources, migration of fauna, transport routes, exploration and exploitation areas, etc.).

Mangalia and Limanu municipalities are located in the South of Constanta County, adjacent to the border. The municipality of Mangalia is located on a plateau with an approximate elevation of 10 meters from the sea level, which borders the seaside on the East and the Limanu lake South. The Limanu municipality include two settlements, Limanu and 2 Mai; the first located at the lake Limanu shore, the second being situated at the seaside.



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The municipality of Shabla (LAU1 region) is geographically located at the North Bulgarian Black Sea coast, from cape Sivriburun to the border of Romania. It is a part of Dobrich county (NUTS III region).

The total coastal length of the plan area is 54.94 Km, from which the Romanian shore length is 21.2 km and the Bulgarian shoreline length is 33.75 km. The Bulgarian area is still low urbanised and low developed compared to the southern part of the Bulgarian coast. The maritime border of the plan area is the territorial waters limit of the two countries.

1.2 Documents relevant for the marine plan area

The elaboration of the marine spatial plan will take in consideration the following international and trans-boundary collaboration documents which have effects on the plan area:

- Convention on the Protection of the Black Sea against Pollution, regulating the environmental protection of the Black Sea by its Protocols and being in concordance with other relevant national/international legislation.
- The Danube River Protection Convention, signed by Bulgaria, Romania and Ukraine, which is an overall legal instrument for cooperation and trans boundary water management in the Danube River Basin.
- The Memorandum of Understanding ensures the economic cooperation between all Black Sea countries.
- The Black Sea Biodiversity and Landscape Conservation Protocol, the Protocol on the Protection of the Marine Environment of the Black Sea from Land-Based Sources and Activities and the Legally Binding Document on Fisheries.
- The Strategic Action Plan for the Environmental Protection and Rehabilitation of the Black Sea, adopted in Sofia, in 2009, by the Governments of all Black Sea countries.
- The Black Sea Environmental Project (BSEP) and the Black Sea Ecosystem Recovery Project (BSERP) and other interventions supported implementation of the Bucharest Convention and the Strategic Action Plan for the Rehabilitation and Protection of the Black Sea, and other projects affecting the plan area.
- The Black Sea Integrated Monitoring and Assessment Programme (BSIMAP) has been implemented by the Black Sea Commission since 2001. The BSIMAP is addressed to the main trans-boundary environmental problems in the Black Sea region.

1.3 Spatial planning documents and strategies relevant for the area

The countries in the Black Sea basin have made progress towards developing more effective ecosystem conservation policies and implementing international commitments, but no marine spatial plan was produced so far. There are a variety of spatial plans and strategies whose provisions are relevant for the marine spatial plan of the cross-border area:

- Development Plan of Shabla Municipality for 2014 – 2020
- General Urban Plan Mangalia Municipality 2014 – 2020
- General Urban Plan for Limanu Municipality 2005
- Development Strategy of Dobrich County 2014 – 2020
- Development Plan for Dobrich Municipality 2014-2020
- Project Plan Coast - Coastal Zone and Maritime Spatial Planning 2006-2008



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2. Current situation analysis of the marine processes and activities and the land sea interactions present in the cross-border area Mangalia- Shabla

2.1 Natural environment

2.1.1 Changes in biodiversity and habitats

Habitats and ecosystems

The habitable marine environment in the Black Sea is mostly on the continental shelf, to a depth of 200 m and is influenced to a large extent, by the abiotic environment and water dynamics. The submarine topography, characterized by different biotopes, ensures the development of flora and fauna closely related to this configuration. Thus, some animals prefer rocky substrates, while others sandy or muddy substrates.

The Pontic biotope can be classified as follows:

Supralittoral: It consists of shore areas covered or occasionally lashed by waves. The area has an increased humidity, flooding, generally large amounts of organic material brought by waves or of local origin.

Mediolittoral: according to soil substrate, it is divided in rocky and sandy or muddy areas and includes the breakwave zone between 0 and 0.5 m deep. In the hard substrate areas it covers a 2-10 m wide strip, depending on the inclination of the rocky platform.

Infralittoral: It lies at depths of 0.5-12 m, maximum 18 m. It is the most favourable area to life, where most species of algae are found and the biomass of most multicellular organisms is the richest, as well as different animal species.

Circalittoral: It extends from 12 to 18 m depths up to 100 m, rarely 150 m. The substrate is usually muddy and less often sandy. The main biotope of this floor consists of associations of mollusks and worms that constitute the favourite food of many species of fish that come here from the infralittoral area to feed.

Periazotic: located between 100 m depth (sometimes 50 m) and 150 m depth (rarely 200 m), it makes the passage between the oxygenated water layer that allows aquatic animal and plant life and the Pontic specific layer of sulphide bacteria, contaminated with hydrogen sulphide. Here are found thanatocoenoses (recently dead animals) or subfossil associations, with low numbers of living organisms. Microbiologically, the area presents a mixture of aerobic bacteria and anaerobes, respectively.

Azoic: It starts at 150-200 m and descends to the maximum depth of the Black Sea (2,212 m). It forms a unique biotope, where the only existing life forms are sulphide-reducing bacteria (*Microspira*, *Desulfovibrio*).

Along the **Romanian** coast are situated a large variety of marine and coastal habitats, falling in the following categories: *infralittoral* areas (submerged) with shallow waters; *mediolittoral* - sandy or rocky shore, *cliffs* continued by limestone plateaus, sand dunes, marshes and salt meadows (**annex 1**).

Due to their ecological value, a great attention is given to the natural habitats of community interest listed in Annex I of the Habitats Directive:

1. Sandbanks slightly covered by sea water all the time (Natura 2000 Code: **1110**) Pal. Class.: 11.12, 11.22, 11.31, 11.33, (Palearctic class)

The habitats are characterized by sandbanks composed of sandy sediments in the form of deposits made up of boulders and cobbles, larger grain sizes and/or smaller grain sizes having tall shapes, oblong, rounded or irregular, permanently submerged and predominantly surrounded by deeper water. The biotopes are associated with sandbanks.

This habitat is located on the coast between Vama Veche – Olimp.



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2. Mudflats and sandflats not covered by seawater at low tide (Natura 2000 Code: **1140**) Pal. Class.: 14

The habitats of sands and muds of the coasts connect the sea and associated lagoons, not covered by sea water at low tide, devoid of vascular plants, usually coated by blue algae and diatoms. The latter is important as food resources for waterfowl - *Haematopodidae*, *Scolopacidae*, *anatides*).

This habitat is located in the plan area on the Black Sea coast between Saturn - Mangalia, 2 mai - Vama Veche, Durankulak, between Shabla – Ezerets and Kaliakra Cape.

3. Coastal lagoons*, priority habitat under Annex I of the Habitats Directive (Natura 2000 Code: **1150**) Pal. Class.: 21

The Habitat of lagoons which represents shallow coastal salt water, of varying salinity and water volume, wholly or partially separated from the sea by sand banks or shingle, or, less frequently, by rocks, with or without vegetation: *Ruppiaetea maritima*, *Potametea*, *Zosteretea sau Charetea*.

This habitat is located in the plan area on the Black Sea coast between Shabla – Ezerets, and Kompleks Kaliakra

4. Large shallow inlets and bays (Natura 2000 Code: **1160**) Pal. Class.: 12

Habitats represented by bays with limited freshwater influence; they have shallow sheltered from wave action and contain a great diversity of sediments and substrates with a rich benthic community presence. The habitats are characterized by a rich diversity of plant associations of *Zosteretea* and *Potametea*.

This habitat is located in the plan area on the Black Sea coast only in Kompleks Kaliakra

5. Reefs Pal. Class.: 11.24, 11.25

Substrate located on a solid base (hard) or sedimentary (soft), which arise from the seabed in the infralittoral and mediolittoral zone.

Reefs are often associated with other habitats - permanently submerged sandbanks in shallow sections, marine caves and estuary habitats, sea arm components, and large shallow bays.

In the Romanian sector of the Black Sea are present several categories of reefs. In *Mangalia - Cape Aurora* zone between 0 and 15 m deep, are located shallow sulfurous hydrothermal vents; in the *2 Mai - Vama Veche* zone, in mediolittoral, there are rocky shores, with artificial habitats of rocks and boulders;

Algal communities, brown, green and red, bivalve and shellfish populate there habitats.

6. Submerged or partially submerged sea caves (Natura 2000 code: **8330**): The ceiling and walls shelter marine invertebrate communities (sponges, hydrozoas, actiniae, briozoans, colonial tunicates) and sciaphyle algae.

Along the **Bulgarian** coast area are located various Natura 2000 sites with great variety of habitats and numerous species of flora and fauna (**annex 2**). Marine habitats of European interest in the plan area are:

1. Sandbanks slightly covered by sea water all the time (Code Natura 2000 02A2; code Pal. Hab: 11.125, 11.22, 11.31, 11.33)

The habitats are characterized by deposits of sandy sediments, permanently submerged and predominantly surrounded by deep water. The biotopes are associated with the sandbanks.

This habitat is located between Shabla – Ezerets, Tyulenovo-Shabla cape, Krapets and the Romanian border.

2. Littoral sands and muddy sands (Code Natura 2000: 02A2; code Pal. Hab: 11.27);

3. Black mussels and/or barnacle communities on mediolittoral rocks (Code Natura 2000: 01A1; code Pal. Hab: 11.29);

4. Underwater “meadows” of sea grasses (Code Natura 2000: 05A2; code Pal. Hab: 11.333);

5. Submerged macrophytic communities in hypersaline water bodies (Code Natura 2000: 06A2; code Pal. Hab: 11.412);



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6. Infralittoral rocks and other hard substrates (Code Natura 2000: 07A3; code Pal.

Hab:11.24);

7. Cystoseira spp. on exposed to waves infralittoral bedrocks and boulders (Code Natura 2000: 08A3; code Pal. Hab:11.24);

8. Sea caves (Code Natura 2000: 09A3; code Pal. Hab:12.72);

9. Sublittoral sands (Code Natura 2000: 10A4; code Pal. Hab:11.22);

10. Sublittoral mussel beds on sediments (Code Natura 2000: 11A4; code Pal. Hab: 11. 254).

- Coastal habitats

On the coastal area are located a significant diversity of habitats which shelter many distinctive plant and animal communities, specific to saltwater wetlands, sand dunes, steppic, ruderal and marine cliff zones. Many of these are affected by the residential complexes located near the coastline. Regarding to the benthic macrophytes on the Black Sea coast, 68 species are considered threatened and 22 are extinct or endangered.

The presence on the coastline of Romania and Bulgaria of important wetlands and lakes is especially important for avifauna and the marine shore habitats. The most important types of coastal habitats in relation with the marine area are presented in **annex 3**.

Protected marine areas and areas in need of protection

Since a large part of the Black Sea basin (i.e. approx. deeper than 200 m) is anoxic, life forms in the sea display limited diversity and almost all pelagic and benthic fauna and flora dwell in the shallower upper oxic water layers. Therefore a large part of the marine continental shelf must be formally protected in order to preserve the biodiversity of flora and fauna (**annex 4**) and the conditions that support its specific processes. The marine protected areas, established under the Habitats Directive (Council Directive 92/43/EEC) and Special Protection Areas (Directive 2009 / 147 / EC) in the plan area are as follows:

ROSCI0281 - Cap Aurora

The site is entirely located in the area covered by the sea resorts Olimp, Neptun, Jupiter, Cap Aurora, Venus and Saturn and overlaps with the Black Sea region.

The site has 2 protected habitats listed in Annex I; 2 mammal species *Phocoena Phocoena* (porpoise, porpoise) and *Tursiops truncatis* and 2 species of fish - *Alosa immaculate* and *Alosa tanaica* listed in Annex II of the Habitats Directive. The dominant classes of habitat in the sites are marine zones and islands.

The two protected habitats, covering most of the surface of the site, include the next subtypes:

- 1170, the habitat with the largest area, has 7 subtypes from which the most important are
 - 1170-2 *The biogenic reefs of Mytilus galloprovincialis*, located in the offshore site, between 30-45m depth and
 - 1170-8 *Infralittoral Rock with photophilous seaweeds*, represented by *Cystoseira barbata* belts.
- 1110 the habitat wich has 4 subtypes, the most important are
 - 1110-3, *Shallow fine sands*, represented in the site by biocoenosis with *Donax trunculus* and
 - 1110-8, *Shallow bioturbate sands of Arenicola Callianassa* very rare in the Romanian area of the Black Sea

The site is under pressure by anthropic activities - continuing urbanization of the coastal zone, extending of the artificial beaches, dams, recreational boating and underwater amusement, fishing, aquaculture and selective fishing.



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ROSCI0094 - Submarine sulfur springs in Mangalia

The site is located in the marine area, near the Saturn resort and Mangalia municipality. It has protected elements 3 habitats are listed in the Habitats Directive, Annex I and 12 important species of flora and fauna. The dominant classes of habitat in the sites are marine zones and islands.

Although with a small area, this site hosts the greatest diversity of marine habitats and species in Romania, having their conservation status of the best in the country. It is the only place in Romania where it survives seagrass, *Zostera noltii*. The habitat is located in coves, 78%, on the beach of Mangalia and the rest, 22% in another cove located on the north breakwater of the Mangalia port.

The site is also important because it contains mostly (90%) of the population of perennial algae *Cystoseira barbata* from Romania.

The subtype habitat, 1110-1, *Fine sands, clear or slightly muddy with Zostera noltii meadows*, is characteristic for shallow depths (0.5-3m) and the seagrass plain is found in sheltered areas by the wave action and the prevailing winds on substrate of fine sand (100-200µm).

ROSCI0269 Vama Veche - 2 Mai, covers 4 types of elementary habitats: 1110, 1140, 1170, 8330, with 15 sub-types, which were identified.

The priority conservation objectives for the ROSCI0269 Vama Veche - 2 Mai site are reaching the good conservation state for the 1170-10 *Pholas dactylus*, 1170-8 *Cystoseira barbata* and 1170-2 *Mytilus galloprovincialis* habitats, all slightly degraded, including the conservation of the representative species *Cystoseira barbata*, *Pholas dactylus* and *Corallina officinalis*. In addition, the mammal and fish species in Annex II of the Habitats Directive occurring in the site must also be protected: *Tursiops truncatus*, *Phocoena phocoena*, *Alosa immaculata* and *Alosa tanaica*.

BG0000154 Ezero Durankulak site of community interest and **BG0002050 Durankulashko ezero**. The area is called Durankulak Lake Natural Complex and includes Durankulak Lake, the wetlands around the lake, the steppe habitats nearby, the sand dunes between the lake and the sea and the adjacent marine area. (*Coastal Biodiversity Conservation Dobrogea Strategy -2008*). The lake is a freshwater-brackish water lagoon of natural origin and with considerable vegetation cover. It lies in a former river valley, that is why the lake has a specific 'S' shape.

The lake of Durankulak is one of the places with large concentrations of birds, many of them endangered species and a place of global importance for winter waterfowl and for autumn and winter migration

The lake is under municipal property – 23%, state property – 38% and private property – 39% (Vasilev et al., 2013). Arable lands occupied by cereal crops prevail in the adjacent areas, as the lake is located in the Dobrudzha region – one of the most fertile lands.

The lake and its related ground water are of importance for irrigation of the neighbouring arable lands.

The lake has an elaborated and operative management plan including a wide spectrum of conservation measures (1998), but still missing developed and enforced management plan for Natura 2000 protected site.

The main treats are mainly related to anthropogenic impacts: illegal draw of water for drinking and irrigation causing fluctuations of the water level during the period of active exploitation – May through October. The separation of the Kartaliysko Marsh from the lake, by means of a dyke, is disturbing the water regime of this part of the lake. Nutrient overload is the main cause of accelerated eutrophication and of unbalancing of the aquatic ecosystem of the lake. Large-scale illegal net-fishing in the lake is another treat.

In 1993 the wetland was included in the Montreux list of Ramsar sites threatened by changes to their ecological characteristics



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BG0000621-Ezero Shabla - Ezerets community importance site and **BG0000156-Shablenski ezeren complex**.

These are two brackish, coastal lakes of connected by an artificial canal. The lakes overlies a horizon of sand 4-5 m thick deposited on top of a rich peat layer, evidence of a long marsh period. Limestone forms huge karst fields in parts of the wetland. The lake is fed exclusively by groundwater.

The Shabla area important for its large variety of bird species, there are 274 documented species of birds in the area, representing 68% of the total number of existing species in Bulgaria

The lake is under state property – 38%, municipal property – 14% and private property – 48% (Vasilev et al., 2013). The groundwater connected to the water in the two lakes is the subject of significant abstraction for drinking purposes for the surrounding settlements and for the district center – Dobrich and for agricultural-land irrigation purposes.

The wetland is located in the fertile lands of and therefore, there is significant agricultural use of adjacent areas.

Most of the complex is in good condition due to the special regime over part of the area. The common threats include excessive water use, illegal hunting and fishing, disturbance, pollution (with chemicals from the neighbouring agricultural lands). The lakes are polluted with nutrients (ammonia salts, nitrites, nitrates and phosphates) and with organic matter resulting from intensive agriculture and animal breeding in the region.

BG0000573 - Kompleks Kaliakra overlapping the **BG0000573** site - **Kaliakra Reserve**.

The area is distinguished by the 18 types of habitats that are under conservation in accordance with Annex I, Habitats Directive and 38 species under Annex II of the same Directive. The site limit on the coastline lies between the village port Tyulenovo and Cape Kaliakra, 34km.

The total Reserve area is 687.5 hectares, of which 400 hectares is marine area. The reserve aims at the conservation of coastal marine ecosystems, steppe vegetation, fauna and the rare bird species nesting or endangered.

The marine area north of Cape Kaliakra (Tyulenovo village) is a habitat of *Clupeidae* fish, including a migratory corridor to the breeding and nurturing grounds in the Danube region.

The marine Kaliakra area has also a high significance for *Cetaceans* - *Phocoena phocoena* and *Tursiops truncatus*, which is a stopover during their trophic migrations and provides a high biodiversity and habitat for the monk seal.

The coastline is fringed and has in some places a height of 100 m above sea level, with caves and niches, shapes characteristic to the limestone relief. The vegetation has developed a specific prevalent steppe associations and rare trees and shrubs. Therefore it provides shelter to a great number of bird species (310, of which 71 are listed in the Red Book for Bulgaria).

The site also includes 100 species listed in Annex II of the Habitats Directive, which requires special conservation measures, of which 95 are listed in Annex I of the Birds Directive.

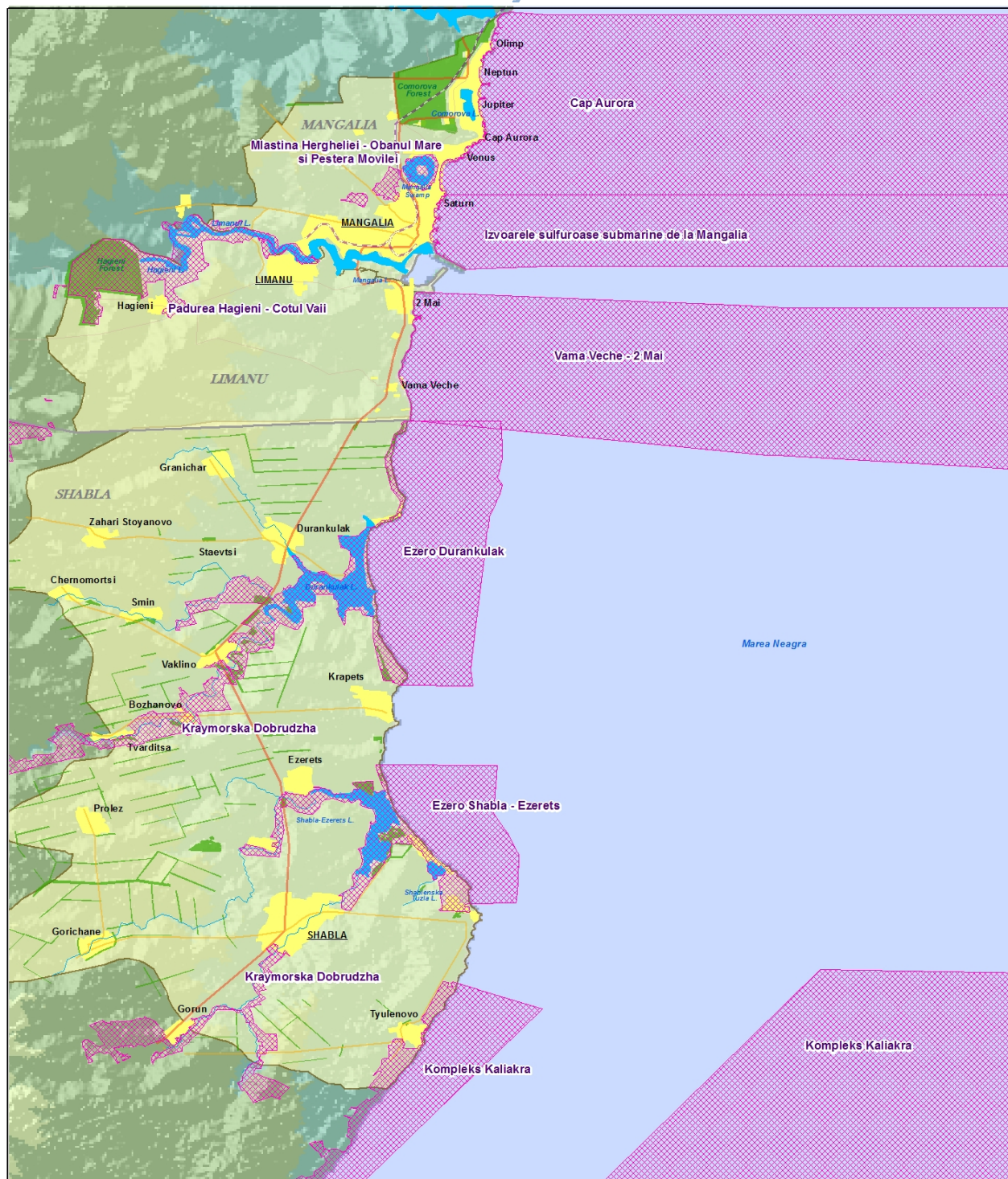
Located on the migration route Via Pontica, the site is particularly important during bird migration and is also important for breeding species.

The vulnerability of the area is linked to specific coastal habitats where human influence is present, like fishing – selective fishing, water sports, traffic - the existing of a road in the site, the existence of a pumping station in the western part of the site.

Also, a major issue is the construction activities which are changing the landscape, the reforestation with exotic species, the extraction of the construction material from beaches, the latter having a negative impact on habitats 1110 and 1170, the prospection, exploration of natural resources on the coast and the discharge of untreated wastewater.



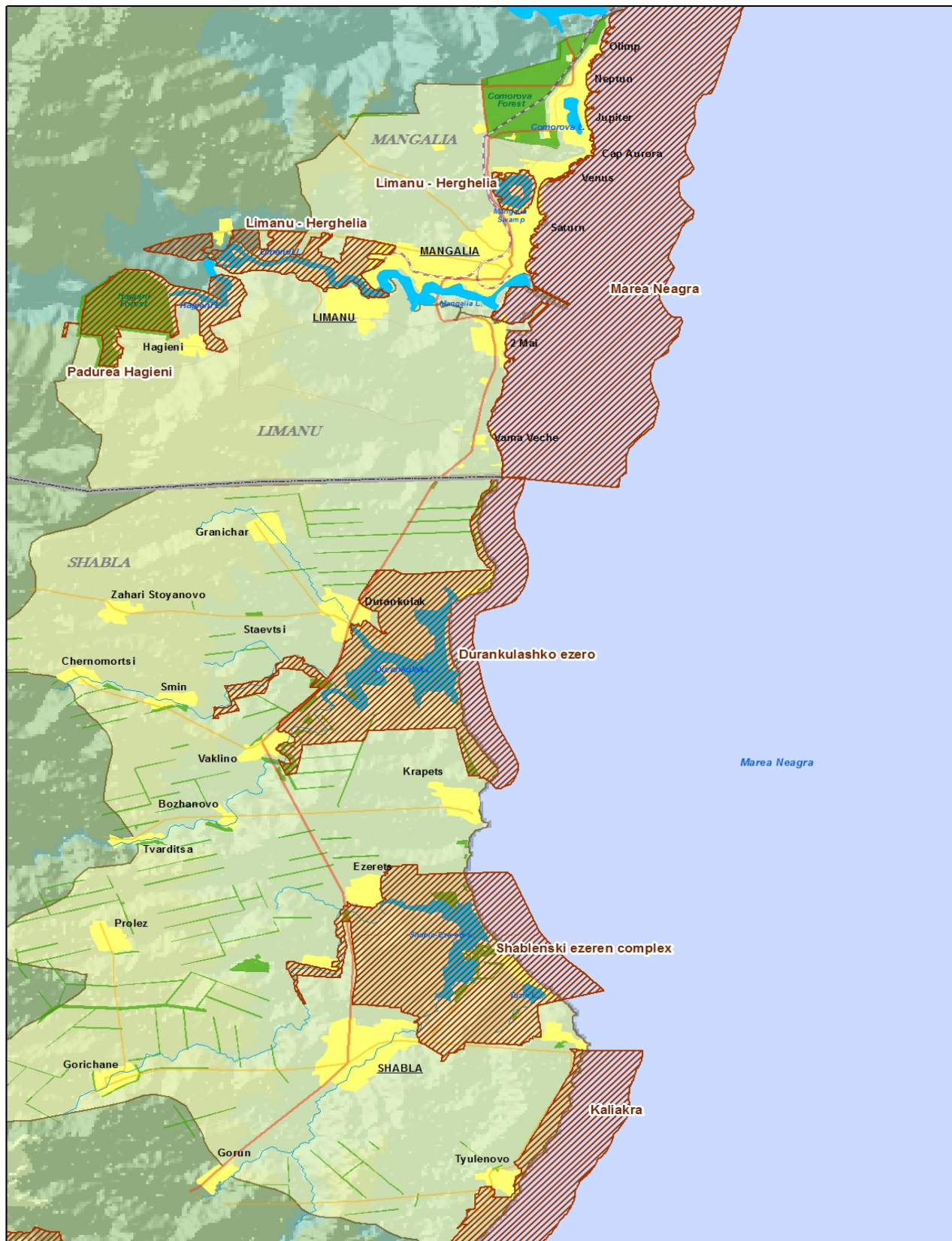
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The SCI sites in Mangalia – Shabla area
Source: <http://natura2000.eea.europa.eu/>



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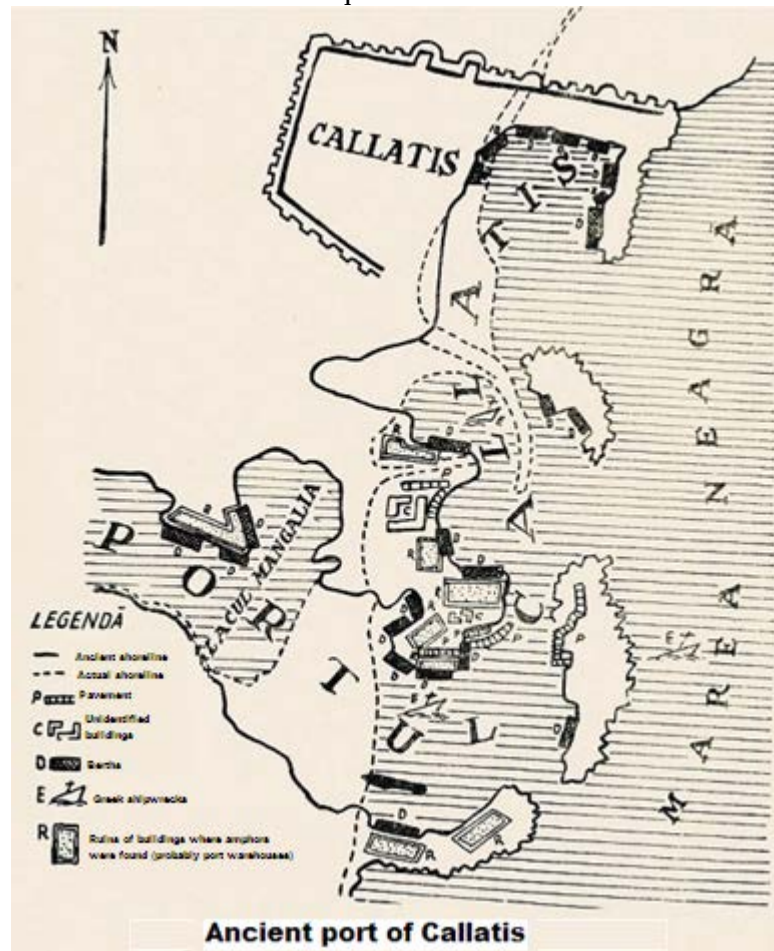
The SPA sites in Mangalia – Shabla area
Source: <http://natura2000.eea.europa.eu/>

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Underwater cultural heritage

In the last period many attempts to research the submerged historical heritage were made in the area, with extraordinary results.

An entire part of the old city of Callatis (Mangalia) is now under sea, with streets, remains of the buildings, columns, ceramics; at this it is added the remains of the ancient and medieval port with sunk ships, (by various reasons) adjacent to Mangalia shoreline. Now it is estimated that only 15-20% from the submersed archeological artefacts are recovered from the sea. Also, the perimeter of the submersed city is estimated at about 4.5 square miles.



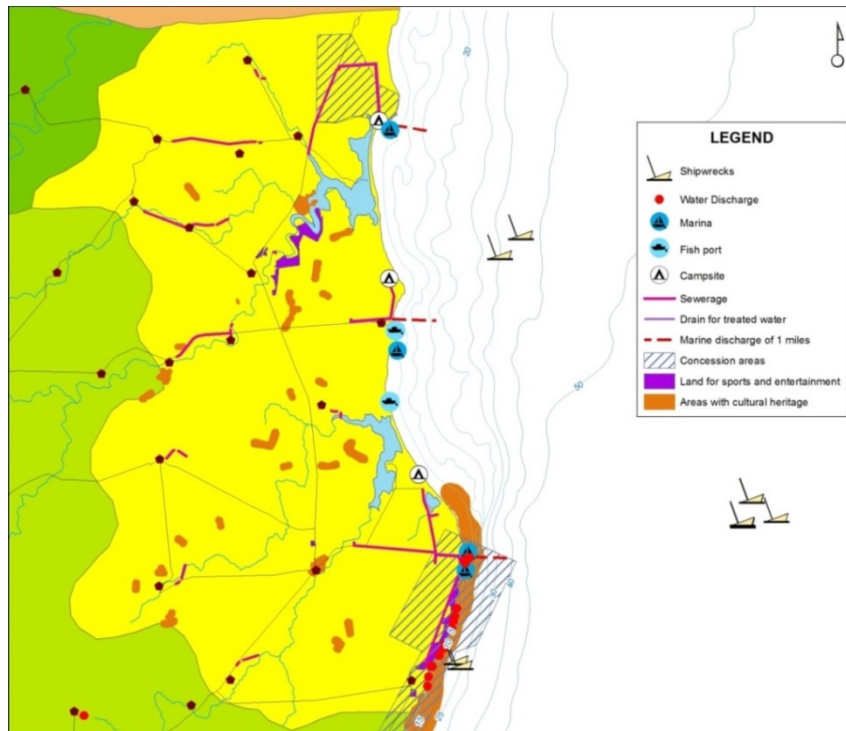
In the Black Sea ships have sailed since ancient times. Even the oldest Mediterranean sailors, the Phoenicians, visited the Black Sea area and all other came after them. At the same time, except trade ships in the Black Sea there were active military actions. For this reason, there are found numerous shipwrecks both wood older than 2000 years, and modern metal ones. These ship wrecks are interesting for both researchers and tourists (scuba divers). As the coast east of Shabla is straight and open, in the maritime space of plan area numerous shipwrecks have been found (trade and military). The location of some of these wrecks is already known, nevertheless they still need to be further explored and protected for the future generations (see figures).

Shabla is a municipality with ancient history and rich culture. The historical development of the area can be traced back to the earliest times, 7000 years ago, on the extremely rich archaeological finds, which are still under-researched and known. The most important of these are:

- From the 6th and the 5th millennium BC. - The Prehistoric Necropolis near Durankulak, the largest prehistoric necropolis studied in the world.
- The Bronze Age: multiple burial mounds grouped in mound necropolis complexes;

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- The Hellenistic Age: The ancient fortress near Shabla, the sanctuary of the goddess Cybele on the Big Island of Durankulak Lake, Thracian settlements near the village of Vaklino;
- Antiquity and Middle Ages: near Durankulak, Shabla, the villages of Vaklino, Gorichene, Ezeretz, with particular significance for the two fortresses in the context of the Roman province of Scythia: Ancient and late antique port fortress Karon Limen near Shabla and Late Antiquity and Early- The Byzantine fortress "Kaletó" near the village of Tvarditsa.



Main coastal and marine zones with cultural heritage in the Shabla area

Biodiversity

- inventories of species

During the period 1960-1970, there were 26 commercial fish species in the Black Sea, and the potential of Romanian platform is of 140 species, at the present, only about ten pelagic species remained: sprat, anchovy, horse mackerel, a.o. and three demersal species, turbot, sole and plaice.

In the Black Sea live three marine mammals, common dolphin *Delphinus delphis*, thick-nosed dolphin *Tursiops truncatus* and porpoise *Phocoena phocoena*, all of them are protected, first in Annex IV of the Habitats Directive and the last two in Annex II. These species are threatened by the intensive fishing, the decrease of marine fish stock and the degradation of marine environment.

Reptiles and amphibians that are found on the Romanian and Bulgarian coast, according to the *Conservation Strategy of coastal Biodiversity, 2011*:

- Reptiles are in larger numbers in Bulgaria
- In Romania, all species of amphibians and reptiles are included in the Habitats Directive (OUG 57/2007), with one exception; in Bulgaria only some of them are included in the Habitats Directive (Law 77/2002)
- In the plan area can be found a significant number of species compared to the national level for both in Romania and Bulgaria.

In the Romanian plan area there were recorded a number of bird species:

- 80 species under protection according Annex 1 of the Birds Directive;
- 104 migratory species according annexes on Migratory Species Convention (Bonn);
- 13 bird species endangered worldwide.

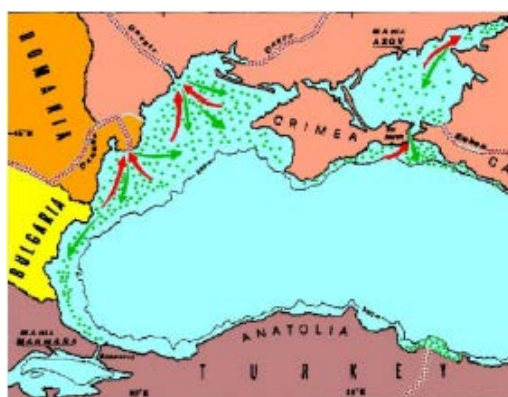
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In the Bulgarian plan area there are 260 bird species on the territory of the lake complex Durankulak and Shabla-Ezerets, as 70 respectively 72 species are included in the Bulgarian Red Book (1985). 111 species are of European conservation concern (SPEC) (BirdLife International, 2004): 13 species as globally threatened in category SPEC1 and 26 threatened in Europe species in category SPEC2.

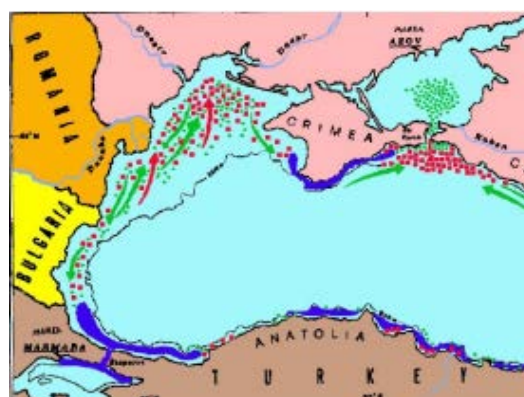
- species composition

The shallow sea water habitats situated near the coast are nursery and spawning grounds for many species. The main commercial marine species for the plan area are *Sprattus sprattus*, *Trachurus mediterraneus ponticus*, *Engraulis encrasicolus*, *Sarda sarda*, *Alosa immaculata*, *Squalus acanthias*, and species of Gobiidae. Turbot (*Psetta maxima* L., 1758) is a very important demersal fish species for the commercial fishery as well as. Some of the fish species occurring in the area have a high conservation status and species are listed under different categories in the IUCN Red List (IUCN, 2016). All representatives of family Acipenseridae are international trade restricted (included in Appendix II of CITES since 1.04.1998 for family Acipenseridae).

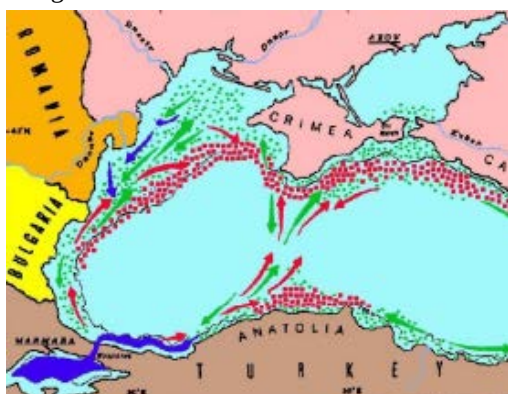
Some of the fish species have a seasonal and/or migratory character. Other species are non-migratory and can be fished all year-round. Trayanov et al., (2007) published a comprehensive list of fish species with transboundary distribution.



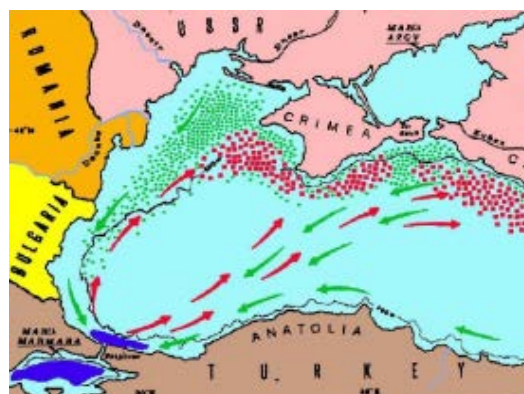
Sturgeons



Red mullet

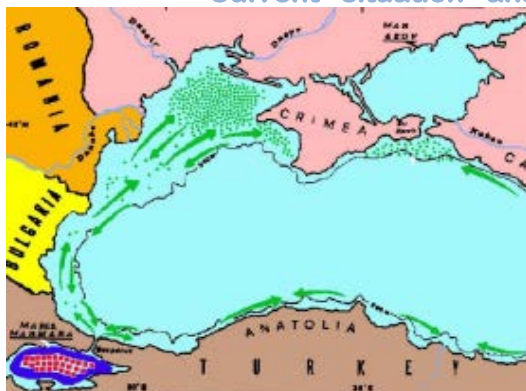


Bluefish

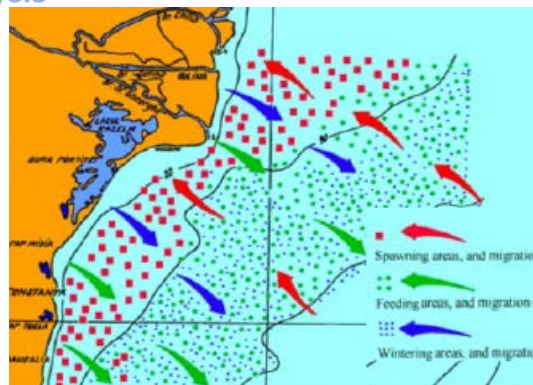


Bonito

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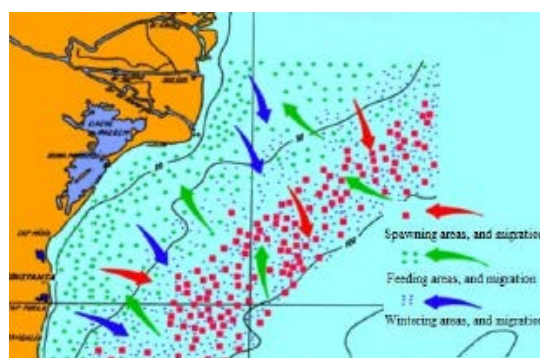
Atlantic Mackrel



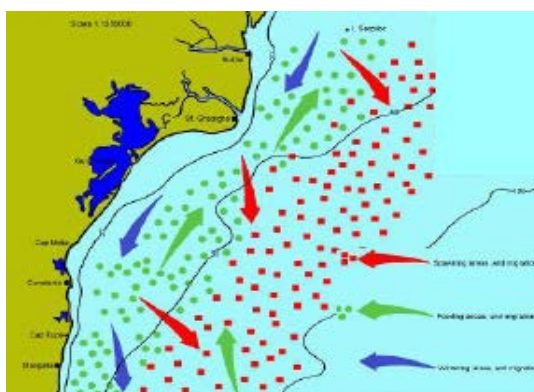
Turbot



Sprat



Whiting



Horse mackrel



Anchovy



Migration routes, spawning, feeding and wintering areas for representative fish species

Source: Case study on marine fishery and aquaculture under Marsplan - BS project

The marine area north of Cape Kaliakra (Tyulenovo village) is a habitat of *Clupeidae* fish, including a *migratory corridor* to the breeding and nurturing grounds in the Danube region. Bulgaria has largely developed the exploitation of an invasive sea snail, the Rapana (*Rapana venosa*).

Fish species in different **coastal wetlands habitats** have been reported. In the past, the lakes Shabla and Ezerets were dominated by fish species as *A. brama*, *C. carpio*, *S. glanis*, *E. lucius* and *P. fluviatilis*. In the recent years most frequently found were *R. rutilus*, *S. erythrophthalmus*, *S. abaster*, *P. fluviatilis*, *K. caucasica*, *N. melanostomus* and *P. marmoratus*. The species *K. longicaudata*, which is listed as Extinct in the Red Book of Bulgaria, was found in low



Current situation analysis

abundance in the lakes. The finding of *C. cultriventris* considered as extinct in most lakes along Black Sea, was reported in the lake of Ezerets (Vassilev, 1998).

Most abundant in the Durankulak Lake were the species *A. bjoerkna*, *C.gibelio*, *R. rutilus*, *S. glanis* and *S. lucioperca*. Recent research showed the dominance of *C. carpio*, *R. rutilus*, *S. erythrophthalmus*, *S. abaster*, *P. fluviatilis*, *K. caucasica*, *N. melanostomus* and *Pr. marmoratus*. Frequently found were also the species *C. carpio* and *S. lucioperca*. The lake was reported as the only habitat of *N. platyrostris* (Vassilev, 1999). The lake is the only habitat of wild carp in Bulgaria, proven to date. Most of the Bulgarian coastal lakes had very high fish production in the past. In recent years the fish resources have been considerably reduced, increasing the dominance of non-commercial species. The main threats to the fish populations are changes in hydrological and hydro chemical parameters of the lakes, especially in halinity, hydro-engineering development, industrial and household pollution and overfishing.

The marine area is with high significance for *Cetaceans* - *Phocoena phocoena* and *Tursiops truncatus*, which is a stopover during their trophic migrations. All these species are included in the red book of the Black Sea endangered species. The seal monk (*Monachus monachus*), (extinct in Bulgaria) belongs to the group of top-predators, which distinction together with reduction of the dolphins abundance was the main reason for the trophic cascades in 80's (ecodb.bas.bg/rdb/en/vol2/Momonach.html), with deleterious effects on the whole ecosystem. The reserve 'Kaliakra' in Bulgaria provides a high biodiversity and habitat for the monk seal (Trayanov et al., 2007).

2.1.2 Influences/pressures on marine environment

Natural influences/pressures

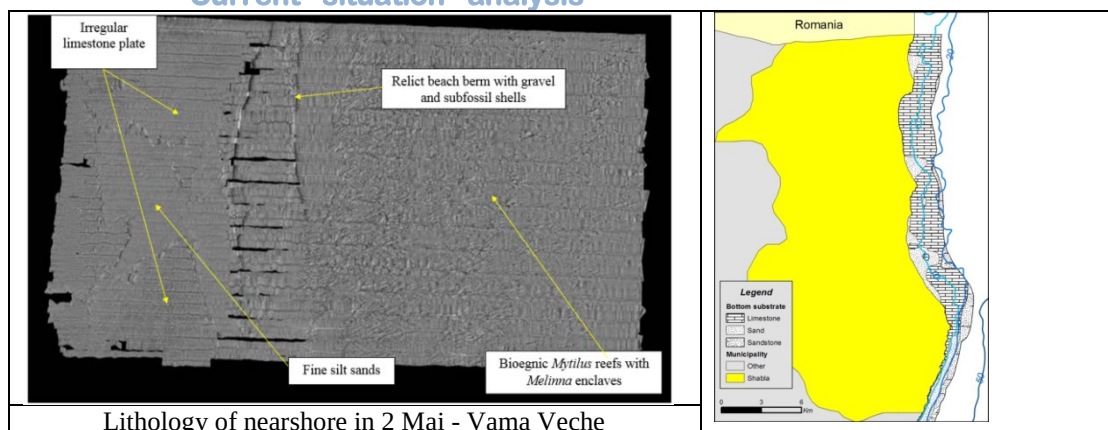
- geomorphology

The southern sector of the Romanian coast, consisting mainly of cliffs formed of thick loess arranged above a discontinuous Quaternary red clay and Sarmatian limestone. There are discontinuous outcrops in the limestone base of the cliff and extending in the submerged area, forming a continuous submarine layer.

The superficial sediments on the continental shelf of are distributed according to actual hydrodynamic regime while retaining sediments and numerous relict bodies. Sands are found mainly near the shore and at a depth of 30-35 m. The superficial sediments at greater depths consist predominantly of clays and silt, with relict sedimentary sand bodies.

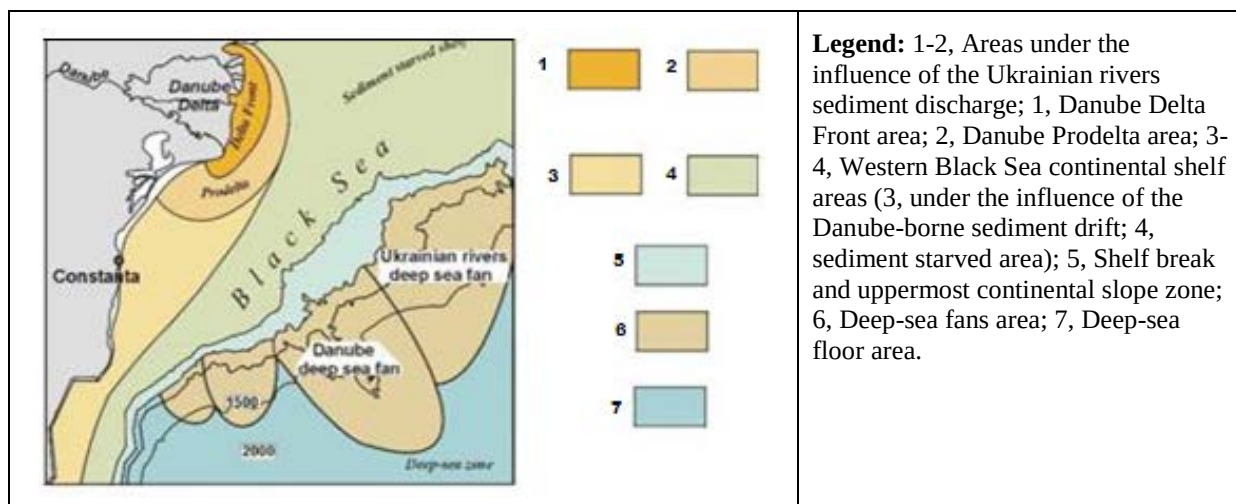
Bulgarian shelf includes in its northern part a system of underwater sea terraces and smaller underwater sandy banks with depressions between banks. The underwater coastal slope is covered mostly by rocky banks overlaid by a dynamic sandy layer. In the coastal zone down to 1.5 m depth mostly sandy deposits prevail. The nearshore underwater slope is presented mainly from limestones, sands and sandstones (**see figure**).

Current situation analysis



Lithology of nearshore underwater slope along the plan area in Romania and Bulgaria

The plan area is under the influence of sediment discharge of the main rivers tributaries of the NW Black Sea basin. The sediment is transported by the Rim Current, confined mainly along the continental slope and margin topography around the basin and a series of anticyclonic eddies along onshore side of the Rim Current.

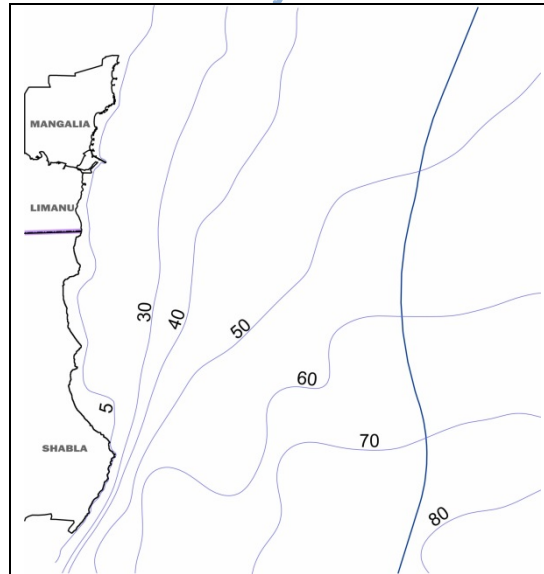


Main sedimentary environments in the northwestern Black Sea (after Panin et al., 1998)

- bathymetry

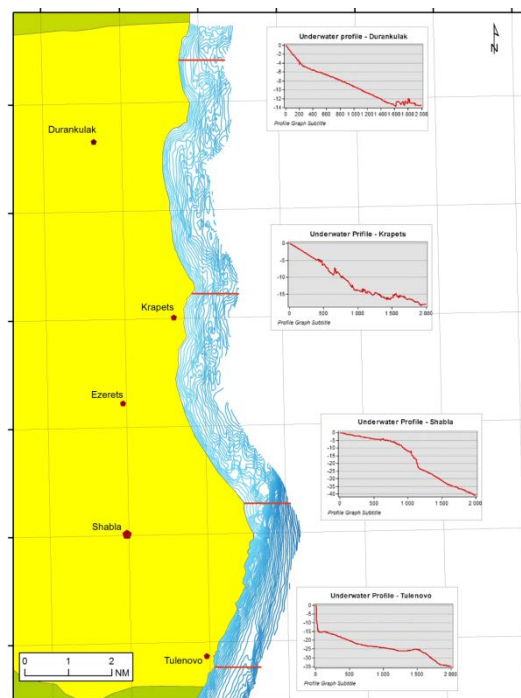
The adjusting underwater slope is the shallowest, comparing with the other parts of the continental shelf, mostly from the depths deeper than 50 m. For example, the depths of 75 m are located at a distance from the coastline between 12 nautical miles at the south part of Shabla municipality, to more than 40 nautical miles to the most northern part. The depths of 100 m are located respectively on 28 nautical miles distance from the coastline on the South part and 55 nautical miles on the North. Actually, this is the shallowest part of the Black Sea shelf zone.

Current situation analysis



Bathymetry map of the plan area

The *underwater coastal slope* retains its character to the most eastern point of the Bulgarian shore, until Cape Shabla. On the north, the shore is shallow, as the depths in the 2 miles portion reaches 20 meters in front of the capes sections and in front of the beaches, depths are only 15-16 meters. South of it the depths increase sharply, as in some places, the depth of 15-20 meters (circalittoral) is reached less than 100 m offshore. Here, the deepest measured depth in the 2-mile zone reaches up to 40-45 m



Bathymetry map of one mile offshore zone with underwater profiles (Bulgarian area)

The nearshore coastal slope of plan area is composed of coarse - to fine-grained sands, aleurite, gravel and carbonate lithification. Deeper (between 20 and 60 m), the Holocene units A, B, C and D (gray-black, gray and gray-green, soft, terrigenous muds) are distributed (**See figure**). The largest distribution is on Unit O (modiolus shellfish accumulations), reaching 100 m isobaths. Units K and H (olive to gray-green, middle plastic, terrigenous muds with detritus) are other shelf type



Current situation analysis

sediments presented in the plan area. The deep sea sediments are presented by unit *Ia* (light green, fine disperse, carbonaceous, coccoliths clays), unit *Ia* (diatomaceous and coccolith sediments), unit *Ia* (clayey lithofacies) and unit *Ic* (Pleistocene terrigenous grey clayey muds).

- impact of changes in physical conditions of the sea (river discharges, erosion, accretion, natural hazards, large debris flows, large turbidity currents, slumps and structure failures)

The hydrophysical characteristics of the marine area coast are a principal factor determining hydrochemistry of the region, biochemical processes and marine organisms' behaviour. The *hydrophysical characteristics* include currents, temperature and salinity regimes.

Currents in the area are strongly dependant on the Black Sea main rivers inflow and the Rim Current. The Rim Current is cyclonic and flows counterclockwise at an average of 10 – 30 n.m. distance from coast and pass along Shabla coast in southern direction. In late summer Kaliakra anticyclonic eddy emerges at the end of the shelf zone. The close coastal current caused by the river inflow in the Black Sea north-western part is formed completely after Danube waters reception. Along coast the stream follows southern direction and near Cape Kaliakra merges with the Rim Current. South currents are most intensive in winter and spring. Strong winds from south in summer and autumn in immediate proximity to the coast turns currents towards north and west, causing upwelling phenomenon. The latter is favoured by the relatively steep shelf area. Pushing surface waters out make oxygen poor subsurface layers to shift up and mass mortality of marine organisms may occur as a consequence.

The salinity of the surface layer of the marine area is typically about 17 ‰. In spring and summer it could decrease to 13 ‰. The surface waters salinity is strongly dependant on the hydrological regime, defined by the Danube river input and precipitation. Surface salinity may increase during upwelling. In deeper layers in coastal area waters salinity slightly increases to 18 – 19 ‰. In open sea the salinity is slowly increasing bellow CIL down to the redox zone where it suddenly rises above 20 ‰ forming halocline at oxic/anoxic waters boundary and continue increasing with depth to 22 – 23 ‰.

Temperature of the surface sea water varies in large limits depending on the season in ranges: 2 – 6 °C to about 23 °C in summer. In winter the upper 20 – 30 m layer is rather isothermal and deeper waters temperature raises to 8 – 9°C. During transitional seasons and summer an upper warm layer is formed, as well as distinct thermocline. It is at 5 – 10 m depth at beginning of spring and late autumn and sinks as low as 40 m in summer. Under the thermocline boundary, temperatures decrease down to 8°C at 50 – 60 m forming the Cold Intermediate Layer (CIL). Bellow CIL temperature gradually increases to 9 °C. During upwelling conditions in summer the thermocline boundary shifts up and prevents gas convection from surface to seabed layers leading to oxygen depletion and marine organisms mass mortality. During strong storms water mixing occurs and the entire water column becomes isothermal and isohaline and isothermal.

- climatology, atmospheric deposition, wind, waves

The plan area is located in a temperate continental climate, which is adjusted by the influence of the Black Sea Basin. Due to the flat terrain of the plan area the strong winds are very common. Often invaded by cold air masses associated with continental climatic events, respectively and the average absolute maximum temperatures are slightly lower than those measured inland. Other characteristic is a relatively high amount of radiation balance. Droughts are common, rainfall is weak. The influence of the Black Sea Basin reaches to 25-30 km west of the coastline.

The average wind speeds station is approx. 4 m/sec (Climate Reference Book, 1982). This value is twice lower with Kaliakra station

Winter is the stormiest season, when the high values of winds speed are recorded compared to the other seasons. In January, at cape Shabla the average wind speed reaches 4.7 m/s, compared to cape



Current situation analysis

Kaliakra, where the average wind speed reaches 8.5 m/s. The prevailing wind directions along the coastal area come from the north quarter: NW (27.5%), NE (13.5%) of the wind cases and N (11.8%), as well from the SW (14.5%),

Other important wind characteristic is the frequency of strong winds (wind speed ≥ 14 m/s). The highest mean winds speeds are recorded during the winter months (January, February and December). Calm days are only 18.9% of the days of the year. The lowest number of calm days is recorded in February (11.6%) and March (13.8). The months with highest number of calm days are July (29.1%) and August (26.7%).

The average annual temperature varies between 10°C and 14°C, with prevailing values between 11°C and 12°C. The hottest months are July and August (average maximum July temperature of 22.5°C).

Other main climate characteristic is rainfall; its distribution is uneven along the coast. The peculiarity in the distribution of rainfall is closely related to atmosphere circulation over area as well as by the important influence of the Black Sea. The smallest rainfall amounts are measured in Dobrudzha region, at Kaliakra station the value are 410 mm/year and at Shabla station the value are 480 mm/year.

The coastline orientation of the plan area and wind direction determines the wave regime. The significant wave height with one and ten return period is 6.29 – 8.70 m for Cape Shabla and 7.13 – 10 for Cape Kaliakra (Grozdev, 2005).

Offshore winds and waves are estimated by means of model simulations and reanalysis (Valchev et al., 2010b). In the western Black Sea most frequently winds blow from north-east and east, which give rise to the most severe storms. North-eastern winds prevail in the north (26% probability of occurrence) and middle (29%) fractions of the shelf zone, while for the south one the portion of east winds is decisively larger – 32% – that is almost 3 times the value for the north portion (11%). Generally, south-east winds are less significant in terms of storm intensit. Winds from other directions of the North quarter (N and NW) are of median frequency.

Offshore wind rose for 8 directional and 8 wind speed magnitude bands with 2.5 m/s increment, representing the probability of occurrence in percentage of winds with given direction and speed estimated for the North Bulgarian shelf.

With respect to the wind action intensity, most frequent are winds with velocity magnitude falling in the 2.5÷5.0 m/s and 5.0÷7.5 m/s bands with relatively constant probability of about 30%. The strongest winds (speed magnitude > 17.5 m/s) blow only from north-east and east and represent about 2% of total number of cases for the north, 0.4% for middle, and 0.8% for south portion of the western shelf.

In the western shelf, most probable waves' directions are coming from East and North-East. The East waves are predominant within the entire shelf zone ranging between 30 and 40% probability of occurrence. The fraction of north-eastern waves remains nearly constant (about 32% probability of occurrence). Due to refraction, part of waves takes directions of the eastern quarter in the most north shelf portion. Waves coming from the western half are of negligible weight both in terms of probability of occurrence and wave height. The former shows an average of 5.5% while the latter rarely exceeds 1.0 m. Waves from these directions are distinguished for fetch-limited conditions of their growth within the western shelf, and are irrelevant for the coastal processes. Most frequent are waves with significant heights < 1.0 m. The largest waves (significant height > 3.0 m) come only from north-east and occasionally from east (0.1%) and represent about 0.3% of total number of cases for the north portion of the western shelf. Extreme waves, larger than 4.5 m, propagate exclusively from northeast.

Storms and storm surges are typical for Black Sea coast in the period of September - March. More than 40 % of the coast is very or extremely exposed to wave impact. More specifically this applies



Current situation analysis

to shore units of Krapets, Shabla, Tulenovo and Bolata. Most exposed to unfavorable storm impacts (strong wind and high waves) are the endmost northern, middle and southern parts of the coast. Coastline exposure as well as substrate of the seabed in front of the shore units is deterministic in relation to the wave exposure classes.

Quality status of the environmental components

The environmental quality status of the marine area is directly bound to the human pressures: resources utilization, industrial and agricultural activities, urbanization, infrastructure and waste water treatment. Generally, the quality status is estimated as “good”, favoured by reduced production activities in last decades, leading to decreased air, water and soil pollutants emissions.

Air

There are no large industrial facilities located in the area with significant air pollution activity. The principal air pollutants are ash and sulphur dioxide, emitted by household solid fuels heating in the cold part of the year and hydrocarbons and nitrogen oxides from the transport during the active recreational season. The risk factors for the air pollution are the increased transport activity and wear out of the local vehicles. Regular governmental control is applied to air pollution parameters, but no systematic pollution was detected. There are three groups of facilities under control:

1. Fixed potential sources;
2. Sources of volatile fuels;
3. Sources of volatile solvents.

Fresh water

There are no surface land water sources. Municipalities are provided with water from underground water sources. Although, there is underground water pollution caused by:

- unsanctioned usage of nitrogen containing fertilisers in agriculture;
- the waste waters are generally untreated except those from Shabla which are collected in a partially built WWTP. Since local ground composition is practically all lime – a porous rock, the household waste waters easily penetrate through soils;
- food industry does not treat waste waters properly;
- unsanctioned household wastes dumping around communities and recreation sites;
- unsanctioned dumping of wastes from animal farms.

In spite of occasionally exceeding the Maximal Acceptable Concentrations (MAC) of nitrates and microbiological parameters, waters are used after chlorination only.

The partially treated waters of Shabla town are discharged in Shabla Lake. There is MAC violation in respect of nitrogen and phosphorous concentration. Another WWTP is in its initial stage of building, which is expected to satisfy the requirements.

There are oil wells operating in the area. The waste waters are either discharged in the sea in a sanitary secured site south from Shabla lighthouse, or are reinjected underground.

Soils

There is no significant soil pollution in the area, since no large industrial facilities are located in municipality. The dunghills are a potential pollution sources but no toxic substances are detected in soils. Household wastes and oxidized hydrocarbons are occasional pollutants of the coastal line, generally brought by the northern sea currents. The porosity of the rocks and the high depth of the aquifer protect the soils from salinization.

Natural and technological risks

One of critical issues and conflicts for the plan area is coastal erosion (cliff and beach erosion), in particular at coastal section between capes Aurora and Krapets. As the coast between capes has eastern exposure, low crenulated and it is approached by the strongest waves from E, NE and SE



Current situation analysis

direction. The coast consists of loess, that cover the Upper Sarmatian limestones and this lithology predisposes an intensive coastal erosion process. According to field data by IO-BAS, the average rate of coastal erosion in the Shabla coastal section is 0.30 m/year, as at some sites (e.g. cape Krapets and cape Shabla) has been measured one of the highest rates along the Bulgarian coast: between 1.2 and 1.6 m/y. The general direction of long-shore sediment transport on the coast is from north to south; installing of hard protection structures at some coastal section could provoke new erosion problems and sediment deficit further down at the next coastal sections. Therefore preliminary hydrodynamic and lithodynamic model studies are needed. The Cape Krapets and Cape Shabla section was also classified as highly hazardous to coastal erosion/cliff retreat using a predictive model for cliff erosion vulnerability based primarily on the structure and geology of the cliff/bluff sections of the shore.

Anthropogenic pressures on marine environment

The main anthropogenic pressures identified on the coastal zone come from the development of the socio-economic activities: fishing, tourism, agriculture, food industry, shipping industry, construction and military activities. Eutrophication (overfeeding) of the sea, overexploitation of marine living resources (especially fish stock), bottom trawling can change habitats over vast areas of the sea bed: on average, under this practice over 80% of the catch discarded, most of it dead.

Exploitation of marine living resources - description, potential

- ecosystem services of socio-economic importance

Fishing is a major source of ecological pressure in the area. Marine fisheries concern both pelagic and demersal species. Fishing vessels use a variety of methods (trawling, purse seining, gillnets, longlines). Bottom trawling, although it is forbidden is the main fishing gear used in turbot fisheries in the coastal waters. All the states of the Black Sea basin have restarted bottom trawling (officially called hauls near the bottom), to increase catches of sprats which is near the bottom layers of the self. As a result, catches of sprat in the 80s were 15-20 times higher than in the 60s.

The main demersal species caught are whiting, sharks and turbot. Pelagic fish dominated in terms of quantity in catches in recent years, the most important pelagic species being sprat. Seabed trawling has a major impact on seafloor habitats and species. When trawls are dragged along the seabed, they disturb sediment and scoop up seabed species such as crustaceans.

Bottom trawling for the shellfish *Rapana venosa* has become widespread along the Bulgarian Black Sea coast during the past decade, and has raised significant environmental concerns. Assessment of its impact on benthic communities reveals disruption of mussel bed and transformation of the bottom community from epifauna (mussels and crustaceans) dominated to infauna (clams and polychaetes) dominated, which is generally less diverse. A serious threat to the biodiversity is the intensive fishing and especially the illegal bottom trawling for turbot. Apart from the direct impact, there is also overfishing and fishing practices largely account for the impact on natural stocks and habitats. The passage of this fishing gear over the seabed can be summarized as follows:

- disturbance of the upper layers of the seabed causing short-term re-suspension of sediments, re-mineralization of nutrients and contaminants, and re-sorting of sediment particles.
- direct removal, damage, displacement or destroy of a part of the animals and plants living in or on the seabed.
- a short-term attraction of carrion consumers into the path of the fishing gear.
- the alteration of habitat structure (e.g. flattening of wave forms, removal of rock, removal of structural organisms).

- condition of major commercial stocks and assessments at species level



Current situation analysis

Black Sea ichthyofauna, in general and the populations of commercial interest, in particular, have suffered, in recent decades, severe mutations, often unpredictable. Dependent of biological specifics of each fish species, these mutations are apparent both in structure and potential of ichthyofauna and also in ethological aspects of the population.

Factors that are purely ecological are significant for some species (anchovy, mackerel, turbot, sturgeon, shark, etc.) threatened by an unregulated fishing and improperly catches.

The disturbance of fish behaviour - mainly by keeping of fish shoals away from shallow waters - is another category of factors that produce mutations in the potential of ichthyofauna. These are produced by the loss of spawning habitats of anadromous species, by damming the rivers banks, by altering the shelf habitats, important for spawning and feeding of living resources, through siltation from coastal works and changes in the shore morphological conditions.

Fishing activities contribute themselves to the worsening of the ecological situation and for the depletion of the fish stocks through: open access resources management regime applied independently by each coastal country; overfishing and illegal fishing and the use of destructive fishing techniques.

Some conflicts exist between the interests of local fishermen and the restrictions imposed on the fishing in protected areas. The area of Durankulak Lake is used water abstraction for irrigation purposes, fishing and collecting of crayfish, angling, cattle sheep and goat grazing, small-size reed cutting, intensive agriculture (vegetables, grain crops), recreation, small-size forestry, hunting out of the protected area. Over-exploitation of fresh water for irrigation damages the water balance of the lake. The illegal fishing and hunting and non-regulated grazing in the water-fringe vegetation cause habitat destruction and disturbance of the biodiversity. The legal hunting activities out of the protected area permanently chases the wintering geese from the arable lands located around the northern part of the lake which are the most desirable feeding areas for the geese.

Eutrophication

- coastal waters ecological status
- sources of nutrients
- impacts of eutrophication

Due to intensive agricultural activities in the arable lands neighbouring the lakes and intensive livestock breeding, the concentration of biogens (esp. ammonium and phosphates) and organic matters in the lake have drastically increasing in recent decades.

Intensive agricultural activities in the catchment area of the lake, particular, involving the use of big quantities of phosphates and nitrates, the wrong storage of fertilizers and the absence of communal waters treatment have also seriously contributed to increasing the biogenic elements in the lake. Unregulated water pumping for drinking and irrigation needs causes unnatural reduction in the water level. The excessive biogenic content and the disturbance of the natural water level in the lake is the main reason for the acceleration of the eutrophication processes and disturbing the water ecosystem's equilibrium.

Phytoplankton

The phytoplankton status in coastal sea waters are found to be "moderate" by Menhinick (1964), Sheldon (1969), Shannon-Weaver (H') and TRIx indices. The status is same all along the coast of the area.

Macrozoobenthos

Macrozoobenthos state has improved during last 5 years and is established "excellent" in Krapets and Kamen bryag villige areas and "good" in Shabla area by H', AMBI and M-AMBI indices.



Current situation analysis

Macrophytobenthos

Macrophytobenthos state is estimated as “bad” in Krapets area by H', AMBI and M-AMBI indices. After analyses of the influencing factors it was considered that causes of the bad state are natural (non-anthropogenic). The critical factors are the high nutrient content and high turbidity of the water column. These factors are rather connected to hydrological specifics of the region (currents, proximity of Danube delta, porosity of the substratum, precipitation) than to direct human input. In Shabla and Kamen Bryag areas the status is “good”.

Physicochemical status

Physicochemical parameters include temperature, salinity, dissolved oxygen and nutrients (nitrates and phosphates). All along the coast line, except oxygen all other parameters are found to be in “excellent” and “good” state. Dissolved oxygen is lower than typical levels due to hydrological specifics and “moderate” state is established.

Presented information is found in Estimation of current state of Black Sea Basin Directorate (2015).

Pressures by touristic and recreational activities

The in-depth analysis of the environment-unfriendly developments in the tourism sector of Mangalia-Shabla coastal area revealed a disproportionate tourism development pattern between the Romanian and Bulgarian sectors of the studied territory in terms of overcrowding and bathing water quality.

NUTS 3	NUTS 5	Pressures on marine and coastal environment			
		Touristic and recreational activities			
		Arrivals (no)	Nights spent (no)	Beach surface (ha)	Bathing water quality
Constanta	Mangalia	233.576	1.232.904	43,7	good
Constanta	Limanu	13.468	37.351	10,6	good
Dobrich	Shabla	4.552	13.694	48,0	excellent

Source: European Environment Agency (2015), NSI Romania and Bulgaria

- Mangalia-Limanu coastal area

There's a higher costal concentration of tourism activities in both Limanu and Mangalia, where tourism investments have taken priority, resulting in a total number of 338 accommodation units. Mangalia is one of the oldest resorts on the Romanian Black Sea coast, being subject to intense urbanization due to the rapid expansion of the resort area. During summer months, the resorts (Saturn, Venus, Cap Aurora, Jupiter, Saturn and Olimp) become overcrowded as the number of arrivals increase with second-home owners and tourists coming on holiday. In this regard, there's an over-construction due to the sprawling resorts, at the expense of natural ecosystems. As most coastal tourism takes place along the shore and in the water immediately adjacent to the shoreline, the Black Sea coastal zone and the marine environment are an important resource for leisure activities in Mangalia and Limanu, thus its protection is of the utmost importance.

- Shabla coastal area

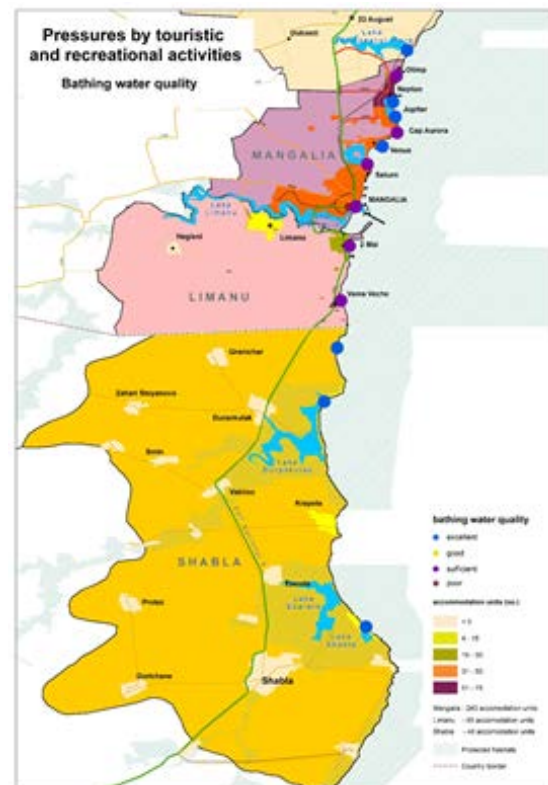
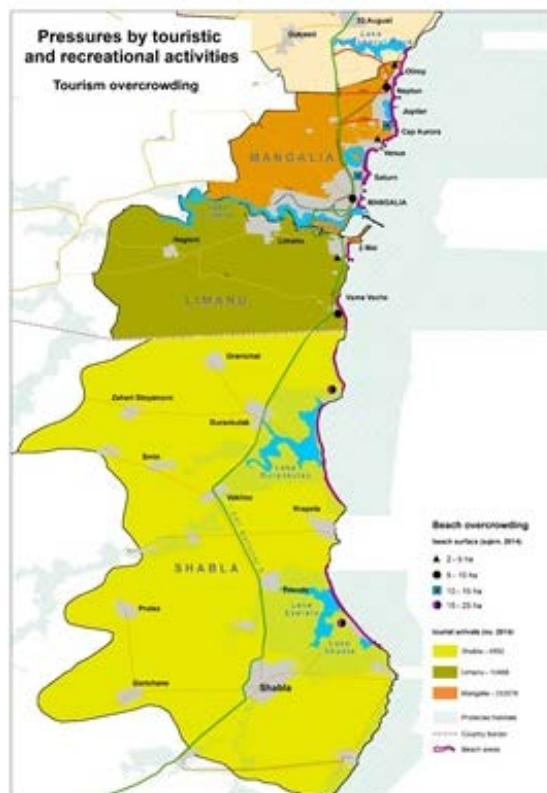
The Bulgarian sector of the studied area includes Shabla municipality which is one of the least built villages and resorts (Durankulak, Krapets, Shabla and Ezerets) of the Bulgarian Black Sea coastal area. There is a prevailing role of agriculture, compared to a relatively small land use associated with tourism and complementary activities like transportation. Compared to Mangalia and Limanu that are dependent on tourism for livelihoods, Shabla territorial unit is mainly oriented towards agricultural production. The development of Shabla economy is directed towards environmentally clean agricultural production and secondly on coastal tourism and recreation, in which case it's intended to valorize the existing hydro-mineral resources.

Current situation analysis

In the northern part of Shabla municipality, around 15,000 people practise unregulated camping in the peak summer season, these camping sites are subject to protection of the Natura 2000 Network or national designation.

- beach carrying capacity - tourism overcrowding

Overcrowding was assessed based on the indicator for tourism carrying capacity. It expresses a report: the number of tourists / square meter of beach. The highest values are associated with the Romanian sector of the studied area, Mangalia and Limanu being faced with a high annual influx of tourists, most of them coming for the overcrowded beaches. Therefore the Romanian sector of the analyzed coastal area can be associated with mass tourism, large scale construction, and extensive resort development. Therefore, beach carrying capacity issues can be related to tourist density and impacts of tourism on the environment. Buildings near shore often have indirect effects on these sensitive habitats by facilitating activities such as boating, which may deteriorate habitats. Beach overcrowding results in degradation of natural resources and in increased pollution, resulted mainly by littering. According to the enviroGrids Black Sea beaches database, Mangalia has 43.7 ha of beach surface compared to only 10.6 ha in Limanu and Shabla reaches 48 ha. Out of these, none is labeled with the Blue Flag by fulfilling several environmental and safety criteria. Beaches can provide several protective, recreational and natural functions, yet recreation has been prioritized in most cases. Sandy beach ecosystems offer important environmental functions such as nutrient recycling, water filtration, and coastal protection. Marine and costal tourism is one of the fastest growing industry, making beaches important resources for tourism and major tourism destinations. However, studies indicate that as beach tourism continues to increase, there are signs of environmental degradation affecting the quality of natural ecosystems like the loss of naturally functioning of beach habitats and reduced biological diversity. Among varied human uses of beaches, the most damaging to the marine environment are waste discharges, jet-skiing, and boating.



Bathing water quality



Current situation analysis

The bathing water quality is assessed based on the microbial status and indicated an overall good towards excellent status. For the 2014 season, the bathing water quality was assessed under the New Bathing Water Directive 2006/7/EC. Understanding the trade-off between the requirement for clean safe bathing water and beaches, and their wider marine environment is central to the aims of the Maritime Strategy Framework Directive. The environmental sources contributing to microbial contamination of bathing waters and beaches can include diffuse and point source inputs as sewage discharges and effluent from leaking septic tanks. The overall assessment of the sea water in the bathing areas of Mangalia-Shabla region indicates that there is no health risk to bathers, connected with mass development of phytoplankton and/or cyanobacteria, as well as excessive development of macro-algae. Regarding the impact of beach camping on the marine environment, official data indicates that 4 campgrounds are running in Mangalia. Yet, unofficial and unorganized beach camping should be further investigated in order to understand differences between camping and non-camping zones in terms of: beach disturbance by four-wheel drives, direct damaging to vegetation, and introduction of human waste and litter into the territorial and marine systems. Given that campers prefer various camping zones related to access to various attractions, some coastal areas are more affected by camping intensity than others.

Marine economic activities and uses

- fishery and aquaculture

Fishing activities have suffered significant changes after 1980 in the structure of the fishing fleet and in operations. The crisis of the resources, together with new conditions of fishing in the former socialist countries, has led to a dramatic transformation in the relative importance of the fishing activities. This situation is blamed mainly on the sharp degradation of the environment in coastal areas and especially in the area of the north western shelf, representing the main breeding ground and nursery growing commercial species.

In the last period fish stock data from Bulgaria and Romania were collected and reported for the Data Collection Program from National agencies for fisheries and aquaculture in both countries.

The landings (in tons) of the main species targeted for fishing in the Black Sea by the two countries are presented in the next table.

Sprat	2008	2009	2010	2011	2012	2013	2014
Bulgaria	4304	4551	4041	3958	3157	3784	2279
Romania	234	92	39	131	88	99	85
Whiting	2008	2009	2010	2011	2012	2013	2014
Bulgaria	0.4	2.3	14.7	1.0	1.4	5.3	4.8
Romania	55.2	39.5	23.6	0.1	0.4	1.1	0,3
Anchovy	2008	2009	2010	2011	2012	2013	2014
Bulgaria	28	42	65	18	7.4	9.5	370
Romania	15	21	50	41	18	111	62
Red mullet	2008	2009	2010	2011	2012	2013	2014
Bulgaria	17.0	48.2	72.4	176.2	131.5	256.8	314
Romania	-	-	-	1.9	1.4	2.5	9
Turbot	2008	2009	2010	2011	2012	2013	2014
Bulgaria	54.62	52.47	46.45	37.8	36.38	39.58	39
Romania	47.11	48.77	48.25	43.25	43.21	43.2	43
Horse mackerel	2008	2009	2010	2011	2012	2013	2014
Bulgaria	179.6 8	176.9	165.3	394.8	381.4	271.4	1101

Current situation analysis

Romania	11	17	7	22.8	20.0	26.3	1459
Picked dogfish	2008	2009	2010	2011	2012	2013	2014
Bulgaria	23	9	42	38	29	31	34
Romania	10	4	3	4	2	9	2
Bonito	2008	2009	2010	2011	2012	2013	2014
Bulgaria	16	5	16	8	96	-	-

Source: STECF - Black Sea assessments

A relatively recent fishing activity is the catch of Rapana whelk, which is an invasive mollusc, introduced to the Black Sea in the 1940s.

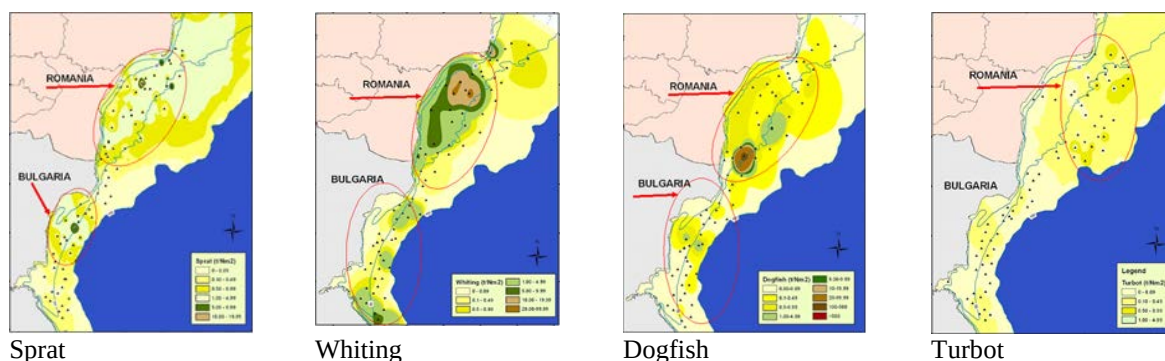
Rapana production (tons)

	2008	2009	2010	2011	2012	2013	2014
Bulgaria	2872	2214	4381	-	3793	4819	4732
Romania	-	2	0	218	588	1357	1953

STECF - Black Sea assessments 2015

Fishing methods for Rapana disrupt bottom sediments and often produce high rates of bycatch of non-target species; therefore it is a great need for an “ecologically friendly” method for harvesting it. On the other hand it is not appropriate to constrain fishing activities to achieve high biomass levels of Rapana; fishing and other actions that will restrict further growth of this stock should be encouraged.

In Bulgaria and Romania fishing fleets are relatively small in size and obsolete, even if sea fishing is an important economic sector in the countries of the Black Sea basin. Commercial fishing fleets and small scale fisheries operate in relation with the spatial distribution and densities of the fish stock.



Fish stock densities distribution in the Romanian and Bulgarian areas

In Mangalia, the potential is exploited by the fishing companies and businesses focused on the aquaculture in lakes and natural loadings. Recently, sea fishing began to grow, catches of fish being higher in volume, compared to the previous years.

The production of the fisheries in Shabla were mostly consumed internally, the share of sales was ¼ of the quantity of fish produced in 2015.

Fishing area	Fishing (kg)		Fishing revenue (BGN)	
	2014	2015	2014	2015
Shabla	508 502	603 057	15533	16543

Source: EAFA

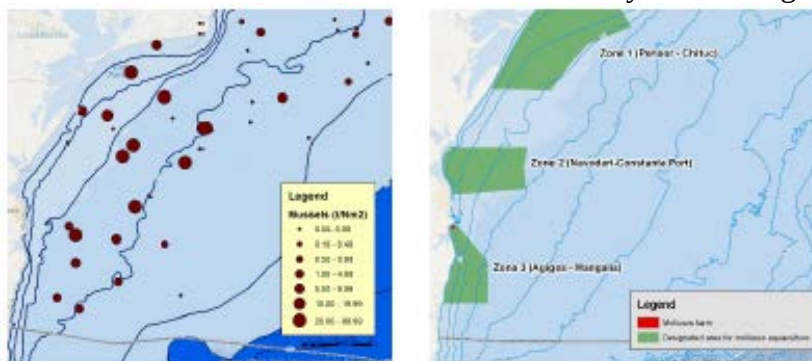
As early as 2011, Romania has adopted a process of competitive fisheries, both by short sea fishing trips and inland fisheries. The initiative is aimed at developing the local strategies and business plans for fisheries in order to be a FLAG.

In Mangalia-Shabla area operate two FLAGs, one association in Romania and one in Bulgaria.

Current situation analysis

The small and large scale fisheries along the coastline of the Black Sea remain limited compared to inland fisheries; the activity in the marine waters relies mainly on capture of: anchovies, mackerel, sprat and whiting.

The marine aquaculture is developed only in the mollusc sector and only in the Bulgarian marine area. Even if in the Romanian area were determined favourable areas for mollusc culture (suitable not only for molluscs, but also for other resources, such as macrophyte algae) - approved through GD no. 201/22.03.2002 - the initiatives in this activity are missing.



Mussels biomass distribution and favourable areas for mussels aquaculture

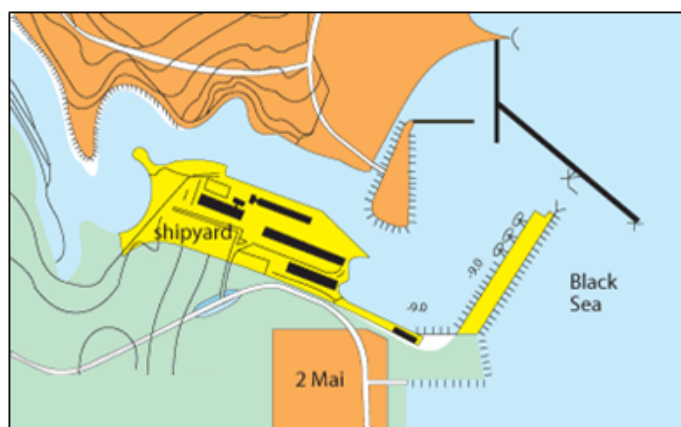
Source: Case study on marine fishery and aquaculture under Marsplan - BS project

The main challenges of the fishery and aquaculture sector are: the lack of competitiveness of fishing; underinvestment in infrastructure; the lack of financial resources; inadequate equipment, low levels of productivity, and a limited diversity of fisheries products.

- shipping and shipping routes

Sea transport plays major role in the area, defined by historical, geographical and economic factors. Mangalia is the southernmost waterbody of the Romanian seaside and is formed as a large bay, wide open to the sea. The convenience for building ports was estimated by ancient travellers, navigators and traders. As described in earlier two ancient submerged ruins were discovered in the area: the ancient port and the citadel of Callatis.

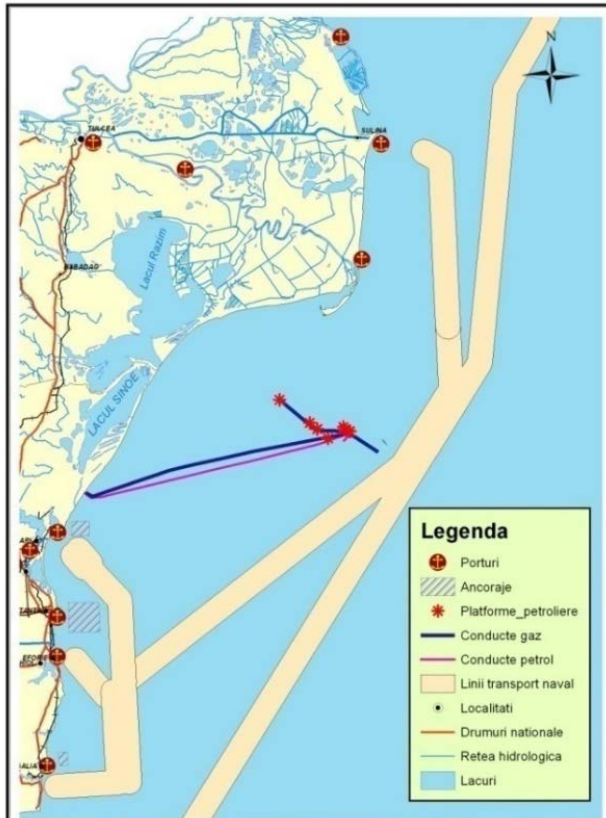
The favourable geographic position and opportunity for intermodal transportation by sea, rail and road make it excellent for receiving and redirecting of cargo traffic. Through Mangalia Port access to Asian transport hubs by Black Sea route TRACECA is provided as well as to traditional and developing local Black Sea routes and to the global shipping system.



The port and shipyard of Mangalia

The shipping routes, crossing the plan area, are corridors which insure the linkages between ports of the Western side of the Black Sea basin: Mangalia, Constanta, Varna, Burgas, Odessa, Istanbul and others.

Current situation analysis

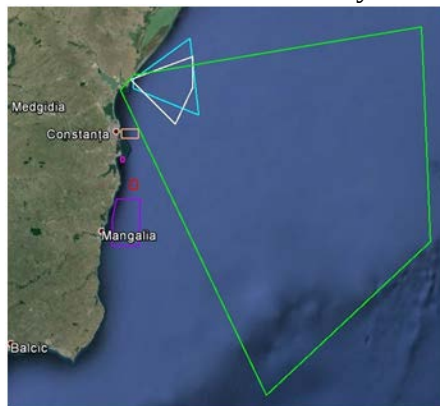


Ports and shipping routes in the Romanian part of the pilot area

Source: PlanCoast project

Military activities

The military activities are present in the area through the operations of the Romanian Navy inside and in the vicinity of the Mangalia port. The Mangalia marine area is affected only by exercises for underwater operations, which are developed in the area neighbouring Mangalia municipality shoreline. Shabla marine area is entirely affected by the military operations.



Military activities in the marine area Mangalia - Shabla

Source: Management plan for RO
SPA0076 Marea Neagra

2. External context

The plan area Mangalia-Shabla is part of an external context which significantly influences the functionality and spatial organisation of the plan area. As mentioned before the external context analysis of the plan area extends to the administrative territorial units (NUTS III), adjacent to the country border (the municipalities of Mangalia, Limanu and Shabla) and the Economic Exclusive Zone limit.

The influences on marine areas coming from the shoreline are the most dominant, while these induced from the high sea are more discrete.

The shoreline activities are carried out in the interest of local communities and serve also larger interests, at the regional or national level (port activities, ship building and tourism). Therefore, the

Current situation analysis

analyse of the socio-economic context of the coastal area will be useful for establishing the indirect pressures on the plan area.

2.1 Built environment

Settlements network

The settlement structure of the Romanian coastal area includes two municipalities: Mangalia and Limanu. Mangalia municipality is composed of one town and 6 seaside resorts; Limanu municipality consists of 4 villages, of which two have touristic functions (2 Mai and Vama Veche). The settlement structure of the municipality of Shabla includes 16 settlements - the administrative center - the town of Shabla and 15 villages: Bojanovo, Vaklino, Gorichane, Gorun, Granichar, Durankulak, Ezerets, Zahari Stoyanovo, Krapets, Prolez, Smin, Staevtsi, Tvurditsa, Tyulenovo and Chernomortsi.

The settlements built-up areas are complex ecosystem, with land-sea interconnections which are important in the study of coastal pressures on the marine space.

The seaside settlements exert pressure on the marine space by two kinds of actions

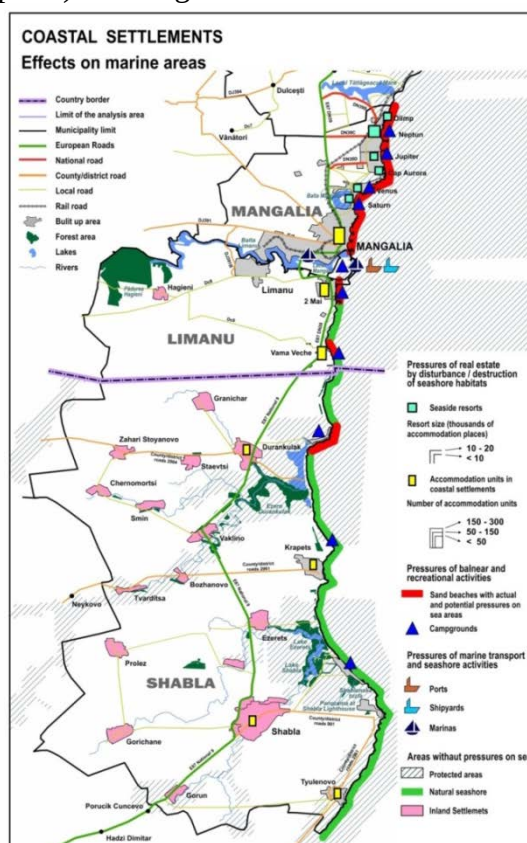
1. Reduction/damage of the coastal habitats' areas by waterfront settlements and disturbing marine ecosystems and sea-shore ecosystems relations by:

- destruction and disturbance of foreshore and seabed and other coastal habitats
- hindering sea - coast relations of ecosystems by increased building density on the shore

This category of influences on marine space is determined by the size and density of the built up areas which replaces and changes the coastal habitats. The natural shore ecosystems and habitats are the least harmful and the most supportive for the marine ecosystems. Replacing and/or modifying these habitats produce important disturbances in the marine ecosystems and gaps in the ecosystems continuity.

2. Influence on water quality of waterfront settlements by pollution from:

- point source discharges
- zonal (non-point) discharge sources.



Coastal settlements
effects on marine areas



Current situation analysis

The built up areas growth is determined by the population established in the coastal settlements (in Bulgaria, between 2004 and 2011, over 43% of the new buildings were situated in the coastal zone), which are in turn attracted by the functionality of these localities. The coastal settlements' functionality includes a temporal (dynamic) component and a spatial (static) component. The dynamic component can be intermittent, determined by the fluctuation of resources and people taking part in the activities (seasonal influx of people in tourist activities, intermittent activities in fisheries, etc.) or continuous (industrial activities and services).

The static component of the urban function is the spatial "footprint" associated to the specific activities, which is the object of study in planning, which attempts to achieve the best functional configuration in space.

Both components impact in specific ways the marine space; the first by water pollution and exploitation of marine living and non-living resources, the second by destroying or modifying the coastal natural habitats.

Based on a functional classification and the relations with the sea, the spatial configuration of coastal settlements is interpreted according to four categories:

1. Villages with primary and minor tourism activities

Their influences on marine ecosystems are reduced due to their small sizes, development dynamic and their specific economic activities.

2. Settlements with developed tertiary activities

A special type of settlements, in this category, is the tourist resort, which are part (integrated or detached) of other major settlements (Mangalia, Shabla). The total number of accommodation places in the seaside resorts of the Mangalia area is estimated at 32,322.

The sea side resorts are mono-functional structures, with a seasonal functioning of about 4 months yearly. Seaside resorts occupy a good part of coastal habitats; their direct action on marine ecosystems is reduced to a third of a year, while inducing significant pressures on marine ecosystems.

3. Complex seaside settlements

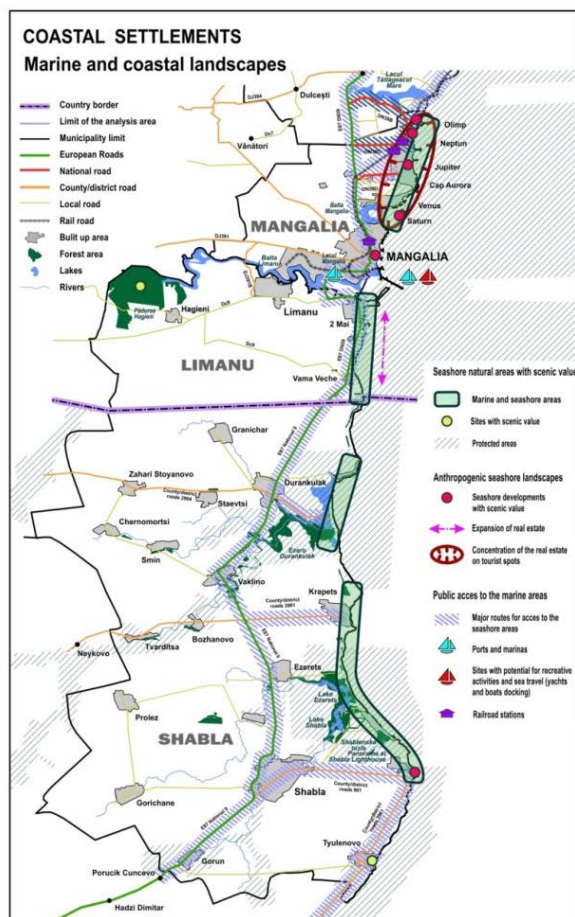
The city of Mangalia is the only settlement of this type in the plan area. Industry, tourism and shipping activities become the most important in this category, along with the activities related to the maritime transport. The influence of this settlement on neighbouring marine areas is the strongest of the entire area.

4. Inland settlements. This category of settlements, located at a relative short distance from the sea, includes a small town and villages inhabited by little communities; the largest population of a village in this category is in Durankulak. The influence of this category of settlements on neighbouring marine areas is the weakest of the entire area due to their small population, touristic traffic and to the agar profile.

Marine and coastal landscapes

Marine landscapes are important assets of the cross-border area which strongly influence the development of the coastal settlements that, in turn, impact on the adjacent marine areas. Marine and coastal settings are perceived together, so there they must be treated as single spatial units. Marine and coastal landscapes can be particularly vulnerable to impacts from coastal developments due to the high visibility of these landscapes from the sea, foreshore and skylines.

Current situation analysis



Marine and coastal landscapes in the cross-border area Mangalia-Shabla

Marine landscapes are the result of a combination of sea images with coastal elements (mostly natural in Bulgaria and anthropic in Romania). In the plan area there are the following areas with scenic value:

Area	Administrative unit
Olimp seafront	Mangalia
Neptun - Saturn beaches	Mangalia
Mangalia seafront	Mangalia
Seafront South of 2 Mai - Vama Veche	Limanu
Durankulak beach	Shabla
Shabla lighthouse - Zargana cliffs	Shabla
Seafront Tyulenovo Kamen bryag	Shabla

The seascapes present in the cross-border area have a potential of attractiveness for cruise ships, boats and yachts. The marinas where yachts and cruise ships could be lodged and also refitted are in Mangalia and Limanu (Life Harbour Marina); in the area operates a number of ports for fishing and leisure boats which could be developed for recreational and water sports purposes.

The ability to access and enjoy the coast is a significant contributor to people's quality of life and sense of community well-being. If the real estate developments are obstructing the access and view to the sea the settlement is deprived of a significant feature. The access to the seashore must be realized through a buffer area which should provide free public access, mainly pedestrian, on or over the entire common marine and coastal area. These features, in the form of esplanades or park areas serve functional and ecological purposes, improving as well scenic attributes of the locality and marine landscapes.

Current situation analysis

2.2 Technical infrastructures networks

Water management infrastructures

- *Integrated River Basin Management (IRBM) with special focus on sensitive riparian/coastal resources and ecosystems (beaches, dunes, wetlands, estuaries, lagoons, bays, river mouths, etc.)*

Mangalia and Limanu municipalities fall in Dobrogea Littoral catchment area, characterized by surface water resources very poor multiannual average flow is about 145 mil.m³. The hydrographical network consists of several rivers with low debt, but permanent, coastal lakes and related Danube discharge area. There is no economic use for these rivers due to their low flows.

In the area, only Albești is a watercourse of interest, with 16 km length, 349,0 km² catchment area and 0,155 m³/s flow annually. This watercourse is equipped with a year accumulation for fish aquaculture, with a capacity of 2,14 mil.m³. The river flows into the Black Sea through Lake Mangalia.

The hydrographic network of the Shabla municipality is located in the Northeast River basin, an area with coastal rivers flowing directly into the Black Sea. This is represented by several rivers, whose basins are formed only in the valleys on the surface runoff that occur only during heavy rains or intensive melting snow. In the northern part of the Dobrogea plateau there are not permanent rivers and ponds are fed from the existing coastal groundwater, due to the great depth presences karst and groundwater.

The lakes located along the Black Sea coast are mainly of two types: estuary and lagoon. Most lakes are concentrated around two large bays: Varna and Burgas. Several small lakes are located on the coast of South Dobrogea and coastal Sozopol.

Groundwater resources totalling approx. 3.172 mil.m³/year (100,6 m³/s), of which 84,8 m³/s located in deep layers of very good quality and 15,8 m³/s in aquifers, drinking water with high mineralization. Of these resources, exploitable resource in South Dobrogea is 8,95 m³/s in layers of depth and 0,2 m³/s of water.

The area is infiltrated by the body of groundwater RODL04 Cobadin - Mangalia.



Delimitation of the groundwater bodies in Dobrogea- Litoral basin area

The body extends in the cross-border area and the groundwater are stationed in deposits of limestone and eolithic lumaselice Sarmatian (Kersonian), located in the far South East Dobrogea. Sarmatian limestone deposits constitute a plate with a thickness of 10-150 m slightly inclined towards the East, which counts water free level, which is the main food source of the coastline south of Eforie Nord. Hydrochemical water in this body is bicarbonated sodo - magnesian - calcium, of high quality, with total mineralization of 750 - 1000 mg / l (1998).



Current situation analysis

- modifications in flow regimes affecting the salinity, flood hazards

In Mangalia and Limanu municipalities, there were built various hydraulic works for coastal and bank protection:

Hydraulic works	Location	No. form, size (m)	Role
Dams	Mangalia	3, linear	breakwater of the port, beach protection
	Neptun	1, linear, 20; 1, T shape, 200	mooring vessels
	Olimp	4, linear, 20	mooring vessels
	Saturn	5, T shape,	beach protection
	Venus	3, linear	beach protection
	Cap Aurora	4, linear	beach protection
	Jupiter	5 linear	beach protection
Protection dams	Mangalia Bog	1, linear concreted banks	banks protection
	Lakes Venus and Neptune	2, linear concreted banks	banks protection
	camping Kosmos	1, linear	coastal protection pier promenade
	Krapetz	1, linear	coastal protection
	camping Dobrudzha	1, linear	coastal protection
	Cape Shabla	1, linear	coastal protection

- mismanagement of coastal zone (erosion/accretion of coastlines and others)

The status of this works is unsatisfactory in the Saturn – Mangalia coastal zone, and the locality of 2 Mai threatening, beaches by erosion, and the properties and infrastructure in these areas.

At the entrance of port Mangalia, where only port associated structures including dams and jetties exist, there is a good condition these works, with little impact locally. However, these structures have interrupted natural coastal current, causing the accumulation and stability of sediment in 2 Mai port. Under these circumstances a wider beach, south of the port structures will be created, enhancing the value of recreation in the northern part of the 2 Mai village.

In the Mangalia Port, Limanu and Vama Veche villages, coastal protection structures do not exist and thus no direct impact on coastal processes was perceived. For Mangalia Pond there is risk for SCI sites Swamp Stud - Oban Great and Mound Cave, to modify properties and structure. For Limanu and Vama Veche there are long-term risks for properties and infrastructure, but to comply with the requirements of the Natura 2000 site it is beneficial to function without these coastal protections.

In Shabla municipality the main existing problems are related to coastal protection is erosion and cliff retreat since the coastline retreated by 60 m for the last 5 years in some sectors

- discharges (inflows of nutrients and pollutants)

Mangalia city is supplied with water in centralized system from Constanța regional system that provides drinking water for population, businesses and coastal settlements. The daily water consumption in the city is 265 l/s/capita, well above consumption regulated by national rules, of 170 l/s/capita, which recommend the awareness rising by the municipality on the issue of water consumption, the need to save water and the correct use of this resource.

The municipal water system supplies the neighbouring resorts (Olimp, Neptun, Jupiter, Cap Aurora, Venus and Saturn) and the localities Limanu, 2 Mai and Vama Veche. The total population connected to this system is about 54108 inhabitants; the distributed water volume is 5.627 thousand m³.



Current situation analysis

The wastewater sewerage in Mangalia is a distinct system which works for approximately 97,4% of the municipality's population. The sewage of the tourist resorts Olimp, Neptun, Jupiter, Cap Aurora, Venus and Saturn is pumped directed (by 9 pumping stations of wastewater) to the treatment plant. Mangalia wastewater sewerage network is underdeveloped, considering the city expansions, both residential and economic.

The treatment station, located in the south of the city, has a capacity of 900 l/s (102.384 p.e.) and works with mechanical and biological stages, waste water is discharged in the Black Sea through a pipe of 800 mm 2- 3 m from the shoreline. There have been breaches of indicators: BOD₅, NH₄, NO₂, total nitrogen, total phosphorus.

The Mangalia shipyard and the village of Limanu have their individual systems of sewage and rainwater discharge.

The water supply in Shabla is achieved through 34 wells and 25 pumping stations; the total flow to the city is 514 m³/day. The flows are sufficient for a long-term period.

Wastewater sewerage system exists only in the town of Shabla, with coverage of 25% and a total length of 5.24 km. The network is damaged; the loss of wastewater is estimated over 50%.

The capacity of city treatment station (WWTP) is about 40 m³/day, and the actual estimations of wastewater discharges are of over 100 m³/day. The current functioning of the treatment plant is considered unsatisfactory.

Ports infrastructures

The ports functioning in the plan area are located in the Romanian side of the Mangalia-Shabla cross-border area and belong to the Mangalia municipality.

Mangalia sea port is a “satellite port” of the Constanța port, having a surface of 142.19 hectares, out of which 27.47 hectares on land and 114.72 hectares on water. The north and south breakwaters have a total length of 2.74 km. There are 4 berths (2 operational berths) with a total length of 540 m. The maximum depth is 9 m. Next to the commercial port is located a port of the Romanian navy, which uses for military practice the sea area off the town seashore.

Two recreational ports are located in the plan area:

- **Mangalia touristic port:** Lodging more than 146 boats, Mangalia marina (set up between 2006 and 2008 with Phare and local funds) is the starting point for short coastal trips both to the northern part of the area (Venus, Neptun, Olimp) and to its southern part (2 Mai, Vama Veche, Limanu). It is also the starting point for larger boats in their abroad trips, to other Black Sea cities, such as Istanbul, Varna or Odesa. The Mangalia Marina dockside has a length of 155 m and a depth of 2.5 m and offers modern berthing and maintenance spaces.

- **Limanu LifeHarbour Marina:** located in the Mangalia estuary (Limanu lake), the marina has 70 places for ships until 24 meters length and 20 places for small vessel. The water depth is 3-10 meters and it allows seif berthing.

In Mangalia-Shabla area there are 2 **border checkpoints:** Vama Veche - Durankulak (roadway) and Mangalia (port).

The industry of shipbuilding and ship repair is represented in the area by the private sea shipyard operating in Mangalia (Daewoo Mangalia Heavy Industries).

- terrestrial transport infrastructures in connection with the shoreline

The area is dominated by the **European road E87**, which crosses the territory of Mangalia-Shabla area from North to South, connecting the Romanian and Bulgarian seashore areas. This route is a national road in Romania (**DN39**) and a highway in Bulgaria (**I-9**) – connecting the major coastal cities from both countries.

Part of transport corridor no.8, which is the most important national and international transport axe running through all the municipalities along the sea-coast and provides inter-regional links between the northern and southern coast. Besides its transport functions, this route creates conditions for



Current situation analysis

tourism potential in the coastal area; its distance from the seashore make difficult for the atmospheric pollution, produced by traffic, to influence the marine area.

Except Mangalia, 2 Mai and Vama Veche, all the settlements located in the plan area are not crossed by routes with intense traffic, all being accessible from secondary roads.

The Romanian seaside resorts, located very close to the coastal area, have not a directly access from E87; the national roads DN39B, DN39C and DN39D connect these localities (Olimp, Neptun, Jupiter, Cap Aurora, Venus, Saturn) to E87.

Shabla municipality has a relatively well-developed road network with a good spatial organization, but dominated by the poor state of the third category roads, especially during winter, and different sections of national roads need to be repaired.

Although the class III coastal road - 901 serves the coast and is used by tourists, most of it is in a poor condition and needs rehabilitation. In 2012, transport infrastructure has been improved in the area of Kavarna - Shabla – Durankulak.

The total length of roads crossing the municipality is of 115.2 km. The road network density is higher than the national average, proving to be a well-developed road network, with good spatial organization but with more than 60% municipal roads. The difficult accessibility, due to bad road conditions, hampers the development of tourism. Nearby the "Shabla lighthouse" complex, partially used, the road network does not correspond to contemporary standards. The poor condition of municipal roads and the difficulty of their maintenance in winter represent a negative aspect. The high share of the primary road network is a priority for the municipality. Also several sections of the national road network need to be repaired.

The **railway network** is developed in the Romanian part of the area, crossing the most coastal localities. Coming from the Northern part of the seacoast, it runs through Olimp, Mangalia and 2 Mai shipyard. There is no railroad serving the Bulgarian plan area.

Shabla municipality has 3 **local airports** for agricultural and technical purposes, meeting the standards of the lowest classes' airports in ICAO (International Civil Aviation Organization).

The activities of the **port areas** have a direct impact on marine environment. The commercial and military port of Mangalia and the shipyard have a low environmental impact, but subject to increase, in case of accidents or accidental pollution. Port activities together with new port investments have an indirect effect on the marine environment. As for shipping, port activities are responsible of noise pollution. Light pollution in port area, coming from ships, has a temporarily low impact, especially on the populations of seabirds. The motorized water transport for tourism purposes presents for the moment a low environmental impact.

The road transport, especially during the summer, is a source of noxious fumes (hydrocarbons, nitrogen and sulfur oxides and lead aerosols) and it is also the main source of noise in the municipalities. The area is subject, during the summer season, to a great increase in transit traffic on the road I-9 (E 87), there are areas of acoustic discomfort (noise levels higher than the admissible ones – 70 dBA compare to 45 dBA), especially in the residential areas adjacent to the road. The expansion of automobile flows, the aging and wear of a majority of vehicles are unfavourable prospect of worsening ecological characteristics of air, adjacent to the roads areas. Road transport, the main source of noise in the municipality, is creating health risks for locals and tourists, especially in summer season.



Current situation analysis

Energy production & transport, renewable energy, telecommunications

- marine energy resources

There are no units of power generation which use fossil fuels in Mangalia and Shabla area.

The major technical infrastructure for transmission of electricity is represented by the electrical power transmission network, managed by the National Company Transelectrica of Romania and Bulgaria's National Electricity Company, which are the national operators of power grid.

There is no electricity transmission network of high voltage, 220 kV or more, crossing Mangalia-Shabla area.

Electricity distribution network in municipalities included in the plan area provides power supply to all the component localities, according to statistical data and strategies developed at local level.

There are several substations 110/20 kV on Mangalia and its component localities: Neptun, Mangalia North, Mangalia South and Mangalia Shipyard substation. In municipality of Shabla, electricity is delivered through 110kV overhead lines substation which connects substation Shabla 110/20 kV to Kavarna and Toshevo substations.

Individual consumers and resorts are supplied at low voltage from distribution transformers fed by underground or overhead lines.

Distribution networks are managed by Enel Dobrogea SA in Mangalia and Limanu, and by Energo-Pro in Shabla and its component villages.

There are no submarine cables for electricity transport in the afferent marine area and from the point of view of influencing the plan area, the existence of these power lines presents a low potential risk, which could come only in terms of coexistence with other energy infrastructures, if not complied with the protection and security zone for these systems, as they are set out in the technical norms.

Renewable energy

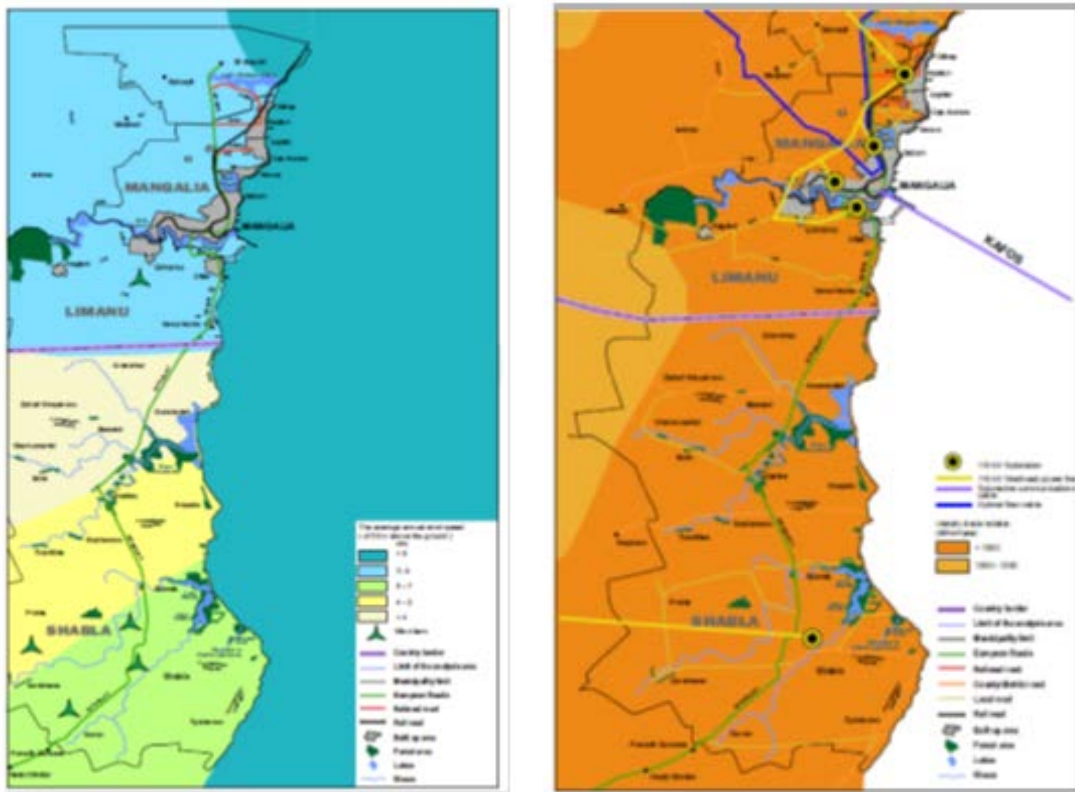
The entire plan area enjoys a high solar energy potential, as well as high wind potential which is found in both Mangalia and Shabla territories.

Regarding the use of sea waves to produce energy in the studied area, the Black Sea is considered a relatively calm sea. Peculiarities that Black Sea waves present decisively influence the choice of an optimal capture procedure.

Solar potential is high in the studied area; the intensity of solar radiation exceeds 1350 kWh/m²/year in Mangalia, and 1450 kWh/m²/year in Shabla.

Currently, the solar potential of the area is not valued on municipality of Mangalia and Limanu. In Shabla, solar energy is exploited only locally, for water heating purpose.

Current situation analysis



Solar and wind potential in the plan area

Wind potential is evaluated based on the annual average rates calculated from the height of 50 m above the ground. The notion of wind energy potential is using for annual average crossing normal area unit downwind. Calculation of wind potential was made from standard height of 10 m to a height of 220 m regarded as equal to the atmospheric boundary layer thickness of coastal zone.

Wind potential is high on Mangalia coast, the average annual wind speed of 50 m above the ground is over 8 m/s. Also, the territory of Shabla is part of the most promising sites in the northern Black Sea Coast, where the wind speeds at a height of 80 meters is 6 up to 8 m/s.

It must be considered that the actual potential of wind power is inferior to the harnessed technical potential due to environmental restrictions (sites with prohibition of use) therefore, an assessment of the impact of wind turbines on bird migration and possible noise and visual pollution is required.

Evaluation of wind potential for coastal station Mangalia was made based on specific methods for estimating wind potential through measurements and probabilistic models of wind speed distribution.

At the level of Black Sea, the average wind speed varies as follows :

- Mangalia (on the coastline, at the sea level): 4,5 m/s
- Black Sea (off-shore); over 9 m/s

Mangalia station is placed on the second position (after Constanta) where the multiannual wind potential value varies in the range of 332 - 1462 W/m².

Expanding the use of wind energy has environmental effects both positive and negative. The extent of implementation of this technology is based on the success of maximizing the benefits and minimizing the negative aspects.

Wind energy, as well as like many technologies based on renewable energy sources, is expected to produce most of its effects during the execution phase that focuses the majority of expenditure, such as: the environmental effects related to the purchase of materials and risks to the environment in



Current situation analysis

which industrial activities are carried out. On the other hand, these effects are common to other industries, so they can be evaluated quite accurately. For the final disposal of equipment (post-use) should be considered only dismantling and disposal or material recycling, because long-term effects is not an issue in this case (unlike radioactivity in the nuclear power plants).

Wind potential in the studied area is valued at present, through a number of wind turbines, which are grouped in Shabla. There are also proposals for wind farm projects with an estimated capacity of 215 MW as mentioned in Shabla development plan 2014-2020.

- renewable energy and telecommunications infrastructures

In a recent study (Onea and Rusu 2012), the wind characteristics corresponding to a representative location in the western side of the Black Sea were compared with those from three other places from the Baltic Sea where wind farms already operate with good results and to another one selected for the implementation of such a farm. The main features were found to be very similar to this, indicating that wind farms can operate effectively also in the coastal environment of the Black Sea. Finally, taking into account the results of the present data, it can be concluded that the western sector of the Black Sea is a *viable candidate to implement wind farms projects* and in the context of emerging wave energy technology it is expected that hybrid energetic marine projects could diversify the local renewable energy portfolio.

Wind power plants in use in Mangalia-Shabla area

County/ District	TAU	Power plant name	Installed power capacity by type of power plant (MW)
Constanta	Limanu	Limanu	8,5
Dobrich	Shabla	Shabla N	1,6
		Shabla NW	1,99
		Shabla S	2,4
		Shabla SE	0,4
		Shabla SW	6,1
		Shabla W	1,2

Data source: Transelectrica, repowernet.org, 2016

There are no off-shore wind farms in the Mangalia and Shabla sea territory. The technical potential for offshore wind does not account for the fact that other uses of the sea area may limit the potential for offshore wind developments. Such uses comprise, for example, shipping routes, military use of offshore areas, oil and gas exploration, and tourist zones. Spatial planning policy is very important to guide proper use of the available sea area.

Telecommunications

The area of Mangalia and Shabla is characterized by the existence of a well-developed communication network, both on shore and offshore. The existing optical fiber lines belong to Romanian telecommunications service provider, TELEKOM and to Global Communication Net (GCN), Bulgarian supplier of similar services in the studied area. The existing optical fiber backbone network crosses Mangalia territory as follows:

- On shore, Optical fiber Backbone Telekom - Constanta – Mangalia - 55 km
- Submarine route, Black Sea Fibre Optic System (Karadeniz Fiber Optik Sistemi - KAFOS): Mangalia (Romania) –Varna (Bulgaria)-Rumeli-Igneada (Turkey) – 504 km

In Mangalia and Shabla telecommunication services as mobile and internet are provided by the major operators:

- Telekom, RCS-RDS, Vodafone and Orange in Mangalia
- VIVACOM, Globul, M-Tel in Shabla

Telecommunication systems cover all the component localities in Mangalia and Limanu.



Current situation analysis

There is a poor development of telephone network in Shabla. Shabla villages, Gorun, Prolez and Staevtzi has no telephone network. In the rest of the villages there is a telephone density between 12 and 37 lines/100 inh.

Local residents benefit from Internet access, with total coverage in all the component localities.

Oil and natural gas transport and distribution, district heating

- energy corridors transporting large volumes of crude oil and gas

Bulgaria is dependent on imports of petroleum products. The country's proven oil reserves at 1st January 2005, were estimated at 15 million barrels. Exploration for oil and natural gas is centered mainly in the Black Sea and in the north of the country.

On the Bulgarian plan area there is one single pipe carrying oil extracted from the Black Sea, in the village Tyulenovo, towards the industrial area near the city of Pleven.

Tyulenovo exploitation site area extends both on shore and in the sea, here being drilled 39pprox.. 600 wells (of which 39pprox.. 200 wells in operation) so far; this field of oil and gas was discovered in 05/31/1951, the oil reserve being estimated at 30 million barrels (4,800,000 m3) and production was 39pprox.. 500 barrels per day (79 m3 / day) in 2015 (39pprox.. 900 tons of oil extracted per month).

Over time there were more soil and water pollution with oil coming from marine exploitation sites, the last being in February 2005 when a pump exploded and four tons of oil were spilled (part of it ran into the sea, forming an oil slick 1,600 m, long and 40 m thick).

The existence of the seismic active fault, starting from the Black Sea, near the town of Shabla, which passes near Bucharest and stops in Fagaras Mountains, requires enhanced measures of protection, especially for mining oil and gas in the Black Sea, therefore it is recommended to avoid hydraulic fracturing technology used for drilling.

Transport activity and transit of natural gas in Bulgaria is provided by "Bulgartransgaz" LLC, a subsidiary of "Bulgarian Energy Holding" S.A. The Bulgarian municipalities studied are not powered by natural gas. There is only a proposal for gas supply in the municipality of Shabla from municipality of Kavarna.

Although Bulgaria produces oil and gas field in Tyulenovo, however these amounts are very low, so we can say that Bulgaria is dependent on gas supplied by Gazprom via Trans-Balkan pipeline network.

From the need to diversify gas import points, S.N.T.G.N. Transgaz S.A. in collaboration with Bulgartansgaz achieved a new point of import on the pipeline transiting Dobrogea (which supplies Bulgaria with natural gas) in the town of Negru Voda for supplying with natural gas the southern area of Dobrogea. Thus, a gas distribution network was realized in Mangalia (2013) with a length of 84 km, being accomplished and the gas supply to villages of Limanu, 2 Mai, Vama Veche.

Mangalia's natural gas supply situation during 2011-2015

	2011	2012	2013	2014	2015
Length of the city streets (km)	104	104	104	104	104
Total length of the gas distribution pipes (km)	1	1	55,9	70	87
Percentage of the total length of the streets (%)	0,96	0,96	53,75	67,31	83,65
Quantity of natural gas distributed in total (thousands of m3)	:	:	1580	6980	9370
Quantity of natural gas distributed for household (thousands of m3)	:	:	23	351	1056
Percentage of household gas consumption from total quantity distributed (%)	-	-	1.45	5,03	11,27

Currently there is an ongoing process of expanding the natural gas supply to most towns / resorts on the Romanian Black Sea coast.



Current situation analysis

In Mangalia, heat supply is carried out in centralized system. Goldterm company Mangalia SA is the operator of the heat supply and its sole shareholder is CL Mangalia. Goldterm Mangalia SA's main activity is the production, transport and distribution of heat in Mangalia, through 30 thermal stations and three substations located in residential areas. The raw resources used to produce thermal energy are softened water, electricity and the fuel necessary for operation of boilers; by 2012 it has been used light fuel, which sometimes led to accidental pollution of soil, subsoil and sewerage network by oil, but since 2013, starting with using natural gas in thermal power plants, these shortcomings have been removed and heating costs were reduced.

In the others localities of the plan area (without centralized heat supply and without distribution of natural gas) heating is produced with solid fuel (wood, agricultural waste and plants, and coal) and liquid fuel (CLU) and food preparation with gas tank stoves.

- impact of crude oil and gas infrastructures

Specific activities of extractive industry (oil and gas) present significant risks for marine areas, for neighboring populations and for environment.

During the activity of drilling and the entire period of mining (extraction and treatment) there is always the risk of eruption followed by an explosion ("blow-out" effect) and fire (causing a rapid increase of temperature of environment and of all objects in the affected area, as well as direct and indirect effects on humans).

In a drilling, cementing of the annular space between the column and the wall of the well is running for sealing this space in order to isolate geological formations crossed by the well (so that no exchange of fluid occurs between them, or between them and the surface during well operation) and to ensure mechanical support for the column, support that increases its resistance to loads during its construction and exploitation (internal and external pressure variations, the milling of windows, perforation etc.).

But it has been found that even to wells where checks showed perfect working, there were, over time, troubles with sealing the spaces between columns or between columns and land. The most frequent tightness problems were manifested in the form of gas migration or cracking of the neighboring areas.

Compared with conventional exploitation of oil and gas (drilling vertical to the accumulation of oil/gas) exploration and exploitation activities using gas fracturing technology / hydraulic fracturing involves much higher risks for the environment.

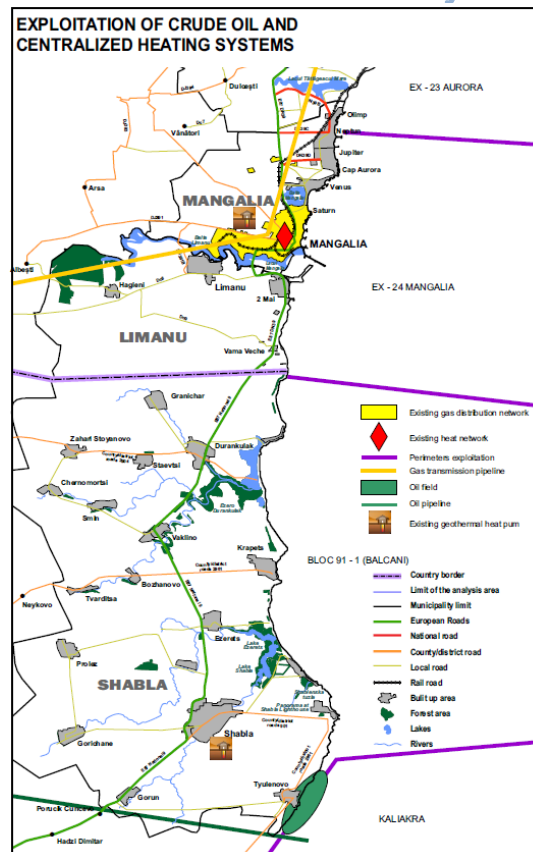
Currently Shabla - Snagov - Vidraru fail can produce earthquakes with devastating effects if it is affected by the application of extracting shale gas technology in the area, technology banned in several European countries as well as the in the seismic security code of Cernavoda nuclear power plant.

Hydraulic fracturing for shale gas exploitation may take place at depths up to 2,000 meters.

Updrafts of hydrogen sulphide, bringing to the surface large amounts of gas, can cause significant accidents and damage to human and natural life.

Ships transporting crude oil in the Black Sea (10,000 ships with about 155 million tons of cargo), many of them crossing the area on their way to Bosphorus strait, represent also a potential danger to the marine environment.

Current situation analysis



Infrastructures for crude oil, gas transport and centralized heating

Waste management

- municipal waste

The nature and quantities of waste coming from the cross-border coastal area are a reflection of the settlement patterns, type and distribution of industrial, commercial and agricultural activities, and the physical characteristics of the landscape (topography, geology, vegetation, hydrology). Moving fresh water courses (surface and groundwater) can contribute to the pollution of the sea water with waste derived substances. Many pollutants, coming from waste landfills, are conveyed in the seawater by groundwater.

A full assessment of groundwater vulnerability to waste disposal, in relation with sea, can however only be achieved by detailed local studies based on the modeling of specific site attributes and abstraction points.

Other sources of seawater contamination are the beaches, where winds and rains contribute to the dispersal of waste on the sea areas.

Port activities could be a major source of marine pollution with waste and bilge water.

In Mangalia, waste disposal is made on an ecological landfill located 500 m from Mangalia Lake. The landfill is located on County Road 391 between Mangalia and Albesti and is administered by TC EcoGold Invest Corp.

Limanu municipality

In the commune Limanu the largest amount of waste comes from tourism activities.

The percentages from the total amount of waste (254.53 kg) collected from beach area in 2014, (between 2Mai and Vama Veche - 6 km) were:

- plastic waste - 58,55%;
- metal waste - 7,78%;
- glass waste - 0,27%;



Current situation analysis

- wood waste - 27,31%;
- fishing nets - 4,69%;
- textiles - 1,40%

Shabla municipality

In the municipality of Shabla, the present system of municipal waste collection and disposal covers 100% of the population. Collection and disposal services for municipal waste are made by BKSTRO company.

Municipal landfill in 2010 was PI 83017.88.65. Landfill area was approximately 10 h.

The landfill does not meet the legal environment requirements, so will be opened a new regional landfill to Stojer, Dobrich.

- other categories of waste

The area produces different amounts of waste, the municipal waste being the most significant, but a large part of the construction waste and other types of discarded objects is not known.

Waste generated between 2007-2011 in Shabla municipality (t)

Municipal waste (tons)	2008	2009	2010	2011
industrial waste	4,28	1,01	12,48	14,3
dangerous waste	116,01	130,92	0,07	93,43
household waste	-	-	-	1226
construction waste	-	-	-	-

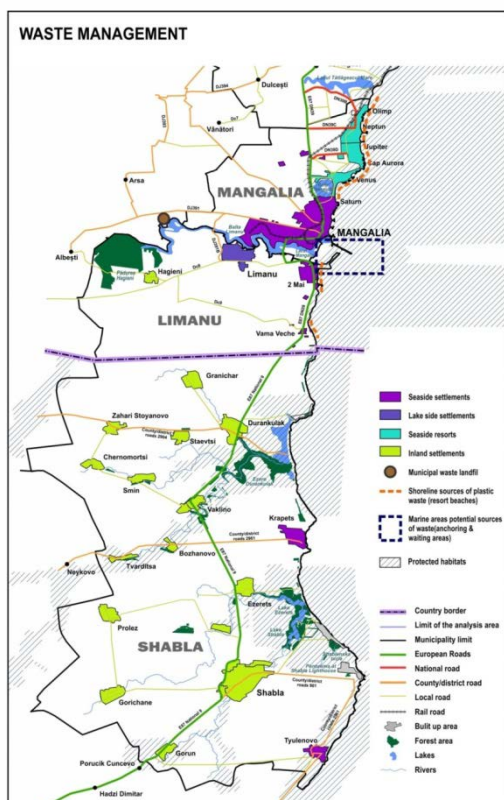
Source: Varna Regional Inspectorate

In September 2010, in Shabla was realized a separate collection system of packaging waste, with "Ekokolekt" SA.

In June 2010 it was introduced a separate collection system of electrical and electronic equipment waste, by a contract with "Eltechresource" AD and batteries and accumulators by a contract with "Ekobateri" SA.

A dangerous category of litter affecting the marine space is the plastic waste, which may be in the form of solid or soft objects (slabs, bottles, bags), may have different dimensions (from large fragments to micro particles) and can consist of different materials (polystyrene, polyethylene, etc.). The sources of plastic waste, affecting the marine areas, are terrestrial (litter being thrown in the sea or being driven by rain and wind in the water) and waterborne, coming from ships discharges. The most significant locations of terrestrial sources of plastic waste could be considered the densely populated beaches and the seaside resorts, where seaside promenades and commerce generate litter resulted from packages.

Current situation analysis



Infrastructures for waste management

Analysis of the current socio-demographic processes

Population and demographic potential

The demographic analysis centred on the Mangalia - Shabla population made use of statistical data collected by the Romanian National Institute of Statistics and the Bulgarian National Statistical Institute, focusing on the temporal evolution of demographic structures and phenomenon, as well as their spatial pattern. From this point of view, the analysis integrates time series at NUTS 5 (UAT-territorial administrative unit, in Romania's case) level and NUTS 4 (municipalities in Bulgaria's case) that favours a spatial in-depth statistical analysis¹.

Size and evolution of population

The total population in the Mangalia -Shabla area reached 53808 inhabitants at **1st January 2015**, out of which the Romanian sector gathered 49043 inhabitants and the Bulgarian sector 4765 inhabitants. Compared to year 2004, the coastal area population decreased with 1427 inhabitants. The decrease tendency is specific both to the Bulgarian sector, considering that in the time interval of 2004-2014 the population decreased with 1308 persons, which represents almost 20%, while the population from the Romanian sector maintained a relative constant level, with a slight decrease of almost 0,3%. In fact, the overall population growth wasn't abrupt, instead it followed a constantly progressive decrease during 2004-2014, with some irregular annual moderate growth.

Year	Total Mangalia - Shabla area	Romanian area	Bulgarian area	Total population growth 2004-2015 (number)	Total population growth (2004=100%)

¹ The Bulgarian National Statistical Institute issues a series of data regarding the population at 31st December each year, while the Romanian NIS issues these reports at 1st January and 1st July each month. In order to reassemble time series for each indicator under analysis, we used statistical data issued at 31st December for the Bulgarian case and 1st January – the following year – for the Romanian case.

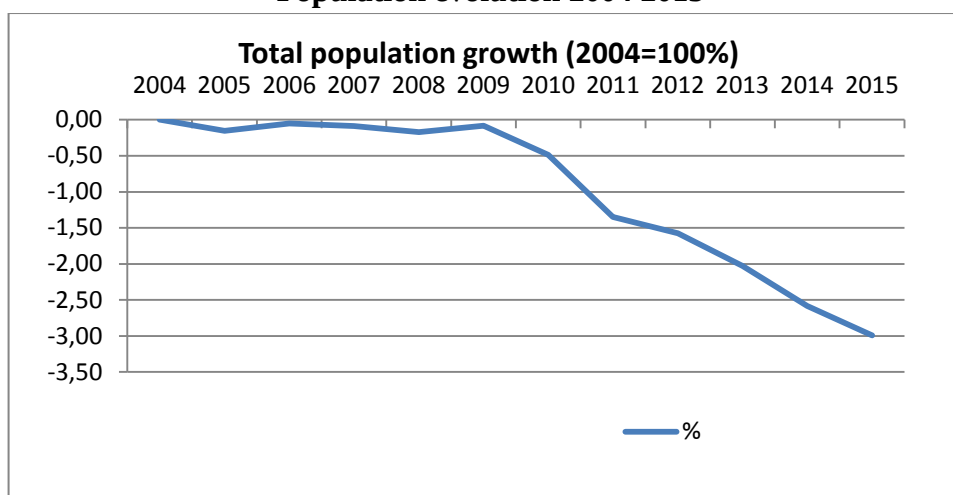


Current situation analysis

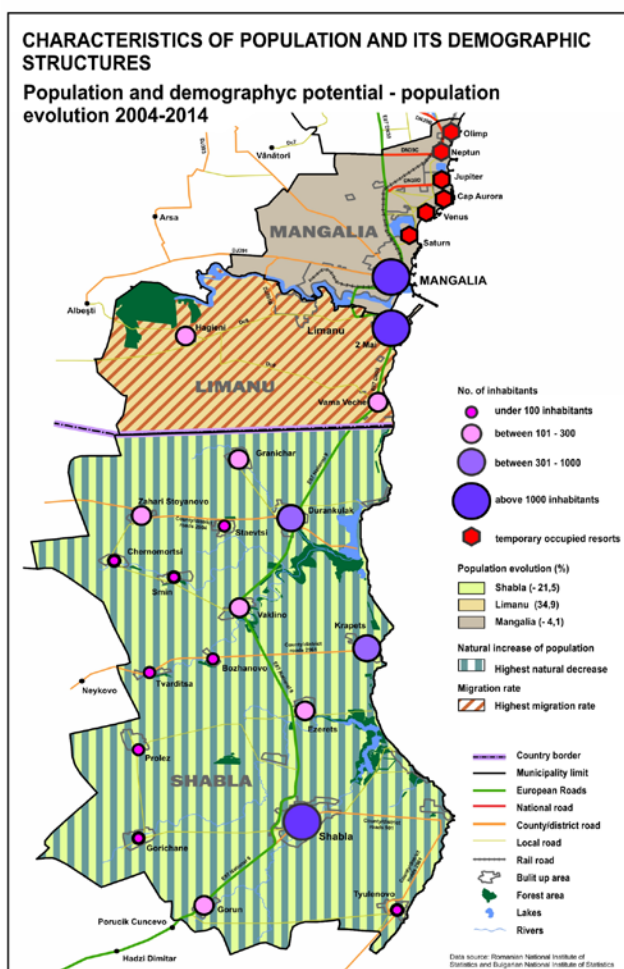
Year	Total Mangalia - Shabla area	Romanian area	Bulgarian area	Total population growth 2004-2015 (number)	Total population growth (2004=100%)
2004	55235	49166	6069		
2005	55149	49190	5959	-86 ²	-0.2
2006	55206	49354	5852	57	0.1
2007	55188	49429	5759	-18	0.0
2008	55139	49491	5648	-49	-0.1
2009	55189	49609	5580	50	0.1
2010	54965	49550	5415	-224	-0.4
2011	54489	49494	4995	-476	-0.9
2012	54366	49436	4930	-123	-0.2
2013	54115	49231	4884	-251	-0.5
2014	53808	49043	4765	-307	-0.6
2015	53582	48898	4684	- 356	- 0.65

Source: Romanian National Institute of Statistics, Bulgarian National Statistical Institute
(-86) = number of population in 2005- number of population in 2004

Population evolution 2004 2015



Current situation analysis



Evolution of population 2004 - 2014

Source: Romanian National Institute of Statistics, Bulgarian National Statistical Institute

According to the residential areas, the total regional population counted for 53808 inhabitants in 2014, out of which the rural population estimates for 55308 inhabitants. Mainly, 96% of the total regional population is grouped in urban centres, while only 4% occupies the rural areas. A close focus on the population evolution by residential areas during 2004-2014 indicates that the urban population share registered a decline of 7%, while the rural population grew by almost 26%. There are significant differences between the Romanian and Bulgarian - sectors in terms of urban population evolution. Therefore, starting with 2004 until 2014 the urban population in the Bulgarian sector declined by 29%, while the rural population stands at a relative constant level, the situation is reversed in the Romanian case: the urban population is marked by a slight decline, while the rural population grew by 35%.

Distribution of population by place of residence		2004	2015	Population growth (2004-2015) %
urban	Romanian area	44342	42537	-4,1
	Bulgarian area	4574	3229	-29.4
	Total Mangalia - Shabla area	48916	45766	-6,4
rural	Romanian area	4824	6506	34,9
	Bulgarian area	1495	1455	2,7
	Total Mngalia - Shabla area	6319	7961	26

Source: Romanian National Institute of statistics, Bulgarian National Statistical Institute



Current situation analysis

At the level of territorial administrative units, the population volume evolution lacks a uniform character. Shabla and Mangalia are affected by population decline. Instead, population grew during 2004-2014 with almost 35%.

Distribution of population by age

Analyzing the structure of the main population age groups, we find that, during 2009-2015, the share of young population (0-14 years) stands at a relative constant level in the Romanian area, decreased throughout the region and in the Bulgarian coastal region. The growth trend of the young population (0-14 years) is accompanied both in the Romanian area and the overall coastal region by an increasing elderly population (65+), while in the Bulgarian area both the young and the elderly population are declining.

Area	Number population (2009):			Number population (2015):			Age dependency ratio 2009	Age dependency ratio 2015
	0-14 ani	15-64 ani	65+	0-14 ani	15-64 ani	65+		
Romanian area	7108	38623	3832	7019	36565	5314	62.6	69.7
Bulgarian area	568	3163	1849	474	2848	1362	72.3	81.3
Total Mangalia-Shabla area	7676	41786	5681	7530	39160	6892	31.8	35.7

Source: Romanian National Institute of Statistics, Bulgarian National Statistical Institute

The increasing elderly population, particularly in Mangalia - Limanu region, has important demographic consequences, related to the population renewal process, as well as economic consequences by increasing the pressure on social security system (health and pensions). Considering the main age groups, a synthetic indicator of the age composition of the population is the age dependency ratio that expresses the ratio of the working age population (15-64 years) to the rest of the population and indicates the pressure on productive population. It is not identical to the economic dependency ratio, which is calculated as the ratio between the active and inactive population.

In 2015, age dependency ratio of the Mangalia - Shabla area has recorded a level of 35.7 dependent minors and / or elderly per 100 persons of working age, indicating an increase of about 4 percentage points from 2009, when the value of dependency ratio was 31,8%. The age dependency ratio has lower values in the Romanian zone compared to the Bulgarian area. Although the indicator remains at a lower level in the Romanian coastal region compared to the Bulgarian one, between 2009-2015, it increased both in Romanian area from 62,6% to 69,7% and in the Bulgarian area (approximately 4 percentage points during this period). The settlements with the highest values of the age dependency ratio are concentrated in the Bulgarian region, especially the municipalities of Shabla.

Natural growth of the population

The demographic phenomenon of live-birth is measured through the live-birth rate which represents the number of live births per 1000 inhabitants in a given time interval (a calendar year). During 2009-2015, the live-birth registered a quite constant evolution that varies 8,4‰ and 9,0‰. Regarding the Mangalia-Shabla area, the average value of this indicator in the given time was 9,0‰. During 2009-2015, the average values of the Romanian sector were higher than those from the Bulgarian side.



Current situation analysis

Area	Live-birth rate (‰)							Average 2009-2014
	2009	2010	2011	2012	2013	2014	2015	
Romanian area	9.9	9.5	8.5	8.7	8.7	9.0	8.6	9.0
Bulgarian area	7.0	6.1	8.4	5.7	7.0	6.8	7.2	6.9
Total Mangalia-Shabla area	9.6	9.2	8.5	8.4	8.6	8.8	8.0	8.7

Source: Romanian National Institute of Statistics, Bulgarian National Statistical Institute

Considering the whole plan area, during 2009-2015, mortality manifested a fluctuation around 8,5‰, with higher values on the Bulgarian side of the region.

Area	Mortality rate (‰)							Average 2009-2014
	2009	2010	2011	2012	2013	2014	2015	
Romanian area	6.8	7.1	7.0	6.9	7.7	7.8	7.7	6.8
Bulgarian area	23.4	25.9	21.1	19.9	19.2	24.2	23.3	23.4
Total Mangalia-Shabla area	8.5	9.1	8.4	8.2	8.9	9.3	8.7	8.5

Source: Romanian National Institute of Statistics, Bulgarian National Statistical Institute

The natural growth rate indicates the balance between the two phenomena: live-birth and mortality. It pinpoints the natural growth of a population and it's being computed as a difference between the number of live births and the number of deaths that had occurred during a year per population volume. The average value for the interval 2009-2015 indicates a slight imbalance between the two phenomena, as a consequence of reduced live-birth. Spatial disparities are extremely important. During 2009-2015, localities from the side of the Romanian area display constant positive values while the Bulgarian sector recorded constant negative value.

Area	Natural growth (‰)							Average 2009-2014
	2009	2010	2011	2012	2013	2014	2015	
Romanian area	3.1	2.3	1.6	1.7	1.0	1.2	1.3	1.8
Bulgarian area	-16.4	-19.8	-12.7	-14.2	-12.2	-17.4	-17.3	-15.8
Total Mangalia-Shabla area	1.0	0.1	0.1	0.2	-0.3	-0.5	-0.6	0.1

Source: Romanian National Institute of Statistics, Bulgarian National Statistical Institute

Human resources

Knowledge on the size and structure of the coastal area human resources of Mangalia-Shabla help to establish priorities relating to the socio-economic environment and the pursuit of activities in relation to available resources. Issues related to development and demands for sea use stem generally from the activities generated by the population.

Density of population

Human population density (people per sq. km of land area) is one of the factors that influence the development pressure due to coastal human settlements expansion and diversification of human activities having impact on coastal and marine spatial development.

In the plant area Mangalia-Shabla average density of the resident population in 2014 was of 112 inhabitants / km² (see the following table). The highest values of density are found in Mangalia, which is highly urbanized. Shabla municipality, although comprises urban population, has the lowest density in the plan area because its administrative area is double compare to the Mangalia-Limanu coastal area.



Current situation analysis

Population density in 2015

	Population (no.)	Surface (Km ²)	Density (inh./km ²)
Mangalia-Shabla area	53582	479.6	111.72
Shabla	4684	329	14.24
Limanu	6506	88.2	74
Mangalia	42537	62.4	679.04

Source: Romanian NSI, Bulgarian NSI

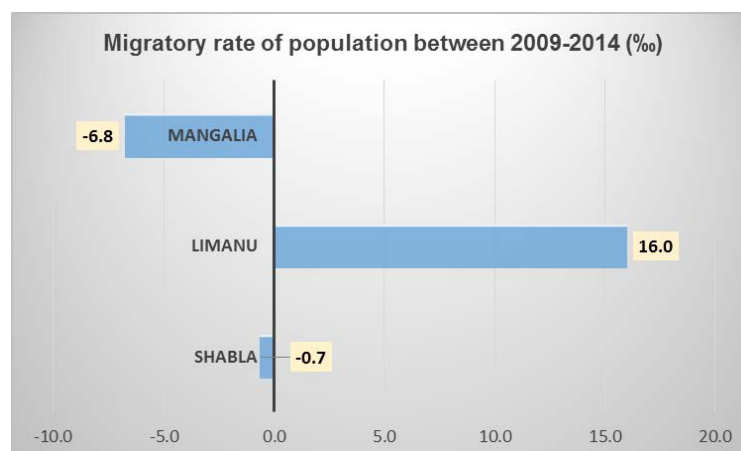
In the Romanian and Bulgarian coast analysis there was shown that the northern and southern extremes of the studied area are sparsely populated and the average population density of Bulgarian area is less than the value recorded in the Romanian area.

Migratory movement

The growth in population of coastal areas illustrates the importance of emergency planning and preparation for areas that are prone to floods and tempests. The pressure on the coastal zone can be a result of the migration of the population, which tends to establish in villages situated along the coast, especially in areas with developed tourist infrastructure.

Growing populations and development along the coasts increase the vulnerability of coastal ecosystems to sea level rise.

To develop and understand the physical processes responsible for shaping the ongoing evolution of the coast and to develop the management strategies to deal the impact of human activities on the coastal zone and as well as for adapting to the hazards associated with the people living on the coast, knowledge of the mechanism, processes and the pattern of migratory movement in the coastal zone is of utmost importance.



Source: Romanian NSI, Bulgarian NSI

In the last six years the average net migration rate is negative in the studied area (-3.6‰). Consequently the average net migration rate was (-6.4‰) in 2014, with positive value only in Limanu (2.9‰) and negative value in Shabla (-4.6‰) and Mangalia (-8.1‰).

Migratory movement in the plan area confirms that population coming into the coastal urban areas of the two countries prefer the southern coastal towns. Municipalities highly urbanized from coastal area recorded in the period 2009-2014 population declines, as in the case of Mangalia, losing 7‰ of the population through out-migration. In contrast rural areas surrounding large cities attract population, as in the case of Limanu, located at the 5 km away from Mangalia.

Labor resources and unemployment rate

Labor resources represent a category of the population that has all the physical and intellectual capacities that allow it to perform useful work in one of the national economic activities. The labor resources include: the population of working age, able to work, and people under and over working age employed.



Current situation analysis

Available data on employment show that the population employed under labour contract in the Mangalia-Shabla area represents 26% of the population of working age. In 2014 for urbanized areas of Mangalia-Shabla this indicator was significantly higher than the value recorded in the rural area. Thus in Mangalia employment rate was 39.7%, in Shabla, with 68% urban population, was 37%, while in Limanu did not exceed 5.5%. The analysis of the evolution of the employment rate, from 2007 to 2014, shows that the trends were different in the two municipalities with urban population. Employment rate in Mangalia decreases in seven years; while in Shabla increases by 10% (see the following figure). In Limanu employment rate recorded a slight increase over the period (1.4%).

The unemployment rate in the plan area was 3% in 2014. The unemployment rate value in Bulgarian area (13%) was 6 times greater than in the Romanian area (2%). The lowest value of unemployment was registered in Limanu administrative unit. Analysis has shown that in the Romanian coastal zone unemployment values are lower than those recorded in the Bulgarian coastal zone and Shabla has the highest unemployment rate of all municipalities within the plan area.

Social exchange rate on the labour market

To estimate the regeneration capacity of human resources in the coastal area in the short term we analyzed social exchange on the labour market index for 2014.

Social exchange index (rate) is the ratio of the population aged 60-64 and people aged 15-19, and values greater than 1 (or 100 if weights) indicates the difficulty to keep constant the working capacity of the geographical plan area.

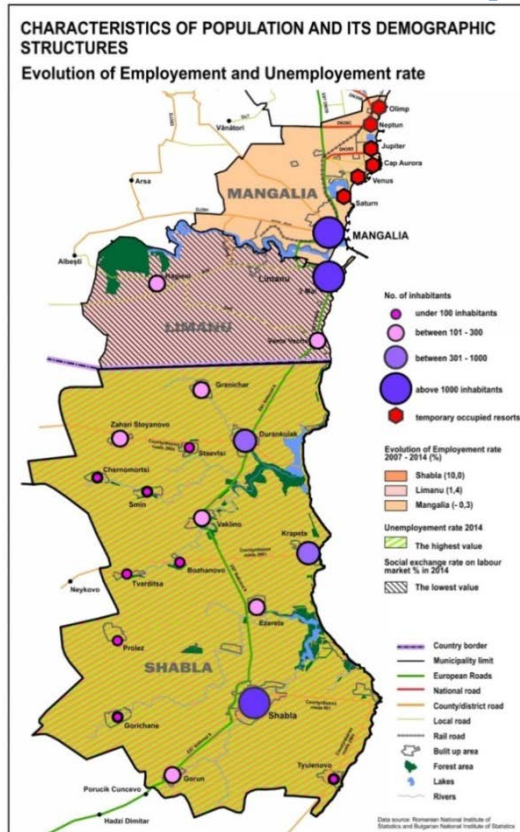


Source: Romanian NSI, Bulgarian NSI

Social exchange rate on the labor market in Mangalia-Shabla area reached the value of 168% in 2014. The increased values of social exchange rate in Bulgarian coastline (mean 177%) indicate an aging workforce comparatively with the Romanian coastline (mean 153 %) and a lower regenerative capacity of labor resources of the localities situated on the Bulgarian seaside.

The analysis of social exchange rate by municipality shows that the highest values (over 196%, see figure above), were reached in Byala (228.6%), Shabla (219.5%), Constanta (207.8 %), Primorsko (197%) and Sulina (196.4%). Diminished workforce capacity is a problem for most municipalities of coastline, but its intensity is different from one municipality to another. In Mangalia (166.5%) the value of social exchange rate is lower than in Shabla. The value of this indicator for Limanu is the lowest in the Mangalia-Shabla area.

Current situation analysis



Evolution of the employment and unemployment in Mangalia - Shabla area

2.4 Analysis of coast economic activities

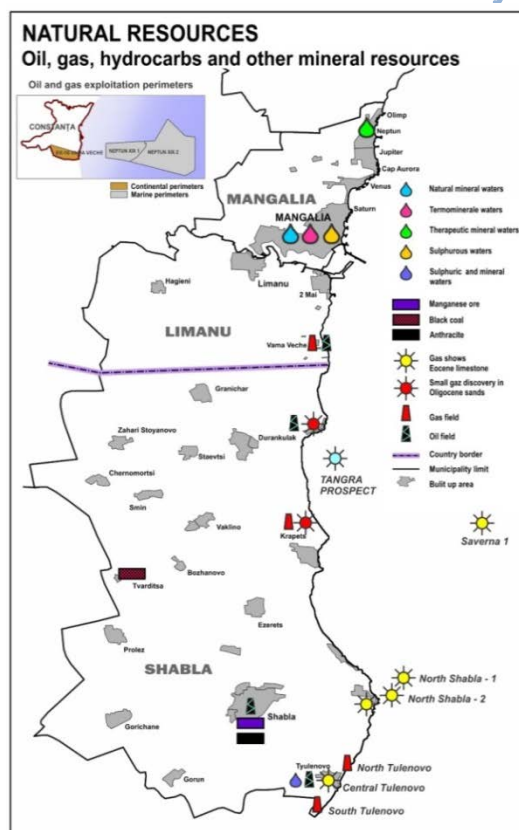
Economic resources

The most important assets in the area of Mangalia-Shabla are the Black Sea resources and the coastal resources (balneal, water, soils, minerals, etc).

Oil and natural gas

According to the Romanian National Agency for Mineral Resources, in 2016 was signed the following concession agreement for exploration – development – oil exploitation (RNAMR, 2016 - in **figure**): Vama Veche (oil and gas). In the Bulgarian Black Sea coastline, there are exploited oil from Tyulenovo - Shabla (oil and gas). The gas reserves are exploited from the Bulgarian Black Sea basin (Savarna – 1, North Shabla – 1, North Shabla – 2 - **see figure**). The Black Sea continental shelf is rich in hydrocarbon resources, minerals and sands.

Current situation analysis



Oil, natural gas and other natural resources exploitation sites

Source: data processing ANRM, 2016, Mediapool.bg, 2015 and Caspian Barrel, 2015

The Romanian National Agency for Mineral Resources has authorized oil fields in 2 oil perimeters along the cross-border Mangalia-Shabla area (Romanian Black Sea Basin): Neptun XIX 1 and Neptun XIX 2. The prospecting areas for oil and gas from the marine waters are heavily polluted by the cuts, detritus or solids drilling, mud or mud of drilling, air emissions, underwater noise and accidental spills, with a negative impact on the marine environment, especially on the water quality and the sediments and even on the species of plant and animal organisms.

Regarding the oil and hydrocarbons pollution, the analyses realized have demonstrated the existence of oil leaked into the sea waters from the countries situated along the seashore.

The first oil field in Bulgaria was discovered in Tyulenovo in 1951. Currently, the oil drillings are positioned near Tyulenovo. Along with the extracted oil there is an amount of healing sulfuric and mineral water, which are presently poured into the sea. The hot fluid is very useful for balneal activities. Later were found the oil-gas deposits from Eocene age in Balgarevo - Krapetz - Blatnitsa. These gas reserves are massive and multilayered; they cover a total of three sections: North - Shabla, Central - Tyulenovo and South - St. Nicholas. At present, Bulgaria imports about 98% of its necessary oil, in Romania and this represents only 2% of our resources (Hristov, 2017).

Fresh water resources

Water and especially fresh water, is one of the most critical natural resources in the area. The tourism industry generally overuses water resources for accommodation, swimming pools, golf courses and personal use of water by tourists. This can result in water shortages and degradation of water supplies, as well as generating a greater volume of waste water (GDRC, 2015).

The Shabla municipality has no surface water streams. The water supply of the settlements is carried out by underground water sources built near Durankulak, Vaklino, Krapetz and Shabla. The groundwater contamination is a complex action that leads to exceeding the MAC for nitrates, as well as deviations from microbiological indicators. The general pollution of the Dobrudzha coast waters are added and local discharges of untreated or partially treated wastewater, which have a negligible contribution to the deterioration of seawater. In the resort Albena Cape Shabla, the

Current situation analysis

pollution is generated by the high level concentration of the indicator of nitrate nitrogen, in some cases ammonium nitrogen and permanganate oxidation BOD-5.

A distinctive feature of this cross-border area is the existence of natural lakes and lagoons and meadow (Mangalia Lake, Shabla-Tuzla Costal Lake, Shabla and Ezerets Costal Lakes). Shabla Tuzla Coastal Lake is located approximately 6 km east of the town of Shabla. This lake is completely separated from the sea by a sand strip of about 80 m wide. It is a salt lake – lagoon, formed mainly by infiltration of saline waters beneath the sand dunes which separate it from the sea. Compared to other coastal lakes and mud deposits the Shabla mud deposit stands out with its extremely high quality and homogeneity (Shabla.be, 2016a). At some 3 km from Shabla there is also the Shabla Lake, declared a protected area in 1979. Under this name are two natural coastal lakes in Shabla and Ezerets connected by an artificial canal. They are both separated from the sea by a strip of sand, 30-50 m wide. Together with Durankulak Lake the area is among the most significant wetlands in Bulgaria (Shabla.be, 2016b). Mangalia Lake is a former lagoon, both maritime and fluvial.. As origin, the littoral lakes from the Romanian part of the cross-border area are of three categories: fluvio-marine (Mangalia lake); lagoons (Comorova, Hergheliei - Mangaliei Moor); man-made (the three lakes of the Comorova complex and Hergheliei).

Forests

According to the data provided by Corine Land Cover during 2006, version 2013, the broad-leaved forest occupies a restrained surface on the cross-border Mangalia-Shabla area (**see figure**).



Forests and water bodies in the cross-border Mangalia-Shabla area

Source: processing of data Corine Land Cover 2006

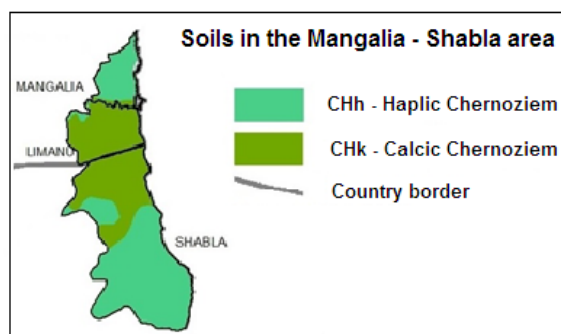
Forests often suffer negative impacts of tourism in the form of deforestation caused by fuel wood collection and land clearing. Coastal wetlands are frequently affected by the deforestation and intensified or unsustainable use of land, drained and filled due to lack of more suitable sites for construction of tourism facilities and infrastructure. These activities can cause severe disturbance and erosion of the local ecosystem, even destruction in the long term (GDRC, 2015). Aside from direct effects, such as marine and coastal pollution and the introduction of invasive species are likely to result in more fragile marine ecosystems, making them more vulnerable to other environmental impacts resulting from, for example, the coastal deforestation (Makarow et al., 2009). Further effects of deforestation include soil erosion and coastal flooding. In addition to their previously mentioned roles, trees also function to retain water and topsoil, which provides the rich nutrients to sustain additional forest life. The deforestation also allows a greater amount of

Current situation analysis

greenhouse gases to be released into the atmosphere. The trees also help control the level of water in the atmosphere by helping to regulate the water cycle.

Soils

According to the FAO-UNESCO classification from 1990, in the cross-border Mangalia-Shabla are predominate the chernozem soils, very suitable for agriculture. The Calcic Chernozems represent the soil class prevalent in Limanu and north of Shabla, while the Haplic Chernozems majority occupy Mangalia and center and south of Shabla.



Type of soils in the cross-border area Mangalia-Shabla

Source: processing data FAO, 1990

The use of fertilizers in agriculture is the main problem related to the water pollution in the cross-border area Mangalia-Shabla. The extra nutrients cause eutrophication - flourishing of algal blooms that deplete the water's dissolved oxygen and suffocate other marine life. Phosphorus is now the limiting factor for algal growth (eutrophication) and phosphorus inputs into the Black Sea have been halved since around 1990.

Balneal resources

The beaches of Shabla cover 22% of all the beaches of the Bulgarian Black Sea coast, but their exploitation is not entirely made through accommodation structures.

In Shabla there are rich mineral resources, developing production of coal and manganese ore, and deposits of oil (limited and declining reserves).

Mangalia has resources of sulphurous springs and mesothermal water, this being the only resort with mineral springs, discovered and used since Roman times.

In Shabla municipality much of occupied land surfaces are for agriculture (284.433 ha). 92% of the total agricultural land is arable land (261.058 ha). Forest areas occupy 3% of the total land area of Shabla.

Shabla municipality owns three sources of mineral water and a source of mud. Near Tulenovo there are resources of mineral water with a temperature of 41 °C.

The number of sunny days per year creates an environment favourable for location of solar panels and renewable energy sector development.

Economic activities

In Mangalia the most business (88.9%) are micro-enterprises, establishments with fewer than 9 employees per segment, achieving approx. 9 % from the total turnover. Very large units, with more than 500 employees/unit, are only 5 (0.4% of the total), with a turnover of approx. 75% of the total indicator at the local level. SMEs represent 99.6% of the total businesses in Mangalia (2015). Companies with headquarters in Mangalia had in their structure a number of 10925 employees in 2015.

In the municipality of Limanu, in 2015, were active a number of 90 businesses with 633 employees. The number of employed persons grew in 2011; an increase of 3.8 times was recorded in all companies, from small businesses up to businesses with over 100 employees per unit.



Current situation analysis

The dominant activities in Shabla municipality are agriculture, tourism and trade. The number of active businesses was growing 2.2 times during the 2008-2011 period (from 142 to 317 units). During the same period were set up new businesses in agriculture (29 units), services and trade (21), hotel services and restaurants (20), industry (3), transport (4 units). After the economic crisis of 2008, the construction sector recorded decrease from 20 to 8 businesses (2008-2011).

The favourable geographical position of Shabla and the proximity of the Black Sea makes the land in the area attractive for investors and real estate developers (71 economic units in 2011 were in real estate services). In the field of trade and services there are 24 units, representing 76% of all businesses in Shabla. In the agricultural sector are operating 15% of the economic units and the accommodation services and the restaurants 13%.

- agriculture

Agriculture represents an important activity in the economy of the municipalities, through the culture of cereals and leguminous plants. The lands are fertile and there are large surfaces equipped for irrigation. The microclimate of the area is favourable for a wide range of crops. Vegetable sector has recorded decreases in production in recent years, by the closing of greenhouses, in the 90th.

The total land area of the Romanian municipalities is 6230 ha (in 2014), of which 56% (3490 hectares) are agricultural land, and 44% are non-agricultural lands. Agricultural lands are occupied by arable surfaces (85.7%), grassland (9.4%), and wine-growing nurseries (4.7%). This distribution of land contributes to the development of agricultural activities, livestock and wine-growing.

Agriculture is the most important sector of the economy of Shabla municipality. It is a major source of revenue and employment for the population and will continue to play an important role in the development of the area in the future. The total land area of the Shabla municipality is 3296 ha, of which 87% (2864 ha) are agricultural land. In the town of Shabla are registered 8 active agricultural cooperatives, 13 SMEs (2012) and many private farmers (274 in 2012).

An important part of the agriculture is for subsistence being produced for household's consumption in small farms. There are also firms that develop a more efficient farming based on scientific procedures.

- secondary sector

The industrial zone of Mangalia is significant, being beneficial for the development of productive activities, especially those related to the sea transport and trade.

The city of Mangalia passes through a shortage of production and processing of raw materials from coastal area: functional units for processing of meat, fish, milk, bakeries, fruit and vegetables processing, production units in alcoholic beverages, bottling of water, etc. From this point of view it is apparent the vulnerability of the local economy in terms of food production, which leads to rising prices of these products, leading to an increase of prices in tourism activities.

In industrial activities of Mangalia, in 2015, were registered 210 firms. The industries have financial performances in: construction of vessels and floating structures (SC Daewoo Mangalia Heavy Industries; Marman COMTRANS export market leader); repair and maintenance of ships and boats; manufacturing, food and textile, etc. Ship construction branch is representative for the municipality, which include the largest shipyard of its kind in Romania. From the point of view of the source of funding, it is the largest foreign investment capital in Romania

The industrial sector in Shabla is very poorly represented; it includes SMEs that don't have a large production capacity. In the structure of the local economy, enterprises in this sector occupy only 3% of the economy.

The Shabla area proved favourable for the production of electricity from renewable sources, mainly wind; many agricultural lands are overlapped by wind farms. For this reason during the period 2008-2011, the number of companies in the sector of production and distribution of electricity has



Current situation analysis

increased, reaching 25 units in 2011. Inland, wind farms are located on an area extending more than 5 km of the shoreline.

- tourism, retail and services

Tourism is a significant driver of the regional economy. The city of Mangalia has 6 component seaside resorts (Olimp, Cap Aurora, Jupiter, Neptun, Saturn, Venus). Mangalia and Limanu have a large number of tourist accommodation units, but due to the crisis and other destination competition the number of accommodation units decreased during the last decade.

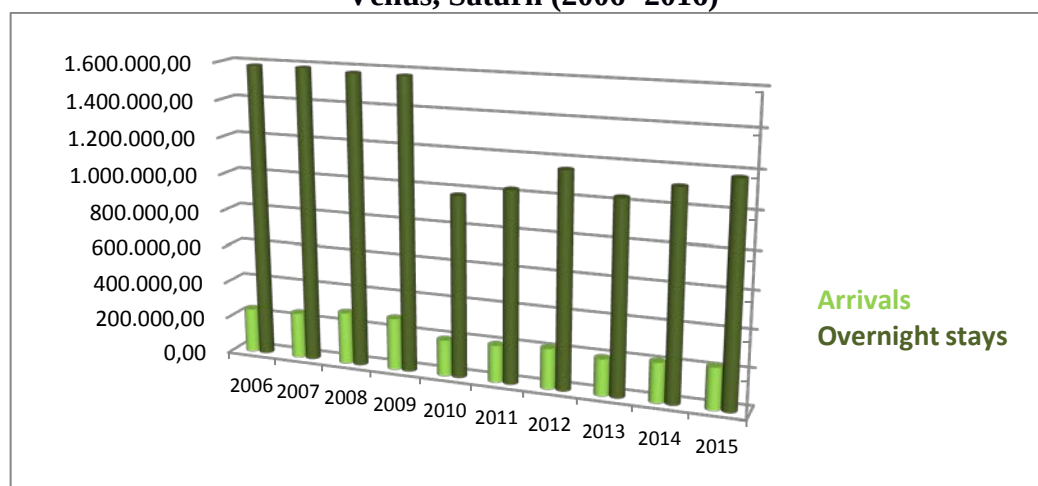
The number of accommodation units in Southern Romanian coast

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Mangalia	9	10	11	12	13	12	11	11	13	12
Olimp	12	12	12	13	13	11	11	12	14	9
Neptun	75	80	80	82	135	54	46	46	48	49
Jupiter	32	34	34	34	34	26	24	30	30	29
Cap Aurora	9	9	9	9	9	7	7	7	7	7
Venus	62	63	70	63	64	21	22	24	24	28
Saturn	38	38	38	39	41	28	29	30	30	27
2 Mai	7	8	8	8	8	4	7	7	7	7
Vama Veche	7	7	7	7	8	10	11	11	10	12
Total	251	261	269	267	325	173	168	178	183	180

Source: Constanța County Department of Statistics

Being a string of resorts and a tourist attraction, the Southern Romanian coast could represent a pole for tourism development up to the highest standards. Despite the development of tourism, it does not participate in raising funds from local budgets by promoting jobs, due to its seasonality and low standards.

Arrivals and overnight stays in the South coast resorts: Olimp, Neptun, Jupiter, Cap Aurora, Venus, Saturn (2006 -2016)



Source: Constanța County Department of Statistics

The tourism in Shabla is after agriculture, the second important sector in the local economy. Shabla municipality has considerable tourist resources and great potential for development that are still not used to its capacity to create income.

In town Shabla and the villages Krapets and Tulenovo are few private hotels and guest houses. However the main issues are the poor developed road network, even in some places there is no road access to the beaches and the sea.



Current situation analysis

Other places for tourist accommodation are: camping "Dobrudzha" near the Shabla; Kariya-Cape Shabla; s. Gandhi; the village of Tyulenovo; Ezeretz village; Krapec; s. Durankulak; camp Cosmos end s. Durankulak. The several camping sites need an infrastructure renewal and an increase of tourist places.

Shabla Municipality has two settlements, located directly on the sea coast and the settlement formation Kariya, located on Shabla cape; these are locations for further tourism development.

Tourist accommodation in Shabla muniipality¹

Indicators	Unit	2010	2011	2012	2013	2014	2015
Means for shelter and accommodation places	No.	7	7	8	8	8	8
Beds	No	528	733	360	371	363	382
Rooms	No	110	109	173	234	162	158
Hotels	No	4	4	5	5	5	
Accomplished nights	No	11 614	..	15 710	19 473	13 694	17 726
including. of foreigners	No	1 768			4 093	2 617	4 670
Overnight persons	No	4 355	..	4 278	5 288	4 552	6 229
including. of foreigners	No	781			1 099	1 150	2 261
Revenue from overnight stays	BGN	194 661	..	308 320	379 115	349 995	464 288
including. of foreigners	BGN	26 411			80 907	75 781	145 634

¹ Includes categorized shelter and accommodation places with over 10 beds, functioned during the year.

Transport activity is well developed in Mangalia, due to the activity of the shipyard, naval construction services and the commercial port. Annually, hundreds of ships load and download in this port thousands of tons of merchandise.

The operations of the Gas Mangalia Terminal, located in Callatis Mangalia port, allows for the the storage and transport of gas fuels, in very large capacities (the largest operational capacity of its kind in the country) as well as for their beneficiaries on road distribution in South-East Europe.

Retail in Mangalia is limited to small shops and street stalls with commerce and market products, both in town and in the resorts; the large retail segment is represented by three supermarkets.

Retail and services in Shabla occupies a considerable share in the economy in recent years. 24% of bussinesses in the municipality carried out such activities.

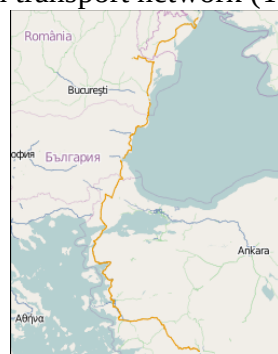
At a larger scale, the Mangalia - Shabla area is influenced by terrestrial activities, at a regional and transnational level, as well by the Exclusive Economic Zone.

Mangalia municipality is part of the Constanta County and Dobrogea region, from which take some anthropogenic and natural features. Shabla municipality belongs to the Dobrich region, part of Northeastern Region of Bulgaria.

The area is influenced by the following external spatial components of national and international infrastructures:

- transport corridors

The trans-European transport network (TEN-T)



The European Route E-87 (coastal road I-9 in Bulgaria is part of the Trans-European Transport Network TEN-T)



Current situation analysis

The Orient/East-Med Corridor connects the German ports, Czech Republic, Slovakia, Austria, Hungary, the port of Constanta, the port of Burgas, with a link to Turkey, Greek ports and a "Motorway of the Sea" to Cyprus. It comprises rail, road, airports, ports, RRT's and the Elbe river inland waterway.

The Rhine-Danube Corridor connects Rhine, Main and Danube, to the Romanian ports of Constanta and Galati.

Important port cities and development poles influencing the Mangalia-Shabla area are: Constanta and Varna.

Areas with ecosystems and marine resources surpassing the cross-border area

Pursuant to the provisions of Emergency Ordinance no. 57 of 20 June 2007, the following natural protected areas were established in the marine zone:

- Natura 2000, ROSPA0076 Marea Neagra
- PZ Kaliakra - BG 0002051 - area - 10902.79 ha, of which 5359.39 ha inland and 5543.40 ha. aquatory

Protected areas under the Law on Biological Diversity – Directive Habitat

- PZ Coastal Dobrudzha - the lands of settlements of municipalities General Toshevo - / 13 / Kavarna / 9 / and Shabla / 6 / with an area of 6517.31 ha.

Neighbouring areas of cooperation

Several regional organizations and initiatives are currently active in the region, reflecting the need and political will for cooperation and coordination in the area. Yet the activities of these structures are often limited by the lack of political commitments at both regional and national levels. These organizations and initiatives differ greatly in terms of geographical scope, extent and focus of cooperation activities:

- The Black Sea Synergy
- Bucharest Convention
- Black Sea Economic Cooperation Initiative
- Black Sea Forum for Dialogue and Partnership
- Organisation for Democracy and Economic Development – GUAM
- The Community of Democratic Choice
- Environment for Europe Process (UNECE) & Kiev declaration on networks of protected areas
- The Biodiversity Strategy (EU)

The influence of the Exclusive Economic Zone on Mangalia-Shabla marine area

The marine area afferent to Manglia-Shabla, is influenced by the maritime area neighbouring the territorial waters of the two countries. Exploration and exploitation of oil and gas, including untreated waste water from shipping activities, sea transport and fishing are main activities that could influence the plan area.

The recognition and formal establishment of EEZs has brought a significant part of the countries' seas under the jurisdiction of coastal states. In addition, the majority of the seas' primary productivity and fisheries production is located in the coastal shelf regions within the EEZs.

Exploration and exploitation of hydrocarbon deposits are considered to be high degree factors of environmental pollution. Although scaffolding oil extraction is done in a closed system, which should lead to the avoidance or minimization of any form of pollution, and the depth at which it is being worked is large, however there are many cases where substances specific to oil extraction, drilling or mining have been found in fountains or in the basements of poorly-insulated blocks. The same situation is found in the case of marine area drilling, where such substances specific to exploration / exploitation of oil and gas can migrate from drilling to sea water.



Current situation analysis

Offshore oil and gas exploitation can generate the following environmental issues:

- emissions into the atmosphere
- waste water discharges
- solid and liquid waste discharges
- noise generation (including underwater)
- leakage of fuel and gas
- energy efficiency and conservation of onshore resources.

Oil and gas tanks contain water (forming water) which becomes water produced when it is brought to the surface during the production of hydrocarbons. In many cases, water is injected into the tank to maintain pressure and / or maximize production. The total product flow is one of the largest waste disposal products, depending on volume and therefore requires offshore operators.

The water produced contains a complex mixture of inorganic (dissolved salts, concentrations of certain metals, suspended particles), organic (suspended and dissolved hydrocarbons, traces of fatty acids and other organic compounds) and, in some cases, residual concentrations of chemical additives, (for example, scaling and corrosion inhibitors, hydrate inhibitors), which are sometimes used to enhance the hydrocarbon production process.

In a bore, annular space, cementation between the column and the well wall is performed to seal this space in order to isolate geological formations traversed by the well (so that no fluid exchange occurs between them or between them and the surface during the operation of the probe) and to provide a mechanical support for the column, which enhances its resistance to the demands during its execution and exploitation. But with all these measures of insulating / assuring drilling, it has been found that even in the case of probes where the checks showed a perfect state of operation, there have been problems over the sealing of the spaces between the columns or between the columns and the ground.

Compared with the classic oil and gas exploits (vertical drilling to oil / gas accumulation), exploration and exploitation activities using hydraulic fracturing technology (applied by OMV Petrom SA from 2010 in the Black Sea) involve much higher risks for the environment than sea pollution and earthquakes can cause. Currently Shabla-Snagov-Vidraru fault can cause earthquakes with devastating effects if it is affected by the application of hydraulic fracture technology in the area, technology banned in several European countries as well as in the seismic code of the Cernavoda nuclear power plant.

In the case of hydraulic fracturing, water flowing back from the well to the surface after hydraulic fracturing is generally referred to as flowing water; this water needs separate considerations or in addition to those that refer to the water produced because its characteristics depend on the type of fluid and the chemicals injected to induce fracturing of the rocks. Reflux water can thus be one of the most important environmental management issues for hydraulic fracturing operations. In order not to affect the marine environment, this water may be temporarily stored in sealed tanks prior to injection into an appropriate offshore storage pit or may be temporarily stored for reuse in other hydraulic fracturing operations or may be flown along with hydrocarbons products, for their treatment and disposal.

Other wastes from offshore installations are: sewage water, food waste, ballast water and storage tanks, sewage water, drainage (rainfall, marine spraying or routine operations such as cleaning decks and equipment, as well as fire drills). Other non-hazardous and hazardous waste can be: general office and packaging waste, waste oils, oil-contaminated cloths, hydraulic fluids, used batteries, paint boxes, used chemicals and used chemical containers, filters used, fluorescent tubes, medical waste - wastes that must be insulated at least in non-hazardous and dangerous waste and transported to the shore for re-use, recycling or disposal.



Current situation analysis

To avoid collisions with third-party vessels and support, offshore installations must be equipped with navigation facilities that meet national and international requirements. The navigable fuses include radar and lights on the installations structures and, where appropriate, on the supporting ships. A minimum safety area with a 500 meter radius required to reduce the risk of collision between the ship and offshore installations must be implemented around offshore installations.

The relevant maritime, port or shipping authorities must be informed of all offshore permanent facilities as well as the safety and routine transport routes used by vessels related to this activity. Permanent installations locations should be marked on nautical maps. Maritime authorities should be informed about the program and location of activities when there is a significant increase in vessel movement, such as during installation, platform movements and seismic surveys.

A safe area of the submarine corridor (usually 1,000 meters wide) should be established to define the anchorages exclusion areas and protect the gear. In shallow waters with high maritime activity, the burial of the pipeline under the seabed shall be considered.

In the case of offshore installations, it is necessary to analyze the possible situations in which objects / cargoes accidentally hit by sea can affect submarine installations or pipelines, and a material handling study should be developed to identify handling devices and procedures to avoid impact and injury to personnel.

Offshore infrastructures must establish and maintain a high level of preparedness in case of emergency to ensure that the response to incidents is effective and without delay. The most serious potential accidents should be identified by risk assessment and the development of appropriate training requirements. An emergency response team should be set up for offshore installations, a team ready to respond to emergencies, save the wounded and take emergency action; the team will coordinate actions with other agencies and organizations that may be involved in the emergency response.

In identifying potential hydrocarbon reserves in geological formations located far below the seabed, seismic technology is used, which consists in reflecting the sound waves to identify underground formations. The seismic sources trailed by the seismic vessel are air vents, which eliminate sound explosions of 200-250 decibels (sound pollution) down, repeated blasts on average every 6 to 10 seconds, which are then reflected by geological formations deep and recorded by the hydrophone array. The hydrophone array, towed behind the seismic vessel, at a depth of 5 to 10 meters, consists of a maximum of 16 "streamers" (cables containing the hydrophones used to detect underground reflected sound); each cable can be 8-10 kilometers.

The decommissioning of offshore installations occurs when the tank is depleted or the production of hydrocarbons in the tank becomes unprofitable. Parts of the offshore installation, such as platforms, are treated to remove contaminants and are removed. Drilling is blocked and abandoned to prevent the flow of fluid from the well, which could contaminate the marine environment. The equipment in the drilling well is removed and cleaned. The borehole is then plugged to prevent the inflow of liquids. The integrity and correct positioning of the wells in the drill well is checked, then the casing is cut under the surface of the marine soil and covered.

On 25 March 2013 the European Parliament's Committee on Industry, Research and Energy presented the Report on the proposal for a regulation of the European Parliament and of the Council on the safety of offshore oil, prospecting, exploration and production activities.

Since major oil-related accidents have been identified as having a particularly serious impact on the marine and coastal environment and on coastal economic activities, a policy review has been decided to ensure the safety of offshore operations, protection of the marine environment.



Current situation analysis

Following the Commission proposal, the European Parliament issued the Directive on the safety of offshore oil and gas operations and amending Directive 2004/35 / EC. This directive set minimum requirements for the prevention of major accidents and the limitation of their consequences in offshore oil and gas operations. There were also defined important terms used in these operations, of which very important for the present work are:

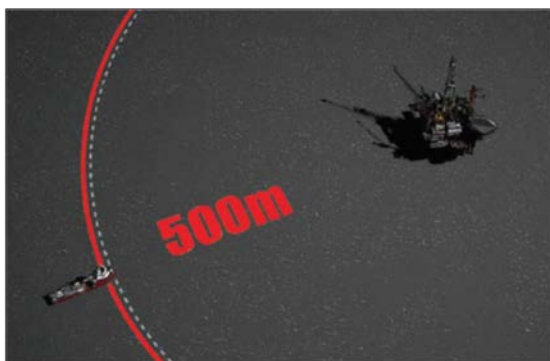
- safety area - is the area within 500 meters from any point of the installation, where installation - means a stationary, fixed or mobile plant, or a combination of installations permanently interconnected by decks or other structures, used within offshore oil and gas operations or in connection with such operations; this includes mobile offshore drilling installations only when they are stationed in offshore waters for drilling, production or other activities associated with offshore oil and gas operations.
- offshore - means located in territorial waters, exclusive economic zone or continental shelf of the Member State within the meaning of the United Nations Convention on the Law of the Sea (UNCLOS);
- offshore oil and gas operations - means all activities associated with the connected installation or infrastructure, including their design, planning, construction, operation and decommissioning, related to exploration and production. This does not include oil and gas transport from one coast to the other.

By connected infrastructure, within the safety area or in a neighboring area located at a greater distance from the installation, it is understood:

- any well and related structures, extra units and devices connected to the offshore installation,
- any equipment or work on the main structure of the offshore installation or fixed by it;
- any piping or work system.

In March 2017, the Step Change in Safety in association with Marine Safety Forum published the paper "Marine operations: 500 m safety zone, working together to continuously improve our safety performance," which provides information on how offshore installations and vessels can work together to ensure safer maritime operations in the 500-meter area (safety area of the facility).

Analyzing the dangerous events related to ship collisions and maritime operations in safety zones, it was found that the highest collision risk comes from ships that are invited to enter the 500-meter area, managed by the offshore installation.



Source: "Marine operations: 500 m safety zone, working together to continuously improve our safety performance"

A safety zone is an area extending out from any part of an offshore oil and gas installation (typically 500m) and is established automatically around all installations which project above the sea at any state of the tide. Subsea installations may also have safety zones, created by statutory instrument, to protect them. These safety zones are 500 m radius from a central point.

If it has been identified that working in drift conditions is required then, before permission to enter the 500m safety zone is given, a risk assessment must be undertaken by both vessel and installation, between the OIM (Offshore Installation Manager) and vessel master made before allowing operations to be undertaken.



Current situation analysis

The Black Sea has unique features in the world, consisting of two different layers, a discovery made by the Russian oceanographic expedition in 1890. The first layer, from the surface of the water up to the depth of approx. 150 m is composed of salt water, which is the basis for the development of underwater life. Under the 150-meter depth (90% of the sea water volume) there is a layer of hydrogen sulphide (flammable and explosive gas, smell of broken egg, poison, and in high concentration) and heavy water, unfit for life.

In the occurrence of an accident at a Marine Exploration / Exploration Platform, oil can pollute extensive areas, being pushed by the marine currents to other maritime platforms or shoreline; the same is for natural gas that rises in the air and can be transported over long distances.

In the 70's, Japanese studies showed that there is a fragile balance between the two layers of water, and in the event of a major earthquake, upward currents could appear to bring this flammable gas to the surface.

Using the hydraulic fracturing method implies a risk of creating earthquakes and emergence of upward currents, whereby large amounts of hydrogen sulfide, which, being heavier than the air, will float to the surface of the water, being carried by sea currents and can even reach the Bosphorus Strait, with particularly serious consequences.

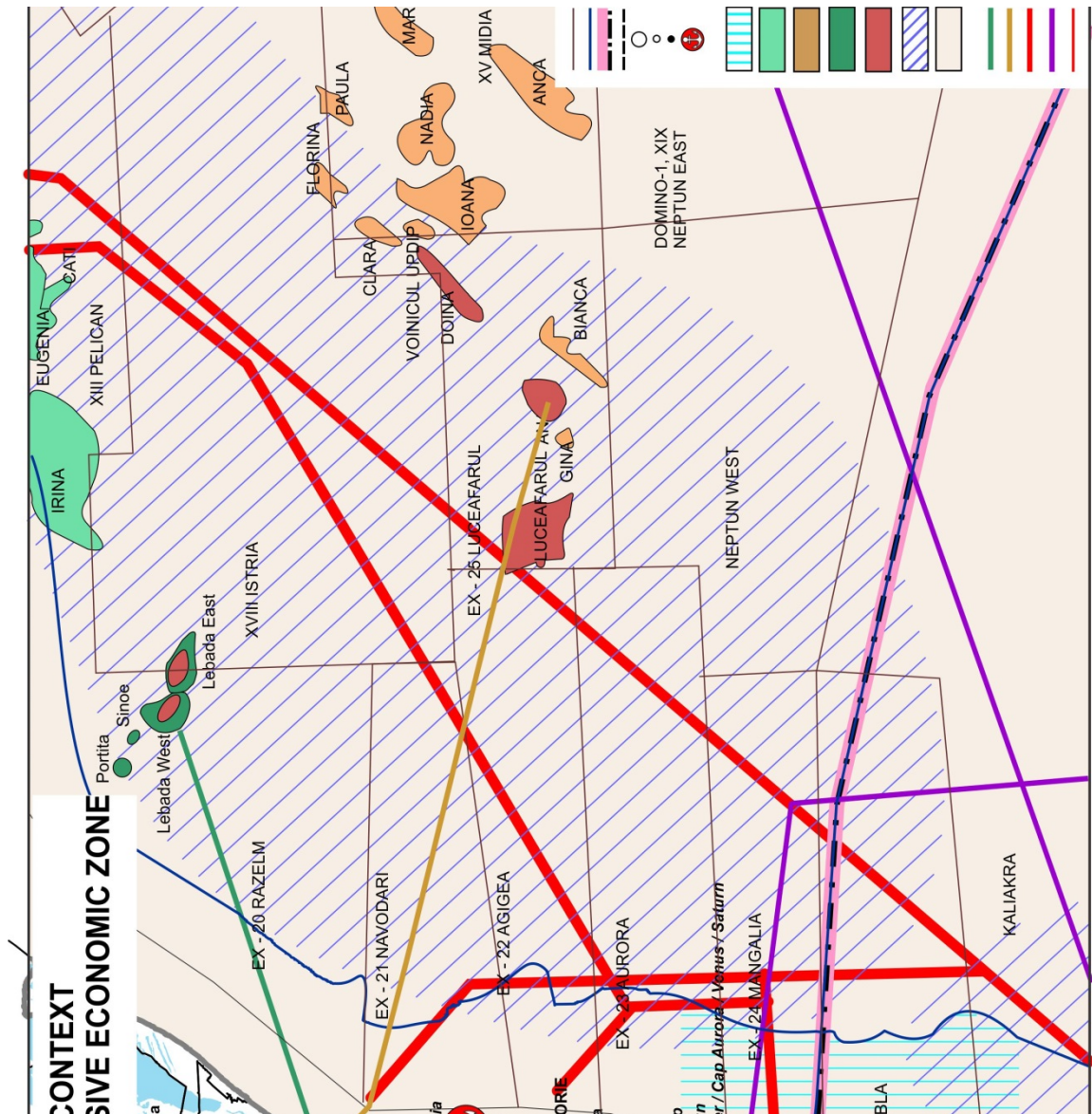
Living resources exploitation in the EEZ is another activity that influences the plan area by way of variations of stock and introduction of nonnative species.

The exploitation of fisheries resources in the EEZ is limited to the upper shelf, since depths below 100-150 m are anoxic and have high amounts of H_2S , both conditions being hostile to life. Marine fish catches have exhibited trends similar to other Black Sea countries. In the mid-1960s, Atlantic mackerel (*Scomber scombrus*), bonito (*Sarda sarda*), and bluefish (*Pomatomus saltatrix*) were the commercially important species. Bluefin tuna (*Thunnus thynnus*) and swordfish (*Xiphias gladius*) were also targeted, but were less abundant. In the late 1960s and early 1970s, Atlantic mackerel, bonito and bluefish catches dramatically decreased in the Black Sea fisheries. Among demersal species, turbot (*Scophthalmus maximus*) was one of the most important commercial species, and catches averaged 600 t/year in the 1960s, but dropped to 20 t/year by the 1980s. In the 1970s, the over-exploitation of larger pelagic predators, combined with the increased eutrophication of the north-western Black Sea led to a dramatic increase in the catches of small pelagics such as sprat (*Sprattus sprattus*), anchovy (*Engraulis encrasicolus*) and Mediterranean horse mackerel (*Trachurus mediterraneus*). The sprat population saw a massive increase in biomass from the mid-1970s and 1980s, and its maximum catch was recorded in 1989, after which the stock collapsed, but rebounded later. In the late 1980s, an alien invasive species, the ctenophore *Mnemiopsis leidyi* reached its maximum abundance in the Black Sea, and thus became a powerful food competitor of adult planktivorous fish, and a significant predator of their eggs and larvae. As a consequence of this and other changes in this Large Marine Ecosystem, the Rapa whelk (*Rapana venosa*) has become, since 1995, the most commercially important taxon, closely followed by sprat.

From 1965 to 1990, the two countries owned a large high-seas distant-water fleet in the Atlantic and in the southeastern Pacific (which consisted of high-capacity trawlers and transport vessels). This fleet was liquidated in the early 1990s, and the fishing fleets refocused their efforts on the Black Sea coastal areas and EEZ.



Current situation analysis





Annexes

Annex 1

Marine habitats of European interest in the Romanian area

	Marine habitats	Characteristics	Distribution	Conservation/risk factors
1.	1110-3 Fine sands in shallow water	The substrate is composed of fine sand terrigenous, siliceous, or biogenic residues mixed with shells and pebbles	Distributed along the shore up to the isobath of 5-6 m.	This habitat is home to <i>Donax trunculus</i> biocoenosis, which is characterized by abundant populations of this bivalve. The associated fauna is not very diverse but can be abundant. The conservation value is very high.
2.	1110-6 Infralittoral	Such beaches are partly submerged and covered	It is found here and there,	Occur only in areas with a strong hidrodinamism and are inhabited by



Current situation analysis

	galets	with flattened round stones, pebbles, usually white limestone, molded by waves.	along the coast exposed to the natural rock, between depths of 0.5 and 2.5 m.	shellfish isopods, amphipods and crabs
3.	1110-8 Muddy sand and sandy banks bioturbate by Upogebia	The substrate is pierced by numerous galleries of decapod crustacean <i>Upogebia thalassinid pusilla</i> , which penetrate deep 0.2-1 m,	The habitat forms a continuous belt along the Romanian coast, the shore disposed between 10-30 m deep.	The conservation value is very high. <i>Upogebia thalassinid</i> 's role in biofiltration and ensuring benthic-pelagic coupling in the functioning of the ecosystem is essential.
4.	1140- 4 Well calibrated sands	The substrate is composed of silica sand finer and more homogeneous, less affected by waves. Silt and clay content of the sediment increases with the depth.	This habitat is disposed in the immediate continuation of shallow fine sands, from 5-6 m up to 10-15 m deep.	The conservation value is very high.
5.	1170-2 Biogenic reefs of <i>Mytilus galloprovincialis</i>	<i>Mytilus galloprovincialis</i> biogenic reefs are composed of the banks of mussels, whose shells have accumulated over time, forming a hard heightened support to the surrounding sediments, silt, sand	Reefs of mussels appear on the substrate sedimentary silt, sand, or a mixture pebbles, most often between 35 and 60 m depth.	Eutrophication caused "blooms" of the phytoplankton and hypoxia/anoxia in the bottom water layers that lead to the mass mortality of black mussels, arthropods and bottom fishes in the habitat.
6.	1170-4 Agglomerations of rocks and boulders	The habitat appears in mediolitoral and infralitoral rocky shores at the foot of cliffs made of hard rocks.	Vama Veche, Large dams in port of Mangalia can be considered an artificial version of this type.	Building of embankments and tourism activities (shore protections ports) causes changes in the hydrological and hydro-chemical regime and deterioration of the habitat. The petrol spills are a potential threat.
7.	1170-8 Infralittoral rocks with photophores algae	Starts below mediolitoral lower floor and extends to the lower limit of photophores algae and marine phanerogams. This lower limit is subject to daylight depending on the topography and water clarity.	South of Cap Aurora, Venus, Mangalia, Vama Veche, in places with rocky seabed, not deeper than 10 – 15 m.	The major threat for the habitat is the eutrophication which reduces the light penetration and restricts the distribution of the edificators from the genus <i>Cystoseira</i> . The industrial, chemical and household pollution of the coastal waters, pollution with petrol and solid wastes also have negative impacts on the habitat.
8.	1170-9	The mussels <i>Mytilus</i>	South of Cap	It is an important area of feeding,



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	Circalittoral rocks with <i>Mytilus galloprovincialis</i>	galloprovincialis become dominant as a compact mat, which continues to the lower limit of the rock substrate.	Aurora, Venus, Mangalia, Vama Veche, from 30 to 35 m depth	reproduction and refuge for many species of fish of commercial value. He has the lead role in biofiltration surrounding coastal waters, ensuring their quality.
9.	1170-10 Infralittoral clay or shale benches with <i>Pholadidae</i>	Benches of clay or shale, of increase form or elongated plates, raised from the surrounding bottom sediment. They may be partially covered with sediment.	The distribution of this habitat is fragmented and insular on the Romanian littoral	The existence of this habitat is dependent on medium-hard clay-shale substrate, which is very vulnerable to clogging with sediments.

Annex 2

Marine habitats of European interest in the Bulgarian area

	Marine habitats	Characteristics	Distribution	Risk factors
1.	Black mussels and/or barnacle communities on mediolittoral rocks	The habitat occurs in the mediolittoral (surf zone) of the Black Sea coast on monolithic rocky sea beds, rock blocks or stones.	Along the whole Bulgarian Black Sea coast, in the surf area, at 0 – 1m depth.	The habitat is on the border between land and sea and hence is very vulnerable to anthropogenic activities on land, especially in the coastal area. Among the major threats are the pollution from agriculture, household, industry and tourism which cause eutrophication of the coastal waters and rapid development of green algae that replace the black mussels.
2.	Littoral sands and muddy sands	In the Black Sea, as a result of the lack of real tidal waves, the habitat includes sands and muddy sands in the surf area called the mediolittoral.	Black Sea, on sedimentary beaches, at 0–1 m depth	The habitat is on the border between sea and land, as a result of which it is particularly vulnerable to anthropogenic activities on land, especially in the coastal area.
5.	Underwater “meadows” of sea grasses	This habitat type encompasses monospecific or mixed communities of the sea grasses from the genera <i>Zostera</i> , <i>Zannichellia</i> , <i>Potamogeton</i> and <i>Ruppia</i> that develop on pure or muddy fine sand of shells and sandy mud at 0,5–5 (7) m depth.	Black Sea, sandy and sandy-muddy bottom; 0 – 5 (7) m depth.	The main threat for the habitat is the decreasing clarity of the seawater as a result of the eutrophication, hydro-engineering or digging in the coastal area causing suspension of the sediments.
6.	Submerged macrophytic communities in hypersaline water bodies	These are relatively small, coastal, hyperhaline water bodies with clay-muddy bottoms and banks.	Black Sea coast: Shablenska Tuzla (northwards	Main threat for these habitats is the constant and uncontrolled access of people with different purposes: collection of the saline crab for bait, poaching, etc. Other negative factors



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			from Shabla).	are the roads in close proximity of the habitats, waste pollution and draining, noise pollution, possible construction of wind-power parks, and restitution of the land around them.
7.	Infralittoral rocks and other hard substrates	The habitat covers the massive rocky bottom and stones in the shallow sub-littoral zone between 0,5 – 25 m depth and supports communities of photophilic brown algae, red and green macroalgae and/or overgrowing fauna. The habitat has various subtypes.	In the shelf zone along the whole Bulgarian Black Sea coast, at 0,5–25 m depth.	Existing threats are the industrial and chemical pollution and deposition of solid waste in the coastal waters. The building of embankments and tourism activities (yacht ports) in the coastal area causes changes in the hydrological and hydro-chemical regime and deterioration of the habitat. The petrol spills are a potential threat.
8.	<i>Cystoseira</i> spp. on exposed to waves infralittoral bedrocks and boulders	The habitat occurs on open or semi-open, horizontal, slanting and well lit vertical, rocky and stony, infra-littoral bottom, at 0,5 – 15 m depth.	The whole Black Sea coast, in places with rocky seabed, not deeper than 0,5 – 15 m.	The major threat for the habitat is the eutrophication that makes the seawater opaque. This reduces the light penetration and restricts the distribution of the edificators from the genus <i>Cystoseira</i> . The industrial, chemical and waste waters pollution and pollution with petrol and solid wastes also have negative impacts on the habitat.
9.	Sea caves	Almost all caves of this type are a result of the abrasive strength of the sea surf and there are no natural cave formations.	In the Sarmatian limestone of the rocky bottom (between Kavarna and Shabla) 0 up to 20 m alt.	Natural erosion and rock-slide processes of the coastal rocks; potential threats are the construction and exploitation activities that can take place on the rocky coast.
10.	Sublittoral sands	The sand sediments are distributed in the infra-littoral zone (0,5–15 m) along the accumulative coast or in specific shapes – sand banks at deeper levels (15–25 m) in the <i>circumlittoral</i> .	Black Sea coast, the sandy bed, at 0,5–25 m depth.	Existing threats are industrial and chemical pollution and deposition of solid waste on the sea bottom. Potential threat are the anthropogenic activities related to sand extraction from sand banks and the change in the hydrological conditions as a result of building embankments, breakwaters that influence the direction of the sediment transport, etc. A serious threat to the biodiversity is the intensive fishing and especially the illegal bottom trawling for turbot.
11.	Sublittoral mussel beds on sediments	<i>Mytilus galloprovincialis</i> forms specific mussel beds on different sediments	Black Sea, shell sand, muddy sand and muddy	Anthropogenic eutrophication of the Black Sea that has caused “blooms” of the phytoplankton and hypoxia/anoxia in the bottom water layers that lead to



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		varying from coarse shelly sand and muddy sand to mud.	sea bottom, 10–70 m depth.	the mass mortality of black mussels, arthropods and bottom fishes in the habitat.
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Annex 3

Coastal habitats of European interest in the plan area

	Marine habitats	Characteristics	Distribution	Conservation/risk factors
1	Annual vegetation of drift lines	Include plant communities belong to <i>Cakiletea maritima</i> which grow on coarse sand, slightly salty and rich in nitrate Substances; they cover the space between the midlittoral and the first strip of dunes.	Over the entire shore length including the narrow beaches at the base of seawalls. North of Cape Shabla, the occurrence of this habitat is on the narrow beaches from the bay area	Small decline both in Romania and Bulgaria Natural (big waves, strong winds, coastal erosion) and anthropogenic (touristic activities, garbage disposal on the beach).
2	Embryonic shifting dunes	Type of habitat with high mobile dunes, partially or not at all fixed by vegetation.	In several points of the shore in areas with wide sandy beaches, Durankulak, Shabla, Krapets,	Decline on the southern coast of Romania and stable in the northern coastal area of Bulgaria Natural (strong winds) and anthropogenic.
3.	Shifting dunes along the shore line with <i>Ammophila arenaria</i>	Habitat of high mobile or semi-fixed sands, generally populated by psammophile species of the alliance	Only in the Bulgarian coastal area, between Durankulak and Shabla	Very good, due to the small touristic developments in the northern coastal area of Bulgaria Especially natural (strong winds, climate changes).
4.	Fixed coastal dunes with herbaceous vegetation (grey dunes)	Coastal habitat made up of low dunes, stabilized and fixed by vegetation, located behind the strips of mobile dunes; the solidification process is advanced.	Only in the area of wide beaches in the vicinity of paramarine lakes (the beaches of Durankulak and Shabla).	Stable, both in Romania and Bulgaria Natural (strong winds) and anthropogenic (buildings, sand extraction; garbage disposal on the beach);
5.	Humid dune slacks	Type of low habitat located between dunes, with slightly salty soils and high humidity conditions; the solidification process is advanced.	Habitat located in the proximity of the littoral lakes between dunes with slightly salty soils and high	Decline in Romania and stable in Bulgaria Natural (climate change) and anthropogenic (buildings, garbage disposal on the beach);



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			humidity Durankulak and Schabla)	
6.	Mediterranean halophytic communities of tall rushes, sedges and grasses	The habitat is a community of tall (0,9–1 m) rushes, grasses and sedges in the periphery of hyperhaline or brackish seaside lakes (lagoons or limans), along the Black Sea coast.	Durankulak Lake	Construction of tourism facilities, draining of areas, changes in the hydrological regime of the saline lakes.
7.	Communities of annual halophytes in coastal salt marshes at the Black Sea	Communities of mainly annual species of <i>Chenopodiaceae</i> (mostly from the genus <i>Salicornia</i>) or grasses that occupy periodically flooded muddy and sandy places in the periphery of the hyperhaline and more rarely brackish marshes along the Black Sea coast.	Shablenska Tuzla locality	Intensive development of marine tourism; changes in the water circulation of the salt marshes with which this habitat is connected. These changes reflect in the decreases of salinity of the marshes, thus having impact on the quality of the habitat.

Annex 4

Typical plant/animals associations in marine habitats of European interest

	Marine habitats	Typical plant/ animals associations
1.	Black mussels and/or barnacle communities on mediolittoral rocks	Algae: Rodophyta: <i>Bangia atropurpurea</i> , <i>Corallina officinalis</i> , <i>Dermatolithon litorale</i> , <i>Porphyra leucisticta</i> ; Phaeophyta: <i>Padina pavonica</i> (only in clean waters), <i>Scytosiphon simplicissimus</i> ; Chlorophyta: <i>Bryopsis plumosa</i> , <i>Cladophora</i> spp. Animals: Anthozoa: <i>Actinia equina</i> ; Polyplacophora: <i>Lepidochitona cinerea</i> ; Gastropoda: <i>Patella ulyssiponensis</i> , <i>Melarhaphe neritoides</i> ; Crustacea: <i>Idotea baltica basteri</i> , <i>Eriphia verrucosa</i> , <i>Pachygrapsus marmoratus</i> .
2.	Littoral sands and muddy sands	Vascular plants: <i>Zostera marina</i> , <i>Z. noltii</i> . Animals: Polychaeta: <i>Ophelia bicornis</i> , <i>Nerine cirratulus</i> , <i>Saccocirrus papillocercus</i> , <i>Pisione remota</i> , <i>Hesionides arenaria</i> ; Bivalvia: <i>Donacilla cornea</i> ; Crustacea: <i>Eurydice dolfusii</i> , <i>Gastrosaccus sanctus</i> , <i>Pontogammarus maoticus</i>
3.	Mediterranean halophytic	Vascular plants: <i>Aster tripolium</i> , <i>Elymus elongatus</i> , <i>Juncus littoralis</i> (= <i>Juncus acutus</i> subsp. <i>tommasinii</i>), <i>Juncus maritimus</i> , <i>Limonium latifolium</i> , <i>Phacelurus</i>



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	communities of tall rushes, sedges and grasses	<i>digitatus</i> (= <i>Rottboellia digitata</i>), <i>Plantago cornutii</i> , <i>Polypogon monspeliensis</i> , <i>Puccinellia distans</i> , <i>Eleocharis palustris</i> . Animals: <i>Recurvirostra avosetta</i> , <i>Himantopus himantopus</i> , <i>Tringa totanus</i> .
4.	Communities of annual halophytes in coastal salt marshes at the Black Sea	Vascular plants: 1. <i>Aeluropus littoralis</i> , <i>Aster tripolium</i> , <i>Bassia hirsuta</i> , <i>Limonium gmelinii</i> , <i>L. vulgare</i> , <i>Puccinellia convoluta</i> , <i>P. limosa</i> , <i>Salicornia europaea</i> agg., <i>Suaeda altissima</i> , <i>S. maritima</i> ; 2. <i>Artemisia santonicum</i> , <i>Atriplex hastata</i> , <i>A. nitens</i> , <i>A. tatarica</i> , <i>Cressa cretica</i> , <i>Frankenia pulverulenta</i> , <i>Halimione pedunculata</i> , <i>H. portulacoides</i> , <i>Lepidium perfoliatum</i> , <i>Melilotus officinalis</i> , <i>Parapholis incurva</i> , <i>Petrosimonia brachiata</i> , <i>Salsola soda</i> . Animals: <i>Charadrius alexandrinus</i> , <i>Larus melanocephalus</i> , <i>Sterna albifrons</i> .
5.	Underwater "meadows" of sea grasses	Plants: Algae – Rhodophyta: <i>Laurencia obtusa</i> ; Phaeophyta: <i>Ectocarpus siliculosus</i> , Chlorophyta: <i>Enteromorpha</i> spp., <i>Ulva rigida</i> ; Vascular plants: <i>Potamogeton pectinatus</i> , <i>Ruppia maritima</i> , <i>Zannichellia palustris</i> , <i>Zostera marina</i> , <i>Z. noltii</i> . Animals: Bivalvia: <i>Tellina tenuis</i> , <i>Loripes lacteus</i> , <i>Lucinella divaricata</i> , <i>Solen marginatus</i> , <i>Abra ovata</i> ; Gastropoda – Hydrobiidae: <i>Rissoa parva</i> , <i>Bittium reticulatum</i> ; Crustacea: <i>Upogebia pusilla</i> , <i>Carcinus aestuarii</i> , <i>Polybius vernalis</i> , <i>Rhithropanopeus harrisi</i> , <i>Palaemon adspersus</i> , <i>P. elegans</i> ; Actinopterygii: <i>Zosterisessor ophiocephalus</i> , <i>Nerophis ophidion</i> , <i>Hippocampus guttulatus</i> .
6.	Submerged macrophytic communities in hypersaline water bodies	Vascular plants: <i>Juncus maritimus</i> , <i>Lemna gibba</i> , <i>Phragmites australis</i> , <i>Ruppia maritima</i> , <i>Scirpus lacustris</i> , <i>S. triqueter</i> , <i>Typha angustifolia</i> , <i>T. latifolia</i> , <i>Zannichellia palustris</i> . Animals: Invertebrates – <i>Syndesmia ovata</i> , <i>Cardium edule</i> , <i>Cyprideis torosa</i> ; Vertebrates – <i>Platichthys flesus luscus</i> , <i>Knipowitschia caucasica</i> , <i>Atherina boyeri</i> , <i>Mugil cephalus</i> , <i>Liza aurata</i> , <i>L. saliens</i> .
7.	Infralittoral rocks and other hard substrates	Plants: Algae – Rhodophyta: <i>Ceramium rubrum</i> , <i>Corallina officinalis</i> , <i>Porphyra leucosticta</i> ; Phaeophyta: <i>Cystoseira barbata</i> , <i>C. crinita</i> ; Chlorophyta: <i>Briopsis plumosa</i> , <i>Cladophora vagabunda</i> , <i>Enteromorpha intestinalis</i> , <i>Ulva rigida</i> . Sponges and animals: Spongia: <i>Dysidea fragilis</i> , <i>Halichondria panicea</i> , <i>Petrosia dura</i> ; Anthozoa: <i>Actinia equina</i> ; Hydrozoa: <i>Aglaophenia pluma</i> , <i>Campanularia integriformis</i> ; Bryozoa: <i>Lepralia pallasiana</i> , <i>Membranipora membranacea</i> ; Polychaeta: <i>Ficopomatus enigmaticus</i> , <i>Janua pagenstecheri</i> , <i>Pomatoceros triqueter</i> ; Cirripedia: <i>Balanus improvisus</i> ; Decapoda: <i>Athanas nitescens</i> , <i>Clibanarius erythropus</i> , <i>Eriphia verrucosa</i> , <i>Hippolyte leptocerus</i> , <i>Pachygrapsus marmoratus</i> , <i>Palaemon adspersus</i> , <i>Pilumnus hirtellus</i> , <i>Rhithropanopeus harrisi</i> , <i>Xantho poressa</i> ; Bivalvia: <i>Barnea candida</i> , <i>Mytilus galloprovincialis</i> , <i>Mytilaster lineatus</i> , <i>Ostrea edulis</i> , <i>Petricola lithophaga</i> , <i>Pholas dactylus</i> ; Ascidiacea: <i>Botryllus schlosseri</i> ; Pisces – Actinopterygii: <i>Aidablennius sphinx</i> , <i>Chelon labrosus</i> , <i>Chromogobius quadrivittatus</i> , <i>Coryphoblennius galerita</i> , <i>Gobius cobitis</i> , <i>G. niger</i> , <i>G. paganellus</i> , <i>Liza aurata</i> , <i>L. saliens</i> , <i>Mesogobius batrachocephalus</i> , <i>Neogobius cephalarges</i> , <i>N. melanostomus</i> , <i>N. platyrostris</i> , <i>N. ratan</i> , <i>Parablennius sanguinolentus</i> , <i>Pomatoschistus minutus</i> , <i>Salarias pavo</i> , <i>Scorpaena porcus</i> , <i>Symphodus ocellatus</i> , <i>S. tinca</i> , <i>Syngnathus tenuirostris</i> , <i>S. typhle</i> .
8.	<i>Cystoseira</i> spp. on exposed to waves infralittoral bedrocks and boulders	Plants: Algae – Rhodophyta: <i>Callithamnion granulatum</i> , <i>Ceramium elegans</i> , <i>Corallina granifera</i> , <i>Dermatolithon cystoseirae</i> , <i>Dipterosiphonia rigens</i> , <i>Erythrotrichia bertoldii</i> , <i>Gelidiella antipai</i> , <i>Laurencia paniculata</i> , <i>Osmundea hybrida</i> , <i>Polysiphonia elongata</i> , <i>P. opaca</i> , <i>P. sanguinea</i> , <i>Pterocladia pinnata</i> , <i>Rhodochorton velutinum</i> ; Phaeophyta: <i>Cladostephus spongiosus</i> , <i>Corynophlaea flaccida</i> , <i>C. umbellata</i> , <i>Cystoseira barbata</i> , <i>C. crinita</i> , <i>Dylophus fasciola</i> , <i>Ectocarpus siliculosus</i> , <i>Feldmannia caespitula</i> , <i>Myriactula rivularie</i> , <i>Punctaria plantaginea</i> , <i>P. tenuissima</i> , <i>Sphacelaria cirrhosa</i> , <i>Stilophora rhizodes</i> ; Chlorophyta: <i>Pseudoprihgsheimia confluens</i> , <i>Ulva rigida</i> . Animals: Hydrozoa: <i>Aglaophenia pluma</i> , <i>Coryne</i> sp., <i>Lucernaria</i> sp.; Bryozoa: <i>Electra pilosa</i> ;



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		Mollusca: <i>Bittium reticulatum</i> , <i>Mytilaster lineatus</i> , <i>Rissoa splendida</i> , <i>Tricolia pulus</i> ; Crustacea: <i>Athanas nitescens</i> , <i>Clibanarius erythropus</i> , <i>Eriphia verrucosa</i> , <i>Hippolyte leptocerus</i> , <i>Palaemon adspersus</i> , <i>P. elegans</i> , <i>Pilumnus hirtellus</i> ; Actinopterygii: <i>Gaidropsarus mediterraneus</i> , <i>Aidablennius sphinx</i> , <i>Chelon labrosus</i> , <i>Coryphoblennius galerita</i> , <i>Dicentrarchus labrax</i> , <i>Diplodus annularis</i> , <i>D. puntazzo</i> , <i>D. sargus</i> , <i>D. vulgaris</i> , <i>Gobius cobitis</i> , <i>G. niger</i> , <i>G. paganellus</i> , <i>Hippocampus guttulatus</i> , <i>Lisa aurata</i> , <i>L. saliens</i> , <i>Mesogobius batrachocephalus</i> , <i>Mugil cephalus</i> , <i>Neogobius cephalargoides</i> , <i>N. melanostomus</i> , <i>N. platyrostris</i> , <i>N. ratan</i> , <i>Nerophis ophidion</i> , <i>Parablennius sanguinolentus</i> , <i>P. tentacularis</i> , <i>P. zvonimiri</i> , <i>Pomatoschistus marmoratus</i> , <i>P. minutus</i> , <i>Salarias pavo</i> , <i>Scorpaena porcus</i> , <i>Symphodus cinereus</i> , <i>S. ocellatus</i> , <i>S. roissali</i> , <i>S. tinca</i> , <i>Syngnathus abaster</i> , <i>S. tenuirostris</i> , <i>S. typhle</i> , <i>S. variegates</i> .
9.	Sea caves	Animals: Myriapoda: <i>Scutigera coleoptrata</i> ; Aves: <i>Apus melba</i> , <i>Columba livia</i> , <i>Delichon urbica</i> , <i>Phalacrocorax aristotelis</i> ; Mammalia: <i>Miniopterus schreibersii</i> , <i>Monachus monachus</i> , <i>Myotis blythii</i> , <i>M. capaccinii</i> , <i>M. myotis</i> .
10.	Sublittoral sands	Plants: <i>Zannichellia</i> spp., <i>Zostera marina</i> , <i>Z. noltii</i> , <i>Potamogeton</i> spp. Animals: Polychaeta: <i>Arenicola marina</i> , <i>Magelona papillicornis</i> , <i>M. rosea</i> , <i>Microphthalmus fragilis</i> , <i>M. similis</i> , <i>Ophelia limacina</i> , <i>Polygordius neapolitanus</i> , <i>Protodorrvillea kefersteini</i> , <i>Protodrilus flavocapitatus</i> ; Bivalvia: <i>Anadara inaequalis</i> , <i>Cerastoderma glaucum</i> , <i>Chamelea gallina</i> , <i>Donacilla cornea</i> , <i>Donax trunculus</i> , <i>Lentidium mediterraneum</i> , <i>Mya arenaria</i> , <i>Tellina tenuis</i> ; Gastropoda: <i>Cyclope neritea</i> , <i>Hydrobia</i> sp., <i>Nassarius nitidus</i> , <i>Rapana venosa</i> ; Crustacea: <i>Crangon crangon</i> , <i>Carcinus aestuarii</i> , <i>Diogenes pugilator</i> , <i>Palaemon adspersus</i> , <i>Polydora vernalis</i> , <i>Upogebia pusilla</i> ; Fish: <i>Dasyatis pastinaca</i> , <i>Raja clavata</i> , <i>Squalus acanthias</i> , <i>Acipenser stellatus</i> , <i>Arnoglossus kessleri</i> , <i>Callionymus pusillus</i> , <i>C. risso</i> , <i>Chelindonichthys lucernus</i> , <i>Diplodus annularis</i> , <i>D. puntazzo</i> , <i>Gobius niger</i> , <i>Gymnammodytes cecereus</i> , <i>Knipowitschia caucasica</i> , <i>Mesogobius batrachocephalus</i> , <i>Mullus barbatus</i> , <i>Neogobius melanostomus</i> , <i>Nerophis ophidion</i> , <i>Ophidion rochei</i> , <i>Pegusa lascaris</i> , <i>Platichthys flesus</i> , <i>Pomatoschistus marmoratus</i> , <i>P. minutus</i> , <i>Psetta maxima</i> , <i>Sciaenops ocellatus</i> , <i>Trachinus draco</i> , <i>Umbrina cirrosa</i> , <i>Uranoscopus scaber</i> .
11.	Sublittoral mussel beds on sediments	Animals: Anthozoa: <i>Actinotheria clavata</i> ; Polychaeta: <i>Aonides paucibranchiata</i> , <i>Aricidea claudiae</i> , <i>Capitella capitata</i> , <i>C. minima</i> , <i>Eumida sanguinea</i> , <i>Glycera alba</i> , <i>Hediste diversicolor</i> , <i>Heteromastus filiformis</i> , <i>Nephtys hombergii</i> , <i>Nereiphylla rubiginosa</i> , <i>Pectinaria koreni</i> , <i>Polycirrus jubatus</i> , <i>Polydora</i> spp., <i>Pomatoceros triqueter</i> ; Gastropoda: <i>Rapana venosa</i> ; Crustacea: <i>Ampelisca diadema</i> , <i>Apseudes acutifrons</i> , <i>Athanas nitescens</i> , <i>Balanus improvisus</i> , <i>Caprella acanthifera</i> , <i>Corophium runcinorne</i> , <i>Crangon crangon</i> , <i>Cumella limicola</i> , <i>Iphinoe elisae</i> , <i>Microdeutopus gryllotalpa</i> , <i>Pilumnus hirtellus</i> , <i>Pisidia longicornis</i> , <i>Polydora vernalis</i> , <i>Upogebia pusilla</i> ; Holothuriidae: <i>Leptosynapta inhaerens</i> , <i>D. pastinaca</i> , <i>R. clavata</i> , <i>Squalus acanthias</i> ; <i>A. gueldenstaedti</i> , <i>A. stellatus</i> , <i>Chelindonichthys lucernus</i> , <i>G. niger</i> , <i>H. huso</i> , <i>M. batrachocephalus</i> , <i>N. melanostomus</i> , <i>Pomatoschistus minutus</i> , <i>Psetta maxima</i> , <i>Uranoscopus scaber</i> .

Typical plant/animals associations in coastal habitats of European interest

Natural habitats	Typical plant associations
Annual vegetation of drift lines	<i>Cakilo euxinae</i> – <i>Salsolietum ruthenicae</i> ; <i>Atripliceto hastatae</i> – <i>Cakiletum euxinae</i> ; <i>Tournefortietum sibiricae</i> ; <i>Lactuco tataricae</i> – <i>Glaucietum flavae</i> ; <i>Crambetum maritimae</i>
Embryonic shifting dunes	<i>Elymetum gigantei</i> ; <i>Leymo sabulosi</i> – <i>Elymetum farcti</i> ; <i>Artemisietum schernieviae</i> (arenariae); <i>Secali sylvestris</i> – <i>Alysetum borzeani</i> (very rare, observed on the Lupilor sand bank by (Sârbu, et al., 2000), in Agigea Marine Dunes reserve and on the Anna Maria



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	beach, near Durankulak by Tzonev <i>et al.</i> , 2005; <i>Aperetum maritimae</i> ; <i>Secali sylvestris</i> – <i>Brometum tectorum</i> ; <i>Convolvuletum persici</i> (very rare plant association, recorded in Durankulak). Conservation importance: Some rare and protected psammophytes such as <i>Argusia sibirica</i> , <i>Eryngium maritimum</i> , <i>Lactuca tatarica</i> , <i>Otanthus maritimus</i> etc., whose populations decrease progressively, occur on the coastal beaches.
Shifting dunes along the shore line with <i>Ammophila arenaria</i>	<i>Ammophila arundinaceae</i> – <i>Elymetum gigantei</i> ; <i>Medicago tenderiensis</i> – <i>Ammophiletum arundinaceae</i> ; Conservation importance: Many rare and protected psammophytes whose populations gradually decrease in Bulgaria occur in the pontic mobile (white) dunes. Such species are <i>Astrodaucus littoralis</i> , <i>Centaurea arenaria</i> , <i>Convolvulus persicus</i> , <i>Euphorbia paralias</i> , <i>Festuca vaginata</i> , <i>Maresia nana</i> , <i>Medicago marina</i> , <i>Otanthus maritimus</i> , <i>Stachys maritima</i>
Fixed coastal dunes with herbaceous vegetation (grey dunes)	<i>Scabioso argenteae</i> – <i>Caricetum colchicae</i> ; <i>Stachyo atherocalici</i> – <i>Caricetum ligericae</i> ; <i>Ephedro</i> – <i>Caricetum colchicae</i> ; <i>Festucetum beckeri</i> ; <i>Plantaginetum arenariae</i> ;
Humid dune slacks	<i>Orchio</i> – <i>Schoenetum nigricantis</i> (only on the Romanian seacoast); <i>Lythro</i> – <i>Calamagrostidetum epigei</i> ; <i>Caricetum distantis</i> ;

Annex 5

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REGIONAL STRATEGIC DOCUMENTS

Strategic Action Plan for the Environmental Protection and Rehabilitation of the Black Sea (2009)

The first **Strategic Action Plan for the Rehabilitation and Protection of the Black Sea** was adopted in 1996 (and later amended in 2002), within the framework of the Commission on the Protection of the Black Sea Against Pollution, between the Governments of Bulgaria, Georgia, Romania, Turkey, Ukraine and the Russian Federation. An updated agreement was signed in 2009, under the name the **Strategic Action Plan for the Environmental Protection and Rehabilitation of the Black Sea (2009)**, by reorganising the priorities and actions therein considering the progress in the region and the current state of the environment.

The document establishes a list of **Ecosystem Quality Objectives (EcoQOs)** based on a resolution of priority problems identified in the Transboundary Diagnostic Analysis.

The four EcoQOs and associated Sub EcoQOs are:

EcoQO 1: Preserve commercial marine living resources.

EcoQO 1a: Sustainable use of commercial fish stocks and other marine living resources.

EcoQO 1b: Restore/rehabilitate stocks of commercial marine living resources.

EcoQO 2: Conservation of Black Sea Biodiversity and Habitats.

EcoQO 2a: Reduce the risk of extinction of threatened species.

EcoQO 2b: Conserve coastal and marine habitats and landscapes.

EcoQO 2c: Reduce and manage human mediated species introductions

EcoQO 3: Reduce eutrophication.

EcoQO 4: Ensure Good Water Quality for Human Health, Recreational Use and Aquatic Biota.

EcoQO 4a: Reduce pollutants originating from land based sources, including atmospheric emissions and discharges.

EcoQO 4b: Reduce pollutants originating from shipping activities and offshore installations

Each EcoQO is assigned a number of management targets that address the immediate, underlying and root causes of the concern areas. These targets are assigned timings of the interventions, as well as legal, institutional and policy reforms required, indicators of success and uncertainties.

SOURCE: Strategic Action Plan for the Environmental Protection and Rehabilitation of the Black Sea (2009)

EUROPEAN UNION STRATEGIC DOCUMENTS

The Black Sea Basin Operational Programme

The Black Sea Basin Programme 2014-2020 is part of European Union's Cross-Border Cooperation (CBC) under its European Neighbourhood Instrument (ENI). The Managing Authority of the Programme is the Ministry of Regional Development and Public Administration of Romania.

Priorities & Measures

Priority 1: Supporting cross border partnerships for economic and social development based on common resources

- Measure 1.1: Strengthening accessibility and connectivity for new intra- regional information, communication, transport and trade links
- Measure 1.2: Creation of tourism networks in order to promote joint tourism development initiatives and traditional products
- Measure 1.3: Creation of administrative capacity for the design and implementation of local development policies

Priority 2: Sharing resources and competencies for environmental protection and conservation

- Measure 2.1: Strengthening the joint knowledge and information base needed to address common challenges in the environmental protection of river and maritime systems
- Measure 2.2: Promoting research, innovation and awareness in the field of conservation and environmental protection for protected natural areas
- Measure 2.3: Promotion of cooperation initiatives aimed at innovation in technologies and management of solid waste and wastewater management systems

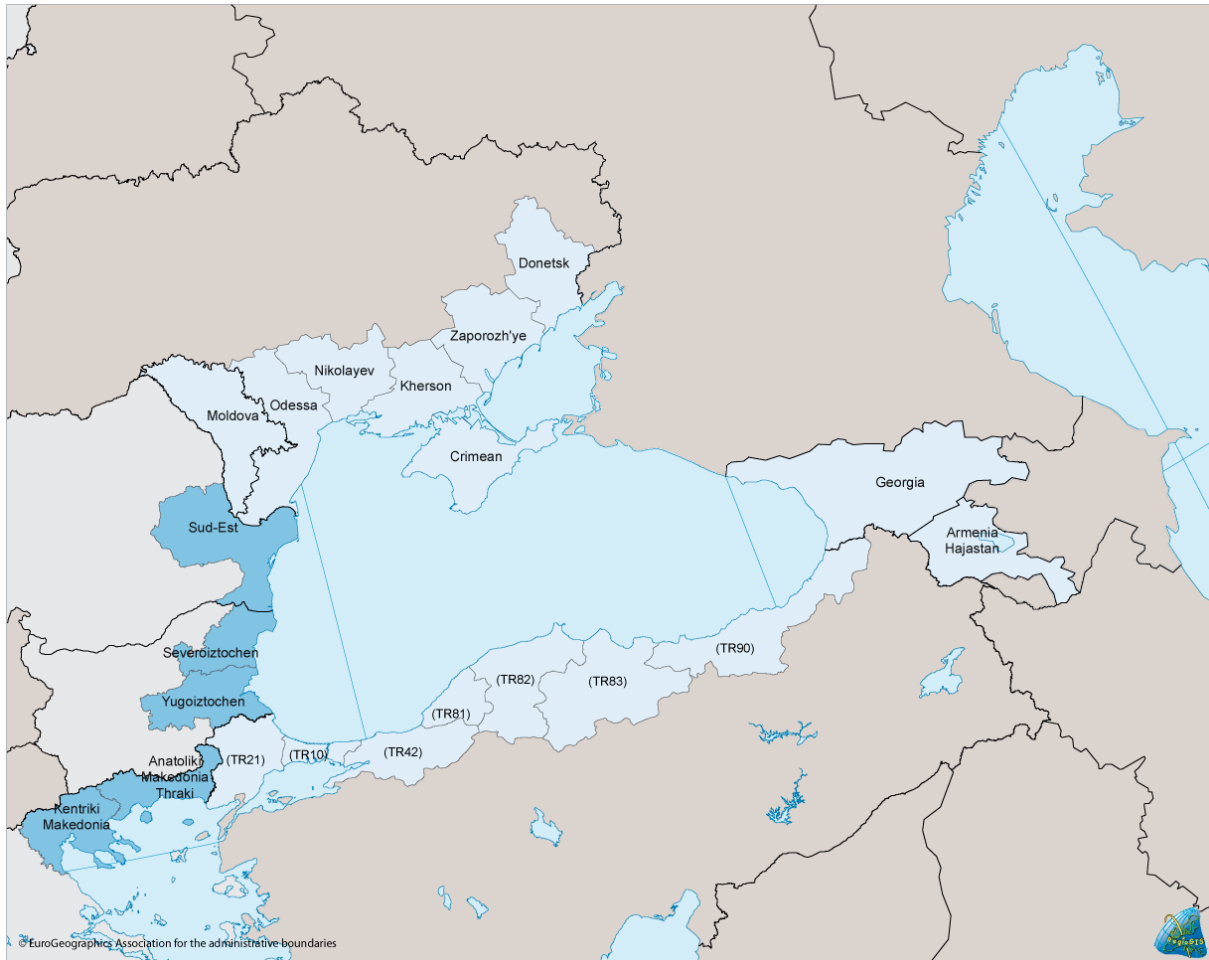
Priority 3: Supporting cultural and educational networks for the establishment of a common cultural environment in the Basin

- Measure 3.1: Promoting cultural networking and educational exchange in the Black Sea Basin communities.

Technical Assistance

SOURCE: ENI CBC Black Sea Basin Joint Operational Programme 2014-2020
<http://blacksea-cbc.net/black-sea-basin-2014-2020/eu-regulations/>

Map of the Black Sea Joint Operational Programme 2014-2020. EU regions cooperation areas in dark blue, other cooperation areas in pale blue



The Black Sea Synergy

In 2007 the European Union launched the Black Sea Synergy (BSS) in order to reinforce regional cooperation within the Black Sea countries and between the region and the European Union.

The Black Sea Synergy is less a policy in the traditional sense, but rather it aims to focus political attention onto the regional level and stimulate cooperation in the Black Sea Region, with a focus on energy, transport, environment, migration and security. Thus, the initiative is designed as a flexible framework to ensure greater coherence and policy guidance, while also inviting a more integrated approach and closer regional ties in order to:

- ✓ Stimulate democratic and economic reforms
- ✓ Support stability and promote development
- ✓ Facilitate practical projects in areas of common concern
- ✓ Open up opportunities and challenges through coordinated action in a regional framework
- ✓ Encourage the peaceful resolution of conflicts in the region

SOURCE: "Black Sea Synergy – A New Regional Cooperation initiative" (COM(2007)0160)

Towards an EU Strategy for the Black Sea

In 2011, the European Parliament called on the Commission and the European External Action Service to draw up a strategy for the Black Sea region, stating that “*given the strategic importance of the Black Sea region for the EU and the rather limited results of the BSS, a strategy should be launched to enhance the coherence and visibility of EU action in the region*”. The Parliament also recommended that EU Black Sea Strategy should be an integral part of the EU's broader foreign and security policy vision.

Parliament stressed that the main objective for the EU and the EU Member States in this strategy is to establish an area of peace, democracy, prosperity and stability founded on respect for human rights and fundamental freedoms and providing for EU energy security. It considered that good governance, the rule of law, promotion of respect for human rights, migration management, energy, transport, the environment and economic and social development should constitute priority actions.

The resolution encourages priority financing for small-scale development projects and stresses the need for a project-based approach with a view to including local authorities, business communities, NGOs or other civil society organisations.

It encourages the development of synergies between the various EU policies that come into play in the Strategy, particularly the Structural Funds, the Research and Development Framework Programme and the Trans-European Transport Networks in order to ensure the sustainability of the actions financed so that opportunities created by one economic development initiative can be taken up by another, complementary initiative.

SOURCE: European Parliament resolution of 20 January 2011 on an EU Strategy for the Black Sea ([2010/2087\(INI\)](#))

Blue Growth Strategy

Blue Growth is the long term strategy to support sustainable growth in the marine and maritime sectors as a whole. The Blue Growth communication adopted in September 2012 is the maritime strand of the **Europe 2020** strategy and an update of the **Integrated Maritime Policy**.

The strategy consists of three components:

1. Develop sectors that have a high potential for sustainable jobs and growth, such as: aquaculture, coastal tourism, marine biotechnology, ocean energy, seabed mining
2. Essential components to provide knowledge, legal certainty and security in the blue economy
 - marine knowledge to improve access to information about the sea;
 - maritime spatial planning to ensure an efficient and sustainable management of activities at sea;
 - integrated maritime surveillance to give authorities a better picture of what is happening at sea.
3. Sea basin strategies to ensure tailor-made measures and to foster cooperation between countries: EU Strategy for the Adriatic and Ionian Region, EU Strategy for the Arctic, Maritime Strategy in the Atlantic Area, EU Strategy for the Baltic Sea Region. There are no specific strategies for the North Sea or the Black Sea region.

SOURCE: Communication from the Commission: Blue Growth opportunities for marine and maritime sustainable growth (13.09.2012)

Maritime Security Strategy

The European Union Maritime Security Strategy (EUMSS) for the global maritime domain, adopted by the European Council in June 2014, is an overarching maritime security strategy against all challenges from the global maritime domain that may affect people, activities or infrastructures in the EU.

The EUMSS is complemented with an Action Plan, which contains a list of over 130 specific actions. The EUMSS Action Plan is organised around five key areas of cooperation: External Action; Maritime Awareness, Surveillance and Information Sharing; Capability Development; Risk Management, Protection of Critical Infrastructures and Crisis Response; Maritime Security Research and Innovation, Education and Training.

SOURCE: European Union Maritime Security Strategy, as adopted by the Council (General Affairs) on 24 June 2014; Action Plan, as adopted by the Council (General Affairs) on 16 December 2014

Other relevant EU policies and initiatives

Maritime Transport

White Paper for Transport, 2011

- It further specifies the orientations of the Maritime Transport Strategy until 2018: the ability to provide cost-efficient maritime transport services; the long-term competitiveness of the EU shipping sector; and the creation of seamless transport chains for passengers and cargo across transport modes

Communication on a European maritime transport space without barriers, 2009 & the Directive on reporting formalities

- This initiative simplifies and harmonises administrative procedures so as to boost intra-EU maritime transport.

New guidelines for Trans-European Networks, 2011

- The Commission proposed new guidelines for Trans-European Networks to broaden the role of the Motorways of the Sea as main European corridors.

Eastern Partnership

Representing the Eastern dimension of the **European Neighbourhood Policy**, this initiative was launched at the Prague summit in 2009 and was reaffirmed in 2011 and 2013. It aims to deepen and strengthen relations between the European Union and its six Eastern neighbours, Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine. The main objective is to support political and socio-economic reforms in partner countries to:

- ✓ Foster political association and further economic integration
- ✓ Support mobility of citizens and visa liberalisation as a long term goal
- ✓ Enhance sector cooperation
- ✓ Support civil society

It includes four multi-lateral platforms focusing on:

1. Democracy, Good governance and Stability
2. Economic Integration and Convergence with EU Policies
3. Energy Security
4. Contacts between people¹

The Danube Strategy

A macro-regional strategy to boost the development of the Danube Region was proposed by the European Commission in 2010 and endorsed by the European Council on 13 April 2011. The Strategy seeks to create synergies and coordination between existing policies and initiatives taking place across the Danube Region, including 14 countries among which Bulgaria, Romania, Moldova and Ukraine are from the Black Sea Basin.

The Danube Region Strategy addresses a wide range of issues, divided among 12 priority areas within four pillars:

- Connecting the Danube Region
 - 1) To improve mobility and multimodality
 - 2) To encourage more sustainable energy
 - 3) To promote culture and tourism, people to people contacts
- Protecting the Environment in the Danube Region
 - 4) *To restore and maintain the quality of waters*
 - 5) To manage environmental risks
 - 6) To preserve biodiversity, landscapes and the quality of air and soils
- Building Prosperity in the Danube Region
 - 7) To develop the Knowledge Society through research, education and information technologies
 - 8) To support the competitiveness of enterprises, including cluster development
 - 9) To invest in people and skills
- Strengthening the Danube Region
 - 10) To step up institutional capacity and cooperation
 - 11) To work together to promote security and tackle organised and serious crime

One of the targets particularly mentions the Black Sea and refers to restoring and maintaining the quality of waters (Priority Area 4): “Reduce the nutrient levels in the Danube River to allow the recovery of the Black Sea ecosystems to conditions similar to 1960s”.

SOURCE: European Union Strategy for the Danube Region COM(2010) 715; Action Plan SEC(2010) 1489

¹ More information on the Eastern Partnership is available at http://eeas.europa.eu/eastern/index_en.htm

Europe 2020 Strategy

Europe 2020 is the EU's ten-year growth and jobs strategy launched in 2010. It aims to create within the EU the conditions for economic growth:

- ✓ Smart, through more effective investments in education, research and innovation;
- ✓ Sustainable, thanks to a decisive move towards a low-carbon economy;
- ✓ Inclusive, with a strong emphasis on job creation and poverty reduction.

Public attitudes report

This document summarises the findings of a Stakeholder Attitude Survey carried out by the IO-BAS in 15 April 2016 with the support of Shabla Municipality.

Results of questionnaire at Stakeholder Meeting on 15 April 2016 organized by IO-BAS with the support of Shabla Municipality: Following questions were distributed amongst participants and respectively a summary of answers to each of them is presented:

What currently existing activities/interests should be added to the map of the uses of the pilot area of Shabla Municipality? Please specify spatially and temporally.

Durankulak and Ezerets municipalities need lake waters level control by lake-sea connection; Krapets Municipality requires a deep discharge treatment unit, coast protection facilities, fishing and yacht ports; Shabla Municipality also requires a deep discharge treatment unit; In Shabla and Tyulenovo municipalities maritime tourism is considered to be perspective activity.

What activities and interests are planned or would likely arise in the next five years in the Shabla Municipality pilot area? Please specify spatially and temporally.

Mud therapy; Eco-routes in Tyulenovo region.

Where and what kind of problems or conflicts can, in your opinion, appear (or maybe there are already existing problems that need to be solved?) concerning the use of the pilot area?

Conflicts:

Affecting	Affected
Military	Fishery
Military	Recreation
Military	Bottom trawling
Bottom trawling	Fishery
Bottom trawling	Recreation
Recreation	Fishery
Oil and gas drilling	Recreation
Pier construction	Cultural heritage

Which are the existing or potential conflicts between the economic sectors/users and the environment by your opinion?

Conflicts:

Affecting	Affected
Treatment units	Wetlands
Water abstraction	Wetlands
Wind farms	Ornithology (birds)

Where and what type of compatible activities exist or would arise in the Shabla Municipality pilot area?

Accommodation and food services and maritime recreational activities are compatible and supplementary to each other.

Which economic activities in Shabla Municipality pilot area are considered to be of highest priority?

High priority activities are considered to be Rapana Tommassiana snail catchment, recreation, fishing and aquaculture and construction.

Is it necessary a future regulation of fishing/aquaculture and a small scale fishing support?

Most of the participants consider the regulations and support to be insufficient, but the minority's opinion is that the present legislation has a lot more reserves for utilisation.

What means are necessary to solve coastal erosion problems in the most vulnerable sections with already existing infrastructure by your opinion?

In addition to the regular measures underwater reefs are expected to give good results additionally benefiting the environmental health.

Do you consider as “good” the level of protected areas and cultural/historical heritage (Natura 2000, wetlands, bird important areas, sand beaches/dunes, natural and archaeological reserves, etc.) conservation in the Shabla municipality pilot area and do you consider that society is sufficiently informed about their conservation?

Most of the participants define the conservation level as good, but minority consider it as insufficient.

Do you consider the development of underwater tourism, yachting, ecotourism – regulated camping sites, spa, cultural and ornithological tourism, etc. as main future perspectives for sustainable development of Shabla Municipality pilot area?

All of the participants consider the sea-, eco- and cultural heritage recreational activities as perspective for the region.

Where and what type of problems or conflicts could appear (or already exist and a solution is necessary) in the transboundary pilot area Mangalia – Shabla?

The current environmental state could be deteriorated by wild camping, uncontrolled fishing and underwater activities.

Are there possibilities for cooperation in the transboundary area Mangalia – Shabla in the field of your activities and what are the potential opportunities for that type of cooperation?

While the participants do not define the nature of the opportunities they consider cooperation in the area as perspective in spite of being not well defined.

What kind of mutual benefits could be expected in result of the transboundary maritime spatial planning in the pilot area Mangalia – Shabla?

The main benefits defined in the participants' answers are coastal erosion protection and development of recreational infrastructure.

Main maritime activities and uses in the study area (identified at the meeting with Shabla Municipality: Mayor Mr. Mariyan Zhechev and chief architect Mrs. Tatyana Neykova)

1. Fishery (traditional fishing) and aquaculture farms?
There are no developed and or operated aquaculture farms in the maritime space of Shabla Municipality. There are intentions for aquaculture farms development on the coast: there are old fishponds near Durankulak and have investment interests for their restoration and cultivation of crabs; another investor interest is to build aquariums for fish near the shore of Tulenovo village. There is no information on the number of registered fishing vessels in Shabla Municipality, information can be requested from Executive Agency Maritime Administration or from Executive Agency of Fishery and Aquacultures for statistics on fishing vessels. No registered large fishing vessels, as there is not built port infrastructure in Shable Municipality.
2. Catch of snails with divers (mainly Rapana Venosa).
No observations and information for illegal trawling on the sea bottom.
3. Maritime tourism – activities such as surfing, water skiing, diving, underwater fishing and other water sports are carried out.
4. There are no activities such as sand or gravel extraction or any other raw materials.
5. Oil and gas exploitation/extraction: there is extraction of gas at Durankulak (not functioning), but has an idea to compress gas and for construction of gas station - will begin drilling. Near Tulenovo village there is oil operated drilling – this is a concession with 15 years period- depletion of the deposit, as part of the wells are located in the maritime area, as they are inclined. There is no conflict with the development of tourism sector, as the construction of tourist and recreational infrastructure is planned after the depletion of oil deposit.
6. There is no use of sea water for different purposes – it is possible to be used sea water for the planned aquaculture farms on the coast.
7. Ship yards (old and functioning). Location - there is old well known ship yard near Tulenovo village and in the sea water still exist such activities. However they are not regulated and are therefore in conflict with the Executive Agency Maritime Administration.
8. The whole pilot maritime area of Shabla Municipality is an area for military trainings. Therefore there is an existing conflict with all other activities since the trainings are always held in late August, which coincides with the peak of tourist and fishing season. One possible planning solution for avoiding these conflicts is to coordinate time schedules between trainings and all other economic maritime activities.
9. There is not foreseen port service on the existing jetty – it is planned initially, but indeed an official port activity has not been evolved yet. One of the reasons is the existence of underwater rocky reef, which impedes ships operations.
10. Underwater archaeological sites, shipwrecks and other objects – there are number known as locations; more information can be obtained from Regional Historical Museum in Dobrich.

Main coastal activities and uses

1. Tourism and recreational activities – Shabla Municipality has two settlements, located directly on the sea coast and the settlement formation Kariya, located on Shabla cape. There are several camping sites, but they need an infrastructure renewal and increase of tourist beds. In Krapets and Tulenovo villages there are few private hotels and guest houses. However the main issues is the poor developed road network, even in some places there is no road access to the beaches and sea coast.
2. Wind farms – there is only one wind park located of more than of 5 km from the coast;
3. Agriculture - availability of livestock farms, fertilizer systems, irrigation, and no livestock farms located near the coast, irrigation systems are significantly reduced. There are systems for surface and underground irrigation penstocks for pumped and gravity irrigation. Main sources of water are lakes of Durankulak and Shabla.
4. There is sea water extraction from the north part of Shabla Lake. Currently the problem is the overflow of water from the lake to the sea, due to the formation of a bar, which acts as a sand dike. This bar impedes the lake water and thus endangers the nearshore infrastructure; there is a plan for the management of lakes and it is needed to open mechanically the dike by digging of a canal for water runoff into the sea.
5. There is just one wastewater treatment plant - because the municipality has a population of about 5,000 inhabitants, by law it is not possible to apply under operational programs, as funded only settlements with a population of over 10,000 people. Possible option is to seek opportunities for private investments, however these are very expensive equipment.
6. Coastal protection structures are built at several places along the coast of Shabla Municipality – camping Kosmos (dike and seawall), Krapetz village (two seawalls), camping Dobrudzha – seawall and cape Shabla - groin and riprap. The main existing issues are related to coastal erosion and cliff retreat, as the coastline has retreated with 60 m for the last 5 years based on data of coastal protection agency “Geozashtita” – Varna. A regular year monitoring of the coast is carried out. No significant changes of the dynamics of existing sand beaches have been measured, and therefore they are currently in some equilibrium. An interesting fact is that in the near past (in 1960s) near Ezerets a sand mining from the spit was carried out mainly for construction purposes). Later, certain amount of sand was taken from Krapets, which was used for construction of artificial beaches at Balchik and Kavarna towns.
7. Archaeological and historical sites – there are many and their locations are well known
8. Protected coastal areas and important bird areas- they are managed directly by the Ministry of Environment and Water of Bulgaria, but still missing developed and enforced management plans for protected sites. Information on such plans can be sought from the Agency for Geodesy, Cartography and Cadaster.

Potential interests in coastal zone and maritime space of Shabla Municipality

1. Construction of a fishing port (respectively for yachting) – it is planned the construction of two fishing ports (near camping Kosmos and north from cape Shabla), as well as one marina south of cape Shabla.
2. It is envisaged renovation and expansion of tourist infrastructure (accommodation facilities, construction of new hotels, family and business type, etc.). It is not foreseen an increase of already urbanized areas.
3. Construction of new coastal protection structures – this is planned near camping Kosmos, at cliff section near Krapets village, camping Dobrudzha, cape Shabla. At this stage the types of structures are not specified.
4. No information for potential interests for construction of offshore wind farms.

5. There are intentions and it is foreseen the development of underwater tourism, yacht tourism, ecotourism - construction of regulated camping sites along the coast; development of spa tourism, cultural tourism; ornithological tourism etc.

Existing and potential conflicts between sectors and users (identified at the meeting with Shabla Municipality Mayor Mr. Mariyan Zhechev and main architect Mrs. Tatyana Neykova)

1. One of the existing conflicts is between local and outside fishermen (coming from other parts of the Black Sea: Betting on fishing nets by local fishermen, very often they are broken or entangled by passing outside fishermen who commit trawling for fish. Most cases of possible conflicts in the current planning area are caused by overlapping of the areas allocated to other possible sea uses and „fishing“.
2. Another existing conflict is between fishing and underwater cultural heritage – during trawling many artifacts on the sea bottom are being destroyed.
3. Another conflict exists between tourism in the coastal zone and exploitation of oil and gas.
4. Military training areas are overlapped with areas of all other maritime uses and thus having possible conflicts.
5. Another potential conflict exists between snails catching with divers and sport maritime tourism (surfing, yachting etc).

Existing and potential conflicts between sectors and users and environment

1. Potential conflicts between scuba diving and other uses are due to the degradation of water quality or water visibility and a limited access to space. For example, diving will not take place in the vicinity of possible trawling.
2. Conflict between scuba diving and marine environment (MPAs). Diving is usually seen as a form of ecotourism. However, certain diving practices and the intensity of use of a diving site may be incompatible with the preservation of the marine environment. Divers may negatively impact the marine environment when they enter into contact with the seabed or their presence may also disturb marine species.
3. Oil and gas production and exploitation may have an impact on the quality of marine water.
4. Potential conflict could be the planned coastal protection structures, as well as construction of fishing and yachting ports – these involve impacts on marine environment of direct construction and sediment dredging, drilling, changes of local currents and sediment transport, hard engineering infrastructures for coastal defence (e.g. shoreline armouring or groins), degradation of water quality in port areas due to decreased water circulation.
5. Military training activities have negative impact on marine mammals, other habitats, important bird areas etc.

2.6 Assessment of the previous evolutions - SWOT analysis, problem tree analysis

Glosary

Supralittoral zone (also called the *splash, spray* or *supratidal zone*) is the area above the spring high tide line that is regularly splashed, but not submerged by ocean water. Seawater penetrates these elevated areas only during storms with high tides.

Midlittoral or mediolittoral zone is the *intertidal zone* also known as the *foreshore*. It extends from the spring high tide line, which is rarely inundated, to the spring low tide line, which is rarely not inundated.

Sublittoral zone refers to coastal regions with significant tidal flows and energy dissipation, including non-linear flows, internal waves and river outflows. In practice, this typically extends to the edge of the continental shelf, with depths around 200 meters. These are areas where sunlight reaches the sea floor, that is, where the water is never so deep as to take it out of the photic zone. This results in high primary production and makes the sublittoral zone the location of the majority of sea life.

Within the sublittoral, marine biologists also identify the following:

- The **infralittoral zone** is the algal dominated zone to five metres below the low water mark.
- The **circalittoral zone** is the section beyond the infralittoral, that is, below the algal zone and dominated by sessile animals such as oysters.



EUROPEAN UNION
European Maritime
and Fisheries Fund

Marine spatial plan for the cross-border area Mangalia Shabla



Assessment of the previous evolutions



EUROPEAN COMMISSION

Executive Agency for Small and Medium-sized Enterprises (EASME)

Department A - COSME, H2020 SME and EMFF
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European Maritime and Fisheries Fund (EMFF)

Marine spatial plan for the cross-border area Mangalia Shabla

Volume 2

Assessment of the previous evolutions - issues paper

DELIVRABLE



Introduction

The purpose of the issues paper is to compile, in a concise and consistent manner, the main issues arising from the topic papers in one document. This document has focused primarily on those issues that are related to sea use and spatial development that can be addressed in the Spatial Plan. Marine spatial development and planning deals with a variety of marine and human activities, which are influenced by and affect a number of parameters in the environmental, economic and social fields. This inter-relationship is highlighted when comparing issues between the respective multi- sectorial analyses and in this respect an attempt has been made to identify such cross-cutting issues. The tasks undertaken for the formulation of the issues paper included a collation exercise where all common strategic issues (present in both Romanian and Bulgarian part of the plan area) from each topic studies were drawn out.

Natural areas

In view of the small scale of the plan area and small population density, it is not surprising that the proportion of the cross-border area covered by natural and semi-natural habitats is significant. Moreover, the seashore areas attract a number of people mainly for touristic and recreational purposes, which increase the potential for the degradation of the marine and coastal habitats. The absence of suitable and practical common management measures further aggravates this problem. The status of these natural habitats is complicated further as urban development, roads, resource extraction and agriculture activities have generally led to their fragmentation or destruction.

Natural habitats

The natural habitats within the Mangalia - Shabla zone are diverse but their occurrence is not abundant due to the limited size of the area. The status of coastal and marine habitats depends very much on the type and level of activities and uses occurring within them or in their vicinity. Cliffs and rocks areas are significant in the area and still sustain richer communities due to their relative inaccessibility.

However, the impacts resulting from years of unmanaged development, uncontrolled access and use of natural resources by different types of development limit this abundance further. Legal protection has been effective in controlling the types and level of activities permissible in ecologically and scientifically important areas at a strategic level. Similar protection of the remaining areas, particularly on Shabla area, the south of Mangalia and more specifically within the marine environment is necessary. Areas that are not of ecological or scientific importance but play a role in coastal processes, such as cliffs and low-lying rocky shorelines, need to be safeguarded from inappropriate development as well.

The common strategic issues in this domain are:

- Loss of biodiversity due to the abusive exploitation of marine resources and the lack of management plans for coastal and marine resources and habitats;
- Accidental occurrence of alien species and unbalanced development of certain species;



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- The development of eutrophication process due to uncontrolled use of fertilizers, rivers discharge and bottom trawling;
- Coastal protection infrastructures, beach constructions and sand nourishments produce modification of marine habitats and dynamics of currents and sedimentation. These constructions produce the destruction of near shore marine habitats and a reduction of habitats' diversity, which influence on their ability to accommodate marine species.
- The sand beaches exert pressure on marine areas from tourist and recreational activities
- The development of Natura 2000 sites as the main instrument for protecting the marine biodiversity in the area;
- A significant part of the shoreline geomorphology is supportive for natural life in many coastline sectors. Reefs habitats are considered the most stable and less affected by pressures;
- All habitats and species in the area are sensitive to pollution with chemicals or hydrocarbons;
- Large areas of the coastal natural area are undamaged (undeveloped), consisting of a significant variety of habitats, of which many are wetlands.
- Absence of a common regional view on criteria and methodologies regarding evaluation of marine habitats having a regional importance for conservation of living resources and for establishment of protected areas or of fishing free zone in trans boundary context;

Natural protected areas

The natural protected areas are covering the greatest part of the marine zone corresponding to Mangalia-Shabla shoreline.

The area where life forms can exist in the Black Sea is limited by the anoxic central zone of the basin. This particular situation limits the diversity of life forms and almost all pelagic and benthic fauna and flora dwell in the shallower upper oxic water layers. Therefore a large part of the marine continental shelf must be formally protected in order to preserve the biodiversity and the conditions that support its specific processes. The main problems of the natural protected areas are the elaboration of management plans, on the basis of in depth studies and the implementation of these plans.

The main issues of the domain are:

- The presence of coastal and marine areas, with high and unique biological value, are object of conservation with priority in "Special Protection Zones" and the development of an ecologically coherent network of MPAs in Bulgaria and Romania.
- Due to their EU membership, Bulgaria and Romania have to apply certain measures to preserve the fish stocks in their waters. However, these measures cannot bring maximum effect without being also applied to the rest of the Black Sea States;
- The absence of good monitoring of pollution sources' effects on marine and coastal ecosystems;
- The lack of an integrated (Romania and Bulgaria) management of the Mangalia-Shabla area to reduce the effect of natural and anthropogenic factors on protected areas and on other areas;
- Numerous shoreline wetlands offer extension areas for ecosystems protection and functioning;
- The absence of update regional or national databases on coastal habitat types in SCIs and inventories of rare and endangered species;
- The expansion of mass tourism outside the resorts and actual areas is threatening the integrity of the protected areas.

Landscapes



Assessment of the previous evolutions

The natural landscape is a resource and a potentially valuable asset for recreation and tourism. The analysis indicates that most protected areas with high landscape value focus on protecting the setting of the built heritage. To date there has been no designation aimed primarily at coastal and marine scenery that have a high landscape value. Enhancement of coastal landscapes in strategic open gaps between and in urban areas improves opportunities for informal recreation, whilst releasing recreational pressure from sensitive coastline areas.

The main issues are:

- The rapid transformation of the coastal zones from a natural to an urbanized state
- Changes of the shoreline landscapes by modification of the coastal physical conditions and destruction of shore habitats;
- Development is concentrated in areas that have easy access to the sea exerting negative effects on coastal landscapes

Marine cultural heritage

The area is enriched with historical and archaeological remains covering several epochs. A considerable number of these are located within the coast, on both sides of the cross-border area. A number of remains have also been discovered at sea. The most notorious and large submerged archaeological vestiges are those of Mangalia ancient city, situated in the marine area neighbouring the town. The main threats for underwater relics and structures of cultural significance are associated with coastal engineering works especially in ports, such as dredging, pilferage by divers, as well as fishing activities.

Uses of marine and coastal areas

Uses and activities within the sea and the coast vary and each has particular resource needs. When marine and coastal resources are limited and demands for their use are high, there is great competition for their exploitation and damaging pressures upon the resources, which can bring them to extinction. If the resources use is left unmanaged, conflicts may also arise between users. The over-riding issue is that the majority of uses in the area have been developed in a manner that has not considered the implications they may have on natural resources, processes and ultimately, other uses. Demand for development is concentrated in areas that have easy access to the sea and offer easy situations for construction, regardless of the impacts on marine and coastal habitats.

Living resources exploitation

In the present conditions, the state of marine fish resources has been influenced by:

- Loss of valuable habitats for spawning and feeding habitats of fish due to transforming of lagoons/limans in freshwater reservoirs;
- Alteration of ecological state in rivers, lagoons/limans and shelf areas;
- Eutrophication (sources from agriculture, municipal waste, industry, etc);
- Mass mortalities of demersal species;
- Disturbance of fish behaviour, mainly by keeping of fish shoals away from shallow waters.
- Loss of spawning habitats of anadromous species by damming of rivers;
- Disturbance of shelf habitats important for spawning and feeding of living resources through siltation from building of port dams or civil coastal defence works;
- Changing of fish behaviour in coastal areas due to modification of water currents by building of big ports;



Assessment of the previous evolutions

- The wide north-western shelf in particular is the most important spawning and feeding area for the Black Sea fish species and Romania has one of largest shelf.
- The ecological and geomorphologic characteristics of the coast and the presence of other users make it practically difficult for aquaculture and fisheries to expand unless the cage units are taken further offshore within sites primarily zoned for this type of activity. Aquaculture is conditioned by wave and wind regime, water temperature and quality as well as the fish and seafood market restrictions. The main strategic issues relating to fisheries are the modernization of the fish fleet and the protection of marine areas used by the registered fishing fleet from other types of usages. The common strategic issues in this domain are:
- Overfishing has reduced the volume and limited the diversity of fisheries products. The commercial fish species suffered a reduction from 26 to 13 species in the last four decades;
 - There is no process for assessment of fish stocks, even for shared and migratory species, at a regional level. Data and methodologies used at national level for collect, process and assessment scope are not compatible and comparable for regional purposes;
 - Romania and Bulgaria, as member states, has a very small share of the fishing fleet and catches in the Black Sea, especially in comparison to Turkey, Russian Federation and Ukraine;
 - The sector of processing and marketing fish and marine products need more development;
 - The conditions for offshore fish farms are not favourable; the aquaculture in the marine area must develop mainly in the mussel culture sector;
 - The need for protection of shallow sea water habitats of the coast which are nursery and spawning grounds for many commercial fish species.

Cruise shipping and yachting

Maritime recreational activities are still expected to continue within both the Mangalia harbour and the other marinas present in the area. The spatial requirements for these activities need to be safeguarded along with other legitimate uses that take place within both cross-border area. Similar considerations need to be taken with respect to the yachting industry and the development/maintenance of Mangalia and other harbours.

The common strategic issues in this domain are:

- The reduced valorisation of local attractions (natural and cultural heritage) for cruise shipping and yachting activities;
- The infrastructure for shipping and yachting activities is not fully adequate or sufficient;

Military areas

Most of the military infrastructure of the area is of national importance and therefore it is necessary that any operational interventions should take into consideration the need to safeguard their value in the best practical way. The common strategic issue in this domain is:

- Military operations areas are overlapping natural areas and fishing areas

Non-living resources exploitation

The main issues relating to mineral extraction are related to the different stages of exploitation development and abandonment. Site exploration for future operation has to consider the impacts associated with the natural environment. Implementation programs for restoration schemes for both existing and future quarries need to address the existing characteristic of the areas, in terms of topography, resources and uses with the objective of rehabilitating these sites for multiple uses.



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Areas known to have mineral reserves should as far as possible be protected from certain types of development. Oil exploration in the plan area has been on-going sporadically over the past five decades both on land and at sea with the major issue being the potential impacts arising from the industry with respect to coastal and marine resources.

The common strategic issues in this domain are:

- The negative impact of exploitation of the non-living natural resources on environmental quality;
- The need to develop the geothermal resources exploitation - tourism based on balneal resources is more sustainable than seasonal leisure industry;
- Protection of forests and soil resources in order to protect the coastal and marine habitats;

Built environment

Coastal engineering works associated with changing the configuration of the coastline have an effect on the hydrodynamics of the stretch of coast being developed and potentially even in adjacent areas and may lead to impacts on other coastal uses present. Changes in currents and sediment transport may affect sandy areas and increased turbidity during operations affect water quality.

Tourism and recreational facilities

The trend for developing coastal areas for tourist accommodation and other recreational facilities has taken up extensive areas that were previously natural habitats or could have been promoted for parks and other recreational activities whilst altering the landscape. This leads to an issue where the main experience of open space could be confined to the coastal environment. On the other hand there is a need to primarily safeguard popular tourist areas, including bathing sites, from incompatible uses. Measures to protect existing sandy beaches and low-lying rocky shorelines and manage popular bathing areas are necessary. The provision for and protection of vehicular access within the coast is another issue, which has to be provided in recreational/touristic areas.

The common strategic issues in this domain are:

- A large part of the accommodation units is outdated (Mangalia); in the Bulgarian part these are reduced in number of units and accommodation places;
- Recreational facilities are insufficient, especially those related to the water sports (sailing, kayaking, diving, etc.);
- Beaches are overcrowded in some sectors producing deterioration of the environment/protected areas;
- The need to develop the ecotourism and a sustainable growth of the tourism structures.

Urban sprawl

Seashore settlements need to reflect the dynamics and meet the challenges of everyday life. The challenges faced by the construction sector for the past two decades in the plan area are mainly driven by the growing need for housing and accommodation units, in the context of the decreasing number of local population, which is also ageing. The built up areas occupies the most of the coastline favourable locations for holiday homes and accommodation units, replacing the shore natural habitats. The preference for newer, less dense houses over the existing ones has been a factor that influenced the development of new housing areas. In the tourism sector things are almost the same; however the supply has exceeded the need leading to the current situation where a large part of the new built units is now vacant.

The common strategic issues in this domain are:



Assessment of the previous evolutions

- Disruption/removal of indigenous marine and coastal habitats;
- Reduction /disturbance of sea - coast relations of habitats;
- Water quality changes in the vicinity of the shoreline settlements;
- Changes of settlements' activities structure towards alternative functions with focus on external resources;
- Increased dependence on external resources - polarization of activities and employment;

Infrastructures

The major infrastructure uses (e.g. roads, power stations, water supply plants, sewage outfalls etc.) requiring a coastal location have all been established to a certain extent and no major future development is envisaged. The major issues to be addressed relate to waste and waste water management, namely dumping at sea. With the proposed sewage treatment plants the amount of sludge generated will increase and a more fine treatment to disposal at sea needs to be sought. The waste reaching the sea water, intentionally or not, is an increasing threat for the marine ecosystems. The plastic waste, coming into the sea from terrestrial sources or the litter discarded from ships must be strictly diminished and controlled. The availability of recycling facilities is very limited and the strategy of the local authorities, to collect separate and recycle the municipal waste stream, need to be established.

The development of alternative energy sources is another issue that may affect coastal and marine areas, particularly the development of offshore wind turbines. The location of new infrastructure facilities needs to take into consideration the natural characteristics and existing uses of the marine environment.

In the plan area are located on the seafloor several oil and natural gas transport pipelines which raise issues of environment protection in case of accidental spills.

The common strategic issues in this domain are:

- Reduced capitalization of existing solar and wind energy potential in Mangalia -Shabla marine area;
- Negative impact of submarine power cables on the marine environment;
- Negative impact on marine environment of the oil and gas exploring / exploiting activities
- Incidental fluid losses from underground oil transport pipelines represents a threat for marine life;
- Excessive use motor vehicles (mainly private cars) at the peak of tourist season; lack of more eco-friendly modes of transportation between coastal destinations;
- Underdevelopment of wastewater sewage system - network capacity and treatment plants;
- Existing hydraulic works for coastal protection hinder the natural processes in the sea and water bodies;
- Increasing municipal waste volume stored on soil - lack of selective sorting and recycling systems;
- Reduced control of plastic waste and micro- particles waste that reach the sea

Economy

The structure of economy and composition of employment in the labour market has changed considerably over the years, with labour demand increasing in the last three decades. The participation rate is also estimated to have decreased, as a direct result of social and demographic changes such as changing economic strategies, globalization and technological improvements. The changes in the local economy were observed mainly in the naval transport and fisheries sectors,



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which decreased in significance and in the growing of the service activities (commerce, wholesale, catering, terrestrial transport and other). Another changes in the local economy occurred with the transition from large industrial units to small-scale activities, mostly located within the residential and tourism areas.

The common strategic issues in this domain are:

- Fishing fleets are reduced in number and outdated; therefore there is a lack of financial resources; inadequate equipment, low levels of productivity and competitively. Sea fishing, conducted along the coastline, is limited to the marine areas up to 60-70 meter isobaths, as a consequence of the characteristics of the vessels and their limited autonomy.

There are large differences among the Black Sea countries in the economic and technical structure of the fleets exploiting the fishery resources, making regional cooperation a more difficult exercise.

- The lack of an adequate management in the Black Sea fisheries is also evidenced by the fact that in spite of evident decline of stocks, the fishing effort continued to increase in some counties.

This fact is very obvious in cases of high value large life fish species as well: sturgeons, turbot, spiny dogfish

- The need to develop the “blue economy” in the area in order to replace traditional activities, more damaging for the environment by exploiting living and non-living resources;

- Low diversification of economic activities related to the marine resources - the area relies in part of agriculture and tourism activities;

- Insufficient number of permanent jobs - accommodation structures do not sustain tourism and recreational activities;

- Port and shipyard activities do not assure continuous employment opportunities;

- In Romania marine aquaculture is very poor developed, almost inexistent, in the cross-border area the activity is developed only in molluscs’ mariculture.

Cross cutting issues

The size of the plan area as well as population and economic structures are major factors that lead to a high degree of inter-relationship. Therefore ecosystems and demographic trends will have widespread repercussions on all types of sea and land uses since human needs will trigger resources exploitation, generate waste and demand more infrastructures.

Attention needs to be paid to the implication of the development of the areas outside the development zone (external context). Such areas have different functions ranging from the provision of resources (by imports) to the demand of recreational space and marine resources. The natural resource base needs further development and protection as well. The main cross-cutting issue here is the lack of a harmonized management of both areas and of practices/activities occurring within the areas outside the development zone. This has led to the deterioration of the natural and cultural resources present to the detriment of the natural environment and quality of life. In a somewhat similar fashion as has happened in the urban areas, some form of ‘renewal’, through appropriate management practice, is required to rehabilitate the marine ecosystems, to safeguard biodiversity, natural habitats and landscapes.



Assessment of the previous evolutions

Compatibilities among maritime uses

	Protected areas	Bathing areas	Small scale fishery	Large scale fishery	Pound nets	Underwater cables	Shipping routes	Dumping sites	Dredging	Anchorage sites	Yachting and cruising	Water sports	Diving areas	Submerged cultural heritage	Bottom trawling	Military practice areas	Waste water discharges	Aquaculture	Oil/gas extraction and transport
Protected areas	Compatible	Semi-compatible	Semi-compatible		Compatible		Semi-compatible			Semi-compatible		Semi-compatible	Semi-compatible	Compatible				Semi-compatible	Semi-compatible
Bathing areas		Compatible									Semi-compatible	Semi-compatible	Semi-compatible						
Small scale fishery			Compatible				Not compatible		Semi-compatible	Not compatible	Not compatible	Semi-compatible	Not compatible	Not compatible		Not compatible	Not compatible	Not compatible	Not compatible
Large scale fishery				Compatible			Not compatible	Not compatible	Not compatible	Not compatible		Semi-compatible	Not compatible	Not compatible		Semi-compatible			Not compatible
Pound nets					Compatible	Not compatible		Not compatible	Not compatible	Not compatible	Not compatible		Not compatible	Not compatible			Not compatible		Not compatible
Underwater cables						Compatible		Not compatible		Not compatible	Semi-compatible		Semi-compatible	Not compatible	Not compatible			Not compatible	
Shipping routes							Compatible		Compatible	Compatible	Compatible	Not compatible	Not compatible	Not compatible		Not compatible		Not compatible	
Dumping sites								Compatible	Not compatible	Not compatible	Not compatible	Semi-compatible	Not compatible	Not compatible	Not compatible	Not compatible			
Dredging									Compatible	Semi-compatible	Compatible		Not compatible	Not compatible	Not compatible			Not compatible	
Anchorage sites										Compatible	Compatible		Not compatible	Not compatible	Not compatible	Not compatible			
Yachting and cruising											Compatible	Semi-compatible	Not compatible	Not compatible			Not compatible	Not compatible	
Water sports												Compatible	Semi-compatible		Not compatible	Not compatible	Not compatible	Not compatible	Not compatible
Diving areas													Compatible	Semi-compatible	Not compatible	Not compatible	Not compatible	Not compatible	Not compatible
Submerged cultural heritage														Compatible	Not compatible	Not compatible	Not compatible	Not compatible	
Bottom trawling															Compatible	Semi-compatible			
Military practice areas																Compatible		Not compatible	
Waste water discharges																	Compatible	Not compatible	
Aquaculture																		Compatible	Not compatible
Oil/gas extraction																			Compatible

Not compatible	Not compatible
Semi-compatible	Semi-compatible
Compatible	Compatible



Assessment of the previous evolutions

Land- sea interactions - coastal activities and marine uses

	Marine areas																		
	Protected areas	Bathing areas	Small scale fishing	Large scale fishing	Pound nets	Underwater cables	Shipping routes	Dumping sites	Dredging	Anchorage sites	Yachting and cruising	Water sports	Diving areas	Submerged cultural heritage	Bottom trawling	Military practice areas	Waste water discharges	Aquaculture	Oil/gas extraction
Coastal activities																			
Recreational beaches																			
Tourism activities																			
Residential areas																			
Shipyard areas																			
Port terrestrial areas																			
Waste water treatment																			
Terrestrial transport																			
Electrical grid																			
Agriculture																			
Natural gas/oil pipelines																			
Tailings dams																			
Fisheries sites																			
Coastal protection																			
Waste management																			
Natura 2000 areas																			
Cultural heritage, landscapes																			

Conflict

Week interaction/conflict

Good interaction /synergy

Conflict	Conflict
Week interaction/conflict	Week interaction/conflict
Good interaction /synergy	Good interaction /synergy



Assessment of the previous evolutions in the Mangalia - Shabla area

SWOT analysis

Natural habitats

Strengths	Weaknesses
Large areas declared Natura 2000 sites and wetlands of international value, Ramsar sites, best preserved coastal wetlands in Bulgaria (Shabla and Durankulak) Reefs (habitat type 1170) are spatially stable, with a good conservation status of structure and specific functions, including typical species, being not significantly damaged and not under various pressures. Reefs habitats are considered the most stable and less affected by pressures, which will remain viable on the long-term.	Fishery and aquaculture activities interact with the marine environment by: - removing both target species and other species present in accidental stocks, causing locally extinction; - modifying the energy flow through the food web, which may affect other species of the ecosystem; - modifying the physical environment (bottom trawling, sediments, waste) and threatening the diversity of habitats. (1110, 1140, 1170, by damages and fragmentation caused by bottom trawling; all habitats and species, by water eutrophication) Coastal protection infrastructures, beach constructions and sand nourishments produce: - modification the dynamics of currents and sedimentation, - altering the physical environment and destruction of seashore habitats, - reduction of habitats' diversity, which could influence on their ability to accommodate both commercial and non-commercial species. (1110, 1140, 1170) Military and maritime transport activities may have considerable influence on the marine environment by: - impact of acoustic activities on marine mammals and fish, - dredging and dumping in the marine transport routes affecting the shallow water habitats.
Opportunities	Threats
Large areas of the coastal natural area are undamaged and consisting of a significant variety of habitats, of which many are wetlands. The conservation status of the natural shore habitats is in general good; they could provide an efficient buffering space to the marine shore habitats. The good conservation status of natural shore habitats is perceived as stable in area, distribution model, structure and specific functions in: - habitat type 1140 - Mudflats and sandflats not covered by seawater at low tide, - habitat type 1110 - Sandbanks which are slightly	All habitats and species in the area are sensitive to pollution with chemicals or hydrocarbons in the coastal zone, especially coming from the Mangalia Port and Tyulenovo (1110, 1140, 1170, by pollutant and waste water discharges) Rapid transformation of the coastal zones from a natural to an urbanized state, as a result of an expansion of housing, tourism, recreational facilities and technical infrastructures - Mangalia resorts, 2 Mai Underwater tourism and illegal fishing produce destruction and wear of habitats, including



Assessment of the previous evolutions

covered by sea water all the time. Development ecological tourism and education programs in areas with high biodiversity and habitats of scientific interest.	removal/harvesting algae and marine invertebrates. (1110, 1170)
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Natural protected areas

Strengths	Weaknesses
Coastal and marine area with high and unique biological diversity and concentration, are object of conservation with priority in “Special Protection Zones” (all SCIs) The presence of rocky marine and coastal habitats, support for natural life, favours the biodiversity conservation interest (type 1170 and)	Sewage disposal into the sea and Shabla lake The development of eutrophication process from the uncontrolled use of fertilizers in rivers discharges The absence of update regional or national databases on coastal habitat types in SCIs and inventories of rare and endangered species of plants and animals The absence of good monitoring of pollution sources’ effects on marine and coastal ecosystems
This particular form of most of the coastline is supportive for the biodiversity	Shoreline geomorphology non-supportive for natural life - sand beaches, real estate land
Presence of shelter bays, wetlands, landscapes with sand dunes, supporting cliffs for endemic or endangered marine ecosystems in the study area The geological structure of superior Sarmatian limestone favours the appearance of karst formations on the cliffs under the action of waves	The lack of policies and integrated management of the Mangalia-Shabla area reduces the effect of protection in the natural areas The low level of environmental education and awareness of the importance of protecting the environment
Opportunities	Threats
Development of ecologically coherent network of MPAs in Bulgaria and Romania, including the transboundary area Cross-border cooperation by regional and local in development of programs related to biodiversity conservation in the areas	Negative effect of global climate change on water and air factors The irrational or illegal use of natural resources and pollution outside the coastal and marine protected areas Expansion of mass tourism outside the resorts due to urban development and camp areas

Living natural resources

Strengths	Weaknesses
The fish species with migratory and non-migratory character are located in the West and Northwest extremity of the Black Sea basin. The areas favourable for fishing these species are offshore the Mangalia-Shabla area The presence of many fresh water bodies; in some of them are developed aquaculture activities Most species of algae and the biomass of most multicellular organisms is the richest, as well as different animal species are in the mediolittoral hard substrate areas	Decrease of the commercial fish species in the last four decades from 26 to 13 species, ten pelagic and three demersal species Sea mussels communities are damaged by bottom trawling for the shellfish and habitat destruction The marine aquaculture is developed only in the mollusc sector and only in the Bulgarian marine area even if favourable areas were determined also in the Romanian area. The exploitation of sea weeds and algae is not yet developed
Opportunities	Threats
The potential of continental platform is of 140 commercial fish species The shallow sea water habitats of the coast are nursery and spawning grounds for many species. These areas are in majority included in marine protected areas (SCI) Mussel marine aquaculture is an economic opportunity in the area.	The fish species are threatened by the intensive fishing, the decrease of marine fish stock and the degradation of marine environment. Eutrophication from coastal discharges and sea bottom disturbances are threatening the living natural resources



Assessment of the previous evolutions

The prospects of usage of algae in bio technologies	
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Non-living natural resources

Strengths	Weaknesses
Large variety of the non-living natural resources: Hydrocarbons resources (oil and gas: Vama Veche - Limanu, Tyulenovo; black coals and anthracite: Tvarditsa) Ferrous and non-ferrous ores (manganese ores: Shabla) Mineral resources (Mangalia), thermo-mineral waters (Jupiter-Aurora, Mangalia), sulphuric and mineral waters (Tyulenovo)	Negative impact of exploitation activities - the oil and mineral extraction has led to heavy metal and hydrocarbons pollution of large areas in Shabla; Limited amounts of non-living natural resources in the area don't offer sustainable prospects to these activities
Opportunities	Threats
Increasing use of renewable energy sources (wind, solar etc.) as alternative to fossil fuels, introduction of new technologies for coals exploitation; Increased development of economic activities: services, industry, tourism based on natural potential of the sea (balneal, wind, solar etc.)	Irrational exploitation of non-living natural resources (oil, gas, coals etc.) and thus the increasing of Romanian and Bulgarian energy dependence Negative effects of pollution due to obsolete technologies for exploitation the non-living natural resources could impede the development

Shoreline settlements

Strengths	Weaknesses
Existence of alternative functions which provide alternative activities: - balneal resources provide alternative activities - Mangalia, Saturn, Tyulenovo - aquaculture - fish and mussels production and processing - related to fish stock protection - Durankulak, 2 Mai, Vama Veche Small size settlements able for moderate balneal touristic development, benefiting from good resources (beaches, water quality, landscapes) - Durankulak, Ezerets, Krapets, Tyulenovo	Disruption /removal of indigenous coastal habitats: - changes of shoreline physical conditions through earth works, dikes, shipyards, marinas - Mangalia, Saturn - Olimp resorts, Vama Veche, - modification of coastal settlements functionality and morphology with impact on land-sea relations - Mangalia, Saturn - Olimp resorts, Vama Veche, 2 Mai, Shabla lighthouse beach development Loose enforcement or lack of ICM plans or development without plans - 2 Mai, Vama Veche, Shabla lighthouse beach development
Opportunities	Threats
Large zones of the seashore and territorial waters are declared natural protected areas restraining the development on the shore. - coastal and marine protected areas, not permitted for development	Negative impact of climate change on settlements impacts on sea areas - weather conditions (rain, temperature and wind) generating: pollution and sedimentation of the marine areas in the vicinity of urban areas - benthic habitats



Assessment of the previous evolutions

Economic prospects for seashore settlements: - international cruising tourism (ships and yachts) in local marinas - Mangalia, Shabla - development of ecotourism - Olimp (Talageac), Limanu, Durankulak, Shabla, seashore forests and wetlands - development of blue economy in the Black Sea basin - biotechnologies based on seaweed, jelly fish and processing of other marine resources Economic prospects for settlements situated distant from seashore: Durankulak, Ezerets, Vaklino	Increased dependence on remote resources in a shifting global market (shipped resources) and mono-functional developments (tourism) - development of activities adjacent or in close connection with ports and shore line Mangalia industries and Saturn - Olimp large resorts - increasing energy costs related to the decrease of fossil fuel stock - industrial cities: Mangalia - development of tourist activities and secondary homes on the seashore in relation with coastal settlements - Durankulak, Ezerets, Vaklino, Graniciar, Gorun, Zahari Stoianovo
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Marine economy

Strengths	Weaknesses
The local market for fish and fish products is growing but still there are few links between market and primary producers; The wide western shelf in particular is the most important spawning and feeding area for the Black Sea fish species; The area has many protected areas which are important reserves for marine resources. Marine trade and transport are important and sustainable activities in the area. Ship building is a developed activity which employs a great number of local inhabitants and economic units.	The marine fisheries can be considered almost in collapse if we take into account the decreasing of catches from 16000 tons in the 80's period and 200 tons in 2010, The decreasing the number and the GRT of vessels, the actual state of fleets that is in poor condition and needs improvements for safety, working conditions and facilities for landing. Marine aquaculture in the area is a relatively recent developed and is still not widespread. Much of the technology and production in the region depends of economical status and possibilities of funding and marketing. Lack of wholesale markets and centres for the first sales for marine products; lack of conditioning equipment; poor organization of producers; simple diversity and insufficient promotion of marine products.
Opportunities	Threats
The market for fish and fish products is growing but still there are few links between market and primary producers; The increase of interest for MSP among the Black Sea countries could result in a process of policy harmonization in the domain of living resources exploitation; The advances in implementing the 'blue economy' with development of aquaculture, biotechnologies and sea energy exploitation.	The foreign trade balance of the fish and fish products is negative. In 2005 was imported ten times more fish than exported and in 2011 was imported 6 times the exported quantity. Small share of the fishing fleet and catches in the sea, especially in comparison to other riparian states. Coastal aquaculture can, under certain circumstances, result in loading abnormal organic matter, leading to eutrophication of the sea water



Assessment of the previous evolutions

Tourism and recreational activities

Strengths	Weaknesses
Improved bathing water quality: - mobilization of local stakeholders and monitoring actors towards meeting the minimum defined standards for bathing water quality – Durankulak, Krapets, Ezerets, Shabla (excellent bathing water quality, according to the European Environmental Agency)	Extensive building of hotels on beaches and in the immediate vicinity of the shore: - deterioration of the beach and coastal waters due to overcrowding – Venus, Olimp, 2 Mai - bathing water qualified as sufficient due to waste discharge into the waterways – Olimp, Cap Aurora, Saturn, Mangalia, 2 Mai, Vama Veche
Coastal natural protected areas as buffer zones: - tourism infrastructures have to meet requirements set by protected lands, thus limiting the impact on marine environments	
Opportunities	Threats
Connection between ecotourism and sustainable development principles: - provision of economic alternatives to activities that destroy or deplete marine ecosystems - provision of strong incentive to preserve a high quality environment in case of marine ecotourism providers	Transboundary nature of environment-unfriendly developments in tourism: - management of tourism in marine environments doesn't grasp a broader understanding of marine specific processes - actions taken in one marine locality will impact another distant one

Waste management

Strengths	Weaknesses
Technical development, transport, infrastructure and social protection system, relatively well developed - Shabla municipality Both cities, Mangalia and Shabla are having great tourism potential, because of curative mud In Shabla and Mangalia the present system of municipal waste collection and disposal, covers 100% of population Separate collection system in Shabla, for electrical and electronic equipment. In Mangalia the system is just beginning	The absence of updated waste management systems in Mangalia, Limanu and Shabla. There are only one landfill in Mangalia and Shabla. Lack of interest for selective collection systems in in Mangalia, Limanu. The absence studies on environmental impact of landfills on aquifers and sea areas. Plastic waste and microparticles pollution are not studied in the sea areas neighbouring the large resorts - Mangalia, 2 Mai .
Opportunities	Threats
Attraction of Bulgarian and foreign investors, in in the area can improve the waste management The existence of EU financial support for investment in waste management projects and waste infrastructure expansion Usage of waste resources could create sustainable green jobs and reducing the amount of waste discarded on landfills	Economic development, especially touristic activities, will increase the waste volume. Increased dependence of the municipal budget on government, the scarcity of own resources hampers the further treatment of waste in Shabla. In Mangalia, construction and demolition waste is used as filler material causing chemical reactions in soil, with impact on sea



Assessment of the previous evolutions

Water management

Strengths	Weaknesses
in Mangalia area the underground water sources are of very good quality; in Shabla area the groundwater sources are sufficient quantity, ensuring long-term water needs; the existence of coastal defence structures, which protects much of the coast; supply water to cities and tourist resorts in the area are supplied with water Romanian consistently Water System Mangalia; water supply for the settlements is provided from the Bulgarian regional and local water systems; the ability of local water sources widely exceed the water needs of the Shabla.	pollution of underground water sources in the Bulgarian area is produced by uncontrolled use of chemical fertilizers, uncontrolled household waste and manure, practice evacuation of wastewater into septic tanks and absorption pits; the specific consumption of drinking water in Mangalia is far above the normal average of national legislation; in Shabla the drinking water network is built in 87% of asbocement and concrete, materials not complying with the rules in force; underdeveloped wastewater sewage system in all areas of Mangalia - Shabla; wastewater treatment plant in Shabla has exceeded its operating capacity;
Opportunities	Risks
Master making plans to protect coastal areas from Mangalia - Shabla; the project „Reconstruction of water supply network in Vaklino, Ezerets, Krapec, Durankulak, Shabla municipality”, under measure 321 „Basic services for the rural population and economy” Rural Area Development Programme; application for funding the project "Water supply and sewerage system and wastewater treatment plant (WWTP) Sabla city" under the Operational Programme Environment 2007-2013, Priority Axis 1 - Extension of water and wastewater systems.	bad technical condition of protective structures in Mangalia port, favouring beach erosion and property and infrastructure in these areas; Marsh Mangaliei law, lack of coastal protection structures, increases the risk of a negative impact on SCIs stud-Oban Great Swamp Cave Mound (Natura 2000); SPA's negative impact on Lake Shabla (Natura 2000) through the discharge of insufficiently treated water treatment plant in Shabla; Underdevelopment or absence of sewage systems (networks and treatment plants) in settlements in Mangalia-Shabla has a negative impact on the population and related ecosystems.



Assessment of the previous evolutions

Transport infrastructures

Strengths	Weaknesses
Developed transport infrastructure network linking coastal localities in the area: - transport routes (European road) running from N to S on the coast - modernized railroad infrastructure, good coverage with public transport networks (Mangalia) - attractive touristic ports, valuing the potential of nautical tourism (Mangalia, Limanu).	Unsatisfactory traffic on existing transport infrastructure: - lack of a network of ecological transport in the area (riding, cycling, walking roads) - lack of a plan and a strategy to control the traffic and parking in Mangalia- Limanu area - difficult access to the railway transport (Durankulak, Shabla) Naval operations in Mangalia marine area disturbs the local ecosystems
Opportunities	Threats
Development of transport infrastructure programs: - road rehabilitation programs, including streets and parking lots. - the interest of some municipalities to reduce air pollution from motor vehicles transport (Mangalia) Development of alternative transport at local level (bikes, tram) - possible development of the naval transport (nautical tourism) (Mangalia, Limanu) - the interest of some municipalities to reduce air pollution from motor vehicles transport	Increased accumulation of nuisances related to transport affects the quality of coastal and marine environment: - excessive use motor vehicles, of private cars (especially in tourist season) and vehicles in poor condition - reduced traffic capacity from Mangalia to Constanța on DN39 Growth of port activities could impact indirectly the marine environment: - long term disturbance of shore habitats (Mangalia); - endangering the submerged cultural heritage (Mangalia)

Power and telecommunication infrastructures

Strengths	Weaknesses
Well-developed power distribution network in Mangalia-Shabla area High renewable energy potential: - solar energy on Mangalia and Shabla municipalities; - high wind energy potential in Mangalia and Shabla (on shore and off shore) - wind farms in exploitation (Limanu, Shabla) Developed telecommunication network: - on shore cable – optical fiber Constanta-Mangalia - submarine cable – KAFOS (Mangalia–Varna–Rumeli-Igneada),	Reduced exploitation of marine energy resources - reduced capitalization of existing solar energy potential in Mangalia and Shabla - poor capitalization of existing wind energy potential in Mangalia Negative impact of submarine communication cables on the marine environment: seabed disturbance, habitats disturbance Reduced development of telephone network in Shabla villages: Gorun, Prolez, Staevtzi
Opportunities	Threats
National legislation to encourage renewable energy development in the area Subsidy programs for renewable energy and environmental protection	Exhaustion of viable locations for coastal (on shore) wind farms Negative impact of submarine power cables on the marine environment



Assessment of the previous evolutions

Oil and gas transport infrastructures

Strengths	Weaknesses
The existence of submarine oil and gas transport pipelines important for the coastal economic activity of Bulgaria.	The fragility of the infrastructures network in the sea (extraction and transport) being always the risk of leakages and pollution.
Opportunities	Threats
The existence of onshore oil transport corridors and adequate facilities (pumping stations, warehouses) which can become oil transit routes to Europe. The existence of multiple types of drilling platforms allow development of the network The existence of hydrogen sulfide as a resource of fuel that can be exploited (when extraction and processing will be 100% safe environment).	Incidental fluid losses or resulted from criminal aggression constitutes a danger of explosions / pollution of the sea and groundwater Using hydraulic fracturing increases the risk of sea water pollution, triggering earthquakes and the emergence of updrafts, which will be brought to the surface large quantities of hydrogen sulfide Specific risks of offshore drilling activities (marine pollution by oil and gas)

Economic activities

Strengths	Weaknesses
Important economic assets and potential of resources in the area: - important tourism potential; unique landscapes and balneal resources (Mangalia, Shabla); - activities in construction and industry are developed (Mangalia); - naval activity of commercial and tourist port is developed (Mangalia); - developed agriculture with fertile land (Shabla, Limanu, Mangalia); - wind farms are developed in the area (Shabla); - access to the major transport network (Mangalia, Shabla); - specialized workforce in activities with economic performance (Mangalia);	Reduced investments and infrastructures: - low diversification of economic activities and therefore limited access to financing (Shabla, Limanu); - low level of advance in technology and economic infrastructure - IT&C sector, tourism, recreational and sea based activities (Mangalia, Limanu Shabla); Reduced visibility and promotion of the area and local resources (Mangalia, Shabla) Industrial sector is based only on few big companies; SMEs are underdeveloped (Shabla); Employment dependent on port activities and seasonal jobs in tourism (Mangalia); The low involvement of local communities in economic development (Limanu); Large dependence of households on agriculture activities (Limanu Shabla)
Opportunities	Threats
Creation of a brand, to promote local tourist area and the diversification of tourism Accessing European funds and implementing government programs and development projects; Increasing cooperation in the area of cross-border Romania-Bulgaria; Development 'blue economy' activities with high potential for economic diversification, job creation, employment stability.	Increasing competitiveness and reduced economic attractiveness for investors; Departure of the young population and skilled work force as a result of lack of jobs; Decline of global demand in ship construction activity affects shipyard in Mangalia; Unreasonable exploitation of resources (oil, gas, renewable energy, and soil) can lead to loss of stability of economic growth.



Assessment of natural and anthropogenic risks in the Mangalia - Shabla area

Romanian sector - Risk factors

Code	Description	ROSPA0076 Marea Neagra				ROSCI0269 Vama Veche – 2 Mai				ROSCI0094 Izvoarele sulfurose de la Mangalia				ROSCI0281 Cap Aurora			
		Negative		Pozitive		Negative		Pozitive		Negative		Pozitive		Negative		Pozitive	
		Inside	Outside	Inside	Outside	Inside	Outside	Inside	Outside	Inside	Outside	Inside	Outside	Inside	Outside	Inside	Outside
A	Agriculture																
A10	Restructuring agricultural land		H														
B	Silviculture, forestry																
C	Mining, extraction of materials and energy production																
C01.01.02	removal of beach materials	M				M											
D	Transport and service corridors																
D01	Roads, alleyways and railroads																
D01.02	roads, motorways		M														
D02.03	communication masts and antennas													L			
D03.01	port areas	H	H														
D03.01.03	fishing harbours	M	M														
D03.02	Shipping lanes	H	H				L				M						
D05	Improved access to site									L					L		
E	Urbanisation, residential and commercial development																
E01	Urbanised areas, housing		H														
E01.01	continuous urbanisation										L				M		
E01.03	dispersed habitation		L														
E03	Discharges					L	L										
E03.01	disposal of household / recreational facility waste										M				L		



Assessment of the previous evolutions

E03.04.01	costal sand suppletion/ beach nourishment		L														
F	Biological resource use other than agriculture & forestry																
F01	Marine and freshwater aquaculture								L								
F02.01	professional passive fishing					L											
F02.01.01	potting	L	L														
F02.01.02	netting	L	L														
F02.01.03	demersal long lining	L	L														
F02.02.02	pelagic trawling													L			
F02.03	Leisure fishing					L			L					L			
F03.02	Taking and removal of animals (terrestrial)	L	L														
F03.02.09	other forms of taking animals								L	M				L			
G	Human intrusions and disturbances																
G01	Outdoor sports and leisure activities, recreational activities									L							
G01.01	nautical sports								L								
G01.01.01	motorized nautical sports	M	M														
G01.03	motorised vehicles						L										
G01.07	scuba diving, snorkelling					L											
G02	Sport and leisure structures		H														
G02.08	camping and caravans						H										
G02.09	wildlife watching							M									
	690 Other leisure and tourism impacts not referred to above									M					L		
G04.01	Military manoeuvres	H	H														
H	Pollution																
H01	Pollution of surface waters (limnic, terrestrial, marine & brackish)					H	M			L	L			L	L		
H01.02	pollution to surface waters by storm overflows		L														
H01.09	diffuse pollution to surface waters due to other sources not listed	L	L														
H03.03	marine macro-pollution (i.e. plastic bags, styrofoam)	L	L			M	M			M	M			M	M		
H04	Air pollution, air-borne pollutants	L	L														
I	Invasive, other problematic species and genes	L	L														



Assessment of the previous evolutions

I01	invasive non-native species	H	H			H	H			H	H			H	H		
J	Natural System modifications																
J02.02.02	estuarine and coastal dredging		L														
J02.11.02	Other siltation rate changes														H		
J02.12	Dykes, embankments, artificial beaches, general									H							
J02.12.01	sea defense or coast protection works, tidal barrages										H			H			
K	Natural biotic and abiotic processes (without catastrophes)																
K01.01	Erosion		H			M	L										
K02.03	eutrophication (natural)						M										
K03.01	competition					H				H				H			
K03.04	predation					H				H				H			
K03.05	antagonism arising from introduction of species					H				H				H			
L	Geological events, natural catastrophes																
L10	other natural catastrophes	L?	L?			L?	L?			L?	L?			L?	L?		
M	Climate change																
M02.01	habitat shifting and alteration	L?	L?			L?	L?			L?	L?			L?	L?		
M02.03	decline or extinction of species	L?	L?			L?	L?			L?	L?			L?	L?		
X	No threats or pressures																
XO	Threats and pressures from outside the EU	M	M			L?	L?			L?	L?			L?	L?		
XE	Threats and pressures from outside the EU	M	M			L?	L?			L?	L?			L?	L?		

Risk magnitude

H High
 M Medium
 L Low



Assessment of the previous evolutions

Bulgarian sector – Risk factors

Code	Description	SCI BG0000154 Ezero Durankulak				SPA BG0002050 Durankulashko ezero				SCI BG0000621 Ezero Shabla - Ezerets				SPA BG0000156 Shablenski ezeren kompleks			
		Negative		Positive		Negative		Positive		Negative		Positive		Negative		Positive	
		Inside	Outside	Inside	Outside	Inside	Outside	Inside	Outside	Inside	Outside	Inside	Outside	Inside	Outside	Inside	Outside
A	Agriculture																
A01	Farming		L					H	H		H			L	M		
A03	mowing / cutting of grassland					H								L			
A04	grazing	M				M								M			
A04.01.02	intensive sheep grazing					L											
A05.01	Animal breeding,		L			H	H							M			
A07	use of biocides, hormones and chemicals					H								L	M		
A08	Fertilisation		L				H							M			
A09	Irrigation					H	H							M	M		
A10	Restructuring agricultural land holding		L														
B	Silviculture, forestry																
B01	forest planting on open ground		M		M												
B01.02	artificial planting on open ground (non-native trees)	L	M	L	M									M			
B02.02	forestry clearance					L								L			
C	Mining, extraction of materials and energy production																
C01.01	Sand and gravel extraction					M								L			
C01.01.02	removal of beach materials													M			
C02	Exploration and extraction of oil and gas														M		
D	Transport and service corridors																
D01.01	paths, tracks, cycling tracks													L			
D01.02	roads, motorways	M									L						
D02.01	electricity and phone lines	L									M						
D02.02	pipe lines					M											
E	Urbanisation, residential and commercial development																
E01	Urbanised areas, housing																
E01.01	continuous urbanisation					M											
E01.02	discontinuous urbanisation	L									M						



Assessment of the previous evolutions

E02.02	industrial facilities					M											
E02.03	other industrial / commercial areas					H	H										
E03	Discharges	M															
E03.01	disposal of household / recreational activity waste	L	M			H				M				H	H		
E03.03	disposal of inert materials									M				M	M		
E03.04	Other discharges					H	H							H	H		
E05	Storage of materials					M											
E06	Other urban/industrial activities	M															
F	Biological resource use other than agriculture & forestry																
F02.01.02	netting					H				H				M			
F02.03	Leisure fishing	L	L	L	L	H											
F02.03.01	bait digging / collection					M								H			
F03.01	Hunting	M	M			H				M	M			M			
F06	Hunting, fishing or collecting activities not referred to above					H				M							
G	Human intrusions and disturbances																
G01	Outdoor sports and leisure activities, recreational activities													M			
G01.03	motorised vehicles																
G01.04.01	mountaineering & rock climbing	L															
G01.08	other outdoor sports and leisure activities	L								M	H						
G02	Sport and leisure structures	L															
G02.05	hippodrome	L															
G02.08	camping and caravans	M	H								H						
G02.10	other sport / leisure complexes									H				M			
G04.01	Military manoeuvres									M	H				H		
G05	Other human intrusions and disturbances					L								M			
G05.01	Trampling, overuse,	L															
H	Pollution																
H05	Soil pollution and solid waste (excluding discharges)					M	H							M	H		
H06.01	Noise nuisance, noise pollution		H														
H07	Other forms of pollution					H											
I	Invasive, other problematic species and																



Assessment of the previous evolutions

	genes																
I01	invasive non-native species	H	H			H	H			H	H			H	H		
I03.01	genetic pollution (animals)					M								H			
J	Natural System modifications																
J01	Fire and fire suppression						M							M	H		
J02.01.01	polderisation					H								M			
J02.03	Canalisation & water deviation					H									H		
J02.05	Modification of hydrographic functioning, general			H								H					
K	Natural biotic and abiotic processes (without catastrophes)																
K01	Abiotic (slow) natural processes																
K01.01	Erosion					M								M			
K02.02	accumulation of organic material													H			
K02.03	eutrophication (natural)													H			
K02.04	acidification (natural)					H											
K03.04	predation					M											
K04	Interspecific floral relations					L											
K05.01	reduced fecundity/ genetic depression in animals					M								M			
K03.01	competition	M	M			M	M			M	M			M	M		
K03.05	antagonism from introduction of new species	M	M			M	M			M	M			M	M		
L	Geological events, natural catastrophes																
L10	other natural catastrophes	L?	L?			M				L?	L?			M			
M	Climate change																
M01	Changes in abiotic conditions																
M02.01	habitat shifting and alteration	L?	L?			L?	L?			L?	L?			L?	L?		
M02.03	decline or extinction of species	L?	L?			L?	L?			L?	L?			L?	L?		
X	No threats or pressures																
XO	Threats and pressures from outside the EU	L	L			L	L			L	L			L	L		
XE	Threats and pressures from outside the EU	L	L			L	L			L	L			L	L		

Risk magnitude

H High **M** Medium **L** Low



EUROPEAN UNION
European Maritime
and Fisheries Fund

Marine spatial plan for the cross-border area Mangalia Shabla



Analysis of the future evolutions



EUROPEAN COMMISSION

Executive Agency for Small and Medium-sized Enterprises (EASME)

Department A - COSME, H2020 SME and EMFF

Unit A3 - EMFF

Call reference No: MARE/2014/22

Project Full Name: Cross border maritime spatial planning in the Black Sea – Romania and Bulgaria (MARSPLAN – BS)

Project No: EASME/EMFF/2014/1.2.1.5/2/SI2.707672 MSP LOT 1 /BLACK SEA/MARSPLAN-BS

European Maritime and Fisheries Fund (EMFF)

Marine spatial plan for the cross-border area Mangalia Shabla

Volume 3

Future situation analysis

DELIVRABLE



Analysis of the future evolutions

Analysis of the future evolutions

The findings of this paper incorporate up to date detailed information based on the analysis of the current situation and previous evolutions.

The study provided forecasts for activities in the marine and coastal area economy. These were made for the next twenty years at an aggregate level and broken down by type of activity. This was done within the context of identifying the major growth areas of the economy over the coming years, enabling the formulation of plans for the use of sea.

It must be stated at the outset that it is rarely the case where forecasts over twenty years are made. However, **for strategic planning purposes**, it is essential that these forecasts are undertaken in order to be able to gauge the broad changes which may occur in the zone ecology/economy and the impact these may generate on the distribution of sea and land uses in the area. It is important that the assumptions underlying the forecasts are regularly monitored and the implications considered in a periodic review of these forecasts.

In order to enable the projections a series of assumptions have to be made:

- labour supply will follow the trends of the actual drivers of the local economy
- salary level and households demands for goods and services could improve slightly over time
- unemployment will remain in the actual trend
- the economic ties with UE, other countries, are broadly stable over time
- the development of marine living resources will depend mainly on human activities and pressures

The forecasts findings are subject to difficulties inherent to the predictions. The first relate to the existence and quality of the data as twenty year forecasts are based on only ten years of data. Another problem is the substantial degree of uncertainty, which surrounds a number of crucial issues, not the least of which is European Union policies.

Any changes to the assumptions, taken singly or on a cumulative basis, will have a major bearing to the long term projections

1. Prospective analysis of the population dynamic

The demographic forecast of the coastal area was performed based on the official estimates of changes in population provided by The National Institute of Statistics in Romania in "Projection of the Romanian population at the horizon of 2025", " Projection of the Romanian population at the horizon of 2050" and demographic projections conducted by The National Statistical Institute in Bulgaria. We used the global demographic projection method based on the average of annual growth and combined with the projections made by the two national statistical institutes. Basically, the population projections of the national statistical institutes in Romania and Bulgaria at county / district level were recalculated at each territorial administrative unit level, given the population change between 2002- 2014 and the share of



Analysis of the future evolutions

the population of each municipality in the total population of each county/district and developing on three scenarios:

- *The baseline variant (1)* - is based on the assumption that the natural and migratory growth will have constant values during the forecast period;
- *The optimistic variant (2)* - which assumes an increase in the natural and migratory growth, the two components which determines the number of population;
- *The pessimistic variant (3)* - which assumes decrease in both natural and migratory growth of the population.

As shown in the following table, Mangalia - Shabla population is expected to decrease by 2050, in all three scenarios of forecast. Compared with number of estimated population in 2015, until 2050, Mangalia Shabla population would decline by about 19% in the medium scenario, 24% in the pessimistic scenario and 17% in the optimistic one. The decrease would affect more the Bulgarian side of the region where the average of this would be about 60%. In the optimistic scenario the Bulgarian population from the area would decrease by 55% and in the pessimistic scenario, the decrease would be around 67%. In Romanian costal area, population would decrease by about 14% until 2050 in the medium variant, 13% in the optimistic scenario and 20% in the pessimistic one.

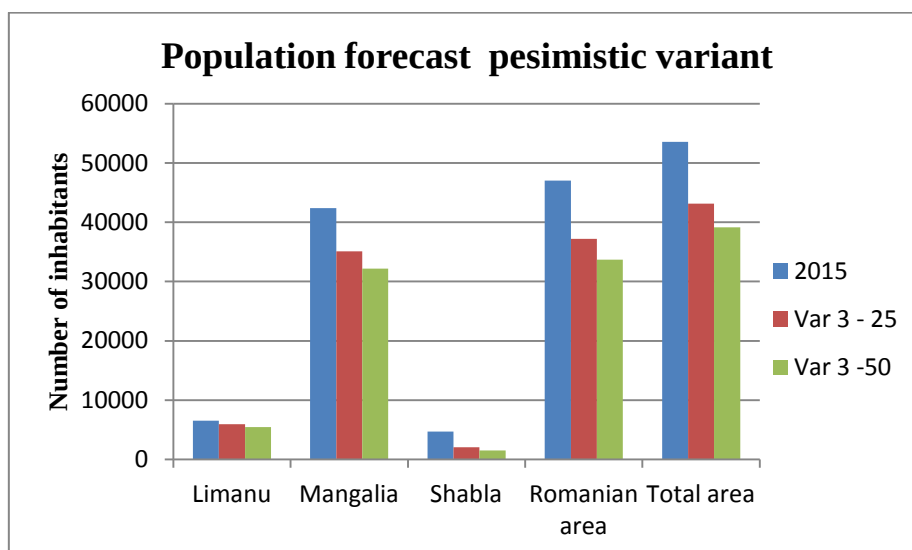
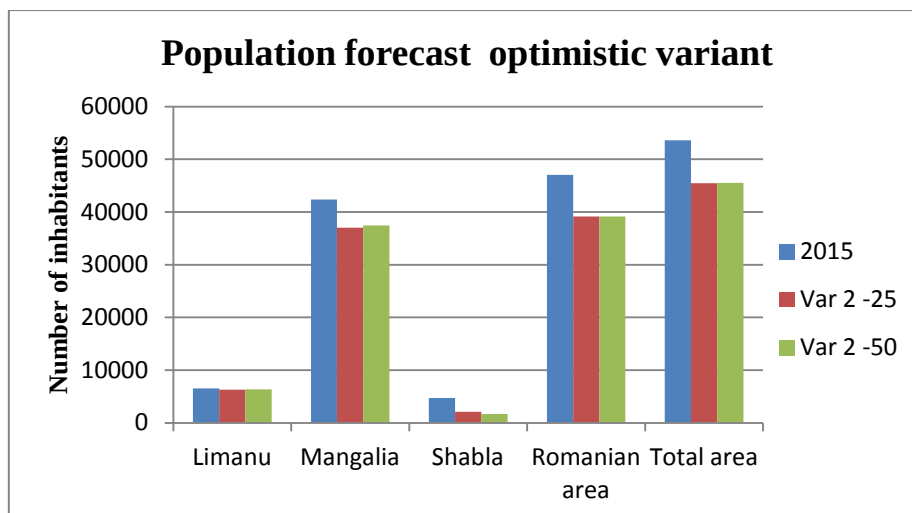
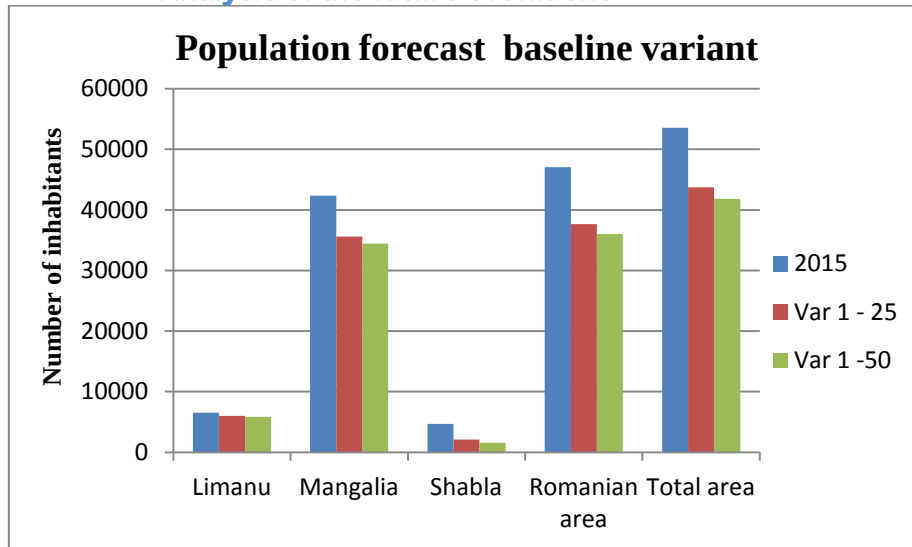
Projection of the Mangalia - Shabla area population 2015 -2025-2050

NUTS 5	Population 2015	Horizon 2025			Horizon 2050			Population dynamic 2015-2050		
		Variants			Variants			Variants		
		1	2	3	1	2	3	1	2	3
Limanu	6526	6031	6278	5952	5835	6349	5456	-10,6	-8,8	-16,4
Mangalia	42372	35591	37049	35124	34433	37467	32197	-18,7	-17,1	-24,0
Shabla	4684	2082	2114	2067	1577	1697	1517	-66,3	-55,9	-67,6
Romanian area	47056	37673	39163	37191	36010	39164	33714	-85,1	-73,0	-91,6
Total area	53582	43704	45441	43143	41845	45513	39170	-95,7	-81,8	-108,0

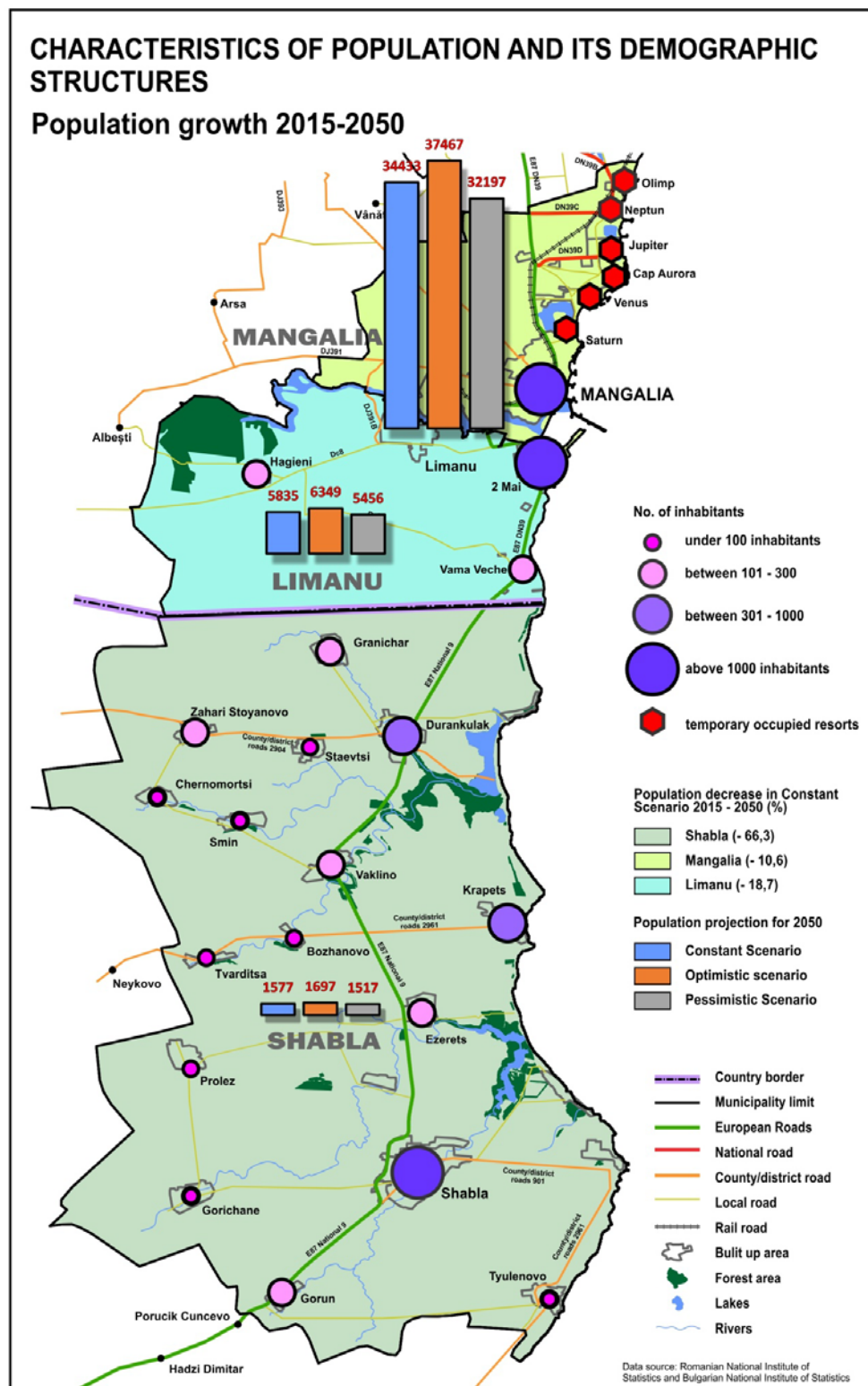
The most common approach to population projections assumes that future events will be similar to past events. The Baseline and optimistic variants were considered as the best choice scenarios where the optimistic variant was considered as the best choice scenario. The third variant was considered less likely to occur.



Analysis of the future evolutions



Analysis of the future evolutions





2. Prospective analysis of the economic activities

At the macroeconomic level, for the period 2018-2020, it is estimated that the Romanian economy will grow more sustainably, with an average annual rate of 5.6%. Internal demand (consumption and investment) will continue to be the engine of growth. In the medium term economic growth will create the conditions for improving employment, especially as regards the number of employees. In 2016, the increase in goods exports compared to 2015 was 5.1%, while imports increased by 7.0%. Under these circumstances, the FOB-CIF trade deficit increased by 19% compared to 2015. Overall, the forecast for 2017 shows that the trade deficit will have a GDP share of 6.4%. (*Convergence Program of Romania, 2017*)

Based on the data from the existing situation, the Mangalia-Shabla area has a tendency to diversify the economic activities in Mangalia, Limanu and Shabla. In Mangalia and Shabla there are higher values of economic indicators, but the structure of employees remains the same or in decline.

The factors contributing and supporting the economic development of Mangalia in the future are: naval, commercial, tourist, service (transport, storage, trade), cultural activities, and fisheries. The existing tourism resources, the spa resorts in the area, the presence of the tourist resorts in the area, contribute to the development of tourist services and to the increase of the number of tourists in the territory. The industrial area of Mangalia is great, being beneficial for the development of productive activities. By developing this industrial area, it is envisaged the expansion of the shipyard in the western part of the city, in such a way that it does not affect the housing construction in the area. Mangalia Commercial Port is of great importance in the development of the economy of the study area, being an important link with the major international economic centres.

Fisheries and aquaculture

Sea fishing is an important economic sector in the countries of the Black Sea region, but in Bulgaria and Romania fishing fleets are relatively small in size, with no remarkable development prospects. However, the area is rich in fish resources, with a large variety of species, especially of small size.

The fishing activities forecasts are based on the landings reported in the last period and the factors that affected the fish stock in the area, like catches by other Black Sea countries and fish reproduction and mortality. The fishing activities are observed by the landings quantities of the most targeted species, recorded in the fishing ports of the two countries.

The stock of sprat was exploited unsustainably during 2010, 2011 and 2012 (but not during 2013) and unevenly in the two countries. The exploitation of the fish resources is limited to the shelf area (the water above 100-150 m), that is nearly and beyond the territorial waters limit.

The biomass estimations for the sprat stock in cross-border marine area are presented in the following table; the catches reported in the two countries are small fractions of the total amount assessed.

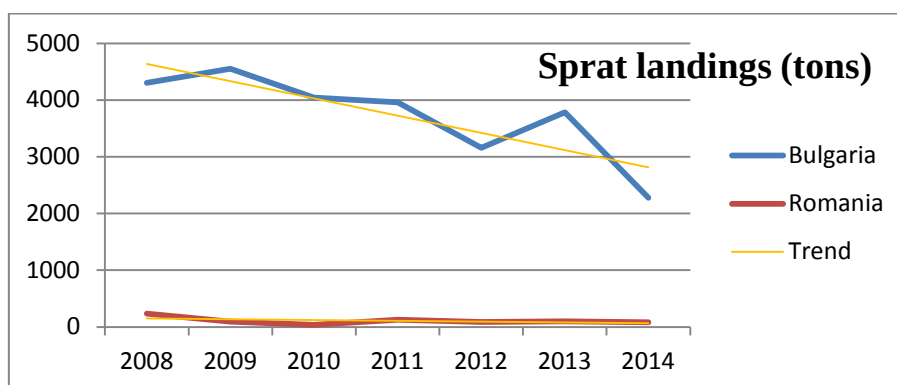


Analysis of the future evolutions

Sprat	2008	2009	2010	2011	2012	2013
Bulgaria	32718.3	41761.4	75080.2	48201.7	-	-
Romania	60000	60000	59600	-	68886	56428

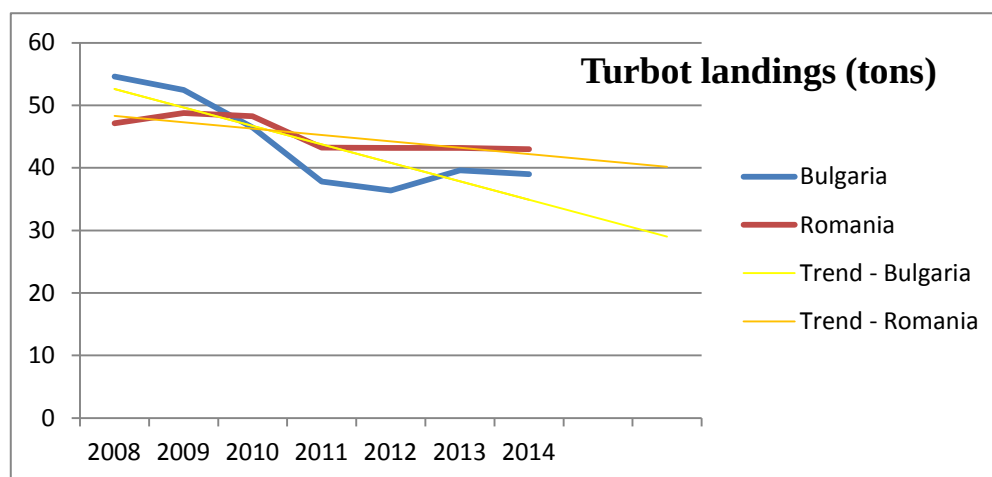
Source: STECF - Black Sea assessments

The trend of sprat landings are generally decreasing in the two countries, the catches in Romanian marine area are extremely low, compared to the Bulgarian part of the sea.



For a period of 60 years (from 1950 to 2012) the annual catches of turbot dropped from an average of about 4000 t to an average of about 2000 t during the 1990s and 2000s. Except for a slight increase in catch in 2012, the annual catches have declined steadily since 2007.

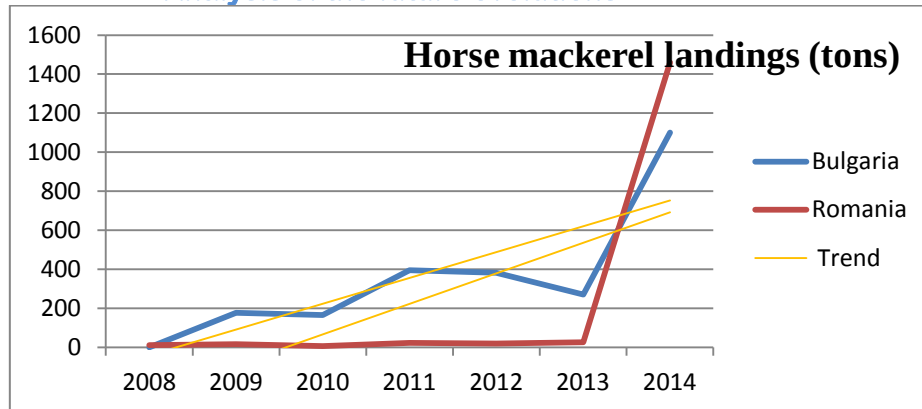
The turbot catches in the two countries are equivalent; the trend of landings is constantly declining, as a result of the poverty of the fishing areas and the competition of other countries in fishing this fish variety.



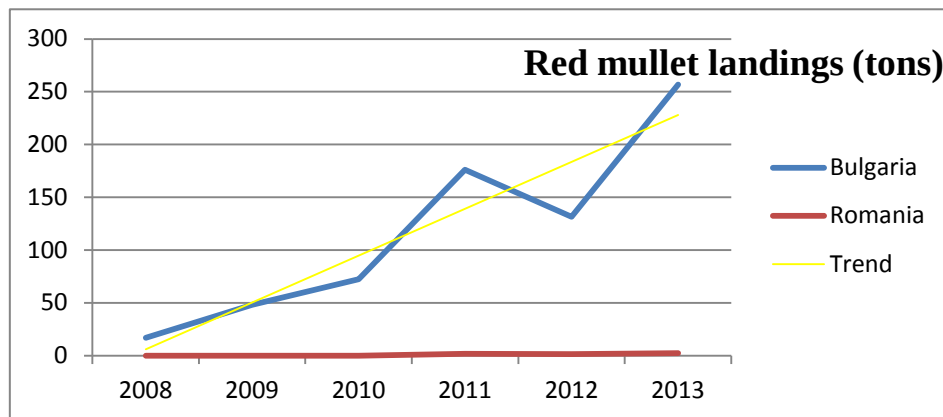
The horse mackerel is another productive fish stock exploited successfully in the cross-border area. During the period assessed (2004 to 2014) annual catches of horse mackerel increased markedly.



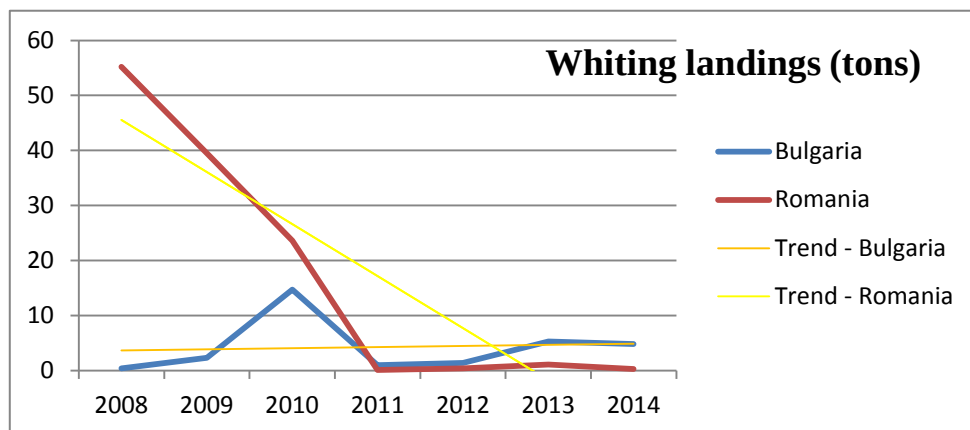
Analysis of the future evolutions



The exploitation of red mullet was productive in the Bulgaria where landings over 250 t/year were reported. However, the stock assessment for red mullet considers that the stock was exploited unsustainably in recent years.



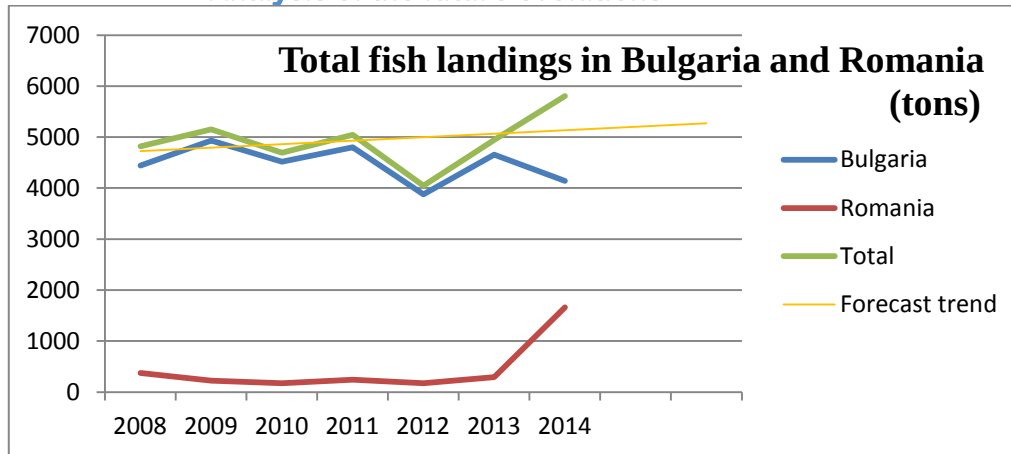
The landings of whiting dropped dramatically in the Romanian waters, while in Bulgaria the catches remain at a low level but are slowly increasing.



In general the production of the fisheries, reflected in the total landings reported yearly in both countries, is slightly increasing and will still be at a low level in the next years.



Analysis of the future evolutions



The roots of this trend have been evaluated by various authors and are: fishing pressure; dystrophication by rivers inflow, degradation of the ecosystem, destruction at the lower trophic levels of the ecosystem and internal causes of the fishing industry.

Aquaculture is a field of development prospects, but growth of the activity is slower. There is a continuing economic downturn in the shipbuilding and shipbuilding industry, which is manifested by a rather low investment and declining labour force.

In Shabla, the process of diversification of economic activity is making slight progress by creating new forms of tourism and also contributing to the exploitation of renewable resources (wind, geothermal). For Shabla, wind, geothermal and tourism resources present strengths in local economic development.

Agriculture

Due to the fertility of agricultural lands, agriculture represents an activity supporting the current and future economic process, making progress in the economy of Limanu and Shabla. Agriculture is the most important sector of the local economy in Shabla. It is a major source of income and jobs for the population and will continue to play an important role in the development of the region in the future.

In Shabla, the structure of employees follows a slight downward trend, but in agriculture, industrial production and transport services there are a slight increase in the number of employees. The predominant activity in the locality is agriculture, followed by tourism and trade. There is a tendency to increase the number of active enterprises at local level.

In Shabla, the foreseen development of the agricultural sector is based on sustainable, highly efficient agricultural activity. (*Development Plan for Shabla Municipality 2014-2020, Implementation plan, 2013*)

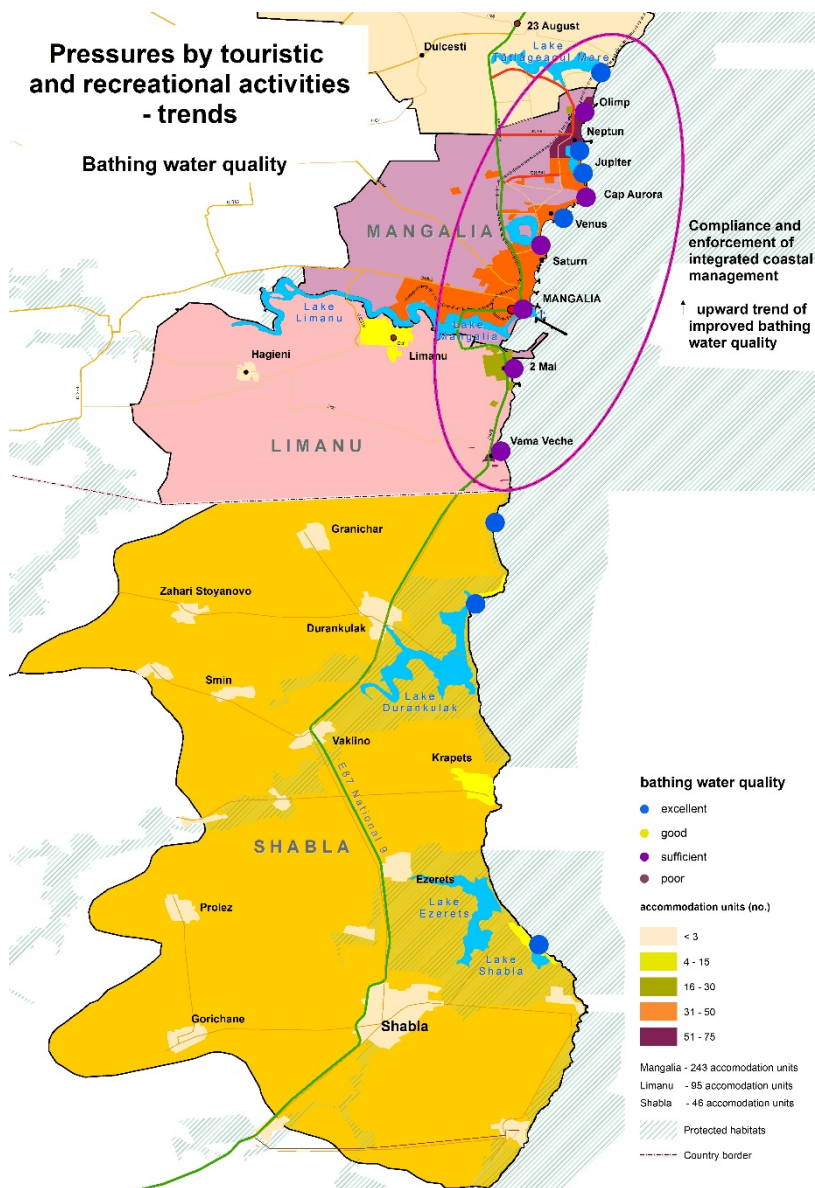
Services

The service sector, through transport, trade and tourism, is a dynamic segment. Many companies in Mangalia are active in the service sector, along with a significant number of employees.

Tourism and transport are the services that most define the economic profile and identity of the Mangalia-Shabla area. The performance of shipping is recorded in the transport sub-sector. The prospects for the development of the port network are ambitious, relying on increasing economic performance and sector development. This approach will have an impact on the development of multi-modal transport infrastructure, being supported by various financial programs.

Analysis of the future evolutions

To support touristic and recreational activities, Mangalia-Shabla coastline has been substantially transformed, especially in the Romanian part of the studied area.



The current situation analysis indicates an uptrend of tourism clustering as the area becomes more and accessible by terrestrial roads.

On the other hand, European programmes like the Blue Flag will continue to improve local conditions, particularly the bathing water quality, considering that tourism can be designed to improve the lives of tourists and those who are part of the tourism industry, conserve natural resources and protect the environment.

Consequently, it is expected that Limanu and Mangalia will follow an upward trend of improved bathing water quality, as result of complying with and enforcing an integrated coastal management.



Analysis of the future evolutions

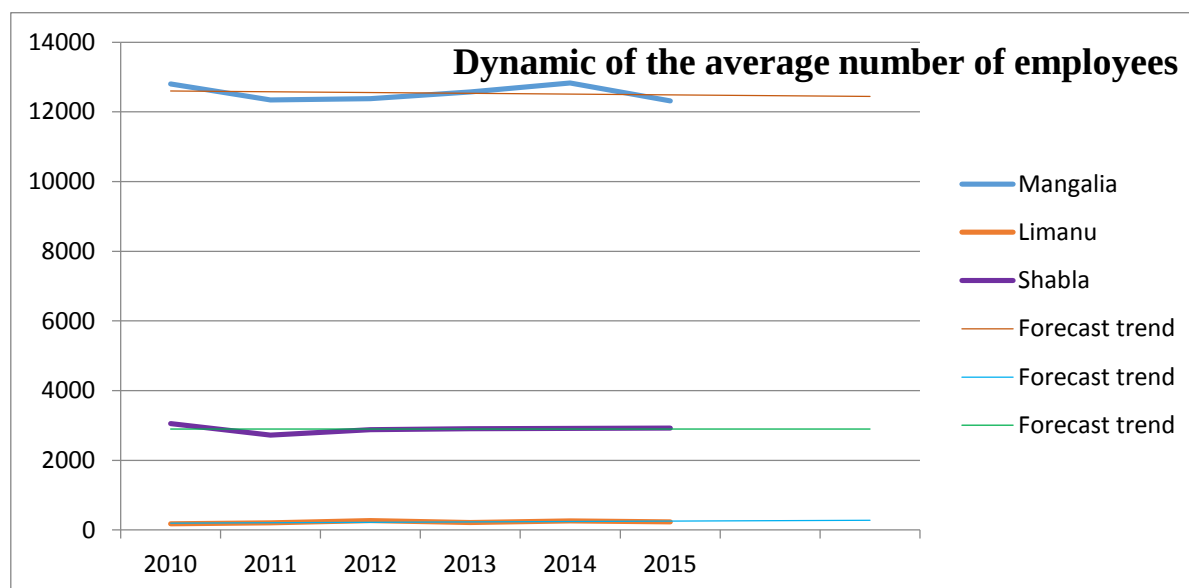
Descriptors	Indicators	Time series		Trend (next 10 years)	Target value (year, source)
		2014	Present value (year, source)		
Tourism pressures	Tourism overcrowding (no. tourists/sqm. of beach)	2014	0,4 (source: NSI Romania, NSI Bulgaria)	↑	No data
	Bathing water quality	2014	Good or sufficient water quality (source: European Environment Agency, 2015)	↑	Excellent/ Blue Flag Beach (source: European Environment Agency, 2015; the Blue Flag programme for beaches and marinas, 2015)

The seasonal nature of tourism and agriculture leads to the migration of the area's workforce to more economically developed localities. In the territory, there is still a downward trend in the structure of employees.

The general trend of economic growth will be manifested by the establishment of business infrastructure to support the local economic environment, through the creation of industrial parks, logistic and technological parks, business incubators, research centres and other associative forms.

The "Blue Economy" is an important opportunity to strengthen economic growth in the Black Sea area and also to create new jobs in the economy. The need for strong and dynamic regional cooperation in various areas covered by Integrated Maritime Policy is supported. They cover components of coastal and maritime tourism that extend into development through fisheries management activities. It also aims to protect the marine environment to safe navigation, offshore energy, shipping and maritime security.

In Mangalia there is a decrease in the number of employees, a trend that will continue in the following years. In Limanu there are increases in the number of employees, the tendency being encountered in tourist resorts 2 Mai and Vama Veche. Although with a seasonal nature of the workforce, most of the tourist resorts in the study area record an upward trend of the employees' structure in the summer season.



In the Romanian area, the estimated oil and gas resources at the Domino-1 probe in the Neptun perimeter are the equivalent of Romania's production for 4-8 years (about 42 to 84 billion cubic meters). Recently, a new field has been discovered, with an estimated volume of



Analysis of the future evolutions

nearly 30 billion cubic meters. These resources could provide a constant number of employees from the local area in this industry.

The forecasted trends in employment in the local economy are persistent for the next years, showing slight oscillations around constant values.

In Romania, the real GDP growth is projected to remain strong, on the back of fiscal easing and wage increases. Unemployment fell significantly in 2016 and is expected to remain at a low level in 2017 and 2018. With a positive output gap, inflation is set to pick up. The budget deficit is projected to continue to grow due to tax cuts and higher public spending. The draft unified wage law poses a significant downward risk to the fiscal forecast. (*Economic forecast for Romania, European Commission, 2017*).

In Bulgaria, the real GDP is expected to grow by 2.9% in 2017 and is forecast to marginally decline in 2018. Domestic demand continues to be the main growth driver over the forecast horizon. Inflation is projected to turn positive in 2017. Unemployment is expected to continue declining in the coming years. A balanced budget was achieved in 2016, mainly due to higher tax revenues and reduced public investment, but a deficit of 0.4% of GDP is forecast in 2017. Risks to growth outlook are broadly balanced. (*Economic forecast for Bulgaria, European Commission, 2017*)

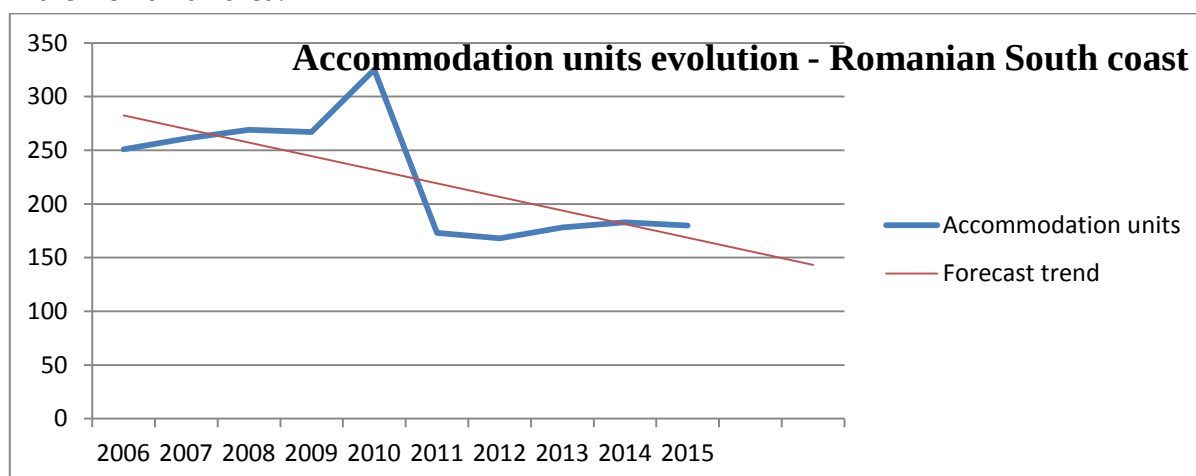
3. Prospective analysis of the urban and infrastructure development

Built up areas

The surfaces of built up areas in the three municipalities will not increase significantly in the next decades, due to the number of accommodation places existent in the area, which is more than satisfactory for the tourist demand.

The population decrease in the next years will also lessen the effort of building new housing estates, while concentrating on the upgrading the existing dwelling stock.

The accommodation units' evolution will be decreasing in the next years; the former trends of creating accommodation will not be attain in the future based on the oversupply of the sector in the Romanian area.

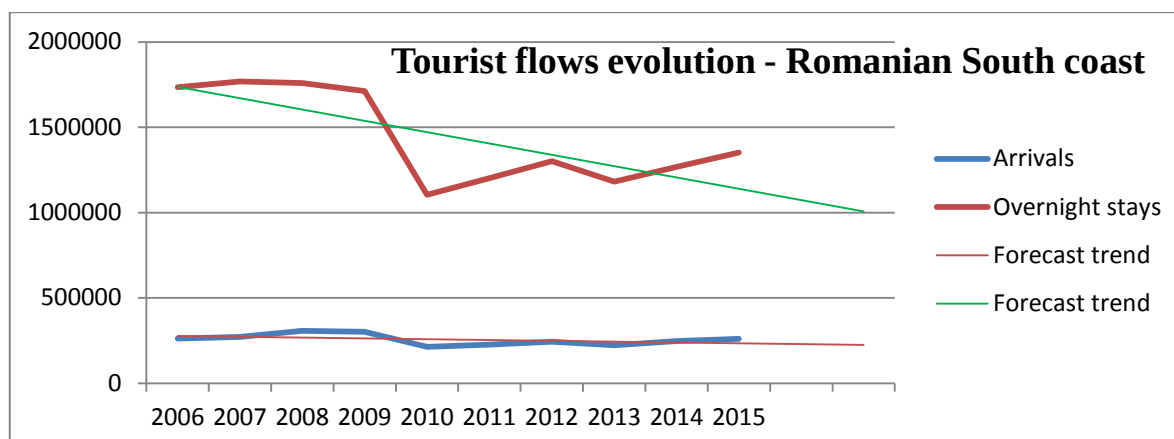


The trend of tourist flows in the Romanian part of plan area will not sustain the construction of new accommodation units, but the upgrading the existing ones, according to new quality standards. The competition of the northern Romanian seashore area, attracting more tourist

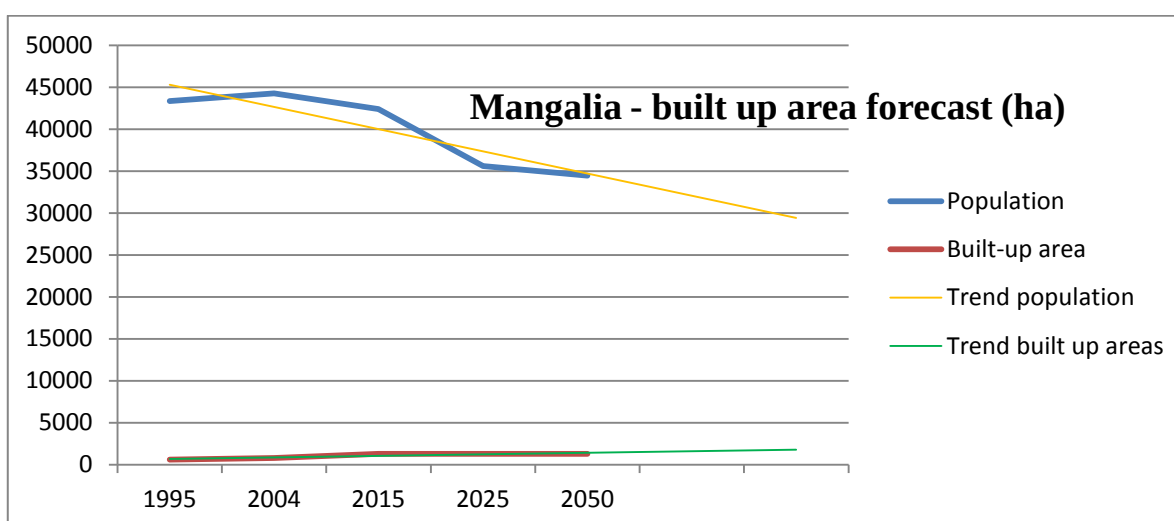


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flows due to its easier access, will keep the southern part of the coast at a constant level of tourists' arrivals.



Based on these assumptions, one can foresee that the built up area afferent to the tourist accommodation in the Romanian part of plan area (Mangalia, Limanu) will remain constant or will change, when new demands for urban developments will appear.



In the Bulgarian part of the plan area the need for real estate could be relative higher due to its lack of development, which will attract investments at an unimportant scale. The increase of built up area in Shabla municipality is predictable in the chief centre and in the localities related to the main roads, especially in the housing sector. The accommodation activities will not affect the shoreline area, which is in a large extent a protected area.

Therefore the influence on water quality of waterfront settlements by pollution from zonal (non-point) discharge sources will remain constant for the next years, if no measures to diminish it will be taken. The sealed surfaces of the built up areas (roads, pavements, parking lots, roofs) should be provided with drainage systems which will discharge only clean water into the sea.

The other main influence on the sea of the built up areas, the reduction/destruction of the coastal habitats, is likely to stop at the actual level, if no other building activities will take place on the shoreline.



Analysis of the future evolutions

Transport, energy, water and waste management

Electricity production and transport; telecommunication

The power supply infrastructure is properly developed with the needs of Mangalia-Shabla area.

In the coming years, it will expand concomitantly with the growth of socio-economic activities and with the increasing number of consumers.

No power plants using fossil fuels are foreseen to be constructed in the area, but the tendency is to increase the electricity production from renewable sources in the Mangalia-Shabla area by building photovoltaic plants, which will capitalise on the high solar radiation potential.

Regarding the use of the existing wind potential, the studied area allows wind farms location within certain limits, taking into account the average wind speed in the Mangalia coastal area of 8 m/s to 50 m above the ground and 4,5 m/s on the coastline at the sea level, as well as the type of existing economic activities (tourism and port infrastructure).

On the other hand, in the Shabla area, an exhaustion of viable locations for onshore wind projects will eventually occur, so in both areas, Mangalia and Shabla, in the next years the attention will be directed to the offshore area, which in this case is unused, the offshore average wind speed being over 9 m/s. Offshore wind farms development must take into account the restrictions in relation to certain existing activities as tourism, shipping routes, military use of offshore areas, oil and gas exploration, etc. All such actions must be preceded by development of location studies and development of rules and regulations that limit the negative impact of these structures on the environment.

The future telecommunication infrastructure, which has had a dynamic evolution in recent years, will be improved continuously, but no significant expansions of the telecommunication main routes will be developed and having a major impact on the environment.

Water management

Hydrographical basins management

The coastline was heavily modified due to the concentration of coastal economic activities, the port, numerous tourist resorts and human interventions in coastal dynamics (the creation of breakwaters, navigation, locks, heavy coastal protection works). Their impact is manifested both locally and on a large scale by altering the natural alluvial circulation along the coast and the longitudinal alluvial transfer block.

The Mangalia dykes, even if they are not coastal protection structures, have a significant impact on coastal dynamics, for example the widening of the 2 May beach, thus increasing the recreational impact of the locality.

Coastal protection structures are major erosion eradication interventions (the most vulnerable are Olimp-Venus, Saturn - Mangalia, Shabla, Kosmos camping, Krapetz village, Dobrudzha camping) while improving the environment for the use of the tourist attractions of the area (Beaches frequented by tourists). These structures, where they exist, are in a precarious,



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inefficient state, presenting health and safety risks. On the environment and on the population, the risks are related to the decrease in water quality near the shore (coastal protection is too close to the shore), the deterioration of infrastructures and properties due to landslides and erosion caused by wind and wave effects.

The spatial effects on the site consist of narrowing beaches and time-lagging of coastal protection structures. An accelerated erosion of the land set up after the failure of protective structures is estimated in the future, and in areas without coastal protection the erosion phenomenon continues its current trends.

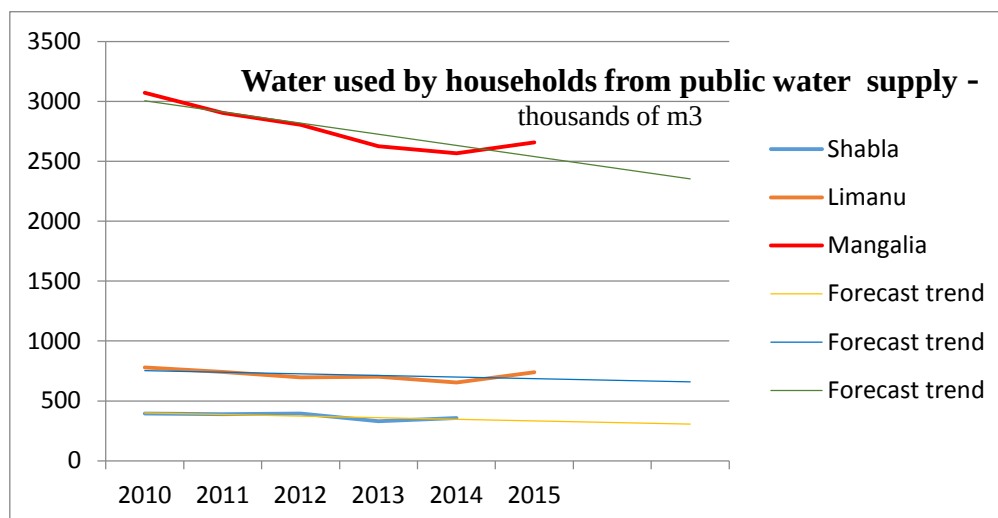
In the future development of the coastal area, in sectors protected by coastal protection structures, where there are important socio-economic assets, it is appropriate to maintain the "coastline" strategy, where the risk of erosion is managed by keeping current means of protection, by rebuilding them or by making new works. For coastal sectors where there are few socio-economic assets at risk, the "no intervention" strategy is considered as an opt-in, where there is no other intervention in the current protection structures and the shore is allowed to develop naturally. Without any management for the future, however, the situation is high risk of flooding and coastal erosion. For sectors where there is no coastal protection, the shore is left to evolve naturally.

Proposals for intervention in coastal defence should be supported by field studies and mathematical modelling, which analyse their effect on sediment migration and deposition along the coast.

Water supply infrastructure and wastewater treatment stations

The water supply in the Romanian area is carried out in all localities, having water sources with the quality which fall into the limits stipulated by the specific legislation. The supplied quantities are dropping in the last years due to the modernisation of the networks and the reduced tourist consumption.

In the Bulgarian area, the potential of water sources ensures the needs of the city and the localities for the coming years. Water supplies are sufficient, as local sources considerably exceed the household consumption needs of the population as well as the tourist capacity, but the large depreciation of the drinking water distribution network produces large water losses and limits the development of services.





Analysis of the future evolutions

Source of data: NISI

The water quality of the sources is being depreciated as a result of the uncontrolled disposal of household waste and manure, the uncontrolled use of chemical fertilizers (Shabla area) and the lack or insufficient development of sewage infrastructure for domestic sewage (Mangalia and Shabla).

Sewage networks in all the localities of the area are underdeveloped (Mangalia and the component localities, Shabla) or missing (all localities of Shabla municipality), and the sewage treatment is insufficiently achieved (exceeding the quality indicators in Mangalia, exceeding the capacity Purification plant in Shabla).

The spatial effects of the lack or insufficiency of water supply and sewerage facilities consist of negative impacts on water, soil, subsoil, socio-economic environment, biodiversity and landscape.

For the future development of the coastal area, it is imperative to reduce the impact on the environment and the population through rehabilitation, extension and establishment of centralized water supply and sewerage systems.

The negative elements of the water supply and sewage facilities are mainly manifested in the phases of supply (network loses) and wastewater transport and treatment with potential environmental effects. The lack of wastewater networks and treatment capacity are the most important problems of the sector affecting the marine space. A large number of the households are transporting periodically wastewater from independent storage tanks to WWTPs by trucks.

The households using own/independent treatment facilities (septic tanks, cess pools etc.) is not calculated as connected to public sewerage.

Waste management

In the coastal area, the population is steadily decreasing, according to the evolution of the last years and according to the census of 2011.

Thus, starting from a population of 53582 in 2015 and considering a decrease of 0.9 % per annum by 2025 (baseline variant) and 0.5% per annum by 2050, the following data is available:

Forecast of the evolution of the plan area population, Year 2015 - 2025 - 2050

Area	2015	2025			2050			population dynamic 2015-2050		
		Variant			Variant			Variant		
		1	2	3	1	2	3	1	2	3
Limanu	6526	6031	6278	5952	5835	6349	5456	-10,6	-8,8	-16,4
Mangalia	42372	35591	37049	35124	34433	37467	32197	-18,7	-17,1	-24,0
Shabla	4684	2082	2114	2067	1577	1697	1517	- 66,3	-55,9	-19,2
Romanian area	47056	37673	39163	37191	36010	39164	33714	- 14,6	-12,9	-91,6
Total area	53582	43704	45441	43143	41845	45513	39170	-31,8	-27,3	-36,0

Variant: 1 - Base line, 2 - Medium, 3- Pessimistic

In order to achieve a more detailed prognosis of waste generation a separation was made on inhabited environments depending on the types of localities. These are as follows: the urban



Analysis of the future evolutions

area represents the urban localities with a population of less than 50,000, and the rural area represents all the rural localities (villages and communes).

Forecast of the plan area population by environment

	2015	2025	2050
Area		Variant 1	Variant 1
Mangalia	42372	35591	34433
Urban	42372	35591	34433
Limanu	6526	6031	5835
Shabla	4684	2082	1577
Rural	11210	8113	7412

According to the official data, the average municipal waste generation index (calculated according to the number of inhabitants in the urban and rural areas, respectively by the indigenous waste generation indices) had, during 1995 - 2000, an average value of 293 kg / inhabitant/year, respectively 0.80 kg / inhabitant/ day (compared to this index the forecasts in the plan area were approx. 20% higher, due to the tourism and the construction activities).

For the forecast we have considered the following indices:

Waste/pers/year	(To)
Waste from municipal services	0,10
Construction and demolition waste	0,12
Total generated municipal waste/pers/year	0,532
Household waste collected	0,180
Total collected municipal waste	0,524

Waste generated forecast

- quantities of household waste /year estimated for 2025-50:

- 210 kg / inhabitant in urban areas,
- 150 kg / inhabitant in rural areas;
- 180 kg / inhabitant/year

- quantities of municipal waste /year estimated:

- 346 kg / inhabitant in urban areas,
- 186 kg / inhabitant in rural areas;
- 532 kg / inhabitant/year

The waste generation forecast will contain the following groups of waste:

- 1. Municipal waste, (streets, squares, gardens, parks and green spaces);
- 2. Household waste;
- 3. Construction and demolition waste.

Starting from 2015 data, compared with 2025, an average increase of 0.8% per year of municipal and selectable waste generation was established.

For the amount of construction and household waste, an average increase of 0.8% per year in terms of generation was also established.

Waste collection forecast

Starting from the estimated waste quantities to be generated and taking into account the established targets for the extension of the collection system and the implementation of the

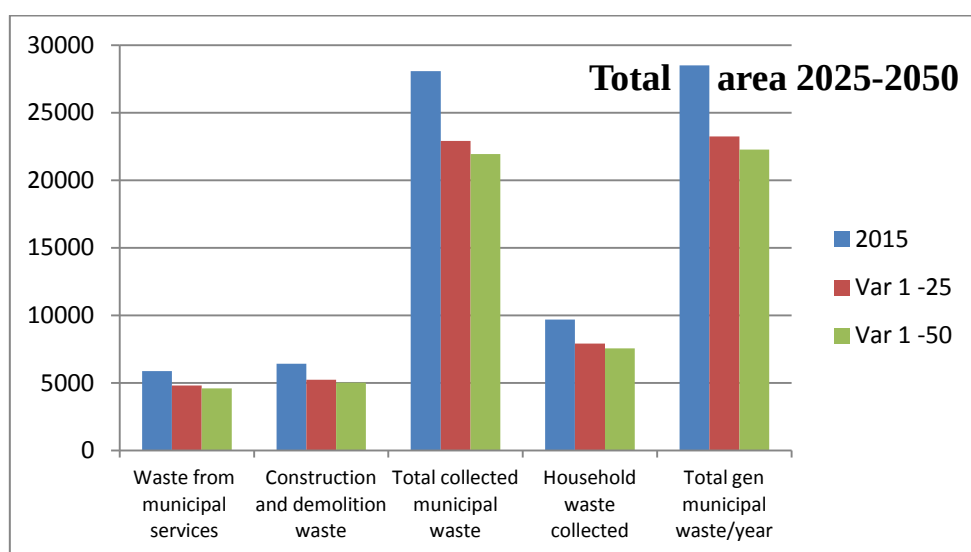


Analysis of the future evolutions

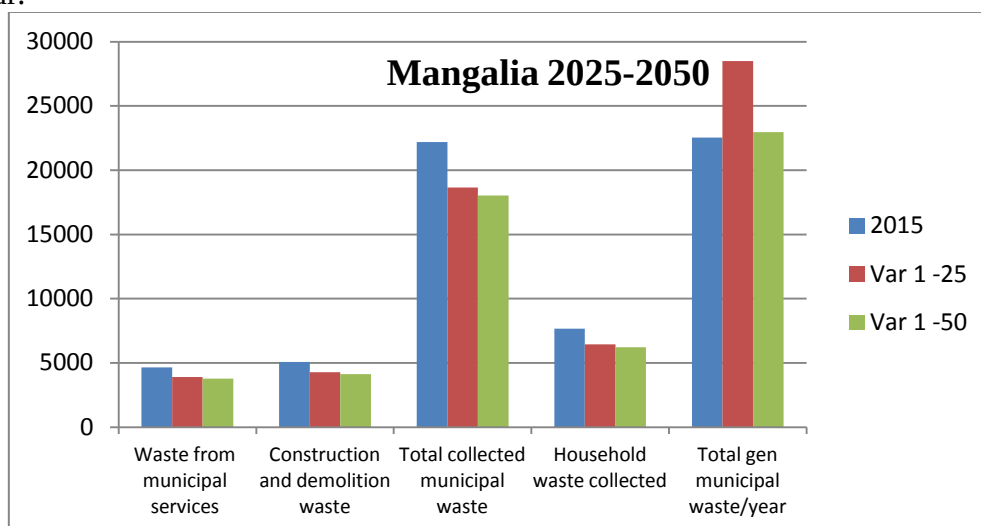
selective collection, the quantities of waste to be collected and the quantities of waste separately collected were estimated. The following hypotheses on the annual evolution of collection and implementation of selective collection were used to make estimates.

For the urban and rural areas is nearly 90%, which is expected to remain constant until 2025, after which it will increase by 2% per year until 2050, when it will reach a 100% collection. From the point of view of the population from which the waste is collected - a current regional coefficient of 70% - was considered and a growth rate of 0.2 was forecast by 2025, after which a 4 % when it reaches 100%.

The forecast of municipal waste generation and collection on the type of waste is presented in the following charts:

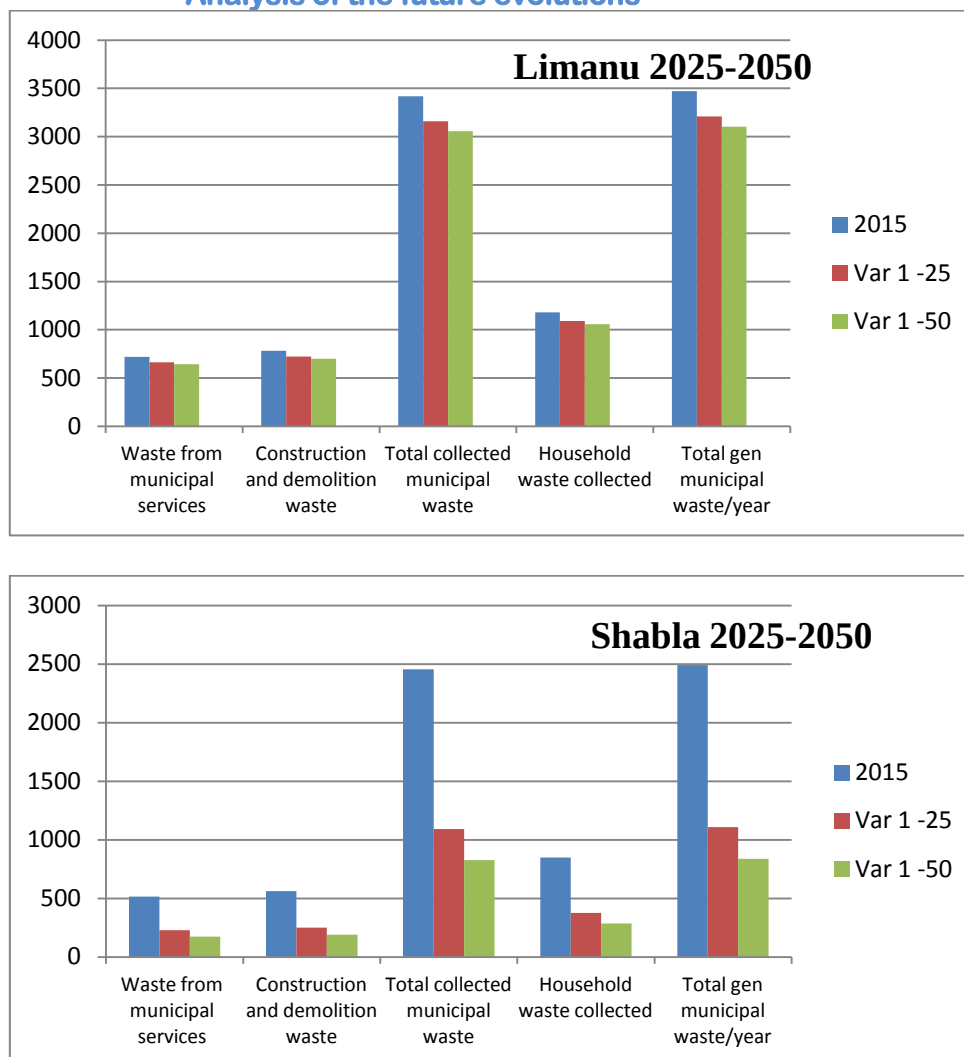


The total amount of generated waste is foreseen to drop in the plan area, in relation with the decrease of resident population. The amount of waste generated by tourism and other activities will be probably constant if other regulations and waste management methods will not occur.





Analysis of the future evolutions



This forecast is a broad outline of the evolution of waste management for the next years, relying on existing data and knowledge on municipal waste generation and collection systems. With the development of new systems and methods of waste selection, recycling and reuse, new data and details can be added.

4. Biodiversity - prospective analysis

The Convention on the Protection of the Black Sea against Pollution in the Strategic Action Plan for the Rehabilitation and Protection of the Black Sea has set as a **strategic objective** the restoration of environmental conditions to the state observed in 1960. The natural process of recovery from the Black Sea biodiversity requires a long period of time and the application of measures for the conservation and sustainable development set out in the *Strategic Action Plan of the Black Sea*.

Some of the important factors which have negatively affected species diversity, habitats and biological resources are **eutrophication**, **pollution** and **irresponsible fishing**. Any other additional action to which the Black Sea environment is subject, may influence the evolution towards recovery and restoration of environmental conditions to the state observed in year 1960, considered as **the reference period**.



Analysis of the future evolutions

Coastal processes are monitored and following the geomorphological dynamics assessment, they are generally influenced by the special conditions of those years

- *the floods* lead to rising sea levels and flooding of the beaches and,
- *the drought* leads to lower sea level and coastline advancement.

If one of the above phenomena is present, coastal processes on various sectors of the beach such as erosion / dynamic equilibrium / accretion will appear.

In the study area, the erosion phenomenon is manifested with low intensity, being located in the Olimp-Venus and Saturn-Mangalia areas, Krapets locality, Cape Shabla and, Kosmos and Dobrudzha campsite area. Also, the accumulation phenomena are characteristic of 2 Mai area. In the evolution of the shoreline, the erosion processes pose risks to inhabited coastal areas or where there are economic units for which the existing coastal protection structures must be maintained and built for others Bulgarian coast, less urbanized, retains the natural character being recommended preserving its evolution in this sense.

Starting from 2014, the assessment of the profile of the Romanian beaches is monitored seasonally, in the protective dams' area, starting from baseline values.

The sea level, (one of the main indicators of the status coastal zone), has the annual average in 2014 characterized by a constant positive trend than the annual average of the 1933-2013 period.

The temperature has a slightly increase trend in the surface layer with about 0.02 ° C/year, as found by studies for the period 1959-2015.

Marine ecosystem status

The phytoplankton (status indicator of eutrophication) is characterized by seasonal variability and new anthropogenic pressures. In the summer of 2015, on the Romanian shore it was a larger development of the phytoplankton community compared to last year, 141 species were identified in relation to 132 species in 2014, varieties and forms in the composition of the phytoplankton and the greatest diversity being found in shallow coastal and marine waters compared to other years.

Thus, the coastal waters fall into the category of *Poor-Moderate* for the summer of year 2015, compared 2011-2014 when it was Moderate-Good category, an analysis performed with the *Integrated Biological Index, IBI*.

This confirms the unstable nature of the ecological status of the coastal ecosystem recorded in recent years, subjected to anthropogenic pressures and constantly changing Romanian seaside.

The algal blooms (eutrophication impact indicator on the marine environment) show a downward trend, both in number of phenomenon as well as the number of species thriving.

However, every year, it becomes apparent the presence of macroalgal deposits (macrophytes) on the shore, a disliked phenomenon for the tourist emerged as a result of the production of waves, currents and existing summer storms.

In 2015 from the point of view of the qualitative and quantitative composition **the zooplankton** is characterized by higher than average values between 2011-2014 (considered the poorest in the last 10 years), mean value close to the period 2009-2010. Regarding to the number of species it is found that in 2015 it is better, but its observed that the general trend is still decreasing compared to the period 2007-2012.

Phitobenthos

Cystoseira barbata, key species for aquatic ecosystem, shelter for various fish larvae, juveniles, feeding and breeding place for various species, has been identified along the shore of Mangalia-Vama Veche, Jupiter-Saturn and Mangalia (depth between 1 and 3 m) with the highest development in marine reserve Vama Veche-2 Mai, observing a regeneration process.



Analysis of the future evolutions

This process is influenced by human activities (construction of dams, the excavations at the port) which lead to the occurrence of the turbidity phenomenon that disturbs the biological processes of this perennial species. In the Mangalia area, the presence of three *Zostera noltei* meadows indicates a good ecological status.

Compared to the previous years was found that an improvement was made, continuing the process of restoration, for both species included in the red list as endangered *Cystoseira barbata* and *Zostera noltei*.

From 2010, it is found that other extremely rare species of red algae, *Lomentaria clavellosa* (at 2 Mai) and *Cocotylus truncates*, have appeared indicating a light regeneration of the benthic macroflora in terms of qualitative point of view.

The zoobenthos, (eutrophication status indicator) continues to show a positive trend of increased biodiversity on the species diversity. Qualitative assessment of the monitored areas leads to the recording of a 53 macrozoobenthic species in 2010 at 86 species in 2015, with the same characteristics in previous years. Recovery of benthic communities takes place within a larger environmental period with improved conditions, due to the fact that species with a low degree of tolerance, which recover harder when pressures of natural and/or anthropogenic are higher.

Marine biodiversity indicators

Living marine resources of the area suffered over the past 50 years major changes in the structure of qualitative and quantitative measure, but also in behaviour as a result of anthropogenic interventions, direct - fishing pressure - and indirect – the environmental deterioration, (especially in the western part of the sea, where one can find the main sector of reproduction and growth). Some species were strongly influenced so only representatives of zoological species have remained.

In the 60s-80s, the Russian experts show the presence of 166 species of marine fish - 111 species of Atlantic origin, 29 ponticocaspic species, 6 acclimated species, 9 endemic species and 23 local species.

Now it has been found the presence of 185 species of marine fish, of which 75 (40.54%) are the species of commercial interest.

The recovery trends of the marine ecosystem in the context of a algal blooms reduction since 1990 have signalled in the southern part of the Romanian seaside the isolated recurrence of rare species (mackerel) and increasing the number of pelagic and bottom species located on the coastline.

Status of fish stock

As the main feature of the sector in the Romanian area is the occurrence of a large number of species (more than 50 especially small species). Valuable species (shark, zargan, chefal and lufar) still have low presence although their trend is to restore their condition is critical.

The evolution of fish stocks, invertebrates and aquatic plants will be managed and harvested in a sustainable development, legally, to avoiding overfishing and the recovery of threatened species such that vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.

Regarding to the mariculture we can say that it shows a positive trend since 2011. There is an increase in the mussel production and attempts to acclimate of a new species, the Japanese oyster, *Crassostrea gigas*. The presence of marine fish farms is also signalled. The impact of mariculture on the marine and coastal environment is negligible.



Analysis of the future evolutions

Invasive species

They lead to major loss of biodiversity and substantial economic loss, sometimes eliminating indigenous species. Introduction of the new species has led to changes in pre-existing organisms associations. The presence of 3 invasive alien marine species in the Black Sea, *Mnemiopsis leidyi*, *Rapana venosa* și *Mya arenaria* had a major impact on anchovy species, native oyster populations and the destruction of biota on the sandy bottom. By 2020, it is expected to identify, control, eradication and management ways to prevent the introduction of invasive species.

Marine pollution

Nutrients, the main cause of eutrophication, have the following trends in coastal waters on the Romanian seaside

- Phosphate concentrations are close to the reference period of the 1960s, slightly higher
- Inorganic forms of nitrogen concentrations fall within the areas of variability in recent years recording the low values in relation to the period of intense eutrophication (1976).
- Silicates, presenting low concentrations relative to the reference period of the 1960s

Future developments for eutrophication phenomenon may be to underestimate the target values for good ecological status of coastal and marine waters due to fluvial and anthropic, seasonal and of climatic influences (temperature, wind, wave, current and precipitation regime).

By 2020, pollution (nutrient surplus) is expected to be at a level that does not affect the function of ecosystems and biodiversity. At present, although there are low amounts of nutrients that reduce the inflorescence of algae, the phenomenon is still present.

Protected areas

Romania and Bulgaria, being EU member states, must expand (as an area and number) and strengthen the Natura 2000 network, and the habitats and species must be in a favourable conservation status.

Most marine protected areas are in coastal areas and the protected area network has grown since 2011 and, according to monitoring reports, more than 60% of habitats, and over 15% are in a favourable conservation status.

In the next few years, it wants to

- The rate of loss of all-natural habitats to be lowered to half and even to zero and reduce how much their degradation and fragmentation.
- Ecosystems, natural habitats and populations of species to be protected in the natural environment by avoiding fragmentation and their destruction, and those who are degraded and threatened to be restored
- Creation of coherent natural landscapes

The Indicator *Changing the number and size of protected areas* is used to evaluate the number and size changes of protected areas. The evolution of this indicator is intended to be positive by designating new protected areas for the protection of biodiversity and reducing its loss.



Analysis of the future evolutions

Descriptors	Indicators	2007	2008	2011	Present value (year, source)	Trend	Target value (year, source)
Biodiversity	Changing the number and size of protected areas (Natura2000)	3	8	9	9 (2015, EEA)	↑	No
	Conservation status of selected habitat				Good (2013, CBD Fifth National Report – Romania, Bulgaria)	↑	favorable conservation status
	Invasive species with major impact				3, (2014, CBD Fifth National Report – Romania)	eradication	identify, control, eradication
	Bethonic species	1990 20			40, (2014, , Fifth National Report – Romania)	↑	
	Integrated Biological Index, IBI (status indicator of eutrophication)			2011-2014 Moderate-Good	Poor-Moderate (2014, , Fifth National Report – Romania))	↓	safe ecological limits
Status of fish stock	number of species of marine fish	1960-1980 166 species			185 species (2014, , Fifth National Report – Romania))	↑ Stock is in good status since the late 1980s	safe ecological limits



EUROPEAN UNION
European Maritime
and Fisheries Fund

Marine spatial plan for the cross-border area Mangalia Shabla



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EUROPEAN COMMISSION

Executive Agency for Small and Medium-sized Enterprises (EASME)

Department A - COSME, H2020 SME and EMFF

Unit A3 - EMFF

Call reference No: MARE/2014/22

Project Full Name: Cross border maritime spatial planning in the Black Sea – Romania and Bulgaria (MARSPLAN – BS)

Project No: EASME/EMFF/2014/1.2.1.5/2/SI2.707672 MSP LOT 1 /BLACK SEA/MARSPLAN-BS

European Maritime and Fisheries Fund (EMFF)

Marine spatial plan for the cross-border area Mangalia Shabla

Volume 4

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DELIVRABLE



Overall diagnosis

Introduction

The objectives of the Overall diagnosis paper are to develop a set of alternative strategic growth scenarios for the Marine Spatial Plan, to identify a preferred scenario on the basis of a comprehensive evaluation, and to propose a strategic direction for the marine plan. The scenarios developed essentially relate to the levels of economic growth that the Mangalia - Shabla marine area may need to accommodate over the implementation period (2025 – 2030).

A strategic scenario is essentially a future - oriented strategy for accommodating the ecosystem and economic development needed over the implementation period in the context of the overall vision and goals of the marine plan. The objective of creating and testing alternative scenarios is:

- to ensure that all genuine alternatives for ecosystem and economic growth offered by the local conditions of the marine area are considered;
- to ensure that the impacts of these alternatives are examined prior to making choices as to the most appropriate strategic direction for the MSP.

The most significant sectors, in terms of the marine area they occupy, are ecosystems and sea related human activities: these sectors are also crucial to the satisfying of basic human needs in terms of ecosystem services and work. For these reasons, it is alternative patterns of growth in these two sectors that are the principal concerns in developing growth scenarios.

This is not to say that strategic choices do not exist for other sectors, as economic activities, such as tourism, industry and mineral exploitation, which are essential for the coastal community's life and wellbeing.

1. Development of strategic scenarios for the plan area

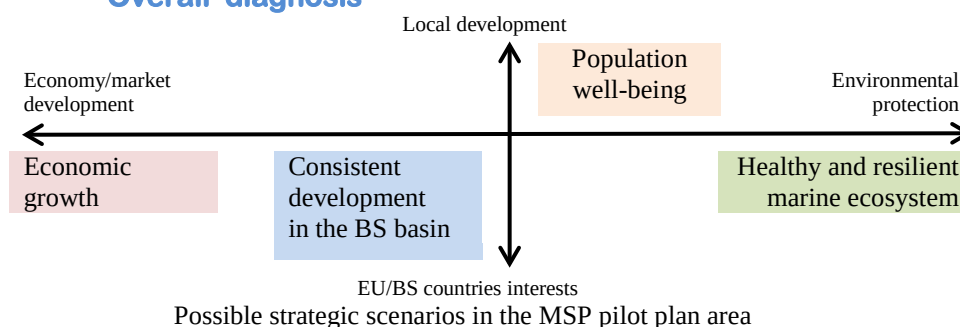
Strategic Scenarios description

Four alternative scenarios for the development and respective spatial use of the sea were elaborated in the framework of the MSP, in order to identify the possible maritime spatial development options (alternatives), to perform their strategic assessment and as a result to arrive at an optimal solution for permitted uses of the sea that would be acceptable to different groups of stakeholders.

Scenario-building was based on identification of possible development directions (axes) according to the determining factors (driving forces) that affect the marine resources and spatial use and the situation in maritime sectors. Different policy and societal priorities are the possible confronting choices for the development. On the vertical axis, the development is confronted by accounting for local interests and the Black Sea countries and/or EU interests. While the economic (free trade market, profit, competition) and environmental (state of environment, climate change) interests are confronted on the horizontal axis. Depending on the evolution of the determining factors in connection with the policy and societal choices, four distinct development scenarios are identified (see figure).



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Scenarios show radically different alternative development options, which could be realised by choosing one or another policy priority. However, it shall be taken into account that in the real life different policy priorities are usually balanced, therefore such radical scenarios would not be possible.

Scenario A: Healthy and resilient marine ecosystem (developing marine ecosystems)

Scenario A is directed towards maintenance of a clean environment and resilient marine ecosystem as a basis for natural environment well-being and sustainable development. While developing maritime activities, the unique and fragile ecosystem of the Black Sea is respected, as well as global objectives to decrease the GHG emissions and increase the share of renewable energy sources in the total consumption.

The coastal ecosystems are also protected areas (even if some are not declared as such) due to their importance as buffers for the marine areas in front of the human developments and activities.

Promoted maritime activities are those securing safe and clean maritime transport, sustainable fisheries and tourism, wind and potentially also wave energy production that are adjusted to the carrying capacity of the marine ecosystem. Spatial solution in Scenario A focuses on development within ports settlements and seaside resorts by optimising the shipping transport in order to reduce the pressure on marine ecosystem. There are areas foreseen for promotion of algae and mussel aquacultures that improves the marine environmental quality by consumption of nutrients; fish aquaculture is not foreseen at a large scale (Shabla municipality could implement such activities) because of higher pollution risks and pressure to the marine ecosystem, as well as the general poor water conditions in the area. Tourism development is mainly related to recreation in nature, and services of tourism and recreation of high environmental quality ("Blue flag" beaches and marinas). Areas for offshore wind energy production could be foreseen outside the territorial waters (floating wind power plant), where less impact to ecologic value areas (bird migration routes, reefs) is expected. In order to preserve the integrity, resilience and biodiversity of the marine ecosystem, several areas (marine and terrestrial) have to be proposed to be potentially included in the network of protected areas, in case the surveys raise evidence on the presence of nature values that requires designation of protected area.



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Scenario B: Social well-being (increasing life quality)

Scenario B is directed towards a social cohesion policy – balanced development of all municipalities in the cross-border area and diversified growth of economic sectors that secure jobs, both in the existing fields and offering new ones – with higher added value and wages. Social well-being is based on an increase of income for the population, which cannot be achieved in the absence of a sustainable economic development. In this case the economy is based more on services and processing the shipped resources and less on export of local resources, among which are the marine resources. In this scenario the marine environment is supposed to be more exploited, while the income increase could lead to an additional demand of living marine resources.

Promoted priority maritime activities are those securing a high employment rate and income for the local economy – coastal balneal tourism and recreation (incl., development of yacht clubs, marinas and spas), fishery, operation of ports, passenger transport and short-sea shipping, as well as potentially – aquaculture development. Interests of the local community are a determining factor secured by support of the local and regional resources, infrastructure, services and entrepreneurship, the desire of people to live on the coast (with the development of real estate and maintenance services), preserving of traditions. Spatial solution in Scenario B highlights the development of marinas and ports for small scale fishing, short-sea shipping, including maritime transport between Black Sea ports. In this scenario, none of the sea area is reserved for production from renewable energy sources because the development of fisheries is brought forward by non-restricted use of sea space. However, development of all types of aquaculture is foreseen at places with suitable natural conditions in order to promote production and employment. In addition, the scenario foresees diversification and provision of tourism services along the whole coastal area, while the most intensive development of recreational activities is expected in the area (yachting, sport fishing, diving).

Scenario C: Economic growth (increasing economic product)

Scenario C is directed towards economic breakthrough driven by competitiveness and profit generation in economic sectors. In this scenario, the economy is based more on industry and manufacture which need a major influx of external resources and less on local assets.

Port development, freight and passenger transport, cruise and coastal tourism, development of resorts, as well as maritime technologies and innovations are promoted as priority maritime economic areas. Potentially perspective energy sources (hydrocarbons, wind and wave energy) are supported with an aim to secure the energy independence of the region, as well as to export the electricity produced to other countries in the region and within Europe.

Development of fisheries is limited by the availability of resources and quotas set internationally and therefore the development of this sector is stable within the limits of available resources. The development policy is mainly led by the interests of powerful national and international companies (the external context). The spatial solution in Scenario C is adapted to enhancing the importance of ports and intensive shipping traffic between ports within and outside the Black Sea region, by ensuring adequate shipping corridors. The maximum available area is reserved for production of renewable energy, both by allocating



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space for construction of wind parks and by delineating areas for research on the potential of mineral energy production. The scenario foresees the development of fish aquaculture as economically the most viable branch of aquaculture at the coast of the Black Sea between Mangalia and Shabla. Provision of tourism services is mainly clustered at the largest settlements and is oriented at mass tourism and resort development. For Shabla municipality the coastal and maritime tourism will be oriented not for large scale resort development, but for a tourism that relies on alternative forms such as balneology, mud, sport fishing, underwater tourism, diving, etc.

Scenario D: Consistent development in the Black Sea basin (growth in external context)

This scenario is not possible to achieve with the actions and resources available to the relevant stakeholders, active at local level, in Mangalia-Shabla area, not to mention that it is also challenging to be accomplished at a national level.

In Scenario D, the Black Sea area is perceived not only as the common ecosystem but also a common space for the economic and cultural development. Development of maritime activities and the uses of the sea are dominated by the Black Sea regional interests. Cooperation, as well as competition within the Black Sea region is becoming the key driving force for regional development. Due to this, the international attainability is particularly promoted. Priority is given to the maritime sectors that are important in the context of the Black Sea region – coastal tourism, fisheries, shipping transport between the Black Sea ports (short distance sea shipping) and other destinations, shipbuilding and repair, passenger transport services, as well as the offshore renewable energy production, building of a common power grid and the coastal ring of transport roads. Spatial solution in Scenario D focuses on the development of the ports that are competitive within the Black Sea region, therefore the shipping corridors are ensured to the large regional ports. Transit-corridors for shipping are developing, thus respecting the international connectivity and shipping interests of other countries. The development of aquaculture is not foreseen because the conditions for that are more suitable in other parts of the Black Sea. Tourism and recreation services of high quality that are competitive within the Black Sea region are expected to develop and therefore the offer is mostly concentrated at larger centres. Territories for offshore wind energy production are foreseen outside territorial waters, where less impact to ecologic value areas is expected. Power grid interconnections with neighbouring countries are foreseen in order to join the common Black Sea and European power grid. Areas to be potentially included within the network of marine protected areas are offered to secure compliance with international objectives.

The description of the strategic scenarios, with the anticipated impacts of each sector on related domains are presented in annex 1.

International legal documents concerning the protection of the Black Sea are:

- Bucharest Convention on the Protection of the Black Sea against Pollution - 1992;
- Odessa Ministerial Declaration on the Protection of the Black Sea - 1993;
- The Strategic Action Plan for Rehabilitation and Protection of the Black Sea - 1996;
- Ministerial Declaration on Protection of the Black Sea Ecosystem - 2002;
- Black Sea Environmental Programme (1993-1996), TACIS Black Sea Funds (1995-



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2000), Black Sea Ecosystem Recovery Project - 2004

2. Assessment of the strategic scenarios

Three methods were employed in evaluation of the alternative sea use scenarios:

- Strategic evaluation of the scenarios by using SWOT (strength, weaknesses, opportunities and threats) method;

SWOT analysis of the scenarios was carried out by the project partners, which were able to comment on each of the scenarios by highlighting strength, weaknesses, opportunities and threats. Particular focus of the discussions will be on the spatial solution of each scenario, identifying draw-backs, potential cross-sectorial conflicts and possible solutions. Results from the SWOT analysis are summarised in **annex 2**.

- Economic, social, environmental and cross-border impact evaluation by **selected criteria** and parameters (**annex 3**);

- Evaluation of spatial implications of the scenarios in relation to the marine ecosystem components (benthic, pelagic habitats, species) is presented in **annex 4**.

Economic, social and environmental impacts of the scenarios and a cross-border context were evaluated qualitatively by the multi-criteria method. Implications from the scenarios have been assessed (**annex 2**) and will be mutually compared in context with the long-term vision of sea use development (as defined in the strategic part) and the priority areas suggested by the project partners and the stakeholders. In order to evaluate how the particular scenario could ensure implementation of the long-term vision, 3-6 criteria were defined for each of the group of impacts.

By using the selected criteria, implications of the scenarios were assessed in a comparative scale (--: significant negative impact; - : small negative impact; 0: no impact; +: small positive impact; ++: significant positive impact), based on expert judgement and parameters of development trends used for characterisation of scenarios. Assessment of the cross-border context was developed in cooperation with experts on marine problems in Bulgaria and Romania (**see annex 3**). Summary evaluation of the scenarios is presented in the table below.

Summary evaluation of the scenarios	A	B	C	D
Environmental impact	++	-	--	+
Social impact	0	++	+	+
Economic impact	+	0	++	+
External context impact	+	-	--	+
Average value	+4	0	-1	+4

The results of the socio-economic and environmental assessment of the scenarios show an equal value for the first and fourth scenario. The difficulty of meeting the requirements for the



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accomplishment of the fourth scenario and the fact that it is not feasible by local stakeholders makes it unavailable for giving a strategic direction for the marine plan.

The assessment shows also the negative impact of the economic growth scenario; the area being unfit for sustaining a significant development of economy, based mainly on industry and manufacture. The economic development of the area should be sustained in the first place by local resources (of which marine resources must become increasingly important) and secondly by shipped resources.

The impact of the second scenario on the marine area is almost neutral; its economic effect is in the domain of consumption, leading to an increase of demand for ecosystem services. The increase of population wellbeing could be sustained, at a local level, by economic performance and a rise in taxation, which is hardly conceivable in the context of the area.

The external impacts of the four scenarios are different; the positive influences on neighbouring areas are exerted by the first and fourth scenario. The scenario of economic development is the most harmful for the external context by developing the transport activities on sea and on land, as well as increasing pollution in the neighbouring areas.

As a result of this evaluation, the recommendation of the first scenario is clearly required in order to build the basic strategic direction and vision for the marine plan.

Evaluation of spatial implications of the scenarios included identification of impacts from each planned type of sea use on particular marine nature values and ecosystem services (**annex 4**).

The requirements of marine space for ecosystems sustainability and human activities were assessed on a comparative scale (0 - current state, 1 - slightly increased, 2 - significantly increased, -1 slightly decreased, -2 significantly decreased).

Marine areas	Scenario A	Scenario B	Scenario C	Scenario D
Natural areas				
Protected areas	2	0	0	1
Other natural areas	1	0	0	1
Human activities				
Aquaculture	1	2	2	1
Bathing areas	0	2	2	1
Small scale fishery	1	1	0	0
Large scale fishery	-1	1	1	-1
Renewable energy	1	0	2	2
Shipping routes	1	2	2	2
Anchorage sites/ports	1	1	2	1
Yachting and cruising	2	2	-2	2
Dredging	1	2	2	1
Dumping sites	-1	2	2	1
Water sports	1	2	0	1
Diving areas	1	2	0	0
Underwater cables/pipelines	0	1	2	2



Overall diagnosis

Total	12	21	18	15
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The requirements for marine space are the lowest in the first and last scenario (A and D) because these are the most protective for the natural environment related to the sea. In Scenario A the protective trend for the marine ecosystems results in a lesser usage of the marine areas for economic activities, while in Scenario D the distribution of the economic activities in the entire basin, among the Black Sea countries, have a positive effect on the marine space (with the inconvenient of increasing the transport in the area). The other two scenarios, based on economic development and increasing usage of resources (external and internal) are more demanding for marine space and more harmful for the marine natural environment.

In **Scenario A** the most human activities are foreseen to occur on shore with the development of services related to the naval transport, research and ecosystem services and others economic activities focused on to ecosystems thriving. The main economic facilities are located in the inner and outer area of the localities, leaving as much areas for the free space on the seashore, allocated to park areas and walkways which act as protective buffers for the marine areas. In this respect, the coastal (not protected) natural areas must be increased in order to insure the development of such ecosystems, acting as buffers and complements for the marine areas. In this respect, all real estates developed on the seashore will observe a distance from the shore line, in order to live the required areas for protection.

Aquaculture (on land and sea) and small scale fisheries will demand more areas for development, in accordance with environmental-friendly practices.

All kind of water (not motorised) sports will demand more marine areas for development, in accordance with the regulation for the protected areas.

Infrastructures will require the minimum space from the marine area; energy will be supplied as much as possible from renewable sources and resources should be recycled in a circular economy approach.

In **Scenario B** the marine resources will be used more for the population consumption; fisheries and aquaculture should be developed in order to fulfil the market requirements. The economic development will occur in the light industry and services; the maritime transport and port activities will increase in order to provide the resources for the economic growth. Therefore, an increase of marine space for shipping will follow this trend.

All services for tourism and recreation (cruising, yachting, water sports) will be developed, requiring more marine areas and shore facilities.

The infrastructures will affect more the marine areas as they will need to provide more energy and resources. Shore protection infrastructures will increase their relevance in the development of shore activities. In this scenario, the shore habitats will be less protected by the development of real estate and shore protection structures than in the previous one.

Scenario C provides the lesser protection for the marine and coastal natural areas, focusing primarily on the economic development of the area. The industry (mechanical, shipbuilding and electric and electronic industry), which provides the most significant turnover and added



Overall diagnosis

value, will develop in particular. This trend will impact the shipping and port activities and demand more marine space for their development.

Of all development directions, this scenario is the most harmful for the natural environment, requiring a significant part of the marine area for shipping and energy acquisition, as well as for infrastructures.

The **Scenario D** raises huge political challenges, making it difficult to achieve even at the national level, however is not to worth to be disregarded, because of the efforts of the Black Sea states to make agreements regarding the marine space.

The countries of the Black Sea basin are on the way to agree on the necessity of addressing common problems regarding the marine space; a number of legal documents concerning the protection the sea were adopted in this respect.

The common actions undertaken in the Black Sea basin will affect the Mangalia - Shabla area hopefully in a beneficial way.

The marine ecosystems could be improved by forming a network of marine protected areas and regulating the fishing and other human activities affecting the marine life. The area allocated to the protection of marine ecosystems can grow as an effect of common agreements regarding the exploitation of living resources.

The common actions of protection and rational exploitation of the marine resources could improve the development of marine ecosystems along with the reduction of the human uses of the marine area.

The blue economy could be developed in this scenario as a result of collaboration between countries, especially in the domain of research related to sea resources exploitation.

This scenario favours the connectivity between the countries of the Black Sea basin improving the transport activity on land and sea. The regional ports will became more active thus driving the coastal settlements in the economic cycles.

In this scenario the marine corridors are linking the ports along the sea coast and the terrestrial roads encircling the coast (the “Black Sea highway”). The Black Sea Ring Road is an ample project, a four -lane highway measuring some 7,140 km in all, linking eight countries. This project could have significant influences on marine areas by reducing the marine traffic of persons and goods on short distances and by distributing more evenly the resources among the riparian countries.

3. Optimal strategic scenario description and goals

Scenario description

An overall conclusion of the above analysis is that spatial solutions offered by the scenarios have ambiguous implications on the health and stability of ecosystem and nature values assessed because the carrying capacity of the ecosystems were not applied as one of criteria in the development of the scenarios. Significant negative impacts were identified only in small areas (tourist resorts, beaches, ports, defence infrastructures) and were mainly related to the sea uses – development of transport, aquaculture and fishing and waste production. The least negative impacts on nature components were accounted for in Scenario A and D.



Overall diagnosis

Taking into account the assessment carried out on the four scenarios, one can recommend the first scenario (A) to be pursued as a direction for the plan strategic approach; the main drivers of the scenario are described below.

The main features of this scenario are influenced by the concern of preserving and developing the components of the natural environment and especially the **marine environment**.

All components of the marine environment will be monitored, protected and improved to growth in harmony with other elements of coastal and marine ecosystems. The stock of economic species of fish will be developed as a prime resource for marine fisheries and an important source of business and employment.

Other living resources of the sea are expected to increase in stock and diversity, becoming sustainable economic resources, environmentally beneficial and having financial and wider social benefits.

These effects on the natural marine environment can be realized only by a firm control and organization of the marine activities and by reducing the pressures that affect the marine habitats by establishing the carrying capacity of the ecosystems and a better management or conservation of marine biological resources.

The protection and restoration of aquatic biodiversity and ecosystems are provided by interventions and support operations for waste collection at sea, decreasing water contamination, construction, installation or updating of static or movable facilities aimed at protection the marine flora and fauna. This means further research into economic values of marine biodiversity and ecosystem services to ensure best practice planning and management of the sea resources.

The knowledge, development and protection of the marine habitats, especially of those which are home for valuable ecosystems, are basic strategic directions of action in the achievement of this scenario.

The favourable results on marine areas could not be achieved in the absence of helpful and constructive actions coming from the coast.

The **coastal natural areas** are creating the most favourable conditions for the development of the marine life; therefore these areas should be kept in the forefront of the preoccupation for developing a sound and resilient marine ecosystem.

The wild natural areas adjacent to the sea (wetland, water bodies, vegetation) must be protected and developed in order to assure a strong connection and helpful area for the marine ecosystems.

The **built-up areas**, neighbouring to the sea, must be configured to support the marine ecosystems by natural components that are beneficial for the marine life, or, at least do not impact negatively the sea environment, acting as buffers which reduce the human pressures. A good status of the marine environment should be the result of good socio-economic conditions on the coast area, built on a sustainable development basis.

Definitely, the **economy** of the coastal area should be oriented towards a “blue economy”, which connects and combines seemingly disparate environmental problems with open-source scientific solutions based upon physical processes common in the natural world, to create solutions that are both environmentally beneficial, reducing environmental risks and



Overall diagnosis

ecological scarcities, and which have financial and wider social benefits. The economy of the area is dominated by three activities: industry, tourism and agriculture; these sectors must be transformed in order to meet the social demands and also being ecological friendly and beneficial.

The industry should be more oriented towards the use of natural (living and not living) resources of the marine and coastal areas for food production, biochemical, natural medicines and pharmaceuticals and unconventional energy.

Tourism will shift from a mass activity to a more diverse and qualitative sector, by providing more novel and adapted services like ecotourism, cruising, water sports, etc. The tourism activities should take advantage from all local resources provided by the marine and coastal space. A new direction in tourism sector should be developed in the area combining small scale accommodation with local gastronomy, ecosystem services (balneal, recreational, cultural and ecotourism) based more on sea resources.

Fisheries and aquaculture should growth to a more significant position in the economic structure of the area. The main problems of the sector arise from inadequate equipment and outdated production facilities and fishing fleets, insufficient use of scientific advances and new technologies in the sector. The unsatisfactory condition of ports and first sale market infrastructure, the unsuitability of a substantial part of the coastal zone for the demands of the tourism industry decrease the potential to generate additional income, especially for smaller, family-type operators. These drawbacks should be overcome by strategic orientation of the sector towards modernization and marketing.

Aquaculture activities need development in new sites (marine and coastal) by financing new aquaculture farms and modernisation by introducing resource-efficient technologies, optimization of pond aquaculture, diversification of production, adding value to aquaculture production, improved partnership with research institutes etc.

Maritime transport should growth in this scenario in order to sustain local economy; transport operations being related to activities like commerce and wholesale, industry and manufacture, tourism.

The development of marine transport should be characterised by the increase of cargo turnover in the port of Mangalia, the number of ships served and growing trends in passenger transport in cruising ships and yachts.

Agriculture and husbandry must be oriented more in the direction of agro-ecology by the study of ecological processes applied to agricultural production systems. This orientation must be achieved through the study of problems and practices related to the four system properties of agro-ecosystems: productivity, stability, sustainability and equitability.

The agriculture land is in the direct contact with the marine and coastal ecosystems; therefore this vicinity obliges farm activities to take measures to stop sea contamination with chemical agents or prevent shoreline erosion.

Strategic goals

For the preferred scenario a number of four ecological principles for the ecosystem-based MSP were selected: maintain *native species diversity*, maintain *habitat diversity and heterogeneity*, maintain populations of *key species*, maintain/improve habitats' *connectivity*.



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Principles in connection with the marine ecosystems

Processes	Strategic directions	Principles
Spawning and nursery	- protection of spawning areas from pressures; - ensuring connectivity between habitats	- maintain / increase populations of <i>key species</i> - <i>maintain connectivity</i> - <i>maintain habitat diversity and heterogeneity</i>
Benthic fish stock	- assuring access of fish shoals to reproduction areas - maintain / increase the stock of valuable fish species - protection from overfishing	- maintain / increase populations of <i>key species</i> - <i>maintain habitat diversity and heterogeneity,</i>
Pelagic fish stock	- increasing the fish stock by controlled fishing and protection from pressures	- <i>maintain connectivity</i>
Mussel, shellfish	- protection/increasing the endemic species in denude areas	- maintain native species diversity
Clams and polychaetes	- maintain zoobenthic species especially those that are very adaptive and tolerant	- maintain populations of <i>key species</i> - <i>maintain habitat diversity and heterogeneity</i>
Macro-algae, micro-algae	- control and diversity of algal species	- maintain populations of key species
Plankton	- improvement of species composition and control volume	- maintain native species diversity

Principles in connection with the “green” economy

Processes	Strategic directions	Principles
Exploitation of living marine resources	- development of offshore and inland aquaculture; - increased exploitation of other living marine resources (mussels, algae, sea grass)	- efficiency - resilience - sustainable development - safeguard biodiversity
Exploration/exploitation of non-living resources	- increased and sustainable exploitation of local resources (energy, wind, balneal, minerals, soil)	- efficiency - intergenerational principle - sustainable development
Tourism and recreational activities	- increased attraction of tourism by diversification (ecotourism, cruising, water sports, etc.) and quality services	- efficiency - sustainable development
Services and utilities	- increase of market services and ecosystem services - increase of research and services related to marine ecosystems	- economic equity - sustainable consumption and production - market as organizer of economic activity
Agriculture and husbandry	- development of ecological agriculture - improving diversity of (bio)products with increased market value	- efficiency - safeguard biodiversity
Industry and manufacture	- increased profitability (transition to low volume technologies with high product value)	- efficiency - sustainable consumption and production - productivity



Overall diagnosis

Principles in connection with the population

Processes	Strategic directions	Principles
Working population	- maintaining / increasing share of working population through professional qualification and reconversion	- transition to blue economy - access to new skills and jobs - dignity - inclusion
Employment/ income generation	- sustain /increased income due to permanent jobs and job creation - rising cost of labour	- resilience - gender equality
Consumption of goods and services	- increasing demand for goods and services - demand for recreational activities	- equitable distribution of wealth - redefine well-being - sustainable consumption
Ecosystem services	- increasing demand for ecosystem services: climate change mitigation, watershed services, biodiversity improvement	- integrated approach - safeguard biodiversity - sustainable consumption - information, participation and accountability

As a result of the main directions of actions, considered for the further development of the processes present in the marine space, the goals of the strategic approach should include the most significant objectives contained in these directions.

In the domain of **marine ecosystems**, which should be oriented toward a healthier and resilient natural environment, the main goals refer to the **species** populations and diversity, the integrity, diversity and heterogeneity of **habitats**, and the **connectivity** between habitats. The economic development, intended to growth in the direction of a “green” economy, would have the goals related to the processes **efficiency** (getting the maximum benefits from its available resources of the area) and to the **sustainable development** of consumption and production.

In the social domain, the most important directions of action are related to the inclusion of all working population in economic activities, in order to achieve a status of wellbeing in the area. Two main goals should be taken into account in the strategy related to population: the transition of the actual workforce to **new skills and jobs**, related to a “green” economy, the sustainable consumption, and an equitable distribution of wealth.

Therefore, the main goals of the marine plan should be as follows:

Domain	Goals
Marine ecosystems	Achieve healthy ecosystems by maintaining / increasing the populations of key species and native species diversity
	Maintain the marine habitats' integrity, diversity and heterogeneity
	Assure and maintain marine



Overall diagnosis

	habitats' connectivity in order to assure the well-functioning of the ecosystems
Economy	Realising a thriving maritime economy by efficiently use the resources of the sea and harnessing the market opportunities
	Achieve a sustainable development of economic activities by focussing on high value products and at the same time safeguarding biodiversity
Population	Create social inclusion by assuring permanent jobs and job creation through professional qualification and reconversion of workforce
	Achieving population well-being by sustainable consumption and equitable distribution of wealth and ecosystem services

The main conclusions and recommendations for development of the optimal allowed solutions for uses of the sea - particular attention has to be paid to the ecosystems improvement and growth, to activities related to the research and exploitation of marine resources (living and non-living), to the shipping activities and their impacts on new coastal and sea uses and to the general environmental status.

- In order to achieve a healthy ecosystem status in the territorial waters, nutrient loading and pollution from urban areas and economic activities must be cut. The implementation of river basin management plans will play a key role in cuts to nutrient loading and pollution from on-land sources. The reduction of littering the sea water aims also at achieving a level at which waste pollution does not harm the coastal or marine ecosystems. Especially recreational use of the sea and beaches, shipping, boating, spill-over from wastewater treatment plants, storm waters and fishing are main sources of littering.



Overall diagnosis

Sustainable use of marine living resources is a key objective for the sustainable use and management of marine natural resources. An objective must be the control and prevention of introduction the invasive alien species in the area and to slow down the rate at which they spread. Reducing physical damage to the sea habitats must become a new focus of the marine area strategy. The activities causing the greatest damage to the seafloor include dredging, stacking of dredge spoils, excavations, construction works for shore protection and laying down of cables and pipes.

Another direction of improving the ecosystem health is assuring the connectivity of habitats in order to ease the access to spawning and feeding areas of the marine faunae and to insure the best condition in these areas for the biological processes.

The new strategic plan will include more effective conservation in marine protected areas, drawing up an action plan for key and native species and habitats and realizing a network of underwater habitats.

A key part of the strategic measures must be the improvement of the knowledge base related to underwater nature by extending the research of the underwater marine environment and the land sea interactions.

- Possibilities for development of aquaculture in marine waters of the cross-border area have to be evaluated critically because this type of use (particularly fish aquaculture) can cause significant negative impact on all types of benthic habitats and there are no spatial solutions to avoid such negative impact. In addition, fish aquaculture causes leakage of nutrients thus increasing eutrophication and therefore is not acceptable in the sea waters affected enough by the special conditions of the Black Sea. It should be noted that the current technologies are difficult to adapt to the local environmental conditions at the coast in the cross-border area (e.g., impacts of waves, water salinity and temperature regime). Therefore, while considering possibilities for development of aquaculture, the environmental experts judgement on suitable areas for particular types of aquaculture and possible disturbances for shipping have to be taken into account (areas for fish aquaculture would not be acceptable on the southern coast of the Mangalia seashore, particularly between 2 Mai and Vama Veche).

- In order the increase the share of renewable energy sources in overall energy consumption it is necessary to allocate areas for production of the wind energy, while for ensuring the local energy security and implementation of the potential development scenarios of the electricity transmission system a possible location of the electricity cable for creating interconnection with riparian countries shall be foreseen.

- Within the plan of permitted uses of the sea it is advisable to allocate areas where the wind energy technologies could be located, although the placement has to be evaluated from the perspective of shipping safety. It has to be recognised that the production efficiency of the wind energy will be low when the wind park installations are placed in small number.



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- In order to ensure safe shipping it is necessary to allocate shipping areas free from fixed constructions and other uses posing a threat to shipping. These areas have to be sufficiently wide to ensure smooth shipping; connections between main ports and strategically important destinations have to be anticipated. As much as possible, the optimisation or concentration of shipping routes that may increase the risk of accidents and the length of the shipping routes increasing costs and emissions have to be avoided.

Based on the evaluation results of the scenario assessment and consultations with representatives from economic sectors, a strategic vision of plan area, the specific objectives and the solutions for permitted uses of the sea will be elaborated, that would be acceptable for different stakeholder groups, avoiding negative impacts as far as possible and promoting balanced marine spatial development.



Overall diagnosis

ANEXES



Overall diagnosis

Annex 2

SWOT analysis of the scenarios

Healthy and resilient marine ecosystem

Strengths	Weaknesses
- The marine habitats and ecosystems have the maximum protection - The coastal ecosystems are also protected and foreseen as buffers between development and marine areas	- The scenario provides the weakest economic development based on local resources: external resources are used in the highest degree - The economy needs diversification and a shift to high quality, high tech and pricy products in order to sustain the environment protection
Opportunities	Threats
- a large area of the shore is undeveloped or declared protected areas (SCIs and SPAs)	- dependence on external resources in the local economy could lead to periodic crisis in employment

Social well-being

Strengths	Weaknesses
- Population wellbeing is improved by higher employment and income - Higher offer of goods, services and recreational activities - Increased diversity and volume of economic activities	- Increased exploitation of living marine resources - Development of naval and terrestrial transport - Negative impacts on coastal and marine ecosystems - Environmental protection is on the second plan of preoccupation
Opportunities	Threats
- Existing large surfaces of protected areas (marine and terrestrial) on the shoreline - Existing basis for tourism development without necessity of expansion	- Increased dependence on external resources in the local economy - Intake of nutrients and contaminants from external areas is still a threat

Economic growth

Strengths	Weaknesses
- High development of traditional activities of the area and extension of these by diversification - Development of new economic activities with beneficial effects on the area	- Environmental protection is not perceived as a priority - Development of construction and industrial activities could affect the coastal and marine habitats
Opportunities	Threats
- If wisely used, the high economic product could be invested in a more sustainable form of economy (blue economy, bio-technologies) and in environment protection	- Exhaustion of the local resources exploited in a not sustainable manner could lead to more dependence on external resources - Irreversible destruction of habitats and ecosystems

Consistent development in the Black Sea basin

Strengths	Weaknesses
- The coordination of environment protection and marine resources usage could have a beneficial impact on marine ecosystems (environmental effect) - Configuration of a coastal ring of transport roads which can contribute to the resources exchange, relieving the stress on marine environment (economic effect)	- Moderate or low employment and income development due to the concentration of activities in larger centres with port activities - Increased shipping transport between international and regional ports could result in a more concentrated development in these areas and more stress for the marine ecosystems
Opportunities	Threats
- A continuous strip of coastal and marine protected areas can result in a more sound benthic habitats	- The diversity of sizes and political orientations of the riparian countries in the BS basin, could be a hindering factor in getting a balanced agreement



Overall diagnosis

Annex 3

Assessment of the scenarios in a comparative scale

Population						External context	Total
		Employment/ income (0)	Goods and services (0)	Ecosystem services (1)		(1)	1
Economy							
Industry and manufacture (-1)	Construction (-1)	Agriculture and husbandry (1)	Services and tourism (1)	Living marine resources exploitation (-2)	Maritime and land transport (1)	(1)	0
Coastal ecosystems							
Birds nesting and migration (1)	Water vegetation (1)	Water for spawning and nursery (2)	Grass areas (2)	Field cultures (1)	Forests (2)	(1)	10
Healthy and resilient marine ecosystems (20)							
Plankton (1)	Spawning, nursery (2)	Mussel, shellfish (1)	Benthic fish stock (2)	Macroalgae and sea grass (1)	Pelagic fish stock (1)	(1)	9

Social wellbeing (-6)						External context	Total
		Employment/ income (2)	Goods and services (1)	Ecosystem services (1)		(0)	4
Economy							
Industry and manufacture (1)	Construction (1)	Agriculture and husbandry (1)	Services and tourism (1)	Living marine resources exploitation (-1)	Maritime and land transport (1)	(-1)	3
Coastal ecosystems							
Birds nesting and migration (0)	Water vegetation (-1)	Water for spawning and nursery (-1)	Grass areas (-1)	Field cultures (0)	Forests (-1)	(0)	-4
Marine ecosystems							
Plankton (-1)	Spawning, nursery (-1)	Mussel, shellfish (-1)	Benthic fish stock (-2)	Macroalgae and sea grass (-1)	Pelagic fish stock (-2)	(-1)	-9

Population						External context	Total
		Employment/ income (2)	Goods and services (1)	Ecosystem services (0)		(-1)	2
Economic growth (-7)							
Industry and manufacture (1)	Construction (1)	Agriculture and husbandry (2)	Services and tourism (2)	Living marine resources exploitation (1)	Maritime and land transport (2)	(-1)	8
Coastal ecosystems							
Birds nesting and migration (-1)	Water vegetation (-1)	Water for spawning and nursery (-1)	Grass areas (-1)	Field cultures (-2)	Forests (-1)	(0)	-7
Marine ecosystems							
Plankton (-2)	Spawning, nursery (-2)	Mussel, shellfish (-2)	Benthic fish stock (-1)	Macroalgae and sea grass (-1)	Pelagic fish stock (-1)	(-1)	-10



Overall diagnosis

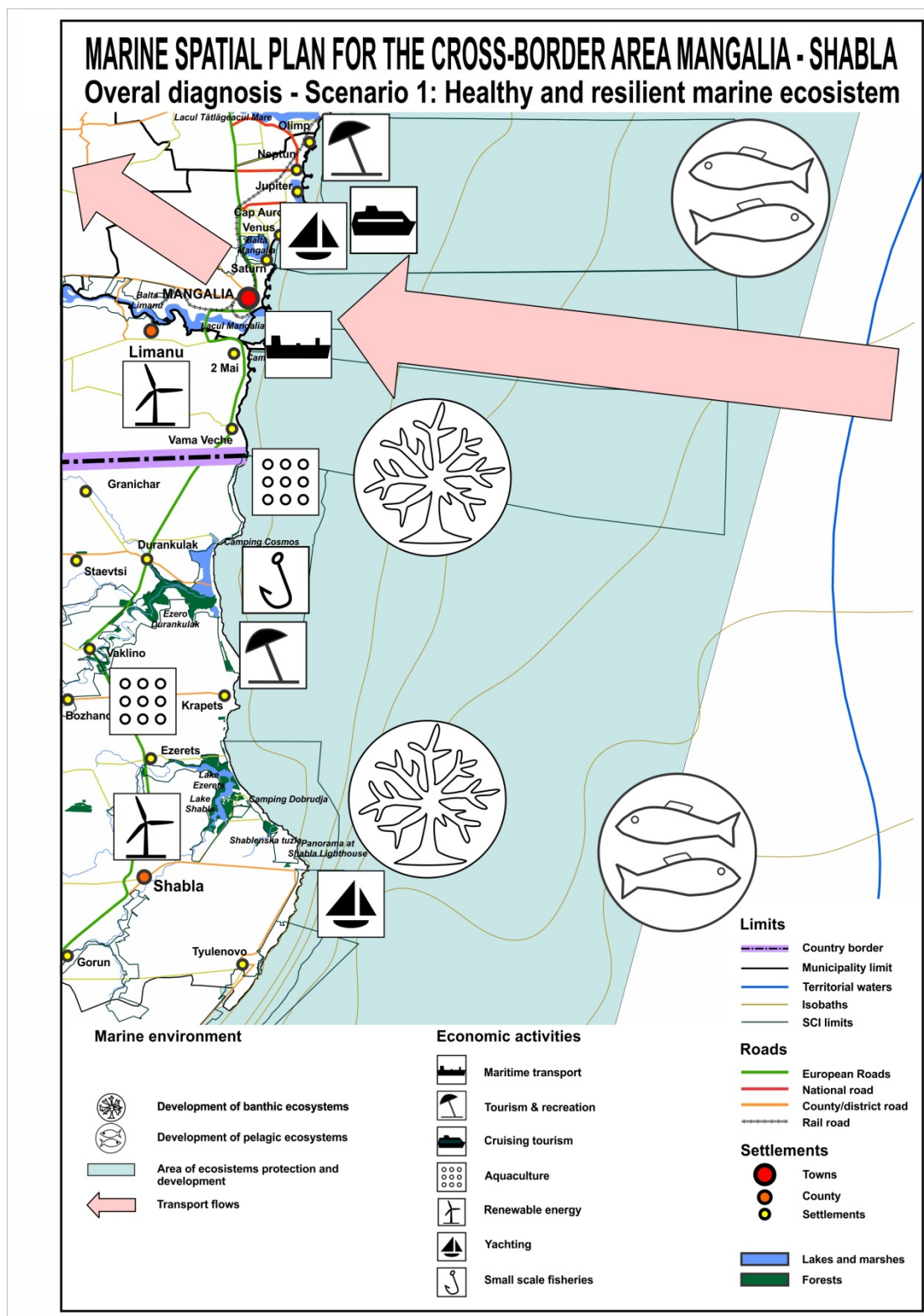
Population						Consistent development in the BS basin	Total (18)
		Employment/ income (1)	Goods and services (1)	Ecosystem services (1)		(1)	3
Economy							
Industry / manufacture (1)	Agriculture and husbandry (0)	Tourism and recreation (0)	Services and utilities (1)	Living marine resources exploitation (1)	Maritime and land transport (1)	(1)	5
Coastal ecosystems							
Birds nesting and migration (1)	Water vegetation (0)	Water for spawning and nursery (1)	Grass areas (1)	Field cultures (0)	Forests (1)	(1)	5
Marine ecosystems							
Plankton (1)	Spawning, nursery (1)	Mussel, shellfish (0)	Benthic fish stock (1)	Macroalgae and sea grass (0)	Pelagic fish stock (1)	(1)	5



Overall diagnosis

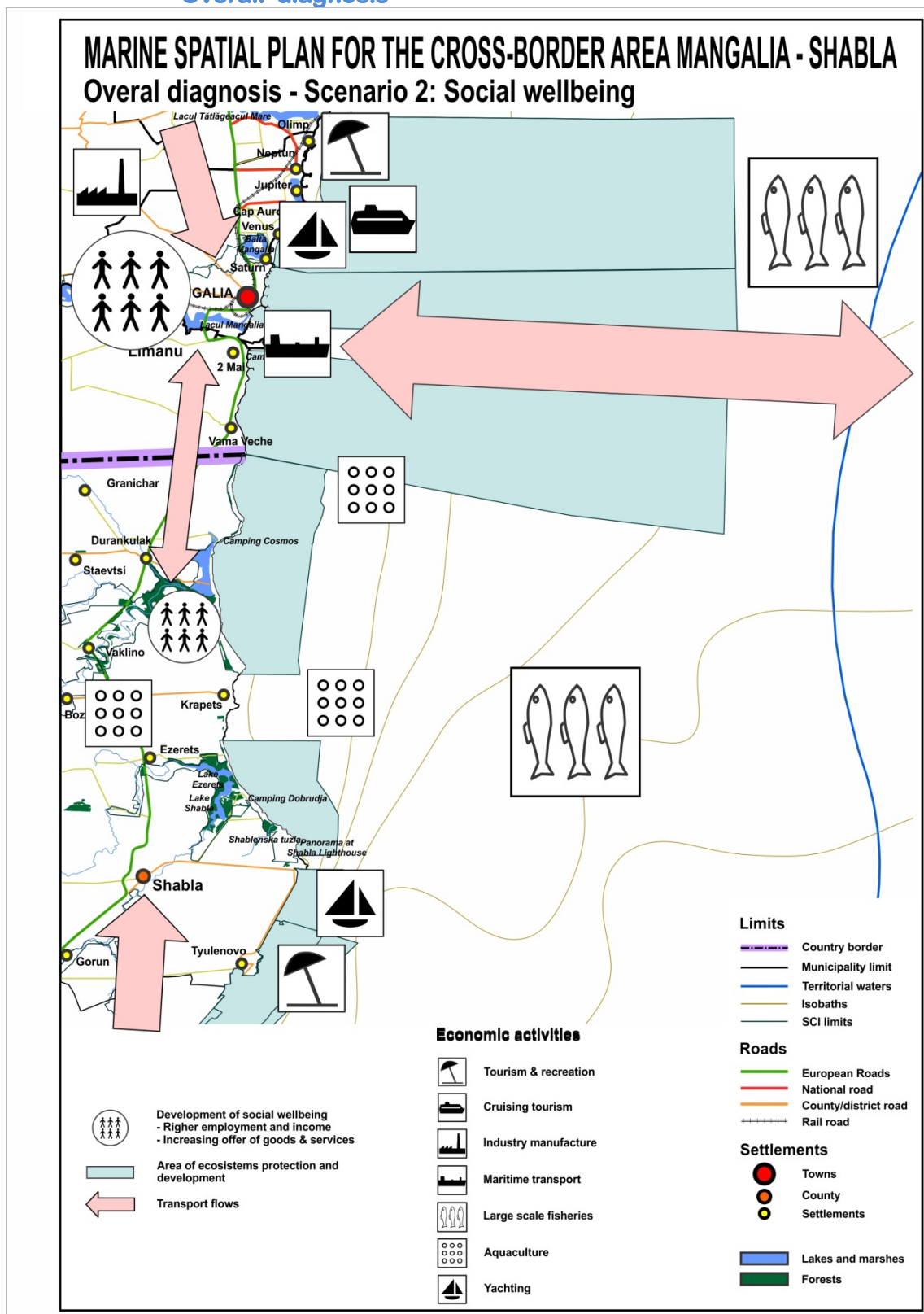
Annex 4

Evaluation of spatial implications of the scenarios



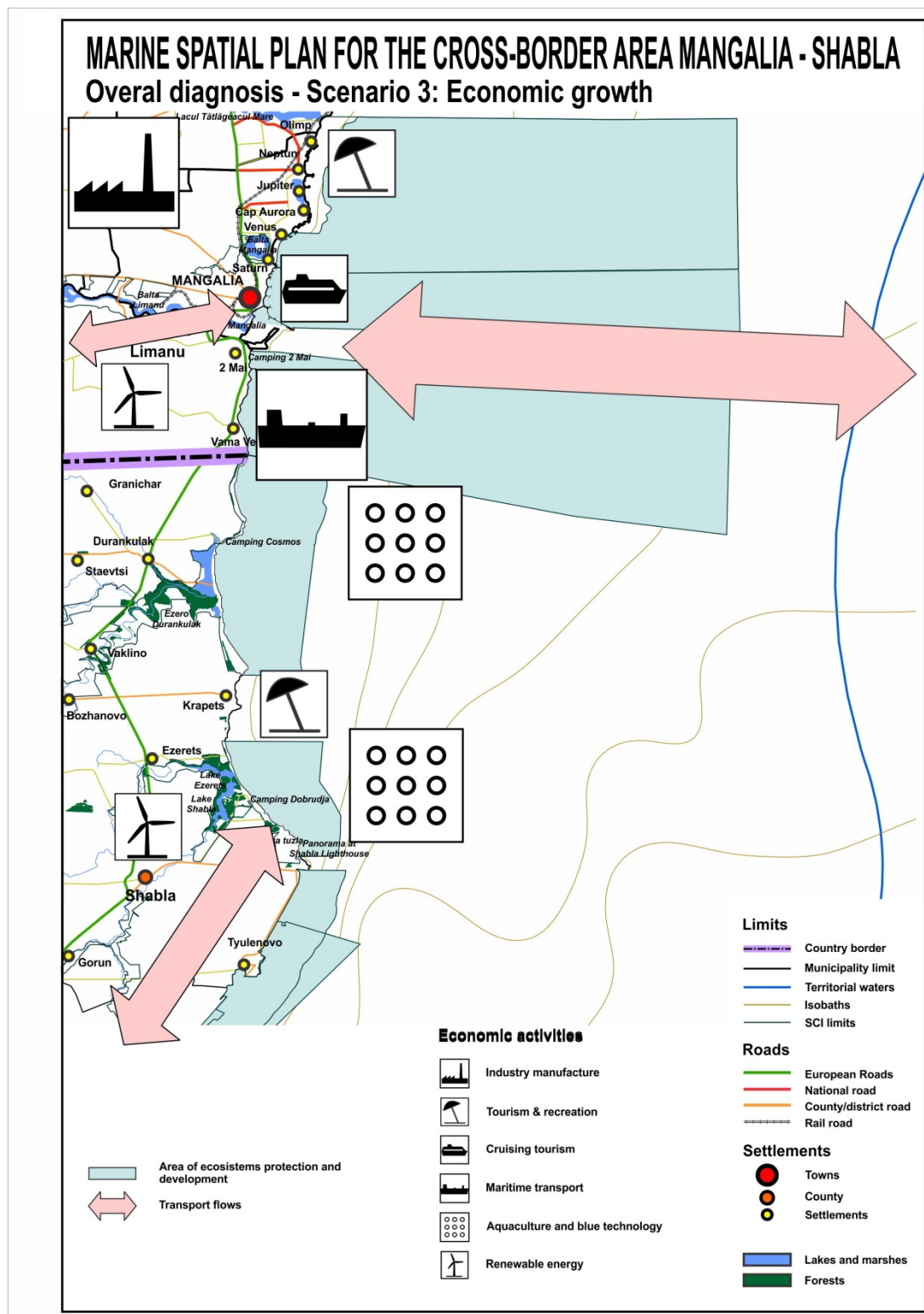


Overall diagnosis





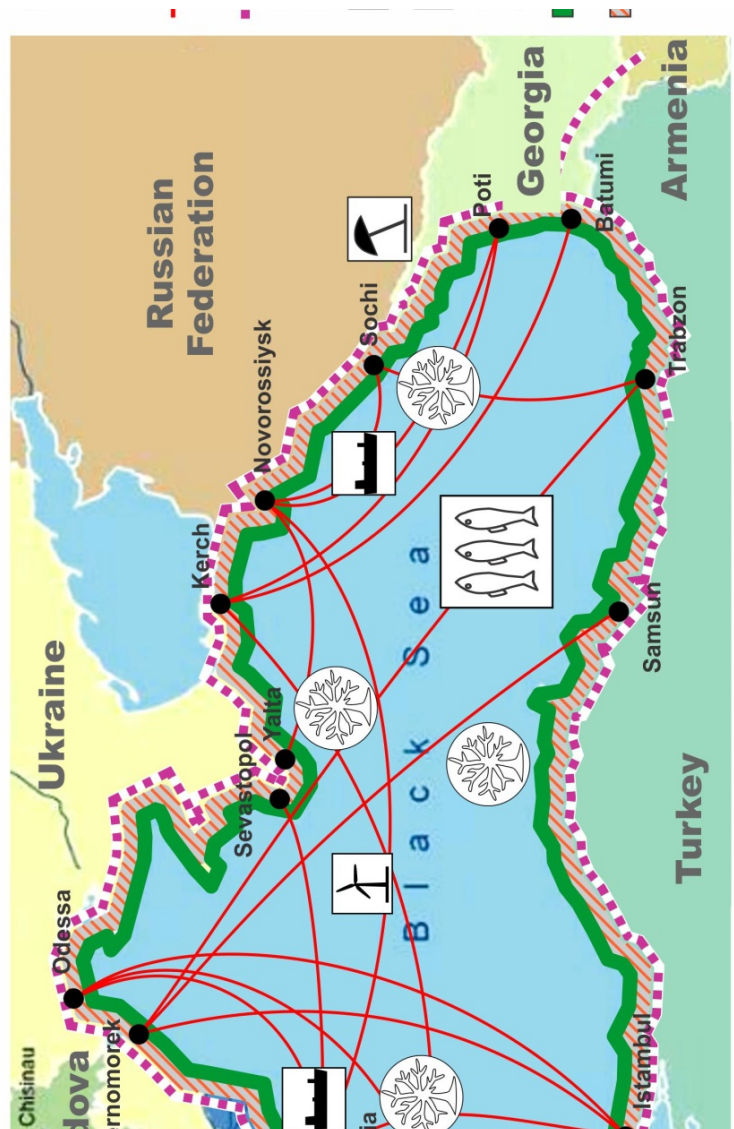
Overall diagnosis





Overall diagnosis

PATIAL PLAN FOR THE CROSS-BOARDER AREA MANGALIA agnosis - Scenario 4: Consistent development in the Blac



Strategic scenarios sectorial description and anticipated impacts in other domains

Annex 1

Population						External context
		Employment/ income	Goods and services	Ecosystem services		
		- moderate employment rate and income growth	- moderate demand for goods and services and for recreational activities	- ecosystem services are sustainable (sea food, sea products, bio products)		- possible migration
Economy						
Industry and manufacture	Construction	Agriculture and husbandry	Services and tourism	Living marine resources exploitation	Maritime and land transport	
- development and diversification of manufacture activities using external resources - increased share of renewable energy sources in consumption	- development within large settlements, most activities in renewals and infrastructures works	- development of diverse and quality products instead of growing production volume	- development of services related to environment protection, naval transport, industry and tourism - tourism and recreation of high environmental quality adjusted to the carrying capacity of the coastal and marine ecosystem	- development of sea farming for mussel; fish aquaculture is not foreseen - fisheries operations in ports, reduced activity of small scale fisheries	- shipping transport is developed and optimised - safe and clean maritime and terrestrial transport - public transportation is predominant	- external resources are used in the highest degree in the local direct production - increase the renewable energy production
Coastal ecosystems						
Birds nesting and migration	Water vegetation	Water bodies for spawning and nursery	Grass areas	Field cultures	Forests	
- less impact to nesting areas and bird migration routes	- assuring shore conditions for nesting and protection against anthropogenic pressures	- assuring access from the sea for spawning and nursery - protection against contamination and human pressures	- protection from pollution and modification of physical conditions of the habitat - buffers between development and marine areas	- chemicals and fertilizers are banned in field cultures; - increased biodiversity in agriculture	- forests vegetation is an important element of protection as buffers against pressures - forest products are sustainable exploited	- good influence from neighbouring natural/rural areas (23 August, Kavarna)
Healthy and resilient marine ecosystems						
Benthic ecosystems				Macroalgae and sea grasses ecosystems	Pelagic ecosystems	
Plankton	Spawning, nursery	Mussel, shellfish	Benthic fish stock	Macroalgae and sea grass	Pelagic fish stock	
- improvement of species composition and quantity	- shallow waters protected from human pressures; - ensuring connectivity between sea areas	- aquacultures that improves the marine environmental quality by consumption of nutrients	- assuring access of fish shoals to shallow waters for reproduction - protection from overfishing	- increasing clarity of the seawater due to seaweeds expansion - increased area of benthic macroalgae and sea grass	- stock increasing by controlled fishing - halt mass mortalities of demersal species	- decrease the GHG emissions and contaminants - threats from overfishing in other BS

				ecosystems		areas
Social wellbeing						External context
		Employment/ income	Goods and services	Ecosystem services		
		- higher employment rate and income due to permanent jobs and rising cost of labour	- increasing demand for goods and services - demand for recreational activities	- increased demand for ecosystem services (sea food, sea products, bio technologies products)		- reduced emigration processes, possible immigration
Economy						
Industry and manufacture	Construction	Agriculture and husbandry	Services and tourism	Living marine resources exploitation	Maritime and land transport	
- maintaining /diversification of activities; a special increase of manufacture activities	- encouraging SMEs development - concentration of activities in renovations and infrastructures works	- increased diversity and products quality instead of growing production volume	- diversification and increased provision of tourism and recreational services - development of services and public utilities	- development of sea farming for mussel and crabs; - inland aquaculture development - increasing small scale fisheries operations	- development of naval transport: passenger and short-sea shipping; - increased access from the region through transport services.	- increased amount of external resources in the local economy - excessive fishing by countries of the BS basin
Coastal ecosystems						
Birds nesting and migration	Water vegetation	Water for spawning and nursery	Grass areas	Field cultures	Forests	
- maintain the current situation	- modification of shore conditions by anthropogenic pressures	- contamination through terrestrial sources (aquaculture, services) - infrastructures development pressures	- erosion, pollution and modification of physical conditions of the coast - endangered by grazing and human activities	- increased demand for product diversity and quality - no pressures from urban development and energy sector	- forests products are more appreciated and exploited - forest land endangered by developments	- constant pressures from climate change and economic activities - large surface of protected areas on the shoreline
Marine ecosystems						
Benthic ecosystems				Macroalgae and seagrasses ecosystems	Pelagic ecosystems	
Plankton	Spawning, nursery	Mussel, shellfish	Benthic fish stock	Macroalgae and sea grass	Pelagic fish stock	
- alterations in species composition and abundance	- removed from shallow waters by human pressures and from water bodies due to loss of connectivity	- water contamination, eutrophication	- disturbance of fish behaviour by keeping of fish shoals away from shallow waters	- removal by decreasing clarity of the seawater - decreased in area and distribution of benthic macroalgae and sea grasses	- stock decreasing by uncontrolled fishing - mass mortalities of demersal species	- intake of fresh water and increased nutrients inflow (large rivers) - atmospheric deposition

Population						External context
		Employment/ income	Goods and services	Ecosystem services		
		- high employment rate and moderate income growth	- moderate demand for goods and services and for recreational activities	- moderate demand for ecosystem services (sea food, sea products, bio products)		- emigration due to favourable economic conditions
Economic growth						
Industry and manufacture	Construction	Tourism and recreation	Services and utilities	Living marine resources exploitation	Maritime and land transport	
- expansion and diversification of activities using external resources	- large operations for tourism and other facilities (industry, retail, wholesale and infrastructures)	- diversification and development of tourism and recreation services - development of yacht and cruising tourism	- development of services related to naval transport, industry and tourism	- development of sea farming for mussel - increasing fisheries operations in ports	- development of naval transport for goods and passengers - increased access from the territory through mass transport.	- external resources are used in the highest degree in the local economy
Coastal ecosystems						
	Water vegetation	Water bodies for spawning and nursery	Grass areas	Field cultures	Forests	
	- modification of shore conditions by anthropogenic pressures	- contamination through terrestrial sources and aquaculture - pressures from beaches and port infrastructures development	- erosion, pollution and modification of physical conditions of the coast - endangered by grazing and human activities	- overexploitation resulting in usage of chemicals; less biodiversity - pressures from development and energy sector	- forests products are more appreciated and exploited - forest land endangered by developments	- constant pressures from climate change and economic activities - large surface of protected (wetlands) areas on the shoreline
Marine ecosystems						
Benthic ecosystems				Macroalgae and sea grasses ecosystems	Pelagic ecosystems	
Plankton	Spawning, nursery	Mussel, shellfish	Benthic fish stock	Macroalgae and sea grass	Pelagic fish stock	
- alterations in species composition and abundance	- removed from shallow waters by human pressures and from water bodies due to loss of connectivity	- water contamination, eutrophication and rapid development of green algae	- disturbance of fish behaviour by keeping of fish shoals away from shallow waters	- removal by decreasing clarity of the seawater - increased area of benthic macroalgae and sea grass ecosystems	- stock decreasing by uncontrolled fishing - mass mortalities of demersal species	- excessive fishing by countries of the BS basin - intake of fresh water with increased nutrients inflow (large rivers) - atmospheric deposition

Population						Consistent development in the BS basin
		Employment/ income	Goods and services	Ecosystem services		
		- moderate employment rate and income growth	- moderate demand for goods and services and for recreational activities	- ecosystem services are sustainable (sea food, sea products, bio products)		- mobility of persons and businesses are enhanced in the BS basin area
Economy						
Industry and manufacture	Agriculture and husbandry	Tourism and recreation	Services and utilities	Living marine resources exploitation	Maritime and land transport	
- development of shipbuilding and repair industry - offshore renewable energy sources related to a common power grid	- activities are correlated between BS countries and related to renewable energy production	- coastal tourism , balneal tourism and recreation services of high quality - services mostly concentrated at larger centres	- development of services related to naval transport, industry and tourism - improvement of utilities services by coordination of quality control	- increasing fisheries operations in ports - development of sea farming for mussel and crabs; - fish aquaculture is foreseen where conditions for that are more suitable	- shipping transport between the Black Sea ports - short distance sea shipping to regional ports - transport predominant on coastal ring of transport roads	- external resources are distributed between BS countries - cooperation, and competition are key driving force for regional development - maritime and terrestrial transport is dominant
Coastal ecosystems						
Birds nesting and migration	Water vegetation	Water bodies for spawning and nursery	Grass areas	Field cultures	Forests	
- less impact to nesting areas and bird migration routes	- modification of shore conditions by anthropogenic pressures	- assuring access from the sea for spawning and nursery - protection against contamination and human pressures	- protection from pollution and modification of physical conditions of the habitat	- chemicals and fertilizers are not used in field cultures; - increased biodiversity in agriculture and quality of products	- forests vegetation is protected as buffers against land pressures - forest products are sustainable exploited	- coastal natural areas form a circular network of protected areas, as a buffering zone between marine and coastal developments
Marine ecosystems						
Benthic ecosystems				Macroalgae and sea grasses ecosystems	Pelagic ecosystems	
Plankton	Spawning, nursery	Mussel, shellfish	Benthic fish stock	Macroalgae and sea grass	Pelagic fish stock	- a network of marine protected areas are foreseen to secure compliance with environmental objectives - decrease the GHG emissions and increase the renewable energy production - fish stock is secured by regulation of catches
- control of species composition and abundance by water quality improvement	- shallow waters protected are exposed to less pressures; - connectivity between sea areas is improved	- mussel aquacultures improves the marine environmental quality by consumption of nutrients	- access of fish shoals to shallow waters for reproduction is improved - protection from overfishing by common regulations	- increasing clarity of the seawater by consumption of nutrients - marine phytoplankton regress - increased of area of benthic macroalgae and seagrass ecosystem	- stock is maintained by controlled fishing - mortalities of demersal species is reduced	

	MSP Scenario framework - cumulative impact analysis - Scenario A (optimal scenario)										External context
Domain	1. Population										
Subdomain	1.1 Population dynamic			1.2 Income of the population			1.3 Consumption				
Processes	Natural growth		Population volume	Working population	Dependent population/ welfare	Employment/ income	Goods and services	Ecosystem services	Housing	Migration	
Strategic direction	- decreasing number of population ↓	- decreased number of households ↓	- reduction due to natural growth and migration ↘	- maintaining / increasing share of working population through professional qualification and reconversion →	- decreased number of dependent population - constant/decreased rate of unemployment →	- sustain /increased income due to permanent jobs and job creation - rising cost of labour ↗	- increasing demand for goods and services - demand for recreational activities ↗	- increased demand for ecosystem services: climate change mitigation, provisioning, cultural services ↗	- decreased demand for housing due to oversupply and decreasing number of households ↘	- decrease of migration with the changes on coastal conditions - changes in the global work force market	
Specific areas				- urban areas	- rural areas	- urban areas	- urban areas , resorts				
Domain	2. Economy - increased utilization of marine ecosystem services with increased market value										
Subdomain	2.2 Sector II				2.1 Sector I		2.3 Sector III		Military		
Processes	Industry and manufacture		Construction	Agriculture and husbandry	Exploitation of living marine resources	Exploitation of non-living resources	Tourism and recreational activities	Maritime and land transport	Services and utilities	Military and naval bases activities	
Strategic direction	- increased profitability (transition to low volume technologies with high product value); - production based on more local and shipped resources →	- investment in infrastructures, ecological housing and small scale tourist accommodation →	- development of ecological agriculture; - improving diversity of (bio)products from ecosystem services ↗	- development of inland aquaculture; - increased exploitation of all ecosystem services (genetic resources food production, etc.) ↗	- increased and sustainable exploitation of local resources (energy, wind, balneal, minerals, soil) ↗	- increased attraction of tourism by exploiting cultural ecosystem services (ecotourism, cruising, water sports, etc.) ↗	- the increase of shipping and land transport due to manufacture and commerce development ↗	- increase of market services and ecosystem services - increase of research and services related to marine ecosystems ↗	- modernization of fleets and facilities due to NATO commitments ↗	- external investments and trade, - increased offer of external resources: tourist attractions, rough materials, inland aquaculture, etc. - reduction of cruise tourism due to regional insecurity	
Effects on economy	- diversification of marine activities by using ecosystem productions; - orientation towards a circular economy	- rational investments and could improve employment - improvement of small sized operations	- upgrading due to the need for bio-products (volume, diversity and quality) - shift towards agro-ecology systems	- increasing demand for fisheries and aquaculture products, natural medicines and pharmaceuticals	- more demand for local resources; renewable energy, balneal, mineral resources	- quality upgrading of tourist infrastructure and development of recreational facilities - employment in the sector will rise	- development of naval transport and jobs creation; - easy access in the territory through transport services	- development of services and infrastructure - marketing, source of increased economic efficiency	- employment in activity is steady or could increase	- the flow of external resources on coastal area is capitalized more outside it in the continental area	
Land use	Built up areas			Exploitation areas			Infrastructures		Military areas		
Specific areas	Shipyards		Housing and facilities	Farm land	Fishing/ aquaculture areas	Sites of exploration /exploitation	Sea resorts	Ports, roads, rails, airfields	Water , energy and waste management	Military training and ports areas	
Domain	Coastal ecosystems - biodiversity improvement, regulation and supporting ecosystem services										
Subdomain	Wetland ecosystems				Grassland ecosystems			Agro-ecosystems			
Processes	Birds nesting and migration		Vegetation	Water bodies for spawning and nursery	Insects, animals		Grass	Shifting dunes	Field cultures	Forests	
Strategic direction	- maintaining the birds species diversity and number at a sound level →	- increasing species and number of local species ↗	- functioning of water bodies as extension areas for the marine ecosystems →	- maintaining/increasing the number and species related to shore ecosystems →	- maintaining coastal erosion and anthropogenic pressures at a minimal level →	- remove anthropogenic threats, erosion and loss of biodiversity →	- improving biodiversity by bio-culture and ecological farming ↗	- increase of surface and biodiversity of forest vegetation on the shoreline ↗	- nutrient inputs from rivers discharges - constant pressures from climate change and economic activities - large surface of protected areas on the shoreline		
Effects on coastal ecosystems	- land-sea interactions between ecosystems (reconstruction of shore habitats)	- modification of shore conditions by easing anthropogenic pressures	- repopulation of waters from aquaculture farms with valuable fish species - reducing contamination from terrestrial sources	- stop the reduction of natural habitats and destruction through contamination from terrestrial sources	- erosion, pollution and modification of physical conditions of the coast	- conservation of structures and natural conditions	- exploitation on agro-ecology basis - enabling coordination with development and energy sector	- forests products are more appreciated - forest land protected from illegal developments	- impacts from non-indigenous species of flora and fauna - impact on water quality and biodiversity		
Coastal habitats	Freshwater habitats				Coastal habitats					Lagoons, Estuaries (NW), Forests, Cliffs (SE)	
Specific habitats	Running water (rivers, creeks)		Standing water (marshes, lakes and lagoons)		Supra-littoral rocks/cliffs		Grass areas	Beaches/dunes	Farming land, forests	Coastal wetlands (about 10 000 km ²), Forests, Farming land	
Domain	Healthy and resilient marine ecosystems - biodiversity and stock improvement, ecological recycling										
Subdomain	Benthic ecosystems - sand, mud and gravel				Benthic ecosystems - reefs and boulders				Sea grasses ecosystems	Pelagic ecosystems	
Processes	Plankton	Spawning, nursery	Mussel, shellfish	Benthic fish stock	Macro-algae, micro-algae	Clams and polychaetes	Benthic fish stock	Macroalgae and sea grasses	Pelagic fish stock	- invasive species, overfishing; valuable fish species have nearly disappeared	
Strategic direction	- improvement of species composition and control volume	- protection of spawning areas from pressures; - ensuring connectivity between sea areas	- protection/increasing the endemic species in denude areas	- assuring access of fish shoals to reproduction areas - protection improving habitats	- control and diversity of algal species - usage of biomass in bio-technologies	- maintain zoobenthic species especially those that are very adaptive and tolerant	- maintain / increase the stock of valuable fish species	- sea grass and brown macroalgae Cystoseira have to increase in shallow waters.	- increasing the fish stock by controlled fishing	- coastal waters and continental shelf is eutrophic - changes in the species diversity	
Effects on marine ecosystems	- reducing hypoxia/anoxia in the water columns and the bottom water layers	- easing spawning in shallow waters by reducing human pressures and loss of connectivity	- mussel aquaculture that improves the water quality by consumption of nutrients	- improvement of fish stocks and biodiversity	- avoid breaking macro-algae fields - prevent algal blooming resulting in eutrophication	- maintaining the biomass of opportunistic species at a sensible level	- facilitating access of fish shoals to shallow waters	- increase of specific spawning and hutching habitats	- balancing the food chain/networks	- invasive species, overfishing; valuable fish species diminished	
Marine habitats	Sandy-muddy bottom shallow-water areas				Sandy muddy, muddy- sandy, rocky sea beds				Muddy sea beds		
Specific habitats	Mudflats and sand flats		Large shallow inlets and bays		Mediolittoral rocks		Infralittoral		Circalittoral rocks		
									Open sea		

	MSP Scenario framework - Baseline Scenario - cumulative impact analysis										External context
Domain ¹	1. Population										
Subdomain	1.1 Population dynamic			1.2 Income of the population			1.3 Consumption				
Processes ³	Natural growth		Population volume	Working population	Dependent population/ welfare	Employment/ income	Goods and services	Ecosystem services	Housing demand	Migration	
Trends ⁴	- decreasing number of population ↓	- decreased number of households ↓	- reduction due to natural growth and migration ↓	- decreased share of working population ↓	- increased number of dependent population - constant rate of unemployment ↓	- increased income due to permanent jobs and shortage of work force - rising cost of labour ↗	- increasing demand for goods and services - demand for recreational activities ↗	- increased demand for ecosystem services ↗	- decreased demand for housing due to oversupply and decreasing number of households ↓	- decrease of migration with the changes on coastal conditions - changes in the global work force market	
Specific areas				- urban areas			- urban areas , resorts				
Domain	2. Economy										
Subdomain	2.2 Sector II				2.1 Sector I			2.3 Sector III		Military	
Processes	Industry and manufacture		Construction	Agriculture and husbandry	Living marine resources exploitation	Non-living resources exploitation	Tourism and recreational activities	Maritime and land transport	Services and utilities	Military and naval bases activities	- development of external trade, wholesale, transport, tourism, - overfishing in BS basin
Trends	- slow development of activities with increased profitability (transition to low volume technologies with high value); production based on shipped resources →		- moderate investment in developing housing estates and tourist accommodation →	- development of industrial and ecological agriculture; - limitations of land usage for agriculture →	- development of inland aquaculture; - increased exploitation of other living marine resources than fish. →	- increased and sustainable exploitation of local resources (energy, wind, mineral water, mud, rocks) ↗	- reduction of tourism development due to decreased attraction of investment and required level of quality. ↓	- the increase of shipping transport based on industrial production and agriculture; - development of land transport ↗	- the increase of market services through demand in retail, catering and utilities ↗	- modernization of fleets and facilities due to NATO commitments ↗	- external investments - increased offer of external resources outside the plan area: external tourist attractions, rough materials, inland aquaculture, etc. - reduction of cruise tourism due to regional insecurity
Effects ⁵ on economy	- diversification of activities and maintaining/increasing number of jobs;		- low investments may create regression in employment - persistence of small sized operations	- technological upgrading for increased production volume, diversity and products quality	- increasing small scale fisheries operations - marketing, source of quality food	- oil and gas resources exploitation will be sporadically or ceased - renewable energy, balneal, mineral resources	- quality upgrading of tourist infrastructure and development of recreational facilities - employment in the sector will drop	- development of naval transport and jobs creation; - easy access in the territory through transport services.	- development of services and infrastructure development	- employment in activity is steady	- the flow of external resources on coastal area is capitalized more outside it in the continental area
Land use ⁶	Built up areas			Exploitation areas			Infrastructures			Military areas	
Specific areas	Shipyards		Housing and facilities	Farm land	Fishing/ aquaculture areas	Sites of exploration /exploitation	Sea resorts	Ports, roads, rails, airfields	Water , energy and waste management	Military training and ports areas	Routes of transport Oil and HC pipes, telecom. cables
Domain	Coastal ecosystems										
Subdomain	Wetland ecosystems				Grassland ecosystems			Agro-ecosystems			
Processes	Birds nesting and migration		Vegetation	Water bodies for spawning and nursery	Insects, animals	Grass	Shifting dunes	Field cultures	Forests	- nutrient inputs from rivers discharges	
Trends	- diminishing number due to food resources reduction - migration to other habitats ↓		- persisting due to decrease pressures from real estate and protection →	- modification of extension areas for ecosystems functioning and reproduction →	- decrease of number and species ↓	- coastal erosion and anthropogenic pressures by touristic activities ↓	- continuous threats from development, erosion and loss of biodiversity →	- reduction of biodiversity by monoculture and mechanisation ↓	- decrease of volume and diversity in non-protected areas ↓	- constant pressures from climate change and economic activities - large surface of protected areas on the shoreline	
Effects ⁵ on coastal ecosystems	- impact on land-sea interactions between ecosystems (destruction of shore habitats)		- modification of shore conditions by anthropogenic pressures	- repopulation of natural waters from aquaculture farms - contamination from terrestrial sources	- reduction of natural habitats and destruction through contamination from terrestrial sources	- erosion, pollution and modification of physical conditions of the coast	- modifications of structure and natural conditions	- overexploitation due to increased demand - pressures from development and energy sector	- forests products are more appreciated - forest land endangered by developments	- impacts from non-indigenous species of flora and fauna - impact on water quality and biodiversity	
Coastal habitats ⁶	Freshwater habitats				Coastal habitats						Lagoons, Estuaries (NW), Forests, Cliffs (SE)
Specific habitats	Running water (rivers, creeks)		Standing water (marshes, lakes and lagoons)		Supra-littoral rocks/cliffs		Grass areas	Beaches/dunes	Farming land, forests	Coastal wetlands (about 10 000 km ²), Forests, Farming land	
Domain	Marine ecosystems										
Subdomain	Benthic ecosystems - sand, mud and gravel				Benthic ecosystems - reefs and boulders				Sea grasses ecosystems	Pelagic ecosystems	
Processes	Plankton	Spawning, nursery	Mussel, shellfish	Spawning, larvae	Macro-algae, micro-algae	Clams and polychaetes	Benthic fish stock	Macroalgae and sea grasses	Pelagic fish stock	- climate change - invasive species, overfishing; valuable fish species have nearly disappeared	
Trends	- alterations in species composition and abundance	- reduction and disturbance by beaches activities, natural calamities and pollution	- diminution of indigenous species populations	- diminution of spawning capacity due to pollution and loss of habitats	- decrease in biomass and diversity of algal species	- loss of almost all zoobenthic species besides those that are very adaptive and tollerant	- decrease of living marine resources	- areas covered by sea grass and by brown macroalgae Cystoseira have decreased in shallow waters.	- diminishing the fish stock by excessive fishing	- coastal waters and continental shelf is eutrophic - changes in the species diversity	
Effects on marine ecosystems	- hypoxia/anoxia in the water columns and the bottom water layers that lead to the mass mortality of all aquatic organisms	- removed from shallow waters by human pressures and from water bodies due to loss of connectivity	- replacement of endemic species with other invasive species in denude arias	- reduction of fish stocks and biodiversity	- breaking macro-algae fields and stranding on the beach in organic decomposition - algal blooming, eutrophication - anoxia, hypoxia	- increasing of biomass of opportunistic species	- disturbance of fish behaviour by keeping of fish shoals away from shallow waters - reduction of fish stocks of valuable species	- decrease of specifical spawning and hutching habitats	- unbalancing of food chain/networks	- invasive species, overfishing; valuable fish species diminished	
Marine habitats	Sandy-muddy bottom shallow-water areas				Sandy muddy, muddy- sandy, rocky sea beds				Muddy sea beds		
Specific habitats	Mudflats and sand flats	Large shallow inlets and bays		Mediolittoral rocks		Infralittoral		Circalittoral rocks		Open sea	

	MSP Scenario framework - cumulative impact analysis - Scenario A										External context
Domain ¹	1. Population										
Subdomain	1.1 Population dynamic			1.2 Income of the population			1.3 Consumption				
Processes ³	Natural growth		Population volume	Working population	Dependent population/ welfare	Employment/ income	Goods and services	Ecosystem services	Housing demand	Migration	
Trends ⁴	- decreasing number of population ↓	- decreased number of households ↓	- reduction due to natural growth and migration ↘	- decreased share of working population ↓	- increased number of dependent population - constant rate of unemployment ↘	- increased income due to permanent jobs and shortage of work force - rising cost of labour ↗	- increasing demand for goods and services - demand for recreational activities ↗	- increased demand for ecosystem services ↗	- decreased demand for housing due to oversupply and decreasing number of households ↘	- decrease of migration with the changes on coastal conditions - changes in the global work force market	
Specific areas				- urban areas			- urban areas , resorts				
Domain	2. Economy										
Subdomain	2.2 Sector II				2.1 Sector I			2.3 Sector III		Military	
Processes	Industry and manufacture		Construction	Agriculture and husbandry	Living marine resources exploitation	Non-living resources exploitation	Tourism and recreational activities	Maritime and land transport	Services and utilities	Military and naval bases activities	- development of external trade, wholesale, transport, tourism, - overfishing in BS basin
Trends	- slow development of activities with increased profitability (transition to low volume technologies with high value); production based on shipped resources →		- moderate investment in developing housing estates and tourist accommodation →	- development of industrial and ecological agriculture; - limitations of land usage for agriculture →	- development of inland aquaculture; - increased exploitation of other living marine resources than fish. →	- increased and sustainable exploitation of local resources (energy, wind, mineral water, mud, rocks) ↗	- reduction of tourism development due to decreased attraction of investment and required level of quality. ↓	- the increase of shipping transport based on industrial production and agriculture; - development of land transport ↗	- the increase of market services through demand in retail, catering and utilities ↗	- modernization of fleets and facilities due to NATO commitments ↗	- external investments - increased offer of external resources outside the plan area: external tourist attractions, rough materials, inland aquaculture, etc. - reduction of cruise tourism due to regional insecurity
Effects ⁵ on economy	- diversification of activities and maintaining/increasing number of jobs;		- low investments may create regression in employment - persistence of small sized operations	- technological upgrading for increased production volume, diversity and products quality	- increasing small scale fisheries operations - marketing, source of quality food	- oil and gas resources exploitation will be sporadically or ceased - renewable energy, balneal, mineral resources	- quality upgrading of tourist infrastructure and development of recreational facilities - employment in the sector will drop	- development of naval transport and jobs creation; - easy access in the territory through transport services.	- development of services and infrastructure development	- employment in activity is steady	- the flow of external resources on coastal area is capitalized more outside it in the continental area
Land use ⁶	Built up areas			Exploitation areas			Infrastructures			Military areas	
Specific areas	Shipyards		Housing and facilities	Farm land	Fishing/ aquaculture areas	Sites of exploration /exploitation	Sea resorts	Ports, roads, rails, airfields	Water , energy and waste management	Military training and ports areas	Routes of transport Oil and HC pipes, telecom. cables
Domain	Coastal ecosystems										
Subdomain	Wetland ecosystems				Grassland ecosystems			Agro-ecosystems			
Processes	Birds nesting and migration		Vegetation	Water bodies for spawning and nursery	Insects, animals	Grass	Shifting dunes	Field cultures	Forests	- nutrient inputs from rivers discharges	
Trends	- diminishing number due to food resources reduction - migration to other habitats ↓		- persisting due to decrease pressures from real estate and protection →	- modification of extension areas for ecosystems functioning and reproduction →	- decrease of number and species ↓	- coastal erosion and anthropogenic pressures by touristic activities ↓	- continuous threats from development, erosion and loss of biodiversity →	- reduction of biodiversity by monoculture and mechanisation ↓	- decrease of volume and diversity in non-protected areas ↓	- constant pressures from climate change and economic activities - large surface of protected areas on the shoreline	
Effects ⁵ on coastal ecosystems	- impact on land-sea interactions between ecosystems (destruction of shore habitats)		- modification of shore conditions by anthropogenic pressures	- repopulation of natural waters from aquaculture farms - contamination from terrestrial sources	- reduction of natural habitats and destruction through contamination from terrestrial sources	- erosion, pollution and modification of physical conditions of the coast	- modifications of structure and natural conditions	- overexploitation due to increased demand - pressures from development and energy sector	- forests products are more appreciated - forest land endangered by developments	- impacts from non-indigenous species of flora and fauna - impact on water quality and biodiversity	
Coastal habitats ⁶	Freshwater habitats				Coastal habitats						Lagoons, Estuaries (NW), Forests, Cliffs (SE)
Specific habitats	Running water (rivers, creeks)		Standing water (marshes, lakes and lagoons)		Supra-littoral rocks/cliffs	Grass areas	Beaches/dunes	Farming land, forests		Coastal wetlands (about 10 000 km ²), Forests, Farming land	
Domain	Marine ecosystems										
Subdomain	Benthic ecosystems - sand, mud and gravel				Benthic ecosystems - reefs and boulders			Sea grasses ecosystems	Pelagic ecosystems		
Processes	Plankton	Spawning, nursery	Mussel, shellfish	Spawning, larvae	Macro-algae, micro-algae	Clams and polychaetes	Benthic fish stock	Macroalgae and sea grasses	Pelagic fish stock	- invasive species, overfishing; valuable fish species have nearly disappeared	
Trends	- alterations in species composition and abundance	- reduction and disturbance by beaches activities, natural calamities and pollution	- diminution of indigenous species populations	- diminution of spawning capacity due to pollution and loss of habitats	- decrease in biomass and diversity of algal species	- loss of almost all zoobenthic species besides those that are very adaptive and tollerant	- decrease of living marine resources	- areas covered by sea grass and by brown macroalgae Cystoseira have decreased in shallow waters.	- diminishing the fish stock by excessive fishing	- coastal waters and continental shelf is eutrophic - changes in the species diversity	
Effects on marine ecosystems	- hypoxia/anoxia in the water columns and the bottom water layers that lead to the mass mortality of all aquatic organisms	- removed from shallow waters by human pressures and from water bodies due to loss of connectivity	- replacement of endemic species with other invasive species in denude arias	- reduction of fish stocks and biodiversity	- breaking macro-algae fields and stranding on the beach in organic decomposition - algal blooming, eutrophication - anoxia, hypoxia	- increasing of biomass of opportunistic species	- disturbance of fish behaviour by keeping of fish shoals away from shallow waters - reduction of fish stocks of valuable species	- decrease of specifical spawning and hutching habitats	- unbalancing of food chain/networks	- invasive species, overfishing; valuable fish species diminished	
Marine habitats	Sandy-muddy bottom shallow-water areas				Sandy muddy, muddy- sandy, rocky sea beds			Muddy sea beds			
Specific habitats	Mudflats and sand flats	Large shallow inlets and bays		Mediolittoral rocks		Infralittoral	Circalittoral rocks		Open sea		



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Marine spatial plan for the cross-border area Mangalia Shabla



Strategy of the marine cross-border area



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Marine spatial plan for the cross-border area Mangalia Shabla

Volume 5

Strategy of the marine cross-border area

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Strategy of the marine cross-border area

Introduction

This Marine Spatial Plan is a strategic long-term instrument for the Mangalia - Shabla marine area, organizing economic activities and ecosystem protection which, for most purposes, covers more than 10-year period to year 2025-2030. It is concerned with all aspects of natural, economic and physical structure, but it is distinguished by the following characteristics:

It does not attempt an in-depth analysis of all sectors of marine aspects: this is essentially the job of the various public bodies and agencies. Instead, the objective of the Plan is to be comprehensive and to examine each sector in sufficient detail to ensure that individual sectorial policies are as compatible as possible with those of other sectors. In this sense, it is basically a coordinating plan.

As well as being strategic in an analytical sense, it is strategic in a physical sense. It covers the whole territorial waters afferent to the Mangalia - Shabla coastal area and for the most part, is expressed in terms of areas, zones and routes rather than sites. It provides the context for the subsequent more detailed plans.

Although many of its analyses and recommended policies are non-physical, its basic concern is with marine area - essentially what should be developed where, when and how.

It is not a plan for the total restructuring of the marine areas' fabric and way of existence. The marine areas are what they are, and the broad disposition of habitats and activity places will remain largely as they are now. Planning has been defined as cooperation with the inevitable: the Plan seldom seeks to reverse trends, but rather to divert them where this seems to be beneficial. In the case of MSP Mangalia - Shabla the natural environment has priority, in order to restore the ecosystem and to intensify the exploitation of the resources and opportunities offered by the sea

It is essentially an enabling plan. The inclusion of some forecast or proposals does not mean that it will happen, particularly if applicable to the natural processes and private sector. Rather the Plan says if and when this particular demand arises, this is where and how it should be accommodated.

The MSP is not a static instrument. Changes in the various sectors of activity with which it deals will be monitored and amendments to the Plan will be made when this seems appropriate.

1. Common strategy and action plan

1.1. Spatial vision

The strategic vision of the marine spatial plan is based on the awareness of the sea area as a combined space, where all elements (natural processes, human activities and structures), are interrelated. The marine ecosystem, its network of habitats and processes, ensure natural resources required and conditions for development of maritime sectors, economic growth and benefits for the people. At the same time, impacts from the economic activity affects the state of the marine ecosystem and thereby its capacity to ensure important resources for



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communities, including the opportunities for jobs and ecosystem services. Similarly, the maritime sectors and their development potential are interconnected – these can be united by a common infrastructure, e.g., ports and energy networks, as well as the space where various business interests can live together.

The vision of the sea-use development characterizes the anticipated situation by the year 2020 - 2030, by reflecting options for sustainable use of the marine space without jeopardizing the viability of the marine ecosystem. The formulation of a common strategic vision for the Black Sea is crucial step in implementation of MSP process. Such common vision should have a long-term perspective; provide a holistic cross-sectorial view on issues that are often regarded separately; facilitate the stakeholder involvement and help to communicate benefits of the MSP process.

The main pillars of the Black Sea Basin strategic vision are the four dimensions of the sustainable development of coastal and marine areas: a healthy environment, the “blue” economy, the social well-being and good governance, dealing with the cross-cutting issues of climate change, marine knowledge and cross-border cooperation.

A healthy marine environment and a resilient ecosystem as well as a safe place to live were acknowledged as the main cross-cutting priorities during the planning process and the discussions with the key stakeholders for development of the Maritime Spatial Planning (MSP). A sustainable use of marine living resources, tourism and production based on shipped resources were nominated as priorities from the economic sectors.

The overall analysis revealed that unless economic sustainability is closely related to environmental sustainability, it is not possible to foresee a uniform and high level standard of living in the Black Sea region. With this understanding the most relevant the most relevant strategic approach to the Mangalia - Shabla marine area MSP is to promote a sustainable use of resources and protection of the marine ecosystem, as a basis for economic growth and welfare of coastal communities.

Therefore the spatial vision of the marine spatial plan should be formulated as follows:

Achieve a healthy marine ecosystem while adapting to climate change and supporting a sustainable economic growth of the maritime sectors, related to the increase of the ecosystem services, with an integrated and innovative management of the marine resources, leading to well-being of the coastal communities.

1.2. Principles and goals

The process of strategy formulation for the maritime spatial plan has taken into consideration the following principles related to the marine areas development:

a. Environment principles

The ecosystem integrity principle

This essential principle implies a primary focus on maintaining ecosystem structure and functioning. From this general principle are derived three specific principles:



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- Maintaining or restoring indigenous species diversity, composition, and functional redundancy
- Maintaining populations of key species
- Maintaining habitats attributes

The integration principle

Integration among sectors enables to go beyond sector policies, plans and legal instruments and provides win-to-win solutions for more than a single use of the sea. Integration among levels of government can help create complementary and mutually reinforcing decisions and actions

The long term perspective principle:

Plans should be based on long term visions of a comprehensive nature, an underlying comprehensive vision for maritime space development, vertical and horizontal coordination of the given plan with other policies, planning horizon and existence of alternative scenarios of the future use of the sea area.

Scientifically-based principle

An important effort should be put in developing knowledge, acquiring and processing data in forms really useful for the decision-making process, including among the other thematic issues of current and future uses and maps of main conflicts.

The participation and transparency principle

The principle stresses the need to secure participation of all relevant authorities and stakeholders as well as general public in maritime spatial planning initiatives at the earliest possible stage.

Cross-border cooperation principle

Cooperation in MSP is essential at all levels: methodological (e.g. common methods, data and information sharing, best practice exchange, etc.), strategic (elaboration of a common vision; definition of shared principles, objectives and targets; cross-sectorial planning), implementation (including shared monitoring, common indicators and evaluation).

b. Economic principles

Efficiency principle

The decisions in economy are made as trade-offs between efficiency and equity. Efficiency is achieved by getting maximum benefits from scarce resources, while equity means fairly distributing economic resources and outputs. Efficiency leads also to minimising the used resources by implementing a circular economy by slowing, closing, and narrowing material and energy loops.

Incentives principle

The economic agents respond to incentives, making decisions based on benefit or detriment.

Market principle

Markets are usually a good way to organize economic activity by allocating resources through decentralized decisions of many firms and households, as they interact in markets' sectors.

c. Social development principles

Equity principle



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Equity means distributing economic prosperity fairly among all the members of a society, reduce disparities between rich and poor, and achieve social justice.

Inter-generational equity principle

Environmental resources and ecosystems must be carefully managed and safeguarded so as to enhance the value of environmental assets for future generations, thereby equitably meeting their needs and allowing them to live.

Human development principle

Human development in harmony with the environment is fundamental to the achievement of sustainable development, so that individuals and societies are empowered to achieve positive social and environmental outcomes. Human wellbeing and quality of life, and environmental health should be the guiding objectives of economic development.

Sustainable consumption principle

Sustainable consumption is related with the sustainable and equitable resource use. Reduce and eliminate unsustainable patterns of consumption means reduce, reuse, and recycle the materials, acknowledge the scarcity of the natural resources and act accordingly.

Inclusion principle

All citizens should have access to information concerning the environment, as well as the opportunity to participate in decision-making processes and make use of tools that enable civil society to hold institutions at all levels to account.

d. Governance principles

Integrated planning principle

An integrated approach must be adopted at all levels to expedite the achievement of socio-economic and environmental sustainability through strategic planning with civil society and stakeholders and across all relevant government departments.

Accountability principle

Institutions at all levels (national and international) must be democratic and accountable, and make use of tools that enable civil society to hold them to account. In this regard, the access to justice by citizens for redress and remedy in environmental matters is a cornerstone of enhancing accountability.

Precautionary principle

Scientific uncertainty of environmental impacts shall not lead to avoidance of measures to prevent environmental degradation. The 'burden of proof' should lie with those claiming that there will not be significant environmental impacts.

The consistency of the strategic goals with the principles is discussed in the following section.

Environmental goals (Env).

Env 1. Achieve healthy ecosystems by maintaining / increasing the populations of key species and native species diversity.



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This goal is governed by the ecosystem integrity principle, in particular by the first sub-direction of the principle which promotes the restoration of indigenous species diversity, composition, and functional redundancy. Species diversity, from local to global scales, can affect multiple ecosystem functions including maintenance of productivity, resistance to and recovery from perturbations, capacity to maintain functional redundancies within an ecosystem, and stable food web dynamics.

The goal is also related to the second guideline of the ecosystem integrity principle: maintain populations of key species (species that are essential to marine ecosystem functioning). Research has shown that the dynamics of marine ecosystems are often driven by a few key species that have disproportionately strong effects on community structure and function.

Env 2. Maintain the marine habitats' integrity, diversity and heterogeneity.

Env 3. Assure and maintain marine habitats' connectivity in order to assure the well-functioning of the ecosystems.

The second and third environment goals are directed by the third guideline of the ecosystem integrity principle, which recognizes the fundamental importance of habitats' attributes: heterogeneity and spatial dynamics in promoting resilient and productive ecosystems.

The habitats' attributes identified as important to sustaining healthy marine ecosystems include habitat heterogeneity, habitat structure, habitat connectivity and land-sea connectivity.

Diverse habitats promote species diversity by acting as refuges from competition and predation, providing multiple sources of prey and settlement substrates, supporting species with specialized requirements and ameliorating environmental stressors. Maintaining habitat heterogeneity - the spatial arrangement and relationships among habitat patches across the seascape - is also critical to ecosystem functioning.

Habitat heterogeneity influences connectivity among marine habitats and land-sea habitats facilitates the successful movement of individuals among multiple locations throughout their lifetime, being also important for supporting the exchange of organisms and materials among habitats.

The environmental goals are related to the scientifically-based and the long term perspective principle. All ecosystems and habitats are not created equal, nor are they static, therefore these processes must be studied constantly and changes must be expected after long periods of time. The exploration of the sea environment require a comprehensive and multidisciplinary approach, the ecosystem structure can be seen as a nested hierarchy, with processes occurring over a range of spatial scales from larger to smaller. Therefore cooperation in research, marine spatial planning and implementation is essential at all levels, the necessity of collaboration being promoted by the cross-border cooperation principle.

Economic goals (Eco)

Eco 1. Realise a thriving maritime ("blue") economy by efficiently use the resources of the sea and at the same time safeguarding biodiversity.

The sea is a reservoir of economic resources which were not yet fully explored and exploited.



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Up to now, the exploitation of marine resources in economic activities was mostly in the primary sector by fisheries, aquaculture, oil and minerals exploitation. The goal for growth of the marine economy is consistent with the efficiency principle which recommends a complete and sustainable use of the marine resources.

Research and development of adequate/new technologies and techniques are important factors for achieving this goal is through the involvement of the scientific community and the entrepreneurs in these activities in order to make the shift to a higher level of the economy.

Eco 2. Achieve a sustainable development of economic activities by focussing on high value products and harnessing the market opportunities.

To obtain a sustainable development of economic activities, the governance structures designed to incorporate the needs of multiple users and sectors, must focus on endorsing the most attractive activities (incentives principle), available in the area, in order to build a sound business environment and a close cooperation between decision-makers in the different sectors. The most promising activities/markets in the future, must be assessed on indicators such as ‘innovativeness’, potential for competitiveness, employment creation and sustainability considerations.

The complexity of the economic environment is not conceivable without an efficient system of information and communication between economic agents, provided by the market structures. By making MP goals consistent with the market principle, the policy and planning environment must facilitate economic growth by delivering business-friendly and robust governance, which is supportive of private investment and entrepreneurship.

The economy orientation will also allow striking a balance between protecting the marine ecosystems and maximising the use of its resources as a source of economic growth.

Population goals (Pop)

Pop 1. Create social inclusion by assuring permanent jobs and job creation through professional qualification and reconversion of workforce.

Creating a maritime economy is not conceivable in the absence of the human factor which must be considered as essential in achieving the MSP goals. The human development principle promotes a sustainable use of the human resources by education, training and job creation in order to obtain social wellbeing and quality of life, though economic growth . The inclusion principle is also related to this goal, by encouraging the maximal integration of work force in economic activities, which must operate across a large spectrum of sectors at varying levels of expertise. A skilled and experienced workforce that adapts to changing requirements and new opportunities is a pre-requisite for achieving our vision and goals.

Pop 2. Achieving population well-being by sustainable consumption and equitable distribution of wealth and ecosystem services.

The economic growth is usually followed by an increase of consumption; consequently the wealth, as a result of economic efficiency, must be equitable distributed (equity principle) between population members, in order to achieve social justice and the incentives for further employment. This guideline is related to the sustainable consumption principle which



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endorses the limitation of resource usage, especially the natural ones, while stimulating the reducing, reusing, and recycling the goods and materials used in households. This desiderate is achievable through consumers' information and education related to environmental issues. The inter-generational equity principle refers also to the rational consumption of resources, but from a temporal viewpoint, it promotes sustainability by enhancing the value of economic and environmental assets for the use of the future generations.

Good governance and maritime safety and surveillance of the ecosystems and sea resources are vital to achieving MSP vision and goals. Cross-sectorial integrated marine policy, planning and decision-making at the various levels of governance (international, national, regional and local) are a vital component of harnessing the sea wealth. The delivery of more efficient and effective public services; the removal of impediments where appropriate; and the provision of a robust planning and licensing framework, underpinned by robust legislation and regulation can support sustainable development and create a degree of certainty, as well as a safe and stable environment for business and consumers. Good governance, in relation with MSP implementation, is guided by some principles, significant for the process: integrated planning, accountability, precautionary principle and inclusion principle. A number of integrated administration delivery mechanisms have to be identified and the action plan will put in place a process that the government departments and agencies will use in developing integrated marine planning and policy.

The process of dialog of the authorities with the public is a continuous task in MSP achievement and implementation. There is a need to move towards more inclusive stakeholder participation in the management of the sea wealth, creating further opportunities for our citizens to make meaningful contributions to decision-making.

Directions of action

Taking into consideration the above mentioned guidelines for action in the marine area, a number of directions of action could be formulated for each strategic goal. The directions of actions contain several specific objectives, referring to a domain of activity. The specific objectives are the results that strategic actions need to achieve by implementing the plan.

Goal	Direction of action
Env 1. Achieve healthy ecosystems by maintaining / increasing the populations of key species and native species diversity	Env 1.1 Carry out an assessment and related works to provide an accurate representation of the marine ecosystems status. Set appropriate targets in the pursuit of good environmental status
	Env 1.2 Measures of management, conservation and rebuilding the populations and diversity of key and native species for long-term sustainable exploitation of marine biological resources
	Env 1.3 Reduce land originated pollution, pressures and impacts from human activities on marine ecosystems
Env 2. Maintain the marine habitats' integrity, diversity and heterogeneity	Env 2.1 Develop a common spatial data base (atlas) of the marine habitats with relevant information kept in a central GIS



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	Env 2.2 Maintain and where appropriate, expand key marine habitats, essential to assure a suitable level of diversity and heterogeneity
Env 3. Assure and maintain marine habitats' connectivity in order to assure the well-functioning of the ecosystems	Env 3.1 Assess the need for connectivity between marine habitats and between coastal and marine habitats
	Env 3.2 Measures of conservation, management and rebuilding the connection elements between habitats
Eco 1. Realise a thriving maritime ("blue") economy by efficiently use the ecosystem services and at the same time safeguarding biodiversity	Eco 1.1 Support the strategic marine economy, policy and discovery research, through cross-border collaboration in order to ensure an efficient use and management of the ecosystem services
	Eco 1.2 Develop and implement relevant measures that address marine opportunities; e.g. sustainable food production and processing, offshore services, products for health, shipping logistics and transport, minerals exploitation, biotechnology and offshore renewables
Eco 2. Achieve a sustainable development of economic activities by focussing on high value products and harnessing the market opportunities	Eco 2.1 Encourage a number of targeted and emerging business development opportunities which could provide economic growth, by focussing on high value products, while preserving biodiversity
	Eco 2.2 Develop and strengthen a common and sound market environment for the present and emerging activities related to a sustainable maritime economy
Pop 1. Create social inclusion by assuring permanent jobs and job creation through professional qualification and reconversion of workforce.	Pop 1.1 Preserve and build capacity (employees) to meet the needs of the maritime sector; e.g. through tailored education, training programmes and professional reconversion in marine activities and research for capacity building
	Pop 1.2 Maintain job creation in marine activities through: business supports, provision of specialist marketing and investment advice, market intelligence and consumer research and information (employers)
Pop 2. Achieving population well-being by sustainable consumption and equitable distribution of wealth and ecosystem services.	Pop 2.1 Develop information programmes that create an awareness of the sea wealth and the rational utilisation of existing marine resources and ecosystem services for all the coastal communities
	Pop 2.2 Implement systems of encouraging sustainable consumption of marine resources and reducing the human pressures on marine environment.



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1.3. Strategic objectives and action plan

(Common strategy for cross-border area Mangalia – Shabla)

Direction of action	Specific objectives
Marine environment	
Env 1.1	Env 1.1.1 - Assess the status of key marine ecosystems by coordinated scientific research and monitor the progress in achieving the good environmental status
	Env 1.1.2 Develop a common activity of monitoring ecosystems' status, which will include the collation of all relevant information into a central system.
Env 1.2	Env 1.2.1 - Implement common actions for restoring and improve marine biota in marine ecosystems
	Env 1.2.2 - Increase the stocks of living marine resources especially of the commercial native fish species
	Env 1.2.3 - Assure a coordinated management and control of the activities using the marine ecosystems to act in ways which help to achieve the good environmental status
Env 1.3	Env 1.3.1 - Reduce land originated pollution processes that affects the water quality and marine ecosystems
	Env 1.3.2 - Reduce land originated pressures and impacts on marine ecosystems and habitats
Env 2.1	Env 2.1.1 - Realise a precise screening of habitats (mapping and status) in the area and a common spatial data base at the disposal of planning and monitoring authorities
	Env 2.1.2 - Asses the problems of habitats in order to restore and increase their suitability to the marine ecosystems
Env 2.2	Env 2.2.1 - Management plans for solving physical problems of key habitats and landscapes (threats, damages, destruction) in order to restore their diversity and heterogeneity
	Env 2.2.2 - Implement measures for increasing/restoring the diversity and heterogeneity of marine habitats and landscapes
Env 3.1	Env 3.1.1 - Establish the needs for connectivity between marine habitats and ecosystems identify obstructions, inhibitive factors and land - sea interaction
Env 3.2	Env 3.2.1 - Implement measures for improvement/conservation of habitats' connectivity
	Env 3.2.1 - Establish/improve connectivity between marine and coastal habitats
Economy	
Eco 1.1	Eco 1.1.1 - Asses scientific research domains and approaches in which the economic activities, based on knowledge and innovation, could provide significant results
	Eco 1.1.2 - Develop associations between companies and research institutions for collaboration and knowledge transfer in the field of marine economy
Eco 1.2	Eco 1.2.1 - Select local businesses interested in developing new opportunities in marine "blue" economy



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	Eco 1.2.2 - Launch a number of calls for projects in future marine enterprises and infrastructures which could sustainable use marine resources in an innovative way
Eco 2.1	Eco 2.1.1 - Use incentives for encouraging the local businesses to develop activities by focussing on high value products, while preserving marine biodiversity
	Eco 2.1.2 - Reduce/relocate economic activities that adversely affect the habitats and ecosystems (coastal and marine)
Eco 2.2	Eco 2.2.1 - Study the market opportunities for the local products and services
	Eco 2.2.2 - Introduce instruments including management, economic and legal to ensure increased market results of local marine economy
Population	
Pop 1.1	Pop 1.1.1 - Plan for the appropriate human resources to efficiently and effectively meet the demands of future labour market in relation to the development of local marine economy
	Pop 1.1.2 - Develop higher education, vocational and professional training and professional reconversion programmes to meet the identified needs of marine economy
Pop 1.2	Pop 1.2.1 - Encourage and facilitate a number of targeted business leaders/investors to progress in employing local work force and knowledge in the marine economy
Pop 2.1	Pop 2.1.2 - Initiate outreach programmes that create an awareness of the sea wealth and marine economy
Pop 2.2	Pop 2.2.1 - Inform communities and customers about the sustainable ecosystem services consumption
	Pop 2.2.2 - Stimulate public concern for the living marine resources regeneration and related activities for the marine environment

Action plan

The marine spatial development strategy includes an action plan consistent with the analysed domains and their components. The action plan (known also as a program of measures) is a coherent and correlated set of provisions for the spatial development of the plan area, structured in stages and assigning responsibilities for implementation.

The actions are related to the plan goals and to the specific objectives of each domain, being concrete ways of achieving them, by delimiting specific areas of intervention in the marine space.

The spatial plan actions have a spatial and procesual dimension, related to the ecological economic and social domains; these are supported by administrative and legal structures and are organized by phases of determined duration: short term, medium term and long term.

The actions are consistent with the Key Types of Measures (Annex 2) for Marine Strategy Framework Directive, listed in the document “Programmes of measures under the Marine Strategy Framework Directive - recommendations for implementation and reporting” adopted in 2014 by Marine Directors of the European Union and associated countries.



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Action plan

Specific objectives	Actions/location	Timeline	Responsible/ involved organizations**
Marine environment			
Direction of action: Env 1.1 Carry out an assessment and related works to provide an accurate representation of the marine ecosystems status. Set appropriate targets in the pursuit of good environmental status			
Env 1.1.1 - Assess the status of key marine ecosystems by coordinated scientific research and monitor the progress in achieving the good environmental status	Research, improvement of knowledge base reducing uncertainty *	Mid-term	IMR, ME, MEW
	Study, develop and introduce common methodologies to assess the condition of marine ecosystems status by coordinated scientific research	Mid-term	
Env 1.1.2 Develop a common activity of monitoring ecosystems’ status, which will include the collation of all relevant information into a central system.	Perform causal chain analyses, in trans boundary context, in order to find out root causes of individual problems of marine ecosystems	Mid-term	
	Set appropriated management targets and monitoring indicators in order to achieve the good environmental status	Mid-term	
Direction of action: Env 1.2 Measures of management, conservation and rebuilding the populations and diversity of key and native species for long-term sustainable exploitation of marine biological resources.			
Env 1.2.1 - Implement common actions for restoring and improve marine biota in marine ecosystems	Reducing pollution, pressures and losses of priority substances	Long-term	ME, MEW, IMR, FLAGs
	Measures to restore and conserve marine ecosystems, including habitats and species		
	Measures to reduce other types of biological disturbance, including death, injury, disturbance, translocation of native marine species		
Env 1.2.2 - Increase the stocks of living marine resources especially of the commercial native fish species	Measures to prevent or control the adverse impacts of fishing and other exploitation/removal of animal and plants	Long-term	MARD, MAFF, FLAGs
	Measures to reduce the introduction and spread of non-indigenous species and diseases in the marine environment, control and reduce their adverse impacts		
Env 1.2.3 - Assure a coordinated management and control of the activities using the marine	Set common management programmes that influence the amount of human activity that is permitted	Long-term	IMR, MARD, MAFF



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ecosystems to act in ways which help to achieve the good environmental status	Mitigation and remediation management tools which guide human activities to restore damaged components of marine ecosystems		
	Measures to reduce biological disturbances in the marine environment from the extraction of species, including incidental non-target catches		
Direction of action: Env 1.3 Reduce land originated pollution, pressures and impacts from human activities on marine ecosystems			
Env 1.3.1 - Reduce land originated pollution processes that affects the water quality and marine ecosystems	Reduce local water contamination and eutrophication: - reducing pollution, pressures and losses of priority substances (e.g. reduce nutrient pollution from agriculture) - construction or upgrades of wastewater treatment plants - remediation of contaminated sites (historical pollution including sediments, groundwater, soil) - measures to prevent or control the input of pollution from urban areas, transport and built infrastructure - measures to reduce interferences with hydrological processes in the marine environment - aquifers pollution	Long-term	ME, MEW, MWF, MH
Env 1.3.2 Reduce land originated pressures and impacts on marine ecosystems and habitats	Measures to prevent or control the adverse impacts of tourism and recreation including angling and diving	Mid-term	MTo, MC
	Measures to reduce litter in the marine environment: - plastic products (beaches and built up areas) - micro particles (cosmetics and sewage) - other materials (construction materials, metals)	Mid-term	ME, MEW, MTo
Direction of action: Env 2.1 Develop a common spatial data base (atlas) of the marine habitats with relevant information kept in a central GIS			
Env 2.1.1 - Realise a precise screening of habitats (mapping and status) in the area and a common spatial data base at the disposal of plan and monitoring authorities	Realise seabed mapping and data collection as key enablers for scientific use and business development	Mid-term	IMR, MRI
	Realise a study of marine landscapes with the purpose of developing these assets for cruising tourism and recreation	Short-term	MTo, MRDPW
Env 2.1.2 - Asses the problems of habitats in order to restore and increase their suitability to the marine ecosystems	Establish habitats' influential factors and problems as well as a list of critical habitats for threatened species	Mid-term	IMR, IBER-BAS
Direction of action: Env 2.2 Maintain and where appropriate, expand key marine habitats, essential to assure a suitable level of diversity and heterogeneity			



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Env 2.2.1 - Management plans for solving physical problems of key habitats and landscapes (threats, damages, destruction) in order to restore their diversity and heterogeneity	Investigate and asses the diversity and heterogeneity of marine habitats and landscapes	Mid-term	IMR
	Establish management plans for increasing/restoring the diversity and heterogeneity of marine habitats and landscapes	Mid-term	ME, MEW
Env 2.2.2 Implement measures for increasing/restoring the diversity and heterogeneity of marine habitats and landscapes	Measures to reduce physical damage in marine waters / Measures to reduce physical loss of seabed habitats in marine waters Measures to reduce sediment from soil erosion and surface run-off	Long-term	ME, MEW, MARD, MAFF, IO-BAS, IBER-BAS
Direction of action: Env 3.1 Asses the need for connectivity between marine habitats and between coastal and marine habitats.			
Env 3.1.1 - Establish the needs for connectivity between marine habitats and ecosystems identify obstructions, inhibitive factors and land - sea interaction	Assess the needs for connectivity between marine habitats in order to assure the flows to spawning and feeding areas	Short-term	IMR
	Study the necessity of creation of new and/or expansion of existing protected areas, in order to increase habitats' connectivity	Mid-term	IMR
Direction of action: Env 3.2 Measures of conservation, management and rebuilding the connection elements between habitats			
Env 3.2.1 - Implement measures for improvement/conservation of habitats' connectivity	Improvements in flow regime and/or establishment of ecological flows	Long-term	ME, MWF, MEW
	Improving longitudinal continuity (e.g. establishing fish passes, demolishing old coastal defence works)		
Env 3.2.1 - Establish/improve connectivity between marine and coastal habitats	Improve flows between marine areas	Mid-term	
	Improve flows between marine habitats and coastal terrestrial habitats	Long-term	
Economy			
Direction of action: Eco 1.1 Support the strategic marine economy, policy and discovery research, through cross-border collaboration in order to ensure an efficient use and management of the marine resources			
Eco 1.1.1 - Asses scientific research domains and approaches in which the economic activities, based on knowledge and innovation, could provide significant results	Enable the focusing of research resources on priority areas for development of the marine sector	Short-term	MRI, IMR
	Initiate research projects on priority themes of economic development based on local marine resources (e.g. living resources, oil and gas, sand beaches/dunes for tourism)	Mid-term	IMR, EAFA
Eco 1.1.2 - Develop associations between companies and research institutions for	Enable necessary collaboration between institutions, agencies and companies, if needed develop clusters	Long-term	MRDPAEF, MRDPW



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collaboration and knowledge transfer in the field of marine economy	Improve the commercialisation of research results with significant economic effect	Long-term	MRI, IMR
Direction of action: Eco 1.2 Develop and implement relevant measures that address marine opportunities; e.g. sustainable food production and processing, offshore services, products for health, shipping logistics and transport, minerals exploitation, biotechnology and offshore renewables			
Eco 1.2.1 - Select local businesses interested in developing new opportunities in marine “blue” economy	Establish programs for the development local marine economy	Short-term	MBECE, LC
	Asses business plans for developing activities in the marine area and corresponding EIAs	Short-term	MARD, MBECE
Eco 1.2.2 - Launch a number of calls for projects in future marine enterprises and infrastructures which could sustainable use marine resources in an innovative way	Shipping, ports and services Marine infrastructures Maritime transport services	Mid-term	MT, BPIC
	Aquaculture on-shore and off-shore Cruising tourism, ecotourism and leisure Marine renewables - wind, sun and currents	Long-term	MARD, EAFA, MTo, MEn
Direction of action: Eco 2.1 Encourage a number of targeted and emerging business development opportunities which could provide economic growth, by focussing on high value products, while preserving biodiversity.			
Eco 2.1.1 - Use incentives for encouraging the local businesses to develop activities by focussing on high value products, while preserving marine biodiversity	Development of: seafood production, maritime commerce and ship leasing, marine and coastal tourism and leisure, ports and maritime transport services, maritime manufacturing, engineering, marine ICT, biotechnology, pharmacology	Mid-term	MBECE, MTo, MARD
	Establish biodiversity preservation regulations for the local economic units using marine resources	Mid-term	ME
Eco 2.1.2 - Reduce/relocate economic activities that adversely affect the natural landscape, habitats and ecosystems (marine and coastal)	Assure free spaces on shore as buffers between marine and built-up areas, preserving sand beaches and dunes and restoring coastal habitats	Long-term	LC MRI, MRDPW
	Measures for the phasing-out of emissions, discharges and losses of priority hazardous substances from economic units	Long-term	LC, ME
Direction of action: Eco 2.2 Develop and strengthen a common and sound market environment for the present and emerging activities related to a sustainable maritime economy			
Eco 2.2.1 - Study the market opportunities for the local products and services	Acquire market and consumer trend data for specific marine sectors and socio-economic data on the effect of marine sector development	Mid-term	MARD, MAFF MBECE, MC



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	Develop a market strategies with a common message and themes that promotes marine local products and services for the investors	Mid-term	
Eco 2.2.2 - Introduce instruments including management, economic and legal to ensure increased market results of local marine economy	Instruments can be: economic incentives, communication strategies, entrepreneurs awareness raising and education, voluntary agreements with stakeholders, customers awareness raising and education	Mid-term	
		Long-term	
Population			
Direction of action: Pop 1.1 Preserve and build capacity (employees) to meet the needs of the maritime sector; e.g. through tailored education, training programmes and professional reconversion in marine activities and research for capacity building.			
Pop 1.1.1 - Plan for the appropriate human resources to efficiently and effectively meet the demands of future labour market in relation to the development of local marine economy	Assess the local human resources in relation to the local economic context (present and future)	Mid-term	MLSJ, MLSP
	Evaluate the demands of future labour market for the local economy	Mid-term	MARD, MAFF, RI
Pop 1.1.2 - Develop higher education, vocational and professional training and professional reconversion programmes to meet the identified needs of marine economy	Evaluate the needs of work force education and professional training in the domains related to the marine economy	Mid-term	MLSJ, MLSP, MC
	Develop professional reconversion programmes local work force in order to meet the needs of the transition to the “blue” marine economy	Long-term	MEN, MES, EI
Direction of action: Pop 1.2 Maintain job creation in marine activities through: business supports, provision of specialist marketing and investment advice, market intelligence and consumer research and information (employers)			
Pop 1.2.1 - Encourage and facilitate a number of targeted business leaders/investors to progress in employing local work force in the marine economy	Provide entrepreneurs with work force marketing and investment advice to improve employment in marine activities	Long-term	MBECE, MAFF, MC
	Survey the activity and provide support to small businesses in order to employ local work force in marine economy	Long-term	MLSJ, MLSP, MBECE,
Direction of action: Pop 2.1 Develop information programmes that create an awareness of the sea wealth and the rational utilisation of existing marine resources and ecosystem services for all the coastal communities			
Pop 2.1.2 - Initiate outreach programmes that create an awareness of the sea wealth and marine economy	Organise popular events: maritime festivals, sea gastronomy days, thematic fairs	Long-term	MC, FLAGs, SMEs
	Arrange visits of vessels and of marine economic infrastructures	Long-term	MND, FLAGs
	Presentations about marine protected areas.	Long-term	IMR, NGOs



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	Presentations on natural values of the coastal and marine landscape, with focus on sand beaches and dunes preservation		
Direction of action: Pop 2.2 Implement systems of encouraging sustainable consumption of marine resources and reducing the human pressures on marine environment.			
Pop 2.2.1 - Inform communities and customers about the sustainable ecosystem services consumption	Create suggestive media for informing people about the ecosystem services parameters and offer an suggestive overview of consumer habits	Mid-term	MC, ME, MEW
	Inform communities and customers about the damaging processes that affect ecosystem services (e.g. pollution, habitats' disturbance and damage, extraction of living resources)	Mid-term	ME, MEW, IMR
Pop 2.2.2 - Stimulate public concern for the regeneration of living marine resources and related activities for the marine environment	Organise environment protection campaigns of reducing loss and sustainable use of marine natural resources	Mid-term	ME, MEW, IMR
	Implement actions for environment protection and ecosystem services development with the local communities (cleaning beaches and marine litter, habitats' recovery and protection)	Mid-term	ME, MEW, MC

* Measures consistent with Key Types of Measures which need elaboration (Annex 2)

** List of acronyms of involved institutions in Annex 1



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Marine zoning

The methodology for the research and vision development represented in this plan is borrowed from the methodology used for spatial structural planning on land, even if the topic analysed in this process is different from the terrestrial planning.

In structural planning space is seen as an area of operational unity, in which spatial decisions need to be balanced against each other. In contrast with so-called 'end situation planning', structural planning does not determine what can and cannot be done on every single piece of space, but on a large scale basis.

The structural plan is rather a global and strategic vision on the desired spatial development of a particular area, a framework for sustainable spatial content represented by structural maps rather than detailed final planning maps.

Structural planning tries to detect large and smaller inter-connected units or 'structures' and structural elements and formulates these into a strategic vision that is relevant within the scope and scale of the studied area. The structural plan is intended to make provision for existing issues and problems as well as potential opportunities.

Another difference between structural plan and the geographically accurate representation of space is the use of so-called 'mental maps' of the studied area.

Mental maps are drawn up on the basis of things such as major infrastructures and/or activity areas, sub-areas with a distinct profile, which determine the spatial structure of a plan area.

Structural maps unlike GIS maps are not geographically accurate down to the last detail.

Rather they illustrate specifically chosen information so that planners and policy makers can easily handle the information.

The chosen level of detail illustrated on a structure map is determined by the scale of the studied area.

The dynamics of both natural as well as human activities determine the subdivision of the marine area in this part of the Black Sea. According to the type and intensity of their dynamics, the marine area is divided into activity zones and transit zones (routes).

Apparently, some activities do not occupy all their allocated space (both in time and space) and some activities or infrastructures can be perfectly combined without spatial or temporal conflicts. Nevertheless, future requirements for marine space will continue to increase.

Several future plans (e.g. for offshore wind parks or aquaculture) could illustrate this increasing demand for space within the plan area. This in turn will increase pressure on current uses and natural systems. It is important to note that the need for space changes in two directions. The fixed activities (such as wind energy, cables and pipelines, coastal defence, port structures, aquaculture and recreation) are gaining importance (and spatial occupation) in comparison with the mobile uses at sea. The mobile uses (such as fisheries, shipping, military use, maritime transport and dredging activities) do not increase their spatial occupation, but rather intensify their action in the zones they already occupy.

It is important to acknowledge the sea's specific characteristics. The MSP cannot just be seen as an extension of the land because the sea has a unique and typical structure and dynamics. It is not a space for activities that can no longer take place on land but an area of resources and opportunities which are not entirely exploited. One important difference is that the sea is borderless and there are no physical barriers to stop the spread of pollutants, the migration of organisms, or the transfer of sediments. Territorial planning is concerned with the control of rights to private space, whereas MSP is concerned with the control of uses in common sea space. Therefore, each activity needs to be examined in terms of whether it can be performed more effectively on land or in an alternative form.

The characteristics of the marine zones, developed in the Mangalia - Shabla strategic framework, are exposed in the following descriptions.



Activity zones

Small scale fishery

The entire territorial waters zone is valuable, either as fishing or as spawning ground. However, it is difficult to say that a fishing ground is rich or poor in fish as there are no concrete measuring results available. The nature of the fishing ground as well as other criteria, including the distance to the fishing point, the legislation as regards fishing prohibition, the right of way of other users in the area (such as the shipping lanes) and disturbing activities such as military use will determine where most of the small scale fishing will be done.

Incompatible areas:

- maritime recreational areas: sailing, diving, kayaking, wind surfing, trips
- dredging and dumping
- military exercise areas during the activities
- aquaculture areas

Compatible areas:

- wind farms
- coastal defence areas

Aquaculture

Aquaculture on the open sea is a rather innovative concept as previous European aquaculture experiments always took place in naturally protected bays or in closed inlets. The aquaculture on the open sea is currently still in its testing phase. An interesting aquaculture method and more environmental friendly could be to grow fish species on the mainland and to release them into the sea after the cultivation period. The process is conditioned by factors and risks related to the marine environment and human activities.

Soon it will become clear whether aquaculture on a larger scale in the plan area can be economically viable.

Incompatible activities:

- fishing;
- shipping traffic- sea-going or fishing vessels can destroy the aquaculture installations
- **High Protection Zones** in Natura 2000 sites
- diving;
- sailing, kayaking, motor boating;
- research activities.

Incompatible zones:

- anchorage areas;
- military zones;
- international shipping routes;
- dredged material dumpsites;
- areas for oil and gas exploitation;
- areas for recreation and for sports.

Compatible activities:

Aquaculture in combination with wind parks can offer possibilities to cultivate commercially interesting or new fish species.



Strategy of the marine cross-border area

Compatible zones:

Wind parks: wind parks offer interesting aquaculture possibilities. The area closed for fishing can be used as a place to release different fish species. In addition the combination of a wind park with mussel cultivation is possible as well. As wind parks are closed for shipping traffic there is no danger that the aquaculture will be damaged.

- areas with no strong currents and storms;
- areas with good quality of the seawater and the surrounding phytoplankton (as few heavy metals and PCBs as possible).

Highy 'strict' Protected Zones

Incompatible activities:

In the high protected areas all economic or disturbing activities are forbidden.

Compatible activities:

- scientific research
- ecosystem monitoring and safeguard

Maritime recreational areas - sailing, diving, kayaking, wind surfing, short trips

The coast is perfectly suited for recreational activities: one of the last remaining large natural sand beaches and wide dune areas. Hotel and catering industry near the beach are developed and there are a relatively large number of breakwaters and piers, which could serve marine recreational activities.

The development of ecotourism and recreational activities on sea could be new directions of economic grow in the area, which constitutes a complement for other seasonal activities, like fishing, maritime transport and balneal tourism.

Trips in small scale sailing vessels and wind surfing are significant activities to be developed on sea in relation with existing coastal structures (dykes, coastal defences) and the attractive landscapes.

Incompatible zones

- wind parks areas - wind parks influence the way people experience the coastal-marine landscape
- highly protected marine areas (some of the recreational activities – e.g. diving, kayaking , wind surfing - are possible with certain limits and regulations)

Compatible zones (possible multiple use)

- coastal defence sites: once the coastal defence is realised these sites offer new recreational and tourism possibilities.
- nature reserves: although recreation and tourism may affect coastal fauna and flora, nature reserves also represent attractive zones for ecotourism, which may have a sensitising effect with regard to nature and the environment and may strengthen support for new nature reserves.

Incompatible activities

- military practice
- coastal defence (beach nourishment) is undertaken as much as possible out of season so as to prevent conflicts with the tourist sector.
- other recreational activities: fishing from the shore can be dangerous to swimmers, surfers; motor boating for fishermen and anglers.
- fishing could be seriously disturbed by recreational vessels



Strategy of the marine cross-border area

HC exploration and exploitation areas

The presence of these fixed structures (small in size of their occupied surface) naturally hinders a number of other users in the performance of their functions. But in general it can be said that the impact on the marine environment and other users is minimal

Fishing areas

Romania has one of the smallest offshore fishing fleet of the entire Black Sea basin. Bulgaria is more advanced in the fishing activities, obtaining more landings than the Romanian fishermen. Most vessels fish in general in the EEZ and beyond the middle of the territorial waters, where less disturbing activities are located. Rich, unpolluted fishing grounds are required for a good, large and healthy catch.

Incompatible zones for fishing

- 'strict' marine protected areas
- marine traffic lanes
- wind parks.

Fishing can experience problems in:

- areas with shipwrecks;
- former industrial waste dumpsites;
- dredged material dumpsites.
- military practice areas during the exercises

Incompatible activities:

- sand and gravel extraction;
- military practice;
- dredging and dumping activities;
- recreational fishing;
- shipping traffic;
- diving.

Compatible zones

- areas with shipwrecks;
- wind parks;
- marine protected areas.

Fishing near wrecks, offshore wind farms and marine protected areas may become more attractive because these zones can serve as refuges for fishes.

Mobile wind turbines parks

Due to the depth of the sea in the vicinity of the shoreline, imposing deep foundations and the existing MPAs, at the moment no offshore wind parks have been constructed in the plan area. To avoid these conditions, mobile wind farms could be conceived and located at 4 - 6 miles offshore.

Incompatible activities:

Offshore wind parks cannot be constructed in or in the immediate vicinity of recognized shipping routes. The construction and maintenance of the farm will result in additional shipping traffic and laying of electric cables on the sea floor, which may result in a limited disruption of other shipping traffic and marine habitats.

Sand and gravel extraction is not possible in the vicinity of wind parks. Fishing in the vicinity of wind parks is not allowed.



Strategy of the marine cross-border area

Military practice and dredging activities are also impossible in the immediate vicinity of wind parks.

Compatible activities:

- tourism: wind parks may offer new possibilities for divers (specific fauna and flora) and for pleasure cruising;
- aquaculture: wind parks may also offer new aquaculture possibilities: wind parks are suitable for oyster and mussel cultivation and it is also possible to free cultivated fish species in the parks;
- fishing: wind parks may have a “shelter function” for fish, so that they develop into rich fishing grounds.

Highly protected areas

Incompatible activities:

- activities with a large impact on the natural ecosystem: fisheries, wind parks, coastal defence works, military practice
- sand or gravel extraction
- sea water extraction
- pollution from coastal and marine discharges
- dumping of dredged materials

Compatible activities:

- research of the ecosystems parameters: e.g. the ecological value assessed by means of the macrobenthos communities living in the upper strata of the seabed. The macrobenthos is generally seen as a parameter for the health of the environment as these communities are very sensitive to pollution and disturbance of their living environment.
- ecotourism

Military practice areas

Incompatible activities

- shipping traffic,
- fishing areas,
- sand and gravel extraction, dredging activities and dumping of dredged material,
- recreation/tourism, exploration of shipwrecks,
- building of coastal defences:

All these activities cannot take place in the practice zone or sector at the time of practice.

Incompatible zones

- wind parks
- highly protected areas
- shipping routes
- marine tourism and recreational areas

Routes

Coastal defence works

Certain coastal defence works can have positive or negative effects on ecologically valuable areas. For instance, soft coastal defence protects cliffs against erosion, and hard coastal defence constitutes a rocky substrate on which specific species can develop (mussels, oysters, seaweed, crustaceans, anemones). In general, the ecological value of the break waters increases in proportion to their length, height and number of microhabitats.



Strategy of the marine cross-border area

There are cases where coastal defence works change the hydrodynamics of the areas where they are constructed, hindering the transport of sediments along the coastline and resulting in burial of certain areas with sand while other areas lose some of their sediments.

Incompatible activities:

- military activities: no coastal defence works can be carried out during military activities.
- shipping traffic: certain coastal defence Works (especially in the vicinity of ports) can disturb the shipping traffic.
- tourism and recreation: beach recreation is impossible during coastal defence works. The spatial conflict is limited as most are carried out in the off-season. Certain hard coastal defence elements can also create risks for tourists (e.g. danger of slipping).

Compatible activities (possible multiple use):

- dredging works and sand and gravel extraction: dredged material (mostly originating from shipping routes) and extracted sand can be used for beach nourishment.
- shipping traffic: buoys, groined sand the like contribute to the discernibility of shipping routes and ports.
- tourism and recreation: once the coastal defence works are completed new tourism and recreation possibilities arise (beach fishing, boating, yachting).

Cables and pipelines

For the energy network infrastructure (oil, gas and high voltage) no connections are made along the coast at the present. Nevertheless, some terrestrial cables could be connected to sea cables of future wind turbine parks. The same situation could be envisaged for the oil and gas pipelines which will connect offshore exploitations to mainland facilities.

The telecommunication and power cables should be usually trenched into the seabed at a depth of 60 to 100 centimetres.

Incompatible zones for laying cables and pipelines

The laying of cables and pipelines is not allowed in the following zones: dredging and dumping sites, anchoring areas

The laying of cables and gas pipelines is not allowed in the following zones.

- dredging material dumping sites;
- anchoring areas
- dredging areas
- beam trawling areas (bottom trawling)

Furthermore, a safety zone of 250 metres for communication cables and 1,000 metres for gas pipelines applies outside these zones

Maritime transport and traffic lanes

Incompatible activities:

- sand and gravel extraction. Dredged material dumpsites: the sea bottom may rise as a result of dredged material dumping. This may obstruct shipping traffic.
- areas with shipwrecks: wrecks that are located in shallow water need to be salvaged or towed away so as to avoid collisions;
- location of cables and pipelines: cables and pipelines may be damaged if ships need to drop anchor in case of emergencies;
- areas for dredged material dumping. In practice dredged material is not dumped in shipping lanes;
- wind parks need to be located at a sufficient distance from the shipping lanes to avoid collisions;



Strategy of the marine cross-border area

Military practice areas: during military practice all shipping traffic is temporarily forbidden
Fishing: fishing vessels are considered obstacles for shipping traffic in the traffic separation schemes and other shipping routes.

Compatible activities:

- dredging the shipping lanes.
- recreational shipping.

Dredging and dumping sites

Dredging activities keep the seaports accessible; therefore these areas are confounded with the maritime transport lanes. The greater part of the dredged material is dumped back into the sea, not far from the dredged sites (the cheapest solution). While the dredging activities occur mainly in shallow waters, the dumpsites are supposed to be also in these areas, where important ecosystems exist.

Incompatible zones

- zones with cables and/or pipelines: it is legally forbidden to lay cables or pipelines near dumpsites. A minimum safety distance from cables and from pipelines must be applied. Cables and pipelines can be laid in the actual dredging zones but are generally dug in deeper by way of precaution;
- wind parks: dredging and dumping activities are not possible in the immediate vicinity of wind parks.
- dredged material in ports and in the vicinity of ports is often heavily polluted.
- benthos may change as a result of the dumping of dredged material

Incompatible activities

- military practice: dredging and dumping activities are forbidden during military exercises;
- fishing is not possible at times when dredging and dumping activities take place.

Compatible zones (possible multiple use)

Zones where sand or gravel is extracted. The dumped dredged material is not suitable for the building industry (concrete). Other dredged material (from the shipping lanes) is used for beach nourishment.



Annexes

Annex 1

List of acronyms

EIA - Environmental Impact Assessment
GES - Good environmental status
ICT - Information and communications technology
MPA - Marine Protected Areas
MSFD - Marine Strategy Framework Directive
MSP - Marine Spatial Plan

List of institutions involved in plan implementation

Romania

MRDPAEF - Ministry of Regional Development, Public Administration and European Funds
ME - Ministry of Environment: County Agency for Environmental Protection,
MWF - Ministry of Waters and Forests: National Administration "Apele Romane", Water Basin Administration - Dobrogea - Litoral (Water Management System Constanta)
MARD - Ministry of Agriculture and Rural Development: General Directorate for Fisheries - Management Authority for the Operational Program for Fisheries and Maritime Affairs, National Agency for Fisheries and Aquaculture
MT - Ministry of Transport: Romanian Naval Authority - ANR, National Company "Maritime Ports Administration Constanta" S.A.
MRI - Ministry of Research and Innovation: General Directorate Policies and RDI Programs
IMR - Institutes of Marine Research
MEc - Ministry of Economy: Shipyard Mangalia S.A., Shipyard 2 MAI S.A. Mangalia
MEu - Ministry of Energy: General Directorate Energy Policies
MBECE - Ministry for the Business Environment, Commerce and Entrepreneurship: Direction for Entrepreneurship and Programs for SMEs
MNE - Ministry of National Education: General Directorate Pre-University Management
MND - Ministry of National Defence: Staff of the Naval Forces
MLSJ - Ministry of Labour and Social Justice: County Agency for Employment
MTo - Ministry of Tourism: International Relations Department, Licensed travel agents
MC - Municipal Councils
NGO – Non-Governmental Organization
CR - Custodians of Marine Reservations
FLAGs - Fishing Local Action Groups
LC - Local councils, Mayors
RI - Research institutes
EI - Education institutions
SMEs - Small and medium sized enterprises



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Bulgaria

MRDPW - Ministry of Regional Development and Public Works – Directorate Public Works and Geo-protection and Directorate Spatial Planning and Administrative-Territorial Organization

MAFF - Ministry of Agriculture, Food and Forestry: Executive Agency of Fisheries and Aquaculture – Varna (**EAFA**)

MEW - Ministry of Environment and Water: Executive Environment Agency, Black Sea Basin Directorate – Varna, Regional Inspectorate for Environment and Water - Varna

IMR - Institutes of Marine Research

CR - Custodians of Marine Reservations

MTITC - Ministry of Transport, Information Technology and Communications: Executive Agency Maritime Administration (navigation and ports), Bulgarian Ports and Infrastructure Company

MEc - Ministry of Economy

MEn - Ministry of Energy: Energy Strategies and Policies for Sustainable Energy Development

MLSP - Ministry of Labour and Social Policy

MES - Ministry of Education and Science

MH - Ministry of Health

MTto - Ministry of Tourism: Directorate Programs and Projects in tourism, Directorate Management of Beaches

MC - Municipal Councils

NGO - Non-Governmental Organizations

RI - Research institutes

FLAGs - Fishing Local Action Groups

SMEs - Small and medium sized enterprises



Key Types of Measures and an indicative relationship to the MSFD and its GES Descriptors

N°	WFD KTM description	Indicative relevance to MSFD
1	Construction or upgrades of wastewater treatment plants	Reduction of nutrient loads & solid particles (D5, D10)
2	Reduce nutrient pollution from agriculture	Reduction of nutrient loads (D5)
3	Reduce pesticides pollution from agriculture	Reduction of contaminants loads (D8, D9)
4	Remediation of contaminated sites(historical pollution including sediments, groundwater, soil)	Reduction of contaminants loads (D8, D9)
5	Improving longitudinal continuity(e.g. establishing fish passes, demolishing old dams)	In relation to diadromous fish (D1) and sediments (D7)
6	Improving hydro-morphological conditions of water bodies other than longitudinal continuity (e.g. river restoration, improvement of riparian areas, removal of hard embankments, reconnecting rivers to floodplains, improvement of hydro-morphological condition of transitional and coastal waters, etc.)	Relevant (D7)
7	Improvements in flow regime and/or establishment of ecological flows	Relevant (D7)
8	Water efficiency technical measures for irrigation, industry, energy and households	Unlikely
9	Water pricing policy measures for the implementation of the recovery of cost of water services from households	Unlikely
10	Water pricing policy measures for the implementation of the recovery of cost of water services from industry	Unlikely
11	Water pricing policy measures for the implementation of the recovery of cost of water services from agriculture	Unlikely
12	Advisory services for agriculture	Relevant for nutrient and pesticide reduction (D5, D8, D9)
13	Drinking water protection measures	Sea water desalination (D7)
14	Research, improvement of knowledge base reducing uncertainty	could be applied to all descriptors
15	Measures for the phasing-out of emissions, discharges and losses of priority hazardous substances or for the reduction of emissions, discharges and losses of priority substances	Reduction of contaminant loads (D8, D9)
16	Upgrades or improvements of industrial wastewater treatment plants (including farms)	Reduction of nutrients, solid particles and contaminant loads (D5, D8, D9, D10)
17	Measures to reduce sediment from soil erosion and surface run-offs	Possibly relevant for the reduction of nutrients and sediments (D5, D7)



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18	Measures to prevent or control the adverse impacts of invasive alien species and introduced diseases	Relevant (D2)
19	Measures to prevent or control the adverse impacts of recreation including angling	Relevant (D2, D3, D10, D11)
20	Measures to prevent or control the adverse impacts of fishing and other exploitation/removal of animal and plants	Relevant (D1,D3, D4, D6)
21	Measures to prevent or control the input of pollution from urban areas, transport and built infrastructure	Reduction of pollution in general (D5, D8, D9, D10, D11)
22	Measures to prevent or control the input of pollution from forestry	Possibly relevant for the reduction of nutrient and contaminant loads (D5, D8, D9)
23	Natural water retention measures	Positive effects on nutrients and sediment transport (D5, D7)
24	Adaptation to climate change	When related to the coastal zone (D1, D4, D6, D7)
25	Measures to counteract acidification	Unlikely (WFD KTM refers to freshwater systems)

Key Types of Measures (KTMs) for the MSFD, supplementing the WFD KTMs

26	Measures to reduce physical loss ¹ of seabed habitats in marine waters (and not reported under KTM 6 in relation to WFD Coastal Waters)
27	Measures to reduce physical damage ² in marine waters (and not reported under KTM 6 in relation to WFD Coastal Waters)
28	Measures to reduce inputs of energy, including underwater noise, to the marine environment
29	Measures to reduce litter in the marine environment
30	Measures to reduce interferences with hydrological processes in the marine environment (and not reported under KTM 6 in relation to WFD Coastal Waters)
31	Measures to reduce contamination by hazardous substances (synthetic substances, non-synthetic substances, radio-nuclides) and the systematic and/or intentional release of substances in the marine environment from sea based or air-based sources
32	Measures to reduce sea-based accidental pollution
33	Measures to reduce nutrient and organic matter inputs to the marine environment from sea-based or air-based sources
34	Measures to reduce the introduction and spread of non-indigenous species in the marine environment and for their control
35	Measures to reduce biological disturbances in the marine environment from the extraction of species, including incidental non-target catches
36	Measures to reduce other types of biological disturbance, including death, injury, disturbance, translocation of native marine species, the introduction of microbial pathogens

¹ Measures relating to placement of infrastructure and landscape alterations that introduce changes to the sea-floor substratum and morphology and hence permanent loss of marine habitat.

² Measures which address other types of sea-floor disturbance (e.g. bottom fishing, gravel extraction) which can change the nature of the seabed and its habitats but which are not of a permanent nature.



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	and the introduction of genetically-modified individuals of marine species (e.g. from aquaculture)
37	Measures to restore and conserve marine ecosystems, including habitats and species
38	Measures related to Spatial Protection Measures for the marine environment (not reported under another KTM)
39	Other measures

Annex 3

Official documents of EU Maritime affaires

- Initiative for the sustainable development of the Blue Economy in the western Mediterranean (19/04/2017)
 - Framework for action
- Report on the Blue Growth Strategy: Towards more sustainable growth and jobs in the blue economy (31/03/2017)
- Communication from the Commission: Innovation in the Blue Economy: realising the potential of our seas and oceans for jobs and growth - COM(2014) 254/2 (13/05/2014)
 - Marine Knowledge 2020: roadmap accompanying the document
- Communication from the Commission: Blue Growth opportunities for marine and maritime sustainable growth (13.09.2012)
- Programmes of measures under the Marine Strategy Framework Directive - Recommendations for implementation and reporting (25/11/2014)
- Council Regulation (EC) 2371/2002 on the conservation and sustainable exploitation of fisheries resources under the Common Fisheries Policy
- Directive for the valorisation of shellfish areas (2006/113/CE)) on the quality required of shellfish waters
- Council regulation (EC) 199/2008 Common Fishery Policy concerning the establishment of a Community framework for the collection, management and use of data in the fisheries sector and support for scientific advice regarding the Common Fisheries Policy

Conclusions

The marine spatial plan for Mangalia - Shabla area is the product of a process which concluded that for the wellbeing of marine life and for enhancing the beneficial outcomes on coastal communities, **ecosystems services** have to be stimulated with diverse strategic actions.

In this respect, the priorities of this plan are in the domain of **marine environment protection** and **ecosystem services development**. Studies of these domains, in relation with their spatial parameters, are needed in order to take the appropriate actions which will result in improvements of local economy and impact on communities' interests.

Economic development is the purpose of each spatial plan and the sea is considered as a production space where many more resources can be exploited than at present.



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Accordingly, the maximisation of its exploitation is the priority in this plan by improving the ecosystem services provided by the sea. The different uses of the sea's wealth should be geared to complement one another in order to maximise the return on exploitation. If necessary, conflicting uses that do not contribute to the economic exploitation of the sea must yield in favour of exploitation, or even disappear.

Consequently, the following main spatial directions and priorities for development of the cross-border marine zone were outlined:

Protection of the natural wealth of shallow coastal zone and coastal habitats (marine protected areas).

In this trend attention is focused on safeguarding and strengthening the natural resources of the sea by protecting the habitats located in the shallow waters. Protection of the most valuable areas is therefore essential in order to improve spawning and growing areas for marine flora and fauna. Limitations would be imposed in 'marine protected areas' (MPA's), on different types of uses. Some activities would be prohibited in these MPAs. It is generally accepted that the shallow coastal zone (western continental shelf) would be suitable for such protection. The protected areas would be extended to land in order to protect beaches, wetlands and coastal habitats.

Moving activities to deeper sea and inland in order to protect the shore habitats.

Protecting the shallow waters and coastal zone implies that activities that were prohibited from taking place in these zones need to be relocated to other areas where they cause fewer nuisances to the ecosystem. This would lead to many activities being moved to deeper sea or coastal areas.

Reducing the intensity of activities that are harmful to nature, banning/reducing activities whose impact on nature is too large.

In some cases, relocating activities will not be sufficient to protect the natural value of the sea. Some activities will have to be reduced or transformed (e.g. transformation of the trawling fishery into more ecologically sound alternatives), and other functions will have to be banned completely because their impact on the ecosystem in the area is too large (e.g. fixed infrastructures that form an atypical rock-like habitat in the area, exploiting sand and gravel of the seashore).

Assuring the combined action of economic and ecological processes and the connected dynamics of the sea.

Dynamics means the constantly changing intensity, quantity and movement of natural elements including (amongst other things) the travel of fish shoals, the movement of sand and sediments, the transition between fresh and saltwater, water currents, wind directions, the spread of nutrients and biodiversity of the sea.

Dynamics also refers to temporal factors including: the periodicity of life cycles, weather phenomenon, changes from day to night and the passage of the seasons.



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Contrary to the natural preservation development, the use and consumption of natural resources is possible under this trend, provided that such use and consumption is controlled. In this manner the North Sea is treated as a storage room of resources where economy and ecology go hand in hand. Every use and exploitation is flexible or mobile, based on the natural dynamics of the sea. The emphasis in this direction is on mobile structures that can follow the sea's dynamics. Immobile structures are therefore limited and in some cases even prohibited.

1. Spatial vision

The strategic vision of the marine spatial plan is based on the awareness of the sea area as a combined space, where all elements (natural processes, human activities and structures), are interrelated. The marine ecosystem, its network of habitats and processes, ensure natural resources required and conditions for development of maritime sectors, economic growth and benefits for the people. At the same time, impacts from the economic activity affects the state of the marine ecosystem and thereby its capacity to ensure important resources for communities, including the opportunities for jobs and ecosystem services. Similarly, the maritime sectors and their development potential are interconnected – these can be united by a common infrastructure, e.g., ports and energy networks, as well as the space where various business interests can live together.

The vision of the sea-use development characterizes the anticipated situation by the year 2020 - 2030, by reflecting options for sustainable use of the marine space without jeopardizing the viability of the marine ecosystem. The formulation of a common strategic vision for the Black Sea is crucial step in implementation of MSP process. Such common vision should have a long-term perspective; provide a holistic cross-sectorial view on issues that are often regarded separately; facilitate the stakeholder involvement and help to communicate benefits of the MSP process.

The main pillars of the Black Sea Basin strategic vision are the four dimensions of the sustainable development of coastal and marine areas: a healthy environment, the “blue” economy, the social well-being and good governance, dealing with the cross-cutting issues of climate change, marine knowledge and cross-border cooperation.

A healthy marine environment and a resilient ecosystem as well as a safe place to live were acknowledged as the main cross-cutting priorities during the planning process and the discussions with the key stakeholders for development of the Maritime Spatial Planning (MSP). A sustainable use of marine living resources, tourism and production based on shipped resources were nominated as priorities from the economic sectors.

The overall analysis revealed that unless economic sustainability is closely related to environmental sustainability, it is not possible to foresee a uniform and high level standard of living in the Black Sea region. With this understanding the most relevant the most relevant strategic approach to the Mangalia - Shabla marine area MSP is to promote a sustainable use of resources and protection of the marine ecosystem, as a basis for economic growth and welfare of coastal communities.

Therefore the spatial vision of the marine spatial plan should be formulated as follows:

Achieve a healthy marine ecosystem while adapting to climate change and supporting a sustainable economic growth of the maritime sectors, related to the increase of the ecosystem services, with an integrated and innovative management of the marine resources, leading to well-being of the coastal communities.

2. Principles and goals

The process of strategy formulation for the maritime spatial plan has taken into consideration the following principles related to the marine areas development:

a. Environment principles

The ecosystem integrity principle

This essential principle implies a primary focus on maintaining ecosystem structure and functioning. From this general principle are derived three specific principles:

- Maintaining or restoring indigenous species diversity, composition, and functional redundancy
- Maintaining populations of key species
- Maintaining habitats attributes

The integration principle

Integration among sectors enables to go beyond sector policies, plans and legal instruments and provides win-to-win solutions for more than a single use of the sea. Integration among levels of government can help create complementary and mutually reinforcing decisions and actions

The long term perspective principle:

Plans should be based on long term visions of a comprehensive nature, an underlying comprehensive vision for maritime space development, vertical and horizontal coordination of the given plan with other policies, planning horizon and existence of alternative scenarios of the future use of the sea area.

Scientifically-based principle

An important effort should be put in developing knowledge, acquiring and processing data in forms really useful for the decision-making process, including among the other thematic issues of current and future uses and maps of main conflicts.

The participation and transparency principle

The principle stresses the need to secure participation of all relevant authorities and stakeholders as well as general public in maritime spatial planning initiatives at the earliest possible stage.

Cross-border cooperation principle

Cooperation in MSP is essential at all levels: methodological (e.g. common methods, data and information sharing, best practice exchange, etc.), strategic (elaboration of a common vision; definition of shared principles, objectives and targets; cross-sectorial planning), implementation (including shared monitoring, common indicators and evaluation).

b. Economic principles

Efficiency principle

The decisions in economy are made as trade-offs between efficiency and equity. Efficiency is achieved by getting maximum benefits from scarce resources, while equity means fairly distributing economic resources and outputs. Efficiency leads also to minimising the used resources by implementing a circular economy by slowing, closing, and narrowing material and energy loops.

Incentives principle

The economic agents respond to incentives, making decisions based on benefit or detriment.

Market principle

Markets are usually a good way to organize economic activity by allocating resources through decentralized decisions of many firms and households, as they interact in markets' sectors.

c. Social development principles

Equity principle

Equity means distributing economic prosperity fairly among all the members of a society, reduce disparities between rich and poor, and achieve social justice.

Inter-generational equity principle

Environmental resources and ecosystems must be carefully managed and safeguarded so as to enhance the value of environmental assets for future generations, thereby equitably meeting their needs and allowing them to live.

Human development principle

Human development in harmony with the environment is fundamental to the achievement of sustainable development, so that individuals and societies are empowered to achieve positive social and environmental outcomes. Human wellbeing and quality of life, and environmental health should be the guiding objectives of economic development.

Sustainable consumption principle

Sustainable consumption is related with the sustainable and equitable resource use. Reduce and eliminate unsustainable patterns of consumption means reduce, reuse, and recycle the materials, acknowledge the scarcity of the natural resources and act accordingly.

Inclusion principle

All citizens should have access to information concerning the environment, as well as the opportunity to participate in decision-making processes and make use of tools that enable civil society to hold institutions at all levels to account.

d. Governance principles

Integrated planning principle

An integrated approach must be adopted at all levels to expedite the achievement of socio-economic and environmental sustainability through strategic planning with civil society and stakeholders and across all relevant government departments.

Accountability principle

Institutions at all levels (national and international) must be democratic and accountable, and make use of tools that enable civil society to hold them to account. In this regard, the access to justice by citizens for redress and remedy in environmental matters is a cornerstone of enhancing accountability.

Precautionary principle

Scientific uncertainty of environmental impacts shall not lead to avoidance of measures to prevent environmental degradation. The 'burden of proof' should lie with those claiming that there will not be significant environmental impacts.

The consistency of the strategic goals with the principles is discussed in the following section.

Environmental goals (Env).

Env 1. Achieve healthy ecosystems by maintaining / increasing the populations of key species and native species diversity.

This goal is governed by the ecosystem integrity principle, in particular by the first sub-direction of the principle which promotes the restoration of indigenous species diversity, composition, and functional redundancy. Species diversity, from local to global scales, can affect multiple ecosystem functions including maintenance of productivity, resistance to and recovery from perturbations, capacity to maintain functional redundancies within an ecosystem, and stable food web dynamics.

The goal is also related to the second guideline of the ecosystem integrity principle: maintain populations of key species (species that are essential to marine ecosystem functioning). Research has shown that the dynamics of marine ecosystems are often driven by a few key species that have disproportionately strong effects on community structure and function.

Env 2. Maintain the marine habitats' integrity, diversity and heterogeneity.

Env 3. Assure and maintain marine habitats' connectivity in order to assure the well-functioning of the ecosystems.

The second and third environment goals are directed by the third guideline of the ecosystem integrity principle, which recognizes the fundamental importance of habitats' attributes: heterogeneity and spatial dynamics in promoting resilient and productive ecosystems.

The habitats' attributes identified as important to sustaining healthy marine ecosystems include habitat heterogeneity, habitat structure, habitat connectivity and land-sea connectivity.

Diverse habitats promote species diversity by acting as refuges from competition and predation, providing multiple sources of prey and settlement substrates, supporting species with specialized requirements and ameliorating environmental stressors. Maintaining habitat heterogeneity - the spatial arrangement and relationships among habitat patches across the seascape - is also critical to ecosystem functioning.

Habitat heterogeneity influences connectivity among marine habitats and land-sea habitats facilitates the successful movement of individuals among multiple locations throughout their lifetime, being also important for supporting the exchange of organisms and materials among habitats.

The environmental goals are related to the scientifically-based and the long term perspective principle. All ecosystems and habitats are not created equal, nor are they static, therefore these processes must be studied constantly and changes must be expected after long periods of time. The exploration of the sea environment require a comprehensive and multidisciplinary approach, the ecosystem structure can be seen as a nested hierarchy, with processes occurring over a range of spatial scales from larger to smaller. Therefore cooperation in research, marine spatial planning and implementation is essential at all levels, the necessity of collaboration being promoted by the cross-border cooperation principle.

Economic goals (Eco)

Eco 1. Realise a thriving maritime (“blue”) economy by efficiently use the resources of the sea and at the same time safeguarding biodiversity.

The sea is a reservoir of economic resources which were not yet fully explored and exploited. Up to now, the exploitation of marine resources in economic activities was mostly in the primary sector by fisheries, aquaculture, oil and minerals exploitation. The goal for growth of the marine economy is consistent with the efficiency principle which recommends a complete and sustainable use of the marine resources.

Research and development of adequate/new technologies and techniques are important factors for achieving this goal is through the involvement of the scientific community and the entrepreneurs in these activities in order to make the shift to a higher level of the economy.

Eco 2. Achieve a sustainable development of economic activities by focussing on high value products and harnessing the market opportunities.

To obtain a sustainable development of economic activities, the governance structures designed to incorporate the needs of multiple users and sectors, must focus on endorsing the most attractive activities (incentives principle), available in the area, in order to build a sound business environment and a close cooperation between decision-makers in the different sectors. The most promising activities/markets in the future, must be assessed on indicators such as ‘innovativeness’, potential for competitiveness, employment creation and sustainability considerations.

The complexity of the economic environment is not conceivable without an efficient system of information and communication between economic agents, provided by the market structures. By making MP goals consistent with the market principle, the policy and planning environment must facilitate economic growth by delivering business-friendly and robust governance, which is supportive of private investment and entrepreneurship.

The economy orientation will also allow striking a balance between protecting the marine ecosystems and maximising the use of its resources as a source of economic growth.

Population goals (Pop)

Pop 1. Create social inclusion by assuring permanent jobs and job creation through professional qualification and reconversion of workforce.

Creating a maritime economy is not conceivable in the absence of the human factor which must be considered as essential in achieving the MSP goals. The human development principle promotes a sustainable use of the human resources by education, training and job creation in order to obtain social wellbeing and quality of life, though economic growth .

The inclusion principle is also related to this goal, by encouraging the maximal integration of work force in economic activities, which must operate across a large spectrum of sectors at varying levels of expertise. A skilled and experienced workforce that adapts to changing requirements and new opportunities is a pre-requisite for achieving our vision and goals.

Pop 2. Achieving population well-being by sustainable consumption and equitable distribution of wealth and ecosystem services.

The economic growth is usually followed by an increase of consumption; consequently the wealth, as a result of economic efficiency, must be equitable distributed (equity principle) between population members, in order to achieve social justice and the incentives for further employment. This guideline is related to the sustainable consumption principle which endorses the limitation of resource usage, especially the natural ones, while stimulating the reducing, reusing, and recycling the goods and materials used in households. This desiderate is achievable through consumers' information and education related to environmental issues. The inter-generational equity principle refers also to the rational consumption of resources, but from a temporal viewpoint, it promotes sustainability by enhancing the value of economic and environmental assets for the use of the future generations.

Good governance and maritime safety and surveillance of the ecosystems and sea resources are vital to achieving MSP vision and goals. Cross-sectorial integrated marine policy, planning and decision-making at the various levels of governance (international, national, regional and local) are a vital component of harnessing the sea wealth. The delivery of more efficient and effective public services; the removal of impediments where appropriate; and the provision of a robust planning and licensing framework, underpinned by robust legislation and regulation can support sustainable development and create a degree of certainty, as well as a safe and stable environment for business and consumers. Good governance, in relation with MSP implementation, is guided by some principles, significant for the process: integrated planning, accountability, precautionary principle and inclusion principle.

A number of integrated administration delivery mechanisms have to be identified and the action plan will put in place a process that the government departments and agencies will use in developing integrated marine planning and policy.

The process of dialog of the authorities with the public is a continuous task in MSP achievement and implementation. There is a need to move towards more inclusive stakeholder participation in the management of the sea wealth, creating further opportunities for our citizens to make meaningful contributions to decision-making.

Directions of action

Taking into consideration the above mentioned guidelines for action in the marine area, a number of directions of action could be formulated for each strategic goal. The directions of actions contain several specific objectives, referring to a domain of activity. The specific objectives are the results that strategic actions need to achieve by implementing the plan.

Goal	Direction of action
Env 1. Achieve healthy ecosystems by maintaining / increasing the populations of key species and native species diversity	Env 1.1 Carry out an assessment and related works to provide an accurate representation of the marine ecosystems status. Set appropriate targets in the pursuit of good environmental status
	Env 1.2 Measures of management, conservation and rebuilding the populations and diversity of key and native species for long-term sustainable exploitation of marine biological resources
	Env 1.3 Reduce land originated pollution, pressures and impacts from human activities on marine ecosystems

Env 2. Maintain the marine habitats' integrity, diversity and heterogeneity	Env 2.1 Develop a common spatial data base (atlas) of the marine habitats with relevant information kept in a central GIS
	Env 2.2 Maintain and where appropriate, expand key marine habitats, essential to assure a suitable level of diversity and heterogeneity
Env 3. Assure and maintain marine habitats' connectivity in order to assure the well-functioning of the ecosystems	Env 3.1 Assess the need for connectivity between marine habitats and between coastal and marine habitats
	Env 3.2 Measures of conservation, management and rebuilding the connection elements between habitats
Eco 1. Realise a thriving maritime ("blue") economy by efficiently use the ecosystem services and at the same time safeguarding biodiversity	Eco 1.1 Support the strategic marine economy, policy and discovery research, through cross-border collaboration in order to ensure an efficient use and management of the ecosystem services
	Eco 1.2 Develop and implement relevant measures that address marine opportunities; e.g. sustainable food production and processing, offshore services, products for health, shipping logistics and transport, minerals exploitation, biotechnology and offshore renewables
Eco 2. Achieve a sustainable development of economic activities by focussing on high value products and harnessing the market opportunities	Eco 2.1 Encourage a number of targeted and emerging business development opportunities which could provide economic growth, by focussing on high value products, while preserving biodiversity
	Eco 2.2 Develop and strengthen a common and sound market environment for the present and emerging activities related to a sustainable maritime economy
Pop 1. Create social inclusion by assuring permanent jobs and job creation through professional qualification and reconversion of workforce.	Pop 1.1 Preserve and build capacity (employees) to meet the needs of the maritime sector; e.g. through tailored education, training programmes and professional reconversion in marine activities and research for capacity building
	Pop 1.2 Maintain job creation in marine activities through: business supports, provision of specialist marketing and investment advice, market intelligence and consumer research and information (employers)
Pop 2. Achieving population well-being by sustainable consumption and equitable distribution of wealth and ecosystem services.	Pop 2.1 Develop information programmes that create an awareness of the sea wealth and the rational utilisation of existing marine resources and ecosystem services for all the coastal communities
	Pop 2.2 Implement systems of encouraging sustainable consumption of marine resources and reducing the human pressures on marine environment.

3. Strategic objectives and action plan

(Common strategy for cross-border area Mangalia – Shabla)

Direction of action	Specific objectives
Marine environment	
Env 1.1	Env 1.1.1 - Assess the status of key marine ecosystems by coordinated scientific research and monitor the progress in achieving the good environmental status
	Env 1.1.2 Develop a common activity of monitoring ecosystems' status, which will include the collation of all relevant information into a central system.
Env 1.2	Env 1.2.1 - Implement common actions for restoring and improve marine biota in marine ecosystems
	Env 1.2.2 - Increase the stocks of living marine resources especially of the commercial native fish species
	Env 1.2.3 - Assure a coordinated management and control of the activities using the marine ecosystems to act in ways which help to achieve the good environmental status
Env 1.3	Env 1.3.1 - Reduce land originated pollution processes that affects the water quality and marine ecosystems
	Env 1.3.2 - Reduce land originated pressures and impacts on marine ecosystems and habitats
Env 2.1	Env 2.1.1 - Realise a precise screening of habitats (mapping and status) in the area and a common spatial data base at the disposal of planning and monitoring authorities
	Env 2.1.2 - Asses the problems of habitats in order to restore and increase their suitability to the marine ecosystems
Env 2.2	Env 2.2.1 - Management plans for solving physical problems of key habitats and landscapes (threats, damages, destruction) in order to restore their diversity and heterogeneity
	Env 2.2.2 - Implement measures for increasing/restoring the diversity and heterogeneity of marine habitats and landscapes
Env 3.1	Env 3.1.1 - Establish the needs for connectivity between marine habitats and ecosystems identify obstructions, inhibitive factors and land - sea interaction
Env 3.2	Env 3.2.1 - Implement measures for improvement/conservation of habitats' connectivity
	Env 3.2.1 - Establish/improve connectivity between marine and coastal habitats
Economy	
Eco 1.1	Eco 1.1.1 - Asses scientific research domains and approaches in which the economic activities, based on knowledge and innovation, could provide significant results
	Eco 1.1.2 - Develop associations between companies and research institutions for collaboration and knowledge transfer in the field of marine economy

Eco 1.2	Eco 1.2.1 - Select local businesses interested in developing new opportunities in marine “blue” economy
	Eco 1.2.2 - Launch a number of calls for projects in future marine enterprises and infrastructures which could sustainable use marine resources in an innovative way
Eco 2.1	Eco 2.1.1 - Use incentives for encouraging the local businesses to develop activities by focussing on high value products, while preserving marine biodiversity
	Eco 2.1.2 - Reduce/relocate economic activities that adversely affect the habitats and ecosystems (coastal and marine)
Eco 2.2	Eco 2.2.1 - Study the market opportunities for the local products and services
	Eco 2.2.2 - Introduce instruments including management, economic and legal to ensure increased market results of local marine economy
Population	
Pop 1.1	Pop 1.1.1 - Plan for the appropriate human resources to efficiently and effectively meet the demands of future labour market in relation to the development of local marine economy
	Pop 1.1.2 - Develop higher education, vocational and professional training and professional reconversion programmes to meet the identified needs of marine economy
Pop 1.2	Pop 1.2.1 - Encourage and facilitate a number of targeted business leaders/investors to progress in employing local work force and knowledge in the marine economy
Pop 2.1	Pop 2.1.2 - Initiate outreach programmes that create an awareness of the sea wealth and marine economy
Pop 2.2	Pop 2.2.1 - Inform communities and customers about the sustainable ecosystem services consumption
	Pop 2.2.2 - Stimulate public concern for the living marine resources regeneration and related activities for the marine environment