



Technical assistance for Priority Axis 5 Projects Preparation

**Implementation of the appropriate structures of natural risk
prevention in most vulnerable areas. Key area of intervention 2 –
*Reduction of Coastal Erosion***

ENVIRONMENTAL STRATEGIC ASSESSMENT PROPER EVALUATION STUDY



VERSION: DECEMBRE 8th, 2011



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1.INTRODUCTION

Romania, located in the South-Eastern Europe has its territorial coast along the North-Western Black Sea, along with Bulgaria, Turkey, Georgia, Russia and Ukraine, around Black Sea, in the counterclockwise direction.

The litoral has a length of about 245 km from Sulina, situated in the Danube Delta, to Vama Veche, in the south, representing approximately 6% of the entire Black Sea coast from around. Its topography consists of low elevation shores, beaches (80%) and relatively high shores, cliffs (20%). From the typological point of view, it includes both natural coastline (beaches and cliffs - about 84%) and about 16% "built" shore (ports, hydrotechnical constructions of protection).

Coastal zone of Romania covers an area rich in tourist resources, in both natural and anthropogenic terms, Danube Delta Biosphere Reserve (RBDD), for example, designated as UNESCO Heritage in 1991, being one of the most important tourist areas in the country.

While the north unit is designated for nature conservation, the south unit was heavily developed from socio-economic point of view. Heavily urbanized, economic activities prevail in this area: tourism, port activities and maritime, petrochemical industry. Thus, coastal tourism is estimated at about 60% of the total nationwide.

Through the pan-European transport corridors IV and VII, Coastal area of Romania is connected with the Black sea basin port network, also having two International Airports: Tulcea Airport and Kogalniceanu International Airport.



Fig.1.1 Pan-european transport corridors

Elaboration of the "Coastal zone protection and rehabilitation" Master Plan is due to alarming situation caused by advanced erosion in some areas along the coastline of Romania and to intervention needs that reside from it.

The "Coastal zone protection and rehabilitation" Master Plan project is developed in the context of the 2007 – 2013 Sectoral Programme Environment, under Priority Axis 5 "Implementation of the appropriate structure of natural risk prevention in most vulnerable areas" , key area of intervention 2 -"reduction of coastal erosion". Sectoral Operational Programme Environment of the Romanian Government is one of the ninth operational programs of the Convergence"Objective for 2007 - 2013 periods of the EU funds, the general objective of it being to protect and improve the environment and living standards in Romania. SOP ENVIRONMENT specific objectives are:

- Improving quality and access to water and wastewater infrastructure, by providing water supply and sanitation in most urban areas by 2015 and setting up efficient regional structures for the management of water / wastewater services.
- Development of sustainable waste management systems by improving waste management and reducing the number of historically contaminated sites in minimum 30 counties by 2015.
- Reducing negative environmental impacts and mitigation of climate change caused by urban heating systems in most polluted localities by 2015.
- Protection and improvement of biodiversity and natural heritage by supporting the protected areas management, including through the implementation of Natura 2000 network.
- Reducing the risk of natural disasters affecting the population, by implementing preventive measures in most vulnerable areas by 2015.

The overall objective of this Master Plan is to protect and improve the environment quality and living standards along the Romanian Black Sea coast and to increase safety in the south area of the coast, severely threatened by coastal erosion.

Master Plan area of interest is represented by the entire coastal area of Romania - from North to South, over a length of about 245 km, from the Musura Bay to Vama Veche (the border with Bulgaria), from a the shoreline on a average width inside the land of:

- 400 m in the North - between Musura Bay and Midia
- 200 m in the south - between Midia and Vama Veche (the border with Bulgaria) and by the 15 m isobath into the sea.

Master Plan divides the area into two distinct units of interest, namely:

Northern Unity between **Musura Bay** and **Cap Midia**, with a length of about 165 km, designated to nature conservation and protection and

South Unity, from **Cape Midia** to **Vama Veche**, with an approximate height of 82 km long, developed for port activities, housing, industry and tourism.

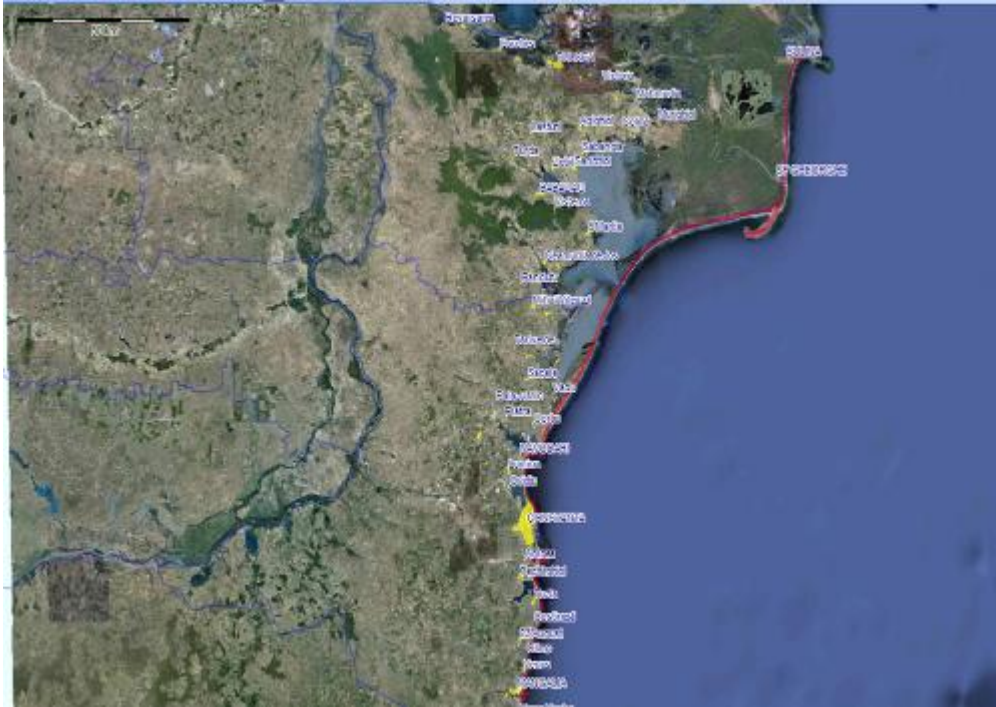


Fig. 1.2 Master Plan Area of interest

Analysis carried out by Halcrow on the Romanian coastal zone changes, suggested that the North Unit Black Sea coast, between the Musura Bay and Cape Midia is not considered a priority from risk to erosion point of view as the coastline is generally natural. Unlike the Northern Unit, The Southern Unit, between Midia Port and Vama Veche, has more critical erosion points , where most of the alignment is currently artificially defended. However, many defence elements are in poor condition and the beaches are consequently subject to strong erosion phenomena.

Studies show that Mamaia beach, located in north of Constanta, has been eroded with over 80 m in the last thirty years. In the late 1980s, urgent measures to counter beach erosion were taken , by building six break-wave structures parallel to shore, located offshore, and by sanding with a half million cubic meters of sand. Although for a relatively short period the beach was restored as a result of these countermeasures, break-wave structures have begun to degrade over time, and beach erosion continued to manifest. Measurements made demonstrate that also other beaches located south of Constanta face the same problem, namely the erosion, more or less pronounced. According to the report on „Diagnosis of coastal zone”, multiannual erosion rates in the last three decades (1979 - 2006) were derived from maps and are summarized in the following tables:

Coastal sediment cell	Sub-sector	Shoreline change (m/yr) +ve values mean accretion, -ve values mean erosion	
Chilia Delta to Sulina Jetty Sulina Jetty to Zatoane (N1)	Musura Lagoon	10,4	
	Sulina	8,1	
	Canalul cu Sonda	- 9,4	
	Casla Vadanei	- 6,3	
	Sf. Gheorghe	3,7	
	Sahalin	- 17,7	
	Delta secundara Sf. Gheorghe to Ciotic		
	Ciotic to Zatoane		
Zatoane Midia Harbour (N2)	Perisor	- 2,7	
	Periteasca	0,7	
	Portita	- 3,9	
	Periboina	- 3,5	
	Chituc	- 1,5	
	Corbu (Cape Midia)	Cape Midia – north Cape Midia – south	2,1 3,2

Coastal sediment cell	Sub-sector	Shoreline change 1979-2006 (m/an) +ve values mean accretion, -ve values mean erosion
Midia - Constanta	Navodari North	0,15
	Navodari South	0,23
	Mamaia North	-0,79
	Mamaia Central	-1,38
	Mamaia South	-1,21
	Tomis North	3,12
	Tomis South	1,42
	Eforie – Cape Tuzla	Eforie North
Eforie Central		-0,52
Eforie South		0,78 (artificially managed – inadequate for natural coastal dynamics trends analysis)
Tuzla North		-0,38
CapeTuzla - Mangalia	Tuzla South	-0,29
	Costinesti	-1,11
	23 August	-0,92
	Olimp – Venus	-0,37 (artificially managed – inadequate for natural coastal dynamics trends analysis)
	Venus - Saturn	-2,12 (artificially managed – inadequate for natural coastal dynamics trends analysis)

	(tinuturile umede Mangalia)	coastal dynamics trends analysis)
	Saturn – Mangalia	-1,49 (artificially managed – inadequate for natural coastal dynamics trends analysis)
2 Mai - Vama Veche	2 Mai	-2,24
	Limanu	-1,75
	Vama Veche	-1,19

Development of the three ports (Constanta, Midia and Mangalia) led to a major change in sediment circulation along the shore, with emphasis on erosion rates after 1980. The strongest erosion occurs in the southern area of Mamaia resort, where the shoreline will retreat with more than 70 m in the next 20 years, if no countermeasures are taken.

Thus, the coastal erosion phenomenon behaves differently in North sub-unit compared with the south sub-unit of the Southern Unit of the Romanian litorall. The main cause of beach erosion in the northern sub-unit is the blocking by the northern broken-wave structure of Midia Port of the terigen sand, structure which was extended to the depth of -10 m starting 1977. Sand transported to the southwest by the currents along the shore produced by waves is blocked by this structure and can not be moved to Navodari and Mamaia. Reduction of sediment deposition by Danube contributed to decreasing the sediment quantity from the northern sub-unit. Along the Mamaia beach , littoral sediment transport by waves is estimated at 160,000 m³ / year to the north and at 140 000 m³ / year to the south, leading to a transport net rate to the north of 20,000 m³ / year. This net sediment transport, without new deposited quantities, represents the cause of the beach intense erosion at south of Mamaia resort. Sediment transported to the norths then removed by transverse offshore currents and lost for the shore area. Coastal erosion in southern sub-unit is not as strong as that of Mamaia, except for Mangalia Pond area and the low cliff area from Limanu. Most cliff areas retreat for several years at a rate of about 0.6 m / year, which seems to be a natural process in this sub-unit. With the withdrawal of cliffs line, also adjacent beaches must retire, which means beach erosion. Imbalance between Sediment transport to North and South produces also the beaches local erosion, existing also a cross-shore sediment loss.

Area of project implementation and structural actions recommended in the Master Plan in cases where high cliffs are close to the shoreline will be limited to foot cliff. in this Master Plan ,The scope of coastal protection works, , exclude work to be done for establishing the cliff. In particular, drainage measures to reduce land instability of the associated intervention works are excluded. Given the cliffs near the shoreline, these will be still considered and recommendations will be included as regarding the interface between the works to reduce coastal erosion and of those for cliffs stability.

Master Plan area of interest is rich in habitats protected by specific legislation, therefore, in developing the Master Plan, their sensitivity is an essential element in establishing subsequent works that will be done to protect and rehabilitate the coastal zone.

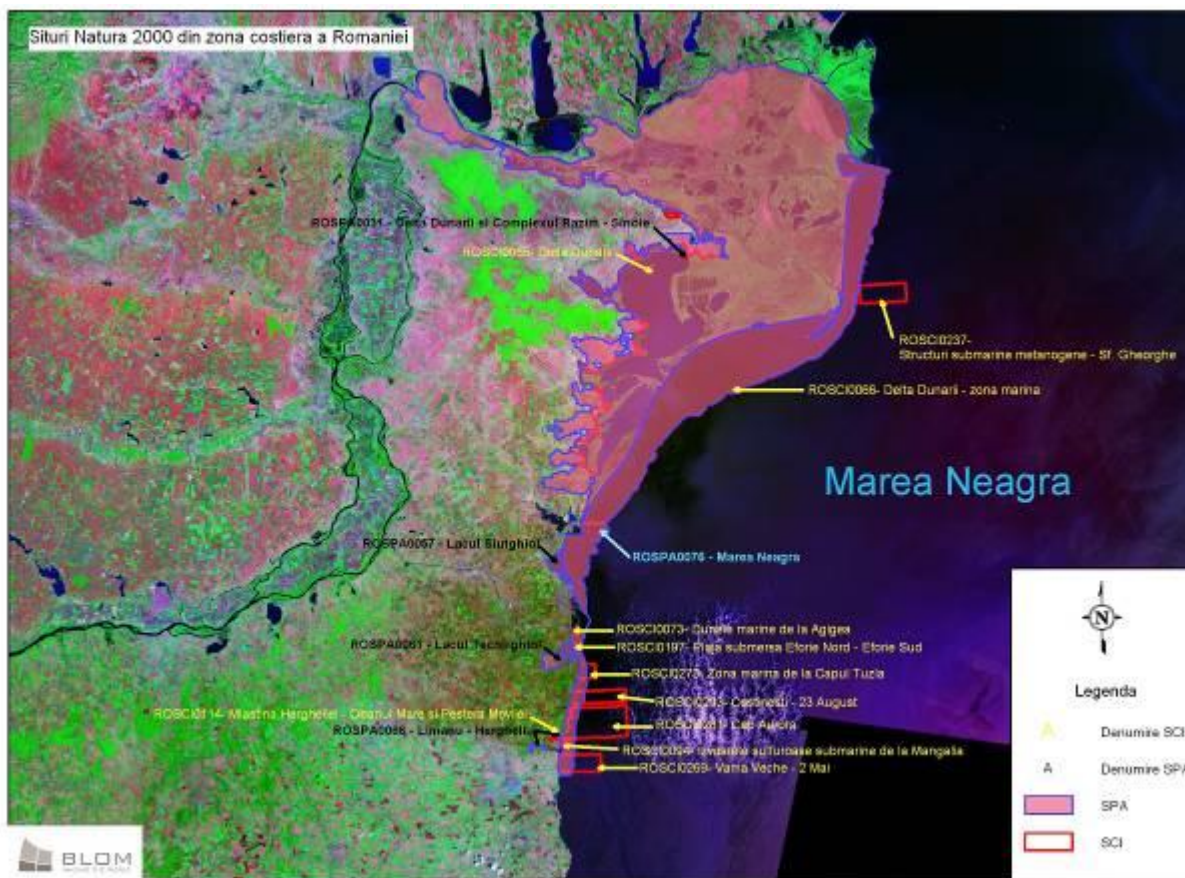


Fig. 2.1.2.1 Natura 2000 sites location

ROSCI0065 Delta - the only habitat that may be affected are: "sandbanks covered by a layer of small permanent of sea water "(1110) and" coastal lagoons "(1150), the rest being land.

ROSCI0066 Delta Marina area - Habitats that may be affected are: "sandbanks permanently covered by a layer than seawater" (1110), "sand and swamps covered by seawater at low tide" (1140), "melee and bays "(1160).

ROSCI0237 Submarine structures methanogenic Saint George - habitats that may be affected are: "submarine structures made by leaking gases" (1180).

ROSCI0197 North and South Eforie Submerged Beach - habitats that may be affected are: "Sandbanks covered by a layer of small permanent of sea water "(1110)," sand and swamps covered by seawater at low tide "(1140)," Rock of *Mytilus galloprovincialis* infrashore "(1170);

ROSCI0273 marine area from Cape Tuzla - habitats that may be affected are: "sandbanks permanently covered by a layer than seawater" (1110), "sand and swamps covered by seawater at low tide" (1140) and "reefs" (1170).

ROSCI0094 underwater sulphurous springs in Mangalia - which can be influenced habitats are permanently covered sandbanks small layer of sea water "(1110) and" reefs "(1170).

ROSCI0281 Cap Aurora - habitats that may be affected are: "sandbanks permanently covered by a layer than seawater" (1110) and "reefs" (1170).

ROSCI0293 Costinesti - 23 August - habitats that may be affected are: "sandbanks permanently covered by a layer than seawater" (1110), "sand and swamps covered by seawater at low tide" (1140) and " Reefs "(1170).

ROSCI0269 Vama Veche-2 - habitats that may be affected are: "sandbanks permanently covered by a layer than seawater" (1110), "sand and swamps covered by seawater at low tide" (1140) and "reefs" (1170).

Marine Dunes *ROSCI0073* from *Agigea* - habitat that can be influenced is "fixed dunes with perennial vegetation herbacee (gray dunes)" (2130 *)

ROSCI0114- Oban High Marsh and Cave mound - habitats that can be influenced by anthropogenic activities are "rivers of the plains, to the mountain vegetation of *Ranunculion fluitantis* and *Callitricho batrachion*" (3260) and "deciduous shrubs *Ponto - Sarmatian*" (40C0 *)

Master Plan area of interest integrally overlaps over *ROSPA0076* Black Sea, bordering and possibly influencing the following protected areas: *ROSPA 0031* Danube Delta and *Razim - Sinoe Lake complex*, *ROSPA0057* *Siutghiol Lake*, *ROSPA0061* *Techirghiol Lake* and *ROSPA0066* *Limanu - Stud*.

2. INFORMATIONS REGARDING THE PROTECTION AND REHABILITATION MASTER PLAN OF THE BLACK SEA ROMANIAN LITTORAL

2.1 INFORMATIONS REGARDING THE MASTER PLAN

2.1.1 PLAN NAME

" COASTAL AREA PROTECTION AND REHABILITATION" MASTER PLAN, as part of the contract "Technical assistance for project preparation Priority Axis 5 - Implementation of the appropriate structures of natural risk prevention in most vulnerable areas. Key Area of Intervention 2 - Reduction of coastal erosion.

2.1.2 PLAN HOLDER

National Administration "Romanian Waters" - Dobrogea-Litoral Water Basin Administration

2.1.3. ADMINISTRATIVE AND GEOGRAPHICAL LOCATION OF THE MASTER PLAN



Fig. 2.1.3.1 Master Plan Area of Interest¹

The **Master Plan** area of interest, from administrative point of view, covers part of Tulcea and Constanta counties. Geographical coordinates of the two units are distinct:

UNITATEA NORTHICA			UNITATEA SOUTHICA		
Limit	Latitudine	Longitude	Limit	Latitude	Longitude
Sulina	45°09'30"	29°44'18"	Navodari	44°19'27,09'' N	28°38'20,45'' E
Navodari	44° 10' 0" N	28° 38' 0" E	Vama Veche	43°44'20,40'' N	28°34'45,68'' E

In terms of distance from the state border of Romania, taking into consideration that in the southern Romanian littoral the works will take place until the 2May locality, that build protective dike in the southern part of the fishing port, assume that the analyzed project, in the south part of the Romanian coast, is under the incidence of the Convention on Environmental Impact Assessment in Transboundary Context, done at Espoo on 25 February 1991, ratified by Law no. 22/2001.

¹ "Coastal area protection and rehabilitation" Master Plan, V3, Halcrow, 2011

Project location to protected areas (Natura 2000): SCI - Sites of Community Importance and SPA - Special Protection Bird sites is shown in Fig. 2.1.2.1

2.1.4 MASTER PLAN DESCRIPTION AND OBJECTIVES

Master Plan aims to establish the strategic vision for the management of erosion risks on the entire Romanian coast, taking into account the interactions between all areas. The coastal Master Plan focuses on improving the environment through both beach restoration and reinforcing the existing coastal defence line.

The **overall objective** of this Master Plan is to protect and improve the quality of the environment and standards of life along the Romanian Black Sea Coast and to increase safety in the southern area of the coast which has been severely threatened by the destructive effects of coastal erosion.

Specific objectives focus on:


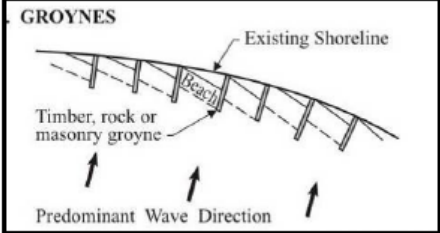
- Developing a programme of coastal protection and rehabilitation works to rehabilitate and protect the adjacent shoreline and land, and marine ecosystems
- Protect economic infrastructure and social objectives in distress as a result of erosion
- Implementation of an integrated coastal zone monitoring programme to support the delivery of operation and maintenance works in the medium and long term (30 years).



2.1.5 INFORMATIONS ON MASTER PLAN PROPOSED PROJECTS


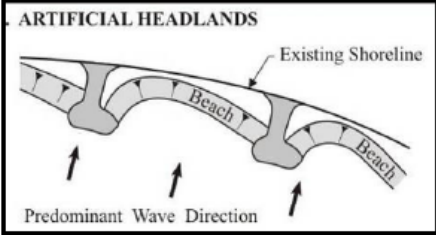
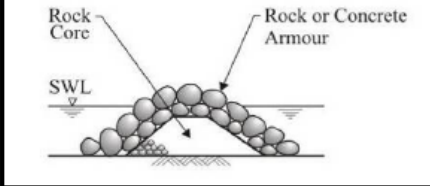
Based on field investigations, field studies and modeling of sediment transport, the Master Plan proposes for each intervention area, five options for intervention - technical solutions types, as presented in Table 2.1.5.1. .


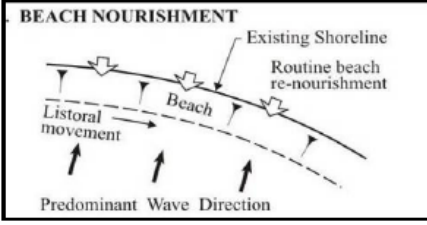
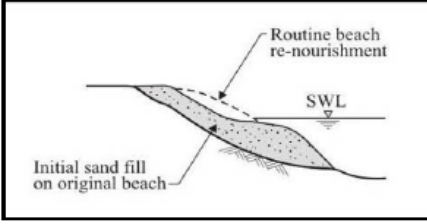
Through the Master Plan, based on risk assessment of the exposure to erosion (Table 2.1.5.2), in conjunction with identified intervention options, four types of intervention are proposed. They are presented in Table 2.1.5.3.²


² Master Plan “Protection and rehabilitation of the coastal zone”, v3, Halcrow, 2011

Option	Description	Advantages	Disadvantages
<p>Groynes</p> 	<p>Groynes are shoreline control structures, located perpendicular to the shore, crossing part of, or the entire, littoral zone. They can be constructed from various materials.</p> <p>Groynes impede the long-shore drift, causing sediment, resulting in accumulation of sediment on the updrift side of the groyne. In order to minimise the down-drift erosion effect typical of these structures, these should be utilised along coastlines where the net transport is low but the gross transport is high, i.e. there is transport in both directions that will mitigate some of the downdrift effects in the net transport direction. They may also be designed to allow transport once the groyne bays are filled.</p> <p>Groynes are traditionally designed as one part of a coastal erosion risk management scheme, normally in</p>	<p>They can be very effective at retaining a beach, is the most effective form of sea defence, as it has the ability to adapt naturally to changes in wave conditions and to dissipate wave energy.</p> <p>Rock groynes have the advantages of simple construction, long-term durability and ability to absorb some wave energy due to their semi-permeable nature.</p> <p>Variable levels of protection can be provided along the frontage.</p>	<p>Although groynes encourage upper beach stability and reduce the maintenance commitment for recycling or recharge, they still disrupt the natural nearshore processes, potentially creating downdrift erosion if an adequate level of maintenance is not provided.</p> <p>The lifespan of groynes depends upon the material used in construction, with rock groynes having a longer lifespan.</p> <p>They can impede watersports and some beach activities and are also a potential hazard if climbed upon.</p> <p>They have a high visual impact and can totally alter the natural planform of a stretch of shoreline.</p>
	<p>combination with beach recharge, but can also be used in combination with a revetment or vertical wall.</p>		

Option	Description	Advantages	Disadvantages
<p>Offshore breakwaters</p> 	<p>Detached breakwaters (also known as reefs) and submerged breakwaters are distinct from groynes as their principal purpose is to alter the nearshore wave direction and energy, to create an environment conducive for sediment deposition, rather than simply retaining sediment.</p> <p>These structures tend to be suitable for beaches where cross-shore transport is a key process.</p> <p>A salient, or pocket beach, is the characteristic evolution of the shoreline in the lee of the structures. If the salient reaches the structure, a tombolo forms; this can then act, in</p>	<p>If properly designed these structures can be an effective way to either hold a recharged beach or stabilise an existing beach.</p> <p>Variable levels of protection can be provided along the frontage.</p> <p>Submerged breakwaters encourage marine life; they can provide habitat for shellfish with potential advantages for water quality and sediment supply.</p>	<p>They need to be carefully designed otherwise they can:</p> <ul style="list-style-type: none"> -induce hazardous rip currents which, in some cases, can encourage the loss of sediment through the gaps between the structures, deepening the seabed at those locations; -cause water quality issues due to stagnant water; -promote the deposition and accumulation of fine sediment and flotsam; -adversely affect the nearshore transport of sediment and therefore impact on downdrift
	<p>combination with the breakwater, as a groyne; thereby affecting littoral transport along the beach.</p> <p>Offshore breakwaters may be surface piercing or, where less shelter is required, submerged.</p> <p>Another form of detached breakwater is the Artificial Reef. These are sometimes constructed from alternative or recycled materials and the purpose may be to provide habitat or to improve surfing conditions.</p>		<p>areas.</p> <p>Offshore breakwaters can also be visually intrusive.</p> <p>They require time to design properly and can also be difficult and costly to construct because of their position offshore.</p> <p>They are also a potential hazard to vessels and bathers.</p>

Option	Description	Advantages	Disadvantages
<p>Rock headlands and shore connected breakwaters</p>  	<p>Artificial rock headlands and shore-connected breakwaters can create stable pocket beach formations by modifying the incoming wave climate between adjacent structures.</p> <p>They are generally positioned along frontages where the net long-shore transport is limited and are commonly used to maintain artificially replenished beaches.</p>	<p>If well designed they can be used to create or maintain good amenity beaches in areas where a combination of longshore and cross-shore control is needed.</p> <p>They tend to have a long design life and</p> <p>Variable levels of protection can be provided along the frontage.</p> <p>They can be used to create better amenity beaches and the structures can be designed to also function as promontories with walkways.</p>	<p>Artificial rock headlands and shore-connected breakwaters tend to be significant rock structures with a large footprint; they therefore have a high visual impact.</p> <p>They tend to have large capital costs, and will still require some maintenance to ensure no rock movement</p> <p>They can impede watersports and some beach activities and are also a potential hazard if climbed upon.</p> <p>They may cause leeward deposition of fines and flotsam, which has both ecological and beach quality impacts.</p>
 <p>Diagrams taken from Fleming and Reeve (2005)</p>			<p>There is limited design guidance currently available.</p> <p>They can cause downdrift erosion issues.</p>

Option	Description	Advantages	Disadvantages
<p>Beach recharge with sand</p>    <p>Diagrams taken from Fleming and Reeve (2005)</p>	<p>Beach recharge is a 'soft' coastal defence solution.</p> <p>Sediment is placed on the beach, sourced from outside the sediment cell, either from an offshore site, from land based quarries or river beds.</p> <p>Beach recharge can be implemented on its own or in combination with other options such as erosion control structures (e.g. groynes) to retain the new beach material. This depends upon the dynamic nature of the shoreline in question.</p> <p>Beach recharge can also be used in combination with artificial recycling to counter alongshore losses. Beach recycling is an operation, typically with excavators and dumper trucks, to transport beach material that has been transported downdrift back to an updrift location in the same sediment cell.</p> <p>It is very important to select appropriate sediment grain size and mineralogy for the project site, which should normally be coarser or similar to the naturally occurring material at the location.</p>	<p>It has the advantage of re-establishing a 'natural' beach, which is the most effective form of sea defence, as it has the ability to adapt naturally to changes in wave conditions and to dissipate wave energy.</p> <p>This solution is less likely to cause erosion problems downdrift than other engineering solutions.</p> <p>It offers up a more environmentally acceptable use of natural material.</p> <p>This solution can be used to increase beach space and create amenity areas.</p> <p>It may enhance coastal habitats for plants and animals.</p> <p>It does not limit future options for management of the coastline.</p>	<p>Erosion of the beach will continue if natural sediment supply is restricted, therefore, further beach replenishment may be necessary in the future.</p> <p>It may alter beach quality and morphology with potential introduction of non-native beach material, which may differ in colour, mineralogy or texture.</p> <p>Environmental impacts at dredging source site needs careful consideration. Potential impacts on other coastal communities also need to be considered.</p> <p>There may be difficulty in sourcing new material in the future, either due to availability or cost.</p> <p>It may be difficult to convince locals that this is an adequate and long-term solution.</p>

Option	Description	Advantages	Disadvantages
<p data-bbox="226 272 359 297">Sand bypass</p> 	<p data-bbox="688 272 1050 529">Sand bypass is a special measure to solve the problems of siltation at the entrance of ports or inlets and of related beach erosion at the down-drift side. Sand is dredged from the up-drift side and transported to the down-drift side through a pipeline, by a hopper dredge, or by dump trucks.</p> <p data-bbox="688 545 1050 688">It is a site-specific solution and normally only applied where there are long shore-perpendicular structures that have interrupted the natural longshore drift.</p>	<p data-bbox="1119 272 1480 415">It can be a relatively low cost solution in comparison with other options, e.g. building a new sea wall or the having to find new sources of sediment for recharge.</p> <p data-bbox="1119 431 1480 542">It reinstates natural littoral links and mitigates the environmental impacts of port structures and training walls / jetties.</p> <p data-bbox="1119 558 1480 669">It involves the relocation of naturally occurring beach sediment so there are no issues with the sediment type or grade.</p> <p data-bbox="1119 685 1480 763">There is potential to create new habitat through improved beaches downdrift.</p> <p data-bbox="1119 779 1480 857">Used in conjunction with other solution it can help prolong the lifespan of a scheme.</p>	<p data-bbox="1533 272 1885 383">Depending on the technique applied there is potential disturbance to benthic communities.</p> <p data-bbox="1533 399 1885 509">It may affect sediment circulation and excessive recycling may cause problems in the source areas.</p> <p data-bbox="1533 526 1885 604">To be effective, the dredged material needs to be placed in the right location.</p> <p data-bbox="1533 620 1885 698">Due to variability in longshore drift rates, operations need to be flexible.</p> <p data-bbox="1533 714 1885 857">There is a long-term commitment as needs to be repeated at regular intervals; therefore there are potentially significant operation costs.</p>

Tabel 2.1.5.2 Assessment of shoreline change/ erosion risk (sursa: Master Plan,,Protectia si reabilitarea zonei costiere” Versiunea: V3, 2011)

Coastal Sediment Cell	Sub- sector	Present shoreline trend (m/year)	Defence effective residual life (years)	Projected shoreline change/ erosion risk 30-50 years (m range)	Assumptions and considerations
Musura Lagoon to Sulina Jetty	Musura Lagoon to Sulina Jetty)	Area accreting offshore	No defences	Accretion	It is assumed that there are no major changes to management of the Danube or Sulina Jetties. It is also assumed that there are no major changes in water flow or sediment discharge from the Danube. The current trend of accretion is expected to continue.
Sulina Jetty to Southern end of Sahalin Spit (Zatoane)	Sulina	Stable /Accreting (5 to 15 m/yr)	>10	Accretion	It is assumed that there are no major changes to management of the Danube or Sulina Jetties. It is also assumed that there are no major changes in water flow or sediment discharge from the Danube. The current trend of accretion is expected to continue – the short length of rock groyne is already buried in sediments.
	Canalul cu Sonda	Eroding (-5 to -15m/yr)	No defences	290 - 480	It is assumed that there is no change in the effect of the Sulina jetties – which affect supply to this area. It is also assumed that there are no major changes in water flow or sediment discharge from the Danube. The current trend of erosion is expected to continue.
	Casla Vadanei	Eroding (-5 -10m/yr)	No defences	200 - 330	It is assumed that there is no change in the impact of the Sulina jetties, which affected sediment supply to this frontage. It is also assumed that there are no major changes in water flow or sediment discharge from the Danube. The current trend of erosion is expected to continue.
	Sf. Gheorghe	Stable/ accreting (0 to 5m/yr)	No defences	Stable/Accretion	It is assumed that there is no change in the effect of the Sulina jetties. It is also assumed that there are no major changes in water flow or sediment discharge from the Danube. The current trend of net accretion is expected to continue – although periods of accretion and erosion are expected, as observed recently.
	Sahalin	Eroding (-10 to -20 m/yr)	No defences	540 - 900	The spit feature as a whole is expected to continue to migrate landwards and rotate as it does so, at a similar rate to that observed recently.
	Secondary delta	Stable	No defences	Stable	It is assumed that the Sahalin spit will continue to have an

Coastal Sediment Cell	Sub- sector	Present shoreline trend (m/year)	Defence effective residual life (years)	Projected shoreline change/ erosion risk 30-50 years (m range)	Assumptions and considerations
	of Sf. Gheorghe distributary - Ciotic	(2 to -2 m/yr)			influence on this shoreline, with the frontage remaining mainly stable.
	Ciotic – Zatoane (coast behind southern part of Sahalin spit – and Zatoane coastal wetlands system)	Eroding (0 to -10 m/yr)	No defences	0 - 250	It is assumed that the Sahalin spit will continue to have an influence on this shoreline, with the frontage remaining mainly stable along the northern stretch, but erosion to the south, due to downdrift transport of sediments.
Zatoane to Midia Harbour	Perisor	Eroding (0 to -5 m/yr)	No defences	90 - 150	No significant changes in sediment supply are predicted, therefore it is assumed that the present trend of net erosion will continue.
	Periteasca	Stable/ accreting 0 to 2 m/yr)	No defences	Accretion	No significant changes in sediment supply are predicted, therefore it is assumed that this frontage will remain generally stable, with possible accretion.
	Portita	Eroding (0 to -5 m/yr)	>10	130 to 200	As the majority of this barrier beach shoreline is unprotected, it is assumed that current rates of erosion will continue. At Gura Portitei, there is likely to be accelerated loss of the retained beach once defences fail, and then a rate similar to that observed along adjacent frontages is expected to resume.
	Periboina	Eroding (0 to -5 m/yr)	>15	110 to 180	The majority of this frontage is unprotected, therefore, assuming no major change in sediment supply, recent trends are expected to continue. Failure of the short section of defence at Periboina penstock is unlikely to have a major impact on the shoreline trend. Failure of the short outfall at Edighiol penstock is only likely to have a local impact on the shoreline processes.
	Chituc	Eroding (5 to -5 m/yr)	>15	50 to 80	The majority of this frontage is unprotected, therefore, assuming no major change in sediment supply, recent trends are expected to continue.
	Corbu (Cape Midia)	Stable/accreting (0 to 5 m/yr)	N/A	Accretion	It is assumed that the breakwaters at Midia Port continue to have an influence on the southern extent of this shoreline. Present trends are therefore expected to continue.

Coastal Sediment Cell	Sub- sector	Present shoreline trend (m/year)	Defence effective residual life (years)	Projected shoreline change/ erosion risk 30-50 years (m range)	Assumptions and considerations
	Midia Harbour	-	>30	-	The port breakwaters are expected to remain effective beyond Master Plan evaluation period
De la Golful Mamaia – Cape Midia	Navodari North	Stable/ accreting (0 - 0.15m/year)	No defence	Accretion	It is assumed that the breakwaters at Midia Port continue to have an influence on the southern extent of this shoreline. The frontage is therefore expected to remain mainly stable, with slight accretion in the lee of the structures.
	Navodari South	Stable/ accreting (0 - 0.15m/year)	No defence	Accretion	It is assumed that the breakwaters at Midia Port will continue to have an influence on the southern extent of this shoreline. The frontage is therefore expected to remain mainly stable, although there is a risk of localised dune erosion, particularly along the southern extent of this frontage.
Mamaia Bay – Cape Midia to Constanta Harbour	Mamaia North	Stable/ eroding (1 to -1m/year)	No defence	30 - 50	It is assumed that the breakwaters at Midia Port will continue to have an influence on the southern extent of this shoreline. The frontage is therefore expected to remain mainly stable in the north and erode in the south.
	Mamaia Centre	Stable/ eroding (0 to -1.5m/year)	<5	80 -110	The residual life of breakwater system along this frontage is less than 5 years. Once these fail there will be rapid erosion of the beach that has been retained by these structures, therefore the projected retreat includes an allowance for this.
	Mamaia South	This coast has been artificially managed therefore current rates are not indicative of future rates under no intervention.	<5	150 - 170	Current shoreline change is not indicative of how the shoreline might respond once defences fail. A 'natural' erosion rate of -1 - -1.5m/year has been assumed. The residual life of breakwater system along this frontage is less than 5 years. Once these fail there will be rapid erosion of the beach that has been retained by these structures, therefore the projected retreat includes an allowance for this.
	Tomis North	This coast has been artificially managed	<5	120 – 160	This coastline has been significantly modified by various interventions and coastal defences. Current shoreline change is not indicative of how the shoreline might respond once defences fail. A 'natural' erosion rate of -1.5 to -2m/year has

Coastal Sediment Cell	Sub- sector	Present shoreline trend (m/year)	Defence effective residual life (years)	Projected shoreline change/ erosion risk 30-50 years (m range)	Assumptions and considerations
		therefore current rates are not indicative of future rates under no intervention.			been assumed. The residual life of defences is less than 5 years. Once defences fail there will be localised accelerated erosion of reclaimed land. An additional allowance for a buffer safety zone has been included, as once reactivated, the cliffs will be susceptible to periodic landslides.
	Tomis South	This coast has been artificially managed therefore current rates are not indicative of future rates under NI.	Coastal defences <10 Tomis Port <20 Tomis Port to Constanta Port <10	150 – 200	The beach dynamics are almost entirely controlled by human intervention. Current shoreline change is therefore not indicative of how the shoreline might respond once defences fail. A ‘natural’ erosion rate of -1 to -1.5m/year has been assumed. The residual life of defences is less than 10 years. Until these defences fail, the shoreline will remain fixed, but once they fail, there will be accelerated erosion of reclaimed land and retained beaches. The jetties and breakwaters of Constanta Port are, however, expected to continue to have an impact beyond the Master Plan evaluation period. An additional allowance for a buffer safety zone has been included, as once reactivated, the cliffs will be susceptible to periodic landslides.
	Port of Constanta	-	>30	-	It is expected that the port breakwaters will remain effective beyond Master Plan evaluation period
Eforie - Cape Tuzla	Eforie North	This coast has been artificially managed therefore current rates are not indicative of future rates under NI.	Defences <5 Marina >30	60 – 80	The beach dynamics are controlled almost entirely by human intervention. The residual life of the coastal defences is less than 5 years. Following their failure, accelerated erosion of reclaimed land is expected - therefore an allowance has been included for this. An erosion rate of -1m/yr post defence failure has been assumed. It is assumed that the breakwaters at Constanta Port will continue to have an influence on the northern extent of this shoreline, which may enable some accumulation of sediment in the lee of the structures. An additional allowance for a buffer safety zone once reactivated, the cliffs will be susceptible to periodic landslides.

Coastal Sediment Cell	Sub- sector	Present shoreline trend (m/year)	Defence effective residual life (years)	Projected shoreline change/ erosion risk 30-50 years (m range)	Assumptions and considerations
	Eforie Centre	This coast has been artificially managed therefore current rates are not indicative of future rates under NI	existing <5 new >15-20	40 – 60	The submerged breakwaters are already mainly ineffective and the recent increased rate of erosion is likely to continue. To the south, the new rock revetment and seawall/promenade is likely to remain for 15 to 20 years, fixing the shoreline along this section. Once these structures fail, there could be accelerated erosion; an erosion rate of -1m/yr post defence failure has been assumed.
	Eforie South	This coast has been artificially managed therefore current rates are not indicative of future rates under NI	<5	60 – 80	The beach dynamics are controlled by a series of groynes and artificial headlands. The residual life of defences less than 5 years. An erosion rate of -1m/yr post defence failure has been assumed. There is also likely to be localised increases in beach erosion as retained sediment is lost once defences fail. An additional allowance for a buffer safety zone has been included, as once reactivated, the cliffs will be susceptible to periodic landslides.
	Tuzla North	Stable cliffs, but eroding beaches (0 to -0.5m/year)	<10	20 – 30	The cliffs have historically been susceptible to landslides, but recent cliff protection works should prevent further retreat for up to 10 years. Beyond this, historical rates are expected to resume, once defences fail. Rates of 0 to -0.5m/year for cliff erosion have been assumed. An additional allowance for a buffer safety zone has been included, as once reactivated, the cliffs will be susceptible to periodic landslides.
Cape Tuzla - Mangalia	Tuzla South	Stable cliffs, but eroding beaches (0 to -0.5m/year)	<10	20 – 30	The cliffs have historically been susceptible to landslides, but recent cliff protection works should prevent further retreat for up to 10 years. Beyond this, historical rates are expected to resume, once defences fail. Rates of 0 to -0.5m/year for cliff erosion have been assumed. An additional allowance for a buffer safety zone has been included, as once reactivated, the cliffs will be susceptible to periodic landslides.
	Costinesti	Eroding (where unprotected) (0 to -1m/year)	Groyne <5 years Breakwater	50 – 70	The rock groyne and toe protection are expected to remain effective for less than 5 years. Once these fail, there could be initial accelerated erosion, but there may be some release of

Coastal Sediment Cell	Sub- sector	Present shoreline trend (m/year)	Defence effective residual life (years)	Projected shoreline change/ erosion risk 30-50 years (m range)	Assumptions and considerations
			>15 years		sediment to downdrift areas, reducing slightly the erosion here. An additional allowance for a buffer safety zone has been included, as once reactivated, the cliffs will be susceptible to periodic landslides.
	23 August	Eroding (0 to -2m/year)	No defence	50 – 60	It is assumed that this area will continue to be affected by updrift defences works until these fail. There may be some supply of sediment to this frontage, but the general current trend is expected to continue. An additional allowance for a buffer safety zone has been included, as once reactivated, the cliffs will be susceptible to periodic landslides.
	Olimp - Venus	Beaches are eroding. This coast has been artificially managed therefore current rates are not indicative of future rates under NI.	<5	70 – 110	There is a succession of pocket beaches which are all artificially controlled and maintained. The residual life of defences is less than 5 years. Once the defences fail, there is likely to be accelerated erosion of the beaches and reactivation of the cliffs behind. An erosion rate of -2m/yr post defence failure has been assumed. An additional allowance for a buffer safety zone has been included, as once reactivated, the cliffs will be susceptible to periodic landslides.
	Balta Mangalia	Eroding (-1 to -3m/year)	No defence	70 - 110	It is assumed that the beach will, continue to be affected by the coastal defences and maintenance measures to the north, until they fail. Present trends of erosion are expected to continue, although there may be an input of sediment once defences fail to the north, which could reduce erosion slightly, at least temporarily.
	Saturn -Mangalia	Beaches are eroding. This coast has been artificially managed therefore current rates are	<5	70 – 110	There is a series of tightly-enclosed embayments which are all artificially controlled and maintained. The residual life of defences is less than 5 years. An erosion rate of -2m/year has been assumed post defence failure. There is likely to be accelerated erosion of artificial headlands and retained beaches once defences fail -although this may offset some of the erosion currently experienced in the centre of the bays.

Coastal Sediment Cell	Sub- sector	Present shoreline trend (m/year)	Defence effective residual life (years)	Projected shoreline change/ erosion risk 30-50 years (m range)	Assumptions and considerations
		not indicative of future rates under NI.			Sediment released will tend to transported downdrift. The breakwaters of Mangalia Port are assumed to have a local input, resulting in localised accretion updrift. An additional allowance for a buffer safety zone has been included, as once reactivated, the cliffs will be susceptible to periodic landslides.
	Portul Mangalia	-	>30	-	The port breakwaters are expected to remain effective beyond Master Plan evaluation period.
2 Mai - Cape Schabla (Bulgaria) - local national boundary at Vama Veche (state border with Bulgaria)	2 Mai	Eroding (0 to -2m/year)	<5	80 – 120	Along the majority of this sector there are no coastal defence structures. It is assumed, however, that Mangalia breakwaters will remain and will continue to have an impact on this frontage. The existing trend of erosion is expected to continue. The residual life of the breakwater/pier is less than 5 years, but this is only likely to have a very localised impact. An additional allowance for a buffer safety zone has been included, as the cliffs are susceptible to periodic landslides.
	Limanu	Eroding (0 to -2m/year)	No defence	70 - 110	The current trend of erosion is expected to continue at similar rates to present. An additional allowance for a buffer safety zone has been included, as the cliffs are susceptible to periodic landslides.
	Vama Veche - (Vama Veche to the State border with Bulgaria)	Eroding (0 to -1.2m/year)	No defence	50 - 80	The current trend of erosion is expected to continue at similar rates to present. An additional allowance for a buffer safety zone has been included, as the cliffs are susceptible to periodic landslides.

Tabel 2.1.5.3 Intervention options proposed through Master Plan

Sub-sector	Intervention area Proposed projects	Intervention option			
		No intervention	Minimum Intervention	Medium Intervention	Maximum Intervention
Golful Musura	Sulina Channel, Jetties and area adjacent to North arm (in order to mitigate erosion problems in Canalul cu Sonda)	No intervention and allow Sulina Channel structures to continue affecting downdrift coastal processes	Periodic by-passing of sediment from north of the Sulina Channel structures or from maintenance dredging of the Sulina Channel and placement in Sulina and/or Canalul cu Sonda sub-sectors.	Create or modify break in Sulina Channel structures to improve movement of sediment downdrift	Shorten Sulina Channel structures to prevent sediment moving offshore and initial recycling operation.
Canalul cu Sonda	Canalul cu Sonda	No current intervention and continuation of natural processes - breach of the barrier would result in saline ingress to the wetlands behind	Shoreface nourishment by discharging dredged sediments offshore of the submerged beach.	Sand bypass system to transfer from north or recycle sediment from near Sulina Jetties	Beach recharge: 20 m width beach
Portita	Gura Portitei (Local defences at tourist beach)	Defences allowed to fail and natural processes resume	Existing structures repaired as condition deteriorates	Beach recharge 15m width and existing structures repaired	Beach recharge 15m width and existing structures replaced with new rock groynes and Breakwaters
Periboina	Adjacent to Periboina Penstock (options with regard to penstock itself not considered)	No intervention and allow existing groyne to deteriorate and fail.	Inlet management	Boat shelter construction	New groyne to stabilise inlet and construction of boat shelter and sand by-passing to minimise impact

Sub-sector	Intervention area Proposed projects	Intervention option			
		No intervention	Minimum Intervention	Medium Intervention	Maximum Intervention
Chituc	Adjacent to Edighiol Penstock (options with regard to penstock itself not considered)	No intervention and allow existing groyne to deteriorate and fail.	Repair existing groyne and inlet management	Reairing the existing Groyne and sediment by-passing in the area of the channel Adjacent to Edighiol Penstock	Sediment by-passing and future works to reduce the impact on , inlet management and boat shelter construction
Mamaia North	Mamaia North	No current intervention and continuation of natural processes	Beach recharge 40m width	Beach recharge 60m width	Beach recharge 60m width and Rock groynes/ breakwaters
Mamaia Centre	Mamaia Centre	Existing offshore Breakwaters allowed to fail and natural processes continue	Beach recharge	Repair existing structures and undertake beach recharge 60m width	Construct new rock groynes/breakwaters and undertake beach recharge 60m width
Mamaia South	Mamaia South	Existing offshore Breakwaters allowed to fail and natural processes continue	No repairs to existing structures. Frequent recharge.	Existing structures repaired and less frequent recharge.	Repair, improve and construct new defences with recharge
Tomis North	Tomis North & Tomis Centre	Existing offshore Breakwaters allowed to fail and natural processes continue	No repairs to existing structures. Frequent recharge.	Existing structures repaired and less frequent recharge.	Repair, improve and construct new defences with recharge
Tomis North	Tomis Centre	Existing offshore Breakwaters allowed to fail and natural processes continue	No repairs to existing structures. Frequent recharge.	Existing structures repaired and less frequent recharge.	Repair, improve and construct new defences with recharge
Tomis South	Tomis South & Tomis Port	Existing offshore Breakwaters allowed to fail and natural processes continue	No repairs to existing structures. Frequent recharge.	Existing structures repaired and less frequent recharge.	Repair, improve and construct new defences with recharge
	Portul Tomis - Portul Constanta	Existing offshore Breakwaters allowed to fail and natural processes continue	Existing revetment repaired	Construction new revetment to replace existing structure, length Xm	Construction of new revetment in replacement existing structure and to provide additional protection

Sub-sector	Intervention area Proposed projects	Intervention option			
		No intervention	Minimum Intervention	Medium Intervention	Maximum Intervention
Eforie North	Agigea Breakwater to Steaua de Mare	Existing structures allowed to fail and natural processes continue	No repairs to existing structures. Frequent recharge.	Existing structures repaired and less frequent recharge.	Technical solutions leading to natural sand accumulation
	Steaua de Mare to Hotel Belona (Touristic Port) (Eforie North)	Existing structures allowed to fail and natural processes continue	No repairs to existing structures. Frequent recharge.	Existing structures repaired and less frequent recharge.	Repair, improve and construct new defences with recharge.
Eforie Middle	Eforie Middle	Existing structures allowed to fail and natural processes continue	No repairs to existing structures. Frequent recharge.	Existing structures repaired and less frequent recharge.	Repair, improve and construct new defences with recharge.
Eforie South	Eforie South	Existing structures allowed to fail and natural processes continue	No repairs to existing structures. Frequent recharge.	Existing structures repaired and less frequent recharge.	Repair, improve and construct new defences with recharge.
Costinesti	South of lake outlet training walls to Vile Albatros (Costinesti South)	Existing structures allowed to fail and natural processes continue	No repairs to existing structures. Frequent recharge.	Existing structures repaired and less frequent recharge.	Repair, improve and construct new defences with recharge.
	Hotel Maramures to Garofita (Olimp)	Existing structures allowed to fail and natural processes continue	No repairs to existing structures. Frequent recharge.	Existing structures repaired and less frequent recharge.	Repair, improve and construct new defences with wider bays and recharge.
Olimp - Venus	Neptune Jetty	Existing structures allowed to fail and natural processes continue	Repair and improve existing structure	Replace existing structure	Replace existing structure and provide further protection
	Lacul Tismana to Hotel Slivia (Jupiter - Venus)	Existing structures allowed to fail and natural processes continue	No repairs to existing structures. Frequent recharge.	Existing structures repaired and less frequent recharge.	Repair, improve and construct new defences with wider bays and recharge

Sub-sector	Intervention area Proposed projects	Intervention option			
		No intervention	Minimum Intervention	Medium Intervention	Maximum Intervention
Balta Mangalia	Balta Mangalia	No current intervention and continuation of natural processes	Beach recharge: 30m width beach	Beach recharge: 40m width beach	Beach recharge: 60m width beach
Saturn - Mangalia	Hotel Cerna to Hotel Diana (Saturn)	Existing structures allowed to fail and natural processes continue	No repairs to existing structures. Frequent recharge.	Existing structures repaired and less frequent recharge.	Repair, improve and construct new defences with wider bays and recharge
Saturn - Mangalia	Hotel Diana to Mangalia North breakwater (Mangalia)	Existing structures allowed to fail and natural processes continue	Repair existing structures	Existing structures repaired and beach recharge 10m width	Construct new defences with wider bays and undertake beach recharge 20 m width
2 Mai	2 Mai	Existing structures allowed to fail and natural processes continue	Repair existing structures	Existing structures repaired and beach recharge 20m width	Undertake 40m beach recharge and construct new defences consisting of series of groynes and/or offshore breakwater

2.1.6 Programul de implementare al lucrarilor de protectie

Master Plan represents the planning tool for the Romanian coastal zone rehabilitation and protection over a 30 years period from the elaboration date, and therefore, in order to reach its objectives, is essential to plan the implementation period as follows:

2011 – 2013 – short term (current EU financing period);

2014 – 2021 – medium term (coming EU financing period) ;

2022 – 2041 – long term.

In establishing the measures implementing programme, the following were considered:

- Each individual sediment cell, because of sub-sectors interdependence, and that is why, the intervention in one of them might negatively affect the adjacent ones inside the same sediment cell.
- Recent or undergoing investments for cliffs consolidation.
- Environmental assessment

2.1.6.1. Short-term Implementation Plan – 2011 to 2013

Tabel 2.1.6.1 Short-term Implementation Plan – 2011 to 2013

Location / Option	Length of coast Improved (km)	Area of beach Created (ha)
Mamaia South / Do maximum Repair existing structurea, construct new defences and recharge beaches	1,2	13
Tomis North (Tomis North) / Do maximum Repair existing structurea, construct new defences and recharge beaches	2,3	7
Tomis North (Tomis Centru) / Do maximum. Repair existing structurea, construct new defences and recharge beaches	0,9	4,5
Tomis South / Do maximum Repair existing structurea, construct new defences and recharge beaches	1,4	2,2
Eforie North / Do maximum Repair existing structurea, construct new defences and recharge beaches	1,3	7

Eforie North – repairing and construction of new defences might affect the Eforie North – Eforie South submerged beach Protected (proposed works will not be developed in the protected area).

The selection of structural measures for the short term took into consideration the following aspects:

- Feasibility studies realised through the JICA Study regarding the Protection and Rehabilitation of the Black Sea Romanian South shoreline;
- The three Tomis projects have interlinked benefit areas and there are also plans to undertake cliff stabilisation works. The coast protection works at the Tomis frontage are also interconnected with beach control breakwaters which are shared between adjacent sites. The three Tomis priority sites should therefore be considered together.
- Beach recharge at Mamaia South could provide benefit to the adjacent frontages, and Mamaia is recognised as a nationally important beach.
- The existing coastal defences are in poor condition or have exceeded the design life
- The severe beach erosion at Eforie North has resulted in the need to undertake emergency measures to shore up to the frontage.

2.1.6.2. Medium-term Implementation Plan – 2014 to 2020

Structural measures recommended in the **Northern Unit** in the medium term are at Canalul cu Sonda and Portita. Highest priority should be given to the Canalul cu Sonda project, where the coastline is suffering rapid erosion of the important protected environmental sites of the Danube Delta reserve. The final solution depends on the outcome of a short term study. The Portita project depends on the outcome of a proposed major study of the future management plan of the Razelm-Sinoe lake complex. It will take time to complete the study and agree approaches, and the project is therefore unlikely to go ahead before at least the middle of the medium term.

The existing coastal defences are in poor condition at all of these medium term locations in **South Unit** so it is difficult to distinguish between difficult to distinguish between most of them in terms of priority. However, the projects have been grouped below to show what are presently considered to be the most urgent projects.

Identified highest priority projects on medium term are:

- Mamaia Middle and Mamaia North – these projects have interlinked benefit areas and are also closely linked to the Mamaia South frontage which is recommended to go ahead in the short term;
- Eforie South – a project for Eforie South (1), which is part of the enlarged area. In order to mitigate any linked impacts on the rest of the sub-sector it would be advantageous to implement this adjacent Eforie South (2) project early in the medium term .
- Agigea – this is adjacent to the Eforie South project planned on short term; there could be benefits, including saving costs if this project would be implemented as a continuation of Eforie North project;
- Costinesti South – relatively urgent small project for the area to the South of the outfall training works/shelter.

Lower priority projects on medium term:

- Tomis Port to Constanta Port – The solution must be developed in collaboration with the local authority and urban planners;

- Eforie Centre – the existence of protected areas in the intervention area and in its vicinity, determines a long duration for Feasibility Studies and accompanying EIA to confirm the solution with minimum impact;
- Olimp, Neptun, Jupiter – Venus, Saturn, Mangalia si 2 Mai – many of the defences are in poor condition and the small bays amplify problems with the algae blooms. Development of solutions for improvement will require longer studies and detailed consultation with stakeholders, so these projects have all been given lower priority.

Tabel 2.1.6.2 Medium term implementation plan – 2014 to 2020

Location/option	Length of coast improved (km)	Area of beach created (ha)
Canalul cu Sonda / Do Minimum Shoreface nourishment by discharging dredged sediments offshore of the submerged beach	6	0
Portitia / Do medium Beach recharge 15m width and existing structures repaired	0,4	0
Mamaia North / lucrari de anvergura medie Beach recharge 60m width	2,7	33
Mamaia Centru / lucrari de anvergura maxima Beach recharge 60m width, construct new rock groyness / breackwaters	2,0	0,8
Tomis Port - Constanta Port / Do maximum New revetment in replacement of existing structure to provide additional protection	1,6	0
Agigea / Do maximum Rehabilitation, improvement and construct new structures and artificial beach recharge	1	0,8
Eforie Middle/ Do minimum No repairs to existing structures. Frequent recharge	1,6	1
Eforie South / Do maximum Repair, improve and construct new defences with recharge	3,1	2
Costinesti South / Do maximum Repair, improve and construct new defences with recharge.	0,4	0,4
Olimp / Do maximum. Removal of some existing defences to widen bays. Repair, improve and construct new defences with recharge.	1,5	1,7
Neptun Do minimum. Repair and improve existing structures	0,7	0
Jupiter – Venus / Do maximum. Removal of some existing defences to widen bays. Repair and improve existing structures and construct new ones and recharge	2,7	3,1
Saturn / Do maximum. Removal of some existing defences to widen bays. Repair and improve existing structures and construct new ones and recharge	0,8	1,8
Mangalia / Do maximum. Removal of some existing defences to widen bays. Repair and improve existing structures and construct new ones and recharge	1,8	4
2 Mai / Do minimum. Repair existing structures and cliff toe revetment at selected locations	0,3	0

Canalul cu Sonda: proposed works, of shoreface nourishment by discharging dredged sediments offshore of the submerged beach, are of minimum intervention. The proposed works will affect only locally, temporary and insignificantly the ROSCI0066 Danube Delta – marine area.

Portita: proposed works are of medium scale and they will affect only locally, temporary and insignificantly the ROSCI0066 Danube Delta – marine area.

Agigea: Proposed Works, between Agigea dam and Steaua de Mare hotel, will significantly affect the natural rocky habitats and the *Pholas dactylus* bivalve population - protected species under Berna & Barcelona Conventions

Eforie centru: even the proposed works are at minimum scale, they will affect **ROSCI0197** Eforie North – Eforie South submerged beach.

Costinesti: proposed works will affect the new defined Costinesti – 23 August protected area

Jupiter- Venus: proposed works will affect the south part of *ROSCI 0281 Aurora Cape*

Saturn – Mangalia: proposed works will affect the *ROSCI0094 Mangalia Submarine sulfated Springs*

2 Mai – The estimated impact of the works over the ROSCI0269 Vama Veche - 2 Mai will be minimum and temporarily, during works execution.

2.1.6.3. Long term implementation plan 2021 – 2041

The proposed structural projects in the long term are all dependent on short or medium term studies. It is recommended that prioritisation of the long term projects is considered at the next revision of the Master Plan.

Tabel 2.1.6.3 Long term implementation plan – 2021 pana in 2041

Location / option	Length of coast improved (km)	Area of beach created (ha)
Jetele Sulina / Do minimum Periodic by-passing of sediment from north of the Sulina Channel structures or from maintenance dredging of the Sulina Channel and placement in Sulina and/or Canalul cu Sonda sub-sectors	Values will be defined through the study proposed as medium term non-structural measure	
Stavilar Periboina / Do minimum Inlet management	0,4	0
Stavilar Edighiol / Do minimum Repair existing groyne and Inlet management	0,4	7
Balta Mangalia / Do maximum Beach recharge: 60m width	1,7	N/A
Costinesti (Faza II) / Do maximum Repair existing structures and beach recharge	2,5	N/A

2.2. NATURAL RESOURCES FOR PLAN IMPLEMENTATION (WATER, RENEWABLE RESOURCES, NON – RENEWABLE RESOURCES, ETC.)

Sources of sand for beach recharge

A strategic study of sand, as potential source for recharging the beaches was carried out by GeoEcoMar as part of field studies for this project. Full details of the investigation and the results are presented in the Coastal Dynamics (Halcrow, 2011) which presents a brief summary.

The objective of this study was to investigate a series of strategic sources of sand, which would allow subsequent selection for beach recharge projects that can be proposed as part of the Master Plan. Potential sources investigated included (Fig. 2.2.1):

- commercial dredging of the Danube - Calarasi sands from Cernavoda;
- active or disused sand quarries in southern Dobrogea;
- sources of land on the banks SAEL (Histria) and Chituc;
- dredging of sediment from the Sulina bar;
- accumulation of sediment near the Midia port.

Evaluation of sand sampling and its effects it over the biodiversity can not be done at the Master Plan level. An accurate impact assessment will be done late when specific technical solutions will be established. **Sand will not be exploited from strictly protected areas such Chituc and Saele.**

Similarly, dredging of sediment from other critical points of navigation on the Danube were considered. Sand sources in Constanta were Also taken into account, although it is known that sediments from the sea, the eastern beaches of the South Unit of the Romanian seaside, are fine, granular, not suitable for beach restoration.

Investigations have included visiting potential sites, collecting sediment samples for analysis.

Since the main objective of the entire coastal restoration project and improve the environment, special attention has been drawn to the potential impact on the environment, including impacts on the site source, during transport from the site and the site proposed sites beach recharge.

Analyze the factors considered most relevant were:

- Physical factors, chemical, biological and environmental quality, with special emphasis on sediment suitability to environmental conditions;
- The quantities available, without causing environmental damage;

Transport and environmental impact;

- Economic and financial factors.

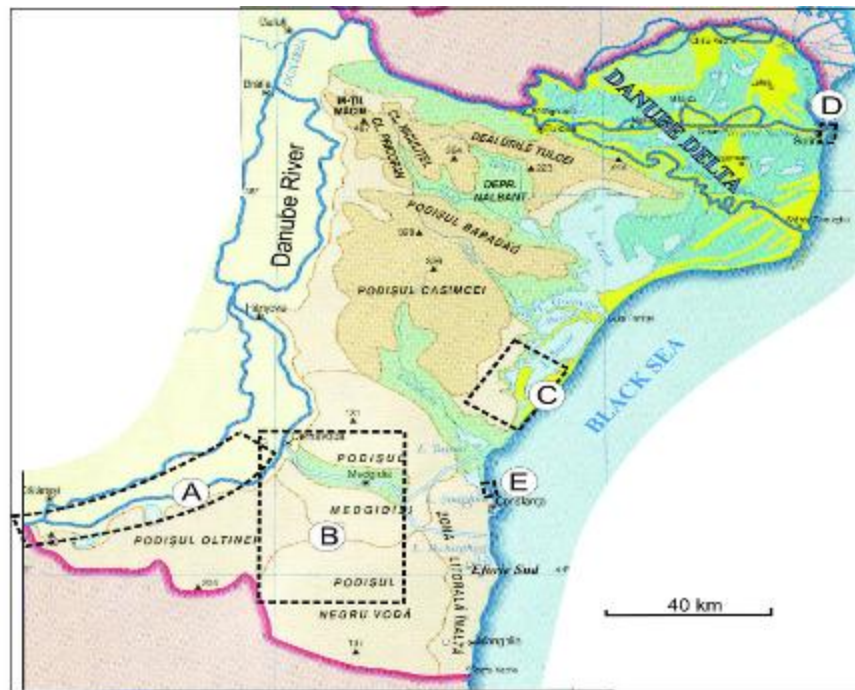


Fig 2.2.1. Sources of sediment for beach recharge

(A.Calarasi - Cernavoda, B. Cernavoda - Medgidia - Biruinta C. levees and Chituc Histria D. Sulina Bar, E. Midia Port). Master Plan "coastal protection and rehabilitation," Halcrow, 2011

Studies have highlighted the following aspects:

- Cochirleni area (km 310 - km 305 on the Danube) is proposed as a potential source of recharge of Mamaia beach-South and North beaches Eforie;
- It is worth mentioning that in the Danube alluvial Calarasi (km 390 - km 375) are rough and could be more appropriate for North Eforie beach, but due to larger distance transportation costs would be higher than the Cochirleni sands;
- Sands of the Cuza Voda and Tibrinu careers are considered an auxiliary source, with similar sized wire sand beach sand from Mamaia;
- Sands on the Danube near Calarasi - Cernavoda is characterized by the absence of pathogenic bacteria and parasites, as confirmed by the State Laboratory of Constanta, Sanitary Inspection;
- It is important to the delivery of river sand by mining companies and careers of the Cuza Voda Tibrinu;
- - Sands dredged by AFDJ Galati, from Sulina mouth, recorded significant volumes of sediment eroded stock Sulina beach area - Saint George.

2.3. EMISSIONS AND WASTE GENERATED BY THE PLAN AND HOW TO DISPOSE THEM

2.3.1 ATMOSPHERE POLLUTANTS EMISSIONS

Odata cu inceperea implementarii proiectelor propuse, pot aparea urmatoarele surse de poluare atmosferica:

- surse mobile reprezentate de mijloace de transport echipate cu motoare cu ardere interna;
- emisii necontrolate si accidentale de substante volatile de la un eventual depozit de combustibili si lubrifianti, amenajat in organizarea de santier.

From the implementation phase, sources of air pollution may occur :

- Mobile sources represented by vehicles equipped with internal combustion engines;
- Uncontrolled and accidental emissions of volatile substances from a possible fuel and lubricant storage, furnished in the site organization.

Air pollution is estimated that could come from mobile sources, especially in the execution phase of investment, site organization, namely the use of specific vehicles and construction equipment using internal combustion engines. Use of vehicles and construction equipment on the site where the investment is based on the number of turbines that are mounted simultaneously. Technical and economical approach would be up to five mounting positions simultaneously. This approach would create a significant pollution from mobile sources of pollution, estimated as the means of transport and construction equipment located in the area should not consume more than 100 liters of fuel per hour. Mobile pollution sources on the less feel that this activity and the construction - assembly is done at a significant distance from protected areas and only for short periods of time. However, as a preventative measure, it requires the use of new machinery, motor in good condition and equipped with more efficient exhaust gas filtration (Euro V).

As regarding pollution from uncontrolled sources, it is estimated that for 5-6 equipments that might work in the area there is no need for a fuel household and therefore there will be no emission source for volatile organic compounds .

Dust generated by moving machinery on the technological roads could be considered as pollution source, but given to the small number of machines, assembling short time and again, distance from protected areas, we can say that dust emissions are sporadic, they have low intensity, local character and no significant impact on the environment. As a preventive measure technological road sprinkling should be repeated.

2.3.2 NOISE AND VIBRATIONS

Master Implementation Plan involves construction works producing noise and vibration. Noise measurements are usually performed considering three levels of observation:

- noise at source;
- noise at near field;
- noise at distant field.

Noise at distant field depends on a number of external factors such as weather conditions, the soil effect, air absorption, topography, vegetation, etc..

Generally, frequently used tools in a construction site, generates noise associated with the following powers:

No.	Equipment	Associated Sound power (Lw)
1	Bulldozers	110
2	Vole	112
3	Excavatoare	117
4	Rollers	105
5	Crawler	115
6	Tippers	107

Vibrations are mainly generated by favourable conditions such is the quality of access roads in the area, especially when heavy machinery are used. Based on the acoustic power calculations associated to equipments, estimates shows that inside the area the noise levels will be up to 100dB (A) for short intervals. Considering national legislation provisions and taking account of the distance, smaller working intervals than the reference period (one day), it is estimated that, during construction period, the noise level becomes insignificant for the population of surrounding villages, leaving at distances between 500 and 1000 m, depending on the type of developed activities.

Noise impact on dolphin populations *is significant during construction period*. During summer, the three Black Sea dolphin species - *Delphinus delphis*, *Tursiops truncatus* and *Phocoena phocoena* – are approaching the coast up to 50-100 m distance from shoreline. Noise generating activities can have a **temporarily negative impact** on dolphins populations, dolphins being removed from the reference site. Marine mammals are dependant of sound for both communication and to capture information on their living environment. Hearing sensitivity of cetaceans is most intense at frequencies of 10-150 kHz and sounds with a frequency between 500 Hz to 1 kHz may interfere with their communication frequencies, as their communication calling are mainly made from moderate to high frequencies (1-20 kHz). Considering that the threshold of producing injuries to dolphins is of 120 dB and that the level of producing immediate pathological effect is of 40 dB above it, it can be said that the dolphin auditory system damage could occur at 220 dB. Some Odontoceti species, including the three Black Sea species of

dolphins, possess abilities and behavioral skills through which they can reduce their susceptibility at negative effects of noise of human origin:

- *Turpsiops truncatus* - dolphin with glass nose - he can raise the frequencies location levels when background noise is too high and they adjust their location signal frequencies to avoid background noise interval.

- Directional hearing ability of some species often have to help them to detect natural sounds in the presence of environment background noise. Directional hearing can help when directional characteristics of the sound signal and background noise differ.

- Leaving the sound impact area is the marine mammals normal response against human noise.

Construction activity in general, and the generated noise, will remove also the aquatic bird species present in the area. Because construction activities will take place during summer season, when the number of species and their flocks are reduced, ***the impact will be insignificant.*** Emphasize that the highest number of species is present in littoral marine waters in winter.

In order to reduce noise and vibrations levels and their effects on biodiversity it is recommended that the access roads to avoid protected areas located in coastal areas. As an activity limited in duration, the effect of implementing the Master Plan on the environment and population, in terms of noise and vibration, can be considered insignificant.

2.3.3 WATER POLLUTANT EMISSIONS

Activities set forth in the Master Plan are generating suspended solids in coastal marine waters. Substances in the water, being in suspension, in floating and in solution, in solid, liquid or gas forms, essentially determine water quality. Aquatic organisms are directly affected by these substances. In addition, they are also indirectly affected by the effects of chemicals on other forms of aquatic life which with they are in trophic relationships. Different species and different developmental stages of the same species may show very different sensitivity or tolerance to environmental conditions, substances and to synergic or antagonistic effects of toxical substances.

Reducing light intensity due to displaced suspended solids in water will lead to qualitative and quantitative changes in phytoplankton from water upper layers. Natural turbidity of romanian littoral allow development of benthic algae up to a depth of 10 m. Fine and coarse suspended solids resulting from construction activities will adversely affect algae population in the coastal area. For dams and jetty construction, the benthos in the respective area will be significantly affected (long-term effect). Master Plan Implementation will not affect quality of groundwaters.

2.3.4 WASTE MANAGEMENT

During project implementation, the following waste types might be generated:

- Household or equivalent waste;
- Waste resulting from the execution of steel resistance structures;
- Construction materials waste;
- wood waste from the current activity on the site;
- cardboard and paper packaging and office activities within the site organization.

These wastes will be separately collected and will be sold / disposed off by licensed operators.

During the exploitation period, waste is occasionally generated, in small quantities that could be represented by:

- oil;
- headed and degreasers of maintenance equipment;
- spare parts;
- consumable parts (air filters and oil);
- textile cleaning materials;
- packaging.

All waste will be recovered, selected and recovered / removed by licensed operators.

2.4 ACTIVITIES GENERATED AS A RESULT OF PLAN IMPLEMENTATION

Proposed plan implementation is generating the following activities:

- equipment and construction materials transport activities ;
- construction activities;
- Monitoring activities to assess the impact on biodiversity / environment in the project area;
- Activities of waste collection and transportation during project implementation.

3. INFORMATIONS REGARDING THE COMMUNITY INTEREST NATURAL PROTECTED AREA ARIA AFFECTED BY PLAN IMPLEMENTATION

3.1 DATA REGARDING COMMUNITY INTERES PROTECTED NATURAL AREA

As previously mentioned, the project area is covered by Natura 2000 sites (SCI - Sites of Community Importance and SPA - sites of special protection) from the coastal zone:

- ROSCI0065 Danube Delta,
- ROSCI0066 Danube Delta – Marine Area,
- ROSCI0237 Structuri submarine metanogene - Sfantu Gheorghe,
- ROSPA0031 Danube Delta si Complexul Razim - Sinoe,
- ROSPA0076 Black Sea,
- ROSCI0197 Eforie North - Eforie South Submerged Beach,
- ROSCI0273 Marine Area de la Cape Tuzla,
- ROSCI0094 Izvoarele sulfuroase submarine de la Mangalia,
- ROSCI0269 Vama Veche - 2 Mai,
- ROSCI 0281 Cap Aurora,
- ROSCI0293 Costinesti – 23 August,
- ROSPA0057 Siutghiol Lake,
- ROSCI0073 Marine Dunes from Agigea,
- ROSCI0114 Mlastina Hergheliei - Obantul Mare si Pestera Movilei,
- ROSPA0066 Limanu – Herghelia,
- ROSPA0061Lacul Techirghiol.

Site Code	Surface (ha)	Biogeographical region	Ecosystem/ habitat	Species	Vulnerability
ROSCI0065 Danube Delta	454.037	Steppe& Pontic	1130 Estuary 1140 Sands and marshy areas covered by water at low tide 1150* Coastal Lagoon	According to Natura 2000 Standard form	Danube basin pollution status, Riverine and maritime transport
ROSCI0066 DDZM	123.374	Pontica marina	1110 Sandbanks permanently covered by a layer of sea water 1130 Estuary 1140 Sands and marshy areas covered by water at low tide 1170 Recifs	According to Natura 2000 Standard form	Eutrophication, oil pollution ,illegal fishing
ROSCI0237 Sf. Gheorghe	6.122	Pontica marina	1110 Sandbanks permanently covered by a layer of sea water 1170 Recifs 1180 Submarine structure gas leak created	According to Natura 2000 Standard form	Navigation Natural resources exploitation
ROSPA0031 Danube Delta si Complexul Razim - Sinoe	512.820	Steppe& Pontic		According to Natura 2000 Standard form	Poaching, tourism, industrialization and extension of urban area, agriculture
ROSPA0076 Black Sea	170.902	Pontica		According to Natura 2000 Standard form	Port activities, maritime transport, commercial fishing, urban development
ROSCI0197 Plaja submersa Eforie North – Eforie South	140	Pontica marina	1110 Sandbanks permanently covered by a layer of sea water 1140 Sands and marshy areas covered by water at low tide 1170 Recifs	According to Natura 2000 Standard form	Tourism, pollution associated si waste water discharges, hydrotechnical works
ROSCI0273 Tuzla	1.738	Pontica marina	1110 Sandbanks permanently covered by a layer of sea water 1140 Sands and marshy areas	According to Natura 2000 Standard form	Agriculture, tourism, recreational diving

Site Code	Surface (ha)	Byogeographic al region	Ecosystem/ habitat	Species	Vulnerability
ROSCI0094 Izvoarele sulfuroase submarine de la Mangalia	382	Pontica marina	covered by water at low tide 1170 Recifs 1110 Sandbanks permanently covered by a layer of sea water 1140 Sands and marshy areas covered by water at low tide 1170 Recifs	According to Natura 2000 Stardand form	Repairing the existing Works, artificial beaches recharge
ROSCI0269 2 Mai – Vama Veche	6.936	Pontica marina	Sandbanks permanently covered by a layer of sea water 1140 Sands and marshy areas covered by water at low tide 1170 Recifs	According to Natura 2000 Stardand form	Minor anthropic impact arround the protected area
ROSCI 0281 Cap Aurora	13.453	Pontica marina	Sandbanks permanently covered by a layer of sea water 1170 Recifs	According to Natura 2000 Stardand form	Urban development, recreational diving & water sports, artificial beaches recharge
ROSCI0293 Costinesti – 23 August	4.878	Pontica marina	Sandbanks permanently covered by a layer of sea water 1140 Sands and marshy areas covered by water at low tide 1170 Recifs	According to Natura 2000 Stardand form	Urban development, water sports Agrement nautic, cliffs rehabilitation
ROSPA0057 Siutghiol Lake	1.849	Steppe& Pontic		According to Natura 2000 Stardand form	Tourism, water sports, fishing, transport, urban development
ROSCI0073 Dunele marine de la Agigea	11	Pontica	2130* fixed dunes with perennial vegetation herbacee (gray dunes)	According to Natura 2000 Stardand form	Uncontrolled grainig, urban/industrial development
ROSCI0114 Mlastina Hergheliei - Obantul Mare si Pestera Movilei	232	Steppe& Pontic	3260 Water course from the plains to the mountain vegetation of Ranunculion fluitantis and Clitricho-Batrachion 40C0* Ponto-Sarmatic deciduous shrubs	According to Natura 2000 Stardand form	Uncontrolled waste sites

Site Code	Surface (ha)	Biogeographic al region	Ecosystem/ habitat	Species	Vulnerability
ROSPA0066 Limanu Herghelia	874	Steppe& Pontic		According to Natura 2000 Standard form	Roads, agriculture, fishing and fisheries
ROSPA0061 Lacul Techirghiol	2.939	Steppe& Pontic		According to Natura 2000 Standard form	Tourism, agriculture

3.2. Information about the presence, location, population and recology special and / or habitats of Community interest presented on the surface and imidiated neighborhood plan mentioned in the standard formular of Community interest protected area

Tabel 3.2.1. Habitats

Habitat	Natura 2000 Site	Reprezenting (%)	Surface (ha)	Location
1110 Sandbanks permanently covered by a layer of sea water	ROSCI0065	1	4540,37	Infralittoral & circalittorale Sedimentary habitats up to 20m deep and exceptionally deeper
	ROSCI0066	70	86361,8	
	ROSCI0197	68	95,2	
	ROSCI0273	27	469,26	
	ROSCI0094	39	148,98	
	ROSCI0269	44	3051,84	
	ROSCI 0281	20	2690,6	
1130 Estuary	ROSCI0293	25	1219,5	Danube estuary and Delta chanells, & Razelm –Sinoe Lake complex, toghether with Musura Bay and Sachalin and Black Sea tranzitory waters, upt to 20m izobath
	ROSCI0066	25	30843,5	
1140 Sands and marshy areas covered by water at low tide	ROSCI0066	1	1233,74	Upper and midlittoral habitats on sedimentary substrates, including coarse (gravel, buckets, boulders)
	ROSCI0197	5	6	
	ROSCI0273	1	17,38	
	ROSCI0094	1	3,82	
	ROSCI0269	1	69,36	
1150* Coastal lagoon	ROSCI0293	5	243,9	Sinoe, Zaton & Musura Lagoon. Razelm, Golovita si Zmeica are kept in an advanced state of sweetening through continuous human intervention (operating the system of weirs).
	ROSCI0065	2	9080,74	
1160 Sea arms and marine gulfs	ROSCI0269 ROSCI0094 (in vecinatate, nu in interiorul situilor)	0	0	Mangalia „Lakel” (sea branch)
1170 Recifs	ROSCI0197	27	37,8	Rocky recifs or byogenic, with expansion from supralittoral to circalittoral
	ROSCI0273	72	1251,36	
	ROSCI0094	60	229,2	
	ROSCI0269	55	3814,8	
	ROSCI 0281	80	10762,4	
1180 Structuri	ROSCI0293	70	3414,6	Carbonate concretions created
	ROSCI0237	20	1224,4	

Habitat	Natura 2000 Site	Reprezenting (%)	Surface (ha)	Location
submarine create de emisii de gaze				by bacteria of various shapes and sizes that develop around gas emissions. They are located from 10 m isobath to the edge of the continental shelf and beyond this

Tabel 3.2.2. Species

Species	Natura 2000 Site	Reason	Population	Locatio, ecology
1349 Tursiops truncatus	ROSCI0065	Directiva	Pasaj	AfaLinul is present in the Romanian sea in summer, all over the continental shelf. It also enters into the Danube.
	ROSCI0066	Habitata, anexa	Rezident	
	ROSCI0197	II	Rezident	
	ROSCI0273		Rezident	Present in all sites, moving in family groups of 4-6 individuals. Large Groups (50-150 indivizi) were observed in ROSCI0273 Cap Tuzla organized hunting migratory pelagic fish schools. It's more social than humans and most often observed.
	ROSCI0293		Rezident	
	ROSCI 0281		Rezident	
	ROSCI0094		Rezident	
	ROSCI0269		Rezident	
1351 Phocoena phocoena	ROSCI0065	Directiva	Pasaj	Marsuin is a neritic species (6-200m depth) entering also in the Danube and the lagoons. In Romania its populations are concentrated near the coast, where food is more abundant and accessible. It is sometimes accidentally caught in nets for turbot. When approaching winter it migrates to wintering areas in Georgia and Turkey. It's present in all sites.
	ROSCI0066	Habitata, anexa	Rezident	
	ROSCI0197	II	Rezident	
	ROSCI0273		Rezident	
	ROSCI0293		Rezident	
	ROSCI 0281		Rezident	
	ROSCI0094		Rezident	
	ROSCI0269		Rezident	
1350 Delphinus delphis	ROSCI0066	Directiva	Pasaj	Dolphin is a offshore pelagic species, that avoid to come near the coast and sweetened waters. It can be rarely seen and only in the offshore part of the sites with great extension, only during periods when fish banks strikes it to coastal waters.
	ROSCI0237	Habitata	Pasaj	
	ROSCI0281		Pasaj	
	ROSCI0293		Pasaj	
	ROSCI0269		Pasaj	
4125 Alosa immaculata	ROSCI0065	Directiva	Pasaj	Criofila Pelagic species. Adults approach the shore only during the reproduction migration period in February-April., when it is present in all sites. Juveniles can be found often in coastal waters.
	ROSCI0066	Habitata, anexa	Pasaj	
	ROSCI0197	II	Pasaj	
	ROSCI0273		Pasaj	
	ROSCI0293		Pasaj	
	ROSCI 0281		Pasaj	
	ROSCI0094		Pasaj	
	ROSCI0269		Pasaj	
4127 Alosa tanaica	ROSCI0065	Directiva	Rezident	The species is present along the whole Romanian coast for most of the year. It is a thermophilic species which prefer shallow coastal waters. It is constntly present in all sites.
	ROSCI0066	Habitata, anexa	Rezident	
	ROSCI0197	II	Rezident	
	ROSCI0273		Rezident	
	ROSCI0293		Rezident	
	ROSCI 0281		Rezident	
	ROSCI0094		Rezident	

Species	Natura 2000 Site	Reason	Population	Locatio, ecology
2488 <i>Acipenser stellatus</i>	ROSCI0269		Rezident	
	ROSCI0065	Directiva	Rezident	The species is present along the whole Romanian coast. Adults are more commonly found in front of the Danube Delta, while juveniles are spread across the continental shelf, especially near the coast
	ROSCI0066	Habitata	Rezident	
	ROSCI0197		Rezident	
	ROSCI0273		Rezident	
	ROSCI0293		Rezident	
	ROSCI 0281		Rezident	
	ROSCI0094		Rezident	
ROSCI0269		Rezident		
2489 <i>Huso huso</i>	ROSCI0065	Directiva	Rezident	The species is present along the whole Romanian coast. Adults are more commonly found in front of the Danube Delta, while juveniles are spread across the continental shelf, especially near the coast
	ROSCI0066	Habitata	Rezident	
	ROSCI0197		Rezident	
	ROSCI0273		Rezident	
	ROSCI0293		Rezident	
	ROSCI 0281		Rezident	
	ROSCI0094		Rezident	
	ROSCI0269		Rezident	
2553 <i>Proterorhinus marmoratus</i>	ROSCI0066	Directiva	Rezident	Guvid de mici dimensiuni, usor de recunoscut dupa tuburile nazale. Este o specie foarte comuna in habitatele stancoase si in bancurile de midii. Frecvent intalnit in toate situurile.
	ROSCI0197	Habitata	Rezident	
	ROSCI0273		Rezident	
	ROSCI0293		Rezident	
	ROSCI 0281		Rezident	
	ROSCI0094		Rezident	
2551 <i>Pomatoschistus minutus</i>	ROSCI0066	Directiva	Rezident	Small sand goby, characteristic to many habitats of small depth. It prefers clean areas, with a good conservation status.
	ROSCI0197	Habitata	Rezident	
	ROSCI0293		Rezident	
	ROSCI 0281		Rezident	
	ROSCI0094		Rezident	
*** <i>Hippocampus guttulatus</i>	ROSCI0197	IUCN	Rezident	Long-snouted seahorse is a common species for both rocky habitats and seagrass meadows.
	ROSCI0273	Regional (Cartea Rosie a Marii Negre - BS TDA 2007)	Rezident	
	ROSCI0293	National (Lista Rosie)	Rezident	
	ROSCI 0281		Rezident	
	ROSCI0094		Rezident	
	ROSCI0269		Rezident	
2581 <i>Pholas dactylus</i>	ROSCI0293	Directiva	Rezident	Common piddock which pierce the soft rock, digging galleries in limestone, marl and clay. It develops only in areas with natural rocky substrate and are vulnerable to clogging with sediment
	ROSCI0269	Habitata Conventia de la Berna Conventia de la Barcelona	Rezident	
*** <i>Donacilla cornea</i>	ROSCI0197	Regional (Cartea Rosie a Marii Negre, BS TDA 2007) National (Lista Rosie)	Rezident	Species characteristic to sandy mediolittoral, very good indicators for environmental quality. Threatened throughout the Black Sea in Romania only survives in Eforie site
*** <i>Donax</i>	ROSCI0197	Regional (BS TDA 2007)	Rezident	Characteristic species to sandy infralittoral under strong conditions hydrodynamics.

Species	Natura 2000 Site	Reason	Population	Locatio, ecology
trunculus		National (Lista Rosie)		Threatened throughout the Black Sea, in Romania there are dense populations only in Eforie site.
*** Ophelia bicornis	ROSCI0197	Regional (Cartea Rosie a Marii Negre, BS TDA 2007) National (Lista Rosie)	Rezident	Species characteristic to sandy mediolittoral, very good indicators for environmental quality. Threatened throughout the Black Sea in Romania only survives in Eforie site
3001 Zostera noltii	ROSCI0094	Directiva Habitata Regional (Cartea Rosie a Marii Negre, BS TDA 2007) National (Lista Rosie)	Rezident	Seagrass habitats build value for conservation, important for the survival of threatened species complex. Seagrass meadows also help to stabilize sediments and beach erosion. Currently threatened worldwide, in Romania only survives in the site from Mangalia.
*** Cystoseira barbata	ROSCI 0281 ROSCI0094 ROSCI0269	Regional (Cartea Rosie a Marii Negre, BS TDA 2007) National (Lista Rosie)	Rezident Rezident Rezident	Large perennial algae, forms dense belts in the rocky infralittoral. These underwater forests are an important habitat for a many threatened species, as well as for reproduction and development of juveniles of species with economic value. Protected in the Mediterranean and Black Sea. In Romania has a very localized distribution and fragmentation, greatly reduced from the past.
*** Corallina officinalis	ROSCI0094 ROSCI0269	Regional (BS TDA 2007) National (Lista Rosie)	Rezident Rezident	Characteristic species in rocky mediolittoral under strong hidrodinamic conditions. Loves the bright light, hydrogen peroxide and clean waters.

3.3 DESCRIPTION OF COMMUNITY INTEREST AFFECTED SPECIES AND HABITATS ECOLOGICAL FUNCTIONS (SURFACE, LOCATION, CHARACTERISTIC SPECIES) AND OF THEIR RELATIONSHIP WITH NEARBY COMMUNITY INTEREST NATURAL SITES AND THEIR DISTRIBUTION

1110 Sandbanks shallow submerged [Sandbanks Which is Slightly Covered by seawater at all times]

There are benches and circalitorale infralitorale graded sediment average (from the sandy gravel) permanently submerged. Rarely exceeds 20 m depth, but in some cases can exceed 50m. Where hidrodinamismul and lack of light does not permit the development of vegetation, are nude. In areas sheltered from waves, clear water that allows good light penetration, lawns are made of a vegetable or more species of sea grass (*Z noltii* Oster, *Stuckenia pectinata*, *Zannichellia pedicellata*, *RUPP sea*). This group of habitats not host large numbers of invertebrate species

linked by trophic relationships established. Populations of mollusks, worms policheti, decapod crustaceans can reach here amphipode and high biological productivity, making important biomass. They are valued as food by juvenile flat fish, the sturgeon and other fish species of economic value.

In the Romanian Black Sea, the habitat is represented by the following *subtypes*:

1110-1 Fine sands, clean or slightly malo, with meadows of *Zostera noltii*

Habitat is present at shallow depths (0.5-3m) in areas sheltered from wave action and prevailing winds, the substrate of fine sand (100-200 μ m). The shelter is often given protection dikes or natural rock formations (reefs), which together comprise the small bays.

Thick foliage of the grass high wave action diminishes, and with dense network of rhizomes, acts as a veritable trap for sediment. Sediments are stabilized, and the silt fraction is 5-10%. Dense bed is formed by rhizomes anoxic environment for endobentica fauna and has a high resistance to erosion than the surrounding sediment free, which is often raised from 20-50cm.

Characteristic fauna consists of large mobile forms that hide in foliage: guvid-the-grass *Zosterisessor ophiocephalus*, shrimp *Palaemon adspersus-de-grass*, crab *grass-de-Carcinus aestuarii*, seahorses *Hippocampus guttulatus* and high thread *Nerophis ophidion*. *Cerastoderma glaucum* mollusks epibentica Fauna and *Cyclope* include *shallow-water*, and the mollusks *Tellina tenuis endobentica*, *Loripes lacteus*, *Lucinella divaricata*, worms *Nephtys policheti hombergii* and decapod crustacean *Upogebia Glyceria tridactyla* and *pusilla*.

Meadows of sea grass habitat gives the high dimensional complexity and biological productivity. Many species find here their shelter, refuge from predators and abundant trophic resources, which explains in part the high specific diversity of this type of habitat. Seagrass meadows provide shelter and food for juvenile fish in the early stages of development payments are an important food resource for wintering seabirds us.

In Romania this subtype *does not exist only in underwater sulphurous springs ROSCI0094 Mangalia*.

1110-2 Hydraulic dunes of medium sands

Habitat consists of sand grain moving average, as strong currents and wave action forms submerged sand bars or hydraulic dunes parallel to the direction of the mainstream. The sand accumulation over time, these structures can become emeritus, representing islands of sand bars moving or standing.

The fauna is highly variable in time and space due to sedimentary instability. Biodiversity is reduced, but populations are abundant species present.

Examples of this type of habitat are Sakhalin island in the mouth of St. George and associated submerged dunes and sand bar which tends to close emersion Musura bathroom.

1110-3 Shallow fine sands

The Romanian seaside, this habitat is present at the mouth of the Danube and to Vama Veche, where there are sandy beaches.

The substrate is composed of fine sand terigene (siliceous) or biogenic waste mixed with shells and pebbles, arranged from the shore up to 5-6 m isobath

In the north (from Sulina to Constanta), where the Danube freshwater influence is felt, this habitat is home to fine sands with *Lentidium mediterraneum* biocoenosis. Besides the dominant species *Mya arenaria* are characteristic molluscs, *Cerastoderma glaucum* and *Anadara inaequalis*, crustaceans *Crangon crangon*, and fish *Platichthys flesus* *Liocarcinus vernalis* and *Pegusa Lascaris*.

In the south, to Eforie Costinești Comorova-Mangalia, where salinity is more stable, this habitat is home to *Donax trunculus* biocoenosis, which is characterized by abundant populations of this bivalve. Due to high hidrodinamismului, associated fauna is very diverse: *Cyclope shallow-water* gastropods, crustaceans and *Diogenes pugilator* *Liocarcinus vernalis*, but may be abundant.

Conservation Value: very high.

1110-4.Well-sorted sands

This habitat is disposed in the immediate continuity of shallow fine sands, from 5-6 m up to 8-10m depth in the north (from Sulina to Constanta) and 10-15m depth in the south. The substrate is composed of silica sand smooth, much less affected by wave agitation. Silt content of sediment increases with depth.

Characteristic species are molluscs *Chamelea Gallina*, *Tellina tenuis*, *Anadara inaequalis*, *Cerastoderma glaucum*, *Cyclope shallow-water*, *Nassarius nitidus*, and *Diogenes pugilator vernalis* *Liocarcinus crustaceans*, fish *Gymnamodytes cicereus*, *Trachinus draco*, *Uranoscopus scaber*, *Callionymus sp.*, *Pomatoschistus sp.*

Conservation Value: very high

1110-5.Coarse sands and gravel little battered by the waves

Are found in natural rocky coves of the coast exposed and do not exceed a few tens of centimeters deep. Is in the form of very narrow submerged beaches consisting of coarse sand and gravel derived from the degradation of rock, the waves continually repaired ones.

1110-6 .Infralittoral buckets

They meet here and there along the rocky coast exposed naturally, between depths of 0.5 and 2.5 m. These beaches are partially submerged rocks covered with round and flattened (buckets), usually limestone, white, shaped by waves. Occur only in areas with strong and are populated hidrodinamism izopode crustaceans, and crab *Xantho* amphipode *poressa*.

1110-7 Shallow sands bioturbated of Arenicola and Callianassa

Habitat is fragmented distribution, covering small areas scattered on the beaches south of Cape submerged Midia, between 4 and 7 m depth. It is best represented in the Cap Aurora sites and

Mangalia. At the top (4-5m) habitat is contiguous with 1110-3, where it extends up to 7m deep. The sand is bioturbated to a depth of 1m and the sediment surface is marked by characteristic funnels and *Callianassa* mounds and truncated cones attached manure *Arenicola marina*. Value conservative high

1110-8.Muddy sands and muds SandS bioturbated by *Upogebia*

Habitat forms a continuous belt along the coast Romanian on shore located between 10-30m depth. The substrate is riddled with numerous galleries of *Upogebia pusilla* thalassinid Decapoda Crab, which penetrate deep 0.2-1m, depending on sediment composition. *Upogebia* populations are very dense (100-300 ex / m²) and cover very large suprafete, biofiltration, and resuspensia bioturbația sediment carried by these crustaceans have a notable influence on the ecosystem.

Decapod crustacean species is edifying *Upogebia pusilla* thalassinid, which feeds by filtering organic suspension plactonul and stream pumps you continuously through its galleries. Bivalve molluscs is low density in this habitat due to food competition and planktonic larvae and postlarvelor predației by *Upogebia*. Other species, particularly commensal living in *Upogebia* galleries, are facilitated.

Conservation Value: very high. *Upogebia* thalasinidului role in biofiltration benthic-pelagic coupling and ensuring the functioning ecosystem is essential.

1130.Estuaries

The mouth of the Danube, with baths and Sacalin Musura and Black Sea waters in front of them until the 20 m isobath is estuarine waters. Waters of the Danube Delta are substantially influenced by freshwater inflow. Mixture of freshwater and marine sediments leads to precipitation of fine and streamline and currents often carry these sediments. This habitat includes midlittoralul, infralitoralul and circalitoralul, characterized by low salinity surface water upstream and entering a deep layer of sea water. These waters are home to communities of specific estuarine plants and animals. Therefore, although there is high (as in the Mediterranean and Baltic) and did not form typical estuary, these waters are a habitat estuarin variable salinity, relatively close to the Baltic Sea.

Characteristic species are molluscs *Abra segmentum*, *Cerastoderma glaucum*, *Mya arenaria*, *Hydrobia* spp policheți *Hediste diversicolor* worms, *Capitelli capital*, and crustaceans *Corophium* sp. *Dikerogammarus* sp.

Conservation Value: High

1140-1 Supralittoral sands with or without fast-drying drift lines

Present on the Romanian seaside beaches. Occupy the beach which is not wetted by waves only during storms. Deposits are composed of materials to large vegetable (tree trunks, pieces of wood, and swamp land plant debris, algae, leaves), animal (dead aquatic animals, insects, animals drowned land) or anthropogenic (waste solid) and dense foam derived from marine plankton. The fauna is made up mainly of crustaceans and insects isopode.

Conservation Value: Low

1140-2 Supralittoral slow-drying drift lines

Currently composed of boulders on the shores or beaches buckets (Agigea, Tuzla, Vama Veche). Handle portion which is not wetted by waves during storms than the shores or beaches formed by rocks buckets. They accumulate in the spaces between them remains described above, and humidity, so it dries hard deposits. The fauna is made up of detritivori, decomposers and their predators.

Conservation Value: Moderate

1140-3 Midlittoral sands

Present on all sandy beaches of the Romanian seaside. Holds strip of sand from the shore, the waves that burst. Depending on the degree of agitation of the sea, it may be wider or narrower, but the Black Sea is still limited due to negligible tidal amplitude. The sand is loose, coarse and mixed with shells and pebbles scrap.

Species typical of the beaches of southern Romanian coast (Eforie, Costinești, Mangalia, Vama Veche) is bivalve *Donacilla cornea*, and the beaches of the coast amphipodul *Euxinia maeoticus* Delta.

Conservation Value: very high.

1140-4 Midlittoral detritus on shingle and boulders

Habitat is present in rocky shores midlittoralul (Agigea, Tuzla, Costinesti and Vama Veche), the substrate of boulders, gravel buckets or, in detrital deposits supralitorale continuitare with slow drying (1140-2).

Shore consists of boulders, gravel buckets, which accumulates mainly algae death. When the amount is in excess of organic compounds, degrades habitat, hypoxia and anoxia can occur locally, affecting habitats and biota of infralitoralul contiguous.

The fauna is represented by the genera *Idotea* isopode and crab *Pachygrapsus marmoratus* and *Sphaeroma*. Value conservative: low

1160 -1 Malo sands in sheltered areas

This habitat is the bathroom (embayments) and bath Sacalin Musura Bay. Sandy habitat is located in protected bays with peaceful waters whose depth does not exceed 3 m. The sand malo located in areas sheltered, shallow, develop a rich vegetation and diverse fauna, both marine and salmastricole elements.

Floristic composition: *Zostera marina*, *Z. noltii*, *Zannichellia pedicellata*, *Najas marina*.

Conservation Value: very high

1170-1 *Ficopomatus enigmaticus* biogenic reefs

This habitat is found in sheltered waters but with a slight wave current, preferably with variable salinity. Premises legătură ports and channels of the sea and delta are the places where it is easiest to find.

Worm reefs are built by polychet tubicol *Ficopomatus enigmaticus* whose calcareous tubes grow crowded and cemented between them on any hard substrate, including strains of *Phragmites* reeds. Biogenic reef building are similar to worms *Serpula vermicularis* policheți tubicoli Atlantic coast of Europe, the difference being that *Ficopomatus* prefer sheltered waters of the waves, with a slight current and variable salinity. The fauna is extremely diverse, contrasting with the surrounding sedimentary areas.

Conservation Value: Great. Habitat is a very original, very localized and a high specific diversity. A reef can accommodate 50 species macrozoobentice. This habitat plays an important functional, both in terms of food, due to high densities (ie 245 250 m⁻²) and areas they cover and in terms of biofiltrării, *Ficopomatus* reefs of being able to improve significantly the quality water in which it grows.

1170-2 *Mytilus galloprovincialis* biogenic reefs

Mussel reefs occur on sedimentary substrate (mud, sand, scrădiș or mixture), most commonly between 35 and 60 m. izobatele are spread throughout the Romanian coast, between izobatele above.

Biogenic reefs of *Mytilus galloprovincialis* mussels consist of banks whose shells have accumulated over time, forming a hard raised to support the surrounding sediments (silt, sand, scrădiș or mixture), the living mussels living colonies. Sedimentary habitats with substrate of the Black Sea, it accommodates the specific diversity due to its expansion to a wide range of depths and because of the many reefs of mussels microhabitate matrix that provides living conditions for a wide variety of species.

This reef is unique crucial ecological role in self-cleaning benches ecosystem mussels and benthic-pelagic coupling realization, by the existence here of several species, the importance of socio-economic as habitat for many species fishery value Commercial (*Psetta maeotica*, *Squalus acanthias*, Acipenseridae, Gobiidae, *Rapana venosa*). Floristic composition: *Peyssonellia rubra*, *Phyllophora nervosa*, *Lithothamnion crispum*, *Lithothamnion cystoseirae*, *Lithothamnion propontidis*.

Conservation Value: very high. Mussels themselves are the species of molluscs consumed by people around the Black Sea, and schools of mussels are a source of larvae for aquaculture and rear.

3.4 CONSERVATION OBJECTIVES OF THE COMMUNITY INTEREST NATURAL PROTECTED AREA

Regarding the Community importance site - **ROSCI0065 Danube Delta**, this has a *Management Plan* approved by the Scientific Council of the Danube Delta Biosphere Reserve (RBDD), which specifies the conservation objectives of the natural protected area. According to Law no. 82/1993, the Danube Delta Biosphere Reserve Administration (DDBRA) has as main objectives ecological conservation of the rezervation territory, conservation and protection of natural patrimony with high scientific value and promoting sustainable use of natural productivity ecosystems, ecological reconstruction of the habitats damaged by the works made before 1989.

The Management plan, discussed and approved by the RBDD Scientific Council, contains 35 objectives and 87 projects, grouped in four categories, namely:

- ✓ General objectives regarding the RBDD ecological status recovery, legislative framework and some forms of cooperation and promotion of the reservation;
- ✓ Targets regarding the sustainable economic use of RBDD space and the use of its natural resources (agriculture without chemical fertilizers and pesticides, use of natural resources - reeds, reed, wood, fish fauna, ornithologists and mammals, ecotourism);
- ✓ Objectives and activities in the buffer zone to help reduce human pressure for full protection and rehabilitation of areas previously degraded habitats;
- ✓ Objectives on full protection areas such as improving water quality, biodiversity research and monitoring on conservation and protection for them.

According to the current legislation, aligned to European requirements, the conservation objectives of protected natural areas of interest are:

- ✚ Ensuring biodiversity, through the conservation of natural habitats and species, wild flora and fauna in Romania;
- ✚ Maintaining or restoring a favorable conservation status of natural habitats and species of flora and fauna;
- ✚ Measures for the protection and conservation of wild animals and plants endangered, vulnerable, endemic and / or rare.

For ROSCI0066 Danube Delta – Marine Area, ROSCI 0237 Structuri metanogene Sf. Gheorghe, ROSCI 0197 Plaja submersa de la Eforie, ROSCI 0273 Cap Tuzla, ROSCI 0094 Izvoarele sulfuroase de la Mangalia si ROSCI 0269 2 Mai – Vama there are ongoing projects to achieve integrated management plans. For the new sites ROSCI Costinesti 0293 - 23 August and ROSCI 0281Cap Aurora, there are no management plans. Under this circumstances, Table 3.4.1. presents the summarized main priority objectives for sites conservation.

Tabel 3.4.1. Conservation Priority Objectives

Community interest priority area	Conservation priority objectives
ROSCI0066 Danube Delta – Marine Area	<ol style="list-style-type: none"> habitats 1130 & 1110-2 priority conservation; in Romania they exist in this site only conservation of <i>Alosa species</i>, involving the conservation of needed habitats, and also adequate legislation for their fishing conservation of dolphins species, using this site as feeding zone during summer. Involves also fishing regulations in order to keep enough dolphins food resources and to avoid their accidental or deliberate killing by fishermen. the conservation of sturgeon that gather within the site especially during the autumn-winter
ROSCI 0237 Structuri metanogene Sf. Gheorghe	<ol style="list-style-type: none"> priority conservation of 1180 habitat, which is protected in this site only sturgeons, Alose & dolphins species conservations as in previous site
ROSCI 0197 Plaja submersa de la Eforie	<ol style="list-style-type: none"> priority conservation of 1140-3 & 1110-3 habitats, reaching here the the best conservation status and the best representativity in Romania conservation of <i>Donacilla cornea</i> si <i>Donax trunculus</i>
ROSCI 0273 Cap Tuzla	<ol style="list-style-type: none"> conservation of 8330 habitat, presented in this site only conservation of 1170 habitat sub-types dolphins species conservation
ROSCI 0293 Costinesti – 23 August	Conservation of 1170 habitat, especially for 1170-2 si 1170-10 sub-types
ROSCI 0281Cap Aurora	<ol style="list-style-type: none"> conservatio of habitat 1170-8 with <i>Cystoseira barbata</i>, reaching here the highest density in Romania conservation of habitat1110-7 with <i>Arenicola</i> & <i>Callianassa</i> conservation of habitat 1170-2 from the offshore area zone dolphins species conservation
ROSCI 0094 Izvoarele sulfuroase de la Mangalia	<ol style="list-style-type: none"> conservation of 1110-1habitat, with <i>Zostera noltii</i>, unique in Romania conservation of 1170-8 habitat with <i>Cystoseira barbata</i>, the site containing 90% from its whole population in Romania conservation of habitat 1110-7 with <i>Arenicola</i> si <i>Callianassa</i> conservation of dolphins species and of the national and regional interest rare species
ROSCI 0269 2 Mai – Vama Veche	<ol style="list-style-type: none"> identification of the causes of the site environment degradation conservation of 1170-10 habitat with <i>Pholas dactylus</i> few fragments of the 1170-8 habitat with <i>Cystoseira barbata</i> the conservation of mediolittoral rocky natural habitat in danger of being destroyed by building works cliff conservation of dolphins species and of the national and regional interest rare species

3.5 DESCRIPTION OF CURRENT CONSERVATION STATUS OF THE COMMUNITY INTEREST NATURAL PROTECTED AREAS, INCLUDING EVOLUTION/CHANGES THAT MIGHT OCCURE IN THE FUTURE

Tabel 3.5.1. Current conservation status of community interest natural protected areas

PROTECTED AREA	DIVERSITY	UNICITY	CONSERVATION STATUS	VULNERABILITIES
ROSCI0066 Danube Delta – Marine Area	reduced	habitats 1130 si 1110-2, which in Romania exists in this sites only	good	- Oil pollution from oil exploitation existing in the vicinity of the site -suprafishing, illegal fishing methods (bottom trawl) - Failure moratorium on sturgeon
ROSCI 0237 Structuri metanogene Sf. Gheorghe	reduced	habitat 1180, which is protected in this site only	good, very good for 1170-2	Oil pollution from oil exploitation existing in the vicinity of the site -suprafishing, illegal fishing methods (bottom trawl) - Failure moratorium on sturgeon
ROSCI 0197 Plaja submersa de la Eforie	medium	- the only place in Romania where still exist sandy mediolittoral with <i>Donacilla cornea</i> & <i>Donax trunculus</i> - the only beach in South littoral unaffected of hydrotechnical works	Very good, mainly for , 1140-3 &1110-3	Construction of water likely to alter the natural sedimentary hidrodinamism and circulation - Discharges of freshwater and / or polluted marina -intensive tourism
ROSCI 0273 Cap Tuzla	big	- the only place in Romania where exists the 8330 Marine caves habiat - spectacular underwater landscape - one of very few places in Romania where the midlittoral natural rocky was present exists	good, mainly for 1170 & 8330	-hydrotechnical construction building already destroyed midlittoralul rocky cliff in 2010 - Extraction of stone from the site for hydraulic works - Pollution from Eforie South WWTP - Turbot fishing nets in this area is intense and constant mortality occurs among porpoises - species Natura 2000 -
ROSCI 0293 Costinesti – 23 August	big	- spectacular underwater landscape - one of very few places in Romania where the midlittoral natural rocky & 1170-10 habitat with	Very good, mainly for 1170	Construction of water to strengthen the cliff - Extraction of stone from the site for hydraulic works

PROTECTED AREA	DIVERSITY	UNICITY	CONSERVATION STATUS	VULNERABILITIES
ROSCI 0281Cap Aurora	big	Pholas dactylus is present - 1170-8 habitat with Cystoseira barbata, which reaches here the highest density of Romania - 1110-7 habitat with Arenicola si Callianassa	Very good, mainly for 1170 si 1110	- hydrotechnical constructions
ROSCI 0094 Izvoarele sulfuroase de la Mangalia	big	- 1110-1 habitat with Zostera noltii meadows, unique in Romania - 1170-8 habitat with Cystoseira barbata, the site continand 90% of the whole population in Romania - 1110-7 habitat with Arenicola si Callianassa	Very good, mainly for 1170&1110	- -hydrotechnical Construction of water from nature to destroy or modify existing unique habitats here
ROSCI 0269 2 Mai – Vama Veche	medium	- one of very few places in Romania where the 1170-8 habitat with Cystoseira barbata is present - One of very few places in Romania where the 1170 – 10 habitat with Pholas dactylus is present - One of very few places in Romania where natural rock midlittoral is present.	degraded	hydrotechnical constructions of nature to destroy natural rocky midlittoralul -pollution AREA-rapid erosion former military wild-tourism, including underwater

Site **ROSPA0031 Delta Razim-Sinoe** faces a series of negative aspects regarding the birds fauna conservation , namely:

- intensification of agriculture: change of farming methods from the traditional ones to intensive agriculture, with large monocultures, excessive use of chemicals, carrying out works with equipment and machinery only , semi-natural habitat change (hay, pasture) due to the cessation of agricultural activities as mowing or grazing, poaching, drainage of wetlands along rivers on lowland areas, in peat bogs, mowing during the nesting, industrialization and urban expansion;

- destruction of nests, of ponte or offspring , disturbing birds during the nesting period (colonies) , burning of vegetation (stubble and the areas set aside) , setting the river courses, electrocution and collisions in the electric power lines , mass tourism , location of wind generators;
- uncontrolled growth of invasive species , deforestation, logging and forestry works that result in cutting trees in large areas , selective logging of older trees or species-gathering fire wood, afforestation of semi-natural areas (pastures, fanatic, etc..) - drainage of wetlands through drainage along the river, the plain areas, river course adjustment - burning reed nesting location in the period of wind generators - Navigation.

Coastal and littoral area from Cape Midia to Vama Veche to, included in **0076 ROSPA Black Sea**, is under anthropogenic factors pressure with major impact on coastal and marine ecosystems due to port activities, shipping, commercial fishing, major urban areas and resorts, tourism and water sports, industry, etc..

3.6 OTHER RELEVANT INFORMATIONS REGARDING COMMUNITY INTEREST NATURAL PROTECTED AREAS, INCLUDING POSSIBLE CHANGES IN THEIR NATURAL EVOLUTION

In order to estimate the future evolution of the community interest marine natural protected areas, complex studies regarding the protected habitats and species evolution and status, databases with centralised information and modeling activities are needed.

4. IMPACT IDENTIFICATION AND ASSESMENT

The works for coastal protection and rehabilitation involves direct impact mostly, not only on species located in and in its immediate vicinity, sediments re-suspension and contribution of clay contained in rock , having the effect of clogging, choking and blocking of light penetration within a radius of at least one km. This means that the impact will affect the benthic fauna and flora on large surfaces, as well as juvenile stages of pelagic species, destroying habitats with important role in feeding, reproduction and development of their brood. Dredging works will have a severe impact on benthic habitats and species, by their mechanical destruction and by re-suspension of fine sediments ("pelitic" fraction), which are re-settled on large area leading to the suffocation of the respective biocenoses. Pelitic fraction contains fine abiogen sediments (minerals), but it is very rich in dissolved organic substances, as well as in toxic compounds accumulated in sediment and in water - sediment interface. Macrophyte algae populations will not be destroyed immediately by burial by sediment will die soon due to excessive turbidity which completely block the penetration of solar radiation required for photosynthesis. This indirect effect will occur on more extensive areas than the ones from warping. Re-suspension of organic substances contained in pelitic fraction will raise the water nutrient concentrations (nitrates, phosphates) with at least one magnitude degree, which will generate massive microalgae bloom. They will heavily diminish the water quality, both for tourism and for other ecosystem components. Algal bloom causes mass fauna mortality due to hypoxia, but also due to toxins when this is due to toxic phytoplankton species. Together with nutrients, toxic pollutants (pesticides, heavy metals, HAA) accumulate into sediments are brought back into suspension. These are taken from suspension by filtrating aquatic organisms, gathering and focusing through taking over to higher trophic levels. Finally it comes to the contamination of the species of economic interest (fish, molluscs, crustaceans), but also to the poisoning of the species of conservation interest (dolphins). The last two types of impact (algal bloom and toxins) affect a very large area, practically the entire Romanian Black Sea sector. Disruption of normal functioning of the marine ecosystem will be produced also by the noise and vibrations produced during during excavation works, which will remove the pelagic fish flocks and dolphin species attending the area looking for food.

Phytoplankton

During execution of the works it is expected that sea physical and hydrological conditions change like increasing the suspended solids concentration in water, reduction or even total absence of light, etc., implicitly leading to a change from qualitative and quantitative point of view of phytoplankton communities, as follows:

- Reduced light intensity caused by the suspensions displaced in water will lead to the qualitative and quantitative phytoplankton changes also from water upper layers. Throughout the whole period of works execution that are affecting the marine bottom, in the immediate vicinity of the works, the quantities of phytoplankton microalgae will decrease and will increase the diatoms dominance.
- On a much larger area, re-suspension of organic substances contained in the sediment will increase the concentration of nutrients in water , which will generate massive microalgae blooms. These will over diminish the water quality, both for tourism and for other components of the ecosystem. Algal blooms causes flaural mass mortality due to hypoxia, and also to toxins when they are due to toxic phytoplankton species.

As a consequence, the impact on phytoplankton during works implementation, affecting a much wider area than the one of the works, can persist for several years.

Fitobentos

Natural turbidity of Romanian coastal waters normally allow the development of benthic algae by depths of 10 - 15m. Dredging and construction hydrotechnical works of dams and rockfill lead to massive sediments in nearby waters. Their effect is ,on the one hand, the clogging and burial of habitats in the immediate vicinity, including of macrophyte algae populations and on the other hand , blocking solar radiation resulting in the death of algal populations that were not buried. If for the annual or seasonal algae species it can count on the populations restoration in about 1-5 years, for perennial macrophyte algae (*Cystoseira barbata*, *Corallina officinalis*) and superior ones (*Zostera noltii*) their distruction has permanent and irreparably character . This is even worse as these are endangered species of great conservation interest

Zooplankton

Under the technical conditions provided , during the period of work performance the following potential negative effects of construction works on zooplankton biocoenosis are anticipated:

- Through the benthic habitat destruction populations of many species of benthic invertebrates (worms, mollusks, crustaceans, etc.)will be eliminated, by default will also disappear these species larvae that form **meroplankton**. By interrupting the reproductive cycle of benthic species, the specific **meroplankton** diversity and abundance will be affected.
- At zooplankton level, one of the qualitative and quantitative structural changes under the influence of anthropogenic factors (including hydraulic works) might be the decrease of one populations of sensitive species, such as *Centropages ponticus*, *penile* cladocercul *avirostris*, *thirsty* *Sagitta*, *Oikopleura dioica*, species considered of trophic value for

pelagic fish. After the last ten years (starting with 1994), following environmental monitoring carried out by INCDM specialists, found a slight but fragile ecological return to normal ecological structural parameters of zooplankton, previous to eutrophication, that is why we anticipate that under dredging works conditions, it can record a state of stress, at least temporarily.

- The effects of some hydratechnical works, made in previous years in synergy with other pollutants factors, led to the destruction or modification of habitat of some rare species of zooplankton organisms included in the Red Book (microscopic crustaceans that live in the upper superficial water layer, namely *Anomalocera Paterson*, *Labidocera brunescens Pontelli* and *the Mediterranean*. It is expected that, during works, due to machinery, a physical aggression to be produced of these organisms, so the impact over these water ultrasuperficial horizon to be maximum, and the three species, that in the last ten years have reappeared in the samples of zooplankton, to have to suffer again. Therefore, there will be a change / decrease in species diversity of zooplankton biocoenosis.
- The very fine fraction (clay, silt) of suspended sediments brought back in suspension by hydrotechnical works can suffocate zooplankton organisms, either through or by respiratory clogging (copepode) or simply by covering their entire body (rotifere).

Planktonic organisms float freely in the water mass but can not swim against water currents, totally depending on them for displacement. They can not leave the tools action sites and the wider area affected by sediment resuspension. Therefore, we consider that negative impact produced by execution works on zooplankton will be directly and indirectly, reversible in 1-2 years.

Zoobentos

As a indicator of the environmental factors changes that occur in the aquatic ecosystem, the benthos reflects in time, the effect of ecological pressures. When triggering negative environmental events, natural or anthropogenic, the disturbances caused by these pressures at benthos level are more obvious, its recovery requiring a longer time. Through dredging works a number of negative effects on benthic communities existing in the area, are anticipated :

- Direct, mechanical, damage of the habitats and benthic populations through burial or massive extraction together with sediments.
- sediments resuspension and decreased on oxygen content lead to suffocation and mass mortality of macrozoobentos.
- Performing some hydrotechnical works done in previous decades led to the destruction or modification of habitat of rare species included in the Red Book.
- *Donacilla cornea* and *Ophelia bicornis* extinction from mediolittoral sandy areas was due to 1 hydrotechnical works.

We appreciate that the negative impact produced by the works execution over zoobentos will be directly and indirectly on much longer period than that of carrying out the works. We appreciate that the destruction of certain subtypes of benthic habitats and rare and threatened certain species will be irreversible.

Dolphin populations

Marine mammals from the Romanian littoral, represented by the three species of dolphin - *Delphinus delphis*, *Tursiops truncatus* and *Phocoena phocoena* - are extremely vulnerable to the threats generated by various human activities. These threats are most severe in the Black Sea and Mediterranean due to their semi-closed character, of the human populations high density in coastal area and of their activities intensity.

Fig. 4.1 marine mammals on the romanian littoral



Phocoena phocoena



Tursiops truncatus



Delphinus delphis

Delphinus delphis is the only representative of these type in the Black Sea. Offshore predominant species, can also occur in coastal waters following seasonal agglomerations and migrations of pelagic species. On the Romanian coast appears from April to November, pending on the migration of feeding fish species.

Tursiops truncatus is the most familiar species, because, on the one hand to its coastal habitat but also for its ability to live in captivity; is common along the whole length of the Black Sea continental shelf. On the Romanian coast it appears from late June until November, when it leaves Romanian waters, migrating to coastal areas of Crimea and Anatolia.

Coastal waters, relatively shallow of the Black Sea area, are the typical area of the *Phocoena phocoena* species. They did not avoid waters with low salinity and transparency; sometimes they get into ponds, lagoons and estuaries, penetrating even into the Danube, quite far from the sea.

a) Impact over dolphins populations in construction period

Execution of work activities may have a *temporarily negative impact* on dolphins populations when due to the high intensity of noise generating activities (movement of construction machinery from the premises, the operation of any surface concrete stations, etc..) Dolphins can be removed from the of reference area. Marine mammals depend on sound both for communication and to capture environmental information. Cetaceans hearing sensitivity is most intense at frequencies of 10-150 kHz and sounds with frequencies of 500 Hz up to 1 kHz may interfere with their communication, because their communication call is made mainly from frequent moderate to high frequency (1-20 kHz). Considering that the threshold of producing injuries to dolphins is of 120 dB and that the level of pathological effect immediately for production is 40 dB above it can be said that the dolphin auditory system damage could occur at 220 dB. Some species of Odontoceti, including the three species of dolphins in the Black Sea, possess skills and behavioral skills through which they can reduce the susceptibility at the negative effects of noise of human origin:

- *Turpsiops truncatus* - afalina - isi poate ridica nivelul frecventelor de ecolocatie cand zgomotele de fond sunt prea inalte si isi ajusteaza frecventele semnalelor lor de ecolocatie pentru a evita intervalul zgomotelor de fond. can raise the level of ecolocation frequencies when background noise is too high and they adjust their ecolocation signal frequencies in order to avoid avoid background noise.
- Directional hearing ability of some species often have to help them to detect natural sounds in the presence of environment background noise. Directional hearing can help when the directional characteristics of the sound signal and background noise differ.
- Leaving the sound impact area is the normal response taken by the marine mammals to the human noise.

Activities involving the extraction of the sand from the seabed to recharge some beaches, in which case loading equipment shall be used in some offshore areas, as well as transport ships, may have temporarily negative impact on dolphins populations. There are situations when *Phocoena phocoena* species is often seen near the ships, sometimes tending to change behavior and to go up to 1-1,5 km away from the ship, avoiding being stronger in the range up to 400 m.

As a consequence, during dam construction, there will be an obvious disturbance over these mammals species, they moving away from the location, thus bypassing the coastal area. As dam construction will be performed in lower time, it is more likely that dolphins will return into the Romanian coastal waters.

b) Impact over dolphins population in the hydrotechnical works exploitation period

In the exploitation period of the new hydrotechnical works no negative impact on dolphin populations could be seen. But a positive impact may occur, in certain periods, new hydrotechnical constructions becoming housing habitats for fish wildlife which, usually represents the food for dolphins, this fish fauna being easier to hunt.

Danger of distruction of natural environment in case of accident

In case of applying inappropriate management during the execution of coastal protection and rehabilitation works of the Black Sea coast (Northern Unit), it can lead to destruction of the beach close to the target and to damage shore areas, due to improper storage of materials and waste, of the beach sand excavation, of the uncontrolled wastewater discharge on the ground.

The effects of a massive accidental oil pollution from fuel deposits (diesel, oil) over the benthos, fish, dolphins and birds would be catastrophic. Should also consider the socio-economic indirect effect on coastal communities, whose income depends on tourism and fishing. These effects will stay for a very long time and are extremely difficult and costly to remove.

4.1 Identify and assess the negative impacts of the project likely to significantly affect the protected natural areas of interest

Master Plan Area practically includes all the Romanian coast, Gulf Musura to Vama Veche, focusing, especially in the southern unit, mainly on the realization of shoreline protection works through dams and groynes, beach extension, and installment of submerged structures like artificial reefs to decrease waves force reaching the beaches.

Due to the works scale, the shore structure will undergo changes, sometimes significant, changes that will focus not only on the emerged shore, but also the submerged shore. In particular, in areas located in front of tourist resorts, extensive beaches recharge works are taken into account that will enlarge the beaches, works that will change the structure of the seabed in respective areas.

Due to the fact that the entire Black Sea coast is included in ROSPA0076 Black Sea and , due to the fact that in the coastal zone there are a number of community interest marine sites, included into the Natura 2000 network - ROSCI0065 Danube Delta, ROSCI0066 Danube Delta – Marine Area, ROSCI0237 Structuri submarine metanogene - Sfantu Gheorghe, ROSPA0031 Danube Delta si Complexul Razim - Sinoe, ROSPA0076 Black Sea, ROSCI0197 Eforie North - Eforie South Submerged Beach, ROSCI0273 Marine Area de la Cape Tuzla, ROSCI0094 Izvoarele sulfuroase submarine de la Mangalia, ROSCI0269 Vama Veche - 2 Mai, ROSCI 0281 Cap

Aurora, ROSCI0293 Costinesti – 23 August, ROSPA0057 Siutghiol Lake, ROSCI0073 Marine Dunes from Agigea, ROSCI0114 Mlastina Hergheliei - Obantul Mare si Pestera Movilei, ROSPA0066 Limanu – Herghelia, ROSPA0061Lacul Techirghiol (protected areas through EU environmental legislation to which Romania adhered by ratifying the Convention on Biological Diversity Conservation), it requires detailed analysis of the effects that these works will have on marine biota in these areas.

In the coastal zone, there are a number of marine habitats, including characteristic species of macrophyte algae, invertebrates and vertebrates. Some of these types of habitats are habitats of Community interest listed in the Annexes of the Habitats Directive and protected areas according to OUG 57/2007 regarding the natural protected areas regime , wild flora and fauna and natural habitats conservation, approved with amendments by Law no. 49/2011. In the areas to be covered by coastal development works *three types of protected habitats* have been identified:

- 1110 Sandbanks permanently covered by a layer of sea water;
- 1140 Mudflats and sandflats not covered by seawater at low tide
- 1170 Recifs

NORTH UNIT

Through the habitat types designated for *ROSCI0066 Danube Delta – Marine Area: 1110 Sandbanks permanently covered by a layer of sea water; 1130 Estuaries; 1140 Mudflats and sandflats not covered by seawater at low tide; 1170 Recifs*, 1110, 1130 si 1140 habitats were identified in the area of the protection and rehabilitation of the romanian littoral coastal zone master plan development.

CANALUL CU SONDA AREA

In **the Canalul cu Sonda area**, the Master Plan, through the medium term implementation plan (2014 – 2020), proposes minimum scale works: beach nourishment by discharging dredged sediments offshore of the submerged beaches.

Protected areas of Community importance in the area of interest: the area is located in ROSCI0065 Danube Delta, ROSCI0066 Danube Delta – Marine Area, precum and ROSPA0076 Black Sea.

Expected effect of the development works on natural habitats: these works of beaches sand supply by discharging dredged sediments, if they will be realised by the current shore limit, will not disturb the shallow sand biocoenosis.

We appreciate the work will have a easy and temporarily impact on the protected area.

PORTITA AREA

For **Portita Area**, the Master Planul proposes, through the medium term implementation plan, medium scale works, respectively: artificial beach recharge with 15 m depth and consolidation of existing structures.

Protected areas of Community importance in the area of interest: the area is located in ROSCI0066 Danube Delta – Marine Area, ROSPA0031 Danube Delta and Razim-Sinoe complex and ROSPA0076 Black Sea.

Expected effect of the development works on natural habitats:

Works to consolidate the existing structures, during their development, will produce changes of substrate conditions (increased water turbidity, suspensions in water mass, light reduction), which will lead to disturbance of the aquatic invertebrates species. Although following the works execution, a decrease of the specific diversity of benthic and planktonic organisms byocenosis will be noticed, these will have temporary character, without causing mass destruction or changes of aquatic invertebrates habitats structure, which in time, can return to the normal ecological structural parameters

We appreciate that the *impact* will have *local, temporarily* (during the execution of the proposed works) and *insignificant* character.

To conclude, regarding the works proposed by the *medium – term Implementation Plan* in the Canalul cu Sonda area (natural beach nourishment) and Portita (beach recharge and consolidation), will have an *insignificant effect* on the *1110 Sandbanks permanently covered by a layer of sea water* habitat identified in the works area.

Recharging can be done by the limit of the spread of *macrophytes meadows* :*Ruppi macrophytes, Potamogeton pectinatus*. Molluscs species (*Cerastoderma glaucum, Lentidium mediterraneum.*), as well as crustaceans species (*Crangon crangon, Upogebia pusilla, Diogenes pugilator to.*) designated for the 1110 Sandbanks permanently covered by a layer of sea water habitat type will not be significantly affected, because they are mobile and maintained at depths between 0.5 to 25 m, recharging being made up to 0.5 m depth.

Regarding the proposed measures under the *long term Implementation Plan (2021 – 2041)* , prezented in cap. 2.1.6., they will be defined through future studies, and the selected solutions will consider the ROSCI0065 Danube Delta si ROSPA0031 Danube Delta si Razim-Sinoe complex Management Plans recommendations, as well as the results of the environmental impact assessment to be done in design phase.

Research made on natural habitats, flora and fauna species from the projects implementation area, demonstrate a insignificat impact over the environment, and implicitly over the natural

ecosystems of the integral protection regime areas: Sacalin-Zatoane, AREA Periteasca-Leahova, Istria-Sinoie, Grindul Lupilor si Grindul Chituc.

Thus, *in looking fauna*, with reference to the birds species protection and conservation, we mention the following:

- The impacts produced on habitats and biodiversity following the development of the protection and rehabilitation works in the **coastal zone (northern unit)**, is **insignificant** for the populations of listed flora and fauna species;
- Project coverage are **does not interfere with the wintering, migration and breeding** areas of aquatic bird species from the integral protection regime areas: Sacalin-Zatoane, AREA Periteasca-Leahova, Istria-Sinoie, Grindul Lupilor si Grindul Chituc.
- **The protection and rehabilitation works of the coastal zone (northern unit)**, through engineering works to combat coastal erosion phenomena, **will not have significant adverse impacts on avifauna during spring –autumn migration period;**
- Fauna species, **including birds species**, designated for integral protection regime areas strictly protected areas Sacalin-Zatoane, Periteasca-Leahova area, Istria, Sinoe, Grindul Lupilor and Grindul Chituc , **were not reported in the project area during migration or nesting period.**

The Coastal zone designated for the development and coastal protection works is located in **ROSPA0076 Black Sea protected area**, which extends practically on the entire length of the coast, from Sulina bar and occupies an area of 147 242.9 ha. Protected Area - ROSPA0076 Black Sea is important only during migration and wintering grounds for birds.

SOUTH UNIT

MAMAIA AREA

The sand tongue where Mamaia is located represents a lido that bars eastward a former sea gulf, later becoming the great Siutghiol lake. The area is intense anthropogenic in the south, where there are located the resort facilities. In the north part, existing natural habitats (wetlands area and sandy habitats) were largely replaced in recent years with residential areas, the area being strongly anthropic.

However, in the area, besides plant associations dominated by anthropophilic species (ruderal or planted woody species), plant associations next valuable under conservative aspect were identified. The beach is wide in the north area and narrow in the south, beach regression being due to disturbances occurred in the orientation of the drainage direction of sediments drawn from the Danube mouth to the south due to the construction of Midia Port large dam.

From physico-geographic point of view, supralittoral area is made up of sand dunes fixed by herbaceous or woody vegetation and wet depression surfaces, between dunes, on which vegetation type mesophilic or meso-higrofil grows. Because of mineralized groundwater located at low depth (1-1,5 m), based on intense evapo-transpiration during summer season, soil suffered a slight salting, which makes possible the development of moisture-loving plant species and also of slight sandy or moderate halophilic soils (of low to medium salting).

Because of sands being at a high degree of soil formation and due to high soil humidity, degree of land coverage by vegetation is very high for coastal zone, reaching up to 90-100%. Although the vegetation is heterogeneous and consists of a large number of plant species, rarity floral number (contained in Red Lists) of this area is quite small; out of these species, *Centaureum spicatum* recall (R), *Samolus valerandi* (R) *Plantago ergot* (R) are to be mentioned. In the studied area, these species are represented by isolated individuals, without forming important local populations. The following types of habitat were identified in this location (as manual 'Habitats in Romania "- Doniță N. et al. 2005):

Crt. Nr.	Coastal habitats types	Natura 2000 Code	Palaearctic habitats Code	Plant Associations Characteristic
1.	West – pontic communities with <i>Juncus maritimus</i> și <i>Juncus littoralis</i>	1410	15.55	<i>Juncetum littoralis</i> Popescu & al.1992 <i>Juncetum littorali-maritimi</i> Popescu & Sanda 1972
2.	Ponto-Sarmatian meadows with <i>Juncus gerardi</i>	1530 *	15.A2224	<i>Juncetum gerardi</i> (Warming 1906) Northh. 1923
3.	West-Pontic Grasslands of <i>Festuca arundinacea</i> ssp. <i>orientalis</i> și <i>Carex distans</i>	1530*	15.A2225	<i>Carici distantis-Festucetum orientalis</i> Rapaics 1927
4.	West-Pontic Communities with <i>Agropyron elongatum</i>	1530*	15.A21273	<i>Agropyretum elongati</i> I.Serbanescu 1965
5.	West-Pontic Communities with <i>Limonium gmelini</i> și <i>Artemisia santonicum</i>	1530*	15.A2115	<i>Limonio gmelini-Artemisietum monogynae</i> Topa 1939

Tabel 4.1.1 Coastal habitats types

Out of these types of habitates, those marked in red are priority for the European Community, imposing their conservation and protection of the specific biodiversity that they are hosting. To the beach, in the sand dunes area, covered by characteristic psamofila vegetation, consisting of *Leymus sabulosus* - lyme grass of sand, sea Crambe - sand sprouts, *Cakile maritime*, *Polygonum maritimum*, *Lactuca Tatar*, *Picris hieracioides*, *Senecio jacobaea*, etc., a degraded habitat of the *Eremias arguta deserti* – sand lizard was identified.

The area is quite rich in entomofauna, being dominated by chironomide diptych, orthoptere, colebole. Of invertebrates, in this area *Oedipoda Germanic campestre Gryllus* (Orthoptera), *Myrmeleon* sp. (Larvae), *Tanymecus dilaticollis*, *Malachius* sp. *Pieri* and *rapa*, *Autograph gamma Eurydema spectators* (Heteroptera), homoptere cicadelide, terrestrial isopode crustaceans part of oniscoidea group. Among gastropods, numerous individuals of *Helicella obvia Helix lucorum* and isolated *vindobonensis Cepa* were observed. From this area, a a number of araneas characteristic for habitats covered with adapted vegetation to particular habitat conditions - *Lycos vultuosa*, *Alopecosa cunea*, *floor monticola*, *araneus diadematus*, *Clubiona terrestris*, etc.

rubicunda Harpactea. All these species feed with the rich insect fauna present in the area. The area represents also a habitat for *Natrix tessellata* and *Podarcis bulls*, where also copies of *Eremias arguta* (sand lizard) may occur.

The Marine habitats present in this area are: *1110 Sandbanks which are slightly covered by sea water all the time*, *1140 Mudflats and sandflats not covered by seawater at low tide* and *si 1170 Recifs*, with their respective sub-types.

1140-3 Midlittoral sands, is present along the whole area, reaching here, due to the very low beach slope, the highest width (10-20m) in the whole romanian Black Sea sector. The characteristic specie is the *Euxinia maeoticus* crustacean amphipode, whose dense populations have important trophic value for birds and juvenile fish species.

1110-3 Shallow fine sands, located further out to the sea, is also present in all over the area. Characteristic species are: bivalve molluscs *Lentidium mediterraneum* (large populations) and *Donax trunculus* (isolated individuals). Other species with important densities and biomass are: the bivalve molluscs *Anadara inaequalis*, *Cerastoderma glaucum*, *Mya arenaria*, *Tellina tenuis* and *Chamelea Gallina*, decapod crustaceans *Crangon crangon*, *Diogenes pugilator* and *Liocarcinus vernalis* and *Ampelisca diadema* amphipode.

1170 Recifs is represented by the protective dams which are artificial reefs. The typically hard substrate biota, dominated by phototyle algae and *Mytilus galloprovincialis* and *Mytilaster lineatus* mussels, grown on these..

Proposed works:

Mamaia resort beaches are subject to strong erosion. The Master Plan proposes, through the *short term implementation plan of measures (2011-2013)*, high investments in Mamaia South, consisting in existing structure repairs, construction of new structures and beaches recharge, as well as *medium term measures (2014 - 2020)*, consisting of artificial sanding to create a beach of 60 m width and construction of submerged wave breaks dams /groynes in Mamaia Centre and artificial beach recharge to create a 60 m wide beach in Mamaia North area.

Protected Areas of Community importance in Mamaia area or in its vicinity

ROSPA0057 Siutghiol Lake este singura AREA situata la North fata de AREA care urmeaza a fi supusa lucrarilor de amenajare. Lacurile Siutghiol si Tabacarie sunt situate la North de Constanta si formeaza un complex lacustru Datorita legaturii stranse care exista intre ele. Suprafata totala ocupata este de 2023,3 ha. Siutghiol Lake, cu exceptia partii estice delimitate de cordonul

ROSPA0057 Siutghiol Lake is the only area located northwest to the area to be proposed for development. Siutghiol and Tabacarie lakes is located north of Constanta and forms a lake

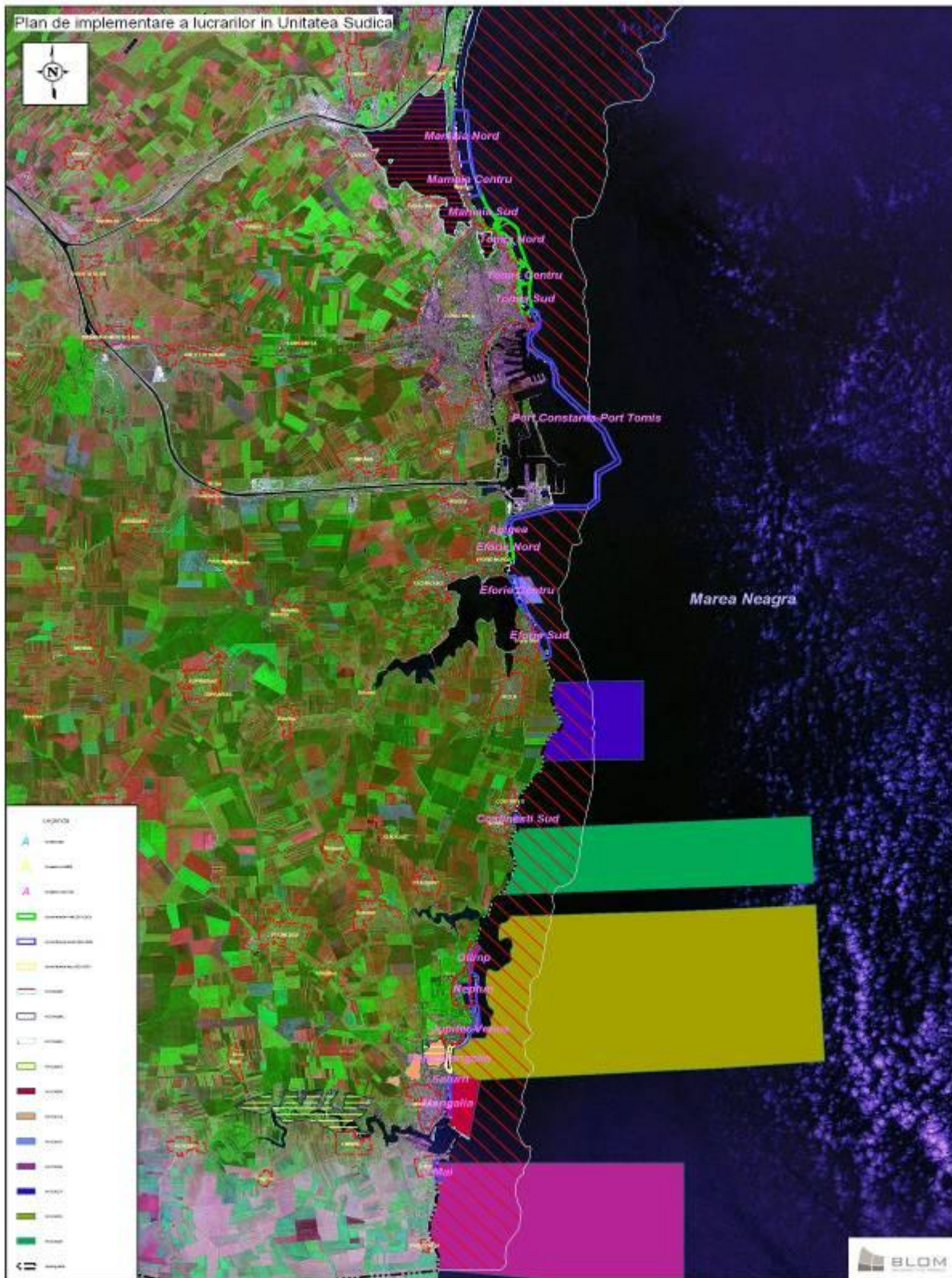


Fig 4.1.2 Arii protejate si lucrari preconizate in unitatea Southica

complex, due to the close connection between them. The total occupied area is 2023.3 ha, except for the eastern part limited by the maritime cord where Mamaia resort is located, has a cliff with heights ranging between 10 and 20 m.

Due to northeast winds exposure and of the big development surface on the water mirror, the western and southern shore is subject to direct intense lake abrasion acting. In the north part, because of the shelter created by the cliff in the way of the wind, a reed vegetation is installed, sometimes even forming mats. ROSPA0057 Siutghiol Lake is hosting important effective of protected bird species. According to the available data we have the following categories: 32 species in Annex 1 of Birds Directive; 43 migratory species listed in Annexes of the Convention on Migratory Species (Bonn), 4 endangered species globally.



Fig. 4.1.3. Works and protected area in Mamaia South – South Unit

ROSPA0074 Black Sea. This site is important for bird species migrating or wintering in coastal marine waters. In winter, you can see over 10,000 aquatic birds at sea, in front of Mamaia resort.

Due to increased antropogenic impact, during the summer season, there are no birds species that nest on the beach of Mamaia resort.

Expected effect of the development works on marine and terrestrial habitats

In the interest areas there no protected areas of community interest, the only protected area being *ROSPA0074 Black Sea*. Taking into account that these protected area is important especially for those birds migrating or wintering on the littoral, we believe that **the impact will be insignificant**, because the works to be carried out will be completed during summer season. Currently, there are no identified bird species that nest on Constanta beaches or cliffs.

The effect of development works on *terrestrial habitats is negligible*.

In Mamaia area , Mamaia North especially, where important plant habitats under conservative term, should be considered and works shall be carried out with their strict protection. Meantime, large scale beaches norishment works will be carried out outside the areas where specific maritime beaches birds nest or feed on litoral.

Beaches Habitats will be only affected during the progress of works. Later, after ending of activities, supralittoral the demise of the associations supralitorala bodies will recover without difficulty.

Regarding the *marine habitats*, nor in this case noticeable effects are recorded. Bottom structure will allow restocking fresh sanding areas with fauna elements beyond the area where sand filling is done. Breakwaters, artificial reefs and jetteys will be populated with the same species existing in areas with rocky substrate.

Given the degree of human intervention in the area, *effects on avifauna* will be at small scale. Heavy traffic from the working premises, equipment activities on the shore and at sea will be a stress factor for avifauna. We recommend that the works to be carried out in compliance with standardized working rules regarding dust and noise emissions and to avoid activities during the migration period. Because Siutghiol Lake is of high importance on winter is not likely to interfere with works execution, as they will be performed during the warm season.

CONSTANTA AREA

In Constanta area, coastal zone development will be performed on the entire length of the cliff, from Pescarie to Tomis touristic Port (South Tomis, central Tomis and northern Tomis). Terrestrial area is under heavy human intervention, cliff being covered with anthropic herbaceous vegetation, with large number of ruderal species, together with planted shrubs or undergrowth. Beaches presents only traces of the original vegetation, with isolated specimens of

Crambe maritime, *Turnefortia sibirica*, *Glaucium sp.*, and herbaceous vegetation, with *Ecbalium elaterium* bushes. Natural habitats not found in this area.

Marine habitats in Constanta area belong to 1110 *Sandbanks which are slightly covered by sea water all the time*, 1140 *Mudflats and sandflats not covered by seawater at low tide* and 1170 *Recifs* types. All are in an advanced state of degradation, without presenting interest to conservation.

Proposed development works :

Coastal area related to Constanta city is strongly subject to coastal erosion, so that the Master Plan provides maximum investment works both through *short term implementation plan (2011-2013)*, which proposes rehabilitation of existing structures, construction of new ones and beaches recharge, and the *medium-term implementation plan (2014 - 2020)*, which proposes for Tomis Port - Constanta Port a high investment work, which is to achieve new protection structures of the cliff base, which will replace the existing one and will provide a greater protection degree.

Protected Areas of Community importance in the area of the interest or in its vicinity.

There are no protected areas of community interest, except for ROSPA0074 Black Sea.

Expected effect of the development works on marine and terrestrial habitats. Taking into account that the protected area is especially important for birds wintering on the littoral, we consider that *the impact will be insignificant*, because the works to be carried out will be carried out in warm season. Currently there are no birds species that nest on the Constanta beach or cliffs. The effect of development works on terrestrial habitats is *negligible*. In Constanta area, there are practically no natural cliff habitats, these being covered by secondary vegetation strongly anthropic or are converted into green areas.



Fig.4.1.4. Lucrari preconizate si arii protejate in AREA Constanta – Unitatea Southica

AGIGEA AREA

Between Agigea fishery and Eforie North Steaua de Mare Hotel there is one of the only few natural rocky coast (Agigea, Tuzla, Costinesti and Vama Veche , of which Tuzla was destroyed by hydrotechnical works in 2010) from the Romanian Black Sea coast.

Development works envisaged: technical solutions provided in potential *medium-term implementation plan (2014-2020)* are works of high investment, consisting of rehabilitation, improvement, construction of new structures and artificial beach nourishment.

Protected Areas of Community importance in the area or in its vicinity. ROSCI0073 Marine Dunes from Agigea, ROSCI0197 Eforie North - Eforie South submerged beach (Fig. 4.1.5)

Expected effect of the development works over the marine and terrestrial natural habitats

ROSCI0073 Marine Dunes from Agigea: Located near the Agigea city - north from Agigea sanatorium - this protected area has been deeply affected in 1970-1990 by the construction of the Danube-Black Sea Channel and then by the expansion of Constanta South - Agigea harbour. Currently, the protected area - which covers 25 ha - has no longer exit to the sea and the maritime dunes are suffering a fixing process with herbaceous vegetation that eliminates initial arenaria vegetation. The protected area is covering an formal sea gulf plugged with sand. Because the area currently does not have any contact with the sea and the beach, development of coastal protection dikes or beach nourishment can not affect the maritime dune reserve. Thus, the impact on *marine dunes in Agigea ROSCI0073* will be practically *null*.

ROSCI0197 Eforie North - Eforie South Submerged Beach: Proposed works in Agigea area AREA Agigea will have an indirect impact on **ROSCI0197**, mainly by increasing water turbidity (due to the resuspension of sediments and marine clay intake rockfill), which will affect the whole area. However, because the littoral cell bordered by the dam of Constanta South port and Cape Tuzla, currents and sediments circulation is predominantly from south to north, the *impact* on Natura 2000 site will be *temporarily, of low intensity* and *the effects will be reversible*. To maximum reduce the impact on *ROSCI019*, it is recommended for the works to be conducted in summer period.

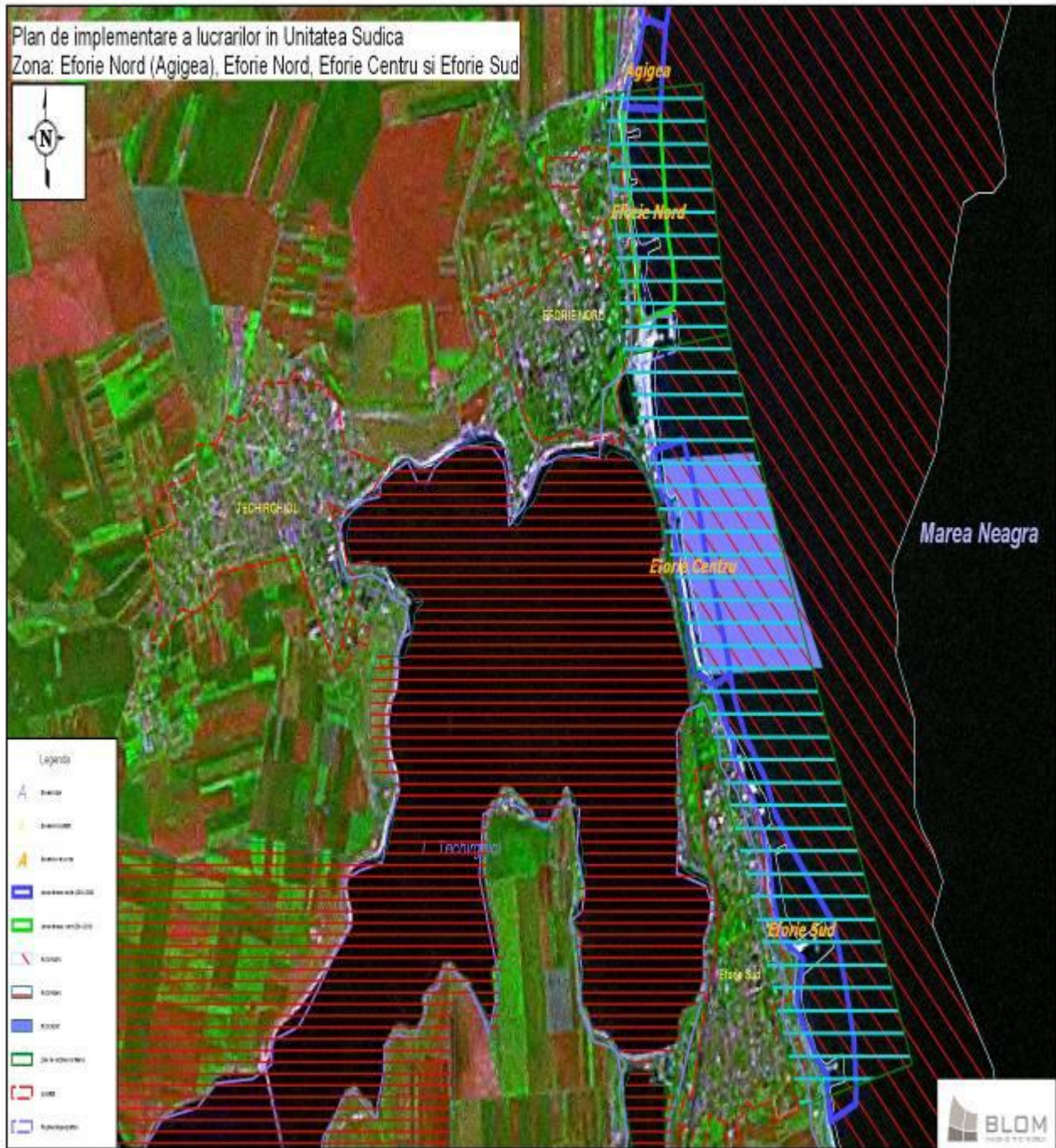


Fig. 4.1.5 Protected areas in Agigea and Eforie

Medium term Sanding and construction works , proposed between the Agigea dam and Steaua de Mare Hotel will significantly affect the natural rocky habitats and the *Pholas dactylus* bivalve populations - protected species under Berna and Barcelona Conventions. This impact may be irreversible, so we suggest as **alternative solutions**:

1. No intervention in the area;
2. To identify those technical solutions that lead to natural accumulation of sand in the area, without beach nourishment.

Measures to reduce impact:

1. Settlement of dams to be done so that construction work to not directly affect 1170 -10 *Pholas dactylus* habitat ;
2. Works to take place during summer

EFORIE NORTH AREA

Area located in front Eforie North resort, is characterized by the same type of habitat as the one located in front of Eforie South, the cliff being higher. Also here, the cliff is occupied by vegetation dominated by herbaceous plants and constructions making the cliff sensitive to natural erosion associated with torrential rains. The beaches are narrow, fragmented by protection dikes and the sea bed consists of a mosaic of rocky and sandy habitats belonging to 1110 *Sandbanks permanently covered by a layer of sea water*, 1140 *Sands and marshy areas covered by water at low tide* si 1170 *Recifs* types. The following sub-types are present in the supralittoral area: 1140-2 *Supralittoral slow-drying drift linessi* 1170-5 *Supralittoral rock*.

In the midlittoral area, 1170-6 *Upper midlittoral rock*, 1170-7 *Lower midlittoral rock* si 1140-3 *Midlittoral sands* types can be found. In this last area, presence of *Donacilla cornea* bivalva, also protected in **ROSCI0197 Eforie North - Eforie South Submerged Beach**, located in near vicinity. In the rocky infralittoral area, 1170-8 *Infralittoral rock with photophylic algae sub-type* is present. In the sandy infralittoral area 1110-3 *Shallow fine sands*, 1110-4 *Well-sorted sands*, 1110-5 *Wave-lashed coarse sands and fine gravels* and 1110-6 *Infralittoral cobbles* are present. *Of this*, last two are distinguished by their rarity, being associated to natural rocky shores between Agigea fishery and Steaua de Mare Hotel in Eforie North. In the 1110-3 *Shallow fine sands* habitat, *Donax trunculus bivalva* is distinguished, these being also protected in **ROSCI0197 Eforie North - Eforie South Submerged Beach** site, located in its near vicinity.

Proposed development works: Short – term implementation Plan (2011-2013) technical solutions proposed are maximum investment works consisting of existing structures repairs, construction of new structures and beach nourishment.

Protected Areas of Community importance from the area or in its vicinity: ROSCI0197 Eforie North - Eforie South Submerged Beach, ROSCI0273 Cape Tuzla Marine Area and ROSCI0073 Marine Dunes from Agigea.

Expected effect of the development works over the marine and terrestrial natural habitats

Short term measures proposed for Eforie North sector might affect mainly many habitats, with a **possible negative effect** *Donacilla cornea* and *Donax trunculus* species, which could be controlled and limited through **impact mitigation measures** as:

1. To monitor the *Donacilla cornea* si *Donax trunculus* species dynamics before, during and after works completion;
2. To reduce the artificial beach nourishment frequency according to monitoring results.

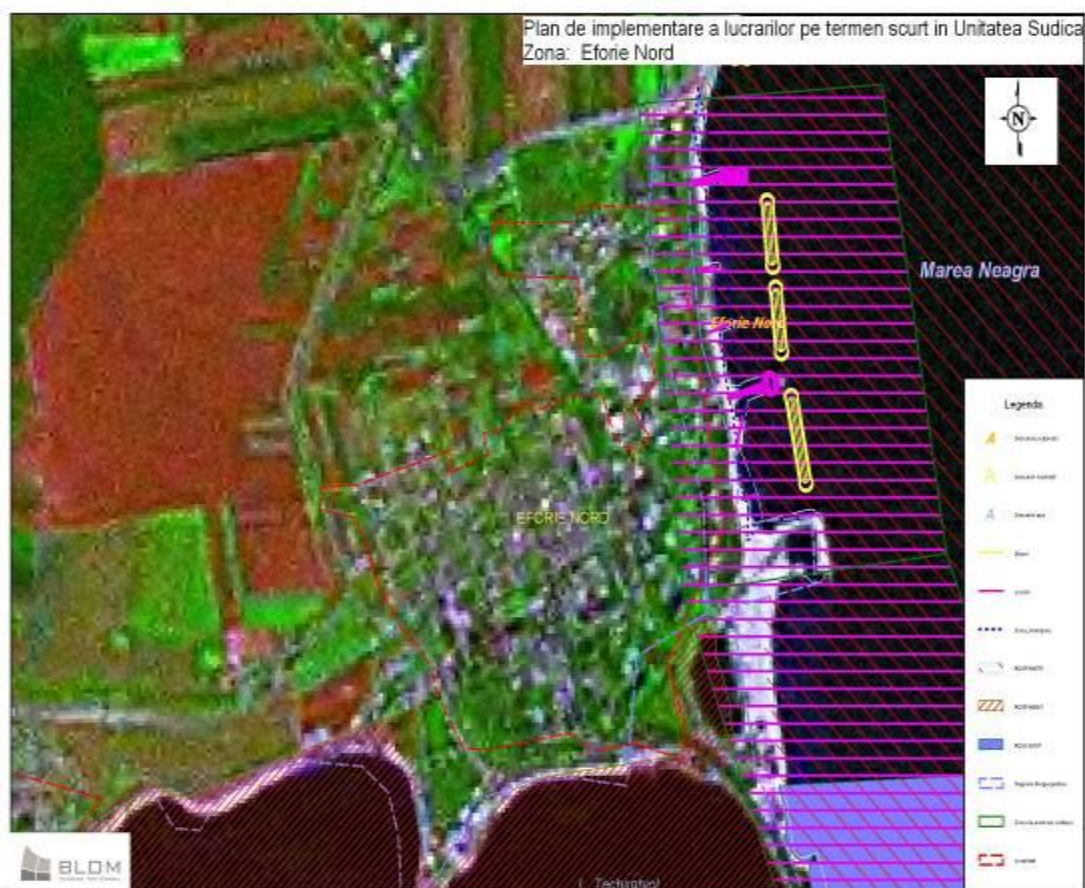


Fig.4.1.6. Proposed works and protected areas in Eforie North area –South Unit

In the **ROSCI0197 Eforie North - Eforie South Submerged Beach**, practically located at the limit of the area south from touristic port (Eforie North Marina), suspended solids that will result following beach nourishment and dams construction activities will be mostly blocked by the touristic port North and redirected through offshore, partially affecting the north part of

ROSCI0197 Eforie North - Eforie South Submerged Beach. **Taking this under consideration it is appreciated that the effect over the above- mentioned protected area of community interest will be of low intensity.**

Low intensity impact will be also felt in *ROSCI0273 Marine Area from Cape Tuzla*, located South from Eforie South, due to the fact that the protected area enters deep on the sea, beyond the 10 m isobath. As regarding the proposed works effect over the *ROSCI0073 Marine Dunes from Agigea*, located at about 4 km North of Eforie North, we appreciate them as being **nulle**.

MIDDLE EFORIE

The area between Eforie North and Eforie South consists of a sandy terrain which barred a formal estuary opening to the sea, currently the salty Techirghiol Lake. In this area there are no cliffs. On this terrain, the Techirghiol lake coastal defense works, railway and European road E87 were build. Between the road and the sea, there is a large natural beach of 80-110m width, on which several tourist amenities were built, remaining unbuilt beach width being of 30 to 50m. The submerged part of the area is mostly contained in the *ROSCI0197 Eforie North - South Eforie submerged Beach*, marine site of community interest, which extends from the shoreline out to sea, on an area of 163 ha. The site consists mainly of sandy habitats, also rocky habitats being present , but they have a wide fragmented distribution on the offshore limit of the site.

Eforie **submerged beach** is the only beach in the southern Romanian coast which was not modified by building huge coastal protection structures. Here only the exposed sandy beaches natural hydrodynamic and habitats characteristics are preserved, which allows development under natural, undisturbed conditions of the associations characteristic to sandy midlittoral and infralittoral areas. Currently, Eforie submerged beach is the only place from across the Romanian littoral where *Donacilla cornea* and *Ophelia bicornis* survive today, forming a sandy midlittoral specific association. Also, this is the only place where *Donax trunculus* dense populations, with important biomass, can be found in. In the past (50s-60s), both species - *Donax trunculus* and *Donacilla cornea* - were widespread in all habitats with medium and coarse sand from the midlittoral and upper infralittoral of the Romanian Black Sea sector.

Due to their ecological requirements (water purity, oxygen content, salinity), the simple presence of the two species was an indicator of good quality marine water. Both species, revealing the typical biocoenosis in the past, were declared as missing from the Romanian coast in all the literature of the period 1980-2000, period of maximum Black Sea eutrophication and ecological decline. After 2000, studies conducted in the area, revealed the presence of these associations, which led to declare this area as area of community interest within the Natura 2000 network.

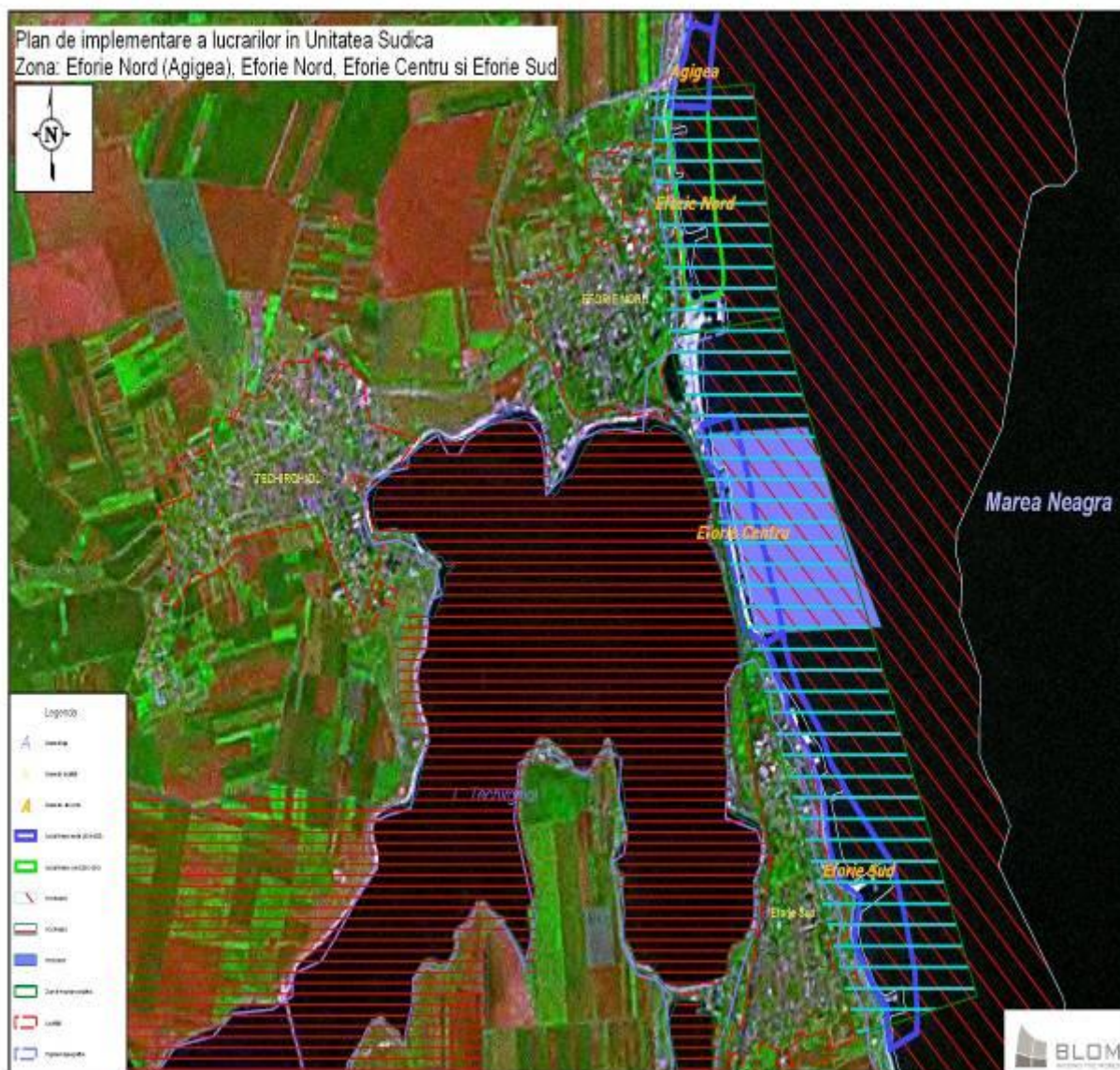
Habitats of Community interest presented in the shore area of *ROSCI0197 Eforie North - South Eforie submerged Beach* belong to *1110 Sandbanks permanently covered by a layer of sea water* and *1140 Sands and marshy areas covered by water at low tide* types.

1140-3 Midlittoral sands habitat achieve here the highest degree of representativeness and the best conservation status from the entire Black Sea romanian sector. The habitat occupies the shore sand strip on which waves breaks at between 0.5 m and -0.5 m from the sea level. Width of the strips in the Black Sea is limited to a few meters, due to reduced tidal amplitude (0.3 m), making the characteristics habitat and species are even more vulnerable. The characteristic species for romanian coast beaches is *Donacilla cornea* bivalve is accompanied by *Ophelia bicornis* policheto worms and *Nerrine cirratulus*. The first two species have a high conservative value, being considered as threatened at both national and regional level (Black Sea). The ecological value is given by these environment richness, characteristic species reaching densities of 1000 to 4000m⁻². It is an area of nutrients and pollutants transfer between sea and land and an important food source for waders birds and juvenile fish species, including juvenile *Alosa Immaculate* and *Alosa Tanaica*, species of Community interest.

1110 -3 Shallow fine sands habitate reach here its highest level of representativity and the bestconservation status of all Romanian Black Sea. The habitat occupy the submerged beach located between -0.5 and-4-5m depth and corresponds to the area of maximum beach hidrodinamics, where waves form and break. Characteristic species are *Donax trunculus*, *Tellina tenuis* and *Lentidium mediterraneum* bivalves. *ROSCI0197 North Eforie- Eforie South submerged Beach* site is unique in the Romanian coast because it maintains unaltered the massive *Donax trunculus* populations, with densities of over 200 m⁻², characteristic for this habitat. The species is considered as threatened at national level, being included in the Red List of marine species. Ecological value of the habitat has two aspects, geological and biological. From geological point of view, this habitat constitute a sand reserve ensuring the renew and the completion of emrged beach. From biological perspective, the habitat is an importan area for feeding and growing of many fish species juveniles, either of Community Importance (*Alosa Immaculata* and *Alosa Tanaica*, often captured during scientific fishing in the beach trawl) or economic value (turbot, plaice, sole, mullets).

Potential development works and erosion risk assessment: Proposed technical solutions for Mid Eforie area are: bank protection, break -wave dam, stabilization spurs, artificial nourishment. Currently beach width(from shoreline to the first building), in Mid Eforie sector, is of 30 to 50m, build beach width is of 50 to 60m, european road being located at about 80 to 110m away from the shoreline. In a realistic assessment of the presented risk of coastal erosion for the Mid Eforie touristic beach and for the Techirghiol Lake littoral belt, of multiannual average erosion rate in Mider Eforie is of -0.52 m / year, in the built area being even slower.

Protected Areas of Community importance in the area and in tis vicinity: ROSCI0197 Eforie North - Eforie South Submerged Beach, ROSCI0273 Marine Area from Cape Tuzla (fig. 4.1.7).



Expected effect of the development works over the marine and terrestrial natural habitats

Impact over *ROSCI0197 Eforie North - Eforie South Submerged Beach*

Proposed technical solutions for Mid Eforie area are: bank protection, break -wave dam, stabilization spurs, artificial nourishment.

Negative impact of first three hydrotechnical works over *1140-3 Midlittoral sands* and *1110 -3 Shallow fine sands* is already known, being mentioned also by specialised publications (Micu & Micu, 2006). Their implementation would result in a loss of habitat area proportional with the

works scale, a reduction of at least 90% of *Donacilla cornea* and *Ophelia bicornis* populations and a reduction of at least 50% of the population of *Donax trunculus*.

For beach recharge, Master Plan proposes to carry out works on a length of 1,600 m, the newly created beach area being of 10.000m². Average width sanding result is of 6.25m. This width covers the entire 1140-3 *Midlittoral sands* and part of 1110 -3 *Shallow fine sands* habitat. The impact of frequent artificial sanding would be the burial and suffocation of 1140-3 *Midlittoral sands* and 1110 -3 *Shallow fine sands* characteristic habitats species (*Donacilla cornea*, *Ophelia bicornis* and *Donax trunculus*). Because sanding would be frequently repeated, it is appreciated that the impact would be of 100%, consisting of immediate and final extinction of *Donacilla cornea* *Ophelia bicornis* species in Romania. It would also be prevented the recruitment in *Donax trunculus* population, by repeated destruction of the habitats in which juveniles species are living, which would lead to long-term complete disappearance of the population.

ROSCI0273 Marine Area from Cape Tuzla. Effect of works is nulle.

Alternative sollutions:

1. No works to be developed in the area and in its vecinity
2. To identify those technical solutions leading to natural sand accumulation on the beach bordering the site, as might be extension to the north of the touristic port or building a jetty in prolongation.

Impact mitigation measures:

1. Detailed scientific researche over *Donacilla cornea*, *Ophelia bicornis* si *Donax trunculus* populations dynamics is needed in order to establish if there are periods/locations/technical solutions making possible beach nourishment without affecting them.
2. Impact mitigation measures, such is to identify a working method for artificial beach nourishment reproducing as much as possible the natural nourishment phenomena or sediment accumulation in the area, on both short (due to storm type events) and long (seasonal) term.
3. For beach nourishment to be done in Eforie areas, NOT to use sand extracted from **ROSCI0197 Eforie North - Eforie South Submerged Beach** site from its vecinity, this having a very dangerous impact over the site. It is needed to avoid sand extraction from the littoral cell between South dam of Constata South-Agigea Harbour and Cape Tuzla. Sand used for nourishment had to brought from other sources, and works have to be developed from the shore.

EFORIE SOUTH AREA

The area is located in front of Eforie South, being characterized through a high cliff occupied with planted vegetation dominated by herbaceous plants and constructions making the cliff sensitive to natural erosion associated with rain. Beaches are narrow, divided by protection dams and the sea bed consists of a mosaic of rocky and sandy habitats belonging to 1110 *Sandbanks permanently covered by a layer of sea water*, 1140 *Sands and marshy areas covered by water at low tide* si 1170 *Recifs* types. The following sub-types are present in the supralittoral area: 1140-2 *Supralittoral slow-drying drift linessi* 1170-5 *Supralittoral rock*.

In the midlittoral area, 1170-6 *Upper midlittoral rock*, 1170-7 *Lower midlittoral rock* si 1140-3 *Midlittoral sands* types can be found. The midlittoral area itself is replaced near the shore by protection dams. On this dams, typical hard substrate biota is developed, being dominated by mussels and seasonal green, red and brown macrophyte algae, same as in the natural areas in south littoral.

In the rocky infralittoral area, 1170-8 *Infralittoral rock with photophylic algae sub-type* is present, and in the sandy infralittoral area 1110-3 *Shallow fine sands* and 1110-4 *Well-sorted sands*, are present.

Proposed development works. Proposed technical solutions through the **mid term implementation plan (2014-2020)** are maximum investment works, consisting of: rehabilitation, improvement of existing constructions, construction of new ones and artificial beach sanding.

Protected Areas of Community importance in the area or in its vicinity. Near the area subject to the coast development works the following protected areas exists: ROSCI0197 Eforie North - Eforie South Submerged Beach, ROSCI0273 Marine Area from Cape Tuzla (fig. 4.1.8).

The main impact on the two sites is given by the sediments that can be carried by currents during the performance of work and after that, as well as by the muddy water filled with fine sediments, which will be transported on long distances. Given that in this area the currents and sediment transport is predominantly from south to north, we consider that the effect on **ROSCI0273 marine area from Cape Tuzla** will be insignificant, while the impact on ROSCI0197 Eforie North - South Eforie submerged Beach will be significant but temporary, with the best opportunities for restoration of habitats and species after cessation of works.

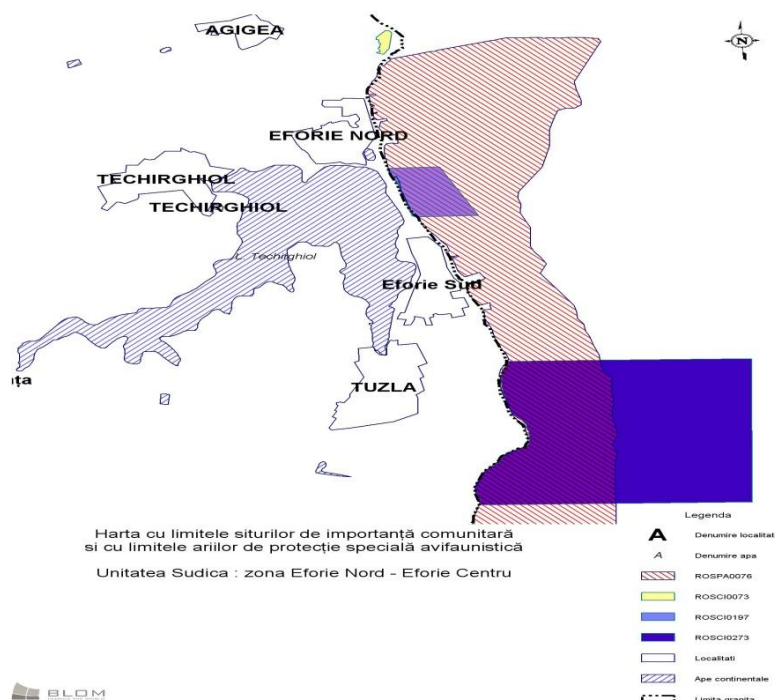


Fig. 4.1.8 Protected areas in Eforie Area

COSTINEȘTI AREA

The bottom is rocky, with steep slopes. Terrestrial natural habitats are practically nonexistent, beaches being arranged. Fauna of this area does not differ from that found in the nearby area of south. Seabed is represented by a mosaic of rocky and sandy habitat types belonging to 1110 *Sandbanks submerged shallow, sandy surfaces*, 1140 Mudflats and sandflats not covered by seawater at low tide and 1170 Recifs. In front of the Forum hotel there is one of the very few natural rocky coasts (Agigea, Tuzla, Costinești and Vama Veche, of which Tuzla was destroyed in 2010 by hydrotechnical works) from the Romanian Black Sea coast. In the supralittoral area, 1140-2 Supralittoral slow-drying drift lines and 1170-5 Supralittoral rock sub-types exists. In the midlittoral, 1170-6 Upper midlittoral rock, 1170-7 *Lower midlittoral rock and 1140-3 Midlittoral sands sub-types are present, sub-types are found*. In the rocky infralittoral area 1170-8 Infralittoral rock with photophylic algae and 1170-10 *Infralittoral hard clay banks with Pholadidae* are present. The last one is found in three locations only, Agigea, Costinești, Vama Veche, and contains *Pholas dactylus* bivalve, protected species through Berna and Barcelona Conventions. In the sandy infralittoral area, 1110-3 Shallow fine sands, 1110-4 *Well-sorted sands*, 1110-5 *Wave-lashed coarse sands and fine gravels* and 1110-6 *Infralittoral cobble*. Of these, last two are remarkable due to their rarity, being associated to natural rocky shores on the south part of the resort. Within the 1110-3 Shallow fine sands habitat, presence of *Donax trunculus* is noticeable.

Proposed development works. Maximum proposed investments through the mid term implementation plan (2014-2020), for Costinesti South area, consists of rehabilitation, improvements of existing structures, construction of new ones and artificial beach sanding.

Protected Areas of Community importance in the area or in its vicinity. The area is located near to the new ROSCI0293 Costinesti – 23 August site of community importance AREA. ROSCI0273 Marine Area de la Cape Tuzla is located at north from the site.

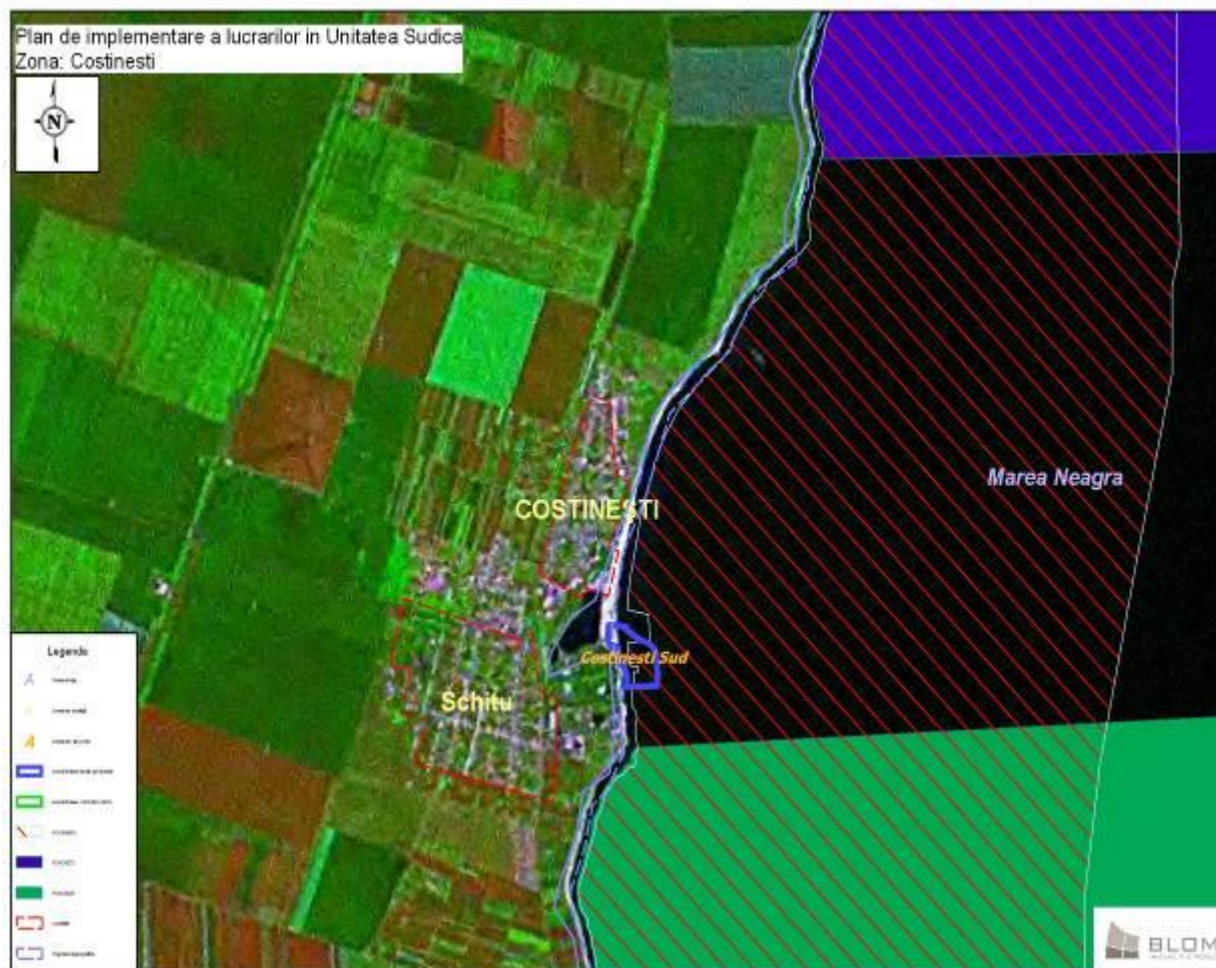


Fig.4.1.9. Works and protected areas in Costinesti

Impactul of works over the natural habitats. Even if the proposed works will not be extended on the location of the new Natura 2000 *ROSCI0281 Costinesti – 23 August* designated site, these works might have a **significant indirectly impact** over the shore area from the protected site, through the migration to south of the sediments used for sanding. They risk to clog the rocky midlittoral in front of Forum hotel. This impact might completely destroy the protected habitats in the area: *1170-6 Upper midlittoral rock, 1170-7 Lower midlittoral rock, 1170-10 Infralittoral hard clay banks with Pholadidae*, as well as *Pholas dactylus* populations, without any possibility of recovery.

Recommendations:

1. No works which might affect the natural rocky shore from Forum hotel to be performed (located on the north border of the *ROSCI0281 Costinesti – 23 August site*)
2. Within adopted technical solutions, to identify solutions for maximum limitation of the sediments loss to Natura 2000 site, such as to construct a dam to block the sediments migration from Costinesti beach to the south, in order to prevent their entrance on Natura 2000 site.

OLIMP –VENUS AREA

In the area located in front of Olimp resort, the shore is covered by constructions – hotels or restaurants, and terrestrial habitats have been replaced cu anthropic green areas. The flora and fauna of this terrestrial habitats are of no interest from conservative point of view. Sea bottom is represented by a mosaic of rocky and sandy habitats belonging to *1110 Sandbanks permanently covered by a layer of sea water, 1140 Sands and marshy areas covered by water at low tide* and *1170 Recifs* types.

• **OLIMP**

The proposed works through the mid term plan of measures(2014 – 2020), are high investments works, consisting of: removal of some of the structures in order to enlarge the gulfs, rehabilitation and improvement of existing structures, as well as construction of new ones and artificial beach recharge.

Protected Areas of Community importance in the area or in its vicinity. The area is located near the *ROSCI0281 Cap Aurora* protected area, as well as near to the following protected areas of community interest: *ROSCI0293 Costinesti – 23 August, ROSCI0094 Submarine sulphorous Springs from Mangalia*.

Works impact over marine natural habitats. The works will be carried out in *ROSCI0281 Cap Aurora* vicinity. Proposed works will not be realised at a higher distance than 100 – 200 m, marine currents direction is from north to south, so that the site will be only indirectly affected by the works in Olimp area and only from its south extreme, for the rest the distance between the

shore and the west border of the protected area being between 741,81 m and 1050,76 m (fig. 4.1.11).



Fig. 4.1.10 works and protected areas in Olimp – Venus area



Fig. 4.1.11 Distance from the shore line to the west limit of the ROSCI0281 Cap Aurora protected area

In order to mitigate the negativ impact we recommend the sendings or dams construction to be done under good metheorological conditions, calm sea, low wind intensity (maxim vant gradul 2-3 Beaufort degree maximum wind and sea 2-3 Douglas degree). The works for some existing works removal to enlarge gulfs, as well as construction of new protection works, might have a

insignificant indirectly negative impact, on short term, over the *ROSCI0281 Cap Aurora site, through the generated high turbidity waters*. During the construction period, pelagic species (marine mammals and some fish species like *Alosa immaculata*, *Alosa tanaica*) will be disrupted, they will move away from the coast, but they can refuge in Cpa Aurora site having very wide offshore extension. After works completion, once the trophic resource is improved, pelagic species will come back to shore, so the effect will be negative, temporary. *Mytilus galloprovincialis* Byogen reefs will not be affected by dams construction works or beach recharging, because they exist at high depth (30-45 m depth).

The effects of works over the new *ROSCI0293 Costinesti – 23 August* site, located at north from the project area, will be null, because marine currents direction is from north to south.

Effects over *ROSCI0094 sulphur submarine springs Mangalia* will be negligible, because the distance is of about 5 to 6 km. Only if big sand quantities are discharged and if strong storm with north – east wind there is a risk that suspended particles to reach the south part of the littoral, in the above mentioned protected areas.

- **NEPTUN**

In the area located in front of Neptun resort, the shore is fully occupied by massive hotel construction (Amfiteatru complex), which has replaced virtually all traces of terrestrial natural habitat in the area. The beaches are narrow and the bottom of the sea - with a smoother slope than areas north and south - is covered with sandy and rocky habitats, with a predominance of the sandy ones.

Proposed works: works proposed in the *mid term action plan (2014 - 2020)* are works with minimal investment and consist of rehabilitation and improvement of existing structures.

Protected areas that are of community importance in the area or in its vicinity. Structural repairs works will be carried out in the vicinity of *ROSCI0281 Cap Aurora* protected area. The area in front of Neptune Resort is located in *ROSCI0281 Cap Aurora* site and near to other protected areas of community interest: the new *ROSCI0293 Costinesti - 23 August* and *ROSCI0094 submarines sulphurous springs from Mangalia*.

Works impact on marine and terrestrial habitats. Because the proposed works are of minimal scale (rehabilitation and improvement of existing structures) and because the western boundary of the protected area, from the shore, is at a distance between 741.81 m and 816, 65m (Fig. 4.1.9) we consider that the *effects* on the *ROSCI0281 Cap Aurora* protected area will be *insignificant, temporarily*, only for the duration of the works. Because mainstream from north to south, sediments have no way to reach the general area. During works execution, pelagic species (marine mammals and some fish species *Alosa Immaculate*, *Alosa Tana*) will be disturbed, they

will be removed from the Black Sea coast. After works completion, while improving trophic pelagic resource, pelagic species will return to shore.

The work effects on the ***ROSCI0273 marine area from Cape Tuzla*** protected area, located at north of Neptun, will be practically **zero**. The protected area is at long distance, and the direction of the current that could lead suspended particles is from north to south, along the coast.

Effects on ***ROSCI0094 submarine sulfur springs from Mangalia and on ROSCI0269 - 2May Vama Veche*** will be **nulle**.

Effects on ***the Oak trees in Neptun***. Natural monuments, secular oaks from Neptun are included in a green space at distance from the sea, on the opposite bank of Neptune Lake. In these circumstances, the effect of works over this natural monument is practically **zero**.

• JUPITER - VENUS

In front of Jupiter, Cap Aurora and Venus resorts, the shore presents a high cliff with hotels. Shore is fragmented, small bays with beaches alternating with protective structures such as dams. Seabed is rocky, both in Venus and Cap Aurora area, and Jupiter is partly rocky, partly sandy, the submerged slope being steeped. Terrestrial natural habitats are virtually nonexistent, undeveloped beaches are invaded by ruderal vegetation that dominates the few examples of plants characteristic of the sand supralittoral area.

In southern part of Venus resort, ***ROSCI0281 Cap Aurora*** site limit is very close to shore being in contact with the shore in the small bay formed between the two dams in front of Carmen hotel. 1170-6 and 1170-7 midlittoral rocky habitats as well as ***1170-8 habitat exists***. In this location, 1170-8 habitat is very important for conservation because the bay is filled with the most dense and representative population in Romania of perennial macrophyte alga *Cystoseira barbata*. Part that connects this bay and ***ROSCI0281 Cap Aurora*** offshore area also contains sub-types of 1110 habitat, having high value for conservation. Near Venus - Cap Aurora shore some sulphurous springs exist, around which is developing a characteristic biota dominated by bacteria.

Proposed works: works proposed through the mid term plan of measures (2014 – 2020) are maximum investments works, consisting of: removal of some of existing structures to enlarge the gulfs, rehabilitation and improvement of existing structures, construction of new ones and artificial beach recharge.

Protected Areas of Community importance in the area or in its vicinity. Project area is located in near vicinity of the ROSCI0281 Cap Aurora. Near the project area the following

protected areas of community interest exist: ROSCI0094 Izvoarele sulfuroase submarine de la Mangalia, ROSCI0114 Mlastina Hergheliei - Obantul Mare si Pestera Movilei, ROSPA0066 Limanu – Herghelia.

Works impact over terrestrial and maritime habitats. Works will be developed on the west limit of *ROSCI 0281 Cap Aurora*, more specifically between protected area west border and the shore. Works could not significantly affect the offshore site area, but might have significant impact over its shore area – containing conservation maximum importance objectives. Most probably part of the sediments resulting from project implementation to be transported by currents in the south part of the site (where the site limit/border strta from the shore) and in the MangaliaSulphates springs area. But, due to the already existing protection dams, the sediments volume possible to reach Mangalia sulphorous springs is estimated as estimated as being low. As a conclusion, impact over ***ROSCI0094 Mangalia submarine sulphorous springs will be insignificantly negative***. The rocky infralittoral area will be deeply affected in the areas where nourishment works will be realised, where rocky bottom characteristic habitats will be replaced by sandy habitats. Offshore rocky area, where works to place artificial reefs parallel with the shore will be affected during works development, especially due to suspensions which lately will be deposited on the bottom and will be carried along the littoral, to the south. But, after works completion, artificial reefs will be integrated into the existing habitats, representing recovery points for invertebrates and macrophytes algae populations.

Impact over *ROSCI0114 Mlastina Hergheliei - Obantul Mare si Pestera Movilei, ROSPA0066 Limanu – Herghelia*. For Pestera Movilei site, the impact will be zero, due to the distance from the project area. With respect to Mlastina Hergheliei si Limanu lake, given the Important Bird Areas, it is recommended that heavy machinery traffic will not take place on access roads in the immediate vicinity (on the littoral belt between Mlastina Hergheliei and the sea) but the detours, because avifauna to be as little disturbed. Access to the protected areas is recommended to be restricted to any heavy machinery, causing noise or other discomfort type for birds fauna.



Fig. 4.1.11 Protected areas and proposed works in Jupiter – Venus area

Measures/Recommendation:

1. No works that affect the bay formed between the two dams in front of Carmen hotel, located inside the 0281 ROSCI Cap Aurora site, likely to lead to limit free communication with the sea or clogging with sedimente, must be performed. In this area, only works for damsi recovery may be allowed, provided that the works to be carried out only on the dams face from offshore.
2. No type of works likely to limit free communication with the sea or clogging with sediments, to be allowed inside or outside the gulf.
3. To reduce the negative impact of the waters with high turbidity, sandings or dams construction to be done under good meteorological conditions, calm sea, low wind (maximum wind 2-3 Beaufort degree and sea 2-3 Douglas degree).

BALTA MANGALIEI (MLASTINA HERGHELIEI) AREA

Proposed works: proposed works through the long term measures plan (2021 – 2041) are maximum investment works, consisting of artificial beach recharge up to 60 m width.

Protected Areas of Community importance in the area or in its vicinity. The area for works development is located on the littoral belt between ROSCI0114 Mlastina Hergheliei - Obantul Mare and Black Sea. In the Black Sea, in front of the littoral belt there is ROSCI0281 Cap Aurora. The limit of Cape Aurora site is on the 5m isobath, so that between the shoreline and the site there is a distance of over 200 m.

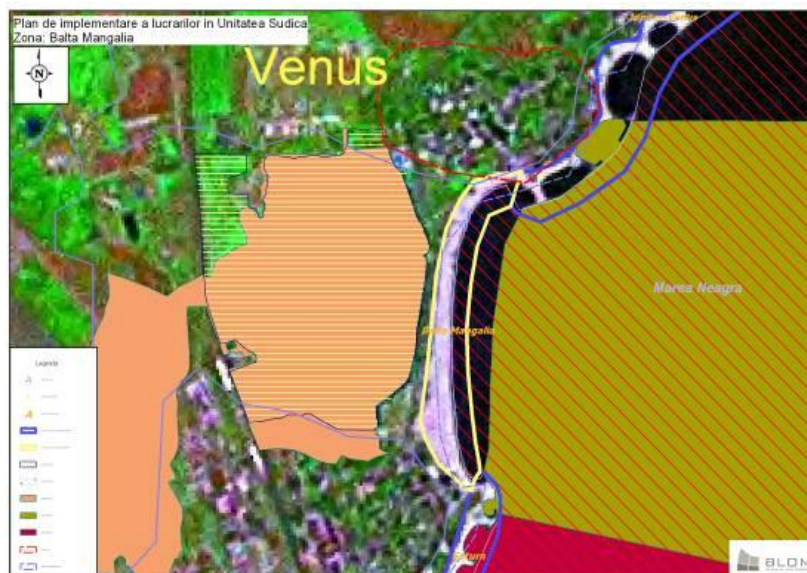


Fig. 4.1.12. Works and Protected areas in Balta Mangaliei area

Impact over ROSCI0114 Mlastina Hergheliei - Obantul Mare and ROSCI0281 Cap Aurora. *Impact over ROSCI0114 Mlastina Hergheliei - Obantul Mare is indirectly and might be given only by the noise and vibrations emitted during the works development , which might disturb birds fauna from Mlastina Hergheliei. Impact over ROSCI0281 Cap Aurora is given by the propagation of sediment and high turbidity water during the period of works development. Because in ROSCI 0281Cap Aurora site, protected habitats are sandy habitats, we consider that the impact will be indirectly and temporary, with good possibilities of recovery.*

SATURN -MANGALIA AREA

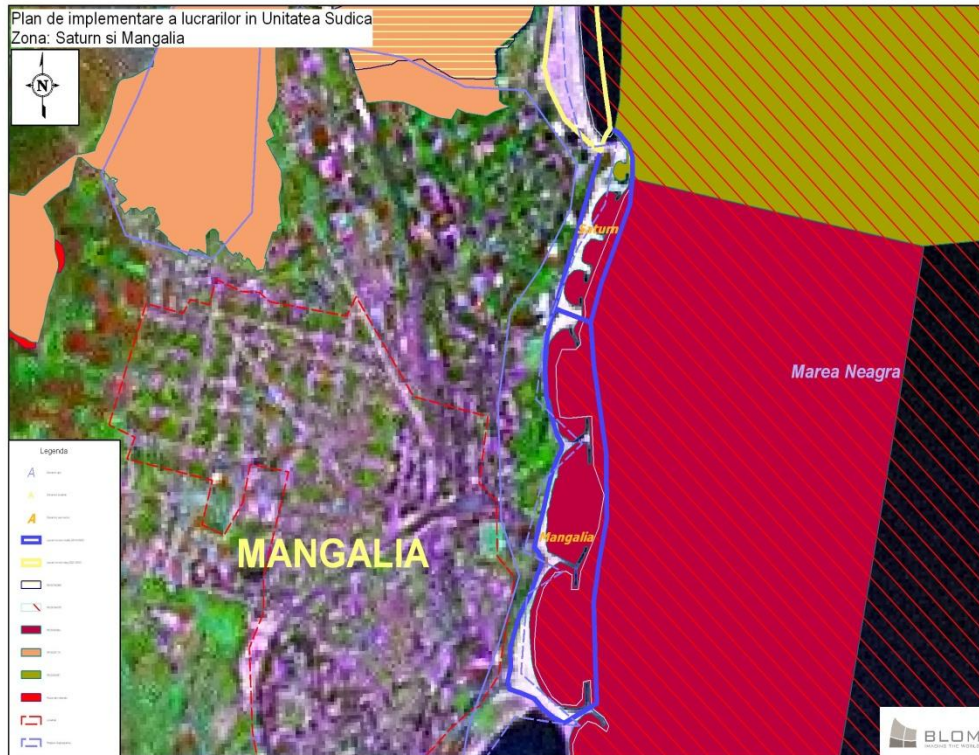
The area located in front of Saturn resort, naturally continues to the north, submerged area in front of Mangalia, being integrally part of *ROSCI0094*. Terrestrial habitats near the shore are represented by the areas of degraded cliff, covered with anthropogenic herbaceous vegetation. On the beaches, there are isolated examples of *Crambe maritime* and *Tournefortia sibirica*. Cliff's Fauna is is not important from conservative, no natural habitats existing in this area. On beaches, the same supralittoral characteristic association develops, characterized by species of invertebrates or birds exploiting the debris thrown on the beach by the waves.

In Mangalia city area, seashore consists of a mid high cliff, with constructions, without terrestrial natural habitats. On sandy beaches, clusters of arenaria vegetation characterized by the presence of sea cabbage *Crambe maritima* appear, but only in isolated individuals. Associations of organisms characteristic to the sandy and rocky supralittoral appear on beaches .

ROSCI0094 Site, contains the greatest diversity of marine habitats in Romania and has, overall, the best state of conservation of all marine sites in Romania. In addition, the site contains several unique features that make it the most important marine sites in Romania. It is the only place in Romania where *1110-1 fine sands with meadows of Zostera noltii* habitat exists, sea grass growing inside the alveoli formed by existing protection dams. Also in this bays and offshore, 90% of the *Cystoseira barbata* population in Romania is found. Both species are listed in the Red list at national and regional level. (Black Sea).

The site contains a wide variety of animal species, considered rare or threatened at regional and national level: *Gibbula divaricata*, *Clibanarius erythropus*, *Arenicola marina*, *Calianassa truncated*.

Proposed development works: proposed technical solution in *the mid term implementation plan (2014 - 2020)*, consists of: removal of some existing structures to enlarge the bays, rehabilitation and improvement of existing structures, construction of new structures for protection and artificial beach nourishment of 20 m width.



Protected Areas of Community importance in the area or in its vicinity: ROSCI0094 Izvoarele sulfuroase submarine de la Mangalia, ROSCI 0281 Cap Aurora, ROSCI0114 Mlastina Hergheliei - Obantul Mare si Pestera Movilei, ROSPA0066 Limanu – Herghelia, ROSCI0269 Vama Veche - 2 Mai.

Works impact on natural marine and terrestrial habitats. The impact of existing structures demolition and beach nourishment would be particularly serious over marine habitats in the *ROSCI0094 site*. Totally and irreversibly destroyed will be both 1170-8 habitat, containing 90% of the *Cystoseira barbata species area* in Romania, and 1110-1 habitat, containing the only *Zostera noltii* bushes existing in Romania. All the other habitats, including sulphur springs contained by them, will be severely degraded through mechanical destruction or sand clogging. Such an impact will lead to Natura 2000 site disappearance. Because on the site territory the natural shore is rocky, and already consolidated with hard protection works, erosion risk is minimum. That is why, to realize the conservation Natura 2000 site and to protect the current habitats natural rocky structure, we appreciate that proposed works are not needed.

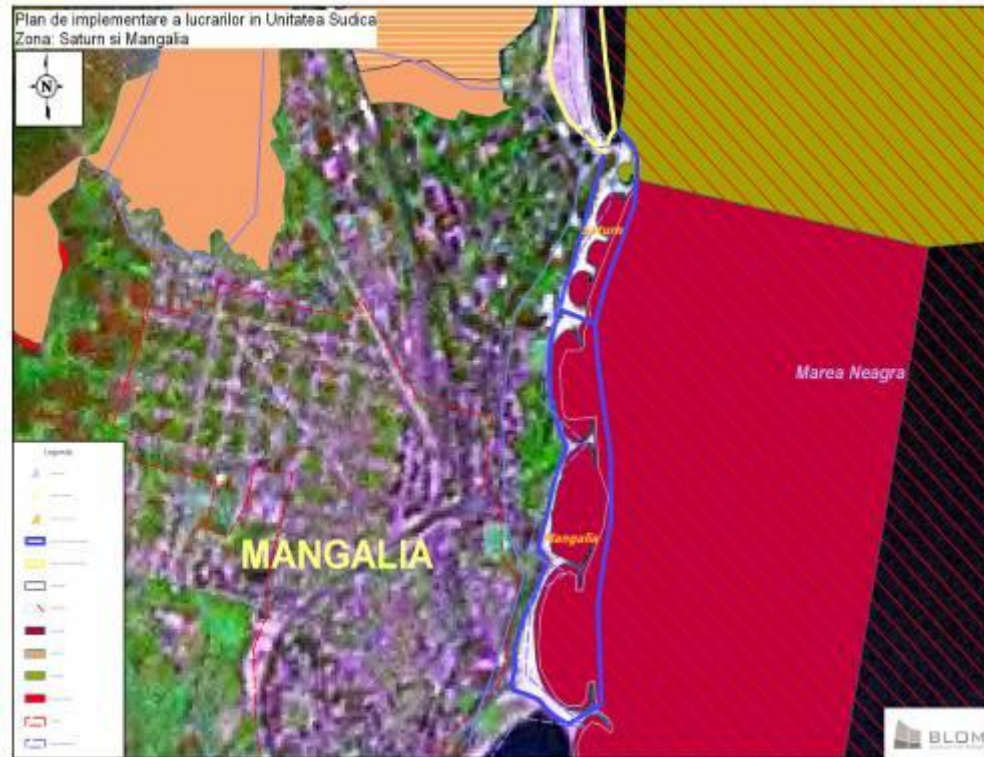


Fig. 4.1.13. Works and protected areas in SATURN – MANGALIA area

Effect over ROSCI0114 Mlastina Hergheliei - Obantul Mare si Pestera Movilei, ROSPA0066 Limanu – Herghelia will be negligible.

Effect over ROSCI0269 Vama Veche - 2 Mai will be insignificant due to its defence by Mangalia Port dams.

Alternative sollutions:

1. Any kind of existing structures demolition or construction of new ones can not be allowed, because it will lead to the distruction of those habitats for wich the site was declared. Only rehabilitation works of existing structures, in their current form and only if they are needed, can be accepted.
2. From the same reason, no beaches recharge can be accepted. The only exception is the socket formed between the two dams from sowth part of Managlia Cliffs (**President Hotel, Teilor str.**), where a **20 m recharge could be allowed.**

2 MAI AREA

In front of May 2 locality, seabed consists of rocky substrate formed of limestone of sarmathian age alternating with areas covered with coarse sand of mainly organic origin. Benthic fauna is represented by the same types of organisms that grow in the protected area ROSCI0269 Vama Veche - 2 Mai. Community interest habitats found in the area are in the active cliff area, there are patches of natural vegetation, with a range of ruderal species plus planted trees - *Eleagnus* etc. On 2 May area, the seabed consists of a sandy and rocky habitats mozaic belonging to 1110 and 1170 habitats type. The most valuable for conservation is the 1170-8 habitat, represented by small areas where *Cystoseira barbata* perennial algae grow. These are situated at a big distance from the shore.

Proposed development works. Proposed works through the mid term implementation plan (2014 - 2020), will be realised on the north part of the Vama Veche – 2 Mai protected area, consisting of the rehabilitation of the existing structures and intermittent protection of the cliffs base.

Protected Areas of Community importance in the area or in its vicinity. The area is located in the northwest *ROSCI0269 Vama Veche - 2 Mai* protected area, one of the most important areas of community interest included in the Natura 2000 network from the area western Black Sea coast area. The area is also closed to the following protected areas of community interest: *ROSCI0094 Izvoarele sulfuroase submarine de la Mangalia*, *ROSCI0114 Mlastina Hergheliei - Obantul Mare si Pestera Movilei*, *ROSPA0066 Limanu – Herghelia*.



Fig. 4.1.14. Works and protected areas 2 MAI area

Expected effect of the development works on marine and terrestrial habitats. Even if these works are of minimum extent, respectively existing structures and cliff base repairs, there will

Invertebrates	-	0	-	-	0	0	-	-	0	0	-
Pisces	0	-	-	-	-	-0	0	0	-	0	-
Amphibians	0	0	0	0	0	0	0	0	0	0	0
Reptiles	0	0	0	0	0	0	0	0	0	0	0
Birds	+	0	0	0	0	0	+	+	0	+	0
Mammals	0	-	0	0	0	-	0	0	-	0	-
Pollution	-	0	0	0	0	-	-	0	-	0	-

"0" = no impact.

"-" = Negative impact.

"+" = Positive impact.

"X" = neutral impact

Subliniem faptul ca efectele asupra mediului devin semnificative si permanente daca proiectul se va implementa si in zonele protejate ROSCI 0094 Izvoarele sulfuroase de la Mangalia, ROSCI 0197 Plaja submersa Eforie North – Eforie South, ROSCI0293 Costinesti-23 August si ROSCI0281 Cap Aurora, la un nivel atat de grav incat nu se pot concepe masuri compensatorii. Este necesara evitarea implementarii planului pe teritoriul siturilor Natura 2000.

In ceea ce priveste *aspectele tehnice* ale investitiei - „Asistenta tehnica pentru pregatirea de proiecte AXA PRIORITARA 5 - Implementarea structurii adecvate de prevenire a riscurilor naturale in zonele cele mai expuse la risc.Domeniul major de interventie 2 – Reducerea eroziunii costiere ”:

- **impactul produs de lucrarile de protectie si reabilitare a zonei costiere** (unitatea Northica), planificate a fi realizate pe termen mediu (2014-2020) si lung (2020–2040) **vor avea un caracter temporar, doar pe perioada de constructie/executie** (dragare, refacere diguri etc.), **impactul produs asupra ecosistemelor naturale fiind nesemnificativ.**

Comments:

We note that environmental negative impacts on the environment are given on both short and long term , permanent.

Benthic invertebrates are the most affected by the implementation of this Master Plan (long term and permanent).

Repetitive sanding will make some negative impacts to be permanent.

We underline that effects over environment become significant and permanent if the project will be implemented in ROSCI 0094 Izvoarele sulfuroase de la Mangalia, ROSCI 0197 Plaja submersa Eforie North – Eforie South, ROSCI0293 Costinesti-23 August si ROSCI0281 Cap Aurora protected areas, at a such severe level, that compensatory measures are inconceivable. It is necessary to avoid plan implementation within Natura 2000 sites.

Regarding the *technical aspects* of investment - "Technical assistance for project preparation Priority 5 - Implementation of appropriate structure of natural risk prevention in most vulnerable areas. "

- **impact of work on coastal protection and rehabilitation** (north unit), scheduled to be completed over the medium term (2014-2020) and long term (2020-2040) **will be temporarily, only during the construction / execution** (dredging , rebuilding levees, etc..), **the impact produced on natural ecosystems being insignificant.**

Presentation of Master Plan options

No intervention (FI) or "zero option" - where there is no further investment in coastal defences and the coastal frontage is allowed to develop naturally, without any management. Where there currently no coastal defences, this strategy allows, in fact, a natural evolution of the shoreline. Similarly, where the shoreline is now protected, existing protective structures will be maintained but will be allowed to further deteriorate until complete disappearance. This means that areas inshore will be subject to increased risk of erosion and / or flooding the coast in the future.

In these conditions, *anthropogenic influence on biodiversity will be minimal.* It is an ideal solution for the conservation of coastal marine area specific diversity.

Managed realignment (RC) - where the shoreline is allowed to move backward in a controlled way to manage the risk from coastal erosion. This strategic option consider both building a new line of protection, and introducing measures to reduce erosion.

In this case we have no significant negative influence on the aquatic environment. *Interventions in cases of strict necessity* of protecting the coast *will be insignificant.*

Maintaining the line (ML) - where the risk of erosion is controlled by maintaining existing structures or building new ones, or by restoring existing ones.

We do not have negative effects, significant effects on marine biodiversity. But *there may be effects on aquatic fauna during repairs made to existing structures.*

Advancement (A) the current protection line - where the risk of erosion is controlled by building new defences on the seaward side of the original defences to reclaim land.

Only in this case we are dealing with *significant environmental effects*, both on short and long term. The works proposed in the Master Plan in strictly protected areas, will have a significant negative impact in the long run.

Coments:

Detailed evaluation of the strategic options impact and of the technical options is presented in Anexx 1.

5. GENERAL MEASURES TO REDUCE ENVIRONMENTAL IMPACT

In general, measures to reduce environmental impact in the situation are the following:

- application of appropriate management both during the execution of protection works and rehabilitation of the coastal zone of the Black Sea coast, and during the operation;
- during execution of works will ensure strict monitoring of activities to avoid waste of fuel, oil, sewage in the aquatic environment;
- equipment operation must be done in conditions of maximum security, respecting the rules of operation provided by the technical book. In these circumstances the risk of a major accident may be considered minimal, and the likelihood of oil pollution, minimum;
- It is recommended that work on coastal protection and rehabilitation of the Black Sea coast to take place in as small a space, excavation and dredging for the area extending to eliminate negative effects on environmental quality and thus the communities of aquatic organisms.

Also, other measures necessary to mitigate the impact on biodiversity:

- full compliance with the order of site;
- compliance with established access roads (existing or newly created);
- Do not store excess excavated material on adjacent land;
- repair machinery is not executing the work surface;
- compliance schedule to achieve planned works etc.

Other measures recommended to limit the impact are:

- fence enclosure site organization;
- equipping staff with appropriate protective equipment;
- prohibition of money, carrying out repairs to transport inside the target;
- maintaining strict rules of hygiene and work safety at work;
- prohibiting storage of materials or waste outside surfaces inside the site organization and in any case deposited in beach and cliff area near the site;
- excavation and eventually ban the use of the various works inside the site, a sand beach near the goal;
- Construction works will be carried out during the summer season;
- transport and waste materials will be made only with suitable means of transport;
- in the execution of construction works, waste management will be in strict compliance with environmental standards in force and it will be clear responsibility of the beneficiary or work, or general constructor but it will be clearly specified in the contract concluded between the two sides on the works;

- recommended that, during the development works in the marine environment protection and rehabilitation works contractor of the coastal zone to have a contractual relationship with a company that specializes in remediation and technical capability to hold umanasa intervene including marine pollution event (Accidental oil);
- will not be allowed in any form of wastewater disposal, hazardous territory site organization or floating platforms;
- It is forbidden to organize the site or any necessary temporary Spatial objective during construction in the beach area (on the one hand to protect the beach, on the other hand to limit any risk of migration in materials or waste water Sea);
- rapid intervention in case of failure to remove the causes and mitigate the effects;
- the project organization works and rehabilitation of coastal protection, the manufacturer authorized to be appointed will perform its own environmental management system to prevent damage to the site;
- will be fully respected Marpol 73/78 requirements to which Romania adhered so that the project will not result in a significant impact on the marine environment in the area of development works;
- compliance technologies work presented in the proposed project for environmental approval is requested;
- improve the technical condition of access roads by repairing and maintaining permanent in good condition;
- Maintain equipment and vehicles in good condition, revisions and maintenance in workshops;
- periodic determination of the amount of dust in the project implementation phase, and if appropriate, the application of additional measures to reduce the amount of dust released into the atmosphere;
- periodic determination of exhaust gas emissions of the machinery for implementation of the project, and if their level exceeds that the maximum allowed, shall be taken as their replacement or installation of more efficient equipment to reduce noxious emissions;
- determine the noise level and if the noise level exceeds that maximum allowable, best fitting equipment to reduce engine noise
- dumpers equipped with tarpaulins to cover the load during transport to reduce the amount of dust released into the atmosphere;
- permanent endowment working point suitable container storage and transportation of household waste and transport them to a regular in taking their authorized operator;
- provision of site water tank with spray device, used in case of fire and to reduce the amount of dust in the atmosphere;
- staff training on prevention and fire fighting, work safety and conduct in the vicinity of protected areas;
- prepare a schedule of work for transport, indicating the route, traffic speed and mode of transport of cargo;
- transport and storage of fuel and lubricants in suitable container for storage and transportation standards of oil products.

To prevent trouble or wintering birds that migrate seaside recommended that work be performed in hot weather, when their flocks are the lowest. In this period we see the fewest species of birds. Specify that in the southern coast, where there will be the largest works, aquatic birds listed in the Black Sea and the ROSPA 0076 listed in Annex I of Birds Directive does not nest. Human impact (Shipping, fishing, tourism, trade, etc..) Is so strong in this area and marine aquatic birds that have virtually no where to nest.

A mitigation is through the progressive, gradual project, such as coastal protection performance in a particular area of the coast and then move to another area, so that could have disturbed wildlife refuge in places where no work is performed.

Finding technical solutions (engineering) in order not to affect protected areas submerged Eforie ROSCI0197 North Beach - Eforie South ROSCI0094 underwater sulphurous springs in Mangalia, ROSCI0269 Vama Veche - 2Mai, ROSCI0293 Costinesti-23 August and ROSCI0281 Cap Aurora. This applies especially to *benthos* in these areas, in particular requiring such protection.

Other measures to reduce impacts on biodiversity :

In stage works to achieve coastal protection and rehabilitation of the Black Sea coast, to avoid serious disturbances have produced ecological balances are necessary measures to reduce the impact on biodiversity. Among these include the following:

- Prevent damage to surrounding areas to prevent loss and / or damage to habitats and species of flora and fauna;
- Avoidance of uncontrolled storage of material from excavation works;
- Selective collection, recovery and disposal of waste in order to avoid periodic illness and injury of fauna species
- Preventing drainage alteration, improvement and maintenance of natural drainage ways and / or artificial;
- Prevention of soil compaction in storage areas;
- The use of quieter machinery and transport equipment to reduce noise due to rehabilitation works and coastal protection, which could disturb wildlife species, and equipped with advanced systems to minimize and contain plouantilor the atmosphere;
- Exclusion of repairs to machinery and transport out specialized legal premises;
- Prevention and removal of consequences of accidents that could pollute the area leak or burning strong;
- Control or volatile fuel spill on the ground near natural drainage ditches and / or artificial;

- Any accidental discharge of pollutants (fuels, oils, etc..) Will be neutralized and will be immediately notified to the Environmental Authority;

- For each site will be named a delegate from manufacturers or beneficiary who will monitor compliance with environmental rules, contact details of these people were brought to the attention of the environmental authority with the commencement of works.

Considering measures to mitigate the impact on biodiversity in the area, reducing stress and significantly affecting environmental components, the minimum possible, consider that the above measures are most appropriate in the given situation.

6. CONCLUSIONS

”Protection and Rehabilitation of the Romanian Coastal Zone” Master Plan includes virtually all the Romanian coast, from Sulina to Vama Veche, focusing especially on the development of shore protection works by dams and epiures for the enlargement of the beaches and installation of the submerged artificial reefs structures to lower waves’ force waves that reaches the beaches.

Due to the scale works, the structure of the shore will undergo changes, sometimes significant, changes that will focus not only emersion shore, but also the submerged shore .Especially, in areas situated in front of tourist resorts (South Unit), the extensive work that will enlarge sanding beaches to large are taking into account, works that will change the structure of the seabed in these area.

The proposed works in the Master Plan in the Northern Unit does not affect the marine infrastructure (Sulina and Midia). The proposed works in the Master Plan in the South Unit of the littoral does not affect marine infrastructure from North Constanta and South because of the existence of large dam that blocks the movement of sediment to pass input port of Constanta. The situation is similar in Mangalia Port areas.

Because the entire Black Sea coast is included in ROSPA0076 Black Sea and because in the coastal area there are a number of submarines protected areas of community interest included in the Natura 2000 network - ROSCI 0066 Danube Delta – Marine Area, ROSCI 0237 Structuri submarine metanogene Sfantu Gheorghe, ROSCI0197 Eforie North - Eforie South Submerged Beach, ROSCI0273 Marine Area de la Cape Tuzla, ROSCI0094 underwater sulfuros springs in Mangalia, ROSCI0269 Vama Veche - 2 Mai, ROSCI0293 Costinesti – 23 August si ROSCI0281 Cap Aurora, a further detailed analysis is required in the design phase to assess the works effects on the marine biota of these areas.

The works for coastal protection and rehabilitation involves mainly a direct impact only on species located on and in the immediate vicinity of the plan. This means that the impact on pelagic species will be negligible, almost zero.

CONSTANTA – MAMAIA AREA

The effect of the works over terrestrial habitats is negligible. In Constanta area, there are basically no natural habitats on the cliffs, these being covered by secondary vegetation strongly anthropic or are converted into green areas.

In Mamaia area and especially in Mamaia Mamaia area, the areas where important plant habitats are present from conservative point of view exists should be considered and the works must be carried out strictly protecting them. Also, large-scale sanding works will be done outside of the migration and wintering period of the specific beaches birds, which are resting or feeding on littoral belt. Habitats on the beaches will be affected only during the progress of works. Later, after works finalisation, organisms associations on supralittoral area will recover without difficulty.

In terms of marine habitats, nor in this case noticeable effects are recorded. Bottom structure will allow restocking fresh recharged areas with elements of the fauna existing beyond the area where sand filling is done. Breakwaters, jetty, artificial reefs will be populated with the same species existing in areas with rocky substrate, with the possibility of installing also invasive species taking advantage of the unoccupied substrate of native species.

Given the degree of human intervention area, effects on avifauna will be at a small scale. Heavy traffic from the working premises, equipments activity on the shore and on the sea will be a stress factor for birds fauna. We recommend that the works to be carried out in compliance with working rules regarding the emission of dust and noise and to avoid activities during the migration. The fact that Siutghiol Lake has a big importance for winter period is not likely to interfere with work performance, these works being executed during the warm season of the year.

AGIGEA AREA

The proposed works will have an indirect impact on **ROSCI0197**, mainly by increasing water turbidity (due to the resuspension of sediments and marine clay intake rockfill), which will affect the whole area. However, because on the littoral cell dam bordered by Constanta port South dam and Cape Tuzla, currents and sediment flow is predominantly from south to north, the *impact* on Natura 2000 site will be *temporarily, of low intensity and the effects will be reversible*. To reduce

the maximum impact over *ROSCI0197* it is recommended, if possible, that the work to be conducted during the summer. Impact on *ROSCI0073* will be practically *zero*.

Sanding and construction works in the mid term, provided between the Agigea dam and Steaua de Mare hotel will significantly affect the natural rocky habitats here and the *Pholas dactylus* bivalve populations, species protected by the Berna and Barcelona convention. This impact may

ALTERNATIVE SOLUTIONS

1. No intervention in the area;
2. To identify technical solutions leading to natural sand accumulation in the area, without making additional recharge.

Measures to reduce the impact:

1. Dams positioning so that construction works not to directly affect the 1170-10 cu *Pholas dactylus* habitat;
2. Works to be done during summer.

EFORIE NORTH AREA

Short term Works might mainly affect the Sandy habitats, with a possible negative effect over Donacilla cornea si Donax trunculus species, which can be controlled and limited through measures of reducing the impact.

In ***submerged ROSCI0197 North Eforie Beach - South Eforie Beach***, located practically on the edge of the south area of the tourist port (Marina North Eforie), the suspensions which will result from the activities of sanding and building dams will be largely blocked by the North dam of the tourist port and diverted to large, affecting partially the northern extremity of *ROSCI0197 submerged North Eforie Beach - South Eforie Beach*. **From this point of view we appreciate that the effect on the protected area of interest mentioned will be of low intensity.** Also, a ***low intensity impact*** will be felt in ***Marine*** protected area ***ROSCI0273 from Cape Tuzla***, located south of South Eforie, because the protected area is deep into the sea, exceeding 10 m depth isobath

Regarding the effects of proposed works upon the ***ROSCI0073 marine dunes from Agigea***, the protected area located at about 4 km north of North Eforie, we consider to be ***void***.

Measures to reduce the impact:

1. monitoring the dynamics of *Donax trunculus* and *Donacilla cornea* species before, during and after the execution of the works;
2. artificial sanding rate reduction in accordance with the monitoring of the results.

MIDDLE EFORIE AREA

The impact on submerged ROSCI0197 North Eforie Beach - South Eforie Beach. We appreciate that the potential technical solutions proposed in the Master Plan will have a **significant negative impact** on 1140-3 "medlittorale Sands 'and 1110-3' shallow fine sands" habitats, and in case of achieving the works the loss of habitats and species will be permanent and final, because there is no possibility of recovery.

ROSCI0273 Marine area from Cape Tuzla. In this case, the effects of the works are void.

ALTERNATIVE SOLUTIONS

1. Do not make any site works in or in its vicinity.
2. The identification of some technical solutions that will lead to natural accumulation of sand on the beach that borders the site, such as a large extension of marina port or building a jetty in its extension.

MEASURES TO REDUCE THE IMPACT:

1. On the population dynamics of *Donacilla cornea*, *Ophelia bicornis* and *Donax trunculus* detailed scientific research are needed to determine if there are times / places / technical solutions that will make possible the carry out of sanding without affect them.
2. Scientific research methods to identify a work method for artificial beach sanding, as possible to reproduce the natural phenomenon of sanding or accumulation of sediment in the area, both in short terms (due to type storm events) and also in long terms (seasonal).
3. For sanding in sectors North, Central and South Eforie **Do not** use sand beach extracted from the submerged ROSCI0197 North Eforie - South Eforie or its vicinity, this being a particularly dangerous for the site. It is necessary to completely avoid the extraction of the sand from the littoral cell between the south jetty of South Constanta Agigea Port and Tuzla Cape. Sand for sanding must be brought from other sources, and work must be conducted on shore.

SOUTH EFORIE AREA

The main impact on the two neighboring sites is given by the sediments that can be carried by currents in the construction work but after that, and also by the muddy water filled with fine sediment to be transported on long distances. Given that the currents and sediment transport is predominantly from south to north, we consider the **impact** on **marine are ROSCI0273 from Cape Tuzla** will be **insignificant**, while the **impact** on **submerged ROSCI0197 North Eforie Beach - South Eforie Beach** will be **significant, but temporarily**, with good possibilities of habitats and species recovery after cessation of work.

COSTINESTI AREA

Although the proposed works of Master Plan will not extend to the territory of the new marine Natura 2000 site **ROSCI0281 Costinesti - 23 August**, these works may have a **significant indirect impact** on **coastal areas** of the protected area through migration to the south of the sediment used for sanding. They run the risk of clogging the rocky midlittoral around the Forum Hotel. This impact could completely destroy here the protected habitats (*1170-6 Upper midlittoral rock*, *1170-7 Lower midlittoral rock*, *1170-10 Funny infralittoral hard clay with Pholadidae*) and *Pholas dactylus* populations with no possibility of recovery. Also, high turbid waters generated during the works will move south into the protected area and may cause temporary damage to the populations of macrophytes algae and the associated fauna.

MEASURES TO REDUCE THE IMPACT :

1. Do not make any kind of work that directly affect the natural rocky shore at Forum Hotel (located on the northern limit of the site ROSCI0281 Costinesti - 23 August)
2. In the technical solutions adopted to identify solutions to mitigate the loss of sediment within the Natura 2000 site, such as a building block epiu to Costinesti beach sediment migration to the south, to prevent their entry into the Natura 2000 site.

OLYMPUS AREA

The works for removing the existing structures so as to large the bays, and also the construction of new protection structures, would have **an indirect negative impact insignificant, on short term** on the protected area **ROSCI0281 Cap Aurora**, by **high turbidity waters released**. During construction works, *pelagic species* (marine mammals and some fish species *Alosa Immaculate*, *Alosa Tana*) will be disturbed, will be removed from the coast but they will find the refuge in Cap Aurora site, which has a large extension to large . After completion of the works, together with the improving of trophic resource, the pelagic species will return to shore, so **the effect will be negative temporarily**. Biogenic reefs of *Mytilus galloprovincialis* will not be affected by building dams or sanding works, because they we meet them in the large depths (30 -45 m depth).

The effects of work on the new site **ROSCI0293 Costinesti - 23 August**, the north area of the concerned area will be **void**, because the marine currents have direction from North to South.

The effects on the **ROSCI0094 submarines sulfur springs from Mangalia** will be **negligible** because the distance is considerable (about 5 - 6km). Only in case of discharge of large

quantities of sand in case of storm with wind from the north to east there is the risk that the particles in suspension to reach the southern coast, in the protected areas mentioned. On the other hand the shore structure encourages the diversion of the sediments in suspension and their submission to the wide before reaching the perimeter of the two South marine areas.

NEPTUN AREA

We appreciate that *the impact* on the ***ROSCI0281 protected area Cap Aurora will be insignificant temporarily***, only during the execution of the works. Because of the mainstream from north to south, sediments have no way to reach the offshore. During construction works, the pelagic species (marine mammals and some fish species *Alosa Immaculate, Alosa Tana*) will be disturbed, and it will be removed from the Black Sea coast. After completion of the works, while improving the resource trophic pelagic species recourse, they will return to shore.

The effects of the work on ***ROSCI0273 Marine protected area from Cape Tuzla area***, the area north of Neptune, will be practically ***zero***. The protected area at long distance and the direction of current that could lead particles in suspension is from north to south, along the coast.

The effects on ***sulfur springs ROSCI0094 submarines sulfur springs from Mangalia and on ROSCI0269 Vama Veche- May 2*** will be ***void***.

Effects on ***the oak trees in Neptune***. Natural monuments, secular oaks from Neptune are included in a green space remote from the sea, on the opposite bank of Lake Neptune. In these conditions, the effect on construction works on coast upon this natural monument is virtually ***zero***.

JUPITER – VENUS AREAS

The proposed works will take place at the western boundary of the protected area ***ROSCI 0281 Cap Aurora***, specifically between the western boundary of the protected area and shore. The works can not significantly affect the general area of the site, but ***may have a significant impact*** on coastal areas of it, which contains extremely important conservation objectives.

It is highly likely that some of the sediments resulting from the project will be carried by currents in the southern Cap Aurora site (the site where the limit starts from the shore) and in the sulfur Springs from Mangalia area. However, due to the existing protective dums, the amount of sediment that could reach the sulphurous springs from Mangalia is estimated to be reduced. In conclusion, the ***impact*** on ***ROSCI0094 underwater sulphurous springs Mangalia*** will be ***slightly negative***.

The rocky infralittoral area will be deeply affected deeply where they will perform sanding works , where the rocky bottom habitats characteristic are about to be replaced with sandy habitats.

Offshore rocky area, where there will be done works of location the artificial reefs parallel to shore will be affected during the execution of works, mainly due to the suspension which will then be deposited on the bottom and will be driven along the coast, south . But, after the completion of the work, artificial reefs will integrate existing habitats, representing points recovery of populations of invertebrates and algae macrophytes.

The impact on *Marsh ROSCI0114 Mlastina-Hergheliei and High Oban and Movila, ROSPA0066 Limanu - Stud.* In the case of Movila Cave, the impact will be void, given the fact that the protected is farther away from the targeted area. Regarding Mlastina Hergheliei and Limanu Lake and due to the importance of avifauna, it is recommended that traffic with heavy machinery not to be performed in the immediate vicinity of the access roads (the litoral herd of swamp and sea) but because avifauna to be unobtrusive. Access to the protected areas recommended to be restricted to any heavy machinery, noise causing discomfort or other fauna.

MEASURES TO REDUCE THE IMPACT :

1. Do not made any works that affect the bay formed between the two epiurs near Carmen Hotel, located inside the 0281 ROSC Cap Aurora site, likely to lead to limit free communication with the sea or clogging with sediment. In this area may be allowed only recovery works of the two epiurs, provided that the works to be carried out only on the face from wide side of them.
2. Do not allowed any other kind of work within the bay or off it, which would lead to limit free communication with the sea or from clogging with sediment.
3. To reduce the negative impact of high turbidity waters, sanding or construction of dams to be done in good weather, calm sea, little wind (up to 2-3 Beaufort winds and high grade level 2-3 Douglas).

AREA BALTA MANGALIA (MLASTINA HERGHELIEI)

The works proposed for this area have an indirect and temporay impact on ROSCI0114 Mlastina Hergheliri and - Oban High and ROSCI0281 Cap Aurora.

SATURN –MANGALIA AREA

The impact of demolition of existing structures and of sanding would be *particularly serious* upon the marine habitats underwater sulphurous springs ROSCI0094 site in Mangalia. It will be destroyed totally and irreversibly both habitat 1170-8, which contains 90% of the species *Cystoseira barbata* area of Romania and also the habitat 1110-1 containing the only *Zostera noltii* meadows that exist in Romania. All other habitats, including sulfur springs they contain, will be severely degraded by mechanical damage or clogging with sand. We appreciate that this impact is so devastating so to lead to the cancellation of Natura 2000 site.

Since the territory site is rocky natural shore, having a natural rhythm because of this very slow erosion, and it is already consolidated with heavy protection works, the erosion risk is minimal. Therefore, to achieve the objective of conservation of the Natura 2000 site and protect the natural structure of rocky habitats, consider that the proposed works are not necessary.

Impact on ROSCI0114 Mlastina Hergheliei - Oban High and Movila Cave, ROSPA0066 Limanu - Stud will be *negligible*.

Impact on ROSCI0269 Vama Veche - 2 May will be *insignificant* due to its defense by dams of Mangalia port

ALTERNATIVE SOLUTIONS:

1. There can be no remaining permitted works as demolition of existing structures, because it would just destroy the habitats for which the site was said. It can only accept rehabilitation works of existing structures in their current form.
2. There can be no remaining permits sanding works for just the same reason. The only exception is the socket formed between the south coast last two epiurs Mangalia (President Hotel, Teilor Street), where you can accept a sanding 20m.
3. There can be no allowed building works of new structures to defend the coast.

AREA 2 MAI

Expected **impact** of development works (minimum scale) on the protected area ROSCI0269 Vama Veche - May 2 will be ***minimal and temporary*** during execution works.

To minimize the impact that the project it can have on the draft marine protected area will require a study design point of environmental impact assessment. Works from the cliff can be started only after a thorough research on species and plant associations present here, to not destroy endangered plant species or halophilic arenicole (unfortunately, the area became increasingly anthropogenic and assaulted by ruderal species)..

Concerning the proposed works of long-term implementation Master Plan (2021-2041) for northern unit, they will be implemented in the Danube Delta Biosphere Reserve. Impact will be analyzed punctual at the beginning of the project itself.

RECOMANDATIONS.

May 2 sector is affected by the most intense coastal erosion from Romanian coast, especially in the Gulf of former 2 May military unit and near the road that connects the city 2 May of its fishing port. We recommend protection works hard to support the cliff and the road sectors as well as at-large sanding to restore the beach, on a breadth of 60m

7. RECOMANDATIONS

Landed area may be negatively affected by the activities performed during the progress of transportation, dust emissions, noise. To reduce / limit the adverse effects to strictly enforce the rules of work on site (fences absorbing, wetting, making noise generating activities between the hours 8.00 - 16.00 etc) or transport (using sheets or tarpaulins covering load) .

In accordance with Law no. 82/1993, the Danube Delta Biosphere Reserve Management Plan (RBDD) approved by the Scientific Council of DDBRA for special areas of conservation Sacalin-Zatoane (21,410 ha) and Grindul Chituc (2,300 ha) imposes to be prohibited any works that would disturb ornithofaunaspecies during migration and wintering spring-fall, increasing thus the anthropogenic pressure on areas with full protection of the Danube Delta (related to coastal zone). These special areas of conservation are important areas for breeding, migration and wintering for many species of seabirds.

In Constanta and Mamaia areas should be avoided the works in the cold season to avoid disturbing wintering aquatic birds that migrate or seaside. It also requires that the works to be carried out in compliance with work rules regarding the emission of dust and noise. Siutghiol Lake that has great importance for the winter, is not likely to interfere with work performance, they are executed during the warm season – of the year. Given the importance of protected areas of interest mentioned, during the works, must be observe environmental legislation in force.

In AGIGEA Area is necessary to completely avoid the extraction of sand from the littoral cell between the South Port of the South Constanta Port-Agigea and Cape Tuzla. Sand for sanding must be brought from other sources, and work must be conducted on shore.

ALTERNATIVE SOLLUTIONS

1. No intervention in the area;
2. To identify technical sollutions leading to natural sand accumulation in the area, without making additional recharge

Measures to reduce the impact:

1. Dams positioning so that construction eorks not to directly the 1170-10 cu *Pholas dactylus* habitat;
2. Works to be done during summer

In **NORTH EFORIE AREA** is necessary the execution of the works in periods of calm sea, although it is estimated that much of the suspension generated during the execution of the works will be blocked by the North dam of tourist port (North Marina Eforie) and diverted to large, so order to reach their maximum limit in the extreme North of ROSCI0197 Eforie North - South Eforie Eforie Submerged Beach Pentru sanding in the North not to use sand extracted from the

site ROSCI0197 Eforie North - South Eforie Submerged Beach or its vicinity, this being a particularly dangerous for the site.

Measures to reduce the impact:

1. monitoring the dynamics of *Donax trunculus* and *Donacilla cornea* species before, during and after the execution of the works;
2. artificial sanding rate reduction in accordance with the monitoring of the results.

In MIDDLE EFORIE AREA :

ALTERNATIVE SOLUTIONS

1. Do not make any site works in or in its vicinity.
2. The identification of some technical solutions that will lead to natural accumulation of sand on the beach that borders the site, such as a large extension of marina port or building a jetty in its extension.

MEASURES TO REDUCE THE IMPACT:

1. On the population dynamics of *Donacilla cornea*, *Ophelia bicornis* and *Donax trunculus* detailed scientific research are needed to determine if there are times / places / technical solutions that will make possible the carry out of sanding without affect them.
2. Scientific research methods to identify a work method for artificial beach sanding, as possible to reproduce the natural phenomenon of sanding or accumulation of sediment in the area, both in short terms (due to type storm events) and also in long terms (seasonal).
3. For sanding in sectors North, Central and South Eforie **Do not** use sand beach extracted from the submerged ROSCI0197 North Eforie - South Eforie or its vicinity, this being a particularly dangerous for the site. It is necessary to completely avoid the extraction of the sand from the littoral cell between the south jetty of South Constanta Agigea Port and Tuzla Cape. Sand for sanding must be brought from other sources, and work must be conducted on shore

SOUTH EFORIE AREA required that the work on protective structures in the North resort and artificial reefs will be limited only in days of calm (2-3 Beaufort winds and high degree grade 2-3 Douglas) or air circulation in the North (North, North East or North west), and when the sea is rough and strong winds have stopped them. For sanding Do not use sand extracted from the site ROSCI0197 Eforie North - South Eforie Submerged Beach or its vicinity, this being a particularly dangerous for the site. It is necessary to completely avoid the extraction of sand from the littoral cell between Constanta Port dam South and South-Agigea Cape Tuzla. Sand for sanding must be brought from other sources, and work must be conducted on shore.

In COSTINEȘTI AREA: MEASURES TO REDUCE THE IMPACT

1. Do not make any kind of work that directly affect the natural rocky shore at Forum Hotel (located on the northern limit of the site ROSCI0281 Costinești - 23 August)
2. In the technical solutions adopted to identify solutions to mitigate the loss of sediment within the Natura 2000 site, such as a building block epiu to Costinești beach sediment migration to the south, to prevent their entry into the Natura 2000 site.

In AREA JUPITER - VENUS: MEASURES TO REDUCE THE IMPACT

1. Do not made any works that affect the bay formed between the two epiurs near Carmen Hotel, located inside the 0281 ROSC Cap Aurora site, likely to lead to limit free communication with the sea or clogging with sediment. In this area may be allowed only recovery works of the two epiurs, provided that the works to be carried out only on the face from wide side of them.
2. Do not allowed any other kind of work within the bay or off it, which would lead to limit free communication with the sea or from clogging with sediment.
3. To reduce the negative impact of high turbidity waters, sanding or construction of dams to be done in good weather, calm sea, little wind (up to 2-3 Beaufort winds and high grade level 2-3 Douglas).

In **MANGALIA POND AREA** is recommended not be used for sanding, sand or near the site of the ROSCA 0281 Cap Aurora. To reduce the negative impact of high turbidity waters, sanding or construction of dams to be done in good weather, calm sea, little wind (up to 2-3 Beaufort winds and high grade level 2-3 Douglas).

In SATURN – MANGALIA AREA: THE ALTERNATIVE SOLLUTIONS ARE :

1. There can be no remaining permitted works as demolition of existing structures, because it would just destroy the habitats for which the site was said. It can only accept rehabilitation works of existing structures in their current form.
2. There can be no remaining permits sanding works for just the same reason. The only exception is the socket formed between the south coast last two epiurs Mangalia (President Hotel, Teilor Street), where you can accept a sanding 20m.
3. There can not be allowed building works of new structures to defend the coast

In AREA 2 MAY, is required at the design stage, analyzing how best to achieve the repair works to existing structures to minimize the impact on biodiversity of the protected area. For works to the cliff, is required prior research on species and plant associations present here, to not destroy endangered plant species or halophilic arenicole.

RECOMANDATIONS

May 2 sector is affected by the most intense coastal erosion from Romanian coast, especially in the Gulf of former military rights in the right way May 2 and May 2 linking the fishing port related. We recommend protection works hard to support the cliff and the road sectors as well as at-large sanding to restore the beach, on a breadth of 60m

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A APPENDIX

*IMPACT ASSESSMENT OF POLICY OPTIONS AND ALTERNATIVES COMMUNITY OF
INTEREST PROTECTED AREAS*

COASTAL UNIT	SEDIMENT CELL	ZONE	Coastal dynamics			Existing works		Erosion risk without intervention	Environmental Impact in case of non-intervention	Strategic Options					ALTERNATIVES		Term (S/M/L/J)		
			Protected areas	Forecast shoreline change, erosion risk in 30-50 years (m)	Description	Estimated life duration (years)	Non - Intervention (N)			Controlled withdrawal (BC)	Maintaining shoreline (ML)	Urea/Advancing (A)	Proposed Strategy	Shore protection	Other (N/A)	Stabilisation spurs		Beaches and tidal sanding	Bypass type sanding
Grof Muresu		Suffine	Fast accretion	Danube Delta Biosphere Reserve, ROSPA076 Black Sea	Accretion	Salina jetty (training walk), but no coastal defence structures.	N/A	N/A	NI will avoid impacts on designated Black Sea SPA birds and continued accretion will provide natural protection to terrestrial and freshwater habitats (and associated species) within the Danube Delta Biosphere Reserve. Should the trend of accretion reverse, there is risk of some loss of these habitats. The continuation of natural coastal processes is likely to result in significant change in existing landscape character. Continuing accretion will limit impact on the built environment and land-use. Should this sub-sector begin to erode, there is risk of some loss of urban assets, infrastructure and services. However, there are very few assets within the risk zone. The Salina Jetty structures are assumed to remain as they are operational port structures not coastal defences.	✓	▲	▲	▲▲	▲	▲	▲	✓	✓	I
				Danube Delta Biosphere Reserve, ROSPA076 Black Sea	Accretion	Natural frontage with short rock groyne	>10	N/A	Continued accretion in the north of this sub-sector will provide natural protection to terrestrial and freshwater habitats (and associated species) within the Danube Delta Biosphere Reserve. However, potential loss of some terrestrial/freshwater habitats (and species) within the International conservation site in the southern parts of this subsector, if the northern parts begin to erode, it is considered that natural processes are favoured over the construction of hard defences in this sensitive environment.	✓	✓	✓	▲▲	▲	▲	▲	▲	▲	N/A
				ROSC0066 Danube Delta, ROSC0066 Danube Delta – Marine Zone, ROSPA0076 Black Sea.	290-460	Natural area, without coastal protection	N/A	Yes	NI will avoid impacts on designated Black Sea SPA birds. The continuation of natural coastal processes is unlikely to result in significant change in existing landscape character.	✓	✓	✓	▲▲	▲	▲	▲	✓	✓	BC
Canalul cu Seaca			Severe erosion					Potential loss of terrestrial and freshwater habitats and associated species. RIDD. Risk of formation of holes in the beach, which can lead to intrusion of saline water into freshwater habitats protected. Avoid impact on non-intervention in the SPA birds. It is unlikely that the natural coastal processes to continue showing significant change in the existing landscape. Long-term impact on fisheries should be evaluated. As the front beach is unprotected, the negative effects occur in the absence of potassium intervention. There is risk to the area of land for non-intervention, however, there are very few constructive elements in the area.	✓	✓	✓	▲▲	▲	▲	▲	✓	✓	II	

LIMITATE A MORDIŢA										
Golful Muzuriu - Insulele din la Sulina										
Definiți secundară în Nr. 55 al Legii										
Clasă-Categorie										
Subsector										
Stabilitate										
St. Ghiorghieș										
Cauze Vulnerabil										
<p>Pronounced erosion which decreases towards the south part of the sector</p> <p>stable</p> <p>Accelerated erosion multianual scale - decade-actually part of a process of accumulation of sediments. The southern part of the island rotates clockwise, and moving east by washing sediment island phenomena by waves</p> <p>Continue progradare as a result of accumulation of sediments transported by the Delta century arms. St. George in the lagoon behind the island of Sakhalin.</p> <p>Severe coastal erosion</p>	<p>ROSG0065 Danube Delta, ROSG0066 Danube Delta – Marine Zone, ROSPA0076 Black Sea.</p> <p>ROSG0065 Danube Delta, ROSG0066 Danube Delta – Marine Zone, ROSPA0076 Black Sea.</p> <p>REDO, ROSPA0076 Black Sea, SC/Metagenese structure from St. Ghiorghieș</p> <p>REDO, ROSPA0076 Black Sea.</p> <p>ROSG0065 Danube Delta, ROSG0066 Danube Delta – Marine Zone, ROSPA0076 Black Sea.</p>	<p>200-330</p> <p>Stabila/ acrotic</p> <p>540-900</p> <p>0 - 250</p>	<p>Natural area, without coastal protection works</p> <p>Natural area, without coastal protection works</p> <p>Natural area, without coastal protection works</p> <p>Natural area, without coastal protection works</p> <p>Natural area, without coastal protection works</p>	<p>N/A</p> <p>not applicable</p> <p>not applicable</p> <p>not applicable</p> <p>not applicable</p>	<p>Yes</p> <p>No</p> <p>Risc mediu</p> <p>Risc mediu</p> <p>5</p>	<p>Potential loss of some terrestrial and freshwater habitats (and associated species) within the Danube Delta Biosphere Reserve. High erosion rates mean there is risk of a breach in the barrier beach, which may lead to saline incursion into the protected freshwater habitats. However, it is considered that natural processes are favoured over the construction of hard defences in this sensitive environment. It will avoid impacts on designated Black Sea SPA birds. The continuation of natural coastal processes is unlikely to result in significant changes in existing landscape character. The high erosion rates mean there is risk of impact on the hinterland; however there are very few built assets in the coastal zone. There is potential for loss of access along coastal roads. Potential loss of terrestrial and freshwater habitats and associated aspectilor REDD, disacelandita of acrotic will slow or reverse. Non-intervention to avoid the impact on birds of SPA. It is unlikely that the natural coastal processes to continue showing significant changes in the existing landscape. Long-term impact on fisheries should be evaluated. As the front beach is unprotected, the negative effects occur in the absence of intervention. Acrotic trend continue to limit the impact on land use potential built.</p> <p>Potential loss of terrestrial and freshwater habitats and associated aspectilor REDD, disacelandita of acrotic will slow or reverse. Non-intervention to avoid the impact on birds of SPA. It is unlikely that the natural coastal processes to continue showing significant changes in the existing landscape. Long-term impact on fisheries should be evaluated. As the front beach is unprotected, the negative effects occur in the absence of intervention. Acrotic trend continue to limit the impact on land use potential built.</p> <p>Potential loss of terrestrial and freshwater habitats and associated aspectilor DOBR if acrotic trend will slow or reverse. Avoid impact on non-intervention pasurilor. It is unlikely that the natural coastal processes to continue showing significant changes existing landscape. Shelter offered by a barrier strip of sand Sahalineprelata, meaning that this sub-sector is unlikely to suffer severe erosion. Number of buildings at risk in this subsector is limited.</p> <p>Potential loss of terrestrial and freshwater habitats and associated species DOBR if acrotic trend will slow or reverse. Avoid impact on non-intervention pasurilor. It is unlikely that the natural coastal processes to continue showing significant changes existing landscape. Number of buildings at risk in this subsector is limited due to the undeveloped character of this area.</p>	<p>✓ ✓</p> <p>✓</p> <p>▲</p> <p>▲▲</p> <p>▲</p> <p>▲</p> <p>▲</p> <p>▲</p> <p>▲</p> <p>▲</p> <p>▲</p> <p>▲</p> <p>▲</p> <p>▲</p> <p>▲</p> <p>▲</p>	<p>NI</p> <p>NI</p> <p>Partial Interventabil</p> <p>Partial Interventabil</p> <p>Partial Interventabil</p>	<p>▲</p> <p>▲</p> <p>▲</p> <p>▲</p> <p>▲</p> <p>▲</p> <p>▲</p> <p>▲</p> <p>▲</p> <p>▲</p> <p>▲</p> <p>▲</p> <p>▲</p> <p>▲</p> <p>▲</p> <p>▲</p> <p>▲</p> <p>▲</p> <p>▲</p> <p>▲</p> <p>▲</p> <p>▲</p>	<p>N/A</p> <p>N/A</p> <p>N/A</p> <p>N/A</p> <p>N/A</p>

Goldfish Marmara - Cap Mida pass & Port of Constantine																					
Goldfish Marmara - Cap Mida pass & Port of Constantine	Corbu (Cap Mida)		ROSC0005 Delta Dunari, ROSC0006 Delta Dunari - Zona Marina, ROSPA0076 Marea Neagra, SPA Lacurile Tasaui si Corbu	accrete	Natural area, without coastal protection works	not applicable	R	continue to provide natural protection acrotlines terrestrial and freshwater habitats of RBDO. If you reverse the accretion risk losing habitats.	✓	▲	▲	▲	▲	FI	▲	▲	▲	▲	▲	N/A	
	Mida Port	Structure operating in the Port of Mida navigation and are not considered in this MP.	ROSC0005 Danube delta, ROSC0006 Danube Delta-Marine Zone, ROSPA0076 Black Sea, SPA Tasaui and	FR	epiluv breaks - wave of the port, but not protective structures	<20	R	Port structures will remain in position	▲	▲	✓	▲	ML	▲	▲	▲	▲	▲	▲	N/A	
	Nereusht (Southward) Nord	stable, exposed to storms in the south - eastern direction	ROSPA0076 Black Sea	accrete	fers protectii împotriva eroziunii costiere	not applicable	R	there is a risk of construction if erosion will continue, including some properties.	✓	▲	▲	▲	▲	FI	▲	▲	▲	▲	▲	▲	N/A
	Nereusht (Southward) Nord	Central Gulf and all Marmara is slightly erosion	ROSPA0076 Marea Neagra si SPA0057 Lacul Stutghiol	accrete	without protection against coastal erosion	not applicable	S	there is a risk of construction if erosion will continue, including some properties.	✓	▲	▲	▲	▲	FI	▲	▲	▲	▲	▲	▲	N/A
	Marmara Nord	erosion - In an area with a net sediment drift south-north oriented - the area is situated in the continuation of current longitudinal dike break after the G -	ROSPA0076 Black Sea and SPA0057 Stutghiol Lake	30 - 50	without protection against coastal erosion	not applicable	M	Non-intervention has an impact on birds. It is unlikely that natural processes continue to result in significant change. Non-intervention to avoid the impact on birds. If there is a risk of erosion will continue on construction, including some resort properties	▲	▲	✓	▲	▲	ML (S)	▲	▲	▲	✓	▲	▲	M
	Marmara Central	Erosion, the beaches are under anthropogenic influence	ROSPA0076 Black Sea and SPA0057 Stutghiol Lake	80 - 110	large dike wave break-	<5	M	Non-intervention has an impact on birds. It is unlikely that natural processes continue to result in significant change. Non-intervention to avoid the impact on birds. If there is a risk of erosion will continue on construction, including some resort properties	▲	▲	✓	▲	▲	ML (U)	▲	✓	✓	✓	▲	▲	M
	Marmara Sud	In present this subsector is most affected by erosion	ROSPA0076 Black Sea and SPA0057 Stutghiol Lake	150 - 170	large dike and wave break and control structures in South Beach	<5	R	It is unlikely that natural processes continue to result in significant change. Non-intervention to avoid the impact on birds. Loss of sediment from the beach, in the event that further erosion can affect the value of the tourist resort. Because there is a risk further erosion on construction, including some resort properties and local infrastructure.	▲	▲	✓	▲	▲	ML (U)	▲	✓	✓	✓	▲	▲	S
	Scenic Nord	Artificially maintained by anthropogenic intervention	ROSPA0076 Black Sea and SPA0057 Stutghiol Lake	120 - 160	New protection and recovery of land from the sea shore with small beaches south of epiluv without break-wave, to the south - large bays protected by dike extended in the form of T.	<5	R	non-intervention will avoid impact on spms. Destabilization of the base of their cliffs and erosion resulting destabilization properties of cliff top. Loss sediment on the beach where erosion continues and gets worse, there is a risk to health and safety issues related to the degradation and break protections. Erosion of today will lead to degradation of existing buildings and local infrastructure.	▲	▲	✓	▲	▲	ML (S)	▲	✓	✓	✓	▲	▲	S

UMETATEA SUDICA		Eforie - Cap Turda		Eforie Nord		Eforie Sud				
Artificially maintained by anthropogenic intervention	ROSPA0076 Black Sea	150 - 200	protected bays wide T-shaped headlands built of stone and concrete walls or aprons, dams built-wave to the south, break-wave apron south of Port Tomis.	Coastal protections <10 Tomis Port <20 Tomis Port to C-ta. Port <10	M	Noe-intervention has an impact on birds. Destabilization of the base of their cliffs and erosion resulting destabilization properties of cliff top. Low sedimentation the beach where erosion continues and gets worse, there is a risk to health and safety issues related to the degradation and break protections. Erosion of today will lead to degradation of existing buildings and local infrastructure.	AA AA ✓ AA	ML (U)	✓ ✓ ✓ ✓	S
The dipping and operation structures of the port are not in top aim	ROSPA0076 Black Sea	28	jetty and dam-break wave which are not coastal protection structure	>20	R	Port and navigation structure that will remain in place. Port structures will continue to provide protection to the built-up areas.	AA AA ✓ AA	M	✓ ✓ ✓ ✓	M
Intre peccaria de la Agliea si hotelul Steaua de Mare din Eforie Nord exista una dintre fantele putinei coaste intracoste naturale	ROSPA0076 Black Sea and ROSC0073 Marina dulce from Agliea	60-80	natural stone cliff		R	Noe-intervention will not affect the protected areas. Erosion can lead to an increased risk of built-up areas and infrastructure.	✓ AA ✓ AA	FP (M, G)	✓ ✓ ✓ ✓	M (low result of alternative)
In most parts of the beaches there are no cliffs. Cliffs are affected by slip processes	ROSPA0076 Black Sea, ROSPA0061 Techigiol Lake and ROSC0197 Submersa beaches from North and South Eforie	60 - 80	Epic stone in the north. Naturally eroded platforms at little or no beach south beach.	Protected <5 Marina >10	R	Noe-intervention will not affect the protected areas. Erosion can lead to an increased risk of built-up areas and infrastructure.	✓ AA ✓ AA	ML (U)	✓ ✓ ✓ ✓	S
Erosion	ROSPA0076 Black Sea, ROSPA0061 Techigiol Lake and ROSC0197 Submersa beaches from North and South Eforie	40 - 60	the northern beach is wide, narrowing towards the south closer underwater wave break.	<5	R	noe-intervention will have no effect on avifauna and habitats belonging ROSC0197. Sedimentation loss of beach erosion with continued emphasis may affect the value and tourist resort, there is a risk on health and safety issues related to the degradation of protective structures. There is a risk to buildings located on top of the cliff because of erosion continued and enhanced.	✓ AA ✓ AA	FP (M, G)	✓ ✓ ✓ ✓	M (low result of alternative)
Cliffs are affected by slip processes.	ROSPA0076 Maree Neagra, ROSPA0061 Local Techigiol, ROSC0069 7 Plaja submersa Eforie Nord-Eforie Sud, ROSC0273 Zona marina de la Capul Turda	60 - 80	area consists of a series of bays with narrow beaches and headlands protected apron modified artificial stone and concrete pitching.	<5	R	noe-intervention will have no effect on avifauna and habitats belonging ROSC0197. Sedimentation loss of beach erosion with continued emphasis may affect the value and tourist resort, there is a risk on health and safety issues related to the degradation of protective structures. There is a risk to buildings located on top of the cliff because of erosion continued and enhanced.	AA AA ✓ AA	ML (G)	✓ ✓ ✓ ✓	M

Cap Tuzla - Mingali																							
Cap Tuzla - Mingali	Cliff/Vegetation	Tuzla Nord	Beaches in erosion, as well as beaches affected by slip processes.	ROSPA0076 Black Sea and ROSCO073 Marine Zone from Capul Tuzla	20 - 30	new works to protect the cliffs and stone pitching protection.	<20	M	non-intervention will have no effect on avifauna and habitats belonging ROSCO073. Non-intervention will lead to the phenomenon of washing intertidal beaches and sedimentation in some areas. There is a risk to buildings located on top of the cliff because of erosion continued and enhanced.	✓✓	▲	▲	▲	▲	FI	▲	▲	▲	▲	▲	N/A		
		Tuzla Sud	Beaches in erosion, as well as beaches affected by slip processes.	ROSPA0076 Black Sea and ROSCO073 Marine Zone from Capul Tuzla	20 - 30	new works to protect the cliffs and stone pitching protection.	20	S	non-intervention will have no effect on avifauna and habitats belonging ROSCO073. Non-intervention will lead to the phenomenon of washing intertidal beaches and sedimentation in some areas. There is a risk to buildings located on top of the cliff because of erosion continued and enhanced.	✓✓	▲	▲	▲	▲	FI	▲	▲	▲	▲	▲	▲	N/A	
		Continued	Floor erosion, relatively stable in the center; erosion occurred just south of the new coastal structure that protects the communication channel between Lake Continesti and sea. Cliff is affected by landslides.	ROSPA0076 Marine Neagra, ROSCO073 Zona marina de la Capul Tuzla si ROSCO093 Continesti - 23 August	50 - 70	new wave crush levees that protect the entrance / exit of the lake. Epiu only stone in the south.	epileum <5 ani; dams <15	R	Non-intervention will have no effect on avifauna and habitats belonging ROSCO093 and ROSCO073. Non-intervention will lead to the phenomenon of washing intertidal of beaches sedimentation in some areas. While the coast is generally unprotected front, changes will occur without implementation of the MP. Current erosion can lead to a potential loss of tourist facilities in the resort.	▲	▲	▲	✓	▲	ME (E)	✓	✓	✓	▲			M (or recommended)	
		23 AUGUST	Beaches in erosion, as well as beaches affected by slip processes.	ROSPA0076 Black Sea and ROSCO093 Continesti - 23 August	50 - 60	without protection structures	not applicable	M	Non-intervention will have no effect on avifauna and marine habitats. Sedimentalor loss from continuing, and increase awareness of beach erosion can affect the value of the tourist resort, showing a risk the health and safety issues related to the degradation of protective structures. There is a risk of a significant number of functions supra tourism and recreation of resort.	✓	▲	▲	▲	▲	FI	▲	▲	▲	▲	▲	▲	N/A	
			Beach dynamics is controlled almost completely by human intervention (controlled artificial beaches)	ROSPA0076 Black Sea ROSCO081 Cap Aurora, ROSCO114 Marsh stud - Oban High and Cave mound, ROSCO281 Cap Aurora, sulphurous springs ROSCO094 submarine at Mangalia	70 - 110	The north-protected epiur! new stone pitching protection Y with cliffs behind, the south-epiur protected inlet, headlands, occasionally breaking-wave submerged dams. Appear show protection and protective walls behind the	<5	R	Non-intervention will have no effect on avifauna and habitats belonging to SCI sites in the area of influence of MPL. Loss of sediment from the beach where erosion trend continues or gets worse will affect the tourist value of the resort.	▲	▲	✓	✓	▲	ME (E)	✓	✓	✓	✓	▲			M (or recommended)
			erosion	ROSPA0076 Marine Neagra, ROSCO281 Cap Aurora, ROSCO114 Mlaetina Hergheleu - Obanul Mare si Fetters Movila	70 - 110	without protective structures, natural barrier beach	not applicable	M	Non-intervention will have no effect on the avifauna, belonging ROSCO281 habitats and characteristics ROSCO114. Continued erosion may lead to increased risk of narrow barrier beach break, leading to potential loss of land habitat/ator.	▲	✓	✓	✓	▲	ME (S)	▲	▲	▲	✓	▲			L

2 MM - Ernie frontiers Bulgaria															
Varna Veches - Ernie frontiers Bulgaria	Saturn-Mangalia	Beach dynamics is controlled almost completely by human intervention	ROSPA0076 Black Sea ROSCO081 Cap Aurora, ROSCO114 Marsh stud - Oban High and Cave mound, ROSCO281 Cap Aurora, sulphurous springs ROSCO094 submarine at Mangalia	70 - 110	protection of existing structures with narrow bays and beaches protected by apron	V	R	Non-intervention will have no effect on avifauna and marine habitats. Sedimental loss from continuing, and increase awareness of beach erosion can affect the value of the tourist resort, showing a risk to the health and safety issues related to the degradation of protective structures. There is a risk of a significant number of functions supra tourism and construction if erosion continues.	▲▲ ▲	✓ ✓	▲▲	ME (U)	✓ ✓ ✓ ✓	▲	M
	Mangalia Port	Navigation structures and operation of the port are not included in the order NP	ROSPA0076 Black Sea	FR	jetée et digue (space-val dar care nu sunt structuri de protectie costiera)	>30	R	Port and navigation structures that will remain in place. Port structures will continue to provide protection to the built-up areas.	▲▲ ▲▲	✓ ✓	✓ ✓	ME	▲ ▲ ▲ ▲	N/A	
	3 Mal	North beach is relatively stable, being protected by the levee and the south beach has disappeared due to erosion. Cliff is affected by landslide.	ROSPA0076 Maria Neagra, ROSCO269 Vama Veches-2 Mal	80 - 120	single coastal defence structure in rock and concrete armoureds currently used as a breakwater/pier by local fishermen. Clow here, so coastal defence.	V	M	Non-intervention will not affect the fauna and protected area. It is unlikely that the natural coastal processes continue to result in significant changes in the existing landscape character. Loss of sediment from the beach where erosion or worse still may affect the value of the tourist resort. Any future development proposed for construction, including approved PLZ is in danger.	▲▲	✓ ✓	▲▲	ME (E)	✓ ✓ ✓ ✓	▲	M (not recommended)
	Livorno	Cliff is affected by landslide	ROSPA0076 Black Sea, ROSCO09 Vama Veches-2 May	70 - 110	without protection structure	R	M	Non-intervention will not affect the fauna and protected area. It is unlikely that the natural coastal processes continue to result in significant changes in the existing landscape character. Loss of sediment from the beach where erosion or worse still may affect the value of the tourist resort. Any future development proposed for construction, including approved PLZ is in danger.	✓ ✓	▲	▲▲ ▲▲	FI	▲ ▲ ▲ ▲	N/A	
	Vama Veches - Ernie frontiers Bulgaria	The beach is relatively stable, cliff is affected by landslide.	ROSPA0076 Black Sea, ROSCO09 Vama Veches-2 May	50 - 80	without protection structure	R	M	Non-intervention will not affect the fauna and protected area. It is unlikely that the natural coastal processes continue to result in significant changes in the existing landscape character. Loss of sediment from the beach where erosion or worse still may affect the value of the tourist resort. Any future development proposed for construction, including approved PLZ is in danger.	✓ ✓	▲	▲▲ ▲▲	FI	▲ ▲ ▲ ▲	N/A	

ANNEX B

PROPER ASSESSMENT CONCLUSIONS

Priority	No.	Project name	Major Coastal Unit	Coastal Sedimentation Unit	Sub Sector	Location	Shoreline protection	Offshore break-waves dams	Groynes	Beach recharges sand "by pass"	
Short Term	1	Mamaia Sud	Sudica	Golful Mamaia - Cap Midia to Portul Constanta	Mamaia Sud	Hotel Melody - Pescarie	x	✓	✓	✓	x
	2	Tomis Nord	Sudica	Golful Mamaia - Cap Midia to Portul Constanta	Tomis Nord	Pescarie - Strada Havana	x	✓	✓	✓	x
	3	Tomis Central	Sudica	Golful Mamaia - Cap Midia to Portul Constanta	Tomis Nord	Strada Havana - Strada Renasterii	x	✓	✓	✓	x
	4	Tomis Sud	Sudica	Golful Mamaia - Cap Midia to Portul Constanta	Tomis Sud	Strada Renasterii - Tomis Touristic Port	x	✓	✓	✓	x
	5	Eforie Nord	Sudica	Eforie - Cap Tuzla	Eforie Nord	Steaua de Mare - Hotel Belona (Touristic Port)	x	✓	✓	✓	x
Mid Term	1	Canalul cu Sonda	Nordica	Sulina Jetty on the South end of Scalin Island (Zatoane)	Canalul cu Sonda	Canalul cu Sonda	x	x	x	✓	✓
	2	Portita	Nordica	Zatoane - Port Midia	Portita	Gura Portitei	x	x	✓	✓	x
	3	Mamaia Nord	Sudica	Golful Mamaia - Cap Midia to Constanta Port	Mamaia Nord	Limit between Navodari and Mamaia - Hotel Rex	x	x	x	✓	x
	4	Mamaia Centru	Sudica	Golful Mamaia - Cap Midia to Constanta Port	Mamaia Centru	Hotel Rex - Hotel Melody	x	✓	✓	✓	x
	5	Tomis Port - Constanta Port	Sudica	Golful Mamaia - Cap Midia to Constanta Port	Tomis Sud	Tomis Port to Constanta Port	✓	x	x	x	x
	6	Agigea	Sudica	Eforie - Cap Tuzla	Eforie Nord	Digul Agigea to Steaua de Mare Hotel	x	✓	✓	x	x
	7	Eforie Centru	Sudica	Eforie - Cap Tuzla	Eforie Centru	Eforie Centru Vraja Marii - Tabara Internationala	✓	✓	✓	✓	x
	8	Eforie Sud	Sudica	Eforie - Cap Tuzla	Eforie Sud	Tabara Internationala - Pescarie Eforie Sud	✓	✓	✓	✓	x
	9	Costinesti Sud	Sudica	Cap Tuzla - Mangalia	Costinesti	De la sud de deversarea lacului la Vila Albatros	✓	x	✓	✓	x
	10	Olimp	Sudica	Cap Tuzla - Mangalia	Olimp - Venus	Hotel Maramures la Vila Garofita	✓	✓	✓	✓	x
	11	Neptun	Sudica	Cap Tuzla - Mangalia	Olimp - Venus	Neptun Jetty	x	✓	✓	x	x
	12	Jupiter - Venus	Sudica	Cap Tuzla - Mangalia	Olimp - Venus	Tismana Lake to Silvia Hotel	✓	✓	✓	✓	x
	13	Saturn - Mangalia	Sudica	Cap Tuzla - Mangalia	Saturn - Mangalia	Hotel Cerna to Hotel Diana (Saturn); Hotel Mangalia	✓	✓	✓	✓	x
	14	2 Mai	Sudica	02 Mai - Vama Veche	2 Mai	Mangalia Port South Dam - 2 Mai	x	✓	✓	✓	x
Long Term	1	Jetele Sulina	Nordica	Delta Chilia (Ucraina) - Sulina Jetty	Golful Musura	Sulina Jetty and addiacent areas	x	x	x	✓	✓
	2	Gura Portitei	Nordica	Zatoane - Port Midia	Portita	Gura Portitei	x	x	x	✓	✓
	3	Stavilar Periboina	Nordica	Zatoane - Port Midia	Periboina	Stavilar Periboina	x	x	✓	x	✓
	4	Stavilar Edighiol	Nordica	Zatoane - Port Midia	Chituc	Stavilar Edighiol	x	x	✓	x	✓
	5	Balta Mangalia	Sudica	Cap Tuzla - Mangalia	Balta Mangaliei	Hotel Silvia - Hotel Cerna	x	x	x	✓	x