SPATIAL PLAN FOR SPECIAL PURPOSE COASTAL ZONE

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PREFACE

Spatial Plan for a special purpose for the Coastal Zone of Montenegro has been developed as a synthetic review of researches conducted, opinions accepted and recommendations obtained during the time of activities of the previous phases. It also expresses well known and adopted decisions of the Republic of Montenegro and its coastal units of local governance regarding strategy of spatial development and planning of the Coastal Zone.
Structure and contents of the Plan, based and coming from the established methodology and organization of work, are defined by a special Work Project that is based on legislation and adopted after detailed and comprehensive consideration and harmonization by both orderer and processor. In accordance with the Work Project, the Plan represents a functional and logical composition of works presented descriptively (narrative) and graphically with emphasized inter-dependence and inter-complementing between the text and graphic presentations.
Textual part is presented as a final report, taking into account all the works presented in the Plan so far.

Historical background – grounds for development of the Plan, purpose and task of the Plan; basic data about the Plan - spatial and time coverage and dynamics of development; organizational aspects - composition of the engaged work team, work conditions and cooperation established with interested subjects during work; and a short review of activities conducted related to development of the Plan – all of these are presented in “Introductory remarks” following the Preface.

Through the part of the study "Evaluation of the present state", natural characteristics, resources and potentials of the area are presented; actual organization of development and utilization of area; cultural heritage; areas under special regimes; condition of living environment and identified conflicts of interests, conflicts and restraining factors.
Natural conditions of the area, which were a subject of numerous researches in the past, mainly viewed from the perspective of planning of mainland development, were complemented with new knowledge and were specially expanded in the part which refers to the area of local sea waters of Montenegro, which was paid special attention to in line with the character of the Plan as much as the acquired knowledge at that point allowed, which is still insufficient from different aspects.
Organization, planning and use of space are viewed from the perspective of land policy and policy of local sea waters; demographic movements and network of inhabited areas; production activities (with emphasis on maritime economy and tourist, health, sport-recreational and other activities); as well as technical infrastructure systems, pointing out the problem of inadequate water supply of the area as well as discharge of waste waters and precipitation waters which are not in line with ecological requirements.
Conflicts of interest of different space users (on land and in a part of local sea waters); factors that limit development related to seismic and other natural hazards, underdevelopment of technical infrastructure systems, serious phenomena of pollution of elements of living environment – particularly water, non-activated values of the area, etc., are emphasized based on knowledge about the trends present so far.

Actual spatial plans - Spatial Plan of the Republic of Montenegro, spatial plans of local governance units and general urban plans of their centers, as well as strategic documents of the Republic referring to development of tourism, maritime economy and agriculture, that is, their grounds and implementation significant from the aspect of development, planning and protection of the area of the Coastal Zone make the contents of the chapter "Extracts from relevant spatial - planning and other strategic – development documents".

Second part of the survey begins with review of basic principles and goals of the Plan.

Position of the Coastal Zone area in relation to Mediterranean, the Balkans and Montenegro is shown in the light of geopolitical changes which occurred after 1990s.
Interpretation of development projections of the Coastal Region of Montenegro, inspected from the perspective of spatial units already defined by the Spatial Plan of the Republic, is presented in the chapter "Position and directions of development of the Coastal Zone in relation to environment".
In the following chapters spatial models of traffic and technical infrastructure systems are presented.
A special part refers to the view of protection of cultural heritage on land and submarine world and measure for the following period. Models of revitalization and active protection of cultural and building construction heritage are proposed.
Chapter „Concepts of protection of living environment" presents general presumptions of the Plan; measures of protection of mainland part of the Coastal Zone; measures of protection of local sea waters from waste waters and torrent courses from mainland as well as pollution from ships. Measures referring to protection and improvement of bio-ecological potentials of local sea waters, as well as natural and environment values of the area as a whole are also pointed out.
Importance of measures of protection from seismic hazards, other natural and anthropogenic hazards as well as measures of protection relevant for defense of the country are specially emphasized.

Regimes of use and space planning are specified in accordance with the areas of the Coastal Zone which are divided as bigger units, within which zones with specific environmental characteristics are defined, based on which measures and conditions of use and protection of the area are prescribed - in line with purpose defined.
Chapter "Guidelines for realization of the Plan" include general and specific guidelines for implementation of the Plan for individual purposes and activities in space, and for specifically defined sectors in the Coastal Zone.

Apart from the narrative part of the Plan, a set of graphical presentations along with the basic Plan was made in proportion 1:100.000, 1:25.000 and 1:10.000.

Constituent part of this survey make detailed elaborations for the selected six zones and locations which have narrative and adequate graphic part.

INTRODUCTORY NOTES

Republic Montenegro initiated in June 1998 development of the Spatial Plan for the area for a special purpose for the Coastal Zone of Montenegro.
Reason for development of this Plan is the need to: use optimally this public good as one of the biggest development potentials of the Republic, realistically evaluate its natural and man-made potentials, create development strategy and to determine optimal purpose of the areas which would enable rational use of space and protection and saving of living environment.
Goal is to create a strategic document for organization and planning of this area, but also to obtain instructions for concrete actions through segregation of functions and zones for individual purposes as well as for joint standards of use.
Purpose of this plan is not only to preserve and save the Coastal Zone for younger generations, but also to provide the present generation with solutions for its sustainable use.
Development of the Spatial Plan of the Coastal Zone as a unique spatial plan for a special purpose implied use of all strategic and development, planning and programme documents of the Republic and municipalities in this area, with application of the concept of sustainable development, scientific methodology and mechanisms of planning which are used in the world for such a specific purpose. It should be pointed out that we did not have more experiences in planning the coastal zones in our country.

Spatial coverage of the Plan

Spatial plan of the Coastal Zone of Montenegro covers the local sea waters (about 2.540 km2), overall coast whose length is about 310 km as well as a narrow part of mainland defined according to the Law on the Coastal Zone (surface of about 58 km2).

Even though the Plan is formally made only for the previously mentioned area, all the previous analysis have shown that mainland of the coastal zone defined by the Law is not relevant enough for research and development of this type of the plan document.

That is why researches were conducted and present state is presented on the three levels:
- THE COASTAL ZONE (local sea and mainland part as defined by the Law on the Coastal Zone)
- CONTACT ZONE (area of general urban plans, that is a narrower coastal zone with natural values as well as man-made structures which have a direct influence on the Coastal Zone)
- FUNCTIONAL BACKGROUND (area of all six coastal municipalities in total surface of about 1.600 km2 such as: Herceg Novi, Kotor, Tivat, Budva, Bar and Ulcinj, as units of local governance which manage the area which naturally gravitates to the coastal zone; data can be collected more easily on the level of these units, and the Plan can be more easily implemented in cooperation with them).

Provisions of the Plan refer to only to the Coastal Zone, while guidelines and recommendations are given for wider area (contact zone and functional background) as a basis for application in the plan documents of the lower rank.

Definition of the Coastal Zone

The Coastal Zone is a public good where the state executes its sovereignty within which it effectuates defense policy, legal and spatial planning, it conducts researches, economic exploitation and ecological and environmental protection.

Natural units which make the coastal zone are by their character heterogeneous, but in economic and ecological sense they make interdependent and integrated area. In this area economic logic, that is, exploitation of the area and resources is contradictory to the logic of ecological and environmental protection. Ecological and environmental integrity of the area of the Coastal Zone can be provided through its planning, programmed exploitation of its resources and implementation of measures of ecological protection through the program of use.

Law on the Coastal Zone (Official Gazette of the Republic of Montenegro No 14/92) in Article 2, precisely determines the area, objects and resources which make a part of the coastal zone such as: "sea shore, ports, breakwaters, slipways, drifts, sand-banks, swimming areas, cliffs, bayous, crag, submarine springs, springs and wells on the shore, river mouths running into sea, channels connected with sea, submarine, sea bed and underground as well as the internal sea waters and territorial waters, alive and unalive resources in them, and alive and unalive resources of epi-continental zone. The Coastal Zone in the sense of the Law on the Coastal Zone includes shores of the river Bojana in the territory of the Republic of Montenegro".
In Article 3 of the Law on the Coastal Zone the idea of the sea shore is defined as the "zone of mainland bordered with the line that highest waves can reach during the strongest storms as well as the part of the mainland which according to its nature or purpose serves to use of the sea for maritime traffic and maritime fishing and for other purposes which are related to use of sea, which is at least 6 meters wide starting from the line that highest waves reach during the time of strongest storm."
Shore of the river Bojana includes the area of mainland which is at least 6 meters wide starting from the line which is horizontally distanced from the line of the medium 20- year-old water level."

Land border and surface of mainland

Land border of the Coastal Zone of the Republic of Montenegro begins in municipality of Herceg Novi at the cape Kobila, from which it goes along the upper edge of the road Vitaljina - Herceg Novi up to the bridge on the river Sutorina. Then, along the upper edge of the road Njivice - Herceg Novi, the border continues to the villa ”Galeb”, then along the walking path ”Pet Danica” it passes through Igalo and Herceg Novi up to Meljine. From Meljine the border goes along the old local road to the motorway in Zelenika. Through Kumbor, Đenovićе, Baošićе and Bijela the border continues along the upper edge of the local road Zelenika - Bijela to the exit to the motorway. From Bijela through Kamenari to Kostanjica, the border goes along the motorway. Then through Morinj, Risan, Perast, Dobrota

and Kotor it goes along the local road Kotor - Lepetani. From Lepetani to Tivat it goes along the motorway. At the House of Culture it takes off the motorway and takes the main road along the sea to the House of Army where it turns, goes along the fence of the repairing facility and it goes to the motorway. Border then goes along the motorway and the fence to the military hotel where it turns and takes the path between the school center and the hotel to the asphalt path through the park, along the road to Pino.
Through Tivat it goes along the local road up to the place Župa where it gets to the motorway and continues to the airport of Tivat until the cross-road to Kotor where it continues to Krašići and Rose. From Rose to the cape Platamuni, the border goes along the edge of cliff, with a little bit bigger portion covered on the cape Trašte. From the cape Platamuni to the beach Jaz, the border goes along the road to Platamuni - Jaz. From the beach Jaz, the border gets to the Adriatic highway and it follows the upper border of the highway to the tunnel. From the tunnel it goes along the border of crag to the Old Town of Budva, then along the walls of the Old Town up to the walking path "Slovenska obala". Then, the border goes along the walking path to Bečići and continues to the end of the beach in Rafailovići where it joins the motorway and goes along it to the beach Kamenovo. From the beach Kamenovo the border goes along the edge of the crag to the beach Pržno and touches the edge of the beach. From Pržno the border line continues along the edge of the crag and along the Queen's Beach (Kraljičina plaža) and the beach Miločer to Sveti Stefan. From Sveti Stefan to Petrovac the border goes along the edge of crag including the beach Drobni Pijesak and hotel "AS". Through Petrovac the border goes along the shore street to the end of the beach, then along the crag to Buljarica including the beach Lučice. The border continues through Buljarica and along the edge of the beach to the end of Buljaričko polje, continues along the edge of crag to Crni rt (Black Cape) including the beach Čanj with the hotelfacilities. From Crni rt to Sutomore it goes along the local road. In Sutomore the border goes along the street "Iva Novakovića" to the Adriatic Highway (motorway), then along that motorway to the road along the beach Žukotrlica. It continues along the road to the bridge on the river Železnica, then down the river to the walking path along the beach Topolica. Along the walking path it goes to the facilities of the port of Bar including it totally to the stream Ujtin. From the stream Ujtin to beaches Mali and Veliki Pijesak the border goes along the edge of crag. In the hinterland behind the beaches of Mali and Veliki Pijesak, the border goes along the local road to the border of recreation camp including the camp. From there it goes further along the crag to the place Kruče including the beach "Utjeha". Through the place Kruče, the border goes along the local road to the place Kruče, and further along the crag through the cape Mavrijan it includes the bay Valdanos and cape Mandra and continues along the crag to the Old Town of Ulcinj. Along the walls of the Old Town of Ulcinj and the shore street it goes along the Small Beach (Mala plaža) and along the road to the hotel "Albatros". From the hotel it goes along the crag to the tunnel to the channel Port Milena, and through the channel to the facilities of the salt plant "Bajo Sekulić", and from there along the regional road Ulcinj - Sv. Nikola to the river Bojana. It goes along the river Bojana to the state border with Albania.

In line with the Law on the Coastal Zone, a special Commission, established by the decision of the Government of the Republic of Montenegro, has determined the boarder line of the Coastal Zone on the mainland.

In order to define this boarder, legal, economic and ecological criteria were taken into account and that is why it does not cover at all parts of mainland the minimum of six meters from the highest wave in the strongest storm as defined by the Law, but instead it provides natural, economic and ecological whole as much as it was objectively possible.

Biggest width of mainland of the Coastal Zone was provided in economic zones whose activity is related to exploitation of sea and it alive and unalive resources, that is submarine and underground, at river mouths, and water springs on the shore, as well as in protected objects of nature and natural reserves.

In that way the mainland area was determined which covers the area of about **58 km2.**

Municipality	MD[1] surface participation	participation of MD in municipality
H. Novi	491,7 ha	(8,49%) 2,1%
Tivat	746,3 ha	(12,89%) 16,2%
Kotor	215,9 ha	(3,73%) 0,6%
Budva	220,6 ha	(3,81%) 1,8%
Bar	796,5 ha	(13,76%) 1,3%
Ulcinj	3.318,4 ha	(57,32%) 13,0%
The Coastal Zone	**5.789,4 ha (57,894 km2)**	**3,6%**

The following belongs to the Coastal Zone of the Republic Montenegro: 8 islands and 6 small rocky islands, 31 rocks and 4 crags on the level of the sea of the total length of the shore line of 25,6 km.
Surface of mainland parts in the sea is 565,17 ha or 5,65 km2, out of which Ada Bojana covers about 4,66 km2, island St Nikola 0,41 km2 and island St Marko 0,37 km2.

According to the data from the cadastre registry of the Directorate for Real Estate of the Republic of Montenegro and based on the values registered in TK 1:25.000 and ODK 1:5.000, total length of the mainland sea shore of the Republic of Montenegro is 288,2 km, (out of which the Boka Bay covers 105,5 km), length of the shore of islands is 25,6 km while length of the shore along the Bojana river which belongs to the Republic of Montenegro is 22,8 km, which means that total length of shores encompassed by the plan is 336,60 km.

	Shore length	size of island	shore total
H. Novi	59,47 km	1,25 km	60,72 km
Tivat	37,06 km	4,75 km	41,81 km
Kotor	67,25 km	0,51 km	67,76 km
Budva	34,67 km	5,98 km	40,65 km
Bar	44,10 km	0,14 km	44,24 km
Ulcinj	45,66 km	12,98 km	58,64 km

[1] MD – the Coastal Zone

total	288,21 km	25,61 km	313,82 km
+Bojana	22,80 km		22,80 km
All shores	**311,01 km**	**25,61 km**	**336,62 km**

Border and surface on the sea

Sea border of the coastal zone was determined by the Law on Territorial Sea and Internal Sea Waters.

Territorial sea covers 12 Nm (18.520m) from the basic line in direction to the open sea.

Basic line is the line of the lowest tide along the mainland shore and islands, that is, the straight line which closes enters in the bays. That line at the same time makes a border of internal sea waters.
That zone of the sea is a part of the state territory where the coastal country exercises its sovereignty except for the right to non-harmful passing through of boats with foreign flags.

Internal sea waters are the waters of Boka Bay except the part that belongs to the Republic of Croatia, waters of the bay Trašte, the bay of Budva and Spičansko-barski bay.
Sea border towards the Republic of Croatia starts from the bay St Nedjelja on the internal part of the semi-island Prevlaka of the Boka Kotorska bay and it goes south-west in the direction of about 230^{o} to the border of territorial sea.

(remark: this border is still a subject to the dispute between Croatia and Montenegro).

Zone of internal sea waters is determined in the following way: cape Konfin – south-western cape Mamula – cape Veslo - cape Žukovac – coastal line to the cape Platamuni – cape Mendra.
Sea border towards the National Republic of Albania starts from mouth of the river Bojana towards south-west at approximate direction to the border of territorial sea.

Surface of territorial sea framed in such a way is about 2.172 km2, while surface of internal sea waters is 368 km2. That means that the Republic of Montenegro disposes of sea area of **about 2540 km2** (data are obtained from Hydro-Graphic Agency).

The underwater, as a part of the coastal zone, represents a water (sea) area with its alive and unalive resources from the sea surface to its bed. That is economically a very significant area in sense of exploitation of its alive and unalive resource, scientific researches and utilization in sport purposes.

Underground includes sea bed and parts of the earth crust under the sea bed and the shore.
That is in economic sense a significant area in sense of exploitation of alive and unalive resources where the Republic of Montenegro exercises its right of exploitation. This is where researches for oil and gas are conducted.
Right to exploitation of the previously mentioned resources regarding to the sea bed, a coastal country may enjoys up to the border of epicontinental zone.

Epicontinenatal zone, based on the Convention on Epicontinental Zone covers sea bed and underground of underwater areas out of the border of territorial sea up to the depth of 200m and above that border to the line where depth of water from the sea bed allows exploitation of natural resources of sea bed and its underworld. Size of that area is**3.886 km2**

Time framework of the Plan

Time framework of this Plan, as a long-term strategic document, is to the year 2020 as a focused period at the end of which the Plan should be revised and verified.

Dynamics of development

Made in a complex manner, this Plan required a step by step process and a longer period of time to be developed:

I phase Defining methodological and information grounds, adoption of the Work Project
II phase Evaluation of spatial-planning and other documentation, definition of basic studies and their TORs
III phase Development of basic studies, making inventory of space and present state evaluation.
IV phase Development of Draft Plan
V phase Development of the Plan Proposal

Work team

Work team engaged in development of this Plan consists of highly qualified individuals and organizations specialized in certain topics and fields.

The idea was to gather all scientific and research potentials of Montenegro in a unique task completion. More than 50 scientists and specialists from our country have participated in the work conducted so far.

MonteCEP from Kotor (business unit of the Center for Urban Development Planning from Belgrade) and the Republic Agency for Urbanism and Design (RZUP) from Podgorica as task bearers have undertaken the responsibility for the organization and management over the whole project.

Bearer of preliminary works of development and adoption of the plan was the Ministry of Physical Planning, then Ministry of Living Environment and Physical Planning and in the final phase their legal successor, Ministry for Economic Development of the Republic of Montenegro.

Location of the Plan creation

Even though the head offices of the bearers of the Plan development are placed in Podgorica (RZUP) and in Belgrade (CEP), it was planned to conduct major part of works in all phases at the location of the Plan processing, that is, Montenegrin Littoral.

Having in mind positive experiences that arose during the processes of plans development, when local institutions and teams of specialists took their part, the

decision was made to establish head offices in Kotor where the "focal point" of this project was formed.

Cooperation in the Plan development

In the course of the Plan development cooperation was established with: authorized state organs (respective ministries), organs of local governance, specialized scientific and educational institutions, public companies and communal systems, hotel-tourist companies, health institutions and numerous business subjects.

In order to be operational in data collecting and in order to verify the proposed solutions for development of such a complex business, representatives of municipal urbanism services and urbanism agencies from Montenegrin Littoral were included.

Activities of the Plan development

In the first phase of work, the Work Project was made, which presented basic methodological basis of this Plan, its dynamics and structure of materials.

Constituent part of the Plan and its documentation are basic studies and a set of work papers which support each phase in a certain number. Each elaborate presents current stat of the observed phenomenon, review of potentials and limitations and proposal of measures for their removal. Work paper processes one of the topics which due to its specificity deserves a special treatment or it was not planned according to the previously determined contents.

At the beginning foreign experiences in costal region management were analyzed. Examples of Canada, USA, Denmark and Scotland were taken as sufficiently illustrative for different approaches in management and planning of coastal zones and maritime areas which could serve to the authors of this plan as a recommendation.

During the II phase all available plan documentation was collected and relevant urban services of all maritime municipalities and respective ministry provided support.
The analysis included: Spatial plan of the Republic of Montenegro (with changes from 1997), spatial plans of municipalities Herceg Novi, Tivat, Kotor, Budva and Ulcinj (municipality Bar does not have a spatial plan for municipality) as well as general urban plans of Herceg Novi (with partial changes), Tivat, Kotor (with partial changes), coastal area of municipality of Budva (with changes in the sector Budva - Bečići, while changes for the area Bečići – Buljarica are currently being made), Bar and Ulcinj.

Plan documents, developed thirty years ago – Regional spatial plan of the region of Southern Adriatic and General Urban Plan of Boka Kotorska, which set grounds for planned development and organization of this inshore area, have also been analyzed.
Plans of the area which directly lean on the Republic of Montenegro have been taken into account, which subsequently reflects on Montenegrin Littoral. This refers on spatial plans of the Republic of Serbia and Republic Srpska. Elements of the Strategy of long-term development of Croatia have been taken into account as well.

During the II phase of work, basic studies developed in 1995 were analyzed. These studies were made for the needs of Changes and Amendments of the Spatial Plan of the Republic, of the officially determined strategy on the Republic level, which refer to the area of agriculture and tourism, and materials which are currently in the phase of specialists and public debate, which being such, due to their character and comprehensiveness of the topic, could be used as input data for this matter. They present previous period during which the state status changed, ex state union disseminated and a severe economic crisis hit the country at the beginning of 1990s. Most of these phenomena found their place in presentation of basic activities. Special attention was paid to the areas most closely related to the problems of the coastal zone such as: global development, agriculture, tourism, maritime economy and bio-ecological economy and bio-ecological potentials of inshore sea.
These materials express basic goals and directions of the concept and development strategy of the Republic at the beginning of the III millennium along with presentation of basic trends of development so far, description of the state of affairs, available capacities and development constraints as well as potential attractive zones and locations of special interest for the Republic.
These studies and strategies show official stands of the state and its specialists, who were at the time engaged in this matter.

In the end of the phase II, programs were determined for 4 basic studies ("Natural resources and potentials", "Man-made resources and potentials", "Condition of the living environment" and "Economic study"), which could be used to make inventory list of the present state, and problems and potentials of this area would be analyzed.

Purpose of doing these basic studies was to analyze in more details certain key components of a spatial complex or some very significant problems and processes, to understand their characteristics, structures, factors of development and their positioning, development trends, and to view from those perspectives opportunities, needs, goals and options of future development.

Due to limited deadlines, work on basic studies imposed the need to conduct analysis of these phenomena through:
- global approach by using representative aggregate indicators
- partial synthesis of the results, researches, evaluations and projections, obtained from a bigger number of other studies whose results could have been synthesized, reduced to requirements setting in sense of spatial units and time cross—sections.
- use of information from statistics and valid and current documentation.

Essence of the applied method lies in synthesizing comprehension of natural and man-made potentials and concept of sustainable development along with emphasizing importance and role of the coastal region in a long-term development of Montenegro, not only for present but also for future generations.

Special attention was paid to economic valuation of space and the concept of sustainable development which imposes itself as the only right direction of development with respect to extraordinary spatial specificities of local sea waters and coastal zone as units of a unique whole of the Coastal Region, but also in light of the decision of Montenegro to be the first ecological state.

Synthesized survey "Review and evaluation of the present state of the Coastal Zone of Montenegro" was the final material of the III phase of work on the Spatial Plan for the area of special purpose of the Coastal Zone.
Purpose of this survey about the present condition of mainland and seawater portion under the Coastal Zone was to provide a quality base for development orientation and mechanisms of protection and implementation of planning grounds, specially having in mind conflicts of interests, investors pressures, lack of clear public awareness about the importance of space and a very present practice of usurpation, illegal construction, and devastation of area, which has unfortunately already infected the whole Montenegrin Littoral.
Third phase of the Plan development included terrain inspection and making inventory of the present state, and also interviewing a number of specialists and experts well familiar with potentials and problems of the Coastal Zone, a contact zone and areas of coastal municipalities.
The idea was to get the Plan developers familiar with the issues related to the so far conducted individual activities and with perspectives and directions of their development.
All the meetings were held in organization of the Ministry for Spatial Planning of the Republic of Montenegro and Public Company for the Coastal Zone management.
In the following period a set of interviews was conducted as well as consultations with numerous specialists and representatives of the state bodies, public companies and organizations etc.

Draft Spatial Plan for a special purpose for the area of the Costal Zone of Montenegro represented the fourth - penultimate phase of the process of development and completion of the final plan document. It was made as a synthesized presentation of published researches, accepted opinions and recommendations provided during work in previous phases, and expressing well known and official decisions of the Republic of Montenegro and coastal local governance units about the Strategy for spatial development and planning for the area of the Coastal Zone. It was defined as such in July 2001, after the respective ministries had provided their opinion, and after the team of specialists of the Faculty of Civil Engineering had revised it.

In the course of the Draft Plan development, during its review and in standpoints of the Plan orderers - Ministry of Spatial Planning and the Public Company “The Coastal Zone” ("Morsko dobro"), it was pointed out that some zones and locations within the Plan coverage have to be elaborated in details. Zones and locations of importance for realization of the Plan, which enable realization of investments of interested investors, which are not subject of property issues (this mainly refers to the state property zones), and which are coordinated with decisions of the Master Plan for tourism, are proposed for detailed elaboration within the Spatial Plan.
Conclusion of the Government of the Republic of Montenegro on detailed elaboration (January 2002) recognizes seven locations - Njivice (Herceg Novi municipality), Solila and Kalardovo (Tivat municipality), island Sveti Nikola (Budva municipality), Maljevik and Utjeha (Bar municipality) and Velika plaža (Ulcinj municipality).
Government of the Republic of Montenegro adopted extension of basic ToR with detailed elaboration for seven locations in August 2002. Cadastre and geodetic grounds were developed on for about 18 months and detailed elaborations were carried out in 2004.
Draft detailed elaborations were completed in August 2004 after the respective ministries had provided their opinion, and team of specialists of the Faculty of Civil Engineering had revised them.

A comprehensive Draft Spatial Plan for the area for a special purpose for the Coastal Zone of Montenegro with detailed elaborations for seven zones and locations was after being approved by the Government of the Republic of Montenegro was forwarded to the Parliament of the Republic of Montenegro which adopted it on December 27, 2004 and forwarded it to a further procedure, that is, to public debate.

In the period from January 21 to February 21, 2005 public debate was organized during which the offered Plan document was made available for users of the area – local governance, citizens, legal entities, potential investors and NGOs when they expressed their opinion, suggestions and objections, which were forwarded to 6 coastal municipalities, Ministry of Living Environment and Physical Planning and to the Public Company for management of the coastal zone of Montenegro.
Public debate is the opportunity to identify some other zones and locations as the areas of special interest and to recognize some new investment initiatives.

Actions taken in line with objections of the specialists commission and public debate conclusions were the opportunity to include in the final survey of the Plan new legal solutions and elements from numerous strategic documents and master plans adopted in the past years or whose development is underway, including the study grounds for the new Spatial Plan of the Republic (developed in 2005).

PART ONE – CURRENT CONDITION ASSESSMENT

(Note: The information in this part of the Plan are renewed with the end of 2005)

1.1. Natural Characteristics, Resources and Potentials with Development Possibilities

1.1.1 Geological and Geoseismic Characteristics

Lithosratigraphic Composition and Tectonics of the Terrain

Montenegrin Littoral belongs to the southeast part of the external Dinarides, which are characterized by very complex geological and tectonic structure. Therefore, the structure of the terrain in the borders of the Coastal Zone is shown in accordance with the lithologic and paleofacial features of individual members within separated geotectonic units in the area of the Littoral, i.e. Parautochthonous, the area of Budva, and the area of Visoki krš.

Geotectonic unit of Parautochthonous comprises the parts of the Littoral west of Herceg Novi, and Mrčevo and Grbaljsko Polje (the field of Grbalj), Luštica and Donji Grbalj, as well as the area from Bar to the river Bojana, i.e. the area between the sea and the tectonic unit of the area of Budva or the area of Visoki krš. Carbonate sediments of the Upper Cretaceous (Maastricht) and foraminiferal limestone of the middle Eocene, flysch sediments of the middle and upper Eocene, and sediments of the middle Miocene are included in the composition of this unit.

The sediments of the Upper Cretaceous, developed in Košara near the bay of Herceg Novi, at Luštica and Donji Grbalj, in the vicinity of Valdanos, as well as at Možura and Briska gora, are shown in grey, whitish and brown and yellowish limestone, lime and bituminous dolomites, dolomite limestone, marly limestone with interbeds and cherts, carbonate breccias and breccias' limestone. These lithologic members are mutually replaced and they gradually pass from one into other. Limestone contains significantly rich micro fauna (*Accordiella conica, Rotalina cayeuxi, Microcidium elegans, Lapeirouseia crateformis,* and the like) and meager macro fauna.

Foraminiferal limestone of the middle Eocene, developed at the south west edge of the Sutorina, Kumbor gorge, Grbaljsko and Mrčevo Polje (fields of Grbalj and Mrčevo), as well as at the edge of Briska gora and Valdanos, are represented by stratified grey and whitish, yellowish and rosy limestone that has detrial structure. They lay in the base of upper Eocene flysch, transgressively through Maastrichtian limestone and dolomites and through smaller appearances of bauxites as well. The following microfossils appear: *Orbitolites complanatus, Nummulites aturicus, Discocyclina discus, Pallatispira madaraszi, Alveolina sp. and the like*. The depth of the limestone is between 30 and 40 m.

Flysch sediments of the middle Eocene are found in Grbaljsko and Mrčevo Polje and in Sutorina, and are represented by clay, marls, and sandstones with intercalations of breccia and conglomerates. Middle Eocene fauna was determined in micro breccias and coarse-grained sediments of flysch series: *Nummulites laevigatus, N. millecaput, N. atacicus, Disciciclina sp.,* etc.

Typical flysch series of the upper Eocene, built up from sandstones, greywacke, calcarenites, marly clay and conglomerates are found at the same sites as well as the limestone of the middle Eocene. In the area of Bar and Ulcinj they contain numulites out of fossils, the remains of hedgehogs (*Conoclypeus sp.*) and rare shells *(Phalodomya),* then *Globigerina triloculinolides, Gl. eocaena, Turborotalia centralis* and the like.
The sediments of the middle Miocene comprise the area around Ulcinj, the hills Pinješ and Mendra, and are found at the island Krš Đeran. The lower part of Miocene is made up of sands and grey and brown sandstones, which are transgressive and discordant through Cretaceous and Eocenic limestones or flysch sediments of Eocene. Fine-grained sands and sand clay with lenses of sandstones are above the mentioned sediments. The upper part of series is represented by lumpy limestones (lithotamnium limestones), rich fossils, among which the following spieces are determined: *Lithotamnium adriaticum, Cytherea multi, amella, Ostrea crassisima, O. digitalina* and the like.

The tectonic unit of Parautochthonous is characterized by general fall of all formations towards northeast, with slight and medium angles of fall, although folded structures of synclinals and anticlinals of small dimensions with southwest vergence are spotted, such as anticlinals in the area of Oštri rt, Volujica southeast of Bar, as well as in the system of pine tree in the area of Možura, Briska and Bijela gora, north and northwest of Ulcinj. It should be particularly pointed out the flysch of Eocene, which is here and there intensively collected in squeezed and inverted metric folds with southwest vergence. Of rupture deformations, normal longitudinal faults are significant.

Geotectonic unit of the area of Budva, leaning at the area within Parautochthonous, comprises the narrow zone between Sutorina at northwest and the river Bojana at the southeast. It builds the coast from Budva to Sutomore, where it is below the sea. Carbonate and eruptive rocks of Mesozoic, and Anisian and paleogenic flysch participate in its composition.

Triassic creations, which occupy a substantial space of this geotectonic unit, are very different from facial and lithologic standpoint. The lower Triassic, Anisian and Ladinian floor of the middle Triassic and the upper Triassic are paleonthologicaly determined. Volcanic rocks are present besides sedimentary rocks.

Lower Triassic sediments are discovered in the area of Čanj, and are represented by the sandstones, marls and slates. The following are found among others in these sediments**:** *Clarai clarai, Anodontophora (Myacites) fassensis, Turborecte-costatus, Naticella costata, Gervilia cf.* and the like.

The Anisian floor of the middle Triassic is represented by flysch, limestone, and volcanic rocks. The flysch sediments that are discovered in the area from Bijela to Čanj and in narrow zones along almost this entire geotectonic unit is developed by the series of flysch, which comprises conglomerates, sandstones, sandy

and clay limestones, aleurolites, marlstones and calcilutites. *Spiriferina fragilis, S. microglosa, Rhynchonella decurtata, Terebratula,* and the like are known from the Anisian macro fauna, and Meandrospira *dinarica, Frondicularia woodwardi, Pilammina densa, Glomospira articulosa* and the like are known from micro flora. Limestrones determined in the area of Bar and Sutomore, Petrovac and Budva, normally lay over the Anisian flysch, which is covered with the limestones of the Ladinian floor. These are stratified, banked to massive, solid, detrial, organogenic-detrial and breccia limestones. Their age is determined based on the microfossils. The volcanic rocks, separated in more sites are shown as breaches in lower Triassic and the Anisian flysch.

Andesites, which are discovered in the area of Sutomore and Šušanj, are grey, green, dark green, grey and whitish. Their composition is chlorine crystal and porphyry and are made of plagioclast and colored minerals as important components. Diabases that are discovered in the area of Bečići, appear between the Anisian flysch and Ladinian flaky cherts and tuffits. These are massive rocks or they appear in the form of "pillow lava". They are dark grey and dark green. They are made of plagioclase, pyroxene and olivine.

The Ladinian floor of the middle Triassic, which appears in the form of narrow zones, is represented with facies of volcanogenic and sedimentary series and facies of carbonate sediments with interbeds and cherts. Volcanogenic and sediment series is found in the area of Budva and Bečići. It is comprised of: diabases and porphyries, tuffs and tuffites, volcanic breccia, cherts, marlstones, sandstones and flaky limestone in the highest parts. All of them are changed upwards one after another, and formation of diabases and porphyries is synchronized with the depositing of sediment members of this series. Sedimentary carbonate facies, i.e. stratified flaky limestone and cherts appear in Čanj and Sutomore. They are marlstones, grey, greenish, grey, and whitish sandy and detrial limestones with interbeds and cherts. This facies of limestone is above the volcanogenic-sedimentary series and belongs to the lower part of the Ladinian floor. The following is present out of macro fauna: *Posidonia wengensis, Daonella lomelli, D. pichleri,* then lituolides, ostracodes, codiacea and the like.

In some parts of this geotectonic unit was not possible to separate sediments of the Ladinian floor from the sediments of upper Triassic, so both are treated as one stratigraphic unit called middle-upper Triassic. This series of carbonate sediments, which is developed in long broken zone from Herceg Novi to the bay of Čanj, lays normally over the Anisian flysch, Anisian limestone, volcanogenic-sedimentary series of the Ladinian floor or it is reversely moved through paleogenic products. The series is build by stratified to banked grey limestone, often followed by banks of dolomites, breccia, and biocalcarenite. Cherts appear as interbeds, smaller lenses or they appear as thin zones in limestone. The following fauna is noted, inter alia, in the series: *Vidalina martana, Neoendothyra reicheli, Ophalmidium sp., Cristelaria sp., Textularia sp., Thaumatoporella parvovesiculifera, Codiaceae, Bacconella floriformis,* and the like.

The Jurassic sediments appear in the form of narrow zones and long broken zones, in the same sites as the sediments of the middle-upper Triassic age. These sediments have significant facies diversity in some zones, which points to different conditions of sedimentation or creation of the series of different limestone-silicate and dolomitic rocks, which are sometimes often laterally changed. In the area from Sutomore to Bečići reddish to black, thin layered and flanky limestone with cherts change mutually. Smaller lenses of limestone, micro breccia and aleurolitic marlstones appear occasionally. From Verige to Kameno (north of Herceg Novi) massive and banked dolomites and dolomitic breccia appear more frequently, with occasional appearances of banked limestones and cherts. Paleontologic content of sediments is characterized by the following: *Involutina liassica, Vidalina martana, Protopeneroplis striata, Kurnubia palastiniensis, Bačinella irregularis, Clypeina jurassica* and the like.

Cretaceous sediments, found in the areas where the Jurassic sediments are developed, appear as zones, but occasionally and relatively long areas, in northwest and southeast. The sediments of the Lower Cretaceous are characterized by the significant presence of silica rocks that are comprised of cherts with lenses of organogenic and detrial limestone or organogenic breccia and micro breccia. The Lower Cretaceous is developed in the area of Budva, Sveti Stefan, and Petrovac, on the facies of radiolarites, and it includes partially fine marly limestones with interbeds and cherts. The thickness of the sediments is approximately 30 m. The sediments of the upper Cretaceous are separated in three groups of sites along the whole hinterland of Montenegrin Littoral: from Budva to Čanj, wider area of Verige and northeast slopes of Vrmac, as well as in the part of terrain between Čanj and Bar. The sediments in these sites are characterized by classical limestone and silica series. They are presented by pelagic limestone with interbeds of limestone, micro breccia and breccia, which contain numerous orbitolines, and younger parts contain orbitoline-siderolitic association.

The sediments of Cretaceous and Eocene or Cretaceous-Palogenic age near the bay of Morinj at the northeast slopes of Vrmac, as well as in the hinterland of Budva, Sveti Stefan and Petrovac are gradually developed from the sediments of the upper Cretaceous (Senonian) age, so that the Danish floor, Paleocene and Eocene are separated as one geological unit. Several meters of marly sediments with pelagic fauna *Globorotalia pseudobulloides* and the like belong to the Danish floor, and they gradually move to the flysch of Paleocene and lower Eocene, which represents the characteristics heterogeneous series with frequent and fast changes of coarse-grained to the finest grained clastic rocks.

The sediments of the Paleogenic, which were discovered in the part of the terrain southeast of Čanj, are represented with paleocenic-eocenic flysch facies, which includes sandstones, marlstones, cley, marlies, sandy and detrial limestones, breccia and conglomerates. The series characterizes substantial presence of the carbonate component based on the sedimentary characteristics. The following is found out of Paleocenic micro fauna: *Operculina sp., Coskinolina*

sp., Alveolina sp., Discocyclina seunesi and the like, as well as lower Eocene species: *Nummulites bolcensis, N. nitidus, N. partschi, Assilina granulosa* and the like.

The tectonic unit of the zone of Budva can be followed from Sutorina, through Verige towards Budva. From Budva to Bar, the front of this unit through Parautochthonous is in the sea, and from Bar, this unit goes towards east. The zone of Budva was moved through Parautochthonous along the reverse dislocation.

The composition of this tectonic unit is extremely complex. Generally, the strike of layers and axis of folds is Dinaric, although there are bendings that significantly deviate from this direction. The intensity of disturbance also changes along the strike. In the northwest part, two flexures of Mesozoic and Paleogenic sediments are separated by the reverse faults. In the northeast thrust of the mentioned fascia there are no plicative distortions, while the inverted synclinals and anticlines with southwest vergence are noted in the southwest fascia, which vanishes along the strike. The Mesozoic and Paleogenic sediments around Budva are folded in several parallel inverted anticlines and synclinals, which moved one across the other towards southwest.

From Budva towards Bar, there are folded and ruptured tectonic forms. In short, the whole area of this tectonic unit has very imbricate structure, with southeast vergence of axial flats and overthrust nappe.

Geotectonic unit Visoki krš participates in the composition of the terrain of the mountain hinterland from the bay of Morinj, towards the bays of Risan and Kotor, although it has significantly higher regional importance and spread. Carbonate sediments from shallow water of Jurassic and Cretaceous age participate in its geological composition, as well as carbonate breccia of Craterous-Eocenic age and flysch sediments from middle Eocene.

The Jurassic structures are presented with carbonate sediments of middle and upper Jurassic age. The sediments of the middle Jurassic age, from lithologic standpoint, are very similar to the upper Jurassic, but they are poor from the fossil composition standpoint, which hinders their separation. These limestones are massive and contain corals, bryozoa, crinoides and sponge. The following species are determined among others in corals: *Montlivaltia cf. greppini, M. dilatata, M. cf. subcompressa, Stilosmilia aff. corallina* and the like.

Cretaceous sediments that are discovered in the direction from the bay of Morinj to the bay of Risan are presented with sediments of lower and upper Cretaceous. The sediments of lower Cretaceous are presented with yellowish, grey, and white banked, sometimes weakly stratified and massive limestones and dolomites, which are frequently poor regarding the composition of the fossil remains. In the lowest horizons of the lower Cretaceous there are tintinines (*Campbelliella milesi*), miliolides and the like, then nerineas (*Ptygmatis bruntrutana, Ptyg. carpatica,Nerinea lobata)*, and in upper part the series of pachiodotus shells–requiendis are found. The sediments of the upper Cretaceous are shallow water structures represented by limestones, dolomites, and breccia. These structures are Cenomanian, Turonian and Senonian age. The sediments of Cenomanian stage are presented by grey and yellowish stratified and banked limestones with miliolides *Nummoloculina heimi,* gastropodes and requiendis or often without clear tracks of fauna, as well as yellowish pseudolitic limestone with abundance of miliolides, orbitolonid, and various alga, rarely replaced by dolomites and limestone in upper part of the Cenomainan series. The sediments of lower Turonian are presented with change of dolomites and stratified limestone, and in upper parts with stratified limestone with abundance of chondrontonts, rudists and requiendis. The middle Turonian is build by the banked and massive sandbar whitish limestone that contain requiendis and small gastropodes, rare miliolidea, then caprinidis, radiolitides and echinoderm. Layered limestone of brown to yellowish color are through massive limestone of middle Turonian with the association of rudists: *Hippurites resectus, H. libanus, Biradiolites angulosus* and the like. The Senonian sediments, which were developed in the area of the bay of Risan are presented exclusively with limestones. Based on the fauna that was found, these limestones lack higher parts of Maastricht, the part that would correspond to the change of dolomites and limestone, with other profiles. Above these sediments, there are transgressive flysch of middle Eocene.

Paleogenic sediments in this area are represented by walnut breccia and flysch sediments of the middle Eocene. Various limestones of Jurassic and Cretaceous age are included in the composition of walnut breccia that appear from the bay of Risan to the bay of Kotor. Most frequently these are pre-settled blocks that have significant dimensions. In the basalt part of these breccia there are layered limestone with numerous rotalides, then globigerinas and globotruncans of Danish and Paleocene age. Paleocenic-eocenic globorotalides are found in the cement of breccia, and numulites that are probably from middle Eocene are found in the highest part of breccia. Middle Eocene, developed in the flysch facies which is build by conglomerates, micro conglomerates, greywacke, sandy marlstone and clay is slightly represented in the area of Risan. Middle Eocene foraminifers are determined in the lowest parts of the horizon of coarse clastic rocks, which are found over the breccia of Maastrichtian age: *Nummulites laevigatus, N. partchi, Assilina granulosa, Discocyclina sp., Alveolina sp.* and the like*.*

Quaternary structures are developed at the whole territory of the Montenegrin Littoral, independently from the area of separated geotectonic units. They occupy significant area, and are represented by alluvial and delluvial structures as well as sandy beaches.

Alluvial sediments are developed in the valleys of lower courses of permanent and occasional watercourses. The areas of Tivatsko and Mrčevo polje, Budvansko, Barsko and Ulcinjsko polje are specifically emphasized, where the sediment is built of pebbles, sand, mud, and sandy clay, or from materials that build basins of individual watercourses.
Delluvium appears almost at all mountain slopes, usually beneath steep limestone skerries. It is made of carbonate rocks. The detached pieces of these rocks are not rounded and they significantly vary in size.

Drifts of beaches are relatively frequent throughout entire coast of Montenegrin Littoral. These mostly sandy, and frequently pebbles and sandy beaches appeared on the sites where the sea broke through soft rocks and built up a suitable space for accumulation of products of its erosive work.

The tectonic unit Visoki krš was dragged over the tectonic unit of the area of Budva. The route of dragging has Dinaric direction, with significant deviations and bends. It is visible west of the bay of Morinj where it goes on towards east and southeast beneath the sea. From Boka Kotorska, and further towards southeast, the line of dragging in the form of steep slope can be followed along entire Montenegrin Littoral. The main characteristic of this unit are the intensive faults where they are mostly vertical and have different directions, so that in some parts they form hardwood strip structure.

Seismicity

Data related to the statistical processing of earthquakes at the territory of Montenegro point to very high seismic activity of the area of Montenegrin Littoral. This activity is genetically connected not only to the evolution of different structures but to physical features of geological environment, i.e. to the position of deep ruptures.

Reinterpretation of geophysical, geomagnetic and gravimetric data, as well as the result of deep seismic sounding resulted in the Seimic-tectonic map of Montenegro, with the position of seizmogenic zones, which emphasizes five deep regional faults. For the area of Montenegrin Littoral the fault called “coastal” is important, which continues from Ulcinj through inland part towards northwest. The depth of the earth’s crust is 34-40 km northeast of this fault up to the border towards the fault of Zeta and Niksic.

It has been determined that the seismicity of the coastal area is genetically connected with the movements of blocks in this part of the crust, which are formed after the main stage of the folding of the Dinarides (Laramie Tectonic phase), as the consequence of permanent subductive activity of the Adriatic mass in the border zone towards the Dinarides. To wit, the tectonic fillets are the most active seismically, or zones of deep faults which are active in longer periods.

The complex review of the obtained data point to the existence of several seismoigenic zones, of which those to the southeast part of Montenegro are most important for the coastal area, i.e. zone of Skadar, zone of Ulcinj and Budva. Strong earthquakes occur in the mentioned zones, which maximum intensity ranges approximately 9^{o} MCS scale.

Based on the Seismic Regionalization Map (1982), Montenegrin littoral is within the limits of 9th main seizmic level (MCS scale) in the conditions of the medium soil. The fact that the area within the Coastal Zone and direct hinterland is mostly built of flysch, clastic sediments and quaternary structures, represent great unfavorablesness from seismic risk standpoint.

This is important for the majority of urban areas. Since they are formed at the alluvial soil (clay, sand, pebbles), which is saturated with water or with subterranean water at the level less than 5 meters. Such soils represent extremely seismically adverse environment, bearing in mind possible appearances of liquifaction (running of soil), which occurred in the destructive earthquake in April 15, 1979.

Besides the above mentioned, and bearing in mind that the acceleration is the measure of effects of destructive power of earthquake and as such depends on several natural phenomena, we will give some basic data and one hypothetical generalization.

The earthquake that occurred on April 15, 1979 pointed maximum value of acceleration of soil oscillation from Ulcinj to Petrovac, which ranged within limits from of 0.49 g to 0.21 g. To the northwest, in Herceg Novi, and to the northeast, this value dropped.

The measurements of seismic parameters at three locations, immediately after the main earthquake in Petrovac, Bar and Ulcinj gave important data for general review of seismic hazard.

	Maximum acceleration (cm/s2)	maximum speed (cm/s)	maximum movement (cm)
Petrovac	440	40	11
Bar	370	43	11
Ulcinj	260	42	12

The acceleration depends from the magnitude and hypocentral distance, composition and orientation of the geological structures, the position of building facilities on them and other factors, so that the previous data should be considered general for the projecting needs and building of facilities in the area of Montenegrin Littoral.

1.1.2. Geomorphological Basis

General View of the Relief

Lithological structure, geotectonic structure, and erosion activity of the exogenetic agents caused the formation of several relief entities at the territory of Montenegro. Among them, the area of Montenegrin Littoral is clearly separated, which ranges from the foothill of the high mountain massifs of the Orjen (1895 m), Lovćen (1749 m), Sutorman (1175 m) and Rumija (1595 m), from Sutorina, west of Herceg Novi to the river Bojana. Due to the vicinity of the mountain range, which sides steeply go towards the coast, the width of the seashore varies. It is the largest at its furthest parts, in the area of Boka Kotorska and Ulcinj where it reaches approximately 10 km, while in the middle part, in the area from Budva to Barsko polje (field of Bar), it does not exceed 2 km.

The relief of Montenegrin Littoral, pre-determined by the diversity and complexity of its geological composition and terrain structure is very dynamic with sudden hypsometrical changes in relatively small area.

From cape Oštro, at the entrance to Boka Kotorska, to the mouth of the river Bojana, the composition of rocks reflects the appearance of the shore. Bays, gulfs, and coves are created in soft clay sediments, and cliffs, undercuts and caves. Reparian terrace extends along the shore, which spreads on the part of the terrain that

is built of soft rocks. Extremely deep break through of the sea into the land is the bay of Boka Kotorska, which represents the most complex part of Montenegrin Littoral from relief standpoint.

Boka Kotorska consists of several narrowings and widenings. From the entrance, between peninsula Luštica and cape Oštro, width 1500 to 2950 m, to Kotor, there are the bay of Herceg Novi, Kumbor gorge, the bay of Tivat, Verige gorge (width 340 m), the bays of Morinj and Risan and the bay of Kotor. Two parallel hill lines that go between the sea and high mountain hinterland make peninsula Luštica (585 m) and its extension over the entrance in Boka - Oštro (65 m) and Kobila (454 m), built primarily of limestone and dolomites of the upper Cretaceous, as well as Vrmac (712 m) and its extension, from the other side of the gorge Verige - Devesilje (775 m), are built of Mesozoic limestone, cherts, breccias and dolomites. The zones of paleogenic flysch of different size appear between the hill slopes of high mountains and mentioned lines. The shores of the Bay built of limestone are steep and those built of flysch are slightly inclined sinking gradually under the sea. The following have features of plains: Sutorina, small Kutsko polje (Kutsko field) in the hinterland of Zelenika, surroundings of Morinj and Risan, Škaljari near Kotor, surroundings of Tivat, and Grbaljsko and Mrčevo polje between Tivat and the beach Jaz, which is the largest complex of flat terrains in the area of Boka. The bottom of the Bay, in the depth of 30-40 m, is inclined towards the exit to the open sea. The complex structure of the Bay is formed probably in Miocene and Pliocene, when this was land, by denundation, and fluvial erosion at the flysch, and intensive corrosive processes at the contact of flysch with limestone, since only after the Pleistocene the sea level increased by approximately 100m.

Peninsula Luštica, built of banked and layered limestone, and rarely of dolomites of upper Cretaceous in the middle part have the character of rolling plateau with several hollows and valleys.

Contrary to the poorly jagged coastline in the bay of Boka, the coastline of Luštica in the open sea is represented by numerous capes, coves, and ports. The jagged part of the coastline of Luštice is the bay of Trašte with several sandy and pebbles' beaches that resulted from the bottom of some coves. The area of Donji Grbalj, further towards southeast, based on general characteristics of the area and coastline, is similar to the area of Luštica.

From the cape Plantamuni, west of Budva to the peninsula Volujica, south of Bar, there are no limestone terrain of upper Cretaceous age, which belongs in geotectonic view to Parautochthonous. Breaking and sinking of this part caused that this part of the coastline is made of numerous capes, small bays such as bays of Budva, Sutomore and Bar and large number of coves and ports. Capes along the coastline, hills, among which the dominant ones are Spas (385 m) west of Budva, Dubovica (312 m) between Buljarica and Čanj and Veligrad (497 m) between Čanj and Sutomore, and series of hills and small hills and low crests are built of carbonate sediments. The other area of this narrow zone of the Littoral is built of clastic rocks, most frequently paleogenic flysch. The most significant plains originated from these sediments, such as Budvansko polje, plateau of Bečići, plain around Petrovac, Buljarica, Čanj and Sutomore, along which are formed spacious sandy and pebbles beaches. The beaches are formed also at some other smaller area, where flysch was represented along the coastline.

The Littoral area from Bar to the river Bojana is characterized by the series of four reefs, which spread from the sea to the mountain Rumija in the direction northwest – southeast in the form of small overthrust nappe. These are reefs formed by Mendra and Pinješ, Mavrijan and Bijela gora, and Možura and Briska gora in the area of Ulcinj, and Volujica in the area of Bar. Leveled parts of the ground built of the paleogenic flysch appeared between these hills that are built of limestone of the upper Cretaceous. Along the coastline are steep capes, between which there is Barsko polje with Port of Bar, well protected Volujica from strong waves caused by south wind, gulfs Kruče and Valdanos, and piers and city beach of Ulcinj, which ends in sandy and pebbles beaches. At the furthest southeast part of this segment of the coastline is spacey plain of Ulcinjsko polje, including Ada as well, a triangle island between the river Bojana, its branch, and sea. One part of Ulcinjsko polje (field of Ulcinj) includes Port Milena and saltworks of Ulcinj, while the contact of the field and sea is represented by sandy beach Velika plaža, which is long 12 km together with the Ada beach.

Further to the north, there is Brisko polje between the Briska gora on the north side of Ulcinjsko polje and Šasko brdo. In the east, lower part of the field is Šasko jezero, which is connected with the river Bojana by the channel.

Geomorphological Structure of the Wider Area

The determined genetic types of relief, which characterizes geomorphological structure of the wider area of Coastal Zone are fluvial-denundation, fluvial-accumulation and naval relief.

Fluvial-denundation relief, is characteristic for the slopes of approximately 30^0 or higher, is formed on water non-permeable rocks from cretaceous-paleogenic and paleogenic flysch of geotectonic unit of the zone of Budva. It is represented by steep slopes, escarpments, river valleys in the form of "V", narrow and pointed or rounded reefs, numerous ravines and torrents, separated within the special zones from Igalo, through Boka Kotorska, Budva and Bar to Ulcinj. Strong denundation and erosive processes in this genetic type of relief emphasized also by seismoltectonic events resulted in numerous forms of movements of mass (landslides, rockslides, and slides), appearances of piracy and turning of water streams.

Fluvial-accumulation relief, as a result of erosive, corrosive and denundation processes in the river beds, appears at the locations where the transport power of streams weakens, or where the formation of alluvial accumulation plain begins. This type of relief belong also ditch plains, which resulted from the action of fossil lake and fluvial genetic type.

The most characteristic parts of the fluvial-accumulation type of the relief are the areas of Grbaljsko and Mrčevo polje, area of Budvansko polje (field of Budva),

Buljarica and Barsko polje, as well as the area of Ulcinj (Špatula). Grbaljsko polje is accumulative plain in a form of ditch that shrinks in the southeast direction, filled with alluvial material and erosive with river course of the Koložun. Water channels are made in the lower part of the field. Mrčevo and Budvansko polje represent smaller accumulative plains that move towards sea into beaches. Occasional watercourses in Budvansko polje created inundated cone in seabed, in which they egravated its basin and formed narrow zone of sediments a “shallow sea” or a “path” to the island St. Nikola. Buljarica is accumulative plain, opened towards the sea with swamp structures found immediately behind the beach. Barsko polje, originated in neotectonic depression, filled with alluvial sediments where are engraved occasional watercourses formed in flysch back. Periodical flooding of the field is regulated by the channel system. Ulcinjsko polje represents alluvial plan in which is situated brackish Zoganjsko jezero mostly under saltworks Solana. For the purpose of preventing occasional flooding of the field, a protective levee was built along the river Bojana. In its lower course, the river Bojana cut the beach Velika plaža, and it created an island by meandering, and in the sea, it created relatively wide delta.

Karst relief is formed at easily dissolable carbonate rocks of Triassic, Jurassic and particularly Cretaceous ages which were karstified in longer period by corrosive processes. Its largest diffusion is in the area of Luštica and Donji Grbalj, Volujica, then Možura, Mavrijan and Bijela gora, as well as Mendra. The main characteristic of this relief is the appearance of numerous funnel-shaped depressions, slopes, scarce depressions and well-developed valleys between which are usually narrow and sharp reefs.

Naval relief originated by the activity of abrasion and accumulation processes in the contact of the sea and the land, where the abrasion forms, by number and diversity prevail in relation to the accumulation forms.

Abrasion forms, which are characteristic for rocky coastlines at the open sea, are built of clastic rocks of tertiary flysch and carbonate sediments of Triassic, Jurassic and Cretaceous age, which form cliffs with certain cuts. Typical cliffs are separated at the coastline of Luštica and Donji Grbalj, in the cove of Jaz, near Budva, between Bečići and Sutomore, and from Bar to Ulcinj. Besides sea erosion, the movement of mass and faulted neotectonic influenced on the creation of abrasion forms, which points out that the majority of coastline relief is of polymorph genesis.

Accumulation forms are represented by sandy and pebbles beaches and isthmus Sv. Stefan. Piedmont cones and surfaces that originated along low coastlines from non-consolidated material which is built of alluviums, are represented by beaches and isthmus of Sv. Stefan. Larger sandy and pebbles beaches are in the bay of Trašte, cove of Jaz, Budva, Bečići, Petrovac, Buljarica, Sutomore and Bar, while smaller appear between Bečići and Petrovac, and between cape Volujica and cape Mendra. The beach Velika plaža near Ulcinj, with fluvial plain in the hinterland, is built of fine-grained sand, which originated from ophiolitic zone in the basins of tributaries of the Skadarsko jezero. This material, which was brought by the river Bojana in the littoral part of the sea, the energy of the seawater retransported and accumulated to the low coastline at the beach. The wind also influence on this movement. Some of these processes can be observed every day.

Forms of movement of masses, as contemporary appearance, are present in the hinterland of the area that borders the Coastal Zone. Landslides are largely observed in the terrains built of clastic flsych structures, while moved blocks rarely appear and they are observed in the area of Verige.

1.1.3. Mineralogy and Energy Potentials

Thanks to long range geological researches at the territory of Montenegrin Littoral, numerous appearances and deposits of mineral raw materials are discovered, among which are represented energy, metallic and non metallic raw materials, construction materials, underground mineral and drinking waters, and the sea slat is also produced.

The appearances of oils and gas in seabed are important for the area within the Coastal Zone, deposits of Ulcinj sand and spring of thermo mineral waters in Igalo and in the area of Ulcinj.

Coal appearances, determined in the area of Pistula-Zoganje, in the hinterland of Ulcinj, are small depth; therefore they were not interesting for investments in further researches and possible valorization.

Oil and geological researches that began in 1951 at the land and later they began in seabed, resulted in **appearances of bitumen, oil and gas**.

The discovery of gas deposits in the series of middle tertiary limestone and conglomerates in Buljarica has not commercial value but it is significant as an indicator of possible presence of oil and gas in this location. The results of deep-sea drillings for oil, from five deep and four shallow holes near Ulcinj show that there are smaller appearances of hydrocarbon in upper Eocene flysch (the appearances and trails of gas, asphalt and bitumen), in middle Eocene limestone (trails of bitumen, hydrogen sulfide and sulfur) and in carbonate sediments of upper and lower Cretaceous and anhydride (appearances of viscose bitumen and oil). All of the mentioned appearances are shown in cracks or broken zones, which tells about their epigenetic character. Two appearances of bitumen are found at the deep research hole in the area of Luštica, in the immediate hinterland of Zlatna luka, but these and some other data cannot serve as the basis for reaching conclusions on oil-geological possibilities of Boka Kotorska.
The researches of oil and gas in seabed comprised the development of approximately 10 000 km of seismic profiles and realization of four research holes. One of these holes is liquidated due to the technical reasons; two did not reach main facilities of research, while the fourth hole discovered mobile oil, which represented the first discovery in seabed. Later researches showed that this was non-commercial deposit, due to the depth of the water of 320 m, and that the additional research drillings are needed to establish if the deposit is commercial.
The results of recent researches, at the land and in the seabed, show that there were fair conditions for

formation of hydrocarbon. Such expectations support recent discoveries of oil in Italian south part of the Adriatic basin, as well as long range exploitation of oil in the land of Albania. The main reasons why commercial amounts of oil have not been discovered so far in Montenegrin Littoral lay probably in the extremely adverse relation of the volume of seismic works and the number of performed drills, as well as the number of potential facilities that should be tested by researches drilling.

The appearances of bauxite are found from the village Žvinje, through Luštica to Grbalj, and towards southeast from Bar to Ulcinj. (In the foothill of grey, yellow and red oolitic and pisolitic bauxites there are karstified limestone of the upper cretaceous, and on the roof is numulitic limestone of middle Eocene.) Special attention has never been given to this raw material primarily due to weaker quality and due to small amounts, very often in adverse structural position regarding the availability of exploitation.

The appearances of mercury mineralization are found (1894) in the sites of Grabovik, Peroč and Glavica in Spič, near Sutomore. Mining was performed in this area during Austrian and Hungarian occupation, but the researches performed after the Second World War did not show the perspective of the appearance from the economy standpoint.

The appearances of barite in Spič, near Sutomore and Mišić, were discovered during the research of mercury mineralization through mining and digging, but are not commercially interesting, although they were exploited at that time in very small amount.

In the area of Vrmac, above Kotor, to Lepetane and Kamenari, and further on towards Herceg Novi, powerful layers of chert rocks appear. The largest discovery of cherts is at Vrmac ("Vrdola"), above the village Gornja Lastva near Tivat, which is connected with local asphalt road. The reserves are partly exploited (Possible application in glass industry). Quartz sandstones that are present in significant layers in Zoganje in the hinterland of Ulcinj, are partly researched but they have not been economically valorized (Possible application in metallurgy).

Limestone and dolomites are used as **technical-construction stone,** which occupy large space in the area of Littoral. The exploitation is performed on the deposits of limestone and dolomites "Kobilj" and "Podi", in the hinterland of Herceg Novi and at the deposit "Velja spilja" at the peninsula Luštica, as well as at the limestone deposits "Haj-Nehaj" near Sutomore,"Velji Zabio" and "Goran" in the southeast part of Volujica, and at the deposit "Borik II" in the northeast hill slopes of Bijela gora near Ulcinj.
Red flaky limestone from the deposit "Đurići" near Kamenari was exploited as architectonic-construction stone, and the mines at deposits "Gornja Lastva" at Vrmac and "Lješevići-Vranovići" in Grbalj are still functioning.

Cement marlstone, which is present in clay sediments of flysch along entire Littoral have not been used so far, but brisk clays are exploited for the needs of the factory "Račica" in deposits "Sinjarevo" and "Zekova glavica" near Tivat.

The deposits of Ulcinj sands appear directly at the surface of the terrain, from the channel Port - Milena to the river Bojana. Their thickness ranges from 4 m along the river Bojana to 110 meters at Velika plaža, while the middle thickness of the layers is 17 meters. The main components of these sands are small fragments of carbonate and quartz. Approximately 17 other minerals in small amounts were also found (magnetite, chromite, titanite, ilmenite, etc.), but the research drillings and technological testing performed for the purpose of production of iron, chrome and titanium concentrate done at the end of 19960-is did not point to the profitability of the production. According to the soil analysis, the sand is fine grained to very fine grained and it meets the requirements of construction activity, for which needs is used mostly from the pit at the utmost southeast part of Velika plaža, along the branch of the river Bojana. The promising reserves of these sands amount to approximately 200.000.000 m^3.

Sulphur thermomineral waters near Ulcinj are the only ones of such type in Montenegro. Along Ulcinjska Riviera, these waters spring at the sites of coves Orašac, Ženska plaža (Pinješ), Stari Grad and cove Valdanos, mostly along littoral sea area, and majority of them below the lowest line of flooding. The estimated plentifulness of thermomineral water in the cove Valdanos is 200 l/s, but there are not exact data on their capacity. Thermomineral waters of Ženska plaža spring in a diffuse way mostly through recent structures that cover part of sea basin that is built of Miocene sediments. Based on two performed drills, over 10 l/s of mineral water at the temperature of 24^0C can be exploited at this site. With respect to the gas composition, the water is characterized by high content of 44.2 mg/l H_2S, and very high mineralization ranges from 19 g/l to 22 g/l. Based on chemical composition they are similar to seawater. Due to the composition of hydrogen sulfide and radioactivity, this thermo mineral water is used only in balneology. The combination of these waters with paleolides, which has the area of Ulcinj, enables the use in medicine, since the effects can be reached in medical treatment of skeleton-muscular system (chronical rheumatic and other bone, joints and soft parts diseases), neurological diseases that damage the function of skeleton-muscular system and chronical gynecological diseases (inflammations), as well as some skin diseases.

Mineral waters from the spring Njivice, at the right bank of the river Sutorina, are used with sea mud bath for the needs of Igalo resorts. Waters from the spring Njivice can be grouped into salty radioactive waters of natriumchloride type from hydrochemical standpoint, where the content of Cl and NA ion is dominant. The radioactivity of these waters is tied with dissolving of radioactive elements that contain traces of bauxite at the contact of upper Cretaceous and middle Eocene. Its pH value is 7.7, and rH is 27.1. The recent researches have not given reliable data on the spread of deposits of these waters.

Besides mineral waters, there is **mud bath** in Igalo that smells like hydrogen sulfide. The most represented minerals in mud are calcite and quartz, then chlorite, muscovite, feldspar, biotite and amphibole, and there are fragments of carbonic substance and the remainders of plants. Besides the mentioned minerals,

there are caolinite, ilinite and mica. Mud pH is 7,3, and rH is 14,8.

The deposits of underground waters in the area of Montenegrin Littoral are of special importance, both for water supply of citizens and for increased demand of drinking and technical water during tourist season. The researches of underground waters that have been performed for the last 40 years and which have been particularly intensified in the last 15 years and have not been completed yet, should be continued bearing in mind the complexity of these researches and growing needs regarding the amount of mineral raw materials.

Seal salt is produced in the saltworks Solana Ulcinj thanks to the saltiness of the sea and favorable climate of the area, through the evaporation of the water from saltwork basins and industrial way.

1.1.4. Climate and its Specifics

The measurements of the relevant parameters for the elements that determine the climate of the Montenegrin Littoral is performed by the Hydro Meteorological Institute of the Republic through its hydro meteorological stations Herceg Novi, Tivat, Kotor, Budva, Bar and Ulcinj. The quantitative values of the parameters are the result of long-range researches during the last period.

Characteristics of the Climate of the Land

The maximum temperature of the air has mean maximum values in the warmest months (July and august) of approximately 30^{o}C, while in the coldest months (January and February) it is from 11^{o}C - 13^{o}C. The oscillations of mean value are relatively low, which is due to the stable values of maximum daily temperatures. Somewhat higher oscillations are in period February – May. The frequency of maximum temperatures, observed for the entire seashore (mean for six stations), shows that the concentration of the higher temperatures ranges during August from 29.3^{o}C to 32.8^{o}C.

Minimum air temperature during the winter months has average value of approximately 5^{o}C, while in the summer months it is approximately 20^{o}C. The lowest daily air temperatures during summer, which are determined during night and in early morning hours, are on average within tropical nights. The half of all lowest temperatures during summer (July and August) is below 17^{o}C - 20^{o}C, while in winter they range from 4^{o}C - 5^{o}C to 8^{o}C - 10^{o}C.

The mean monthly **air temperatures** show regular course with maximum during July-August and minimum during January-February. The annual fluctuations amount on average approximately 17^{o}C. No month shows mean temperature below 5^{o}C.
The mean monthly temperatures above 10^{o}C begin relatively early, in March and they end in December, i.e. period with active temperatures is from March to November.
The mean monthly temperature for entire Littoral is 15-16^{o}C, and by individual stations is as follows: Kotor 15,6^{o}C, Tivat 14.7^{o}C, Herceg Novi 15.8^{o}C, Budva 16,0^{o}C, Bar 15.6^{o}C and Ulcinj 15.8^{o}C.

The extreme monthly air temperatures, as mean values, show significant movement of the limits. For entire Littoral, the highest values of temperatures during winter are approximately 17^{o}C, and extremely lowest are approximately 0^{o}C, while in the summer, the extremely high temperatures are 33-34^{o}C, and extremely low are 15-17^{o}C. The absolute maximum is in August for the following stations Kotor (39.0^{o}C), Tivat (39,.5^{o}C), Herceg Novi (42.0^{o}C), Budva (38,2^{o}C) and Ulcinj (40.5^{o}C), and in July for Bar (37,7^{o}C).
The absolute minimum us in January for the station Herceg Novi (- 4,4^{o}C), and in February for the stations Kotor (-3.4^{o}C), Tivat (- 8.2^{o}C), Budva (-4.2^{o}C), Bar (- 5.3^{o}C) and Ulcinj (- 6.4^{o}C).

The number of days with determined thermal limits for the extreme temperatures encompasses so-called *summer, tropical and frosty days*.
There are approximately 107 summer days annually in the seashore when the highest daily temperature reaches 25^{o}C and more, (summer days are registered during March with average of 0.1 days) where the largest number of these days is in July and August (approximately 29-30 days monthly). Total number of summer days for the station of Kotor is 114,6, for Tivat - 113,3, for Herceg Novi - 104,4, for Budva - 103,6, for Bar - 97,4 and for Ulcinj - 108,0.
There are approximately 29 tropical days annually at the seashore when the higher daily temperature reaches 30^{o}C and more. Tropical days are registered mostly in June, July, and August. In relation to these three months, 11% of all tropical days for Herceg Novi are realized in June, 43% in July and 46% in August. The relation is very similar also for other stations at the seashore. Total number of tropical days for Kotor is 44.8, for Tivat - 37.3, for Herceg Novi - 28.6, for Budva - 22.5, for Bar 13.0 and for Ulcinj – 27.6.
There are 10 frosty days annually at the seashore when the lowest temperature drops below 0^{o}C during 24 hours, and they are characterized for December, January and February, and rarely for March. (for the Littoral, the probability that one day of January out of 31 is frosty is 12%). The number of frosty days for Kotor is 4,7, for Tivat - 28,0, for Herceg Novi - 4,4, for Budva - 4,7, for Bar - 8,0 and for Ulcinj - 9,0.

The temperature of soil during the year show regular course. During winter, the temperature with depth has a slight increase, while in summer the situation is reversed. While in winter, the temperature grows by approximately 2^{o}C, in summer, in the same depth it drops by approximately 5^{o}C. The amplitude decreases with the increase in depth. The annual course of the mean monthly values shows that the warming up to maximum temperatures is somewhat faster than the cooling.

The depth of breaking through of zero isotherm which largely depends on the physical characteristics of the soil and the presence of water and which substantially changes the factor of heat or cold transport in deep layers of soil is for Herceg Novi 4.9 cm, for Bar 7.4 cm and for Ulcinj 8.2 cm.

General **regime of precipitations** at Montenegrin Littoral characterizes maximum during winter and minimum during summer period of the year. The largest contribution have October, November and December in

total annual amount of precipitations with approximately 30-40%, and the lowest have months of June, July and August with only 10%.

During winter period, daily average of precipitations amounts to 5-8 l/m2, although the largest daily amount can reach values over 40 l/m2. in summer, daily average of precipitations amount only to 1 l/m2.

Spatial distribution of mean annual amounts of precipitations shows relatively good homogeneity in the zone directly along with the sea. From the sea to the continental hinterland, there are sudden changes with respect to the increase of precipitations, with extremely shown gradient due to high orography, which exceed heights of 800 m.

The mean annual amount of precipitations for Kotor amounts to 1638,3 l/m2, for Tivat -1429,2 l/m2, for Herceg Novi -1661,7 l/m2, for Budva -1188,8 l/m2, for Bar -1230,8 l/m2 and for Ulcinj -1109,0 l/m2.

The extreme 24 hour precipitations for return period of 100 years (appraised at GUMBELA model) for the seashore may be realized with the amount of 234 l/m2, and by individual stations: Kotor with 235,19 l/m2, Tivat with 214,07 l/m2, Herceg Novi with 318,12 l/m2, Budva with 237,63 l/m2, Bar with 213,27 l/m2 and Ulcinj with 190,96 l/m2.

The wind, as climate element, at individual stations (for period 1981-1995) shows different values of disposition of frequency of directions and speed as well as appearances of silence.

Winds from northeast and southwest are dominant for entire Littoral, while in some stations there are some specifics noted. So that for the station Tivat the most frequent winds are the following: southeast (8.7%), west-southwest (7.9%), east-southeast and south winds (6.4% each), and participation of silence is 31%; for Herceg Novi east-northeast (4.7%), south (4.1%) and north-northeast winds (3.9%), and silence 54,3%; for Budva south (14.4%), southwest and northeast winds (4.5% each), and the participation of silence is 60.6%; for Bar northeast (20%), east-northeast (18.9%), north-northeast (8.1%), west (7,8%) and west-southwest winds (7.2%), and the participation of silence is 5.2%; and for Ulcinj northeast (16.8%), east (16.3%), east-northeast (11.6%), west (8%), west-southwest (7.7%) and north-northeast winds (7.4%), and the participation of silence is only 3.9%.

Maximum speed have winds from north and south quadrant for entire seashore, which average speed show very stable values (they do not exceed 5 m/s). The largest average wind speed by directions for Tivat has north-northeast wind (with frequency of 3.8%, mean speed 5.5 m/s and maximum speed of 19 m/s); the largest mean speed for za Herceg Novi has northeast wind (3.6 m/s, with frequency of 3.5%), and the largest maximum speed has north-northeast wind (30.5 m/s); northeast wind for Budva has the largest mean (4.2 m/s), and the largest maximum speed (27.5 m/s); the largest mean speed has north wind for Bar (5 m/s, with frequency of 5.9%), and the largest maximum speed has northeast wind (18 m/s); while for Ulcinj the largest mean speed has south wind (3.6 m/s, with frequency of 3.7%), and maximum speed has southwest wind 17 m/s, with frequency of 3.6%).
The extreme blows of wind (evaluated by the Theory of extremes) are very important characteristics of the area of wind. The activity of the extreme blows of wind may have the character of natural disaster. The extreme annual blows of wind have the average speed of 33 m/s (120 km/h), in Herceg Novi; 30 m/s (108 km/h), in Bar 20 m/s (72 km/h), in Ulcinj. Due to the determination of these parameters the blows of wind of 33,4 +/- 5,93 m/s are pretty regular – expected appearance in the area of Herceg Novi; speed 30,0 +/- 3,60 m/s, in Bar; speed of 20,2 +/- 5,38 m/s in Ulcinj.

Based on the evaluations, the extreme blows of wind that appear once in 100 years from Bar to Herceg Novi amount to 51 m/s (180 km/h), and for period of 10 years 40 m/s (approximately 140 km/h).

Relative **humidity** shows very stable course during the year. The maximum of mean monthly values is during the transitional months (April-May-June and September-October), and minimum is mostly during summer, in some cases during January and February. The mean daily relative humidity show oscillations that are lower in summer (approximately 10%-20%), and that are significantly higher during winter (approximately 20%-30%).

The frequency of the value of humidity in the air for entire Montenegrin Littoral shows that 20 % of all daily values has humidity less than 56%; 50% of all days, the humidity is less than 72%; relative humidity below 86% has 90% of all days (indicator of high values); while 10% of all days has values over 86%.

The mean annual relative humidity has the following values: Tivat 70.8% (minimum 62% in July, maximum 75.6% in October), Herceg Novi 70.5% (minimum 65.4% in July, maximum 72.7% in October and December), Budva 69.1% (minimum 63,5% in July, maximum 72.7% in October), Bar 69.6% (minimum 65.3% in February, maximum 71.4% in September) and Ulcinj 65.9% (minimum 61.5% in July, maximum 69.3% in May).

Cloudiness as the measure expresses the coverage of the sky with clouds in tenths. The increase values of cloudiness are characteristics of the winter, whereas in the summer these values are small. During the year an average of 4.2 tenths (42%) of the sky are covered with clouds at the seashore. The cloudiness in summer is smaller in relation to the average annual cloudiness by approximately 40%.
Observed as mean value for the Littoral, 20% of all daily values of cloudiness there is 0.7 tenths of daily values of cloudiness; half of the values up to 3.9 tenths; and 90% up to 8.8 tenths.
The mean annual cloudiness for Kotor amounts to 4.46 (minimum 2.4 in July, maximum 5.7 in December), Tivat 3.84 (minimum 1.8 in July, maximum 5.0 in February and March), Herceg Novi 4.40 (minimum 2.2 in July and August, maximum 5.6 in March), Budva 4.26 (minimum 1.9 in July and August, maximum 5.9 in December), Bar 4.27 (minimum 1.9 in July, maximum 5.6 in December) and Ulcinj 4.13 (minimum 1.8 in July and August, maximum 5.5 in December).
The mean monthly values at all stations show that over 50% of coverage of the sky with clouds is in period

November – April, except for Tivat where these values are in February and March, and 18-22% of cloudiness at all stations is in July and August.

Solar insolation (exposure to the sun) represents the duration of sun shining expressed in hours.
The Littoral has on average approximately 2455 hours of solar insolation annually, of which 931 hour in summer (June, July and August), i.e. approximately 40% of annual insolation belongs to one fourth of the year. In the winter, insolation is significantly reduced. During January, the Littoral has only 125 hours, which represents 5% of annual value or 13% of the insolation realized in period June-August.

The mean monthly value of solar insolations for Herceg Novi amounts to 201,25 (maximum 327,7 u July), Budva 192.18 (maximum 316.7 in July), Bar 212.20 (maximum 347.0 in July) and Ulcinj 212.90 (maximum 332.0 in July). The appearance of high values of this parameter reversed in the proportionate to the appearances of mean values of cloudiness.
On daily basis, during the entire year Littoral has on average approximately 7 hours of sun shining, with daily oscillations of +/- 3.5 hours.

Meteorological Characteristics of the Sea

Certain characteristics of the sea, from meteorological standpoint, is monitored by the Hydro meteorological Institute of the Republic (RHMZ), through the parameters that include the temperature of the sea, the correlation-connection between the air and the sea, the direction of waves and the condition of the sea surface.

The mean annual **sea temperature** along Montenegrin Littoral is 17.9^{o}C, with mean value of annual oscillation of 1.7^{o}C. The coldest period of the year January – March has mean temperature of approximately 12^{o}C, while the mean annual minimum temperature 15.5^{o}C. In the warmest period June-August, the mean maximum temperature is 23^{o}C, while the mean annual maximum temperature is 20.1^{o}C. The annual amplitude of temperature amounts to approximately 12^{o}C, while relative annual fluctuation is approximately 70% of the mean annual temperature.

At individual stations, the mean annual sea temperatures for Kotor amount to 17.0^{o}C, Herceg Novi 17.4^{o}C, Budva 17.8^{o}C, Bar 17.7^{o}C and Ulcinj 17.1^{o}C. The mean monthly values with temperature higher than 20.1^{o}C at all stations are in period June - September, where the higher mean value is in August at eh station Kotor 25.1^{o}C, Herceg Novi 24.1^{o}C, Budva 24.1^{o}C, Bar 23.8^{o}C and Ulcinj 23.3^{o}C.

The mean daily temperatures of the sea show very stable values. At the entire Littoral 20% of days annually has the temperature below 16.5^{o}C; 50% days below 17.9^{o}C; 90% days below 20.1^{o}C; while only 10% of days the temperature exceeds 20.1^{o}C. (40% of days have temperature between 17.9^{o}C and 20.1^{o}C)

The sea temperature in 14 hours has stable and regular distribution of values during the year, without high oscillations and with very narrow and precise intervals for the domain of normal, extraordinary and dangerous values of the sea temperature. The range of normal (the most frequent) values is +/- 1^{o}C-3^{o}C of the mean value.

The mean monthly values by stations amount for Kotor 17.3^{o}C, Herceg Novi 17.9^{o}C, Budva 17.9^{o}C, Bar 18.5^{o}C and Ulcinj 17.6^{o}C. The mean monthly values with temperature higher than 20.1^{o}C appear at the station Kotor in period June - September (maximum 28.8^{o}C in July); in Herceg Novi in period June - September (maximum 26.7^{o}C in August); in Budva in period June - October (maximum 25.8^{o}C in August); in Bar in period June-October (maximum 27.0^{o}C in July and August); and in Ulcinj in period June-October (maximum 25.8^{o}C in August).

The correlation between the sea and air temperatures is determined in an empirical way (by the method of indivisible regressive analysis). Based on the determined equation of linear regression, it is possible to determine the sea temperature as a dependent variable, through air temperature, which is set as an independent variable. Based on this equation, if the air temperature in 14 hours amounted to 30^{o}C, it is expected that the sea temperature is 24.4^{o}C in Kotor, 25.7^{o}C in Herceg Novi, 23.8^{o}C in Budva, 25.1^{o}C in Bar and 24.1^{o}C in Ulcinj.

The direction of waves at Montenegrin seashore is defined based on the registered frequency at individual stations, with separation of appearances when the sea is waveless (calm). From the available data, the waveless sea is registered at the station Kotor in duration of 57.7% of time annually; at the station Herceg Novi in duration of 59.1% and at the station Budva 52%, while at the stations in Bar and Ulcinj such situations do not exist. High frequency of movement of waves in the station Kotor has north direction (12.1% of time annually); at the stations Herceg Novi and Budva south direction (17.7% and 27.8% respectively); at the station Bar west direction (69.3%) and northeast direction (14.9%) and at the station Ulcinj east direction (41.5%), south (28.8 %), then southwest and west direction (12.7% and 12.5% respectively).

The surface of the sea is described by using the international gradation from 0 to 9. (The gradation for the sea surface: 0-calm, glassy sea; 1-calm, rippled sea; 2-calm, waves sea; 3-smooth sea; 4-slight sea; 5-moderate sea; 6-rough sea; 7-very rough sea; 8-strongly rough sea; 9-extremely rough sea).
The results of the frequency of individual situations are derived according to the given gradation, by months and integral for the year. The gradation for calm, glassy sea (0) is the most presented in Kotor (57.4% annually), Budva (52.0%) and Herceg Novi (36.4%), while in Bar and Ulcinj it doesn't practically exist; calm-rippled sea (1) appears in Bar (30.2%), Kotor (29.2%), Herceg Novi (27.8%) and Budva (22.4%); calm waves sea (2) appears in Ulcinj (66.9%), Bar (53.8%), Herceg Novi (24.9%), Budva (10.9%) and Kotor (9.1%); and smooth sea (3) appears in Ulcinj (16.0%), Bar (14.1%) and Budva (9.2%).

The frequency of other sea surface conditions (4-7) is slightly low, while the extreme situations, when the sea is strongly rough (8) and extremely rough (9) are very rare.

1.1.5. Hydrogeological Characteristics

The diversity and specifics of the hydrogelogical characteristics of the Coastal Zone, immediate contact zone, and functional hinterland is caused by the complex geological material, tectonic structure, and morphology of the terrain, as well as the climate characteristics of the area. From the behavior standpoint towards surface and underground waters, rock mass at this area, are divided to water permeable-hydrogeological aquifiers and water impermeable-non hydrological insulators.

Hydrogeological aquifiers are more significantly spread than the insolators – which build more narrow zones at the Montenegrin Littoral. Depending of that, underground waters represent especially significant hydro geological appearances, which are formed in aquifiers.

Diffused karst aquifiers are formed in the terrains that are built of hydrological aquifiers with fracture and cavernous porosity. These aquifiers are fed by precipitations, and emptied through `submerged springs, lateral springs and those at contacts between insulated and acquified rock mass.

Based on the recent findings, some important characteristics should be pointed out for the following aquifiers:

· Aquifier Brca, in the hinterland of Sutomore – the drainage area is approximately 20 km^2, it is drained at the height of approximately 20 m, the yield of spring is approximately 40 l/s;

· Aquifier Gradac, in Buljarica - is drained during the rainy season of the year, by the series of small springs around the peak Gradac, approximately at the level of 10 meters above the sea level, one tapped spring has yield of approximately 25 l/s;

· Spring Topliš, in the western part of Budvansko polje –yield of approximately 1l/s, with the amplitude of fluctuation of 1: 8. The drainage area of the aquifiers is not completely defined;

· Water source Solila – formed by the groundwater tapping, the drainage area is approximately 16 km2, minimum yield of approximately 40 l/s, it is used for water supply of Tivat;

· Spring Plavda, approximately 3 km northwest from Tivat and approximately 30 m from the sea shore – drainage area has not been precisely defined, can give 40-60 l/s water, and during summer it is used at least 20 l/s, it is always possible salinization from the sea.

· Aquifier Škurda, in the north part of Kotor, forms the water course that flows into the sea, its basin at the slopes of Lovćen, in Njeguško polje and surroundings, encompasses the area of approximately 90 km^2. The yield of the spring is 0,1-30 m3/s and it is tapped in the function of water supply of the town, it is occasionally salinated.

· Estavel Gurdić (spring of siphon type, the depth of the crater is 35 m, subaqueous channel network reaches to the depth of 51 m) – of the same drainage area, i.e. aquifiers as the water source Škurda. In period of small waters this water source if transformed in the sink hole which accepts waters of the sea, while during maximum flow out its yield is 50-75 l/s;

· Aquifier Ljuta, in the hinterland of the bay of Kotor – the drainage area of approximately 70 km^2, ranges to Njeguša. The minimum yield of the water source Ljuta is appraised at approximately 100 l/s, and maximum is 170 m3/s;

· Water intake Orahovac at approximately 700 m northwest of Ljuta – the drainage area encompasses the area from Njeguško polje of approximately 70 km2. The minimum yield is 40-100 l/s. In summer dry period the intrusion of seawater is performed;

· The spring Spilja, northwest of Risan – the basin encompasses the area of approximately 120 km^2 at the area of Grahovo. The minimum yield of the spring is 4 l/s. In the channel, which length is 450 m from the water source to the sea, the water in the dry period is salinated;

· Aquifier Morinja – the drainage area is approximately 82 km^2 in the hinterland of Morinjsko polje and in it bottom. The waters-aquifiers are divided by karstic channels opened towards the sea, which causes their salinization in the period of small waters. The springs of Morinje in the dry period have cyclic yield, between 550-650 l/s.

Compacted karst aquifiers originate in the littoral fields, which terrains are built of water permeable rock masses with inter grained porosity. These aquifiers are near the surface, and the depth of appearance of underground water depends on the level of the field, distance from the sea and facies composition of the rim of the filed, as well as from the flows of the surface waters from the rims.

In all fields, more or less, there is the mixing of salt-sea and fresh waters.

· Aquifier Tivatsko polje – in the plain area of approximately 3 km^2, surrounded by hills Vrmac, Lušina gomila, Lješevići and Vranići, in the alluvial sediments of quaternary, thickness of 4-12 m, depth to the level of underground wasters of 1-3 m;

· Aquifier Mrčevo polje – alluvial plain with lower parts of more water courses, the area of approximately 7 km^2 and basin of approximately 43 km2 with quaternary sediments of the thickness of 12-36 m, with higher amount of clay, and with reduced water permeability and yield. The level of underground waters is 0,5-1,0 m, from the surface of the terrain. In some parts, there is the influence of the sea;

· Aquifier of Budvansko polje – under the town with the area of approximately 2 km^2, within the alluvial and deluvial sediments it thick 10-50 m. The depth to the level of underground waters is 1-4 m. Aquifier is small and its waters serves only for the supply of some building facilities and watering of green area;

· Aquifier of Buljaričko polje – with the area of approximately 2 km^2, in the quaternary alluvial sediments with thickness of 12 m, which do not contain larger underground waters, and they are used only for individual households. The level of the filed is lower than 3 meters above the sea. The level of underground waters is close to the surface of the terrain. The aquifier is emptied directly to the sea;

· Aquifier of Barsko polje – is replenished with waters of atmospheric deposits and watercourses of Rikavac and Željeznica, and is emptied in the sea. It is formed in the alluvial sediments in the form of subarteric aquifier. The lowest depth of the aquifier is 0.3-1,0 m. Its waters are not significant and the yield of the derived wells does not exceed 1-2 l/s.

Submerged springs should be mentioned out of other hydro geological appearances. These springs, that

appear below the sea level and bring large amounts of fresh water from mountain karstic hinterland, are characteristic specifically for the area of the bays Kotor-Risan-Morinj. The submerged spring Sopot near Risan is known of several submerged springs in this area.

1.1.6. Hydrological characteristics

The area of the Montenegrin Littoral, and with that the coastal zone is marked by the relative abundance of the mainland waters and the maritime zone of the South Adriatic on which the cost is leaning.

Hydrographic of the mainland

Montenegro, in its entirety, and particularly in its southern part, which belongs to the Adriatic basin, is one of the world's water-richest areas. The average of 604 m3/s of water is running off from its territory, that is, a total of 19 km3 or 44 l/s/km2 per year. Such runoff or larger runoffs occur on the less than 2-3% of the mainland surfaces in the world.

Montenegrin Littoral is marked by the high quantity of precipitations, as well as the unfavorable seasonal oscillations. Due to the relatively fast runoff through the soil, water balance is not favorable; therefore there are water shortages in the critical periods (vegetation period and tourist season). The largest quantity of waters runs off in the sea through the karst ground through the underground paths that are very complex and still insufficiently researched, and a large part is flowing beneath the sea surface. The result of such water runoff is a relative scarcity of surface waters – running and still, in the coastal area. Except for the border river Bojana, all rivers in the coastal area have a fast and short course, with large flow oscillations, while for the still waters in this area, there is only a small Šasko Lake. As opposed to this, there is a relatively large number of torrential watercourses along the entire coastal area, while the part of the area is jeopardized by floods.

Quality monitoring of the change of surface flow regime in the Montenegrin Littoral has been performed only for watercourses for which there is a minimum of hydrological observations and measuring that has been continuous for at least 20 years, which is a criteria met by available data for rivers Bojana, Željeznica and Sutorinu, as well as Reževića river, with the insufficient -16 years of water level monitoring.

River Bojana represents an inter-country watercourse; therefore it was not possible to perform hydrometric measuring of its flow. Statistic analysis of the maximum annual water level is given in absolute quotas, for a 46-year series of observations (1952-1987) in the hydrologic station Reč. The lowest large water level of the river Bojana was recorded in February 1983, with the absolute quota of 1.81 mnm, while the highest water level of 4.56 mnm was recorded in January 1963, when the absolute maximum level of the Skadar Lake – 9.86 mnm was also recorded. Maximum amplitude of oscillation of large waters of the river Bojana in Reč is 2.75 m.
From the Skadar Lake, river Bojana is running on around 18 km of the Albanian territory, while downstream, at around 25 km it becomes a border river between Montenegro and Albania. Multi annual flow of the river Bojane on the Skadar Lake profile is 310 m3/s. River Drim is flowing in the river Bojana directly downstream from the Skadar Lake, which adds 320 m3/s (profile Vaudeis) to the river Bojana, which could have a more significant impact on the water regime, particularly after the activation of the HPP "Fierza" (1981) with the accumulation volume of 2.3x109m3. On the profile of the HS Fraskanjel, total multi annual flow of the river Bojana is 640 m3/s, which makes it the fourth river in Yugoslavia considering the water quantity (after rivers Danube, Sava and Tisa).
Basin of the river Bojana covers the total area of around 19.000 km2, on the territories of Montenegro, Serbia, .e. Kosovo and Metohija, Macedonia, Greece and Albania. Share of the waters from Montenegro in the total balance of the river Bojana is estimated at around 35%.
Average depth of the river Bojana is around 3-5 m, while in some whirlpools it exceeds 8 m. On the confluence in the sea, sea waves create a bulwark, in which, during small waters, the river is carving a deep channel. Before the confluence the river Bojana is divided in two branches, of which the right-smaller branch is located on the Yugoslavian territory. Between these two branches there is the Ada Island. Depth of branches in the confluence varies, particularly on the main branch, along the border from 1.2 m during winter to 1.6 m during summer, and on the right branch - from 0.9 m during winter to 1.2 m during summer.
The river Željeznica is drying on the measuring profile (downstream from the bridge on the Adriatic highway, in Bar) because upstream, its confluents are scooped with numerous channels for irrigation.
The river is drying in August (21 days on the average), July (12 days), September (17 days) and October (7 days). The lowest measured flow amounted 34 l/s, while the highest flow was 6.6 m3/s. The surface of the river Željeznica basin is 28 km2, while the medium multi annual flow is around 1.6 m3/s.

The river Reževića is regularly drying, since a part of its waters is scooped by the Budva's water supply system, and part of the waters is used by the locals for irrigation. On the measuring profile (directly under the highway road Petrovac - Budva) it is drying continuously, even up to five months, while during August and September it is frequently without the surface flow.

According to the available data (period 1973-1978), the average duration of drying occurs in June (4 days), July (21 days), August (30 days), September (28 days), October (13 days) and in November (5 days). The lowest measured flow is 134 l/s, while the highest measured flow is 4,06 m3/s. Surface of the basin of the Reževića river is 12 km2, while the multi annual flow is around 0.35 m3/s.

The river Sutorina is regularly drying in the area of Hydrologic station (profile in the settlement Sutorina-the bridge on the highway road "Herceg Novi-Dubrovnik") due to the scooping of the part of Sutorina waters in the upper parts of the basin for water supply and irrigation. Average duration of drying is most frequent in June (three days), August (26 days), September (17 days) and in October (5 days). The lowest measured flow is 52 l/s, and the highest is 3.1m3/s. Surface of the river Sutorina basin is around 25 km2, while a medium multi

annual flow is around 1.3 m3/sec. River basin is at around 500 m upstream from the confluence, it is developed and the access is enabled to the small vessels.

Considering other rivers, watercourses within urban developed environments should be emphasized. The following rivers have a regulated –built basins: Škurda (main and secondary channel) in Kotor, along the entire flow length; river Spila in Risan, on the major part of the flow; and river Repaj, on the part of the flow from the confluence in Zelenika, towards Kutsko field; whereas the channel Port Milena, at the top of Velika plaže, that leads Ulcinj Solana waters into the sea, flows in the unregulated basin along the entire length.

Šasko Lake is located in the area between Briska hill and Šasko mount. Lengt of the lake is around 3 km, width - around 1.5 km, while the surface during small waters is around 400 ha. Average depth is around 3 m (during small waters); however, there are occasional whirlpools up to 12 m deep. Stream Međurječ flows into the lake from the West, while from the north side, one branch of the torrent Mida flows into the lake forming a large fan from the drift. Lake waters are running off in the river Bojana through the channel Sv. Đorđe. Water level of the lake varies from the quota of 1.4 to 5.4 mnm.

Torrent differs from the other flows in that their waters sharply increase and relatively rapidly decrease and carry large quantities of pounded material – alluvium. Alluvium quantities can amount up to 50%, and there are cases in which the alluvium amounted 250% and more than flowing quantities of waters. Torrents are most frequent in the upper part of the basin with large falls, during intensive precipitations and rapid snow melting. Biggest damages are caused in the underflow, in the confluence in the recipient river, lake or sea.

Montenegrin coast represents a basin area for around 70 torrential flows and channels of which 46 are active. The surface of basins of torrential flows amount around 350 km2, which means that around 30% of the entire territory of the Montenegrin coast represents a basin area of all torrential flows in this region.

Out of the coastal area torrential system, the most important torrential subsystems are those of the Boka-Kotorska Bay, Buva, Sutomore, Bar and Ulcinj torrents. Out of the Boka-Kotorska torrents, torrents in the basin of Sutorine and Repaja should be mentioned, as well as those in the area of Herceg Novi; stream Zverinjak, in the area of Kotor; torrents Seljanovo, Rosino, Gradiošnica, and torrents in the basin of Koložunj, in the area of Tivat; torrents in the basin of river Kučac (Jaška river), Grđevica and Bečićka river, in the wider area of Budve; torrents in the basin of Botuna, in the area of Sutomore; torrents in the basin of the river Željeznice, with Rena and Rikavac, in the area of Bar; and in the Ulcinj area – torrents in the basin of Međurječka, Vladimirska and Rastiška rivers, which are flowing towards Šasko Lake and river Bojana.
Organized and systematic development included around 30 major torrential areas. The works on the development of torrents had commenced in 1880, when the Austro-Hungarian empire constructed a system of torrent barriers, stream Zverinjak (these are the oldest torrential structures constructed in Montenegro), and have since continued with shorter of longer interruptions until the seventies, when these activities have ceased.

Local torrents are short; their basins have high slopes that are sharply decreasing at the exit of the cliff and become floods. Lower parts of the basin are regularly covered with alluvium material that causes water spills and flooding of surrounding areas.
Large lateral fall of the flow is typical for all coastal torrents, which is caused by the very apparent terrain configuration that results in the high energy potential and destructiveness of the torrential mass.

Climate factors in this area provide favorable conditions for development of water erosion, which is reflected in the large quantities of precipitations, averaging from 1500-2000mm per year. Precipitations during the year have an unfavorable pattern, which is the result of Mediterranean pluviometer regime; therefore the maximum precipitations occur in the late autumn and early spring, i.e. during the weakest protection of the land with plant layer.

Torrents represent a very lively and dynamic system in which the factors (relief, climate, geological composition, pedologic layer, plant layer and a manner of land exploitation) are constantly changing, particularly if it is known that the last works have been performed more than 30 years ago, therefore, only a direct insight of the terrain could provide an accurate volume of required works, since the problem of land erosion and development of torrential flows can be solved only through the optimum combination of technical and biological interventions.

Erosion processes are the result of the interaction between the geologic and pedologic soil, relief shape, climate characteristics (primarily quantity of precipitation and temperature) and the manner of land exploitation.
On the Montenegrin coast this is particularly develop along the entire length of the belt made of softer flysch rocks. On one hand, these processes are devastating productive surfaces (pastures, forests, etc.), rooting different structures (terraced land), while on the other hand arable surfaces, transportation and other structures are endangered by the deposits of alluvium, which is, in many cases, the main cause of numerous local flooding. Besides the negative impact, these processes can have a positive impact, which is the case with many torrents near the sea, where the beaches have been formed on its fans, while in its hinterland quality arable land has been created.
Protection from flooding was previously limited to undertaking of passive measures to directly protect the endangered area, which implied the construction of dams and performance of smaller scale works for regulations of the water flows.

Most extensive works on the construction of the dam have been performed along the river Bojana. On the Yugoslavian side of the river the following works have been performed:
- Dam Sveti Nikola - Reč, 6337 m long and dam Sutjel - Sveti Đorđe, 1455 m long, which protect the area of around 600 ha between Bojana and old Solana dam, as well as the Ulcinj field itself (By monitoring of the dam after the flooding from 1963, it was established

that the dam Sveti Nikola - Reč doesn't have a required height on the 27% of the length, while the dam Sutjel - Sveti Đorđe – on the 40% of the length). Dams are covered with undergrowth and trees and can only partially serve its purpose.

- Dam Gropat - Štodra, 960 m long, protects around 110 ha of the Vladimirsko field.
- Dam Štodra - Sukobin, 2900m long, protects around 360 ha of the agricultural land in the Sukobinsko field.

For the dam located upstream from Sveti Đorđe to Fraskanjela, the project has been developed, which has not been implemented, therefore in this area there is no protection from the large waters of the river Bojana.

Regulation works on the stabilization of the basin and construction of the dam have been performed for the protection from the flooding of the river Sutorina, on the 3500 m length; however, torrential waters are still flooding the area of around 20 ha of the land.

Documentation related to the structures for the protection from flooding has not been systematized and is non existent for some structures.
Cadastre of structures for the protection from flooding, which is required for any systematic management of the protection fro flooding, has not been developed.
Also, many structures for the protection from flooding that have been constructed within the transportation or other infrastructure have not been registered.

Maritime zone

The maritime zone of the Adriatic Sea across the coast of Montenegro is 200 km wide and is a part of South Adriatic basin in which the biggest depths of the Adriatic have been measured (1340 m). It differentiates from the other pats of the Adriatic in that it has the largest water mass (26 000 km3 of he sea, of the total 32 000 km3) and stronger direct exchange of the water with the Mediterranean. This inter basin change that occurs through the undersea (Outran) door, which is 741 m deep, has a great impact on the open, as well as on the coastal waters of the South Adriatic inshore waters, including waters along the Montenegrin coast.

Part of the Adriatic coast that belongs to Montenegro stretches from the Cape Kobila on the north to the confluence of the river Bojana on the south. Length of the coastal line, including several smaller islands is around 311 km, i.e. the ratio of coast indentation is around 2.9.
Boko-Kotorski bay consists of the outer (Herceg-Novi), middle (Tivat) and inner (Risan-Kotor) parts, and represents the most indented part of the Montenegrin coast. Length of the coastal line of the entire Bay amounts 105,7 km, while in some parts of the Kotor Bay it is 25,0 km, Risan - 12,6 km, Tivat - 36,1 km and Herceg Novi - 32,0 km. Indentation ratio of the entire Boko-Kotorski bay is 3.62, while for individual parts amounts as follows: Kotor bay- 2.61, Risan – 2.76, Tivat – 3.55 and Herceg Novi - 3.63.
Medium depth of the entire Bay is 27.6 m, while the medium depths of individual bays range form 27.0 m in the Kotor bay, 25.7 m in the Risan bay, 25.5 m in the Tivat bay, and up to 31. in Herceg Novi bay. Maximum depth in the Kotor bay is 52.0 m, Risan – 36.0 m, Tivat – 47.0 m and Herceg Novi bay – 60.0 m. Significant characteristic of all bays is the isobat convergence of larger depths to the small distances from the coast.
The area of Boko-Kotorski Bay maritime zone amounts 87,334 km2, which makes up 0.06% of the Adriatic Sea. The area of the maritime zone outer and middle part of the Bay is 63,067 km2, is around 2.59 times larger than the area of the inner part, which amounts 24,267 km2.
Total volume of the Boko-Kotorski bay is 2.41 x 106 m3 of water, whereof 18.2 % - Kotor, 8.5 % - Risan, 36.4 % - Tivat and 36.9 % - Herceg Novi bay.

In the relief of the seabed of the Bay, two steps are distinctive: strand and continental shelf. Considering the structure and vertical scope of the coastal area of the mainland, there are no strands in the most parts of the Bay, instead, from the sea surface stone slopes with steep sides are coming down to the sea up to the very bottom. The Bay's bed is mainly covered with thick layers of fine mud of terigen origins, with more or less detritic elements.

In the immediate hinterland of the Boko-Kotorski bay there is an area with the highest annual amount of precipitations (Crkvice, above Risan, with 5480 mm), which causes the flow of huge mass of mainland waters mainly into the relatively small and closed Risan and Kotor part in the period November-April. Period from June-September is a dry period of the year, therefore many mainland springs, streams and streamlets as well as underwater wells – *vrulje* are during up or their activity falls down to the minimum.

Shape and position of the Bay, as well as the inflow of the freshwater during some parts of the year, reflect on the water mass dynamics, which is very variable in its direction and velocity, on the different depths and in specific parts of the maritime zone.
In the Kotor bay, on the surface and at the 10m depth, during all seasons, exit direction of the currents is predominant, with the rate of 17 cm/s during summer and winter, up to 26 cm/s in autumn, during the highest inflow of the atmospheric and freshwater. The current rate is falling with the depth to 3-5 cm/s in the near-bottom layer, where the inwards direction is predominant. In the defile Verige, current speed is high in all seasons, ranging even up to 56 cm/s. Maximum multi annual amplitude of oscillation of the sea level in this part of the bay 125.5 cm.

Tivat bay is different than Kotor bay in that it has a significantly smaller inflow of freshwater. In this part of the bay, on the surface and up to the 10 m of depth, outwards direction of currents is predominant, with the slowest speed of up to 2.5 cm during summer and the highest speed of 41 cm/s during the autumn, while on the greater depths, outwards direction is predominant, however, with somewhat slower speed. Maximum amplitude of the sea level amounts 80 cm.

Herceg Novi bay is under the greatest influence of the open sea. In the surface layer, during the winter, inwards direction of the current is predominant, up to 18 cm/s, which can be felt in the deep and near-bottom layer. During the summer, outwards direction appears in the surface layer, while in the near-bottom layer there is an inwards direction and slower currents. Highest speed of currents - 41 cm/s, occurs during the autumn. In the same season, direction of the currents in the

near-bottom and deep layer varies, with the speed of up to 31 cm/s. Maximum amplitude of sea level oscillation amounts 106,5 cm.
Large inflow of mainland waters during the winter months and cold northern winds in that period are causing distinct seasonal dynamics of the series of hydrographic characteristics of the sea water in the Bay, in particular temperature and salinity.
Measuring of the temperature of water layers (0.5 m, of the middle and the bottom layer), has been performed once a month, from the one-year aspect, on thirty equally distributed positions (special researches of the Institute for Marine Biology in Kotor), have shown irregularities of gradation of temperature values, from the surface to the bottom of the Bay, considering that the temperature values of the surface layer have one minimum (February) and one maximum (July); that medium layers have 3 distinct minimums (February, March and April) and two maximums (August and September); and that two minimums are distinctive in bottom water layers (March and April) and one maximum (August).

Sea water salinity values vary strongly throughout the year, in particular in the vertical direction. Oscillations are largest in the shallow Kotor bay (28-38 %o, on the surface and 28-38,39 %o, near the bottom), depending on precipitations and inflow from the shore; significantly lower in the outer parts (in Herceg Novi bay, from 30.01 %o on the surface, to 38.59 %o near the bottom); while in the open sea, in front of the Bay, oscillations amount around 38.48 %o.

The color of the sea water in the Kotor part of the bay ranges from blue to greenish, regardless of the season of the year, while during the season of strong precipitations, to yellow-brown; in the Tivat part, the color ranges from blue-green to brown-green; while in Herceg-Novi color ranges from dark blue-green to do brown.

This similar situation relates to the transparency, which ranges from 6 m in the Kotor bay to 16.15 m in Herceg Novi bay.

Maritime zone from the Boka-Kotorska Bay to the confluence of river Bojana, leans on the shore of the Coast, which is mainly rocky with well formed cliffs, while on the far South Eastern part, it is low, partly lagoon type and under the greater influence of freshwaters from the mainland. Indentation ratio of this part of the shore is under 2.

Epiconinental belt of the Montenegrin coast is relatively shallow (up to 50-60 m), its narrowest par is in front of the Boka-Kotorska Bay, where it stretches for several kilometers towards the South-East. The shelf area (continental shelf, up to the 200m depth) at the Cape Oštro is at the 9,5 NM from the shore, and at the confluence of the river Bojana is at 34 NM. Total shelf area is 3 300 km2. From the borders of the shelf, sea bed is descending towards the South Adriatic basin, in which the greatest depths of the Adriatic have been measured (1228 m, according to some sources or 1340 m, according to other).

There is no detailed data on the relief of the sea bed along this part of the shore, except for the part of the maritime zone that gravitates towards the shores of Ulcinj municipality (according to the research of the Institute for Marine Biology-Kotor), with clearly developed strand and shelf, i.e. littoral circle (up to 200 m of depth) and the initial part of the bathyal system.
The strand is a narrow part of the seabed, which lies between the high and low waters; therefore it has an amphibian character, because it is covered by the sea during the high tide, while during the low tide it remains above the sea level. This belt is greatly exposed to the mechanical action of the sea water and is marked by frequent and periodical changes of the physical and chemical conditions of the environment. Ulcinj beaches are a typical example of the developed strand.
The shelf or littoral system is a part of the seabed, which continues to the strand, usually with a mild slope and it stretches in the maritime zone before Ulcinj, up to around 200 m of depth.

In the physical structure of the seabed, three major and well developed types can be differentiated - rocky, sandy and muddy seabed – whose particles are of the terrigen and pelagic sea origin.

Waves are more frequent during the winter period, particularly: from the northern direction (January, February, and March) and southern direction (November).
Most frequent waves height is from 0.5 to 1.5 (59-71%), the share of big waves of over 1.5 m (6-8%) is smaller; they are usually occurring after long-lasting southern winds, while waves of over 4.5 m are he rarest (0.1%). Calm sea, without waves varies between 14 and 27%.

Sea currents along the Montenegrin littoral are under the direct impact of the currents in the Southern Adriatic, and their highest speeds are from 42 (incoming current) to 88 cm/s (exit current), along the Italian coast) and are up to six times greater that those in other parts of the Adriatic. Main surface current ranges from the south-east to the north-west speed of 42 cm/s following the coastal line from the Otrant door towards the northern part of the Adriatic.

Since the southern Adriatic has the larger water volume than other parts of the Adriatic Sea, temperature during the winter doesn't fall below 12^{o}C, neither in the inshore waters, nor in the deeper layers in the open sea. During the summer, inshore waters warm up to 27^{o}C, and over, while during the winter, isotherm is established, starting from the coast and extending to the open sea. With the spring warm up in the termocline layer of 10-30 m is established (level of the temperature rise), which is particularly present at the end of the summer. Shallow part of the sea in the Bojana estuar has a lower temperature during the summer in the entire column from the open sea (19-22^{o}C), because the freshwater basins in the inshore waters cause distinct temperature stratification.

Water salinity varies. In the researched stations (Institute for Marine Biology-Kotor) it amounted 38.30 – 38.48 %o, while in the area under the impact of the river Bojana, 29.70%o and lower values have been registered. Simultaneously, these values on the open sea raise up to 39 %o, during stronger inflows of Mediterranean waters. During the spring maximum flow of the rivers from the Montenegrin-Albanian coast and rivers from the Puglia area (Apuglia), the entire area of the southern Adriatic is bridged with freshwater inflows

in the transversal direction. These transversal currents encourage formation of the so called hydrological discontinuity zone.

Color of the sea along the Montenegrin Littoral is blue, blue-green or green-blue, depending on the cloudiness, nature of the seabed and vegetation along the coast. In over 90 % of cases, sea color is unchanged; it changes only in the part of the coast that is in the area of the impact of river Bojana – mostly up to the inlet Masline (Utjeha beach). On the confluence of the river Bojane, water color ranges from yellow-green to grimy yellow and dark yellow. Distinctly blue to dark blue color is typical for the waters on the open sea of the southern Adriatic.

Water transparency on the most parts of the inshore of the Montenegrin Littoral reaches the seabed, except in the part exposed to the impact of the river Bojana. Decreased and often low water transparency on the confluence of the river Bojana, stretches up to the Mala Ulcinjska beach. Towards the open sea, transparency is increasing, reaching its highest values in the middle of the maritime zone –up to 60 m.

1.1.7. Pedologic characteristics

Pedologic cover on the boundaries of the coastal zone and wider hinterland is marked by the large number of different soil, with different physical and chemical characteristics and quality class.

Existence of specific soils is caused primarily by the diversity of geological composition of the ground, dynamics of the relief and the climate, which is, as a creation factor, significant for vertical spreading of the land.

Specific soils and their characteristics

Marine sand and pebble, created by the sea waves, which have shaped it and deposited it along the low coast, appears on all beaches of the Montenegrin Littoral. Largest area with very fine, almost powdery sand is within the area of Velika Ulcinj beach and Ada. On the majority of other beaches, sand is of the smaller or larger granulometric composition, while the marine pebble drifts are present only at the couple of beaches or their parts.

Use of the marine sand and beach pebble is naturally predisposed for sunbathing, thus beaches are more or less developed. Majority of beaches are without vegetation, while some trees and rare crops of other overgrowth or grass, mainly in peripheral parts, are of the interest for the research of flora and fauna.

Alluvial soil exists in Donji and Gornji Štoj, on the Ada Island and near Bojana, in the Tivat field, while smaller areas are present in Mrčevo field, behind Jaz beach and in the hinterland of Igalo. This soil, which are predominantly sandy and clay, is located in the lowest terrains and are therefore under the influence of close underground waters, which are impacting creation of swamps and ponds, followed by the process of salination under the influence of the sea water. The soil near the river Bojana is salinated with its water, since these water are saline up to Reč. In the inshore zone of this waterstream, the soil is exposed to flooding, on the sections where protective dams haven't been constructed.

Mentioned processes are expressed in micro depressions to the highest degree in the area of (known as *knete*), as well as in the lowest part of the Tivat field (Solila). Soil in micro depressions in the Ulcinj area is of the IV to VI quality class, and is covered with swamp and pond vegetation, thus representing an excellent habitat for the game, in particular birds. Higher terrains of Donji and Gornji Štoj, Brijeg mora and Špatula (2,2-2,9 mnv), are of the better quality class (III – IV class). This soli, which is partially cultivated, is predominantly used for agricultural production of vegetables and fruits – particularly citruses, crops and flowers; one part is covered by meadows and pastures; while the largest area is covered by forest and overgrowth. Present soil quality class of Štoj and Ada (III and IV, rarely, and V class category), can be improved by melioration by one or more categories, which also relates to the area of Solila, near Tivat.

Alluvial soil, which continues from Donji and Gornji Štoj to Solana and surrounding knet (Štojska, Mala and Darzanska knet), also includes the lowest part of Zoganjsko field (up to salt basin), as well as the Bojana banks, from Šasko Lake to Fraskanjel. On these localities quality class of the soil is mainly II to III category. In Mrčevo field, most parts of this soil were once meliorated and recultivated (I and II quality class), while the smaller part, west from the river Drenovštica are still ameliorated (II and III quality class). In Sutorinsko field, near Igalo, soil has been upgraded to a I quality class by regulation of Sutorinska river and drainage and other measures.

Alluvial-delluvial soil is present, as a continuation of alluvium, in Sutorina, Tivatsko and Mrčevo field, Štoj and near the river Bojana, as well as on localities along the low coast, where starting from sandy and gravel beaches it fills out flat and slightly sloped terrains of Barsko and Budvansko field, terrains in the inlets of Valdanos and Čanj, as well as in Škaljari, near Kotor. Along the coast, this soil appears in minor areas from Meljine to Zelenika, around Bijela, Morinj, Risan, Bigovo, Perazića do, Lučice and other smaller inlets. Large areas of the flat terrains are located in the hinterland. These are the large Ulcinj and Anamalsko fields, Brisko and Spičansko fields, parts of Buljaričko field and Kutsko field, near Zelenika, as well as plateous in Sutomore, Bečići, Seljano and Donja Lastva, Baošići and Đenovići.

This soil is usually of the loamy or loamy-clay composition. On the completely flat terrain, its drainage is poor, which is, in addition to the soil composition, caused by the vicinity of underground water. Sometimes, under the influence of underground waters, swamps and occasionally ponds are created, particularly during the periods of more abundant precipitations. Intensive agricultural production is possible with previously performed melioration. Regarding the productive value, alluvial-delluvial soil, closer to the coast, usually belongs to the III and IV quality class, and mostly I, II and III, rarely IV class in the ample littoral fields.

Swampy-gley soil, which is located in the minor area in Špatula (behind Velike plaže), in Ada, Bjelila and Naluško field, in Buljarica, where it is salinated and covered with swamp vegetation (cane, sedge, willow and other species), thus representing good habitat for the game. Quality class of this soil is poor (it belongs to the VI class), however it can be brought to cultivation by melioration and transform in productive land. Further from the coast, largest area of this type of soil is located in Štojska, Mala and Darzanska knet, which also has a distinct salination process, while the larger land area on the shores of Šasko Lake is unsalted.

Brown soil is present on the mild and moderately steep parts of the coast, i.e. terrains created by flysch and mixed silicate-carbonate rocks, and rarely by eruptive rocks and limestone. Steeper terrain of flysch hills is usually strongly eroded and covered by thinning overgrowth, while milder slopes have been terraced through time and turned to arable land. Moderately steep slopes are mostly covered by bush and forest, and occasional terraces with agricultural cultures.

Brown soil has heterogeneous characteristics. Its depth differs, depending on the location, slope steepness, erosion, ground on which it was formed and other conditions. On the flysch ground it is richer with clay than with hornstone and eruptives, and is generally characterized by greater presence of skeleton. Particularly high share of skeleton is present in terrains with distinct erosion, such as bare flysch hills, with thinned vegetation layer, as well as reefs and steep slopes made of the mixture of limestone, hornstone and other silicate ingredients, where the vegetation is undeveloped, and closer to the settlements devastated by felling and fire. Brown terrace soil, along the entire seaboard is marked by skeletoid, which is of the variable contents, but is uniformly penetrating the soil layer, as opposed to non terraced soil, where the skeleton is increasing with the depth.

These soils, present in larger or smaller areas, along the entire Montenegrin Littoral, are of a different quality. Of the particular importance for the agriculture are terraced terrains with brown soil on which the olive trees are mainly grown, as well as other types of exotic fruit, including figs, peaches and citruses. Quality of this soil is uneven, because it depends on the width and length of terraces, skeleton contents, slope of the terrain and plateau of terraces, and other conditions. Therefore its quality class ranges from the IV to VI class. Outside the terraced terrain, brown soil belongs mainly to the VI, VII and VIII quality class, and exceptionally to the V class.

Red soil is the soil formed on pure and sound limestone in the conditions of warm Mediterranean climate. Largest areas of red soil, of undisrupted continuity, are present on the peninsula Luštica and Donji Grbalj, from the inlet Pržno to the Jaz beach. In this area, up to Grbaljsko and Mrčevo field, red soil is the absolutely dominant soil, mainly of the shallow layer, both on steeper terrain and on the milder slopes with usually high percentage of shadiness (30–90 %). Milder slopes are partially terraced, therefore somewhat deeper layer was created, while the lat terrain of inlets, karst sinkholes and smaller fields, such as terrains in villages in Donji Grbalj and Donja Luštica, with deep layer of settled or coluvial soil, which is a good agricultural land (I, II and III quality class). On the terraced terrain range of the soil quality is larger (III – VI category), while the steeper-stone terrain is of the poorest quality class (VII and VIII class). Similar characteristics, depth and quality class is typical for red soil on the reef Košare and Cape Kobila, above Njivice; along the bay of Kotor, from the Cape Banja to Orahovac; in several areas in Paštrovići; from Buljarice, through Čanj, up to Sutomore. Larger areas of red soil are reappearing on Volujica; from Barskog field through Zaljevo, up to Pečurice; between Cape Meret and inlet Hladna; on Možura and mount Briska. Finally, this soil is present on the hill Mavrijan and mount Bijela, as well as Mendri and Prnješu. Here, red soils are of the steeper and rockier terrain from VI to VIII quality class, while those in depressive relief forms are from II to V class.

Limestone-dolomite black soil, is also known as ***buavica***, is the soil that is formed on pure limestone, however in the colder climate. This soil appears on the steep terrain from Morinj to Risan, above Perast and Dobrota. Steep limestone cliffs in this part of the Littoral are exposed to the strong erosion due to the abundant precipitation, as the soil is constantly renewed by erosion and remains in so called initial development stage. *Buavica* is a very shallow soil, except in karst sinkholes and inlets which are appearing sporadically. Soil has a high percentage of rocky (30 – 90 %) and stony parts as well as much undeveloped vegetation.

On the steep and very steep terrain, such as limestone cliffs, reefs and peaks from Morinj to Kotor, there is practically no vegetation, therefore such terrain represents a **typical stone-field**.

Land potential and problems with the use of soil

The best quality land, important for the agriculture, is located in the coastal fields, inlets and terraces. Only the small areas of its parts belong to the coastal zone, while the majority is located in the contact zone and in the functional hinterland. Regarding its type, they belong to the alluvial, alluvial-delluvial and swampy-gley soil in the flat part, i.e. brown soil and red soil on the higher hilly terrain.
Basic problems for the more intensive and rational use of land in the plain part, of the total area of 11 100 ha, are related to the regulation of the water regime, which implies: water-drainage of swamps and undertaking measures to enable cultivation, including desalinization of saline soil; protection from the flooding, construction of protective dams and regulation of water stream basins; dewatering of damp land and irrigation.

Alluvial-delluvial land that represent majority of plain area's parts, due to the depth of the land layer and physical and chemical characteristics, with adequate melioration of specific complexes, represent a significant potential for the development of agriculture, not only in the Montenegrin Littoral, but in Montenegro as a whole.

In addition to the land in plain area, agriculture can also be developed on around 10 000 ha of terraced terrains with brown soil, as well as on inlets, karst sinkholes and smaller fields with red soil, with main olive groves and

meadows. Besides olive trees, this soil is suitable for growing peaches, figs and exotic fruit and vegetables, on the lower sheltered parts.

All arable land, from I to IV quality class category should be used for agriculture, excluding the change of their purpose, except if absolutely necessary, in towns and tourism complexes.

Forests, forest land and pastures also represent a significant potential, both from the economic and from the sports and recreational aspects (outdoors trips, hunting, etc.). Due to these reasons, and in order to preserve the appearance of the landscape, problems of erosion and torrents should be solved, as well as forestation and fire protection, with good management of the forest fund, medical herbs, game, etc.

1.1.8. Characteristic of the flora and vegetation

Flora

Among the new taxonime, endemic and rare plants are common, as presented in the overview:
Species
(Endemism Rarity Endangerment Recommended protection degree)
/E = endemic species, Rare = rare species, Rare + = very rare species, Endang = endangered species, Endang+ = very endangeed species, Z = protected species, (Z) = species that should be protected/

Aceras anthropophorum (L.) W.T. AITON	Rare		(Z)
Allium chamaemolyi L.	Rare		
Allium subhirsutum L.	Rare		
Asphodelus fistulosus L.	Endang +		
Artemisia arborescens L.	Rare		
Berteroa gihtlii Rohl.	E		
Calystegia soldanela (L.) R.Br.	Endang		
Castanea sativa Miller	(Z)		
Cephalanthera longifolia (L.) Fritsch	Rare		(Z)
Crocus dalmaticus Vis.	E (YU-Al)		
Cynanchum acutum L.	Rare		
Dactylorhiza romana (Seb.) Soo	Rare		
Dactylorhiza sambucina (L.) Soo	Rare		
Daphne laureola L.	Rare		
Edraianthus wettsteinii Hal. & Bald.	E (CG)	Rare	Z
Ephedra maior Host.	Rare	End (Ext?)	Z
Epipactis heleborine (L.) Cr.	Rare		
Epipactis microphylla (Ehrh.) Swartz	Rare		
Eryngium maritimum L.	Endang		
Euphorbia dendroides L.,	Rare		Z
Fritillaria gracilis Asch. & Graeb.	E		
Galium baldaccii Hal.	E (CG)		
Galium procureus Ehrend	E (Balk)		
Hermodactylus tuberosus (L.) Salisb.	Rare +		Z
Himantoglossum caprinum Sprengel	Rare		(Z)
Lamium lovcenicum Rohl.	E (CG)		
Leontodon incanus L.	Rare		
Limodorum abortivum (L.) Swart	Rare		
Listera ovata (L.) R. Br.	Rare		
Moltkea petraea (Tratt.) Gris.	E		
Neottia nidus - avis (L.) L.C.M. Rich.	Rare		
Ophrys L.			Z
Ophrys apifera Huds			Z
Ophrys araneola Rchb.			Z
Ophrys bertolonii Moretti			Z
Ophrys bertoloniiformis O. & E. Danesch			Z
Ophrys bombyliflora Link & Schrader			Z
Ophrys fusca			Z
Ophrys holoserica			Z
Ophrys incubacea			Z
Ophris reinholdii			Z
Ophrys scolopax ssp. cornuta			Z
Ophrys scolopax ssp. scolopax			Z
Ophrys sphegodes ssp. montenegrina			Z
Ophrys sphegodes ssp. sphegodes			Z
Ophrys tenthredinifera			Z
Orchis simia Lam.,	Rare	Endang	Z
Quercus robur L. ssp. scutariensis Černj.	E		
	Rare +	Endang +	Z
Pancratium maritimum L.	Rare +		
Platanthera bifolia (L.) L.M.C. Rich.	Rare +		
Polygonum maritimum L.	Endang +		
Polygonum salicifolium Brouss ex Willd.	Endang		
Pinus heldreichii Christ.	Z		
Rhamnus orbiculata Bornm.	E (J-Din)		
Sesili globiferum Vis.	E		
Thymus rohlenae Velen.	E (CG)		
Tulipa grisebachiana Pant.	E		Z

Particular attention should be paid to adventivne species. Advantages of the Mediterranean climate, frequency of the different types of traffic, including connections with distant countries, development of horticulture, etc., have caused the constant increase of new domesticated species- the exots in the flora and vegetation of the Littoral. Lately, as new species the following are mentioned: Adonis flamea Jacq., Euphorbia prostrata Aiton., Tagetes minutus L., Ambrosia psilostachya DC, Myconia myconi (L.) Briqu, Eleusine indica Gaertn., Paspalum distychum L., Amorpha fruticosa L. There are probably much more species like these and their number is constantly growing. Many species have a great ability of reproduction and are rapidly conquering newly inhabited areas, sometimes in even greater numbers and coverability than in their natural arals.

Decorative flora in the seaboard of the Montenegrin Littoral is the result of a long tradition of cultivation of decorative plants of domestic and foreign origin. These plants are cultivated in different manners: in the parks and other town's green areas, in yards and house gardens, apartments, etc. Previous findings expose the need to develop an illustrative overview of decorative species, which needs to be constantly amended, since new decorative species and different hybrids, etc. appear every day.
It can be concluded that the flora in the Littoral is marked by numerous endemism, rare species that are protected, as well as Mediterranean flora elements included in halophyte and psammophyte composition vegetation or make up a coniferous macchia belt, and diverse decorative flora.

Vegetation

Similar to flora, there is no specific study of the vegetation of the Montenegrin Littoral, and nether previous efforts were made to create at least an

overview of the distribution of vegetation units in this important area based on the identified material.

In the "Prodromusu of Plant Communities of Montenegro" (Blečić and Lakušić 1976), vegetation of Montenegro has been presented in the form of 37 categories, 53 ranks, 97 parcels and 267 associations. According to the Prodromusu, and latest amendments, vegetation of the Montenegrin Littoral consists of the following vegetation units:

- Vegetation of leafy deciduous forest of sub Mediterranean, hilly, mountain and sub Alpine belt (QUERCO - FAGETEA Br.-Bl. et Vlieger).
- Vegetation of damp and acid oak and beech forests (QUERCETEA ROBORI - PETRAEAE Br.-Bl. et Tx.).
- Vegetation of flooded shrubbery and willow and poplar forests (SALICETALIA PURPUREAE Moor).
- Forests and bushes of the corniferous belt of the holm oak (QUERCETEA ILICIS Br.- Bl.).
- Vegetation of mountain rose Daphnea on the limestones (ELYNO - SESLERIETEA Br.-Bl.).
- Vegetation of the rock creep (THLASPEETEA ROTUNDIFOLII Br.-Bl.).
- Vegetation in the rock cracks (ASPLENIETEA RUPESTRIS Br.-Bl.).
- Vegetation of mezofile meadows (ARRHENATHERETEA Br.-Bl.).
- Vegetation of coastal rocky pastures and dry meadows (THERO-BRACHYPODIETEA Br.- Bl.).
- Vegetation of damp coastal rocks (ADIANTHETEA Br.-Bl.).
- Vegetation of coastal cliffs (CRITHMO-STATICETEA Br.-Bl.).
- Vegetation coastal sands - dunes (AMMOPHILETEA Br.-Bl. et Tx.).
- Vegetation of nitrofile coastal sands (CAKILETEA MARITIMAE Tx et Preg.).
- Vegetation of nitrophile communities (CHENOPODIETEA Br.-Bl.).
- Vegetation of dry deponies (ARTEMISIETEA Lohm., Prsg., Tx.).
- Vegetation of ponds and swamps (PHRAGMITETEA Tx. et Prsg.).
- Vegetation coastal swamps (JUNCETEA MARITIMI Br.-Bl.).
- Vegetation of freshwaters (POTAMETEA Tx. et Prsg.).
- Vegetation of bractic waters (RUPPIETEA MARITIMAE J. Tx.).
- Vegetation of the sea and ocean (ZOSTERETEA Pignatti).
- Vegetation of saline habitats (SALICORNIETEA Br.-Bl.).

Condition of the flora and vegetation

Evaluation of the flora and vegetation condition in the Montenegrin Littoral, i.e. the most typical zones or specific parts of vegetation hat is typical for the area is presented within the following zones or belts.

Halophyte zone includes flora and vegetation on the salty habitats close to the sea, i.e. plant world of the swamp habitats on the flat coast, in Tivatsko field and Štoj, near Ulcinj. Due to urban planning interventions, new construction and overcrowding of the beaches, most endangered are the plants of the sandy habitat, where some are in the process of complete extinction, such as: Pancratium maritimum, Polygonum maritimum, Cakile maritima, Calystegia soldanela, etc. Halophyte swamp habitats are also endangered, since their number is small and they cover small areas. Therefore, even the minimum melioration intervention and water regulation on these areas can endanger the entire vegetation / flora. Such species are: Aster tripholium, Arthrocnemum fruticosum, Salsola soda, Bupleurum tenuissimum, Limonium angustifolium, etc. The least endangered is the plant world on steep rocks along the coast, because is the least accessible.

Coniferous macchia belt (Orno quercetum ilicis) is present on the significant area and marks the entire landscape of the Montenegrin Littoral. In Boka Kotorska, macchia is inhabiting the entire peninsula Kobilu and Luštica; it is largely present in Donji Grbalj, on Topliš and Spas near Budva, between Petrovac and Sutomore, where on the Crni Rt larger clusters of old trees are present, as well as remnants of original forests Quercus ilex, in the area of Ratac and Žukotrlica, between Sutomore and Bar; stretching further on the larger areas between Bar and Ulcinj. In the past, this belt was mostly endangered by land clearing and felling, causing degradation of the original forests Quercus ilex to the macchia stadium. Today's factors that are endangering the coniferous belt are significantly different. Major cutting and thinning have disappeared; therefore macchia is recovering and is enriched in numerous localities. However, several other factors are deeply affecting not only the coniferous macchia belt, but also the landscape in general. This is primarily tourism related construction (hotel complexes, camps, etc.), and other activities, such as: construction of roads, expansion of towns' settlements, individual construction of residential and holiday homes, development of beaches, etc., and quarries. Recently fires have occurred on larger areas, which have caused disasters, devastation of the macchia, in some parts of the area of Grbalj, near Igalo and on other localities. Therefore, this coniferous belt should be protected in general, most strictly in the vicinity of beaches, along tourism complexes and near the highways, since its protection means protection of the entire flora which creates this belt.

Flora and vegetation of steep and open limestone rocks inhabits the slopes of the mountains of the Montenegrin Littoral and separate limestone blocks along the coast, on which many rare and endemic species are growing, such as: Galium baldaccii, Moltkea petraea, Portenschlagia ramosisima, Ramondia serbica, etc. These habitats are endangered primarily by the opening of quarries, construction of roads and also by collectors that are collecting flora (botanists).

Flora and vegetation on the reefs and on tops of Montenegrin mountains is present in the habitats on Rumija, Sutorman, Lovćen and Orjen, whre the large number of endemic, rare, decorative and other important plant species is growing. Particularly significant are: Edraianthus glisicii, Silene tommasini, Amphoricarpus neumayeri, Lamium lovcenicum, Gymnospermium scipetarum, Fritillaria gracilis, Pinus heldreichii, etc. Rich and interesting flora of this habitat represent the subject of the interest of botanists and other collectors that can endanger particularly small habitats with excessive collecting.

Characteristic phytocenosis and clusters are: 1) laurel trees community and oleanders above the well Sopot near Risan, which inhabits a significant area on the severe carst above the well Sopot.; 2) clusters of chestnut trees (Castanea sativa) near Kostajnica and Stoliv in Risan-Kotor bay of Boka and smaller fragments in the vicinity of Tivat, Budva and Ulcinj. Very important from the scientific and protection aspects are remnants of the forest community of Skadar dub in Štoj and fragments of the Kermes Oak (Quercus coccifera) , near Ulcinj, water and pond vegetation of the Šasko Lake, etc.

Small number of old trees have been preserved in the Montenegrin Littoral. The most interesting is the old oak (Quercus lanuginosa) in Donji Orahovac, in Boka, individual old trees or groups of the Holm Oak trees (Quercus ilex) in Savina near Herceg-Novi, on Ilinoj kiti above Igalo, on the Crni rt near Buljarice and in Sutomore, as well as the old chestnut trees (Castanea sativa), old olive trees (Olea europaea), old exemplars of the Kermes Oak (Quercus coccifera), near Ulcinj, etc. Majority of these objects require previous restoration and conservation, because they are prone to extinction due to their age.

Community of clusters of the Hungarian oak (Quercus conferta) inhabits a significant area with flysch groun, in the vicinity of Ulcinj. These forests are completely unexplored, therefore they should be researched and from that aspect conclusions should be made on their character and phytopcenosis status, after which the protective measures should be undertaken.

Special overview of the forests

Once covered with high and thick forests, wider area of the Montenegrin Littoral is nowadays marked by a small degree of forestation, degraded natural structure of forests and lack of economically valuable forest tree types, with the domination of law scattered forest formations and bush-macchia.
Considering that the forests have been partially elaborated in the previous chapter on flora and vegetation, the following text will provide a zonal overview of the dominant forest components, i.e. their remains – by the attitude profile, starting from the coast up to the mountain tops in the hinterland.
The first altitude belt – from the very sea coast up to 300 mnm is marked by a coniferous macchia belt with remains of the original forest of the Holm Oak (Quercus ilex) with associated strawberry tree (Arbutus unedo) and other species in the lower grounds. This belt is typical for Luštica, parts of Grbalj, surroundings of Budva, Bar and particularly Ulcinj, where fragments of the Kermes Oak (Quercus coccifera) and Skadar's oak (Quercus robur scutariensis) (Štoj) can be seen.
Following this belt, goimg towards higher altitudes above the sea level there are the deciduous belts:
- Belt from 300mnm to 600-700mnm that is marked by oriental hornbeam forests (Carpinus orientalis) with ash, Macedonian oak, butcher's broom and other species in the lower grounds.
- Belt from 600-700mnm to 900-1000mnm that is marked by forest formation of the black hornbeam (Ostrya carpinifolia).
- Belt from 900-1000mnm to 1600mnm is inhabited by beech, on the mountains Orjen, Lovćen and Rumija on the north side.
In all of the above mentioned belts, due to extensive devastation of the forests in the long history of human civilization in this area, there are many devastated areas inhabited by the secondary vegetation, predominantly wormwood (Salvia officinalis), which is a very important species for the protection of the terrain from the previously stated erosion. In addition, this species is meliferous, therefore it is also important for beekeeping, and due to the high concentration of essential oils it is used for the pharmaceutical purposes.
Following the beech belt, on the top of the mountains-particularly on Orjen, and o the smaller scale and in fragments on Lovćen and Rumija endemic Bosnian pine (Pinus heldreichii) is present.

Mediterranean zone of Montenegro, with the vegetation period that lasts around eight months, is the area with prevalent coniferous vegetation – communities of the Holm oak and macchia (thick and relatively high coniferous bushes created by devastation of forests of the Holm oak with black ash), directly along the coast from Ulcinj to Herceg-Novi, on the somewhat colder expositions and milder slopes, with somewhat deeper soil. Percentage of prevalence of the forest community of the Holm oak and macchia amounts around 35% of the total area of the costal region of Montenegro. Wood mass by one hectar amouns 20-25m3/ha.
Forests of the Holm oak with black ash are spatially and ecologically between coniferous and deciduous forests, therefore they should be differentiated from the pure Holm oak forests. These are pure coniferous forests or macchia made of coniferous species of the thick composition. They are present on the very warm habitats on the most southern part of Montenegrin Littoral and in the area of Bokokotorski Bay, where the presence of this community amounts around 30% of the total area, while the wood mass by the hectare amounts 15-22m3.
Community of spiny shrubbery is present in fragments in the area of coniferous vegetation and macchia as a degree of its devastation. The wood mass by the hectare amounts around 8m3.
Vegetation map of the coastal region of the inner Bokokotorski Bay is very complex – there are forest community of macchia, tea plants and butcher's broom with various devastation stages, as well as the community of the tea plant and spiny shrubbery. Additionally, there are communities of laurel trees, domestic chestnut, oleander, as well as different types of stone-fields.
Around Ulcinj, there are permanently green kermeses oak with deciduous elements, which occupy a relatively small area of 5%-10% of the area compared to the Holm oak forests with black ash, prevailing mainly in colder expositions with milder slopes. The wood mass by the hectare amounts 30-40m3.
On the lower terrains, mainly up to 100 mnm, there is a community of coniferous laurel forests, present from Ulcinj to Herceg-Novi, mainly in damp places. Around 10-15% of the coastal belt area is covered by this community. The wood mass by the hectare amounts around 15-22m3/ha.

Degraded macchia represents anthropogenuous degradation stages of coniferous forests and bushes on

the coast, i.e. degradation-progradation stages of laurel and chestnut coastal forests, where stone-fields are practically with further devastation of degraded macchia. Wood mass of degraded macchia per hectare amounts around 5-8m3.
In the area from Bar to Ulcinj, in the coastal region, 160 types of trees and bushes have been established, whereof around 45% relates to autochthon species, while in the area of Boka, 264 species of trees, bushes and bended plants have been established.

Since the above mentioned forest communities are located on the terrains which are prone to erosion (pluvial and eolic), their dominant function is to protect these terrains from erosion. In addition to the fulfillment of this function, these forest communities are important for the maintenance of the water regime in the severe coastal stone - karst, and also to provide safe habitat – shelter for many other species related to the forest ecosystem and depend on it. Decorative aspect of forest communities and their importance for the landscape, particularly in the coastal zone, are elaborated in the part of the plan that is dedicated to the landscape and ambient specificities of the coastal zone.
On the other hand, macchia belt, which the local population has not been cutting intensively lately, has been significantly recovered and strengthened, which increases the risk of its destruction by the fire.

Fires on the entire south Adriatic region represent a great problem, because they occur mainly during the dry periods of the year. Coniferous vegetation and its degradation forms, conifer culture – mainly black pine, Alpine pine and littoral pine are very sensitive to the fire, both underground fires, and overground and higher fires, which are easily spread with even the slightest wind and are therefore hard to control.
This problem is even greater if it's known that fires can drastically devastate the vegetation cover and pedologic layer, which is very difficultly renewed, mostly as grass or low bushes of spiny shrubbery.

Restoration of burned areas is a very expensive and long term process with seemingly simple interventions of forestation, semination, etc. However, due to the burnt humus layer in pedologic profile, which in this case changes its structure and texture, crop of seedling is often low, and only the grass formation is rapidly regenerated, nevertheless, during the drought periods, newly formed layer of grass is very sensitive to the repeated fire, therefore it is very common that in the period of few years there are more fires on the same location - in this case humus layer is permanently destroyed and sharp development of pluvial and eolic erosion is encouraged.
There are many such examples on the Littoral, e.g. peninsula Luštica, slope Glavati above Prčanj, Kumbor, Zelenika, slopes of Paštrovačka gore, Donji Grbalj, etc.
Forest management in the wider area of the Littoral is assigned to the forest holdings in Cetinje, Kotor and Ulcinj and Public Companies for Communal and Residential Activities in Bar and Budva.

1.1.9. Characteristics of the fauna

Based on zoogeographic characteristics, in the fauna of the Montenegrin Littoral, all cosmopolite species can be observed – widely spread all over the world; holarctic species - inhabiting northern hemisphere; paleartctic species – inhabiting the Europe, Asia and Northern Africa; Mediterranean species – that can be considered as Mediterranean endemites; and endemic species – inhabiting more or less limited areas (eastern/western Mediterranean endemites, Adriatic, Balkan, Dinaride, Montenegrin emdemites, etc).

Habitats and zoocenosis

Narrow belt of the Littoral, with numerous specific spatial characteristics, is marked by diversity of habitat and animal communities, whose characteristics, condition and endangerment have been particularly emphasized.
Habitats and zoocenosis zones of sea waves activity encompass the belt which is leaning directly on the seaboard, i.e. the area usually within the reach of the sea waves. The belt is very narrow (2-3 m), except on the sandy strands, which are marked by the lack of mainland vegetation. Permanent animal habitat is represented by snails and shells (periwinkles, cockles, Noah's Ark shell) and sea crabs that are coming out to the mainland. Regarding the mainland fauna, there are birds that are finding food in that zone (sea gulls, plovers, crows) or the resting place (sea gulls, cormorants, halcyon).
Benthic communities have been preserved on the "wild" coast, while they are endangered in the ports and in places where the coast has been developed. They are particularly endangered by the illegal and unplanned construction, and by pollution from town sewerage waters, and less by the tourists (collecting periwinkles).
Habitats and zoocenosis of the sandy strands on the broken "string" of the beaches of the Montenegrin Littoral is marked by sandy – pebble ground of the different composition and grain size. The belt that is closest to the sea is made of the sterile sand, without vegetation, while moving forward to the mainland halophyte vegetation first appears, followed by mainland vegetation, which is usually in harmony with the one in the hinterland. Specific fauna doesn't exist in the lower part, except for the occasional residing of birds that are feeding with waste (sea gulls, crows).
Velika plaža in Ulcinj and, in the smaller scale, Buljarica and Jaz beaches, have a flora and fauna hinterland. Agricultural hinterland of Jaz beach and the swamp zone with cane in the hinterland of Buljarica beach, are marked by the presence of amphibians (Dalmatian frog, Greek frog, salamanders) and freshwater-semisaline water fish species (mullet, sole) in smaller water streams, which are flowing into the sea in that part.
Very wide and environmentally complex hinterland of Velika plaža is the widest spread sand zone in Montenegro and is the only area with three parallel dune "belts". These dunes are low, covered with vegetation; however they are distinct and are largely determining the profile of the terrain. First belt is represented by the bare, sterile sand behind the beach, while the other, up to 200 m drown in the inland, and is covered with vegetation of prickly grass and some representatives of halophyte vegetation. In the "valley" between the second and the third belt there are several smaller swamps and pond terrains, as well as the remains of previous forests of Skadar oak. The "ridge" of the third belt of dunes and further towards the interior of borders with the agricultural area and tourism-

residential structure of the settlement Donji Štoj. Sandy areas of Velika plaža have very well developed specific zoocenosis. Many birds, such as seagulls and terns, crows and Kentish plover are regularly feeding on the bare sands of the first belt of dunes. Animal communities on the grass covered sands are marked by the presence of the rare nesting birds (oystercatcher, stone curlew and collared pratincole), rare micromamals (shrew and voles), and endemic fauna of reptiles and insects. The area behind the second belt of dunes has the richest fauna, whose composition and diversity can be compared to the great abundance of the Skadar Lake.
Habitats on the majority of beaches are mostly preserved, while the occasional disturbances are the result of “illegal constructions”, and large number of tourists during the summer season. Disturbance implies pollution with the waste waters and disturbing of the animal world, particularly during the tourist season, and already existing exploitation of sand.

Habitats and zoocenosis of macchia, degraded macchia stone fields are present on the larger or smaller scale along the entire length of the coast. Macchia with the present of the Holm oak, strawberry tree and laurel can be found only sporadically in Boka Kotorska, while the best quality groups of macchia can be found on Luštica, mainly in the inland of the peninsula. Bushes with the elements of macchia are growing along the entire Littoral on places where the rocks are not too steep, where degraded forms of bushes, such as degraded macchia are also present. Stone-fields represent a specific habitat with scarce vegetation. Animal habitat of the stone-fields and bushes is very complex and represent a real reservoir of endemic Mediterranean species, particularly insects (Mediterranean dove tail), reptiles (sharp-snouted rock lizard, karst lizard, glass lizard, snake, leopard aesculapean snake) and numerous termophile species of singer birds (whitethroat, gray warbler, garden warbler, olivaceous warbler, rock nuthatch, etc.). Regarding mammals, there are jackals, which are irregularly appearing in the most southern coastal belt.
Habitats are mainly in the different stages of degradation, endangered by fires, illegal construction and infrastructure.

Habitats and zoocenosis of the swamp are present only in the vicinity of Tivta (Solila), hinterland of the Buljarica beach, and particularly in the hinterland of Velika plaža, near Ulcinja. Solila, which represent the remains of previous salt plant are marked by the gradual transition from mainland to water biocenosis. These are small, but important winter habitat of water birds (ducks), as well as the winter habitat of some birds from the family of water rails (Rallus aquaticus, Porzana porzana). Swamps and ponds in the hinterland of Velika Plaža, located in the dents between the dunes are of the greatest importance for the fauna. Although they are not large, they have a very complex fauna, which in its composition can be compared with rich swamp communities of the river Bojana, Šasko Lake and Skadar Lake. This complex biological community is made of amphibian fauna (green frog, Skadar frog, salamander), swamp representatives of reptiles (plain and lake copperhead), "water” insects (dragonfly and some beetles), and nesting birds, such as water birds (ducks, cots, divers, warblers). These communities can be considered as the most developed and most complex in the entire Littoral. It should be considered that these habitats make up a unique biological complex with zoocenosis of the salt plant "B. Sekulić", where salt basin can be treated as the "artificial” lagoon as the fauna object of the first category (particularly ornithological).
Habitats are mainly preserved, particularly Ulcinj habitat. Habitats are endangered by construction and pollution, in the case of Solila, while Ulcinj swamps are endangered by pasture, insufficiently regulated hunting and ”illegal” exploitation, and also by the planned transformation into the park-type lakes and fish ponds .

Habitats and zoocenosis of deciduous forests and bushes, as remains of original forest of Skadar’s oak (Quercus robur scutariensis), are not severely divided from the swamp areas, instead they are intertwined.
Nowadays, forests are degraded, since oak trees have been mostly cut, therefore mixed forests are dominated by alder and swamp (white) ash. Rich and complex fauna of these habitats, similar to the one on the Skadar Lake shores and deciduous forests in general, is marked by the significant presence of songbirds, occasional presence of larger mammals (foxes, wild boar) and a very complex world of forest insects. There is also a significant presence of some swamp birds colonies (cormorants, on Ada ad along the banks of Bojana). This zone has a particular importance for the development of the area (and fauna protection) during winter months, which becomes the winter habitat of numerous migratory birds, some of which represent the hunting game (ducks, coot, pigeons, and particularly woodcock).
Entire biological community is in the various stages of degradation. Habitats have been preserved in fragments, however not in the original form, considering that felled forest areas have been converted to agricultural areas. Habitats are endangered by cultivation, urbanization, pastures, fires and insufficiently regulated hunting.

Habitats and zoocenosis of the settlements and agrarian areas are related to specific areas within the contact zones of the narrowest coastal belt. Important for this belt are the habitats such as old town centers in Herceg Novi, Kotor, Budva and Ulcinj. Their fortification walls and traditional houses are inhabited by some rare birds. This primarily relates to swifts (black and a very rare, pallid swift) and swallows (house martin and less so red rumped swallow). There are also daws and house sparrows, while in some towns there are flocks of domestic pigeons ”gone wild".

Specific zoocenosis are created on the rural and agricultural areas in the hinterland of the coastal belt. Most important are the ones behind Velika plaža (Donji Štoj), which are continued with a mixed forest community. Cultivation of these areas is incomplete and irregular and includes growing of crops and vegetables, and exotic fruits fields in some areas. Fauna is marked by the presence of "agrarian" species (birds -larks, pipits; mammal – field vole and coone; insects – daily butterflies and cicadas), and so called synantropic types (adjusted to the life with humans), such as collared dove, crow, magpie, house sparrow, pheasant (introduced), rats and house mice, insects connected with waste, such as cockroach.

Condition of these habitats is stable, and with the further development of towns and agriculture, development of related animal community should be expected. Generally, habitats are not particularly endangered, however, locally and occasionally, some negative effects of hazardous waste can occur if they are not disposed and neutralized properly.

Hunting game

Hunting game in the Littoral include: feathery game (ducks, pochards, coots, snipes, partridges ..) and fur game (wild boar, rabbit, fox, jackal, wolf…). These are the species that locally inhabit hunting grounds of coastal municipalities, or are migrating across the area of these hunting grounds (migratory bird species).

Hunting is less based on the culling of farmed game, which are few, namely:
- breeding site of pheasant (organization for game breeding and hunting "Rumija" from Bar)
- breeding sites of the rock partrige and rabbits (hunting society "Orjen" from Herceg Novi)
These breeding sites are located outside the coastal zone, in which only on the island Sveti Nikola, opposite, fallow deer is breed (hunting society "Primorje" from Budve).

Hunting grounds in the costal region differ according to the dominant hunting species. Therefore, wild boar (in addition to other fur game) is a recognizable hunting species in the hunting areas: "Rumija" (Bar), "Paštrovačko hunting society" (Budva), "Orjen" (Herceg Novi) and "Boka" (Kotor), while ducks and other feathery game, is typical for the hunting area of the "Forest Management Ulcinj" from Ulcinja. Area of this hunting ground represents a significant part of a large Euro-Asian- African biocoridor of many migratory bird species. Hunting that is organized for foreigners, known as "foreign hunting tourism" is represented mainly in this hunting ground.

Pursuant to the Law on Hunting, hunting season, depending on the type of the hunting game, lasts from July 15/August 15 to March 15.

Vulnerability of the fauna

Vulnerability factors are the following:

General vulnerability of the living world, particularly nests of migratory birds, killing during migration, etc. This negative factor has been recorded during the research of vulnerability of biodiversity on the global level. Its effects are spreading on the coastal zone fauna through the decrease of the number of population of migratory species. From the aspect of spatial planning and development of the coastal zone, only minimal impact can be made on these factors, however, help can be provided through the inclusion of Montenegro in the global efforts for elimination of these factors.

Cross border pollution is transmitted through the air and water. Previous research shows that Montenegro and especially its Littoral are largely spared from the negative effects of these factors. This factor is also outside the control of the coastal zone. Its solution requires inclusion of Montenegro in the global solution process, particularly related to the protection of the Mediterranean.

Vulnerability originating from the direct hinterland of the coastal zone.
- Direct effects on the size of fauna. It is manifested as a consequence of unorganized hunting, especially on the hunting grounds of the Skadar Lake and in the area of the municipality of Ulcinj
- Pollution of the coastal zone from the hinterland is noticeable in the cities, places with significant tourism infrastructure, agricultural hinterland. Particularly endangered are Bokokotorki Bay and the surroundings of the river Bojana confluence, which leads the pollution into the sea, regardless of the self purification effects of the Skadar Lake. Problem should be solved on the pollution spot. Specific problem of the coastal zone is the drainage of faecal and industrial waste waters through the territory of its mainland, and the discharge of these waters into the sea.
- Negative effects of traffic due to pollution and disturbances.

Vulnerability factors of the fauna from the coastal zone area.
Direct destruction (hunting). Factor of minor importance. It is present in Solila, Luštica, and Štoj. Largest negative effects are suffered by the woodcock population in their winter habitat. (This study doesn't include the subject f sea fishing).
- Development of infrastructure, tourism and other facilities. Intensity varies from place to place. Beaches are particularly endangered.
- Pollution. Present in tourist centers, especially during tourist season. Water is endangered more than the mainland.
- Disturbance. Present in tourism centers during the season. The most endangered is the hinterland of Velika plaža, where population of rare nesting birds is endangered.

1.1.10. Bioecologic characteristics of the maritime zone

Maritime ecosystems create a dynamic complex of open waters and seabed, where the division to benton and pelagic area has a methodological character.

Bentos biocenosis of the open sea

Seabed settlements (bentos biocenosis) of the Adriatic sea belong to the Mediterranean area according to their basic composition, although they have some individual characteristic, developed during the geological formation of the Adriatic, which are still developing due to effects of various factors – primarily relative isolation and specific bioenvironmental condition.
Majority of the living world of the Adriatic belongs to the phytal (littoral) or coastal system, which stretches in the area of continental shelf, up to around 200 m of depth. This system is marked by the presence of bentos chlorophyll plants and mutual dynamic relation of flora and fauna components of Benton biocenosis.

Adlittoral, as the final step of terraced settlements, represents an area with halophyte blossoms and animals adjusted to the vicinity of the sea. It ends on

the rocky coasts and sandy beaches, marking the boundary between the settlements on the mainland and marine settlements (supralittoral), from which bentos biocenosis of the sea are formed on the steps.

Supralittoral and mediolittoral represent upper steps of the littoral system of the sea upper step. Common characteristic is the permanent or occasional condition outside the water - emersions. Biocenosis of these steps along the Montenergin Littoral are linked to predominantly hard ground of limestone and dolomite rocks, and in smaller parts to sandy deposits of beaches and other forms of movable grounds.

Infralittoral is the area with optimal conditions fro majority of autotrophic bentoa species. This step is marked by the rich vegetation (best developed algae forests and seagrass meadows), and rich and diversified animal world. Infralittoral starts from the level of normal sea tide and ends wih the lower boundary of seagrass meadowes, i.e. in the southern Adriatic, at around 30 - 40 m.
Rocky bottom of the infralittoral, is present along the coast and is very much suitable for the development of biocenosis of phytophile algae, as a dominant biologic community on the firm ground. Biocenosis of phytopile algaes appears in the form of different facies, however, there are animal species that are present in the entire biotope, such as crab (Acanthomyx), shells (Cardita, Patella, Gibbula, Rissoa i dr.), and sea urchins (Paracentrotus, Echinaster), different fishes, especially (Labridae, Gobidae, Blenidae, etc.). On some localities, rocks are almost entirely covered with algae, somewhere with sea urchins, particularly Paracentrotus lividus, which can browse entire rocks and make them bare. On the rocks with thinned algae cover, colonies of photophile sponge (Verongia aerofoba) are formed. With increase water pollution, typical biocenosis of photophille algae becomes more deprived of species, therefore biocenosis is dominated by few species adjusted to these conditions, such as sea lettuce (Ulva lactuca), among whose large leafs lives the sea slug (Aplysia depilans), as well as the octopus (Octopus vulgaris), and some species of coastal fish.
Movable bottom of the infralittoral is mainly covered with Posidonia oceanica (which is well developed on sandy and muddy bottom along the coast) or other seagrass. In the biocenosis of Posidonia meadows four biocenosis elements are represented: sesil animal and plant species (several algaes, bryozoa, hydroid, polyhets, etc.); vagil zoobentos species (larger number of shells, snails, prozobranhia, small starfish, small jellyfish, and some specific isopods, copepods, amphipods, etc.); nekton species (different crabs – particularly ostracods, copepods, amphipods, and decapods - several species of small shrimps); and very numerous epiphyt microfauna (different foraminifera, flagellates, etc.). In the Posidonia meadows eggs are laid by many fishes and other animals. This biotope is related to the largest shell in the Adriatic sea - noble pen shell (Pinna nobilis), as well as the decapode crab (Pinnoteres) - guardian. Regarding fish fauna, species from the family of Labridae, Seranidae, Sparidae, Gobidae and Scorpenidae are dominant. Some localities of shallower areas of movable ground are inhabited by the biocenosis seagrass - Zostera (which includes almost same fauna component as biocenosis of Posidonia meadows).

Cirkalittoral step takes the largest part of the shelf. While the supralittoral, mediolittoral and infralittoral step together take a narrow belt of the inshore sea, cirkalittoral step stretches towards the pučini up to the 200m depth.
Solid ground of cirkalittoral step is marked the settlements of mixed composition of vegetal and animal elements and settlements with distinct domination of the vegetal element, made of coralligen or coralline complex. Corallingen biocenosis in the southern Adriatic includes termophyle elements of eastern and south eastern Mediterranean. Biocenoses of semi-dark caves is inhabited exclusively by animal elements, particularly red coral (Corallium rubrum), which is well developed in the southern Adriatic as well as the sciaphille sponge (Verongia).
Movable base of the cirkalittoral step as a biotope is made of areas significant for fishing (white bentos fish, chephalopods, crabs, shells). Biocenosis of detritic parts of the seabed is marked by numerous preferential-characteritic species, such as sponge (Suberites domuncula), starfish (Astropecten irregularis), lamprey (Ophiura albida), Cardita acuelata, slug (Apporhais pes pelecani) and Microcosmus vulgaris; and many additional species, of which some represent indicators of specific environmental conditions (sea urchins, shells, stone corals, etc.). Biocenosis of sandy and detritic parts of the bottom of open sea is marked by sea urchins (Cidaris cidaris), barrel snail (Dolium galea), and shelled crabs - Maia verucoza, etc. This biocenosis includes typical species of the open Mediterranean and is important from the environmental aspect due to its abundance of different fishes (Zeus faber, Mullus barbatus, etc.), with fishes from the famiy Selachie are usually prevailing over more appreciated salmon fish. Large forms of sessile fauna, such as sponges, sea urchins and shell conches – especially small pen shell (Pinna pectinata), make difficult the fishing with puling nets - trawls (area opposite Bara on the 80-100 m of depth). In the biocenosis of detrictic, more or less muddied, parts of the open seabed fish include sole (Solea solea and solea vulgaris), mullet (Mullus barbatus), picarel (Maena), etc.; pelagic species of sardines (Sardina); and crabs. Biocenosis of the muddy bottom of the opean Adriatic is the richest habitat of crab-shrimps (Nephrops norvegicus), regarding composition and distribution of many fishes, especially cod or hake (Merlucius merlucius), and economically important chephalopods species (Cephalopoda) Sepia, Loligo i Eledone.

Starting at around 200m depth, phytal system is followed by the affital (deep) system, on the seabed is determined by the batial step. This step is marked by scarcity regarding quantity, due to the lack of food sources. Future research should provide a picture of biocenosis of the batial step of this part of Adriatic.

Biomass generation

The living sea resources depend on the marine environment, mainly primary organic production (trophic capacity of the environment) which is contingent on nutrients, primarily on phosphates and nitrates. The accumulation of these nutritional salts depend on numerous factors, particularly geomorphologic characteristics of the seabed (insolation, evaporation,

wind regimes and sea currents, rate of vertical mixing of surface and deep waters, and the like), and especially freshwater drift from the land.

Montenegrin Littoral belongs to the south Adriatic Sea which, considering the configuration and depth of the sea bottom, as well as the immediate connection with the Mediterranean, in many ways differ from the much shallower north and middle Adriatic.

The mean value of phosphates in the South Adriatic basin amounts to 3.45 mg/t and is lower than the averages for the north and the south Adriatic (up to 7 mg/t). The maximum values of 7.6 mg/t, 8.5 mg/t and 11.5 mg/t have been found in the depths of 100 m, 270 m, and 1,000 m.
The amounts of nitrates and nitrites are similar or somewhat lower than averages in other parts of the Adriatic Sea (38 mg/t of nitrates and 37 mg/t of nitrites).
The average amounts of oxygen in the south Adriatic are somewhat lower than in the north and middle Adriatic, ranging around 7 ml/l. The maximum values are reached in June, at the depth of 30 m, since at that time and at that depth the photosynthetic value is the highest. This is supported by high values of oxygen saturation of over 100%. During algal blooming in the Boka Kotorska Bay in July 1975, the amount of dissolved oxygen was 8.10 ml/l and oxygen saturation reached 160.40%, and over 100% in the entire water column.

According to the productivity categorization of the global oceans and seas, at its medium value, the Adriatic sea comes under the third category, with productivity of 150-250 mgC/m2/a day, i.e. medium productive seas at the boundary of oligotrophicity.
According to the division of the Adriatic sea on productive zones, open sea of the south Adriatic comes under the A zone (primary production of 55 grC/m2/a year), the inshore waters under the C zone (60 grC/m2/a year), and Boka Kotorska Bay and the area around the estuary of the river Bojana come under the D zone (over 150 grC/m2/a year). These are estimated values because the primary production in this part of the Adriatic sea has not been systematically measured.

The amount of live sea resources is directly or indirectly contingent on phytoplankton, as the main producer of organic matter, and zooplankton, which consummates the produced organic matter and makes it available to organisms higher in the food chain.
The latest research of the inshore area of the south Adriatic sea showed high values of primary production of 14.94 mgC/m3/a day and the very maximum of phytoplanktonic biomass.
In the Boka Kotorska Bay, 91 phytoplankton taxa have been identified in addition to their great density. The food base of total phytoplankton biomass in the neritic area of the open, south Adriatic sea is dominated by Nitzscheia and Dinoflagellate diatoms.

The density-biomass of various zooplankton systematic groups, especially Copepodes, is significant for nourishment of many fish species and their development stages. Copepodes in the south Adriatic sea represent some 80% of total zooplankton biomass.

Density of zooplanktons is lowest during winter, and the maximum values are reached in spring. Quality composition is a result of mixing of water masses that bring zooplanktons from the open to the inshore sea. The predominant taxa among copepodes of the south Adriatic sea is Ctenocalanus vanus, some 10% of total number of copepodes, followed by some 7% contribution of Centropages typicus and Temora stylifera, and a rather abundant Oithona species. The global index of taxa variety, as the quantitative structure indicator of this group, amounts to 6.18 and is twice the value of that in the north Adriatic sea. The abundance of zooplankton biomass in spring, in addition to other ecological benefits, is owing to much larger terrestrial inflow with a larger content of inorganic phosphate and nitrate salts and phytoplankton as their main nutrients.

The maximum quantity of zooplankton in the Boka Kotorska Bay is in March due to the ingoing of neritic eurythermal and eurichal species, their larvae and juvenile stages, which prevail in zooplankton community of the Bay. Dominant species of copepodes are Centropages kroyeri, Acartia clausi, Paracalanus pargus, Euterpina acutifrons, Oithona nana, and Oncaea subtilis. At the end of winter and the beginning of spring, there is a substantial increase in nauplius larvae and various juvenile stages of these species. The maximum abundance is in mid-April, the time of the main spawn of mussels (Mytilus galloprovincialis), resulting in plenty of larvae of this shellfish in planktons, especially in the shallower part of the Bay. After the spring maximum, plankton biomass starts to gradually decrease until end-July when another lower peak occurs.

The assessment of total plankton biomass, i.e. the actual food concentration in the south Adriatic sea waters remains a problem, especially since there has been no bioproduction research (using isotopic methods – C14) or chlorophyll research in this part of the Adriatic maritime zone.

Fishing biological resources

Populations of edible organisms and organisms serving for some other purposes (obtaining raw material for chemical and pharmaceutical industries, some other industries, jewellery, and the like) make up fisheries – biological aquatic resources. These raw materials in the world fisheries are, for the most part, made of various types of fish, mollusc and crayfish that are caught by using various fishing tools and types.

Natural and anthropogenic factors affect the population of species that are subject of any kind of exploitation. Natural factors are environmental factors that determine the size and fluctuation of population, and anthropogenic factors are the intensity and effect of fishing on population (pollution, including euthropication, various construction activities on the sea, and the like).
The maximum sustainable yield (MSY) of biological resources is determined through a systematic control of population condition. No systematic assessments of biological resources biomass in the Montenegrin Littoral have ever been made and there are no statistical data on any king of fishing. The only information that could provide for some kind of development estimates refer to trawler fishing around the shelf of the Montenegrin Littoral, including the Boka Kotorska Bay. According to

this data (obtained by measuring the standard trawling over one hour - for Boka Kotorska Bay in the period 1963 -1964, and for the shelf area during 1948, 1961 and 1973), the medium biomass of trawler shoal of fish, cephalopoda, and crayfish on the shelf surface amount to some 3,400 tons. According to the weight structure, this biomass consist of 37.3% of Chondrichtyes, 59.1 % of Osteichthyes, 3.5 % of Cephalopoda, and some 0.01 % of Crustacea.
This data provide for the estimate that the level of maximum sustainable yield, depending on the mortality ratio of these resources, ranges between 1,300 and 1,700 t/a year. The information that trawler fishing on the Montenegrin Littoral amounted to a mere 3.8% of total fish catch of SFRY in the period 1976 – 1986, shows that the shelf of this part is almost intact, that is, that the catch could increase by much more. Unlike trawler resources, pelagic and inshore fish resources at the Montenegrin Littoral have not been estimated. However, it is certain that neither these resources have been exploited to a larger extent, as shown in statistical data (period 1976-1986) where oily fish catch at the Montenegrin Littoral amounted to a mere 0.35% of total fish catch of SFRY.

A further development of fishing requires an assessment of pelagic fish biomass (primarily sardines and anchovy) using the method of assessment of egg production in plankton and partial fecundity.; update assessments of trawler resources using the method of sample test surfaces, followed by continuous monitoring of these resources. Later on, examine the cost-effectiveness of some new types of fishing (tuna fishing by trammels; tuna and swordfish fishing by floating gillnets; fishing by demersal trawlers in the south Adriatic shelf; opportunities for trawler fishing development on the continental shelf and the use of floating trawlers for small oily fish, and the like).

Other biological resources

During the longstanding researches of the Montenegrin Littoral, the situation and changes in the population of eurichal types of young fish were examined in order to discover the deposits of young for the use in aquaculture. These researches were performed on estuary sites of Sutorina, the Mrčevska (Jaške) river, and the right estuary of the Bojana river, which are inhabited by juvenile forms of eurichal fish due to their favourable thermic and trophic conditions. Besides the estuaries, the researches covered fresh water parts of the waterways and the area around Ulcinj saltworks, wherein special attention was paid to examining the eel population, as the species of special economic interest. A quality analysis of ichtyofauna in the estuaries of Sutorina, the Mrčevska and Bojana rivers showed the presence of 37 species of fish from 29 genuses and 16 fish families.

The ichtyopopulation at the estuary of the river Bojana consists of the primary fresh water fish family Cyprinidae, which indicates that this site has characteristics of fresh water. Of fish species discovered, young fish from the fish families Mugilidae, Serranidae and Anguillidae are of potentially greatest importance for the use in aquaculture. The estuary of the Bojana river is the most important natural finding of young fish of Mugil cephalus and Liza ramada.

Significant natural findings of young fish of Liza aurata, Liza saliens and Chelon labrosus are locations of the estuaries of the rivers Sutorina and Mrčevska, wherein the total of 5,205 juvenile specimens of mullet was caught during the research, of which: Mugil cephalus 867 specimens (16.6 %); Liza ramada 1,149 (22 %); Liza saliens 827 (15.9 %); Chelon labrosus 1,018 (19.6 %); and O. labeo 3 (0.01%). The caught specimens were divided into three development classes, of which: development class A (< 30 mm) covers young fish that just came from the inshore water; development class B (30-40 mm) covers young fish most suitable for fishponds, and development class C (> 60 mm) covering mullets that are capable of avoiding fishing tools by jumping out of water. This classification provided for the establishment of the migration phenology of mullet young fish in the inshore sea of the Montenegrin Littoral. According to the obtained results, the first appearance of young mullets in the inshore waters is in the following seasons: Liza ramada – late winter and spring; Chelon labrosus - spring; Liza salines – summer and autumn; Mugil cephalus – late summer and autumn; and Liza aurata – autumn and early winter.

Along the Montenegrin Littoral, the habitat of European eel is in short aquifers (3-4km) which are often surrounded by industrial and agricultural zones. Very suitable locations for catching juvenile eels (glass eels and elver form, yellow eel) are around Ulcinj saltworks. In addition, numerous populations of juvenile stages of eel have been discovered in the Mrčevska river and Jankove vode (both watercourses are in the Grbalj field). The first appearance of glass eel in the aforesaid locations has been identified in March and silver eels during the autumn months.

During the spring months (May), a large population of young Dicentrarchus labrus (TL < 3 cm) has been registered at the estuary of the river Bojana. During the summer months, the juvenile forms (5 - 10 cm) of this species have been discovered in the waters at all the three estuary locations.

The committee for the assessment of possibility of shellfish and fish farming in the Medditerranean countries, established by the UNDP, FAO and UNEP, distinguished SFRY, at the time, as one of the countries with substantial natural, expert and social capacities for mariculture, which could actively join the unique Medditerranean program. Considering the aforesaid, the inshore sea of Montenegro takes on of the top places in this program, especially the locations in the Boka Kotorska Bay.

On the basis of available data on natural characteristics of the inshore sea of the Montenegrin Littoral, the results of experimental research, natural findings of young fish and adult forms of economically important species of sea organisms, and the comparison of quality of the environments where fish is bred in countries of the Mediterranean, the potential locations for mariculture have been singled out:
- in Boka Kotorska Bay - Plagenti, Orahovac, Risan, Morinj, Bijela, Uvala Kukuljina, Krtole, Rose, Njivice and Kobila;
- on the open inshore sea - Dobra Luka, Uvala Žukovica, Zagorski pijesak, Krimovački potok, Uvala

Trsteno, Crni Rt, Uvala Valdanos, Port Milena, and others.

1.1.11. Landscape and environmental characteristics

The Montenegrin Littoral stands out for its landscape diversity and attractiveness. In the value scale of the Coastal Zone, landscape takes a dominating position and represents the key baseline for this area.
The landscape of the Montenegrin Littoral is a reflection of complexity, diversity, quality, and relationship and interaction of the prevailing natural elements. Adding to the picture of the landscape, the major influence have climatic, geomorphologic, hydrographical, and vegetation characteristics. According to the unique classification of Montenegro's landscape, the Montenegrin Littoral belongs to the Mediterranean landscape type. This macro landscape, as viewed from a distance, is seen as a swirling morphological composition of the three major components: the dark blue sea surface, evergreen forests, and bare limestone mountain peaks of grey tones. The micro landscape is characterized by numerous construction components.

The Coastal Zone, observed as one complex system with certain interrelated characteristics, has unique configuration characteristics.
Eight types of landscape are distinguished in this area: hygrophilous forests and thickets, marshes landscape, dune landscape, pebbled-sandy beaches, coastal reefs and rocky coasts, muddy coasts, the Boka Kotorska Bay landscape, and anthropogenic landscape. Each of these landscape types has its own unique characteristics, and the quality of their expression depends on diversity and composition of constructive elements. The visibility of more than one landscape creates a new landscape quality that is reflected in the abundance of landscape content.

Aquatic landscape covers the immediate surroundings in a very distinct visual contact and contributes to the richness of the landscape content and visual experience of the area.

Hygrophilous forests and thickets landscape is characteristic for the flooded zone of the Ulcinj area. The inshore parts of the Porto Milena canal and the river Bojana, starting from the sea shore and along its course through Montenegro, are grown in groves of white and brittle willows and shrubberies of chasteberries and tamaracks that are separated from sandy dunes and alluvial marshland of the Ulcinj planes. In the back of this harmonic landscape arise the gigantic Albanian Prokletije mountains. What makes the landscape even more charming are little wooden bungalows on water (called “kalimere”) with hanging fishing nets.
Marshy landscape covers a wide alluvial plane of the river Bojana, the surroundings of Zoganj mud, marshy Buljarica plane, and damp Mrčevo plane, below which there is a sandy beach Jaz, and occasionally on damp parts of the Tivat plane. The landscape is recognizable for its more or less compact clusters of marshy plants, mainly canes, reeds and sedge. This landscape belongs to monotonous landscapes of low aesthetic value owing to its configuration characteristics.

Dune landscape is found in the far southeast of the Montenegrin Littoral, the area of the Velika Plaza and the coastal part of the Ada island. This is a zone of some 13 km in length and between few tens and few hundreds of meters wide (400m). The specific character of this landscape is its very fine sand, vivid micro landscape that quickly changes under intensive wind and waves, and verdant vegetation of dunes (Ammpholiteum mediterraneum). The inshore area is mostly covered in quicksand, and the middle land is dominated by sands grown in high grass (Ammophila arenaria and other). In the hinterland of Velika Plaza, there are hygrophilous thickets of chasteberries and shrubberies with ashes and oak. This unique natural landscape was changed at the beginning of Velika Plaza (area of Milena`s beach) construction of hotel-tourist complex with arranged parks.

Pebbled-sandy landscape – is characteristic for over 30 larger and smaller beaches located in open coves and bays, between steep limestone reefs and capes. Beaches are covered with sand or sand and pebbles of various colours and shapes. The quality of the landscape depends on the composition and preservation of beaches, characteristics of land and immediate hinterland scenery.

Coastal reefs and rocky coasts landscape is characteristic for limestone islands, rocky coasts and a narrower inshore area with immediate hinterland. The main construction elements of this landscape type are: limestone reefs, capes, rocky coast, and evergreen vegetation. The scenery, for the most part, is protected from anthropogenic influence and preserved in its original appearance, except in places where the Adriatic highway passes. This is primarily due to the inaccessibility of steep rocky shores and their unsuitability for construction and touristic exploitation.
The coast between Ulcinj and Jaz is very indented. Reefs are descending towards the open sea, and coves and bays almost as vertical rocks. Of orographic details, the ones that single out are: the hills Pinješ, Mendra, Mavrijan, Komina, Bijela Gora, Volujica, Rt Ratac, Golo brdo, Crni Rt, hill Velji Grad, Srednje brdo, Dubovica, Ostrovica, Velje and Malo brdo near Petrovac, Rt Skočiđevojka, cliffs between coves Velja and Mala luka near Miločer, Rt Đevištenje, Rt Zavala, Rt Mogren, Rt Jaz and Rt Plantamuni, and islands Katič, Sv. Neđelja, before Petrovac and St. Nikola, before Budva.
From Trsteno cove towards Luštica, i.e. to Trašte bay, the coast toward the open sea is steep and not too high. There are not many coves along the coast, to a small extent getting into land (Krekavica, Nerin, Žukovac, Žabica), and capes Kostovica, Žukovac, and other.
The following bays are notched in steep and rocky shores of the Luštice peninsula toward the open sea: Dobra luka, Zlatna luka, bay Trašte (coves Bigova, Pržna and Međeđa), and capes between them: Mirišta, Veslo, Mačka and Kočište.
What makes this landscape special is the harmony between two contrastive nature elements of evergreen vegetation and rocky, steep, limestone reefs. The evergreen vegetation gives the landscape its vividness throughout a year.
In the narrow inshore area of the Montenegrin Littoral, from Luštice to Ulcinj, there is a zone of evergreen forests of holm oak and black ash in their degradation

form – macchia, which makes the landscape recognizable. Grown trees of holm oak are very rare. This grouping of trees is well preserved only in the area between Dobre Vode and village Krute where individual holm oak trees reach the height of 15m. Macchia mainly consists of holm oak, viburnum, green olive, gorse, plain bushes, sage bushes, olive, myrtle, laurel, blackberry, and many others. Common oak is common in all groupings in the inshore area. There are also scattered communities of gariga, which represent the next degradation stage of holm oak.
Near Ulcinj there are shrubby communities of degraded oak and holm oak. Only on Mavrijan hill there are small groups of tall oaks.
On the coastal rocks around Budva, Petrovac and Luštica, wood spurge forms a community with olives. Wood spurge is a protected species in Montenegro as being a rare and decorative, thus the protection of this landscape element is of national interest.
Along the entire coastal area, there are many olive groves embroidered in the macchia in the form of a mosaic or clusters of high aesthetic value. Between Valdanos and Liman there are vast, old olive groves that represent the remains of the former olive grove from Bar to Ulcinj. The grey-green colour of the olive groves adds to the visual dynamism of the dark green ground of the macchia.
The landscape is even more picturesque with numerous Aleppo pine forests in the form of massifs that interfere in the areas of low bushy vegetation, thus creating contrastive spatial forms.

Landscape of muddy beaches represents a specific landscape of the southern part of the Montenegrin littoral, in the Tivat bay, at Solila location- deserted medieval salt plants, and around the Tivat airport. In the Bjelila bay, in the northeast part of Luštice peninsula, elements of this kind of landscape are present only in small fragments.

The southeast littoral of the Tivat bay is shallow and muddy “lagoon” with diversified and abundant saline vegetation that makes the landscape recognizable. At very saline and constantly flooded area grows marsh samphire (Salicornia herbacea) that gives a special aesthetic experience in summer and autumn. Compact clusters of bushy Sarcocornia fruticosa stretch mostly over periodically flooded substrates somewhat further away from the sea or mixed with marsh samphire, forming a beautiful mosaic. On elevated parts out of tide’s reach and on the nearby meadows there is salty marshes vegetation that gives a characteristic appearance of this area during summer with their whitish, spiky leaves, and with bluish flowers in late summer and early autumn. The community of Bowles golden (carrex elata) grows in marshy land of the upper saltworks, covering vast areas in some basins.
Boka Kotorska Bay, owing to its impressive landscape, is hereof presented as a separate type of landscape. The entire area of this part of the Coastal Zone and its immediate hinterland is characterized by very clear and impressive structural elements that add to its special landscape identity. Specific and miscellaneous natural values (with orographic and autochthon vegetation characteristics) combined with the valuable construction heritage, with numerous details (alochtone flora) make a unique, harmonious whole.

The frontal (Herceg Novi-Tivat) part of the Boka Kotorska Bay has open wide sea view, bounded by mild slopes covered in abundant, evergreen macchia mediterranea, with the vast Tivat field and two “green” islands covered in thick vegetation, (Ostrvo cvijeća and Sveti Marko) which give the impression of a calmness.
The inner (Kotor-Risan) part is further inland and is more dynamic, between two bays wherein, across Verige, there are two small islands of Gospa od Škrpjela and Sveti Đorđe, and small place Perast on the shore, “the town of captains” with baroque buildings. High, monumental massifs in the back lean over the sea. In the hinterland, under the typical maritime climate, from Verige to Donji and Gornji Stoliv and on the Svetonikoljski reef, from Donja to Gornja Kostajnica, there is evergreen Mediterranean vegetation of oaks and holm oaks (macchia mediterranea). The community of grabića and kostrike covers the parts under maritime-continental climate. Typical parts of this community, mostly of grabić and hrast medunac, are found on somewhat more levelled terrains and valleys such as: slopes of Vrmac, Škaljari, Donji Orahovac, Dobrota, Dražin Rt, Strp and Morinj, whereas in the area from Donji Orahovac to Risan, due the degradation of this community, there are rare and low shrubberies mostly under drač , šipak and primorska kleka. On the slopes of Vrmac (between Gornji and Donji Stoliv) and Gornja and Donja Kostajnica prevail the community of horse chestnuts and laurel, and on the slopes above the spring Sopot near Risan, there is the community of laurel and oleander. The specific identity to the landscape add the settlement along the shore (Kotor, Dobrota, Risan, Perast, Prčanj) with rich construction heritage represented with baroque palaces, harmoniously fitted fishermen houses, remains of the medieval towers and walls, characteristic piers on the coast -artificial capes and mole-enclosed harbours. In addition to the existing rural ensembles, there are small olive grows, citrus fruit orchards, and small family gardens called “giardini” (Ital.). The exotic flora of the settlement harmoniously fitting into the ambience adds to this landscape expression of the Kotor-Risan bay that reflects in irresistible beauty, security, and perfection.
Rich exotic flora, well adjusted to the environmental conditions, aesthetically enriches the landscape of the coastal [art of the Boka Kotorska bay. In parks and gardens of the bay, over 170 species of foreign trees, bushes and climbing plants, brought from all over the world, are cultivated.
This picture is rounded off by smaller areas under Aleppo pine, cypress, and maritime pine.
Along the indented coast of the Boka Kotorska bay there are no wide beaches. Small, pebbled inlets are situated between coves and mole-enclosed harbours. The exceptions are a pebbled beach in Njivice and one in Igalo in-between the zone of muddy coast with small pebbles.
The northern coast of the Luštice peninsula is low and accessible. The look of this part of the Bay also affects the quality of the landscape expression.
Anthropogenic landscape resulted from great anthropogenic interventions in the Coastal Zone area. It is characteristic for areas with largely changed environment, such as the ports of Bar, Kotor and Zelenika, shipyards and repair centres in Bijela and Tivat, and the town park of Tivat.
The manmade structures, observed as integral elements of the anthropogenic landscape, are relatively

often found along the entire Coastal Zone area. These are small mole-enclosed harbours, artificial capes, concrete shores, complementary beach facilities, horticultural facilities, cultural-historical monuments, hotels, camps, roads, and the like.

Special aesthetic quality to the Montenegrin littoral gives the well-shaped, decorative plants, especially since they have enriched the general plant fund of this area because they had been brought from all over the world. Some of these plants have immediate economic importance, such as agricultural-fruit cultures. However, many of them are used for aesthetic purposes, around residential and tourist facilities, main roads, and surroundings. These species, well-adjusted to the environment, add to the richness of the landscape.
Over 120 species of foreign trees and bushes have been identified in the area between Budva and Ulcinj, and this added to 170 species cultivated in parks and gardens in the Boka Kotorska bay. As being very beautiful decoration on green surfaces, the ones that stand out are: canarian date, Chamaerous humilis, bougainvillea, the Juddas tree, London plane tree (platanus acerifolia), mimosa, Southern magnolia (Magnolia grandiflora), firethorn (Pyracanthra), hibiscus, oleander, Albizia julibrissin, stone pine, maritime pine, Hymalayan cedar, Chinese wisteria, Virginia creeper, trumpet creeper, camellia, pitosporum, melia azadirachta, Japanese plum, Spanish dagger (mohave yucha), Agave Americana,, tamarack, dyospyros, yellow bird of paradise (Caesalpinia gilliessi), French hydrangea (hortensia), as well as already domesticated species that can be found in the environment vegetation, such as Aleppo pine and cypress.

Adding to this unique landscape structure of Boka Kotorska are its promenade parks. The abundance of the specific elements and authentic construction of artificial capes and mole-closed harbours using local sources of stones, winding promenades (lungo mare) that follow the green and hilly landscape in the hinterland give this bay the attribute of the largest and best-quality landscape whole.
The Coastal Zone landscapes are of high aesthetic quality. Except for minor anthropogenic effects, they have been entirely preserved in their genuine, natural forms. The anthropogenic landscape is present only in extremely changed environments, mostly urban centres of the coastal municipalities; the combined landscape is present in significantly changed areas in the Boka Kotorska bay and some parts of the open coast, and their less changed environment is mostly found in other open coast areas.

1.1.12. Montenegrin beaches

What makes the Coastal Zone recognizable are well known beaches of the Montenegrin littoral, characterized by extraordinary, unusual and diverse natural beauties combined with the clear and warm sea, favourable weather conditions, and the exclusive tourist offer.

In addition to genuine narrow, sandy or pebbled beaches, rocky shores have been adapted, as well as artificially created beaches.

With regard to their composition, natural beaches are divided into sandy, pebbled and rocky beaches, and the artificial ones are parts of the natural beaches and artificially created bathing resorts.

According to available data (JP Morsko dobro Crne Gore), there are over 100 beaches, covering the total coast length of 70.35 km and surface area of 271.5 ha, which are used for swimming and sunbathing. Further breakdown by municipalities is as follows:

H.NOVI	11.48 km = 12.10 ha		
Njivice	1800 m	21600 m2	h,t
Sutorina	600	9,000	s,p,
Igalo	920	13,750	t,s,h
Topla	690	12,100	h,t
Herceg Novi	565	21,350	t,h
Savina	1,590	11,580	t
Meljine	325	2,900	h,t
Zelenika	430	3,260	t
Kumbor	235	940	t
Đenovići	535	2,070	t
Baošići	600	2,800	t
Bijela	1,360	5,520	t,h,s
Kamenari	275	930	t
Mamula	100	800	e
Rose	250	2,500	e
Žanjice	410	6,050	p,p
Arza	550	5,350	p,p
Luštica	360	2,050	e
TIVAT	9. 22 km = 7.09 ha		
Oblatno	150 m	1,200 m2	e
Pržno	870	24,070	h,p
Krašići	600	3,000	t
Krtole	3,100	15,500	t
Sv. Marko	1,000	5,000	s
Os.cvijeća	500	2500	s
Kalardovo	250	2500	p
Kukoljina	150	1500	t
Župa	300	2240	t
Tivat	375	2680	h,t
Seljanovo	235	1175	t
D.Lastva	1065	7845	t,h
Lepetane	620	1690	p,t
KOTOR	17.02 km = 8.33 ha		
Kostanjica	1,200 m	4,000 m2	t
Morinj	200	4,000	t
Risan	1,054	4,500	t,h
Perast	340	1,700	t
Dražin vrt	159	1,180	t
Orahovac	410	2,360	t
Ljuta	975	3,200	t
Dobrota	5,340	29,540	t
Kotor	320	2960	t,h
Muo	1,900	7,600	t
Glavati	360	1,430	t
Prčanj	2,820	11,920	t
Stoliv	1,700	5,950	t
Bigovo	40	3,080	t
Trsteno	90	1,080	e
Žukovica	600	5,400	e
BUDVA	12.43 km = 31,95 ha		
Jaz	1,565m	34,475 m2	p,s,e
Budva	340	4,500	p
Sv. Nikola	575	4,945	p,p
Stari grad	230	4,980	t

Slov.plaža	1,620	28,950	t
Bečići	1,800	99,000	t
Rafailovići	280	4,200	t
Đevištenje	130	650	s
Kamenovo	300	10,500	p
Pržno	255	4,700	t,h
Miločer	400	9,350	h
Sv. Stefan	1,315	18,840	h,t,e,s
Galija	70	1,050	s
Drob.pijesak	200	5,000	e
R. Reževići	100	1,000	e
Perazića do	60	540	h
Petrovac	585	9,645	t
Lučice	250	4,250	h
Buljarica	2,350	72,850	p

BAR	5.2 km = 13.11 ha		
Pećin	220m	9,768 m2	e
Čanj	830	21,500	p,h
Maljevik	300	1,900	p
Sutomore	470	30,480	t,h
Ratac	95	875	e,s
Šušanj	870	25,230	p
Topolica	750	21,230	t
Veliki pijesak	480	13,900	p
Utjeha	185	5,250	e

ULCINJ	14.91 km = 199.18 ha		
Kruče	300 m	2,400m2	p
Valdanos	380	7,600	p,s
Liman	105	1,390	t
Mala plaža	430	9,950	t
Pinješ	840	32,700	h,s,p
Velika plaža	10,100	1,879,200	p
Ada Bojana	2,750	75,000	s

(note: predominant beach alocation:
p -public, t - town, h - hotelska, e - excursion, s - special

The lengths listed above cover specific town beaches in the Boka Kotorska bay that are actually built parts of the coast, often different (artificial capes, moles, mole-closed harbours) and used for sunbathing and swimming.
All natural and artificial beaches make up a quarter of the total coast length of the Montenegrin littoral, which does not exclude the possibility of using other parts of the coast for bathing, sports, and other recreational activities.

The research undertaken has shown that additional beaches can be created to extend some of the existing beaches (beach nourishment or creation), to a larger or smaller extent, along the entire Montenegrin littoral. This would attribute to the length and width of the beaches and increase their user capacity (tourists, swimmers).
According to data of the water management plan of Montenegro, with regard to the existing condition and capacity of beaches and their augmenting and creation of new beaches, the total length of the Montenegrin coast could be extended by some 100 km, which would result in 270,000 swimmers.

Coast and beaches

Most of the coast is directly exposed to sea waves because the number of islands along the coast is very small. The coast is mostly rocky, with very notable cliffs especially in the zones exposed to high waves. Typical examples of cliffs are on the shore of Luštice, Donji Grbalj, around Budva, between Bečići and Sutomore, and between Bar and Ulcinj. Sections of rocky coast are stable, as u rule, and there are no distinctive morphological changes due to the impact of natural factors.
More than one hundred beaches are found along the Coastal Zone shore. Most of them are the so-called “pocket beaches” because they are found in coves between two capes. Typical examples of such beaches are Mala plaža in Ulcinj and beaches in Bar, Sutomore, Čanj, Buljarica, Petrovac, Bečići, Budva, Jaz, etc. Drifts on these beaches come partly from rivers and streams that flow into the sea in the cove zones, and partly from coastal erosion due to wave impacts. Most of the beaches are of sandy-pebble material, while only some of them are covered by larger, round pebbles. In the last few years some instability problems have been identified, reflected in a reduced effective width and beach material, like in the case of Mogren beach.
The beach that stands out for its size, characteristics, and origin is Velika Plaža in Ulcinj of some 12 km in length and an average width of 50 m. The beach original material is fine sand that comes with the river Bojana`s flow into the sea. The beach sand easily moves under wind, forming a zone of dunes in the hinterland of few tens to few hundreds of meters. Regardless of rather uncontrolled exploitation of sand deposits, Velika Plaža is relatively stable and there have been erosion processes so far.
Owing to the natural protection from higher waves, the shore and many of the natural beaches in the Boka Kotorska bay are stable.

There has been no measuring of wave characteristics in the area of the Coastal Zone although waves are the most important natural factor from the aspect of coast and beach stability. The existing information on observing wave characteristics from ships for the area of the south Adriatic sea can only be obtained from some international organisations because no relevant institution in Montenegro has the right to use and disseminate this data. Wind measurement in the area of the Coastal Zone was used for obtaining information on waves. There are systematised data on wind measurements (direction, frequency, medium and maximum speed) over a longer time period for Ulcinj, Bar, Budva and Herceg Novi.
A mareograph (tide gauge) of Bar is used for measuring high tide and low tide characteristics, and another one has been set up in Dobra Luka, on the open sea coast of Luštice.

No continuous measurement of the sea current is performed in the area of the Coastal Zone. For most of the natural beaches there are only approximate data on beach dimensions, because there are no data on slants because the lateral profile of the beaches is not observed. Quantitative data on the characteristics, granularity, and mineral composition of deposits on

natural beaches exist only for some parts of the Coastal Zone area. Available data on isobaths and beach slants under water are mostly outdated because they were last recorded many decades ago.
The estimate on beach erosion intensity, as a rule, is based on the visual comparison of two conditions and not geodesic observation of beach configuration.

Coast and beach stability in the Coastal Zone area has not been a subject of any comprehensive study or on-site research. This does not mean that they are absolutely stable, but that some of the instability problems mostly implied local, relatively short coast parts and that coast change intensity under natural factor impact has been relatively low. In the last few years, the damage frequency has been increasing, and the damage degree of some beaches reaches the point of concern. Most of the damages occur during winter because under high waves in this period. High waves hitting some of the beaches in most exposed zones have removed beach deposit in the sea, so that after winter periods these beaches have been reduced to a large extent.
Notwithstanding the necessity of on-site/study research for determining the cause of beach instability, the main culprits for this instability remain uncontrolled development and construction of the Coastal Zone. In other words, it is the human factor. For example, coastal walls built on some of the beaches and stretching parallel with the coast have caused large damage to the beaches after high wave impacts. To wit, the walls are very near to the coast line, so the energy of a wave impact scatters in the zone in front of the wall, thus intensively drawing beach deposit back into the sea.

Accelerated tourism development of the Montenegrin littoral in the last couple of decades entailed the construction of a large number of buildings and construction work in the broader hinterland of the coastal area. The greatest effect on beach stability has the construction work on arranging and regulating river the estuaries in the beach zones.

The consequences of some of the construction work were reduced or even total interruption of beach deposit inflow. This completely disturbed the natural balance between beach deposit inflow and wave erosion ability. The interruption of deposit inflow has induced gradual beach erosion, and beach width and area have substantially reduced under wave impacts.
One of the main culprits for a drastic beach deposit reduction of some beaches was also the totally uncontrolled exploitation of beach deposit for construction purposes.

Since beach erosion is the problem that is solely important with regard to coast utilization for tourism purposes, this has been the only problem that has been solved so far. It has been solved by depositing appropriate beach material on the most jeopardized beaches (beach replenishment). This has been performed before each tourist season, and the amount of the deposit varied considering the damage level.

1.2. Manmade resources and development potentials

1.2.1. Population density and construction

The coastal area covers 6 municipalities: Herceg Novi, Tivat, Kotor, Budva, Bar and Ulcinj. However, borders of some of the municipalities, mostly of the Bar municipality, go further inland thus covering a territory that significantly differs from the coastal area.
That is why the coastal area can be defined as the area separated from the high land area of Montenegro by mountains Orjen, Lovćen, Sutorman and Rumija.

The area of the Montenegrin Littoral distinguishes three environmental and historically distinctive wholes - Boka Kotorska; Maine, Pobore, Brajiiće and Paštroviće; and the southern part of the coast, i.e. the territory of today's municipalities of Bar and Ulcinj.
This division occurred due to the socio-historical conditions and power alternations over al long period of time, providing separate sources of data on settlements and population.

This area is considered as early inhabited. The oldest town is Budva (2,500 years old), and Risan, Ulcinj and Kotor also date back in the period before Christ. The Adriatic coast was the route on the way of conquest of many empires - Illyrian, Greek, Roman, Byzantium, Venetian, Serbian, Ottoman ..., so that the coastal area development was different from 15th century. The areas of Bar and Ulcinj were under the Ottoman's authority until 1878 when they became parts of the independent Montenegro, and authorities over other parts of the coastal area alternated over time: Venetian, French, Spain, but most of the time these parts were under the Austrians, and this being until 1918 when all the coastal areas became parts of the newly established Kingdom of Serbs, Croatians and Slovenians.

Population

In the last 30 years, the economic valorisation of the coastal area has improved, followed by an intensive movement of population and their significant growth, thus absorbing a large portion of population from other parts of the country.

A share of the coastal area population in overall population of Montenegro grew continuously - from 17.7% (1961), through 18.4% (1971) and 19.8% (1981) to 21.9% (1991) and 23.4% (2003).

In the last three decades, the coastal population increased 1.6 times, and overall population of Montenegro by 1.3 times. When looking at the last 70 years, we come to the calculation where the population of this area has tripled. The town that singles out for this relative growth is Budva, followed by Tivat. In 1990`s, due to the war in the neighbouring republics, the highest increase in new population recorded the municipality of Herceg Novi (over 6,000 persons).

The hypsometric arrangement of population density shows points to littoralisation processes and population concentration in the lowest coastal areas.

Considering the relief diversity and abrupt height changes on a relatively small coastal area, three altitude zones distinguish: a plane with two subzones – up to 100m and from 100 to 200 m, then foothills from 200 – 500 m, and hills from 500-1,000 m.
These zones show that almost 60% of the coastal population lived at the altitudes up to 100 meters in 1961, and after thirty years this percentage rose to 80%. The highest growth in the said period recorded Budva (from 57% to 91%), Bar (from 28% to 58%), and Kotor (from 70% to 87%), while the highest population density was recorded in Tivat municipality (no less than 94%). All other zones record relative declines in population density; thus in the zone from 100-200 metres this number remains the same, whereas at higher altitudes we have both relative and absolute declines in population density).

The population disposition in relation to the distance from the shore also point to littoralisation – thus 52% of the population in 1948 lived in the zone up to 5 km from the shore, but this portion increased in 1971 to 75%, reaching 89% according to the last census. Bar municipality experience a great boom in this period as this percentage rose from 23% to 76%. As for other municipalities, this growth in the last forty years was around 10%.

What speaks in favour of the fact that the closeness of the sea is a very luring factor is the last census data (2003) that indicate that around 74% of the entire coastal population live in the zone up to 1 km from the shore; these figures are very high in the following municipalities: Tivat – 99% (owing to the terrain morphology) and Budva – 96%, followed by Herceg Novi with 87% and Kotor with 83%, while in the southern municipalities this share is some half of the total number of population.
The highest increase in the last four decades saw the municipalities of Bar and Budva, and a somewhat moderate growth recorded Herceg Novi and Kotor.
It is obvious that the littoral zone is the zone of urban growth, economic transformations, and better traffic connections, so the population increase is faster than in the lower hinterland settlements.

The coastal area has always been the most suitable for inhabiting. The most suitable relief land at the Montenegrin Littoral is covered in settlements and their further construction shows a tendency of almost unique agglomeration from Igalo to the river Bojana.
The coastal area is a part of Montenegro with the highest population density. Disproportion in population density between the coastal area and other part of the country has been continuously growing, so that now we have the situation that the number of people at 1 km² in the coastal area is almost twofold higher than in other parts of the country.
The population density in the coastal area showed the following increase – from 52.4 (1961), over 60.8 (1971), 71.8 (1981), 84.6 (1991) to 91 persons per square kilometre (2003).

The differences in the population density at the municipal level were very obvious in 2003.

The highest population density, not only in the coastal area but the entire country, is in Tivat municipality (293 per\km²). This indicator for the municipality of Herceg

Novi amounts to 140 per\km², that for Budva is 128 per\km², whereas the coastal municipalities with lower figures than the coastal average (which is 90 per\km²) are Ulcinj, Kotor and Bar. In the period between two censuses (1991 and 2003), the population density in the coastal area increased by additional 6.5 per\km². The highest increase in the coastal population density recorded the municipalities of Tivat and Budva.
The reasons for this should be sought in the attractiveness of inhabiting in the coastal municipalities as they are the most important parts of Montenegro from the aspect of tourism industry. This uptrend continued in the current decade, mostly due to the migrations following the war in the neighbouring republics.
Higher population density in the coastal cadastre municipalities is characteristic for all municipalities and it has been growing much faster than the population density in the administrative area of the municipalities. Thus, the littoral of Bar is no less than four times denser than its hinterland, whereas Budva and Herceg Novi littorals are threefold denser than their hinterlands.
However, the processes of population relocation from littoral to hinterland have not followed the same pace in each of the municipalities.

In the littoral zone of cadastre municipalities of urban settlements and important tourist centres have seen almost explosive increase in population density, those in the immediate hinterland a moderate increase, while those in deeper hinterland have experienced density decline due to ongoing depopulation.
Most intensive migration movements at the Republic level happened in the coastal area, where migrant population accounts for 47.2%.
The share of autochthon population in the Montenegrin Littoral in relation to the entire country decreased in the period following 1961. This share declined by the consensus – from 59.2% (1961), over 57.1% (1971), to 52.8% (1991).
On the other hand, the share of migrant population increased over time, which points to increased mobility of population. However, while the country is an emigration, the Littoral is an immigration, zone.
The largest share of migrants from other Montenegrin municipalities is in Budva and Tivat (more than half), while Herceg Novi was mostly inhabited by people from other republics of the former SFRY, especially after the war in these republics.
After the war, the number of displaced persons and refugees was higher in the coastal municipalities than in other parts of Montenegro. Over 14 thousand of these persons have regulated their status and residence (which is a half of people in an average coastal municipality).

Settlements

Old coastal towns were the nuclei of the urbanisation process because they had quality demographic potentials, technology, and flexible forms of social organisation.
The coastal urbanisation was linear as it went along the very coast, that is, the Adriatic highway. Besides the municipal centres, smaller urban settlements enter the urban tissue, thus “producing” a specific, urban, functional and physiognomy whole viewed as an almost linear settlement along the Boka Kotorska Bay. The small settlement networks in the littoral certainly endured owing to tourism. An average distance between urban settlements in 15.4 km.

In 1961 there were only 5 urban settlements (all municipal centres, except Budva which was a mixed settlement). All nowadays urban coastal centres have grown from mixed to urban category. This first happened with Budva and Dobrota in 1971, and ten years later (with the abolition of the mixed settlement category) with Stari Bar, Virpazar, Sutomore, Petrovac, Sveti Stefan, Perast, Prčanj, Risan, Donja Lastva, Igalo, Bijela and Zelenika, and in 1991 with Bečići.

Tourism growth was foloowed by an increase in the number of settlements with urban features, thus making them secondary centres of population concentration. All urban coastal settlements have the status of tourist places. The coastal area had the urbanisation level of 66.4% in 2003, being 20% higher than in 1991 (45.9%).

According to the last census, the most urban municipality is Budva because some 85% of population live at its riviera, whereas the least urban one is Bar (some 44%), which can be explained by the fact that suburban settlements are not included in the group pf town settlements although they make up a spatial-functional whole together with the town of Bar.

The Republic of Montenegro has characteristics of a relatively dense network of settlements – 9.1 settlements per 100 km², on average, whereas the highest network density is in the coastal part of the Republic, 16 settlements per 100 km².
Among the coastal municipalities, the ones with the highest network density are Budva (27) and Tivat (25.9 settlements per 100 km²), and the others have a rather even settlement network density.
Taking into account such a dense settlement network, the average distance between the coastal settlements is a mere 2.5 km, the shortest average distance is on the territoryof Budva municipality, 1.9 km.

Such a high settlement network density in the aforesaid municipalities followed by a high population density, indicate a high degree of construction in this area.

The settlement network in this area is characterized by the non-existance of a settlement having more than 15 thousand inhabitants. Changes in the size structure in the coastal area were very slow. The evident stronger agglomeration occurred only in municipal centres that have moved to the category of towns with over 10 thousand inhabitants.

The network of centres in the coastal area has already reached a high level of development. Dispersed development was encouraged, so the network of centres is denser and the very centres are smaller.

The building of roads and the development of the tourist function had effects on the development and interaction of the centres.
Therefore, the coastal area is characterized by a higher population density, denser network of centres and a very high degree of deagrarisation and urbanisation, but also with small networks of scattered primary settlements in the hinterland, the moving out from small

settlements, and an increase in the population concentration in municipalities.

Due to their specificities and limited construction possibilities, as well as the attractiveness of certain locations, small settlements have coalesced into near towns and formed agglomerations of urban settlements connected with the existing centres.

Thus all the coastal towns, more or less, have expanded and together with these settlements form spatial-functional wholes with a remarkable increase in the number of inhabitants – the examples of Herceg Novi (from Igalo to Meljine), Kotor (from Mu to Ljuta), and Tivat (fromLepetane to Mrčevci).

On the territory of all the municipalities there are settlements that play the role of a smaller, i.e. secondary centres; their arrangement is mostly between two neighbouring municipal centres:
- Herceg Novi has a centre in Bijela, for the eastern part of the municipality;
- Kotor has two centres - Radanovići in Grbalj and Risan for the Risan-Morinj part of the bay and for the mountain zone of the municipality;
- Tivat has a centre in Radovići for the municipality part in Krtole;
- Budva has a centre in Petrovac, for the southern part of the municipality;
- Bar has three centres - Virpazar and Ostros for the zone around the Skadar Lake, and Sutomore for the coastal part,
- Ulcinj has a centre in the hinterland - Vladimir.

In addition to these secondary centres, the coastal municipalities also have centres of greater importance as being suburban or local centres; these are Igalo, Sutorina, Zelenika (Herceg Novi), Perast, Donji Morinj, Lastva Grbaljska (Kotor), Donja Lastva (Tivat), Bečići, Pržno and Reževići (Budva), Stari Bar and Pečurice (Bar), and Bratica, Zoganje and Donji Štoj (Ulcinj).

The Montenegrin littoral could be characterized as follows:
- municipal depth zonality;
- settlement network most developed and population density highest in the coastal part, whereas these indicators lower with a further distance from the shore and increased altitude;
- zones of population concentration in the coastal parts established in places of the most favourable morphological characteristics – altitude, distance from the shore, width of the coastal area; these zones also record the concentration of infrastructure and tourism superstructure, and a high urbanism degree;
- zones with comparative advantages for tourism development are simultaneously the zones of the highest population density and growth;
- the littoralisation process was not induced only by tourism growth, but the population concentration occurred due to the urbanisation process and location of towns with long urban traditions;
-the process of emptying the highlands in the hinterland with a simultaneous process inhabiting low and coastal parts;
- all coastal municipalities became immigrational after 1971, whereas the more developed ones experienced this even earlier; however, intensified immigration occurred owing to intensive economic growth of the littoral;
-the migrations have led to the concentration in the coastal area, i.e. the urban zones of the coast;
- the migrations have affected the changes in the relocation of the population, both at the micro and macro levels; the regional differentiation of town-village, and other;
-the first waves of the post-war immigration to the coastal area induced the reallocation of population in the area as: local migrations before 1961 from country hinterland to coastal settlements, and during 1960`s the Montenegrin littoral, with the expansion of its contractive zone, generated migrations from further distances and from towns;
-as one of the factors for population migrations and intensive inhabiting the littoral is certainly the tourism growth that has spread the gravitation zone of the littoral and encouraged migrations of urban population;
- the littoral is mostly oriented towards tourism and maritime economy, whereas industry is primarily agriculture-oriented or towards the use of other natural resources;
- natural resources were one of the main reasons for the higher population density is in this area; this trend has continued in the recent period;
- a share of urban population has been increasing, amounting to over 65%;
- deagrarisation process has covered almost the entire area, resulting in a mere 6% of the economically active population in agriculture, mostly in off-town areas in the hinterland
-tourism economy, as the main activity in the coastal area of Montenegro, does not have any larger polarisation strengths, but environmental conditions contributed to the creation of a diversified tourist offer with numerous tourist centres and resorts;
-a distinct specialised, functional structure of numerous smaller centres, with a somewhat more complex functional structure of Bar and Kotor;
-the main pillar of the coastal zone development is the length of the coast and its connection to Podgorica

Construction

The increase in the number of population, the number of households (with a decrease in the average size of a household in the coastal area and the country), development of certain tourist zones accompanied by the appropriate living standard lead to: an increase in the number of housing for permanent or occasional residence (legally or illegally built), an increase in construction of institutional buildings, public and commercial facilities, municipal infrastructure, but also to problems in this field with the final outcome of spatial saturation.
Almost all indicators show that the coastal region in above the Republic average, which certainly has repercussions on the area itself.
Spatial, urban and municipal benefits, increased tourist demand, as well as (lacking) support by spatial planning documentation resulted in intensive construction in some settlements. In the period 1971-1991, the housing fund of the coastal area rose by 70%, whereas that of the entire country increased by 46% and mostly accompanied by an increase in population.
In the period between the last two censuses, the number of housing in Montenegro increased by 24%,

and that in the coastal area over 34%, whereby in the municipality of Budva this number doubled.
The housing number increases at rates higher than that of households, so it can be concluded that many of the housing also have a tourism function.

Residential construction concentration in the coastal area is reflected in data indicating that the number of residential units in the zone up to 5 km from the shore has increased by such a high that the share of these units in the municipalities of Herceg Novi, Tivat and Budva amounts to 98%, some 88% in Kotor and Bar, and around 79% n Ulcinj.

Due to the consequences of the earthquake in 1979 and the subsequent favourable monetary, credit, fiscal and urban measures, but also owing to the increase in living standard of the population and excess of money resources, the housing fund of the coastal region is young and of good quality (in construction, installation equipping). The aforesaid singles out the municipalities of Budva and Herceg Novi with the highest living standards, yet the lowest living standard being in Bar and Ulcinj.

At the same time, residential units intended for lease are more modest in square meters and equipment owing to the seasonal character of tourism and irrationality of investing in better quality accommodation, and this is also supported by higher demand for tourist accommodation. The number of residential units with more rooms, i.e. surface in square meters, has also increased, which is supported by the increase in an average apartment surface area per capita.

In addition to their main function of being the accommodation for resident population, residential units also have the seasonal or temporary or a permanent secondary function (sublease of excess residential space to tenants or tourists). In the settlements adjacent to the shore or in the contact zone wherein the number of inhabitants has increased, the number of residential units for permanent residence has increased as well, to a larger or a smaller extent.
A sort of usual practice in the last ten years is that a part of excess residential space, primarily at ground floor, but also on upper floors (especially at attractive locations) has been turned into business premises (usually for shops, cafés, services), and that more and more newly built residential buildings have been designed to contain business premises in a part of or the entire ground floor.

In the period 1981 -1991, in some settlements near the coast, due to the aforementioned reasons, there was intensive construction of residential buildings with complementary recreational facilities.

In most of these settlements, the number of such residential buildings increased as of 1971 when they started to be treated as a separate register items, this resulting in their increase by more than tenfold by 1991.

The fact that speaks in favour of the attractiveness of closeness to the coast is that over 95% of all weekend housing is situated in the zone up to 5 km from the shore. This also indicates that there is an enormous pressure on space, primarily the coast; these are often very valuable locations that have been overconstructed by such housing by the day, which is from the aspect of rational spatial utilization and impact on the landscape unacceptable.

As for the construction of residential units for recreation, it is most evident in municipalities where spatial and other conditions allow construction (Herceg Novi, Budva, Bar and Ulcinj).

The coastal region represents the area of intensive construction which is enabled almost throughout a year owing to its favourable climate conditions.

The littoral, as a small area where natural and manmade values are concentrated, has become very attractive for tourists, but to the population as well, the latter migrating towards more economically prosperous and expansive areas.

This has led to intensive construction in the last few decades, primarily residential and commercial (tourism) construction on what used to be low-density and less constructed coastal area and its immediate hinterland. Regardless of whether such facilities have been constructed with or without a plan, we can still talk about a construction boom at some very attractive locations, yet being unaccompanied by appropriate planning measures.

Such construction intensity will continue in the future, especially when taken into account different property and market conditions.

It is also obvious that this also has momentous ecological impact in the form of numerous adverse effects on environment, which diminishes the value of the area and tourism services, both the current and the future ones.
The coast, i.e. the Coastal Zone of Montenegro, is a limited and sensitive resource which has already been devastated by the existing construction in some of its parts. Some parts of both immediate and distant hinterlands of the Coastal Zone have also been encumbered with excessive or inadequate construction, thus having an impact on this area that is of national importance as one of the most valuable resources of Montenegro.
New construction cannot be prevented, but it can be managed if supported by quality plans and strategies.
Construction of buildings for permanent or occasional residence requires a lot of space, especially the latter has few storeys, is irrational in an area that could be put to much better economical use. In material sense, it is interesting only for private land owners and constructors that want to commercialize residential constructions for tourism economy.

1.2.2. General assessment of economic situation

The coastal region has very favourable natural conditions for the development of tourism, maritime economy, and some of agriculture branches.

Owing to an accelerated development of tourism and some of the maritime branches, the coastal region has

become the most developed part of Montenegro, gaining advantage not only over the Republic average, but also over the Middle region.
It is obvious that tourism and maritime economy, as activities based on maritime zone qualities, have contributed to a more accelerated development of this region of far above the Republic average.

The capacities of maritime economy lie with the coastal region towards which some 50% of the former SFRY territory and parts of the middle and eastern Europe gravitate, and which provides the shortest link to the south Italy and the entire Medditerranean.

Specific sea resources and potentials of the coastal area have not been properly valorised and all development opportunities have not been used (insufficiently used potentials for the development of port trade, maritime shipping, shipping industry, salt production; maritime home trade has been neglected and brought down to excursion-tourist routes; nautical tourism, with its capacities for acceptance and depositing vessels lags behind that in other parts of the Adriatic littoral, as does sea fishing although it has plenty of possibilities for further development; mussel breeding and other aquaculture activities are underdeveloped regardless of favourable conditions; oil exploitation from the seabed have yet to be examined).

All the aforesaid has not changed, but heavy disturbances in economic developments in the previous decade have had a great impact on maritime economy, especially maritime transportation, as one of the most profitable activity in the previous period.
The main maritime zone directions towards sustainable development and ecotourism require the reconsideration of future development commitments of once big, profitable maritime companies.
The general assessment of the previous period development could be summarized in the following:
- most of the economy, and even non-economy of coastal municipalities are based on the aquatorium – tourism, catering industry, other tourism related activities; sports, recreation and the like, especially maritime economy;
- almost all coastal municipalities have good, diversified development concepts, i.e. the economic structure contains all fields with development potentials – tourism, catering industry, maritime economy, trade with other related activities, but also industry, which indicate large development potentials in the forthcoming period;
- The Coastal Zone, in a wider sense, i.e. all 6 coastal municipalities has not nearly used their development opportunities in the previous longstanding period due to numerous objective and subjective reasons;
- the main objective problems are the disintegration of former Yugoslavia and the period of longstanding sanctions, as the major external circumstances that held back the economy and non-economy during the previous decade.

However, numerous subjective weaknesses followed these devastating trends and contributed to even greater hindering of economic development and overall quality of life that need to be carefully explained, honestly declared and defined in order to be properly overcome in the upcoming period, and they to a large extent determine the manner, efficiency, and overall successfulness in managing the Coastal Zone in both wider and narrower sense.

However, regardless of all the problems, the coastal region represents the most developed part of Montenegro.

Domestic product of the coastal region in 2002 accounted for 26.5%(29.15% in 1989) of total GDP of Montenegro. GDP per capita amounted to USD 1,897 (USD 3,133 in 1989), which was 113.4% of the Republic average (127.7% in 1989). A share of this region in tourism domestic product in 2002 amounted to 68% (64.5% in 1989). The lowest domestic product per capita had the municipality of Ulcinj, USD 1,201.6, while the highest recorded the municipality of Bar, USD 3,102.7$.

The number of employed and unemployed people in the coastal region in 2002 amounted to 30,165 and 15,876, respectively. The share of unemployment in this region in total unemployment in Montenegro amounted to 19.5%, and that of employment was 27.5% (in 1989, employment and unemployment share was 25.2% and 15%, respectively). With regard to the structure of employment in this region, 30.7% and 15.6% are employed in wholesale and retail trade, respectively, and 15.1% in education. Some 2,319 people (7.5%) are employed in hotels and restaurants, and 13.8% in transportation. The share of employment in the private sector in the coastal region accounted for 34.3% of total employment n this sector in Montenegro. The unemployment rate of this region in 2002 amounted to 31%. The highest unemployment rate was recorded in Tivat, 43%, and the lowest in Budva, 18%.

In the south of Montenegro, where the poverty threshold is some 8.8%, there are about 19% of the poor, of which 16% are domicile population, 38% Roma people, 38.5% refugees, and 11.8% displaced persons.

1.2.3. Agriculture

The land resources of the coastal area amounted to some 50,000 ha at the end of the previous decade, which is 10.2% of the Republic area; some 20,500 ha of this area or 11% of the Republic average was agricultural land – ploughland and gardens represent 17.7% of total ploughland resources of the Republic, orchards no less than 49.6%, i.e. almost half of total orchards in the Republic, and vineyards represent some 17.6%.

Land capacities and their use indicate that the existing capacities are well utilized.

The basis of plant production represents ameliorated coastal fields of: Ulcinj (100 ha), Zoganj (110 ha), Mrčevo (220 ha), Tivat (80 ha) and Sutorin (120 ha), which together makes up 640 ha. Unfortunately, most of this land is not used and neglected. A great potential represents Štojska greda in the hinterland of Velika Plaža (1.000 ha).

Coastal lands have been returned to their original owners, thus practically being excluded from any kind

of intensive agricultural production.
These lands used to be organised through various hydrotechnical and agrotechnical measures, but in the meantime, orchards and grape vine plants have been or are being cleared, and irrigation and drainage systems have become non-functional, mostly torn or destroyed.

In the very Coastal Zone there are no conditions for initiating any significant agricultural production. However, adjoining this zone, there are coastal fields of the greatest potential for organized production. Added to this, there are olive groves on about 2,700 ha up to the altitude of 200m, located on steep slopes of mountains Orjen, Lovćen and Rumija and on anthropogenic land (terraces).

Agriculture development in the coastal area has been characterized by the following:
- uncritical import of cheap citrus fruit for a number of years prevented any mass cultivation of citrus fruit – very profitable fruit that can be cultivated in this favourable Medditerranean climate; thus, the current 240,000 fruit trees are insufficient, both regarding the number and crop maintenance, yield and overall treatment, especially tangerines, for whose growing the coastal area has very favourable conditions;
- very large fund of 415,000 olive trees is not a s nearly neglected in any of the medditerranean country as in Montenegro;
- there is also a very remarkable fig potential, over 200,000 trees, but it is also insufficiently utilized regardless of the traditional orientation of this area towards fig growing;
- what is very negative is that this area has potential for growing specialties whose value is far above average prices, especially when placed though tourism, but this has not been considered or realized in practise so far;
- the aforesaid and many other potential of the coastal area have not been utilized although it is considered that 1 ha at the coast is worth 3 ha in other parts of Montenegro, especially is agricultural products were to be placed through high-end tourism, thus reaching much higher prices;
- one of the biggest problems of coastal agriculture is a dramatic reduction of agricultural land through uncritical construction of residential, business, industrial and other facilities, especially through illegal construction;
- what was once built (greenhouses, modern crops, and the like) is nowadays neglected, especially the part that has been returned to original owners in the restitution process, returning to private ownership and a gradual change of the system; individual owners, who are not usually farmers, without modern agricultural machinery and not used to working this kind of work, have not found an organizational method to activate this land;

There are favourable natural potentials for the collection and cultivation of medicine herbs and wild fruit, and flowers as well (especially in combination with transportation facilities such as Tivat airport, the railroad route Bar-Belgrade, bus lines, and the like).

1.2.4. Maritime economy

Fishing and mariculture

Fishing in Montenegro is almost the most neglected economic sector, this supported by the symbolic fish consummation per capita of somewhat more than 1 kg/a year.
The use of fish resources in Montenegro is nowadays more intensive, mostly based on trawlers, seines and sometimes night lines.
In addition to commercial fishing, there is also sport fishing of a rather seasonal character and in the Bar-Ulcinj area.
The current level of sea fish resources exploitation is about 300 tons, of which 280 tons is caught by trawler fishing, and some 20 tons by fishermen. Of total amount of fish catch, 70% are wild and oily fish and 30% high-quality fish.
Fishing possibilities, besides by trawlers, are numerous, so the aquatorium (local sea) potential is quite rich, especially for oily fish.
According to analyses, trawler fishing is a very delicate way to catch refine fish, so it is estimated that sustainable capacity is only 4-6 trawlers, and other 30 trawlers are redundancy that jeopardizes refine fish habitats.
There are many fishing cooperatives in the coastal area (”K.Cvetković”, Baošići; ”B.Pivljanin”, Orahovac; in Bigovo, Vladimir (with catch from the river Bojana and Šasko lake) and fish processing plants (”L.Mitrović”, Bijela, ”Ribarstvo” Rijeka Crnojevića).

Mariculture cultivation in Montenegro has been very symbolic, with small yield and effects, especially when considering great mariculture opportunities. The research of the Institute of Marine Biology in Kotor showed that the Aquatorium, especial Boka, have remarkable conditions for natural development and artificial cultivation of mariculture – collection of brown and red algae, cultivation of mussels and oysters. The Boka capacity for mussel cultivation is estimated at 300 wagons a year.
There are modern programs that offer development opportunities for mariculture cultivation such as floating parks – suitable for mussels and other shells cultivation.
Montenegro's capacity for lagoon fish breeding is 3,000 tons and cage breeding of 2,000 tons a year.
Projects and estimates of opportunities and concrete programs point to a remarkable profitability of artificial mariculture on one hand, and almost unlimited market of high-end demand on the other hand, which is a great challenge for the utilization of the Aquatorium.

Oil and gas exploitation and trade

Intensive modern research were performed in the period following 1973 when “Jugopetrol” got the rights to oil research and exploitation in land and sea of Montenegro, and today it has concession rights for this activity.

The development area is 21,000 km² , of which 13,000 km² is land and 8,000 km² is seabed developed in 3 research blocks.

In the Montenegrin seabed, over 12,000 km f seismic profiles have been found since 1972 and 4 deep oil

bores have been drilled: Južni Jadran 1 (4,610 m), Južni Jadran 2 (3,700 m), Južni Jadran 3 (4,606 m) and Južni Jadran Ulcinj 1 (4,068 m).

The main reason why commercial amounts of this raw material have not been discovered is a very unfavourable ratio of performed seismic work and research drilling, i.e. only a small number of oil bores has been realized.

From the geological aspect, potential zones for oil or gas finding that has or could have immediate effects on the Coastal Zone, are the Budva zone and the Seabed zone.
On land, 1,250 km of seismic profiles have been recorded and 18 deep research bores have bee drilled, of which the most important and the deepest is the bore Ulcinj Kopno 1 – 5,309 m. All bores showed traces of oil and gas, and the bore JJ-3, at the depth of 3,141 m, showed mobile oil, but due to great water depth (306 m) and unfavourable ratio of permeability this bearing was assessed as uneconomical. In the immediate vicinity, there are much ore favourable structural facilities that will be the subject of drilling.

Results of land and sea research point to oil-gas potential of the area. If the expectations of the presence of oil in seabed and inshore fulfilled, oil industry could change the entire development orientation of the Montenegrin Littoral.

Oil industry, as a high accumulating industry, takes an important position in Montenegro's economic development.
Oil derivatives for Montenegro's purposes are entirely imported. The method of delivering goods to petroleum installations in Bar and Lipci is by sea, and the transportation of oil derivatives from the installations to retail sales is by road, i.e. tank cars.
Oil industry of Montenegro's coastal area has two petroleum installations, three yachting services, nine petrol stations, an air service, two warehouses, and a car base. Total reservoir capacity is some 100,000 tons. There also many private petrol stations in this area.

In the very Coastal Zone, there are the following capacities: petroleum installations Bar and Lipci, air service Tivat, yachting services in Budva, Kotor, Herceg Novi and a warehouse in Ljuta.
- petroleum instillation Bar (at Volujica; warehouses, i.e. reservoirs of 98,900 m³, and two berths for petroleum ships up to 80,000 tons capacity; it services the entire market, its own needs and reexport; acceptance and dispatch of goods is by ships and tank cars.
- petroleum installation Lipci (reservoir space of 12,200 m³ with 5 reservoirs; some 5,000 m of pipeline complex; berths for ships of up to 6,000 tons capacity and draft depth of up to 8 m; acceptance is only by sea, and cargo dispatch by ships and tank cars.
- air service Tivat (the airport itself covers 15,000 m²) covers two locations: Bonići for acceptance of goods by water for ships up to 3,000 tons and draft depth of 5.2 m, and installation connected to Bonići via underground pipelines of 960 m, with a reservoir of 4,840 m³, the management building of 100 m², and pumps and decanting facility of 50 t/h with a relay station; a reservoir with firefighting water and firefighting pumps.
- yachting service Budva (in a prefabricated facility near Stari Grad; with two automated stations and two reservoirs of 40,000 tons, and a retail outlet)
- yachting service Kotor (in a prefabricated facility near town park; with 3 automated stations and 3 reservoirs of 90,000 l capacity)
- yachting service Herceg Novi (with a kiosk, 2 automated stations and 2 reservoirs of 60,000 tons)
- warehouse Ljuta (with a pier – wharf of 20 m and draft depth of 5 m, the management and warehousing building of 450 m² and operative platform of 1,700 m²; no longer in use, but serving as sales outlet for the nearby fish and shell farm)

The ecological and firefighting system is developed, but as much as it was financially possible.
Technological characteristics of the existing facilities provide a high security level in warehousing and transportation of oil and oil derivatives.
Petroleum installations in Bar and Lipci are technologically modern facilities and meet all international norms and standards.
Petrol stations and yachting services are facilities that meet the minimum standards with regard to protection and security. These facilities require many technological innovations – especially with regard to their automation and security by providing an underground reservoir space. This also includes yachting services located at the shore.

Shipyards and ship repair

There are two shipyards within the Coastal Zone: one in Bjela and one in Tivat.

The Adriatic shipyard Bijela covers the area of 121,000 m² and the aquatorium area of 350,000 m², and ship repair facility of 14,900 m², shipyard facility of 3,150 m², warehouses of 15,000, parking space of 7,000 m², internal road of 30,000 m², and other facilities of 50,000 m².
Equipment consists of two docks – the big one of 250 m in length, and lifting capacity of 33,000 tons, with cranes of 12 tons capacity, and a small dock of 184 m in length, 10,000 tons lifting capacity, and a crane o 7.5 tons capacity; then wharf of 160 m in length, and another one of 510 m with cranes and repair facility of ships up to 120,000 tons. The length of operable shore is 1,200 meters, and the Shipyard has two tugboats of 450 Ks and 250 KS, with the required infrastructure – relay stations, waterworks, and a tank for used oil.
The Shipyard provides servicing of ship equipment (engines, turbines, regulators, and the like).

The shiprepair institute "Sava Kovačević" in Tivat operates within the Montenegrin army, thus intended primarily for military ship repairs.
The institute has two docks of 12,500 t and 3,500 t capacities, with a synchronized elevator for ships up to 1,000 tons.
The status of this Institute remains an open issue, especially when taking into account the sensitivity of its location (central position in the very town and on the most valuable land).

Shipping

Montenegro, as a medditerranean country, has a long maritime tradition that used to be famous for its world

renown shipping companies “Jugooceanija” in Kotor and ”Prekookeanska plovidba” in Bar.
The most drastic example of economic devastation in the previous decade is the destiny of these two reputable companies.
In the period following 1996, burdened with many difficulties, maritime shipping in Montenegro has failed in finding a solution for its financial troubles. This led to its further decay, so in 2005, maritime shipping had at its disposal 3 bulk carriers of total 7637 BRT designed for home trade, two passenger ships of total 15615 BRT, and one Ro-Ro ship of 3598 BRT.

1.2.5. Industry

Industry of the coastal municipalities accounts for 15% of domestic product.

The available capacities by industries in the South region are as follows:
- Engineering capacities in Kotor ("Daido Metal");
- Production of non-metal minerals – salt production in Saltworks "Bajo Sekulić" in Ulcinj.
- Production of base chemical products; the existing capacities located in Buljarica and Bijela;
- Capacities for chemical products manufacturing in Kotor ("Henkel"-Rivijera").
- Capacities for rubber and caoutchouc processing in Kotor ("Bokeljka");
-Manufacturing of food: mill and confectionery industry in Herceg Novi ("Aleksandrija"). Manufacturing of vegetable oil "Primorka" and "Olio-prom" in Bar; capacities for medical herb and forest fruit processing in Bar ("Barbilje") and Risan ("Exportbilje" – not working currently); capacities for beverages production in Bar ("Primorka").

Large potentials represent the opportunities for technological and production orientation with regard to the free zone functioning.
The Free zone Bar is in contact area of the Port of Bar. It has a developed internal communication, sewage for atmosphere waters, lighting, and small warehouses. It physically defined space of 10 ha, and another 4 ha, of which 450 m² are buildings.
The free zone Kotor is not in function, but it would have two physically separated areas – the business centre Škaljari, and the other is the commercial zone on Grbalj field.

1.2.6. Tourism

The potentials of the Montenegrin coastal area for tourism are fully competitive to the most attractive parts of the Mediterranean, as one the most attractive tourist destinations in the world.

Tourism development has the main priority in Montenegrin economy. Jobs and living standard of broad population are contingent on continuous utilization of natural potentials, including the public and private sector, attractiveness of overall offer and its international competitiveness.
Montenegro's position is weak: it lacks the financial potential, marketable, diverse tourist products with sufficient accommodation capacities, well-qualified staff, and well-functioning public utility infrastructure. The number of tourist overnight stays fell from 11 million in 1980`s to the current less than 5 million. Foreign tourists are coming back slowly, and demand from Serbia and Montenegro is only 6 week in the peak season. Low wages, poor capacity filling and the condition that is not suitable for demanding guests is what characterizes the hotel industry.
The official accommodation capacity of tourism industry amounts to 78,806 beds (in 2003), of which some 35,000 is the basic lodging. Of the latter, 88% of the capacity is in the coastal region. However, only 3,000 of the available 26,000 hotel beds are suitable for international market.
The official statistics does not take into account 90,000 bed in weekend apartments, and on the other hand we have the situation that 60,000 beds virtually vanished from the statistics. Both capacities are still available for individual use during holidays or for the “black market”. Therefore, Montenegro has the accommodation capacity of 243,000 beds.
However, it could be concluded that the additional complementary capacities for Montenegro` tourism industry are much less interesting from the economic aspect than those covered in the statistics. While the actual accommodation capacity is 160% larger than that statistically presented, the number of tourist overnight stays increases by a mere 31%. This indicates that there is a great divergence between the basic and complementary capacities, pointing to the urgency of solving this problem.

According to the applied criteria for the number of beds on 1,000 citizens, with its 232 beds Montenegro can be considered a real tourist country. However, with the number of beds per 1 km² on the national territory of 10.9 indicates that Montenegro has great unused potential, especially in the continental part of the country.

A share of the coastal tourism in the total number of tourist overnight stays amounts to 96% (foreign tourists 97%) indicates that the role of the coastal tourism much bigger in relation to overall tourist potentials of Montenegro.

However, the seasonal distribution of tourism turnover of the coastal area is very unfavourable in comparison with other parts of the country – 73% of turnover in the summer months, 12% in spring and summer, and only 3% in winter, which points to a very irrational and insufficient utilization of expensive capacities, which will be the main issue to be solved in the following period.

Tourism industry in Montenegro accounts for 8%-17%of GDP, depending on the year and the method of calculation, i.e. whether all direct (hotel industry, gastronomy) or indirect factors (agriculture, construction, and the like) are taken into account. However, this relatively high share is primarily due to the overall poor condition of the Montenegrin economy.

Montenegro still does not have the country image, which can be considered positive at this moment considering the image of the former Yugoslavia as a cheap medditerranean destination, mostly mass tourism oriented. However, a significant success in penetrating international market, primarily the Western European market, was achieved in the previous year. This resulted in a high increase in total tourism revenues, according to the official data of the Central

Bank of Montenegro.

Total revenues from tourism in the previous years are somewhat over USD 100 million. The main reason for the increase in revenues is a growing number of foreign tourists, which adds to the special quality of the achieved results. To wit, while revenues from Serbian tourist remains at almost the same level, revenues from foreign tourists is larger by the year; thus, when comparing the increase foreign tourist overnight stays with the increase in the financial effects of their visit, it can be concluded that the structure of foreign tourists changes in favour of tourist from developed countries, with a higher financial solvency.
Numerous projects were initiated, aiming at creating a better quality tourist product, but due to the lack of funding, they were of smaller scope and having short term effects.

However, the encouraging results will not continue if not followed by privatisations and investments in hotel capacities in the near future, the creation of an improved and stimulating legislative and institutional framework, better water supply, waste water and solid waste management, better transportation infrastructure, more qualified staff, and support to private entrepreneurship.

Healthy tourism is the vital part of this profitable area, with very favourable climate conditions, but also with already very positive results in overall tourism industry of Montenegro. To wit, the facilities already achieve higher level of capacity utilization due to working over the entire year. At the same time, health tourism organisations account for 3.2% of accommodation capacity, 8.4% of domestic and 18.1% of foreign turnover of Montenegro. Remarkable natural conditions and manmade potential, and domestic and international reputation are the guarantee for a further successful development of this specific type of tourism.

Institutions, locations, and accommodation capacities of healthy tourism in Montenegro are as follows:
- "Centre for recreation and therapy" in Igalo (less demanding therapies);
- Rehabilitation Institute "Dr Simo Milošević" in Igalo providing rheumatic, pulmonary, cardiovascular, neurological, gynaecological and other therapies, including various programs for children, active recreation, antistress, and similar treatments;
- Institute "Vrmac" in Prčanj for pulmonary, cardiac and other children illnesses ;
- "4 jul" in Petrovac with hydro, kinesis, and electric therapies, inhalations, diagnostics (EKG and ultrasound);

All of the aforesaid facilities, except the Institute "Vrmac", are located outside the Coastal Zone, while others have only smaller parts of the shore as bathing spots.

Nautical tourism represents one of the most favoured selective types of tourism. **.**
There is only one "real" marina in Montenegro, in Bar. Necessary equipping includes the entire accompanying infrastructure – electricity and water connections, sanitary connection, showers, and the like, then the service of safe keeping of vessels, and with higher level marinas tourist-boater accommodation in the accommodation capacities of a marina. According to these criteria, even the marina in Bar has certain defects. That is shy the marinas in Budva and Prčanj, and especially other facilities that are sometimes called marina (e.g. harbour in Herceg Novi or harbour Kalimanj in Tivat) are actually moorings for local boats that are occasionally used for mooring larger yachts.

Mooring is a part of water area and a part of a shore designed for the entering of vessels and equipped with the mooring system, but not enclosed as a separate zone intended only for boaters, and does not have to have complementary facilities. Most of the moorings in Montenegro are not equipped for accepting larger vessels due to their size, limited manoeuvring possibilities (especially in numerous small mole-closed harbours) and wind exposure.

Additional problem is the non-existence of infrastructure designed for boaters. The basic infrastructure lacks services for vessels, shops of nautical equipments, a charter service, petrol stations on the sea accessible to yachts, and other.

Table 1. EXISTING MARINAS AND COMMERCIAL MOORINGS IN MONTENEGRO

	Locations	Marinas and commerc moorings*)	Noncommercial moorings (mostly for smaller vessels)	For yachts over 15m	Quality of addit. offer
1	Herceg Novi		20	yes	low
2	Meljine		5 -20	no	low
3	Zelenika		10	yes	medium
4	Risan		5 -10	yes	low
5	Kotor	(10)	25	yes	medium
6	Prčanj - "Kordić"	8	15	yes	medium
7	Tivat - Kaliman	(20)	230	no	low
8	Budva	(30)	65 - 115	yes	medium
9	Petrovac		5	no	low
10	Bar	500	400	yes	high
11	Ulcinj - gradska luka		10	no	low
	TOTAL	508 (568)	790 - 860		

*) locations with numbers in brackets are listed as marinas, but they are actually commercial moorings for yachts and smilar larger vessels

Source: Documentation of the Publi Company for Montenegrin Coastal Zone Management

For the time being, there is no informational support which implies regular marine weather forecast (in summer and in foreign languages), nor precise and updated nautical maps, nautical guides with detailed lists of all moorings and anchorages, and other specialized material for boaters.
(Source: Study of nautical tourism in Montenegro, GTZ, 2005)

Capacities of the existing marinas, "marinas", and moorings intended for domicile population and weekend visitors cannot bring any significant financial benefit because they are currently free of charge, as will probably remain the same in the near future, which makes them commercial uninteresting.

Considering such a big lagging behind other countries of the Medditerranean, the development of this kind of tourism should be maximally accelerated. With a view to more efficient investments and accelerated activities on improving the quality of the tourist offer, the

activities should be in two directions: designing and equipping of the existing nautical places and the construction of new, modern-equipped marinas that would compete to the similar ones in the Medditerranean with their structure and quality.

1.2.7. Sport and Recreation

The Adriatic Sea with its coastline from the Cape of Oštro to the mouth of the river Bojana offers vast possibilities for quality, ample and attractive tourism. One of the important parameters for the expansion of this kind of tourism are the exquisite natural values of the sea and coasts for developing water sport activities such as: sailing, rowing, water skiing, wind surfing, moto-nautics, sport fishing, diving, both recreational and for competing.

The present condition of the building facilities, which should be supporting water sports, can not be evaluated as satisfactory. This is the reason why the natural beauties of the coastal line and the exceptional privilege of the sea for developing certain sports and recreational activities have not been used enough.

The previous usage of the sea for water sports, sports fishing and other activities was more the result of the development of the tourism centres, the need of the local citizens (from recreation to professional sports) and the existing infrastructure for practicing certain sports, than the purposeful usage of the existing natural potentials.

The development of certain sports activities was most intense at the places where the natural conditions were also most favourable, such as for example sailing, which is especially developed in the Boka Kotorska Bay. There are four sailing clubs in the Bay which are hosts of many sailing regattas, of which one is of an international character. Sailing can be practiced in the Bay form February until the beginning of October. The sailing conditions are favourable along the open coast of the Montenegrin Littoral, especially near Bar and Ulcinj.
The Boka Kotorska Bay is suitable for rowing, water skiing, wind surfing, swimming marathons etc. The configuration of the coast enables good coverage of these competitions from the shores.
Sports competitions in swimming and water-polo have a long tradition and are connected with centres such as: Kotor, Herceg Novi and Budva.
There are also yachting clubs in a couple of places in the Boka Kotorska Bay and of course in the larger places along the open Montenegrin Littoral.

Sports Building Facilities

A significant sports construction fund, which the littoral possesses, consists of:
- 3 sports halls, as separate buildings or within sports centres (of which one is under construction), of about 11,700 m2 of surface, with the audience capacity of 7,500 seats;
- 5 stadiums (of which 2 football, and 3 with athletic tracks), with the audience capacity of 6,000 seats;
- 3 indoor pools (of which one is under construction), of 10,700 m2 of surface, with the audience capacity of 2,900 seats;
- 3 stadiums for small sports;
- 1 beach football stadium,
- 2 big well equipped and arranged tennis terrain complexes,
- 6 outdoor swimming pools with sea water,
- 2 building facilities for other sport activities.

Within the boundaries of the Coastal Zone are the following 12 building facilities: outdoor pool with sea water in Budva, Kotor, Herceg Novi, Djenovići, Baošići and Bijela; sports centre "Velika plaža" in Ulcinj; bowling field in Budva; beach football stadium on the beach in Bečići; stadium of small spots in Kotor and a yachting club "Delfin" and sports hall "Župa" in Tivat.

In the contact zone of the Coastal Zone there are 3 building facilities: Sports centre "Madžarica" in Bar; sports and recreational pool in Budva; football stadium in Tivat.

In the hinterland of the Coastal Zone there are 8 building facilities: Mediterranean sports centre, tennis complex "Slovenska plaža", sports and recreational pool and football stadium FK "Mogren" in Budva; sports centre "Igalo" and sports and recreational pool in Igalo; and sports and recreational pool and football stadium in Kotor.

It is obvious that Montenegro possesses a fund of sports building facilities, the density of which in space represent not only significant potential and the basis for the further development of sport, but also a opportunity when speaking about sports culture, and the educational and health role of sport.

The experience from the prevoius period indicates the unsuficiently focused planned approach to the realisation of the sports building facilities, wnen it comes to their spacial disposition on the Republical level. On the other hand, the locations of certain built building facilities have a lot of problems caused by the lack of needed space and traffic infrastructure. One gets the feeling that certain building facilities and centres have been more „inserted„ in the city tissue, than are the result of an adequately planned spatial treatment.
The capacity of the building facilities, primarily in audience, inner communication and non-sports facilities, are almost as a rule over dimensional.

The construction condition of the fund, generally taken, can not be evaluated as satisfactory. However, all the building facilities, although mainly unsuitably maintained, with certain planned investments and relatively modest investments can be brought into the condition for appropriate purposes.

Finally, in the context of changes that have appeared, sport should not only be observed through the fund of built building facilities and the means invested in them, but as the integral part of the social and economical matrix, which has to be treated as the object for offering and demanding. Actually, sport and especially sports building facilities should be more and more approached through their commercial function, whereby one of the ways for commercialising the fund is organising sport events on a profitable basis.

1.3. Transportation

Because of the many factors which characterise the region of Montenegro, the transportation system has a special role in the development of the Republic.
The existing economical structure of Montenegro assumes the need for significant bringing and taking of raw materials, semi-finished products and consumer goods, which means that in this region transportation is intensive, both goods transportation and passenger transportation.
The gravitational area of Montenegro, caused by its geographical position, in regards to transportation is important and directed to the region of Serbia and Montenegro, and wider, which is especially recognisable in tourism streams.

In the previous development of the transportation system the following important effects have been achieved:
- the basis has been set for including Montenegro in the European road system by building the Adriatic road, which consists of the coastal continental part (E 60-85), with which the shortest modern road link between the Adriatic coast and Serbia and Macedonia has been established.
- with the construction of the railway Beograd – Bar the railway system of Serbia and Montenegro has been established.
- with the construction of the Port of Bar, the gravitational area of the railway Beograd – Bar, and the territory of Montenegro, have come into contact with global sea transportation.
- with the construction of the airports in Podgorica and Tivat, Montenegro has been included in the domestic and global air transportation system.
The development of the whole transportation system can not be considered as satisfactory.
Besides road transportation, as the basic form, the transportation system consists of: railway, sea and air transportation.

The primary characteristics of the individual forms are as follows:
- road transportation is unsatisfactory in regard to the density of the system, its characteristics and service level; the lack of appropriate connections with the surrounding area and within the Republic should be emphasised; the density of the highway and regional roads system is 13 km/100 km 2; of the total of 1,796 km of the road system the highways participate with 47% (844 km), and the regional roads with 53% (952 km); the system is covered with a modern hard surface road in the length of 918 km (51%), while 160 km (9%) of roads are still macadam; the average speed of driving is modest 48 km/h.
- the railway transportation is based on three corridors; absolutely the most important one is Beograd - Bar, then Podgorica - Nikšić and Podgorica - Božaj; the total length of the railways is 250 km of which 68% is electrified; the density of the system is expressed with the value of 1.8 km/100 km 2; of the constructed stations three: Bar, Nikšić and Podgorica represent the places in which the largest flow of goods and services is realised.
- sea transportation is carried out mainly through the international ports among which the Port of Bar dominates, as the largest port in the country; ports determined for international sea transportation, besides the Port of Bar, are Budva, Kotor, Herceg Novi and Zelenika.
- air transportation is carried out through the airports of Podgorica and Tivat (class A) which have been prepared for international passenger transportation; an airport in Berane has also been built, which is not used for public transportation.

1.3.1. Road Transportation

The main characteristics of the road system at the Coast are:
- The road system of the Coast consists of 357 km of highways and regional roads, which is 19.89% of the Montenegrin road system; the longest system of roads of this rank belongs to the Municipality of Kotor (115.01 km)
- the density of the highway and regional road system at the Coast is in total 22.45 km/100 km 2 which is almost double in comparison to the rest of the Republic; the highest value of this index has the Municipality of Budva with 47.29, and the lowest the Municipality of Herceg Novi with 11.34 km/100 km 2.
- the road structure is old
- inbuilt roundabouts when the routes pass by towns and larger places, represent great problems on the Adriatic highway along the Montenegrin Coast; and because of the same reasons traffic on the highway route north – south, through Podgorica and Bijelo Polje, during the tourism season is extremely difficult, which makes the tourism offer of the Coast less attractive.
- the level of maintenance of the local roads, which are in the competence of the local authorities, is lower.
- the road equipment and traffic signalisation is old and insufficient.
- the level of motorisation at the Coast has reached a large value
- the large number of vehicles and their technical characteristics, especially in the last years, are in contrast with the condition and characteristics of the road system
- the technical culture of the citizens and the drivers is not adequate with the level of motorisation and the technical and technological characteristics of the vehicles driven on the roads.
- the absence of garages and parking lots represent negative elements in the tourism offer and in property security of the local inhabitants.

1.3.2. Railway Transportation

The main characteristics of the railway system at the Coast are:
- the only connection of the Montenegrin Littoral with railway transportation is realised through the railway station Bar.
- the way out to the world railway system is realised with the railway Bar-Beograd-Subotica.
- the gravitational region of this railway encompasses the central and north-west part of the Republic of Montenegro with the total surface of 5,414 km 2, which makes 39% of the total territory in which 231 thousand inhabitants live or 40% of the total population of the Republic.

- in the transportation system of the Republic the railway system should take over the role of the long-distance goods transporter and the organisation and realisation of transportation of goods from the economical centres of the Republic towards the Port of Bar.
- from the aspect of the railway, as a technical system, the basic orientation for the next period is aimed at railway reconstruction, modernisation of equipment and better usage of the existing capacities.

1.3.3. Sea Transportation

A favourable geographical position offers the Montenegrin Littoral realistic opportunities, with distinct complementary advantages, for effective entrance in the frequent Mediterranean tourism currents, for intense development of nautical tourism and creating ferry connections with the neighbouring countries.
The Montenegrin Littoral has a very favourable tourism and geographical position in comparison to a large part of the territory in the hinterland as well as to a good part of Central, Eastern and South-eastern Europe, as very important present and potential source foreign tourist regions.

Analyses of the available sea transportation resources show large potential and long tradition, as well as favourable geographical and climate characteristics.
Sea transportation has substantial capacities in the shipping industry and port business activities. Human resources appear as one of the most valuable resources, the reputation of which has been verified on the world market.
The level of attained usage of this type of transportation and the whole maritime economy in the last ten years has been exceptionally reduced by the effect of factors which have been coming, mainly, from the political domain. The fleet has been drastically reduced, port and ship maintenance capacities have not been renovated, and the human resources have scattered world wide.

Shipping has superb importance for Montenegro, as one of the basic parts of the maritime economy. In the year 1956, after the decentralisation of the Yugoslavian merchant fleet the ”Jugoslovenska oceanska plovidba” was established, as the first modern shipping organisation in Montenegro, while the ”Prekookeanska plovidba” in Bar was established in 1961.
The shipping industry, as one of the skeletons for Montenegrin development, has come into an unenviable position. The technical condition of the fleet, sanctions of the international community over the last decade which disabled operation of ships, recessions on the world maritime market, ownership transition, attrition of human resources etc. contributed to this situation. Until 1991 the Montenegrin fleet was respectable. In the period after 1996 under the burden of the listed problems, the maritime shipping industry of our country did not succeed in finding a solution for its economical problems.
AD”Pomorski saobraćaj” Kamenari performs the basic activity: transportation of vehicles, cargo and passengers on the route Kamenari - Lepetani. The company possesses 4 ferries with the total capacity of 120 vehicles.

The ports for international sea transportation on our part of the Adriatic Sea are: Bar, Budva, Kotor and Herceg-Novi.
By the decision of the authorities in the year 1986 the ports of Bar and Zelenika defined their statuses as border crossings open for international transportation, while the port of Kotor achieved that status in 1992. In that way these three ports acquired the conditions for docking all ships, during 24 hours a day, which sail in the international maritime traffic.

The Port of Bar is the largest and most important port on the Montenegrin Littoral and at the moment is our only port which possesses built infrastructure, modern equipment (for our conditions), storage capacities, human resources, which makes its internal suppositions for business on the international market.
It spreads over the space of about 2 million m2, of which 500,000 m2 is the water area, 120,000 m2 are open storages, 350,000 m2 are closed storages, the main building, traffic arteries, park and energetic facilities and 600 ha of reserve surfaces for spreading out.
The traffic reloading function is carried out through: container terminals, Roll-on/Roll off terminals, terminals for general cargo, terminal for scattered cargo, grain elevator, terminal for timber and terminal for liquid cargo.
The port possesses a number of hoists of different capacities and special cranes and bridges, mechanisation for horizontal motion – forklifts, loaders and other equipment.

The Port of Kotor is located in the far inner part of the Boka Kotorska Bay.
It has the status of a port for international traffic, and in 1992 it received a permanent border crossing, and in the last years it directed its business from receiving and docking cargo and passenger ships to yachting and nautical tourism.

The Port Authority and the customs house work during the whole year so that complete international treatment is available.
The operative surface of the port, which is used for international sea transportation, is situated on the operational quay and encompasses the space from the lighthouse monument to the building of the Port Authority, and is about 4,000 m2.

The Port of Zelenika is a part of the company AD”Mješovito” Herceg Novi, with capacities in indoor and outdoor storages.
The Port Authority (as a branch of the Kotor Port Authority) and the customs house are located in the port, and thus the port is opened for international traffic during the whole year.

The Port of Kotor, the Port of Zelenika and the Port of Risan are in the phase of development which is characterised by the absence of separate terminals (the first development phase – traditional port). In the Port of Bar the differentiation of the terminals according to the characteristic types of cargo, which are the object of manipulations, has been carried out.
On the whole all the ports have sufficient capacities and equipment, and only the stabilisation of operations is

necessary in order to optimise the usage of the capacities. With the increase of the amount of work the Port of Bar will be able to carry out all the necessary operations, and thus it is evaluated that the ports have good locations, potentials and efficiency.

The Port of Budva is a passenger-tourist port and is mainly used by nautical vessels.
The port provides electricity supply, water supply and drive fuel for the vessels.

The causes for ceasing the existence of passenger sea transportation on the territory of Montenegro are multiple, but they are primarily of economic nature.
Namely, in the 60s the Adriatic highway was built in this region and thus the conditions were made for organising the more rational road transportation. At the same time the living standard of the population increased and the number of cars increased. In this way a large number of the population of the coastal region became independent from ship transportation.
At the same time the costal places became jagged, so transportation by ship could not completely meet the transportation needs of the inhabitants who live in the vicinity of the ports. The increase in the number of passenger ship dockings itself became too complicated and considerably slowed and decreased their efficiency.
Longitude passenger shipping routes that connected our coast with the north Adriatic ports, west Adriatic and Greek ports on the other hand began loosing the race with rail and especially air transportation, which at that time also experienced expansion.
At the end it needs to be emphasised that form the technical and technological aspect at that period the ships did not succeed to fastly enough adapt to the changed market needs.
Nowadays Mediterranean cruising ships only occasionally dock in Kotor.
Ferry connection that the Ports of Bar and Kotor have with ports in Italy- Bar and Barleta - should also be emphasised.
When speaking about excursion maritime transportation, the ports of Herceg Novi and Budva operate as destination ports, and the port of Kotor as a target port. The primary motives of participants of excursion trips are: swimming, which can be seen from the achieved circulation in Herceg Novi (excursions to Žanjic, Rose, Mamulu) and sightseeing of the cultural heritage which can be seen from the achieved circulation in the port of Kotor.

The Port's Operational quay

The Port's Operational quay in Montenegro is insufficiently built and developed; there is not enough space for berthing vessels neither in the small mole-closed harbours nor in the moorings and marinas.
The constructed port's operational quay can be divided on: small mole-closed harbours, moorings, marinas and ports.

The accomplished development level of the port's operational quay, according to the type of building facilities is as follows:
- small mole-closed harbours 2,790 m;
- piers 1,422 m;
- marinas 2,126 m;
- ports 4,339 m,

More exactly the total of 10,093 meters along the whole coast.

Small mole-closed harbours are artificially enclosed parts of the sea that with their surface and depth of the water area enable berth and protection from bad weather for those vessels which can use them, depending on the vessel's dimensions and jetty. According to the way of construction and the material used for construction (rock) they represent a specific environmental and architectural characteristic of the Boka Kotorska Bay where there are mainly located.
The size and the capacity of small mole-closed harbours are very different and depend on the size of the place, number of owners of the vessels, their profession and the characteristics of the location where they are built.
In 26 places in the Boka Kotorska Bay there are 177 small mole-closed harbours with 1,373 berths, while in Budva there are 2 small mole-closed harbours with 138 berths.
According to the data from the vessel register of the Port Authority in Kotor in the territory of the Boka Kotorska Bay over 4,000 vessels have been registered, which would mean that one small mole-closed harbour serves approximately 22.8 vessels.

Piers are built parts of the port – operational quay that provide the conditions for berth of vessels and the performance of simple port operations (boarding and landing of passengers and smaller quantities of packed cargo).
On the Montenegrin coast there are 22 piers, including Ulcinj.
The total length of the piers is 1,422m, with the optimal capacity along the shore for 92 vessels of the permitted jetty. Piers have an operational quay with the total surface of about 15,400 m2.
Except for the tie up facility for the berth they do not have any other built-in infrastructure. Some of them, like Muo and Dobrota, are occasionally used for smaller harbour operations within the Port of Kotor.

The arrangement of the **moorings** in regard to the total length of the Montenegrin Coast shows high spatial concentration in the Boka Kotorska Bay, with approximately one mooring on every 5.2 km of the shore. The Bay has 1,278 m of built mooring shore or 89.9% of the total mooring shore and 10,897 m2 of surface of operational quay or 70.7% of operational quay of all the moorings on the Montenegrin coast.
We are talking about an extremely high developed potential, which for now, because of undeveloped nautical flow and the absence of local maritime traffic, is out of function.

Marinas are reception point nautical tourism facilities by naturally or artificially protected water surfaces, specialised for offering berth services, supplying, securing, maintenance and servicing vessels and other services. They are categorised according to the level of equipment.

Marina"Sveti Nikola", Bar encompasses 100,000 m2 of water area with the shore length of 1,200 m with 8 jetties with the total length of 2,400 m and depth from 1 to 9 m, and thus is ready for even the largest vessels of the VIII category over 18 m long, and has the capacity

of 900 berths on sea of which 500 are for commercial purposes, and 400 for the local population.
The level of the nautical infrastructure development is 60%, so the marina in Bar is considered qualitative and suitable for basic purposes.
Besides that the marina offers accommodation, storing, servicing, winter port, and full servicing of yachts, then selling of new yachts, as well as a "nautical shopping" centre for purchasing and selling a full array of nautical equipment.
The Marina in Budva with an enclosed water area of 4,500 m2 and 300 m of shore without jetties has the capacity of 400 boats and yachts and 50 m of operational quay for receiving excursion boats, but with small drafts because of the small depth of the water area. The infrastructure provides 34 connection points for drinking water and 68 for tt and electricity.
Marina"Kaliman", Tivat has 10 concrete jetties with 45 berths, which is altogether 228 berths, with a 500 m long built shore within which the receiving shore of 25 m and 1,850 m2 for land berths and smaller repairs but is without infrastructure.
The Port of Kotor after the rebuilding and reconstruction of the shore on one of its parts has 27 connections for water, electricity and telephone. It is not a real marina, but it is used and has the capacity of 10-15 vessels of different category.
Marina"Kordić", Prčanj is the first private marina and encompasses the water area of 1,000 m2 and can receive 15 smaller vessels and 8 larger ones over 15 m of length.
The city port Herceg Novi is nowadays mainly used for excursion boats for local destinations and for temporarily berth of fishermen boats. That is why this operational shore of this port is treated as a mooring. However, a large part of the port's water area is used for anchoring and berthing nautical vessels.
The small Port of Meljine has two wharfs – moorings, which offer conditions for berthing 20 nautical vessels. The water area spreads over about 1,500 m2. The length of the operational shore is 47 m, and the depth along it varies form 1.5 to 3 m. Around 60% of the protected part of the water area has the depth around 1 m and less, which is from the aspect of a commercial berth unfavourable.
The mooring in Risan, which is 75.50 m long, previously functioned within the local sea transportation. Today it has an open operational quay of a surface of around 1,330 m2 and is equipped with 4 tie up facilities for berths. The depth along the shore is 4.5 m, which enables berthing of nautical vessels up to 17 m long, in other words five vessels of an average size parallel to the shore.
On the basis of the realised traffic of nautical vessels and existing infrastructure capacities on the shore, the usage level of the built shore capacities, calculated for the period of 90 days (VI-IX), is less than 10%.

The total length of the operational quay in the Montenegrin sea ports is 4,338.6 m.
The Port of Bar has 3,484 meters of operational quay, of which 2,500 m with the sea depth from 10-14 meters for large ships, with terminals in the back.
The Port of Kotor has 513 m of operational quay. The depth of the port and anchorage ranges from 4 to 8.5 meters and thus can receive middle size ships.
The operational quay of the port of Kotor encompasses the central part of the Kotor Bay and consists of: the shore by the city park, Luža shore, shore by the market building and Cultural Centre and Šuranj shore.
The Port of Risan has activated the space of the boardwalk with 75m of operational quay, and the depth of the port is 5m. It is equipped for cargo reloading.
The Port of Zelenika has an operational quay of a total length of 267 m, where there are connections for water and electricity. The sea depth in the port is 4 - 8.9 meters, and receives yachts and boats of a smaller jetty in accordance to the water depth.

Navigable Waterways

The navigable waterway in the Montenegrin coastal sea is 12 nautical miles in the seaboard and is situated some 5-10 km from the most forward points of the shore, is of a width of 2-4 km, and is cut by transversal navigable waterways between the Montenegrin and Italian ports.
The total length of the navigable waterway in the coastal sea is 66 nm, that is 122.2 km which is the distance between the furthest ports - Sv.Nikole on the mouth of the river Bojana and Kotor.

The navigable waterways are marked by building facilities for safety navigation: 7 lighthouses, 3 shore lights, 6 shining buoys, and coastal radio station.
Marking of the navigable waterways is in accordance to international regulations.
Fees for using a navigable waterway and building facilities of safety navigation are paid by ships under the domestic flag when extending the navigation licence, or when issuing a navigation licence for navigation in the coastal sea to foreign smaller vessels.
It is estimated that the authorised office performs its work well and that the navigable waterways and facilities are maintained correctly.

The Port Authorities are a necessary and very authoritative form of organisation and form of protection of the water area and shore - the region of the Coastal Zone, but only when they are well conceptually set and adequately organised, which is not the case in our country.
The Port Authority in Bar, with its branches in Budva, Ulcinj and Virpazar (from the river Bojana to the river Jaz) covers the shore length of 120.3 km, the right bank of the river Bojana 40 km, and the shore of the Skadarsko Lake 171 km, more exactly the total of 33l.3 km.
The Port Authority in Kotor with its branches in Herceg Novi, Zelenika and Tivat in the area from the cape of Sveta Nedjelja on Prevlaka to the river Jaz covers the shore length of 140.8 km.

The open problems which appear in their operations are: bad technical equipment of the Port Authorities; the absence of all the other necessary services at sea such as the rescue squad, search squad etc; unreliable operation because of old data; bad total activity; badly paid insufficient cadres etc.

1.3.4. Air Transportation

In comparison to other types of transportation, air transportation started with its development rather late in Montenegro – in the second half of this century. Montenegro is included in the domestic and world

system of air transportation through the international airports in Podgorica and Tivat.
The Tivat Airport is located in the Tivat field (Tivatsko polje) 4 km from the centre of the town of Tivat and is connected with an existing road system and tunnel with Kotor. Bus passenger transfers are organised to two destinations: Budva and Herceg Novi.
The whole surface of the airport is located in the area of the Coastal Zone.
The road Tivat-Budva which passes right by the take off and landing strip and its route present a serious limitation for further development of the airport.

The airport has a typically seasonable traffic character with extremely high traffic density during the summer season. During the summer the airport is used beside airplanes form the C category also by airplanes from the D category, the frequency of which increases every year.

The airport has a landing stripe 2,500 m long and 45m wide. The airport is equipped for night landing, but is for now used only in daylight conditions.

The organisational structure provides: receiving and dispatching of planes, passengers and cargo, restaurant and café services, maintenance of basic equipment, physical and fire security measures.

1.4. Technical infrastructure

1.4.1. Water supply

It is very difficut to separate the water supply systems in the part of the Coastal Zone, the contact zone and the functional hinterland, except for the distrubution system, because the source areas and reservoires, as well as supply pipelines located in hinterland influence directly the watersupply of the Coastal Zone.

The present state of the water supply system is such that it is characterized by a lack of command management systems, unprotected source areas without established zones of sanitary protection, insufficient reservoir space, insufficiently zoned networks, worn-out water supply systems, insufficent available quantities of water for water supply (in Kotor, Tivat and occasiounally in Budva).

Available quantities of water at local source areas are as follows:

Municipality Herceg Novi

Water supply system Plat	300 l/sec
Source area Opačica	80 l/sec
Spring Sasovići	3 l/sec
Spring Lovac	7 l/sec
t o t a l	390 l/sec

Municipality Kotor

Spring Škurda	100 l/sec
(Orahovac	120 l/sec*)
Spring in the tunnel Vrmac	20 l/ sec
Spring Simiš	5 l/ sec
Springs Gornji Grbalj	16 l/ sec
t o t a l	141 (161*) l/sec

Municipality Tivat

Source area Plavda	20 l/sec
Spring Češjar	3 l/sec
Source area Topliš - Merkur	20 l/sec
t o t a l	43 l/sec

Municipality Budva

Spring Rijeka Reževćci	80 l/sec
Source areas Podgor and Sjenokos.	140 l/sec
Source area Buljarica	25 l/sec
Zagradac	2 l/sec
Lončar	4 l/sec
Topliš	1 l/sec
Piratac.	3 l/sec
Pod piramidom.	5 l/sec
Smokov vijenac.	5 l/sec
Sopot.	7 l/sec
Loznica.	5 l/sec
t o t a l	277 l/sec

Municipality Bar

Spring Brca	60 l/sec
Spring Kajnak	70 l/sec
Spring Zaljevo	20 l/sec
Spring Tarčini	1 l/sec
Spring Sustaš	2 l/sec
Source area Orahovo polje	150 l/sec
Source area Velje oko	50 l/sec
Čanj.	8 l/sec
t o t a l	361 l/sec

Municipality Ulcinj

Spring Gač	30 l/sec
Spring Mide	10 l/sec
Spring Salč	3 l/sec
Spring Kaliman	4 l/sec
Spring Klezna	15 l/sec
Source area Lisna Bori	200 l/sec
Brajša.	5 l/sec
t o t a l	267 l/sec

Recapitualtion per muncipalities is as follows:

Herceg Novi	390 l/sec
Kotor	161 l/sec
Tivat	43 l/sec
Budva	277 l/sec
Bar	361 l/sec
Ulcinj	267 l/sec
total:	1.499 l/sec

The current needs for water can be met from local source areas in Herceg Novi, Ulcinj and Bar, while for the needs of seaside towns and toursim development they can be met only by additional quantities of water from the regional water supply system "Montenegrin Littoral", i.e. by supplying water from the Skadar Lake.

Regional water supply system has been constructed at the section Hecreg Novi – Budva, and the segments are being used in the water supply systems of Herceg Novi, Kotor, Tivat and Budva.

Water supply system of municipality Herceg Novi supplies with water an area covering around 235km2 (entire bay area from Verige till the cape Kobila, and the villages on the slopes of the surrounding mountins up to the level of 360 meters of altitude (Ratiševina and Sasovići).
Out of the total number of municipality citizens around 92% obtain water from the public water supply system.

In the water supply system 82% of annual needs for water are met from the subsystem Plat located at the territory of Croatia which controlls and regulates water delivery, which significantly reduces the reliability degree of water supply. Local source area Opačica cannot cover the needs for water even on the days of minimum consumption.
With the quantity of water supplied from Plat and from Opačica the needs for water cannot be met on the days of maximum consumption, which causes reductions in water supply. Losses in the water supply system are very big.
Unplanned spreading of the water supply system results in a large number of reservoirs in the system – 27, mainly of small capacity, of which 8 are even not in use, as well as a large number of pump stations of small capacity, and in particular of pneumatic pump stations (21) which should be considered interim solutions in the system. Despite such a large number of building facilities, the zoninog of levels in the system is incomplete, because many building facilities were constructed as interventions without a comprehensive plan.

Water supply system of municipality Kotor supplies with water an area covering around 335 km2 – the entire coastal area of the bay, the area of Upper Grbalj, the Grbalj cemetery and Kavač. An area that is not included into the water supply system are the villages above the level of 300 m of altitude and the villages of Lower Grbalj where the distribution system has not been constructed and around 92% of them are supplied from the public water supply system or the village water supply systems.
Source areas Škurda and Spila become salinated during summer so they cannot be included into the balance of waters at the time of highest needs, however, in the period when Škurda becomes salined the springs of Orahovac increase their capacity of fresh water, so their productivity improves the supply in the summer period, so that along with other springs of smaller capacity, and with the current poor maintenance and obsoleteness of installations and large losses in the system, they do not provide a safe water supply as regards water quantity or quaility.
The distribution system and the reservoir spaces meet the current needs.
Out of the total quantity of water that is withdrawn in the source areas 80% is delivered to the reservoirs or into the distribution system so that transport costs for water up to the consumers along with the huge losses in the system are enormously high.

The water supply system of Tivat supplies with water an area of around 46km2 – the entire coastal area of the bay, parts of the peninsula Luštica and villages on the slopes of Vrmac. Villages above the level of 200 m of altitude as well as some villages in Luštica are not included into the water supply through the public water supply system but are supplied from rain collecting cycterns.
Out of the total number of municipality citizens around 90% are supplied with water from the public water supply system.
The supplying is done from the source area Plavda,the new wells in Topliš and the spring Češljar.
In the summer period water in the spring Plavda is salinated so that it cannot be used as drinkable water, and the spring Češljar and the new well in Topliš remain for water supply, which does not even nearly satisfy the present needs, so that there are permanent daily restrictions.
Out of the total quantity of water tapped at source areas 95% is delivered up to the reservoirs or into the distribution system so that the costs of water transport up to the consumers along with the big losses in the system are enormous.
The existing reservoir space as well as the distribtion system meet the present needs but not also the needs of future development.

Budva water supply system supplies with water an area covering around 122 km2 along the entire Budva Riviera including Petrovac and Buljarica and the settlements on the slopes of mountains up to the level of 120 and max 300 m of altitude in the village Markovići.
Out of the total number of municipality population around 96.5% are supplied with water from the public water supply system.
The supplying is done from several springs, Rijeka Režević, Podgorski izvori and the spring in Buljarica which cover the current needs with their productivity but the shortage is already felt which is manifested as the lack of pressure in higher zones of particular settlements.
Water supply system development, i.e. development of its distribution part (distribution system and reserovire space) is not harmonized with the spatial spreading of settlements and the incrase in the number of users (which has lately increased markedly).
The zoning has not been performed adequately, except for the territory of Petrovac, and in Budva this is compensated by installing of pneumatic stations, which is actually an interim solution. There are marked losses of water in the system.
The reservoire space capacity is not satisfactory.

Bar water supply system supplies with water an area covering around 598 km2 – the town of Bar, Sutomore, Stari Bar, Virpazar, with the exception of an area of weekend settlements from the Bar field towards Ulcinj.
Out of the total number of municipality citizens around 86% are supplied with water from the public water supply system.
A very complex system is supplied from 7 source areas, partly through gravitation, partly through pumps, over several main supplies, with a large number of pump and pneumatic pump stations. It is a group water supply system which apart from Bar, Old Bar and Sutomore supplies 14 more settlements distributed along the shore in the immediate hinterland, as well as Virpazar on the Skadar Lake. Such a relatively complex system requires a supervision management system for correct functioning, which has not been established.
Due to insufficient reservoir space it is not possible to equal supply and consumption, so that peak consumption is covered immediatly from the source

area, which reduces the safety of supply.
Although it is located in a wide belt covering a height of around 200m, the distribution system is not strictly zoned primarily due to an insufficient number of correctly placed reservoirs.
The existing source areas satisfy the current needs, but the unplanned housing construction, especially in higher areas results in inadequate supply of water to those spaces.
Great unrealized consumption points to significant losses in the system, which is probably the consequence of damages in older pipelines.

Water supply system of Ulcinj supplies with water an area of around 255 km2 – the town area of Ulcinj, settlements Bratica, Klezna Donji Štoj, Mide and the water supply system of Vladimir supplies with water the villages in that area. Out of the total number of municipality citizens 82% are supplied with water from the public water supply system.
There are 7 source areas of different origin and water quality in the system, from the karst to alluvial ones. Water supply from the source areas is done by pumping and gravitation, with large variations in consumption throughout the year and during the day, so that in functional terms it represents a very complex system with only partly realized zoning.
The available water quantities in source areas cover the current needs for water in peak summer season.
The quality of withdrawn water in karst source areas is of satisfactory physical chemical quality (with the exception of rare turbidity in some of them). Bacteriological pollution is present in all source areas. Water quality at the source area Lisna Bori requires a water treatment procedure.
As regards pressures in the system, it must be pointed out that due to lack of zoning, lack of a reservoir over which the lower zone would be supplied which directly supplies the area of the Coastal zone, and due to supply with water directly over supply pipelines, the work pressures in the lower zone vary significantly (variations in pressure influence significantly the increase in the pipeline damage, water wasting and unrealiable supply).
Unreliable supply is cause also by the fact that 60% of withdrawn water is supplied to the consumption area by pumping by means of pump aggregates which were depreciated long ago, so that losses in water are estamated at around 60%.

SUBMARINE PIPELINES

The following pipelines on the seabed have been registered:
- within the regional water supply system at the territory of municipalities Tivat and Herceg Novi, at the section Cape of Sveta Nedjelja - Opatovo two pipelines 2 x 202 mm
- for extending the water supply for the territory of the municipality Herceg Novi in the zone of Luštica a pipeline 202 mm at the section Kumbor - Pristan
- in the system of water supply of Kotor a pipeline of 250 mm at the section Dobrota – Prčanj and a pipeline of 202 mm at the section Verige - Verige

THE STATE OF THE SYSTEM

All the water supply systems at the Seaside need to be brought to a sanitary and technical level that can secure a reliable and good quality supply with regard to the quantity, pressure and quality of water. First of all, losses in the systems need to be removed, worn out pipelines need to be replaced, and good quality zoning performed in order to reduce the pressures to acceptable levels, extend the system as needed, divide the supply and distrubution lines and increase the reservoir space (to around 40% of maximum daily consumption).

Worn out, long ago depreciated pump aggregates need to be replaced, adequate measures of sanitary protection of the source area need to be carried out and treatments into source areas introduced where needed (Lisna Bori and karst springs which are subject to turbidity).
Good quality supervisory management systems need to be introduced into all the town water supply systems which would supplement the planned supervision management system of the Regional water supply system.

1.4.2. Waste waters runoff

With regard to the runoff of waste waters Montenegrin Littoral is divided in two parts – the Bay of Kotor and the open sea.

The Bay of Kotor as a relatively closed area with a reduced capacity for water self-treatment as regards sea water quality requires the so called terciary degree treatment of waste waters which are disposed into the bay (removal of nitrates and phosphates after primary – mechanical and secondary – biological treatment) or their obligatory evacuation outside of the bay with the constructed sewage infrastructure which would cover the whole of the shore and the bay hinterland.
However, the current state of the sewage systems of the towns in the Bay of kotor is such that it does not even nearly cover the necessary area, and the raw waste water from around 80 outlets is discharged directly into the waters of the Bay.
The situation with the open shore is more favourable, because parts of sewage systems have been constructed for particular areas of these municipalities, mostly in Budva and Bar, but plants for treatment of waste waters need to be constructed before discharge into sea. At this part of the shore there are around 10 outlets.

Waste waters from Herceg Novi are evacuated by a separate sewage system over the eastern and western branch of the main shore sewer which captures waters from the secondary main sewers with pumping over at the pump stations on the main waste water sewer.
Water transport through the main sewer is secured by pumping over on the way towards the central pump station on the cape Forte Mare.
Eastern and western branch of this main sewer have been placed along the present promenade by the sea from Meljine to Igalo and they have been placed in at

the lowest shore levels so that waste waters from hinterland are brought by gravitation by the belonging secondary main sewers along this entire section.
The western branch of the main sewer (500mm, 600mm and 700mm in diameter) stretches from Igalo towards the pump station Forte Mare. At the end of Igalo area there is a pump station (PS Igalo) in which the area waste waters are pumped over through the main sewer 600mm in diameter, placed along the coastal area of the residential settlement Topla. Waters are further conducted by gravitation by the main sewer of 700mm profile (placed along the promenade) towards the central pump station Forte Mare (of 169 l/s capacity).
The eastern branch of the main sewer (profile of 400mm and 500mm) conveys waste waters from Meljine towards the central pump station Forte Mare. Wast waters from Meljine, as well as from Nemila in hinterland are pumped over in the pump station Meljine (of 19 l/s capacity).
At the eastern main sewer, at the section Meljine - Herceg Novi the pump station Savina has been constructed (of 76 l/s capacity,) in which the used waste waters from the area of Zelenika are pumped over in this main sewer of 600mm diameter up to the central station Forte Mare.
From the pump station Forte Mare (PS Herceg Novi) waste waters from the entire area from the section Igalo - Meljine, after the communitor are discharged over two big outlets which begin on the shore between the "Plaža" hotel and the town port, and end at a depth of around 45m; one is 1600m long (the summer one), and the other 334m (the winter one).
This system is under the competence of PI "Water Supply System" of Herceg Novi and it is in function, although both outlets are partly damaged. Other smaller sewage systems have their individual outlets and there are 29 of these in the Bay of H. Novi - Topla.
All the outlets are from several tens of meters to 100-150m long and most of them end at a small depth (from 5 to 20m). Two thirds of the total number of sewage outlets are not secured and are not protected from the influence of the sea and the human factor, and thus their correct functioning and duration is uncertain, and the length and depth at which they end do not meet the sanitary technical standards whereby the quality of sea water is endangered.

With regard to runoff of used waste waters the **municipality Kotor** has the most unfavourable position, and due to the confinement of the bay it is imperative to drain the used waste waters out of the Bay of Kotor i.e.into the open sea.
The quality of water in the Bay of Kotor is seriously imperilled by the quantity and the quality of raw water which is discharged directly into the bay.
As a consequence of this there is frequent pollution of water, increased bacteriological burden, there are indicators of eutrofication and there is frequently sea bloom with the change of sea water colour.
At the territory of municipality Kotor there are smaller local subsistems that end in outlets into the sea without disinfection mainly without diffusers. These are 25 outlets for waste waters, which are mainly outlets for overflow waters from septic tanks which are from ten to several tens of meters long and end at a relatively small depth.
The current degree of functionality of these systems is unknown since there is no control of their work.
The main sewer of the primary sewage system has been constructed only for a part of Dobrota and Škaljari with the pump over station which transports waste water through the tunner Vrmac and the Tivat field up to the bay Trašte where it is discharged into sea through another sea outlet.
In the Old Town the sewage system is located into underground galleries and thus collected waste water is discharged into the primary main sewer.
Waste waters from the settlement "Rakite" and "Novo naselje Peluzica" collected by the sewage system in Skaljari are discharged directly into the primary sewage main sewer.
From the Old Town towards Dobrota and Ljuta there are 13 smaller individual subsystems. At that section all the waste waters are discarged into septic tanks, and then by overflow into the sea.
On the other side of the Bay, the building facilities, except for a few on the Markov rt, are not covered by the sewage system, but the waste waters are collected into septic tanks and are over absorbent wells discharged underground or into the sea.
Waste waters from factories and service plants in the industrial zone are discharged after previously being treated on the premises through the main sewer into the field of Tivat, because the pump station Solila is not in function.
The final solution includes runoff of all waste waters from the Bays of Kotor and Tivat. The primary main sewer Dobrota - Kotor – Trašte has been constructed so far, pump station "Škaljari"-Kotor, main sewer through the Vrmac tunnel, pipeline over Grbaljsko polje, tunnel main sewers through the hill Grude up to the bay of Trašte where the waste water is discharged into the sea through an outlet 3.620m long 630 mm in diameter.
At the location of Solila, the waste waters from the industrial zone with the pump station Solila should be pumped into the main sewer below the tunnel Grude. This main sewer should also receive waste waters from Tivat.
The sewer system Kotor-Tivat is separate and it is exclusively for waste waters.

According to the existing state of waste waters disposal and the available recepients the territory of municipality Tivat can be divided into three characteristic zones: the coastal region of the Tivat bay; inner parts of the municipal area and the coastal region along open sea.
At the territory of the entire municipality there is no sewer which could be treated as a system runoff of waste waters. There is a number of smaller channels and local systems, which have been constructed separately without concrete conception. This is particularly the case with the coastal region of the Tivat bay, in which there are ten coastal outlets directly into the sea.
As a consequence of that the pollution in the bay is frequently at the critical level, bacteriological load is increased, there are indicators of eutrofication.
The situtation in the area of open sea is more favourable because the possibility for self-purification of sea water as a receiving body of water is bigger.
One of the first sewers was constructed for the needs of the hotel "Mimoza", and it is realized by discharging the waste waters over a septic tank into the sea by an outlet 100m long. In a similar way the runoff of waste waters for the hotel complex "Kamelija" and the housing settlement in Seljanovo have been realized.

For the centre of Tivat a sewer system has been constructed and the collected waters are conducted towards Kaliman bay and are discharged into the sea by a submarine outlet 200m long. For evacuation of these waste waters the channel Rosino was used, for the waste waters of some residential objects were discharged into this regulated channel.
Special industry located at the territory of Tivat has a special sewer with a direct outlet into the sea, without treatment.
Tourist centres the Island of Flowers and the Island St. Marko have several separate systems for disposal of waste waters, each of which ends in a septic tank and a shorter outlet into the sea.
For the hotel complex and the car camp Pržno, the waste waters are treated at the plant "Putox", and the effluent is discharged into the sea by a 100m long submarine outlet.
The housing objects outside the territory covered by particular sewege systems, discharge waste waters into the septic tanks and then into infiltration wells, most frequently of insufficient size, or on the soil which does not allow infiltration, so the waste waters spill over surface and there is environment pollution.

Of all the seaside municipalities the state of the system for discharge of waste waters in **Budva** is at the highest level.
Budva does not have a unique sewage system for coastal settlements, but there are 3 smaller sewage systems for Budva, Sveti Stefan and Petrovac.
The sewage system Budva receives all the waste waters from the territory of Budva through the main sewer from the old city till Zavala and Bečići through the main sewer from Rafailovići, over Bečići to Zavala, where both branches are joined and after mechanical treatment are discharged from Zavala into the sea by a submarine outlet 2550m long.
This sewage system is made up of the following objects: pump station Old Town; booster pipeline from the pump station (PS) Old Town till the pump station Budva; pump station Budva; main sewer from Budva and PS Budva I and PS Budva II; pump station Budva II; main sewer (400mm) from PS Budva II till the plant for mechanical treatment; plant for mechanical treatment (communitor); main sewer PS Bečići I - Bečići II – plant for mechanical treatment; pump station Bečići I; pump station Bečići II; submarine outlet at a depth of 40m, of 500mm profile, 2550m of length, and 200 l/s capacity.
Subsystem Sveti Stefan collects waste waters of the settlements Kamenovo and Pržno, then Miločer, Sveti Stefan, Galije and Šumet in hinterland. The system has not been constructed entirely. The following have been constructed and are functioning: pump station Pržno, coastal main sewer from the pump station Pržno till the pump station in Miločer; main sewer from the pump station Miločer till the pump station Sveti Stefan, pump station Sveti Stefan; the main sewer from the hotel complex Sveti Stefan till the pump station Sveti Stefan, plan for pre-treatment and a pool for feeding beside the PS Sveti Stefan and an outlet into the sea at a depth of 40 m, 250mm in diameter, of 209 l/s capacity and 1700m long.
In the zone of Sveti Stefan there are two outlets for waste waters not complying with regulations – the first one belongs to sewage of the settlement Pržno with the hotels "Maestral" and "Vila "Miločer" which discharges itself immediately behind the small cape on the southern part of the beach, and the second sewage runs off waste waters of the resort "Kosovo" which overflow from the septic tank into the nearby stream and into the sea.
In Perazića Do waste waters from the settlement and the hotel "As" are collected by the main sewer, at the end of which there is a pump station from which water is discharged directly into the sea through an outlet 100 m long. It is now known what state it is in, nor the "Putox" treatment plant.
There is no public sewage in the zone of Buljarica and Jaz, nor in the rural settlements in the hinterland of Budva and Petrovac. In these zones waste waters are evacuated through septic tanks and influent wells and their functioning depends on the permeability of the terrain.
The sewage system Petrovac includes the gravitation coastal main sewer from the pump station Lazaret till the pump station Petrovac (profile of 300mm), PS Petrovac and discharge into sea of 260mm profile, 80 l/s capacity, 1400m long.

At the **territory of Bar** there are 3 separate sewage systems that collect waste waters from Čanj, Sutomore and Bar.
The town sewage system of Bar is foreseen as a separate system. A number of rain drainages have been constructed which end in overflows on the shore and serve for evacuation of large precipitations.
For evacuation of waste waters the coastal main sewer begins from the settlement Šušanj (200mm, 300mm, 500mm in diameter) to the pump station Topolica. From PS Topolica till the main pump station in the port (PS Volujica) there is the main sewer of 600mm. The boost pipeline of 600mm from PS Volujica till discharge in the tunnel Volujica. At the outlet in the tunnel there is a submarine pipeline into the sea at a depth of 34 m, of 400mm diameter, 348m long, of 500 l/s capacity. The waste waters are discharged by this submarine outlet out of the port, into the open sea, but the PS Volujica frequently breaks down so there is direct discharge of waste waters into the port of Bar.
The sewage system of Sutomore includes a main sewer for waste waters 400mm in diameter up to the entrance into the tunnel through Golo brdo; the pump station Ratac, then PS Botun and the tunnel. The foreseen submarine outlet (400 mm in diameter, 1500 m long, of 175 l/s capacity) is not realized, and apart from that the PS Botun is frequently out of function so the waters do not go through the tunnel but are discharged directly in the zone of the pump station.
In the cove Čanj a coastal main sewer 300 mm in diameter has been constructed, a pump station with the mechanical pre-treatment and a sumbarine pipeline into the sea at a depth of 40 m, 250 mm in diameter, 1500 m long, of 85 l/s capacity.

Ulcinj has a mixed sewage system. Due to poor functioning of the existing objects and the incompleteness of the sewage system very frequently waste waters are discharged directly into the sea in the vicinity of the mostly visited beaches.
The existing sewage system of Ulcinj collects water from the town. Tourist objects on the Great Beach, Valdanos and Ada Bojana, as well as the villages in the hinterland of municipality Ulcinj are not connected to this system.
Construction of special sewage systems has been foreseen for: the town Ulcinj, the Great Beach – West

and the Great Beach - East. Until now the main gravitation sewer has been constructed (300mm, 400mm) up to the pump station Pristan on the Small Beach. An object has also been constructed for mechanical treatment in that location, but it is not in function. An outlet into the sea of 350mm profile, 1500m long and of 120 l/s capacity has not yet been constructed. The second branch of the main sewer of 500mm in diameter transports waste waters towards PS of Port Milena. At this location (at the mouth of the little river Port Milena) there is an outlet into the sea of 370 l/s capacity, 350mm in diameter, 1100m long.
Within the tourist complex Valdanos a certain number of main sewers for the collection and runoff of waste water has been realized as well as an outlet into the sea 1850m long.
Waste waters from the hotel "Albatros" are conducted into the septic tank, then discharged into the sea. Waste waters from the hotel "Galeb" are discharged into the sea after the septic tank and the disinfection.
Hotels on the Great Beach, the hotel settlement in Ada and particular settlements with private houses are not included into this sewage system and they resolve the issue of sewage through septic tanks with overflows which go into the so called drainage fields, directly into the stream Bratica, into Port Milena or some other channels and streams.
The outlet on the Great Beach which is 1200m long ends at a depth of around 25m.

1.4.3. Solid Waste Treatment

In all 6 municipalities at the territory of Montenegrin Littoral solid waste treatment is done by disposing of waste on the rubbish heap, which is in technological and sanitary sense the worst form of garbage elimination from the urban areas.

In 2004 a joint sanitary waste dump was constructed for the municipalities Kotor, Tivat and Budva at the location "Lovanja", which was foreseen as temporary during three years until an adequate location was to be found for a permanent waste dump.

Communal solid waste management at the territory of Montenegrin Lilttoral is realized by the public utility municipal companies, which are responsible for collection and disposal of solid waste.

Based on the obtained data on the quantity of produced, collected, transported and disposed solid communal waste in towns, it turns out that 50% of that quantity is collected in the seaside region.

Based on the data from the Master Plan the quantity of disposed solid waste is the following:
Bar and Ulcinj 11.000 t/year
Kotor, Tivat and Budva 13.200 t/year
Herceg Novi 7.800 t/year
Total for the region 32.000 t/year

It is worth mentioning that in some municipalities there is a significant increase in the daily production of waste during summer months when there is an inflow of tourists. For example in Bar it increases by 300%, in Budva by 900%, in Ulcinj by 900%, while in Kotor it increases by 30%.
The overall permanent population of these six municipalities is 145.000 and in summer it goes up to 300.000.

In the coastal region an average production of waste is 0,9 kg/per citizen/per day, and for tourists 1,5 kg/per tourist/per day.

The local companies are authorized to organize collection and disposal of waste according to the instructions of republican bodies, but there are no regulations governing the manner of waste disposal. This is evident from the example that every municipality is allowed to locate and manage its own system of disposal, not taking into account the impact on the environment and the public health of its own or the neighbouring municipality.
Apart from that, none of the municipalities has any kind of system of air and water quality control which would make possible assessment of influence on the environment.
Waste is collected and disposed by cleaning the streets manually or with mechanical cleaners – by sweeping, and the waste from buildings is collected by trucks with a press or by trucks for lifting of containers. Waste collected in this manner is disposed on the ground surface, and it includes street garbage, garbage collected from residential buildings, commercial institutions and industries, pharmaceutical, medical as well as process waste from the industrial production objects.

Waste disposal is mainly done by open unloading, except in Kotor where a layer of soil is regularly deposited over waste. Bulldozers are used in several dump sites for spreading and levelling of waste and maintaining of free access for collection vehicles for unloading of waste. Dump sites without bulldozers are those that have constructed platforms for unloading from which the trucks unload the waste over the rock edge, such as Herceg Novi, Budva and Bar.

In most dump sites there is open incineration which continuously produces methane arising from anaerobic biodegradation of organic matters in waste. There is no system of gas or leechate management.

There is no separation of waste according to degree of hazard and the need for special handling. Medical and industrial waste are disposed together with other waste categories.

It is necessary to remedy the existing dump sites, some of which are no more active: Kruče (Ulcinj), Volujica (Bar), slope above Petrovac (Budva), Lovanja – old dump site Trešnjički mlini (Kotor), Grabovac (Tivat), Duganja (Herceg Novi),

1.4.4. Electrical supply system/Grid

Power transmission and distribution at the territory of Montenegrin Littoral are under the authority of the Power Supply Company of Montenegro from Nikšić, i.e. the local power distribution companies it includes.

The consumption area of Montenegrin Littoral does not have at its territory a source of power but it is supplied from the power transmission grid of Montenegro at 110 kV voltage.

The closest supply points on the 110 kV grid are 220/110/35 kV substation, 2x150/(40+31,5) MVA, Podgorica-1 (Zagorič) and 400/110kV, 2x300 MVA Podgorica-2 (Tološi).
At the territory of consumption area of Montenegrin Littoral there are a total of eight 110 kV transmission lines. Both 110kV supply transmission lines, for Bar and Budva, are currently connected to 220/110 kV Podgorica-1 substation.
The existing 110kV transmission grid, after completion of investments that are under way, will represent a good quality primary source of power for the existing consumption area at Montenegrin Littoral.

110 kV d110 kV transmission line Tivat - Herceg Novi – Trebinje passes throug the territory of **municipality Herceg Novi** , which supplies the 110/35 kV substation H. Novi (Podi).
In the110/35 kV substation Podi, constructed for the possible capacity of 2x31,5MVA, two transformers have been installed of 110/35kV and of 20 MVA carrying capacity each.
110/35 kV substation is located in the settlement Podi by the road Meljine – Podi and it is the only source of supply for Herceg Novi at the voltage level 110kV. It currently meets the needs of consumption area, and with regard to the possibility to increase power by replacement of transformation units, this substation will be able to respond to the needs of the existing consumption area in the period to come.
Distribution network of the area supplied from 110/35kV Podi substation is realized with two mean voltages 35kV and 10kV.
From 110/35 kV substation Podi come out 4 35 kV lines. 35 kV grid at the territory of the municipality is planned as a ring one (except for supply of the 35/10 kV substation H.Novi which is supplied from two 35kV lines from substation Podi) with transversal 35kV connections.
The territory of Herceg Novi is supplied from five 35/10kV transformation stations (four for settlements and one for the shipyard).
Apart from 35/10 kV substation H.Novi in other ones it is possible to increase the installed capacities by replacing the transformation units with those of bigger capacity than the existing ones.

A 110 kV transmission line Budva – Tivat – Herceg Novi passes through the territory of **municipality Tivat** which supplies the 110/35 kV substation Tivat (Mrčevac).
In 110/35 kV substation Mrčevac, constructed for the possible capacity 2x31,5MVA, two 110/35kV transformers of 20MVA carrying capacity each have been installed.
110/35kV substation is located in the settlement Mrčevac by the road to Gradiošnica and it is the only source of supply for Tivat at the voltage level of 110kV. It currently meets the needs of consumption area, and with regard to the possibility to incrase the capacity by replacing the transformation units, as well as through construction of the planned 110/35/10 kV substation in Kotor, this substation will be able to respond to the needs of Tivat consumption area in the period to come.
Distribution grid of the territory that is supplied from 110/35kV substation Mrčevac is realized with two mean voltages 35kV and 10kV.
Three transmission lines and two (three) 35kV cables come out of the 110/35kV substation Mrčevac. 35 kV grid at the terriotory of the municipality is a ring one with the transversal 35kV connections.
The area covered by the Power Distribution ED Tivat is supplied from four 35/10kV substations (three for the settlement and one for the Overhaul Company).
The power system also has a submarine high voltage transition from the Island of Flowers to the Island St. Mrako.

A 110kV transmission line Budva – Tivat – Herceg Novi – Trebinje passes through the territory of **municipality Kotor**, but there is no 110/x kV transfromation at this territory, but the consumption area is supplied from 110/35 kV substation Mrčevac which usually works with one transformer for the consumption area of Power Distribution Tivat and with the second one for Power Distribution Kotor.
Distribution grid of the Kotor area which is supplied from the 110/35kV substation Mrčevac is realized with two mean voltages 35kV and 10kV.
2 35kV transmission lines come out of 110/35kV substation Mrčevac for the needs of supply of Kotor municipality consumption area. 35 kV grid at that territory has been planned as a ring one with the 35 kV transverzal connections.
The area covered by the Power Distribution Company Kotor is supplied from four 35/10kV substations. The current installed capacities (except the substation Škaljari which operates at the overload limit) meet the needs of the consumption area. Except for 35/10kV substation Dobrota in others it is possible to increase the installed capacities by replacing the transformer units of bigger capacity than the existing ones without the reconstruction of substation.
110 kV transmission lines Podgorica - Budva - Tivat, Bar - Budva and Budva - Cetinje which supply the 110/35 kV substation Budva (Markovići) pass through the territory of **municipality Budva**.
In the 110/35 kV substation Markovići, constructed for the possible capacity of 2x31,5MVA, two 110/35kV transformers of 20MVA carrying capacity each have been installed.
110/35kV substation is located in the settlement Markovići not far from the trunk road Budva - Cetinje and it is the only source of supply for Budva at the voltage level of 110kV. It currently meets the needs of consumption area, and with regard to the possibility to increase the capacity by replacing the transformation units, this substation will be able to respond to the needs of Budva consumption area in the period to come.
Distribution grid of the area supplied from the 110/35kV substation Markovići is realized with two mean voltages of 35kV and 10kV.
From 110/35kV substation Markovići come out 2 35 kV transmission lines. 35 kV grid at the municipality territory is planned as a ring one with the currently realized 35kV transversal connections.
The area covered by the Power Distribution Company Budva is supplied from four 35/10 kV substations. Apart from them there is also 35/6 kV substation of CS of the Regional Water Supply System. Apart from them there is also 35/6 KV substation CS of the Regional Water Supply System. The existing 35/10 kV substation meets the present needs and can be extended if needed by replacement with larger capacity transformation units.
The constructed 35 kV grid is of sufficient quality, while the construction of the two mentioned transmission

lines from substation Markovići to substation Dubovica and substation Miločer would relieve the line to substation Lazi and increase the safety of supply.
What is characteristic is the transition by submarine 10 kV cable up to the island of St. Nikola.

Through the territory of **municipality Bar** passes the 110 kV transmission line Podgorica - Bar which supplies the 110/35 kV substation Bar. Through the territory of Bar pass also the 110 kV transmission lines Bar - Ulcinj and Bar- Budva.
In the 110/35 substation kV Bar, built for the possible capacity of 2x31,5MVA, two 110/35 kV transformers of 20 MVA carrying capacity each are installed.
110/35 kV substation is located in the settlement Bjeliši by the local road and it is the only source of supply for Bar at the voltage level of 110kV. It currently meets the needs of the consumption area, with the expressed need for replacement of a transformation unit of 20MVA with 31,5MVA:
Distribution grid for the area supplied from 110/35kV substation Bar is realized with two mean voltages of 35kV and 10kV.
From 110/35kV substation Bar come out 2 transmission lines and two 35 kV cables. 35 kV grid at the municipality territory is a ring one with the transversal connections of 35kV:
The territory covered by GUP Bar is supplied from six transformation stations of 35/10 kV. Apart from them there is also 35/10 kV substation Luka Bar
For all 35/10kV substations, at the territory of consumption area of Bar (except for substation Topolica and substation Končar), with regard to the present load and the possibility of extension it can be assumed that they will be able to meet the needs of the consumption area they supply for a long time in the future.

The 110 kV transmission line Bar – Ulcinj passes through **municipality Ulcinj**, supplying the transformation station 110/35 kV substation Kodre.
In the 110/35 kV substation Kodre, constructed for the possible capacity of 3x31,5MVA, a 110/35kV transformer has been installed of 20MVA carrying capacity.
110/35kV substation is located in the settlement Kodre beside the local road to Vladimir and it is the only source of supply for Ulcinj at the voltage level of 110kV. Currently it meets the needs of the consumption area but there is no possibility of secondary supply at 110 kV voltage.
Distribution grid of the territory supplied from 110/35kV substation Ulcinj is realized with two mean voltages 35kV and 10kV.
From 110/35kV substation Kodra come out 4 35 kV transmission lines. The 35 kV grid at the municipality territory is radial with the 35 kV interconnection.
The area covered by the GUP Ulcinj is supplied from four transformation stations 35/10kV:
Regarding the current loading and the possibility to extend the existing 35/10kV substations, at the territory of Ulcinj consumption area it can be assumed that they will be able to meet the needs of konzum they currently supply for a long time in the future.
With a view to increasing the reliability and flexibility of 35kV grid it is necessary to try to connect the 35/10 kV substations to a ring and/or construct double transmission capacities at 35 kV.

10kV grid at the territory of the entire Montenegrin Littoral is realized in town areas mainly by cable, while in suburban and rural areas overhead transmission lines have been constructed at steel grid, concrete and wooden poles.
For 10 kV grid it can be said that it mainly meets the needs of consumption area, since it is mostly constructed with standard conductor cross-sections.
Most substations with 10kV cables have a possibility of two-side or three-side supply depending on the position and the possibility for connection.

It can be assumed that the present four voltage110/35/10/0,4 kV system will be kept in the future as well.

The existing power distribution capacities currently meet the needs for consumption and with the possible extension of capacity they can meet increased needs for power for some time.

1.4.5. TC network

Telephone traffic in Montenegro, and in particular at its seaside saw significant development in the period 1975 - 1985 through construction of modern objects and installation of significant capacities both in switchgears and transmission systems and in the local networks.
Switchgear was analogous electromechanical or analogous electronic. Transmission systems are radio-relay and in those years a seaside coaxial cable Herceg Novi – Bar – Podgorica was also put into function.
Local and intertown cable networks begin to be constructed in urban space through system of cable canalization and almost all town cores "were freed" from telephone poles with physical lines and self-transmission cables.
In the last decade the construction of new digital systems has significantly increased the quality of telephone traffic.
In almost all towns, most suburban settlements and many smaller places digital telephone swithchboards were installed also connected by digital transmission systems to each other as well as to the superordinate switchboards.
These are primarily digital transmission systems by optical cables. Namely, seaside optical cable connects all the nodes and main switch nodes at the Littoral with the transit swithboard in Podgorica. Optical cables today connect also switchgears of different switch levels at Montenegrin Littoral. Apart from these primary transmission systems digital radio-relay transmission systems are also in use as alternative or secondary capacities.
Installed digital systems make possible rapid and efficient access to big world information systems without which modern business world cannot be imagined.
International connections of Montenegro are at present realized over the international switchboard in Belgrade. The coaxial cable Podgorica – Belgrade is used as the transmission route, and radio-ralay systems as an alternative.
Optical cable Herceg Novi-Dubrovnik makes possible international telephone traffic over the international switchboard in Zagreb.
The submarine optical cable between Bar and Korfu makes possible telecommunication connections of huge

capacities towards European nodes and the rest of the world nodes.
The new digital house telephone switchboards (hotel, business ones and other) are connected today to public telephone switchboards by digital links whereby subscribers systems are integrated into digital public network.

The basic characteristic of the network group Herceg Novi is a large number of end switchboards of which Sutorina, Djenovići, Bijela, Zelenika and Kamenari are connected as separate degrees (RSS) of the main switchboard which is made up of the digital switchboard. All these connections are digital by optical cable (OC) or by intertown high frequency cables (TF). The remaining end switchboards are Rose, Zabrdje, Kameno, Mokrine, Mojdež and Bijela.
The main switchboard is connected by a digital optic cable and radio-relay system (RR) to the transit i.e. international switchboard in Podgorica.

The main switchboard (MS) Kotor is made up of analogous electronic switchboards to which electromechanic switchboard is connected as a local switchboard (LC).Conversion of digital signals into analogous ones is still being done in the main switchboard Kotor. The node switchboard (NS) Risan is connected to the main switchboard, which is at the moment made up of a digital and an analogous electronic switchboard. KC Morinj and KC Perast are connected to the NS Risan as separate degrees.
All the connection routes are realized by optic cables as well as the connection MS Kotor towards TS Podgorica which has a digital RR system as an alternative.

The node switchboard Tivat is made up of a digital switchboard to which an older system of analogous switchboard is joined. Two end switchboards are connected to the node switchboard: end switchboard Radovići with the analogous electronic switchboard and end switchboard Krašići with a separate degree.
End switchboard Radovići is connected to the node switchboard Tivat by intertown VF cable of the type TF and the end switchboard Krašići by a digital radio-relay connection. Node switchboard Tivat is connected to the superordinate transit switchboard in Podgorica by optic cable and a digital RR connection as an alternative.

Node switchboard Budva is made up of a digital system to which the local switchboard is connected. The End switchboard Petrovac, Sveti Stefan and Radanovići also make separate degrees.
The district and all the end switchboards are connected to the node switchboard Budva by connections per optical cable, and the NS Budva is connected to the TS Podgorica digitally by optical cable and by radio-relay as an alternative.
It can be stated that the node area of Budva is completely digitalized.

The main switchboard Bar is made up of two digital switchboards TC/LS Bar and LS Bar. LS Bar. KS Brca, Čeluga and Dobre Vode are connected to the switchboard TC/LS Bar by optical cable with the separated degrees (RSS), and KC Pečurice by a digital RR connection. The transversal connection with GC Herceg Novi is realized by optical cable and in a combined manner by RR connection to NS Ulcinj.
Connections towards the superordinate switchboards in Podgorica are realized by optic cable and alternatively by RR system. By coaxial cable KC Sutomore and KC Virpazar with electric-mechanical switchboards are connected to MS Bar. KS Sutomore makes also a searate degree (RSS) which is connected to MS Bar by a digital RR connection.

Tne node switchboard Ulcinj is made up of a digital system. Except for the local switchboard, the node area is completely integrated into one digital network. Namely, the end switchboards Velika Plaža, Štoj, Vladimir, Zoganje, Krute and Kruče make up a separate degree (RSS) switchboards and they are all connected by an optic cable to NS Ulcinj. Connections towards superordinate switchboards in Podgorica are also digital and are realized by optic cable and RR system.

The proces of digitalization and integration of telephone system at the level of switch and transmission is being completed at Montenegrin Littoral whereby an integrated digital network of telecommunications (IDN) is begin created, which will soon grow into a universal digital network with integrated services (ISDN) through integration of subscribers lines, which will be able to transmit at great velocities information in all forms (speech, text, symbol, picture and other).

A telephone network developed to this degree today goes one step before the econonmy, with the possibilities which will further stimulate development of all activities.`

1.5. Quality of the Coastal Zone Environment

Long before elsewhere in Montenegro, and based on natural advantages of the Montenegrin Littoral, human activities initiated a dynamic development there, the outcome of which is still evident. These natural advantages did not include only the favourable weather conditions and good connectivity to faraway countries and regions, but natural resources, too, available both at sea (maritime resources), and on land (forests, arable land…). Many of these resources have been preserved for our own and other generations to come, while some of them have been exhausted completely or have been drastically modified, same as in other neighbouring countries. This was the destiny of once lively Mediterranean forests now reduced to bare rocky countryside on surrounding mountains or underbrush at various stages of degradation in the coastal area.

Even today, human activities including urban settlements, construction of industrial and tourist facilities, traffic routes, etc. bring about changes of large proportions in the area, along with a series of adverse impacts on environment in the whole region.

1.5.1. Coastal Zone Environment

Although the status of coastal zone environment in general could be assessed as positive, research studies indicate that certain protection measures are required immediately in certain areas.

As a rule, the areas in jeopardy are those located on a narrow strip between the land and the Sea. Upsets on land most frequently occur at 500-1000 m wide strips away from the coast, and in smaller settlements and cities these are more evident further inland, while the upsets and certain sea pollution occur mainly at 100-300 m wide strips, away from the coast.

Air

There are no major air polluters in the Coastal Zone. Local pollution originates mainly from heating of industrial and health-care building facilities or individual households, while hotel facilities are polluters only when they operate in winter season. One of the advantages is that the number of heating consumers in heating season is the smallest, as compared to overall consumer capacity of the area, including both local residents and tourists.

The second source of pollution is the traffic. It is most dynamic in the second half of the year, during the summer season. Adverse effects can be experienced in small areas, nearby busy traffic routes and in cities, due to low speed of vehicles in relatively short intervals and during poor weather conditions.

Due to current halt in production or reduced levels of production, industrial sources of pollution can be regarded only as potential ones. The major industrial sources include: “Riviera Chemical Industries" and rubber production in Kotor Industrial Zone; Oil decanting facilities at Lipci; Tivat Airport; Warehouse facilities for bulk cargo, oil decanting facilities and other facilities for decanting of chemicals & hazardous liquids at the Port of Bar and “Primorka Fruit and Oil Industries” in Stari Bar. Some of these polluters are very sensitive facilities and prone to accidents.

A particular aspect of pollution, rather “visual” than chemical are dumpsites distributed at prominent spots close to residential areas. Plumes of smoke originating from municipal dumps can be seen throughout the year, around Tivat, above Petrovac and Bar and at the entrance to Ulcinj.

Frequent fires in coniferous forests and other Mediterranean plant covers represent typical source of air pollution during summer months all over the Montenegrin Littoral.

Air pollution coming from remote locations is also possible, e.g. sand from Sahara flown with cyclone fronts and settled in rain superseding the cyclone activities.

Although the pollution emission levels have not been determined yet, the mentioned sources of pollution are not of great concern. Due to a high degree of self-ventilation in the area, their impact on quality of air is negligible.

Air quality in the Coastal Zone is monitored by JU Centre for Ecotoxiocological Research of Montenegro (in the scope of Annual Programme of Air Quality Control in Montenegro for Bar, Budva, Kotor, Tivat, Ulcinj and Herceg Novi), and the Republican Hydro-meteorological Institute (at Meteorological Stations in Kotor, Budva and Bar).

Based on monitoring of smoke and sulphur dioxide (SO_2) contents in the air, the parameters received from such tests indicate that the air in vast areas of the Coastal Zone can be classified as clean, while in the areas of Kotor and Bar, from time to time, air can be classified as slightly polluted. The evaluation is based on prevailing air quality parameters. Measurement results of these two parameters indicate that the levels do not exceed strict air pollution limit values (SGVZ) established for tourist & recreational regions. Only at very short intervals, maximum permissible smoke levels may sometimes exceed the SGVZ level in the areas of Bar and Kotor, as a result of current meteorological conditions and pollutant emissions. This is particularly true for Kotor which has the least advantageous conditions for “air ventilation". Sulphur dioxide emission levels are extremely low and showing a decreasing trend. A decreasing trend is also evident in annual peak values for smoke. However, mean annual smoke levels show an increasing trend almost everywhere, somewhere more and somewhere less, and in the areas of Kotor, as well as Tivat, Budva and Ulcinj, at short-term intervals, the allowed thresholds are exceed.

Annual mean values of other air quality parameters (ground-level ozone, smoke and charcoal emissions, as well as concentration of settling matters) are predominantly below the GVZ levels. The contents of heavy metals in the air also do not exceed the levels prescribed by the prevailing legislation.

Irrespective of the current status of air pollution in the Adriatic, it shall be necessary to prepare the Cadastre of Polluters for this region, preferably within the Integral Cadastre of Polluters for Montenegro. Irrespective of the fact that, except for certain areas in Boka Kotorska and Bar, there are no major polluters here, this should be done for reasons of possible transfer of pollution from remote areas and evaluation thereof.

Until present, there has been no systematic research related to impact of air pollution on human health, plant vegetation, as well as civil engineering materials and historical monuments. This calls for a relevant institutional organization to monitor the impact of pollution in these recipients.

Precipitation

Quality parameters for precipitation are monitored by JU Centre for Ecotoxiocological Research of Montenegro (in the scope of Annual Programme of Systematic Monitoring the Presence of Radioactive Materials in Montenegrin Environment), as well as by the Republican Hydrometeorological Institute through a network of monitoring stations in Herceg Novi, Kotor, Budva, Bar and Ulcinj, where chemical composition of precipitation is monitored continuously for a period of 24 hours. In addition to pH value and electrical conductivity, macro ion contents are also monitored i.e. traces of sulphates, nitrates, chlorides, bicarbonates, ammonium, natrium, potassium, calcium and magnesium.

Based of monitoring of precipitation for the last twenty years or so, the situation can be assessed as relatively favourable.

Mineralization is somewhat higher, as compared to continental precipitation, resulting principally from vicinity of measuring stations to sea water.

Relatively increased acidity levels have been recorded predominantly at Boka Kotorska Bay, and far less on the open coast. “Acid rains” in the Bay are most frequent during winter season and in the open coast in autumn. In this respect, the most evident example in the Bay is the area of Herceg Novi, and in the open coast it is the area of Ulcinj.

Annual mean values of monitored parameters show a declining trend. The exception is the content of ammonia, which is present in small but increasing quantities.

Radioactivity in the Air and Precipitations

Radioactivity tests in this region have been scarce, and there are no reliable data on contamination levels resulting from natural and artificial nuclides. During the last few years, detailed measurements of beta-activity and its spectrometry have been performed (the experts of the RHMZ and Moscow University have been in charge of this research, on behalf of the Ministry of Environmental Protection).

According to this research, the Littoral is one of the cleanest areas in Montenegro with respect to the level of radioactivity present, having somewhat higher radiation of radon as radiation occurring naturally in soil within a narrow strip of Krašići.

The Herceg Novi Monitoring Station, which is included in the Mediterranean pollution monitoring & research programme dealing with pollution from land-based sources (MEDPOL), monitors the contents of heavy metals in precipitations and respirable particles, as well as exponential growth of gamma radiation in air and precipitation, in the scope of the Accident Early Warning System. The levels of gamma radiation exponential dosage have been within the usual natural radiation thresholds for air and precipitations, most commonly ranging from 0.08-0.13 mG.

Land Waters

The River Bojana, an arm of the Lake of Skadar, is the sole significant tributary to the Adriatic coming from the Coastal Zone and its hinterland. Due to international character, actual hydrologic status of this watercourse is unknown. The relevance of getting further insight into the quality status of this watercourse is gaining in importance due to vicinity of a potable water source Lisna Bori in its alluvium and exploitation of its water potentials for irrigation and fishery. Some high-quality fish use this watercourse as the only route between their spawning place and their habitat i.e. the Lake of Skadar and the Sea, respectively.

Sampling for the purpose of determining the quality of water is performed at measuring profile Fraskanjel, which is sufficiently away from the Sea, so that there is no interference of sea water in the Bojana River. As only the right bank of the river is accessible, since the watercourse is shared with neighbouring Albania and the part of the river leading to the river head belongs to this country, it would be difficult the discuss the sources of pollution.

It has been established that the phenol contents in the River of Bojana are within the prescribed levels. The level of detergents is relatively low, far below the prescribed levels. During the last years, there were some incidents when the contents of this pollutant were above the prescribed levels (maximum episodes).

Microbiological parameters indicate that, with respect to bacteriological pollution and based on mean values, the watercourse can be classified as A2 CII. Microbiological parameters show a declining trend.

Other land waters in this area are characterised by scarce surface waters and rich ground hydrography reflected in general lack of and capricious natural distribution of fresh waters. The upper streams generally flow through uninhabited and very clean areas, only to receive relatively light waste waters downstream, closer to the confluence and bordering with a few urban and country settlements, so that these settlements take a minor part in pollution of the inshore sea.

Land torrents on their own cannot be considered as sea polluting agents. These are seasonal only, occurring during heavy rains and rapid melting of snow. During such periods, they become sea water polluting agents carrying uncontrollably and excessively self-grown

vegetation from their edges, various waste materials and waste waters, in addition to improper construction works upstream (e.g. narrowing and concreting of water-course bed, clogging of discharge holes, etc.).

Soil

The knowledge gained so far indicates that there are minute residues of pesticides in arable land, and that these residues in watercourses neither represent a health hazard for residential water supply nor a hazard to environmental features in watercourses themselves or to the Sea, as the recipient of tributaries. However, this should not serve as an excuse for not taking some institutional and organized action to monitor the pollution parameters in the soil and surface watercourses, resulting from utilization of chemicals in farming.

Research results received from JU CETI study on contents of hazardous and detrimental substances in soil indicate that the quantity of organic polluting agents in coastal region is generally below the threshold, while the quantity of inorganic polluting substances (Cr, Ni, B) exceeds the prescribed levels at all sites in this region. There are two possible explanations for this: either, this is the consequence of the very nature of the soil in the region; or, the result of cross-border pollution transfer from maritime side.

Waste Waters

Construction of water supply systems has significantly increased the quantity of waste waters. However, this was not followed by adequate extensions in the existing sewerage systems to keep up with rapid growth of residential areas and overall tourist facilities, i.e. adequate receipt, treatment and disposal of waste waters has not been provided. This is particularly evident in fast-growing construction of family houses in towns in recent years and growing trend of building weekend homes, which has been present for a number of years now. For this reason, there is a potential danger of discharging waste waters from some building facilities into septic tanks which are often not constructed properly, thus allowing accumulated water to seep through into the soil. Since there is a large number of these houses, separated in groups from a few dozen to several hundred houses in one site, which are constantly being connected to the water supply system, their influence on pollution of ground waters is increasing. This situation is particularly disturbing in weekend sites formed outside permanent residential areas, in the vicinity of the sea coast, where they can also become a source of sea pollution

Pollution of ground waters and sea pollution is also caused by waste engine oil collected from traffic routes and street surfaces, penetrating the soil and surface water, and being only partially discharged into the sewage systems.

Solid Waste

The quantity of solid waste is increasing in this area. This is not only the case in towns and tourist developments, but also in resorts, camping sites, coves and on the beaches.

The solid waste is usually collected in a proper way; however, its final disposal has never been properly resolved anywhere. Soil depressions, coves, abandoned quarries, pits, karst valleys and cliffs, and sometimes even the Sea – they are all used as dumpsites. These dumpsites are often appallingly close to residential areas, public traffic routes and beds of surface waters. Spontaneous fires and deliberate burning of dumpsites, in addition to decaying of uncovered garbage in the open all cause air pollution.

Contamination of surrounding soil, ground waters and surface waters in the vicinity of the Sea is caused by inadequate preparation of dumpsites.

Noise

There are no major specific characteristics of noise in the Coastal Zone, as compared to noise in other areas. Although noise level data are not available, increased noise is present particularly in tourist complexes along the Adriatic highway. As regards the town of Tivat, negative impact of noise on local inhabitants and tourists generated by road traffic is compounded here with airplane noise coming from the nearby airport.

1.5.2 Maritime Zone Environment

A part of the South Adriatic which belongs to Montenegro represents an extremely valuable resource for development of a series of activities both at inshore sea and at open sea. Inshore sea offers opportunities for development of fishery and farming of healthy sea food, in addition to a series of activities within tourist trade and maritime services. Furthermore, the results of research carried out so far indicate that the South Adriatic is the least polluted region of the Adriatic Sea and one of the least polluted ones in the Mediterranean.

However, inshore waters of the Montenegrin Littoral are still endangered, same as all other shallow parts of the Mediterranean sea and marine waters all over the world, due to bacteriological pollution and the process of anthropogenic eutrophication, as a reciprocated consequence of direct discharges of untreated liquid waste into the maritime zone.

Quality of Sea Water

Since July 1995, an organized monitoring of sea water quality has been resumed at a number of sites (55-70), most of which are situated on the beaches.

Judging by its physical and chemical properties, the sea water tested at these sites generally meets the criteria for Class I bathing water. Organic pollution, mineral oils and floating solid waste have been detected at some of the measuring points. However, the results of bacteriological tests, which were the most comprehensive ones, indicated an even gloomier situation.

Generally, the seaboard water is of poorer quality in Boka Kotorska Bay than at the open sea, which is mainly due to small-quantity but direct discharges of waste waters. The tests carried out in the period from

1996-2002 show a deteriorating trend, which is prominent in the Boka Kotorska Bay.

Research of the Montenegrin Littoral, from the exit from Boka Kotorska Bay all the way to the Bojana Rivermouth, also covered a part of inshore sea exposed to the South Adriatic open sea waters. In view of the fact that the 50, 70 and 100 m deep isobaths run very close to the sea shore, and since the water mass in front of this part of the sea shore (amounting to approximately 78% of the total volume of the Adriatic waters), due to its forceful dynamics is constantly blended with inshore waters, the quality of sea water here is far superior to the sea water quality at Boka Kotorska Bay.

Although there are no marine pollution data available on bacteriological pollution of the Adriatic open sea waters, in view of hydrographic and dynamic properties of this part of the maritime zone, and with a measure of certainty, it would be safe to affirm that the South Adriatic is not bacteriologically polluted, with respect to sanitary aspects prevailing both in the territorial waters of Montenegro as well as in international waters.

As regards phytobenthos and zoobenthos research, since the beginning of 60's there are research data available on contents, biomass and biocoenosis of these important groups of sea organisms which either live in the surface layers of the seabed or are dependent upon the seabed for food, reproduction, etc.

However, there are no recent papers on pollution-related variations in either zoobenthos or phytobenthos.

Eutrophication Level

The process of anthropogenous eutrophication (enrichment of waters with nutrient salts resulting from human activities on the coast) represents today one of the most frequently identified ways of coastal sea pollution. During the last decades, signs of this process are visible not only in the shallow waters of North Adriatic, but also along the whole Eastern Adriatic cost, including the Montenegrin Littoral, as well.

The impacts of anthropogenous eutrophication are the same everywhere, and are characterised by proliferation of organic production, changes in composition and relationships among the species both in plankton and in benthos; reduced water transparency; sea colour change; trends of reduced oxygen levels towards the bottom of the sea with simultaneous increase in oxygen levels at depths of around 30 m, where the production is commonly the most intensive; as well as frequent phytoplankton blooms.

In Boka Kotorska Bay, eutrophication is evident in inshore bays, while the Bays of Tivat and Herzeg Novi are at risk of such a phenomenon. Eutrophication phenomenon is only slightly manifested along the open sea coast.

The level of eutrophication present not only in the Montenegrin Littoral inshore waters, but also in Adriatic territorial and international waters depends primarily on coastal influences, more specifically on overall sewage effluents which are discharged untreated directly into the inshore sea.
This situation calls for permanent control and monitoring of the shallow coastal region of Southern Adriatic, and periodical (at least seasonal) monitoring of the open sea, in order to monitor the changes already present there, as well as the impacts thereof.

Level of Pollution Caused by Other Substances

Pollution of the Southern Adriatic waters with solid, dangerous or hazardous waste is insignificant.

Plastic waste is present in the Montenegrin Littoral only in front of urban areas and tourist complexes, predominantly during the summer season. Since this plastic waste consists solely of plastic bags, bottles, etc., this type of pollution could very well be prevented.

Oil pollution of the Adriatic Sea might represent a serious problem in case of engine oil spillage from ships, oil spills at open sea or if caused during decanting of oil at ports. However, monitoring data on oil contents present at sea, in aquatic ecosystems (fish, shellfish) and pertaining sediments indicate that the Adriatic Sea is still not polluted by oil.

Recent studies have shown PAH (polycyclic aromatic hydrocarbons) parameters ranging from 0.4 mg/dm3 in coastal waters of Southern Adriatic. In some parts of the Mediterranean, PAH values range from 0.5 to 6, and even up to 41 mg/dm3. The situation is similar in sediments, too. The samples taken from sediments found in Southern Adriatic contained 0.87 mg/g sediment proper, while much higher values have been recorded in Western Adriatic. PAH values identified in samples of sea organisms are approximately 50% lower than those specified for unpolluted regions. Spot pollution at the Ports of Bar, Zelenika, etc. does not reflect significantly upon overall pollution parameters for Southern Adriatic.

Also, anionic detergent levels are only increased at certain spots along the coast during summer months. Respective values at open sea are low, and according to recent research this also holds true for Boka Kotorska Bay.

Concentrations of heavy metals in sediments are also within the thresholds established for the Mediterranean and other seas. There are somewhat higher concentrations of cadmium and lead in sediments found in the Montenegrin Littoral. The concentration of heavy metals is increased in sea water at the Port of Bar.

The research carried out in the scope of the Programme of systematic research of contents of radionuclides in the environment of Montenegro, implemented by JU CETI at the sites in Bar and Herceg Novi, has confirmed that levels of specific activities of radionuclides, except for potassium, are far below those specified for drinking water (as compared to the levels specified for drinking water, since there are no such regulations for maximum allowed concentrations of this type are available in our country). Radioactive potassium is present in water as potassium chloride (KCl), and percentage-wise these values are

significantly higher in sea water than in freshwaters. An inconsequential deviation in the level of specific activity of thorium has been detected in sea water near Herceg Novi.

The analyses have identified a very low concentration of certain radionuclides in cuttlefish (in the vicinity of Bar) and in squid (Kotor, Herceg Novi). Radioactive beryllium 7Be, the concentration of which in sea water is extremely low – at detection margin – has been detected in mussels' meat.

On the other hand, testing of physical & chemical properties of sea water, as carried out by JU CETI in the scope of annual Programmes of testing the quality of surface waters and inshore sea waters in the territory of the Republic of Montenegro, although performed in a one-off series, indicate that the quality of sea water in tourist and recreational complexes outside Boka Kotorska Bay is in compliance with specified A1S, Category I, with somewhat increased content of ammonia (NH3) and mineral oils at all sites, while microbiological contamination is present at some locations, too.

The quality of sea water in tourist & recreational areas of Boka Kotorska Bay does not meet the criteria specified for A2,C, Category II, due to increased levels of NH3 and mineral oils. In addition, the level of mineral oil exceeding KDK for Category A3 has been identified at the maritime zone of the Port of Bijela. Other maritime zone ports meet the criteria specified for these Categories.

1.5.3. Specially Endangered Areas and Areas at Risk

Most part of the Montenegrin Littoral coastal zone offers a variety of opportunities for development of human activities which are directly or indirectly linked to maritime environment. In particular, this applies to: fishery, shellfish farming, fish farming, shipbuilding, maritime traffic, tourism, salt separation, etc. All these activities will directly or indirectly affect the maritime ecosystem, to some degree. This makes the Montenegrin Littoral a region of vital importance, both from biological and economical aspects.

Based on years of maritime monitoring (since 1995), and in particular with respect to continuous monitoring of quality of bathing water and water used for recreational purposes, it is possible to establish the areas within the coastal zone which are prone to risk and potentially adverse events, unless preventive action is taken in due course. This refers primarily to the region of Boka Kotorska Bay.

Boka Kotorska Bay, being dovetailed far into the coast ("pocket-enclosed") is particularly endangered, since this is the most populated part of the Bay and all sewage effluents are, for the time being, directly or indirectly discharged into the maritime environment. The analyses have already confirmed the impact of eutrophication on the Maritime zone biota.

The issue of sea water contamination at this part of the Bay should be resolved in the scope of the Project of the Main Design for all waste water discharge from the Bays of Kotor and Tivat, respectively, by means of two water treatment plants from which processed water would be discharged into the Adriatic Sea. Relocation of the industrial zone from Kotor to Grbaljsko polje, in the scope of phase I of this Project, would drastically reduce the negative impact of industrial waste waters on living organisms dwelling in Kotor maritime zone.

A similar situation is also valid for the Bay of Tivat, where movement of water masses is more favourable. The problem here is also linked to implementation of the mentioned system for waste water discharge into the open sea.

The situation at the Bay of Herceg Novi is the most favourable one, since it is facing the open sea.

Potential adverse impacts are due to the fact that coastal urbanization is most prominent in this zone.

Areas particularly prone to risk at Boka Kotorska Bay are the two Shipbuilding Yards (at Bijela and at Tivat), Oil Decanting Facility at Lipci and near the Airport of Tivat, as well as the Ports of the Kotor, Zelenika and Risan.

The Montenegrin Littoral from Boka Kotorska Bay all the way to the Bojana Rivermouth is under direct influence of the open sea, thus reducing adverse effects of eutrophication phenomena and acting as an alleviating factor.

Maintaining the mentioned quality is of significant importance, especially for Budva Riviera where the number of inhabitants in summer months is multiplied several times, and it is necessary to find a general solution for discharge of waste waters, since tourism is the main economical activity here.

Bar Riviera is potentially at risk due to port facilities, oil tanks and oil decanting facilities in Bar. In addition to representing local spots of contamination, these facilities also put in a vulnerable position the tourist facilities at Sutomore. Multiple increases in the number of inhabitants in summer months also demand an efficient solution to the problem of waste water discharge.

Certain part of Ulcinj Are also potentially prone to risk, which is particularly true of the Port Milena Channel and the Small Town Beach where the quality of bathing water during 1998 was below Category II.

1.5.4 Summary of Polluters in the Coastal Zone

There are six municipalities which are situated in the Montenegrin Littoral (Ulcinj, Bar, Budva, Kotor, Tivat and Herceg Novi) with approximately 140,000 residents and the tendency of increasing this number by growing number of immigrants. During the summer months, the total population is significantly multiplied by the number of tourists visiting this region. The peaks are recorded in the second half of July and the first part of August, when peak organic contamination of coastal waters has also been recorded due to the waste water discharge from the coast.

Apart form coastal municipalities, waste waters are also discharged from hinterland municipalities. The reason for this is because certain watercourses from hinterland, both surface and ground ones, belong directly or indirectly to the Adriatic Basin.

Along the Montenegrin Littoral, discharge of sewerage effluents into the Adriatic maritime zone as a natural recipient is solved by means of a number of maritime sewerage outlets. So far, 87 such building facilities have been registered. These outlets are used for discharge of foul water from certain coastal towns and settlements, from larger residential and tourist building facilities, as well as from large and small-size residential buildings. In addition, there are a large number of unregistered submerged sewage outlets, utilized by small-size residential buildings situated close to the sea shore and constructed without the necessary approvals and permits.

There is a unified sewerage discharge of effluents for three coastal municipalities, while municipalities in Boka Kotorska Bay have specific diffused discharge of sewerage effluents into the sea. Consequently, there is far less submerged outlets for effluents in the open sea (12.64% out of the total registered number of outlets) than at Boka Kotorska Bay (87.6%).

Sewerage outlets are fabricated from concrete or plastic pipes, and some of them from combined concrete-and-plastic pipes, with diameters adjusted to the foreseen volume of discharge. These discharge outlets are mainly fitted on the sea bed together with required weighs. Only some of the discharge outlets have their front parts embedded into the sea bed, which makes them very susceptible to damage.

The length of sewage discharge outlets vary depending on hydrographic computations, as well as on the depth at which they end. These are generally very long discharge outlets with exit points ending at depths ranging from 20 – 45 meters. According to the design, effluent discharge outlets should be fitted with baffle plates for easier discharge into the recipient.

At Boka Kotorska Bay, discharge outlets are generally short ones. The length varies from several meters up to a couple of dozen meters, while their exit points are at the depth ranging from several meters up to 20 meters. Most discharge outlets are not fitted with baffle plates.

The situation at the open sea is the following: at the Municipality of Ulcinj, there are three submerged sewerage discharge outlets, two of them in Bar and four in the Municipality of Budva.
In addition, there are two registered sewerage discharge outlets in the Municipality of Tivat. The smaller one is servicing *The Blue Horizon Hotel Complex* at the lagoon of Pržno, and close to it there is the longest sewerage discharge outlet in the Montenegrin Littoral ("Trašte"). This outlet is 3600 m long and ending at the depth of 45 m, and for the time being it is only servicing the waste waters from Tivat and the industrial zone of Kotor.

Out of the total number of sewerage discharge outlets along the Montenegrin Littoral, only 19 are functioning properly, while the rest of them are either partially or completely damaged. In majority of cases, the operational status of municipal sewerage systems including the discharge outlets is unknown, in absence of systematic inspection which should be performed according to defined procedures and in defined time intervals.

The fact that management of these facilities is entrusted to various entities, such as: public utility companies, municipal funds, hotel and catering companies, developers of residential areas and owners of residential buildings, is an additional obstacle.

Along the Montenegrin Littoral, waste waters are never treated prior to being discharged into the sea, although this is required by prevailing regulations. In this respect, only a few sewerage systems are equipped with protective grippers and choppers of large-size contents of foul waters in order to prevent clogging filters in force pumps.

1.5.5. Summary of Protected Objects of Nature

Protection of individual objects of nature is provided on the basis of domicile and international legislations.

Protection Based on Domicile Legislation

Identification and protection of individual objects of nature was implemented on the basis of the Law on Protection of Nature (Official Gazette of the Socialist Republic of Montenegro No. 36/77 & 2/89).

Further to the classification stipulated by the Law, the following objects were identified as protected objects of nature in the territory of the Montenegrin Littoral:

The following are classified as Natural Monuments:

Nature Reserves:
- Spas Mount, near Budva (surface area: 131 ha)
- Peninsula Ratac with Žukotrlica (30 ha)
- The Island of Stari Ulcinj (2.5 ha)

Sand-and-Gravel Beaches with Hinterland:
- Long Ulcinj Beach (surface area: 500 ha)
- Small Ulcinj Beach (1.5 ha)
- Valdanos Beach (3 ha)
- Old Ulcinj (island and beach; 2.5 ha)
- Great Sand Beach (0.5 ha)
- Topolica Beach in Bar (2 ha)
- Sutomore Beach (4 ha)
- Čanj Beach (3.5 ha)
- Pećin Beach (1.5 ha)
- Buljarica Beach (4 ha)
- Lučice Beach (0.9 ha)
- Petrovac Beach (1.5 ha)
- Drobni pijesak Beach (1 ha)
- St Stefana & Miločer Beach (5 ha)
- Bečići Beach (5 ha)
- Slovenian Beach in Budva (4 ha)
- Mogren Beach in Budva (2 ha)
- Jaz Beach (4 ha)
- Pržna Beach, at the Bay of Trašte (2 ha)

Landscape Objects
- Park Museum at Topolica in Bar (2 ha)
- City Part in Tivat (3 ha) situated within the Coastal Zone
- Park belonging to former Boka Hotel in Herceg Novi (1.2 ha)

Plant Communities
- Common Yew (*Taxus baccata*), in the whole territory
- English Holly (*Ilex aquifolium*), in the whole territory
- Gray bark Pine (*Pinus heldraichii*), at the mountains of Orjen (300 ha), Lovćen (300 ha) and Rumija (1000 ha)
- Constantinople Nut (*Corylus colurna*), at Orjen Mountain.
- Serbian ramondia (*Ramondia serbica*), around the City of Bar
- Common Oak (*Quercus robur*), at Štoja area.

Samples and Stands of Plant Life
- Common Evergreen Oak (*Quercus ilex*), at Liman, near Ulcinj; below the village of Komina, by the Sea, to the North of the Island of Stari Ulcinj; at Crni Cape, near Sutomore, one sample at by the railway stairs, in Sutomore; and at Savina and Ilinici Mount, near Herceg Novi.
- Downy Oak (*Quercus pubescens*), one sample each at Zoganj and Krutim, respectively, near Ulcinj; at Donji Orahovac, near Kotor; and stand by the Church of Sv. Petka, near Tivat.
- Grain Oak (*Quercus coccifera*), one sample under the former Jadran Hotel, near the Small Beach and one stand at Meterizi, near Ulcinj.
- Stands of Grecian Laurel (*Laurus nobilis*) and Common Oleander (*Nerium oleander*), covering the area of 40 ha, above the hot spring Sopot near Risan.
- Olive Tree (*Olea europaea L.*), at the site of Mirovica, near the Old City of Bara and at the site of Pićanovina in the village called Ivanovići - Municipality of Budva.

The Republic Institute for Nature Protection issued a Decision on protection of rare, relict, endemic and endangered plant and animal species (Official Gazette of the Socialist Republic of Montenegro, No. 36/82). According to this Decision, there are 52 plant varieties, 314 animal species and one complete order (bats) which are protected in the territory of Montenegro.

Out of the total number of protected plant species, 15 of them are available in the territory of the Montenegrin Littoral. The protected plant varieties, which are situated in the immediate Montenegrin Littoral are the following:

Endemic & Rare Varieties
- *Asperula baldacci* i (Hal.) Ehr. – Asperula, which can be found in the vicinity of Bar.
- *Phagnalon rupestre* (L.) – Rock rupestre, present in Montenegro only at one site in the area of Budva.

Rare & Endangered Varieties
- *Colchcum hungaricum* Meadow Saffron – present near Ulcinj, at Donje Grblje, above Budva and Herceg Novi, as well as at some minor sites.
- *Ephedra major Host*. – Esphedrine, in Montenegro present only at Topolica, near Bar, on sandy sites along the beach, at a very restricted area.

Rare and Ornamental Varieties
- *Euphorbia dendroides L*. - Tree-like Spurge, present at several sites in coastal area in the vicinity of Budva and Petrovac, at the peninsula of Luštica (near the Blue Cave) and in the vicinity of Sutomore.
- *Hermodactylus tuberosus (L.) Mill*. – Wild Bergamot, present in the area of Boka Kotorska.
- *Rod Ophrys L.* – Twayblade, represented by several types which can be found at different sites along the coastal zone.
- *Orchis simia Lam*. – Adder's Tongue, present at sites in the vicinity of Bar.

Ornamental, Relict and Endangered Varieties
- *Panctatium maritimum L*., which can be found at sea sand bordering the Long Beach, near Ulcinj, on Slovenian Beach in Budva, Jaz Beach, as well as at several smaller sites.

Protection Based on International Conventions

The Convention for Protection of the World Cultural and Nature Heritage was adopted in 1972.
After the earthquake, the region of Kotor-Risan Bay and the Old City of Kotor were added to the UNESCO List of World Cultural and Nature Heritage and to the List of World Heritage at Risk. Since 2003, the City of Kotor and the Bay are no longer on the list of the world heritage at risk.

As a cultural, historic and natural good of national and international importance, the protected area covers 12000 ha of land and 2600 ha of sea in the territory of the Municipality of Kotor.
A part of this area is located on the territory of coastal zone, and therefore all obligations arising from the Convention are also relevant for implementation of spatial planning at all levels, as well as for implementation of environmental managements plans.

1.6. Cultural Heritage on the Land and in the Submarine Area

The Montenegrin Littoral represents a particularly interesting and from the cultural and historical aspect particularly important territory, over which connections between the civilizations of the East and West were established and maintained.

Man's presence in this limited territory for several millenniums has left numerous traces converted into different types of monuments whose historical, artistic, architectural, ambience values evidence the levels of development of individual cultures and individual epochs.

The monuments from the older epochs are often preserved only in fragments, while those from later times have been preserved either as individual monuments, as monumental complexes or, as the entire urban entities. In case of the monuments from the older epochs, they are predominantly archeological sites, while those from younger ones can be identified as buildings/facilities of profane, fortification, and sacral character. The most numerous ones among them are the sacral ones, there a somewhat smaller number of the monuments of profane and fortification character

while there is the smallest number of confirmed archeological sites. In view of favorable geographical and geomorphological conditions in the Montenegrin Littoral and early confirmed presence of man in it territory, with early established connections with the neighboring regions, by far larger number of archeological sites could be expected, but this is obviously due to insufficiently archeologically investigated land and the submarine area.
In the territory of the Montenegrin Littoral and in its maritime zone there is quite a number of cultural monuments of different types, characters, and degree of preservation, registered in the Central Registry of protected immovable cultural monuments, which is kept in the Republic Institute for Protection of Cultural Monuments in Cetinje.
All the registered monuments are at the same time categorized in compliance with the prevailing statutory provisions as: monuments of outstanding importance (I category), monuments of great importance (II category) and important monuments (III category).

Apart from the registered, or protected cultural monuments, along the Montenegrin coast and in its maritime zone, there is also a number of the so-called recorded buildings/facilities for which it is assumed with good reason that they possess certain monumental qualities, and, therefore, represent the potential monuments. Among them, according to the assumed monumental values, there stand out the sacral facilities and archeological sites in the submarine area in a relatively large number.

In the zone of coverage of the Coastal Zone, there is a symbolic number of cultural monuments, but that quite a number of registered and recorded monuments located along the Montenegrin Littoral judging by their properties, even by their position, or micro-locations, gravitate to the Littoral and make with it a unique whole.

1.6.1. Characteristics of the Heritage on the Land

From the overview of the monumental heritage located along the narrow belt of the Montenegrin coast, it can be noticed that, up to now, there have been registered around 90 monuments, as follows: urban entities and agglomerations (7), sacral monuments (39), profane monuments (26), fortification monuments (6), archeological sites on the land (10) and in the submarine area (2).

Apart from the protected cultural monuments, in the territory of the Montenegrin Littoral, directly along its coast there have also been recorded around 70 buildings/facilities of different types, which have certain monumental features, on the basis of which they can be considered to be potential candidates for protection, or registration, as follows: ambience entities (6), sacral facilities (34), profane facilities (19), fortification facilities (5), archeological sites on land (6).

It can be noticed that there is by largest number of the registered and recorded sacral and profane cultural monuments, while there is a considerably smaller number of urban and ambience entities, fortification facilities, and archeological sites, which obviously speaks about the character of life in threes areas. At the first glance, the small number of the registered archeological sites, both those on land, and those in the undersea area, is puzzling because, in view of the conditions and the role our coast had in the development of certain cultures starting from prehistoric times to the modern history, there should be much more of them. Such a situation is no doubt the result of insufficient investigation of both the land and the submarine area.

One of the basic characteristics of the monumental heritage of this region is reflected in its versatility, both with respect to the style and chronological features and cultural and historic values, and with respect to the main functions regardless of the number of certain types. Versatility is particularly expressed with sacral monuments, which belong to both religions (both the Orthodox and Catholic ones), among which, on the one hand, monuments of outstanding monumental qualities are encountered with wall decorations and particularly rich funds of movable monuments, such as certain monastery complexes (Savina, Banja, Praskvica, Gradište, etc.) or individual facilities (Gospa od Škrpjela, St. Eustahije, Bogorodičin temple in Prčanj, and numerous facilities within the urban entities) and, on the other hand, monuments of quite modest, often just ambience values.

In the zone of coverage of the Maritime Zone, there are the following **registered monuments:** Mamula fortress, Lastavica Island; the monastery complex of St. Vavedenja Bogorodice, Žanjice; the church of St. Nedjelje on the namesake Cape, Jošica; Prevlaka with the remnants of the monastery of St. Mihailo; the Church of St. Trojice, Prevlaka; Verona palace - Bizanti, Račica, Tivat; the complex of the church of Gospe od Andjela, Verige; the church of Gospe od Škrpjela and the church of St. Djordje, the islands in front of Perast; Baja Pivljanina tower, Dražin garden; the church of St. Ilija, Dobrota; the church of St. Nikola, the island in front of Budva (Školj); Drobni Pijesak, Budva; the remnants of a castle and lazaretto, Petrovac; the Monastery of Bogorodice Ratačke. To this, two undersea sites should also be added: between Strpačko Cape and Murove Cape and Bigovica Bay in the vicinity of Volujica, Bar.
It should be stressed that the Maritime Zone also covers **parts of urban entities** of Herceg Novi, Perast, Kotor, Budva, Sveti Stefan, and Ulcinj.

To this also belongs the entire area of the maritime zone of Kotorski and Risanski Bays as well as major part of the land, which was recognized as the **World Cultural and Natural Heritage** of UNESCO.

Within the coverage of the Maritime Zone there are the following **recorded monuments:** the remnants of ancient and medieval architecture, Žanjica; the church of St. Jovan, Žanjica; Arza fortress, in front of Žanjice.; the Citadel (Mezaluna), Herceg Novi; the complex of Lazaretto, Meljine; the railway station, Zelenika; hotel Čabe Madjara, Zelenika; the church of St. Nikola, Djenovići; the remnants of late ancient architecture with a mosaic, Prevlaka; the church of Gospe od Otoka, Tivat Bay; the mouth of the River Ljuta with a mill and remnants of the church of St. Krst, Kotorski Bay; the church of St. Nedjelje, the Island of Katič, Petrovac.

Recorded as **ambience entities** are: the urban center of Risan, settlements Rose, Ljuta, Dobrota, the old

Prčanj and Muo as well as rural entities of Rafailovići and Pržno.

Quite a number of the monuments of building heritage, regardless of their status (whether they are registered or not), have retained their primary functions, either of sacral or profane character. Among the monuments of building heritage, only the fortification facilities have fully lost their primary function.

The monuments of sacral character have predominantly retained their function of religious facilities. Quite a number of them are active and religious services are regularly held in them, while a smaller number of them are out of the true function, because they are quite rarely or almost never used for services (e.g. the church of St. Ilija in Dobrota).

Change of the original function of the monuments of profane character is somewhat more pronounced, although a bigger number of them have retained the primary function.

In view of the fact that they are the buildings primarily intended for dwelling, most of which originate from XVII, XVIII and XIX centuries, and among which particularly prominent are the captains' baroque palaces constructed in the settlement along Boka Kotorska Bay, their basic function was predominantly retained during the restorations and repairs. There are examples of some whose basic function has been changed, particularly during the reconstruction after the earthquake in 1979, and, therefore they are nowadays used for accommodation of cultural institutions, tourist and catering, offices, and other attractions.

Apart from palaces, a number of other profane facilities have also changed their original function into museums and galleries and tourist and catering facilities. Even certain monuments of fortification character have been assigned quite new functions, most often for music-and stage, cinema, or catering activities.

Among the investigated archeological sites, only two have been protected and presented in a modern way. They are the remnants of a Roman urban villa with mosaics in Risan and a late ancient mosaic at the site Mirišta in Petrovac.

Apart from the monuments with clearly defined functions, there is number of important monuments of all kinds (sacral, profane, fortification ones), which have been abandoned and today have no function. Quite a large number of such monuments are located almost on the very coast or on smaller island, which means that they have almost ideal positions and, related to that, a good reason to get in the sphere of certain interests in their use in a modern way.

Today, it is possible to identify the following abandoned monuments: the monastery complex of St. Vavedenje Bogorodice, Žanjica; the church complex of Gospe od Andjela, Verige; Bajova tower, Dražin garden; Ivelić Palace, Risan; Mamula fortress, Lastavica Island; Arza fortress, Žanjica; fortress Mezaluna (citadel), Herceg Novi; Španjola fortress, Herceg Novi; Mogren fortress, Budva; Kosmač fortress, Brajići.

A number of particularly important archeological sites are also in a neglected state, so that they look like they were abandoned long ago, although some of them, after publishing of the investigation works, were conserved and presented "in situ".

1.6.2. Characteristics of the Undersea Heritage

The analysis of geographical and maritime and historical and archeological factors leads to the conclusion that, in the Montenegrin submarine area, there is a major potential for underwater archeological investigations. Namely, due to the geological sinking of the eastern Adriatic coast and the tectonic oscillations, certain building structures, in time, either partly or completely, have got under the surface of the sea. Additionally, the known historical facts clearly indicate the importance that navigation had for the development of ancient and medieval societies in these areas and allow us to assume with great certainty the existence of shipwrecks of different types of vessels and from different time periods. However, since the problems of investigation and protection of such monuments have never been resolved in the right way, the data we have available today are mostly still the information gathered from fishermen and divers.

According to the documentation of the Republic Institute for Protection of Cultural Monuments from Cetinje, only two archeological sites have been registered and categorized in the submarine area: the area between Strpački Cape and Murova Cape in Risan Bay and Bigovica Bay, between Volujica Cape and Bigovica Artificial Cape. Both sites belong to the third category of monuments.

Apart from the registered ones, there have been recorded 27 archeological sites in the submarine area: Njivice (amphora site); Malo Rose (amphora site); Žanjic, (amphora site and shipwreck - patrol vessel of the Yugoslav Navy, 20th century); Lastavica Island, Mamula (amphora site); Karatoč (amphora site); Kumbor (amphora site); Trašte Bay (amphora site); Bigova Cove (amphora site); Pržno Cove, Trašte Bay (amphora site); Tivatski Bay (shipwreck - sheamship Cetinje, 20th century); the Island of Gospe od Otoka (amphora site); Dobra luka Cove (amphora site); the port of Budva (amphora site); Slovenska beach (shipwreck - remnants of a medieval vessel); Katič (amphora site); Petrovac (shipwrecks - unknown period); the port of Bar (shipwreck - yacht "Rumija", 19th century); Volujica Cape, (shipwreck – a sailing vessel from the 18th century); the shore Velja Zabija (shipwreck - Italian cargo ship, 20th century); Barski Bay (shipwreck – anti-torpedo boat/kontratorpiljer, 20th century); Maljevik Cove (amphora site); Stari (old) Ulcinj (amphora site); Valdanos Cove (remnants of a ship's cargo); Velika beach, Ulcinj (shipwreck – Austrian ship Forverc); Ulcinj (shipwreck – a destroyer, 20th century), and Djeran rock (amphora site).

Among the recorded monuments there are also the remnants of shipwrecks from the 19th and 20th centuries. Only some of them have a historical importance, but all other them require legal protection as particularly attractive targets for sports diving, which is in our country almost obligatorily related to collection of "souvenirs", or taking away of parts of ships' cargos

or shipborne equipment. These sites require legal protection so that they could be preserved and used for planned, organized, and controlled tourist diving.

The cultural heritage of the Montenegrin submarine area is in a rather poor state: archeological prospecting by diving has never been carried out, the consequence of which is a negligible number of registered, categorized, and recorded undersea monuments, and minimum archeological knowledge about them. What we certainly know is that the surface layers of all the known and recorded sites have been plundered. Their devastation has reached particularly disconcerting scales with increasing popularity of the diving sport, supported by the lack of supervision over the enforcement of regulations that govern the issues of protection of undersea archeological sites as well as by unregulated legal status of actual sites.

One of the consequences of such state is also that, regardless of the assumed wealth of the Montenegrin submarine area, in the museum collections and storage premises there is a negligibly small number of undersea archeological finds. They got into museums as gifts or by buying up and have generally not been conserved and thereby doomed to relatively quickly decay due to the destructive effect of salt. As opposed to the museum collections, the private ones are rich, typologically and chronologically versatile and illegal. One can well say that the largest part of the movable archeological materials from the Montenegrin submarine area is in the private collections in the country and abroad, inaccessible and unknown to the archeological, but also to the wider public.

1.6.3. Experiences and Problems in Implementation of Protection and Use of Cultural Monuments

Long-term neglect of the monumental heritage within the development plans, uncontrolled construction, and non-compliance with the statutory regulations, have seriously threatened its monumental value. This has had particular impact on the monuments of the coastal belt, on the bad state of which the inadequate maintenance also has had particular influence. Intensive settlement and fast, often uncontrolled development of tourism, with its overcrowded capacities has threatened, not only the natural, but also the cultural values.

Apart from urban entities, the rural agglomerations and old settlements located along the coast were particularly affected, in which the construction has become excessive. As one of the causes of degradation of the monumental heritage, the trend to build new can often, and not to revitalize the old and existing, be specified, which is certainly supported by the nonexistence of proper synchronization between the requests for construction, planning specialists, and the system of protection.

Luckily, when major monuments of sacral character are in question, one can say that have generally been spared of uncontrolled processes, and the examples of usurpations are minimal.

Such a statement cannot be given for the archeological monuments with which the degree of threat is particularly high, both with respect to those on the land, and those in the submarine area.

The archeological sites on the land are most often threatened by illegal and unplanned constructions that disrupt their monumental integrity and often even pose threat to physically destroy the sites (e.g. remnants of the monastery complex of St. Mihailo on Prevlaka, the site ”Carine” in Risan, the remnants of the Franciscan friary with cemetery in Kotor, remnants of the church of St. Toma in Prčanj, the late ancient mosaic in Petrovac, remnants of the Bogorodičin monastery in Ratac).

Apart from the archeological sites on the land, particularly threatened are the sites in the submarine area, especially those containing amphorae, and the others are not spared either. The outstanding wealth of our submarine area (amphora sites, shipwrecks from different periods and scattered cargos) is constantly exposed to devastations and, therefore, a large number of objects, particularly amphorae, ends in private collections or are illegally transferred over the border.

1.7. Organization, Use, and Development of Coastal Zone

For the period as of 1992, when the Law on Maritime Zone was passed and a special public enterprise for management of the Maritime Zone of Montenegro was formed, one can give the following characteristics:
- Use of the Maritime Zone obligatorily implies its protection and preservation and, if possible, improvement and construction
- The Maritime Zone is ceded to use for a time period as developed or undeveloped
- Construction and development of the Maritime Zone are carried out in compliance with development projects or in accordance with requirements established by the public enterprise
- The newly constructed Maritime Zone, regardless whether the employer is a private or government entity, is in the state ownership
- Any natural and legal persons may be the users of the Maritime Zone
- The right to use the Maritime Zone is realized by way of a contract on use which is concluded with the public enterprise
- Private owners of land in the belt of the Maritime Zone have all the ownership rights same as outside that belt - the possibility is excluded that parts of the Maritime Zone pass from the state ownership into private ownership

The public enterprise for management of the Maritime Zone has, in the past period, managed to:
- Protect the Maritime Zone from illegal construction and different forms of usurpation
- Raise the issues from the domain of pollution of the sea with sewerage and to set up the system of measurement of the quality of sea water
- Animate a large number of inhabitants in the coastal settlements to repair and develop the parts of the coast in front of their houses in cooperation with the public enterprise

- Establish cooperation with government authorities, local self-management, tourist associations, sports societies, fishing and diving organizations, entrepreneurs
- Initiate making of the cadastre of the Maritime Zone and create preconditions for protection of the property rights of the Maritime Zone
- Apart from the development and planning documentation, it is also intensively working on preparation of the design documentation.

1.7.1 So-far Experiences in the Use and Development of the Maritime Zone

On quite a number of swimming beaches the level of neatness has been improved and they are better equipped with the necessary beach equipment and attractions and their sanitation is better. Around 1200 palm-trees have also been planted; benches and street waste bins have been put up.
In addition to that, the marking of the actual belt of the Maritime Zone has been completed using boundary stones and boards with main data on the name of the location and lease holder, or user of the area.

Most of the contracts are related to leasing of parts of the coast to form swimming beaches with ancillary facilities as well as for putting up of temporary facilities. Thus over 70% of the beaches include catering facilities (mostly in the municipalities of Budva and Herceg Novi).

With regard to the equipment of beaches, most of them are provided with water and electricity - around 75% (the best state is in Herceg Novi, Bar, and Budva), with showers, the situation is rather good - over 65% (the best state is in Herceg Novi, Tivat, and Bar) while the situation with the sanitary blocks is bad – somewhat over 40% (the best state is in Budva and Bar). The situation is not satisfactory concerning the organized parking either - just 45% of the beaches have it (Kotor and Bar stand out), or concerning provided landing place for ships and boats - around 35% (most of them are in the municipality of Herceg Novi).
The interest of hotels and tourist entities in the use of parts of the Maritime Zone or to provide beaches for their guests is insufficient, but there are also positive examples.
There is a rather small number of contracts that are related to production activities, although there are indications that their number will be increasing in the future. Up to now, several shell farms and 1 fish farm have been set up.

Partial usurpation of parts of the coast and aqua-space with the use of the Maritime Zone in illegal and semi-illegal way is still present.
A complex problem is also the pressure from construction of buildings/facilities and the accompanying infrastructure on the beaches, which are protected as monuments of nature. Thereby the biggest consequences are in their very hinterland.

The state of piers and quay walls is very bad, and certain number of them is in critical and dilapidated condition and they are no longer usable. Some of them were badly damaged in the storms in the course of the past years (Petrovac, Sutomore, Čanj, Bar ...).

Particular threats are the direct sewerage outlets into the sea without any treatment of waste waters. That is why the public enterprise undertakes regular measurements and analyses of the quality of sea water at the swimming beaches and beaches in all the 6 coastal municipalities. According to the Decree on Classification of Waters (Official Gazette of the Republic of Montenegro 14/96), the required quality of sea water for swimming and recreation must be within I class on open sea and of II class in the bay.

As of 2003, on certain beaches in Montenegro, the campaign ”Blue Flag” has been conducted, which implies high ecological and tourist standards on the swimming beaches.

The safety of swimmers is still problematical due to unregulated presence of boats, skimmers, ships, jet skis, and other vessels within the coverage of beaches. On a part of developed swimming beaches the protected zones have been marked with buoys.

1.7.2. Conflicting situations in the coastal belt from Igalo to Ulcinj

Due to the importance of the entire coastal region on the relatively short stretch from Igalo to Ulcinj, it is necessary to harmonize disparate factors of economy, permanent and occasional population, civil and military facilities. That is why special attention has been devoted to the conflicting situations in the coastal belt of the Adriatic Sea. Due to all the specific features it has, the coastal belt is divided into a part of open sea and Boka Kotorska Bay.

Coastal open sea of Montenegro

The belt of open sea of Montenegro is the indented coast of the municipalities of Herceg Novi, Kotor, Tivat, Budva, Bar, and Ulcinj. The use of the area is primarily concentrated on the tourist economy that, on such a short stretch, should enable participation of different factors of space in the existential, economic, and military and security sense, whereby the environmental protection is the limiting factor.
Regardless of the fact that the factors of open sea have a much stronger effect on exchange of substances than in Boka Kotorska Bay, the first and the most significant problem is securing the coastal belt from discharging of waste fecal waters, which is currently, with some exceptions (Budva, Sveti Stefan, and Petrovac), generally on an unsatisfactory level.
In the municipalities from Budva to Ulcinj, there have been registered 11 undersea outlets, out of which the majority should be completely shut down with the construction of the sewerage systems. The sewerage system Tivat-Kotor (partly constructed, operating only for the industrial zone Grbalj) includes treatment of waste waters prior to discharging in Trašte Bay through an underwater outlet 3,500 meters long.

The planned evacuation of waste waters in all the coastal municipalities implies primary treatment with undersea outlets of lengths in excess of 1000 meters.
In line with the requirements of the Mediterranean countries, discharging of waste waters into the sea will, in our case, imply construction of the system for multi-

stage treatment prior to any discharge into the sea.
Every sewerage outlet, even the one that operates properly with a diffuser, is a potential polluter. Such locations should be avoided for growing of maricultures, and they should be away from natural hatching grounds and locations with fish fry, which are most often at the mouths of rivers, brooks, and well springs, where the sea and fresh/salt waters are mixed.

Trends in the world bring about increasingly richer facilities on sea coasts. Construction of marines, moorings, small ports, small mole-closed harbors in natural coves, or adaptations of the coasts to the use, carry the risk of ecological nature. Locations of marinas must be in harmony with the natural factors (winds, waves, sea currents) and tourist and sports complexes, but they are in conflict with growing of maricultures and space intended for exploitation of natural therapeutical factors, such as therapeutical peloid (Bigovo, Ulcinj) or springs of mineral waters in close vicinity of the sea coast, even with the beaches intended for swimming.
The environmental protection measures in such areas imply equipment for pumping out sludge waters prior accepting a vessel in the marine, prohibition of use sanitary equipment during the stay of a vessel in the marine, removal of solid waste from aboard the vessel, technical devices for prevention of pollution with oils and oil derivatives when filling and transfer of fuels and lubricants, technical equipment against spreading of pollution from the marine after accidental situations in the marine or in its close vicinity.
Similar also applied to the port of Bar, where the work of a special security service must be well organized. The square area of the local waters of the port and its land, as well as the aquatic area designated for maneuvering entrance-exit-anchorage must be sufficiently distant from the locations designated for growing of maricultures and implementation of natural therapeutical factors.

Implementation of therapeutical factors on locations may be combined in a positive sense with the medical, sports, tourist facilities and growing of sea flora and fauna, but also conflicting with tourist, industrial facilities, port, reloading of oil, lubricants, and oil derivatives, as well as with marinas. If every beach, in the first place, has medical importance in addition to tourist importance, then each such location is subject to protection, or to conflicts.
Ulcinj Beach is the most interesting belt intended for accommodation of different facilities, where construction of the sewerage system will have the primary place in evacuation of waste waters.
Growth of salinity as the consequence of operation of the salt pans "Bajo Sekulić", is also considered to be a conflict because the environmental factors in Porto Milena are thereby changed. This is a conflicting location with respect to discharged substances and used waters: from the factory for processing of olives as well as from the hotels on Velika Beach, which empty their septic tanks in Porto Milena Bay. Ulcinj Beach has verified its medicinal, highly-valued properties, the application of which should also be promoted in future.

The facilities of the Military have their special importance and it is necessary to separate their locations from the use of civil facilities. Possible conflicts between the military and civil facilities must be the subject of a separate study.

The zones subject to conflicts, in which several factors of different origin coincide are: the port of Bar, Port Milena, Valdanos Cove, the town port of Budva and Trašte and Bigova Coves.

Boka Kotorska Bay

Boka Kotorska Bay is a narrow aquatic area the behavior of which is in many aspects different from the open sea. Accelerated construction in urbanized and un-urbanized zones, has transformed the coastal belt into a sort of concrete and stone ring around the Bay, with visible disruption of natural parameters.
The so-called "linear town" is distributed along the coast of the Bay with just a few zones untouched by construction (along Luštica Peninsula and from Kamenar to Kostanjica, from Strp to Risan, from Risan to Perast and from Perast to Dražin Garden, with some areas under housing settlements somewhat deeper inland and into higher zones of the terrain).

A high degree of facilities in this area ranging from those with natural ones, practically unrecoverable under urban conditions, to the others that are called for by the requirements of modern living are mutually conflicting, even defying. Versatile activities burden the situation in the Bay with their trend of further growth, due to which it is necessary to resolve the current conflicting situations, first of all the fecal sewerage is to be resolved.

The main current problem in the Bay is unregulated discharge of fecal waters. Even 62 undersea outlets have been registered within the Bay in the territory of Herceg Novi, Kotor, and Tivat, which are operating, not operating or partially damaged. Every sewerage outlet is a crisis point due to the impact of waves, sea currents, winds, incidental accidents, which has been demonstrated in practice.

According to all the prepared and effective programs, studies, plans and designs/projects, the solution of fecal sewerage system implies construction of a collector along the coast of the Bay, through all the municipalities of Boka Kotorska, with outlets into the sea, as ultimate point of the collector. Up to now, the possibilities of treatment in several stages have not been reviewed, except for some isolated locations, such as Krašići or a transitional solution for settlement Orahovac and Dražin Garden.

At the locations of spring or mineral waters, it is necessary to protect them from any form of pollution, which means that, in their vicinity, there must be no discharges of impurities (pipes of the sewerage system, septic tanks, stables, roads, waste dumpsites). Similar could apply for the therapeutical mud (Igalo peloid – the basis of operation of the Institute "Dr Simo Milošević") which needs to be protected from negative effects both from the land and from the sea. The measures of protection from the land imply complete protection of the catchment area of the River Sutorina and strict implementation measures in the coastal zone.

Discharging of inflammable substances into the sea and their reloading in the close vicinity may have major consequences to the plant and animal world in the coastal area and on the land. In Boka there is a "base"

for reloading and storage of petrol in Lipci (although with all the security measures) as well as handling of these hazardous substances in the ports of Zelenika, Kotor, Herceg-Novi and at anchorages.

Reloading of liquids calls for security measures and isolation of other facilities, such as housing, tourist, sports ones, but also special, rigorous protection of the sea from spillage of such substances.

The most important accidental, concentric, points are yet, the Jadransko brodogradilište (Adriatic Shipyard) in Bijela and Remontni zavod (Overhaul Depot) in Tivat, due to different negative events appearing continuously or occasionally, such as accidental leakage of fuel oil, sandblasting, or painting with special (antifauling) paints. In close vicinity of these facilities it cannot be expected to develop tourism, grow maricultures, not even recreation on water. In these zones, special measures are expected for the protection of water, air, and surrounding land.

The Military has its special place in the Bay as well with regard to the use of the area, which implies preparation of a detailed presentation of the facilities for special purposes as well as special analyses.

The zones subject to conflicts in which several factors are encountered with different uses of areas are: the beach from the mouth of the River Sutorina towards Topla; the town port of Herceg Novi; Zelenika; Bijela, the town port of Kotor and Tivat.

Through harmonization of the plans for use of the area, the desires and possibilities with the new knowledge about valorization of natural factors and their harmonization with the factors of urbanization, an answer can be given about the realistic possibilities concerning new facilities and improvement of the current state, with as few conflicting situations as possible.

1.8. Excerpts from the Planning and Study Documentation

1.8.1. Review of the Planning Documentation

The Spatial Plan of the Republic (adopted with the amendments and supplements in 1997) underwent a transitional verification of some envisaged solutions, in view of the fact that, in the course of preparing its amendments and supplements in 1994 and 1995, it also underwent updating of the current state (including the 1991 census), i.e. amendments of and supplements to the base studies that reviewed and touched upon the changes that emanated in the course of the nineties. Thus certain projections and planning solutions were changed, although the target year remained the same - 2001.
By a special decision, the validity of this plan was extended until the adoption of a new one, which is being prepared.

The Spatial Plan of the Republic provides the main guidelines and lines of development in the beginning of III millennium, which can also be used as the staging area for the Spatial Plan of the Area of Special Use for the Coastal Zone.

As one of the novelties in the plan is also the separately treated territory of the Coastal Zone, whereby the basic potentials and problems were identified, which can also be seen in the base studies (especially those that had dealt with the overall development, maritime economy, development of tourism and agriculture as well as with the resources of the sea). One of the planning measures is also the obligatory preparation of PPPPN for the Coastal Zone.

The belt of the Coastal Zone is covered by the spatial plans in the territories of five municipalities (Herceg Novi, Tivat, Kotor, Budva, and Ulcinj), or by the master plans in the territories of all the six municipalities, whereby that type of plans covers the entire coastal area of the municipalities of Tivat, Budva and Bar.

In the municipality of Herceg Novi the uncovered part is a part around Dobra Luka Cove, in the municipality of Ulcinj, the coastal area of the River Bojana up to the state border, while in the municipality of Kotor GUP covers only the stretch from Mua to Ljuta. The rest of Kotorski Bay is partially covered by the plans of lower order for certain settlements (PUMN / UPN and DUP), while the open sea coast from Jaz, or from Trsteno to Bigova does not have a planning document regulating the area.

Almost all the spatial plans of the municipalities have the target year 2001, except for PPO Ulcinj, which has the plan horizon up to 2010 and PPO Herceg Novi up to 2020.

However, since these are the highest planning documents for each municipality, they are taken as recommending ones in the domain of the strategy and lines of development, or spatial organization and functional division of areas.

The plans differ from one another very much, although they were prepared according to the related methodologies. Namely, majority of them were prepared in the middle of the eighties within the Project YUG/79/104, but the differences are evident. They are noticed, in planning expression, in the level and contents of treatment of certain areas, both in the textual and in the graphical parts.

This can partly be justified by the fact that six different spatial systems are in question, which are all separate parts, although together they also make up the whole of the Montenegrin Littoral. An additional explanation is that all the processed plans were prepared by as much as 8 institutions from Podgorica, Herceg Novi, Belgrade, and Zagreb.

It is noticeable that the plans are not harmonized with one another, starting from non-correspondence of municipal boundaries, certain routes and priorities of roads, as well as with regard to certain uses. It is obvious that the plans were prepared rather autonomously and without much mention of the surroundings.

With respect to tourism, there are particularly big differences in projections between the overall, or the basic and complementary capacities, with respect to the

Republic, where the differences are as much as three times bigger. They can be also regarded as the projections for a longer period, or for the second phase of implementation. The differences also appear with respect to certain categories of accommodation, so that the data are hardly comparable.

The projections of agriculture are generally corresponding. A declarative mentioning of the development of fishing or mariculture is noticed. There are some bashful attempts to establish the location for mariculture (e.g. in Kotor and Tivat). It is obvious that this area was poorly dealt with and was rather unknown.

Majority of the road networks of the municipalities rests on the Adriatic Highway, which even got the corridors for displacement in all the municipalities. With respect to a new road network, subject to the amendments of PPR from 1992, only the municipalities of Kotor, Herceg Novi and Ulcinj made harmonization with the new solutions, by incorporating the corridors of the new Adriatic Highway and Fast Road in their respective plans.
It has been noticed that the corridors of new roads partially coincide with the corridors of the displaced Adriatic Highway in the territories of the municipalities of Herceg Novi, Tivat, and Budva.

With respect to the maritime transport, each municipality has envisaged ports and landing places for coastal shipping, while the system of nautical points is dealt with more in detail only for the municipality of Kotor.
Majority of the designs of water supply rest on the regional system for water supply, whereby the municipalities resolve this issue locally – or from their own springs to a lesser extent. Transitional or temporary solutions are predominantly provided.

The majority of the sewerage system designs are based on autonomous outlets into the Adriatic Sea, with previous treatment, except that for the territories of Kotor and Tivat where a common system is envisaged.

With respect to the protection, it was dealt with in a standard way - separately for the natural and cultural heritages, although there are also examples where special attention was devoted to the protection of sea and coastal areas. In some plans, the seaside landscape was specifically dealt with (Herceg Novi), or coasts (Tivat, Bar). It is specifically pointed to the values of waterfronts, small mole-closed harbors, and "seaside facades" (Tivat, Kotor).

In view of the fact that the majority of plans were prepared before 1992, the concept of sustainable development is not mentioned, except in the latest modifications of PPO Kotor and GUP Budva, and in the staging areas of PPO Ulcinj and PPO Herceg Novi.

In view of the fact that the spatial plans of the municipalities are the basic planning documents, except in the municipality of Bar where it is the master plan, (because there is not other plan of a higher order), a synthesis-based graphical presentation of their respective designs of the uses of areas and the road networks was made as an attempt to present them in a unique way and, as such, to serve as the input data on the state of planning of the Littoral.

In the following phase, there followed the review and verification of solutions of all the six GUPs in scales of 1:5,000 or DUP in scale 1:1000. There is a very big problem, in view of the updated documents – most of the sections (except for the municipality of Bar) are from the period just after the earthquake, which do not provide an adequate picture of the space. On the other hand, the documents in the scale 1:1.000 were completed after the new surveying for the entire Littoral, but their number is particularly large, and accessibility is very much aggravated. All of this represented a difficulty in the work and proper-quality processing of the data and presentation of the solutions.

1.8.2 Review of the Study Documentation

The staging area in preparing of the draft plan was the "Program of Development and Protection of the Coastal Zone of Montenegro", which was prepared in the course of 1994 and 1995. This is a complexly conceived and realized project, which in five surveys dealt with the current state of the natural and created resources, infra- and supra-structure and, thereafter in the following eight surveys provided the general assumptions for the development of the Coastal Zone specifically with respect to the tourist and nautical facilities, agriculture, fishing, and other economic activities, then the infrastructure, and environmental protection. It also dealt with the economic valuation of the program, the organization of the Public Enterprise for the Coastal Zone, and a marketing strategy for the implementation of thus conceived program. With its results and projections, this project represents a solid inventory of the state as well as possible lines of development.

An integral part of the work on forming the documentation base of the plan is also the analysis of the base studies prepared in the course of 1995 for the requirements of Amendments of and Supplements to the Spatial Plan of the Republic, officially established strategies on the Republic level, which are related to the areas of agriculture and tourism and the materials that are currently in the stage of professional and public debate and, which as such, due to their character and comprehensiveness of the topic could serve as the input data in this matter.

The advantage of base studies from 1995 is that, although they were prepared as the amendments of and supplements to the previous studies from the first half of the eighties, at least to a certain extent, they provide presentation of the past period in which the change of the state structure, disintegration of the former federal state, and big economic crisis, which affected the country in the beginning of the nineties took place. Most of these phenomena found their place in the presentation of the basic activities.

Five base studies have been selected for the analysis, which have the most points of contact with the problem area of the Coastal Zone, as follows: overall development, agriculture, tourism, maritime economy, and bio-ecological potentials of the inshore sea.

The base study "Development of Montenegro" provides the evaluation of the so-far development and the basic preconditions for development up to 2000, which served as a basis to form the proposed solutions in the Spatial Plan of the Republic, whereby the elements related to the

Southern Sub-region are particularly stressed in the analysis.

The base study "Maritime Economy" provides the presentation of the entire complex of maritime economy, the characteristics of its development, and its role in the economic life of Montenegro. The study points to all the potentials of the coastal region and the sea resources as a basis for further development of this part of the Republic.

The base study "Development of Agriculture" points to agriculture as one of the priority branches in the Republic, which, combined with tourism, could be the backbone of development of Montenegro in the Littoral through specialized production and activation of fishing.

The base study "Development and Prospects of Tourism" points to all the forms of tourist trade, the basic indicators of development up to the end of the century, the need to limit development of tourism at certain localities, and has offered a combined scenario of tourist development of Montenegro where the Littoral region represents over 95% of the offer.

The base study "Bio-ecological Potentials, Pollution, Use, and Conflicts of Inshore Sea of the Republic of Montenegro" complexly presents the basic bio-ecological potentials of inshore sea, the quality of the environment, possibilities of development of fishing and mariculture, locations for development of health and nautical tourisms and, in the end, it has presented the existing and possible conflicting situations in the territory of Boka Kotorska.

"Green Strategy of Montenegro up to 2000" represents an official document, which was adopted in the Parliament of Montenegro and which laid the foundation for the development of agriculture on market principles and, at the same time, it can also serve for recording of the state in the belt of the Coastal Zone or be the preliminary study research for the area of agriculture, particularly in the zone of the Montenegrin Littoral.

"Strategy of Development of Tourism of Montenegro" is an additional official document by which the state has established goals and projection of development of one of the important activities in the Republic. The survey evaluated the values of the potentials and the achieved level of development of tourism and established the limitation thresholds. Then, on the basis of the projection of the development of capacities, demand, and economic effects, the priority forms of tourism and programs as well as the organization, equipping, and development of tourist areas were defined.

The material "Montenegro at the Threshold of XXI Century" provides the main goals and trends of the concept and strategy of development of the Republic in the beginning of III millennium with the presentation of main tendencies in the so-far development, description of the state, available capacities, and developmental limitations.

"Regional Development of Montenegro" is a substantial source with updated data on all the essential phenomena in Montenegro in the course of the nineties with very comprehensive overview of the development projects by municipalities as well as for the level of the Mediterranean zone, establishing of which is proposed by this material.

The study "Lines of Development of Montenegro – Ecological State" has very thoroughly dealt with the elements of the strategy of sustainable development on which Montenegro should base its future development. Special attention was devoted to the possibilities of development of individual parts of Montenegro from the aspect of the conditions and resources for development or current and future problems of the environment in the Republic.

The study "Attractive Zones and Locations of Special Interest for the Republic in the Montenegrin Littoral" analyzes particularly valuable areas on the coast and coastal region. Thus valuation is made of 189 sites classified in 22 zones or 4 tourist areas, as well as their ranking. It also deals with the advantages of certain areas for industries to be converted in the ancillary activities including establishing of their categories.
At the end, an overview was given of possible conflicts as well as general lines of development of attractive zones and locations.

”Water Resources Management Base of Montenegro” (2001) serves as a particularly important source of data and maps, projections, and guidelines related to the water resources management problem area (protection of waters and protection from waters, use of the sea ...).

In preparation of the draft plan, the strategic documents adopted after 2001 were used.

”Master Plan of Tourism of Montenegro” offered a new strategic view of tourism in the Republic up to 2020. Taking also into account the new strategic circumstances and the social and economic changes, problems and potentials, this study offers a vision of development of different forms of tourism with the established zones and priorities, as well as with the assessed capacities for the initial five and the total of 20 years.
After the Master Plan for the entire Montenegro, two regional master plan were also prepared for Boka Kotorska and Ulcinj region (2002), which proposed the modalities how to valorize these most important areas in the Littoral from the tourist aspect.

In the course of 2005, there were prepared the "Analysis of 10 Locations in the Montenegrin Littoral" (DEG) and their potentials for tourist development in the forthcoming period as well as the "Study of Nautical Tourism in Montenegro" (GTZ) which has comprehensively reviewed the potentials and spatial positioning of nautical facilities.

"Master Plan of Airports" (2003) proposed the future (staged and final) development of airports in Podgorica and Tivat, with the control mechanisms for use of land in their vicinity and the proposal of urgent measures.

"Master Plan of Drainage and Treatment of Waste Waters of the Montenegrin Littoral and of the Municipality of Cetinje" (2004) gave the presentation of the current state and noticed problems, proposal of the zones that will be covered by the sewerage systems, variants of the locations of the facilities for treatment of waste waters, investment plans for the entire region and the municipalities, as well as the program of urgent measures.

The strategic master plan for waste management on the Republic level (GOPA, 2004) established the national policy and plans of management of individual types of waste.

SECOND PART – PLAN UNTIL 2020

2.1. Starting Postulates

2.1.1. Principles

The Republic of Montenegro has recognized a special importance and exceptional value of the coastal region by proclaiming the Law on Coastal Zone in 1992 and has provided frameworks for the special regime of protection, use and improvement of this important resource. Montenegrin Littoral represents a valuable complex of natural and manmade resources on which main industries of Montenegro rely on to a great extent, primarily tourism. On the other hand, this region is under constant pressure of urban and industrial development, thus the space on the coast, as a specific and unique space, represents a restrictive development factor which gives a special value to the Costal Zone. Essence of the development of the Special-Purpose Coastal Zone Spatial Plan is exactly to offer guidelines for development and protection of this resource, or to provide that a development that will provide for maximum use with minimum degradation of natural and manmade resources to be carried out on the space such is the Montenegrin Littoral. In this manner intent is to provide for sustainable use and protection of the Coastal Zone of Montenegro.

When planning space such as the region of the Coastal Zone of Montenegro specificities that make this region unique and of particular importance for the Republic should be kept in mind, and those are:

- Intensive human activities and interaction of physical, biological, social and economic, cultural and other processes within this region;
- Mutual connection of sea, shore and river systems, that make the area of Coastal Zone an ecologically sensitive region, where changes in one natural system cause consequences in others as well;
- Exceptionally attractive region for settlement and conducting human activities;
- Unique characteristics and multiple purpose which make necessary a provision public access and use of the area of Coastal Zone of Montenegro;
- Area of Coastal Zone is under constant and dynamic process of morphological, landscape, ecological and other changes, such as: urban development, industrial expansion, natural coastal processes, and in a lower extent to natural disaster, climate changes and rising of the sea level in a long run.

As the space on the coast, within the area of Coastal Zone of Montenegro, due to its unique characteristics represents a restrictive factor, or as needs and possibilities for development of industrial business activities and other human activities within the area of Coastal Zone are higher than the what the space allows, it is necessary take into account following principles when deciding on the purpose of such as space:

- Provide, to the highest extent possible, accessibility of the area of Coastal Zone for public access and use;
- Purpose of the space in the area of Coastal Zone should be redirected to activities of general and public importance and of special importance for the Republic;
- Space within the area of the Coastal Zone should be intended, to the greatest extent, to those industrial business activities that cannot be carried out in sites outside of the area of Coastal Zone (nautical tourism, ports, mariculture etc);
- When deciding on purpose of the space for development of human business activities within the area of the Coastal Zone, those industrial business activities that represent a strategic direction of the economic development of the Republic and of local communities, that at the same time endanger minimally resources and the environment of the Coastal Zone should be given a priority;
- Recognize a need to preserve the integrity of the coastal system and that should represent a limitation on the use of coastal resources;
- Develop strategies and programs for integral management that enable multipurpose use of coastal resources where the activities are complementary to each other in order to provide for the efficient protection of the space;
- Due to the complexity and sensitivity of the natural system and constant pressure of human activities on the area of the Coastal Zone, it is necessary to eliminate all industrial and other business activities that pollute, degrade and disturb natural and manmade values and the ecological balance;
- Secure the use of the Coastal Zone is in accordance with natural capacities, as well as for the long-term protection of the coastal region with regard to immediate economic interests;
- Involve local population in the decision making process in order to secure effective use and protection of the coastal region;
- Envisage necessity of an integral approach in management of this region in order to provide for protection and improvement of the Coastal Zone area.

Having in mind international trends in protection and use of coastal regions, in particular in period after the UN Conference on Environment and Development that took place in 1992 in Rio de Janeiro until today, conclusions on the need for coastal regions to be recognized as region of special importance are unanimous, and to secure for their rational use and maximum protection of natural and manmade resources. In the Chapter 17 of the Agenda o 21 countries of United Nations, integrated coastal regions management (ICM) as process that provides for use and protection of the coastal region. ICM represents a dynamic, continuous and adjustable process of resource management that is a foundation of sustainable development in coastal regions, which requires multidisciplinary approach to solving problems, participation of all competent bodies and integration of sectors (departments), institutions and administrative levels.

This plan gives guidelines for development, use and protection of the area of the Coastal Zone of Montenegro, and taking into account specificities and limitations of this space, and having in mind the strategic baselines for the development of the Republic of Montenegro. Guided by the stated principles and characteristics of the Coastal Zone of Montenegro and havening in mind international standards in the domain of coastal regions management, this Plan provides for

rational use of natural and manmade resources in the area of the Coastal Zone and provides for a long-term protection and sustainable development. By applying guidelines proposed in this Plan a protection and improvement of the Coastal Zone will be provided for, as a region of special importance for the Republic of Montenegro.

2.1.2. Objectives of the Plan

Objectives that should be realized by development and organization of the Coastal Zone of Montenegro are the factors of significant impact for the selection of solution of the Spatial Plan of this region.

Procedure for lying down of spatial planning goals is based on supposition that they should supervene from social goals and that are harmonized with them, or the Spatial Plan of the Special-Purpose area of Costal Zone should enable realization of long-term objectives of the society (State).

Considering the role and importance of the Coastal Zone area for the development of all coastal municipalities i.e. the Littoral Region, and the of the entire Republic of Montenegro, expert procedure has identified and established objectives of the spatial development of this region which are entirely based on the objectives defied and accepted through spatial planning and other relevant strategy type documents for all stated levels developed and adopted up to now.

Caused by the importance and effects that impact the selection of the solution for the Coastal Zone Spatial Plan, long-term objectives have been divided by the primary objectives of the spatial development and by particular or sector objectives that arise from them.

Primary spatial planning development objectives arise from the assessment that:

- The Coastal Zone of Montenegro has been recognized as general interest of the Republic, based on its characteristics and values, and as such has been defined as a region of the special care and protection of the society (State);
- The up-to-day development of the region, directed mostly to its shore area, has proceeded under conditions of existence of numerous problems (inappropriate equipping with the technical infrastructure) and contradictions (unclear decision in terms of development of tourism and other industrial business activities – primarily industry), while the spatial planning direction of the development of the maritime zone (local sea) was absent (excluding designated purpose construction of facilities of ports, shipyards and other);
- The achieved level of preservation of the space and realized degree of construction requires a qualitatively different approach to the entire area of Costal Zone, or purposeful (better) organization, development, equipping and more adequate protection of the space on shore, in order for its undoubtedly high values to obtain the place that Montenegrin Littoral objectively deserves as part of the Mediterranean Basin, and at the same time to activate and intensify use of important resources and potential of the sea (in addition to the maritime traffic, creation of conditions for construction of marinas – as a base for the nautical tourism, industrial fishing, mariculture farming and other.).

Based on the above stated, development, adoption and implementation of the Spatial Plan for the special-purpose area of Coastal Zone of Montenegro will create conditions for further activities, including:

- Construction and equipping of the region covered by the Plan, in accordance with the stipulated concept, which relates in particular to beaches, directly linked with the shore; marinas and other facilities serving for the tourism industry in the contact zone of the shore and the sea; as well as to the recognized space of the maritime zone serving for the industrial fishing, mariculture farming and other;
- Manner of use of the space and undertaking appropriate measures for the rehabilitation and improvement of degraded parts of the costal shore and maritime zone;
- Protection of all valuable parts of nature (shore and sea), with particular emphasis for landscaping and ambiance unites of the region, as well as cultural and historical monuments in the immediate contact with the coverage of the Plan;
- Placing request in terms of harmonized and rational conduct (regard) of settlement, hotel and other structures in the hinterland of the covered mountains, and the acceptance by shaping building structures and technical infrastructure solutions (primarily water-supply system, channeling of waster waters and waste treatment) should support intents directed toward the objective that the purpose of the Coastal Zone area is primarily for tourism, repose and recreation;
- Harmonization of the organization of the space with needs of defense and civil defense.

Starting from the basic spatial planning objectives, the Spatial Plan of the Special-Purpose region for the Coastal Zone, though presented solutions, should create conditions for the realization of spatial planning objectives (interests) that refer to:

- Rational use of natural values and resources of the region, while preventing and removing possible harmful effects, in particular in terms of pollution of air, water (including the sea) and soil;
- Preservation, improvement and development of inherited manmade values;
- Defining of the space use regime for each characteristic natural complex of the region, in terms of specific human activities in that region;
- Organization of initiatives in terms of scientific, education, cultural and personality development activities, as well as other expert activities related to the region covered by the Plan, both on shore and sea;
- Initiation of new complex explorations of the maritime zone for the space reconnaissance relevant both from the point of use for industrial purposes (hatcheries and similar), and from the view of protection of cultural and historic heritage (underwater archaeological sites, shipwrecks as well as discoveries of archaeological materials and other).

2.2. Position and Development Trends in Relation to the Surroundings

2.2.1. Geopolitical Position

Geopolitical position of the Littoral region, with whose larger part the Coastal Zone make integral functional unit, is important for the development of the Spatial Plan of the Coastal Zone (maritime zone with the narrow seaboard).

Littoral region of Montenegro covers Southeast part of the Adriatic Basin which represents a Northern dividing line of the East and West Mediterranean, or the Southwest part of the Republic of Montenegro.

Position on the crossroad of civilizations conditioned dividing of this space to different empires. In the turbulent course of history a longer period of integral functioning of the Littoral as administrative and by that as a development unit has not been recorded.

Overlapping of three different cultures and civilizations, in this space, has left rich cultural diversities and resulted in differences, noticeable even today, in manner of living, organization of activities and use of the space.

Latest geopolitical changes that took place in the last decade have had and continue to have important repercussions to the position and future spatial development of the Littoral and the Coastal Zone of Montenegro. The pressure on the entire coast of the Montenegrin Littoral has increased after the breakup of SFRY, and half of the former state gravitates towards it today, while it makes one tenth of its former coast, which caused saturation of some sectors. These changes have altered broader development context, therefore plans needed to take into account specific development of regions for which ones development harmonization was planned within integral country, which by itself have particular importance in the domain of tourism and traffic as well.

Conclusion of an era of bloc division East – West, with stated or already realized intent of all neighboring countries to join NATO, with declared commitment of Montenegro and of the state union of Serbia and Montenegro to join Euro-Atlantic integrations, changes significantly conditions and need for the defense of the country and infrastructure connection at the regional level. Necessary changes of the plan (and organization?) for the defense of the country will condition and enable changes in the allocation of the space in the Coastal Zone, and regional cooperation processes are already making a reality issues of construction of international traffic routes whose corridors significantly impact the organization of the Coastal Zone space.

Mountain massif in the immediate hinterland of the Littoral represents a barrier, in terms of natural communication conditions with the surrounding, which makes this region a relatively isolated one from the continent. On the other hand by opening waterway towards the Mediterranean and beyond, Montenegrin Littoral is potentially a transit region with the broad hinterlands of the Central Balkans, Central and Eastern Europe.

Constructed roads, as well as railway tracks that have surmounted a natural barrier do not however provide for the needed spatial integration of the Littoral with the hinterlands, or for a more significant orientation of traffic flows from the broad gravitational region towards the port of Bar. Exception to this is tourism flows.

Realization of planned highways with the corridors of Adriatic-Ionic route and Belgrade-Montenegrin Littoral, would provided for the opening and integration of this space with the broader region, and the optimum placement of routes and development of “secondary” network would created preconditions for the integration of the Littoral and hinterlands, as well as for the disburden of coastal traffic routes.

2.2.2. Planned Assumptions for the Development of the Littoral Region

Montenegro could be divided into three clearly singled out regional segments, from the point of similarity of issues of development, use and protection of natural values of the space of the Republic, as well as advantages offered by some of their parts for development and at the same time taking into account the level and conditions of the social and economic development: Littoral, Central and Northern region.

Littoral region, by its general aspect, has all typical features of a Mediterranean space. In addition to exceptional natural conditions and important comparative advantages for the development of tourism, maritime industry and some agriculture sectors, it does not dispose with other important natural resources at the moment. Smallest in space (around 1,200 km^2), this region that by its geomorphology matches the defined and singled out Littoral area, covers largest parts of six municipalities Herceg-Novi, Kotor, Tivat, Budva, Bar and Ulcinj.

Littoral region covers functional segments of Bay of Kotor, Central and Southern Littoral.
Although it is smallest in terms of the territory surface, in terms of the industrial potential it is the most perspective region in Montenegro.

Montenegrin Littoral has been for some decades already an immigration region due to its attractiveness and relatively dynamic development. Considering that the Littoral will objectively gain in terms of economic importance, it is logical to expect eve stronger demographic pressure on this region.

Basic Orientations of the Spatial Plan of the Republic

Littoral region will be developed by using all advantages of the sea, climate, cultural and historical heritage and exceptional landscapes. Tourism and maritime industry will be the main development directions. Specific Mediterranean agriculture will have an important role, while the industry will still be only a complementary activity.

Littoral region, as one of the two tourism regions in Montenegro, will have share of 96% in the overall tourism offering of the Republic, whereby the share of this region in the overall basic capacities will be 87%, and in complementary around 98.5%.

Littoral region will base the concept of organization of tourism to assumptions of necessity of the coast protection, in terms of the construction control, activating hinterlands considering the already existing saturation of some parts of the coast, as well as activation of the Skadar Lake region, including also Rijeka Crnojevića, and the connection with the neighboring national and regional parks Lovćen, Orjen and Rumija.
Network of tourism centers in the Region will consist of: Herceg Novi, Kotor, Tivat, Budva, Bar and Ulcinj.
Development of regional tourism offering mostly corresponds with functional segments of Bay of Kotor, Central and Southern Littoral, which are already singled out.

In the coming period, development of sea fishing and mariculture, expansion of extraction and processing of sea salt should be intensified, and works exploration of petroleum deposits should be continued.
The requests for a faster development of sectors have been emphasized, due to occurred changes, such as: shipbuilding and ship repairs, large scale and local specific traffic infrastructure, trade, forwarding, free customs zones, “off-shore” operations, various productions and services.

Coastal region is oriented towards the production of citrus fruits, early vegetables, olives, flowers, herbs, seedling materials of subtropical crops, and fishing and mariculture.
Zones of the Mediterranean agriculture are: Vladimirsko and Ulcinjsko fileds, as well as parts of Grbaljsko, Mrčevo, Tivat, Sutorina and Kutsko fields, which are characterized by exceptionally quality of soil and closeness to tourism centers and secured market. Realization of the concept, in addition to the necessary protection of agricultural land and change of purpose in stages during its use, requires application of hydrological amelioration (drainage, irrigation and leaching of saline soils).
Social and economic and spatial development of Montenegro will make a step further towards the establishment of the axis of more developed regions along the Adriatic Coast, as well as in connection of this axis with developed areas along the Sava-Morava-Vardar valley. Activation of the new Adriatic-Ionic road corridor and re-establishment of the traffic corridor Belgrade-Bar and Port of Bar would exactly enable better connection of the Littoral Region with other parts of the Republic and with neighboring areas in Serbia, Croatia, Republika Srpska (Bosnia and Herzegovina) and Albania as well.

Recommendations from the Spatial Plan of the Republic

Respecting recommendations of the Spatial Plan of the Republic, particular attention in the coming period in respect of the development of the Littoral Region will be directed towards:

- Preservation of the quality of the natural environment and the cultural heritage;
- Creating possibilities for further development of the port and industrial complex and development of the free trade zone in Bar;
- Improvement of the tourism offering while promoting nautical tourism;
- Respecting ecological capacities and avoiding over saturation of the space with tourism facilities in particular within the Bay of Kotor and Central Littoral;
- Activating immediate mountain hinterland in the function of tourism development;
- Activating agriculture as business activity complementary with tourism;
- Emphasizing largest variety of mariculture programs;
- Completion of works on the regional systems for water supply and drainage of wastewaters or treatment and waste treatment and disposal;
- Regulation of River Bojana;
- Creation of conditions for accommodation of Army capacities, that in its scope must be proportional to the defense needs under new circumstances.

Scarcity of space requires elimination of all activities that do not fit within main development directions of the Region, but in order to avoid a mono-functionality of the industry it is necessary to provide for diversified employment opportunities and avoid exaggerated fluctuations in terms of labor force demand, which is a characteristic of a industry relying on tourism.
Under changed conditions the problems of the space will escalate, as the proportionally small territory is required to meet numerous and heterogeneous development needs of the Republic.

It is particularly needed for a space to be provided for intensive development of industrial activities pertaining to the complex of maritime industry, such are for example: port transshipment, services of maritime traffic, shipbuilding industry and ship repair, nautical tourism, agricultural production characteristic for the Mediterranean, sea fishing and shell-fishing, salt extraction and processing, exploration of petroleum deposits and other.

Consequently, re-establishment of the Montenegrin Littoral should be expected under new circumstance and related to that emphasized population movements toward this region, which will require harmonization of increasing development needs and relatively scarce space.

Taking into account low degree of use of capacities in many segments of the complex maritime industry, as well as all limiting factors, it could be concluded that when considering development perspectives the most realistic orientation is for a maximum possible use of existing capacities, therewith such an orientation does not exclude meeting of real investment needs in some parts within objectively possible measure.

The breakup of former Yugoslavia and changes in the past ten years led to, among other things, to the narrowing of the market and redirection of some, important flow of goods and travelers. It is expected that those flows would intensify and directed again

towards the Montenegrin Littoral, not only from Serbia but also from the space of the entire former Yugoslavia, and from the Europe as well.

New geopolitical situation will inevitably lead to the growth of interest for the Montenegrin Littoral and its sea coast from the narrow and broader gravitation region.
In respect of some longer period, it could be realistically assumed that the Montenegrin Littoral would become an area with active investment activity. Most certainly, the owner of the foreign capital would be the most interested for the investment in tourism capacities in the most attractive sites (such are Jaz, Buljarica and Velika plaža (Big Beach)). Domestic and foreign investors would need to be presented also with the possibilities of the Port of Bar, Shipyard Bijela and Tivat, Salt Pans in Ulcinj, free trade zones in Bar and Grbalj field, and potentials of the sea fishing and mariculture as well as latest results of the exploration of the petroleum deposits in the Montenegrin Littoral.

By declaring Montenegro an ecological state, all relevant factors in the area of planning, management and use of natural potentials of the State are obliged to respect ecological criteria.

Under conditions of pronounced growth of interest for a relatively small region of the Montenegrin Littoral, the State administration should conduct a responsible planning and suitable tax policy.

Regional Development Objectives and Guidelines

General objective and guidelines both at the Republic level and for all three regions have been defined in compliance with the macro-economic policy of uniform regional development of Montenegro.

Zones of intensive agriculture should be formed in regions of Ulcinj, Bar and Bay of Kotor. Agriculture should correspond to demand of tourism for food produces, by using climate conditions advantages.
Olive groves should be improved and protected from transformation to other forms of soil use. Growing of new olive groves should be incentivized along with necessary measured for improvement of fruitfulness of existing ones.
Farming of cattle, in particular goats should be developed in these regions.
Some 600 ha of land should be reserved and protected for the development of a port and industrial complex in Bar and around 100 ha of land in the Region should be put aside for development of industry, services and storages. In addition to the zone Grablj filed, which is still under construction, another zone should be formed as well, in the region of Bar, and smaller zones in the region of Igalo (above the Sutorina field), Tivat and near Ulcinj.
Adequate space should be provided for new tourism beds in basic capacities. Orientation is that new capacities should be concentrated mostly in Ulcinj, Budva and in the region of Bar and Bay of Kotor.
National Park “Lovćen” and regional parks “Orjen” and “Rumija”, as well as South coast of the Skadar Lake, within the National Park, should be included in development of tourism and recreation.
Various sports grounds and other entertainment and recreational facilities should be developed both in tourism centers and in recreational areas outside of centers a program of development of sports and other facilities should be established, starting with tennis and golf terrains, pedestrian paths, bicycle tracks and horseback riding trails, to picnic and camping sites in the mountain part.
Construction of weekend houses on the coast should be limited only to selected sites, directed it towards the rural regions, with the objective to contribute to the revitalization of villages on the slopes of neighboring hills.
Conditions should be provided for dynamic development of Bar. It is envisaged that the Bar will become a regional center of the Littoral Region with some 50,000 inhabitants and possible capacities of the Port of approximately 12 million tons of transshipment annually. Therefore, in addition to other things, it is necessary to subject the spatial development of Bar to needs of port-urban-industrial complex, and the structure of urban development, in particular the one of the technical infrastructure, should be planned in manner that the city becomes able to accept readily development in the post-plan period.
Čanj, Žukotrlica and Veliki Pijesak are envisaged as new tourism zones in the municipality of Bar.
Ulcinj should be developed as a center of spacious tourism zone, and at the same time of intensive agricultural development, fields in the zone of Donji Štoj should be a center of the specific agro-eco tourism. Construction of new tourism capacities on the Velika plaža and Ada, potential of that region would not be exhausted so there is a need for a land to be protected for a post-plan development of tourism. Ulcinj should support by its services intensive agricultural development, in particular of Mediterranean crops and classic production of salt, therefore in that respects development of other business activities should be controlled, in particular of those polluting the environment, such is Vladimir a sub-municipal center, and direct them to development of agricultural services.
Budva should remain a first-class tourism center on the international level. Moderate growth of accommodation capacities should be accompanied with faster development of activities connected with the tourism in the domain of culture, entertainment and trade. Sites for that are Kamenovo, and new complexes in Miločer and Oliva in Petrovac.
Completion of reconstruction and revitalization of monument funds is a main task, and at the same time a precondition for successful development of Budva, whose historic heritage represents a particular attraction of this region.
Spaces of Jaz and Buljarica are imposed as zones of special interest for the Republic, which with beaches and pertaining hinterland should be designated for the broadest possible use for tourism purpose and complementary business activities.
Balanced development of cities in the Bay of Kotor should be provided through adequate spatial plan and strong inter-municipal cooperation. It is ensilaged that these cites would establish a strong conurbation, based on well coordinated development program. Kotor, as a sub-regional center, should be a center of business, scientific and cultural activities; the development of Tivat would be connected with the development of industry and air traffic; while Herceg Novi would be a main tourism center specialized in health tourism (area

of Igalo), with cultural functions as important components of its development.
Areas of Luštica and Donji Grblj are recognized as suitable for specific forms of tourism (Arza, Mamula, cove Trašte, Bigovo...).
Rural settlements should be protected from further degradation, and those on slopes should be revitalized in order to receive accommodation and for the agricultural population employed in settlements on the coast.
Quality of water of the inshore sea should be controlled and rigorously protected. In addition to mandatory construction of sewage systems with wastewater treatments, a ship wastewaters discharge must be prevented in any case.
In the seaboard part of the Ulcinjsko filed, grounded waters should be used in a controlled manner for agriculture in order to prevent the increase of saline in the soil.
An ecological corridor along the line of Littoral mountains should be properly maintained, and slopes facing the sea should be afforested. Forests, existing and newly planted, including specific Mediterranean vegetation (maquis shrubland), should have the status of protected forests, in particular in numerous flood regions.
Overall protection of landscapes should be under a particular attention. Landscape should be protected by defining special protection zones, in which the construction will be planned with special care. Exploitation of existing and opening of new quarries should be placed under strict control and excluded from zones of intensive tourism development. Particular attention should be placed to be project of fast traffic route through the Montenegrin Littoral, on the stretch Herceg Novi – Bar. Any sand exploitation should be stopped in the area of Ulcinj in zones defined as natural protected zones and designated for the development of tourism.
On the entire coastline, expansion of already constructed areas should be carefully planned. Constructed and open areas, that from the hinterlands should penetrate to the seacoast should be clearly confined, by setting aside a relatively wide open spaces of some zones of intensive tourism and urban development. Such interruptions in the continuity of the construction is particularly needed between the Budva and Petrova, Čanj and Bar, between the Bar and tourism zone of Ulcinj, and within the region Bay of Kotor.
Conditions for continuation of petroleum exploration, both off-shore and in the hinterlands should be provide n the territory of the Region, and in particular in municipalities of Ulcinj and Kotor.

Key Development Zones

Key zones of the spatial development of the Montenegrin Littoral have been defined relying on the existing concept of organization and development of the space of the Republic and within three singled out macro functional segments.

Geographic, ambience and functional connections have been respected as well administrative baselines, in order for wider spatial units to be defined with recognized potentials and limitations, possible conflicts and priority functions.

In addition to interest zones and gravitational zones, it is possible to define as well some important zones in respect of ambience, but without some wider importance functions. Therefore some of the zones could be considered a homogenous and some even complex due to the variety of activities in the coming period. In that case a division into subzones is possible as well.

Zone BOKA KOTORSKA (Bay of Kotor)

This zone, homogenous from the geographic and ambiance aspect, is divided for functional reasons into two subzones: Herceg Novi and Kotor-Tivat, and the difference in functions among cities and regions within these subzones has imposed defining of regions with specific issues or characteristics.

Herceg Novi, with specific issue areas: Igalo and Sutorinsko field (A), Herceg Novi (B) Zelenika-Bijela (C), Luštica (D).

Resources and Potentials:
Constructed capacities of health resort and complex of fertile agricultural soil (A); attractive urban ambiance with the old historic core (B), groups of villages with arable soil, open sea coast.
Development priorities:
Function of health tourism and intensive agriculture (A); function of cultural and service center and around-the-year tourism (B), production functions connected with the shipyard, products crafts and housing (C), specific agro-eco tourism with space for excursion tours.
Environmental requirements:
Full protection of the local micro climate, whose change can occur as a consequence of high construction density, and change of spatial characteristics of the Sutorina field, and protection of the local environment from air pollution and noise (A); protection and revitalization completion of the Old City and other cultural and architectonic landmarks (B), shipyard noise protection and control of waste materials disposal (C); restricted intervention in space with maximum protection of maquis shrubland and other mediterranean vegetation as well as natural features of the rocky coasts (D); creation of the Regional Park "Orjen" with adequate cooperation with neighboring municipalities; protection of the sea water from pollution (A,B, C i D).
Seismic risk control:
Improvement of accessibility, organization of open spaces and isolation zones, evacuation of dangerous activities and storage inflammable materials and explosives from the region, limitation of construction of new facilities while not creating at the same time of surrounding open spaces; designing building facilities in accordance with requirements of simplicity and earthquake resistance; development of plan of equipping in the case of an earthquake and establishment of systems and mechanisms of equipping, which is particularly important due to the vulnerability of the urban system of entire Bay of Kotor.
Preconditions:
Defining of the special protection zone in the zone of mineral springs and mud (A); infrastructural equipping of peripheral areas (D), establishment of a special body that will have authorizations to control development

activities and protection measures in all zones (A,B,C,D).

Kotor-Tivat, with specific issue areas; internal part of the Bay, with the city of Kotor (A); Tivat with neighboring settlements (B); Tivatsko and Grbaljsko field (C), Donji Grbalj (D).

Resources and Potentials:
Large number of cultural and historic monuments, city of Kotor with the status cultural heritage of the world importance and capacities of specialized health institutions (A); shores within the Bay and on the open sea suitable for swimming beach, other nautical activities and development of mariculture and the Airport of Tivat (B); established production and social functions, services and equipping of the space (A i B), complexes of fertile agricultural land and available space for industrial zone, being formed in the Grbaljsko field (C); large free space above the rocky coast of the open sea with coves, mostly accessible from the sea, specific Mediterranean vegetation (D)
Development priorities:
Tourism (including specific forms of health tourism in the area of Prčanj, sports and recreational and event in settlements along the Bay); functions of cultural and academic center of a wider importance as well as functions of service center; maritime activities and maritime industry (A); tourism (B); technologically highly specialized and harmless industry, agricultural production with the export orientation (using the vicinity of the airport) and to wider tourism market (C); specialized tourism settlements in revitalized villages in hinterlands (D)
Environmental requirements:
Protection of the sea water from pollution, protection of soil from contamination with industrial waste, reduction of the noise level and protection of the landscape in its full scale.
Seismic risk control:
Application of all measures recommended for the subzone Herceg Novi, and measures formulated by UNSECO for the Old Town of Kotor and its immediate surroundings.
Preconditions:
Development of a spatial plan for the entire zone (as a priority task) and resolving the issue of crossing of the Bay of Kotor with the road traffic route and infrastructural equipping of peripheral space.

<u>*Budva Zone*</u>

Resources and Potentials:
Constructed tourism capacities, tradition and established reputation of Budva, series of strands, with specific ambiance characteristics, historic and urban center of Budva; archeological sites.
Development priorities:
Exclusive tourism with diversified offer and revival of specific production functions.
Environmental requirements:
Protection of the landscape of the entire zone, in particular the olive groves; protection of the sea from the pollution; completion of the restoration of significant cultural heritage in the hinterlands.
Seismic risk control:
Adjustment of models of new tourism settlements to the level of seismic hazards, while respecting acceptable seismic risk; full application of all urban planning and architectonic measures with the objective to reduce seismic vulnerability in new facilities projects.
Preconditions:
Resolution of the issue water supply and channeling of wastewaters.

<u>*BAR Zone*</u>

Resources and Potentials:
Constructed complex of the Port of Bar with ancillary facilities, established social functions, services and equipping of the zone; gravitational region, relying on the constructed railway tracks; available land for the expansion of port functions and for the industry development; several sandy beaches and accessible parts of low rocky coast, as well as constructed accommodation tourism capacity along it; agricultural land with terraces (for production of olives, citruses and others), historic heritage, including the Old Bar; insufficiently valorized shore of the Skadar Lake.
Development priorities:
Port of Bar (in accordance with the development program), industry (in sectors of meta-working, production of the equipment for nautical activities, production of food articles and other), establishment of the free industrial zone; tourism (stationary, transit, nautical, sports);
Environmental requirements:
Protection of the sea from the pollution caused by the Port operation, industrial and city wastewaters; protection of the complex of Old Bar and olive groves; protection seaboard from the uncontrolled construction of residential facilities; overall protection of the landscape.
Seismic risk control:
High level of seismic hazard and high concentration of equipment and population accentuate the vulnerability of the entire system, with implications for the economy of the Republic and the federation; seismic risk will continue to increase due to the inevitability of location ports and industrial capacities on the alluvial land along the coast, and partly on the leveled land (port wharfs); due to that reason it is necessary to develop a complex study that will define all preventive and control measures in the area of earthquake engineering, spatial planning, building designing, readiness for earthquakes and other.
Preconditions:
Defining of mutual relations of the functions of the Port, industry and the town, with adequate urban planning documentation and adjusting relevant federal and Republic regulations, in order to comply with international requirements for the operation of free industrial zones.

<u>*ULCINJ Zone*</u>

Resources and Potentials:
Constructed tourism capacities and the reputation of Ulcinj as a most popular resort for a mass tourism in country; high length of sandy strands with therapeutic properties; ethnographic specificities and historic urban core of Ulcinj; complexes of fertile agricultural land; including valuable olive grove complexes; rich fauna habitats in particular of birds and fishes; specific dunes vegetation; salt pans; Skadar and Šasko lakes.
Development priorities:

Construction of tourism facilities in the area of Velika plaža; construction of marina; intensive agriculture; sea fishing and salt production and processing;
Environmental requirements:
Protection of the coastline and the entire landscape zone; protection of the sea from pollution; preservation of the character of the city of Ulcinj, by completing restoration of the Old Town, and whole urban structure; support in creation of the Regional Park "Rumija", with the adequate cooperation with the municipality of Bar.
Seismic risk control:
Application of all urban planning, architectonic and construction measures for the seismic risk control, as well as development of relevant plans for the earthquake readiness.
Preconditions:
Achieving bilateral agreement with Albania on regulation of the inland waterway of the River Bojana, and flooding protection of the fertile agricultural land and amelioration works, including leaching of saline soils of the agricultural land complex beside the Salt Pans;

[Basic proposed space use of the Littoral region and the key development zone is presented in the graphic appendices numbers 5 and 6]

2.2.3. Network of Littoral Settlements and Centers

Higher concentration of population in centers and settlement in the coastal strip caused a differentiated development of the centers and settlements network. More pronounces population concentration on this area, as a consequence of impact of attractive tourism sites, but of the sites that are the most important traffic routes, has caused creation more complex forms of the spatial organization of the settlement network, the system of development axis in the Littoral Region.

As a result of specificity and limited conditions for the construction and large attractiveness for settlement of particular sites, existing small settlements grew in the neighboring cities – centers, and therefore the creation of the agglomeration of urbanized settlements connected with the existing centers.
In this manner all cities have more or less expanded their territories to make with those settlement a spatial and functional complex, with notable larger number of inhabitants, example of Herceg Novi (stretch from Igalo to Meljine), Kotor (stretch from Muo to Ljuta) and Tivat (stretch from Lepetane to Mrčevac).

Guidelines of the Spatial Plan of the Republic envisaged in the Littoral the formation of one center size of 18,0000 inhabitants (Bar), as well as networks of 3 city settlements size from 10 to 15,000 inhabitants (Herceg Novi, Budva and Kotor), two size 5-10,000 inhabitants (Tivat and Ulcinj) and 13 centers of 5,000 inhabitants.

Basic characteristic of the settlements network will be a polycentric system that implies a complex network of centers with the development structure of business activities, where the industrial, in particular production component is emphasized, complex structure of user friendly services, as well as the development of specialized business activities.

System formed in such a manner will enable for a concurrent development of three forms of urbanization, being: primary (through the strengthening and creation of new sub-municipal centers and their transformation into city settlements), secondary (through functioning and impact of medium size cities and expansion of the urbanization process) and tertiary (through creation of system of suburban settlements, equipped with the central facilities, in order to transfer the center of development of larger cities to suburban strip).

Centers network in the Littoral consists of:
- Center with the regional functions – Bar;
- Center with sub-regional functions – conurbation of cities in the Bay of Kotor;
- Municipal centers - Budva and Ulcinj
- Sub-municipal centers with city characteristics: Bijela, Risan, Radanovići, Petrovac, Sutomore (Virpazar in the hinterland); and semi-urban character: Radovići, Sutorina, Kruševica, Ostros, Dragalj and Vladimir (mostly in the hinterland).

Basis of the development concept and organization of settlements networks should compose communities of settlements of different hierarchy levels.
Within a number of settlements with the most favorable position and other required conditions (equipping level, concentration of population activities, development trends and established connections and relations) performs a function of the center. Creation of more centers of settlement communities functions of several settlements are being developed, thus the gravitational zone connected to the provision of services is being reduced, which leads to the improved conditions for the use of services.

On the territory of the Republic the settlements communities of republic, inter-municipal and municipal level have been formed, that are the main carriers of the overall development. In addition to that, in accordance with the reorganization objectives, settlement communities of sub-municipal centers have been also formed on the territory of Montenegro with the objective to unburden specific functions of the higher hierarchy level centers.

Taking orientations from the Spatial Plan of the Republic and spatial plans of municipalities, it results that the following settlement communities with their center, development poles are going to function in the Littoral region:
- Regional center – Bar (settlements of the municipality of Ulcinj will be connected to Bar);
- Sub-regional center – Kotor (gravitation region will cover, in addition to its own, also municipalities of Herceg Novi, Tivat and Budva);
- Municipal centers - Herceg Novi, Tivat, Budva and Ulcinj (these municipal centers will be developed as part of the settlements network on territories of their municipalities; will continue with their own strong development that will, in its own complex structure, favor even more tourism business activity that pretends to become basic function of all these specialized centers).

All **municipal centers** are cities with more than 5,000 inhabitants. Cities maintain complex and multidirectional connection with the surrounding geographic space and have a key role in development of the settlements network. These development centers represent a development poles that appear at the same time as agglomeration poles of industrial and non-industrial activities, residential, working, supply and other functional and spatial units.

As part of such defined basic network of centers to singled in hierarchy are also **sub-municipal centers** (mostly in halfway between neighboring municipal centers, where their impact is weaker) whose range of impact on primary settlements greatly depends from the dynamics and development directions of basic functions of municipal centers. Therefore, the network of sub-municipal centers on one hand represents a kind of support to a municipal center (as a higher rank center), while on the other hand it represents also a certain release of the basic functions of the municipal center.

Number of such settlements in the network of centers is increasing, and according to the development they have the tendency to increase a number of inhabitants during time and take over roles of connection of surrounding settlements that gravitate toward the narrow space. Additionally, their important role reflects in the creation of satellite settlement with more or less developed nucleus for a specific business activity sector that should contribute to planning direction and development of the settlements network within the vicinity of developed centers.

Within municipalities those would be following settlements:
- Kotor - Risan and Radanovići (for Grbaljsko filed);
- Herceg Novi - Bijela (for the Eastern part of the municipality);
- Budva - Petrovac (for the Southern part of the municipality);
- Tivat - Radovići (for the area of Krtole);
- Bar - Sutomore (for the Littoral) and Virpazar and Ostros (for the Skadar Lake);
- Ulcinj - Vladimir (in the hinterland of the municipality)

It should be highlighted that in all proposed sub-municipal centers primary and secondary-tertiary sector of business activities dominates, that also opens possibility for the inhabitants of surrounding settlements to activate certain business activities. Additionally in this hierarchy level within the system of settlements and centers, the accent is placed on the incentives for development of secondary centers in certain municipalities and their roles in directing further development of the settlements network beyond 2000.

Majority of sub-municipal centers, in their urban and morphological structure represents a developed form a mixed settlements, with the highlighted function of center of services (small industrial centers, satellite centers etc) for the neighboring settlements.
It is not necessary to particularly emphasize their importance, as both now and in the coming period they will have the task to gather primary settlements into a special system and to incentivize their overall development.

In that respect option to transform some additional primary settlement to a higher hierarchy level impends, in particular in light of restructuring of the social capital and privatization, this would create **suburban and local centers**.

Stated transformations will be reflected through the restructuring of the network of primary settlements, which will be expressed through notable reduced share and importance of smaller and fragmented settlements, then through the tendency of rational agglomeration of population and activities with positive i.e. stimulating action of attractive centers in their surroundings.

In the coastal municipalities those would be following settlements:
- Igalo, Zelenika, Rose / Radovanići on Luštici (municipality of Herceg Novi);
- Donji Morinj, Perast, Prčanj, Lastva Grbaljska and Bigova (municipality of Kotor);
- Donja Lastva (municipality of Tivat);
- Bečići, Pržno, Reževići and Buljarica (municipality of Budva);
- Old Bar and Dobra Voda - Pečurice (municipality of Bar), and
- Bratica, Zoganje and Donji Štoj (municipality of Ulcinj).

2.2.4. Projections of Basic Development Indicators of the Littoral Region

Intensive processes of spatial mobility of development factors and dynamics of economic changes in thereto, as well as performed extrapolations crossing of such trends in the future period (with needed use of trends method), indicates that the GDP realized by regions will effect quite adversely to the overall development of Montenegro, in particular if the future economic, development and strategically developed population policy does not strongly affect those processes. Active development policy must look for balanced relation between respectable development factors available in specific regions.

Projection of GDP realization by regions, despite the long-term declaiming trend of the share of the Northern region in the realization of domestic product of the Republic, should have respected important tourism and agricultural resources of that region and orientation that the tourism and agriculture represent strategic sectors and that the adequate development policy may expect to bring their effects.

Expectations are presented in tables:

Montenegro GDP growth projection until 2020

Year	North	Center	Littoral
2002	17.8%	55.6%	26.6%
2010	15-17%	57-59%	27-28%
2020	13-16%	58-60%	29-31%

Employment projection in Montenegro until 2021

MUNICIPALITY	EMPLOYMENT
Bar	18400

Budva	10500
Kotor	8400
Tivat	5100
Ulcinj	6700
Herceg Novi	14200
Littoral region	**63200**
Total Montenegro	230000

Further trend of increase of share of the population of Littoral Region in the Republic is planned from 22.2% to 28.3 in 2020.
Employment trend is more dynamic, so Budva will reach already in 2020 a full employment of 41.3 %, while in other municipalities will be between 27.3% in Ulcinj in 2020 and 39.6% in Kotor.
Long-term human resource management strategy should be developed in order to meet needs of tourism as a growing industrial sector.
High jump of employment is a result of somewhat more comprehensive coverage of employed with further development of tourism, where the labor in the domestic sector will be recorded as well, which use to be irregular up to now, with a short time of engagement only in high season.

Overall, development potential, concept and strategy of sustainable development and new orientation toward smaller industrial capacity, including home industry accommodation, will realize significantly higher employment rate and higher share in the employees in the Republic, where these processes will improve with slower paste.

Projection of the overall population until 2011, or prognosis until 2021, at the level of Montenegro, its regions and municipalities have been developed respecting previously set hypothesis on birthrate, mortality, fertility and births and on the a specific social and economic development of Montenegro for a planned period.

	2003 Inhabitants	2021 inhabitants	2021 housholds
Bar	40,037	52,100	18,400
Budva	15,909	19,500	7,040
Kotor	22,947	18,500	6,170
Tivat	13,630	15,900	5,500
Ulcinj	20,290	26,800	8,370
Herceg Novi	33,034	36,500	12,700
Littoral	**145,847**	**169,300**	**58,180**
Total MNE	620,145	661,000	207,380

Changes of the social and economic system that are undergoing will incentivize environment for accelerated industrial development of Montenegro, in particular of the Littoral Region. In accordance with the social democratic changes, structural changes of the industry and non-industry will happen as well, with the market as main regulator of overall tendencies. Democratization of the society, market competition and highlighted individual entrepreneurship will represent a base for overall socio-economic changes that will provide for good economic management of resources, in particular of the sensitive natural ambiance of the Coastal Zone.
That is the reason for a sustainable development to be a new development strategy of the Montenegrin society, which has been confirmed by the declaration of a first ecological state in the World. Merging vulnerable natural environment of the Littoral, modern work achievements and entrepreneurship with new development directions of the ecological state of Montenegro, a very stimulating market environment is being realized for a very sophisticated development decision, but also for the emphasized role of the State. Between two models of market entrepreneurship, liberal or social market economy, social market economy of Central–European and Nordic type suites Montenegro better. This opens possibilities for coupling of entrepreneurship, but also of pronounced care and protection of the vulnerable littoral ambiance with numerous mechanisms of State intervention. Importance and the role of the space, as one of the fundamental development potentials, certainly deserve that. With modern private entrepreneurship, public sector and cooperative forms of doing business are also imposed, i.e. joint actions for the protection and improvement of the overall development ambiance of the Littoral.

Integral sustainable development of all resources is a basic strategy with a quality ecotourism as a structural industrial area and complementary business activities of trade, hospitality industry, traffic and other services. As far as the ecotourism is concerned, development of non-polluting industry is planned on sites that have already an industrial tradition, but also a qualified labor force within the strict concept of the sustainable development. Development of maritime industry is a traditional sector of needed traffic transportation, with the orientation toward specialized loads. Further direction is to the toward the eco-agriculture directed to crops of fruits – citrus, olives, viticulture, figs, early and late vegetables, but also flowers and medicinal herbs. Complete infrastructure on enviable level will follow this eco-industrial development, while non-industrial market will be focused on culture as basic complementary activity to quality tourism.

The Coastal Zone and Littoral Region dispose with development possibilities of diversified industrial structure that will in the new ambiance give wide possibilities for the sustainable development of all natural and manmade potentials. European incentives, not only in the form of capital, but primarily in creation of entrepreneurial environment will also be significant for the further development of this region. Numerous measures of implementation and incentives of the overall development are particularly emphasized as a legal market environment, which is already being greatly developed in Montenegro, and especially in the Littoral.

In any case stated projections represent real possibilities of sustainable development of Montenegro and in particular of the Littoral, but only with the requirements for starting postulates and planned concepts and strategies to be realized. Otherwise, these expectations of desirable and achievable development and increasing the life quality in the Littoral will neither be realized.

2.3. Projections of Business Activities in the Littoral Area

2.3.1. Tourism and Complementary Business Activities

Central place in the selection of privileged development areas in Montenegro certainly belongs to the sustainable tourism, not only because of exceptional natural advantages of the space as a basis of its long-term sustainable development, but due to its propulsion, profitability, but also due to the inexhaustibility of the natural treasures, if those are operated with the care of conscientious holder, and increasingly mass tourism flows in the World, which would impose this sector as a base for a long-term development strategy of the Republic.

Numerous analysis indicate that the tourism is the most valuable industrial sector, in particular for the Littoral, and that all other activities must be subordinated to the increase of quality of exclusive Montenegrin tourism destination which has exceptional natural advantages, and therefore it is needed for manmade resources to be approximated at least in part to those natural treasure, and long-term goal is 1 billion USD for Montenegro, where Littoral would get the far highest share.

Respecting and applying basic development strategies defined in the Master Plan for Tourism Development (2001), tourism as an industrial sector will be in a position to provide a turnover in direct payments from tourism in the amount of 500 million Euros until 2010 and one billion Euros until 2020.

Development strategy of sustainable tourism will be based on maximum acceptance and affirmation of natural exclusivities of the Maritime Zone and the Littoral, i.e. the QUALITY in nature, which has already been extensively emphasized and anthropogenic actions, which means development of QUALITY TOURISM.

- Establish a UNIQUE TOURISM OFFERING of the Montenegrin tourism by combining all forms of tourism and all tourism areas, depending on the demand of every visitor i.e. demand based on ability of payment with basic orientation towards the quality of services and tourists with higher abilities of payment, which corresponds with the exceptional nature and the new character of the Montenegrin Littoral destination, quality facilities and ancillary complementary facilities adjusted to the exceptional nature;
- Combine valuable natural potential, new quality of manmade potentials and reach history and tradition in ethnotourism of capacities appropriate with the sustainable development, which would represent a new development strategy of an offensive ECO AND ETHNO TOURISM, along with the unique offering.
- In already developed spaces of the Littoral in all forms of tourism, thorough reconstruction and MODERNIZATION of existing facilities, reduction of number of beds and maximum increase of tourism service quality, a new character of Montenegrin tourism destination named QUALITY should be created that would correspond to exceptional natural beauties, with the objective to achieve an optimal structure of the quality of the offering in the coming short-term period.
- The manner of new construction should be directed in such a way that newly planned facilities and capacities are directed to already construction segments, TOWARD HINTERLANDS, while avoiding current practices of “concrete pavements” inappropriate for natural resources;
- BEACH EXPANSION AND DEVELOPMENT towards the sea and hinterlands in a long run is a necessary development strategy of the Montenegrin tourism, especially having in mind that more than 95% of the total tourism turnover is directed exactly to those facilities;
- Development of HEALTH TOURISM (wellness and health), that has exceptional natural advantages, strong tradition and good effects in present development, but in such a manner not to jeopardize other forms of tourism, in particular in traditional spots (Igalo, Risan, Prčanj, Tivat - Solila, Bigova, Petrovac, Ulcinj)
- Develop a quality NAUTICAL tourism, while paying a particular attention to the environmental protection and other forms of tourism, and also pushing for large capabilities of existing and new marinas, geostrategic position and similar, while complementing all needed accommodation facilities, infrastructure, trade, charter yachts, rental of vessels and similar, that are required by these very demanding but also very profitable tourists (profitable if provided by complete service);
- Particular attention should be paid to the development of cultural tourism through which its educational function is realized based on the rich cultural heritage in the Littoral (urban cores and agglomerations), partly also in the coastal underwater and a quality of that heritage that they are the part of (Kotor with the Kotor-Risan Bay) is listed as World natural and cultural heritage of UNSECO;
- CONGRESS tourism is a special possibility both for natural and geostrategic advantages and for the current results, therefore with the further opening of Montenegro and connection with the World would be necessary to provide location of some the European, Mediterranean or Balkan institutions that would certainly be imposed with coming integrations in this region;
- Establishment of ECO AND ETHNO TOURISM FARMS in the hinterland of the contact zone (slopes, foothills) combined with the agricultural production, primarily by emphasizing the livestock farming (eco-farms of cattle, goats, sheep, horses, bees, medicinal herbs) that would in reconstructed and facilities adapted to the traditional environment offer distinctive tourism offering to interested domestic and also foreign guests;
- Construction exclusive types of accommodation capacities on Ada Bojana (eyot on Bojana), island St. Marko, Mamula, …
- Necessary ancillary capacities of SPORT AND RECREATIONAL courts in significantly higher number and more diversified facilities outdoors, and in particular indoors immediately in the vicinity of hotel capacities, with the qualified entertainers, as a special from of SPORTS TOURISM, intended for professional sports clubs and national teams, in

particular during the winter pre-season training, will complete all previously stated forms of tourism with exceptional possibilities for refreshments and health improvement, enhancing basic and also complementary capacities;

- EXTRA (OFF-BOARD) SERVICES CONSUMPTION and facilities complementary with tourism with numerous and diversified elements of modern offer starting with a quality commerce of rich assortment, crafts, in particular of old exclusive specialized use, splendid hospitality industry facilities, financial and other service, to comprehensive and specialized facilities and recreation and sports activities in particular tennis courts, golf courts, hippodrome, equestrian clubs, eco-farms, hunting lodges and similar), with ethno-tourism offering, and particularly cultural events, educational and entertainment facilities; all of these necessary facilities of extra services consumption which have been lacking to our tourism represent a precondition for a QUALITY of the Littoral tourism destination, that would be realized with planned construction and management of a concessioners holder;
- Reaching the goal of the EXTENSION OF THE TOURISM SEASON and full use of capacities requires modernization and increasing of levels of existing facilities to international standards and development of unique, competitive and high quality hotels and resorts. If the overall offering would be expanded with additional ancillary activities, conditions for the extension of the tourism season would be created, and the low level of use would be raised. That would be synthesis indicator of success of the overall development directions of eco-ethno and cultural tourism as main industrial sectors of the Littoral region; the objective of the extension of the summer season to approximately 165 days of hundred percent occupancy, with the increase of share of overnights in basic capacities to approximately 60% in 2010 and around 80% in 2020, with significant reduction of the share of overnights in facilities of complementary accommodation (camps, recreational resorts and seaside resorts).

Stated strategic forms of ecologically sustainable, but also profitable projections offer guarantees that significantly favorable conditions would be created by their realization in order for the ecotourism to be imposed in the sustainable development strategy as main industrial sector of the Littoral region and together with other business activities to bring the life quality to an enviable high level, close to European countries, which is ultimately the ambition to be reached.

Dynamics and Size of the Tourism Development

In accordance with the Master Plan for development of Tourism, the strategic objective is the increase of capacities to 50,000 hotel beds until 2010, and to be tripled by 2020, in order for the economic potential in the tourism industrial sector.

Plan imposes elimination of hotels with one star and significant reduction of hotel accommodation capacities with two stars, in order to attract richer tourism markets with significantly higher daily consumption per tourist.

Based on the tourist accommodation categorization results in the hotel sector, primary strategy is focusing on conversion of all remaining hotels with two stars located in strategically important Littoral sites to hotels three, four and five stars in accordance with international standard. This requirement would mean that more than 50 hotels and hotel type accommodations with 20,000 beds should be modernized by 2010.
Alongside with this it is necessary for the capacities in envisaged new zones to be distributed in accordance with economic and social objectives of the Plan.

Some 67,000 new beds will have to be added in the Littoral part of the Republic (around 24,000 beds in the three stars category, 30,000 beds in the four stars category and 13,000 beds in the five stars category) until 2020.

Priority should be given to the construction of new hotels as part of high quality “resort destinations” in four and five stars categories, then to smaller hotels and tourist villages in three stars category, and reconstruction of mansions in the surrounding of the Bay of Kotor with special character of rental for richer tourists.

Clear “forbidden construction zone” between the shore and settlements should be established for it to be guide for the development of new tourism accommodation. Any construction of tourism accommodation near beaches should be reserved only for the high quality hotel accommodation.

On the unconstructed surfaces of beaches/shore, greenery between the sea and the construction zone should be preserved due to the ecological reasons and for securing desirable natural shades for tourists.

Ecological vulnerable surfaces within zones for construction should always be protected and preserved added values to the tourist pleasure. Scope, height and architecture of new hotel complexes should be in harmony with the environment. Bed capacities of hotels with three or four stars, for new hotels, should not exceed 500 beds per building facility and for hotels with five stars not exceeding 350 beds. It is necessary to also respect standards on green arras in compliance with the category of the building facility.

Existing tourism accommodation in the most attractive Littoral sites, with the existing categories of one or two stars, should be raised up to the priority categories or demolished and re-built.

Long-term projection (2020) according to the Master Plan:
Overiview of the overall accommodation capacity (beds) in the Littoral zone (rounded up)

	Herceg Novi	Kotor	Tivat	Budva	Bar	Ulcinj	Total
Hotels *	15,000	7,000	6,500	24,000	11,500	36,000	100,000
Recreation resorts	2,000	500	200	1,000	1,000	500	5,200
Camps	500	500	500	500	500	500	3,000
Private accomodation **	20,000	8,000	10,000	15,000	40,000	15,000	108,000
	37,500	16,000	17,200	37,500	53,000	52,000	213,200

(*) hotels include all types of hotels and hotel-type tourism accommodation; (**) this capacity alreadu exists as registerd.

Long-term projection (2020) according to the Master Plan:
Distribution of hotel's beds capacities by category and municipality
(Includs upgraded and new capacities)

	Herceg Novi	Kotor	Tivat	Budva	Bar	Ulcinj	Total
Hotel beds	15,000	7,000	6,500	24,000	11,500	36,000	100,000
Five *	2,000	500	500	4,500	1,500	5,500	14,500
Four *	6,500	2,500	3,000	9,500	3,500	14,500	39,500
Three *	4,500	3,500	2,500	7,500	4,500	13,000	35,500
Two *	2,000	500	500	2,500	2,000	3,000	10,500

For the purpose of realization of the maximum economic effect according to the Master Plan, Littoral municipalities should aspire to gradual transformation of hotels in order to achieve following distribution until 2020.

(10% of the capacity in 5* hotels, 40% of the capacity in 4* hotels, 40% of the capacity in the 3* hotels, 10% of the capacity in the 2* hotels, striking out 1* hotels)

Camping:
Overall camping space in the Littoral area should be reduced to 3,000 places. Its location in tourism zones should be as follows: one camping field for transit, mobile campers and trailers, organized in accordance with the "international standards", in each of the littoral municipalities. All other existing fields for camping in the Littoral Region should be converted for other use within 3 years.

Golf terrains:
Sites designed in the Regional Master Plan for the golf terrains include Sutorina and Velika plaža, Buljarica and Tivat.

Conversion of military facilities into tourism zones:
Sale of land on the Littoral by military authorities will secure a potential for new tourism zones within the seaboard.
It is recommended that the construction of sites with high tourism potential if offered on international tenders or in public auctions with defined specific criteria for tourism development. Such sites may include Kumbor, Ship Reoair Works (Remontni zavod) – Tivat, complex behind Krašići in Tivat, across Kumbor, on Luštica - Pristan, Kabala For, Cape Trašte near Bigova, Flower island (Ostrvo cvijeća), Platamuni, Maljevik / Black Cape (Crni rt), part inside of the Port of Bar, Volujica, Valdanos, Karaula on Bojana, Mamula, Donja and Gornja Arza, eyot on Bojana (Ada Bojana).
Additional sites can be considered as a priority for tourism development, if it is shown during the coming period that those are not any longer necessary for special purposes. In this case it is possible, in addition to accommodation capacities to also envisage other ancillary commercial, sport and recreation, nautical facilities, in accordance with the provisions of this plan, conditions and limitation for protection and capacities of specific space.

Distribution of facilities:
Quality of zones in which the construction will be done (Bay of Kotor, Jaz, Miločer-Sveti Stefan, Buljarica-Ulcinj) will have a role in the quality and category of facilities, as well as character of facilities to be reconstructed.

In the inshore area of the **municipality of Herceg Novi** on sites: Kobila, Njivice, Savina, Meljine-Lalovina, Zelenika, Kumbor, Baošići, Arza-Mirište-Žanjice, villages on Luštica; construction of 10,000 beds is envisaged predominantly in higher accommodation categories, which would amount to approximately 37,500 beds with registered and estimated number of beds.
On the territory of the **municipality of Tivat** construction of new accommodation capacities is planned on sites: Pržno-Plavi horizonti, Župa and Bonići, rehabilitation of village settlements ensilaged by relevant planning documentation and of tourism settlements, "Flower Island - Ostrvo cvijeća" and "St. Marko", approximately 4,500 beds, which would amount to approximately 17,200 beds with registered and estimated number of beds.
In the littoral part of the **municipality of Kotor** in the Bay, on sites Rtac (Risan) and Raškov brijeg (Ljuta) and on the open sea cost in Bogfa, on sites above cliffs from Žukotrlica to Trsteno in Donji Grbalj, in newly constructed facilities as well as rehabilitation of Perast, Gornji Stoliv and captain's mansions in the Bary, the total of approximately 5,500 beds, which would amount to approximately 16,000 beds with registered and estimated number of beds.
In the littoral part of the **municipality of Budva** approximately 10,000 new beds are planned, primarily in the area of Jaz, Bečići, stretch Kamenovo-Miločer, Lučice and Buljarice, as well as rehabilitation of Paštrovac area rural settlement, which would total to 37,500 registered beds.
In the inshore area of the **municipality of Bar**, construction of 5,000 new beds is envisaged, primarily in the area of Čanj, Veliki pijesak, Utjeha and Maljevik, which would total to 53,000 registered beds.
In the inshore area of the **municipality of Ulcinj** construction is envisaged on sites: Valdanos, former hotel "Jadran" Velika plaža and Ada (eyot), total of approximately 32,000 beds. Total sum of registered capacities would amount to approximately 52,000 beds.

Health tourism

Complexes of health and wellness tourism are one competitive segment of the destination product of Montenegro, both in the domestic and in the global tourism market.

In comparison with the classical littoral, health tourism bespoke a number of advantages in the current development, which could by summarized through:
- Higher level of the use of accommodation capacities during the entire year;
- More stable employment rate and more favorable qualification structure of employees;
- Higher level of total sell prices; and
- More favorable share in creation of the domestic product and national income.

Continuation of the growth and development of the complexes of health tourism on the Montenegrin Littoral is to be expected in future as well. Thereto quality of natural resources for the development of health tourism would significantly if not crucially impact the strategic development position of this form of selective tourism, out of which the most important are located in the coverage of the Coastal Zone

Basic precondition for a long-term efficient and effective development health and wellness tourism complexes represents a rational use of space. Sanctuary and urban type health tourism complexes exist in the World today, where the first are more competitive and with more development perspectives.

Unfortunately, on the Montenegrin littoral we have urban type health tourism complexes, which is result of irrational planning policy over many years, as zones of health tourism are not yet defined, as separated segments of national interest for the development of this form of tourism. Uncontrolled construction nearby over many years and within very health tourism complexes, impacted the creation of such spatial ambiance in which a visitor cannot note where the health tourism complexes begin and where they end.
If it is further continued with the irrational use of space, certain danger represents a threat that health tourism

complexes become hotel complexes with high degree of space saturation.

Construction of the health tourism complexes begun in the inshore areas of the Montenegrin Littoral, that abounded with quality natural resources for its development. Majority of these resources are concentrated within the contact zone and functional hinterland.
Unfortunately uncontrolled exploitation over many years and inadequate protection cause problems such as: uncontrolled pollution of soil with liquid and solid waste; exploitation of deposition of therapeutic sea mud; pollution of sources of thermo-mineral and sea water in the inshore area; air pollution with dangerous substances; destruction of the flora and fauna, construction that lead to significant changes in values of specific micro climates.

In order to eliminate existing limitations to development of health tourism complexes on the Montenegrin Littoral, it is necessary to define zones for health tourism on the Montenegrin Littoral, which based on positive experiences of main providers of the offer in developed receptive countries, should be segments that cover part of the area of the Coastal Zone and of the contact zone.
Thereto it is necessary to define the health tourism zones designated for the stay of visitors and for the exploitation of natural resources.
When defining health tourism zones, priority guidance must be special composition of rare natural therapeutic factors, as basic criteria for their separation from the entire territory, but also according to international standards, if the intent is to attract foreign direct investments in the future.
Zones of the health tourism, defined according to international standards, would impact the creation of preconditions for the prevention of disruption of the ecological balance in those spatial segments, as possibly most important limitation of their development or necessary preconditions for the change of the sustainable tourism development concept would be created.

Health tourism will be developed within the program "Sunny Coast of Health - Sunčana obala zdravlja", that in addition to health services provide also services of rejuvenation, and purports: comfort, ambiance, light activities, cultural offering for the guest from the Scandinavia and golf terrains.
Main center of the health tourism will continue to be: Igalo, Prčanj, Petrovac, with the development perspective in the Solila zone (If compatible with more rigorous protection regime) and in Ulcinj.

Nautical tourism

Nautical tourism represents one of the “favored” selective forms of tourism; therefore development of this form of tourism should be particularly emphasized considering natural and anthropogenic values, benefits of sea and lake shores, nautical and transportation position of the Montenegrin Littoral, constantly growing demand, and in particular because of economic effects that are created by the realization of this form of tourism turnover.

Proposal of the nautical tourism system (“Study of Nautical Tourism in Montenegro, GTZ”, 2005) tried to take account of the overall needs of Montenegro and of specific local environments to the maximum extent. While respecting those facts, three key criteria are singled out that should define priority parts of that system:

- Provision of sustainable development and preservation of the ecological balance;
- Avoiding use of beaches and other important tourism resources; and
- Estimated economical justification

First criterion purports the behavior in accordance with basic rule of the sustainable development. Meaning that the basic resource, in this case the Coastal Zone, is used in such a manner to be changed to the lowest possible degree and in this manner preserved for future generations. This rule purports also a need for the protection of the ecological balance, in particular in protected and very vulnerable areas.
Second criterion is based on the rule that those micro locations that do not have other important economic purpose are used for the construction of nautical spots, because it is uneconomical and can only damage tourism development. Therefore natural beaches and areas suitable for the construction of hotel and similar facilities were avoided when selection site, while the preferred sites were those where the construction could improve the destination image.
Third criterion of economical justification is based on rough estimations considering the situation in the neighborhood. However, it is assumed per se that the entrepreneur that decides to construct the marine, finance before that a development of the feasibility study and undertake all other needed controls in terms ownership, price of land, status of the infrastructure and other.

Exactly because of such criteria special preference is given to entrepreneurial ventures which mean changes of purpose of military and industrial complexes and devastated regions into marinas. In fact, sites such as the Ship Repair Works in Tivat or military complex in Kumbor by changing the original purpose into marines will meet all of the three criteria:

- Ecologic, because the function of the marina is less damaging for the environment that their current functions;
- Spatial and tourism, because by changing the original purpose destination image is improved and there are no serious conflicts with other users; and
- Economic, as partly they already have resolved infrastructure (in particular the operational coast), and there should not be complicated in terms of ownership, and the state has interests and can regulated special conditions of their sale to potential investors.

With this basic criteria for the construction of marinas some additional have been also accepted, in order to define priorities as precise as possible - maritime conditions, preservation of the ecosystem, attractiveness of the location, protection of other resources, position and accessibility, feasibility of the project, attractiveness of investments.

Following four key incentive factors should be accentuated:

- Coast of Montenegro is very attractive for navigation, has preserved and mostly unpolluted coast and in European framework represents undiscovered destination;
- Neighboring Croatia already experiences congestion of vessels and considers introduction of some restrictive measures (such as prohibition of overnight stay of yachts outside of marinas), which could provide incentives to boaters to arrive in Montenegro;
- Current trend in the World indicated a constant and large growth of demand for the nautical tourism, in particular for larger yachts, motorboats and charters, and appetite for new spaces with preserved environment; and
- As a result of the openness of the largest part of its coast, Montenegro currently does not have the system of marinas that enable safe navigation, which means that in a short period of time marinas should be constructed on several sites for purely security reasons.

There are certain factors that indicated the need to be cautions when planning larger number of nautical spots in Montenegro, in particular larger number of berths. Among them there key ones are accentuated:

- Despite currently small number of berths, the coast of Montenegro should have more than double increase of concentration of boaters per kilometer than Croatia or Greece considering its overall length and a minimum increase of only 1,500 berths;
- Croatia, as closest and most similar nautical destination, realizes majority of revenues on the Northern and Central Adriatic which can be easily and quickly accessed by highways from Western and Central Europe, while for example the Dubrovačko-Neretvanska county, the closest one to Montenegro, with triple the length of the coast (approximately 1,000 km) has only three marinas with the total capacity of 650 berths;
- If needed infrastructural and other preconditions for a successful development of nautical tourism are not provided, in particular for the insurance of boats, information materials and facilities, as well as sale and service network, there is a great danger that the new marinas will make losses.

In accordance with all sated, a basic network of marinas in Montenegro is proposed with 2,000 berths, that would comprise of two large service marinas with capacity of 400-800 berths, four standard marinas capacity of 100-300 berths and three specialized marines with somewhat smaller number of berths. In addition to them a provision of commercial berths in existing ports is understood as well, in particular on sites that could be solicit some higher interest of boaters such are Budva, Herceg Novi, Risan or Prčanj.

Before the intensive construction of nautical capacities is started it is necessary to also undertake some systemic measures on the State level, in particular with regard to traffic and communal infrastructure, ship insurance and distribution of meteorological data.

Typology of **marinas**, as proposed in the text to follow, primarily relates to its orientation towards the market and the need to meet special conditions for the location. Proposed “VIP” and “eco” marinas should be subject to the same legal requirements as are “regular” marinas, or there is no need for those to be defined by special laws or that are separated from other marina by different requirements for operations.
As far as the “VIP” marinas are concerned it is expected a higher quality of facilities and orientation towards more demanding clients, while from the “eco” marinas it is expected for them to meet additional special conditions that require specific locations in accordance with the protection regime. That is especially applicable for the mouth of River Bojana that is the most vulnerable location and potentially high rank protected region.

Two *large service marinas*, with adequately large capacity (400-850 berths) should provide to boaters, in addition to the possibility to use berths, also all needed facilities (in particular overhaul and repair of yachts, re-fueling service and other services), therefore they must have sufficient space on shore and on the sea. One of such locations is the existing marina in Bar, which is planning already expansion and adequate equipping. Second such marina has been planned on the location of the existing Remontni zavod (Ship Repair Works) – Arsenal in Tivat. At the Bonići location it is possible to construct small marinas or moorings for the sailboats center.

Four *standard marinas* should meet the needs of boaters in all other key locations, where the highest assumed interest exist for berths and there are possibilities for the development marinas. In that context the one to be highlighted is the location on the cape Kobila as the northernmost (up to 150 berths), closest to Croatia and ideally sited from the navigation aspect. Ulcinj is also accentuated in a similar way as the southernmost location, closest to the Albanian coast and the Strait of Otranto, important also because Ulcinj is the only littoral city of Montenegro that does not have capabilities to accommodate larger vessels. Proposed location is Liman, near the Old Town (up to 300 berths). Bigova (up to 150 berths) is mostly important for traffic and security reasons as the only safe anchorage between the Bay of Kotor and Budva, or Bar, where the stay of boaters would be expected if there was no marina. Kumbor (up to 250 berths) is important because of very good conditions for development of the marina and needs to provide additional capacity or berths for the region of Herceg Novi, which does not have room to accept yachts.

Three *special marinas* refer to locations for which is assumed that there is considerable high interest of boaters, but due to certain ecological limitations extreme caution is required when planning construction. This particularly refers to the southernmost and due to the unique environment, very attractive location of Eyot on Bojana (Ada Bojana) (up to 50 berths), as potential marina there would endanger a rich avifauna and the flow of the River Bojana. For similar reasons site Buljarica is also very vulnerable (up to 100 berths), important for the lack of suitable locations for acceptance of boaters between Bar and Bigova and also in the Budva.

Even though to smaller extent location of Kotor is also vulnerable, because of the Bay being closed and the UNESCO's World Heritage status. However, that fact may be also used as advantage, as the marina (up to 150 berths) next to the old historic city of Kotor could be one of the rare ones in Montenegro having conditions for the orientation to the exclusive ("VIP") nautical demand in the greater extent. That could than mean potentially higher revenues than what could be achieved by the bigger "mass" marina that could be seen as the polluter of the environment.

Nautical tourism ports or locations that should provide only service of commercial mooring should be developed along the entire coast. Budva has a special role among them, which is important due to the possibly high demand of boaters, but because of the potential endangerment of exceptionally valuable resources of the coast and beaches, further stay of boaters is not recommended. In fact Budva, similarly to Herceg Novi, represents a city port where the key conflict is in the use of the space.
Spaces that are partially developed for acceptance of nautical vessels and boaters in the existing ports of Risan, Kotor and Kalimanj-Tivat should be also added to this.

Commercial berths are ensilaged in moorings, as specially constructed and developed for mooring of vessels next to the tourism complexes and facilities. Envisaged locations are: Njivice, Lazaret - Meljine, Zelenika, Glavati - Prčanj, Bonići - Župa, Rose, island of St. Nikola, Perazića dale (Perazića do) and on the stretch Cape Đerane – Port Milena.

In the function of nautical tourism it is possible to include, with careful revitalization, **mandraće – small mole-closed harbor and old piers** in the Bay of Kotor.

For the purpose of nautical connection of the sea and Skadar Lake, provided that the navigability of the River Bojana is provided for, piers in Rijeka Crnojevića and in Virpazar should be revitalized and equipped.

Priority should be given to the equipping of facilities of existing nautical spots which are located within constructed and operationally enabled parts of the coast, such are Kotor, Tivat, Bar and Budva. It seems that the most urgent is the completion of the construction of the marina within the area of the Port of Bar, as the majority of works have been already completed.
Constructions of new and upgrade of existing nautical capacities have as a pre-requirement development of an adequate environmental impact assessment.
Planned revitalization, reconstruction and construction of facilities of nautical infrastructure will be conducted in accordance with the purpose and the character of the Coastal Zone with the adequate technical, technological and legal measures of the ecological protection, and mandatory development of the impact assessment and capacities for each location envisaged for the construction of marinas.

Establishment of large number of nautical tourism ports, or commercial mooring is anyway the future of Montenegro as well as other Mediterranean countries, and it will potentially expand in accordance with the requirements for increasingly numerous nautical clients. In fact, it is to be expected that in future demand for berths will be increasing. It is only matter of time when will this be recognized by local communities through demands for issuing commercial berths, or by requests for functions of nautical tourism ports. Worth mentioning for this is the example of Croatia where more than half of all coastal places are interested for development into nautical tourism port or rights to lease berths.

This proposal should not be understood as the final solution, but as plan that should refer to next 10 years. Considering very fast and large changes in tourism in last several year in particular in the nautical tourism, even before that deadline some new circumstances will emerge that will also require revision of these plans. Somewhat smaller number of berths is envisaged than in previous plans, because it is much easier to increase later on capacity of planned marinas or to construct new ones, than to suffer bad economic and ecological consequences as result of too large capacities.

Sport and recreation

Constructed sports and recreational capacities exist in the Littoral that, with additional investments, modernization and expansion, and direction to the sports management, may be an excellent complementary business activity for the ecotourism.

Based on the proposed concept for the development of the seaboard and planning requirements for sports, program of sports facilities and sites have been proposed, that should meet sports activities demands of visitors (active practice of sport, recreational practice of sport and recreation and adventure practice of recreation and sport).

Active practice of sport purports for it to be conducted in courts and facilities that enable international competition. Courts should be planned and seized in compliance with the international norms standards for specific type of sport. Courts planned and completed in such way, registered with international lists for venues of international tournaments and competition are extending the season.

Attractive sports have been planned for adventure sport for which the nature and natural resources of the Montenegrin Littoral offer exceptional possibilities, unique in the Mediterranean region:
- Cruising from Herceg Novi to Ada, by River Bojan to Virpazar;
- Birdwatching on Skadar Lake, Salt Pans or Solila;
- Exploration of underwater world and archeological monuments in the submarine zone;
- Cable car ride, to fortresses and belvederes;
- Flying with light planes, parachutes, hang gliders;
- Free climbing of rock cliffs, on the rocks of Nerin, beneath Spas, Buljarica, Valdanosa;
- Hunting in Rumija, Krivošije, Lovćen;
- Cave exploration.

Following sports and locations are being proposed for active practice of sport:

- Sailing, organized by clubs (centers Herceg Novi, Kotor and Tivat);
- Windsurfing (several centers, mostly on the open sea cost, for example Valdanos);
- Water skiing, parachute skiing and jet-ski;
- Sport fishing (boat fishing or underwater fishing) requires good knowledge of local conditions (mouth of River Bojana, Channel Milena, Big Ulcinj Beach, surrounding of island St Nikola, Perazića dale, Port of Bar – beyond breakwaters);
- Sport diving (centers Herceg Novi, Žanjice, Rose, cape Veslo, cover Pržno, Bigova, Jaz, Budva, Sveti Stefan, Petrovac and Buljarice);
- Swimming, water polo (centers: Herceg Novi, Igalo, Bijela, Kotor, Bonići, Budva, Lučice, Bar, Velika Plaža);
- Rowing (centers mostly in the Bay of Kotor - Kotor, Orahovac);
- Tennis (centers Dobrota, Nerin, Lučice, Velika Plaža);
- Gols (centers Kavač, Sutorina, Buljarica, Velika Plaža);
- Stables and horse races (centers Jaz-Lastva, Velika Plaža-Ada Bojana);

Following sports have been planned for practice of recreational sport and recreation:

- Walk by the coast, pedestrian paths along the coast; riding of bicycles, rollers on the track along the coast;
- Amateur sailing;
- Swimming and sea bathing on all beaches;
- Bathing in swimming pools with mud or mineral water (Igalo, Njivice, Bigovo, Valandos, Velika Plaža);

Recreational practice of sports is envisaged for mass visits and therefore it is planned for every beach or hotel complex, in proportion to the planned capacities and number of inhabitants of neighboring place.

Practicing water sports brings a certain risk dose both for the participant in sports activities and also for all using the sea for recreation. In order to protect bathers it is necessary to define border of swimming areas where no motor boats, powerboats, personal water crafts (jetboat ski) and other vessels are allowed.

For holding water sports events, for example sailing or rowing regattas, swimming marathons, motorboat races, underwater fishing etc, it is necessary to secure and mark certain parts of the maritime zone (local sea) where the competition is taking place. Since these are high performance sports, therefore for organizing these events most suitable places are selected. Bay of Kotor is exceptionally suitable for organizing sailing regattas, rowing competitions and motorboat races. Open coast of the Montenegrin Littoral is suitable for sailing regattas, competition in sport fishing, diving etc.

Swimming beaches

Important element of the tourism offering is swimming beach, as places for sunbathing, sea bathing and other forms of recreation.

Offer of swimming beaches has priority and even in the coming period various forms of spatial organization should be allowed. Thus the further developed of parts of city coasts is planned in the Bay of Kotor on the stretch Igalo - Kamenari, through Risan and Dobrota, on stretches Muo - Prčanj – Stoliv, Lepetani - Župa and Đuraševići - Krašići. The reconstruction of existing and construction of new artificial capes (ponta) and small mole closed harbors (mandrać), as well as placement of pontoons is assumed by this.

In terms of city swimming beaches in the region of open sea (Budva, Bečići, Petrovac, Sutomore, stretch Žukotrlica - Topolica) expansion of the hinterland is envisaged by increase of green and free spaces with ancillary facilities and water entertainment parks.

In accordance with the development of new tourism capacities on the outer sea coast adequate swimming establishments are envisaged - Luštica, Bay Trašte and Bigova, Donji Grbalj, stretch Sveti Stefan - Petrovac, Maljevik, stretches Veliki pijesak - Stari Ulcinj and Valdanos - Ulcinj, Pinješa zone. Part of these swimming beaches has also an excursion site character.

Kaladrovo is envisaged to be the most significant excursion spot in the Bay, and on the open sea the Island of St. Nikola in front of Budva, with series of swimming establishment units. It is also possible to include other small islands and rocky isles in the excursion programs without them having any constructed facilities.

Specialized swimming beaches are envisaged on location of special interest or importance, naturist beaches (beneath caves near Njivice, Arza - Mirišta, Jaz, Crvena glavica, Ada Bojana, smaller covert spots in the extension of public or hotel beaches), beaches for use of the therapeutic mud (Igalo, Ulcinj...).

Due to the high importance of swimming beaches for tourism, it is necessary to pay particular attention to them in the future and to perform numerous activities which are the precondition for their optimal use. In order for a swimming beach to be valued and permanently used following is necessary:

- Perform exploration works (all needed measurements and observations);
- Perform regular maintenance, development and equipping;
- Take care of the swimming water quality;
- Perform interventions on as needed basis.

Increase of tourism accommodation capacities requires also an increase of the overall surface of swimming beaches, therefore following is needed:

- Gradually increase the usage surface of the existing swimming beaches which are currently partially used,
- Increase, wherever possible, existing swimming beaches, whose surface is currently fully used;
- Establish new natural and artificial swimming beaches wherever needed and do it rationally and not do it contrary to protection requirements.

As part of the Water Resource Management Base of Montenegro (2001), analysis of the current status stated that it is possible to increase to 47 beaches in the total length of 32 km, and the total surface of 830,050 m^2 and aggregate load assessment of 82,390 persons. Increase of these swimming beaches in the

future is directly connected with the construction of new tourism accommodation capacities and those will be formed and equipped at the same time as new tourism building facilities are constructed.

Based on collected data connected with the possible establishment of new swimming beaches, the constatation is: total length of such swimming beaches is 14 km with the total surface of 220,350 m^2 and aggregate load assessment of 19,930 persons. Construction of these swimming beaches in future should be connected with the construction of new tourism accommodation capacities in the immediate hinterland.

Therefore, based on the existing status and the assessment of the expansion of existing and construction of new swimming beaches gives a total maximum length of approximately 100 km or 27 ha, which give a simultaneous number of 270,000 swimmers/bathers.

Swimming beaches, based on their designation, should be equipped in such a way to meet as more as possible criteria of the "Blue Flag" campaign, which would: carefully resolve conflicts between the recreational and protection function, secure access to all persons, equip them with needed devices and facilities.

[details of norms for specific swimming beach, recommendation for the equipment and organization of the swimming beach zone are presented in the chapter covering requirements for use and development of space]

Pedestrian and bicycle tracks

Compactness of the continuous line of the Coastal Zone territory regardless of its width and diversifies geo-morphological structure, gives possibilities of the establishment of long-range cycling and pedestrian routes, that could have span along the entire coast. Partial and very often developed coast of the Coastal Zone with pedestrian paths enables their interconnection until reaching full continuity, with clear well thought stages. Quality of the tourism offering of pedestrian and cycling development is especially pronounces in conditions of immediate vicinity of the coast due to the specific combination of the Mediterranean climate, sea air and intensive greenery, and the contact of the shore and sea makes the most attractive change of landscape, very important categorization of tracts suitable for this type of sport.

The Coastal Zone, even though within its narrow borders, disposes with basic elements needed for the affirmation of walking:

- Alongside of majority of urbanized shored developed pedestrian paths already exist, either separated or as part of traffic rout (Bay of Kotor, all major cities, ….);
- Alongside of all developed landscape zones developed pedestrian paths exist;
- Alongside of undeveloped tracts there are wild paths which, with relatively simple clearing of land, could be put in needed use (Luštica, tracts between cities, ...)

Alongside of all existing traffic routs and pedestrian paths it is possible to also establish parallel cycling routes. Undeveloped tracts could be gradually made meaningful with the staged approach and based on natural and geographic conditions developed into tracks, which could be interconnected into continuous route along the coast.

Possible types of disciples in the littoral are:

- Recreational cycling, for majority of tourists on routes of individual choice and duration, in combination with other sports (walking, swimming, diving, …)
- Sport cycling, for physically better prepared bicyclist, defined routes/tours within which obstacles are negotiated that require efforts for increasing physical condition;
- Professional cycling, entirely organized in forms of preparation for competition conducted under the observance of coach and sports team;
- Biathlon, sport discipline of cycling combined with rowing;
- Triathlon, sport discipline of cycling combined with swimming and running.

Staged approach in the affirmation of cycling and waking is the basic item in the tourism offering of this program. Essentially staged approach means also staged sports offering: which means that first to be realized are walking routs and cycling routs in further development.

Elementary walking routs along the coast are, in higher or lower degree, present in all urbanized shores as well as in developed tracts, whether those are beaches or forest. In a certain rural from they extend deep along undeveloped tracts which requires relatively small intervention in order to connect them with neighboring developed path or to prolong the pleasure of walking along the coast. In any case on terrain they extend along the coast in some interrupted form that has connection trend and which was not connected in some parts only because of the physical obstacle (steep rocky coast or cove). The objective of this program is their connection along the entire coast, which means for the largest part of the Coastal Zone shore.

Continuity of pedestrian paths along the entire immediate littoral is attractive and certainly unique tourism offering. In the domain of the walking sport it is realistically doable and with very small economic/construction fund. Regardless the diversity of the physical structure of the seaboard, it is possible to develop pedestrian paths even on the steepest slopes with simple construction interventions.

The situation is somewhat complex in the domain of cycling needs, but it remains still very financially suitable. Construction interventions of bypassing some of the obstacles are minimal investments compared with the long-range possibilities of the profit by inflow of "cycling" tourists.

Three zone in the seaboard area proposed along the coast where the pedestrian and cycling paths should stretch, which offer specific services needed for the basic characteristic:

1. ELITE: Paštrovići (Budva, Pržno, Sveti Stefan, Rijeka Reževića, Petrovac);

2. SEA: Luštica (Rose, Žanjice, Bigovo);
3. SPORT: Bay of Tivat (Tivat – surrounding, bay and plains).

There are zones along the coast that are partially developed for the needs of cycling and walking offer. For example, along coast of the entire the Bay of Kotor a traffic route stretches that by its frequency does not classify with exceeding traffic, so it enables relatively safe and quick cycling zone.

Even now four zones can certainly be defined on the terrain, where these sports could be practices with very few interventions:
1. TIVAT – developed (but neglected) tracts of Lučica and Župa, which could become very strong zone of the Montenegro offering after the rehabilitation of abandoned facilities;
2. BUDVA - PETROVAC – many developed pedestrian paths along the coast;
3. SUTOMORE - BAR – developed paths along the entire coast suitable for cyclists;
4. ULCINJ – Mouth of River BOJANA – several kilometers long coast for fitness training of walker and any type of athletes combined with swimming, rowing, diving.

Development of these terrains should certainly be directed toward the full use through the current European action EuroVelo, as are mainly within the Mediterranean route number 2.0.

2.3.2. Maritime industry

2.3.2.1. Fishery

Fishing sea of the Republic covers part of the internal waters and continental shelf (epicontinental sea) which is within the borders of Montenegro. Border of the fishing sea in rivers that discharges into the sea is considered to be the line in which the water ceases to be salty.
As opposed to the fishing sea, fishing area of the interest for Montenegro is much wider area starting from the baseline of high and low tide (mediolittoral) and stretches across the continental shelf, continental slope and rise of South-Adriatic basin. Based on the Law of the Sea Convention, fishing area finishes transversally on the borders of territorial waters of Italy. If the Exclusive Economic Zone is declared in Adriatic, then the fishing area would cover internal waters, territorial waters as well as the entire area of shelf which is outside of territorial waters, continental slope and part of the South-Adriatic basin, most likely up to the confining axis going through the center of the basin.

Inshore area of internal waters and shelf area, which is narrow on the entire South Adriatic, is the most important for fishing and collection of benthic and semi-pelagic species. At the level of entrance in the Bay of Kotor the shelf border is at 9.5 nautical miles, and near the Mount of River Bojana at 34 nautical miles from the coast. Except in the shelf, harvest of benthic species is profitable on the continental slope at the depth from 500 to 600 m, as shrimp colonies are located there. As opposed to harvest of benthic species, area of fishing of pelagic species is very profitable right to the border of Italian territorial waters,

Sea fishery means fishing, cultivation, improvement and protection of fishes and other sea animals as well as extraction of sea plants.

Sea fishing

Sea fishing includes catching of fish, other animals and extraction of sea plants, and could be commercial and sports.
Commercial fishing includes:
- Fishing with bottom trawl nets (trawlers) of demersal (ground) species;
- Fishing of pelagic species (small and big oily fish) with drift floating nets, seine nets and anchored gillnets;
- Catching crustaceans and edible bivalvia;
- Fishing with smaller fishing devices (cheena vala – kalimera, fly fishing, long-line fishing, coops, hand-line fishing, hand-trolling, spear fishing, fishing with light attractor, …)

Sport fishing could be performed with all fish hook tools, certain fishing lines and spears, as well as with spear-gun free-diving without the use of light.
Competent body for sea fishery affairs defines areas, time and manner for carrying out commercial and sports fishing, in particular in zones of ports, waterways and channels, developed swimming beaches, fishing reserves, farming of shells, bivalves and other sea animals, underwater archeological sites, underwater installations (cables, pipelines).

Further development of fishing on the Montenegrin Littoral requires assessment of biomass of pelagic species (pilchards and anchovies) and based on that establish starting annual quotas for fish catch, fishing areas and optimal fishing techniques. After that constant monitoring of the sea biomass should be organized this will enable calculation of catch per effort unit. It is particularly important to establish continuous and permanent control of the sea quality status in the Bay of Kotor and other parts of the Montenegrin Littoral, and occasionally of the open sea of the South Adriatic.

For our part of the Adriatic and approximation of the assessment of demersal (trawler) resources is made, while for the biomass of the small oily fish only an assumption is made.
The assessment is that total catch of commercial fishing is around 3,000 tons and o sport approximately 500 tons.
Assessment of the maximum sustainable yield (MSY) of the trawler resources is around 580 tons or 29,000 fishing hours annually.
There are no exact assessments of the MSY for other forms of fishing, but with the assumption that the biomass of the small oily fish is around 15,000 tons then the MSY for the small oily fish would be around 5,000 tons, because with the catch of around 30% of its biomass there is no danger for overfishing.

Focus of the fishing should be directed towards the catching of small oily fish with floating drift nets and/or surface trawler nets at the open sea.
Cost-effectiveness of other fishing techniques should be investigated, tuna fishing with floating drift nets at

the open sea, catching of tunas and swordfish with pelagic long-line fishing, demersal long-line fishing in the Adriatic basin, trawler fishing or coops fishing primarily of shrimps on the continental slope.
It is essential to undertake assessment of the biomass of pelagic specie (primarily of pilchards and anchovies), as well as the assessment of the status of all inshore resources as soon as possible.
It is necessary to organize collection of statistical data on all types of fishing and based on the assessment and data on the catch to undertake assessment of the maximum allowed level of the use of resources.
Based on the assessed MSY it is required to regulate the fishing effort in a way that the initial annual catch quotas, fishing areas, optimal fishing techniques and needed capacities are established. Monitoring of all resources should also be established after those assessments.

Mariculture

Mariculture is the production of food from the sea, in natural conditions, in artificial way. Mariculture represents a business activity that, if performed according to the set conditions, production of food does not create negative consequences for the environment in which is carried out, thus it could be considered a business activity towards the sustainable development. When we discuss about the coast as unique and specific zone, taking into account all impacts of natural and anthropogenic activities in that zone, the space on the coast represents a limiting factor, thus when resolving conflicts in certain space, mariculture most frequently represents the most adequate choice due to its features by which the space could be preserved in quality way for future generations.

Mediterranean Sea is considered to be extremely favorable for mariculture due to its natural characteristics. Even though the mariculture is not developed enough in the Montenegrin Littoral, this area and in particular the Bay of Kotor represent very suitable space for mariculture, primarily for the cage fish farming and bivalve farming on floating plantations. Scientific researches on suitability of locations and some current experiences in mariculture indicated that on the Montenegrin Littoral cultivation is possible of fish (European Seabass, common sea bream, gilt-head sea bream), mollusks (oysters, mussels, clams), crustaceous (prawns) and algae.

Considering the mariculture is the business activity that because of natural and other conditions could be successfully carried out in the Montenegrin Littoral, and considering that this the business activity that does not disturbs the space, this business activity should be stimulated wherever that is adequate.
Mariculture, under certain conditions, promotes sustainable developed and does not have negative effects on the environment, does not permanently distorts space, represents complementary business activity for tourism as main industrial sector in the Montenegrin Littoral.

Mariculture is performed under special conditions, and is limited primarily by main capacity of the environment, physical, chemical and biological characteristics, water quality, performance of other activities on the given location, existence of adequate ancillary infrastructure and similar.

Mariculture cannot be performed on locations where are performed and located industries, ports, army facilities, settlements, tourism and recreational activities, agriculture, fish catchment areas (pošte), protected areas and similar.
Mariculture may integrate cultivation of fish and bivalvia on the same location under specially defined conditions.
Selection of the mariculture technology and type of sea organisms depends on conditions met on the subject location.
Cultivation of bivalvia is given preference in the Bay of Kotor, due to the limitation of the environment.

MARICULTURE ZONES are wider areas that are defined based on data on the quality of the natural environment, existing and planned use of space, population density, infrastructure, economic, social and public activities on the subject area.

Criteria used to eliminate locations unsuitable for mariculture are following:
- Developed polluters (settlements, port maritime zone, industrial centers);
- Unsatisfactory hygiene conditions;
- Unfavorable hydrodynamics;
- Eutrophic areas with risks for mucilage phenomenon;
- Areas of intensive maritime traffic;
- Special protected areas;
- Areas of intensive tourism and recreational activities;
- Special-purpose areas (military areas, archeological discoveries and similar).

Mariculture zones are defined in 3 categories by the degree of meeting required conditions.

1st category ZONE due to the adequacy of all preconditions is determined only for mariculture and complementary activities.
Considering favorable natural conditions of the Bay of Kotor (especially natural protection, favorable hydrodynamics, large number of confluences) and taking into account that there are parts of the Coastal Zone area which have not suffered changes caused by anthropogenic activities, 1st category zones are defined in the Bay of Kotor that meet all above stated criteria, and because of such conditions it should be treated as special importance area for mariculture.
- Cove Solila in Tivat Bay;
- Stretch from the settlement Andrići in Stoliv to the Cape Gospa od Anđela (Lady of the Angels);
- Stretch from the Cape Banovina to the Turskog Cape in Kostanjica;
- Stretch from Vitoglav to Strp;
- Stretch from Perast to the Cape Banja;
- Stretch from the Dražin Cape to Perast;
- Zone of the River Ljuta, from the end of the Ljuta settlement to the beginning of Donji Orahovac settlement;
- Cove Luka and part of the Coastal Zone on the stretch from settlement Lipci to Morinj;

Juvenile fish species can be cultivated on some sites in the estuaries of Sutorina, Jaška River and right branch of Bojana.

2nd category ZONE is for mariculture and other business activities that do not have negative impact on mariculture, zone for the experimental mariculture or scientific purpose mariculture, or zone where mariculture could be performed until the realization of other planned activities. In these zones mariculture is performed under specific conditions while some other business activity is dominant; or if the zone meets all criteria but the Plan envisaged other activities, then the mariculture could be performed until the realization of planned activities.

Parts of the Montenegrin Littoral that represent 2nd category zone meet majority of conditions, but due to certain circumstances mariculture does not have a priority. Those are:

In the Bay of Kotor:
- Plagenti – maritime zone in front of Sea Biology Institute, as zone for scientific researches;
- Raškov Brijeg – cove with adequate conditions for mariculture until planned tourism building facilities and activities are realized;
- Morinj – mouth of Morinjska River, until planned tourism activities are realized;
- Bijela – part of the Coastal Zone up to the Cape St. Neđelja up to the beginning of the coastal road for Bijela, until planned tourism activities at the entrance in Bijela are not realized and the construction of the bridge crossing Verige;
- Njivice - until planned tourism activities are realized;
- Rose - until planned tourism activities are realized, and after termination of military activities;
- Cove Brdišta - until planned tourism activities are realized;
- Cove Kukuljina - until planned marina in Bonići is realized.

On the open inshore sea:
- Dobra Luka – until other planned activities are realized, and after providing adequate access from the shore;
- Cove Žukovica – until planned tourism activities are realized, and after providing adequate access from the shore and enabling electrical energy supply;
- Zagorski Pijesak - until other planned activities are realized;
- Krimovički brook - until other planned activities are realized;
- Cove Valdanos - until planned tourism activities are realized, and after termination of military activities;
- Port Milena – until planned nautical and tourism activities are realized.

In mariculture zone recognized and categorized in such way one or more locations are designated for mariculture under specific conditions taking into account mutual relations of mariculture and main capacity of the environment or in case that there are more mariculture locations in a specific zone relations between technologies and cultivated species should also be take into account.

3rd category ZONE is the zone where mariculture cannot be performed under any circumstances.
Coastal Zone areas that are 3rd category zones are mostly populated places, port maritime zones, shipyards, industrial centers, locations with inadequate water quality and hydrodynamics, zones of pronounced pollution, locations for tourism and recreational activities, zones of intensive maritime traffic, military activities zones, protected areas and special importance areas.

2.3.2.2 Exploration, exploitation and possible production of oil and gas

Results of current explorations on-shore and off-shore indicated that region has oil and gas potentials.

It is important to properly understand geological connections of the land and off-shore for future explorations. From the geological aspect, as possible zones where oil or gas discoveries could be expected which area directly connected or will have important impact for the Coastal Zone area are: Littoral Zone, Budva Zone and Offshore Zone.
Littoral Zone includes areas of Sutorina, Luštica, Tivat field, Grbalj, Bar field, Volujica, Vladimir, Sukobin, Možur, Bijele gore, Briske gore and broader Ulcinja area.
Budva Zone includes littoral zone between Sutorina on the Northwest and River Bojana on the Southeast, then Southern slopes of Orjen, Southwest side of Lovćen, Paštrovačke gore, Sozina and Rumija. Route could be followed from Ljuta in Konavli, across Herceg Novi, Đenovići, Tivat, Bratešići up to the Cove Jaz, then it appears near Šušanj on the margin of the Bar field and so on up to the Old Bar.
Littoral Zone of Montenegro is distinguished by the exceptional structural and tectonic diversity.

Based on interpreted seismic profiles and drilling data, a petroleum-geologic zoning of the offshore zone of Montenegro was developed, that has defined following areas: South-Adriatic Basin, Northwest platform area, Southeast platform area, Inland sea zone, Mesozoic and Tertiary shallow waters carbonate reef, tengentially deformed parts of the Northwest platform area, tengentially deformed parts of the Southeast platform area, deeper shelf zone (early Eocene-Oligocene).
All mentioned zone could be considered as perspective for discovery of commercial quantities of oil and gas, and in particular: South-Adriatic Basin and Northwest platform area.
Especially interesting is the shelf area that divides South-Adriatic Basin from the inland sea zone. This area stretches direction Northwest-Southeast along almost entire offshore area of Montenegro. The inland sea zone transforms into the shallow waters shelf of Ulcinj and Bay of Kotor towards the Northwest.

Oil Industry

Oil industry is maybe the greatest unknown in the strategy of future development of the Littoral region. Territory of Montenegro, in particular seaboard zone, is very suitable for delivery and storage of oil and oil derivates for several reasons.

First is certainly favorable geographic position that enables delivery of goods within 2-3 days to the storage installations by seaway. Such way of delivery of goods is most certainly the most favorable one from the economic point of view and significantly reduces end price. Second reason is certainly favorable geographic position of Montenegro that enables expiation of the market to neighboring countries (Bosnia and Herzegovina, Croatia, Albania), except for maybe Serbia. Certainly the highest limitation to this is the existing traffic infrastructure (railway and road), which would represent a bottleneck at this development level for the delivery of goods from the existing installations (Bar and Lipci) toward final destinations.

Oil industry of Montenegro, with the normalization of political and economic situation in this area, must use all complementary advantages for its expedited development for growing into a regional leader in this area. Long-term development projects area having that direction. Especially if having in mind perspective of the offshore zone of Montenegro, which is proven, to the possibility of discovery of commercial quantities of oil and gas, which would also make Montenegro a producer of this important energy sources, which will be certainly dominant even in the next century.
Development plans of Jugopetrol Kotor JSC, as the main element of the oil industry of Montenegro have two directions. First is the modernization and expansion of already existing facilities, and the second is intensification of oil and gas exploration works on-shore and offshore, in order to reach commercial production as soon as possible.

General statement is that available capacities are adequate, if comparing current market covered by the Jugopetrol Kotor JSC.
In that respect doubling of existing storage capacities of Petroleum Installation in Bar is planned from 99,000 m^3 to circa 200,000 m^3. At the existing location Volucija there is adequate space, and the existing infrastructure would be used to great extent. There are plans for a good part of new planned tanks to be built underground, which would greatly reduce possible risks
Existing capacities of petroleum installation Lipci and of aero services in Tivat will remain within existing capacities, therewith a foreseeable relocation of the installation Lipci should be envisaged due to the constant ecological threat for the Bay.

Modernization of existing yacht services and their development in compliance with international standards is planned. With the development of the nautical tourism in Montenegro, new yachting services would be constructed, especially for areas which are not currently covered, hence Tivt, Bigova, Bar and Ulcinj, in order to complete this form of supply of vessels with existing ones in Kotor, Herceg Novi and Budva.

Modernization of existing building facilities means modernization in terms of up-to-date environmental protection. In the next ten year period introduction of new automation on all fuel-pump stations and yachting services is planned. Furthermore, construction of special concrete protection walls is planned for almost all existing tanks, as well as the establishment of emergency services.

Future Production of Oil and Gas

On the margins of the South-Adriatic Basin several oil and gas deposits have been discovered, that unambiguously define its high perspective. Those are: liquid gas found in the well JJ-1, oil in the well JJ-3, oil phenomena in well JJ-2, oil in Albania in Miocene clastites, oil in the well Rovesti Discovery, oil in the well Aguila, gas in the well Falco in the Italian exploration area.
Based on the current exploration works, and also on those planned, and having in mind that oil and gas are already being exploited in Italy and Albania, in sites very close to our offshore zone and coast, which represents a single petroleum basin, very intensive production of oil is expected in the region of maritime zone and immediately along the coast on several sites. These sites are no precisely defined, but it could be counted with certainty that the oil will be exploited in this region.

In the case of smaller and medium size oil deposits discoveries, nothing would significantly change in terms of infrastructure as oil would be directly loaded from the well into large tankers and driver for processing into refineries of South Italy, Greece or Croatia, and oil derivatives would be returned by the same way to already existing installations, that would need to be expanded by such time. In case of larger oil discoveries, it would be economically justifiable to enter such project of construction of domestic refinery, for which the most suitable location Buljarica field is being mentioned, but this should be established based on the comprehensive feasibility study and environmental impact assessment.

Protection of very vulnerable environment, specially tourism and delicate development of sustainable capacity of the climate would be endangered by that, but oil experts believe that well for oil exploitation on the coast could be located on only on one hectare of land with very large safety and protection measures.
Regardless whether those are exploration or exploitation works, it is necessary to establish starting status of the environment.

This entire area of oil and gas exploitation remains open for further explorations and decision on the highest level of authorities, considering large unknowns.

Gasification Need

Construction of the arterial gas pipeline on the territory of Montenegro has been analyzed in the “Study of development of transport, distribution and use of natural gas in the Republic of Montenegro” developed in 1998, which has made the assessment of needed natural gas quantities for Montenegro or the substitution of existing energy sources with natural gas. Based on those analysis, the Study highlighted connection with gas pipeline system of Serbia, the extension of the gas pipeline Dimitrovgrad – Niš as the only real possibility for the supply of Montenegro with natural gas. That direction would match partly with the route of the gas pipeline for Kosovo, where a route would detach from Podujevo that would enter Montenegro via Rožajw, Beranw, Andrijevica, Mateševo to Podgorica.

Analyzing different options Study selected the option that would meet around 76% of consumption. Cities of Podgorica (50.6% of annual consumption) and Nikšić (23.6% of annual consumption) are recognized as largest consumers, as their connection would secure almost ¾ of the annual consumption of Montenegro.

Construction of the gas pipeline would be realized in 3 phases:

1st Phase	Construction of arterial gas pipeline Podujevo – Podgorica with branch Podgorica – Nikšić;
2nd Phase	Upgrade of arterial gas pipeline Podgorica – Cetinje – Budva with the arterial branches Budva – Tivat and Budva – Ulcinj;
3rd Phase	Construction of arterial branches Berane – Bijelo Polje – Mojkovac, Mateševo – Kolašin and Rožaje – Plav

Due to the very significant funds needed for financing of this project, Montenegro must also have in mind alternative solutions for gasification. One of those solutions is discovery of own reserves for production of natural gas, whose possible surplus in that case should be transported to the gas pipeline system in Serbia. It is normal to expect that if the own natural gas reserves are found, for gasification to be done in stages, first along the coast the in direction of Podgorica and Nikšić, as significant consumption centers. Only in the second phase, after meeting needs of other towns on possible arterial direction and in case of discovery of significant quantities, further development of the gas pipeline system and its connection with the gas pipeline system of Serbia would be taken into consideration.

Littoral area is very suitable for development of gas pipeline system, therefore study analysis and spatial plans should be used to occupy necessary corridors for those purposes, on the route Ulcinj - Bar - Sutomore - Petrovac - Budva - Kotor - Herceg Novi. In this way relatively fast realization of the gas pipeline system and use of produced natural gas would be enabled.

Having in mind that industrial needs of littoral places are relatively small, in the first phase a concept of the gasification of industry and for broad consumption of littoral cities (Ulcinj, Bar, Budva, Kotor, Herceg Novi, etc) should be immediately envisaged, as in that case higher uniformity of the annual natural gas consumption would be achieved. Depending on available quantities of produced gas and place of its acceptance on the coast or the well location on-shore, connection with Podgorica would be defined, wherefrom across the Zeta Valley connected with Nikšić and in that way complete the construction of the 1st gasification phase of Montenegro.

There are even some possibilities for development of the gas system in cites, gradually developing gas distribution networks for supply liquid petroleum gas mixed with air, as precursor for the natural gas supply.

Possibility for supply from transit gas pipelines and construction of LNG (liquid natural gas) terminals in Bar is opened as an alternative solution, but those solutions are conditioned with the construction of regional gasification routes in the Southeastern Europe.

2.3.2.3 Shipyards

Strategic orientations of the Adriatic Shipyard in Bijela that would be required according to the sustainable development plan for ship-repairing yard, ship reconstruction and shipbuilding, as export oriented business activities with known reputation and place on the World market or ship repairs are as follows:

- Modernization of existing ship-repairing capacities, respecting and applying international ecological standards;
- Technical, technological and human resource orientation that shipyards are directed, in addition to business activities of repair and reconstruction of ships, to repair of mega yachts and building of smaller watercrafts, in compliance with ecological standards;
- Particularly specialized equipment and purpose which would also increase the level of complete ship-repairing service, primarily for smaller vessels for tourism purposes;
- Construction and purchase of lifting systems (cranes) for smaller watercrafts;
- Takeover and separation of waster oily waters, as well as supply and sale of oil and oil derivatives to watercrafts in accordance with ecological standards;
- Improvement of business infrastructure – supply of ships with spare parts, expendable supplies, and particularly highly specialized technical services, with the overall trend to increase the quality of services;
- Acceptance of passenger and cargo ships for repair transshipment, and handling passengers off the ship, if they meet all requirements as envisaged by the law.

Development of stated activities must be accompanied with intensive investment in the modern technology that does not pollute the sea, land or air with mandatory introduction of Environmental Management Standards system ISO 14001:2004 for each business activity in the Bay of Kotor.

Repair and reconstruction of ships enables development of small and medium size companies, development of education of production professions and create conditions for performance of specialized courses in maritime affairs and ship-repairing. Development of repair of mega yachts increases tourism offering, revenues from tourism and extend the tourism season.

Limited ship-repairing and service capacities are planned within service marina in Bar. All these capacities must have emergency services in case accidents as well as regulated acceptance of ballast waters.

2.3.2.4 Ports

Perspectives of port development are in direct correlation with perspectives of industrial development of their gravitational region. Special importance for the

perspective development of the traffic functions of ports represents increase of the transit traffic, which is almost negligible in the current structure of transshipping. Especially important element of identification of perspectives of development of port traffic function is proper definition of the gravitational region. In fact it is necessary to undertake detailed analysis of the gravitational region of ports (reconsidering, redefining of gravitational region) in the coming period, applying methods of evaluation of logistical elements, which is based on the comprehensive valuation of all elements that are important for the selection of traffic route (geographical distance, price of transport, velocity of transport, labor productivity in the port expressing the degree of adequacy of equipment and work organization in the port, quality of road and railway connections of the ports with the hinterlands, custom duties and customs regime in the port, tariffs and tariff policy, ...).

Respecting main preconditions for development of commercial function in ports, as well as fact that the Port of Bar is a free trade zone on the dominant part of its territory, a conclusion may be drawn that the perspective of commercial function development in the system of Montenegrin seaports is primarily located in the Port of Bar. In terms of global program orientation, commercial business activity in the Port of Bar in perspective should cover following programs: trade of goods produced in the industrial zone of Bar (and of course Free Trade Zone of the Port of Bar), which is intended for domestic and international market; trade of goods from world markets intended for the broader gravitational region (domestic and international market); trade of goods produced in country intended for the world market; consignment and commission sale of goods; sale of customs goods; retail trade and sale of goods in the narrow gravitational region; commercial affairs based on different forms of partner export-import arrangement (leasing, barter deals/trades and other)

Only Port of Bar has significant perspective for development of industrial function in the system of seaports. Development perspectives of industrial function of the Port of bar are organization of production business activities oriented to a flexible production programs and technologies, as well as on intensive cooperation with foreign investors. Electronic industry, textile industry, food production, footwear and leather accessories production, wood processing industry, production of electrical machines and appliances, production of cosmetic products, production of transportation devices, containers production, production of packing materials, production of plastic goods, production of navigation and detector equipment and devices, metal processing and non-ferrous metals industry and other, are programs that can be developed in the port industrial zone. Furthermore, goods intended for tourism centers in the Littoral can be produce in the zone, which can be based on processing of agricultural products from surrounding settlements that have brief expiry period. It is suitable to locate assembly production such are assembly and production of electric and electronic equipment, computers, communication devices, instruments, toys and other.

In accordance with the identified perspectives of the development functions of Montenegrin seaports, systematization of needed investments could be done in order to optimally use defined development perspectives:

Traffic function:
Port of Bar – complete the construction of the operating coast with existing jetties, begin construction and development of new jetties and breakwaters on the Cape Volujica; construct Ro-Ro terminal with berths, traffic routes, parking spaces and other facilities; upgrade, reconstruct, modernize and technologically equip closed, open and specialized warehouses; construct several standardized and special warehouses (500-2,000 m^2); establish modern terminal for unit cargo and pallet cargo; construct terminal for mass consumption goods; modernize, expand and technologically equip container terminals; expand and improve cereal grains terminal (mill, bagging line and other); add wood terminal; construct cattle terminal; construct and complete multipurpose terminal for unit cargo and bulk cargo and containers; developed and put in intended use platforms obtained from the rehabilitation of the hill Volujica; establish specialized terminals for bulk cargo or build storage silos and transport and transshipment systems for different types of goods (Phosphate, cement and other); construct a pipe transport system of liquid cargo with road and railway pouring spots; on the coast of Volujica complete existing storage facilities (storage silos for phosphates) and install continuous loop transportation devices (conveyor belts); on the Old Coast construct several smaller tanks for acetic acid (up to 5,000 m^3) in addition to existing direct pouring installations; in the zone of cove Bigovica build tanks for oil and oil derivates of the capacity of 200,000 m^3, as well as number of smaller tanks from 500–5.000 m^3 for other liquid cargos;
Port of Kotor **–** construction of nautical and tourism center next to the Hotel Fjord with all ancillary service facilities; improvement of rechnical and technological elements for handling of passenger ships and construction of passenger terminal;
Port Zelenika **–** rising up technical and technological requirements in accordance with European Union regulations; basic business activity will be passenger and cargo port with handling of passenger ships and cargo transshipment;
(it is evident that potential of the Port Zelenika have not been valorized in a right way up to now, so by organizational restructuring a better framework for its usage could be found. Considering the attractiveness of the location of the Port, all interested parties should be connected through the development of a comprehensive development study and harmonize their interest, and such study should define capacities and offer optimal solution and compromise between functions of the cargo and passenger port with commercial moorings, with the possibility to also create free zones on the smaller part which is in the Coastal Zone area).
Port Risan **–** improvement of the cargo transshipment technology;
(Continuation of the tradition of the shortest connection of the Littoral and Northern part of Montenegro and Nikšić as center)

Commercial function:
Port of Bar **–** reconstruction of existing building facilities for the commerce function; construction of new

commercial and distribution and business subsystems; construction of parking spaces with ancillary and service business activities; completed existing traffic and technical infrastructure;

Industrial function:
Port of Bar **–**building of production capacities in accordance with the results of relevant analyses.
Taking into consideration the available capacities and perspectives of development of all main port functions, it is clear that the main role, as far as the system of Montenegrin sea ports is concerned, in integration of the participants in the transportation system belongs to the Port of Bar. In order to achieve the high level of exploitation of its capacities and potentials it is necessary to provide the following:

- quality infrastructure and services;
- busy and reliable ship lines on the principle of short sea navigation;
- good connections with railway and road networks;
- focusing of development projects and investments on terminals for containers and ro-ro traffic;
- simplification of regulatory framework, coordination of customs and inspection authorities and creation of *on-stop* offices for all administrative formalities;
- clarification of roles, functions and cluster associating of all participants in transportation logistic chain;
- integration of information systems of operators, users and state authorities and enabling of electronic forwarding of all administrative data.

The focus is on solid unity with railway system through inter-modality and combined transportation, i.e. practical application of the concept of so-called *Motorways of the Sea*.
The competitiveness of the core port activity may be solely realized through parallel development of distribution centers and adding value to stored goods for transit traffic in the work regime of a free zone. The realization of the mentioned results is primarily conditioned by intensifying of transit traffic.

It is necessary to establish an efficient system for protection of environment in ports, which goals should be harmonized with the main strategic commitments in the domain of environmental protection in Montenegro. Special impulse for optimization of negative impacts on environment, in respect of performance of port activities, is the modeling of the system for environmental protection management in accordance with the range of standards JUS ISO 14000. For the purpose of realization of the policy of environmental protection of Montenegro and undertaken international commitments, the following principles should be applied for activities in ports: undertake preventive actions for disabling possible pollution or destruction of environment, as well as technological accidents; through planning provide for adequate safety distance between potential sources of danger and sensitive potentially threatened facilities and activities; establish, organizationally and materially provide for the system of prevention and protection from accidents; as a final measure, envisage technical-technological solutions for rehabilitation of existent ecological problems and required systems for purification of water and air, i.e. regulated acceptance of ballast waters.

2.3.2.5. Free zones

Montenegro committed to encourage the inflow of foreign capital and free zones would be particularly attractive for such capital.
In that respect, numerous customs, tax, location, organizational and other exemptions are expected, and therefore free zones will be very demanded development centers but strictly directed on sustainable capacity of the area.
Spatial, location and development possibilities of the zones are very qualitative, and it is important upon the realization of systemic conditions to carefully select development programs as to observe eco-industry development strategy as much as possible, which is particularly significant for this sensitive area.
Free zone of Bar has extraordinary spatial conditions since, with 250 ha and developed space of 10.000 m2 that it currently has, it has total spatial area of 600 ha in the hinterland provided.
Traffic advantages of the Zone are extraordinary for maritime and air traffic (airports in Tivat, Podgorica, Dubrovnik and Tirana), as well as the road traffic which was improved by the construction of the tunnel through Sozina.

Free zone of Kotor includes two parts. The first part is the Business Center Škaljari, at the location of former industrial zone, of about 20.000 m2 and it is planned for construction of modern business trade center. The central position in the settlement provides great possibilities for development of this center, particularly for the reason that the Zone relies on the Port of Kotor, then shore traffic route through the Bay, and Tivat Airport is in the immediate vicinity.
The other part of this Zone, i.e. Commercial Zone also covers the area of about 20.000 m2, located in the free space in Grbaljsko polje with extraordinary traffic possibilities, space for expansion (production, processing, working up, sorting of goods) and complementary already developed industrial capacities.

The possibility remains that a free zone gets organized within the Port of Zelenika, but a larger part of capacities should be envisaged in the part behind the Adriatic High-way, not on the shore itself, which is already too crowded.

In accordance with the Law on Free Zones, it is possible to establish other free zones in the area of the Coastal Zone, if needed.

2.3.3. Agriculture and Complementary Activities

Agriculture is not significantly present according to the size of its land in the Coastal Area, but is very important with its mainly Mediterranean cultures for the local inhabitants and as a complementary tourism business activity, creating thus united sustainable development of these two for the Coast important economy fields.

Exceptional natural conditions for culture growing – especially olives, citrus fruits, new fruit species, medical herbs, spice herbs, vegetables and vegetable seedlings, flowers and their seedlings, impose the need

of an offensive state policy for stimulating, financing and intensive development of agriculture.

The strategy for integral sustainable development of eco-agriculture and ecotourism means large engagement of the State on concrete projects:
- the main development courses are: citrus fruits, winter and other vegetables, dairy cattle and poultry raising, flowers, medical herbs, seedlings for vegetables and flowers;
- force the development of healthy food with diverse incentive measures, and especially provide the most qualitative food to be adequately paid through high tourism
- modernise the education of agriculture cadres in schools, and especially in the terrain with continuous consulting work of experts from institutes in order to optimally make usage of all the opportunities for intensive development of eco-agriculture;
- establish a bank for developing farms which would unite domestic and international funds for favourable crediting of this important sector;

Olive growing is an important development direction of the Coast, especially since the present planted 2,800 ha are enough to satisfy domestic needs so the placement on the market is provided. Changing the selection of the new plantings should be emphasised and should be more orientated to eating olives. It is necessary to organise irrigation, which would multiply increase in yields in contrast with the present, especially where the olive trees are located on terraces which are poorly cultivated, and most of the work is spent on mowing grass and fruit picking, and all that with no irrigation.
It is necessary to maximally modernise the existing plantings and separately plant new ones – a 130 ha seedling is planned with all the necessary equipment, irrigation, fertilising etc. with multiple yields.
Citruses (tangerines and oranges) are especially valuable sorts, so 250 ha of tangerine trees are planned to be planted, and 50 ha of oranges trees (at the moment there are 270 ha under citruses), and it is estimated that the yield would be 35 tons /ha.
When it comes to vineyards, purpose changes are planned primarily to table grapes with 60% in regard to wine grapes, and within the table grapes early sorts should be planned with 50% and late with 20%. Figs are very abundant with about 16 kg/per tree, and at the Coast there are more than 100,000 trees, that is the total annual production of 1,600 tunes, but planting and production of figs should be substantially intensified because of insufficient space, high yield and the quality of the product which especially favours the exquisite climate.
Actinidia or kiwi is a very qualitative fruit rich with vitamins with a large possibility for intensive growing at the Coast with the yield of around 20,000 kg/ha and the total possibilities are over 3,200 tones annually.
Other fruits characteristic for this climate are: pomegranate, almond (especially productive because of the high price of the central part), but the conditions are also good for growing apples, pears and especially peaches which should be forced.

It is necessary to activate the agricultural land in the abandoned fields, the most valuable potentials for agricultural development, which have because of certain conditions become neglected but the possibilities for their activation are vast. It is important to regulate the issue of returned agricultural land systematically.

It has been estimated that with adequate investments the fields could be returned to the previous capacities and those are:
- The Ulcinj Field with 100 ha (revitalise 50 ha of an eating olive plantation with 10,800 trees; plant 50 ha of a tangerine plantation with 35,000 trees or eating olive trees; renovate the irrigation system; renovate the wind protection zone of 3,500 cypress trees; activate the plant for olive canning; activate the plant for packing tangerines);
- The Zoganjsko Field with 110 ha (activate the already built reclaimed system; activate the project for planting eating olive trees on 60 ha; activate the project for planting tangerine trees on 50 ha;
- Štojski pijesci (Štojski Sands) with about 1,000 ha (activate 1 ha - greenhouses for flower growing; 1 ha - bulbs; activate the 3 ha greenhouse – once high-quality nursery plant vegetables were produced here; activate the extremely qualitative and large surfaces for early quality vegetables, nursery plants etc; realise a minimum of 200 ha for growing early vegetables; plant 20 ha of aromatic spice herbs; plant 100 ha of medical herbs - lavender, tansy, rosemary; plant 300 ha of tangerines; plant 150 ha of eating olive trees; introduce new fruit types (avocado etc) and always look for optimal sorts;
- Ada – at the mouth of the river Bojana and the space along the river Bojana (it can be irrigated by open channels rich with fish; plant on the cultivated land intensive cultures of citrus fruits, eating olive trees; develop larger quantities of cage fish farms along the river Bojana; 10 km upstream along the river Bojana there is suitable land to the Šasko Lake for intensive cattle breeding - meat, milk, eggs; activate the project for pumping water form the river Bojana at 300 lit/sec by Sv.Đorđa for irrigating 1.000 ha);
/The Municipality of Ulcinj has 60% of coastal agricultural surfaces and is ideal for activating sustainable tourism and agriculture development/.
- Mrčevo Field with 220 ha (plant 100 ha of peach trees; plant 60 ha of eating grapes; plant 60 ha tangerine trees; renovate the wind protection zone; renew the irrigation accumulation ”kap po kap”; activate the cow farm; activate the poultry farm; activate the plants for vegetable processing);
- Tivatsko Field with 80 ha of reclaimed land (renovate 20 ha of eating grape vineyards; plant 20 ha of peach trees; plant 25 ha of orange trees; activate 10 ha of greenhouses for flower growing and seedlings);
- Sutorinsko Field with 120 ha (restore 30 ha of eating grape vineyards; plant 20 ha of pear trees; plant 30 ha of peach trees; plant 10 ha of vegetables and spice herbs);
- Barsko Field with 90 ha (mainly under building facilities, unsuitable for agriculture, but could partly be activated by intensive fruit and vegetable cultures, seedlings, flowers etc.).

In the immediate contact belt of the Coastal Zone it is necessary to avoid the usage of chemicals and fertilisers because of the possibility of contaminating the underground waters and sea water in the inshore sea.

All the listed programmes were once realised as exemplary properties, but because of the uninventive governmental sector, later because of returning the land to the unprepared private owners and because of the general ill-treatment of agriculture they were abandoned and neglected.
According to plans it has been assumed that at the Coast it is possible to realise the production of fruits and grapes for the local inhabitants and tourism in the following quantities: citruses 13,334 t, olives 4,958 t, kiwi 5,700 t, apples 585 t, pears 1,044 t, peach 2,100 t, almond 252 t, figs 5,760 t, cherries 250 t, pomegranates 2,720 t, grapes 5,785 tons.
According to these plans the possible production of fruits and grapes is about 43 thousand tones, and the consumption around 18,000 tons, so that for processing and other markets remain about 25,000 tons, of which the largest part can be directed for processing for juices, jams etc.

The previous analyses indicated that in the prior system agriculture did not develop in accordance with expectations, but also could not having in mind the system frameworks and the total neglection of this sector. Because of that and the uncritical favouring of industrialisation as well as urbanisation, and thus neglection of villages, villages have been destructively devastated with numerous inconvenient consequences.

At the Coast there are great prospects for this tendency to be stopped, but only with a clear development and incentive policy concerning sustainable development, that is ecotourism and eco-agriculture.
The idea is for ecotourism and eco-agriculture to be treated as a one united product which is the only one that can in the real way valorise the advantages of the Montenegrin Coast and have the effect in high returns from these sectors in the next period.

By a gradual but continuous quality increase of the complete tourism service with healthy food the essence of the picture of a poor Montenegrin destination would be changing and thus on the basis of the new image the number of foreign tourist visits would be increasing. In accordance with the quality offer increase the number of foreign visits will increase and the foreign currency revenue of the Republic, which is in everybody's interest. That is why a completely new development strategy of these two tightly connected sectors is being suggested – according to a unique program with many incentive measures modern, effective, ecotourism and eco-agriculture orientated new farms, not houses, will be built and reconstructed – village households which will have financial, educational, marketing and every other kind of support of this kind of village tourism.
In the area of the foothill, that is on the hill and mountain slopes especially to the crests, but also in the whole region beyond the crests and all the way to the borders of the continental municipalities development of eco-farms should be provided: cattle; goats; sheep; horses; rabbits and fur-bearing animals; hunting dogs; medical herbs; bees.
These farms would be the integral part of the unique ecotourism offer of the Coast, and Montenegro as a whole, which would be producing "organic" or "healthy safe" food and directly selling it to the collection and distributive centres in Bar, Budva, Risan and other places, where additional processing capacities would be developed, where the healthy food quality and status would be evaluated, and would be attested, packed contemporarily and distributed according to an agreed structure through upper class hotels, and the remaining amounts would be sold on the growing but demanding domestic and foreign market.

Food contamination especially in Europe and the fear of unforeseeable consequences opens exceptional opportunities for gradual, thorough and strictly controlled development of producing "healthy" food , which will be highly controlled and attested with our but also renown European attests, contemporarily packed and designed and thus highly evaluated placed on the growing and high-paying market. This especially when having in mind certain tourist categories, thus children, elderly people and similar groups of the high-income category of foreign consumers.

In the greenhouses and glasshouses (1,000 m2) with additional heating on gas oil during the whole year you can produce: tomato, cucumbers, lattice, in three cycles; during the winter: lattice because it bears the low temperatures, (the production period is 2 months, yield 3,000 kg on 1,000 m2), in the spring: tomato because of the bigger need for heat (time needed is 5 months, yield around 8,000 kg on 1,000 m2), and in the autumn cucumbers (a large production, it is picked 7 weeks after planting and the yield is 1,000 kg on 1000 m2).

Medical herbs is one of the suitable sectors for more complete valorisation of the economical advantages of the Coast, especially as it offers great opportunities from the aspect of sustainable development, healthy food, and is complementary to the basic sector of ecotourism. The possibilities of picking and producing medical herbs are considerably increased by the activation of two processing plants in Risan and Ostros.
The conditions are especially suitable for picking sage (Montenegrin wormwood), rosemary, laurel, wormwood, oregano, teucrium chamaedrys, thyme, Klamath weed (bogorodičina trava), cultivated and wild mint, juniper bush and other kinds of medical herbs.
Only in the Risan plant it is estimated that the annual production could reach even 10 million dollars with good organisation of collecting and purchasing, and thus appropriate marketing, and even more if including the plant in Ostros.

Honey and honey products are especially suitable types of high profitable production with the outstanding possibility at the Coast both because of the flower riches that the bees use and the quality of the honey from this region.
Enrichment of honey with especially qualitative and medicinal additives of certain herb species (thyme, frangula etc) is used more and more in preventive and curing purposes and thus the price is higher.

Adequate development of horse breeding would upgrade the existing tourism potentials of Montenegro to the level of exclusivity, with which nature has granted this region. By establishing only three horse farms with relatively modest means a real marketing tourism miracle would be made – we would become a tourism destination of top quality with which the holy trinity of

quality would be created – exquisite nature, adequate hotels of top category with following facilities and horse farms of the most attractive horses in the world.
Because of the race characteristics, endurance and modesty in needs, and because of the need to improve the domestic breeds it is necessary to establish one horse farm of Arabic full-blooded horses in an environment similar to their homeland, for which a karst field is suggested, but near the highway, according to which the most convenient area would be the Brajići area between Budva and Cetinje. For a horse farm of Lipizzaner horses Lastva Grbaljska is suggested, and because of the climate for the Ahaltekian horses the most suitable area would be along the Velika plaža Beach in Ulcinj.
Besides the role of increasing the quality of the Montenegrin Coastal tourism destination, as well as providing breeding material for enriching the race of the domestic mountainous horses, the financial expenses for establishing and maintaining of the horse farm would be provided form selling the increase in heads, but also from stable income form entrance fees for visiting the horse farm, horseback riding, horse training, driving etc.

Because of the favourable natural conditions and soundness of the hunting habitat hunting development is possible on the basis of controlled breeding of game. If it should, eventually, at some special request, come to forming “farms” of deer and mouflon games, then it would be necessary to select for their locations less attractive natural locations, while for the selection of the hunting breeding location (untypical farms!), especially feathered games some more attractive natural areas could be selected, for example on the peninsula Luštica. Favourable locations for these breeding places are out of the zone of the Coastal Zone.
The possibilities for breeding game/breeding locations or farms/ in the wider area of the Montenegrin Coast should be valorised more than up to now, both because of the high reputation of game meat and because of the need for changing the already unsafe meat of the regular cultivated - stall-fattened types ("mad cow illness", foot-and-mouth disease etc.).

2.3.4 Industry

Strategy and projections of industry development in the seaboard is a very sensitive issue which most directly determines the overall development strategy of this area, taking into consideration the harmonization of very opposite interests and development commitments.

With respect to all risk factors and commitments of Montenegro as an ecological state it is necessary to define fully i.e. rigorously the conditions related to environmental protection for each proposed development program individually, so this business area would fit into general development strategy of the Littoral. Otherwise, consequences would be devastating for overall development of the region.

Strategic industrial areas in the Littoral are: port-industrial complex in Bar with a free zone, Adriatic Shipyard Bijela and Industrial and Free Zone in Grbaljsko polje.

The zones of local significance for development of industry are smaller areas in Tivat, then in Sutorinsko and Ulcinjsko polje.

In the development of specific industrial capacities, the ecological and spatial protection of this region should particularly be taken into consideration given their specific significance for tourism.
- taking into consideration the available resources, revitalization and development of new processing capacities from the area of Mediterranean agriculture (production of juice, olive oil) should be particularly taken into consideration, then capacities for fish processing and production and processing of sea salt.
- development of specific processing capacities and capacities for development of transport means and port machinery as metal-working industry capacities and mechanical engineering capacities
- in the function of sustainable development necessary is the development of industrial capacities for processing and use of secondary raw materials – waste, particularly from energetic aspect.

2.4. Traffic

Traffic system of Montenegro is based on general goals that are to be achieved: connecting of all municipal centers, main bearers of economic and tourist development, then centers of local significance. Solid traffic connection of the Republic with the neighboring region and broader with Europe has not been realized yet.

Significant changes that occurred after 1990 resulted with adoption of Amendments to the Spatial Plan of the Republic from 1986 which changed the general concept of development, particularly with regard to priority and dynamics of realization of new requirements and needs in space, inevitability of development of new or updating of the existent plans for development of infrastructural systems, then the need for mutual harmonization of strategies of individual areas with the spatial plan.

2.4.1. Road Traffic

In accordance with the Decision on Amendments to the Spatial Plan of the Republic of Montenegro until 2000, spatial concept of the development of the road network relies on two transversal and three longitudinal directions of connection, which create the basic system of roads of high-way significance on the territory of Montenegro.

Transversal directions are taking the northeast-southwest position. They have a crucial role in the spatial integration of the Republic, since they mutually connect three regions which differ by structural features: North, Middle and Coastal in one whole. From broader aspect these directions connect Serbia with Montenegro and its Coast, i.e. with Port of Bar.
Longitudinal directions are set along each of the three regions. They have the effect of traffic arteries at internal level, connecting specific centers mutually, while at the broader level they realize interregional and inter-republic network of Montenegro with neighboring Bosnia and Herzegovina, Croatia and Albania.

The focus of development of the network of road traffic is on those road directions that support development needs of the Republic, in accordance with proposed concept of spatial organization, taking at the same time into consideration their economic significance and development role, then technical standard in broader Yugoslav and European area.

In accordance with the long-term concept of spatial development of road traffic in Montenegro, Spatial Plan of the Republic, and therefore spatial plans of municipalities, provide for spatial conditions for classification in the categories of high-ways, roads reserved for traffic of motor vehicles, which in principle are supposed to go round larger towns.

In the area of the Coastal Zone there is almost no road network, but it is the network in the zone of immediate impact that is of importance for its functioning.

According to the rang of planned roads they are as follows

High-ways:
* Adriatic high-way: Debeli Brijeg - slopes above Herceg Novi - Čevo - Podgorica - (western round-about of Podgorica) - Smokovac. From Podgorica to Mateševo established are two corridors as follows: basic, Smokovac - Kuči - Veruša - Mateševo and reserve one, Smokovac -Bratonožići - Veruša - Mateševo, with the obligation of further research of the terrace under the same technical and traffic-exploitation conditions. The continuation of the road towards Kosovo and Macedonia is defined by the direction Mateševo - Trešnjevik (tunnel) - Andrijevica - tunnel in the district Čakor - Peć.
* High-way Belgrade - Montenegrin Coast: border of Serbia, in the district Boljara - Crnča -Berane - Andrijevica - Adriatic high-way - Podgorica (Tološi) - Virpazar - Sozina (tunnel) -Bar.
* High-way Podgorica - Skadar: Podgorica (Farmaci - south round-about of the town) - Tuzi - Albanian border, with the obligation of more detailed spatial and project research of an optimum corridor.
It is significant also to mention so-called Adriatic-Ionic initiative for creation of quality road corridor from Greece through Albania, Montenegro and Croatia to Italy. A part of terrace is already drawn with proposed network of roads.

Road reserved for traffic of motor vehicles
* Fast traffic route along Montenegrin coast: Ulcinj - hinterland of Bar - hinterland of Budva - hinterland of Tivat - bridge across Boka Kotorska Bay in the section of Verige - connection to Adriatic high-way in the district of Herceg Novi.

High-ways:
* Priboj - Pljevlja - Žabljak - Šavnik - Vojnik (shorter tunnel) - connection with the high-way Nikšić - Srbinje - Vilusi - Grahovo - Risan, with the connection to Adriatic high-way and fast traffic route (semi high-way), Montenegrin coast as well as to the road Nikšić - Cetinje, with the connection to Adriatic high-way.

Regional roads:
* Radanovići - Cetinje
* Risan - Vilusi - Grahovo - Nikšić
* Ulcinj – Vladimir – Ostors – Virpazar - Rijeka Crnojevića - Cetinje (reconstruction of the existent road).

In addition to these traffic routes which have global and regional function of connecting, it is significant to mention that in the area which borders with the Coastal Zone it is necessary to develop a network of local roads that would functionally connect all points of interest in this area.

As a specificity on larger part of the area within the borders of the plan it is possible to construct paths along the sea (lungo mare) which will primarily have recreational function, and at some sections service function too (where there is no other access).
It is planned that this path should be intended for non-motor movement (pedestrians and cyclists), with the possibility that on parts, where justified, it should serve for movement of specific transport vehicles (small tourist trains and the like).

This plan provides for conditions, and more precisely define this type of traffic route it is necessary to develop in further break down of plans and projects of specific sections of the shore.

2.4.2. Railway Traffic

According to existent development plans the railway Belgrade - Bar remains the only one in this region, therefore railway station Bar and railway stop in Sutomore will be retained.

2.4.3. Maritime Traffic

Maritime security

The basic task of the Administration for Maritime Security is to ensure conditions and execute tasks deriving from international obligations, that the State took over by signing conventions, agreements and protocols. This activity is based on construction, setting up and maintenance of maritime lighting on navigation routes, organization of radio service on VHF and MF frequencies, technical examination of vessels and floating facilities, (for the purpose of determining their navigation capabilities), searching and rescuing on the sea and preventing of polluting of the sea by vessels.
The Law on Maritime Internal Navigation defines the navigation route in the shore sea as a stretch sufficiently deep and wide for safe sailing of ships, which is even marked if necessary.
Maritime navigation is performed on the sea, on the rivers of Adriatic basin to the border to which they are navigable from the sea side, on the Skadar Lake and Rijeka Crnojevića.
In territorial and shore sea of Montenegro, in the sea stretch of 12 Nm from the border line which connects the most protruding points, there is state sovereignty, and the regime of navigation is adjusted to corresponding international conventions.

Total length of navigable route in our shore sea amounts to 66 Nm, i.e. 122.2 km, which is the distance between the end ports in this route, from Sv. Nikola (basin of the Bojana) to Kotor. Out of total length of this route 50 Nm (92,6 km) is related to the open sea, while the length of navigable route in the Boka Kotorska Bay amounts to 16 Nm (29,6 km).

There are various criteria for classification of navigable routes. The most significant is the geographic criterion based on which they are classified as overseas, coastal and port navigable routes.

Eastern-Adriatic navigable route from the Strait of Otranto along eastern coast of the Adriatic to the most northern ports. It leads from the coast at the distance of 5 to 10 km, of its most protruding points, i.e. in the zone of visibility of facilities for navigation security. The width of this route by rule amounts 2-4 km.
This navigation route is used by ships which destination is one of the ports on Montenegrin coast, or one of the ports in its immediate vicinity. It is intersected by transverse navigable routes which connect ports on Montenegrin with ports on Italian shore (Bar - Bari, Bar - Ankona, Kotor - Barleta, Zelenika - Barleta).

These routes are continued by port navigable port routes which lead towards the ports on the Montenegrin shore which are open for international maritime traffic (Bar, Budva, Kotor and Zelenika). All these navigable routes have the character of international and overseas routes, since they connect the ports of states which are located along the Adriatic Sea as well as the ports of overseas countries.
The width of these navigable routes by rule is no less than 100 meters, at the distance of 300 meters from the shore, while in the narrow passages of Verige and at Kumbor there are special regimes valid.
In the coming period it may be anticipated that navigable route along the Bojana River will be established which would revive the earlier connection the Skadar Lake - Adriatic Sea, this time with tourist function emphasized. This implies the identification of a joint interest with the Republic of Albania with regard to regulation of that route with marking by facilities for navigation security and establishment of adequate services.

Forthcoming also is the establishment of a navigable route along the coast for line and excursion traffic along our coast, and particularly within the Boka Kotorska Bay, as well as its connecting with Dubrovnik. The frequency of traffic will also increase on all navigable routes, particularly on the transverse ones that connect Montenegrin and Italian coasts.

Navigable routes must be marked with required facilities for navigation security (in accordance with international regulations and the system of modern technology), which include: light houses, shore lights, buoys and other signalization, signal and radio - stations, optical, sound, electrical, electronic and other devices for safe navigation on the sea and navigable routes in ports.
This infrastructure has direct significance in respect of provision of conditions for safe navigation, and indirect in respect of realization of economic effects on its use. Users, i.e. owners of vessels (boats, yachts and ships) which navigate under domestic and foreign flag pay fees for using facilities for safe navigation in the coastal sea.

For the purpose of increasing the level of safety of navigation, technical and technological modernization with new systems of communication (GMDSS - Global Maritime Distress Safety Signal) are necessary.

Generally, modernization and strengthening of maritime administration needs to be undertaken in accordance with the provisions of Paris Memorandum of Understanding which is related to fight against below-standard ships and ports and European Maritime Safety Agency (EMSA), which goal is to provide high, unique and efficient level of maritime safety and prevent polluting of the sea by ships.
The focus of this activities is on:

- searching and rescuing on the sea;
- preventing and disabling polluting of the sea by ships and
- strengthening of the function of shore guards through coordination of activities and unification of resources of all state authorities which are included in the work of Coordination body of the shore security.

The final goal of these activities was to form national shore security.

Port authorities

Port authorities are regional authorities of the Ministry in charge of traffic activities, which perform administrative and other professional operations from the area of maritime navigation, to provide for safety of navigation in this area.
Port authorities realize their responsibilities through regional units - branch offices.
Port Authority Kotor - enforces its functions through branch offices in: Herceg Novi, Zelenika and Tivat.
Organized like this it enforces its function in the area from the border of the Republic of Montenegro and the Republic of Croatia, i.e. from the Cape of Sv. Nedjelja on peninsula Prevlaka in Boka Kotorska to the Jaz River i.e. in the length of 140.8 km and the part of belonging coastal sea.
Port Authority Bar - enforces its functions through its branch offices in Budva, Ulcinj and Virpazar. This means that its competence comprises a part of sea, river and lake shore. The subject matter is the sea shore at the area from the Jaz River to the confluence of the Bojana (120.3 km), right bank of the Bojana River (around 40 km) and the Skadar Lake shore (around 171 km) or total of 331.3 km of shore.

Port authorities also take care of the protection of the coastal zone and have the function of an executive body in case of pollution of the sea by ships.

In the coming period it is necessary to eliminate the problems that arise in work of port authorities such as: issue of technical equipment which limits the enforcement of functions envisaged for them by Law; nonexistence of other suitable services on the sea (service for searching and rescuing); inadequate equipment and functioning of port and other services; unreliability due to outdated data, use of plans of ports, nautical maps, navigation routes.

Local maritime traffic

Development of small size coastal navigation certainly must represent a significant segment of development of maritime shipping industry. In its development it is necessary to take into consideration the level of its complementarity with specific core industrial activities, primarily tourism, turnover of goods and development of fishing. The planned dynamic development of these activities will undoubtedly require development of small size coastal navigation and cabotage in accordance with future market needs. This means that moving forward to meet these needs it is necessary to plan adequate space on land and water, for the purpose of its efficient use, construction and overhaul.

Particularly it is necessary to pay attention to creation of spatial capacities for local passenger traffic (through adjustment and repair of existent and construction of new piers of local significance). This form of passenger traffic in the area of the Coast has the greatest potentials and it is mostly demanded due to completion and formation of a more complete tourist offer in our territory. Natural need of tourists to get to know the area where they are spending vacation or are staying there for another reason as well and as much as possible has not been so far used in proper and organized manner by our tourist and shipping industry workers.

In the area of the Coast there is a large number of attractive sites. Their attractiveness is diverse and includes quality beaches, interesting landscapes, gastro facilities with gourmand specialties, locations for sports activities particularly fishing, as well as cultural historical places, interesting architecture, sacral facilities, artistic treasure etc.

Here is a review of lines of local excursion traffic which would be economically viable: Herceg Novi - Rose, Žanjice; Herceg Novi – Isle of Sv. Marko, Kotor - Peraštanska Isles, Kotor - Žanjice, Mamula; Kotor - Bajova Tower; Budva – Kotor; Budva – Jaz; Budva – Sveti Nikola; Budva - Miločer; Budva - Petrovac; Budva – Sutomore; Budva – Ulcinj; Bar – Ulcinj; Ulcinj – Ada.

This does not exhaust all the possibilities for development of excursion traffic. In addition to the mentioned locations there is also a large number of excursion spots that would be attractive for organized visits, but specific problems are created by poor possibilities for acceptance of vessels, whether they are inaccessible shore, low draught etc.
In that respect the obligation should be envisaged for business entities that are interested to exploit these locations, to build a part of acceptance capacities for vessels. Such acceptance capacities (jetties, piers,...) must be not only in accordance with vessels which are currently intended to bring excursionists, but to provide a reserve for development.

In addition to excursion lines Montenegrin Littoral is very attractive for tourist cruise trips along the shore. Such trips would primarily be directed on sightseeing of natural beauties with possible stops at specific sites. Such lines would include whole shore from Ulcinj to Kotor, or just some of its parts (e.g. Boka Kotorska Bay or Budva Riviera etc).

At this section of maritime traffic, traditionally engaged are smaller vessels that may transport from 80 to 180 passengers. Frequently they are the vessels that were subject to transformation (fishing boats converted into tourist vessels, smaller working boats, yachts, etc). Their speed ranges from 10 - 15 knots. Taking into consideration the distances they take and their purpose (sightseeing, entertainment,...) this speed is quite adequate. Since their engagement is mostly related to seasonal work, it is little probable that engagement of expensive, fast and modern vessels would be cost-effective according to economic criteria which are valid for shipping industry or tourism.
Special problem in engagement of these ships is the observance of safety aspects and ecological aspect of their exploitation. In most cases these ships have not only the restricted number of passengers but restricted areas of navigation too.
The observance of these restrictions is a precondition of long-term development of this form of shipping industry and it should be paid special attention. Particularly since the operators racing for profit are prone to not observing them.

In addition to these lines on our coast, there is navigation on the Skadar Lake as a very attractive segment of excursion tourism as well as the visit to attractive sites such as Plavnica, Virpazar, Rijeka Crnojevića. This region is possible to be connected with the Coast by navigation along the Bojana River or through combination of navigation on the lake with bus transportation to the Coast.
With regard to local traffic, the possibilities of using vessels for special purposes should be pointed out, such as:
- ”exhibition” ships that would travel along the shore and in ports would provide tourists with the possibility to see the exhibitions of pieces of art, antiquities or even exhibitions of products of specific producers - ”fair” ships
- ”shop” ships would cruise along the shore and offer tourists to buy various attractive items, etc.

Operational quay

An operational quay form of a built shore implies a built operational quay infrastructure for provision of simple (piers and moorings) - to services of the highest level (marinas and ports).
In respect of the level of construction of port infrastructure, types and levels of provision of services, constructed operational quays may be classified as: *postas*, small mole-closed harbors, moorings, piers, marinas and ports.

A *posta* is a space on constructed shore that serves for pulling out of fishing nets. They are mostly located in Boka Kotorska. The tendency should be stopped for a part of them to be used as boat quays with some corrections which disable its core function. It is necessary that *postas* be preserved in their original form as much as possible.

Small mole-closed harbor is an artificially fenced part of the sea that with the size and depth of water area enables berth and protection from bad weather for vessels with adequate dimensions and draught.
Due to the manner of construction and material used for construction (stone), they are a specific ambiance - architectonic feature of Boka Kotorska and that is almost the only place where they can be found.
The right to berth and small mole-closed harbors used to be acquired based on the ownership right or vested right. The berth in the small mole-closed harbor and in the anchorage is free of charge.
For the purpose of economic valuation of existent small mole-closed harbors and therefore raising of funds for putting a number of them into function, as well as for their maintenance the following would be required:
- make small mole-closed harbors, which for various reasons are not functional, serve their purpose,
- mark berths and introduce monthly, i.e. annual fee for berths,
- form an anchorage at specific sites where they would not disturb the navigation safety and other commercial and noncommercial activities on the sea, and
- mark and charge use of the anchorage.

Pier is a constructed part of a shore which provides conditions for berth of vessels and for performance of simple harbor operations (embarkation and disembarkation of passengers and smaller quantities of packed cargo).
Except for tie-up facilities for berths they don't have any other constructed infrastructure. Some of them, such as Muo and Dobrota, occasionally are used for smaller harbor operations within the Port of Kotor.
The arrangement of piers in relation to total length of Montenegrin shore shows high spatial concentration in the Boka Kotorska Bay (around 90% of total pier shore and 70% of operational shore of all piers on the shore).
This is an extremely high built potential, which due to undeveloped nautical turnover and lack of local maritime traffic, outside its purpose, let to get ruined and seriously threatened. This is why they are to be rehabilitated.
Some piers, in places interesting for nautical tourists (e.g. Perast, Prčanj and other), should be provided with minimum requirements related to nautical tourism facilities.
Rehabilitation of these, and other piers which are not particularly attractive for nautical tourists, is possible to be realized through inclusion in local maritime traffic or through excursion tours.
Also, envisaged is their construction at locations of future construction of tourist facilities i.e. swimming beaches accessible from the sea.

Through establishment of the navigation route along the Bojana River, the rehabilitation of the piers Sveti Nikola and Svač on the Bojana will be achieved.

Marina is a nautical tourism facility along the naturally or artificially protected water areas specialized for provision of services for berths, supply, safe-keeping, maintenance and servicing of vessels, as well as other services in accordance with the requirements and specific needs of a nautical tourist.
Marina as a nautical tourism facility, is a specialized tourist port which water area is naturally or artificially protected. They are capable of acceptance, providing supplies to crews and tourists, maintaining and equipping vessels, with direct pedestrian access to each roll on vessel and can be used at any moment.
Nautical tourism facilities in business, spatial, building and functional aspect make a whole or within a broader spatial and building whole they have a separate space and necessary functionality.
Marinas are subject to categorization, depending on the level of equipping with nautical infrastructure, types, scope and quality of services they provide, from category one to category five.
/proposed system of marinas and other nautical points is presented in the section on tourism /

In addition to Port of Bar, the **ports** for international traffic Kotor, Risan, Zelenika and Budva will participate in maritime traffic.
/features of these ports are already demonstrated in the segment of maritime industry /

2.4.4. Air Traffic

The development of airport is projected in the long-term development strategy of the public company ”Aerodromi Crne Gore” (Airports of Montenegro) in order to meet the projected demand and to provide high quality services. The role of airport is also defined in the system of air traffic of Montenegro. It is planned that

airport in Podgorica is developed as the airport of the capital, and the airport in Tivat is developed as regional airport, which would provide adequate level of services for tourist and charter transport.

Airports in Podgorica and Tivat are the facilities of primary importance for traffic infrastructure in Montenegro.

Airport in Tivat is the second important airport in Montenegro, which provides direct access to tourist centers at Littoral and has key role for the tourism development.

Besides its basic role, the airport Tivat is an alternative airport for all airports in the region, particularly for the airport in Podgorica.

For the provision of the spatial conditions of the airport location, it is necessary to project the maximum category of the airport in the future. Based on the role and the place of the airport in the air traffic of Montenegro, the categorization of the airport has been performed – for the airport Tivat is projected 4D (ICAO categorization).

The similar strategy is applied for the development of the airport in Tivat, as it was for the airport in Podgorica. The development is divided in several steps, and the first step is the realization of the project of airport modernization. The initiation of the transition from one phase to another is not tied to certain time intervals but it depends on attaining the appropriate capacities.

The current spatial limitation largely impacts on the accomplishment of the development plans, so that steps need to be taken in the future to increase the territory of the airport in order to provide the conditions for the airport development and its safe exploitation.

The current passenger zone of the airport in Tivat is bordered by airport platform from one side, and by road Tivat - Budva from the other side. It has insufficient spatial capacities to meet long-term development needs. Additional land from both sides of runaway of the airport should be obtained to provide conditions for long-term airport development.

Besides the provision of additional land, a series of interventions at the existing travel infrastructure should be performed to provide the conditions for future development of the passenger complex at the airport. To wit, the route of the existing motorway Tivat – Budva should be removed north from the existing route to provide spatial conditions for further expansion of the terminal building facilities. The new platform should be constructed as well as the space for commercial activities should be developed. The conditions for expansion of the main airport path should be provided. It is needed approximately 100 ha of land for these purposes.

The area southwest of airport for the construction of new runaway is proposed in the Master plan for the airport with basic path of width of 300m, which would completely meet international conditions for instrumental landing.

In this case, the existing path would become parallel taxiway, and simultaneously the additional spatial capacities would be provided for the development of platforms and other supportive facilities. Land of 200 ha should be set aside for the development of new runaway, and for the space for the future platforms and building facilities in the southwest part of the airport complex.

2.5. Technical Infrastructure

2.5.1. Water Supply

Long-term supply of Montenegrin Littoral will be accomplished through the development of regional water supply system that would connect distributive networks of coastal towns.

Towns at the Montenegrin Littoral, Herceg Novi, Ulcinj, Kotor, Tivat, Budva, Bar and Ulcinj are supplied with water from local springs, with inappropriate water intakes, which do not have sufficient capacity to meet increased needs during the tourist season, and there is also high reduction in water supply during summer season.

The networks are obsolete, water losses due to leaking are over 60%, there is high lack of reservoir space, which contributes to the increase in reductions.
Municipalities Herceg Novi, Bar and Ulcinj have sufficient water quantities from local springs to meet all current needs.

The sectoral study 4.4 ”WATERPOWER ENGINEERING AND HYDRO-TECHNICAL SYSTEMS” for the needs of development of the new Spatial Plan of the Republic of Montenegro (Urban Planning Institute of the Republic and the University of Montenegro) showed that **total of 2.186,2 l/sec** of hygienic fresh water should be provided for coastal municipalities.

Municipality	Total needs (l/s)
Herceg Novi	424.38
Kotor	273.27
Tivat	192.90
Budva	315.07
Bar	556.20
Ulcinj	424.38

The study titled "Projection of the Long Term Water Supply in Montenegro" (Faculty for Civil Engineering, Podgorica, 1998) confirmed the belief that it is possible to bring the additional water quantities for the municipalities of Montenegrin Littoral through the regional system from the hinterland. The water deficit would be supplemented from the regional water supply system (1.410 l/s) and from internal reserves of the water supply system, by decreasing in losses (275 l/s) from current 60% (at least) to the level of 30%-20%.

Additional water quantities are provided by **the Regional water supply system** for Montenegrin Littoral for all 6 coastal municipalities and for the settlements of former municipality Rijeka Crnojevića from the spring Karuč to Virpazar up to 2020. The deficit water quantities that should be provided from the regional water supply system represent the difference between the minimum quantities, which are provided by local springs during summer, and needs, which should

be provided for local citizens, tourists and other consumers. Besides, 200l/s should be provided for Herceg Novi from the Regional water supply system (in case of disconnection of water from Plat), against the reduction to other consumers.

Total capacities of the spring Karuč (Skadarsko jezero) are 1400 l/s, of which 1330 l/s is placed to five municipalities at Montenegrin Littoral, 60 l/s is placed for settlements in the area Karuč - Rijeka Crnojevića, while 10 l/s is anticipated for own consumption. The requirements of long-term water supply are met by these quantities.
The Regional water supply system of Montenegrin Littoral can be divided in three parts: land, north seashore, and south seashore.

Land part encompasses three intervention buildings: Karuč, Volač and Bazagurska matica (source); the facility for water refinements which includes: pump station of raw water, facilities for water conditioning, pump station of fresh water, facilities for mud treatment, supporting service facilities; breaking chambers of Karuč 1 and 2, pump station Reljići, surge tank Reljići, passage tunnel Sozina, reservoir Đurmani and displacement and gravitation pipelines from water intake at spring Karuč to the reservoir Đurmani.

The north seashore encompasses breaking chambers Perazića Do, Sveti Stefan, pump station Budva, then breaking chambers Prijevor, Radanovići and Tivat and reservoir Zelenika and gravitation and displacement pipelines from Đurmani to Tivat.
The south seashore encompasses breaking chambers Ćafe, pump station Belveder and breaking chamber Bratica gravitation and displacement pipelines from Đurmani to Ulcinj.

The water is taken from all three flooded intake buildings at springs of Karuč in Skadarsko jezero (Lake of Skadar) and it is transported by separate pipelines over the lake bottom to the pool of the pump station of raw water, in front of the facility for the refinement of the raw water, which is located at the entrance into Bazagurska matica. After the water treatment at the refinement facility (removal of large microorganisms at the screens, the direct filtration at sandy filters and water disinfection), fresh water is lifted by pump stations to the appropriate level, which enables gravity flow to the pump station Reljići, and then the water is lifted to the reservoir Đurmani by pipeline under pressure.
From Đurmani, the water is transported by gravitation pipelines through breaking chambers Perazića Do, Sveti Stefan to the north to the pump station Budva, and then it is transported by displaced pipeline to the breaking chamber Prijevor and than by gravitation pipeline through chambers Radanovići, Tivat, and Zelenika to Herceg Novi.
At the south part of Montenegrin Littoral, the water is transported by gravitation pipeline from Đurmani through breaking chamber Ćafe to pump station Belveder, and then by pipeline under pressure to the breaking chamber Bratica and then by gravitation pipeline towards Ulcinj.

Total length of the pipeline from the spring Karuč to Tivat and Ulcinj is 106.67 km. Conjunction pipeline from Tivat to Herceg Novi (to the reservoir Zelenika) belongs to this system (to reservoir Zelenika), the total length of 10 km.
The length of the pipeline that should be constructed is 87 km, of which the continental part would be 26 km (diameter 1000 mm), north part from Đurmani to Budva would be long 26.5 km, (diameter 1000-700 mmm), south part from Đurmani to Ulcinj 34.5 km (diameter 800-400 mmm).

The part from Herceg Novi to Budva of 34.5 km is built and the towns Herceg Novi, Kotor, Tivat and Budva are connected with this part of the pipeline, which enabled the placing of possible surpluses of water from one town to another.

System management is performed from the headquarters, which will be located in Budva and which will have the coordination with the facility for water refinement in Karuč. In addition, the information on the condition of all building facilities will arrive to the headquarters, which will represent the precondition for operational management of the system and optimum performance of the system.

The water from the Regional water supply system would be delivered through the distribution reservoirs that would prevent the expansion of impact of hydraulic conditions from town distribution networks into the regional water supply system and they would, at the same time, serve as the reservoir space for coastal towns. Bearing in mind that the anticipated volumes of the distribution reservoirs from 10.000 to 2.000 and 1.000 m3 and with the existing ones represent the insufficient reservoir space in towns, it should be pointed out that the construction of the regional water supply system will increase the safety of the supply with respect to the delivered water quantity to consumers and reservoir space.
The connections for Herceg Novi, Tivat and Kotor and in small part for the municipality of Budva have been already built at the existing part of the regional water supply system from the reservoir Zelenika to the pump station Budva.

The work of the existing town water pipes should be reconstructed and enhanced in order to bring water adequately from the regional water supply system to the consumers with required quantity and pressure.

The project documentation anticipated the increase of the reservoir space; reconstruction of old parts of the network, introduction of the measurement at the water springs and controlled measurement in the system, removal of bottlenecks by setting the additional pipelines, improvement of water intake at springs taking into account the required biological minimum. It should be also pointed out that the protection zone around the existing springs and other water facilities should be established, if it has not been done yet, and the activities in these zones should be strictly controlled in accordance with the existing legal regulations.

The qualitative management and supervisory system should be organized without which the functioning of water supply systems would be unimaginable.

Water Supply System of Herceg Novi

It is anticipated that the quantity of 200 l/s is delivered from the Regional water supply system for Herceg Novi in case of its exclusion from Plat.
The constructed reservoir Zelenika, the final reservoir of the north part of the Regional water supply system is also used as distribution reservoir in the water supply system of Herceg Novi.

From the improvement of the water quality standpoint, besides prescribed protection zones at spring Opačica, other protective zones, along with partially established zone of direct protection should be established as well. The conduction of the measures needed for protection of the spring quality should strictly controlled .
The zones of sanitary protection should be established around accumulation Bileća, but due to the difficulties of establishment, and bearing in mind that the accumulation is at the territory of another state, and that there are two towns at the shore, the process of refinement at Mojdež should be controlled as well as the quality of the refined water and new segments in refinement process should be introduced, if needed.
The zoning of the network should be planned and the required reservoirs should be upgraded not only due to the insufficient capacity but also due to the height and spatial inappropriate distribution with respect to the network.
In addition, significantly high losses of water in the network should be removed, which can be accomplished by the introduction of measurement instruments and rehabilitation of the damaged water supply network.
The projected quantity for 2021 for Herceg Novi of total planned 424 l/s, amounts to 191 l/s for permanent users, and 233 l/s for temporary users. From local sources, it is needed 240 l/s, and from regional water supply system 200 l/s.

Water Supply System of Kotor

For future water supply of Kotor from the Regional water supply system, the pipes for Kotor with reservoir Vrmac (500 m3) are anticipated, as well as the pipe for Donji Grbalj with reservoir PK Radanovići and Lastva Grbaljska through Tivat to Stoliv.
Losses, which are enormous in the pipeline, should be removed from the system primarily by the replacement of old pipes. In addition, consumers in the network should be monitored, by both water quantities they use and the frequency of their usage. The abundance of all springs should be monitored through the introduction of measurement systems that would produce the data on the water quantity that enters the system.
Mathematical model should be developed that would stimulate the performance of the water supply system to determine precisely bottlenecks of the system and make additional expansions.
For the future development of the system, reservoir Orahovac should be upgraded, and set up the pipeline from Orahovac to Risan with profile of 300mm and length 10.000m parallel with the existing pipeline of the small diameter.
Spring Škurda should be absorbed in a controlled manner so that the spring would not be too absorbed and salt water would not appear in the system, which largely contributes to the destruction of the pipelines and devices, besides the fact that the water in that way becomes usable only for technical purposes.

The projected required quantity for 2021 for Kotor is 273l/s, of which for permanent users is 174 l/s, and 99 l/s for temporary users. From local sources, 20 l/s is needed, and from regional water supply system 253 l/s is needed.

Water Supply System of Tivat

The connectivity of the Regional water supply system and distribution network of Tivat is accomplished through the pipe Airport from the reservoir with pump station Pod kuk, which capacity should be increased as well as the existing reservoir Tivat (PK Tivat) into the existing reservoir Mažine.

To improve the performance of the water supply system of Tivat, the qualitative supervisory and managerial team should be determined. The losses of water should be reduced to a reasonable level (20%), and the destroyed pipes and valves should be replaced. They should be controlled by establishing the required measurement systems.
System of Tivat should be prepared before the opening of the regional water supply system for more qualitative takeover of the quantities of water needed from the regional water supply system, by the construction of the additional reservoir space (Topliš), and the construction of pipelines required from Podkuk to town (distributive network) and from the future reservoir Topliš to Luštica.
Springs Plavda and Topliš should be absorbed in a controlled manner, since over-absorption could destroy poor balance of water layers, which are balanced in a way that the layer of fresh water is formed as easier one above the layer of salt water. It is very difficult to establish that balance again after the mixing of fresh and salt water with the salinization of the spring, so the springs remain salinated for long time.
The perspective of the development of Tivat with respect to the water supply are tied to the development of the Regional water supply system for Montenegrin Littoral, as it is the case with other coastal towns, which may meet the requirements of Tivat until 2021 along with the local springs (their overall capacity is the lowest in relation to the springs of other coastal towns).

The projected required quantity for 2021 for Tivat is 193 l/s, of which for permanent users is 117 l/s, and 76 l/s for temporary users. From local sources, 30 l/s is needed, and from regional water supply system 163 l/s is needed.

Water Supply System of Budva

Water supply system of Budva will be supplied with water from the Regional water supply system through the following pipes and reservoirs: through the constructed pipe Jaz with future reservoir of 2000 m3, from PK Prijevor through small pump station Prijevor, pipe for Bijeli do and the existing reservoir Topliš, pipe for Potkošljun and the related future reservoir of 2000 m3, pipe and reservoir PK Sveti Stefan Podličak 2500 m3, pipe and reservoir for Petrovac of 500 m3, pipe and reservoir for Buljarice 2000 m3.

To promote the performance of this water supply system, the optimization of the system performance is

needed based on the developed technical documentation. In addition, zoning should be performed and the reservoir space should be upgraded, as well as the following should be performed: expand distribution network and remove losses by replacing the destructed pipeline. For the safety purposes, motorway asbestos and cement pipelines should be replaced gradually with the pipelines of ductility cast since the existing asbestos-cement pipelines are often subject to damages due to their unsuitableness for the existing terrain and hydraulic pressure.

The projected required quantity for 2021 for Budva is 315 l/s, of which for permanent users is 142 l/s, and 173 l/s for temporary users. From local sources, 180 l/s is needed, and from regional water supply system 135 l/s is needed.

Water Supply System of Bar

The connectivity of water supply system of Bar and the regional one is accomplished through the pipe and reservoir Čanj of 1400 m3, pipe and reservoir Golo brdo (for Sutomore) of 1500 m3, pipe and reservoir Ratac of 2000 m3, pipe and reservoir Šušanj of 2400 m3, pipe and reservoir Ćafe of 2000 m3, pipe and reservoir Dubrave of 2000m3, pipe and reservoir Utjeha of 1500 m3.
Adequate supervisory and managerial system should be established for the improvement of water supply of Bar. After the documentation is prepared, the following should be performed: optimize the system performance through the rehabilitation of losses in the network – increase and regular distribution of additional reservoir space, adequate zoning of network in three height zones (at least), reconstruct the destroyed pipelines, reparation of measurement instruments on the wells and setting up the new ones where needed.
Additional degrees of refinement – deposits should be set up at the springs that are mixed.

The projected required quantity for 2021 for Bar is 556 l/s, of which for permanent users is 350 l/s, and 206 l/s for temporary users. From local sources, 320 l/s is needed, and from regional water supply system 236 l/s is needed.

Water Supply System of Ulcinj

Water supply of Ulcinj from the Regional water supply system is accomplished through the pipes and reservoir Bratica 2000 m3 and the existing reservoir Bijela gora.

A device of water refinement at the spring Lisna Bori should be developed. With the increase in safety system of supply with respect to the water quality in the last phase should find a way should be found to remove mixtures at karstic springs by forming the deposit for possible coagulation and floculation, which should be examined in more details with certain unclear dependence of precipitations. For the purpose of improving the quality and safety of disinfection, the disinfection should be performed with gas chlorinator with the existence of the reserve device, which will operate in case of the damage of the regular device.

From increase in reliability in supply standpoint and with respect to the quality and pressure, reservoir area in town should be increased, so that the zoning of network is performed, and the following should be accomplished: replace amortized pump aggregates, remove losses and improve the quality of network, and in the transitional period, establish own reservoir space for important locations in the Coastal Zone as the hotels (Albatros, Galeb, Valdanos, Otrant) did.

In the area of Velika plaža, rings should be formed by additional pipelines, which would enable higher safety in water supply.
The projected required quantity for 2021 for Ulcinj is 424 l/s, of which for permanent users is 206 l/s, and 218 l/s for temporary users. From local sources, 262 l/s is needed, and from regional water supply system 162 l/s is needed.

Closing Remarks

It is important to point out that if the water is not viewed as a product that must be saved, no possible technical solutions will be of great help.
The water is vulnerable natural resource which is not inexhaustible. The endless richness in water that is obtained through precipitations is taken into account. The precipitations are not always there when needed, but there is still solution for their storage when they appear and for their usage when appropriate.
The water is ecological category; the more it is taken from the nature the more it destroys its natural balance. With the increase in the quantity of used water, the pollution is increased, i.e. its negative influence on the environment and health.
Frontal media campaign should be started, as well as the education of citizens for water savings, by reduction of the consumption at the very spring and reduction in losses by removing the damages.

2.5.2 Waste Waters Disposal

The Adriatic Sea being the basis for all the activities of the people who live on Montenegrin cost shouldn't be looked upon as a mere recipient when it comes to disposing of waste waters, which used to be and still is so for waste waters from the area.

Knowing that finances which are not spent on purification of waste waters are multiplied through the costs paid later on due to their negative impact on the development of fishing and tourism, medical treatment of diseased who have been in touch with waste waters through tap water or by swimming (where the economic effect is of minor importance compared to a negative health impact with short-term or long-term consequences), we can draw a conclusion that it is cheapest to pay for the costs of waste water purification right away.

When we talk about waste waters disposal, we can say that time has come that the quantity of waters which have been taken from the nature be adequately purified and returned back.

It is planned to collect waste waters of the coastal towns with one or several town sewage systems and as fast as possible, with previous purification and through deep, sea outlets (over 500 m long) discharge them into the sea at 40 m depth.

Depending on the size of a community, i.e. pollution emission which is to be treated, there are several categories of them.

- Communities bigger than 2, 000 ES whose effluents are discharged into surface water need to built a plant for secondary treatment
- Communities bigger than 10.000 ES in sensitive zones, in addition to secondary must have tertiary treatment in sensitive zones
- Communities from 10.000 – 150.000 ES in the coastal area must have both secondary and tertiary treatment

In line with EU Directive, waters must be identified as less sensitive if discharging does not cause harmful effects on the surrounding as a result of favorable morphologic, hydrologic and specific hydrologic conditions existing in the zone.

These include: open bays, estuaries and other coastal parts with favorable circulation that are not euthrophic or parts that are not close to the zones for swimming or sea fruits and fish farms.
On the other hand, sensitive waters are: bays, coves, estuaries and coastal water with bad circulation; problems come up due to area being nutriment rich, but also the area of a high ecologic quality which must be separately protected.

In line with adopted criteria for the treatment of communal waste waters, the competent bodies for waste water treatment require the construction of the plants for the purification of communal waste waters with secondary treatment for the coast.

In line with laws, before being discharged into the public sewage system, industrial waste waters must have, as laid down in the law, the concentration of dangerous and harmful substances in waste waters which are being discharged into communal sewage so that they could be treated at the purification plant together with communal waste waters. Also, if after being treated in a purification unit, industrial waste waters are discharged into the recipient, it is necessary to regulate what is a maximum of permitted concentration of dangerous and harmful substances in the treated waters. For industrially waste waters it is necessary to foresee the equipment for previous treatment before discharging them into the public sewage system which treatment is adapted to the quality of the waste waters, depending on whether it is food industry and requires removal of greater concentration of organic substances or mechanical meaning that it is necessary to remove heavy metals or change of acid in waste water etc.
If the industrial plant has its own sewage system and discharges waste water directly into the recipient, it is necessary to plan the equipment for purification in order to have the quality of waste water at the level of communal waste water before being discharged into recipient. For communal waste water it is necessary to plan one or more purification plants for all towns, while a single central plant for purification of communal waste water is planned for Kotor and Tivat.

After primary and secondary treatment (and possibly tertiary), and after mud treatment on mud line, the mud residue is transported to the plant for organic substances treatment taken from solid waste within the process of anaerobe digestion which is included in the project: ”Integral solid waste treatment and disposal solution”.

The areas that are not planned to be connected to central communal sewage system, because this is not cost effective due to housing facilities being dispersed, need septic pits with obligatory disinfection before discharge into the absorb pits or recipient as well as control of their functioning in order to have proscribed quality of waste waters at their exit. During the interim period it is necessary to build septic pits for the areas at which there will be sewage system. They are not connected to the system yet in order to avoid sea pollution, in particular in the bay, where auto-purification capacity of the sea is much lower compared to the open sea.
The quality and quantity of waste water of some polluters is necessary to be continually measured in winter and summer in order to come up with truthful data necessary as a base for projecting purification equipment.

In the area of Montenegrin coast, separate sewage systems are planned, one for rain and the other for disposal of waste water.

It is necessary to harmonize laws in this area with Convention and Protocol on Protection of the Mediterranean (Barcelona 1976, Athens 1983) and directives of European Union (91/271/EEC, 75/440/EEC and 86/278/EEC).

While planning solutions for disposal and purification of waste water the following documents were used - ”Preliminary Design for Sewage System on Montenegrin Coast” (Civil Engineering Faculty, Zagreb and Republican Bureau for Urbanism and Design, Titograd, 1978), ”Master Plan” (Energoprojekt, Beograd, 1990), with drawings of main concepts for the construction of the sewage system and ”Master plan for Disposal and Purification of the Waste Waters on the Montenegrin Coast and the Municipality of Cetinje” (DHV WATER BV, Netherlands, 2004).
According to the Master plan, a long term calculation was done of the quantities of waste waters till 2028. which should be directed and after an adequate treatment discharged into the recipient, during winter the quantity of 416 l/sec and summer of 868 l/sec.

Montenegrin Coast sewage systems can be looked upon as two wholes:
- sewage systems of the towns of the Kotor Bay (Kotor, Tivat and Herceg Novi)
- sewage systems of the towns of the open sea (Budva, Bar, Ulcinj)

Kotor Bay Sewage systems

The condition of the Kotor Bay as a recipient for communal waste waters is ecologically vulnerable, with limited conditions for disposal of waste waters. It is the most polluted part of Montenegrin littoral, so there was a need for the issue of sewage systems to be first of all resolved for the Kotor Bay towns. The solution is that waste waters no to be discharged into the Bay in the part of Kotor-Risan-Tivat Bay but to be taken out to the

open sea to the Trašte Bay. Purified waste waters are discharged into Herceg Novi Bay, as the first phase, and later it is planned to be taken through the tunnel to the open sea.
Development of project documentation was faster for the towns in the open sea, as well as their implantation i.e. the construction of sewage systems.

Herceg-Novi Sewage System

Herceg-Novi Sewage System includes two systems:
- Zelenika - Meljine - Herceg Novi
- Đenovići - Baošići - Bijela

Present condition of disposal of waste water in the municipality of Herceg Novi is such that the system Zelenika-Meljine-Herceg Novi is connected to Igalo-Topla-Herceg Novi system which collects waste waters from the named areas.
With the construction of all additional facilities which ensure distribution of waste waters to the comminutor (collectors, pumping stations, pipelines under pressure) waste waters are discharged through a long seabed outlet at the location Forte Mare into the bay.
Đenovići-Baošići-Bijela system gets waste waters from these areas with a unique system to the comminutor, where waters are discharged into the sea. Due to the characteristics of terrain's relief, urbane development and recipient's characteristics the location of the comminutor and outlet is at the south-east side of the settlement towards Baošići.
Existing sewage system is planned to fit in the future one which would cover the entire Herceg Novi municipality stating from Igalo over urban area of Herceg Novi, Meljina, Zelenika, Kumbor, Đenovići, Baošići, Bijela to Kamenari via unique coastal sewage collector.

In view of final solution for waste waters there are several possibilities:
- discharge into the bay with tertiary purification
- getting waste waters out of the bay, previously connecting the subsystems into a whole, also with three alternatives so that:
- the existing outlet in Forte Mare would extend and connect with the collector in Luštica near Rosa and further down the coast would go to the open sea to the outlet in the wider zone of Arza.
- the existing outlet would be closed, and collected coastal waste water would get through Kumbor Gorge to the u lock chamber in Luštica and further along the coast of Luštica to Arza.
- the third alternative would be to get the Herceg Novi waters through Kumbor Gorge through the Luštica tunnel to the outlet.
According to all three alternatives waters would be purified at the purification device in the wider area of Arza.

Previous treatment of industrial waste waters should be in Herceg Novi planned for: "Road Transportation" removal of suspended particles from the dregs and removing oil in the separator, slaughter house in Meljine with removal of suspended particles and organic substances at the bottom and it is particularly necessary to take care of the treatment of waste waters in the shipyard Bijela where there is a great quantity of suspended substances which needs to be removed from the mud, as well as removal of oil in the separator and acid neutralizing. It is necessary to dispose sand not in the sea after its treatment but at a specific dump.

Single Primary Sewage System for Kotor-Tivat-Trašte

Single sewage system Kotor - Tivat with central unit for primary treatment comes from 1978 which discharged waste waters from Kotor and Tivat outside the Kotor Bay in the open sea. This is confirmed by UNIDO report (United Nations Industrial Development Organizations) from 1989 where was concluded that adequate protection for Kotor Bay means disposal of waste waters and in particular industrial waste waters out of the bay. The solution was adapted with purification plant being added in line with the Master Plan from 1990.

Technical solution of disposal of waste waters from Kotor and Tivat Bay plans the collection of wastewaters from Kotor Bay at one place, final point of southeast settlement of Škaljari, where collection pumping station „Kotor" was built from where waste waters are pumped through two pipelines with 300 mm diameter towards outlet facility at the entrance of the tunnel Vrmac and through a collector with the diameter of 600 the water goes to the exit from the tunnel, where is automatic grate and aerated sand grit, and further through the channel through Grbaljsko polje to the outlet chamber which is located above the Solila Bay where waste waters from the industrial zone and waste waters from Tivat municipality would connect to.
From outlet chamber (Solila) to the Bay Trašte, waste waters are transported based on gravity going through the tunnel in the hill Grude. After going trough the tunnel Grude waste waters from Kotor and Tivat get to the end of gravitation collector through the facilities to the seabed outlet with diameter of 600 mm and length 3624 m, at the depth of some forty m.
Before discharging waste waters into the recipient – the bay Trašte, it is necessary to purify waste waters at the device for purification with primary (rough grate, aerated sand grit, primary mud) and in secondary purification (bioaeration basin with active mud, secondary mud) as well as mud treatment (anaerobe digestion with previously making mud dense).

Kotor sewage system

Secondary system would connect to the primary collector of the sewage system Kotor-Tivat-Trašte, which consists of two wings: south part, which collects waste waters from the direction of Muo, Stoliv to Markov cape with previous pumping stations for pushing waste waters and east part which collects waste waters from Dobrota. East and south wings of the secondary sewage system connect in the same point-pumping station. Topographic conditions of the terrain as well as the distribution of the consumers conditioned the location of the pumping station which is at the bottom of the settlement Škaljari and Mua.

As to the waste waters of Risan, Morinj and Kostanjice there is a possibility for waste waters of this area are collected in the coastal collector and go from Perast to Stoliv through seabed siphon and further along with south secondary wing to the previous pumping stations Škaljari, i.e. along the mentioned route to the Bay of

Trašte. It is necessary to consider the alternative of discharging into the Bay waters collected at this area after undergoing tertiary purification at its device.

Waste waters of Kotor need to undergo purification before being discharged into the sea. In principle, the purification device is planned in line with the Master Plan which is necessary to consider in details. It is necessary to plan previous treatments for industrial waste waters: industry of iron bearings from Kotor, „Car Overhaul", „Autoboka", chemical industries: „Jugopetrol", processing of tyres - "Bokeljka" and detergent production „Rivijera".
Previous treatment would be removing suspending particles by layers of oil, grease in grease separators BPK „Export of Plants" Risan. For bigger restaurant and hotel kitchens it is necessary to plan grease separators.

In the area of Kotor, in particular of old town it is necessary to reconnect sewage connections in the gallery to secondary collectors as well as take into account to separate rain and waste waters i.e. possibly do reconnection.

Tivat sewage system

For Tivat sewage system separate disposal of waste waters was adopted.
Waste waters of the town of Tivat which were collected through the net of channels are taken with the collector from Tivat and go to the collector Kotor - Trašte in the part from outlet chamber of Solil to entrance portal of the Grude tunnel. Waste waters of the settlement Krašići connect to a collector at the entrance portal of Grude tunnel. This sewage system foresees two separate sewage systems which would cover the municipality of Tivat with sewage system of Tivat and Krtola.

Tivat sewage system would take water with a collector from Donja Lastva through urban part of Tivat to the area of Kukoljin. Collector connects at the outlet facility „Bjelušine", part of sewage system which collects waters from Prevlaka, island Sveti Marko and area of the airport. From the outlet facility continues gravitation collector to the pumping station of Solila from which water is pumped into macro system.

Krtola sewage system collects waste waters via west and east peripheral and link collector. West peripheral collector collects waste waters starting from Perovići transporting them based on gravitation to the village Radovići. East peripheral collector should be above the settlement of Kaluđerovina and Dubravčevine. From Radovići link collector is planned which is to take all waste waters from the area of Krtola based on gravitation to the primary system of Trašte.

Before discharging industrial waters in Tivat it is necessary to plan previous treatment in the Car Overhaul in Tivat to remove suspended particles in mud and oil and grease in separators as well as grease separators for big restaurants and hotel kitchens.

Sewage systems of the open sea

In the area of the open sea (from Budva, across Bar to Ulcinj) effluents are disposed from long seabed outlets with previous mechanical purification. Since this area has three municipalities, and since they are dispersed, the open sea part is planned to have 8 sewage sub-systems as separate units. In line with the Master Plan and regulations it is needed to plan purification equipment for communal waste waters so that effluents can reach planned quality of waste waters, and it is necessary to have the quality of industrial waters at the level of communal waters in previous treatment, before discharging them into communal sewage system, i.e. to be at the level of effluents required at direct discharge into recipient i.e. sea.

Budva Sewage System

Present condition of sewage system is such that the area of Budva municipality is for the most part of it covered with the following three sewage subsystems: Budva-Bečići, Kamenovo-Miločer-Sveti Stefan and Petrovac.
At the area of Budva it was planned that from the north to the south waste waters disposal is to be resolved with more than one sewage systems.

A new system is to be built for the area of future tourism complex and Jaz beach with necessary equipment for purification of waste waters with primary and secondary treatment and outlet along the seabed behind the Cape Jaz.
From the area of Budva, Bečići and Sveti Stefan waste waters would be collected with unique sewage system and after purification with primary and secondary treatment they would be discharged into the sea along the existing seabed outlet in Zavala under one concept. Under another concept there would be two special systems with special devices for purification and special seabed outlets.

From the area of Rijeka Reževića, Drobnići and Krstac collected waste waters are discharged into the sea through the seabed outlet after purification with primary and secondary treatment.

Petrovac Sewage System collects waste waters from the area of Petrovac and Lučice and after primary and secondary purification go along the seabed outlet into the sea.
New sewage system collects waste waters from the back side of the beach, future tourism complex and Buljarica beach. And after purification with primary and secondary treatment, the system takes effluent down the outlet into the sea at the south part of the beach.
Under the other alternative, the existing sewage system of Petrovac and future one for Buljarica will be connected into one and after purification with primary and secondary treatment the waste waters would be discharged into the open sea at the end of the beach in Petrovac.
In view of the previous treatment of industrial waste waters, it is necessary at the device for previous treatment for the bakery to remove oil and organic substances, in Montex factory for ceramics suspended particles are to be removed from the mud.

Bar Sewage System

According to the preliminary design of the sewage system on the Montenegrin Coast and the Master Plan, following sewage systems are planned:

- Čanj System
Present condition is that the waste waters are collected by the coastal collector of the profile of 300mm to the pumping station on the coast and central facility, where through comminutor where mechanical chopping takes place waste waters are discharged through seabed outlet which is 1500 m long, profile of 250 mm, at the depth of 40 m. It is needed to build additional capacity Čanj II as well as the device for purification of waste waters with primary and secondary treatment.

- Sutomore-Ratac System
Waste waters are collected with the system of sewage collectors along which they get to the tunnel Golo brdo, then to the pumping station Ratac and Botun. It is necessary to build an outlet at the existing sewage system which would be 1500m long, of the profile of 400mm, at the depth of 39.5 m with purification device for primary and secondary treatment.

- The town of Bar System
Sewage network for the town of Bar has collectors for the settlement of Sušanj starting with the profile of 250 to 300 mm, then 500 mm towards the pumping station Topolica and further 600 mm to the main station in the port of Bar and further along the pipeline of 600 mm; from the main pumping station through tunnel Volujica to seabed outlet which pipeline is 348 m long, diameter 400 mm, at the depth of 70 m.
The Port of Bar collector should be connected to town sewage system and after purification of all sewage waters from this area at the future plant which would be located near the main pumping station in the port, waste waters would be discharged into the sea.

It is planned that the area of Velji pijesak and Uvala are covered by sewage systems with seabed outlets. It is necessary to plan equipment for purification for primary and secondary treatment before discharging the waste waters into the sea.

As part of previous treatment of industrial waste waters it is necessary to remove oil at the equipment for previous treatment in „Primorka", in the separator as well as organic substances , and in the Port of Bar, to remove from the mud suspended particles and oils in the separator.

Ulcinj Sewage System

It is necessary to resolve as soon as possible the problem of disposal and purification of the waste waters from Ulcinj and Long Beach having in mind the negative effect of it on the quality of water in the Salt Works.

Several sewage systems are planned in Ulcinj.

The terrain configuration conditions technical solution for the sewage system of Old town of Ulcinj with two levels and the location of the collector centre being at the higher level, as well as the starting point of the seabed outlet close to the former hotel „Jadran". Waste waters are collected based on gravitation by the collectors of 300 mm and 400 mm to the pumping station Pristan at the small beach, and to the future seabed outlet 1700 m long, profile 300 mm, at the depth of 25m.

Sewage system Novi Ulcinj-Long Beach covers two urban zones: Ulcinj – New part, and Ulcinj – Long Beach. For the disposal of waste waters from New Ulcinj a long collector was designed with the profile of 500 mm which transports waste waters towards the pumping station Port Milena at the sea mouth of the river Milena. At this location the outlet is 350 mm in diameter and 1,100 m long.

Transportation of wastewaters is moist rationally carried out through the pipeline under pressure. Each hotel complex has its pumping station which pumps waste waters into the central collector. Central facility has comminutor at the beginning of the outlet and a pumping station. Seabed outlet is 2 km long, 500 mm profile, at the depth of 22 m.
For the hotels before discharging waste waters into the town sewage system it is necessary to plan devices for previous treatment (grease separators).

In Valdanos Cove waste waters collector is planned for the waters from the area and after the purification equipment (primary and secondary) water is discharged through the seabed outlet into the sea.

At the area of Ada Bojana, instead of existing septic pits, it is necessary to build sewage system with devices for purification (primary and secondary) before discharging into recipient; in the final phase to be connected to the main sewage collector of the long Beach.

In view of previous treatment of industrial waters it is necessary to remove oil in the previous treatment in „Agroulcinj" (olives processing). Remove it in the separator.

Conclusion

Before defining future concept of waste waters disposal from Montenegrin littoral it is necessary to analyze in details:
- collection of waste waters from a wider area and their purification at the central device for purification
- collection of waste waters from a smaller area and their purification at small units for purification.

From economic aspect, it is rational to build a central purification unit, but it is economically less costly effective to build big collectors where diameter widens with the extension of the territory from which waste waters are collected. E.g. waste waters from Kumbor, according to one alternative, go along the coastal collector to the Forte Mare Cape (in the very town of Herceg Novi) and through the bay to Luštica and further to Arza into the open sea. Or waste waters from the direction of Orahovac go to Škaljari and from there to the Trašte Bay.

Technologically speaking it is easier to maintain purification process and additional facilities, electro and hydro-mechanical equipment at a central unit than at several different ones, but in the case of failure in the

purification process, which is always possible, a great quantity of water would fail to be treated.

In view of environmental protection, in accidental situations, in the case of default at a central unit, there would be an outflow of great amount of waste waters at the unit area or, from the aspect of auto-purification, at all outlets, while with dispersed units the possibility to have this accidental situation is much more unlikely at more than one unit, meaning the pollution would be far weaker.

2.5.3. The Treatment of Solid Waste

Finding solution to the problem of collection, transportation and disposal of solid waste was considered as part of integral part of resolving the issue of solid waste at the level of the Republic of Montenegro, and which was defined in a Strategic Master Plan for Waste Management.

The Master Plan proposed 8 (eight) dumps of which 3 on the coast: for Bar and Ulcinj – Police (municipality of Bar); for the municipalities of Kotor, Tivat and Budva the location has not been defined, because there is a "temporary dump" Lovanja; for Herceg Novi – Duboki do.

The planned waste production for 2020, in the peak of the season taking into account unequal number of users, an amount of waste which should be transported and treated at dumps would be daily and annually for towns and in tons:

Herceg Novi	77.77t/daily,	18.269.80t/annually;
Kotor	36.30t,	10.279,50t;
Tivat	35.36t,	7.857,00t;
Budva	74.00t,	12.169,00t;
Bar	93.88t,	23.574,20t,
Ulcinj	89.24 t,	16.831,60t

(note: the data are based on the estimation of a number of permanent citizens, and occasional users – tourists, the production of waste on the coast is calculated with 0.9 kg/inhabitant/daily, i.e. for tourists 1.5 kg/tourist/daily).

Existing official rubbish-heaps of non-selective communal waste have been defined in the Republic. Reconstruction of existing non-selective rubbish-heaps has been proposed in line with the EU Directive 1999/31/EC.

The realization of this project will have the following segments:
- decrease in solid waste production
- the separation of the waste at the place of collection through slow introduction of the separation at the place of waste production – primary sorting out
- treatment of organic substances after which it is used as a fertilizer or energy resource
- the amount of waste which is disposed at dumps is minimum, and the manner of disposal is in line with the nature
- reconstruction of all existing dumps and rubbish-heaps and giving the land back its natural look

The quality of air and water pollution, as a waste residue, should be on regular basis checked at dumps.

The waste should be also leveled and covered with earth. Foil should be used in order to prevent leak of polluted liquid from dumps, but foil should be also laid out for the future layers of solid waste, where there is space for that.
Recycling as an obligatory form of processing of solid waste has been considered from the aspect of existing situation (under alarming 2%), and from future between 25-45% of total quantity of the material which can be recycled.

For successful sorting of the waste overall education needs to be carried out and people should start with primary sorting as soon as possible and originally decrease waste production. This could be realized by pressing plastic bottles and tins at collection stations, either by returning them to the store where they were bought or at a central spot.
There would be transfer stations in all towns for collection and pressing solid waste.
In the final phase of the project dumps will be places for disposal of unrefined solid waste.

An integral approach towards resolving the issue of solid waste requires multidisciplinary and multi-institutional engagement at municipal, regional and republican level of all those who are responsible for a negative impact of the waste on the environment. i.e. health of people.

In view of the fact that tourism is a strategic industry of Montenegro, and coast in the first place, without integral solution for the treatment and disposal of solid waste it is difficult, especially on the coast, to imagine the development of elite tourism.

2.5.4. Electrical system

The development of the coast leads to the development of the electricity transmission and distribution infrastructure, which needs special attention in particular in the area such as the coast.
In addition to technical, urban conditions must be met when it comes to electrical infrastructure development. Problems related to planning and development of energy infrastructure for MDCG will be resolved through the programs of the infrastructure development, spatial planning and some minor plans.
We suppose that existing four voltage system 110/35/10/0,4 kV will remain.
Existing electrical-distribution capacity at the moment meets consumption needs and with possible extension of the capacity the need for electricity increase can be provided for a certain period.

There is not source for electricity production on the coast but is supplied through the electrical system of Montenegro at the voltage of 110 kV.
The closest supply points in the 110 kV system are TS 220/110/35 kV Podgorica-1 (Zagorič) and TS 400/110kV Podgorica -2 (Tološi).
For the supply needs on the coast there are totally eight 110 kV transmission lines.
Both supply transmission lines of 110kV, for Bar i.e. Budva, are at the moment connected to TS 220/110 kV Podgorica -1.
With the change of the transmission line of 110kV for Budva and Bar from TS 220/110kV Podgorica-1 to TS

400/110kV Podgorica-2, these transmission lines will be linked to a safer supply point. This would increase the quality of supply on the coast. This would mean that the length of 110kV transmission lines will have to change. The construction of the transmission line Tivat-Kotor is planned.
The construction of transmission line from TS 400/110kV Podgorica-2 to TS 110/35 kV Cetinje was recently finalized and put into function which will increase quality supply because the existing 110kV line is relieved.
Development studies for transmission network plan the construction of TS 110/35/10 kV Kotor with three-coiled transformers linked from one side with transmission line of 110kV to TS 110/35 kV Tivat and from the other side with Cetinje or Perućica.
Possible lines of 110 kV from Ulcinj to Skadar in Albania and from Herceg Novi to Croatia would be of importance for greater safety of power supply on Montenegrin coast.

The existing transmission 110kV system with completion of investments that are underway will be quality primary source of electricity for the consumers on Montenegrin coast.

TS 220/110 kV is planned for construction in Grbaljsko polje for supply on the coast, as well as lines of 220 kV from TS 220/110 kV Perućica or fom TS 220/110/35 kV Podgorica 1.

Herceg Novi area is supplied from two 110 kV transmission lines from Trebinje and Tivat. Based on estimated needs for power these lines can provide necessary power.
It would be necessary to connect TS 110/10 kV "Igalo" with 110 kV line with Croatian system, which would even further increase power supply in Herceg Novi. At the moment TS 110/35 kV Podi meets the consumption needs and with a view to the possibility of voltage increase with the replacement of transformers, this TS will in the forthcoming period meet the consumption needs.
It is planned to construct 110 kV transmission line "Podi-Igalo" which will in the first phase function at 35 kV.
With the view to making new 35/10 kV nodes and shaping up 35 kV network in the area of Herceg Novi, it is necessary to harmonize the network for these needs. In line with that in 2010 it is planned to construct two air transmission lines of 35 kV: Podi-Topla and Podi-Zelenika-Kumbor.
In this year it is planned to construct 35 kV transmission line "Pržno-Klinci", and lay down undersea cable "Kumbor-Pristan" and 35 kV line to the TS 35/10 kV "Klinci".

At the moment TS 110/35 kV Mrčevac meets consumption **needs in Tivat,** and with the view to possibly increasing voltage by replacing transformers and constructing planned TS 110/35/10 kV in Kotor, this TS will in the forthcoming period too meet the consumption needs.
The construction of TS 220/110 kV in the area of Tivat is planned and line of 220 kV Peručica-Tivat (cca 55 km long) or Podgorica-Tivat (cca 75 km).In the first phase, the line would be at 110 kV, while the change to 220 kV is expected after 2000.

Taking into account the needs for power supply of the wider area of Kotor Bay, new unit TS 220/110 kV, with 150 MVA of installed power should be located alongside the existing TS 110/35 kV Mrčevac-Peručica of 110 kV. In this way full capacity would be provided in the first phase already for the wider area of the Bay of Kotor with a two-way supply from Podgorica and Nikšić.
TS 110/35 kV Mrčevac will meet long-term needs in Tivat. With the construction of TS 110/35 kV Budva and TS 110/x kV Kotor, TS Mrčevac will be greatly relieved, so that its whole capacity will be reserved for Tivat and thus fully meet future needs.
New TS 35/10 kV Grbalj will probably take over 10 kV network which supplies the area of Grbalj which will greatly relieve TS 35/10 kV Pržno, so that for the next 20 years TS Pržno and TS Tivat 2 will fully meet the needs for the area they supply.

Transmission line Budva - Tivat - Herceg Novi – Trebinje goes through **Kotor municipality**, but in this area there is no transformation 110/x kV, but the supply is provided from TS 110/35 kV Mrčevac working with one transformer for the consumption area ED Tivat and with the other for ED Kotor.
Therefore in the area of the municipality of Kotor it is necessary to build TS 110/x kV in order to have regular and stable supply. The location of new TS is next to the old unit in Tabačini.

At the moment TS 110/35 kV Markovići meets consumption needs for **Budva,** and since it is possible to replace transformers, this TS will in the next period meet consumption needs.
Installed power of TS 110/35 kV "Budva" as well as the possibility of its increase are enough for the entire observed period, so that the construction of new TS 110/35 kV will not be necessary.
Existing TS 35/10 kV "Lazi", "Miločer", "Buljarica" and TS 35/10 kV "Budva 2" will be used till the end of the observed period.
35 kV network is sufficiently good and meets the needs at the moment. With construction of new 35 kV lines in line with the proposed development, after TS 35/10 kV "Budva 2" start up, double supply will be provided for all TS 35/10 kV.
35 kV network is so developed that in all phases of development has the possibility of double supply for all TS 35/10 kV. Also voltage falls on the entire area with respect for regulation within TS 110/35 kV and 10/0.4 kV, should be within permitted limits +/- 5% during proper functioning and -10% in the case of failure in the network.

We should point out that intensive application of solar energy is expected in tourist settlements such as Jaz and Buljarica.

At the moment TS 110/35 kV Bar meets the consumption needs **in Bar,** while there is an expressed need for the replacement of a transformer unit.
At the moment TS 110/35 kV Kodre meets consumption needs but lacks back up supply for 110 kV.

Ulcinj consumption area is at the moment supplied through a 110 kV line only from Bar, meaning that the safety in supply is questioned because each failure in the transmission line results in electricity breakdown in the area. This means that it is necessary to build

another 110 kV line which would have a special work regime.

The development of the area will lead to the development of lines for power transmission which can in certain areas cause big problems. These are the problem of occupied area, so in addition to technical conditions there are urban problems as well. Transmission lines require many routes and wider and wider corridors, which due to forests being cut down, because of the configuration of the terrain, settlement density, aesthetics, and in the first place due to the price of the land problems are far from being small.

In order to cut down on the above problems it is necessary to provide:
- corridors of high voltage air lines of 220,110, 35 and 10 kV,
- locations for construction transformer stations,
- area for cables.
This elaborate includes corridors of high voltage lines of 220, 110 and 35 kV, corridor for 110 kV line is 100m, and for 35line is 40m. It has the locations of the future stations 220/110/35 kV and 35/10 kV.

The solution of 10 kV network is the subject of detailed urban planning when all the elements of the consumption needs are known. Spatial Plan processes only possible principle solutions of the 10 kV network.

For each network it is necessary that the following conditions are met:
- that each network provides safe supply at all times during its normal functioning as well as in the case of failure at the transmission line or transformers or during interventions.
There are many concepts of medium voltage network, among which three are most interesting for our area.
- the concept of so called "open rings"
- the concept of “streaks"
- the concept of a "flower"
In addition to these solutions others are possible such as "loop", "grid" and "multiple parallel lines".
Which of the given concepts will be used, this depends primarily on the development of 10 kV network on the area in question and from the conditions to implement one of the above methods, which is necessary to study in each concrete case.
10 kV network is developed as air and cable network. The networks developed in the last years have lines of great quality. As to future development of 10 kV network, efforts should be made that in towns all 10kV lines be replaced with cable lines, a new network should be only cable one.
For rural areas 10 kV network will be only air network in the future too, which is conditioned by the configuration of the terrain and great distance from the supply location. While designing these lines, the most optimal routes should be found both from supply aspect and from safety aspect due to various natural disasters caused by the region itself and the configuration of the terrain.

Lower level plans should cover the following:
- Based on available data future consumption needs should be analyzed and defined.
- Routes of supply lines should be determined, only as cable network with parameters both for SN and NN.
Routes for power cables to be harmonized with the other underground infrastructure (PTT, water, sewage etc.)
- Determine micro locations for future TS 10/0,4 kV and define the type of the station.
- Do a preliminary design of a low voltage network 0,4 kV.
- Type TS 10/0,4 kV harmonize with protection conditions.
- Special attention to be paid to the use of alternative (renewable) forms of energy and rational use of electric power being the most expensive of all.
- All installations to be in line with the requirements of the competent electro distribution company.

2.5.5. Telecommunications

The planning period of construction of the telecommunications system of Montenegro will be focused on the organization of the telephone network into three regional levels (the Littoral, central, and northern ones), which will at the same time be the security rings of the transport system on the national level, which will integrate the regional levels.

In the Littoral region, it has been started with intensive construction of high-speed SDH transmission and digital switching systems with the signaling No. 7, which enables integration of transmission and switching into a unique digital network with integrated services (ISDN) capable of transmitting information in all forms including image transmission.
The telephone network consists of communications systems, transmission systems, and terminal equipment (telecommunications equipment). In the Littoral, it is necessary to plan and construct the telephone network in such as way as to enable improvement and development of tourism and its ancillary activities.

The existing and new organization of the national telephone network

The existing organization of the national telephone network includes the areas of local networks, (the areas of end exchanges), the areas of nodal exchanges, the areas of main exchanges, the areas of transit centers, and the areas of international exchanges, and the same are hierarchically ranked from the lowest to the highest ones.

The interconnection of the exchanges within areas is of star shape in plan for all the exchanges of the lower rank while the exchanges of higher ranks are interconnected in loops, which particularly applies to the transit centers.

By introduction of SDH (Synchronous Digital Hierarchy) transmission system in the telephone network, the organization of the same has been changed.
In the SDH technology, information signals are transmitted via TRANSMISSION NETWORKS.
Reliable transfer of information between the users of a network is enabled by TRANSPORT NETWORK. Architecture of the transport network is based on layers, whereby each lower transport layer provides services to a higher layer.

The ring represents one of the basic transport structures, which will be applied in the telephone network provided with SDH transmission system. The planned flow of digital signal through all the branches of a ring should be the same.

Organization of transport through the transmission network, realized with SDH transmission system, should be realized in three levels:
- National level (Level 1)
- Regional level (Level 2)
- Local level (Level 3).

The national level represents a part of the transport network through which the regions are interconnected traffic-wise, and it covers the territory of the entire state.
The regional level of the transport network should cover a number of independent traffic areas, which are called regions.
The local level represents a part of the transport network through which traffic interconnection is ensured within the areas of the local exchanges.

Access network can be implemented using cable pairs, optical cables or radio transmission.

The planned changes in the organization of the telephone network should be the result of a study, which should be made on the basis of the guidelines and relevant standards whereby particular attention should be paid to:
- Securing of transport within the national level (state) via bidirectional rings, which have the ability to provide security on the route layer and on the layer of the multiplex section. Flow rate through the rings should be 622 Mbit/s, 2.5 Gbit/s or 10 Gbit/s;
- Coverage of the regional levels (Example: the Littoral, northern, and central regions), which should have their own systems of security, which is provided through the ring structures;
- Type of ring structures in the local networks to solve the requirements of business subscribers, which wish to have higher security of their respective traffic.

SDH TRANSMISSION SYSTEM

In the telecommunications infrastructure of Montenegro, optics is represented on three levels:
- On the international level having the capacity of SD hierarchy of STM 4 (622 Mb/s) and STM16 (2.5 Gbit/s)
- On the regional level having the capacity of SD hierarchy of STM-1 (155 MB/s) and STM-4 (622 Mbit/s)
- On the local level having the capacity of PD hierarchy from 2 to 34 Mbit/s and of SD hierarchy of STM1 (155 Mbit/s).

The high capacity of the installed optical fibers enables introduction of SDH transmission system in the transport of information on all the levels. The installed number of fibers on the routes Bar - Belgrade, Bar – the Croatian border, Bar – the Albanian border is of the order of 20, whereby only 4 fibers have been used, and the other fibers are available not only for transit telephone traffic but also for the use of all types of telecommunications services.

On all the levels, mono-modal fibers with longitudinal attenuation of 0.2 dB/km and with material dispersion (0.5 ms/km) are used. The optical transmitter is based on a laser diode, and the optical receiver uses AP diode. In view of the fact that the sections are short (of the order of 50 km) and maximum 90 km long, possible capacity per fiber is of a minimum level of 622 Mbit/s.
Hence, the available fiber optical sections have a significant redundant capacity, which can be used to support service networks.
In such a case it is necessary to intervene only on the line and terminal SDH and PDH equipment, specifically on the modules for the relevant transmission rates. Thereby the cost of modules is practically negligible compared to the entire section.

The backbone of the transmission system of Montenegro includes:
- Undersea cable optical system Bar - Corfu of STM 16; 2.5Gbit/s (1+1)
- Ground cable optical system Bar - Podgorica - Belgrade of STM 16; 2.5 Gbit/s with the planned rings for securing of transport on the national and regional levels, as follows:

b1) Security ring of the Littoral region of STM 4; 622 Mbit/s Bar - Budva - Tivat - Kotor - Herceg Novi (Risan) - Nikšić - Podgorica - Bar
b2) Security ring of the central and northern region systems of STM-4; 622 Mbit/s; Podgorica - Nikšić - Žabljak - Pljevlja - Bijelo Polje - Kolašin - Podgorica.

By the time of construction of the security regional (the Littoral, central, and northern) rings on the layer of the information transport route on the national level realized through the backbone of the optical fiber Bar - Belgrade, it is necessary to construct, as soon as possible, the security rings on the layer of the multiplex section for the ”backbone” of transport.

ODH network of digital links can be used as security ring on the regional Littoral level in the transitional period up to the construction of SDH along the optical cables.

Undersea optical cable system Bar - Corfu

The main purpose of the optical system of the capacity of STM 16 (1+1) is to transport information on the national level i.e. to connect ITE (International Telephone Exchange) Podgorica with other ITEs in the world that traffic-wise gravitate to this system.
The Littoral region connects its traffic to this system via ITE Podgorica.

In the future, on the basis of traffic demand, the possibility has been created for direct connection of the Littoral region to this system using one STM-1 (155 Mbit/s) out of possible STM-16 (2.5 Gbit/s) with possible forwarding towards Croatia.

The undersea optical cable has the landing point in the belt of the Coastal Zone at a place called Ujtin Potok at a distance of 10 km from Bar in the direction of Ulcinj, from which point it joins the cable route up to the road to Bar. The total length of the cable laid in the sea on the route towards Corfu is 324.27 km, out of which 194.93 km were laid along the sea bottom, and 129.34 km were buried in the sea bottom at a depth of 0.8 to 1 m whereby in the territorial waters of Montenegro its length is around 30 km.

The landing point (the point where the undersea cable reaches the land) nearby Ujtin Potok - Bar is dimensioned in such a way that it enables ducting of a relatively large number of new – planned undersea cables in Bar, as follows: Bar - Albania, Bar - Italy (Bari), Bar - Croatia and Bar - Northern Italy or Slovenia, whereby Bar would become the center for undersea cables with the possibility to use the ring for international undersea cables and the connection of the submarine area with the hinterland.

Ground optical cable system Herceg Novi - Bar - Ulcinj

In the Littoral region, the optical cable on the specified route has multiple importance:
- For traffic connection of the Littoral region with the neighboring countries (Croatia, B&H, Albania, Greece, Italy) as well as with the central region of Montenegro;
- For security of the ”backbone” of information transport on the ground optical route Bar - Belgrade;
- For meeting the requirements of the transit regional traffic in the Littoral region;
- For connection of mobile base stations with mobile switching centers.

All the above requirements can be met with the installed large number of optical fibers in duct and subduct systems (from 20 to 30) through which it is possible to switch on multiplex units practically from STM-1 (155 Mbit/s) via STm-4 (622 MB/s) and STM-16 (2.5 Gbit/s) to 10 Gbit/s depending on the requirements.

SWITCHING SYSTEMS

Planning of the telephone network imposes, as the ultimate objective, the digitalization of the telephone network on all the levels.
Within the following five-year planning period, the switching system in the Littoral region should be fully digitalized. Switching systems, which will be installed, should be digital (time switching and spatial switching) and enable forming of both IDN and narrowband ISDN networks with signaling No. 7 according to the recommendations of ITU-T.
The existing analog telephone exchanges will still remain in operation in the national network until the end of their operating life or until the decision is brought to exclude them from the network.

	Subscribers	Inhabitants	%
2005			
Littoral	120,000	170,431	70
MONTENEGRO	306,000	681,722	45
2010			
Littoral	170,000	175,972	96
MONTENEGRO	370,000	703,887	52
2015			
Littoral	181,085	190,588	95
MONTENEGRO	420,000	762,354	55

(The above indicators of the level of development are on the highest international level due to the characteristics of tourist economy).

The above table gives the Projection of the number of telephone subscriber lines with the development level (the number of telephone subscribers per 100 inhabitants) with the stress on the Littoral region, i.e. on the hinterland of the Coastal Zone of Montenegro.

Planning of the development of telephone capacities is a thankless task to forecast for over 10 years, knowing that, in the course of one five-year planning period, minimum one technology and several technological generations change in this area.

PUBLIC LAND MOBILE NETWORKS (PLMN)

The main task of mobile networks is to provide to the mobile subscribers, via radio links, the telecommunications calls and services and to have the possibility of automatic connection to adequate fixed network (public switched telephone network PSTN, public data network PDN, and integrated services digital network ISDN).

Mobile networks in the system are supported by the public switched telephone network (PSTN) thereby primarily of optical digital transmission and switching systems.
The networks of mobile digital telecommunications consist of the following main structural elements:
- Mobile radio stations (MS)
- Mobile switching center (MSC)
- System of base radio stations (BSS)
- Controllers
- Digital optical radio links.

Automatic establishing of connection between:
- A mobile subscriber, regardless of his/her current location and any subscriber of the fixed network,
- Two mobile subscribers is enabled provided that the mobile subscribers are in the zones of coverage of the network of base stations.

Projection of development of mobile telephony in Montenegro

	2010	2015
Number of mobile subscribers	180,000	210,000
Number of locations of base stations BSS	50	100
Cell diameter in the zone of coverage (km)	4.00	2.00
Density (5) of the level of development of mobile subscribers	102	110
Number of inhabitants in the Littoral	175,972	190,588

The above table gives the Projection of development of mobile telephony in the Littoral region 200 km long subject to the coverage by mobile signal from the base stations and the diameter of cells in the zone of coverage with the density in % of the relevant level of development.

In the service zone of coverage, which is divided into cells, the elements for planning of the development of mobile telephony are: structure of the terrain, volume of traffic, and the number of users.

With the increase of the volume of traffic and the number of users, the size (diameter) of the cell keeps being reduced so that the cells of the biggest diameter are in the rural areas where the volume of traffic is low, while the cells of a smaller diameter are planned in the urban areas with the bigger volume of traffic.

The number of mobile subscribers is considerably increased at the time of tourist seasons with the use of ”prepaid” service, which must be taken into account when dimensioning the base stations reckoning on the increased traffic in the season.

2.6. Protection of Cultural Heritage on Land and in the Submarine Area

In the region of the Montenegrin Littoral and in its maritime zone, there are numerous cultural monuments of different types, characters, and degrees of preservation.

All the registered monuments are at the same time categorized in compliance with the prevailing statutory provisions as: the monuments of outstanding importance (I category), the monuments of great importance (II category) and important monuments (III category).
Apart from the registered, or protected cultural monuments, along the Montenegrin coast and in its maritime zone, there is also a number of the so-called recorded buildings/facilities for which it is assumed with good reason that they possess certain monumental qualities and, therefore, represent the potential monuments. Among them, according to the assumed monumental values, there stand out the sacral facilities and archeological sites in the submarine area in a relatively large number.

In the zone of coverage of the Coastal Zone, there is a symbolic number of cultural monuments.

2.6.1. Cultural Heritage on Land

In the zone of coverage of the Coastal Zone, there are the following *registered monuments:* Mamula fortress (II category), Lastavica Island; the monastery complex of St. Vavedenje Bogorodice, Žanjice (II category); the church of St. Nedjelja on the namesake Cape, Jošica (II category); Prevlaka with the remnants of the monastery of St. Mihailo (II category); the Church of St. Trojice, Prevlaka (II category); Verona – Bizanti palace, Račica, Tivat (III category); the complex of the church of Gospe od Anđela, Verige (II category); the church of Gospe od Škrpjela (I category) and the church of St. Đorđe (II category), the islands in front of Perast; Baja Pivljanina tower, Dražin garden (III category); the church of St. Ilija, Dobrota (II category); the church of St. Nikola, the island in front of Budva, Školj (III category); Drobni Pijesak, Budva (III category); the remnants of a castle and a lazaretto, Petrovac (III category); the monastery of Bogorodica Ratačka (I category) between Sutomore and Bar.
The Coastal Zone also covers parts of *urban entities* of Perast, Kotor, Budva, and Ulcinj (I category) as well as of Herceg Novi and Sveti Stefan (II category).
The zone of Kotorski and Risanski Bays is also in the List of the World Natural and Culture Heritage and, thereby the part of settlements in that part of Boka.

Within the coverage of the Coastal Zone, there are the following *recorded monuments:* remnants of ancient and medieval architecture, Žanjica; the church of St. Jovan, Žanjica; Arza fortress, in front of Žanjica; Citadel (Mezaluna), Herceg Novi; the complex of Lazaretto, Meljine; the railway station, Zelenika; hotel Čabe Mađara, Zelenika; the church of St. Nikola, Đenovići; the remnants of late ancient architecture with a mosaic, Prevlaka; the church of Gospe od Otoka, Tivatski Bay; the mount of the River Ljuta with a mill and remnants of the church of St. Krsta, Kotorski Bay; the church of St. Nedjelje, Katič Island, Petrovac. The following ambience entities have been recorded: the urban center of Risan, settlements Rose, Ljuta, Dobrota, old Prčanj and Muo and the rural entities of Rafailovići and Pržno.

A great number of the monuments of the building heritage, regardless of their status (whether they are registered or not), have retained their primary functions, being either of sacral or profane character.
Among the monuments of building heritage, only the fortification facilities have fully lost their primary function.
Reviving of abandoned monuments or insufficiently utilized entities open up numerous possibilities for their inclusion in some form of development (small business, catering, picnic tourism, handicraft trade, olive growing, beekeeping, etc.).
Out of the profane facilities that had lost their original functions long ago and have not got the new ones in the meantime, special treatment also deserves the spacious lazaretto in Meljine, which can be attributed a polyvalent function due to its spatial potentials and the location on the very coast.
Among the structures of fortification character, the Austrian fortresses deserve attention without a doubt due to their appearance and their spatial potentials to include modern and useful facilities, two of which are located at the entrance in Boka Kotorska Bay (Mamula and Arza), one in Herceg Novi (Mezaluna), one in close vicinity of Budva (Mogren), one above Kotor (For Goražda) and one high above Budva (Kosmač).
In enriching the overall tourist offer from the present aspect, the cultural heritage plays a marked, but not a particularly pivotal role. Among the versatile monumental heritage that is in the sphere of tourist offer, special place belongs to the old urban centers. By their attractive positions and the established balance between the inherited values and the facilities dictated by modern housing, such urban agglomerations offer extraordinary potentials for their more successful use and further development of tourism. Such potentials are also stressed by certain specific features that certain entities possess.
Thus in the old town of Herceg Novi, the squares around major cultural monuments and the fortresses stand out, out of which two have been revived, while the other two are waiting to be revitalized. Particularly important is the existence of an organic bond between the old town and its outskirts, in which a proper town square is located. Natural outgrowing of the old town into the outskirts does not create a sharp and rough border between the old and the new, which is an additional quality for the tourist offer.
Kotor as the good registered in the List of the World Culture Heritage is emphasized with an outstanding wealth of the monumental fund. The current tourist offer could be extended by animation of the attractive town walls and the fortress of St. Ivan, as well as by inclusion of other coastal settlements with their own ambiance and monumental values.
The old Budva, apart from the current ones, also offers a series of additional potentials for extension of the tourist offer and development of the so-called cultural tourism. This primarily implies presentation of the remnants of the Hellenistic, Roman, and early medieval Budva (Cyclopean wall, thermae, basilica), including

opening of the archeological and ethnographical museums.
The old Bar, which should further be nurtured as a unique open-air museum of architecture, should be more prominently included in the tourist offer by introduction of certain new facilities. Apart from the already existing ones, it is also possible to form a series of attractive, artisan workshops with sales premises, workshops for manufacture and sale of souvenirs, small sales galleries with painters' studios, etc.
The attractive position of old Ulcinj, from which one has breathtaking views, also offers a range of potentials for more prominent inclusion in the tourist offer. By setting up small workshops for specific handicrafts, catering points, stores selling souvenirs and artisan products, the present, relatively poor offer would be enriched.
It is also possible to enrich the tourist offer by more active inclusion of sacral facilities, particularly of the major monastery complexes (Podostrog, Praskvica, Reževići, Gradište...) within which there are also particularly rich treasuries.
Certain undersea sites should also certainly be included in the tourist offer through the development program, as it has been done worldwide for long now.

2.6.2. Undersea Heritage

According to the documentation of the Republic Institute for Protection of Cultural Monuments from Cetinje, only two archeological sites in the submarine area have been registered and categorized: the area between Strpački Cape and Murove Cape in Risanski Bay and Bigovica Bay, between Volujice Cape and Bigovica Artificial Cape. Both sites belong to the third category of monuments.
Apart from the registered ones, 27 additional archeological sites in the submarine area have been recorded: Njivice (amphora site); Malo Rose (amphora site); Žanjic, (amphora site and shipwreck); Lastavica Island, Mamula (amphora site); Karatoč (amphora site); Kumbor (amphora site); Trašte Bay (amphora site); Bigova Cove (amphora site); Pržno Cove, Trašte Bay (amphora site); Tivatski Bay (shipwreck); Gospe od Otoka Island (amphora site); Dobra Luka Cove (amphora site); Budva's port (amphora site); Slovenska Beach (shipwreck); Katič (amphora site); Petrovac (shipwreck); the port of Bar (shipwreck); Volujica Cape, (shipwreck); Velja Zabija shore (shipwreck); Barski Bay (shipwreck); Maljevik Cove (amphora site); Stari (old) Ulcinj (amphora site); Valdanos Cove (remnants of ships' cargos); Velika Beach, Ulcinj (shipwreck); Ulcinj (shipwreck), and Đeran rock (amphora site).
The records also include the remnants of shipwrecks from the 19th and 20th centuries, although they cannot be classified in the archeological sites on any grounds. Yet, due to the historical importance some of them have as well as due to the fact that they are particularly attractive for sports, or tourist diving, they could not be omitted.

Undersea heritage is currently the most threatened cultural heritage in Montenegro. Not a single state has ever had an uninterested attitude to it; on the contrary, they have always been determined to settle that problem as best as possible and to do it promptly. What has been lost will not be possible to make up for, but with each day of delaying the commencement of systematic work on this problem area, such loss is just increasing. Efficient protection of undersea archeological sites and finds will not be possible if it is undertaken just as a campaign of one administrative and professional service, but only if it is understood and undertaken as a ***campaign of national interest*****.** Only a joint, well organized and precisely coordinated approach to this problem area can bring about significant results specifically through urgent, intervention measures and through long-term work.

In order to resolve the accumulated problems, setting up of the Center for Undersea Archeological Investigations of Montenegro would be of vital importance, as an institution of the Republic importance with clearly defined legal status and precisely established authorities. For the requirements of the Public Enterprise Coastal Zone of Montenegro in the beginning of 2001, a project for setting up of the Center for Undersea Archeological Investigations of Montenegro had been made. The project envisaged the Center to be the agent and coordinator in the work on and resolving of the problem area of undersea archeology of the Montenegrin submarine area, the initiator and administrator of urgent intervention measures, but also the creator and prime mover of long-term work, a technical base for undersea archeological investigations and have a full insight in all the undersea archeological activities.

In the world, particularly in the past years, it is insisted on non-destructive archeological work because any archeological excavations permanently destruct the remnants of the past. For that reason, the most important task of undersea archeology is prospecting - systematic touring of the terrain in a certain region with the aim to gather the data on archeological finds, or to establish and document new sites.

Prospecting is of fundamental importance because it represents an efficient protection and control and the entire policy in the area of undersea archeology, it can be implemented only on the basis of as complete records of the undersea archeological sites as possible. Therefore, it is necessary to set up a registry, which will contain all the gathered data on each individual site. The basic functions of the actual registry are: to provide an operating list and description of the sites of certain regions; to provide information that will at any moment enable prompt assessment of the threat to a site.
A minimum quantity of data on each site is required for this: exact position, assessment to which time period it belongs, assessment of the state of preservation, factors that threaten it in a short and longer time period, any known historical connection or aspect that makes it particularly important.
The next phase is the classification of the undersea archeological sites, or their typological sorting and valorization. That will, along with the data on the level of threat, enable to easier establish the priorities in investigation as well as the actual manner of archeological investigation that should be applied at each individual site.

The sites that are on the list of the recorded undersea archeological sites in the Republic Institute for Protection of Cultural Monuments from Cetinje should be verified by undersea prospecting in order to get more information on them and to bring the decision as

to whether they should be put under protection and categorized, left as the sites under preliminary protection or removed from the list.
In the course of the so-far investigations, wider, archeologically very interesting zones (Risanski Bay, the Island of St. Đorđe, Trašte Bay, Bigovica and Valdanos Coves, Krš od Đerana) became clearly prominent as well as the sites that indicate that remnants of ancient shipwrecks could be expected at them (H. Novi, St. Nedjelja, a wider area of Žanjica Cove, Dobra Luka, Kalafat, Budva). In the above parts of the submarine area, it is necessary to carry out undersea prospecting by applying geophysical methods and using detection devices in order to precisely locate the archeological finds, and then to establish their character by diving and visual prospecting. By broadening our archeological knowledge, it will be possible to define the zones prohibited for engaging in sports diving activities. To the protected and categorized sites in Risanski Bay and Bigovica, the southern side of Valdanos Cove should be most urgently added, irrespective of the fact that, up to now, this type of legal protection has not been sufficient to protect the sites from plundering, which is indicated by numerous archeological materials from these sites that are in private collections.

The regulations governing the issue of protection of the undersea archeological sites do exist in different laws and rulebooks. The ultimate goal is passing of a special law, which will govern all the issues of undersea activities and, within it, all the issues of undersea archeology as well. Up to then, attempts should be made to achieve that the regulations in force are fully complied with, which means far more than up to now. It should also be necessary to strengthen supervision over their enforcement and to drastically tighten up the penal provisions. All the prevailing regulations governing the undersea archeological activities should be collected, printed out in the form of a collection and forwarded to all the interested institutions and organizations the cooperation of which must be continuously insisted on, and they are the competent institutions for protection of the cultural monuments, seaside municipalities, portmaster's offices, police stations, i.e. all the institutions that are within their respective activities oriented to the sea and the submarine area, and sports diving clubs.
Also related to the statutory regulations is the proposal to legalize private collections. Most of the archeological materials that originate from the Montenegrin submarine area are in private collections, almost as a rule inaccessible to archeologists and a wider public. By legalization of such collections, with the obligation that, within a certain time period, they are registered with the competent museum institutions, it would be possible to archeologically treat and document such materials.

In view of the small quantity of archeological information, and thereby the inability to assume what is contained at the sea bottom with greater certainty, it is necessary, when carrying out construction works in the submarine area, to ensure presence of a diver archeologist, which has never been the case up to now. Such an obligation of a contractor, or employer, must be regulated by law.

Long-term work on the problem area of undersea archeology implies gradual changing of the established mindsets through familiarization of wider public with the great importance of the undersea archeological sites and finds as an integral part of our cultural heritage. Undersea finds are still looked upon only through the market or esthetic values while their monumental values have been completely neglected.
Our modern lifestyle has made us forget, or simply overlook, that ancient and medieval states were based on maritime economy, that towns, such as Perast, Kotor, Budva, Ulcinj, emanated, developed, and flourished owing to the maritime economy.
By organizing one or more attractive, well conceived exhibitions, attention of the public would be drawn to the problem issue of this area in the right way. The project for organization of the exhibition, under the working title Archeological Finds of the Montenegrin Submarine Area, has been in the Ministry of Culture of the Republic of Montenegro since April 2000.

Undersea archeological sites have their past and if, through proper approach to their research, conservation, protection, and presentation of the finds, we also manage to ensure their future, the resulting scientific results will to a large extent contribute to broadening of our knowledge and awareness of the importance of the undersea cultural heritage and thereby also increase the attractiveness of the tourist offer of the Montenegrin Littoral and the submarine area.

2.6.3. Protection of Heritage in the Forthcoming Period

For the purpose of better and more efficient preservation, expert restoration, and use of the cultural heritage, it is necessary to devote more attention to it in the future development plans. The social, expert, and esthetic valorization of the cultural heritage is indispensable for all the types of monuments, starting from urban entities, rural agglomerations to individual monuments, including those of ambience values.
For the monumental heritage to be included in the development plans in the right way, it is necessary to make relevant programs for its complex research, rehabilitation, and use. In parallel with the implementation of programs, the monumental heritage should be gradually included in certain programs of development of the Coastal Zone. Thereby one should not overlook that each rehabilitation and revitalization of monuments, regardless of the character, must be undertaken in compliance with general principles of protection, which implies maximum respect of all the monumental values. All possible changes should be previously verified by the professional authorities and organizations, in the first place by the Institute for Protection of Cultural Monuments.
Special attention in the development plans should be devoted to the undersea archeological sites, for which investigation programs should be made and implemented and, on the basis of the results, certain sites should be included in the development of the Coastal Zone.

Based on the above stated, for the purpose of more efficient protection and more successful use of the potential of the cultural heritage in the development

programs, which will be implemented in this plan, the following measures should be undertaken in future:

- More attention should be devoted to the preservation, expert restoration, and use of the monumental heritage within the development plans because only in such a way the social and expert valorization of the heritage will enable proper attitude towards this precious segment of our past; within that, establishing and resolving of the property-rights relations must commence;
- In the development plans, the priority in the revitalization and use should be given to the heritage which is decaying, which is endangered or which is threatened by construction of new buildings/facilities, where there are conditions for that;
- The necessary expert documentation should be stated being prepared on the basis of the gathered studies, analyses, expert appraisals, etc., which will represent a solid basis for all the future plans of revitalization and use of the monumental heritage;
- Preservation of the monumental heritage should be carried out through the planned, continuous process of revitalization within which the principle that each monument requires specific procedures and treatments should be honored to the maximum;
- Timely cooperation between the planning specialists and experts in the protection of cultural monuments should be established and, while complying with the conservation principles, the plans for proper protection and use of the monumental heritage should be prepared;
- For the purpose of finding the best solutions for the unexploited and neglected monuments to be given an active role, the principle should be adhered to that the chosen function optimally satisfies the specific features of a monument; further protection, presentation, and use of the monumental heritage will actually depend on properly chosen solutions;
- Deciding on one or more possible functions should enable integration of monuments into the entire process of revitalization, which will also ensure corresponding financial investments for future protection and use;
- Special attention should be devoted to the protection of the area of Kotor, which was declared the world cultural heritage, and which implies strict compliance with the international standards related to the protection of the world cultural heritage;
- For the purpose of protection of the undersea archeological sites, an expert organization – the Center for Undersea Archeology of Montenegro should be set up
- It should be urgently started with recording, mapping, and investigation of important and particularly of the threatened undersea sites;
- In the development plans of the Coastal Zone and in the tourist offer, the attractive undersea and other archeological sites should be actively involved.

2.6.4. Guidelines for Use of the Heritage in the Zone of Coverage of the Coastal Zone

Classification of the building heritage, as the basis for classification, should include the original use i.e. the social content of a building. Such classification would enable reconstruction of the historic developments, motives, and forces that had built those goods.

This is the main scientific criterion for preservation and revitalization of the goods of architectural heritage.
The coast reflects all the events in the coastal area both in the functional and in esthetic sense and, therefore, the answers to the questions related to the possibilities and methods of activation of the coast should be necessary to look for today in the process of reconstruction of coastal area.
In the process of revitalization of building heritage, the starting point includes the existing buildings with their original use. All of those whose original facilities cannot be revitalized (such as industrial buildings, engineering and military ones) should be converted and their new - modern function should be established whereby it is necessary to pay attention to the available capacity and possibilities of their adaptability with minimum interventions. On the examples of buildings of archeological and religious uses, their monumental presentation seems to be most acceptable while when considering their conversion, it is necessary to envisage their public use for cultural purposes.

Requirements for protection of the building heritage

In the territory covered by the plan, the entire natural and building heritage registered as the cultural monuments as well as all the recorded areas of characteristic architectural and ambience features should be treated under special requirements.
In the areas marked as the archeological sites, prior to commencement of any construction, it is necessary to undertake exploratory drilling and protective investigation and, on the basis of their results, further requirements will be defined.
For the planned interventions of revitalization and reconstruction on the monuments of building heritage, special requirements for protection, the so-called conservation requirements are issued by the competent institutes for protection of cultural monuments, which prepare and revise the design documentation and carry out conservation supervision. The possibility of construction of new buildings/facilities is excluded in the close vicinity of such monuments.

Only on the basis of the valid documentation on the existence or authenticity of the form of a monument, its revitalization may commence.
In the cases of less significant facilities within a monumental complex, it is possible to envisage interventions on them for functional reasons if there are proper spatial ratios.

The architectural designs should be adapted to the autochthonous architecture of the area in which the intervention takes place as well as to the use for which they are planned in compliance with the original purpose of monuments.
For the planned interventions of construction of new buildings/facilities in the environs of the cultural monuments, the institutes for protection of cultural monuments issue general requirements and revise the design documentation.
It is necessary to incorporate the values of traditional construction into the architectural expression of new buildings/facilities without defying them but with interventions through interpretation of their values.
Having in mind the current state, appreciating the experiences from the past and with the aim to preserve the building heritage of the coast (especially in the protected area of Kotorski Bay), its zoning is recommended.

The parts of the coast that are defined as undeveloped are actually the natural capes and beaches or the constructed embankments of the defined route of the coastal road along which there was no construction until recently. Finding that there are very few such areas, and bearing in mind the fact that certain seaside settlements are interconnected (linear town planning in expansion) as well as the examples of illicit seizures by which the area is devastated and there is a threat of deviation from the plans, it is recommended to preserve undeveloped, i.e. it would be acceptable to apply the method of preservation of the existing state without interventions or with minimum, strictly controlled ones.
Upon reviewing the encountered building density on the coastal region, the coast through the system of piers with small mole-closed harbors, landing places, and swimming beaches as well as tourist facilities (defined and constructed), restoration is recommended i.e. it would be acceptable to apply the method of restoration of what has been constructed, i.e. its reconstruction.

The designs for interventions with new structures in undeveloped and planned areas should be sought in the direction of new technical and technological solutions on the sea, i.e. avoiding creation of new structures by extending land on account of the sea, defined by capital resource, of modern features. Compromises are possible, but it is the question of the extent and method. Copying of traditional elements of forming the coast should be avoided; instead they should be transposed into the modern, i.e. interpreted.

Requirements for use of the building heritage until the implementation of the plan

The areas defined as natural and/or building heritage within the coverage of the Coastal Zone are currently used for different purposes, often otherwise than planned or/and they are unusable and, until the implementation of the plan, it should be enabled that they continue to be used without obstruction within their existing overall dimensions. This emanates from the need to enable assigning the areas their planned uses in the following phases, in the manner that, in the areas the use of which is changed, the trend should be to reduce the building density as well as that, in the transitional period, they are gradually prepared for revitalization through undertaking of a series of methodological procedures, e.g.: reconstruction, restoration, remodeling, change of use, etc.

In the zones under protection, either ambience or monumental, putting up of temporary facilities is excluded except if they are seasonal and even then they should be planned and designed according to special requirements of the ambience complied with by the design documentation with the consent of the competent protection and town-planning services.

Guidelines for implementation of the plan

On the basis of the current state, one can get the impression that, with respect to the protection of the building heritage, i.e. immovable cultural monuments in the territory of the Littoral, there are all the basic preconditions. Namely, the cultural monuments have been recorded, classified, and categorized, and the care of the community for such cultural goods is realized through the work of relevant institutions in compliance with the Law on Protection of Cultural Monuments. Despite the fulfillment of the basic preconditions for protection and preservation of the natural and building heritage, some examples of their particularly poor state point to the flaws in implementing the system of protection.

In order to be able to have influence on the social mainstreams from which the phenomena of the utmost threat to the of monumental goods result, the measures are proposed to improve the legislation governing the interventions in that space.
In the first place, those would be the measures that would impose restoration of old and valuable mansions and prohibit construction of new buildings in their vicinity until the existing, old buildings are revitalized. There is no need to point to the advantages of the traditional architecture with respect to the modern buildings because it was actually the basis for their registration in the Registry of Monuments of the Republic.
Bearing in mind the absence of sensibility for the values of the architecture of the past in the town-planning practice of our time, control and influence on the preparation of urban development plans by protection services become a necessary measure.

2.7. Environmental Protection

2.7.1. Concept of Environmental Protection

The concept of the protection of the environment of the Coastal Zone is based on harmonization of the requirements for development and conservation, or protection of its resources and natural values in a sustainable way (sustainable use), in such a way as to enable the present and the following generations to satisfy their needs and to improve their quality of life.
Attainment of that goal – sustainable development, is realized by applying the following principles:
Principles of sustainable development (UNCED, 1992: Rio Declaration) – out of 27 given principles, for implementation in the belt of the Coastal Zone, the most acceptable are the following ones:
- Human beings have the central place in the care for sustainable development. They are entitled to healthy and productive life in harmony with the nature.
- The states have the sovereign right to exploit their own resources subject to their policies of environmental protection and development, as well as the responsibility to ensure that the activities within their jurisdiction or control do not cause damage to the environment of other states or regions that are outside the borders of their national jurisdictions.
- The right to development must be exercised in order to equally satisfy the requirements for development and the environment of the present and future generations.
- For the purpose of realizing sustainable development and higher quality of life for all people, the state should mitigate and abolish unsustainable methods of production and consumption and stimulate demographic policy.
- The environmental issues are best resolved with participation of all the interested citizens on adequate level. On the national level, each individual should have adequate access to information on the environment managed by the public/government bodies, including information on hazardous substances and activities in their respective communities, as well as the possibilities to participate in the decision-making process. The states facilitate and stimulate the awareness and participation of public by enabling widespread perusal of information. Efficient access should be provided to the court and administrative proceedings, including indemnification and legal remedy.
- Fir the purpose of protection of the environment, the states will, in compliance with their capabilities, broadly apply preventive measures. Where there is a threat of a major or irreparable damage, non-existence of full scientific certainty will not be used as the reason to postpone cost-efficient measures for prevention of destruction of the environment.
- National authorities should endeavor to improve incorporation of the costs for environmental protection in the system of cost accounting and the use of economic instruments, bearing in mind the approach that, in principle, the polluter should bear the costs of the consequences of pollution, with due respect of public interests and without hampering the international trade and investments.
- Assessment of the impact on the environment, as a national instrument, will be undertaken for the proposed activities for which it is assumed that could have considerable impact on the environment, on which the competent national authority will decide.
- Peace, development, and environmental protection are interdependent and indivisible.

Principles from the Pan-European strategy for conservation of natural landscapes and biodiversity – all the 10 principles are acceptable to be applied:
- The principle of careful decision making, on the basis of the best possible information.
- The principle of avoiding negative projects, by introducing the Assessment of the Impact of Interventions, which are proposed by such projects, on the environment.
- The principle of precaution, although causal relations between the planned interventions / activities and their negative impacts have not been proven or confirmed.
- The principle of translocation – the activities that disrupt the quality of the environment, and cannot be avoided, should be displaced to the areas in which they will cause a lesser impact.
- The principle of ecological compensation – if the negative effects on physical characteristics of the areas having high values of biological diversity or diversity of natural landscapes cannot be avoided, then a balance should be achieved by applying the measures of protection and conservation.
- The principle of ecological integrity - the ecological processes on which the survival of the species depends should be protected, as well as the habitats on which their survival depends.
- The principle of restoration and recreation /renewal – where possible, biodiversity and diversity of natural landscapes should be restored or/and recreated, including the measures for rehabilitation and reintroduction of endangered species.
- The principle of the best available technology and the best examples for environmental protection – support to technology transfer is the key element of protection/conservation and, where possible, those technologies that are relevant for protection and sustainable use of biodiversity and diversity of natural landscapes should be available to others as well.
- The principle that ”the polluter pays” – the expenses of the measures of prevention, control, and mitigation of disruption of biodiversity and diversity of natural landscapes should be compensated by the party responsible for that.
- The principle of participation of the public and public access to information – public support to the measures that are related to biodiversity and diversity of natural landscapes should be provided through involvement of the public and private owners of land, scientific communities, and other civic organizations and individuals.

Principles of wise use that have been developed as empirical principles in a number of related global ecological initiatives:
- The principle of interdependence - because the territory of the Coastal Zone cannot be looked upon as an isolated ecosystem and, therefore, with the extension of protection of the environment to a wider area of the surrounding areas and ecosystems, not only the physical barriers between them will be removed, but also different barriers in the management of the

resources through different departmental strategies and policies as well as the political and social barriers.
- The principle of combined addressing the problems and acting to prevent creation of problems.
- The principle of multiple uses - implies acceptance and optimalization of different forms of use of an area.
- The principle of caution - "It is better to be safe than sorry" implies that the activities that may have a negative impact on the environment should be avoided, even when it cannot be scientifically proven.
- The principle of "No Net Loss" - implies that the current values of an area have advantage with respect to those with which those values would be possibly replaced.
- The principle of restoration - implies that parts of areas that are not in a satisfactory state should be restored and brought back into original state.
- The principle of openness to the public - implies the possibility of not only public insight, but also openness to involve the public in the discussions on important issues in management and decision making.
- The principle of operationalization of the public interest - implies that the management will be undertaken in public interest; thereby it should not be allowed to arouse prejudices that private interest is not included in the public interest.

Priorities in protection of the sea and coastal region, which are given in the strategic document "Lines of in Development of Montenegro Ecological State", and are related to the investments from the aspect of conservation and protection of ecosystems:

Requirements, limitations, and „ecological priorities";
- Construction of an integral sewerage system for Boka Kotorska, of a big station in Grbaljsko Polje for treatment of collected waste waters. Construction of an integral collector and station for treatment of waste waters for the territory of Budvanska Riviera (selection of the location of the station is a separate project).
- Construction of an integral collector for waste waters of Bar and Ulcinj Littoral and an integral station for treatment and use of treated waters. Full use of recycled waters for irrigation of afforested areas, parks, and town greenery, washing and sprinkling of streets, and as utility waters;
- Establishing of an integral system of collection of municipal waste for the entire Littoral region and of an integral Station for its recycling, as well as of an integral dumpsite for unusable waste. The system of collection and transport of waste using the cheapest means of transportation (specially built ships) should be elaborated;
- Construction of the regional water supply system for the purpose of efficient supply of all the settlements;
- Construction of an integral system of collection of municipal and industrial waste and construction of an integral station for secondary materials, treatment of solid waste. The system of transportation should be particularly elaborated in this case, if possible along the waterways;
- Reorientation of the technological processes of the chemical and rubber industries.

In addition to the investment priorities, the priorities in organizing of the protection measures are also important, as follows:

- Organizing of an efficient service for protection against forest fires, procurement of firefighting aircraft of Canadair type for such requirements;
- Organizing an efficient service for protection from natural disasters particularly earthquakes;
- Preparation of an integral plan for protection and improvement of the environment of the Southern Adriatic;
- Definition of „ecological capacities" of individual tourist destinations.

In addition to the above stated, one should also bear in mind the limitations aimed to maintain the ecological balance, which are proposed by the above document:
- It is prohibited to invest in industrial capacities basic chemistry, metallurgy, coal-operated thermoelectric power plants, nuclear reactors, oil refineries, and petrochemical plants, metallurgy facilities;
- Feeling of trees is being limited except under the conditions of sanitary logging, which is controlled by ecological police;
- The application of agrochemicals in agricultural regions of Sutorina, Grblja, and Ulcinjsko Polje is being limited;
- It is prohibited to use explosive devices in fishing as well as any means that threaten the living world of the Adriatic;
- It is prohibited to change use of the cultural and historic buildings/facilities and the facilities of national values.

In view of the fact that, in the course of preparation of this plan, the procedure of adoption of the laws dealing with the **strategic assessment and assessment of impacts on the environment** was also under way**,** which will be enforced as of 2008, it is necessary that all the future, lower-order planning documents prepared at that time, have an adequate analysis and assessment of the impact of planned activities and programs, in compliance with the established contents for this type of surveys.

2.7.2. General / Long-term Objectives and Trends of Environmental Protection Policy

In view of the fact that environmental protection represents a continuous process, and not just a single act, then, in that process, the following long-term objectives should be achieved:

- Harmonization of regulations and adoption of relevant documents on the required levels, which are needed for more efficient environmental protection.
- Conservation of the established level of authenticity of ecological values of areas.
- Prevention of further pollution of the sea ecosystem by waste waters from the catchment area, particularly by ensuring taking place of the natural processes that enable stability of the ecosystem at the established level of authenticity.
- Higher protection of the already specified strictly protected areas, primarily beaches.
- Protection of biodiversity as a whole, and in particular the components of species biodiversity that have the conservation value,
- Protection of the species that can be economically exploited, by establishing prohibitions and limitations,

by control of the species in catch and the allowable daily / annual quantities of catch based on which the amount of remuneration should be defined.
- Enabling presentations of ecological values of areas to visitors.
- Development of educational facilities for the purpose of valorization of ecological values of areas.
- Definition of limitations (concerning the number of tourists - visitors – the capacity of an area, tourist capacities, exploitation of resources, with the types of resources and allowable quantities, development of human activities and businesses), represents a special goal, which should be achieved in the protection of the region of the Coastal Zone in the forthcoming period; this is particularly related to establishing of the capacities of each individual beach or a new tourist location.

Implementation of the wide range of the above principles and objectives of protection in everyday practice and safeguarding of the ecological character of areas guarantees a long-term stability and success in its management.

As to the selection of the strategic approach, in the sense of leadership, the so-called ”top-down” approach is considered to be suitable with the leadership by the Government and its executive agency (Public Enterprise for Management of the Coastal Zone) because of the already clearly established authorities in management of the natural values of the areas and possibilities of an efficient operationalization of the goals of environmental protection.

2.7.3. Measures of Protection of Biodiversity, Habitats, and Landscapes

The following general measures of protection of the environment / biodiversity, habitats, and landscapes in the inland part of the Coastal Zone are proposed:
- Maximum possible exclusion from / reduction of the road infrastructure in the region of the Coastal Zone, particularly in the areas with conserved / autochthonous nature. In planning the construction or reconstruction of the road network, pears, and marines, the experts in fauna and flora should also be involved.
- The construction of tourist attractions within the Coastal Zone should be limited to the already developed parts or, to a lesser extent, they should be envisaged in undeveloped zones.
- The measures for upkeeping of ”urban sanitation” should be implemented (safe disposal and collection of waste, evacuation and obligatory treatment of waste waters, development and trimming of green areas).
- Hunting and collection of specimens of animal world in the region of the Coastal Zone should be excluded except under conditions envisaged by the law.
- Exploitation of sand in the region of the Coastal Zone should be excluded.
- If the procedure of soil dressing of beaches is applied, inclusion of non-autochthonous materials should be avoided.
- Educational and promotional campaigns and procedures should be continuously implemented for the purpose of raising the knowledge of the citizens to the level on which they will become the best protector of the environment.

Protection of flora and vegetation

For the protection of flora and vegetation, it is of prime importance to protect plant species, which have already been protected: *(Galium baldacci (Hal.) Ehrend., Colchicum hungaricum Janka, Daphne laureola L., Edraianthus wettsteini Hal. & Bald., Ephedra maior Host., Euphorbia dendroides L. Hermo-dactylus tuberosus (L.) Miller, Ilex aquifolium L., Ophrys fusca Lk., O. aranifera Huds., O. bertolonii Mor., O. fuciflora (Cr.) Rehb., O. bombyliflora Link, O. apifera Huds., Orchis simia Lam., Pancratium maritimum L., Phagnalon rupestre (L.) DC, Quercus robur L. subsp. scutariensis Černj., Ramondia serbica Panč., Salvia brachyodon Vandas, and Tulipa grisebachiana Pantoczek).*

Additionally, due to the rarity or endangered state of plant species that are important for conservation of otherwise high biodiversity of this region (S/A=0.705), it is also necessary to formally protect such plant species. Hence *new plant species* are proposed to be *put under protection*:

I. 1. Individual plant species in a wider region of the Montenegrin Littoral that are proposed for protection: Berteroa gintlii Rohl., Lamium lovcenicum Rohl. (after establishing of its taxonomical status), Valeriana dioscoridis L., Cephalanthera longifolia (L.) Fritsch, Calystegia soldanela (L.) R.Br., Castanea sativa Miller, Narcissus tezetta L., Polygonum maritimum L., Polygonum salicifolium Brouss ex Willd., Prunus webbii (Spach) Vierhaper, Rhamnus orbibulata Bornm., Serapias lingua L., Seseli globiferum Vis.

I. 2. The potential plant species that are proposed for protection in the narrow belt of the Coastal Zone:
- Allium chamaemolyi L., a rare species in the environs of Ulcinj;
- Allium subhirsutum L., present at one site in the environs of Bar as well as at a small number of sites in Boka Kotorska;
- Artemisia coerulescens L. a rare plant in the Montenegrin Littoral (Tivat, Igalo);
- Arthrocnemum fruticosum (L.) Moq., present in limited halophyte habitats in Tivatsko and Ulcinjsko Polje:
- Asphodelus fistulosus L., a rare species in the Montenegrin Littoral at the locality Savina neaby Herceg Novi;
- Aster tripolium L., a rare species in halophyte habitats in Tivatsko Polje and nearby Kotor;
- Bupleurum tenuiccimum L., a rare species in halophyte saline habitats in the vicinity of Ulcinj and Tivatsko Polje;
- Calycotome infesta Guss., a rare plant in the seaside zone in the vegetation of wild scrubland registered at the sites in the vicinity of Tivat, Kotor, Sutorina, Budva, and Petrovac;
- Calystegia soldanela (L.), represents an endangered species because it inhabits the sands of Velika Ulcinj beach and, therefore, with the tourist construction and exploitation of beaches its area is threatened;

- Crypsis acaulis (L) Ait., a rare species known to be present in the halophyte zone of the mouth of the River Bojana.
- Eryngium maritimum L. is endangered in urban parts of Velika Ulcinj beach, Buljarica beach, Budva beach, and other sites where, with the development of the tourist organization, its area is being increasingly limited;
- Leontodon incanus L. is a rare plant in the Montenegrin Littoral encountered in the environs of Budva. Limonium angustifolium (Taus.) Deg. is a rare halophyte species in Tivatsko Polje and nearby Ulcinj;
- Lippia nodiflora L. var. repens (Spr.) Briq. is a rare species recorded on Velika Ulcinj beach and in the environs of Šasko Lake, which are the only known habitats of this type in the country
- Narcissus tazetta L. is a rare and decorative plant in the narrowest zone of the Littoral in the environs of Petrovac, Igalo, etc.;
- Ornithogalum comosum Torn. is a rare plant encountered in the environs of Kotor and Herceg Novi;
- Polygonum maritimum L. is a rare halophyte, psammophyte and endangered plant species, which inhabits sandy beaches predominantly present on Velika Ulcinj beach;
- Polygonum salicifolium Brou. & Willd., is a rare species in Buljarica the area of which is endangered.
- Putoria calabrica L. D C., has been registered in a small number of sites between Bar and Budva;
- Ulticularia vulgaris L. is encountered in the littoral zone only in the region of Velika Ulcinj beach although it can also be expected in other habitats;
- Valeriana dioscoroidis S. S., is known in the region of the Montenegrin Littoral to be only at the site Dobre Vode in the vicinity of Bar.

Important habitats

The following sites having the highest concentration of rare plant species and communities *are proposed for protection* as *the reserves of halophyte flora*:
a) Saline soil nearby Tivat (abandoned Tivat's salt pans and Soliosko Polje) and Ulcinjsko Polje (Štoj – the hinterland of Velika beach), where there grow: Arthrocnetum fruticosum (L.) Moq., Aster tripolium L., Bupleurum tenuissimum L., Crypsis aculeata (L.) Ait., Limonium angustifolium (Tausch) Degen, Salsola soda L., Triglochin maritimum L
b) Combined halophyte and psammophyte habitats on sands, where there grow the following species: Eryngium maritimum L., Cakile maritima Scop., Eryngium maritimum L., Calystegia soldanela L. R. Br., Polygonum maritimum L., etc.

Silty saline shores are frequent in the Montenegrin Littoral, with the allied associations Therosalicornion and Arthrocnemion fruticosi. Such habitats are mainly related to Ulcinj salt pans, the mouth of the River Bojana, Grbaljsko Polje, abandoned Tivat salt pans, the territory of Igalo, etc. Such habitats are quite specific and one of the rare habitats of this type in the Balkan Peninsula and, therefore, they need to be *protected*.

Sandy and gravelly habitats cover significant areas covered with rare and endangered vegetation from allied associations Ammophilion and Cakilion litoralis. Many species from such ecosystems have, due to unplanned development and endangering of beaches practically disappeared and some are on the brink of survival. As a special program and priority in planning of this region is the need to *put under protection these autochtonous ecosystems, by applying ecological zoning*, in view of the fact that a large part has been practically destroyed or considerably changed.

Rock-strewn areas represent the biggest part the coast of the Montenegrin Littoral and they are featured by a relatively few and mainly poor ecosystems judging by the number of species of biodiversity. The vegetation of rocky seashores is predominantly from the allied associations Crithmo-Limonion.

A particularly interesting is the community of tree-like spurge and three wormwood (Euphorbia dendroides and Arthemisia arborenses) as well as the communities from allied associations Centaureo-Campanulion. Some of these communities grow over sea cliffs on rocky shores in the environs of Petrovac and Budva and precisely due to their inaccessibility and exposed terrain they are generally not exposed to anthropogenic impacts. In the sense of protection, these ecosystems must be the subject of a much bigger attention than up to now.

Hard-leaf shrubby vegetation - macchia is represented by several communities that have been generally degraded and are in the stadium of wild scrubland or rocky Mediterranean grounds.
Hard-leaf evergreen shrubby Mediterranean vegetation is the most widespread on the seaside parts oriented to the sea from Petrovac to Bar, then on Luštica Peninsula, the Island of St. Nikola, and in other smaller sites. These ecosystems are under a high anthropogenic impact both with respect to their cutting, fires and impacts by goats and uncontrolled picking of medicinal and aromatic plants. They are featured by high diversity of flora both in the protection program and as anti-erosion systems and also due to other features they must have a much bigger importance. The degraded ecosystems of macchia are tied in with the pseudo macchia, which from the seashore practically reaches the heights of 300-400 m.

The stands of bay (Laurus nobilis), which are more or less widespread on the slopes of seaside mountains and also fragmentary along the coast particularly from Budva to Petrovac as well as on Luštica Peninsula. These ecosystems are under intensive anthropogenic impact due to harvesting of bay for the requirements of pharmaceutical and foodstuff industries.

The above specified types of habitats and plant communities are more or less sensitive to and dependent on a wide spectrum of anthropogenic impacts and, therefore it is necessary to continuously monitor their state.

Special attention must be devoted to the areas that are within the complement of the Coastal Zone and have the character of protected natural objects as well as those objects that have the character of potential protection.

Due to the changes that happened in the past period in the protected areas of nature having the status of "natural monument" (according to the categorization of

the protection status from the Law on Nature Protection, which corresponds to the category of management III under IUCN), it is necessary to undertake revision of those protected areas, particularly beaches that have undergone the biggest changes. After that, preparation of an adequate Management Plan should be ensured for the network of protected areas in the belt of the Coastal Zone where concrete activities and protection measures should be envisaged.
It is necessary to establish an adequate management regime for the above areas, with an adequate service (protection service) which should be formed by the authorized manager – Public Enterprise for Management of the Coastal Zone and which would, in everyday practice, implement the measures prescribed by the Management Plan. As a possible model of functioning of such service, comanagement is proposed with involvement of other stakeholders (municipal services, other authorized institutions, and organized citizen groups).

Protection of fauna

For the aspect pf protection of fauna, the protection of those habitats that ensure safe heaven to the animal world is also important.
A part of these areas has already been protected in the territory of the Coastal Zone, in the dominant category of protection - "Natural monument" (corresponding to the category III, IUCN).
Based on the previously given proposals for protection of flora, the following new proposals have been defined for putting under protection (meaning of flora and fauna, their diversity as well as of conserved areas / landscapes ...), which have been categorized under IUCN categorization of management of protected areas.

The area of saline soil nearby Tivat (abandoned salt pans and Soliotsko polje) - category of management V (IUCN).
Unique boggy-halophyte habitat with specific vegetation and fauna, particularly at the time of wintering of birds.
It should be protected as flora-fauna reserve (nature reserve under the Law on Nature Protection, or Nature Park under the Law on the Environment). The protection implies absence of any construction in the area of the reserve, exclusion of hunting, development of photo-safari tourism, and establishing of educational facilities.

The hinterland of Velika beach (Donji Štoj) - category of management VI (IUCN)
It is considered to be the capital fauna object in the Littoral. Protection of areas outside the borders of the Coastal Zone should be resolved through a joint campaign of the municipality of Ulcinj and Public Enterprise for the Coastal Zone. Most of the hinterland of Velika beach with a part of the very beach (to be defined by the experts after the necessary investigations) should be excluded from construction of tourist facilities. Tourist exploitation should be harmonized with the category of protection of the area.
The zone belonging to the Coastal Zone should be excluded from the hunting offer, particularly from the offer for international hunting tourism. Exploitation of sand, logging should be excluded and the areas for grazing should be regulated. The limitations and conflicts with the present population should be resolved legally, by compensations, etc.

Extension of the sea complex Stari (old) Ulcinj Island with Vučija Cove - category of management IV (IUCN)
Specifically in the inland part to include the area of the reafforested common evergreen oak forest and partly to include macchia in its contact zone towards the settlement. This already protected sea area should be the subject of special care/protection from illegal construction on the land and illegal fishing in the sea area.

Sea complex of Katići Island, Donkova and Velika and seka with rocks and cliff of Resovo Hill nearby Petrovac - category of management V (IUCN)
Prior to formal putting under protection of this area, the procedure valuation / evaluation and establishing of adequate category and regime of protection should be previously undertaken with the guidelines for management of that area.

Meaning of the given categories of management (IUCN):
Category III – Natural monument – which is managed for the purpose of protection of special natural qualities, and in particular rarity, uniqueness, representativeness or esthetic qualities. The objective of management: protection of natural qualities of an area, by providing: suitability for research, education, presentation to the public, etc., by eliminating and preventive prevention of exploitation or occupying of parts of the area for which reasons it has been put under protection, as well as by ensuring to the local population benefit from such form of management.
Category IV – An area in which a specific habitat and species are managed through active interventions. The objective of management: providing and maintaining of the necessary conditions of habitats for the purpose of protection of important species, their communities or physical characteristics of the environment for the purpose of achieving optimal management, assisting scientific research and monitoring including limiting the parts of the area for education of the public, elimination and preventive prevention of exploitation or occupying of parts of the area for which reasons it has been put under protection, as well as by ensuring to the local population benefit from such form of management.
Category V – Protected inland or sea landscape which is managed mainly for the purpose of protection and recreation and in which, through the interaction between people and nature, a characteristic area has been created in time with important esthetic ecological and/or cultural values, and often even high biological diversity. Preservation of integrity of such traditional interactions is important for protection of such an area, preservation of its integrity and further evolution. The objective of management: maintenance of harmonious interactions between nature and culture through: protection of inland and sea landscapes while continuing with the traditional use of the land, construction, social and cultural events, support to the lifestyle and economic activities that are in compliance with nature, while maintaining the diversity of habitats and landscapes with the pertaining communities of plants and animals and their respective ecosystems, elimination/prevention where necessary, of inadequate

manner and volume of use of the land, while ensuring favorable conditions for enjoyment of the public through recreation and adequate level of tourism, supporting scientific research to the long-term benefit of the local population and by ensuring gaining of benefit to the local population from providing services or adequate use of resources from the area.
Category VI – Protected area the resources of which are managed through sustainable use of natural ecosystems. The objective of management: long-term protection of biodiversity and other natural values of the area, by promotion of the management practice based on sustainability, protection of the basis of natural resources from the change of its use by which the biodiversity would be disrupted, contribution of the area to the national and regional development.
The following *areas are proposed for revision of the protection status* due to the change of their ecological values - authenticity, rarity, representativeness):
- Mala Ulcinjska beach
- Topolica beach
- Sutomorska beach
- Petrovacka beach
- Bečići beach
- Slovenska beach

The following areas are proposed *for correction of borders of the protected area*:
- Valdanos beach - correction of the inland border of the area with respect to the already constructed facilities and infrastructure
- Veliki Pjesak beach - correction of the inland border of the area with respect to the already constructed facilities and infrastructure
- Sveti Stefan beach - correction of the inland border of the area with respect to the already constructed facilities and infrastructure
- Ratac Peninsula with Žukotrlica - correction of the inland border of the area with respect to the already constructed facilities and infrastructure of the surrounding settlements

Within the same borders and with the same protection status will remain:
- Pržno beach
- Jaz beach
- Spas Hill
- Mogren beach
- Miločerske beaches
- Drobni Pijesak beach
- Lučice beach
- Pećin cove and beach
- Čanj Pećin.

In order to prevent further degradation of protected beaches on which engaging in tourism is already traditional (swimming beaches, construction of temporary facilities, construction of access roads, parking lots and the like), firstly in the master plans, and thereafter in the detailed urban development plans of the municipalities, their *zoning* should be carried out, by singling out the ecologically most valuable parts of those beaches for strict protection and in those zones no activities would be allowed (tourism, recreational or amusement parks, temporary or permanent building structures, promenades, infrastructure, etc.) which in any way, directly or indirectly, destroy such natural values. Apart from direct protection of beaches, it is necessary to provide a wider protective belt of greenery, which would make up a unique recreational belt with the beach. The more intensive use of beaches also imposes the obligation to their continuous maintenance.

The following areas are also proposed for *further consideration of their status of protection*:
- The old downtowns of Kotor and Herceg Novi
(In view of the fact that the old downtowns are protected as the cultural and historical monuments, it is not necessary to especially protect the fauna but it should be included in the overall protection; it is mainly to do with the protection of old buildings, their maintenance in such a state which provides an ecological niche for rare birds and bats).
- Luštica is the site with the best preserved macchia in the Littoral (Within the framework of the future tourist construction, the most beautiful stands of macchia should be preserved in the form of recreational and park areas or green tampon zones).
- Buljarica
(Within the activities to be planned in this area, it is obligatory to include parts of the existing boggy zones as landscaped park area).
It should be particularly stressed that it is necessary to *support the existing protection of Kotorsko-Risanski Bay and the town of Kotor*, which should be protected in compliance with their international status of protection (UNESCO) (category of management III, IUCN).

Protection of landscapes

Protection of landscapes includes a whole series of planned measures aimed at preservation, improvement, and prevention of devastation of the natural features of landscapes. In that sense, as the priority and basic measure there stands out the establishing of zones with adequate regimes of protection, whereby their basic natural values will be protected, and thereby the landscape of the Coastal Zone as well.
When planning the management of an area of the Coastal Zone, it is necessary to establish adequate ecological model, to prevent any major changes of landscape values, i.e. to tend to retain the authentic features of the landscape, and the future economic and tourist development should be based on the principle of sustainable development.
Special attention should be paid to:
- More rational use of the already occupied space,
- As little occupation of new spaces as possible,
- Use pf preserved areas with minimum of interventions and maximum preservation of the natural landscape,
- Protection of the Mediterranean vegetation, olive groves and forest cultures,
- Preservation of valuable groups of exotic plants, particularly along the coastal roads, promenades, and landing places,
- Retaining of the traditional architectural designs as parts of autochthonous cultural landscapes,
- Retaining of authenticity of landing places,
- Prohibition of construction of buildings/facilities the operation of which pollutes the environment.

Selection of plant species for introducing greenery onto free areas should be based on ecological characteristics of the area and the category of the

future green area. Only in such a way it is possible to properly select those plant species which will under the given conditions achieve the best functionality and harmoniously match with the ambience.

2.7.4. Measures of Landscaping

The quality of landscapes and the balancing of the natural ecosystems represent the basis for definition of the economic and technical level of exploitation of a landscape. Protection of the vegetation and overall potential of the Montenegrin Littoral, while taking into account the sensitivity of the ecosystem of the coastal region and the sea, should be fully manifested, both in the stage of planning, and in designing, and construction.

The activities that are focused on the future development in the belt of the Coastal Zone and the contact zone, which are related to the horticultural landscaping of areas, must be for the purpose of improvement of the bio-ecological potential as one of the main qualities for which the natural and acquired resources of the Littoral will be valorized to the maximum. In view of the already determined wealth of the existing landscape potential, this landscaping differentiate the interventions related to the current state, and new landscape and park interventions are proposed.

In view of the fact that the potentials of authentic landscapes are by volume the most widespread categories of out-of-town protective greenery, their function is to create favorable microclimatic conditions with the beneficial effect on the life and health of the population, which is of the biggest importance. Such effect are corroborated by the evident inflows of fresh air blowing from the hinterland into the urban tissue thus creating the biological enclaves of health in the zone of the Coastal Zone at numerous locations. For the purpose of preservation of the quality of such potentials, landscape interventions are necessary subject to the degree of devastation, importance, and biological threat to certain species or entire associations. In the areas covered by evergreen vegetation having leather-like and hard leaves, the so-called ”macchia”, the processes of recession have not been identified. On the contrary, this vegetation potential is most often in the process of progressive succession. On the rocky grounds, and in particular on pronouncedly degraded parts of landscapes, the measures of recultivation and regeneration should be applied by introducing floral elements that will contributed to the ecological stabilization and overall landscape implementation the adjacent spatial units. When undertaking such interventions, it would be desirable to include and form attractive motives, such as small pine forests and cypress forests, as well as other possible scenic attractions intensifying the potential of landscapes in all seasonal aspects and pheno-phases of vegetation development.

In case of forests and larger complexes of climatogenic communities of large-leaved Downy oak and eastern hornbeam, the most common is the need to undertake forest cultivation measures and better protection for the purpose of stimulating the process of natural succession. Such stands are bio-ecological catalysts and regulators of microclimate. The remnants of these forests and underbrush with added bay or Spanish chestnut call for implementation of the measures of rehabilitation and biological recultivation in the direction of the climatic stadium of development.

The category of proper-quality green areas for general, limited, and special use includes landscaped areas and landscape complexes, among them being town parks with more or less stressed cultural and historic identity.
Such objects will require a serious studious treatment before undertaking any interventions on their restoration or restitution.
The basis for elaboration of a study of cultural and historic identity of such objects is the garden, structural, and vegetation potential. In view of continuous process of destruction of their important features, an urgent protection and inventory taking of the existing vegetation potential is required.
The importance of this category of green areas is particularly stressed in view of the fact that they directly communicate with and connect the hinterland of the contact zone with the belt of the Coastal Zone as a tampon zone and often, like green wedges deeply cut into the town tissue and reach the actual Coast.
Some of such park areas have the medical and therapeutic importance because the vegetation potential is intensified with the details of garden and architectural treatment and has a positive effect on the mental and physical recovery of sick people. The biological basis of vegetation are the species of the Mediterranean and exotic plants, but the lack of proper-quality high trees is obvious, which should ensure a higher degree of the sanitary and hygienic effect of the greenery as well as improvement of the microclimate of a wider region. In order to increase the effect, it is necessary to include in the landscape the species with the powerful phytoncide and bactericide properties.
Phytoncide species that should serves as supplement to the biological base and to increase the effect of the vegetation potential are the following ones:
- Decorative trees: Eucaliptus sp. - Broad-leaved ironbark, Laurus nobilis - Sweet bay, Quercus ilex - Common evergreen oak, Pinus halepensis - Aleppo pine, Pinus pinea - Italian stone pine, Pinus maritima - Cluster pine, Ginkgo biloba - Kew tree, Cupressus sp.- Italian cypress, Cupressus arizonica - Arizona cypress, Cedrus atlantica - Algerian cedar, Cedrus libani - Lebanon cedar.
- Decorative shrubs: Pittosporum tobira - Japanese mockorange, Tamarix sp. - Tamarisk, Viburnum tinus - Laurustinus, Taxus baccata - Common yew, Juniperus sp. - Alaska yellow cedar, Camellia japonica - Camellia, Pyracantha coccinea - Scarlet firethorn, Lagerstroemia indica - Redbud, Prunus laurocerasus - Cherry laurel.

In the category of green areas for special uses, revitalization, extension, and forming of mini-botanical gardens and arboretums in the belt of the Coastal Zone or contact zone is of particular importance.
A special category of the objects of garden architecture characteristic for the settlements along the sea and generally water surfaces are the promenade parks – seaside promenades.
The meaning of such ”lungo mare” areas as continuous squares - terraces – belvederes along the entire coast is featured by the phenomenon of invaluably therapeutic importance for the mental and physical

recovery of sick people, but also strengthening of the physical fitness of the ethnics and guests of all age groups.
The vegetation component of landscaping will be more strongly expressed in contact with the interior spaces, more used for the purpose of mitigating possible uneasy building silhouettes, which threaten the ratios of masses and views, while the communication areas in contact with the sea will be expressed by ground treatment and selection of plant species of the Mediterranean perennial herbs of medicinal and phytoncide properties. Installation of sculpture motives, ecological drinking fountains, and other landscaping and architectural details of autochthonous materials, such as resting-places with benches, attractive fountains and similar elements. In the landscaping technical treatment, special attention should be focused on preservation of the landscape and construction identity of the existing "waterfronts and small mole-closed harbors", which are the embellishment of the old settlements along the entire Boka Kotorska Bay. The main characteristic of such objects is that they are constructed of autochthones stone, individually or in continuity along the coast, in front of family houses and palaces. The picturesqueness of small mole-closed harbors has been complemented with planting of autochthonous species of greenery resistant to salt precipitation and arid environmental conditions.
In some settlements, the lack of greenery is evident probably because of small space and a big concentration of berths. The deficit of space along the sea for satisfaction of numerous functions of life and work of the local population has always been brought down to "snatching" from the rocks or from the sea, which has most often been unsuccessful, but in case of construction of "waterfronts and small mole-closed harbors" it has been successful. Under modern conditions, the needs are the same, but now for construction of attractive catering or entertaining facilities with a rich offer for dancing and leisure. Therefore, the ecosystem of the inshore sea must be protected and, due to particularly important ameliorative properties, greenery must be the ancillary content of all the future construction interventions, particularly in case of possible major penetrations into the sea or in general, when creating larger inert surfaces that undoubtedly disrupt the bio-ecological balance of both the actual micro location and of the coast as a whole, as a very sensitive, or vulnerable conurbation from the ecological aspect. The optimal percentage of greenery share in the total square area of the newly constructed space should be min. 25%.
Planting of adequate plants and formation of the so-called "ecological sunshade" for the purpose of protection from high insolation in the course of summer months, but also from harmful microorganisms, should also be an obligatory element for improvement of the quality of the environment and landscape as a whole. As the biological base for forming of the vegetation potential of a promenade in the entire region of the Montenegrin Littoral, apart from the already proposed high-growing phytoncide plants, the species should be used that also have such properties and can also withstand salt precipitation, as follows: Pittospurum tobira - Japanese mockorange, Tamarix sp. - Tamarisk, Nerium oleander - Oleander, Myrtus communis - Common myrtle, Vitex agnus castus - Hemp tree, Pistacis lentiscus - Chios mastic tree, Atriplex hallimus - Mediterranean saltbush, Arbutus unedo - Medronheiro, Viburnum tinus - Laurustinus.
All of the above species can be used as "ecological sunshades", either by their direct planting or as portable sunshades in big vessels in which they have been previously planted.
It is particularly pointed to the importance of the promenade of Velika Škurda River in Kotor, the bed of which should be cleaned, and the banks of the watercourse from the spring to the mouth should be landscaped.

In the entire territory of the Littoral Bay it is possible to determine the locations of landscape terraces as belvederes at the points of outstanding panoramic views, or the points from which one can experience the versatile and abundant beauty of the azure blue sea and the dark green giant hinterland.
In shaping such terraces, the elements already contained in the authentic landscape should be applied, which will at the same time stress the function of their main purpose. Adequate parking space should be provided in the terraces, benches for sitting, ecological drinking fountains, boards with the necessary information, observation telescopes, and other similar equipment for cultural presentation of the area.

Specific feature of the coastal region is determined by the potential of biological enclaves, where inflows of cold mountain air from the hinterland through natural small valleys and cuts reach the very coast and mix with hot wind flows from the sea influencing formation of microclimate of a high biological and sanitary and hygienic value. In combination with strong bactericide property of volatile phytoncide substances emitted by proper-quality vegetation and medicinal plants, such enclaves become real reservoirs of pure oxygen. The climate, sun and air bathing, as well as bath using natural cold and hot waters have a very favorable effect in treatment of bronchial asthma, bronchiectasia, chronic bronchial suppression, etc.
As a biological base for intensification of the vegetation potential and climatic syndrome of such enclaves, apart from the already proposed phytoncide and insecticide plants, the following ones should also be used:
- Decorative trees: Eucaliptus cinereo - Argyle apple, Laurus nobilis - Sweet bay, Sophora japonica - Japanese pagoda tree, Magnolia purpurea - Magnolia liliflora, Ginko biloba - Kew tree, Prunus pissardii - Cherry plum.
- Medicinal plants: Salvia officinalis - Sage, Origanum vulgare - Oregano, Hypericum perforatum - St. John's wart, Satureia montana - Basil, Achillea millefolium - Fireweed, Mentha piperita - Peppermint, Thymus serpyllum - Creeping Thyme, Teucrium montana - Wood sage, Taraxacum officinale - Dandelion, Lavanda officinalis - English lavender, Mellisa officinalis - Lemon balm, Valeriana officinalis – Valerian.

Under the conditions of relatively cramped up space in the belt of the Coastal Zone, lies of trees are the unique example how minimum area of land ensures maximum of the green fund – the green innervation interconnecting all the facilities along the coast. Bonification of favorable effects by which they achieve important biological functions in space is fully manifested. The abundance of green mass essentially contributes to the improvement of microclimatic

conditions (restoration of oxygen, increase of humidity, reduction of temperature extremes, favorable air circulations).
Compactly formed green mass considerably diminishes the effects of traffic noise, unfavorable vibrations, absorbs noxious gases and dust. Implementation of modern knowledge about growing of trees in solid asphalt, concrete or slab-laid areas has nowadays been practiced with us as well, which enables any area to be enriched. In order to achieve this, it is necessary to ensure ecological conditions to a tree under such ambiences for its optimal growth and development, which is often neglected.
Selection of plant species undoubtedly represents one of the decisive moments for the success in growing of any green area and, therefore, a great attention has been lately paid to this problem.
Exposure of the coastal region to direct effects of the sea, apart from the threat of mechanical damages to structures and vegetation on the occasion of big storms, it is also threatened by permanent unfavorable effects of ”salt precipitation”. A small number of plants withstand close vicinity of the sea, and even a smaller number of them withstand ” salt precipitation”, tiny sea drops that the winds, particularly the north-eastern wind, sometimes carry far into the land. Under the influence of the sea, the soil is salinated and, therefore only the so-called ”halophyte plants” can grow no it, i.e. those that withstand high concentrations of salt. For that reason, the choice of plants for greening and biological revitalization of the belt of the Coastal Zone and partly of the contact zone is quite limited and hence in all interventions strict attention must be paid that the used materials have the ”license” for resistance to salt precipitation.

The territory of the Montenegrin Littoral, apart from the abundance of the cultural and historical monuments, interesting relief, and generally known and internationally recognized beauty spots, is featured by a high level of biodiversity of flora and plant communities. The so-far research of flora and vegetation in the coastal belt point to a high interrelatedness and interfusion of autochthonous vegetation with numerous exotic species, which offers ideal possibilities with respect to the selection of plants whose characteristics ensure big range of functions provided by green areas, from biological and esthete tic to sanitary and hygienic, sports and recreational and protective ones.

2.7.5. Measures for Optimization of the Quality of the Environment of the Coastal Zone

The Coastal Zone as a physically and geographically defined region consists of three components each with their respective characteristics. They are the land (coastal, islands), the sea (inshore, open-sea), and the fresh water component (a part of the watercourse of the River Bojana). Each of these components suffers from the effects of different factors of environmental pollution, mostly anthropogeneous. Between the three components there are interactive processes lead to the situation where the pollution, regardless of the point of its source, is more or less noticed everywhere. However, the biggest consequences of pollution, either direct or accumulative ones, are suffered by the sea component, specifically the coastal, shallow part.

In order to stop the rather uncontrolled pollution of the Coastal Zone, as it has mostly been the case up to now, it is necessary to engage in relevant activities in its zone in compliance with the generally adopted principle of sustainable development. However, in order to bring this principle into life, it is necessary to undertake two actions in parallel. One would be of normative character, i.e. enforcement and supplementing of the prevailing international and domestic legislation in the area of environmental protection, adoption of spatial plans, programs of activities, and use of certain areas. The second one is systematic, scientific, and expert monitoring of, if not all, then at least the majority of the main parameters of pollution and studying of the natural characteristics, changes, and receptive capacities of the environment, or monitoring of individual or of a group of certain abiotic and biotic parameters. The two activities are very much complementary to each other and if undertaken separately, they do not yield useful results.

Actually, the activities in the area of monitoring should precede and provide the basis for the normative activities, which would together result in the satisfactory state of the environment in the Coastal Zone belt.

Measures of protection from waste waters from the land

The so-far results of long-term research indicate that the most important problem in this region is the solution of the sewerage system. Without the solution to this problem, no serious planning can be started concerning the use of this precious region.
Waste waters from the land are major polluters of the sea water, particularly in the coastal belt. Subject to the place and method of generation, waste waters differ in quantity and physical and chemical properties. As to the specific measures of protection from pollution with waste waters, they have already been defined through the relevant domestic legislation, which is either insufficiently or not at all applied for the time being. These are the following laws, rulebooks, and decrees:
- The Law on Water Supply and Evacuation of Waste Waters and Disposal of Solid Waste from the Territories of the Municipalities of: Herceg Novi, Kotor, Tivat, Budva, Bar, Ulcinj, and Cetinje, (Official Gazette of the Republic of Montenegro, 46/91);
- The Law on the Coastal Zone, (Official Gazette of the Republic of Montenegro, 14/92);
- The Law on Planning and Spatial Development, (Official Gazette of the Republic of Montenegro, 16/95, 28/05);
- The Law on Waters, (Official Gazette of the Republic of Montenegro, 16/95);
- The Rulebook on the Contents and Method of Keeping of Waterbook and Cadastre of Surface and Ground Waters, Users and Polluters of Waters, Torrential Streams, and Erosive Areas, and Waterworks and Plants, (Official Gazette of the Republic of Montenegro, 5/96);
- The Law on the Environment, (Official Gazette of the Republic of Montenegro, 12/96);

- Decree on Classification and Categorization of Waters, (Official Gazette of the Republic of Montenegro, 14/96);
- The Rulebook on the Quality of Waste Waters and the Method of Their Discharge in Public Sewerage and Natural Recipient, (Official Gazette of the Republic of Montenegro, 10/97).

In addition to the above there are also relevant international conventions ratified by our country, which oblige us to bring the pollution of sea water with waste waters down to a certain measure. They are:
- International Convention for the Prevention of Pollution of the Sea by Oil, London, 1954 (as amended on 11 April 1962 and 21 October 1969);
- Yugoslav-Italian Agreement of the Protection of the Waters of the Adriatic Sea and Coastal Areas against Pollution, 1974;
- Convention for the Protection of the Mediterranean Sea against Pollution, Barcelona, 1976;
- Agreement Concerning the Protection of the Waters of the Mediterranean Shores, Monaco, 1976.

Measures of protection from torrential streams from the land

Torrential streams from the land themselves cannot be considered as polluters. They are of seasonal character and appear in the periods of heavy rains, abrupt melting of snow, which has lately been a rather rare phenomenon, etc.
However, the things that happen with torrential canals leads to that that they become the polluters of sea water. Namely, in question is an uncontrolled and excessive removal of natural vegetation from their banks, throwing of various wastes, and discharging of waste waters in them, their narrowing, concreting, etc.

In order to prevent this, it is also necessary, apart from adhering to the prevailing regulations in this area, to work on their supplements and amendments in a positive sense. Those are:
- The Law on Water Supply and Evacuation of Waste Waters and Disposal of Solid Waste from the Territories of the Municipalities of: Herceg Novi, Kotor, Tivat, Budva, Bar, Ulcinj, and Cetinje, (Official Gazette of the Republic of Montenegro, 46/91);
- The Law on Planning and Spatial Development, (Official Gazette of the Republic of Montenegro, 16/95, 28/05);
- The Law on Waters, (Official Gazette of the Republic of Montenegro, 16/95);
- The Rulebook on the Contents and Method of Keeping of Waterbook and Cadastre of Surface and Ground Waters, Users and Polluters of Waters, Torrential Streams, and Erosive Areas, and Waterworks and Plants, (Official Gazette of the Republic of Montenegro, 5/96);
- The Law on the Environment, (Official Gazette of the Republic of Montenegro, 12/96).

What should be done immediately is, through the relevant utility services, water economy inspectors, and administrative officers in the Ministry of Agriculture, Water Economy, and Forestry of the Republic of Montenegro, to carry out a detailed and systematic control of torrential streams and to undertake the necessary measures in order to bring them into the state in which they would not pollute the inshore sea. In other words, they should be brought back the role of the refresher of the sea ecosystem, what they actually are.

Measures of protection of the maritime zone in particularly threatened zones

Protection of the maritime zone in particularly threatened zones (shipyards, overhaul, ports, marines, industries, tourist facilities and settlements, healthcare institutions, and sanatoriums, etc.) calls for complex technological solutions in view of the fact that those are the so-called concentrated polluters. In this area as well there are the regulations that point to relevant and binding methods of prevention of pollution of sea water from such sources. They are the following regulations:
- The Law on Water Supply and Evacuation of Waste Waters and Disposal of Solid Waste from the Territories of the Municipalities of: H. Novi, Kotor, Tivat, Budva, Bar, Ulcinj and Cetinje, (Official Gazette of the Republic of Montenegro, 46/91);
- The Law on the Coastal Zone, (Official Gazette of the Republic of Montenegro, 14/92);
- The Law on Waters, (Official Gazette of the Republic of Montenegro, 16/95);
- The Law on the Environment, (Official Gazette of the Republic of Montenegro, 12/96);
- The Decree on Classification and Categorization of Waters, (Official Gazette of the Republic of Montenegro, 14/96)
- The Rulebook on the Quality of Waste Waters and Method of Their Discharge in Public Sewerage and Natural Recipient, (Official Gazette of the Republic of Montenegro, 10/97);
- The Decree on Requirements that Must Be Met by Winter Harbors Open for Wintering of Foreign Ships on Internal Navigable Waterways on which International or Bilateral Regime of Navigation is Effective (Official Gazette of the Federal Republic of Yugoslavia, 28/98);
- The Decree on Requirements that Must Be Met by Ports or Piers Intended for International Transport (Official Gazette of the Federal Republic of Yugoslavia, 28/98).

In order to prevent pollution of sea water from industrial, overhaul, processing, and major healthcare and catering capacities, it is necessary that such institutions located along the Littoral and in its hinterland are toured by the relevant communal and Republic inspections and check the state of the plants for treatment of waste waters. This inspection by the authorized persons should be permanent and systematic.

Measures of protection in the zones of transfer and storage of flammable substances or production processes

It is necessary that the oil installations in Bar and Lipci and in the aircraft service workshop in Tivat as well as the facilities in which production processes take place, have the gravity separators and accompanying equipment (skimmer, gear pump, and a grease receptacle tank) for containment of oily waters from tank spaces, car refueling points, wagon refueling points, and the canals of technological pipelines. It is necessary that the separators fully satisfy containment of all waste waters, that they are regularly maintained

and cleaned, and that the control of the quality of water at the outlet separator manhole is done by the authorized organization twice a year.

In case of accidental situations on the occasion of arrival of tankers for fuel unloading, there should be a protective floating locks which would contain possible spilled fuel.

Complete protection of the environment should be carried out in accordance with:
- The Procedure of Environmental Protection (6.9-00-00 YUS ISO 9002 and 14000),
- Instructions for Maintenance of Separators (6.9-01-00 YUS ISO 9002 and 14000),
- The Law on the Environment (Official Gazette of the Republic of Montenegro, 12/96),
- The Law on Waters (Official Gazette of the Republic of Montenegro, 16/95).

Measures of protection in investigation of submarine area for the purpose of commercial exploitation of living and non-living resources

The above measures should be undertaken exclusively through the relevant government authorities and under control of certain scientific institutions, or qualified expert groups or individuals.

The normative bases for this type of protection exist in the following regulations:
- The Law on the Coastal Zone, (Official Gazette of the Republic of Montenegro, 14/92),
- The Law on Waters, (Official Gazette of the Republic of Montenegro, 16/95),
- The Law on the Environment, (Official Gazette of the Republic of Montenegro, 12/96),
- The Decree on Classification and Categorization of Waters, (Official Gazette of the Republic of Montenegro, 14/96),
- The Law on Sea Fishing (Official Gazette of the Republic of Montenegro, 26/92),
- Convention on Fishing and Conservation of the Living Resources of the High Seas, Geneva 1958,
- International Convention for the Safety of Life at Sea, 1960.

2.7.6. Organization of Environmental Protection of the Coastal Zone

Monitoring of the environment of the maritime zone of the Coastal Zone

In order the for monitoring of the environment of the Coastal Zone based on monitoring of noxious or threatening pollution factors to be fully implemented, it is necessary that it includes at the same time monitoring at the actual source of pollution, at the points of discharge of noxious or polluting substances. It is also necessary to monitor further destiny of polluting substances after their discharge into the environment.

Monitoring of pollution sources

At the points of discharge into the sea, it would be necessary to, once a month, measure and monitor in waste waters from the majority of outlets in the Montenegrin Littoral, the parameters the list of which was published in the Official Gazette of the Republic of Montenegro No.10/1997, p. 8, which includes: temperature, suspended substances, depositing substances, pH, HPK, BPK5, heavy metals, ammonia, nutritive salts, phenols, chlorinated hydrocarbons, aromatic hydrocarbons, pesticides, total coliform bacteria, fecal coliform bacteria, fecal streptococci, total radioactivity, etc. (a total of 50 parameters). This also applies to the above-ground springs and river mouths that flow into the inshore sea of the Montenegrin Littoral, particularly those that flow into Boka Kotorska Bay (Škurda, Gurdić, Ljuta, Gradiošnica, Sopot, etc.).

Monitoring of areas threatened by direct impact from the hinterland of the land

On partly karst terrain of the Montenegrin Littoral, particularly in Kotor-Morinje-Risan part of Boka Kotorska Bay, it is necessary to do control at the places, such as river mouths (both underground and ground), the watercourse which bring along pollution from the hinterland of the land (for example, well Ljuta in Dobrota- Ljuta village, which springs on Njeguška Plateau in Vališti, Škurda, for which it is considered that it springs and sinks on Njeguši, etc.).

Monitoring of inshore sea

This monitoring includes the main parameters that need to be checked in the inshore sea, as follows: oceanographical measurements, visible waste substances, color of sea water, odor, pH, electrical conductivity, suspended substances, dissolved oxygen, saturation with oxygen, BPK5, HPK, salinity, etc., microbiological parameters in compliance with Rulebook on the Quality (Official Gazette Nod. 14/1996 and 30/1996).

This type of investigation needs also to be done in the inshore sea during the swimming season, every 15 days (including river mouths – the River Bojana in our case) and once a month, or at least once in a season through the rest of the year at around 70 major beaches of the Montenegrin Littoral, which has been done as of 1995, and which is planned to be continued with.

However, the fact is that, minimum once in a season, and if possible more frequently (once a month), this type of control should be also done in the territorial waters (12 NM from outer coast of the farthest island) and once in a season in international waters of the Southern Adriatic (middle line).

Additionally, in the inshore sea, investigations should also include:
1. Sediments (total mercury, organic polluters: chlorinated and poliaromatic hydrocarbons)
2. Suspended substances (heavy metals: mercury, cadmium)
3. Biota - sea organisms: shells (Mytilus galloprovincialis and fish Pagellus erythrinus) in compliance with UNEP program and the national monitoring from the former Yugoslavia (total mercury, organic mercury, chlorinated and poliaromatic hydrocarbons, as well as fecal coliform bacteria in edible shells).

Monitoring of air quality

According to the so-far investigations of International Sea, around 33% of sea pollution comes from the air. That is why it is necessary to monitor the results obtained by measurement of air pollution – which is actually regularly done in the Montenegrin Littoral.

Ten-year data of the measurements of air pollution in seaside towns of Montenegro indicate that with us the air quality is still on a satisfactory level, and that it would be necessary to reduce pollution from motor vehicles which are evident air polluters in our Littoral.

Monitoring of air quality is done and it should be further implemented in Bar, Budva, Kotor, Tivat, Ulcinj, and Herceg Novi. It includes:
- Assessment of the overall state of air pollution by measuring concentrations of SO2, smoke, soot, and depositing substances,
- Assessment of pollution by motor vehicles by measuring NO, CO, hydrocarbons, formaldehydes, and lead,
- Establishing of the impact by specific industries by measurement of the contents of fluorides, ammonia, phenol, hydrogen sulfide, carbon disulphide, chlorine, nitric oxide, suspended loads, and ozone oxidants,
- Establishing of the risks from potentially carcinogen substances by measuring the contents of polycyclic aromatic hydrocarbons and heavy metals (Cd, Pb, Cu, Fe, Cr, Mn, Zn, Al) in the air,
- Establishing of transmission of pollution, prognoses of pollution, and establishing of the model of pollution transmission.

This has been done and should continue to be done once a season, at the above mentioned sites, the biggest urban and tourist centers, taking 24-hour samples. By actual obtaining and monitoring of the above results, it will also be possible assume the effect of all of the above pollutants on the pollution of the inshore sea.

Continuous scientific research

The former Yugoslavia (and thereby the Republic of Montenegro as well) was the signatory to a whole series of conventions related to the protection of sea and which are particularly useful in case of regional seas, such as the Adriatic Sea.
They are, inter alia: Geneva Convention (1958), Convention on Epicontinental Belt (1966), Barcelona Convention (1976), Law on Sea (1982), Conclusions of Montreal Conference (1985), Agenda 21 (1992), Conclusions of Washington Conference (1995). Many of the above documents oblige all the seaside countries to intensively and continuously investigate the sea.

Only thus conceived scientific research with ecological approach and study of as many parameters related to the sea environment and sea organisms can serve as a basis for planning, exploitation, and protection of the Southern Adriatic, and particularly of its very valuable resource, the inshore sea, which is actually most endangered.

Only thus conceived scientific research in monthly intervals, and minimum once in a season, will enable obtaining of a voluminous scientific database, which only can be the basis for:
- Protection of the entire ecosystem of the sea with which all the components of that ecosystem can be rationally used without the threat of disrupting the natural balance;
- Protection of biodiversity of sea organisms (for which it has been established that it is in decline, particularly in the inshore sea) endangered by the already established anthropogeneous eutrofication from the land, but also by possible overcatch;
- Protection of living resources through the protection of the zones of reproduction and nutrition of sea organisms and the established (calculated) optimal level of their exploitation;
- Indirectly through all of these components, protection of people's health, a) by using unpolluted food from the sea, either caught, or produced by breeding, as well as b) by rigorous control of the quality of the inshore sea (microbiological pollution) in the zones envisaged for swimming and recreation.

From all of the above stated, the importance of continuous scientific research of the sea is visible, particularly in especially endangered areas of the semi-enclosed basin of Boka Kotorska Bay or the mouth of the River Bojana, where it is exposed to the influence of the fresh water of the watercourse.

2.8. PROTECTION FROM NATURAL AND ANTHROPOGENIC HAZARDS

2.8.1 Protection of Shores and Beaches

The resolving of future problems related to stability of shores and beaches in the area of the Coastal Zone must be based on the results of continuous measurement and the features of shores and beaches themselves.

In addition to the measurement of the features of winds and high and low tides, which has been continuously done for a longer period of time, the measurement of the features of waves must commence as well. It is necessary to set up at least one device for measuring the features of waves in the deep water in the area of the Coastal Zone.

Based on the statistical analysis of the measurement results, there will be relevant features of waves (height, period and direction) established, which are required for both analyzing of the stability of shores and beaches, and designing various structures in the sea. From the aspect of stability of shores in the area of the Coastal Zone, continuous measurement of sea currents is not required, since the speed of the currents is too low to initiate and transport detritus. However, the measurement of currents is required from the aspect of water quality, particularly in the zones where the leakages from wastewater collectors are located.
For the purpose of identifying the features of shores and beaches, as well as erosion processes in the area of the Coastal Zone, it is necessary to perform occasional field-research works. So-called evidence profiles have to be determined in all significant beaches where geodetic photographing is to be performed. The photographing of cross-sections must include the whole width of the inland part of the beach and underwater part of the beach to the depth of approximately 10m. In addition to the measurement of geometric features of beaches (shape, dimensions, inclination, etc.), the features of the detritus (grain diameter, grain size distribution and mineral composition) the beach is formed of must be measured too.

A special measurement program must be defined for determining the inflow of detritus in the zone of beaches from river and torrential courses. For Velika plaža (Long Beach) in Ulcinj, as the most significant natural resource in the area of the Coastal Zone, the levels and flowing of water must be continuously measured and observed, as well as the concentration of suspended detritus in the Bojana River. The knowledge of the regime of waters and detritus of the Bojana River is of capital significance for analysis of the stability and morphological changes of the Long Beach in Ulcinj.

The observation of the status of erosion processes as well as occasional measurements of the level and inflow of water and transport of detritus is also necessary to be planned at least for several most significant torrential courses in the region of the Coastal Zone.

Measures for protection of shores and beaches

It may be assumed that due to future development and construction of building facilities in the coastlands, the stability of shores and beaches in the area of the Coastal Zone may be threatened even more. If already constructed building facilities in the coastlands are the basic cause of instability of beaches, it will be necessary to examine the possibility to relocate the building facilities out of reach of waves that arise during the winter period. On all beaches in the area of the Coastal Zone with reduced natural inflow of detritus as a consequence of regulation works on torrential and river courses, it is necessary to examine the possibility of establishing the previous natural conditions.
From the aspect of future tourism development in the region of the Coastal Zone, the provision of the protection of natural beaches from erosion effects of waves will be a very significant problem. Depending on the level in which a beach is threatened, then on the results of economic analyses and consideration of esthetic features of proposed solutions, it is possible to apply the following protective measures:
- artificial feeding of beaches by laying them with autochthonous detritus of suitable features along the most threatened sections
- construction of structures which partly or fully prevent the effects of waves on the shore exposed to erosion processes
- combined system of protection which includes the construction of protective structures and laying the beaches with detritus.

If the intensity of erosion of a beach is not high, artificial feeding should be applied, since the application of this measure does not disturb the natural look of the beach, and the application may be cancelled if it is assessed that a balanced condition of the beach is established.

On the beaches with significant erosion intensity, it is necessary to envisage the construction of structures for reduction of the height of waves and prevention of sweeping the detritus off into the sea under the impact of currents caused by the effects of waves.

Depending of the direction of dominant waves, i.e. direction of movement of detritus on the beach, the protective structures will be constructed vertically to the beach or in parallel with the direction of the beach extension.

Considering the current features of erosion processes on the natural beaches of the Coastal Zone, it seems that the sunken breakwaters, parallel with the shore line, will be the most frequently used type of protective structures. Namely, most inlets (so-called pocket beaches) in the area of the Coastal Zone are threatened by the effects of waves that hit the shore almost vertically. Since the intensive erosion of beaches takes place only during the period of extreme billows, the role of the sunken parallel structures is to reduce the height of those extreme billows, and therefore their erosion effects.
The construction of transversal structures will be necessary only if dominant waves are oblique to the shore, and the currents caused by the effects of the waves take away the detritus from the beaches in the

longitudinal direction. The transversal structures will prevent the detritus to be taken away from the beach under the effect of longitudinal currents.

Combined protection system will apply for construction of artificial beaches in the area of the Coastal Zone. Namely, the material laid down to form an artificial beach will be protected from the effects of the waves by transversal and longitudinal structures.

Requirements and restrictions related to planning, designing and constructing structures in the coastlands

The problem of protection of sea shores from erosion effects of waves is extremely complex, therefore its resolution requires the consideration of impacts of construction works performed in the coastlands on the change of natural conditions and disturbance of natural balance in the zone of shores and beaches. The application of partial and inadequate protection measures in many cases resulted with drastic disturbance of natural balance and even acceleration of erosion in the threatened sections of the shore.

Contemporary approach in resolving the problem of stability of shores and beaches is based on so-called integral management of the seashore. Namely, any intervention in the coastlands has a specific impact on the broader environment, therefore the Coastal Zone management has to be centralized and integral, as to be able to view numerous interactions among the constructed structures and performed construction works and natural features of shores and beaches.

The mistakes and inadequate solutions from the past made locally and in other countries have to be taken into consideration in the process of planning, designing and constructing structures in the area of the Coastal Zone.
The sea walls along the natural beaches must be out of reach of the waves of extreme features that may arise during the winter period.
Regulation works on river and torrential courses must not reduce the natural inflow of detritus in the zone of beaches. The confluences of torrential courses must not be relocated outside the beaches. The zones of confluences of torrential and river courses must be maintained and cleaned as to provide for adequate transport capability of the course for detritus and inflow of the detritus to the beach.

When constructing protective structures in the coastlands, the tendency should be to disturb the natural look of shores and beaches as little as possible.
Taking into consideration the natural beauty of most of the beaches in the region of the Coastal Zone, the tendency should be to apply the sunken breakwaters as the protective structures as much as possible.

In the process of planning and designing piers and marinas in coves of existent beaches, the tendency should be to locate them in the zone where the natural protection from waves is the greatest.
For the projects of complex structures, large marinas and ports, it is necessary to perform hydraulic model examinations for the purpose of verification of efficiency, functionality and stability of the designed solutions.

For the purpose of preventing further degradation of natural beaches, the exploitation of detritus from the beaches for the needs of construction activities must not be tolerated.

This restriction should also apply to the Long Beach in Ulcinj until the regime of detritus of the Bojana River is determined, as well as the detritus balance on the beach.
Since the zone of dunes in the hinterland of the Long Beach in Ulcinj represents a unique natural site in the Adriatic Sea, the restriction related to exploitation of detritus, as well as to construction of any structures should be expanded to cover this zone.

In the process of planning, designing and constructing artificial beaches, the tendency should be to adjust their features (dimensions, inclination, composition and size of the material on the beaches) to the features of the existent, stable beaches in the region of the Coastal Zone.

2.8.2. Protection from torrents

Torrents are a very lively and dynamic system where the factors (relief, climate, geologic composition, pedological layer, vegetation and the manner of soil exploitation) always change, therefore only direct on-site examination could provide for accurate scope of necessary works, since only optimum combination of technical and biological interventions could resolve the problem of erosion of the soil and regulation of torrential courses.

Good knowledge of torrents basin or erosion area in all its details is of great importance, i.e. the assessment of the condition of erosion processes, the direction and intensity of development and the proposal of protection measures, and therefore investments required for regulation of torrential courses and other areas threatened by various forms of erosion at the Montenegrin Littoral depend on properly identified and considered erosion processes in the basin.

For the purpose of realization of these tasks it is necessary to develop a study on regulation of torrential courses in this region, which will provide for accurate condition and direction for future actions to be undertaken.

Review of required anti-erosion works and measures at the Littoral

Anti-erosion works imply the actions for direct construction of suitable structures in torrential courses in the bed and in the basin area.
These are works on construction of various transversal structures, canals, channel pipes, groynes, wattle dams etc, while reclamation works are of forestry and agricultural character - reclamation of forests, pastures, growing plantation orchards, vineyards, forestation and grassing.

Anti-erosion measures imply the activities that impact the manner of cultivation, maintenance and

management of soil, forests and waters and the manner of their exploitation.

All anti-erosion interventions, technical and biological, must supplement each other and therefore biological-technical works must be previously performed in the basin area, and only after that the technical works in the bed of the torrential course. The performance of technical works and constructions, without biological works i.e. forestation would have no effect, since the cause and the source of the torrential course would not be eliminated. The performance of biological without construction works very frequently in practice would not be possible on the land under devastation, if further devastation of the soil is not previously prevented.
Therefore, the contemporary manner of protection from detrimental effects of torrential courses is realized through the construction of hydro-technical, forest - improvement, land-improvement etc. works and measures, as to cover overall basin of the torrent or overall system of torrential courses that threaten the existent settlements, industrial zones, communications, tourist facilities etc, but are also obstacles for planning and further development of Montenegrin Littoral, and therefore it is necessary to rank anti-erosion works and measures according to the level of their threat to the existent structures and future plans and studies of the development of this region. As to commence the selection, designing and performance of the mentioned systems it is necessary to develop a study for arrangement of torrential courses.

In the region of Boka Kotorska Bay the rehabilitation of torrential courses is a specific problem since the space for future construction and development is very limited, and therefore each square meter saved from erosion processes is very expensive. Due to density of the settlement and infrastructure along the shore inside the Bay the freedom in resolving these problems is very limited, and primarily it is necessary to undertake construction-technical works that include the construction of longitudinal and transversal structures in the very bed of torrents (canals, channel pipes, training works, partitions, thresholds, consolidation bands and culverts), which course is not long, but has a sharp fall of the flow which therefore causes great energy of the flow and devastating power of the torrent.
Geological basis in the Bay is such that on the higher levels there are Mesozoic limestone and dolomite, which are according to their features very resistant to erosion processes, but are also inadequate for biological works. In the lower part of the Bay (inshore part - mostly settled and urbanized) the basis is made of tertiary clastic rocks – flysch, which resistance to erosion is low, and therefore produces large quantities of detritus.
Special attention for regulation of torrents in the Bay should be paid to culverts under the traffic routes and various building facilities, which are due to specific conditions usually last facilities in the system, where the torrents run into the recipient - sea. Culverts must be designed as to disable their clogging by the sand from sea currents - waves.
The production of detritus in the Bay is the central problem at sites where it is necessary to retain adequate depth in the Bay (marinas, piers and shipyards), which by itself imposes the priority of regulation of torrential courses and areas under the erosion that threaten such sites in the Boka Kotorska Bay.

The rehabilitation of torrential courses and erosion-affected areas within the municipalities of Bar and Budva is a very complex problem since it includes large-scale biological and technical works. Geological basis and relief features cause the creation of large quantities of detritus, and therefore the problem of transport of the detritus represents virtually the basic parameter in designing and performing construction-technical works.
It is necessary to protect stability of the bottom and slopes from the scouring, the changing of channel pipe drop and caving of slopes, for the purpose of reducing the production of detritus in the torrential courses.
Clastic sediments which make 80% of geological basis in the part of Municipalities of Budva and Bar require large-scale performance of agro-technical works in the form of: construction of terraces, contour trenches, protection of olive-groves from erosion, grassing of the soil and improvement of pastures, contour cultivation, fertilization and mulching of soil.
Forest-technical works are required on the slopes that are not used as orchards, olive-groves or agricultural soil in general. Such forms of interventions include the construction of rustic walls, wattle dams, ripper furrows which would be subject to forestation and performance of resurrection cutting of neglected forests and underbrush.
Within the technical works it is necessary to consider the possibility of construction of small collectors for detritus and water, particularly in the area where the reduction of production of detritus is required, it is necessary to construct black umber for dispersing hill waters in the basin of the rivers of Željeznica and Rikavac and torrential course that gravitate in the vicinity of the Port of Bar.

The priority of the development of the projects for regulation of torrential courses mostly depends on the development of the study for regulation of erosion area in this region and plans for future construction.

Recommendations for improvement of the terrain at the Littoral

The selection of improvement anti-erosion works in the very inshore area in the zone of macchia and its degradation phases must meet several conditions, and they are: prevent surface flow of water by infiltrating it in the soil before it causes damages of the soil, provide for well-balanced moistening on the whole slope so flowing of surface waters should be dissipated on the whole slope and it should take place as slow as possible for the purpose of better infiltration of the water into the soil, the very selection of anti-erosion systems of works and measures must take the direction to enable the use of the soil for planting, i.e. classical forestation, planting of decorative species, planting of olive-groves, orchards etc.

All the types of terraces are identified as technical types of improvement works. Terracing of the soil may be performed in various manners, only that the dimensions of the terraces differ, as well as the manner of construction, that is, application of the terraces.

The application of infiltration trenches (*Algerian terraces*) is performed on erosion slopes of the inclination of 5-35%, with the longitudinal fall of 0.5%, only that it has, along the outside edge somewhat elevated embankment so it gets the shape of a wide canal. Such trenches-terraces furrow the slopes from bottom to the top, on specified distance, which depends on the inclination of the slope.
Each trench is an element of the network and serves to accept the water from surface flow, to slow down its movement and transport it to the recipient. Longitudinal fall and transversal profile of a trench are constructed to enable sufficiently slow outflow of surface water for the purpose of its easier infiltration into the soil.
Forestation on trenches may be on the formation and on the lower part of embankment and are suitable for planting olive trees, various types of orchards, decorative species, etc.

'Gradons' for forestation are a very old manner of technical improvement works that comprise two functions, the primary of which is to stop the erosion in the inter-space, and supplemental function is to prepare the soil for planting forestry seedlings.
'Gradons' are the terraces 70-90cm wide, which formation inclination is 30% to the uphill side. They are constructed with the longitudinal fall of 0.5%. They are applied on the slopes of the inclination to 70%, on the distance between each other which depends on the inclination of the slope.
'Gradons' are used to treat extremely steep and eroded soils most frequently exposed to the south, south-west and south-east, which are dry due to fast flowing of water and long-term exposure to extremely strong insolation during the year.
If there is a doubt of slide of the soil in some terrain then such soil must be exempted from this manner of rehabilitation.

Contour terraces without any distance between each other represent the most expensive part of anti-erosion measures and they are rational if performed on milder inclination of hillsides, while on higher steep sides, the length of slopes may be shortened with suitable underpinning.
On the horizontal part of the terrace – the formation various plants may be grown, such as fruits, olives, vine yards, parks, etc.
In the cross-section of the terrace the inclination of the formation to uphill side may be to 10%, and longitudinal fall of the formation to 0,5%, or no inclination at all which depends on the purpose of the terrace.
The width of the formation must not be less than 2m for the purpose of easier machine processing i.e. it depends on the inclination of the slope - width of contour lines, so the greater width the better effect.
Such terraces are visually most effective and although their construction is the most expensive in the inshore area, they significantly improve the look of the scenery and protect the soil from erosion.
Contour terraces may be very useful for various forms of exploitation, from plantation to tourist-recreational, and the sufficient width of the formation enables easy and cheap cultivation of soil and enables fast change of the purpose of the terraces.

Windbreaks

In the zone of larger areas where the soil is made of unlinked non-consolidated material of small size fractions, such as on the Long Beach in Ulcinj and the Beach of Jaz in Grbaljsko polje, the form of erosion caused by wind occurs, i.e. arises due to transmission power of air in movement.
Wind erosion commences with strong wind, which hits the surface of bare, dry, unlinked soil, lifting up the particles of the size up to 0.5nm. When these particles hit the surface of the soil, they initiate the movement of the material of larger size fraction. Based on these regularities, as to suppress the erosion caused by wind it is necessary to reduce the speed of wind on the surface of the soil, catch the particles of soil - sand in saltation (bouncing movement), increase soil aggregate if possible and maintain specific moistness of the soil.

The main cause of sand storms particularly on the Long Beach near Ulcinj is the great speed of wind in immediate vicinity of the soil. The reduction of the speed of wind may be achieved by setting up obstacles that may be mechanical or in the form of forest windbreaks.

The most frequent manner of protection from wind erosion is the forest windbreaks. For construction of such windbreaks near suitable species of trees, used are the bushy species, too. Windbreaks are set up vertically to the direction of dominant wind. The distance between the windbreaks, selection of the species of the trees for the windbreak and its structure depend on the strength and frequency of the wind, the size of the area being protected and other natural conditions.

In the network of windbreaks recognized are the main and secondary windbreaks.
The main windbreaks are erected perpendicular to the prevailing wind, while the secondary windbreaks are erected perpendicular to the main. The distance between the main windbreaks should be 15-20H (H - height of the main windbreak), while the secondary windbreaks are planted at significantly greater distance unlike the main windbreaks.

The width of the windbreak should be 3-5 rows of trees with the distance between each other depending on the selection of the species of trees, from 1.5 to 3.0m.

In the structural sense there are three types of windbreaks:
- non-permeable forest windbreak
- semi-permeable forest windbreak
- permeable forest windbreak

For the very selection of the type of the windbreak and species of trees in the area of the Long Beach and the Jaz Beach, as well as other sites at Montenegrin Littoral where there is an evident problem of erosion caused by wind depends on collection of data on the sites themselves, such as development of the wind map with speed and frequency, precipitation, type of geological basis, pedological layer, etc.

Setting up the forest windbreaks, by rule, brings to the change of ecological conditions of habitats, so it reduces micro-climate extremities with regard to wind, moisture, insolation, air temperature, purity of air, so it enables settlement of flora and fauna species in the areas where this was not the case previously, e.g. settlement of birds and low vegetation inside the windbreak itself.

Introduction of such windbreaks in the inshore area does not provide only the protection from erosion caused by wind, but more quality use of space - beaches in the area of the Coastal Zone, which fully justifies the funds that would be invested in their planting.

2.8.3. Protection from Seismic Hazards

The intensity of seismic hazard for inshore zone of Montenegro is 9^o MCS (with the acceleration for the recurrent period of 100 years from 0.20 to 0.28, and for the recurrent period of 200 years from 0.32 to 0.40).

The review of stable and unstable terrains at the Montenegrin Littoral is as follows.

The inshore zone of the Boka Kotorska Bay as the most attractive and the most developed tourist space and the zone of open sea, which is about to become the same, are located in the zone of high natural seismic hazard, with significant range of unstable terrains, out of which significant number overlaps with the most attractive tourist mainly already activated sites at the shores of the Municipality of Herceg Novi, around Herceg Novi and Tivat Bay. Among the most attractive, and already constructed sites, the most threatened are: Igalo i.e. eastern part of Herceg Novi, Meljine, Zelenika, and particularly whole shore range from Kumbor to Baošići, Bijela and Kamenari. Extremely favorable stability of this range characterizes only the eastern part of Meljine and Zelenika, as well as the Cape of Sveta Nedjelja. In the immediate hinterland of this settlement the terrain is very unstable. The most unstable terrains in Kotor hinterland are at the foot of Kotorske strane above the shore zone of Dobrota and from Plagenat and whole shore part of Kotor with the highest density of constructions including Stari grad (Old Town). Extremely unstable terrains in this area are also located above the settlement Muo and in D. Stoliv, and the terrain of favorable stability is stretched only at the exit from Verige.

The shore of Tivat Bay is more favorable taking into consideration the number of stable terrains. They are mostly located at the shore, in Krtola, in Verige and partly in D. Lastva, as well as in the whole hinterland of Tivatsko field and on the Isle of Sv. Marko and Ostrvo cvijeća (Isle of Flowers). Extremely unstable terrains are in Lepetani, partly in Opatovo, Seljanovo and Račica, and to a certain extent in the vicinity of Bijela on the shore of Krtola.

In the zone along the open sea, the accessibility of sites on the shore is in the inverse ratio with the quality of stability of the terrain, therefore it may be concluded that stable terrains are prevailing, with few and far between unstable sites (Cove of Pržno, Cove or Trsteno and some other).

Conflicts between the economy concentration and seismic requirements for dispersion of construction are present in the whole shore zone of Boka Kotorska due to very small width of this zone, particularly in agglomerations of Herceg Novi (from Igalo to Meljine), Kotor (from Ljuta to Pržanj) and Tivat (from Opatovo to Mrčevac), and are significant in the range from Zelenika to Baošići, in Verige, Bay of Morinj, Risan and partly in Krtole. However, concentrations Kotor (primarily Stari grad and Dobrota partly), Risan, Perast and Prčanj, which structure is determined primarily by cultural heritage must be included as cause of the conflicts of this type. This is also related to some other valuable ambiance wholes of old settlements (Morinj, Orahovac, Muo, D. Stoliv), since they are valuables of dense concentration, and therefore the protection from earthquakes must be specially adjusted to them.

Inshore zone of Budvanska Riviera as the most interesting and the most developed tourist space is located in the zone of high natural seismic hazard with seismically unstable micro-sites which are most frequently present just in the most attractive ranges. Of the constructed tourist wholes the most threatened are the shore zone of Budvanska školjke, shore zone of Bečići, shore parts of Kamenovo, Pržno, Miločer, Sv. Stefan, Perazića Do and shore part of Petrovac. Among the most significant potentials for future tourist activation the seismic instability is significant in the inshore part of Jaz and Buljarica, and there are also unstable terrains among Smokov vijenac, Reževići and on Crvena Glavica (open slide).

Conflicts between the economy concentration and seismic requirements for dispersion are most recognizable in: Budva, Bečići, Pržno, Sv. Stefan and Petrovac. In Budva they are most significant in Stari grad, in hotel complex Avala-Mogren and on the Slovenska Beach, as well as at some parts of dense unplanned individual construction in Budvansko polje and Podkošljun. In Bečići the condition is the most problematic along the high-way, and similar problems are also present in the narrow cove of Pržno, on Perazića Do (weekend settlement) and in inshore part of Petrovac and Sv. Stefan.

Inshore zone of the Municipalities of Bar and Ulcinj, as the most developed tourist and urban part of their territories (and Bar even as a significant traffic center) has high value of natural seismic hazard. The most dangerous zones are in alluvial plain of Barsko Polje and slides between Ratac and Sutomore and towards Veliki Pijesak, while in the coastal strip of the Municipality of Ulcinj there are no specifically recognized sites, but the risk is more balanced.

The conflicts between the concentration and seismic hazard in the coastal strip are most strongly recognizable in Sutomore and in older nucleus of the town of Ucinj (including Old Town too), and some dangers threaten Čanj, Bar, Veliki Pijesak and Novi Ulcinj to Porto Milena, if further construction is not controlled to the sufficient extent.

Measures for adjustment to hazard and impact of distribution on the level of vulnerability

The fact is that distribution of expected seismic hazard and distribution of population in the area of the Republic, condition the level of expected damages in the significant extent. The results of research indicate that the level of expected seismic hazard in the Littoral region is significantly higher in comparison to the North Region, and at the same time the attractiveness of the Littoral Region may condition the concentration of population and material resources in a quite narrow area. Therefore, the level of expected seismic risk may increase several times, if required conditions and direction for its reduction are not provided.
With regard to this, it may be concluded that the concentrations and density are the two key development elements and phenomena that are defined at each level of urban planning, representing important factors of their economic implications. In the region subject to earthquakes these two aspects of development, by rule, directly condition not only the size of catastrophe itself, but its further consequences.

Also, it should be mentioned that at the level of general urban plans there is a broader and more realistic possibility, and also greater responsibility for realized interpretation of hazard zoning, both for the sake of defining the purpose of land and functional zoning of settlements. This zoning, particularly for urban settlements, fixes the specific functions for each area (such as schooling, trade, industry, health system, recreation, etc), within the performed seismic micro-surveying. In addition to envisaged and prescribed functions for each area of zoning of surfaces according to the purpose, also it is necessary to define the intensity of use according to every executed element of the urban land function (allowed density, ratio of developed part and total surface of the area, fixing of minimum amount of open surfaces within each site, allowed height of buildings and types of structures resistant to earthquakes, types of material and other).

Completely different situation in the protection from consequences of earthquake arises with regard to cultural-historical monuments, as well as old cultural-historical town nucleuses and old ambiance wholes, where specific criteria and measures are to be applied for strengthening structures which will primarily meet esthetic and security requirements and improve functional potentials, and therefore increase the level of security of overall old nucleuses.

2.8.4. Protection from interests for defense

The use of the Coastal Zone as one of the greatest potentials of the Republic, in addition to the provision and implementation of the development strategy for its use and development, and provision of rational use of space and protection of environment with the application of the concept of sustainable development, implies the provision of the defense requirements in that area.

Since particular areas, building facilities and infrastructure in the Coastal Zone and contact zones represent significant targets in war circumstances, the need is imposed for undertaking significant measures for arrangement of the space for the defense requirements, not only in the area of the Coastal Zone and contact zone, but in functional hinterland.

Goals for spatial development with regard to defense

The goals of spatial development of the Coastal Zone with respect to spatial development of the area of the Coastal Zone are fully convergent with the goals of development of that area in respect of defense. Significant level of convergence of the goals has been achieved in case of balanced development of the system of settlements and tourism industry, development of maritime activities and other economic activities, on development of traffic and other technical infrastructure, as well as valuation of the position of that space in relation to main traffic lines in shoreline region of Montenegro.

When overall development in the area of the Coastal Zone and contact zone is considered, as well as adjustment of this development with defense requirements and protection measures of interest for defense, it is also necessary to provide for realization of special goals with regard to defense, which include, but are not limited to:
- provision of favorable connection of longitudinal directions of the road network with transversal road routes, and connectivity of inland with maritime routes, for the purpose of creating possibilities for maneuver of forces and technical means within the defense system,
- suitable organization of urban settlements, traffic network and facilities of technical infrastructure, provide the possibilities for organization of settlements into qualitative footing of fighting operations in the defense system,
- creation of conditions for successful arrangement of the shore for efficient defense from the sea and air,
- with suitable spatial - urban measures provide for spatial conditions for organizing the defense system and looking after the citizens.

Organization of space with regard to defense of the country

The basic concept of organization of the space of the Coastal Zone and its hinterland, and the concept of traffic network, are fully envisaged in accordance with general conditions with regard to defense and protection from war devastation, while it is important that in case of road communications relatively favorable connectivity with transversal communications has been achieved.

Balanced development of town and other settlements, with restrictions related to high concentration of population, activities and physical structures, is in accordance with the needs of the defense. In this matter, particular significance for mitigation of consequences of high threat from the fighting means used in war circumstances, is taking into consideration the level of construction and ratio of use of land, with restrictions regarding the number of floors in buildings, as well as spatial-urban measures, which are intended for prevention of the development of conurbation in the area of Boka Kotorska Bay.

The development of tourist capacities corresponds to the defense requirements, but since at some sites in Boka there are some collisions with facilities of interest for defense, the resolution of the development at such sites should be mutually harmonized with great care and tolerance.

The envisaged development of maritime activities, industrial capacities and other economic activities correspond to the defense requirements, as well as the planned development of the traffic infrastructure. Since the situation is not favorable with regard to water supply and drainage of wastewaters, it will be necessary to pay greater attention to this area in further development.

The approach in resolving the protection of environment and natural valuables corresponds to the defense requirements, while it would be significant to base everything on the concept of sustainable development.

Structures of defense and protection

For complexes and facilities of Army infrastructure and other structures of defense in the area of the Coastal Zone and in the contact zone, it is mandatory to provide for conditions of their full and autonomous functioning, also including safety and protection zones, as well as corresponding connectivity with external technical infrastructure systems.

The protection of population and material resources from war devastation in the area of the Coastal Zone and its hinterland, are provided through prevention of the occurrence of larger urban concentrations and through construction of protection facilities in accordance with defense plans, particularly in the settlements with high level of threat, and through envisaging zones for acceptance of evacuated population.

As the most important measures of protection from destruction, restrictions should be used in the settlements with regard to the height of the facilities, the level of construction and coefficient of use of land, provision of free space around the facilities safe from ruining and fire, and securing traffic routes from potential ruins.

Application and implementation of the plan from defense aspect

Spatial plan of the Coastal Zone is adjusted with the defense requirements, therefore the Plan incorporates corresponding spatial solutions with regard to defense and protection from war devastation, which are based on general conditions with respect to protection measures of interest for defense of the country, and on specific requirements related to the needs of defense asked by competent authorities.

Since the Army is under transformation as well as its needs with regard to occupying space, on the very shore and in hinterland – this plan envisages re-intending of the most of "military" sites in the zone of the Coastal Zone, while they would be still used under the special regime until the realization of the planned intents.

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While the previous sections of the planning part were the projections of the development of industry and activities in the area of the Littoral, which means that they include not only the Coastal Zone but the contact zone too (space within the urban plans - TUP, DUP or UP, i.e. immediate inshore zone) and functional hinterland (territories of all coastal municipalities), therefore all the presented provisions may be considered as recommendations and suggestions for the coming period in the area of overall Littoral. So, they may serve as a useful framework for plan picture of a municipality or town and should serve as a plan benchmark with the framework projections for the period to 2020.

Sections 2.9, 210. and 2.11 are related directly to the area of the Coastal Zone, which means that all the provisions are legally binding and as such they are to be observed in the process of implementation of the plan, i.e. further development. Therefore, herewith prescribed measures, guidelines and recommendations are considered as a vested urban obligation.

2. 9. Purpose of the Coastal Zone Area

Based on the projections of core businesses and activities on the Littoral, while observing the principles of rational usage of space, that are supposed to bring the conflict situations to minimum, this plan proposes the following categories of purposes and use of space of the Coastal Zone:

/the determined purpose of space is shown in graph attachments no. 7a and b in proportion 1:25.000, then in the map with sheets in proportion 1:10.000/.

Swimming beaches

Swimming beach is any suitable spot, whether natural (gravel, sand, pebble, rocky) or artificial (constructed spaces on and near shore) where recreational swimming and sunbathing are possible.

A swimming beach may have several swimming units, organized depending on the purpose, and each particular is equipped as a whole.

According to purpose a swimming beach may be classified in the following categories: public, hotel and special.

Public swimming beach is the one that may be used by anybody under the same conditions. It may be a city or excursion (outside the settlement) swimming beach, and fully or partly developed.
City swimming beach is a frontal part of the settled zone and its contact with the sea. In addition to swimming character it may have the function related to entertainment, sport, recreation, public events, etc.
Excursion swimming beach is located in the settled place, it is organized for whole-day use and stay, therefore it is preferable that it has forest in its hinterland. The access may be from land and/or sea.

Hotel swimming beach is a constituent part of a tourist (hotel-accommodation) complex. Its dimensions are determined according to its capacity, since the access for guests outside hotel is mostly restricted. These are swimming beaches developed in accordance with the highest standards, low density and great comfort. The swimming beach may be an extended lobby of the hotel and swimming pools, sport and recreational programs with entertaining service and gastro services may be organized there.

Special purpose swimming beach is the one where the access is allowed to specific categories of visitors, in accordance with the special regime of use of the swimming beach and its surrounding: e.g. representative, nudist and swimming beaches with use of medical mud and mineral waters.

In determining the capacity of the swimming beach the used norm is from 4 to 8 m2 per a swimming beach, and in case of hotel and exclusive swimming beaches even more.

According to the level of development swimming beaches are classified as: developed, partly developed and natural – protected.

Developed swimming beach is the one which fully meets organizational-technical, infrastructural, hygiene and security requirements, in accordance with the valid regulations.
Partly developed swimming beach is the one that fully meets organizational and hygiene conditions, and partly infrastructural and security requirements.
Natural – protected swimming beach is the one that has special natural values or is protected as a natural resource.

Functional hinterland of a swimming beach

In immediate vicinity, mostly of city swimming beaches, there is a functional hinterland, which is its extension, i.e. expansion and some kind of a cushion zone towards the settlement. There are envisaged various services, outdoor pools and aqua-parks, sport-recreational offers, wellness and spa capacities, various forms of urban greenery. This space is intended for day and night activities. The accommodation facilities are not envisaged there.

Such space, in the Coastal Zone is envisaged in: Igalo, Donji Morinj, Jaz, Slovenska Beach, Bečićka Beach, Kraljičina plaža (Queen's Beach), Buljarica and Zukotrlica near Bar.

Undeveloped shore

Undeveloped shore mostly implies high, cliffy shore, mostly bare or rocky, inaccessible and inconvenient for construction. At specific sites the non-development is the result of military-strategic significance of that part of the shore.
At some parts of such a shore, unless it is forbidden, with minimum interventions it is possible to create access paths and swimming beaches for tourist complexes that are located in the hinterland.

Urban developed shore

Urban developed form of a shore is a urban developed and constructed shore, regardless of the character and the function of the settlement, i.e. regardless whether the settlement is of permanent residence or temporary residence - tourist.
Part of such a shore comprises developed city swimming beaches as well as a promenade along the sea (lungo mare).

Port-operational beach

Port-operational form of a constructed shore implies the constructed port-operational infrastructure for provision of simple service (small mole-closed harbor, piers and moorings) - as well as the services of highest level (marinas and ports).
In respect of the level of construction of harbor infrastructure, types and levels of provision of services, constructed port-operational shore may be classified as: *'postas'*, small mole-closed harbors, moorings, piers, marinas and harbors.

A *'posta'* is a space on constructed shore that serves for pulling out of fishing nets. They are mostly located in Boka Kotorska. The tendency should be stopped for a part of *'postas'* to be used as a boat docks with some corrections which disable its core function.
Small mole-closed harbor is an artificially fenced part of the sea that with the size and depth of water area enables berth and protection from bad weather for vessels with corresponding dimensions and draught to use them.
They are a specific ambiance - architectonic feature of Boka Kotorska and that is almost the only place where they can be found. In addition to rehabilitation of the old ones, it is possible to create new small mole-closed harbors.
Pier is a constructed part of a shore that provides conditions for berth of vessels and for performance of simple harbor operations (embarkation and disembarkation of passengers and smaller quantities of packed cargo).
Piers used to serve for landing of ships of line traffic, and now most frequently for excursion tours and acceptance of nautical vessels.
It is necessary to provide for landing of excursion and nautical vessels on all larger beaches. The recommendation is that such piers should be at the end of the beach, not to disturb swimming activities. The recommendation is to construct them as temporary facilities – on piles.

Nautical tourism facilities in business, space, construction and functional aspect make a whole or within a broader spatial and construction whole they have a separate space and a necessary functionality.
The level of development and equipment of nautical tourism facility is standardized and defined are categories of various levels of development and equipment.
The nautical tourism facilities are considered to imply marinas, harbors and boat docks, moorings and anchorages.

Marina is a nautical tourism facility specialized for provision of services for berth, supply, safekeeping, maintenance and servicing of vessels, as well as other services in accordance with the requirements and specific needs of a nautical tourist.
Marinas are specialized tourist ports which water area is naturally or artificially protected.
They are capable of acceptance, providing supplies to crews and tourists, maintaining and equipping vessels, with direct pedestrian access to each roll on vessel and can be used at any moment.
The planned system will include the following points: "large servicing marinas" - Arsenal (alternative Bonići) in Tivat (for the area of Boka) and Bar (for open sea), "standardized marinas" - on the cape of Kobila, in Kumbor and Bigova and on Liman near Ulcinj, "special VIP marina" in Kotor, "special eco marinas" in Buljarica and on Ada Bojana.

Nautical offer is supplemented by **nautical ports and boat docks** i.e. **commercial moorings.**

Ports and boat docks are maritime facilities partly developed to accept nautical vessels and boaters and mainly they comprise spaces in the existent city ports - Herceg Novi, Risan, Kotor, Kalimanj-Tivat, Budva.

Moorings are specially constructed and arranged shore areas for mooring of vessels, near tourist complexes and facilities. Envisaged locations are: Njivice, Lazaret-Meljine, Zelenika, Glavati-Prčanj, Bonići (if the marina in Arsenal gets realized), Rose, Isle of Sveti Nikola, Perazića do and in the range Cape of Đerane – Port Milena.
In the function of nautical tourism it is possible to include, through careful revitalization, small mole-closed harbors and old moorings in Boka.
Anchorage is an organized and protected water area for mooring of vessels on buoys.

Port complexes

In the areas of ports the port services are provided to passenger and cargo traffic. Within this business activity performed is the following: loading / unloading and reloading of goods from/to/from/into ships, trucks, wagons, then services of pilotage, services of tying and untying of ships, services related to connecting to infrastructural networks (water, electricity, telephone, ...), removal of garbage, etc. Within the ports there are indoor and outdoor warehouses with necessary machinery.
All ports have operational shore with several piers / docks in different depths of the sea.
There are following ports at the shore: Bar (passenger-cargo), Budva (passenger), Zelenika (passenger-cargo), Risan (cargo) and Kotor (passenger).
Temporary cargo pier is also envisaged for removal of stone in the zone of Oblatno, which is to be converted for tourism purposes after the quarry gets closed.

Shipyard and overhaul of ships

Shipyard is a place where the construction, breaking, overhaul and reconstruction of all types of vessels are performed. In addition to facilities on land (workshop and shipbuilding halls, warehouses, parking, internal traffic routes) they require larger water area and operational shore with several piers / docks and cranes and floating docks.
The shipyard is located in Bijela.
The overhaul of nautical vessels is envisaged within the marina Bar too.

Oil warehouses

Oil warehouses are larger reservoir spaces that enable supplying of industry and other consumers with oil and oil derivatives. The receipt of goods may be performed solely by maritime routes, and shipment by sea and land (tank trucks).
They are located within the Port of Bar on the hill of Volujica, and in Lipci. In the subsequent period these facilities should be envisaged to be relocated from Boka Kotorska Bay due to ecological threat.
Special facility also is the air service near Tivat Airport.
Yachting services are located in Herceg Novi, Kotor and Budva, and within the marinas in Tivat and Bar.

Settlement Structure

Settlement structure implies larger ranges of the Coastal Zone on land which in addition to the constructed shore covers the areas for housing, tourist,

economic and public facilities, then various forms of urban greenery.
Such ranges are in: Njivice, Meljine, Djenovići, Risan, Dobrota, Škaljari, Prčanj, Seljanovo, Tivat, Djurašević Kaludjerovina, Krašići, Budva, Petrovac, Veliki and Mali pijesak, Sutomore, Bar, Petovića Zabio and Kopštar, Ulcinj (around the channel Port Milena).

Tourist facilities and complexes

Tourist complexes comprise the parts of the Coastal Zone which in addition to accommodation capacities have supporting recreational facilities, greenery and internal communications.

Existent hotel complexes are in Njivice, Risan, Kotor, Prčanj, on Slovenska Beach, Sveti Stefan, Perazića Do, Čanj, Sutomore, on the Long Ulcinj Beach and on Ada Bojana.
Special form of accommodation is the tourist settlement on the Isle of Sveti Marko and former military resorts in Valdanos, Bigova and on the Ostrvo cvijeća (Isle of Flowers), which are to be thoroughly reconstructed.
Former military facility in the old hotel "Plaža", Zelenika, is also envisaged for tourism purpose.
The facility of medical tourism is located on the Markov rt (Cape of Marko) on Prčanj.

Newly planned tourism complexes in the zone of the Coastal Zone are: on Kobila, in the extension of Njivice (towards Sutorina), Meljine, Rtac near Risan, URC in Kotor, Župa in Tivat, surrounding of the Isle of Flowers and cope of Brdište, military sites of Petrovići and Pristan, Male Rose, plateau from Rose to Dobreča, Kabala For, Mamula, Žanjic-Mirišta, slope above Arza, Bigova, Cape of Trašte, hinterland of the cope of Žukovica, Kamenovo, extension of Čanj, Crni Rt (Black Cape), Maljevik and cope of Škrbin, Green zone towards Žukotrlica, near the River of Željeznica, Cope of Maslina, Paljuškovo, Valdanos, former "Jadran" hotel in Ulcinj, cape of Đerane, Long Beach – western and central part and Ada Bojana.

In the immediate, contact area of the Coastal Zone, new tourist facilities are envisaged: villages on Luštica, range from the "Plavi horizont" Hotel to Bigova, villages on the plateau of Donji Grbalj, Boat dock from Jaz and hinterland of Jaz, hinterland of Lučice and Buljarica.

For planning tourist facilities used is the norm of 60 m2 of free and green space per bed in the 3* facilities, 80 m2 in 4* facilities and 100 m2 in 5* facilities. This space includes swimming beaches.
The building, except for existent city locations should be away from the sea as much as possible, and the scenery of this space should be adequately developed with minimum interventions.

Multiple purpose

Use of space for housing and smaller tourist facilities is envisaged in the area of the Long Beach along the regional road, within 5 planned tourist modules (according to regional Master Plan).

Combined facilities

Combined usage of space in Overhaul Bureau (Arsenal) in Tivat and military complex Kumbor – implies tourist, central and complementary activities (marina with yachting service, hotels, commercial, public and supporting facilities) with zones of luxury housing and urban greenery.

Utility – service zone

They are mostly located near the settled structures, but due to specific facilities they are considered as separate zones. They imply facilities that are not polluters of the environment, warehouses and storages, selling and exhibition spaces. In specific zones, they may be in the function of tourism offer.

In the range of the Coastal Zone they are located in Kukoljina near Župa, near Tivat Airport, on the Long Beach in Ulcinj.

Sports and Recreational Facilities

Sports and recreational facilities are located within the settlements and tourism complexes, where they usually represent supporting facilities.
As separate facilities considered may be outdoor pools for swimming/water-polo as well as several sports complexes.

In the range of the Coastal Zone there are: outdoor pools with the sea water in Herceg Novi, Đenovići, Baošići, Bijela, Kotor, Prčanj and Budva, sports center "Long Beach" in Ulcinj and in Igalo; bowling field in Budva; stadium for beach soccer on the beach in Bečići; stadium of small sports in Kotor and sailing - and sports hall "Župa" in Tivat.

The Plan also envisages formation of sports - recreational and excursion zones in the area of Župa in Tivat, in the hinterland of the Kalardovo Beach, on the Isle of Sveti Nikola and on parts of Long Beach in Ulcinj (including golf terrain).

Zones protected for under-water activities

Envisaged is the establishment of four zones protected for under-water activities - from Plava špilja to the Cape of Veslo, from the Cape of Sv. Đorđe to Platamun, surrounding of Sveti Nikola and surrounding of Donkova seka and isles of Katić and Sveta Nedjelja.

Water areas are located in the direction of the beach, and towards the open sea they encompass the zone 100m wide and maximum depth of approximately 40 meters which means that the zone supports generally accepted maximum depth for diving.

Artificial reefs

Artificial sunken reefs serve as habitats, shelters or possible sources of food for sea organisms.

Artificial reefs may have other functions, so if adequately set up they serve as barriers for trawling in forbidden zones, or they have complementary function in tourism as a diverse and dynamic under-water park where there is a large number of representative species of sea organisms present.

Oyster/fish farms (mariculture)

A mariculture is a range in the sea where oysters or fish are artificially farmed. This most frequently implies floating parks of oysters or cages for fish farming.

The locations are mostly in Boka Kotorska: near Institute for Biology of the Sea in Dobrota (experiment site), Ljuta, between Dražin vrt and Perast, Perast and Risan, Vitoglava and Strp, Strp and Lipac, near Kostanjica and Donji Stoliv, in front of the dam in the zone of Solila. If it is proved that there are no effects on the living world, it is possible to organize the farming even within Solila.
The oyster farming is more favored in the Bay due to limited natural conditions.

The sites on open inshore sea are: Dobra Luka, cope of Žukovica, Zagorski Pijesak, Krimovički potok, Cove of Valdanos, Port Milena.

Solila

Solila is the area of shore saline soil, which is a specific bird habitat. It is located in the vicinity of the Isle of Flowers.

Due to its features it is proposed to become a nature reservation, within which the bird-watching would be organized.

Marshes

Marshes imply smaller ditchwater and marsh areas featured with specific (halophyte and semi-halophyte) vegetation.

In the range of the Coastal Zone they are mostly located in the area of the Long Beach in Ulcinj, on Ada Bojana and in the area near the River Bojana, then to a smaller extent in the zone of Buljarica, Solila and Soliotsko Field.

Grassy Areas

Grassy areas comprise the areas with specific Mediterranean pastures and meadows, but to a much smaller scale, mostly near the Bojana River and on the Long Beach in Ulcinj and Ada Bojana.

Dune vegetation

Specific dune vegetation is developed in the area of the hinterland of the Long Beach and Ada Bojana.

Vegetation on poor soil

Vegetation on poor soil implies: macchia, various secondary degraded underbrush, anthropogenic slows, evergreen garigue and deciduous osiers.
It is particularly present in Luštica and Donji Grbalj.

Forests

Forests encompass the areas under specific Mediterranean coniferous and deciduous forests.

Special group are the forests on sand, on Ada Bojana and hinterland of the Long Beach, as well as on the Isle of Sveti Nikola.

Olive-groves

Olive-groves are a special and very significant form of land cultivation, and are mainly formed on terrace areas.
In addition to individual trees and groups of olive trees, that are located along the whole Littoral, as the only larger area in the range of the Coastal Zone the old olive-grove in the cove of Valdanos may be distinguished, as a part of larger complex that ranges to the very town of Ulcinj.

Traffic facilities and areas

Traffic areas encompass the space and facilities for road, railway, air and maritime traffic.

Road network in the area of the Coastal Zone includes:
- high-ways (Adriatic high-way M2, which is a border line of the Coastal Zone in the Boka Kotorska Bay)
- regional roads (R1 for Cetinje, R 14 for Virpazar and R 15 to the Bojana River, which is the border line of the Coastal Zone)
- local roads and settlement traffic routes and streets

The planned Fast traffic route bridges over the Coastal Zone in the area of Verige in the hinterland of Montenegrin Littoral

Railway network - There is a railway station in Bar which is the starting point of the railway line Bar - Belgrade.
Starting from there to the Port of Bar there is an industrial gauge that connects these two traffic terminals.

Airport complex - In the range of the Coastal Zone there is a complex of Tivat Airport with all supporting facilities: airport building, runway, hangars, navigation appliances, internal communications, parking lot and air service for fuel supply, which has a special access from the sea. In the coming period the expansion and modernization of the airport is envisaged.

Maritime Traffic Facilities

Among the facilities intended for maritime traffic there are: ports and port terminals as well the facilities intended for local navigation (ferry pier, moorings and small mole-closed harbors). All these facilities are considered as parts of the constructed shore.
Piers, moorings, small mole-closed harbors and boat docks may be improved and modernized for local navigation.

In the water area the waterways and spaces for anchoring of large boats are defined, both in the bay and in the open sea.

2.10. Requirements for Development, Construction and Protection

The development and adoption of this Plan needs to ensure the status for the area of the Coastal Zone to be the status of special interest i.e. the status of complex and integral protection.

In the narrow stretch immediately along the sea it is allowed to:
- construct maritime traffic facilities (jetties, piers, moorings, boat docks) and similar facilities which due to the logic of their existence must be at the very sea shore.
- reconstruction and rehabilitation of existent facilities of traditional architecture and construction heritage
- protection of authentic scenery, reconstruction of fire sites, preservation of Mediterranean macchia
- protection of sea bed
- additional construction of existent tourist facilities as defined in the plan, for the purpose of their modernization and enrichment of the offer as well as restricted construction of new facilities that are envisaged in this plan and lower level plans

In the area of the Coastal Zone, which is very narrow, there are facilities of various types which according to their function may be located in the coastal zone: swimming beaches, traffic facilities, nautical facilities, seasonal facilities, old buildings of traditional architecture, housing and ancillary facilities, groups of new buildings of contemporary architecture, hotel and tourist complexes.

2.10.1. Requirements for Swimming Beaches

Requirements for developed swimming beaches

Developed swimming beach is a separate organizational whole which in the functional, esthetic and ecological sense enables stay of swimmers.

Public swimming beaches must be subject to free access, no admission charges. Hotel swimming beaches may restrict the access only on their guests and may charge admission.

Optimum distribution of functions on a developed swimming beach is as follows:
- at the very entrance in the swimming beach there should be gastro, entertainment, sports, sanitary-hygiene and other necessary facilities;
- central zone of the beach with defined space for setting up sunshades and deck chairs
- zone immediately near the sea (min. 5m) should be free for movement, getting of swimmers in and out of the sea.

The recommendation is that developed swimming beaches should have organized piers for landing of boats and tourist boats, car or pedestrian access, marked range on land and sea, defined entrances to the beach and organized parking space if possible.

Any developed swimming beach is to be maintained on regular basis.

In determination of capacity of the area and offer the norm of 4 to 8 m2 per a swimmer should be used, depending on the level of services on the swimming beach. In case of hotels, this norm can be even higher.

At the area of 1000 m2 or 100 m of length of the developed swimming beach at least two toilet blocks, two showers and dressing cabins should be set up.

Toilet facilities may be: fixed or mobile. Fixed toilet facility is constructed at the locations where there are conditions for connection to the public sewage system, or septic waterproof tank, which may be emptied on regular basis. Mobile toilet facility is set up at locations where there is no public sewage system.

At a developed swimming beach there has to be an organized security service (specific number of professionally capable persons, adjusted to the capacity of the swimming beach), specific number of life boats and other rescue equipment according to international ILS standards.

From the waterside of the swimming beach, the space of developed and constructed swimming beach has to be visibly fenced at the distance of 100 m with buoys which are mutually connected.

In the fenced areas of swimming beaches and at the distance of 200m from the shore the motor boats are forbidden, and at the distance of 150 m from the shore it is forbidden to approach the shore by boats, sailing boats, sailing boards, scooters and the like.

Exceptionally, the boats and other vessels on motor power are allowed to access the developed swimming beaches, only at spots that have to be adequately marked, signalized and fenced, and fast boats (scooters, motor boats, boats pulling skies, *bananas* and the like) are allowed to navigate in the areas designated for such purpose and which are adequately marked, signalized and fenced with the approval from the competent ministry.

Landing of vessels must not be performed by beaching but at piers, which may be permanent or seasonal. The recommendation is that docks should be installed on piles made of wood, metal or concrete. The depth of draught must be such that vessels float while tied.
Spots for landing of vessels from water side must be marked, fenced and signalized by mutually connected buoys, which create a funnel from the shore towards the open sea.

At a part of the swimming beach (preferably on its end), as a separate whole, it is possible to organize other sports activities (water slides, water-skiing, *bananas*, paragliding, scooters, motor boats) which exclude swimming in that area. These parts must be adequately marked with buoys.
Platforms for landing of scooters are assembly-dismantling floating constructions for putting scooters out to the sea, which are set at the distance of 50 m from the shore. At the inland part, the approach to the funnel and the platform for scooters should be free from

other beach equipment with visibly posted signs with information and warnings.

Spatial organization of each developed swimming beach (space where it is allowed to put up sunshades and deck chairs, passages and communications, position of sanitary facilities, showers and dressing cabins, space for entertainment and recreation, other beach mobile facilities and piers) should be defined in the annual plan of temporary facilities and swimming beaches, which would also determine their regime of use.

Development and expansion of existent and possible construction of new swimming beaches would take place by elimination of facilities and buildings that are not required and that may be organized at other sites, by filling with autochthonic sand or gravel, construction of engineering facilities for protection of beaches (e.g. groyne), construction or installation of pontoons and jetties (particularly in Boka) and careful modeling of the existent rocky and stone space and by adjusting them to swimmers. Such works are not envisaged on protected facilities, and must be verified based on assessment of impact of specific works on sea currents and ambiance values.

At specific swimming beaches, and particularly in their functional hinterlands it is possible to create entertainment – aqua parks, that would supplement the offer and increase the space for swimming. It is preferable that they use sea water.

Requirements for partly developed swimming beaches

Partly developed swimming beach is the one that fully meets organizational and hygiene requirements prescribed for developed swimming beaches (dressing rooms, garbage bins and regular maintenance), and partly infrastructural and security requirements.

Requirements for natural - protected swimming beaches

Natural – protected swimming beach is the one that has special natural values or is protected as a natural resource. Most frequently they are located on a rocky shore of the open sea (specific sectors on Luštica and Donji Grbalj, part of the Isle of Sveti Nikola, areas beween Petrovac and Buljarica) or on sandy beaches (e.g. eastern parts of the Long Beach and Ada Bojana)

No interventions can be made on them so the natural balance and authentic look would not be disturbed. No facilities are set on them, no special paths or piers are built.

Requirements for special-purpose swimming beaches

Special swimming beach is the one that has special features or regime of usage – nudist, with medical capacities or representative. Due to special offer it is possible to restrict their accessibility.
Nudist beaches are near Njivice, part around Arza, part of the Jaz Beach, part on the Isle of Sveti Nikola, Crvena glavica near Sveti Stefan, surrounding of Ratac, Ada Bojana.
Beaches with medical capacities are Pećine near Njivice, Blatna plaža – Igalo, Ženska plaža – Borova šuma near Ulcinj.
Representative swimming beaches are the Queen's Beach, as well as specific exclusive swimming beaches – Sveti Stefan, Miločer, Mamula ...

2.10.2.Requirements for Sea-Borne Traffic Building Facilities

Bigger jetties and piers to be built in accordance with stipulated technical solutions and navigation conditions in which process the perimeters, i.e. the edge of horizontal walking surface and vertical one which dips into the sea should be designed as stone blocks with rounded edge. All visible surfaces should be paved with flagstones in concrete bedding.
In order to preserve characteristical look of present capes and small mole-enclosed harbours as well as have the increase of the coast area conformed to conservation principles both in respect of its location and also its general appearance, planned interventions may be accepted under the following conditions:

- extension or construction of artificial capes should be in accordance with micro location options in terms of space and in such fashion which in all respects reflects the traditional shapes (most often irregular, broken lines orthogonal or in parallel with the shore);
- for the finish trim of artificial cape, i.e. walls large roughly dressed boulders of irregular shape should be used to create the impression of original “dry” building method;
- finish trim of the finishing top surface of an artificial cape should be in all respects in accordance with the existing one, i.e. boulders on hard earthen standing or roughly dressed paving flags lain in irregular patters on concrete bedding (concrete for finish trim is ruled out).

2.10.3. Requirements for Seaside Promenades

Interventions as to the formation, development and use of seaside promenades are planned having in view the character (of the open sea and the Bay, natural landscape and developed environment) and earmarked purpose of the Coastal Zone belt with the objective to establish recognizable potentials, particularly emphasizing the diversity, i.e. distinctiveness of every micro location of the Montenegrin Littoral.

Walkways may be planned on areas earmarked for: public swimming beaches, urbanely developed shore; specific development form of the shore of Kotor-Risan Bay (with artificial coves, small mole-enclosed harbours and moorings); settlement structures; tourist building facilities and complexes; sports building facilities; grassy areas and woodland.
Walkways may not be planned on the free part of shore (necessity is emphasised to have the character of the area preserved – natural landscape and not-developed area between line-like urbanised seaside towns and villages which is particularly noticeable in Boka Kotorska Bay); next to hotel and special-purpose

beaches, on areas earmarked for business activities or special purposes.

Basic elements of the spatial and organisational defining the seaside promenades are, as a rule, the following:

- possibility is ruled out to have promenades set up immediately next to or on traffic ridden surfaces, i.e. the network of arterial and regional roads;
- in the process of conversion of town and village roads into the category of "seaside promenades", it is necessary to have traffic regulated, i.e. conditions of use defined (maintenance, deliveries, permanent residents, temporary residents, visitors);
- in any planned interventions for setting up, development and use of the seaside promenades it is indispensable to preserve the sea surface, i.e. possible reclamation of the sea is ruled out;
- pedestrian communication through-put connections to be set up within places and promenades;
- promenade needs to be clearly defined and direction in which it extends should indicated with adequate signalization;
- it is necessary to provide necessary promenade infrastructure;
- on the water side, a wall is mandatory which function is to protect users;
- artificial walkways may be planned in urban centres where there were none so far;
- in order to obtain continuity of a walkway and form lay-bys on plate-like rocky terrains, minimum concrete work to cover the top surface of rocks may be anticipated;
- anticipated walkway finish trimming needs to be in harmony with ambience characteristics of respective location (paving flagstone, cobble, etc., or made from prefabricated elements (pre-cast concrete slabs, timber shutters and, exceptionally, concrete);
- unhindered access without any restrictions should be provided for all interested users;
- unhindered access should be provided for handicapped persons on walkway areas which are adapted to their needs;
- in certain parts and in accordance with available space, bicycle tracks should be also provided;
- sanitation maintenance and the manner of use (bringing pets, etc.) should be regulated by Promenade Rules;
- to protect strollers, it is necessary to define boundaries of promenade areas where it is prohibited to ride bicycles, motorcycles or drive other vehicles;
- sanitary, maintenance and servicing facilities on promenades should be located, as a rule, within the existing structure or, as temporary (seasonal) building facilities, at points envisaged for such purpose;
- all temporary building facilities along promenade should be mobile in order to be easily removed after the end of season.

2.10.4. Requirements for Seasonal Building Facilities

In the Coastal Zone belt, for the purpose of organisation and regulation of swimming beaches, as well as in the parts of shore in the hinterland, setting up of seasonal building facilities may be approved in accordance with the Annual Plan and Program of Setting Up Temporary Building Facilities.

Setting up of the following building facilities and facilities is possible: kiosks, prefabricated and semi-prefabricated building facilities, sales-service points, terraces, telephone boots, food and cold drink show-cases, pop-corn machines, video and game slot-machines, amusement parks, floating pontoons, and portable docks.

These facilities, as a rule, are removed after the end of season or are conserved under special conditions.

2.10.5. Requirements for Housing and Auxiliary Building Facilities

On existing housing buildings in the Coastal Zone belt, all building and specialist's trade works may be approved if such are for the purpose of their regular maintenance and use. Such buildings is possible to extend and build-over if the said is anticipated by valid DUPs or location studies which will be prepared for those parts of towns and villages which are located in the Coastal Zone belt.

It is possible to change the earmarked use of old building facilities in the Coastal Zone belt subject to previously consulting all other laws and normative provisions within the domain of area conservation; and, new business activities may be approved only if all communal prerequisites have been fulfilled and if the new business activity is not hazardous for the cleanliness of the sea and its hinterland and if the intended use itself is not unsuitable for the location.

For building facilities which are of historical and ambiance value or are of traditional built it is necessary to obtain approval and opinion from competent institute for the protection of cultural monuments.
It is necessary to establish and adopt measures for "camouflaging" surrounding building facilities in order for them to intrude upon the area as little as possible particularly if they are in immediate vicinity of a higher value building and/or ambience unity.

Greening is anticipated of parcels and common public areas with autochthonous plant species in order to "soften" landscape and hide old architectural/planning faults that cannot be repaired by building work interventions.

Special attention is to be paid to measures for the protection of sea and soil, organised collection and removal of waste, solving of waste water drainage by way of sewerage system.

Construction of new building facilities of this type is anticipated within the existing (as-found) settlement structures in a form of limited densification subject to

compliance to normative provisions stipulated by subsequent elaborations taking care to provide free and green areas and not to block access to the sea.

Within combined purpose zones in addition to tourist and ancillary facilities of planned marinas it is possible to built luxurious apartments.

Building of weekend house settlements is not anticipated by this Plan.

2.10.6. Requirements for Hotel/Touris Complexes

It is permitted to add on existing hotel complexes and carry out building work interventions in order to increase their comfort level, improve services, adjust them to the overall ambient if their original architectural appearance did not suit it.

Interventions on the area surrounding them are also permitted in accordance with the following conditions:
- Natural landscape of not developed open shore should be preserved in its original form to the maximum possible extent;
- Plant fund and morphological features of the region should be kept as authentic landscape;
- where interventions are performed on landscape, autochthonous materials should be applied (underpinning with stone in dry wall or with sunk draft; it is not permitted to use stone as a mask by way of adhering slats in regular patters to horizontal and vertical surfaces; cuts in the tract may be made in exceptional cases and in as small surfaces as possible which should be then underpinned with stone or planted with adequate plants which will cover “scars” in the tract;
- Autochthonous plant fund should be used for greening (clustered maritime pine, carob tree, olive, locust tree, acacia, Cyprus, etc.).

New tourist capacities may be built only in line with valid urban plans and on locations envisaged by this Plan.

This Plan specifies zones which represent the estimate of terrains whereon construction of tourist capacities will be performed within the composition of broader wholes whereas boundaries are given provisionally and imply differentiation of built up and free areas. Proposed boundaries have also included areas next to the sea in order for the littoral area to which they gravitate, as well as not developed zones under greenery to be also regulated with these plans.

It is estimated that the maximum terrain load on specific micro locations should be up to 150 bed/ha for concentrated hotel complexes while 80 bed/ha is minimum for zones envisaged for villas and bed & breakfast establishments. These norms are calculated on gross basis that is including all pertaining facilities in the tourist offer (centres, service, sports grounds, landscaped green areas, etc.). In proposing these norms, permitted numbers of floors and terrain configuration have been taken into account.
More precise numerical indices can be derived only on the basis of detailed basic design data and solutions of exact settlements and locations. In planning and setting out new tourist facilities conditions must be taken into account which are dictated by terrain topography, present vegetation and created structure of surrounding settlements, as well as the indication of their future spreading.
Recommendation of this Plan is that the capacities should be to the maximum possible extent adjusted to the configuration of terrain and free vistas onto the sea. Building facilities need to be integrated with the environment, both developed and natural. This means that dependant on specific location conditions adequate concrete solutions must be searched for which must not compete with distinctively valid natural or historical entities. In the architecture of tourist building facilities solutions should be looked for which: lean on the experience and forms of traditional autochthonous architecture or represent a symbol of modern time both in respect of form and materials.
General requirements for the construction of tourist building facilities are given as per configuration and type of building.

Tourist complexes in bigger coves should be planned as hotel complexes with a central building in the very cove and “carpet-system” annexes suitably situated in a fen-like arrangement in the hinterland. The annexes should not be higher than Ground floor + 1 floor while the central building with reception and supporting facilities may have bigger number of floors.

Tourist complexes on capes should be organised in such manner to have central facilities with a reception situated on the highest levels with vistas opening onto coves and sea, and accommodation capacities arranged in smaller units which descend towards the shore.
When defining building requirements, special attention should be paid to the integration of individual smaller building facilities into the natural environment in order for the environment to remain dominant. Building facilities should not be placed immediately next to the shore or onto the cape edges.

New tourist developments should be formed on accessible terrains suitable for building, on high levels above the open sea shore, or on other not developed locations which have not been evaluated as being of high value from the point of nature, history or some other point. With establishment of an organised complex with regulated roads and parcels there is possibility to have current dispersed and inadequate building consolidated and integrated into a compact urban structure. Areas which are private property and are already being fragmentised should be incorporated into the planned building region and, resultantly, future uncontrolled individual building would be sanctioned through a detailed urban planning.
This, of course, means that for the areas of remarkable natural or ambiance characteristics the requirements would be much stricter than these general conditions summarised as follows:
- parcels for building villas are of 400 – 800 m2 area with building facilities of free architectural expression and landscaped front and back gardens. Building facilities should not be higher than Ground + 1 floor, namely Ground floor + Loft with overall dimensions of max. 120 m^2. Construction of smaller-size pools within

parcels is optional while it is mandatory to provide accommodation for vehicles in a garage or on a parking;
- It is possible to place a part of accommodation capacities into a hotel (max. 150 beds) which should be within the new joint tourist offer together with villas. Hotel complex may be build as a compact building facility or as a central building with annexes. With the hotel offer it is mandatory to provide all supporting facilities compatible with the category of the tourist complex;
- central zone of development shall include standard development infrastructure such as management, administration and supply areas, as well as information centres for the users of tourist development areas and the entire tourist zone; it may be organised next to the road which connects two parts of the development, including compulsory landscaped open areas and a small piazza;
- free, recreational and green areas should be adequately arranged and connected with beach as the closest point for recreation on water.

Detailed elaborations should treat and regulate the zone between shore and development, define connection of the development with shore and beach, and stipulate landscaping of protective green area.
Boundary in such plans should include terrains extending from the shore to building area limits and within such terrains provide conditions for the use of sea, beach, as well as green areas extending to the development. Communication between the development and beach should be defined, vehicle access as well as pedestrian communication provided and, where required, also lifts or other forms of public transport.

Other requirements for structuring tourist zones:
- Organisation of green, free, sports and recreational areas is mandatory. Standards depend on category (60 m2 per bed in 3* accommodation to 100 m2 per bed with 5*).
- System of pedestrian routes should be arranged to most attractive locations and belvederes. Interconnection between areas should be provided via a system of access and local roads.
- Any construction whatsoever is prohibited on swimming beaches except supporting facilities in form of seasonal structures intended for recreation, entertainment and services.
- Suitable piers should be provided for excursion boats and optionally yacht mooring conformed to maritime conditions.

Concrete building requirements should be stipulated by planning documents of a lower order; in general, they refer to:
- setting location for concrete tourist and service facilities;
- strict regulation of areas which makes possible correct and continuous management, namely care about space without areas which are “common estate” but for which no one is responsible for;
- limits of land development and use levels up to which future investor should or may consume space and burden it with infra- and superstructure;
- building method, namely design and building recommendations and obligations aimed at successive build-up of a location or development and preservation of its identity;
- Guidelines for development of specific areas (tourist stations, recreation centres, ambiance entities, nautical centres, tourist villages, etc.).

2.10.7. Requirements for Marine Culture Farming Locations

Assuming that all preconditions have been fulfilled for determining a location for marine culture farming in a given zone, it is necessary to fulfil the following conditions:

Physical, chemical and biological characteristics: Location Openness (Protected condition); Depth; Currents (velocity, direction); Wind (dash, velocity and direction); Waves; Terrain topography (inclination, underwater barriers); Sediment structure; Suspended matters (turbidity); Water quality; Water quantity relative to biomass grown; Trophic status (oligotrophy, eutrophy); Phyto-benthos and Zoo-benthos; Ambient autochthonous ichthy-fauna; Predators (fish, birds, mammals)

Supporting infrastructure: Availability of space on land; Access from sea and land; Distance from seaways; Availability of current; Production of food for farming; Harmless treatment of dead organisms; Waste disposal and recycling units; Sanitary and veterinary inspection; Advisory services; Maintenance and repair service facilities

Prior opinions, approvals and permits: opinion of competent scientific institution, competent port authority, water management inspectorate, institute for nature protection, republic administration authority competent for marine fisheries about the fulfilment of requirements for marine culture farming; as well as water economy requirements, approval and permit

Design documentation consists of:
- Location outline with delineated boundaries of the area intended for marine culture farming;
In respect of sea locations, a farm or plantation should be situated at 50 m distance from shore and at adequate distance from seaways and at minimum 10 m distance from nearby pier. Protection belt on each side of farm or plantation should be specially marked and connected with onshore location where supporting facility is situated.
- Description of technology and organism species;
Selection of technology and species of organisms anticipated for breeding should be determined in accordance with the Rules of Water Classification and Categorisation.
- Business plan;
Feasibility study should envisage development in of marine culture farming on a given location in phases and define the following: statutory and sanitary standards; duration of the first breeding cycle; investments to be made on the selected location; source of funds necessary until the end of the first breeding cycle, qualifications of workforce; sale of breaded organisms on market; distribution channels, anticipated product price; and other features of marine culture business activity.

- Feasibility study on bearing capacity of environment and assessment of environmental impact.

To determine the level of intensity and capacity or marine culture farming on a given location it is necessary to take into account initial state of physical, chemical and biological parameters on which basis bearing capacity of the environment will be determined.

In view of the fact that marine culture farming more intensive than the bearing capacity may be a serious source of pollution, it is necessary to have Environmental Impact Assessment Study made within which compulsory monitoring program will be provided.

2.10.8. Requirements for Setting Up Artificial Reefs

When selecting locations for setting up artificial reefs (shelters for marine organisms, diving parks, or barriers for trawls, natural features of environment should be taken into account as well as whether there are physical-chemical and biological prerequisites for the development of a typical reef eco-system. Artificial reefs should be set up on bare sea bottom where typical reef eco-system would be created also in a natural process.

Selection of material for artificial reef, as well as its configuration must be adequate. Wrecks of old ships or cars, tyres tied with wire, etc. are frequently used as materials for this purpose; however, such materials often contain toxic substances (battery acids, CFC from waste refrigerators, etc.) and, if this it is stood by this choice, it is necessary to remove all those parts which contain potential sources of pollution. Concrete is a much better choice; blocks, strips or elements of other shapes are made from it which are then assembled into aggregates of required size. When configuring reefs, it is necessary to leave free space through which water circulation will be possible, as well as recesses to serve as a habitat for organisms.

2.11. Guidelines for Implementation of the Plan

Costal Zone Spatial Plan shall be applied by way of adequate elaboration at lower levels or by direct application of the provisions hereof.

Considering that this Plan has anticipated majority of quality solutions given in urban plans which are still valid, its realization may be carried out in accordance therewith. In the course of analysis of the mentioned plans, activities planned for the immediate hinterland of the Coastal Zone have been taken into account in order for them to have logical exit onto the shore and sea.

In those cases where earmarked purposes do not coincide, solutions from this Plan will be valid as it is the planning document of a higher order.

In case this Plan has proposed some new purpose or activity in some area, for "self-contained" entities such as tourist complexes, port complexes, nautical facilities, sporting-recreation facilities, etc., further elaborations (location studies) should be prepared containing more extensive verification of area urban development on the level of the general concept of earmarked purpose of space and infrastructure systems. They stipulate requirements for construction, namely reconstruction of building facilities and performance of work. Also, they represent a basis for issuing approval for location.

If a Coastal Zone belt is an integral part of a settlement structure or a swimming beach functional hinterland, further elaboration (location study) for such area would be required as well as verification of earmarked purpose and infrastructure systems in regard of the contact zone. In this way integral management of the coastal area is achieved.

As this is a type of plan which is adopted by the Republic Parliament, its enforcement is within the competence of relevant ministry which means that all decisions on locations will be issued by the said ministry.

A part of such matters may be resolved by direct application of planning and technical requirements for the development and use of the Coastal Zone in specific areas and for specific building facilities as follows:

- requirements for swimming beaches
- requirements for seaborne traffic building facilities
- requirements for seaside promenades
- requirements for seasonal facilities
- requirements for marine culture farming
- requirements for artificial reefs

Direct application of this Plan is possible for the area covered by detailed elaborations and general concepts of the seven zones/locations which are an integral part hereof.

Detailed elaboration with textual part and graphic exhibits gives sufficient elements for the issuance of location permits.

Guidelines and recommendations as per zones and sections

Stipulated division into key zones on the level of the Republic was the basis for further zoning of the Montenegrin Littoral area in which process all specific characteristics of local government units were taken into account.

Based on spatial characteristics, perceived potentials and restrictions, development directions, defined network of settlements and centres, division of area into sections – smaller units (with a length of several kilometres) has been proposed in which division final and at the same time basic level is the Coastal Zone belt both on land and local waters.

Such outlined zones and sections represent significant basis for the implementation of the Plan, namely elaboration from a broader, republic or regional to local level.
In preparation of these recommendations existing plans, namely their solutions were respected to the fullest extent unless they were contrary to the main principles of this Plan, adopted recommendations for sustainable use of space, protection of biodiversity and tracts.

In that way their flexibility and enforceability is achieved and easier follow-up of all proposed solutions given in valid plans, numerous studies and research, officially adopted strategies and, therefore, these brief recommendations may be considered a sublimate of all used sources.

For each of 68 sections the following has been given: survey of the main purposes of area including guidelines and notes, guidelines for swimming beach types, as well as guidelines covering protection and implementation of this Plan.

For easier reference, for the implementation of these recommendations a special graphical map with 48 sheets in ratio 1:10,000 is used.
This map of graphic exhibits in ratio 1:10,000, on the level of 68 sections, shows planned activities and purposes of areas in the Coastal Zone according to the stipulated division specified in the textual part of the Plan.
Five types have been defined for all swimming beaches in accordance with the division set by this Plan. In some sections types of swimming beaches will be combined in keeping with various purposes of areas which are immediately next to the swimming beach area or its closer hinterland. In such cases stipulated requirements for various types of swimming beaches may be applied in the entire area or individual parts thereof.

Various forms of the implementation of this Plan have also been shown – through direct implementation of urban planning and technical requirements stipulated herein (1), according to general concepts (2) and detailed elaborations (3) prepared within the framework of this Plan, in accordance with Detailed Urban Plan or Urban Plan (4), or in accordance with subsequent elaboration –location study (5).

To individual sections it is possible to apply valid urban plan verified that it is not contrary to this Plan; or a new elaboration may be make if it is wanted to obtain different solutions and capacities in respect to the valid plan but which fit into the basic concept and purpose of this Plan.

Protected areas and individual objects of nature and culture as well as their status are also shown in the Coastal Zone belt.

BOKA KOTORSKA Zone

Municipality of Herceg Novi

Western region – Herceg Novi Bay

section number: **1**	**Kobila – Njivice –Sutorina rivermouth**
main purposes	**tourist complex on Kobila including a marina with max. 150 berths** **underbush** **existing hotel complex** **settlement structure of Njivice** **planned hotel complex at Pecine with a mooring** **settlement structure towards Sutorina river mouth**
swimming beach guidelines	**hotel - developed swimming beaches (Kobila, existing and planned hotels)** **public - partly developed swimming beaches (Njivice and at Sutorina river mouth)**
protection guidelines	**works on mooring within hotel complex at Pecine must not endanger the deposit of curative mud (impact assessment required)** **submarine archaeological site**
implementation guidelines	**valid DUPs for tourist development on Kobila and Njivice** **detailed elaboration for planned hotel complex at Pecine** **COASTAL ZONE SPATIAL PLAN requirements for swimming beaches (direct implementation)**

Central region - Herceg Novi Bay

section number: **2**	**Sutorina river mouth – Igalo**
main purposes	**Mud beach with a seasonal pier** **functional hinterland of the beach (sporting-recreation, service facilities, out-door swimming pools, urban greenery)** **developed shore with swimming plateaus through Igalo – lungo mare including a pier**
swimming beach guidelines	**public - developed swimming beaches (Blatna Plaza and Igalo)** **on a part of developed shore swimming beaches to be set for hinterland hotels (not more than 50%)**
protection guidelines	**protection of curative mud deposit**
implementation guidelines	**valid DUP or preparation of location studies for the hinterland of Igalo beach** **COASTAL ZONE SPATIAL PLAN requirements for swimming beaches and promenades (direct implementation)**

section number: **3**	**Topla - Herceg Novi – Savina**
main purposes	**developed shore – lungo mare –Pet Danica promenade** **town port with commercial mooring**
note	**option to be considered for establishing a passenger port subject to the fulfilment of spatial, traffic and other requirements**
swimming beach guidelines	**public - developed swimming beaches (lungo mare)** **on a part of developed shore swimming beaches to be determined for hotels which are in the back (not more than 50%)**
protection guidelines	**preservation of the rhythm of manmade and natural parts of the coast and more careful planning of new swimming beaches with as little as possible sea reclamation and concrete placing onto shore** **rehabilitation of Mezaluna Citadel**
implementation guidelines	**valid Urban Plan of Pet Danica promenade** **COASTAL ZONE SPATIAL PLAN requirements for swimming beaches and promenades (direct implementation)**

section number: **4**	**Meljine – Zelenika**
main purposes	**touristic complex "Lazaret" with mooring** **developed shore – lungo mare** **settlement structure of Meljine** **touristic complex– old hotel "Plaza" , including mooring** **passenger and cargo port Zelenika including a free zone** **developed shore – lungo mare from the port towards Kumbor**
swimming beach guidelines	**public - developed swimming beaches (lungo mare)** **on a part of developed shore, swimming beaches for hinterland hotels** **(removal of all unsuitable building facilities situated on shore – warehouses, storages,**

	etc.)
protection guidelines	**requirements for the reconstruction and use of listed monuments enjoying former protection – Lazaretto, old railway station and hotel Caba Madjar**
implementation guidelines	**location studies for tourist complexes and port** **COASTAL ZONE SPATIAL PLAN requirements for swimming beaches and promenades (direct implementation)**

Eastern region - Tivat Bay

section number: **5**	**Kumbor - Djenovici – Baosici**
main purposes	**complex of combined facilities in Kumbor, including a marina with max. 250 berths** **developed shore – lungo mare with piers** **out-door swimming pools and yachting clubs**
swimming beach guidelines	**public - partly developed swimming beaches (lungo mare)**
protection guidelines	**use of traditional techniques and materials** **preservation of the rhythm of manmade and natural parts of the coast and more careful planning of new swimming beaches with as little as possible sea reclamation and concrete placing onto shore** **submarine archaeological site Kumbor** **pre-protection of Sv. Nikola church in Djenovici (listed monument)**
implementation guidelines	**valid DUPs** **location study for military complex in Kumbor which purpose will be changed** **Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

section number: **6**	**Bijela – Cape Sveta Nedjelja**
main purposes	**complex of shipyards Bijela** **settlement structure of Bijela** **developed shore – lungo mare with an out-door swimming pool and piers** **rocky shore**
swimming beach guidelines	**public and partly developed swimming beaches (lungo mare)** **on a part of developed shore, swimming beaches for hinterland hotels**
protection guidelines	**establishing of a service for sea pollution prevention** **preservation of the rhythm of manmade and natural parts of the coast and more careful planning of new swimming beaches with as little as possible sea reclamation and concrete placing onto shore** **use of traditional techniques and materials**
implementation guidelines	**valid DUP or location study** **COASTAL ZONE SPATIAL PLAN requirements for swimming beaches and promenades (direct implementation)**

section number: **7**	**Cape Sveta Nedjelja - Kamenari – Cape Turski Rt**
main purposes	**rocky shore** **developed shore** **car-ferry landing** **rocky shore through Verige straits**
note	**Verige bridge-over zone**
swimming beach guidelines	**public - partly developed swimming beaches (lungo mare)**
protection guidelines	**protection of Sveta Nedjelja church (category II)**
implementation guidelines	**COASTAL ZONE SPATIAL PLAN requirements for swimming beaches and promenades (direct implementation)**

Municipality of Kotor

Risan Bay

section number: **8**	**Cape Turski Rt - Kostanjica – Donji Morinj**
main purposes	**undeveloped – rocky shore** **area suitable for marine culture farming** **developed shore of Kostanjica and Donji Morinja** **functional hinterland of the beach in Donji Morinja (sporting-recreation, service facilities, urban greenery)**
recommendations	***belvedere on Turski Rt (entrance to the area of the World Natural and Cultural Heritage)***
swimming beach	**public - partly developed swimming beaches(lungo mare)**

guidelines	
protection guidelines	**area is listed in the World Natural and Cultural Heritage** **mouth of the River Morinja**
implementation guidelines	**valid DUP or location study for the hinterland of the beach in Morinj** **COASTAL ZONE SPATIAL PLAN requirements for swimming beaches, promenades, marine culture farming (direct implementation)**

section number: **9**	**Lipci - Strp –Cove Sopot**
main purposes	**petroleum installation in Lipci** **undeveloped - rocky shore** **zones suitable for marine culture farming** **developed shore in Strp**
recommendations	***relocation of petroleum installations in foreseeable future***
swimming beach guidelines	**public - partly developed swimming beaches (lungo mare)**
protection guidelines	**area is listed in the World Natural and Cultural Heritage** **establishing of a service for oil spill collection**
implementation guidelines	**Coastal Zone Spatial Plan requirements for swimming beaches, promenades, marine culture farming (direct implementation)**

section number: **10**	**Spila - Risan – Cape Banja**
main purposes	**not developed rocky shore** **zones suitable for marine culture farming and undersea activities** **settlement structure of Vitoglava** **settlement structure and hotel complex Carine** **developed shore in Risan** **cargo port, pier and commercial mooring** **settlement structure of Risan** **tourist complex Rtac (former Blind People Centre)** **rocky shore**
swimming beach guidelines	**public - regulated and partly developed swimming beaches (lungo mare)** **hotel - developed swimming beaches ("Teuta" and Rtac)**
protection guidelines	**area is listed in the World Natural and Cultural Heritage** **natural reserve Sopot** **registered submarine archaeological site between Cove Str and Murov**
implementation guidelines	**valid DUP or location studies** **Coastal Zone Spatial Plan requirements for swimming beaches, promenades, marine culture farming (direct implementation)**

section number: **11**	**Cape Banja – Perast – Drazin vrt**
main purposes	**undeveloped - rocky shore** **zones suitable for marine culture farming** **developed shore with a pier**
swimming beach guidelines	**public - partly developed swimming beaches (lungo mare)**
protection guidelines	**area is listed in the World Natural and Cultural Heritage** **Gospa od Skrpjela church (I) and Sveti Djordje church (category II) on islands** **use of traditional techniques and materials for small mole-enclosed harbours and artificial capes in the urban entity of Perast (category I)**
implementation guidelines	**Coastal Zone Spatial Plan requirements for swimming beaches, promenades, marine culture farming (direct implementation)**

Kotor Bay

section number: **12**	**Drazin vrt - Donji Orahovac**
main purposes	**undeveloped - rocky shore** **zones suitable for marine culture farming** **developed shore with a pier** **excursion site – Tower of Bajo Pivljanin**
swimming beach guidelines	**public – developed swimming beach (Tower of Bajo Pivljanin)**
protection guidelines	**area is listed in the World Natural and Cultural Heritage** **Tower of Bajo Pivljanin (category III)**
implementation guidelines	**Coastal Zone Spatial Plan requirements for swimming beaches, promenades, marine culture farming (direct implementation)**

section number: **13**	**Donji Orahovac - Ljuta**
main purposes	**developed shore with a pier** **undeveloped - rocky shore** **zone suitable for marine culture farming** **settlement structure in Ljuta**
swimming beach guidelines	**public - partly developed swimming beaches**
protection guidelines	**area is listed in the World Natural and Cultural Heritage** **bay oak in Donji Orahovac** **mouth of the River Ljuta, with mimium interventions** **remnants of Sv. Krst church at the river mouth** **preservation of small artificial capes for pulling out fishing nets** **renovation of old and construction of new artificial capes and small mole-enclosed harbours using traditional techniques and materials in the ambiance entity of Ljuta which has preliminary protection**
implementation guidelines	**valid DUP** **Coastal Zone Spatial Plan requirements for swimming beaches, promenades, marine culture farming (direct implementation)**

section number: **14**	**Ljuta – Sveti Matija**
main purposes	**developed shore in Ljuta** **swimming beach Raskov Brijeg in the function of the tourist complex above the arterial road** **developed shore in Dobrota**
swimming beach guidelines	**public – developed (Raskov Brijeg) and partly developed swimming beaches (lungo mare)**
protection guidelines	**area is listed in the World Natural and Cultural Heritage** **renovation of old and construction of new artificial capes and small mole-enclosed harbours using traditional techniques and materials in the ambiance entity of Dobrota which has preliminary protection** **preservation of small artificial capes for pulling out fishing nets**
implementation guidelines	**valid DUP** **Coastal Zone Spatial Plan requirements for swimming beaches, promenades, marine culture farming (direct implementation)**

section number: **15**	**Sveti Matija –Skurda rivermouth**
main purposes	**developed shore at Sv. Matija church with a pier** **yachting clubs Sveti Matija and Sveti Ilija (Institute for Marine Biology)** **developed shore – lungo mare Plagenti up to the put-door pool** **touristic complex on the location of URC** **settlement structure between two rivers (town park, business and puiblic facilities, parking and promenade next to the rivers – reception point for the visitors of the Old Town)**
swimming beach guidelines	**public – developed and partly developed swimming beaches (lungo mare)** **hotel – developed swimming beach (URC)**
protection guidelines	**area is listed in the World Natural and Cultural Heritage** **church of Sveti Ilija (category II)** **renovation of old and construction of new artificial capes and small mole-enclosed harbours using traditional techniques and materials in the ambiance entity of Dobrote which has preliminary protection** **renovation of the town park** **special building requirements due to the immediate vicinity of the Old Town**
implementation guidelines	**valid shore improvement project, DUP or location study** **Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

section number: **16**	**Stari Grad – Skaljari – Peluzica**
main purposes	**developed shore - passenger port and custom control crossing, port authority building, town strand, parking, pier and commercial berths** **settlement structure of Suranj** **hotel complex "Fjord"** **nautical-tourist centre (VIP marina with 150 berths)** **developed shore –Peluzica promenade**
swimming beach guidelines	**hotel – developed swimming beach with out-door swimming pools ("Fjord")**

protection guidelines	**area is listed in the World Natural and Cultural Heritage** **special building requirements due to the immediate vicinity of the Old Town**
implementation guidelines	**valid DUP or location studies** **Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

section number: **17**	**Muo – Glavati**
main purposes	**developed shore – lungo mare with piers** **hotel complex "Splendid"** **developed shore Glavati and commercial mooring** **undeveloped shore**
swimming beach guidelines	**public – partly developed swimming beaches (lungo mare)** **hotel – developed swimming beach ("Splendid")**
protection guidelines	**area is listed in the World Natural and Cultural Heritage** **renovation of old and construction of new artificial capes and small mole-enclosed harbours using traditional techniques and materials in the ambiance entity of Mula which has preliminary protection** **preservation of small artificial capes for pulling out fishing nets**
implementation guidelines	**valid DUP or location studies** **Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

section number: **18**	**Prcanj - Markov rt**
main purposes	**developed shore – lungo mare with piers** **settlement structure** **touristic complex Markov Rt**
swimming beach guidelines	**public - partly developed swimming beaches (lungo mare)** **hotel - developed swimming beach (Institute "Vrmac")**
protection guidelines	**area is listed in the World Natural and Cultural Heritage** **renovation of old and construction of new artificial capes and small mole-enclosed harbours using traditional techniques and materials in the ambiance entity of Prcanja which has preliminary protection** **preservation of small artificial capes for pulling out fishing nets**
implementation guidelines	**valid DUP** **Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

section number: **19**	**Donji Stoliv - Gospa od Andjela**
main purposes	**developed shore – lungo mare with piers** **settlement structure** **undeveloped - rocky shore** **zones suitable for marine culture farming**
swimming beach guidelines	**public - partly developed swimming beaches (lungo mare)**
protection guidelines	**area is listed in the World Natural and Cultural Heritage** **renovation of old and construction of new artificial capes and small mole-enclosed harbours using traditional techniques and materials** **preservation of small artificial capes for pulling out fishing nets** **environment of Gospa od Andjela church**
implementation guidelines	**valid DUP** **Coastal Zone Spatial Plan requirements for swimming beaches, promenades and marine culture farming (direct implementation)**

Municipality of Tivat

Verige – Tivat Bay

section number: **20**	**Gospa od Andjela – Lepetani - Opatovo**
main purposes	**undeveloped - rocky shore** **settlement structure** **developed shore – lungo mare in Lepetani** **car-ferry landing**
general guidelines	**Verige bridge-over zone**
swimming beach guidelines	**public - partly developed swimming beaches (lungo mare)**
protection guidelines	**Gospa od Andjela church (Category II)**

	renovation of old and construction of new artificial capes and small mole-enclosed harbours using traditional techniques and materials
implementation guidelines	**valid DUP** **Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

Tivat Bay

section number: **21**	**Opatovo - Donja Lastva**
main purposes	**developed shore – lungo mare**
swimming beach guidelines	**public - partly developed swimming beaches (lungo mare)** **on a part of the developed shore swimming beaches to be provided for hinterland hotels**
protection guidelines	**renovation of old and construction of new artificial capes and small mole-enclosed harbours using traditional techniques and materials**
implementation guidelines	**valid DUP** **Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

section number: **22**	**Seljanovo – Arsenal - Kalimanj – Belane**
main purposes	**settlement structure of Seljanovo (residential, service, public facilities; boating-yachting club Delfin)** **developed shore – lungo mare** **kompleks remontnog zavoda (Arsenal) – service marina with 400-850 berths including tourist related central and complementary activities (hotels; commercial, public and auxiliary facilities including luxurious residential areas and urban greenery areas) with optional establishing of a free-zone on a part of the area, in accordance with the Law on Free Zones** **settlement structure (town park, sports grounds, public facilities)** **town strand Pine with a pier** **developed shore – lungo mare** **commercial mooring Kalimanj** **settlement structure of Belane (residential, service facilities)**
swimming beach guidelines	**public - developed and partly developed swimming beaches (lungo mare)** **on a part of the developed shore swimming beaches to be provided for hinterland hotels**
protection guidelines	**Town Park as a protected natural monument**
implementation guidelines	**valid DUP and study of locations for Arsenal complex** **Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

section number: **23**	**Zupa – Bonici**
main purposes	**touristic complex Zupa** **marina Bonici (Racica) as an alternative to Arsenal – it may be both a mooring and a boating centre** **settlement structure of Bonici – Kukuljina (sports grounds and building facilities, public facilities, bus station, housing)** **service zone Kukuljina**
swimming beach guidelines	**hotel - developed swimming beaches (Zupa)**
protection guidelines	**Verona – Bizanti Palace, Racica (Category III)** **conservation of authentic landscape, careful treatment of existing vegetation and its fitting into the design of the complex**
implementation guidelines	**valid DUP and location studies for Zupa and Bonica** **Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

section number: **24**	**Airport**
main purposes	**airport with all pertaining facilities**
note	***it has been anticipated for the zone to be extended beyond the boundaries of the Coastal Zone***
swimming beach guidelines	**---**
protection guidelines	**building conditions due to airport restrictions**
implementation guidelines	**location study**

Tivat Bay - Krtolj Archipelago

section number: **25**	**Kalardovo – Ostrvo Cvijeca - Brdista**
main purposes	**beach and excursion (sporting-recreation) site Kalardovo with an aqua-park** **underbush agricultural land next to the airport zone** **settlement structure of Kuline(housing, cemetery)** **tourist complexes Ostrvo Cvijeca (Prevlaka) and cove Brdista**
swimming beach guidelines	**public – developed swimming beach (Kalardovo)** **hotel - developed swimming beaches (Ostrvo Cvijeca and Brdista)**
protection guidelines	**archaeological site on Prevlaka – remnants of a monastery and church (Category I and II)** **conservation of authentic landscape, careful treatment of existing vegetation and its fitting into the design of the tourist complex** **restrictions due to conservation area Solila**
implementation guidelines	**general concept for Kalardovo (an integral part of COASTAL ZONE SPATIAL PLAN)** **location studies for tourist complexes** **Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

section number: **26**	**Island Sveti Marko (Stradioti)**
main purposes	**tourist complex** **developed shore with a pier**
swimming beach guidelines	**hotel - developed swimming beaches**
protection guidelines	**archaeological site** **conservation of authentic landscape, careful treatment of existing vegetation and its fitting into the design of the tourist complex**
implementation guidelines	**location study** **Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

section number: **27**	**Solila**
main purposes	**natural reservation Solila - bird-watching centre** **underbush** **communal-service zone next to the road** **marine culture farming zone in front of (and possibly within) Solila** **"wellness" centre on the site of old brickyard**
swimming beach guidelines	**hotel - developed swimming beach in the area of the old brickyard**
protection guidelines	**regime of natural reservation Solila - Soliotsko Polje** **conservation of authentic landscape, careful treatment of existing vegetation and its fitting into the design of the tourist complex**
implementation guidelines	**general conception for Solila (integral part of Coastal Zone Spatial Plan)** **location study for touristic complex** **Coastal Zone Spatial Plan requirements for swimming beaches, promenades and marine culture farming (direct implementation)**

Krtoli

section number: **28**	**Djurasevici – Kaludjerovina – Krickovina**
main purposes	**settlement structure (housing, tourist and service facilities, free and green areas)** **developed shore with piers** **touristic complex Krickovina**
note	**access to the sea to be provided on usurped part of the shore – withdrawal of private fences and exits onto the shore – setting-up of a promenade**
swimming beach guidelines	**public - partly developed swimming beaches (lungo mare)** **hotel - developed swimming beach (Krickovina)**
protection guidelines	**careful treatment of existing vegetation and its fitting into settlement structure** **ambiance entity Bjelila – Kakrc** **Gospe od Otoka church and submarine archaeological site**
implementation guidelines	**location studies for parts of Djurasevici and Kaludjerovina settlements and new tourist complex Krickovina** **Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

section number: **29**	**Krasici**

main purposes	**settlement structure (housing, tourist and service facilities, free and green areas) developed shore with a pier**
swimming beach guidelines	**public - partly developed swimming beaches (lungo mare)**
protection guidelines	**conservation of ambiance values of Stari Krasici**
implementation guidelines	**location studies for parts of Krasici town Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

Municipality of Herceg Novi

Lustica

section number: **30**	**Petrovici - Pristan**
main purposes	**tourist developments (upon change of the use of military building facilities) undeveloped shore - under a special regime until the use change of military building facilities**
swimming beach guidelines	**hotel developed swimming beaches (on locations of new tourist complexes)**
protection guidelines	**---**
implementation guidelines	**location studies for new tourist complexes Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

section number: **31**	**Pristan – Rose**
main purposes	**not developed shore (rocks and underbush) - under a special regime until the use change of military building facilities situated in this part of Lustice**
swimming beach guidelines	**---**
protection guidelines	**---**
implementation guidelines	**location studies for the change of use of military building facilities**

section number: **32**	**Rose – Dobrec**
main purposes	**hotel-tourist complex Male Rose diving centre developed shore with a pier hotel complexes Kabala For and on the plateau not developed shore (rocks and underbush)**
swimming beach guidelines	**public - partly developed swimming beaches hotel developed swimming beaches (on locations near new tourist complexes)**
protection guidelines	**conservation of authentic landscape, careful treatment of existing vegetation and its fitting into the design of the tourist complex ambiance entity Rosa, with preliminary protection submarine archaeological site Malo Rose**
implementation guidelines	**valid DUP and location studies for new tourist complexes COASTAL ZONE SPATIAL PLAN requirements for swimming beaches and promenades (direct implementation)**

section number: **33**	**Dobrec Cove –Zanjic Cove**
main purposes	**excursion site Dobrec with a pier not developed shore (rocks and underbush)**
swimming beach guidelines	**public – partly developed swimming beach (Dobrec)**
protection guidelines	**conservation of authentic landscape and careful treatment of existing vegetation**
implementation guidelines	**Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

section number: **34**	**Zanjic Cove – Miriste – Arza –Lucice Cove**
main purposes	**not developed shore (rocks and underbush) swimming beaches Zanjic and Mirista with piers tourist complexes in the hinterland of Zanjic and Mirista beaches Mamula with a pier touristic complex on the slopes and free area around Arza (rocks and underbush)**

swimming beach guidelines	**public - developed swimming beaches (Zanjic and Miriste)** **hotel - developed swimming beaches (on location of new tourist complexes)**
protection guidelines	**conservation of authentic landscape, careful treatment of existing vegetation and its fitting into the design of the tourist complexes** **protection of rocky shore against concrete placing and construction of building facilities** **monastery complex Gospa od Zanjica** **listed archaeological site and Sv. Jovan church, Zanjice** **submarine archaeological sites Zanjice and Mamula** **Mamula Fortress (Category II) and Arza Fortress (preliminary protection) – special treatment and use for new purposes under strict conservation requirements**
implementation guidelines	**valid DUP or location studies for new tourist complexes** **Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

OPEN SEA Zone

Lustica

section number: **35**	**Cove Lucice –Cape Kociste**
main purposes	**excursion sites with piers and swimming beaches in coves with purpose to serve tourist capacities in hinterland (on Lustica)** **not developed shore (rocks and underbush)** **underwater activities zone from Plava Spilja to Cape Veslo**
swimming beach guidelines	**public - partly developed swimming beaches** **natural swimming beaches**
protection guidelines	**preservation of authentic landscape** **submarine archaeological site Dobra Luka**
implementation guidelines	**Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

Municipality of Tivat

Lustica – Traste Bay

section number: **36**	**Cape Kociste - Brajanovica**
main purposes	**not developed shore (rocks and underbush)** **developed shore with temporary cargo pier serving the quarry (upon termination of the quarry operation, conversion into another type of use intended for tourist facilities)** **excursion site Oblatno**
swimming beach guidelines	**public – developed swimming beach (Oblatno)**
protection guidelines	**submarine archaeological site in Cove Traste**
implementation guidelines	**Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

section number: **37**	**Brajanovica - Przno - Cape Ljutosek**
main purposes	**not developed shore (rocks and underbush)** **swimming beach Przno (Plavi Horizonti)** **shore (rocks and underbush) – serving to receive guests from potential tourist developments on the stretch Przno – Bigovo**
swimming beach guidelines	**hotel - developed swimming beach (Przno)**
protection guidelines	**preservation of authentic landscape and vegetation** **submarine archaeological site in Cove Przno**
implementation guidelines	**Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

Municipality of KOTOR

section number: 38	**Cape Ljutosek – Cove Bigova - Cape Zabica**
main purposes	**shore (rocks and underbush) – serving to receive guests from potential tourist developments on the stretch Przno – Bigova**

	settlement structure and tourist development Bigova **developed shore (lungo mare) with a pier and marina of max. 150 berths** **tourist complex on Cape Traste** **not developed shore (rocks) – serving to receive guests from the tourist development**
swimming beach guidelines	**public - partly developed swimming beach (lungo mare)** **hotel - developed swimming beach (Traste)**
protection guidelines	**preservation of authentic landscape and Mediterranean vegetation** **special treatment Cape Traste – without any interventions on them** **submarine archaeological site in Cove Bigova**
implementation guidelines	**location studies for parts of Bigova town and tourist complexes** **Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

Donji Grbalj – Outer shore D.Grblja

section number: 39	**Cape Zabica - Cape Zukovac**
main purposes	**excursion sites Svinji Potok and Zukovac with piers** **tourist complex Sipavica** **not developed shore (rocks) – serving to receive guests from tourist developments**
swimming beach guidelines	**public - partly developed swimming beach (coves Svinji Potok and Zukovac)** **developed hotel swimming beach (Sipavica)**
protection guidelines	**preservation of authentic landscape and Mediterranean vegetation** **special treatment on rocky shore**
implementation guidelines	**location studies for tourist complexes** **Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

section number: 40	**Cape Zukovac – Cape Platamuni**
main purposes	**excursion sites in coves Nerin and Krekavica** **not developed shore (rocks and underbush)** **protected underwater activities zone from Cape Sveti Djordje to Cape Platamuni**
swimming beach guidelines	**natural swimming beaches (coves Nerin and Krekavica)**
protection guidelines	**preservation of the natural look of the rocky shore**
implementation guidelines	**Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

section number: 41	**Cape Platamuni - Cove Trsteno - Cape Jaz**
main purposes	**excursion site in Cove Trsteno with a pier** **not developed shore (rocks and underbush)**
swimming beach guidelines	**public – developed swimming beach (Ploce – Platamuni, Trsteno)**
protection guidelines	**preservation of the natural look of the rocky shore and Mediterranean vegetation**
implementation guidelines	**Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

Municipality of Budva

Grbaljsko Polje Field - Cove Jaz

section number: 42	**Cape Jaz - Cove Jaz - Cape Mogren**
main purposes	**not developed shore (rocks and underbush) on Cape Jaz – optional belvedere** **swimming beach Jaz with a pier** **part of the beach to be provided for nudists** **functional hinterland of the beach (sporting-recreation and service facilities, urban greenery)** **not developed shore (rocks and underbush) with several smaller excursion beaches towards Cape Mogren which are accessible only from the sea**
swimming beach guidelines	**public - developed (Jaz 1) and public - partly developed swimming beach (Jaz 2)** **parts of the swimming beaches to be provided for future hotels to be built in the hinterland**

	natural swimming beaches on the rocky shore towards Spas hill
protection guidelines	**preservation of the natural look of the rocky shore and Mediterranean vegetation**
implementation guidelines	**location study for the functional hinterland of only the beach or of the entire Jaz complex** **Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

North entity – Budva Bay

section number: 43	**Cape Mogren - Budva - Zavala**
main purposes	**not developed shore below Spas Hill** **swimming beaches Mogren 1 and 2 around the walls of the Old Town** **developed shore with an out-door swimming pool** **town port with commercial berths and pier (extension has been planned)** **settlement structure from the Old Town to Posta (urban greenery, service facilities) to serve the town port (without accommodation and housing capacities)** **Slovenska Plaza beach with seasonal pier** **functional hinterland of Slovenska Plaza beach (sporting-recreation, service facilities, out-door swimming pools, urban greenery)** **touristic complex ("Park")** **not developed shore towards Zavala (rocks) with several smaller excursion beaches accessible from the sea**
swimming beach guidelines	**public - developed swimming beach** **parts of swimming beaches to be provided for hinterland hotels (not more than 50%)** **natural swimming beaches on rocky shore**
protection guidelines	**protected area of Spas Hill** **preservation of the natural look of the rocky shore and Mediterranean vegetation** **submarine archaeological sites in Budva Bay**
implementation guidelines	**location study for the part of the town round the town port and the functional hinterland of Slovenska Plaza beach** **Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

section number: 44	**Sveti Nikola Island**
main purposes	**excursion site with a pier** **sporting-recreation and service facilities** **swimming beaches on the north and west side of the island** **developed shore with a commercial mooring** **smaller excursion beaches on the south side of the island** **south side of the island is a protected area intended for underwater activities** **not developed shore (rocks)** **underbush and woodland in the central part of the island with walking trails**
note	**it is recommended to review and acknowledge opinions given in the study prepared by DEG and EuroNatur "Montenegro – Evaluation of Terrain in Respect of Usage for Tourism Purposes"**
swimming beach guidelines	**public - developed swimming beach (on the north side of the island)** **natural swimming beaches (on the south, rocky side of the island)**
protection guidelines	**preservation of the natural look of the rocky shore , Mediterranean vegetation and fauna on the island** **church Sv. Nikola na Skolju (Category III)**
implementation guidelines	**general conceptual design and detailed elaboration by way of PPMD** **Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

North entity – Becici Bay

section number: 45	**Zavala - Becici - Rafailovici – Djevistenje**
main purposes	**not developed shore (rocks) below Zavala** **swimming beach Becicka Plaza with a seasonal pier and functional hinterland** **developed shore with a pier in Rafailovici**
swimming beach guidelines	**public - developed swimming beach (Becici and Rafailovici)** **parts of the swimming beaches to be reserved for hinterland hotels (not more than**

	50%)
protection guidelines	**preservation of the natural look of the rocky shore and Mediterranean vegetation**
implementation guidelines	**Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

Central entity – outer shore Pastrovica

section number: 46	**Djevistenje - Kamenovo - Przno - Milocer - Sveti Stefan - Crvena Glavica**
main purposes	**not developed shore from Djevistenje towards Kamenovo (rocks and underbush) touristic complex and swimming beach Kamenovo swimming beach Przno settlement structure of Przno with a pier swimming beaches Kraljicina Plaza and Milocerska Plaza with functional hinterland (service facilities, wellness, urban greenery) touristic complex Sveti Stefan with swimming beaches and a pier excursion beaches on the rocky shore**
swimming beach guidelines	**public - developed swimming beaches (Przno, Sveti Stefan 2 with parts of the swimming beaches reserved for hinterland hotels) developed hotel swimming beaches (Kamenovo, Kraljeva Plaza and Sveti Stefan 1) representative swimming beach Kraljicina Plaza natural swimming beaches on rocky shore – nudistic beach Crvena Glavica**
protection guidelines	**preservation of the natural look of the rocky shore and Mediterranean vegetation urban entity of Sveti Stefan (Category II) ambiance entity Przno (preliminary protection)**
implementation guidelines	**location study for functional hinterland of Kraljicina Plaza or of the entire complex Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

section number: 47	**Crvena Glavica - Drobni Pijesak - Skocidjevojka**
main purposes	**not developed shore (rocks and underbush) swimming beach Drobni Pijesak excursion beaches on rocky shore**
swimming beach guidelines	**public - partly developed swimming beach Drobni Pijesak natural swimming beaches on rocky shore**
protection guidelines	**preservation of the natural look of the rocky shore and Mediterranean vegetation Drobni pijesak, cultural monument (Category III)**
implementation guidelines	**Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

South entity - coves Petrovac and Lucice

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section number: 48	**Perazica Do - Petrovac - Lucice**
main purposes	**not developed shore (rocks) touristic complex Perazica Do with a swimming beach, pier and mooring excursion beaches on rocky shore developed shore with a pier in Petrovac town swimming beach with functional hinterland in Petrovac (service facilities, urban greenery) not developed shore (rocks) swimming beach Lucice with a pier not developed shore (rocks) protected zone intended for underwater activities, from Perazica Do via Katic Island to a small Island Vatulja**
swimming beach guidelines	**public - developed swimming beaches Petrovac and Lucice with parts reserved for hinterland hotels developed swimming beach Perazica Do natural swimming beaches on rocky shore**
protection guidelines	**preservation of the natural look of the rocky shore and Mediterranean vegetation marine nature reserve - islands Katic and Sveta Nedjelja and a part of Tiha Luka submarine archaeological site remnants of the castle and lazaretto Petrovac (Category III) Sv. Nedjelja church on Island Katic (preliminary protection)**

implementation guidelines	**valid DUP or location study for Perazica Do** **Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

South entity - Cove Buljarica

section number: 49	**Buljarica**
main purposes	**not developed shore (rocks)** **swimming beach Buljarica with functional hinterland with several seasonal piers** **entrance for "eco marina" with 100 berths in the onshore part** **not developed shore (rocks)**
swimming beach guidelines	**public - developed swimming beach in the north and central part of Buljarica with parts reserved for tourist complexes situated in the hinterland** **public – partly developed swimming beach in the south part of Buljarica**
protection guidelines	**preservation of authentic landscape, marsh and Mediterranean vegetation in the hinterland**
implementation guidelines	**DUP or location study for tourist complex Buljarica** **Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

South entity – outer shore

section number: 50	**Dubovica**
main purposes	**not developed shore (rocks)**
swimming beach guidelines	**---**
protection guidelines	**preservation of the authentic landscape of the rocky shore**
implementation guidelines	**---**

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Zone Canj - coves Pecin and Canj

section number: 51	**Cape Stolac - Canj - Crni Rt Cape**
main purposes	**swimming beach in the cove of Percin with seasonal pier** **not developed shore (rocks and underbush)** **swimming beach Canj with functional hinterland and a pier** **tourist complexes Canj 1 and 2** **not developed shore (rocks and underbush) with excursion beaches**
swimming beach guidelines	**public - partly developed swimming beach Percin** **public - developed swimming beach Canj with parts reserved for hinterland hotels (not more than50%)** **natural swimming beaches on rocky shore**
protection guidelines	**preservation of authentic landscape, rocky shore and Mediterranean vegetation in the hinterland**
implementation guidelines	**DUP or location study for tourist complexes Canj 1 and 2** **Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

Zone Sutomore - Cove Maljevik and Spic Bay

section number: 52	**Crni Rt Cape – Maljevik - Golo Brdo**
main purposes	**hotel complex Crni Rt (former military location)** **not developed shore (rocks and underbush) with excursion beaches** **swimming beaches in coves Maljevik and Skrbina** **hotel-tourist complexes Maljevik and Skrbina** **hotel complex on Golo Brdo** **not developed shore (rocks and underbush on Golo Brdo with excursion beaches**
swimming beach guidelines	**public - developed swimming beaches Maljevik and Strbina with parts reserved for hinterland hotels**

	natural swimming beaches on rocky shore
protection guidelines	**preservation of authentic landscape, rocky shore and Mediterranean vegetation submarine archaeological site Maljevik**
implementation guidelines	**valid DUP for Maljevik and location studies for hotel-tourist complexes Crni Rt, Skrbina, Golo Brdo Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

Zone Sutomore – Spic Bay

section number: 53	**Sutomore - Ratac**
main purposes	**touristic complex with a pier town swimming beach Sutomore with functional hinterland with seasonal pier settlement structure of Sutomore (housing, tourist, service facilities) touristic complex ("Zlatna obala")**
swimming beach guidelines	**public - developed swimming beach Sutomore with parts reserved for hinterland hotels (not more than50%) hotel - developed swimming beach ("Zlatna obala")**
protection guidelines	**---**
implementation guidelines	**valid DUPs Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

Zone Bar – Bar Bay

section number: 54	**Ratac – Green Belt**
main purposes	**excursion zone with archaeological site Ratac not developed shore (rocks and underbush) with excursion beaches swimming beach Crvena Plaza with functional hinterland hotel complex in the direction of Zukotrlica**
swimming beach guidelines	**public - developed swimming beach Crvena Plaza natural swimming beaches on rocky shore**
protection guidelines	**archaeological site (Category I) and natural area Ratac preservation of authentic landscape, rocky shore and Mediterranean vegetation**
implementation guidelines	**valid DUP or location study for hotel complex and functional hinterland Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

section number: 55	**Zukotrlica - Topolica**
main purposes	**town swimming beach Zukotrlica functional hinterland of the beach from Zukotrlica to the River Zeljeznica (sporting-recreation, service facilities, urban greenery) settlement structure "Lekovici" (housing, tourist, service facilities) hotel complexes next to the arterial road and River Zeljeznica (including preservation of quality greenery) town swimming beach and promenade Topolica**
swimming beach guidelines	**public - developed swimming beaches Zukotrlica and Topolica with parts reserved for hinterland hotels (not more than50%)**
protection guidelines	**preservation of Mediterranean vegetation in the hinterland fof the beach adequate regulation of the mouth of River Zeljeznica**
implementation guidelines	**valid DUP or location study for settlement structure, hotel complexes and functional hinterland Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

section number: 56	**Port of Bar**
main purposes	**town promenade repair marina Bar including pertaining facilities port and industrial complex (passenger and cargo terminals, free zone, oil installations, plants for production acceptable from the point of ecology)**
swimming beach guidelines	**---**

protection guidelines	**Ballast Water Collection Centre to be organised within the port** **submarine archaeological site**
implementation guidelines	**valid DUP or location study of the port and industrial complex** **Coastal Zone Spatial Plan requirements for promenades (direct implementation)**

section number: 57	**Volujica**
main purposes	**underbush** **rocky shore**
proposal	***optional aqua-park in former quarry Police***
swimming beach guidelines	**---**
protection guidelines	**submarine archaeological site in Cove Bigovica**
implementation guidelines	**---**

Zone Dobre Vode - Pecurice

section number: 58	**Ujtin Potok - Ponta**
main purposes	**not developed shore (rocks)** **settlement structure Mali and Veliki Pijesak (housing, tourist and service facilities) with swimming beaches** **touristic complex Ponta**
note	***in Cove Ujtin Potok, landing point for fibre-optic cable Bar - Corfu***
swimming beach guidelines	**public - partly developed swimming beaches Mali and Veliki Pijesak** **natural swimming beaches on rocky shore**
protection guidelines	**---**
implementation guidelines	**DUP or location study for settlement structure and touristic complex** **COASTAL ZONE SPATIAL PLAN requirements for swimming beaches and promenades (direct implementation)**

section number: 59	**Ponta – Cove Uvala Maslina - Cape Ademov Kamen**
main purposes	**not developed shore (rocks and underbush) with excursion beaches** **tourist complexes on cape round Cove Utjeha (Maslina) with swimming beaches** **not developed shore (rocks)** **settlement structure up to Petovica Zabio (housing, tourist and service facilities)**
note	***legalization of Petovica Zabio development***
swimming beach guidelines	**public - developed swimming beach Utjeha** **hotel - developed swimming beaches on capes round the cove** **natural swimming beaches on rocky shore**
protection guidelines	**submarine archaeological site Velja Zabija**
implementation guidelines	**detailed elaboration of plan for Uvala Maslina (integral part of Coastal Zone Spatial Plan), location study for as-found settlement structure and touristic complex in continuation of Uvala Maslina** **Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

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Western Seaboard - Cove Kruce

section number: 60	**Cape Ademov Kamen – Mavrijen**
main purposes	**settlement structure of Kopstar (housing, tourist and service facilities)** **not developed shore (rocks and underbush) with excursion beaches**
note	***legalization of Kopstar development***
swimming beach guidelines	**natural swimming beaches on rocky shore**
protection guidelines	**extension of the existing Old Ulcinj natural reserve** **submarine archaeological site**
implementation guidelines	**location study for as-found settlement structure** **Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

Western Seaboard - Cove Valdanos

section number: 61	**Mavrijen - Valdanos - Cove Velika**
main purposes	**not developed shore (rocks and underbush) with excursion beaches** **touristic complex Valdanos with a pier, commercial berths and swimming beach** **olive grove in the hinterland of Cove Valdanos** **not developed shore (rocks and underbush)**
swimming beach guidelines	**public and hotel developed swimming beach Valdanos** **natural swimming beaches on rocky shore**
protection guidelines	**preservation of landscape and olive plantations** **submarine archaeological site**
implementation guidelines	**location study for touristic complex and the hinterland of Valdanos** **Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

Western seaboard – outer seashore

section number: 62	**Cove Velika – Liman**
main purposes	**not developed shore (rocks and underbush) with excursion beaches**
swimming beach guidelines	**natural swimming beaches on rocky shore**
protection guidelines	**preservation of authentic landscape, rocky shore and Mediterranean vegetation**
implementation guidelines	**Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

Town – outer seashore

section number: 63	**Old Town of Ulcinj**
main purposes	**rocky shore with swimming beaches** **marina on Liman with 300 berths** **developed shore round the walls of the Old Town with a pier** **town swimming beach** **settlement structure (service and public facilities)** **tourist complex (former hotel "Jadran")**
swimming beach guidelines	**public - developed swimming beach Mala Plaza** **developed hotel swimming beach – "Jadran"**
protection guidelines	**preservation of authentic landscape, rocky shore and Mediterranean vegetation Old Town environment (Category I)** **submarine archaeological site**
implementation guidelines	**location studies for marina and tourist complex** **Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

Pinjes – outer seashore

section number: 64	**Pinjes – Borova Suma (Pine Forest)**
main purposes	**rocky shore with underbush** **swimming beaches in smaller coves and on rocks**
swimming beach guidelines	**public and hotel developed swimming beaches– Borova Suma, "Galeb", "Albatros"** **special Zenska Plaza (Ladies' Beach)** **natural swimming beaches on rocky shore**
protection guidelines	**preservation of authentic landscape, rocky shore , Mediterranean vegetation and the pine forest**
implementation guidelines	**Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

Djeran – cove and canal Milena

section number: 65	**Cape Djeran - Port Milena**
main purposes	**touristic complex on Cove Djeran** **settlement structure (housing, tourist, service and public facilities) round the canal**

note	***alternatively, commercial mooring around the river mouth***
swimming beach guidelines	**---**
protection guidelines	**preservation of the authentic landscape of the cape and canal with specific pile dwellings "kalimera"** **submarine archaeological site – cliff Djeran**
implementation guidelines	**location studies for touristic complex and settlement structure around the canal**

Velika Plaza – Ada (outer seasore)

section number: 66	**Velika Plaza**
main purposes	**tourist complexes arranged in 6 modules (on the northeast part)** **settlement structure (housing, tourist, public and service facilities) next to the arterial road in the function as tourist developments** **forest and underbush areas (in-between tourist developments)** **sports and service zone (in-between the group of present and planned hotels)** **Velika Ulcinjska Plaza (Big Ulcinj Beach) with several seasonal piers** **vegetation area on dunes in the hinterland of the beach** **nature reserve (in the southeast part) with forests, marshes and meadows** **catering zone (around the bridge to Ada – traditional "kalimera" pile dwellings and restaurants)**
swimming beach guidelines	**public - developed swimming beach Velika Plaza with parts reserved for hinterland hotels** **natural swimming beaches in the southeast part**
protection guidelines	**preservation of authentic landscape, dune vegetation, marshes and forests** **submarine archaeological site**
implementation guidelines	**general conceptual design for Velika Plaza (integral part of Coastal Zone Spatial Plan)** **location studies for tourist complexes** **Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

section number: 67	**Ada Bojana**
main purposes	**touristic complex on the northwest part of the island (part of capacities to be allocated for nudist centre)** **"eco-marina" on the River Bojana with 50 berths** **sandy beach** **vegetation area on the dunes in the hinterland of the beach** **nature reserve (in the southeast part) with forests, marshes and meadows**
swimming beach guidelines	**developed hotel swimming beach** **natural swimming beaches in the southeast part**
protection guidelines	**preservation of authentic landscape, dune vegetation, marshes and forests**
implementation guidelines	**location studies for tourist complexes** **Coastal Zone Spatial Plan requirements for swimming beaches and promenades (direct implementation)**

Shoreland of River Bojana

section number: 68	**right bank of River Bojana**
main purposes	**meadows and forests in the inshore belt**
swimming beach guidelines	**---**
protection guidelines	**preservation of authentic landscape** **maintenance of embankment**
implementation guidelines	**---**

2.12. Recommendations for the integral management of the Coastal Zone of Montenegro and broader coastal area

At the United Nations Conference on Environment and Development held in Rio de Janeiro in 1992, Agenda 21 was adopted which constitutes recommendations for a sustainable development in 21st century. Chapter 17 of Agenda 21 referring to the protection of oceans, all kinds of seas, coastal regions and living and still world therein defines Coastal Area Integral Management (CAM) as a continuous and adaptable process of managing resources which represents the basis for a sustainable development in coastal areas. Chapter 17 of Agenda 21 sets the guidelines orienting all coastal countries to adopt integral management and sustainable development of coastal areas within their national jurisdiction as well as to take actions for the establishment or, where necessary, strengthening of adequate coordination mechanism (institutions) for the integral management and sustainable development of coastal areas and resources on local and national levels. In the process of implementation of the coastal area integral management, coastal countries should integrate and cooperate on both international and regional level. To the present day, coastal area integral management has been adopted and it implemented in the majority of coastal countries.

Considering that Montenegro renewed its membership in the Mediterranean Action Plan (MAP) in 2003 and that ratification of the Barcelona Convention 1995 (Convention on the Protection of Sea Environment and Coastal Area of the Mediterranean) and six supporting documents is in process, this Plan constitutes the basis for all further plans, programmes and activities which as a statutory obligation result from the membership in the said international organisation.
Activities of the Mediterranean Action Plan, through Regional Centres, mostly deal with sustainable development in coastal areas primarily through implementation of Coastal Area Integral Management (CAM) which makes the development of coastal area possible in a sustainable manner. Although implementation of CAM in different countries is organised in different institutional, legal and functional manner, the principle of CAM is always the same.

MAP Priority Action Program of the Regional Activities Centre (PAP/RAC) prepared and published in 1995 the "Guidelines for Coastal Area Integral Management Process" with special reference to the Mediterranean basin.

According to PAP/RAC, Coastal Area Integral Management is a process oriented to achieving objectives of sustainable development of coastal areas taking in view limitations from spatial, economic and social aspects as well as restrictions imposed by legislative, administrative and financial institutions and systems.

On the level of MAP, in addition to the provisions of the Barcelona Convention and its protocols which render guidelines for implementation of CAM, more detailed guidelines are given in terms of the Mediterranean Strategy of Sustainable Development and, in the future period, through the Protocol on Coastal Area Integral Management which draft has been prepared for the XIV Conference of MAP member countries in Porto Rosé. Adoption of this Protocol on MAP level and its ratification thereafter shall make CAM a statutory obligation of all Mediterranean countries.

In Montenegro, it is necessary to take the following activities which are frameworks for CAM. First of all, it is necessary to enact a Strategy of Coastal Area Integral Management in Montenegro based on this Plan, Spatial Plan of the Republic, National Strategy of Sustainable Development, and the Mediterranean Strategy of Sustainable Development. With the assistance of PAP/RAC, it is necessary to commence preparation of a Coastal Area Management Programme (CAMP) which should in the first place regulate management mechanisms in the Coastal Zone and broader costal area.

Recognising the existing statutory, institutional and strategic framework, implementation of guidelines for the management of coastal resources in Montenegro would require certain adjustments and modifications. That is why it is first of all necessary to provide political, administrative, statutory and financial framework at the level of the highest government bodies in the Republic for instituting the integral management of coastal areas in Montenegro.

As CAM implies a high degree of horizontal integration of existing sectors (departments) and vertical integration from the local to republic level, it is necessary that the Republic provides institutional, statutory and financial framework for the implementation of CAM. In the Republic of Montenegro, the existence of the Coastal Zone Law (Official Gazette of the Republic of Montenegro No. 14/92) constitutes a basis in terms of legislation and the existence of Public Company for Coastal Zone Management of Montenegro constitutes a basis in terms of institutions and finances. However, it is necessary to conform and strengthen the said framework in such manner which would make possible adequate implementation of CAM.