



Implementation of the ecosystem approach
in the Adriatic through marine spatial planning

Marine spatial plan of Montenegro: the concept and proposals of planning solutions



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Impresum

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List of Abbreviations

ASCI	Areas of Special Conservation Interest
AIS	Automatic Identification System
CAMP	Coastal Area Management Programme
EC	European Commission
EU	European Union
GDP	Gross domestic product
GEF	Global Environment Facility
GT	Gross tonnage
GIS	Geoinformation system
GUP	General urban plan
IAP	Ionian-Adriatic pipeline
IBM	Institute for marine biology
IMAP	Integrated Monitoring and Assessment Programme
IMO	International Maritime Organization
IMP	Integrated maritime policy
IPPC	Intergovernmental Panel on Climate Change
ISSP	Institute for Strategic Studies and Prognoses
IUCN	International Union for Conservation of Nature
MESPU	Ministry of ecology, spatial planning and urbanism
MORT	Ministry of spatial planning and tourism (<i>Ministarstvo održivog razvoja i turizma</i>)
MPA	Marine protected area
MSP	Marine Spatial Planning
MSY	Maximum Sustainable Yield
NTC	Nautical tourism complex
PAP/RAC	Priority Actions Programme Regional Activity Centre
PER	Economic performance programme (<i>Program ekonomskih reformi</i>)
PE	Public enterprise
PEMDM	Public enterprise Maritime domain of Montenegro
PPR	Spatial plan of the Republic (of Montenegro) (<i>Prostorni plan republike</i>)
SPCAM	Spatial plan for coastal area of Montenegro
TO	Tourist organisation
UNDP	United Nations Development Programme
UNEP/MAP	United nations Environment Programme/Mediterranean Action Plan
UNFCCC	United Nations Framework Convention on Climate Change
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations International Children's Emergency Fund
UTC	Urban-technical conditions
WTTC	World Trade and Tourism Council)

1.

Introduction

The document **Marine Spatial Planning in Montenegro: the Concept and Proposals of Planning Solutions** was developed as part of the project "Implementation of the Ecosystem Approach in the Adriatic Sea through Marine Spatial Planning" (the GEF Adriatic Project). The GEF Adriatic Project is a subregional project carried out in Albania and Montenegro with the aim of restoring the ecological balance of the Adriatic Sea by implementing the ecosystem approach and marine spatial planning.

The implementation of the project, including activities related to marine spatial planning, aims at the implementation of the **Protocol on Integrated Coastal Zone Management in the Mediterranean** (Official Gazette. of Montenegro no. 16/2011) and associated Conceptual framework for marine spatial planning in the Mediterranean. In addition, the project ensures the fulfilment of obligations and key principles of marine spatial planning established and prescribed in the **Directive 2014/89/EU establishing a framework for maritime spatial planning** (Figure 1.1). The project's added value comes from ensuring the integration of two key management frameworks established by the Barcelona Convention – the ecosystem approach and marine spatial planning, by:

- Developing a methodology for the use of the ecosystem approach implementation results for the construction of marine spatial planning (MSP);
- Testing the developed methodology in the preparation of the marine spatial plan for Montenegro.

In this manner, the GEF Adriatic Project represents a technical basis for fulfilling the obligations under the aforementioned EU Directive and encourages the integral implementation of the Protocol on Integrated Coastal Zone Management and the Integrated Monitoring and Assessment Programme (IMAP) for the marine ecosystem, which is a crucial instrument for the implementation of the ecosystem approach in the Mediterranean.

Marine spatial planning is defined as a comprehensive process, which enables an objective and transparent distribution of human activities, both in space and time, in such a way as to enable future generations to enjoy the services provided by

the marine areas. Marine spatial planning presupposes the participation and contribution of all actors, starting from the phase of preparation and development of the plan, through its implementation to the phase of monitoring and evaluation of the achieved results.

Article 11 of the Law on Spatial Planning and Construction of Montenegro (Official Gazette of Montenegro, No. 64/2017, 44/2018, 63/2018, 11/2019 – corrected. and 82/2020) stipulates that in order to achieve economic, environmental and social objectives, **marine spatial planning** shall be a part of spatial planning. In accordance with the aforementioned, this document serves as a **technical basis** for the preparation of:

- Spatial Plan of Montenegro – because it proposes the general organization and arrangement of Montenegrin maritime area, objectives and measures of spatial development;
- Montenegro's General Regulation Plan for the Coastal Region, which includes the territorial sea, in accordance with the law governing the sea – because it proposes more detailed measures of spatial development of the sea area including maritime uses and other conditions of use of the sea.

In case of a need for an independent plan of the maritime area, as part of the discussion on amendments to the Act on Planning and Construction, this document provides baseline technical documentation and concept of such a plan.

The initial added value of the document is that for the first time all available relevant information related to the condition, values, pressures and use of the sea area is in one place. By defining the uses, protection regimes and remediation for the sea area, this document serves as the basis for preserving the exceptional values of the Montenegrin coast – limiting unfavourable processes that continuously reduce the share of natural areas and gradually change the visual experience and (tourist) attractiveness of the Montenegrin coast.



Figure 1.1. Publication on the EU Directive on Maritime Spatial Planning (Source: Publications Office of the European Union, ISBN 978-92-79-45029-7).

The document is not limited to the regulation of the sea area, but is structured in such a way that it contains a comprehensive overview of marine spatial planning. **The starting points for marine spatial planning are outlined in the beginning.** The legal and institutional framework for marine planning and use is particularly emphasized. The methodology and planning process of marine spatial planning are also explained. Next is a **synthetic assessment of the current situation** that requires adequate planning solutions for identified problems. Planning solutions are based on planning goals and basic concepts of marine spatial planning, taking into account sustainable use and protection of the sea area. The central part of the document focuses on **marine uses, with guidelines for the use, protection and remediation of the sea area**, with conditions for implementation. Next are **integral representations** of marine uses and the protection and use regime outlined in more detail. The conclusion provides **guidelines for implementation**, which include recommendations for spatial data management, coastal terrestrial spatial planning and monitoring and evaluation.

The preparation of the sea use plan document envisaged an integral process of development together with the process of drafting the Spatial Plan of Montenegro and the General Regulation Plan. However, due to the changed dynamics of developing the two mentioned documents, the process of drafting the Sea Use Plan was done largely independently. Therefore, in the future work on marine spatial plan, it is important to:

- **Carry out formal procedures for public discussion and adoption of the document, with the public participating as much as possible.** During the preparation of this document, dozens of direct meetings with key relevant institutions were organized, including three rounds of thematic consultations with a number of institutions. Unfortunately, due to the limitations brought on by the COVID-19 pandemic, most meetings were held via video calls. In addition, a large consultation meeting was held in June with all stakeholders (Budva, June 4, 2021). During the process of the formal adoption of the Plan (either as a stand-alone document or as part of other planning documents), it is important to provide additional consultations

with public stakeholders, local communities and relevant institutions, in order to agree on common solutions for the long-term sustainable use of valuable marine and coastal ecosystems.

- **Upgrade the document with detailed guidelines for spatial planning units.** The coastal area and the sea next to it is considered as an indivisible spatial (perceptual, functional, ecological) whole. Land-based planning extends to the sea and individual planning objectives of the marine spatial plan can only be achieved through adequate land-based solutions, including detailed regulation of the coastal zone. Therefore, detailed guidelines for spatial units can be done only together with guidelines for land-based spatial planning, based on analyses of land-sea interactions, done in the context of developing this document and quantitative balancing of the current state of use and future needs. This is especially important for areas where there is overlapping development interests that will need to be addressed through an integrated spatial planning process.
- **Conduct a strategic environmental impact assessment.** Impact assessment is purposefully integrated into all processes of the preparation of planning solutions as an optimization and spatial planning tool. The purpose of the formal process of strategic environmental impact assessment should not only be to confirm the plan's acceptability, but above all to contribute to the further optimization of planning solutions. In the process of adopting the Sea Use Plan, it will be of special importance to assess the current and sensitive contents of the plan (for example, oil and gas exploitation, gas pipelines, cruise ship entry into the Boka Kotorska Bay, etc.).

2.

Starting points for marine spatial planning in Montenegro

2.1. Montenegrin littoral – basic physical features and natural values

The Montenegrin littoral includes a narrow zone that stretches from Debeli Brijeg in the northwest to the river Bojana in the southeast, with a total coastline length of 322 km, of which 124 km belongs to the Boka Kotorska Bay¹. About 80% of the coastline is rocky, with deeper waters usually found right next to the shore, while the rest is shallow, with a sandy-gravel bottom. The general direction of the coast is northwest – southeast, with certain significant and less significant deviations. The number of islands found in the sea is relatively small (number of islands: 7, islets: 37 and reefs: 4; length of island coastline: 11,1 km; total area of islands and cliffs: 0,9 km²).

The maximum registered amplitude of sea level change, caused by sea tides, is 131 cm, while the average amplitude of tides is about 23 cm. The Adriatic is a relatively warm sea. The salinity of the waters of the Southern Adriatic (38.6‰) is slightly lower than the average for the waters of the Mediterranean Sea (39‰). The dominant direction of sea currents, northwest, is parallel to the sea coast. The most frequent waves in the southern Adriatic are generated by the winds *bura* (northeast), *jugo* (southeast), and *maestral* (northwest) in the summer.

The total area of the sea is 6,426 km², and it includes internal waters, the territorial sea, and the continental shelf.

The territorial sea extends 12 Nm (22,224 m) from the baseline in the direction of the open sea.

Internal waters are the waters of the Boka Kotorska Bay, except for the part that belongs to the Republic of Croatia, the waters of the Gulf of Trašte, and the gulfs of Budva and Spič-Bar. The area of internal waters was established as follows:

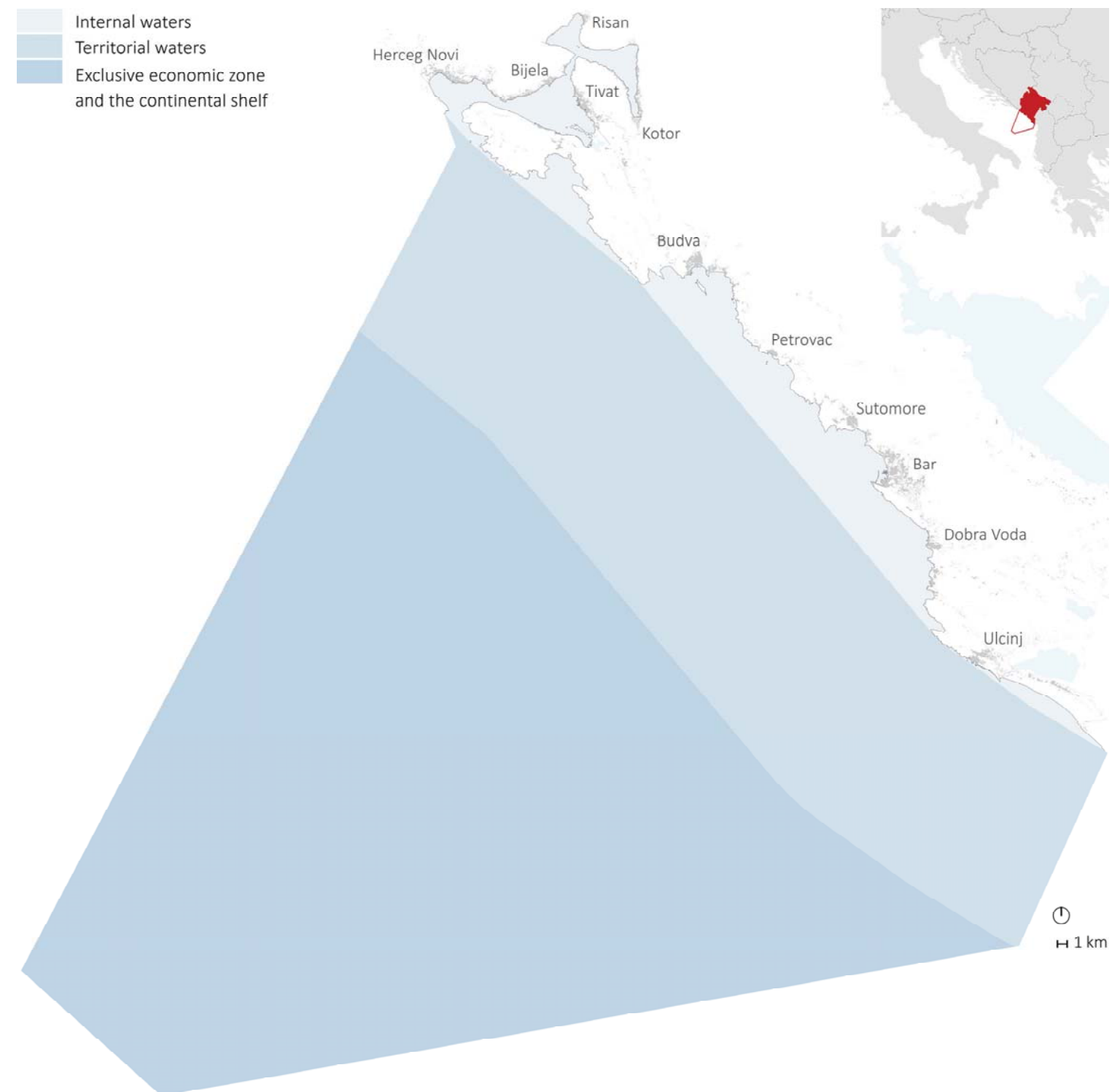


Figure 2.1. Montenegrin coastal area – marine spatial planning area in Montenegro

¹ Depending on the measurement resolution, the length of the shoreline may be different; so that different lengths appear in the document depending on the type and purpose of the analysis.

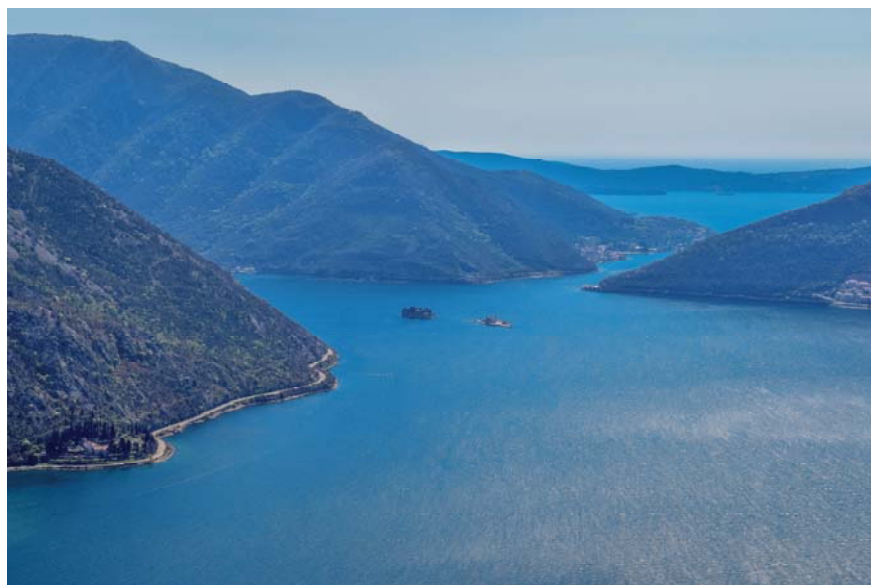


Figure 2.2. Boka Kotorska Bay
(archive of the National Tourist Organization of Montenegro)



Figure 2.3. Open sea of the Montenegrin littoral: Katič, Lučice i Buljarica (PAP/RAC)

Cape Konfin – southwestern Cape Mamule – Cape Veslo – Cape Žukovac – coastline to Cape Platomuni – Cape Mendra. The sea border with the Republic of Albania runs from the mouth of the Bojana River in a southwesterly direction, approximately to the border of the territorial sea.

This limited area of the territorial sea is about 2,172 km², while the area of internal waters is 368 km². Thus, Montenegro has a sea area of about 2,540 km².

The underwater environment, as part of the maritime domain, is a water (sea) column, with its living and non-living resources, from the surface of the sea to the bottom. It is an economically very important space in terms of the exploitation of living and non-living resources, scientific research and use for sports and recreation.

The underwater environment includes the seabed and parts of the earth's crust below the seabed and the coast. It is also an economically significant area in terms of the exploitation of living and non-living resources which Montenegro exercises the right to exploit. Oil and gas exploration is also carried out there. When it comes to the seabed, the coastal state exercises the right to exploit these resources up until the continental shelf.

The continental shelf, based on the Convention on the Continental Shelf, covers the seabed and subsoil below the territorial sea to a depth of 200 m and across that border to the line where the depth of the water above the seabed allows for the exploitation of natural resources of the seabed and its subsoil. The width of the continental shelf (up to 200 m depth) varies along the coast of Montenegro, expanding from 9.5 nautical miles at the entrance to the Boka Kotorska Bay to about 34 nautical miles at the mouth of the Bojana River. The area of this zone is 3,886 km².

When it comes to the coastal sea, two units can be distinguished: Boka Kotorska Bay and the open sea, significantly different in geographical and hydrographic-oceanographic characteristics.

Boka Kotorska Bay

The Boka Kotorska Bay spans for 28 km. It is a branched bay, bordered by steep Montenegrin mountains. The average

depth of the sea is 27.3 m, and the maximum is 60 m. Depths of about 20 m follow the shoreline at a distance of 200 to 300 m. The bay covers an area of about 90 km². Along the entire coast of the bay, especially in the Kotor, Morinj and Risan parts, there are river mouths as well as marine freshwater springs (Škurda, Široka rijeka, Ljuta, Gurdić, Sopot) as well as Gradiošnica in the Tivat part.

The bay aquatorium, total area of which encompasses 87.3 km², can be divided into three parts according to geographical and hydrographic characteristics:

- Bay of Kotor and Risan, separated from the rest of the bay by the strait of Verige;
- Bay of Tivat, separated from the rest of the bay by the straits of Verige and Kumbor; and
- Herceg Novi Bay, separated from the rest of the bay by the Kumbor strait, and from the open sea by the junction of capes Oštra and Mirište.

Due to its depths, the entire Boka Kotorska Bay belongs to the coastal or littoral system. The littoral zone represents not only the most productive area trophically, but also the richest zone in terms of species diversity. Years of research into the living environment of the Boka Kotorska Bay have shown degradations of different intensity, especially on the seabed, i.e. in the benthic zone. Looking at the distribution of habitats, the largest area of the bay is covered by the habitat of coastal terrigenous silt, while the biocenosis of muddy detritic seabed and silted sands cover only small parts of the bay. The biocenosis of coastal terrigenous silt is characterized by a large number of species, i.e. quality dominates over quantity. The total biomass is gradually decreasing towards the bay exit. Communities of sciophilic algae are widespread in the inner part of the bay, and due to the complexity of the geomorphology of the seabed, these communities most often occur in mosaic forms, in combination with other communities.

Coralligenous habitats occupy about 0.14% of the bottom surface and are very important for protection. This important habitat type is present in five locations (Strp, Perast, around the western part of Perast, around the islands of Sveti Đorđe and Gospa od Škrpjela and Dražin vrt). Other smaller coralligenous concretions are located in the central and

northern part of the Bay of Kotor and Risan. When it comes to the habitats of seagrass meadows, Dobrota stands out as a significant location, and significant areas can be found in the Herceg Novi Bay, in Igalo – Njivice and Mamuli – Luštica.

The research of ichthyoplankton diversity in the Boka Kotorska Bay confirmed the presence of a large number of eggs and larvae of pelagic and demersal fish species, of which the largest percentage belongs to economically important species. 38 different species of fish spawn in the bay (28 genera and 18 families), while the analysis of diversity showed a significant degree of diversity in certain locations where the currents are stronger (Kumbor strait and Verige).

Open sea of the Montenegrin littoral

The open sea of the Montenegrin coast includes the area from the entrance of the Boka Kotorska Bay to the border with Albania. The open coast of the Montenegrin coast is relatively poorly indented with several bays and coves, and a small number of islands and islets.

Areas with depths of 200 m occupy 43.5% of the total open sea. The bathymetric zone with a depth of 500–1,000 meters occupies only 10.4% of the sea, which is the result of the abrupt transition from the shelf to the deep southern Adriatic basin, while the bathymetric zone of over 1,000 meters deep occupies a significant 33.7% of the water area.

For the open coastal sea of Montenegro, from the point of view of biocenological potential, the importance of the wider area of the Bojana river mouth with Lake Šas and Port Milena should be emphasized, as a natural spawning reserve, which can serve as the basis for mariculture development, before determining and implementing artificial reproduction programs. There are also migratory routes for some important fish species here. Velika plaža contains deposits of medicinal mud and mineral water. Among the significant bioecological potentials, the finds and the use of medicinal sludges (peloids) in Igalo, Kalardovo, Bigova and Ulcinj should be pointed out, since they consist of fossil remains of microscopic algae.

In the marine ecosystem, in addition to algal fluorescence, there are also seagrass meadows, *Posidonia oceanica* and

Cymodocea nodosa, whose life cycles are connected to a significant number of animal species. The fauna of the Adriatic Sea has not yet been fully explored. Recent data, however, indicate that over 40 species of sponges, 150 species of crustaceans, 340 species of molluscs, over 400 species of fish, three species of sea turtles and four species of dolphins live (or occasionally live) in the Montenegrin part of the Adriatic.

Ecological values

Montenegro has internationally recognized areas – two Ramsar sites and two UNESCO sites, two of which are located on the Montenegrin coast: The special reserve for flora and fauna, Tivat salt pans, declared in 2013 as a Ramsar site, and the Boka Kotorska Bay (the inner part of the Verige strait: The Bay of Kotor and Risan), preserving and valuing the authentic geological, geomorphological, biological and cultural heritage, has been on the UNESCO natural and cultural world heritage list since 1979.

Montenegro has established a list of 32 areas, candidates for the Emerald ecological network (defined as areas of special interest for protection at the European level – ASCIs), covering a total of 234,399 ha, of which 12 are located in the coastal area or at sea: Skadar Lake; Velika Plaža with Solana Ulcinj; Buljarica; Tivat salt pans; Šasko Lake; river Bojana, Knete, Ada Bojana; Kotor-Risan Bay; Orjen; Pećin beach; Spas hill in Budva; the islands of Katič, Donkova and Velja Seka; Platamuni.

In order to protect valuable species and habitats, Nature parks Platamuni and Katič were declared as the first marine protected areas in 2021. Activities are underway to declare additional marine protected area – nature park – Stari Ulcinj Island. Additionally, two sites with significant coralligenous communities in the Bay of Kotor, Dražin vrt and Sopot, have been designated.

Preservation of valuable natural, landscape and cultural features of the maritime and coastal area of Montenegro is extremely important because the sea is one of the most important national resources and the basis for the development of economic activities such as sustainable tourism, maritime transport, shipbuilding, fisheries and mariculture. In addition to these, the sea provides opportunities for economic

activities that are not currently developed in Montenegro – blue biotechnology, exploitation of living and non-living components of the marine environment for pharmaceutical purposes, mineral exploitation and other branches of the blue economy extremely important in facing the 21st century challenges, such as the need to adapt and reduce damage from climate change, but also global pandemics, such as COVID-19.



Figure 2.4. Mouth of the river Bojana (S. Vilus)



Figure 2.5. Tivat saline (salt pans)

2.2. Socio-economic significance



Figure 2.6. Purse seine (A. Pešić, Institute of Marine Biology)



Figure 2.7. Cruiser (archive of the National Tourist Organization of Montenegro)

Due to a lack of adequate statistics on the coastal economy and the contributions of individual sectors, the analysis of the scope and importance of maritime activities in Montenegro is based on existing ones and estimates made for the Blue Economy in Montenegro Report² prepared under the GEF Adriatic project. Key traditional sectors, i.e. maritime economy, fisheries and mariculture, and coastal and maritime tourism, were taken into account.

Estimates of the Spatial Plan for the Coastal Area of Montenegro (SPCAM) from 2018 show that 28.5 to 30% of national GDP is generated in the coastal area, i.e. in the six coastal municipalities that make up 11.5% of the country's territory with about 24% of the total population (148,406 inhabitants according to the 2011 census). About one-fifth of the country's total employment is related to economic activities in the coastal area, which means that one employee generates about 1.5 times higher GDP than the national level. As the economy of the coastal area is predominantly made up of activities related to the sea, this data speaks of the importance of the blue³ economy, i.e. a higher degree of economic efficiency and productivity of blue branches compared to other branches of the national economy. The coastal area (or littoral region) is also the most developed part of Montenegro: the development index in five of the six municipalities in the coastal area is above 125% of the national average. The exception is the municipality of Ulcinj, which has a development index of 75% of the national average (Regional Development Strategy, 2014).

Important economic activities in Montenegro that are directly related to the sea and the coast belong to a group of traditional sectors of the blue economy, and are:

- Maritime economy (including maritime transport, ports and shipbuilding/vessel maintenance);
- Fisheries and mariculture;
- Tourism (coastal and maritime).

The current contribution of the maritime economy to the national economy is only a small part of the potential that this sector has and is far below the previous level of development. Due to the modest capacity of the fleet and low employment, the share of shipping in GDP is measured in percentage terms. Montenegrin cargo ports have used (on average) only about one third of their capacity in recent years, while shipbuilding and ship repairs have almost died out. Employment in shipping, ports and shipbuilding is measured in hundreds of jobs, an extremely low number given the region's previous level of development and maritime tradition. Available analyses also show that the overall share of the Montenegrin maritime economy in GDP and employment is significantly below the levels in other Mediterranean countries.

Despite a long tradition, marine fishing is underdeveloped and mostly found in coastal areas. The key activities are fishing with nets, trawls and small-scale coastal fishing. Commercial fishing on the high seas has developed somewhat more seriously only during the last decade and is mostly done with bottom trawlers. The fishing fleet consists of 161 vessels, which are mostly old-fashioned and aged. Annual catches have increased significantly in the past few years, exceeding, for the first time, 1,000 tons in 2018. The recorded catch is significantly below the maximum possible and sustainable level, but there are also various forms of illegal, unreported and unregulated fishing.

Although it has shown slight growth over the last decade, white fish farming is still low. During 2018, a total of 123 tons of fish were produced on three farms in the Boka Kotorska Bay. A total of 17 shellfish farms, which are also located in the Bay, produced 228 tons of mussels and about 17 tons of

² A qualitative analytical basis, including indicators on the economic structure and contributions of individual sectors of the coastal and blue economy, is extremely important for the successful management of coastal development, and further work is needed to ensure availability of relevant data.

³ The concept of the blue economy in a narrower sense implies a set of all economic activities related to the sea and the coast.

oysters in 2018. The share of the fisheries sector (marine and freshwater) in the GDP is about 0.5%.

Tourism is one of the key (if not the most important) economic sectors and growth generators in Montenegro. The latest estimates of the World Tourism and Travel Council (WTTC) show that in 2019, close to one third of the national GDP (about one and a half billion euros) was realized in activities that are directly or indirectly related to tourism and travel, which is why growth in this sector of over 6% was twice as high as GDP growth. The WTTC also estimates that the consumption of foreign guests (estimated at EUR 1,132 million) accounted for about 48% of total exports. During the last decade, between 85 and 91% of the total number of arrivals and up to 97% of the total number of overnight stays were realized in coastal places, where the main tourist product is bathing tourism.

Significant growth and effects are also recorded in maritime tourism (i.e. in the sub-sectors of nautical and cruising tourism). The number of yachts that visited Montenegro increased 2.2 times in the period 2007-2019, and the number of visitors was 3.1 times higher, reaching a figure of about 28,600 sailors. A rough estimate of revenue from nautical tourism for the last couple of years is EUR 7-11.5 million per year (based on an estimated length of stay of 5 nights per visitor and an average consumption of EUR 50-80 per day).

Over the last ten years, Montenegro has positioned itself as a cruise destination, primarily thanks to the port of Kotor, which is one of the three leading cruise ports on the Adriatic. In addition to the port of Kotor, the Port of Adria in Bar has been active in cruising since 2016. The total number of cruisers in Montenegrin ports almost tripled in the period 2007-2019, with about 649,000 visitors in 2019. Over 95% of cruising tourism takes place at the port of Kotor, which creates significant pressures on the already sensitive waters of the Bay of Kotor, and is associated with a number of other negative impacts that have been recognized for this type of tourism.

Total revenues from tourism (across the country) have exceeded one billion euros in the past few years (1.14 billion in 2019). Based on the conclusions of Monstat research and estimates of WTTC, as well as the analysis of overall trends in

tourism over the past decade, this report estimates that the direct contribution of tourism to national GDP in the last few years has been around 15%, while the direct contribution to employment has been slightly lower (by about one percentage point). In absolute terms, this means that (observing 2018) the tourism sector had a GDP of around EUR 700 million, of which around 664.5 million in the coastal area. Having in mind the estimate that the GDP of the coastal area makes up to 30% of the national one, it can be concluded that about half (47.5–50%) of the regional GDP is generated from tourism.

2.3. Maritime activities

By maritime activities we mean all forms of use of the marine area, regardless of the nature of use (its spatial and temporal characteristics). By maritime sectors we mean the economic use or groups of identical or related users of the marine area (maritime transport, fisheries and mariculture, tourism). Marine spatial planning is part of a comprehensive system of spatial planning that deals with areas on land and at sea. Maritime activities become the subject of regulations that define the content and form of spatial planning documents. Each maritime activity in the terminology of this regulation should have its own category of use for the marine area, with one or more planning symbols. Accordingly, basic categories and subcategories of maritime activities adapted to the needs and specifics of marine spatial planning in Montenegro are proposed, and they include:

1. **Maritime transport** which is further divided into:
 - 1.1. **Maritime navigation** of all types of vessels with the use of waterways, either freely selected or formally defined, in both cases in compliance with a set of rules to ensure safe maritime navigation;
 - 1.2. **Port system** representing the sea (port aquatorium) and the land area directly connected to the sea with port infrastructure and related port anchorages, all providing port services to all types of vessels, where ports can be commercial, nautical tourism ports (marinas), shipyards, fishing, city and military ports.



Figure 2.8. The complexity of maritime activities and land-sea interactions: Lipci (S. Vilus)

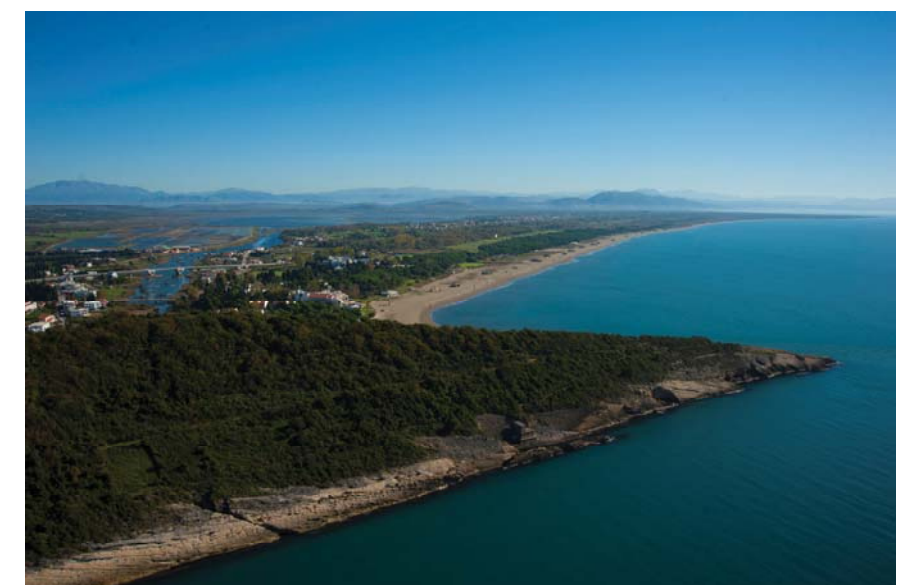


Figure 2.9. The coastal area and the sea next to it is an indivisible spatial (perceptual, functional, ecological) whole: Cape Đerane, Ulcinj salina and Velika Plaža (S. Vilus)

2. **Marine fisheries and mariculture**, which is divided into:
 - 2.1. Sea fishing carried out with various fishing gear; and
 - 2.2. Mariculture, i.e. sea fish farming as well as shellfish farming outside the natural living environment using appropriate technology and equipment.
3. **Tourism** which is divided into:
 - 3.1. Coastal tourism (tourists are placed in accommodation units on land) within which we distinguish:
 - 3.1.1. Tourist and recreational activities related to bathing areas and beaches; and
 - 3.1.2. Daily sports and recreational activities at sea (outside the beach aquatorium).
 - 3.2. Maritime tourism (tourists are accommodated in vessels, own or rented – the whole vessel or cabin/bed) which is divided into:
 - 3.2.1. Nautical (yachting) tourism; and
 - 3.2.2. Cruising tourism.
4. **Underwater cables and pipelines** – refers to underwater infrastructure systems laid on or buried in the seabed. It also includes marine underwater discharges of industrial and municipal wastewater where the sea is used as a recipient for adequately treated industrial or municipal wastewater. Exceptionally, it also includes overhead (air) cable lines.
5. **Exploitation of mineral resources** from the seabed and underground, including exploitation of hydrocarbons as well as offshore hydrocarbons exploration activities.
6. **Dredging and disposal of materials** includes activities of dredging the seabed on waterways, ports and other areas where it is necessary to maintain the required depth of the sea and which are exposed to backfilling as a result of natural and anthropogenic processes and dredging as remediation or removal of harmful materials from the seabed. It also includes the disposal of extracted material on designated areas in the sea or on land (e.g. in the function of forming or expanding beaches).
7. **Coastal protection structures** include coastal engineering structures in the function of protecting natural and

anthropogenic coasts and coastal functions (e.g. from waves, coastal erosion amplified by the effects of climate change).

8. **Military use** includes marine areas or protection zones in the function of military ports and facilities for defence, and areas intended for military exercises, as well as zones for disposing military waste material (all with different degrees of access and use restrictions).
9. **Marine protected areas.**
10. **Underwater cultural heritage** (underwater archaeology).

2.4. The legal and institutional framework for marine planning and use

The obligation and key principles of marine use planning are set out and prescribed in Directive 2014/89 / EU establishing a framework for maritime spatial planning. This Directive has responded to the growing demand for marine space for various needs, for example for renewable energy plants, oil and gas exploration and production, marine and fishing activities, ecosystem conservation and biodiversity, mineral exploitation, coastal tourism, aquaculture facilities and underwater cultural heritage. Within the framework of the integrated maritime policy of the European Union, marine spatial planning is considered a cross-sectoral policy instrument that enables public bodies and actors a coordinated, integrated and cross-border approach. The application of an ecosystem-based approach will contribute to the sustainable development and growth of maritime and coastal economies and sustainable use of marine and coastal resources.

The key principles of marine use planning set out in Directive 2014/89/EU establishing a framework for maritime spatial planning include:

- rational criteria of sea suitability, prioritization and efficiency in the zoning of the sea for various maritime activities, as well as multi-use areas;

- equal treatment of the criteria of economic efficiency and protection of the marine environment;
- integration of land and marine spatial planning;
- open participation of users and sectors;
- cross-border cooperation;
- using the best available knowledge and methodologies.

The basic definitions and principles of marine spatial planning have been established by the aforementioned EU directive and they are, as a rule, adopted into national legislation. The purpose and basic goals of marine spatial planning in Montenegro are determined by the current Act on Spatial Planning and Construction. The same regulation defines the obligation to cooperate with neighbouring countries in marine planning in order to ensure harmonization and coordination.

The direct spatial coverage of marine spatial planning of Montenegro consists of the sea and underwater area which includes internal sea waters, the territorial sea and the exclusive economic zone, as well as the airspace above them. The waters of Skadar Lake, the rivers Crnojević and Bojana up to the navigability limits, which according to national regulations are considered as internal sea waters, are not included in the scope of marine spatial planning. However, in the analytical sense, marine spatial planning also includes analyses of coastal land and freshwater areas to the extent required by the principles of the ecosystem approach and consideration of land-sea interactions.

A specific issue is the definition of planning documents that plan the marine area (current or new), given that national spatial planning systems are quite different, i.e. arise from the specifics of the national territory and the tradition of the current planning regulation of spatial development. In Montenegro, it is accepted that marine spatial planning is carried out at all planning levels that include coastal areas in their coverage. Accordingly, marine spatial planning must be integrated into all levels of the national system of spatial planning documents, from the state level (Spatial Plan of Montenegro), to the regional level, (General Regulation Plan of Montenegro, Spatial Plan of the Coastal Area of Montenegro, and/or other spatial plans within the scope of

the Littoral Region), to local planning documents. The competent national regulation also states the concept of marine spatial planning as part of the Spatial Plan of Montenegro. The same regulation defines that the Coastal Region, in addition to the scope in accordance with the law governing regional development, also includes the territorial sea and the exclusive economic zone, in accordance with the law governing the sea.

The scale and level of detail of the graphic representations of planning proposals for the marine area should be harmonized with the characteristics of the planning documents which include marine spatial planning.

Marine spatial planning requires a specific categorization of the use of marine space (sea use), which is currently not regulated by the national regulations of Montenegro. This document provides a working proposal for appropriate categorizations. Since there is no official categorization, graphic symbols for use in the production of cartographic outputs of the marine spatial plan, which are also proposed in this document, are not prescribed or defined.

In terms of institutional competencies, the Ministry of Ecology, Spatial Planning and Urbanism is responsible for marine spatial planning, as well as the entire spatial planning system. The marine area as a whole is located within the maritime domain which, according to national regulations, is managed by the Public Enterprise for the Management of the Maritime Domain of Montenegro. The tasks of the Public Enterprise are protection and improvement of the use of the maritime domain, management of the maritime domain, conclusion of contracts on the use of the maritime domain and construction and maintenance of infrastructure facilities for the maritime domain. The Port Master's Office takes care of the protection of the maritime domain and thus the entire marine area from pollution by dangerous and harmful substances from the land and from vessels. There are a number of other institutions and state bodies that have sectoral competencies related to the use and protection of the marine area of Montenegro (Table 2.1).

The institution of the **maritime domain** is especially important for understanding the use of marine areas. This institution

has its conceptual roots in Roman law and, with various adaptations, exists in a number of developed European countries. Therefore, as previously emphasized, the total marine area that is the subject of spatial planning is also part of the maritime domain and is under the jurisdiction of the regulations governing it. From the aspect of spatial planning regulation of marine area use, it is important to understand the normative possibilities for the use of the maritime domain. Among other things, there is a noticeable effort to activate the maritime domain as an economic space for new larger investments, which is one of the legitimate goals of marine spatial planning (blue economy and blue growth).

Therefore, a useful contribution in the phase of developing proposals for marine spatial planning, as well as in general the development of the legal framework for marine spatial planning, is a more detailed recording of institutional competencies within the overall national marine area, as well as the corresponding legal framework that regulates these competencies and especially the parts that regulate the ways, conditions and criteria of marine use (elements of regulation of the use of the marine area which includes the seabed and subsoil and the entire water column). This is especially important for the preparation of the first generation of marine spatial planning. Table 2.1 shows the attempt to record jurisdictions and the legal framework by maritime activities. In addition, if competencies were to be shown on a map, it would be easier to identify areas of spatial overlap (often multiple) and also more clearly visualize the complexity of marine spatial planning, primarily as a result of differences in spatial planning approaches, which will be described below, and in relation to spatial planning on land. The spatial scope of competencies will be partly clearer from cartographic representations of marine use (e.g. mariculture zones, marine protected areas, fishing zones or aquatoria and bathing areas, port anchorages and nautical anchorages) as well as from part of the mapped marine use regimes.



Figure 2.10. Coastal infrastructure (S. Vilus)



Figure 2.11. Beaches are an important element of maritime domain management: Herceg Novi (archive of the National Tourist Organization of Montenegro)

Table 2.1. The current state of marine area use by maritime activities, legal basis of use and competent bodies for issuing acts, relevant legal acts and elements of regulation.

Maritime activity	Legal basis of use	Competent authority (for issuing an act *) ⁴	Legal act	Elements of regulation
1a Maritime navigation	<ul style="list-style-type: none"> Maritime Safety Act Yacht Act Boat Regulation Law of the Sea Law on protection of the sea from pollution from vessels 	<ul style="list-style-type: none"> Maritime Safety and Port Management Authority 	No acts on the right of use, certificates on the ability of yachts, ships and boats to sail, certificates on the competence of crew members, etc. are issued.	Obligation to comply with regulations on avoiding collisions at sea and safety of navigation, ability of yachts, ships and boats to navigate, training of crew members, navigation regimes
1b Port system – ports of national importance	<ul style="list-style-type: none"> Ports Act Act on State Property Act on Concessions Law on protection of the sea from pollution from vessels Decree on maintaining order in ports Program of temporary facilities for the maritime domain of Montenegro 	<ul style="list-style-type: none"> Ministry of Capital Investments * Maritime Safety and Port Management Authority 	Concession deed *	Objectives and subject of the concession, use or activity, duration and fees, safety and security conditions, environmental protection measures
1b Port system – ports of local importance	<ul style="list-style-type: none"> Ports Act Act on State Property Act on Concessions Decree on maintaining order in ports Maritime Property Act Program of temporary facilities for the maritime domain of Montenegro Program of coastal infrastructure facilities Law on protection of the sea from pollution from vessels 	<ul style="list-style-type: none"> Ministry of Ecology, Spatial Planning and Urbanism PE Maritime domain* 	UTC issued by PEMDM * Lease (use) agreement for the maritime domain*	UTC: spatial coverage – location and length of the operational shore, number of berths, additional conditions of use ... Objectives and subject matter of the contract, use or activity, rights and obligations of PEMDM, rights and obligations of users, duration and fees, reasons for contract termination, safety and security conditions, environmental protection measures
1b Mooring and docking system	<ul style="list-style-type: none"> Ports Act Maritime Property Act Law on protection of the sea from pollution from vessels Law on State Property Maritime Domain Act Program of temporary facilities for the maritime domain of Montenegro Program of coastal infrastructure facilities 	<ul style="list-style-type: none"> PE Maritime domain* 	UTC issued by PEMDM * Lease (use) agreement for the maritime domain*	UTC: spatial coverage – location and length of the operational shore, number of berths, conditions for equipping and maintaining order at the port and/or mooring Objectives and subject matter of the contract, rights and obligations of PEMDM, rights and obligations of users, duration and fees, reasons for contract termination, safety and security conditions, environmental protection measures

⁴ Where there are several competent authorities, asterisk (s) indicate those competent institutions which are responsible for the legal act marked in the same way.

Maritime activity	Legal basis of use	Competent authority (for issuing an act *) ⁴	Legal act	Elements of regulation
2a Fisheries	<ul style="list-style-type: none"> Act on Marine Fisheries and Mariculture SPCAM Program of temporary facilities for the maritime domain of Montenegro Ordinance on fishing posts 	<ul style="list-style-type: none"> Ministry of Agriculture, Forestry and Water Management * PE Maritime domain** 	Fishing licenses * UTC issued by PEMDM **	Spatial coverage, time regulation UTC: spatial coverage, possible temporary facilities, additional conditions of use ...
2b Mariculture	<ul style="list-style-type: none"> Act on Marine Fisheries and Mariculture Act on State Property SPCAM Program of temporary facilities for the maritime domain of Montenegro 	<ul style="list-style-type: none"> Ministry of Agriculture, Forestry and Water Management * PE Maritime domain** 	Mariculture license * UTC issued by PEMDM **	Spatial coverage – boundaries of the farm (coordinates) and surface area UTC: spatial coverage, possible temporary facilities, additional conditions of use ...
3a1 Coastal tourism – bathing areas	<ul style="list-style-type: none"> Maritime Property Act Act on State Property SPCAM Program of temporary facilities for the maritime domain of Montenegro Atlas of Montenegrin beaches and bathing areas for the period 2019 – 2023, Ordinance on detailed conditions in terms of arrangement and equipment, types and conditions of the use of bathing areas 	<ul style="list-style-type: none"> Ministry of Economic Development PE Maritime domain* 	Lease (use) agreement for the maritime domain*	Spatial coverage of bathing areas, mode of use, standards and guidelines for bathing areas by categories and types, maximum surface areas of facilities at bathing areas, sports and recreational activities on beaches
3a2 Coastal tourism – sports and recreational coastal activities (daily recreational sailing)	<ul style="list-style-type: none"> Decree on minimum technical conditions, manner, means and equipment for the provision of certain services that include sports-recreational and adventure activities Program of temporary facilities for the maritime domain of Montenegro Atlas of Montenegrin beaches and bathing areas for the period 2019 – 2023, Ordinance on detailed conditions in terms of arrangement and equipment, types and conditions of the use of bathing areas 	<ul style="list-style-type: none"> Ministry of Economic Development PE Maritime domain* 	Lease (use) agreement for the maritime domain*	Location and areas of landfills for use at sea, conditions in terms of required areas on land, conditions in terms of equipment and personnel, conditions of qualification
3b1 Maritime tourism – nautical (yacht / charter)	<ul style="list-style-type: none"> Act on Tourism and Hospitality Yacht Act Ports Act Act on State Property Act on Concessions Decree on maintaining order in ports 	<ul style="list-style-type: none"> Ministry of Economic Development Ministry of Capital Investments * Maritime Safety and Port Management Authority 		
3b2 Maritime tourism – cruising	<ul style="list-style-type: none"> Ports Act Act on State Property Act on Concessions Decree on maintaining order in ports 	<ul style="list-style-type: none"> Ministry of Economic Development Ministry of Capital Investments * Maritime Safety and Port Management Authority 		Payment of port services (port fees for mooring and other services) (activities for cruisers are concessioned)
4 Underwater cables and pipelines	<ul style="list-style-type: none"> Act on State Property Act on Concessions SPCAM 	<ul style="list-style-type: none"> Ministry of Capital Investments PE Maritime domain* 	Lease (use) agreement for the maritime domain *	Spatial plans, building permit, concession for special use of the maritime domain

Maritime activity	Legal basis of use	Competent authority (for issuing an act *) ⁴	Legal act	Elements of regulation
5 Sand and gravel extraction	<ul style="list-style-type: none"> Act on State Property Act on Concessions 	<ul style="list-style-type: none"> Ministry of Capital Investments * 	Concession act *	Objectives and subject of the concession, use or activity, duration and fees, safety and security conditions, environmental protection measures
6 Disposal of material from dredging		<ul style="list-style-type: none"> Ministry of Forestry, Agriculture and Water Management PEMDM 	Lease (use) agreement for the maritime domain *	The obligation of the tenants in the contract is to dredge
7 Coastal protection structures	<ul style="list-style-type: none"> Ports Act Act on State Property (Act on Concessions) Maritime Property Act 	<ul style="list-style-type: none"> Ministry of Ecology, Spatial Planning and Urbanism PEMDM 	Lease (use) agreement for the maritime domain *	Compliance with project documentation and permits
8 Military use	<ul style="list-style-type: none"> Defence Act? SPCAM 	<ul style="list-style-type: none"> Ministry of Defence 		
9 Marine protected areas	<ul style="list-style-type: none"> SPCAM Nature Protection Act Act on State Property 	<ul style="list-style-type: none"> Ministry of Ecology, Spatial Planning and Urbanism Agency for Nature and Environmental Protection PEMDM (manager)* 		Protection act, special conditions, protection regimes Management plan *
10 Underwater cultural heritage	<ul style="list-style-type: none"> SPCAM Act on the Protection of Cultural Heritage 	<ul style="list-style-type: none"> Ministry of Education, Science, Culture and Sports Directorate for the Protection of Cultural Heritage 		Protection regimes

2.5. Starting points from relevant strategic documents

In creating the vision of the use and protection of the marine area, as well as strategic and sectoral goals, we started from the already defined visions of sustainable development of Montenegro, the coastal area and the coastal region, as well as the maritime/blue economy. The following are excerpts from valid strategic and planning documents.

2040 vision for Montenegro 's development (2040 Spatial Plan of Montenegro; 2020 concept)

Montenegro follows modern European principles, with the aim of becoming a prosperous, environmentally friendly and attractive country for living and investment.

In the coming period, it will become a prestigious Mediterranean and mountainous country, both in the field of tourism through the offer of mountain, rural and coastal tourism, as well as in the field of agriculture and healthy food, clean spring water and rich forest areas.

Traffic-accessible, energy independent, with more orderly urban and rural settlements, Montenegro will become a particularly attractive country in the Balkans, developing economic and cultural relations with other countries in the region.

2030 vision for Montenegro's sustainable development (National strategy for sustainable development; 2016)

Starting from a vision of sustainable development set by the National Strategy for Sustainable Development of Montenegro 2007-2012, and the assessment of the development priorities of Montenegro expressed by the citizens themselves participating in the consultative process "The Montenegro I want" under the post-millennial consultations, as well as those given in the consultative process that accompanied the development of the new NSSD, set a vision of sustainable national development for 2030.

The vision consists of ten key elements:

1. *Montenegro is a sustainable, open, tolerant, inclusive and prosperous society, where the quality of life of every individual is continuously being improved and investments in human and social capital made.*
2. *The socio-economic development of Montenegro is based on a harmonious relationship between man and nature and efficient management of human, social, natural and economic resources.*
3. *Montenegro is a state built on strong Montenegrin identity, which comprises a tolerant attitude towards all differences, respecting them and regarding them as potentials and resources.*
4. *Montenegro is a state governed by the rule of law where the dignity of every individual is respected, where there is no discrimination on any grounds and where everyone, regardless of difference, has the opportunity and support for the full realization of their human potential.*
5. *Montenegro is a community based on openness and diversity of culture – both in terms of preserving all aspects of cultural and historical heritage, and through the coexistence of different contemporary forms of culture. It is a state where areas of prominent natural, regional and cultural values have been preserved and placed in the function of sustainable development.*
6. *Montenegro is a country where demographic trends have improved by reducing the demographic deficit and population growth by 2030 by 1.4% compared to 2015. This was achieved thanks to the successful implementation of strategic goals and measures defined by the National Strategy for Sustainable Development for 2030, primarily those relevant for the introduction of green economy, improving human resources and strengthening social inclusion, as well as supporting values, norms and patterns of behaviour significant for the sustainability of society.*
7. *Montenegro is a country where everyone has equal access to quality and inclusive education, at all levels and throughout life. The health care system is of high quality, efficient, and providing a healthy life for citizens of all ages. This is especially true for vulnerable groups, thus reducing health inequalities.*
8. *Montenegro is an environmental state where the harmony of a traditional way of life and man's natural environment has been achieved, where the environment is healthy, and the values of biodiversity, water, sea, air, land, space and other natural resources are improved and preserved for future generations. Ecosystem values and services have been preserved, the scope of preserved natural, cultural and landscape values, managed sustainably and efficiently, increased the adaptive capacity of man, ecosystems and economic sectors to the effects of climate change, and remedied pollution at key "black" ecological points. The share of energy from renewable sources is continuously growing, enabling energy efficiency and the transfer of technological solutions that contribute to raising the quality of life in urban areas and reducing greenhouse gas emissions.*
9. *By 2030, the level of greenhouse gas emissions will be reduced by 30% compared to 1990. Montenegro is achieving continuous, inclusive, regionally balanced and sustainable economic development, full employment and dignified work for all. Development paths for the use of natural resources, on the one hand, and economic activity and social welfare, on the other hand, diverge from each other, and are inversely set in relation to the growth of environmental pressures by: i) economic activity aimed at sustainable use of natural resources, while reducing the negative impact on the natural environment, ii) the application of sustainable consumption and production patterns enabled a greener economy, resource efficient and circular. The concept of sustainable economic development has been affirmed, which includes: health, education, healthy environment and sustainability of natural resources, socially responsible action, social inclusion and good governance, as an alternative to the concept based exclusively on affirming the competitiveness of the economic environment and economic growth.*
10. *Montenegro has achieved the goals and tasks set by the United Nations Agenda for Sustainable Development by 2030 and is successfully participating in the Global Partnership for Sustainable Development. Based on the achieved social consensus and full political support for the sustainable development of Montenegro, an efficient system of good governance and sustainable financing of sustainable development of Montenegrin society has been established.*

Vision of the coastal area of Montenegro (National Strategy for Integrated Coastal Zone Management of Montenegro; 2015)

The coastal area of Montenegro is resilient and healthy, has a recognizable identity and authenticity, provides productivity and benefits its current population, as well as future generations.

RESISTANT AND HEALTHY

- Areas of prominent natural landscape and cultural values have been preserved.
- The environment is healthy and preserved for future generations.
- Ecosystem services and services of protected areas of nature and areas of preserved natural, cultural and landscape values are recognized and sustainably valorised.
- The development of the coastal area is adapted to the needs of the protection of its resources.
- The coastal area is resistant to the effects of natural hazards.

RECOGNIZABLE IDENTITY AND AUTHENTICITY

- The specifics of nature and the physiognomy of traditional settlements and landscapes have been preserved.
- Elements of natural and cultural heritage, as the basis of attractiveness, are placed in the function of sustainable development of the coastal area.

PRODUCTIVE

- The coastal area has a sustainable tourist offer based on a year-round tourist product with a developed traditional rural component and a preserved basis of its attractiveness.
- A satisfactory ranking of the tourist destination on the global market has been achieved, which generates positive economic effects.
- Agricultural land and forests are key resources of rural areas that are valorised through ecological and indigenous production and represent an important segment of diversification of the offer of high quality tourism in the coastal area.
- Entrepreneurship based on the protection of natural, regional and cultural values is being developed.

FOR THE BENEFIT OF CURRENT AND FUTURE GENERATIONS

- The best available knowledge and standards are applied.
- Coastal conditions and processes are monitored to measure progress in achieving the desired results.
- The participation of the local population in making and implementing important socio-economic decisions has been improved.

Vision for the development of the coastal region (Spatial Plan for the Coastal Area of Montenegro; 2018)

- The coastal region, as an important spatial, economic and social resource of Montenegro, should be developed in a focused and controlled manner, using in a sustainable way its natural, cultural and created potentials.
- In further development, European standards and values must be respected and rules for quality regulation and management of space must be established.
- The Plan for the Coastal Area of Montenegro is a development-strategic document that enables the development of primary branches of the economy.
- The development of tourism in the narrower coastal zone, which will be a key link in development, should be supported by the development and preservation of rural areas, with more intensive development of agriculture.
- When planning at a more detailed planning level, it is important to respect the rules for tourism development defined by this plan, as well as the regimes for the protection of space and the environment.
- The protection of cultural heritage is defined through the measures given in the plan and the Study for the Protection of Cultural Heritage done for the Coastal Region. This will provide the cultural and natural identity of the destination and an adequate place in the integration of valuable spatial regions in the environment.
- A prerequisite for balanced, quality and long-term sustainable development is the development and improvement of traffic and overall infrastructure.

- The development of the Coastal Region will also encourage the development of the Central and Northern regions and their integration.
- Through the development of tourism and other economic activities, the Coastal Region is expected to strongly encourage the overall socio-economic development of Montenegro.
- With the realization of the proposed planning concept, it is expected that the Coastal Region will be a developed tourist destination in the coming period for the benefit of the local population and the state as a whole.

2030 Vision for Marine Economy Development (Marine Economy Development Strategy; 2020)

By 2030, Montenegro has regained the reputation of a traditional maritime country, with a significantly strengthened and competitive marine economy whose development is based on the principles of sustainability. As such, the Montenegrin maritime economy, which includes all sub-sectors of the blue economy, contributes to the overall economic development of Montenegro with a significant share in the structure of the GDP.

The competitiveness of economic entities in the field of maritime economy has been significantly improved. A large number of infrastructure projects have been implemented according to the model of public-private partnership, in accordance with the new legislative framework.

The implementation of port infrastructure projects has been realized or is in progress, which will establish the basis for positioning the port of Bar as a port of regional importance.

The port infrastructure built in the ports that are connected to the hinterland by modern road and railway infrastructure – contributes to the increase of economic activities and flow of goods, and thus the competitiveness of ports. In this way, Montenegrin ports, which are beginning to adequately use their geostrategic position, can become a generator of continuous and sustainable growth of the maritime economy.

Shipyard ports in Montenegro are recognized throughout the Mediterranean as ports that primarily provide services for the construction and repair of yachts and mega-yachts adhering to

the highest world standards, and represent a quality support to growing nautical tourism.

Revenues from the performance of concession activities have been causally increased, keeping in mind the stated parameters on the amount of variable concession fee.

The capacities of nautical tourism ports satisfy the market's need to accept vessels. On the other hand, the volume of marine traffic in ports has been optimized, where it was necessary primarily in order to protect the cultural and historical heritage, cultural heritage and environmental protection. Through the implementation of measures related to the Yacht Register and fiscal policy, the number of yachts registered in the Montenegrin register used by yachts for Montenegrin nautical ports has significantly increased.

Already recognizable ports of nautical tourism are becoming the centre of activity of maritime entities that manage mega-yachts for economic activity with all the multiplicative effects that result from it.

Stimulating fiscal policy, strengthening the capacity of the flag state in the implementation of IMO and other instruments has significantly increased the gross tonnage of the Montenegrin merchant fleet, and Montenegrin shipowners are becoming competitive in the international maritime market.

Montenegro is becoming a recognizable centre of maritime activities, and a significant number of specialized companies for third-party ship management operate on its territory.

A national maritime cluster has been formed, which unites all factors of the maritime economy in the context of the blue economy, and thus the professional influence in the flows that affect maritime economy has been strengthened, that is, human resources play a very important role in the overall process of improving the maritime economy in Montenegro.

As a precondition for the development of the maritime economy, the implementation of precisely defined activities has improved the safety of maritime navigation and the security protection of ships and port facilities.

*The Montenegrin Maritime Administration has significantly strengthened its capacities, primarily in the field of flag state control and port state control, and national legislation is fully in line with the *acquis communautaire* and other international regulations. Montenegro fully complies with its international obligations as a coastal state.*

By raising awareness, stimulating fiscal policy and applying international and national regulations, the growth of the maritime economy is entirely based on the principles of "green economy".

2.6. The methodology and planning process of marine spatial planning

2.6.1. Chronology of the coastal area planning

The coastal area has always been important from the point of view of the overall development of Montenegro, so all planning approaches in previous plans have opened important questions and suggested integral and quality solutions.

The guidelines of the first Regional Spatial Plan of the South Adriatic region are especially important, as well as the General Urban Plan of the Boka Kotorska Bay, which laid the foundations for the planning and organization of the coastal area.

The "Southern Adriatic" regional plan (later called "Adriatic I") was made in 1969 and included the littoral and central parts of Montenegro. It was one of the main initiatives and achievements in the field of spatial and urban planning at the inter-republican level in Yugoslavia, which included the territories of the then three Republics: Montenegro, Croatia, and Bosnia and Herzegovina.

The region of the South Adriatic was defined as one of the axes of the overall development of the wide area of former Yugoslavia, in the direction of coastal connection along the

Adriatic and connecting this southernmost area with the mainland, and it also provided the possibility of stronger development and connection with the Mediterranean region and Europe.

The main concept of this plan was the formation of infrastructurally equipped spatial units (development axes) that should take over the further development process. Under them, the concentration of production in all types of economy, agriculture, industry, tourist economy, maritime industry, etc. was planned. A strong road of European and national importance in the immediate hinterland of the littoral was planned to be a factor of development in this area and a link between the main development areas.

It was planned that urbanization would be carried out by forcing urban centres with especially careful resolution of the spatial collision in the industry-housing-tourism nexus. Tourism has been recognized as one of the main factors of regional development.

It envisaged that the protection of space and landscape could be achieved by concentrating tourist facilities, properly linked to certain centres, which should number 1,000, 2,000, 3,000 and 5,000-10,000 beds per group. The interspaces remained undeveloped as nature reserves and serve for the daily dispersion of tourists.

The plan envisaged 13 interconnected tourist autonomous areas in Montenegro: Boka Kotorska (Herceg Novi center), Budva littoral (Budva), Ulcinj littoral and Skadar lake (Ulcinj) and central hinterland (Cetinje).

The General Plan of the Boka Kotorska Bay was made for the planning period until 1990, with the first phase of development until 1975, and it included the coast of the Bay. Spatial guidelines for the development of municipal centers and the purpose of using the space of the coastal zone of the Boka Kotorska Bay were given. The master plan proposed solutions for traffic routes, proposals for cable car traffic and the expansion of the airport, which created the preconditions for the development of tourism in the region.

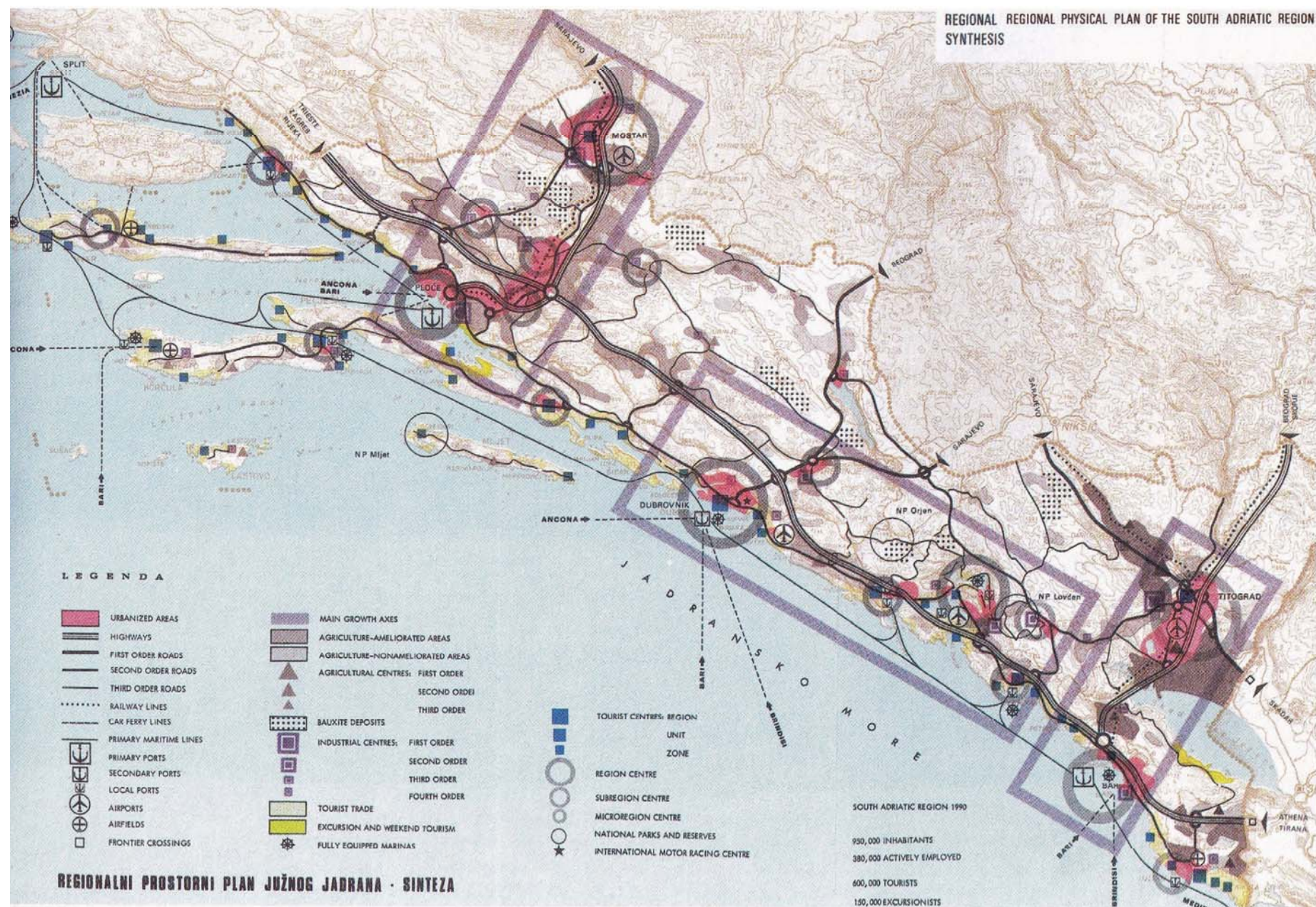


Figure 2.12. Regional Spatial Plan of the Southern Adriatic – Synthesis (1969)

After the earthquake in 1979, a decision was made to revise the existing and develop new general urban plans of urban settlements. An important task was to determine and define the methodology of seismic spatial planning. For the first time, the methodology of integrated and ecological spatial and urban planning was defined. The project was implemented in the period from 1979 to 1986, when spatial plans were adopted for all coastal municipalities except Bar, general urban plans for 6 municipal centers and 6 urban design projects for the old urban cores.

According to the [Spatial Plan of the Republic of Montenegro](#) (PPR; 1985), the territory of Montenegro was divided into three clearly separated regional units: Coastal, Central and Northern region. It was pointed out that the coastal region had extraordinary natural conditions and significant comparative advantages for the development of tourism, maritime economy and some branches of agriculture. Specific sea resources in that period have been mainly focused on the development of tourism, maritime shipping and partly industry (shipbuilding and salt production), as well as the development of port traffic.

The [amendments to the PPR](#) (1996) state that the disintegration of the SFRY has, among other things, narrowed the market and redirected some significant flows of goods and passengers, and that these flows will intensify and be directed towards the Montenegrin coast. This Plan points out that inadequate locations and inappropriate architectural concepts of some buildings often contribute to the deterioration of the value of landscape. Uncontrolled and inadequate construction on the slopes of hills, in the peripheral parts of cities and along roads, is a special kind of devaluation of the landscape, and at the same time a danger to existential natural resources. Insufficient protection of cultural heritage, especially rural settlements, old towns and fortifications, which are part of the recognizable landscape of certain areas of Montenegro, significantly decrease its value. This indicates the need to eliminate all activities that do not fit into the main directions of regional development.

Regardless of the planned orientation of this area in continuity, however, over the past years, numerous restrictions have been created that hinder the development of this area and its integrated management.

In June 1998, Montenegro started drafting the [Spatial Plan for the Maritime Domain of Montenegro](#). The reason for making this plan was to optimally use this public good as one of the greatest development potentials of the state, realistically assess its natural and created potentials, devise a development strategy and determine the optimal purpose of areas which would enable rational use of space and protection and preservation of the environment.

The development of the Spatial Plan of the Maritime Domain as a special use spatial plan included the use of all strategic and development, planning and program documents of the state and municipalities located in this area, applying the concept of sustainable development, scientific methodology and planning mechanisms used in the world for such a specific purpose.

Although formally the plan was made only for the mentioned area, all previous analyses have shown that the land part of the marine domain defined by the Law is not relevant enough for research and development of this type of planning document.

Therefore, research and presentation of the current situation were performed at three levels:

1. Maritime domain (aquatorium and land as defined by the Maritime Domain Act);
2. Contact zone (area of general urban plans, i.e. narrower coastal zone in which there are natural values as well as manmade structures, which have a direct impact on the maritime domain); and
3. Functional hinterland (area of all six coastal municipalities in a total area of about 1,600 km², as follows: Herceg Novi, Kotor, Tivat, Budva, Bar and Ulcinj, as units of local self-government that manage the space that naturally gravitates to the coastal zone).

The planning provisions refer only to the Maritime Domain Zone, while guidelines and recommendations are given for the wider area (contact zone and functional hinterland) as a basis for the application in lower-level spatial plans.

Regimes of use and arrangement of space are defined in accordance with the division of the Marine Area into larger units and within them separate sectors – zones with specific character, on the basis of which measures and conditions of use and protection of space have been prescribed – in accordance with the established use. The Spatial Plan for the Maritime Domain, which was adopted in 2007, divided the narrow land zone (area 58 km², average width about 200 m) into 68 sectors, for which a more detailed elaboration was envisaged through the preparation of the National Site Studies.

[The Spatial Plan of Montenegro](#) with a time horizon for 2020 was adopted in 2008. The general goals of the Spatial Plan of Montenegro for 2020 include the rational use of natural resources. Sustainable development of the coastal area by applying the principles of sustainable development and instruments of integrated coastal zone management as a general interest of Montenegro, including priority solution of the most important, numerous problems and contradictions, especially in the spatial direction of marine waters and better valorisation and use of especially valuable resources and potentials.

The plan defines areas and zones of public interest that are protected by national, regional and international documents, as well as on the basis of adopted legislation. Areas of public interest are: national parks; regional parks; maritime domain; UNESCO protected areas; general urbanistic plan areas; infrastructure system corridors; reservoirs, dams and ancillary facilities; banks of rivers, lakes and seas.

[The Spatial Plan for the Coastal Area of Montenegro](#) (2018), among other things, determined the rules for planning marine use. The sea is an important resource for the development of economic activities such as coastal and nautical tourism, maritime activities, shipbuilding, fishing and mariculture. In addition, there are opportunities for economic activities such as biotechnology, exploitation of living and non-living marine

components for pharmaceutical purposes, exploitation of minerals, oil, gas, etc. The sea is exposed to numerous pressures such as pollution from untreated municipal waste, shipbuilding, overhauls in ports and marinas. According to the analysis of the CAMP project, high vulnerability was highlighted in the narrow part of the Boka Kotorska Bay, the part between the shipyards Bijela and the Port of Porto Montenegro, the Bay of Igalo and the narrow shallow belt from Valdanos to the mouth of the Bojana.

More detailed planning and protection of the sea should have been done within the General Regulation Plan, according to the valid Act on Spatial Planning and Construction.

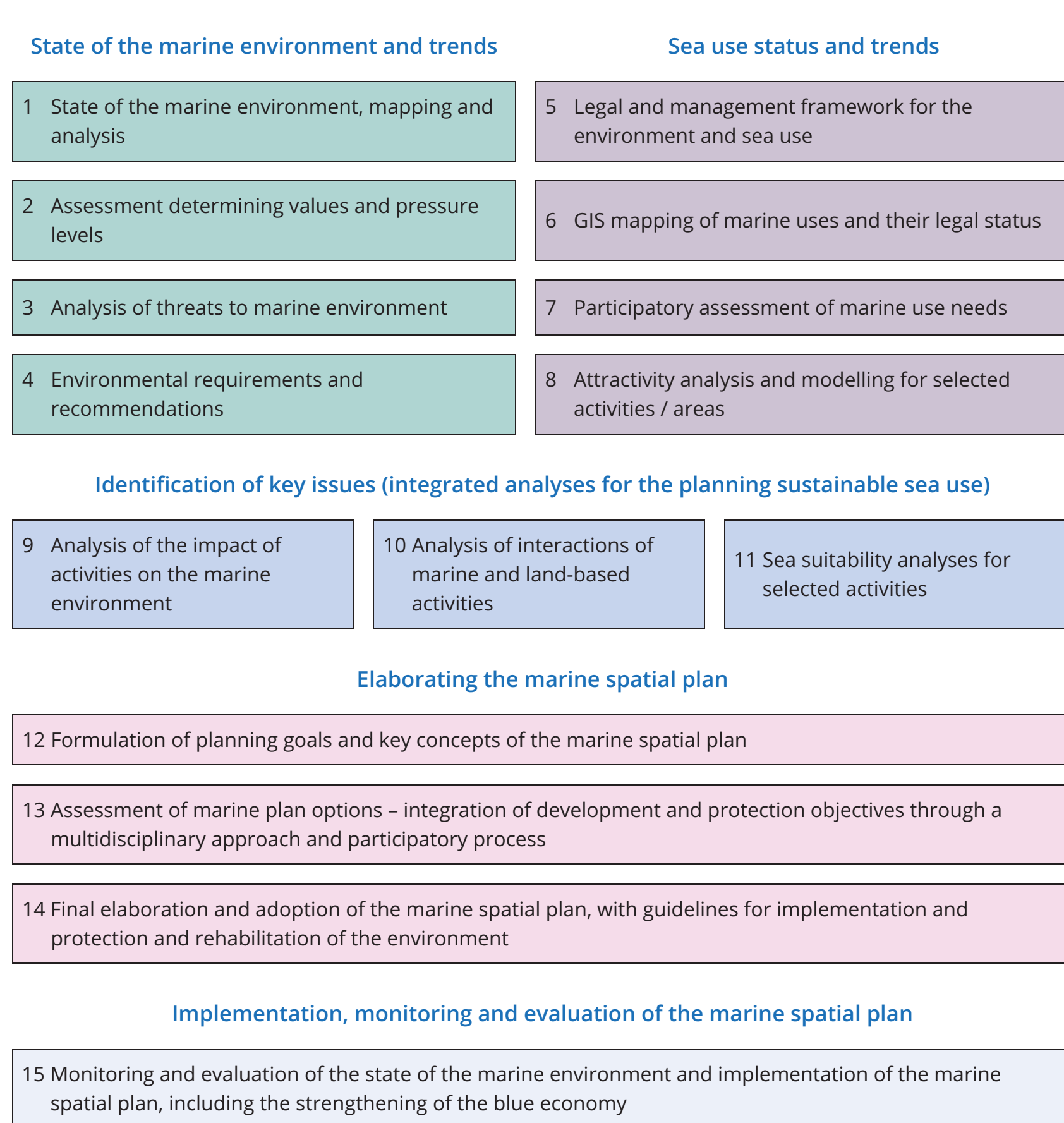


Figure 2.13. Overview of the main steps used in the marine spatial planning process

2.6.2.

Elements of methodological approach in marine spatial planning

The work process of developing a spatial plan of marine areas can be divided into several phases or steps. In the analytical phase, the emphasis is on creating a documentation basis for two important planning components, protection and development. The specificity of the methodological approach used in the GEF Adriatic Project is the separation or ensuring independent dealing with the topics of development and protection planning in the analytical phase of the planning process. Steps 1-4 (Figure 2.13) refer to the protection component and primarily deal with the state of the marine environment and trends through pressures and threats. Steps 5-8 represent the analytical basis for development planning which identifies the existing uses of the sea as well as the future spatial needs of maritime activities. Targeted analyses of attractivity or suitability for selected maritime activities are also conducted. Both parallel analytical phases are based on the collection and processing of data and information (especially spatial data) and their processing using GIS technologies. In the following (steps 9-11) the conflicts of activities and components of the marine environment as well as conflicts between activities are analysed in order to define the integral suitability of the sea area for different maritime activities, thus respecting protection and development criteria and goals. All this represents a complete technical basis for the most important step of the synthesis (steps 12-14), within which the planning goals and key concepts of the spatial plan of the marine area are formulated. Based on the accepted goals (strategic and sectoral), the options for the marine use plan as well as the regimes of use and protection are prepared and evaluated through, in an ideal situation, a broad participatory process. At the end of this phase, guidelines for the implementation of the plan as well as indicators for monitoring (primarily the marine environment) and evaluation as part of implementation plan management in the implementation phase are developed for the accepted marine spatial plan option (step 15).

Although the consideration of possible options is one of the most important instruments in strategic spatial planning, it was

assessed that the [processing of scenarios](#) or variant solutions in the preparation of this document was not meaningful. Formulation of, for example, three typical scenarios – developmental, balanced and protective – which usually ends with "choosing" a balanced development scenario, would have a markedly formal character without room for real added value for the planning document. It was assessed that the approach of incremental plan optimization with a continuous evaluation of the impact of planning solutions on the environment, society and economy as an integral part of the spatial planning process was much more useful. Given that in the case of the coastal area of Montenegro the situation at sea significantly reflects the development processes on land, it is much more important to set realistic scenarios of spatial development on land. Interests on the mainland, especially related to tourism development ("private accommodation") and real estate business, are much more pronounced, so the pressures from that side are harder to control. Due to the intertwining of the impacts of development on land and sea, it seems optimal to conduct a single process of strategic environmental impact assessment for planning documents that include the land and sea area. Assessment of variant solutions in such an integrated process can refer to the current sea use proposals with a large (potential) impact on the environment (for example, oil and gas exploitation, pipeline route variants, scope and regime of cruising in the Boka Kotorska Bay) and specific spatial planning units comprising marine and land area (see Chapter 8.1). First of all, this applies to areas of significant interactions (natural processes and activities) of land and sea where a new generation of spatial planning documentation needs to achieve adequate solutions (related to urbanization, landscaping, remediation of degraded areas) on land (see Chapter 8.2). In addition, the optimization of planning solutions can be achieved by detailed and targeted vulnerability and suitability analyses in the sea that seek to avoid valuable or sensitive locations, while part of the problem is solved through regimes that prescribe conditions and technologies of marine use that minimize impacts. Exactly such an approach was applied in the preparation of this planning document.

In the continuation of this chapter, the specific elements of the used methodological approach are elaborated in some detail.

Land-Sea Interactions

It can be said that the marine spatial planning, as an extension of terrestrial spatial planning, is one of the preconditions for achieving the goals of integrated coastal zone management. Ideally, both sea and land areas would be subject to a single planning intervention. In practice, the "marine" segment has not reached the level of development of "land" planning, and therefore still requires more attention and a specific approach.

In addition, it requires special attention to natural processes and activities that have a terrestrial and marine component. Namely, most of the activities that take place in the marine environment are related to the land; equally, activities and natural processes related to the land part of the coast have a direct and indirect impact on the sea. This is especially significant in the coastal area of Montenegro where most of the maritime activities are concentrated in a narrow zone, right next to the coast.

Therefore, special attention is paid to the analysis of the impact of land and sea, and the proposed solutions at sea significantly depend on existing or planned activities on land. In this regard, coherence and integration between maritime and land-based planning must be ensured through consistency of policies, plans and decisions. Individual planning goals of the spatial plan of the sea area can therefore be achieved only through adequate solutions (changes) in the spatial plans of the land and the remediation and prevention of pollution from the land.

Marine environment and sea use planning, using ecosystem approach

Different characteristics of the marine environment are especially important for its understanding and sustainable use. The impact of the marine environment and its use is mutual. On the one hand, the characteristics of the marine environment enable, facilitate, but also often make its use difficult. Eg. biological wealth enables successful fishing, attractive coastal shores enable the development of tourism, especially nautical. Some other characteristics of the marine environment, such as unfavourable climatic conditions, pronounced windiness, etc. can make navigation difficult or

discourage boaters. In that way, the characteristics of the marine environment affect the use or activities that take place in it. On the other hand, different forms of use affect the marine environment itself. It is often pollution and degradation of the marine environment, the results of which are sometimes irreversible. The reciprocity of influence can thus continue. The degraded environment no longer meets the needs of some activities, such as tourism, which then can no longer function or are significantly less successful. Very often, the same activity negatively affects the state of the environment, so that by worsening the state of the environment, it becomes a victim of that situation. A good example is fishing as well as the uncontrolled development of mass tourism which is not accompanied by the construction of quality infrastructure. Some of these problems, especially those related to insufficiently controlled development of coastal tourism, are also typical of the coastal area of Montenegro.

Therefore, the biggest challenge in the spatial planning of the marine area, as well as the land, is the harmonization of different objectives of spatial development management, guided by the [principles of the ecosystem approach](#). In doing so, an ecosystem is defined as a dynamic complex of a community of plants, animals and microorganisms and their inanimate environments that interact as a functional unit and the ecosystem approach is usually defined as:

"... an approach to managing human activities based on the best available knowledge about ecosystems and their dynamics and processes and on the sustainable use of goods and services, thus ensuring that the overall burden of these activities is maintained at a level that achieves and maintains good environmental status and does not jeopardize the ability of marine ecosystems to respond to human-induced changes."

Under the Barcelona Convention, the ecosystem approach is aimed at managing activities that affect marine and coastal ecosystems, with the ultimate goal of achieving good environmental status of the Mediterranean Sea and the coast. It has been systematized in the Integrated Monitoring and Assessment Program (IMAP), through 11 environmental objectives, for 11 key components of the marine environment, including the state of key marine habitats, marine reptiles,

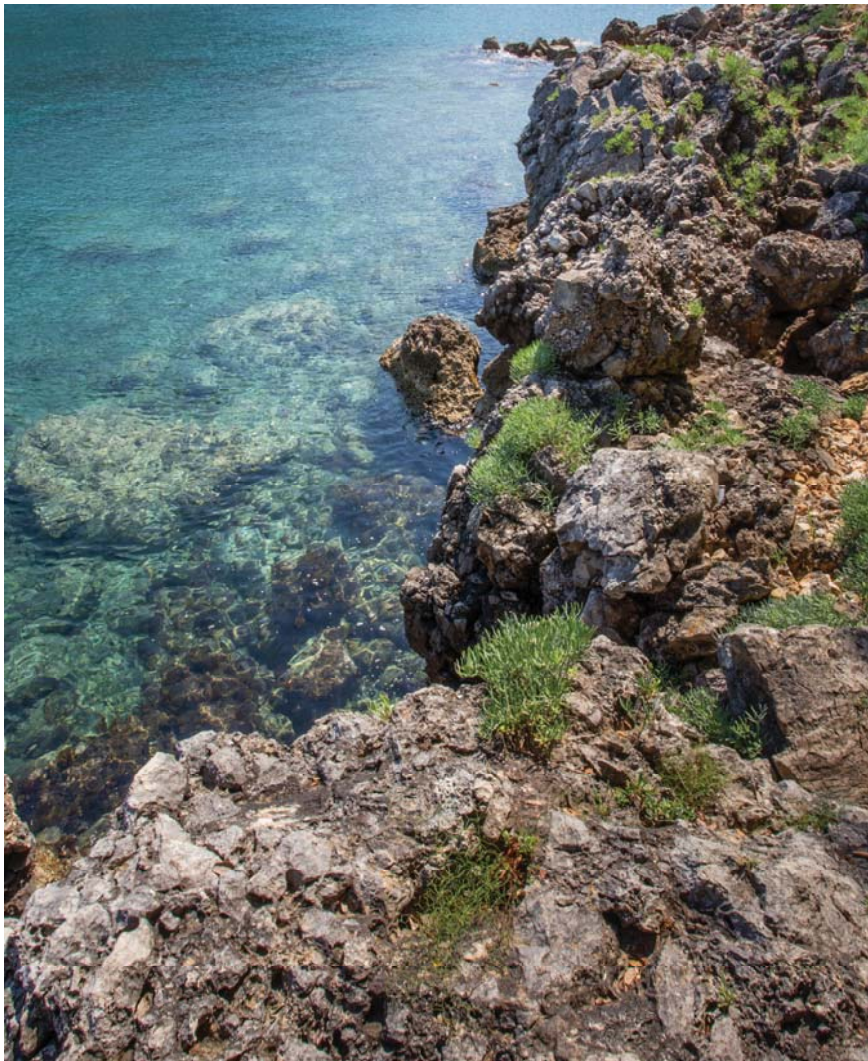


Figure 2.14. Using the ecosystem approach – knowledge about ecosystems and their dynamics and processes: Valdanos (PAP/RAC)

birds and mammals, the functioning of food networks, the presence and impact of invasive species, hydrological changes, pollution nutrients and waste and marine litter and the impact of underwater noise⁵.

In any type of marine planning/management, the continuity of the marine environment and the sheer size of marine ecosystems pose a particular difficulty. The concept of boundaries is more difficult to apply than on land, especially due to the three-dimensional nature of the sea. There are no clear physical boundaries of phenomena, such as sea currents, sea temperature and salinity. On the other hand, the absence of physical boundaries and barriers allows for the relatively free movement of both users and resources within the system. The openness of the marine system allows for a greater degree of interaction than in terrestrial systems and poorer exploration of the marine environment often makes it difficult to understand the process and makes the marine system quite unpredictable. Therefore, significant attention and resources in the marine spatial planning of Montenegro have been devoted to the analysis of values, pressures and vulnerability of the marine environment (see Chapter 3.2).

Starting from the requirements of the Barcelona Convention regarding the application of the ecosystem approach in the process of making plans and programs, as well as the need to use a "place based" approach that requires information that has a spatial component, processed using geographic information systems (GIS), an innovative approach to the spatial determination of valuable and endangered parts of the environment was used, which represent technical basis for articulating all protective interests for the continuation of marine spatial planning. Such analyses, based on the ecosystem approach, are the basis for proposing planning solutions aimed at protecting sensitive parts of nature, remediating existing and reducing future burdens that all make an important step towards achieving good environmental status.

Analyses of the state of the marine environment as well as pressures and threats will also be very useful as a basis in the implementation of the **strategic environmental assessment procedure** for future marine spatial planning.

Regarding the previously described characteristics of the marine environment, it should be emphasized that many marine systems are influenced by external factors whose source may be at great distance away from the observed area. One of the most obvious examples is the quality of sea water. Therefore, it is generally accepted that sustainable management of the marine environment requires **regional and cross-border cooperation**. It must also include areas that do not have direct contact with the coast, but still affect the sea with their activities (e.g. via rivers). This is another form of application of the ecosystem approach.

Balancing sea and land uses

An important spatial planning tool in analysing the spatial needs of individual maritime (and associated terrestrial) activities is the consideration of smaller coastal spatial units. At the level of these units, recording and, where possible, quantitative balancing of the current state of use and future needs was performed. This identifies possible deficits and imbalances on the basis of which, if justified, the types of sea use that should have priority in a spatial unit are defined. This analytical tool is especially important in the case of areas for which there are numerous and overlapping development interests that need to be resolved through the spatial planning process. Taking into account the administrative boundaries, population and spatial distribution of tourist development zones, the coastal area of Montenegro can be observed through 16 spatial or analytical units. An additional advantage of the mentioned spatial units is that they have already been used in previous tourist carrying capacity studies, and in that sense they enable the analysis of a time series of data, i.e. the identification of trends in important coastal processes. Balancing marine uses and functions on land, based on the proposed 16 spatial units (Thematic tourism study, 2021) can be useful in the phase of the formally developing a marine spatial plan that will be integrated with land planning and for which a single strategic environmental impact assessment procedure will be conducted.

⁵ UNEP(DEPI)/MED WG.420/4: Draft Integrated Monitoring and Assessment Programme/Guidance – <https://wedocs.unep.org/rest/bitstreams/8456/retrieve>

3. Synthesis of the current state

3.1.

Marine area use: state and development trends

3.1.1.

Specifics of marine area use in Montenegro

While pressures for different forms of marine area use are not strong, and the number of potential interested users is limited, as long as there is no pronounced competition and conflict among beneficiaries, issues of allocating rights to new users can be addressed successively, sectorally, on a case-by-case basis. The issues of protection of the marine environment are also addressed, from project to project, taking into account primarily the direct impacts of each new user on a narrow location, without taking into account wider cumulative impacts, areas of increased vulnerability and/or already accumulated high pressures on the marine environment. By increasing the intensity of marine use and the number of users, such planning sooner or later leads to conflicts in the use i.e. unbalanced development of maritime activities that do not follow developmental or socio-economic needs.

Seen from the perspective of protection, such practices gradually lead to the creation of zones of increased pollution or degradation of the marine environment (in terms of parameters of good state of the marine environment). Of course, these problems do not manifest themselves simultaneously in the entire marine area, but first occur in areas of higher density of use, both at sea and on land (coast), or in areas that are vulnerable due to natural and/or created conditions. Therefore, in the development of the first generation of the spatial plan of the marine area in Montenegro, part of the rational approach is also selectivity in terms of the need for greater emphasis or more detailed elaboration, from the analytical phase of the planning process, critical areas of higher density or increased vulnerability. In the case of Montenegro, according to both groups of criteria – development and protection – it is certainly the area of the Boka Kotorska Bay.

Taking into account the previously presented criteria as well as the physical and geographical characteristics of the coastal area of Montenegro, the coastal sea can be divided into two significantly different marine and navigable areas: Boka Kotorska Bay and the open sea, from Cape Oštro to the border with Albania at the mouth of the river Bojana. The Boka Kotorska Bay, in itself, is a large natural harbour. In it, navigation takes place in conditions characteristic of port areas (narrowed manoeuvring space, limited width of the waterway, various installations on the shore and on the seabed that should be taken into account when navigating and anchoring). On the other hand, it is an extremely deep natural bay where the depths are suitable for sailing all types of ships. The bay has two ports open to international marine traffic (Kotor and Herceg Novi), a shipyard in Bijela, large marinas in Tivat and Kumbor and a number of other nautical tourism ports, a storage of oil and petroleum products in Lipci, a berth for unloading kerosene in Bonići and a large number of smaller ports and berths (commercial and communal berths) in the function of mooring and berthing of smaller tourist, recreational and fishing vessels. Coastal traffic between these ports and piers is intense and diverse. Due to the natural conditions, the Boka Kotorska Bay, with its closed nature and difficult or slow water exchange, has a reduced assimilative capacity for all types of pollution. Consequently, this means greater vulnerability to growing pressures on the marine and overall environment. In the Bay of Kotor-Risan, protective aspirations and criteria are additionally strengthened by the existence of natural and cultural heritage of exceptional value, due to which the natural and cultural-historical area of Kotor has been on the UNESCO World Heritage List since 1979.

The coastal sea from the Boka Kotorska Bay to the mouth of the Bojana is more directly exposed to the weather, especially, unlike the Boka Kotorska Bay, to the waves from the open sea of the southern Adriatic. Part of the coast descends steeply into the sea, often in the form of cliffs, which protects the coast itself from anthropogenic use.



Figure 3.1. Natural and cultural-historical area of Kotor under UNESCO protection (archive of the National Tourist Organization of Montenegro)



Figure 3.2. Steep coast with excessive erosion south of Čanč (A. Mlakar)

Primarily, this exposure makes it difficult and more expensive to build coastal infrastructure, especially port and nautical. Also, the more intense action of waves in combination with sea currents and the rise of the medium sea level as a result of climate change contributes to coastal erosion and, among other things, makes it more difficult to maintain beach embankments (natural and created) and coastal infrastructure. The effects of these natural processes can be further aggravated due to anthropogenic influences, most often construction in inappropriate locations and in an inappropriate way (blocking of natural streams that recharge shoreline with terrigenous materials). In considering the conditions for maritime navigation, the open sea area, given the space, depths and relatively small number of islands, cliffs and shoals, provides less restrictions for navigation. However, the openness of the area, and exposure to winds and waves at the same time can pose a danger to ships, especially smaller vessels, which are mainly used in coastal sports and recreational navigation. Climate change brings an increased number and intensity of extreme weather conditions and even short-term storms at sea, especially in the summer, when they pose an additional danger to recreational nautical vessels. These effects of climate change are particularly pronounced on the coast facing the open sea.

Along with the Boka Kotorska Bay and the coastal sea outside it, the third spatial unit is the open offshore sea. This unit

includes the rest of the marine¹ area approximately outside the 12 Nm zone from the coast, i.e. outside the territorial sea of Montenegro. In this spatial unit, the intensity of use is significantly lower, and when it comes to forms of permanent use, there are currently only two lines of submarine infrastructure. In this area there is a waste disposal zone (immersion zone) of predominantly military origin, which is suitable for this type of disposal. In this marine spatial unit, there are also, for the most part, blocks for exploration and possible production of hydrocarbons. This exploration area can be considered a preparatory phase for the possible exploitation of hydrocarbons. In the possible phase of actual exploitation, this is the type of use for which, for given deadlines in accordance with the concession acts, fixed plants and installations have been set up, and of course the surface of the sea area that could be occupied is incomparably smaller than the exploration area. Table 3.1 shows the areas and shares of land use of the continental shelf, territorial and internal seas by the two described existing types of sea use.

As already pointed out, the highest concentration of activity at sea is in a narrow strip along the coast or within the borders of the internal sea. Thus, the ways of using the marine area are closely related to the development of settlements on land, including detached construction land areas outside settlements designated for residential (secondary housing) and commercial tourism. This is especially true of the Boka Kotorska Bay due

to the significant share of steep shores that precluded the development of settlements in the hinterland. The density of activities and functions on land that use the coastal sea is somewhat lower on the open sea due to its more difficult accessibility and exposure to weather conditions at sea, especially the effects of waves and winds.

Due to the concentration of maritime activities along the coast, most of them are in direct interaction with the functions on the mainland and are in a functional or logistical relationship with them. A typical feature of marine use is the fragmented structure of spatial units (zones) of use. Given the absolute dominance of coastal tourism, the facilities on the coast and in the coastal zone are predominantly in the function of tourism. Some of these facilities are spatially clearly defined (e.g. beaches and bathing areas, coastal nautical tourism infrastructure) and some are more fluid in nature and use the coastal sea more freely and thus often pose a challenge in terms of navigation safety. This especially refers to smaller vessels of nautical tourism and in particular to sports and recreational activities at sea of the daily type (various types of recreational vessels for daily use).

3.1.2. Strategic issues of marine spatial planning in Montenegro

There are several key strategic issues of marine spatial planning specific to Montenegro. The first is the broader issue of sustainability of spatial development of the entire coastal area of Montenegro and especially some parts facing higher pressures (Budva coast, parts of the Boka Kotorska Bay). Coastal land consumption and expansion of construction areas (anthropogenization popularly and critically called “apartmentization” and “concreting” of the coast) often results in loss or disturbance of natural, landscape and ecological values, which reduces the potential for sustainable tourism development in the future. Thus, on the one hand, the underdevelopment of other economic sectors generates

Table 3.1. Areas according to the GIS database, built for marine spatial planning in Montenegro

	Sea surface km ²	Hydrocarbon exploration area km ²	Percentage %	Waste disposal zone km ²	Percentage %
Continental shelf	3,869.1	1,761.8	45.5	50.4	1.3
Territorial sea	2,075.4	1,364.1	65.6	15.1	0.7
Internal sea	391.5	40.1	10.3	0	0.0
Total	6,336.0	3,166.1	50.0	65.5	1.0

¹ These are not formally set boundaries, but an attempt at conditionally homogeneous regionalization of the marine area guided primarily by functional criteria, i.e. the density and intensity of existing and planned use.

increasing pressure on space as a tourist resource (including related real estate business), and after some time overly touristized and inadequately urbanized space loses its attractiveness for developing quality, high-income tourism. These processes are necessarily reflected in the narrowest coastal zone (coastal setback zone) and even in the marine environment. In terms of regional values, the coastal sea and land areas form a unique landscape. Overbuilding as well as oversized and aggressive physical structures on the coast also diminish the potential for the development of some maritime activities. On the other hand, some maritime activities, such as beaches and bathing areas, which represent a limited spatial resource, are overcrowded. Last but not least, there is often the problem of the inadequate disposal of municipal wastewater that pollutes the sea, especially closed aquatoria. The described spatial development in the coastal area grows into a tacitly accepted dominant development model where valuable coastal land becomes commodity on the market and input raw material for profit-making, most often through real estate projects involving secondary housing. Unfortunately, places with high natural and landscape values are essential for this development model.

From the described perspective, the challenge of harmonizing development pressures on the Boka Kotorska Bay with its physical, ecological and socio-cultural carrying capacities stands out. Within this area, a special challenge is the Bay of Kotor-Risan as an extremely valuable natural and cultural-historical area on the UNESCO list, which is exposed to urbanization pressures, especially from secondary housing and real estate business as well as pressures at sea and consequently on land from cruising tourism. Regarding cruising tourism, the issue of existence and possible evaluation of alternative port infrastructure options for cruise berths and transfer of passengers to the mainland is highlighted. In addition, there is a need to develop a plan for managing the flow of cruise ships and their passengers and visitors in the area of Kotor and Bay of Kotor.

The second strategic issue is the **compatibility of the planned use of hydrocarbons** in an area that is very close to the coastal area of Montenegro, where a significant part of Montenegro's GDP is generated through coastal tourism. In order to be able to make informed decisions about the level of risk for coastal tourism and thus the entire Montenegrin economy, information is needed, among other things, on the final findings of exploration wells and the economic potential of hydrocarbon exploitation and appropriate detailed environmental impact assessments. For this type of use of marine areas, and given the intensity of possible environmental impacts, their cross-border consideration is very important, which is one of the formal obligations in the process of marine spatial planning determined by the current Act on Spatial Planning and Construction.

The third important issue is **marine protected areas**, which were proposed on the basis of the implemented preparatory activities at three locations, among which Nature parks Platamuni and Katič were recently formally established. Apart from their direct importance for the preservation of marine biodiversity, these areas are also important as a kind of green wedge, i.e. parts of the coastal natural landscape that will be preserved both on land and at sea from intensive urbanization processes or unacceptable maritime activities. Marine protected areas also become attractive for controlled visits by tourists and other visitors, especially when they receive the appropriate interpretive infrastructure, which makes them an important part of the tourist offer.



Figure 3.3. Intensive construction: Igalo (S. Vilus)



Figure 3.4. Dispersed construction of low architectural quality: Luštica (A. Mlakar)

3.1.3. Starting points for defining marine uses

In defining marine uses, the starting point is the existing state of use and the inherited rights of use, especially those based on prescribed procedures and acts for use. For more detailed planning of the coastal sea area, it has already been emphasized that it is inseparable from spatial planning of the land. Maritime sectors expressed their interests and requirements in terms of their spatial needs for marine uses. Some of these interests are formally expressed by the adopted sectoral and spatial planning documents and some less formally through the participation procedure.

Table 3.2 below provides a tabular overview of the recorded major spatial needs for all maritime activities. Given the current presence and economic importance, the following maritime activities are discussed in more detail below:

1. Maritime transport including maritime navigation and the port system;
2. Fisheries and mariculture;
3. Coastal tourism, i.e. bathing areas and beaches, as well as sports and recreational activities at sea.

Maritime transport and maritime economy

Today's importance of the maritime economy in Montenegro, i.e. its contribution to the national economy, is only a small part of the potential of this sector and is far below the former level of development. According to the SPCAM (2018) data, for example, the share of shipping in the GDP of Montenegro in 1980 was 24%, while the current contribution, due to the modest fleet capacity and low employment (according to existing data) is measured in fractions of a percentage. Montenegrin cargo ports have used (on average) only about one third of their capacity in recent years, while shipbuilding and ship repair have almost died out. Employment in shipping, ports and shipbuilding is measured in hundreds of jobs, which is an extremely low number considering the level of development from the 1980s and the maritime tradition of the region. Although precise data for Montenegro do not exist, available analyses (e.g. analysis done for the Maritime Economy

Table 3.2. Tabular presentation of spatial needs for marine uses according to the prescribed obligations, development plans and expressed interests

Maritime activities	Spatial needs for marine uses according to the prescribed obligations, development plans and expressed interests
1.1 Maritime navigation – waterways	<ul style="list-style-type: none"> ▪ prescribed activities to improve the safety of maritime navigation across the sea
1.2 Port system – ports of national importance	<ul style="list-style-type: none"> ▪ planned expansion of the port of Bar, development of additional coastal infrastructure for the reception of cruisers, planned additional equipment of the port of Kotor for the reception of cruisers
1.2 Port system – ports of local importance	<ul style="list-style-type: none"> ▪ planned construction and expansion of the nautical tourism port Risan and construction of NTC Kotor
1.2 Port system – berths and ports	<ul style="list-style-type: none"> ▪ possible, through the formation of new ports and moorings on existing and planned operational shores, in the function of communal and commercial use ▪ planned development of local public transport, especially in the Boka Kotorska Bay
2.1 Fisheries	<ul style="list-style-type: none"> ▪ planned and prescribed places of first landing of caught fish and other marine organisms ▪ prescribed and protected fishing posts ▪ prescribed protected fishing areas ▪ prescribed zones of spatial and temporal regulation of fishing (swimmers, trawls, ...)
2.2 Mariculture	<ul style="list-style-type: none"> ▪ planned zones suitable for mariculture, possible additions
3.1.1 Coastal tourism – bathing areas and beaches	<ul style="list-style-type: none"> ▪ possible, through arranging new bathing areas according to the needs of future tourist development or changing the type of existing ones
3.1.2 Coastal tourism – sports and recreational coastal activities	<ul style="list-style-type: none"> ▪ possible, through the conversion or arrangement of new bathing areas for active holidays
3.2.1 Marine tourism – nautical (yachting)	<ul style="list-style-type: none"> ▪ planned by spatial planning documents for the construction of several tourist moorings within selected tourist zones, ▪ planned construction of nautical tourism ports (Risan, NTC Kotor, ...) ▪ planned arrangement of several nautical anchorages in the Boka Kotorska Bay (prepared studies with site analysis and technical and technological solutions)
3.2.2 Maritime tourism – cruising (tourist cruises)	<ul style="list-style-type: none"> ▪ possible, through the planning of new cruise terminals (Boka Kotorska Bayr, Bar, ...), preliminary research in progress
4 Underwater cables and pipelines	<ul style="list-style-type: none"> ▪ planned Adriatic-Ionian gas pipeline, development of conceptual design in progress
5 Exploitation of mineral resources	<ul style="list-style-type: none"> ▪ planned investigative works, in progress ▪ possible exploitation of hydrocarbons depending on the results of exploration wells ▪ possible exploitation of marine sand sediment in the function of cultivating beaches
6 Dredging and disposal of extracted material	<ul style="list-style-type: none"> ▪ carried out regularly at several locations (NTC Kotor zone, Port Milena canal, Bojana river mouth, ...) ▪ Remediation dredging is planned in the waters of Bijela shipyard and in the waters of the Portomontenegro marina
7 Coastal protection structures	<ul style="list-style-type: none"> ▪ possible, based on already made and additional studies at 4 locations
8 Military use	<ul style="list-style-type: none"> ▪ no data
9 Marine protected areas	<ul style="list-style-type: none"> ▪ planned activities to establish a management system for Nature parks Platamuni and Katič ▪ planned establishment of the additional marine protected area (Stari Ulcinj Island) ▪ conducting protection activities for other protected areas on the coastline
10 Underwater cultural heritage	<ul style="list-style-type: none"> ▪ possibly, through new underwater archaeological and other research ▪ implementation of activities for the protection of existing sites

Development Strategy) also indicate that the overall share of the maritime economy in GDP and employment is significantly below the levels in other Mediterranean countries.

In the last ten years, there has been a significant decline in the volume of maritime passenger traffic, so that in 2017 the number of passengers in the three main Montenegrin ports was just under 23,000. Compared to ten years ago, the number of passenger ships calling at the Port of Bar has decreased by more than 3 times. At the same time, the number of cruisers in the Port of Kotor has more than doubled, while in the last 5 years the number of visitors from cruises has been around half a million a year. Preliminary data from Monstat for 2019 show that the number of visitors from cruise ships has approached 650,000. In recent years, the port of Bar has also begun to position itself as a cruise dock destination, with the number of ships increasing from 7 in 2016 to 27 in 2019, while the number of passengers reached 26,000 (MORT data, February 2020).

The degree of capacity utilization of major cargo ports has varied significantly over the past decade. In the case of the Port of Bar, the lowest transshipment volume of 770 thousand tons was recorded in 2009, which was only 15% of the projected capacity. In 2017, the capacity utilization rate reached 63%. Oscillations in the volume of transshipment and the degree of capacity utilization were somewhat more moderate at the Port of Adria, where in the period 2010-2017, about 400 to 800 thousand tons were transshipped annually, which means that the port operated with a capacity of about 15-30%.

The development plans in the Maritime Economy Development Strategy are ambitious and envisage (by 2030 compared to 2018):

1. Doubling the volume of transshipment in the main cargo ports (Port of Bar and Port of Adria) to about 3.14 million tons;
2. Increasing the number of transshipped containers in Montenegrin ports by about 2.4 times;

3. Increasing the gross tonnage of the Montenegrin merchant navy to 450,000 GT (from about 100,000 GT);
4. Increasing the number of active business entities in the field of blue economy from 488 to 750;
5. Doubling the number of nautical ports (from 5 to 10) and the number of vignettes issued (from 5,076 to 10,000);
6. Doubling the number of shipyards and ports intended for the construction and overhaul of yachts and mega-yachts (from 2 to 4).

Port system

One of the strategic goals of the development of the port system of Montenegro is the positioning of the trading port of Bar as a port of regional importance. In addition to strengthening the traffic connection of the Port of Bar, there are plans to expand or build new piers as well as renew the existing port infrastructure. Increasing the port capacity will enable the construction and arrangement of a new port area from the existing main breakwater to the top of Volujica hill, which consists of the following hydrostructures: a new breakwater at the top of Cape Volujica in the length of 1,665 m and a protective breakwater in the length of 330 m; a new pier with an operational shoreline of 1,500 m in length, which was obtained by reconstruction and extension of the existing main breakwater, on which six berths were obtained; two new piers 600 m long and 100 m wide, on which a total of 14 berths are constructed. Inside the pool, a turntable with a radius of 500 m is formed. According to these plans, the spatial needs for the development of the port are increasing in terms of the construction of new breakwaters and the expansion of the port's waters to the west, which will require the repositioning of the southern anchorage of the Port of Bar. The development of the Port of Bar should enable an additional 5 million tons of annual transshipment of goods, thus reaching the level of utilization of the total capacity of the Port of Bar of 12 million tons determined by the Spatial Plan of Montenegro. SPCAM in the Port of Bar also sees the main intermodal terminal in the coastal area of Montenegro, where truck terminals, Ro-Ro terminals, container terminals and other previously mentioned port infrastructure are planned.

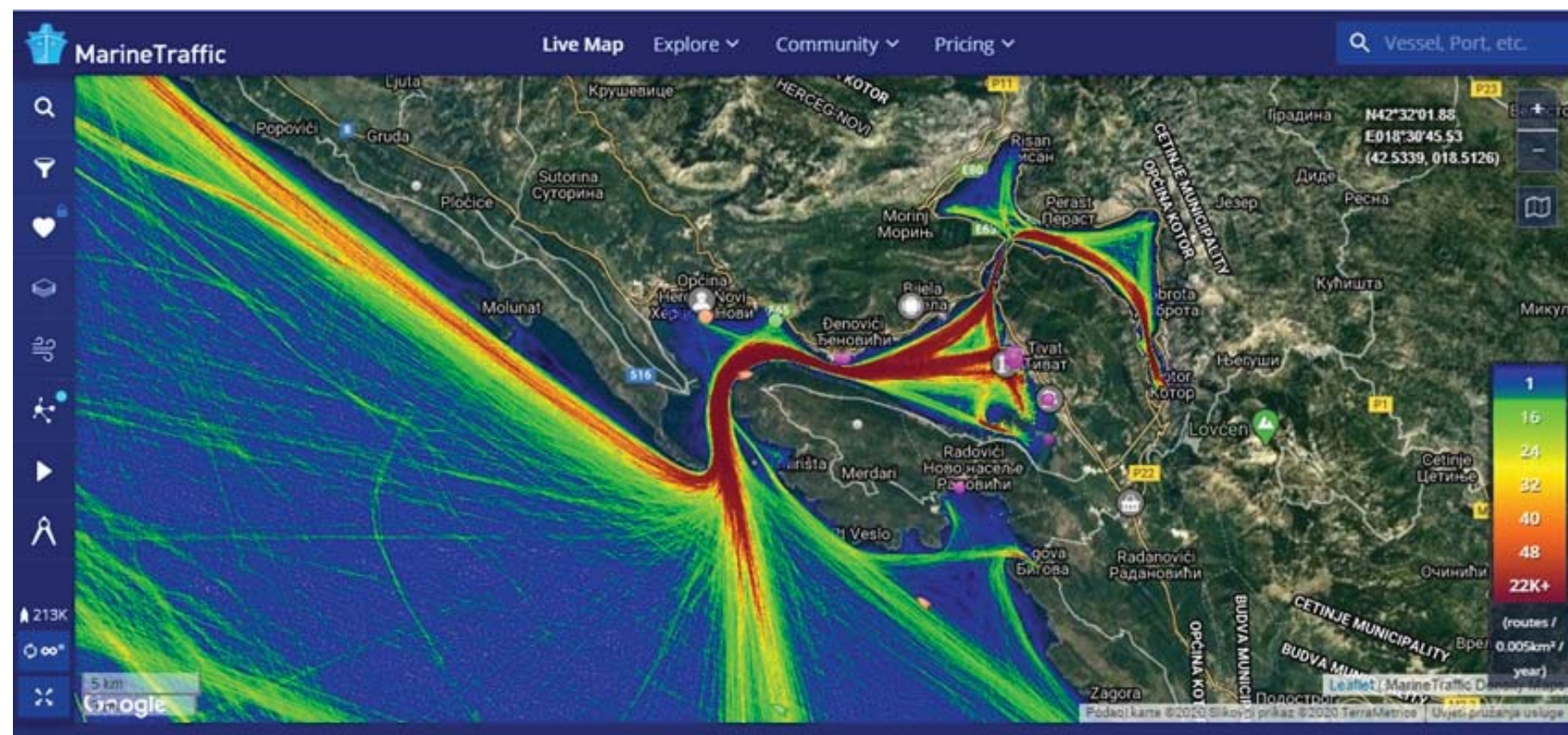


Figure 3.5. External access channels in the Boka Kotorska Bay for passenger and pleasure ships, illustration based on AIS data (source: Marine traffic)

According to the aforementioned, the Port of Bar continues to develop as the main international cargo port in Montenegro, and depending on the transport and distribution requirements and economic opportunities, freight and transport centres can be realized in Zelenica and Lipci.

The Port of Kotor is segmented into two basic units: the port and the marine part. The operational zone of the waters of the port of Kotor covers a total area of approximately 52,000 m². The operational shore intended for mooring ships and mega yachts consists of berths I and II. Berth III on the northern side of the operational shore (approximately 76 m² long) is used for mooring smaller vessels – ships of max draft 4.00 m as well as mega yachts during free traffic and ferries at the aft berth. The operational shore offers quality conditions for the reception of ships about 250 meters long, depending on the draft of the ship. Plans for the Port of Kotor include adaptation, reconstruction, building and equipping the port for the activities of a trading port open for international traffic, with an emphasis on the tourist-passenger segment. It is also planned to increase the capacity of receiving ships at the port berth and providing cruise ships at anchor, by installing temporary buoys for mooring ships. This would significantly improve the safety and security of moored ships, especially in difficult weather conditions. Systemic improvement of the marine part in the southeastern part of the waters of the Port of Kotor includes the improvement of anchor, mooring, electrical, water supply systems, as well as access bridges that have a built-in access control system. This modernization of the marine infrastructure will enable system improvement for the charging and reservation of berths.

The Port of Zelenika functions as a trading port open to international marine traffic and, accordingly, the function of a border crossing at which foreign nautical vessels (pleasure crafts) perform the necessary procedures upon entering the territorial waters of Montenegro. Great depths at the port approach and in the port aquatorium, with the absence of obstacles for navigation, enable unhindered and safe entry into the port. The port of Zelenika still does not meet all standards stipulated by the regulations as necessary for passenger traffic, but there is room for adequate utilization of this port and its opening for the reception of ships as an alternative to Kotor.

Fisheries and mariculture

Despite a long tradition, sea fishing is (generally speaking) underdeveloped and coastal. The key activities are net fishing, trawling and small-scale coastal fishing. Commercial fishing on the high seas has developed somewhat more seriously only during the last decade and is mostly done with bottom trawlers.

In the last few years, the estimated biomass of benthic species (fishing) in Montenegrin waters ranges from 2,500 to 2,700 tons, while the maximum sustainable yield (MSY) of these resources averages about 600 tons per year. The estimated biomass of small blue fish is 10 to 15 thousand tons, while the maximum allowed level of use is around 3,000 tons per year. Due to the lack of monitoring, only a rough estimate of the biomass of coastal species of fish, crustaceans and cephalopods caught by small-scale coastal fisheries is available. The estimate is based on long-term statistics on trawl and coastal species catches on the eastern Adriatic coast, which show that coastal species biomass could be around 1,100 tons.

Annual catches have increased significantly in the last two years, exceeding, for the first time, 1,000 tons in 2018: 787 t of blue fish, 240 t of white, 43 t of cephalopods and 50 t of crustaceans (plus 20 t of other fish). Thus, the catch has almost doubled compared to the years before 2018, when the average catch was around 600 t. The blue fish category is dominated by sardines and anchovies (with a catch of 304 and 188 tons, respectively, in 2018). The recorded catch is significantly below the maximum possible and sustainable level (3,000 t for blue fish).

According to Monstat data, in 2018, there were 175 license holders in the sea fishing sector, while the total number of hired crew was 580, most of which were temporary. Compared to 2015, these figures show a significant increase of almost 30% when it comes to licensees and over 70% when it comes to the employed crew. The main challenges for the further development of sea fishing and mariculture relate to the provision of logistical support on land and further selection and development of mariculture sites, especially in view of multiple pressures in the Boka Kotorska Bay which has been identified as extremely suitable for fish and shellfish farming. Logistical support on land for sea fishing means the



Figure 3.6. Bar and Port of Bar (S. Vilus)

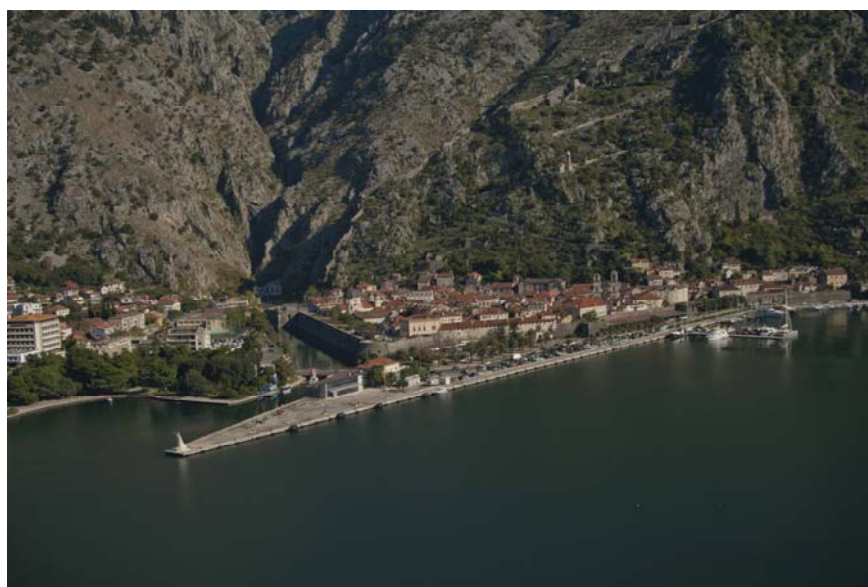


Figure 3.7. Kotor and Port of Kotor (S. Vilus)

development of infrastructure, i.e. the establishment of the place of first disembarkation, the place of first sale, the place for mooring fishing boats in ports, places for overhaul of fishing boats and similar. The preparation of documentation for the construction of a fishing port in Ulcinj (Cape Đerane – Port Milena) is in progress.

The current Fisheries Development Strategy of Montenegro provides guidelines for the development of fisheries in the context of Montenegro's general commitment to pursue an EU accession policy. The key development goals of the sector are divided into short-term and long-term ones. The short-term goal in terms of utilizing existing resources is the activation and modernization of the fleet, and the establishment of appropriate market channels to ensure the economic viability of this activity. The first step in this regard is the provision of land infrastructure (ports, landing sites, storage facilities).

Development of a sustainable aquaculture sector through modernization of existing farms in both segments – mariculture and freshwater aquaculture to increase production, as well as strengthen the competitiveness and efficiency of this sector, while respecting high environmental and animal health and welfare standards. In addition to species that are already farmed (sea bass, gilthead bream, trout, mussels, oysters), Montenegro sees the development of aquaculture in the production of other species that have not been recorded in Montenegrin farms, primarily in the segment of shellfish farming, with preference given to indigenous species farming.

Within the established mariculture zones, based on the species of fish and other marine organisms that are farmed, projected economic profitability, farming technology, etc., the location for performing mariculture activities (farm), at the proposal of the Institute of Marine Biology, is determined by the competent ministry that prescribes the conditions, manner of performing and restrictions of fishing and other activities in:

- mariculture zones;
- waters flowing into mariculture zones;
- on land or waters bordering mariculture zones.

The Ministry may propose the abolition or change of the boundaries of mariculture zones to the state administration body responsible for planning and spatial planning.

Coastal tourism

Tourism as a branch of blue economy includes coastal and marine tourism, i.e. activities that are directly related to tourist visits – transport and accommodation of tourists, provision of other services (food and drink, cultural and recreational activities, etc.) – in coastal areas. The coastal area of Montenegro includes the Coastal Region or the territory of 6 coastal municipalities.

In a narrower sense, coastal tourism refers to visits where tourists are accommodated in accommodation units on land or in tourist areas and tourist places on or near the coast in a way that the tourist product is based largely on tourist infrastructure and tourist attractions related to the sea. Land-based accommodation units can be in all types of tourist business facilities from hotels, tourist resorts, villas and multi apartment buildings through individual apartments and rooms for rent to campsites.

Unlike coastal tourism, maritime tourism includes cruising and yachting (nautical) tourism, where the important difference is that tourists usually have accommodation on vessels. Vessels, private or commercial, can be located in:

- nautical tourism ports;
- moorings offering commercial berths;
- nautical anchorages with buoys or with the use of vessels' anchor systems;
- other locations at sea where anchoring is not prohibited and which offer appropriate conditions for a safe stay at sea.

A specific, although always small, niche consists of those tourists/visitors who combine stay or accommodation on their own or rented boats (yachts) and tourist resorts/hotels. These are tourist resorts/hotels that combine the offer of land accommodation units and berths in marinas or moorings within the same tourist functional unit.



Figure 3.8. Fishing at fishing post (A. Joksimović, Institute of Marine Biology)



Figure 3.9. Mariculture (M. Mandić, Institute of Marine Biology)



Figure 3.10. Budva (S. Vilus)



Figure 3.11. Miločer and Sv. Stefan (archive of the National Tourist Organization of Montenegro)

According to the relevant ministry, total revenues from tourism in Montenegro in the past few years have exceeded one billion euros (1.14 billion in 2019), while the Economic Reform Program (PER) projects tourism revenues at 1.3 billion euros in 2022 (PER, 2020). Tourism is one of the key economic sectors and growth generators in Montenegro. As already mentioned, the latest estimates of the WTTC (for 2019) show that close to one third of the national GDP (around one and a half billion Euros) is generated in activities that are directly or indirectly related to tourism and travel, which is why growth in this sector was of over 6%, twice as high as GDP growth. The total employment contribution is estimated at 66,900 jobs, accounting for more than a third of the country's employment. Consumption by foreign guests is estimated at EUR 1,132 million or close to 48% of total exports (World Trade and Tourism Council, 2020).

Since the middle of the previous decade, coastal tourism, measured by physical indicators, has returned to the level of the golden years of Montenegrin tourism (mid-1980s), with more than 10 million overnight stays per year. Monstat data for 2019 show that this is a record year with a visit of almost 2.3 million tourists and more than 13.7 million overnight stays, which is twice the number of guests compared to 2010 and 79% more overnight stays. The number of inhabitants and tourists as well as the available indicators of physical capacity and load of sea beaches and bathing areas by municipalities of Montenegro are given in Table 3.3.

During the last decade, between 85 and 91% of the total number of arrivals and up to 97% of the total number of overnight stays were realized in coastal places, so for further analysis it is assumed that about 95% of tourist traffic is realized in the coastal area (i.e. part of the blue economy). In absolute terms, this means that (observing 2018) the tourism sector generated a GDP of around EUR 700 million, of which around 664.5 million in the coastal area. Having in mind further estimates that the GDP of the coastal area makes 28.5–30% of the national one, it can be concluded that about half (47.5–50%) of the GDP of the coastal area is generated from tourism.

The main tourist product in the coastal area is bathing or beach tourism. In addition, there are other, less represented products such as business tourism, nautical (yachting) and cruising tourism, and health and cultural tourism.

Tourism development plans were very ambitious, and over time proven to be largely unrealistic. The strategic goals of the innovated Master Plan (Tourism Development Strategy, 2008) for tourism development until 2020, for example, were aimed at improving economic performance through the creation of a diversified tourism product on the coast and year-round openness, which has been only partially achieved. The Master Plan targets, for example, were set at 100,000 hotel beds on the coast by 2020 (half of which in the 4 and 5 star categories), while the total number of beds on the coast was planned at 279,000 (93% of the total 300,000 in the country). Data shows that by 2017 the total planned number of beds had been significantly exceeded, but that the real structure was much more unfavourable than the Master Plan projections: the number of hotel beds was around 46,000, and the share of 4 or 5 star hotels in this number was only 34%. On the other hand, private accommodation in 2017 was about 1.8 times higher than planned for 2020. In addition to the fact that the extension of the tourist season was much slower than planned for by the Master Plan, this contributed to the failure to achieve other target values, so that in 2019 (in the whole country) there were 14.46 million overnight stays, of which 4.68 million or 32% in collective (which includes hotels but also motels, tourist resorts, boarding houses, etc.), and 9.78 million in private accommodation (Monstat, online data for 2019). The Master Plan envisioned 39.6 million overnight stays in 2020 (nationwide), of which about 55% in hotels, with a target hotel occupancy of 194 days per year. The Sector study for the development of SPCAM – Tourism (2018) suggests that the Master Plan goals should simply be transferred to 2030.

If accepted, the stipulations of the Sector Study would constitute a rational proposal that would greatly save the coastal area from further construction and improve economic performance while protecting the environment and especially valuable natural and cultural heritage. The main challenges for

the realization of such a scenario would be the provision of funding sources and further development of the quality of the offer, and the conversion of private accommodation into middle-class hotels is not easily achievable (even with the availability of financial resources). A no less important challenge is the ability of the system (including the planning and construction sectors) to resist the demand for holiday apartments and apartment-type accommodation. Alongside these goals, the problems of inadequate infrastructure (traffic, infrastructure for the treatment and disposal of waste and wastewater) should be addressed and the preservation of the attractiveness and functionality of built areas should be ensured.

Previously, a broader framework for tourism development planning in the coastal area was given, and in a narrower sense, the subject of marine spatial planning related to coastal and marine tourism constitutes activities of tourists at sea and the appropriate spatial regulation of such activities:

- the safe and undisturbed conduct of tourist activities at sea, from the use of beaches and bathing areas to sports, recreational and other activities at sea;
- enabling the creation of a quality and attractive tourist offer of coastal and marine tourism, and ensuring sustainable economic operations in order to achieve socio-economic benefits for all citizens;
- ensuring the unhindered use of the sea by other marine activities, taking into account the established development and protection goals and priorities, as well as other criteria of marine spatial planning.

Table 3.3. Capacity and burden indicators for sea beaches and bathing areas

Municipality	Herceg Novi	Tivat	Kotor	Budva	Bar	Ulcinj	Total for the region
Population 2019 estimate	30,597	15,069	22,753	22,061	44,028	20,191	154,699
% of total	20.1	9.7	14.8	13.7	28.6	13.2	100
Total coastal length (km)*	68.12	57.45	80.35	47.77	56.35	50.41	360.45
% of total	18.9	15.9	22.3	13.3	15.6	14.0	100.0
Length of undeveloped shoreline (km)**	42.58	34.24	50.14	36.78	36.80	44.56	245.10
% of total	17.4	14.0	20.5	15.0	15.0	18.2	100.0
% in municipality/region	62.5	59.6	62.4	77.0	65.3	88.4	68.0
Number of current tourist beds	Data not available						
% of total	Data not available						
Number of planned tourist beds	19,360	29,580	7,110	41,740	14,970	44,400	157,160
% of total	12.3	18.8	4.5	26.6	9.5	28.3	100.0
Total number of tourists for 2019	383,048	161,153	170,852	918,663	210,789	425,808	2,270,313
% of total	16.9	7.1	7.5	40.5	9.3	18.8	100.0
Number of beaches and bathing areas 2020	127	40	40	144	79	73	503
Total beach area 2020 (m ²)	99,000	56,000	42,000	328,000	198,000	887,000	1,610,000
% of total	6.1	3.5	2.6	20.5	12.3	51.9	100.0
Total beach length 2020 (m)	10,388	3,597	3,561	12,474	7,702	12,234	49,956
% of total	20.8	7.2	7.1	25.0	15.4	24.5	100.0
% in municipality	17.1	8.6	5.3	30.7	17.4	20.9	15.9

* length calculated on the basis of the official coastline of the Real Estate Administration and used in the GIS database,

** length calculated on the basis of the analysis Application of selected indicators for monitoring and assessing the sustainability of spatial development of the coastal area of Montenegro from 2013.



Figure 3.12. Lučica (Z. Klarić)



Figure 3.13. Ada Bojana, before (archive of NTO of Montenegro)

Coastal tourism – bathing areas and beaches

Montenegrin beaches are the most attractive and most important segment of the summer tourist offer with a length of about 50 km and over 500 beaches classified by type in order to meet all types of tourist demand. These existing bathing areas are used during the summer for bathing and recreation with an estimated capacity of about 300,000 simultaneous users – bathers.

Beaches are an immense treasure for Montenegro, which should be nurtured, protected and rationally used. This is especially true in the area of the Boka Kotorska Bay, which has very few natural, sandy and spacious beaches that correspond to the market image of sun and sea products. The beaches are narrow and small, conditioned by the geomorphology of the area, with slopes that descend from all sides of the Boka Kotorska Bay. Due to the obvious lack of beach areas, most interventions in the marine domain have occurred in this area in the form of the creation of artificial, concrete bathing areas. Due to the provisions of the Act on the Protection of the Natural and Cultural-Historical Area of Kotor and its status as a UNESCO site, there can be no shift of the coastline, i.e. intervention in the expansion of beaches. This is very important due to the fact that this area contains the smallest beaches on the Montenegrin coast, and the entire municipality of Kotor has the largest difference between the carrying capacity of beaches and the pressure on these beaches.

Budva and Bar riviera are characterized by numerous natural sandy and pebble beaches, laid among the crescent-shaped rocks, while the most impressive long, spacious and sandy beaches are located in the Ulcinj area.

3.2.

State and Pressures on the Marine Environment

Biodiversity: Marine habitats and species

The marine environment of Montenegro is extremely important from the aspect of biodiversity. Out of the rare habitat types significant for protection, **coralligenous habitats** make up 0,14% of the seabed. The largest communities are on the stretch Luštica-Donji Grbalj, including Cape Jaz, Cape Rep and Vučja Vala (near Valdanos). Important coralligenous habitats are present in the Boka Kotorska Bay at six locations (Strp, Perast, around the western part of Perast, around the islands of Sveti Đorđe and Gospa od Škrpjela, Dražin vrt and Verige). Associations of particularly rare coralligenous species *Savalia savaglia* and *Leptogorgia sarmentosa* are present in Dražin Vrt, and encompass an area of about 5,000 m².

Seagrass beds make up 2.47% of the total seafloor surface and locations of particular importance are the Traše bay, area in front of Budva, wider Katič zone including Buljarica, Platomuni, Valdanos. A significant location in the Boka Kotorska Bay is Dobrota because there seagrass meadows occupy a total area of 21,000 m². Other significant locations are Novski zaliv, Igalo-Njivice and Mamuli-Luštica.

In addition to significant habitat types, the significant presence of protected species in accordance with national and international legal frameworks is evident, such as some rare species of algae, mollusks, crustaceans, echinoderms and fish. Platomuni, Ratac, Sveti Đorđe, Verige, but also locations around the islands of Gospa od Škrpjela, Sopot, Dražin Vrt and Strp (Map 3.1) can be singled out as valuable locations with a large number of significant species.

These areas are extremely important in terms of protection due to their value (Map 3.2) and, consequently, vulnerability due to existing pressures and vulnerabilities stemming from new activities.

Map 3.1. The abundance of significant species at selected research sites

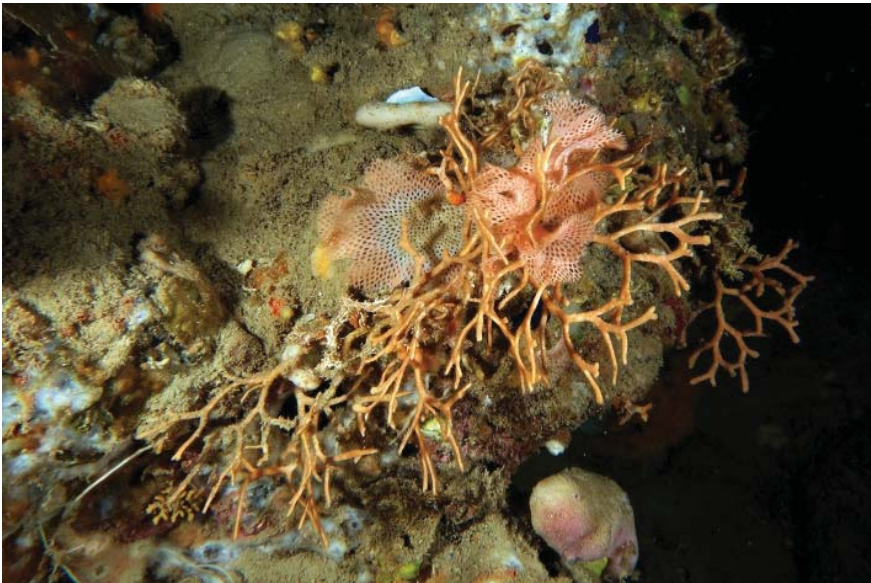
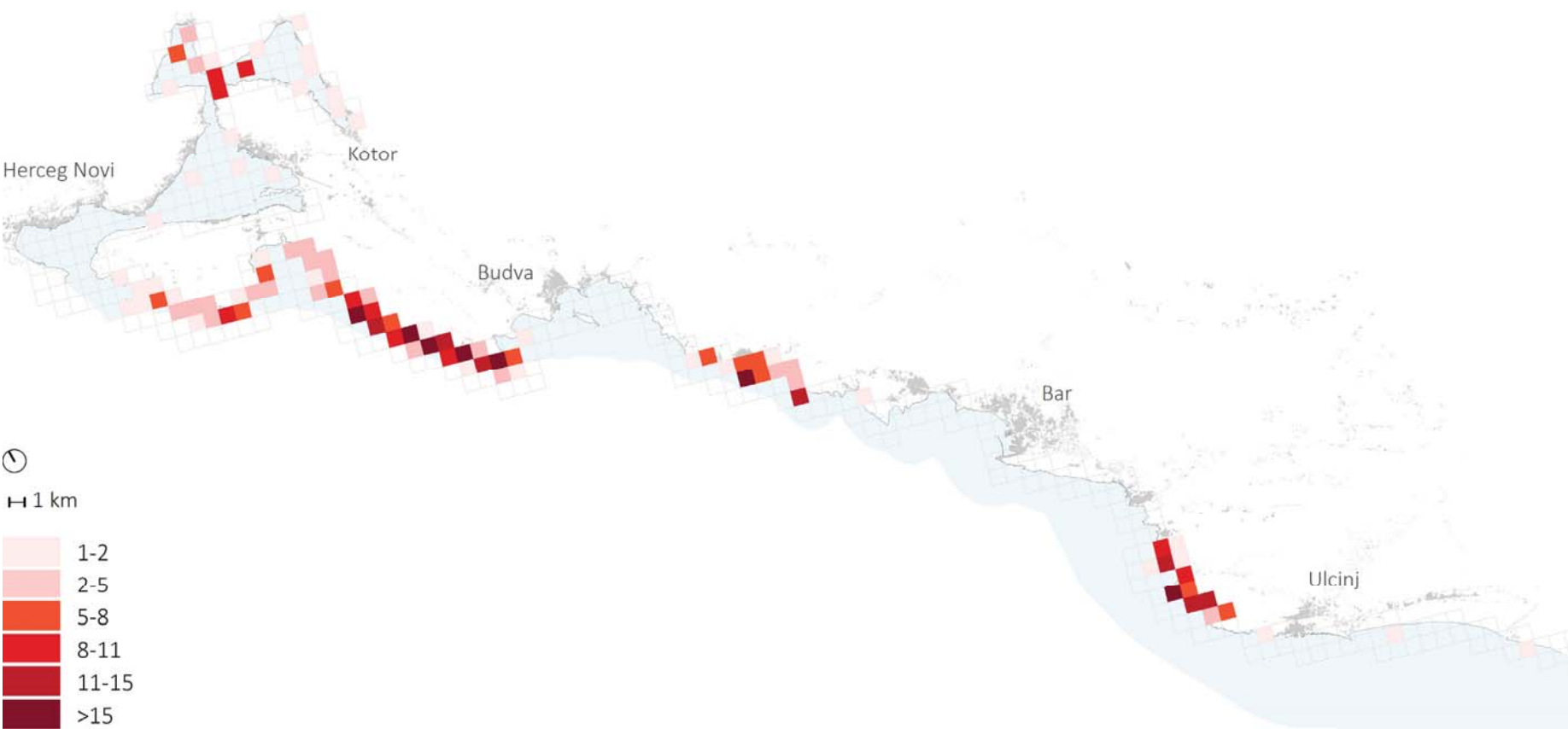
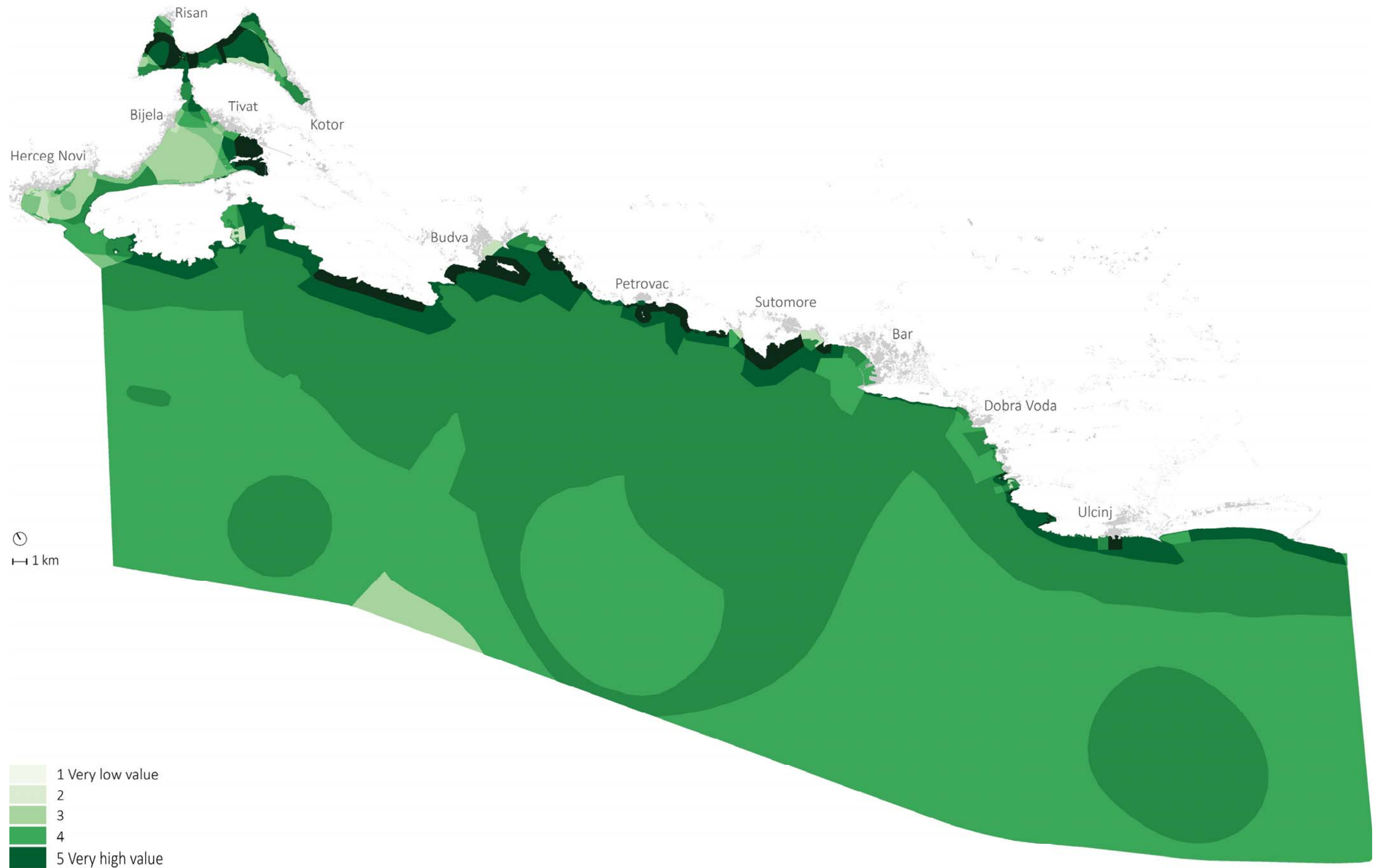


Figure 3.14. Coralligenous habitat (UNEP/MAP-RAC/SPA, 2016)



Figure 3.15. Posedonia oceanica habitat (UNEP/MAP-RAC/SPA, 2016)

Map 3.2. The combined value of biodiversity and landscapes



The Adriatic Sea is also important as a habitat for **pelagic species** of fish (small blue fish), sardines (*Sardina pilchardus*) and anchovies (*Engraulis encrasicolus*), which are very important in fisheries in the Adriatic. Along the east coast of the Adriatic Sea, sardines are far more common in the catch. Although sardines and anchovies are highly migratory species and their distribution varies greatly over a short period of time, some significant zones with an expected higher population density can be singled out. These zones are at the same time spawning zones, i.e. zones of intensive reproduction of anchovies. The first zone of high biomass density for both species is located on the stretch Platamuni – Budva, while the second zone is in the area in front of Ulcinj (Map 3.4).

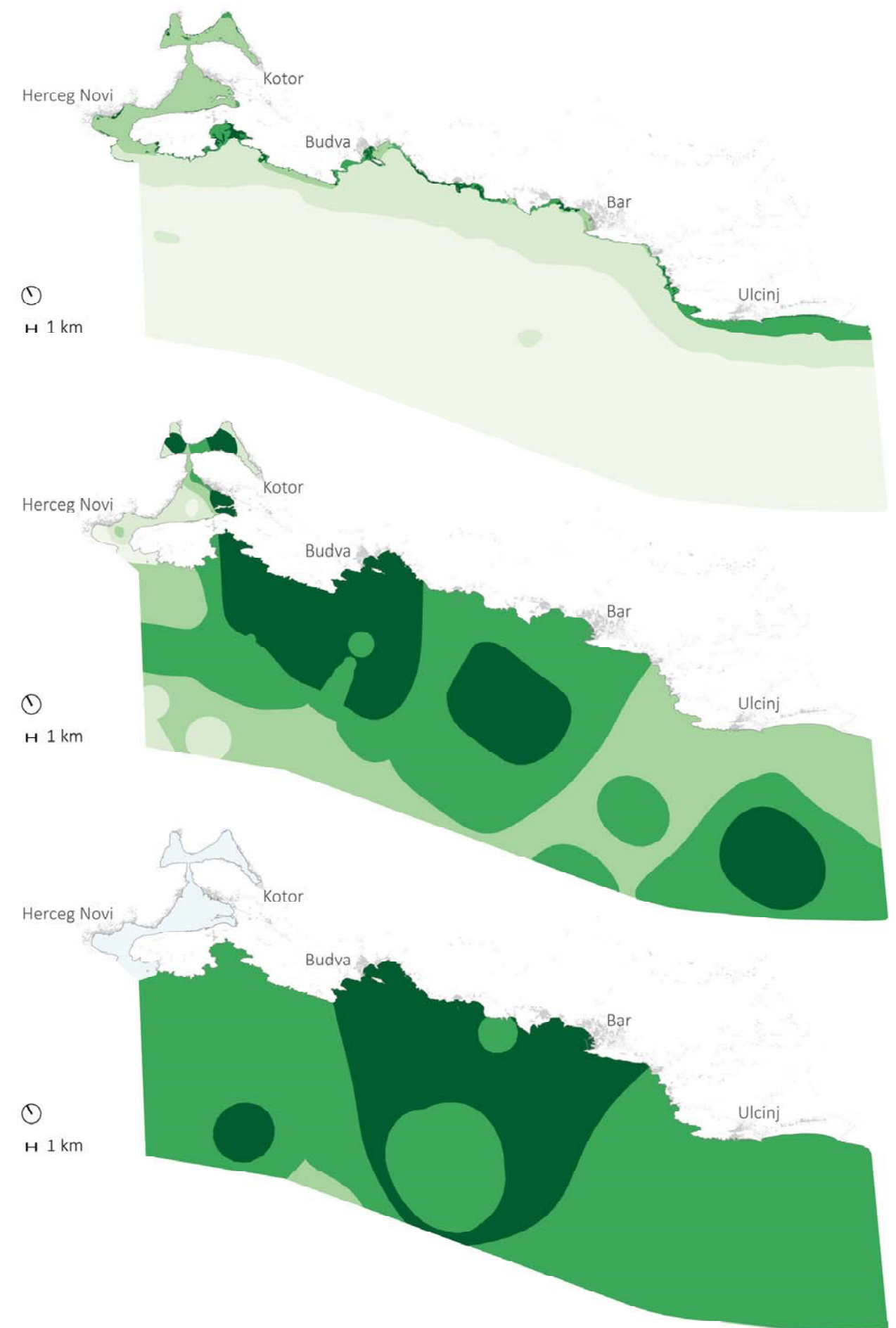
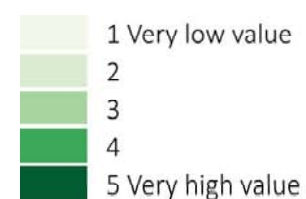
Of the **demersal fish species** (white fish), three key species are hake (*Merluccius merluccius*), mullet (*Mullus barbatus*) and shrimp (*Parpenaeus longirostris*), of which mullet is the most important. The area of recorded higher hake biomass intensity is in the northern and southern zones of the open sea. The very high value shrimp biomass is in the open zone towards the border of the territorial sea in front of Platamuni. The most important zones are the zones of the very high value mullet biomass from Cape Jaz to Dobra Voda. This area was rated as the most valuable area of biomass demersal resources (Map 3.5).

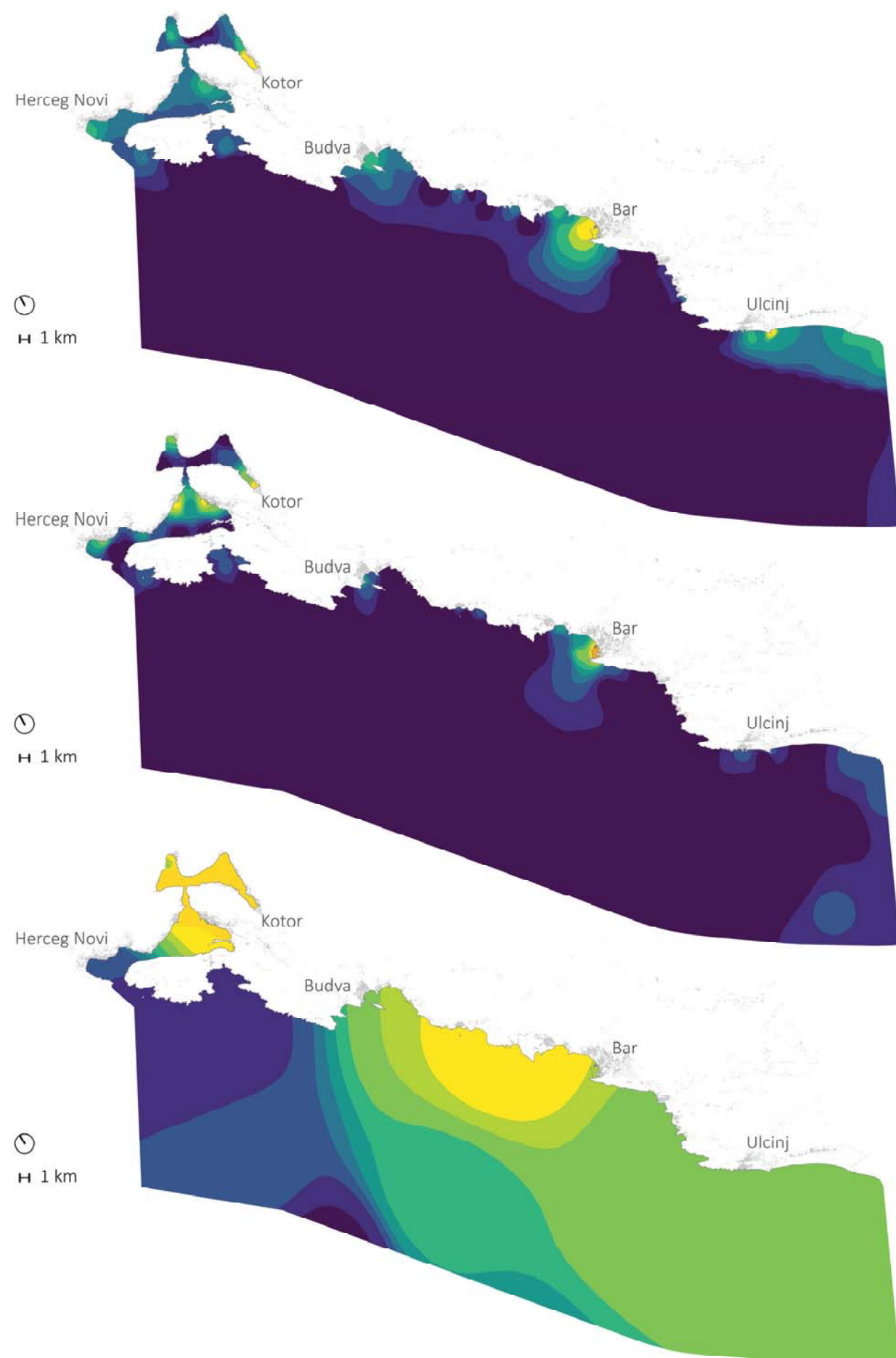
Although the total share of Montenegrin fishing in the Adriatic is 1-5% (depending on the species), **these areas could become controlled fishing zones, with the aim of ensuring greater reproductive capacity and livestock in Montenegrin fishing waters.**

Map 3.3. Habitat value assessment (until the end of the circalittoral zone)

Map 3.4. Overall assessment of the value of pelagic resources

Map 3.5. Overall assessment of the value of demersal species





Pressures on the Marine Environment

At the same time, some of these valuable areas are under significant pressures, primarily nutrients, contaminants and marine litter, mainly resulting from human activities on land (Map 3.9). The areas with the highest pressure were those with a large number of discharges and a significant **impact of inland nutrients on seawater trophism**, estimated poor water circulation and relatively high values of TRIX index and chlorophyll α (Map 3.6). Such locations can be found in the Boka Kotorska Bay from the narrow part of the Port of Kotor to the location of IBM in Dobrota, as well as the locations of Igalo, Zelenika, the coastal area near Kumbor and Risan Bay. This is mostly due to the intake of nutrients through unconnected discharges of municipal wastewater or seepage of septic tanks of private facilities, as well as the intake of nutrients by tributaries and groundwater from the hinterland. The closed nature of the bay, its shallow depth and low seawater exchange significantly contribute to this state. The most significant generator of growth of pressure on the marine environment is the constant increase in tourists and settlements along the coast, which is not accompanied by the construction of sewerage infrastructure at an appropriate pace.

In the open part of the coast, locations with the highest estimated pressure are the locations of the waters of the port and marina of Bar and the waters of the Port Milena canal. In addition, areas with higher pressure are mainly the locations of ports and outflows of larger sewage outlets such as: Budva-Bečići, middle of Bar Bay and Sutomore, location of sewage outflow near Volujica, location of Ada Bojana. The inflow of fresh water enriched with nutrients, unregulated discharges of hotels on Velika plaža that are drained in Port Milen, inflow of wastewater from the Bratica stream, as well as input through torrent streams and canals that bring pollution to the coastal part of the aquatorium significantly contribute to the assessment of increased pressures. Underwater outlets in the open part of the coast are mostly at greater distances from the coast and at depths of over 20 m.

Map 3.6. Assessment of the level of impacts related to the trophic status of the marine environment

Map 3.7. Assessment of the level of pressure of contaminants on the marine environment for the period 2016-2019

Map 3.8. Assessment of the pressure level from marine litter

Map 3.9. Cumulative impact of pollution

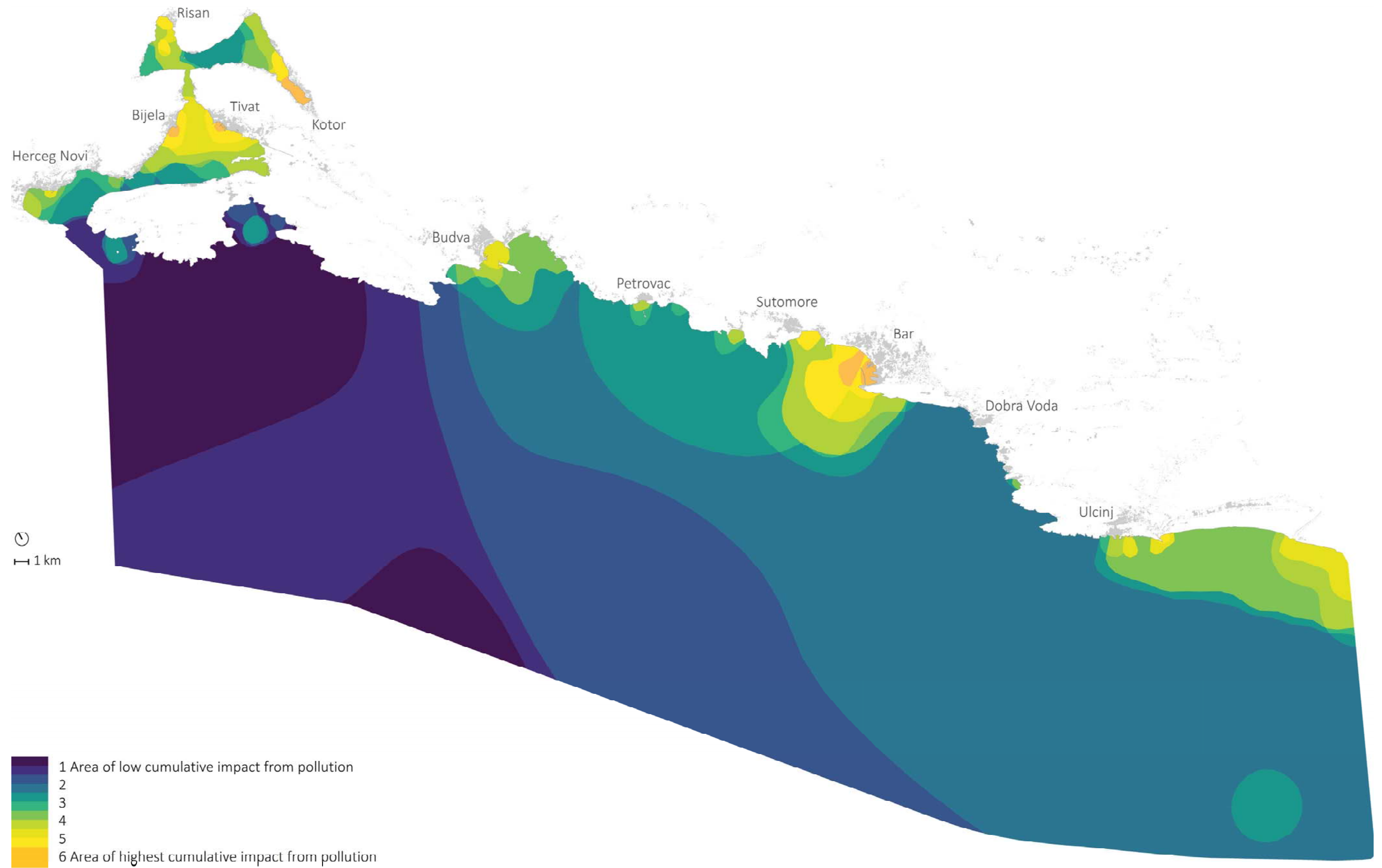




Figure 3.16. Porto Montenegro – location of the former Arsenal Ship Repair Institute (S. Vilus)



Figure 3.17. Bijela shipyard (S. Vilus)



Figure 3.18. Marine Litter (M. Mandić, Institute of Marine Biology)

The coastal part of the open part of the sea coast also has two locations that are under significant pressure from **contaminants** (heavy metals, organic pollutants and synthetic organochlorine compounds) (Map 3.7). The most important location is the port and marina Bar. Additionally, pressures are present in the port and marina of Budva. The area of Ulcinj-Ada Bojana is exposed to the influence of the river Bojana, i.e. activities performed in its immediate surroundings – activities in Skadar, upstream of the river Drim, which flows into Bojana, and pollution, both from the Montenegrin and Albanian sides. Although there are no major industrial pollutants at this site, as well as port activities, the presence of heavy metals and organic pollutants was occasionally recorded, but not exceeding the permitted level. However, a high content of chromium and nickel was expressed, exceeding allowed values many times, but this is attributed to the natural geochemical composition of the soil in the environment because in the upstream part of Drim there are mines of chromium and nickel in Albania.

The most endangered locations in the Boka Kotorska Bay are Bijela Shipyard, Porto Montenegro and the ports of Tivat and Kotor. Arsenal and Bijela, although they have stopped working, are still the biggest cause of sediment and biota contamination. Remediation of the land in the Bijela Shipyard, which is soaked in petroleum products, heavy metals and other contaminants, has not yet been achieved, so that contaminants are still washed away by rainwater into the sea, and polluted sediments, i.e. polluted grit from sandblasting of ships deposited in the sea, was not excavated from the bottom, although by all parameters it significantly exceeded the environmentally acceptable norm. The location of Porto Montenegro (formerly "Arsenal") still shows extremely high levels of sediment contamination, especially with mercury. And at this location in the sea there is still a large amount of used grit and other waste. In addition to the "old" sediment pollution, the impact of vessels in the marina should not be neglected, because nearby oil slicks are reported every year, which is also visible from the content of organic pollutants at this location. In addition, the proximity of Tivat Airport and its kerosene tanks can endanger the waters of the port of Tivat in the event of a breakdown or error during tanking, which has already happened.

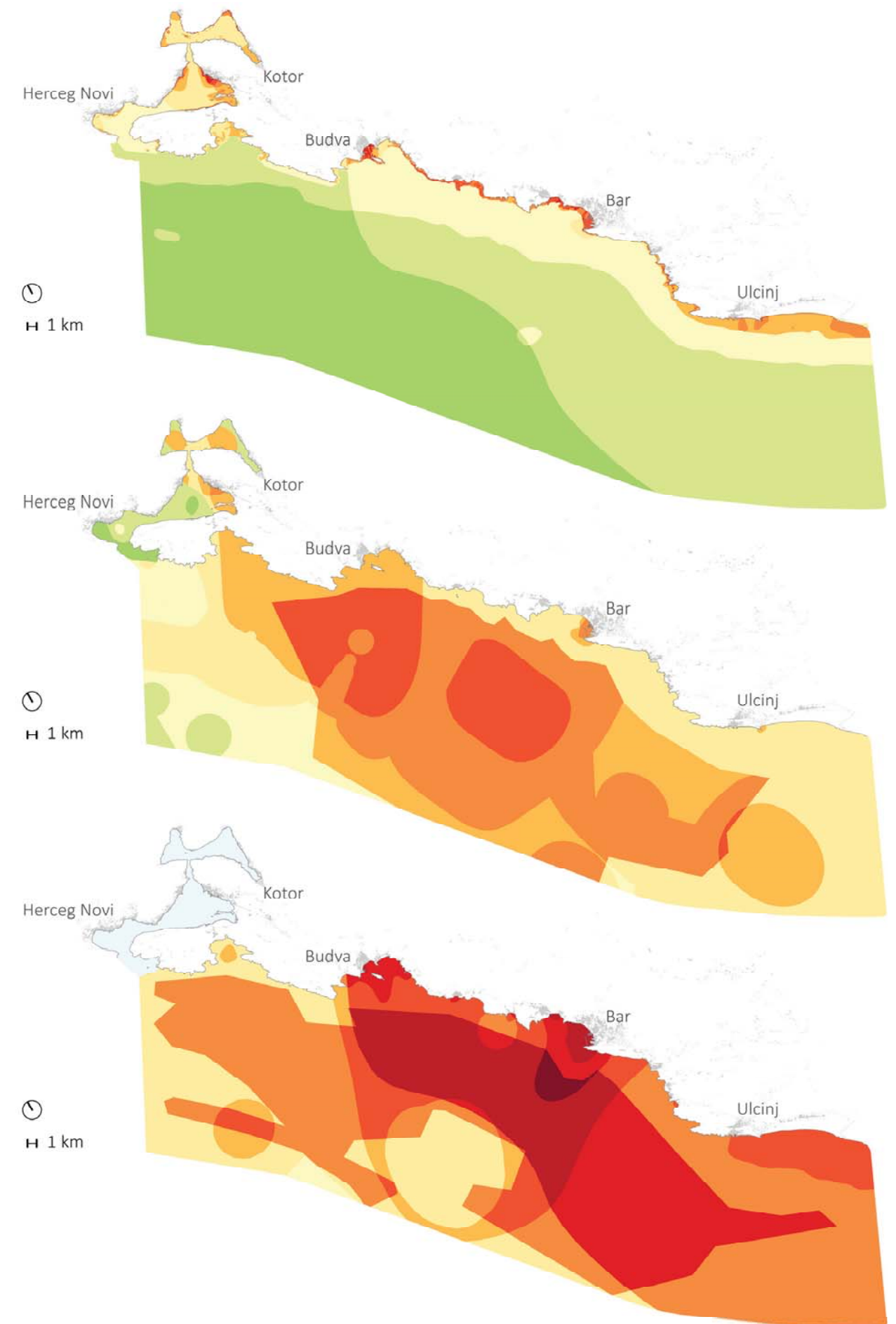
Due to its specific position and intensive maritime activities, the Port of Kotor still contains high concentrations of contaminants in sediments above permitted values. The location in Dobrota near the Institute for Marine Biology is also endangered by the proximity of the Port of Kotor, because polluted sediments are transmitted by the flow of spring water in Kotor: Škurda and Gurdić.

Concentrations of contaminants are occasionally above the permissible values near Mamula at the entrance to the Boka Kotorska Bay. Since there are no industrial facilities nearby, this is probably due to the backlog of military activity at the entrance to the Bay.

The southeastern part of the Adriatic, to which Montenegro belongs, is one of the "hot spots" when it comes to **waste pollution**. The percentage share by waste categories indicates high pollution with artificial polymers (plastics), which occupies a share of at least 80%. Spatial distribution of marine litter shows that the amount of litter in shallow coastal areas (such as the Boka Kotorska Bay) is significantly higher than in the open sea (Map 3.8) In addition, it can be roughly estimated that the amount of plastic litter that reached the sea in Montenegro amounts to 662-1,766 tons per year. If there is no improvement in waste management on land, it is estimated that by 2025 this amount will increase to values ranging between 1,086-2,897 tons of waste that will end up in the sea on an annual basis.

Biodiversity impact

Biodiversity impact (Map 3.13) indicates the existing danger of loss of properties and/or extinction of habitats and species, and depends on the value of habitats or pelagic/demersal resources and their resilience. Two types of areas stand out as the most endangered. The first are areas in a narrow coastal zone – areas of greatest pressure where at the same time there are still more valuable habitat types. These are the areas between Risan, Bijela and Tivat, Budva and Bar, and Ulcinj and Bojana. The second type of area is the common area of greatest fishing effort of pelagic and demersal species. It is the open sea between Budva and Bar.

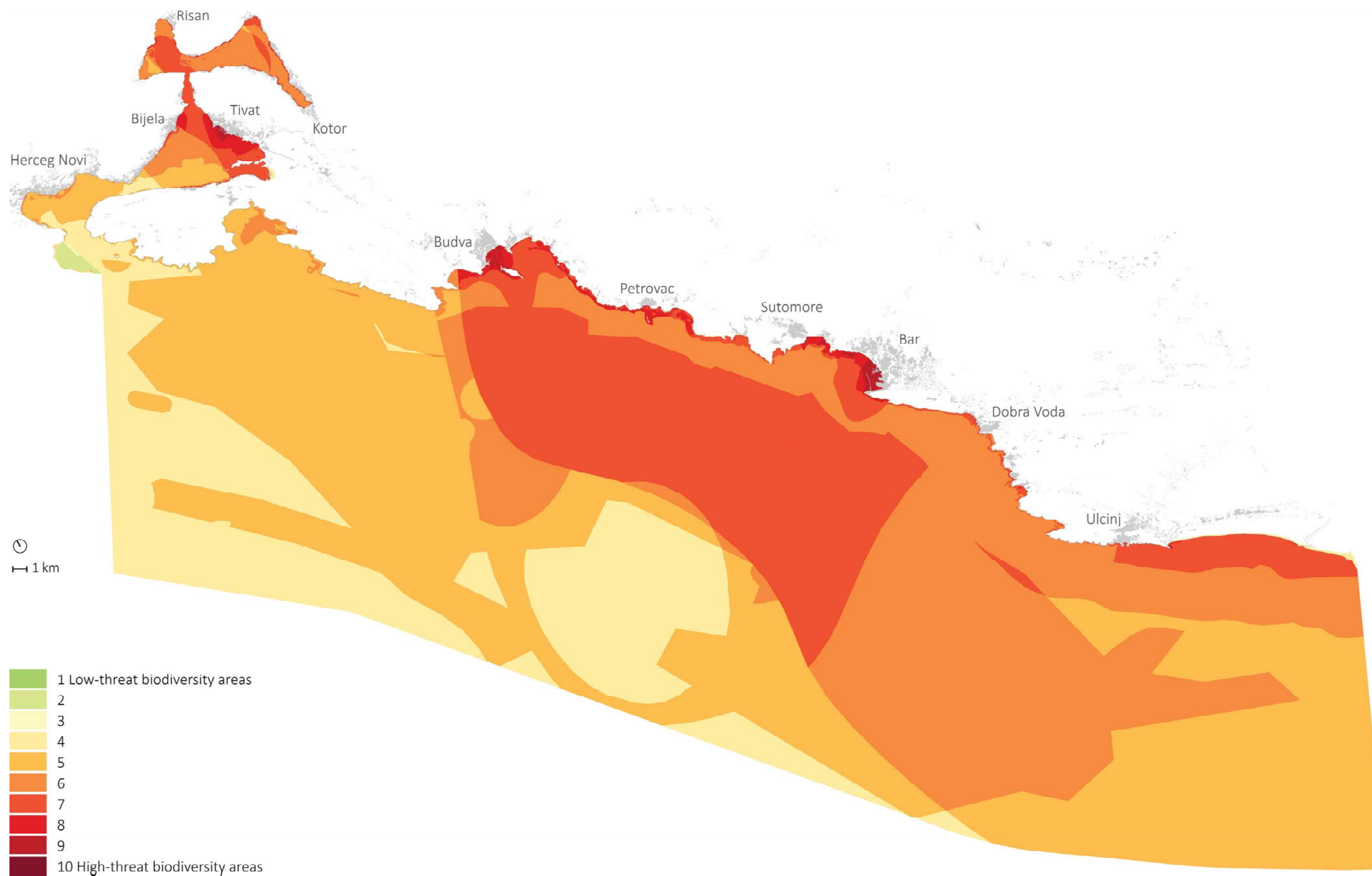


Map 3.10. Overall habitat impact

Map 3.11. Assessment of pelagic resource impact

Map 3.12. Overall demersal resource impact assessment

Map 3.13. Overall biodiversity impact assessment



Landscapes

Apart from biodiversity values, the coastal area of Montenegro is very attractive due to its extremely valuable landscapes, cultural heritage and landscape units of the rural area on the mainland. The area on the coast (land) and the sea next to it are considered an indivisible spatial (perceptual, functional and ecological) unit. The Boka Kotorska Bay is characterized by a cultural and historical area with old towns (Kotor, Perast, Risan) and facilities that, together with the landscape environment, define the landscape quality of this area. Unfortunately, new manmade structures have caused irreversible damage to the landscape, loss of habitat and biodiversity in most of the bay, and have strongly affected the natural configuration of the coast.

Particularly valuable areas of the open sea are areas of naturally preserved slopes and attractive rocky shores (Luštica, Platamuni, Dubovica, Crni rt), areas of intertwined natural and cultural/historical heritage (Budva, Sv. Stefan, Ulcinj) and beaches that are not burdened by manmade structures (map 2.14). These areas are completely opposite to areas without a clear urban concept (based on either historical/heritage characteristics, or contemporary, sustainable trends), dispersed or too densely populated without public space and green areas, of inappropriate scale, and with inadequate architecture (Budva, Bečići, Dobra voda, Utjeha).

The extent of urbanization and land pressures affecting the marine environment is significant. Out of a total of about 252 km (generalized) coastline of Montenegro, about 80.5 km is built, which is 32% of the coast. Construction in the Boka Kotorska Bay (up to Mamula) is significantly higher (54.5%) than along the open sea (16.5%). However, it should be noted that the area from Dobra voda to Utjeha is much more developed than the rest of the coast. The length of the coast measured along the coastline is much larger than the generalized line – a total of 332 km (Table 3.4 right), which indicates a fairly large indentation of anthropogenic and natural coast.



Figure 3.19. Example of low value – settlements without urban concepts, features and undeveloped coastline (Krašići)



Figure 3.20. Example of high value – naturally preserved slopes and attractive rocky shores (Platamuni)



Figure 3.21. Example of moderate value – a relatively harmonious size settlement, with a larger share of green areas and partly natural coastline (Kumbor)



Figure 3.22. An example of very high value – an exceptional area with special, prominent cultural characteristics and symbolic significance (Perast)



Figure 3.23. Example of high value – a region of intertwining natural and traditional cultural elements (Kostanjica)



Figure 3.24. An example of very high value – exceptional natural area – beach (Kraljičina plaža) (all A. Mlakar)

Map 3.14. Landscape value assessment



It is important to point out that the analyses indicate that the coast with manmade structures in the Boka Kotorska Bay is to a large extent outside the area of built land. Reverse situations, where natural shores are located alongside manmade structures, are much rarer. This also explains the large difference in the share of the manmade structures (54.5%) and the share of artificially modified coastline (69.5%). Thus coastal physical changes are not related exclusively to urban areas.

The situation is very different on the open sea. The stretch from Dobra voda to Utjeha is fairly typical, with the urban area spreading out along the natural rocky coast. The share of manmade structures is significantly higher (47.5%) than the share of the artificially modified coastline (27%). In that case, although the coastline itself is formally undeveloped, it cannot be considered natural due to the immediate manmade structures in its hinterland.

Furthermore, some physical changes can be noticed at more than two thirds of the Boka Kotorska Bay due to the influence of manmade structures, with half of the 100 m coastal zone under construction. Along the open sea, the amount of physical coastal change is significantly lower. On average, the facilities are further away from the coastline than in the Boka Kotorska Bay, so the volume of construction in the 100 m zone is smaller, but the space between the coastline and the first line of facilities in some parts has still been changed due to beach infrastructure and other facilities.

Regardless of methodological differences and simplification of records, it is clear that the scope of coastal physical changes due to the influence of manmade structures is large and that the volume of total coastal changes is realistically higher than the numbers in Table 3.4.

Table 3.4. The length and extent of coastal physical changes due to the influence of manmade structures

Coastal type	Length of the ² generalized coastline (m)	Construction surface area ¹ in the 100 m zone from the coast (ha)	Coastline type	Coastline length (m)
Boka Kotorska Bay (until Mamula)			Boka Kotorska Bay (until Mamula)	
Manmade structures	55,369.77	467.99	Artificially modified coastline / coast with manmade structures	86,016.15
Natural and other land ³	45,862.57	567.09	Natural coastline	37,876.36
Total	101,232.34	1,035.08	Total	123,892.51
Share of manmade structures	54,70%	45,21%	Share of artificially modified coastline	69,43%
Area from Mamula to Bojana			Area from Mamula to Bojana	
Manmade structures	25,173.03	269.49	Artificially modified coastline / coast with manmade structures	24,407.55
Natural and other land	125,867.09	1,283.80	Natural coastline	173,760.43
Total	151,040.12	1,553.28	Total	198,167.98
Share of manmade structures	16,67%	17,35%	Share of artificially modified coastline	12,32%
Area from Cape Trašte to Cape Platamuni			Area from Cape Trašte to Cape Platamuni	
Manmade structures	28.24	0.65	Artificially modified coastline / coast with manmade structures	141.15
Natural and other land	16,473.57	168.27	Natural coastline	18,844.11
Total	16,501.81	168.92	Total	18,985.26
Share of manmade structures	0,17%	0,39%	Share of artificially modified coastline	0,74%
Area from Dobre vode to Utjeha			Area from Dobre vode to Utjeha	
Manmade structures	4,681.76	46.22	Artificially modified coastline / coast with manmade structures	3,881.55
Natural and other land	5,136.60	55.36	Natural coastline	10,462.70
Total	9,818.36	101.59	Total	14,344.25
Share of manmade structures	47,68%	45,50%	Share of artificially modified coastline	27,06%
Total			Total	
Manmade structures	80,542.80	737.47	Artificially modified coastline / coast with manmade structures	110,423.70
Natural and other land	171,729.66	1,850.88	Natural coastline	211,636.79
Total	252,272.46	2,588.36	Total	322,060.49
Share of manmade structures	31,93%	28,49%	Share of artificially modified coastline	34,29%

² Without islands

³ Forest, *macchia* shrubland, rocky landscape, agricultural land, beaches.

Map 3.15. Physical coastal changes due to the influence of manmade structures



The problem is not only the total length/area of manmade structures, but also:

- a large amount of sprawl development, which creates a much greater impression of the physical alteration of the coast. Due to less physical (terrain) limitations, this dispersion along the open sea coast is higher than in the Boka Kotorska Bay and this, together with inadequate architectural design, represents the biggest problem of urbanization of the coast of Montenegro;
- High density construction, without green areas in some settlements, creates unsuitable urban spaces, and in the long run leads to a lack of permeable and green areas as a solution to the growing problem of climate change.

Beaches

The biggest problem Montenegro's beaches are facing is erosion, affected by natural and anthropogenic factors. In the past, there was a balance between the amount of sediment that reached the coast and the erosion effect of waves and sea currents, so natural beaches were stable or had a trend of increasing surface areas. In the last few decades, intensive erosion processes have been observed on many Montenegrin beaches, so their widths are gradually decreasing, and their areas have been significantly reduced compared to the situation in the past.

Key factors affecting coastal instability, i.e. coastal erosion and loss of useful land area are:

- sudden and uncontrolled urbanization of the coast (e.g. Slovenian beach in Budva);
- inadequate works on the regulation of tributaries and torrents into the Adriatic Sea (e.g. Mogren beach);
- inadequate works in the coastal area (e.g. coastal walls in Sutomore and Petrovac, where care was not taken that they are out of reach of waves, as well as torrents, Pržno beach, Masline bay, etc.);
- exploitation of sediments from the beach (e.g. Buljarica and Velika plaža);

- sudden changes in the sediment regime in the watercourse (e.g. the river Bojana, the complex hydrological regime of the rivers Drim and Bojana and the impact of three reservoirs on the Drim).

Under the justification of beach development and repairing the effects of sea erosion along the coast, mainly before the tourist season, large amounts of stone and sand are poured into the sea, with some of the beaches expanding significantly in surface area, to the detriment of the sea. This "beach nourishment" has a detrimental effect on wildlife in the coastal zone.



Figure 3.25. Shore embankment: Herceg Novi (S. Vilus)



Figure 3.26. Coastal degradation with manmade structures: Oblatno (A. Mlakar)

3.3. Land-Sea Interactions

Land-sea interactions can be defined as “interactions in which land-based natural phenomena/processes or human activities have an influence or an impact on the marine environment, resources and activities and interactions in which marine natural phenomena/processes or human activities have an influence or an impact on the terrestrial environment, resources and activities”. Interactions have been analyzed with the aim of being included in planning and management processes because they can indicate activities that can disrupt natural processes, degrade valuable phenomena or that are in conflict with each other; point out the negative effects of natural processes on created or natural features, but also help in making decisions to mitigate all identified negative interactions.

The analysis of land-sea interactions shows the great complexity of the coastal area of Montenegro. Areas where different types of interactions between land and sea activities as well as interactions with natural processes occur at the same time particularly stand out (Map 3.16). The first type are beaches/bathing areas with aquatoria, i.e. parts of the coast along settlements and tourist zones that are endangered by activities, leaching/removal of material from land to sea and pressures from manmade structures. This is particularly relevant for beaches that are located next to valuable marine habitats and in areas of extremely valuable coastal/marine zones. Such beaches are in Herceg Novi, Orahovac, Njivice, Žanjice bay, Trašte bay, Jaz bay, Budva and the island of Sv. Nikola, around Sv. Stefan, the northern part of Buljarica, Utjeha and Ulcinj. Due to the volume of interactions, beaches are endangered as a natural phenomenon and as a tourist precondition, and they are still under the influence of natural processes (sea-level rise, erosion).

The second type are natural areas where the number of interactions has increased due to the complexity/diversity of such areas. Examples include Tivat salt pans with the aquatorium, Trašte bay, Platamuni, the stretch from Petrovac to Čanj (especially the northern part of Buljarica), Utjeha and

Stari Ulcinj, south of Cape Medra, Velika plaža and Ada Bojana.

On the one hand, this volume of interaction comes from the large scope and intertwining of uses and activities on land and sea, on the other, from the large scope of significant/valuable characteristics of the marine environment. The analysis largely confirms the importance of areas where endangerment and vulnerability was already detected in previous analyses, especially beaches and natural parts of the coast along tourist zones and settlements, but it treats them in a more systematic and mapped-out way. The analysis shows not only the existing interactions and pre-recorded conflict areas, but also the potential/future or additional areas that should be taken into account in further spatial planning of the coastal and marine area. This is especially true for urbanization, the port system and the protection of marine areas (Nature parks Platamuni and Katič as well as park in the designation process) – activities that inevitably come into conflict. This conflict requires harmonization at the strategic level (withdrawal of some development proposals) and developing construction and protection conditions.



Figure 3.27. Example of interactions of tourist facilities (on land) to the sea during construction – physical and visual change/degradation of the coast, eroding of materials into the sea: Risan Bay (A. Mlakar)



Figure 3.28. The central area of the Platamuni Nature Park, where a huge tourist zone is planned, which necessarily leads to the loss or degradation of natural features and a completely different scope of land-sea interactions (A. Mlakar)

Map 3.16. Land-Sea Interactions



3.4.

Climate resilience

By analysing the interactions between land and sea, one of the most significant is the increase in sea levels, which can have impacts on the natural ecosystems of the coastal area and related activities and urban areas. Taking into account the scenario based on the projections of the Intergovernmental Panel on Climate Change (IPCC) which predicts an increase (relative to the mean sea level in the Adriatic basin) of 0.62 – 0.96 m, by using a digital terrain model of the Montenegrin coastal area it can be determined that the most expected impact will be on beaches/bathing areas and on special habitat types and valuable areas in the lower lying parts of the coast, which would disappear due to sea level rise. These are primarily the areas of Ulcinjska solana, Ada Bojana and the southern part of Velika plaža (Figure 2.32). In the Boka Kotorska Bay, high impact can be found in the area of Morinj (Figure 2.31) and Tivat salts (Figure 2.30). The analysis shows that along the entire coast, in the areas threatened by sea rise, we have parts of settlements, tourist zones and nautical infrastructure, such as Kotor (Figure 2.29).

In addition, the analysis of the possible impacts of climate change on the coastal area (under the CAMP project, 2012 and 2013) indicates that the entire coastal area is vulnerable to climate change which, in addition to rising sea levels, includes the frequency and severity of floods, droughts and storms. However, it should be noted that due to a lack of reliable data on the magnitude of risks and sensitivity to possible impacts, these analyses are preliminary and indicative, with limited estimates of the combined effects of multiple natural hazards (e.g.. the impact of storms and rising sea levels on floods in the Bojana basin area).

The lack of data presented a challenge for the only attempt made so far to assess the possible effects of climate change on the economy. An assessment of the effects of climate change in the EU under the current conditions finds the expected annual damage at the level of EUR 1.25 billion, while

102,000 people are deemed to be in danger of coastal floods. Depending on the climate scenario under consideration, and the passage of time, these figures can increase severalfold (EC, 2019). As part of the preparation of the First National Communication to the UNFCCC, a study was conducted in 2010 with the support of the UNDP, which, among other things, sought to assess how rising temperatures could affect visits and tourism revenues. For this purpose, the then available models and methodologies (Hamburg Tourist Model and methodology developed under the PESETA project) were used. The results showed that after the initial increase in visits and tourism revenues due to rising temperatures, significant losses were to be expected in the long run. At the same time, it was emphasized that the findings depend very much on the assumed climate scenarios and that due to a lack of input data from the national level, they should primarily be used as an incentive to improve analytical capacity in the country.



Figure 3.29. Sea-level rise: Kotor (Harpha Sea, 2013)

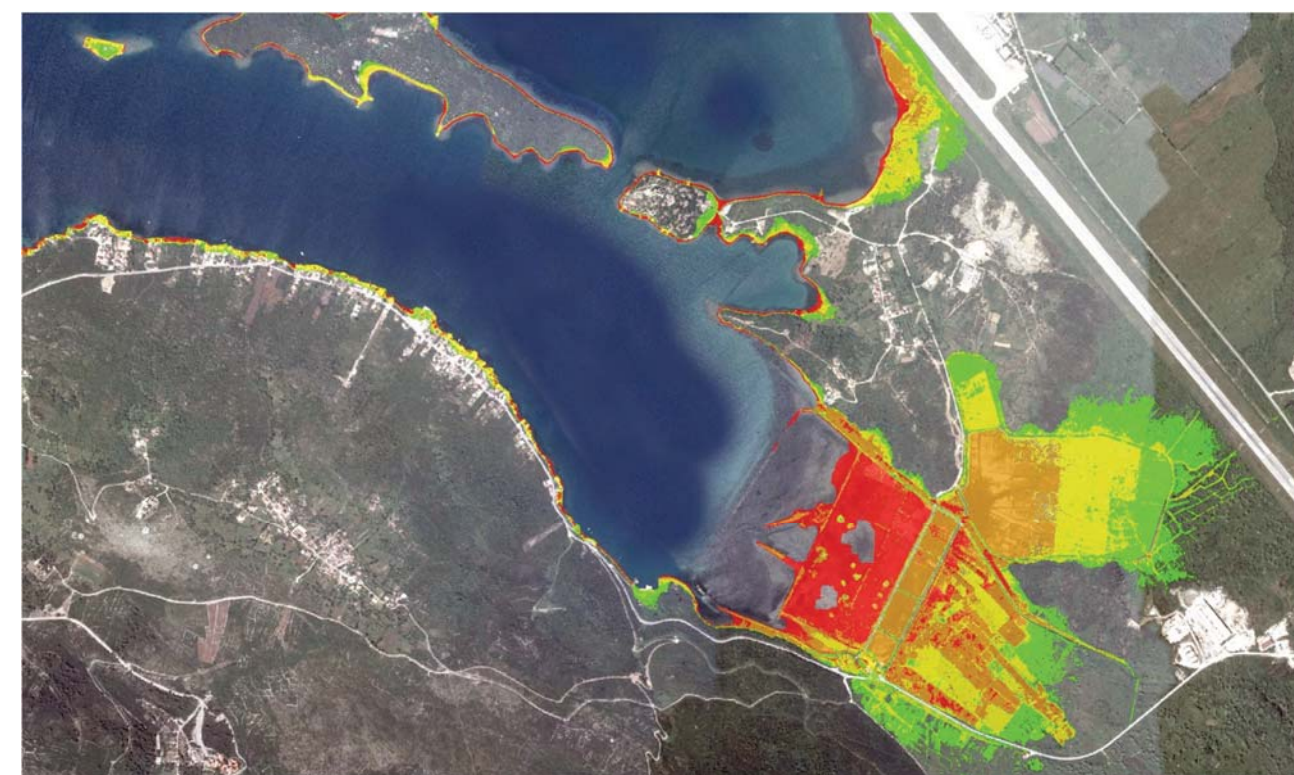


Figure 3.30. Sea-level rise: Tivat saline (Harpha Sea, 2013)



Figure 3.31. Sea-level rise: Morinj (Harpha Sea, 2013)

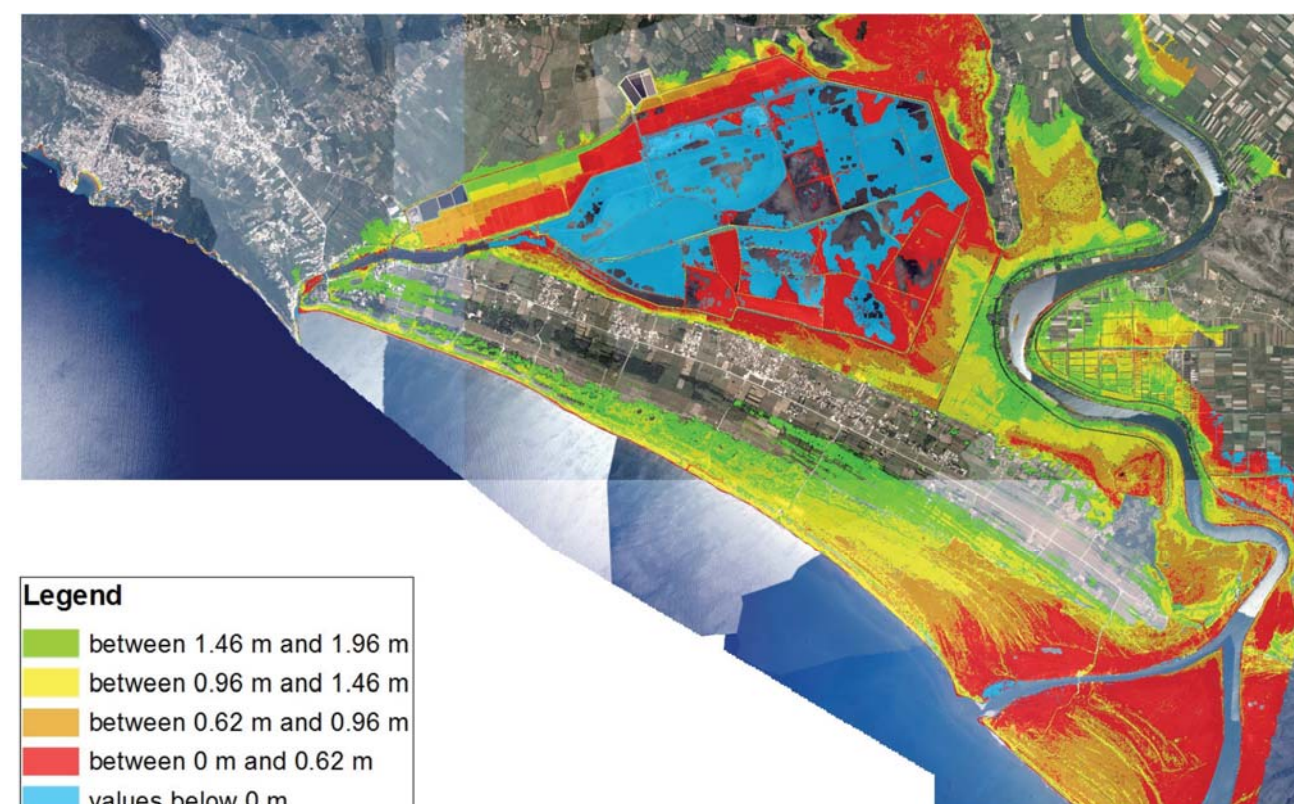


Figure 3.32. Sea-level rise: Ulcinj salina – Ada Bojana (Harpha Sea, 2013)

3.5.
Ecosystem services

Preservation of valuable marine habitats and other marine resources is extremely important for the development of numerous economic activities and the overall development of the coastal area, and Montenegro as a whole.

Estimates of the value of biodiversity and services provided by ecosystems have been made in Montenegro on two occasions: In 2011, the value of protected areas was assessed under the UNDP GEF project (UNDP and ISSP, 2011), while in 2013, also with the support of UNDP and GEF, the economic value of ecosystem services was assessed (Emerton, 2013). The subject of the first study were then the most important protected areas on land (among which there were no coastal ones), while for the second within certain categories some services of coastal and marine ecosystems were also taken into account.

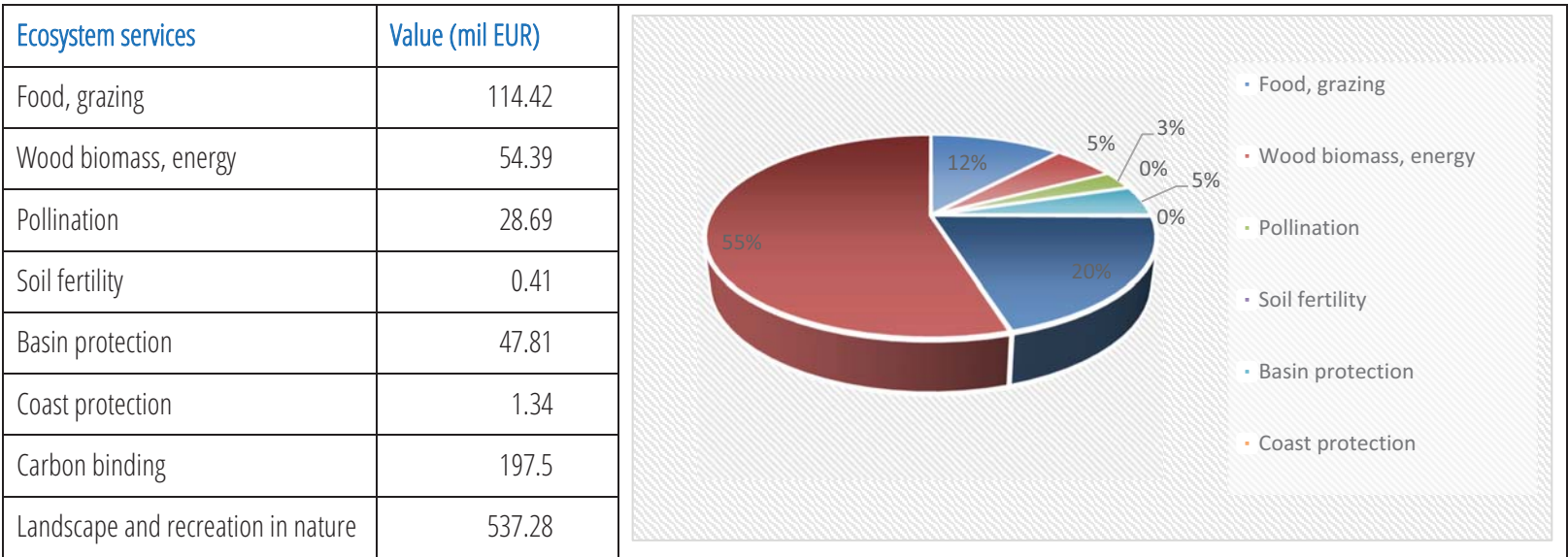
According to the findings of the 2013 study, more than half (EUR 537 million) of the total estimated value⁴ (EUR 982 million) of selected components of biodiversity and ecosystem services in Montenegro comes from recreational and cultural services, including domestic and international visits to the coastal area. The evaluation of services provided by ecosystems in terms of food security also took into account marine fisheries, with the total value of food from aquatic and terrestrial ecosystems (including grazing) estimated at around EUR 114 million. It is estimated that the protective function of ecosystems (protection of the coastal area from erosion, storms and waves) has a value of about EUR 1.3 million, which is equivalent to avoided damage/costs in the narrow coastal zone (Emerton, 2013). The total value of estimated ecosystem services amounted to almost one third of the GDP, 2.3 times higher than the gross value of production in agriculture, forestry and fisheries (from EUR 425 million) in 2011. The estimated

value of biodiversity and ecosystem services (in absolute amounts and share of individual categories) is shown in Figure 3.31. The benefits directly depend on how the ecosystems that create them are managed and preserved, as well as whether they are used sustainably or are depleted through use for different economic sectors. Marine protected areas are important, among other things, because they contribute to preserving the health of marine ecosystems and thus the services they provide.

Certain marine ecosystems (seagrass fields, coastal wetlands, etc.) act as natural barriers against erosion, and have the ability to reduce wave energy and the effects of sea level rise. These natural defence mechanisms provide significant benefits to coastal populations, natural landscapes and coastal infrastructure, and will be increasingly important for adaptation to climate change. With the exception of the 2013 study (where the value that ecosystems provide through coastal protection from erosion, waves and storms is estimated at EUR 1.34 million in 2011), there are no estimates of the contribution of marine ecosystems to climate regulation in Montenegro. An indicative estimate of the value of CO₂-

binding potential in *Posidonia oceanica* seagrass habitats was assessed on the basis of data on *Posidonia oceanica* meadows and available data on the value of these habitats as carbon storages ranging from 6–23 EUR/m² per year. Taking into account the approximate area with seagrass meadows of *Posidonia oceanica* of 1,500 ha, it is calculated that the value of CO₂ bound in these habitats amounts to EUR 90-345 million.

An analysis of 208 published studies on the socio-economic impacts of MPA in the Mediterranean and Black Sea region found that there are a total of 22 uses of marine resources that may be affected by designation of MPA. The studies that were the subject of the analysis mostly addressed the issues of how the establishment of the MPA affects fisheries, tourism and recreational activities, while far less attention was paid to considering the possible impacts on other activities. The results of the analysis showed that small-scale fishing, recreational fishing from land or boats, tourism and the use of beaches, diving and other recreational activities, generally speaking, have benefited from the establishment of MPA (Pascual *et al.*, 2016).



Source: Emerton, 2013

Figure 3.33. The value of biodiversity and ecosystem services in Montenegro

⁴ Estimates were made on the basis of statistical data for 2011.

4.

Planning goals and basic concepts of marine spatial plan

4.1. Vision of sustainable use and protection of the marine area

By applying integrated coastal zone management, sectoral integration and vertical coordination, overlapping competence in coastal resource management and participation of all segments of society, sustainable use and protection of the marine area Montenegro will be achieved.

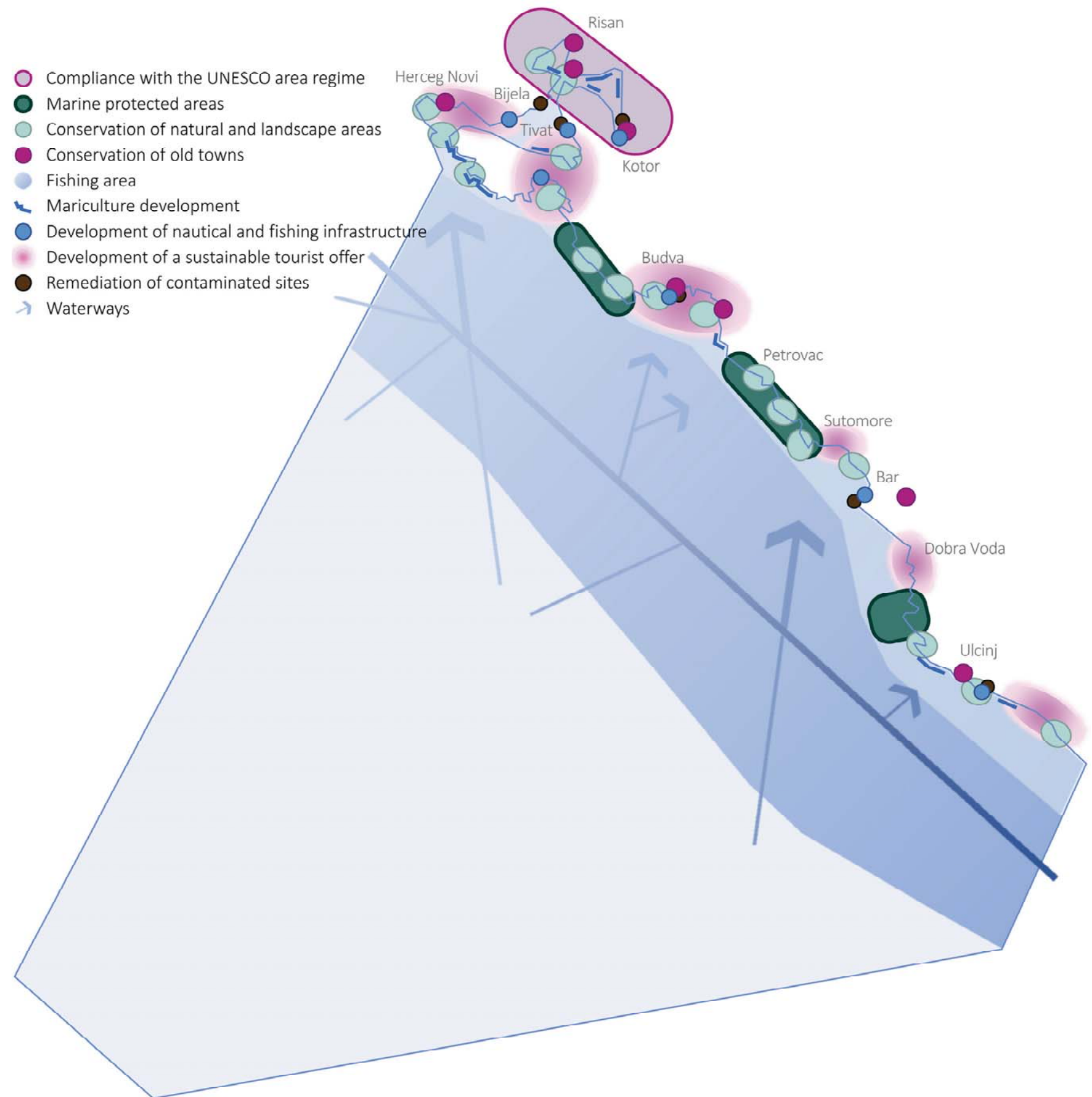
This implies adequate spatial planning to prevent the destruction of resources. Thoughtful and harmonized location selection of maritime activities on and in the sea enables balanced development of the blue economy which includes all activities related to the sea or coastal areas, such as: sustainable tourist offer (coastal and maritime tourism), fishing and mariculture, maritime transport, controlled exploitation of minerals. This includes regulated waterways, defined fishing areas adequate nautical and fishing infrastructure. This also produces satisfactory levels of economic development for the coastal area.

The development of infrastructure for the prevention and remediation of pollution and the application of the ecosystem approach will ensure the achievement of good environmental status of the marine environment and the use of marine resources in an environmentally friendly manner.

Preservation of nature, landscapes and cultural assets includes respect for UNESCO sites, preservation of old towns, marine protected areas and underwater archaeological sites.

Development of the spatial information system with the use of GIS technology and indicators for monitoring and evaluation will provide basic conditions for the successful management of spatial development on land and sea.

Map 4.1. The concept of protection and use of the marine area of Montenegro



4.2.

Strategic and sectoral goals for sustainable use and protection of marine areas

Strategic goals

Strategic goals, with appropriate measures and sub-measures, have been proposed as answers to identified problems and weaknesses, in order to achieve the vision of integrated coastal zone management in Montenegro, especially the marine area. The set goals outlined below are significantly broader than those which are in direct responsibility of spatial planning. Numerous sectors referred to for cooperation and coordination are responsible for their implementation. The spatial plan is primarily used to define the scope of the protection regimes, sea use and remediation sites, while in the same time meeting spatial needs for the development of maritime activities and sectors (marine use plan) in accordance with set guidelines. The key contribution of other departments is in the direct implementation of planning goals in the field while respecting specific planning solutions.

Having in mind the vision and multisectoral nature of integrated coastal zone management of Montenegro, the strategic goals are structured into following thematic areas:

Preservation of nature, landscapes and cultural assets

- *Effectively protect nature, landscapes and cultural assets.*
- *Sustainably manage protected natural assets, ecologically valuable habitats and coastal ecosystems.*
- *Ensure the achievement and preservation of good environmental status.*

The natural, landscape and cultural values of the coastal area are the basis for preserving the identity of the area and the way of life of the population on the Montenegrin coast. At the same time, these values are the most important national resource. Therefore, it is necessary for them to be incorporated into development policies in order to ensure the stability of

ecosystems and services they provide, preserving the attractiveness of the coastal area, human well-being (population and tourists), and the ability of society and nature to adapt to natural hazards and processes.

Development of infrastructure for pollution prevention and remediation

- *Improve the existing wastewater treatment infrastructure.*
- *Contribute to the safe arrangement, revitalization and reclamation of space by remediation of pollution due to inadequate disposal and treatment of waste.*
- *Encourage green infrastructure development.*
- *Establish a risk management system for natural and anthropogenic hazards.*

It is necessary to improve the capacity and quality of existing infrastructure with significant investments in the development of infrastructure projects on land and to reduce negative impacts of infrastructure development on the environment to a minimum. In this context, the priorities are: remediation of existing sites burdened with pollution ("hot spot" sites), prevention of further growth of pollution load, as well as adequate location of future infrastructure in a way that does not endanger sensitive ecosystems at sea and on land.

In conditions of pronounced climate variability and climate change, coastal areas are directly exposed to the effects of natural hazards. Therefore, it is necessary to provide reliable data on risks that may be caused by the impact of natural and anthropogenic hazards in spatial and development plans in order to enable the optimal location of infrastructure in space.

Achieving satisfactory effects of coastal zone economic development

- *Sustainable management of marine resources.*
- *Ensuring adequate marine space for the sustainable development of maritime activities and sectors (blue growth).*
- *Greener development of the coastal area.*

Priority needs from the aspect of achieving sustainable economic development of the coastal area require, among

other things, incentives for the development of sustainable tourism and incentives for other activities that can contribute to the conservation of coastal resources, increase employment and increase living standards.

Taking into account the importance and concentration of maritime activities in the Boka Kotorska Bay, redirect the additional development of the blue economy to the Montenegrin open sea area, ensuring a balanced development of the blue economy for all coastal municipalities.

Encourage the development of new technologies, by exploring opportunities for the development of biotechnology, offshore wind farms as well as the development of seawater desalination plants.

The development of all activities of the blue economy should be harmonized with the achievement of a good environmental status, minimizing negative impacts on the environment.

Provide broader preconditions for the functioning of the spatial planning system

- *Improve the spatial planning system, with an emphasis on sustainable spatial development.*
- *Improve the system of monitoring coastal and marine processes and activities in the coastal area.*
- *Strengthen the coordination mechanism for integrated coastal zone management.*

The spatial planning system must be strengthened primarily through better application of current regulations governing spatial development, which should enable the integration of sectoral needs and aspirations, unconditional protection of the most important natural, cultural and landscape values, rational consumption and use of space, minimization of conflicts between the process of urbanization and valuable, vulnerable spaces, and the quality of built environment. Also, it will be necessary to additionally normatively regulate the tasks of the spatial planning system related to ensuring a balance of activities on land and sea through marine spatial planning and by strengthening the resilience of coastal areas to climate change.

The existing, deficient system of monitoring state and environment trends, urban development and economic effects of maritime (and other) activities should be improved by ensuring monitoring processes in coastal area, especially at the level of settlements and municipalities, using simple indicators and GIS technologies. It is important to create functional spatial databases which would generate new knowledge about coastal processes.

Effective coordination and capacity building of institutions is urgently needed in the existing management system. A significant contribution to achieving sustainable development of society should be provided through further strengthening of cooperation and coordination between social actors, effective involvement of the public in the decision-making processes and use of available knowledge related to the use of coastal (including marine) resources.

Sectoral objectives

Objectives of maritime sectors were identified based on challenges and constraints blue economy sectors are faced with. In the development plans and prioritization of activities, the focus should be on contribution to new employment, with minimal negative impacts on the environment.

The state of the marine environment continues to provide a solid basis for blue economy development, with significant problems in certain areas / certain parts of the year. Achieving and maintaining good environmental status is a *conditio sine qua non*. Further improvements in waste and wastewater management (from land and sea) are extremely important for the blue economy. Healthy marine ecosystems and marine protected areas are invaluable for tourism, fisheries, climate change mitigation and adaptation.

- **Maritime navigation:** improving navigation safety; development and greener internal maritime traffic, especially in the Boka Kotorska Bay;
- **Ports:** better use of existing capacities, efficiency, improvement of port infrastructure / development of missing facilities, modernization; adequate traffic connections of ports (on land, in international maritime corridors);

equipping ports with adequate waste disposal capacities; formation of new ports and moorings on existing and planned port areas, in the function of communal and commercial use; remediation of the current Bijela shipyard area; optimization and improvement of support for yachting tourism; incentives for the use of "green" solutions in the development of port and nautical infrastructure;

- **Fisheries and mariculture:** renewal of the fishing fleet, construction of the missing infrastructure on land (places of first landing); resolving potential conflicts with plans of other sectors; control of illegal, unreported and unregulated fishing; support for marketing and processing of seafood products; increasing fish and shellfish farming, especially in the area outside the Boka Kotorska Bay;
- **Coastal tourism:** diversification and improvement of the quality of tourist products; providing sources of funding for the further development of the offer; competitiveness; developing new bathing areas according to the needs of future tourist development or changing the type of the existing ones; arranging new locations for active holidays;
- **Nautical tourism:** consider solutions for the lack of dry berths and overhauls for yachts; yacht waste collection and disposal systems; nautical port and anchorage development plans should be aligned with the need to preserve the environment and the plans of other sectors;
- **Cruising tourism:** cruise traffic control, especially in the Boka Kotorska Bay; careful analysis of the overall effects of cruising tourism (including negative impacts); planning of new and additional equipment of existing cruise terminals (area outside the Boka Kotorska Bay);
- **Submarine cable and pipeline:** valuable ecosystems must be avoided in the planning and construction of submarine infrastructure;
- **Exploitation of mineral raw materials:** possible exploitation of hydrocarbons depending on the results of exploration wells, provided that strict precautionary measures are taken to prevent the negative impacts of exploitation and to control and monitor marine environment;

- **Infrastructure improvement:** development of wastewater collection and treatment systems;
- **Cultural heritage:** stopping intensive development (exploitation and insufficient protection of space) in the coastal area; intensive protection of space and maintenance of the existing development of areas of national importance, as well as areas under UNESCO protection; consistent implementation of regulations in the field of protection of cultural property of Montenegro;
- **Marine protected areas:** activities for the establishment of a management system for the declared Nature parks Platamuni and Katič, establishment of one additional marine protected area (Stari Ulcinj Island); implementation of protection activities for other marine protected areas.

5. Sea use

5.1. Significance of interactions of maritime activities in sea use planning

Sea use planning tackles three important group tasks:

1. At the regional level (littoral region) or at the level of larger spatial units (planning zones), it is necessary to take care of **balanced need fulfilment of different activities and economic sectors**. This means that, for example, when planning beaches and bathing areas, it is necessary to take into account the number of users, tourists and permanent residents, and the capacities of planned tourist zones that have not yet been put to use. It is also necessary to strive for the spatial (regional) distribution of beaches and bathing areas to adhere as much as possible the zones of higher housing density and tourist activities. This information was gathered from sectoral development documents as well as from direct contacts with representatives of the sector and competent state bodies to the extent possible in the given circumstances.
2. In addition to quantitative needs, each maritime activity also requires consideration of the predominantly **qualitative requirements of areas that will be used for a particular activity or sector**. Natural and manmade conditions that suit different users vary. This means that, e.g, for nautical infrastructure facilities it is necessary to try to meet a number of criteria according to which the attractiveness of an individual location is assessed or evaluated. The term attractiveness means those criteria that are important for a specific maritime activity or sector. These are therefore criteria that primarily take into account the development or economic interest of users as well as criteria that take into account possible technical and technological solutions related to natural and other conditions of a particular location.
3. An additional important set of criteria in sea use planning arises from **analyses of the interactions of maritime**

activities and their environment. In a broader sense, the term interactions refers to the mutual impacts of maritime activities (i) as well as the no less important interactions or impacts of maritime activities on the overall environment including natural, landscape and cultural values (ii). The nature of these relationships and impacts enables the characterization of such relationships ranging from complete incompatibility (conflicts) to compatibility, synergy and even functional dependence. This, as well as the previous group of tasks under sea use planning is primarily focused on the local level, unlike the first group.

In a broader sense, in the coastal area at the macro level, all maritime activities are compatible insofar as they all individually and together contribute to the diversified and sustainable economic and social development of the coastal area. In a stricter sense, at the local level, the interactions of maritime activities are more complex and the negative aspects in their interaction come to the fore, thus in such cases we are talking about a greater or lesser degree of incompatibility or even conflict.

The elementary type of interaction is the competition for the same space or zone at sea by different maritime activities. Addressing this situation depends on the characteristics of specific maritime activities related to use in time and space. Many forms of use are temporary, so at different times of the year or at different times of the day, the same spatial unit can be used by different users or different activities. A good example is the already regulated relationship between the aquatorium functioning as beaches and bathing areas, and the same area used for fishing *postas* (*beach area free of obstacles for pulling up fishing nets*). In addition, the three-dimensional nature of the marine environment allows the simultaneous use of the same spatial unit by multiple users. Examples are zones used for underwater pipelines and cable pipelines that can be used at the same time for other maritime activities that take place on the sea surface. Table 5.1 shows all maritime activities with the characteristics of spatial and temporal use of the sea. Therefore, the possibility of multipurpose use is based on different spatial and temporal characteristics associated with different maritime activities.

In some cases, the solution to the coexistence of different maritime activities is in direct simultaneous use. E.g. tourist and recreational excursion activities may have various objects of interest in addition to the already common sites of valuable natural and cultural heritage. This can be, for example, fishing tourism when a group of tourists board a fishing boat and in the form of a day trip participate in demonstration fishing, usually on trawlers, and have the opportunity to learn fishing techniques while enjoying quality and fresh seafood. In this way, the additional goal of reducing the pressure on the fish stock and contributing to the conservation of marine biodiversity is achieved. At sea, therefore, the competition of different activities for the same areas can be resolved with multi use as a permanent (in case of underwater infrastructure) or occasional solution (tourist activities related to fishing). In a similar way, the commonly perceived conflict of mariculture zones, especially shellfish farming and tourism activities, can at least be mitigated.

Some maritime activities are characterized by pronounced compatibility, which is also functionally conditioned. They can be:

- the port system and dredging of parts of port waters and access waterways;
- exploitation of mineral resources and natural sandy beaches that need nourishment;
- marine fisheries and marine protected areas whose existence contributes to a better state of the fish stock and consequently to a better catch in the future.

If the problem of competition of different activities for the same spatial unit of the sea cannot be solved by multi use, several criteria are used in the selection of optimal sea use. In addition to the general principles of sea use planning listed at the beginning of this chapter, the following criteria were used in the development of the proposed sea use plan:

1. Respect for the initial state or current sea use and inherited rights as well as adhere to valid spatial plans when they are compatible with the strategic goals of development and marine protection.

2. Priority provision of space for key infrastructural functions within the maritime area (waterways, underwater cables and pipelines, ports) most of which are usually part of the initial state of use.
3. Respecting the criteria of site suitability for a particular maritime activity according to the analysis of attractiveness (natural and created conditions) and vulnerability of the overall environment (zones suitable for mariculture).
4. A broader regional view that will enable more integrated insight and more argued balancing of development and protection interests, which will compensate for possible "losses" of protection or development interests (actual or perceived by the holders of these interests) in certain locations and thus approach the theoretical ideal of achieving a sustainable balance of protective, developmental and social interests.

If it is not a direct competition of two or more maritime activities for the same location, it does not mean that interaction and impacts do not exist. They can be environmental (pollution as a result of an activity), safety-related and even visual. In a broader sense, mutual impacts have economic and social implications. E.g. the commercialization of berths at moorings makes their accessibility to the local population difficult. Equally problematic is the situation when assigned communal berths (intended for local inhabitants) are used for commercial purposes and thus create unfair competition. Development of coastal tourist zones can also affect the possibility of providing berths for the local population. Once again, there is a need for balance in ensuring an adequate number of commercial and communal berths.

As already emphasized, the intensity of sea use on the Montenegrin coast is highest in the relatively narrow coastal zone. This means that most maritime activities are directly related to the uses of land. In some cases, individual land use units (sea use zones) have their own land and maritime part that form a single functional unit (e.g. ports, shipyards, beaches). In such a situation, it is rational that the spatial plans include the coastal zone of the sea. The fact is that until now, it was common for these plans to include the aquatorium.

Table 5.1. Maritime activities according to the manner of use of space (unregulated, regulated, mobile, immobile) and time of use (periodical, permanent, as needed).

Maritime activity	Spatial characteristics of use	Temporal characteristics of use
1.1 Maritime navigation	Unregulated except for set waterways (e.g. separate navigation schemes or in narrow channel navigation), on the sea surface at draft depth	Periodical, planned (navigation schedule)
1.2 Port system	Regulated, immobile for ports, regulated mobile for buoy anchorages, on the sea surface at draft depth, at anchoring and at the bottom	Permanent except for anchorages periodical (as needed)
2.1 Marine fishing	Unregulated or regulated with regulations (fishing zones, fishing posts), on the sea surface and the whole water column	Periodical, it can be regulated for periods of the year or daily (posts)
2.2 Mariculture	Regulated, permanent but mobile as necessary, on the sea surface and part of the water column	Permanent, adhering to permits and plans
3.1.1 Bathing areas and beaches	Regulated, immobile, on the sea surface and in the water column	Periodical (seasonal, daily)
3.1.2 Sports and recreational activities at sea	Unregulated or regulated less frequently, on the sea surface and in the water column (depending on the depth)	Periodical
3.2.1 Nautical (yachting) tourism	Unregulated, possibly limited (anchoring, mooring), on the sea surface and bottom (anchoring)	Periodical, seasonal
3.2.2 Cruise tourism	Regulated with regulations, on the surface, at draft depth	Periodical, seasonal
4 Underwater cables and pipelines	Regulated, immobile, planned, on the bottom or dug in	Permanent, planned
5 Sand and gravel extraction	Regulated with regulations and plans, mobile or conditionally mobile (oil and gas exploitation), on the surface and seabed, i.e. underground	Periodical or permanent (oil and gas exploitation), planned
6 Dredging and material disposal	As needed, planned, on the sea surface and seabed	As needed, periodical
7 Coastal protection structures	As needed, immobile, regulated with plans, on the sea surface and / or seabed (part or all of the water column)	As needed, planned
8 Military use	Regulated by regulations and plans	Periodical, planned
9 Marine protected areas	Regulated with plans, variable range, on the sea surface, above it and the entire water column and bottom	Permanent
10 Underwater cultural heritage	Regulated according to plans, variable coverage, depending mostly on the seabed	Permanent

However, the elaboration of the marine area has been simplified, for example, by using predominantly point symbols for sea use zones or, at best, sea use zones are represented with very schematic shapes.

In addition to spatial planning documents, other documents may have their place in the system of regulation of the sea use, such as various more detailed development programs prepared by the Public Enterprise in charge of maritime domain management (e.g. for beaches and bathing areas, moorings and docks). The advantage of these documents is that they can be more flexible in adoption and amendments that are frequent and unavoidable at the micro level. However, more comprehensive analyses that balance the state of use and needs or deficits of various maritime activities should be conducted through targeted studies and spatial planning documents for the entire coverage of the coastal area.

5.2. Sea use with implementation guidelines

For the purpose of management and planning of the use of the marine area, 10 categories of sea uses with several subcategories have been defined. As a rule, all uses are defined by spatial coverage (polygonal elements) and/or line features. Exceptionally for those of smaller dimensions or those planned uses for which there is no clear spatial extent of the aquatorium, and depending on the scale of the cartographic output, they can be represented by point symbols.

For all categories and subcategories of sea use, spatial data layers were built using GIS technology in SHP format. Digital cartographic representations for the purposes of spatial planning of the state, regional and local marine area are generated from the same basic GIS database of spatial data with the use of graphic symbols appropriate to the scale of the map.

Given the no-ownership regime in the entire area of the maritime domain, including the marine side, the characteristics of the marine space and the specifics of its use, a reasonable degree of deviation from established boundaries and lines is allowed, especially in relation to cartographic outputs on a smaller scale. This is especially true in situations where the zone of one sea use does not border directly with another one.

For some categories of use, the established zones do not coincide with individual units of use which must be located within the use zone and are defined subsequently through procedures determined by the competent regulations.

For some categories of sea use, zones under investigation are defined at certain locations. As a rule, these zones are determined in areas where there is no expressed interest for other sea uses, as well as for significant functions that require more complex research before the final selection of location. These temporary reservation zones are usually determined

as a wider area than eventually needed, which leaves more space for the choice of the final solution.

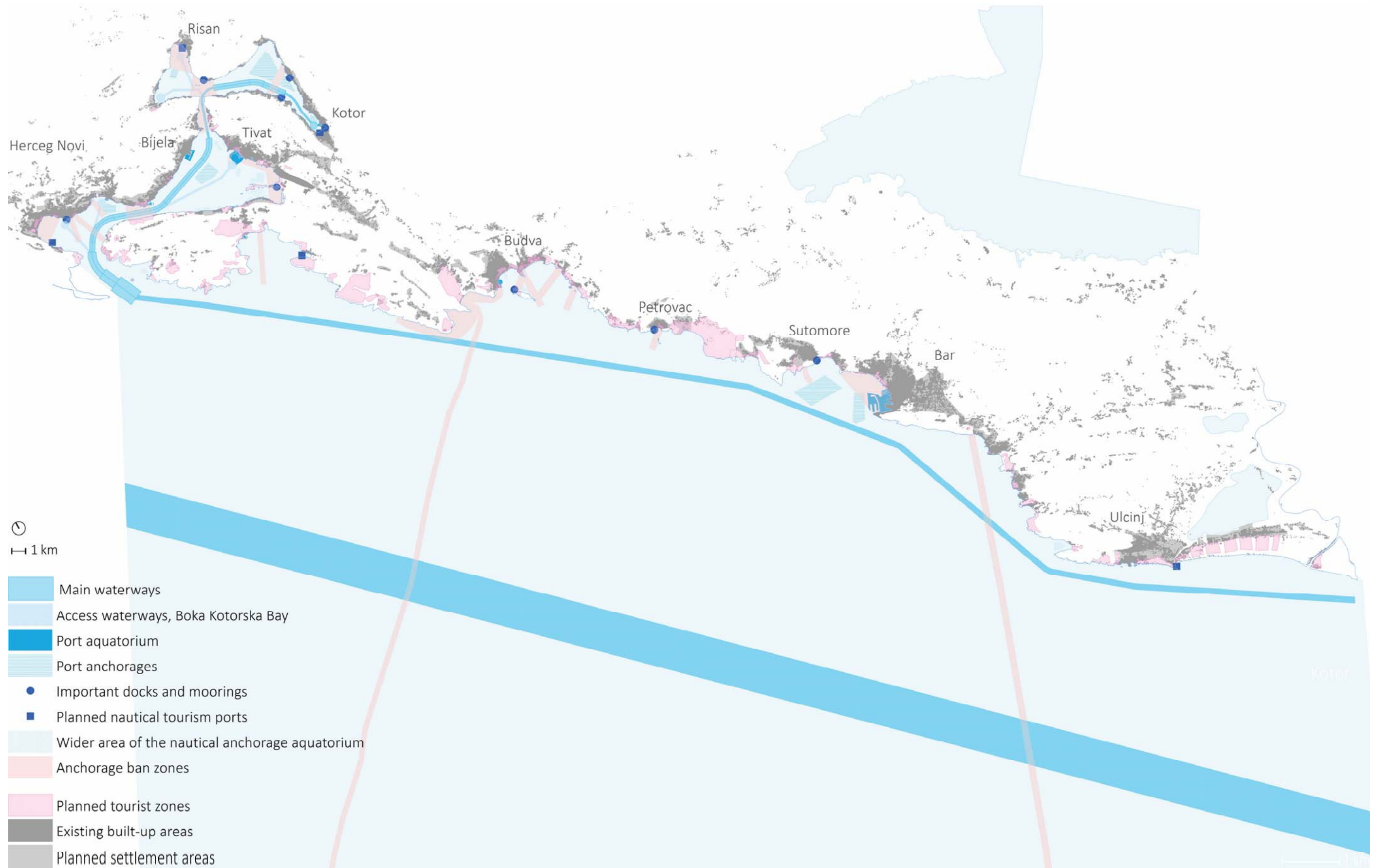
The guidelines for use primarily concern the organization of uses in the marine area, as well as the provision of spatial needs and the definition of conditions of use. For all sea uses, detailed and complete conditions of use in the broadest sense (including environmental protection conditions) are prescribed by national sectoral regulations and are specific to individual use of the sea.

1. Maritime transport

1.1. **Maritime navigation** is navigation performed at sea and other waters as defined by the competent regulations. Maritime navigation is performed primarily by vessels and in a broader sense, any watercraft can participate. Maritime navigation and other related conditions are prescribed by a number of national and international regulations. Above all, they ensure free and safe maritime navigation for all watercraft.

1.2. **The port system** is represented by the sea (port water area) and land area directly connected to the sea with the port infrastructure and associated anchorages, all in the function of providing port services to all types of vessels. Legal status, division of ports according to functional and other criteria, management and other conditions are regulated in detail by national regulations. Planning, construction and reconstruction of port infrastructure and superstructure facilities is carried out in accordance with the regulations governing spatial planning and construction. The port area for ports of national or local importance and the anchorage of the port is determined by the competent state bodies in accordance with the planning document which defines the coastal area.

Map 5.1. Maritime transport



Maritime navigation

Ensuring the smooth and safe flow of maritime traffic is one of the priority infrastructural functions within the marine area. In this sense, the fulfilment of spatial needs for the safe conduct of maritime navigation takes precedence over other forms of sea use, unless otherwise provided by relevant regulations and acts (restrictions based on regulations related to defence, environmental protection, protection of natural and cultural heritage, short-term restrictions for certain activities).

Additional spatial restrictions for maritime navigation refer to the minimum distance of vessels from the shore, so according to current regulations, ships, yachts and seaplanes may not sail at a distance of less than 300 m, motor boats and fishing boats at a distance of no less than 150 m, and use of high speeds on speedboats is prohibited at a distance of less than 200 m from the shore.

For purpose of maritime traffic, the sea surfaces of waterways, the port aquatorium and port anchorage aquatorium are defined.

The waterway in the internal sea waters and the territorial sea of Montenegro is a marine zone deep and wide enough for safe navigation of vessels, which is marked if necessary.

The proposed waterway corridors represent the usual paths, i.e. meteorologically and hydrographically most favourable and safest routes confirmed by research and practice for different types of vessels. Proposals for the following waterways have been identified:

- the main waterway in the Boka Kotorska Bay (allows the entry of referent cruisers 340 m long);
- access waterways in the Boka Kotorska Bay to the main ports;
- local coastal waterway;
- external long-distance waterway.

Separate navigation schemes in the internal sea waters and the territorial sea of Montenegro shall, if necessary, be

prescribed by the state administration body responsible for maritime affairs.

As part of the existing and planned sea uses, there are also facilities for safe navigation on waterways (lighthouses, buoys and other markings at sea), which also represent priority marine infrastructure.

Port system

In addition to spatially defined port aquatoria (as parts of entire port areas) for categorized ports, proposals of priority areas within which the aquatoria of port anchorages are organized are also given. The given proposals are harmonized with the usual port needs and the needs of other maritime activities.

Mooring and accommodation of technical and working vessels is provided along the existing port-operational shores of the ports in Bar, Zelenica, Lipci and at the location of the communal-service zone Kukuljina.

Important ports and moorings are also marked as parts of operational shores for maritime traffic, in the function of piers and moorings (communal and commercial). Ensuring the needs of the port for vessels of state administration bodies and public maritime transport should have priority over other users of the operational shores of the port, which is regulated in more detail by regulations and acts of the competent authorities. In the same way, the proportional representation of communal and commercial berths is regulated, taking into account the needs of the local population. Ports may not be converted into moorings unless the capacity of the port in other locations is increased at the same time in the same settlement in such a way that the total operational shore of the port has not been reduced.

Berths for fishing vessels are provided primarily in the waters of commercial ports and, where possible, nautical tourism ports. The first fishing port in Montenegro is planned at Cape Đeran near Ulcinj with a capacity of about 50 fishing boats. A part of the port area and operational shores of the Bar marina also functions as a fishing port.



Figure 5.1. Cruiser on the main waterway in the Boka Kotorska Bay (Z. Klarić)

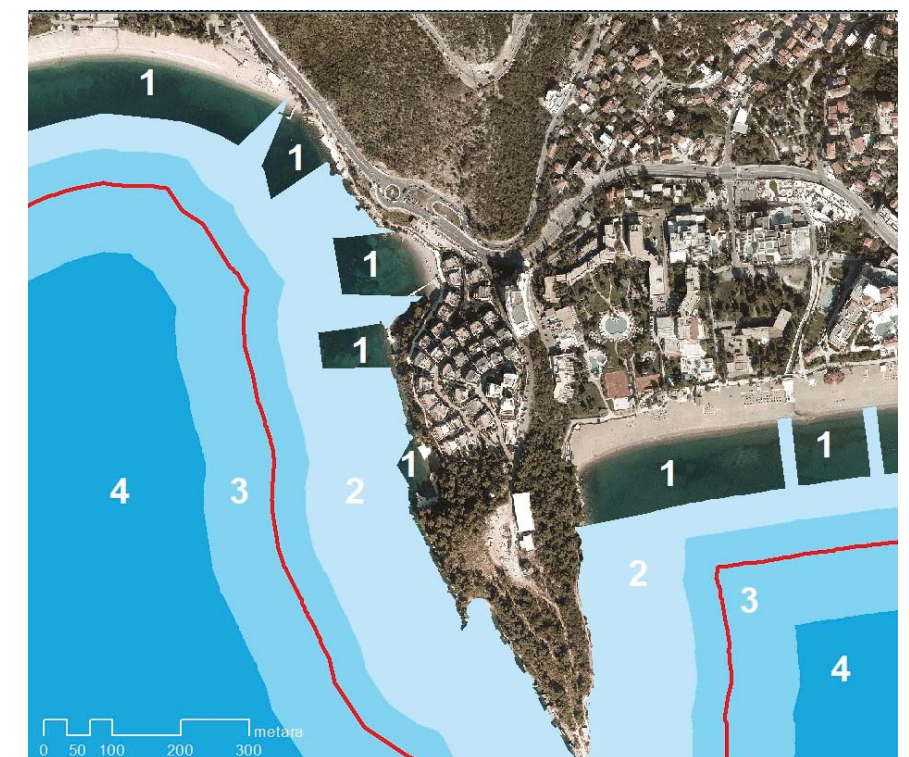


Figure 5.2. Current navigation regimes:

- 1 – bathing areas and beaches,
- 2 – permitted navigation zones for sports and recreational boats (rowing boats, surfboards, canoes, kayaks, gondolas, pedal boats) that can sail up to 150 m from the shore,
- 3 – permitted navigation zones for motor boats and fishing boats, at a minimum distance of 150 m from the shore,
- 4 – permitted navigation zones for ships, yachts and seaplanes, at a minimum distance of 300 m from the shore, red line indicates a distance of 200 m from the shore where speedboating is not allowed.



Figure 5.3. Marina: Porto Montenegro (archive of NTO Montenegro)



Figure 5.4. Port and communal berths: Kumbor (S. Vilus)



Figure 5.5. An acceptable option for the spatial coverage of nautical anchorages near the island of Sv. Marko that leaves enough space for safe navigation. According to available data, areas of seagrass meadows have been avoided. If field inspections show their presence, it is necessary to use fixed anchored buoys, which avoids the harmful effects of anchors and anchor chains.

Within the port area, parts of the operational shore have been defined, primarily in the function of the first landing of caught fish.

The piers can, depending on the specific spatial conditions, be realized within the arranged bathing areas, i.e. on their edges (pontoon piers). These piers are regulated by competent acts

in the function of managing marine assets or regulated bathing areas.

The cartographic representations of this category of land use show:

- aquatoria of categorized ports;
- aquatoria of port anchorages.

Table 5.2. Ports of national and local importance, port and anchorage aquatoria according to the current state and expressed needs (areas according to the boundaries transferred to the GIS database from the available documentation).

Port name	Use	Significance	Aquatorium area in ha	Mooring area in ha
Port of Bar	Trade	National	95.0	169.6
Port of Bar planned part			75.1	369.0
Marina Bar	Marina		9.5	
Port of Kotor	Trade	National	6.1	19.4
				51.2
				248.4
Port of Kotor marine area	Marina		2.5	
Shipyard Bijela	Shipyard	National	29.4	262.4
Port Tivat Porto Montenegro	Marina	Local	61.0	
Port of Budva	Marina	Local	10.5	9.0
Marina Luštica	Marina	Local	4.6	
Marina Kumbor (Portonovi)	Marina	Local	6.9	
Shipyard Bonići	Shipyard	Local	1.5	
Port of Tivat Kalimanj	Marina	Local	1.9	
Port of Herceg Novi Škver	City	Local	2.2	
Port of Zelenika	Trade	Local	3.5	56.3
Port of Risan planned	City	Local	1.7	49.1
NTC Kotor planned	Marina	Local	4.8	

2. Marine fisheries and mariculture

2.1. **Marine fisheries** include catching, collecting and protecting fish and other marine organisms on the principles of sustainable development, in the fishing waters of Montenegro. The fishing waters include the sea and underwater inland waters, the territorial sea and the continental shelf of Montenegro, determined by the regulation governing the sea.

2.2. **Mariculture** involves the cultivation of fish and other marine organisms in fishing waters using techniques designed to produce those organisms outside their natural habitat.

Marine fishing

Fishing activities are carried out in accordance with the competent national regulations as well as with international regulations where their application is stipulated. The conduct of fishing activities is subordinated to activities for the needs of defence, regulations on the safety of navigation, regulations on the protection and rescue, and regulations on the protection of natural and cultural heritage. The implementation of fishing activities must be harmonized with the prescribed regimes of spatial and temporal regulation of fishing.

According to the regulations on the spatial and temporal regulation of marine fishing, fishing using the following methods is prohibited in the area of the Boka Kotorska:

1. with bottom trawlers;
2. with pelagic trawlers; and
3. with purse seine boats.

Exceptionally, fishing with seine nets is allowed in the area from Rosa to cape Arza. In order to protect the total marine biodiversity in the shallower zones of the littoral, fishing with bottom trawlers and pelagic trawlers at a distance of three nautical miles is prohibited, which follows the configuration of the coast, i.e. a depth of 50 m, if the 50 m isobath is less than three nautical miles away.

Protected fishing areas that are favourable for the natural reproduction of fish and the nutrition of fry are described in the regime of protection and use of the marine area. The Bays of Kotor and Tivat are treated as areas of special importance for the reproduction and nutrition of fish and fry (see section 6.1.3).

Fishing *postas* in the Boka Kotorska Bay are areas for pulling fishing nets, with an associated part of the coast, up to 150 m long, with a gravelly and sandy bottom, which is not fenced and has no pontoon, or where the net and catch can be easily pulled to shore. They are used exclusively at night and in the early morning hours and during the winter months all day long.

They have a multi use regime in such a way that they can be used as bathing areas during the day during the tourist season. It is forbidden to use fishing *postas* as moorings for vessels, waste disposal and other activities that prevent the unhindered use of fishing posts. The competent regulation defines the ways of use, maintenance, protection, marking, as well as the length of the shore of the fishing *postas*.

As part of the functional logistics chain in the function of sea fishing, 46 locations have been identified on the Montenegrin coast where it is necessary to provide adequate infrastructure for the first landing of fishing catch. The place of first landing of caught fish and other marine organisms is the area on the shore, port or wharf where freshly caught fish and other marine organisms can be landed from the sea. These places should ensure safe sea access to fishing vessels and car access.

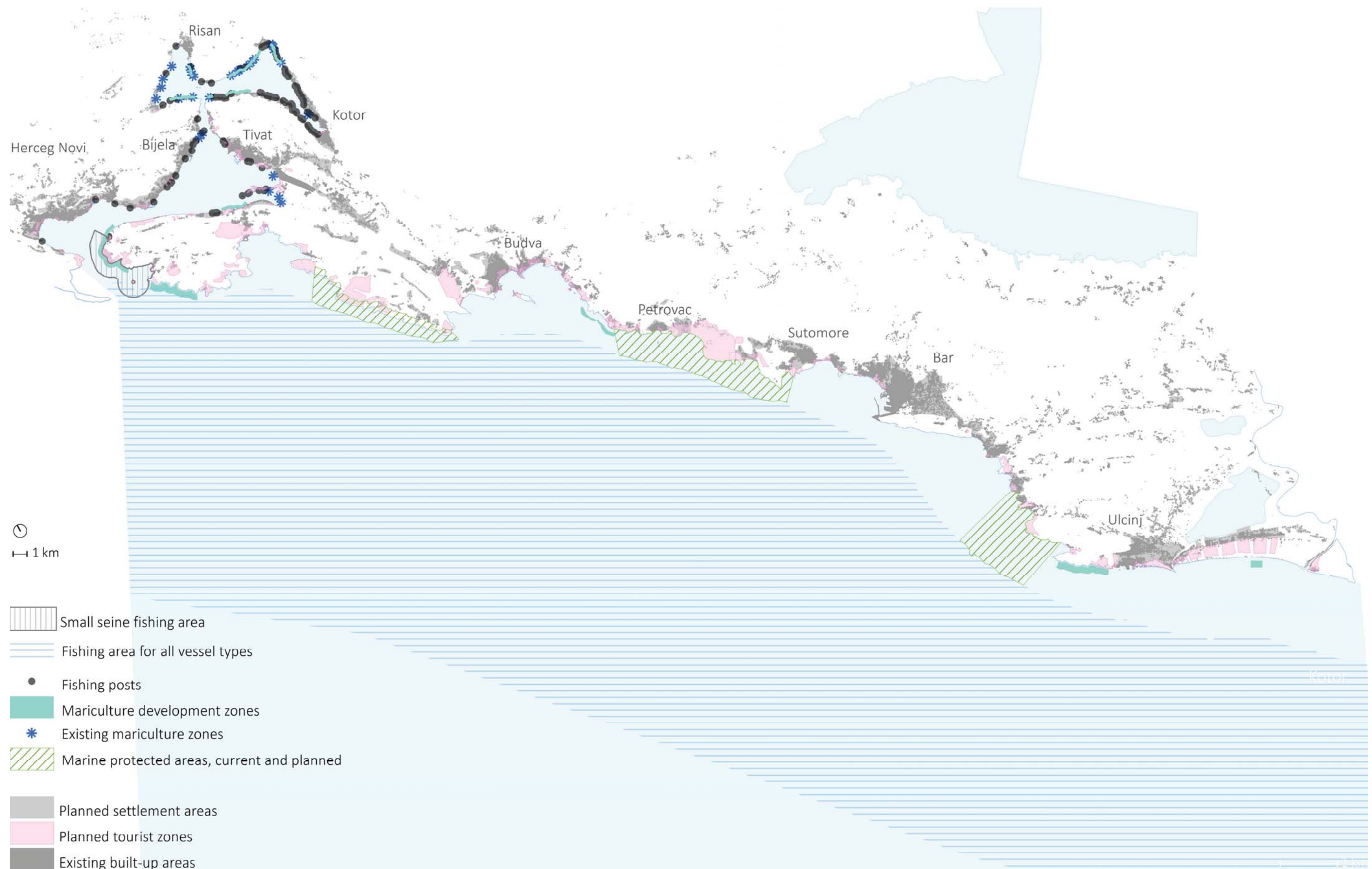


Figure 5.6. Trawler (A. Pešić, Institute of Marine Biology)



Figure 5.7. Example of multi use of the marine area in the Boka Kotorska Bay – fishing posta (1 – narrow posta area, 2 – wider posta area) and bathing areas, 3 – land part, 4 – bathing area aquatorium).

Map 5.2. Marine fisheries and mariculture



Mariculture

The development of mariculture is ensured through the protection and improvement (innovation and technological progress are supported) of shellfish farms at existing locations in the Boka Kotorska Bay. Mariculture is also being developed in other locations within the planned zones that have been identified as suitable. Fish farming in the area of the Boka Kotorska Bay is limited and the development of fish farming on high seas is encouraged.

The obligation to implement measures for reduced pressures on the marine environment in accordance with the regimes for the protection and use of the marine area is prescribed. In order to avoid conflicts of different uses, development on land is limited when its impacts could interfere with the functioning of farms within planned zones.

Based on the analysis of sustainable development of mariculture, as well as the plans of competent authorities, the zones intended for the development of mariculture have been defined and the existing locations of mariculture for which permits have been issued by the competent authorities have been retained.

The cartographic outputs of this category of sea use show:

- small-scale seine fishing zones;
- permitted fishing zone for all fishing vessels;
- fishing *postas*;
- mariculture development zones;
- current mariculture sites.

3. Tourism

3.1. **Coastal tourism** includes the activities of tourists who are accommodated in accommodation units on land, and these activities include sea use. They are:

- 3.1.1. Activities relating to **bathing areas and beaches**; and
- 3.1.2. Daily **sports and recreational activities at sea** outside the waters of the beach aquatorium.

3.2. **Marine tourism** refers to the activities of tourists who are accommodated in vessels, own or rented (the whole vessel or cabin/bed), and it is divided into:

- 3.2.1. **Nautical (yachting) tourism**; and
- 3.2.2. **Cruise tourism**.

Coastal tourism – bathing areas and beaches

Considering the exceptional importance of coastal tourism for the Montenegrin economy as well as the already existing and planned tourist capacities, the satisfaction of tourist needs related to the use of the marine area is one of the priorities of marine spatial planning. Spatial needs of coastal tourism refer to typical tourist activities related to staying at sea or in the immediate vicinity of the sea and include:

- swimming, sunbathing and staying on beaches and in bathing areas;
- daily sports and recreational activities related to the sea such as diving, sailing on sailboats, windsurfers, kite and foil boards, kayaking, riding jet skis and similar recreational vessels for daily use;
- excursions and visits to tourist attractions at sea.

Coastal tourism activities are carried out in accordance with the competent national regulations and other acts, of which those in the field of marine resource management are particularly important. Regarding bathing areas, they define the types and conditions of use of bathing areas at sea, as well as more detailed conditions in terms of their arrangement and equipment.

More detailed conditions are specified in the Atlas of Montenegrin beaches and bathing areas (cadastre of beaches and bathing areas). It is possible to form new baths, especially in areas of increased demand. It is also possible to set up appropriately designed low floating platforms as temporary solutions in areas of increased demand for beach and bathing areas. The new bathing areas and the mentioned beach elements will be planned through more detailed planning documents of the land coastal zone and other documents prepared by the Public Enterprise in charge of maritime domain management.

Activities in the waters of bathing areas may be subordinated to activities for the needs of defence, regulations on navigation safety and regulations on protection of natural and cultural



Figure 5.8. Examples of bathing areas in Herceg Novi with the boundaries of land areas and associated aquatorium.



Figure 5.9. Examples of bathing places in Ulcinj on the beach Velika plaža with the borders of the mainland and the associated aquatorium. Beach areas are marked with different colours according to beach type.

heritage, especially in cases of spatial overlap of nature protection regimes and spatial coverage of bathing areas.

In order to ensure the safety of swimmers, the spatial coverage of the bathing area is always adequately marked. In addition, navigation safety regulations define the minimum distances of vessels in navigation from the shore.

In order to ensure the maximum quality of sea water at bathing areas, a permanent program of monitoring the sanitary quality of sea water at public bathing areas along the entire Montenegrin coast during the summer season is being implemented.

In functional and logistical terms, coastal tourism activities are directly related to capacities and infrastructure on land. Thus, the value chain of coastal tourism on land includes beach and bathing natural and artificial areas where various tourist services are offered, sports-recreational and green areas (coastal promenades), sanitary facilities, security services, catering, cultural and entertainment offer as well as comfortable access and the use of traffic areas and means of communication to the place of accommodation. Given the above, coastal tourism is most directly related to land activities and should be the subject of comprehensive (land-coastal sea) planning through more detailed plans in order to ensure all necessary elements in the value chain that will guarantee a high quality tourist offer.

Regarding sports and recreational activities at sea outside the beach waters that use motor and water jet propulsion (jet ski) and move at higher speeds, it is necessary to require user training (license) as well as defining separate sea area (defining these polygons as priority for areas of highest density and intensity of maritime navigation in the summer season). At these locations, the use of certified electronic control systems is also recommended, which will limit the maximum speed of navigation outside the defined polygons and reduce the speed when close to collision within the polygon.

Regarding sports and recreational activities at sea outside the beach waters that use hand-powered vessels (SUP), it is necessary to take care that they do not take place in locations where they may endanger the safety of navigation and their own safety.

Table 5.3. Marine beaches and bathing areas by municipalities and spatial units with currently available maximum capacities

Municipality	Spatial unit	Number of beaches	Land surface km ²	Aquatorium surface km ²	Length* m
Herceg Novi	Herceg Novi – Meljine	62	57,000	249,000	4,550
	Zelenika – Bijela	53	29,000	173,000	3,160
	Luštica	12	13,000	73,000	1,040
Kotor	Morinj – Risan – Perast	15	9,000	56,000	1,060
	Kotor	22	15,000	78,000	1,530
	Grbalj	3	18,000	76,000	480
Tivat	Tivat	21	19,000	94,000	1,690
	Krtoli	19	37,000	139,000	2,310
Budva	Budva – Bečići	89	210,000	597,000	5,960
	Pržno – Sv. Stefan	19	50,000	180,000	2,160
	Petrovac – Buljarica	36	68,000	258,000	2,840
Bar	Čanj – Sutomore	32	105,000	304,000	3,160
	Bar	24	58,000	213,000	2,480
	Dobra voda – Pečurice – Utjeha	23	36,000	129,000	1,700
Ulcinj	Ulcinj	27	36,000	195,000	2,680
	Velika plaža – Donji Štoj	46	850,000	996,000	9,930
Total		503	1,610,000	3,810,000	46,730

* The length of the mainland beach (bathing area) based on the generalized coastline (approximately natural shoreline before anthropogenic interventions). The total length of such a generalized line of the Montenegrin coast is 252.3 km.

The cartographic outputs of this category of sea use show:

- aquatoria of categorized beaches and bathing areas;
- land coverage of categorized beaches and bathing areas (due to its dimensions it is not visible on a small scale);
- areas for sports and recreational activities at sea (wind & kite surf).

Nautical tourism – yachting

Nautical tourism (yachting) is the sailing and stay of tourists-sailors on vessels, as well as their stay in nautical tourist ports – marinas, and other reception facilities, for rest and recreation. The primary nautical infrastructure consists of nautical tourism ports – marinas, moorings, docks and nautical anchorages. Marine areas in function of nautical tourism are the waters of nautical tourism ports, moorings and docks and the areas of nautical anchorages.

Organized nautical tourism ports according to pre-defined high standards, together with planned nautical anchorages represent an important instrument for the protection of the environment and landscape values in the coastal area. Activities in aquatoria in the function of nautical tourism can be subordinated to activities for defence purposes, regulations on navigation safety and regulations on protection of natural and cultural heritage, especially in cases of spatial overlap of nature protection regimes and spatial coverage of nautical anchorages. It is not allowed to plan nautical anchorages with the use of own anchoring systems in the areas of seagrass meadows and coralligenous communities.

Nautical tourism ports are planned in settlements and in detached tourist development areas outside settlements, depending on natural and manmade conditions, and primarily on degraded parts of the coast. Nautical moorings along tourist zones can have a maximum of 50 berths and not more than 20% of the total number of accommodation units.

Within the entire Boka Kotorska Bay, and primarily within the Bay of Kotor-Risan, it is necessary to establish a regime prohibiting the discharge of sanitary wastewater into the sea. It is necessary to determine the deadlines and transition period for the implementation of this measure and in that period to develop appropriate infrastructure on land for the reception of sanitary wastewater from vessels as well as bilge

water and enable adequate equipment on the vessels of the nautical charter fleets.

The proposed zones for nautical anchorage areas are roughly estimated wider priority areas within which the waters of nautical anchorages are organized. The given proposals are the result of analysed and confirmed nautical needs from practice, harmonized with the needs of other maritime activities as well as with the conditions for the protection of natural values (primarily the preservation of seagrass meadows). In the area of the Boka Kotorska Bay, it is necessary to minimize the number of nautical anchorages for anchoring with vessels' own anchoring systems, and for the area of the Bay of Kotor-Risan, to completely exclude this possibility.

In the functional and logistical sense, maritime activities of nautical tourism are directly related to land nautical infrastructure, primarily in nautical tourism ports and nautical moorings in tourist zones. The value chain of nautical tourism on land includes quality facilities in marinas (supply, service, catering, sports and recreation, sanitation, rent-a-car, parking and, if necessary, transportation to historical town centres) as well as nautical moorings in detached tourist zones (outside settlements) where nautical tourists have all tourist services. Ensuring quality services that cover the entire value chain should be the subject of comprehensive and detailed spatial planning (land – sea). A more detailed planning elaboration is necessary to ensure all spatial planning preconditions for the realization of necessary elements in the value chain that will guarantee high quality nautical tourist offers. Special attention in the implementation of nautical infrastructure projects needs to be paid to safety aspects related to the negative effects of climate change, primarily extreme weather conditions in the summer (sudden summer storms) but also during the rest of the year.

The cartographic outputs of this category of sea use show:

- aquatoria of nautical tourism ports;
- zones and/or locations planned/suitable for nautical tourism ports;
- wider areas of the aquatorium for organizing nautical anchorages;
- more important moorings and docks.



Figure 5.10. Sailing boats (archive of the National Tourist Organization of Montenegro)



Figure 5.11. Nautical anchorage in front of the nautical tourism port in Budva. An example of a situation where due to the presence of seagrass meadows the only option is to set up mooring buoys thus avoiding the use of vessels' own anchoring systems in order to protect valuable natural habitats.

Marine tourism – cruising

Marine tourism – cruising is a maritime activity related to the entry, stay and departure of vessels for tourist cruises and cruises in the marine area of Montenegro. In terms of sea use, this maritime activity uses waterways, port waters as well as port anchorages. The ports that use cruise ships are Kotor, as one of the three leading cruise ports on the Adriatic and since 2016 the Port of Adria in Bar.

Maritime waterways in the Bay of Kotor enable safe entry and exit of vessels up to the size of the referent vessel with a length of approximately 340 m. The same applies to the Port of Kotor, i.e. its waters and anchorages that can safely receive such vessels. In this sense, it can be said that the marine spatial plan allows for this form of use but does not necessarily define the intensity of such use, e.g. the number of entries or types of vessels (especially related to the impact on the marine environment). Increased intensity of cruise tourism can produce impacts that exceed the prescribed or agreed upon limits, and in that case it is necessary to limit the intensity of use through additional instruments of finer regulation. These instruments may or may not necessarily be part of the marine spatial plan¹.

In the functional and logistical sense, maritime activities of cruise tourism are directly related to the land infrastructure and the wider attraction base which is the subject of the tourist offer and interest of cruise tourists. The value chain of cruise tourism on land in particular includes efficient transport logistics that will allow visits to essential attractions in the wider port area. The Port of Kotor is part of the particularly vulnerable Bay of Kotor, as well as the natural and cultural-historical area of Kotor, which is on the UNESCO World Heritage List. Ensuring quality services that cover the entire value chain should be the subject of comprehensive and detailed spatial planning (land – sea). A more detailed planning

elaboration is necessary to ensure all the spatial planning preconditions for the realization of the necessary elements in the value chain that will guarantee high quality cruise tourism offers.

This category of sea use is shown in the group of maritime activities 1. Maritime traffic as well as on the appropriate cartographic outputs (port waters, port anchorages and main waterways).

4. Underwater cables and pipelines

This category of sea use refers primarily to linear submarine infrastructure systems laid on or buried in the seabed or marine sediment. It also includes marine underwater discharges of industrial and municipal wastewater where the sea is used as a recipient for adequately treated wastewater. Exceptionally, it also includes overhead (air) cable lines. Discharges of treated municipal wastewater are shown as points without showing the route of the pipeline on the seabed due to the unavailability of a complete cadastre of underwater lines as they are realized. The main underwater discharges for wastewater are shown in Table 5.4.

Ensuring the safe operation of underwater infrastructure systems is one of the priority functions within the maritime area. In the case of openly laid pipelines and cable pipelines, they are exposed to the impacts of other activities, such as anchoring vessels, in which case the regimes prohibiting anchoring in the 250 m zone on both sides of the underwater route are prescribed. Anchoring prohibition zones have been established for part of the underwater lines and for the rest there is no data on the need or planning of their protection by establishing an anchoring prohibition regime.

Of particular importance is the current underwater power line that connects the power system of Montenegro with the same system of the Republic of Italy. It is a 500 kV HVDC cable

that extends from 400/110/35 kV TS Lastva. The length of the underwater part of the route is 433 kilometers, of which 38.9 km is in Montenegrin territorial waters. The maximum depth of the cable is 1,200 m, and it is buried at depths of up to 700 m. The point of cable exit from the sea is the location of Cape Jaz.

The optical cable laid in the sea on the route Bar – Corfu provides a high-capacity electronic communication connection to European hubs and the rest of the world. The length of the route in Montenegrin territorial waters is about 30 km. Underwater cable comes out of the sea in Ujtin potok, at a distance of 10 km from Bar.

The planned route of the regional Ionian-Adriatic gas pipeline (IAP), a part of which would be under water, is also of international importance. For now, it is in the conceptual design stage with some parts still under investigation². Of the total length of the route through Montenegro, according to available documentation, from about 97 km in total, the underwater part would account for about 37 km in two stretches – from Bar to Jaz, or from Luštica to the Croatian coast.

The cartographic outputs of this category of sea use show:

- underwater pipelines;
- underwater power line, 500 kV HVDC cable;
- underwater optical cable;
- overhead 35 kV line;
- planned Adriatic-Ionian gas pipeline, route under investigation;
- locations of underwater discharges of utility systems.

¹ Analyses of carrying capacity expressed through, for example, maximum number of entries, maximum number of simultaneous vessels or passengers, are usually the subject of local management plans that are developed for individual sectors and / or spatial units (destinations). Other measures aimed at reducing the impact, such as the use of clean fuels in order to reduce greenhouse gas emissions and the greenhouse effect, or by treating ship waste on board and in port facilities for receiving waste from ships, are also affected.

² Within this conceptual design, the route should be optimized with the aim of reducing the impact on the environment and cultural heritage. The current solution of the route passes through the zone of one of only four legally protected underwater archaeological sites – Uvala Bigovica near Bar. The route should be moved outside the bay or archaeological site. The stipulation of impact assessment and optimization applies to all cables and pipelines.

Table 5.4. Main underwater discharges for municipal wastewater

Town	Location	Diameter (mm)	Length (m)	Depth (m)	Capacity (l/s)	
					min	max
Herceg Novi*	Forte Mare	500	1,600	42	200	300
	Meljine	500	1,600	42	200	400
Kotor	Trašte	600	3,600	45	250	400
Tivat	Seljanovo	450	980	25	170	220
	Budva	500	2,550	40	200	300
Budva	Sveti Stefan	250	1,700	40	50	70
	Petrovac	260	1,400	40	50	70
Bar	Volujica	400	350	70	120	180
	Čanj	250	1,500	40	50	70
	Pristan	300	1,700	25	70	100
Ulcinj	Velika plaža/ port Milena	500	1,200	22	280	400
	Valdanos	350	1,850	27	100	140

* In Herceg Novi, the underwater outlet Forte Mare has been cancelled and the new underwater outlet Meljine will be used
Source: SUSPCAM 2018



Figure 5.12. Underwater pipeline (Agency for Nature and Environmental Protection)

5. Sand and gravel extraction

This category of use refers to the areas of the seabed and underground where the exploitation of energy (hydrocarbons in liquid and gaseous state) and non-energy raw mineral materials is carried out. This category of sea uses also includes exploration areas and activities that precede the future possible exploitation of hydrocarbons.

The exploitation of raw mineral materials also includes the extraction of sand, including for the purpose of replenishing beaches with a similar type of sediment. Beach replenishment can be one of the options for beaches that are losing their existing natural beach sediment due to natural processes and anthropogenic influences. The largest sandy beach in Montenegro is Velika plaža in the municipality of Ulcinj, where preliminary data show that there is no more pronounced process of coastal erosion or loss of beach areas.

The cartographic outputs of this category of sea use show:

- coverage of the space of exploration blocks for hydrocarbon exploitation;
- exploration well locations.

6. Dredging and disposal of materials

This sea use refers to areas where dredging is carried out regularly or occasionally, most often on waterways, ports and other areas where it is necessary to maintain the required sea depth and which are exposed to backfilling as a result of natural and anthropogenic processes. This category of use also includes areas for the disposal of extracted material if disposal is performed on designated areas in the sea.

Dredging of the seabed and disposal of materials is carried out on sites and surfaces in the function of remediation or removal of dumped waste materials (remediation of sites in the Shipyard Bijela and in the Port of Tivat – Porto Montenegro).

Dredging of the seabed is also performed in areas where the seabed is filled with sediment caused by torrents and rivers

as a result of natural processes (e.g. zone of the planned NTC marina in Kotor) and where it is necessary to preserve the existing depths, especially in order to maintain the functionality of the marine area for maritime navigation and other functions.

If the extracted material is deposited in the sea, it is necessary to take into account the impact on the marine environment, especially on seabed habitats³.

In the absence of more precise spatial data, the approximate locations of possible dredging activities are shown by point symbols.

7. Coastal Protection structures

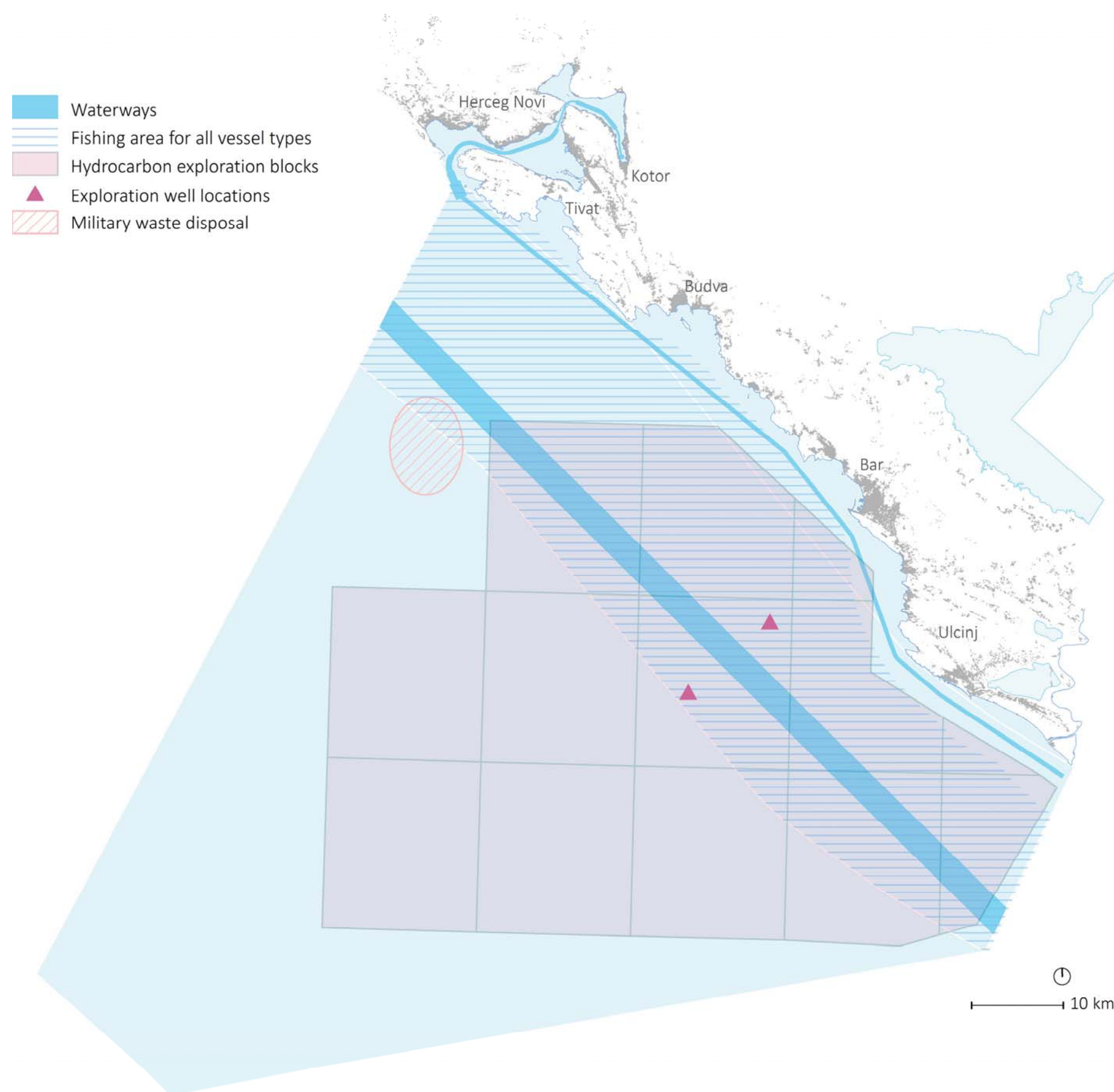
This use generally refers to the coastal sea immediately along the coastline and includes coastal engineering structures in order to protect the natural and anthropogenic coast and coastal functions from the impacts of waves, erosion, flooding and similar impacts.

On the Montenegrin coast, coastal protection structures in the sea (often in combination with measures and interventions on land, if necessary) are primarily in the function of stabilizing beach sediment. At five locations in the municipalities of Budva and Bar, research is being conducted within the established spatial coverage:

- beach Mogren (13.2 ha);
- beach Petrovac (13.2 ha);
- beach Pržno (8.0 ha);
- beach Sutomore (38.0 ha);
- beach Žukotrlica (42.2 ha).

³ Precise data on whether and where this material was disposed of at sea was not available.

Map 5.3. Map of sea uses including high sea uses



8. Military use

This category of sea use generally includes sea areas or protection zones in the function of military ports (parts of the operational shores of the port of Bar, Pristan location on the Lustica peninsula) and facilities in the function of defence and marine areas intended for military exercises and other needs with varying degree of access and use restrictions. Interventions in space on these surfaces are planned in accordance with special regulations.

This sea use also includes the zone on the open sea intended for the disposal of military waste material (zone for immersion of waste). This zone is shown on cartographic outputs of this category of sea use.

9. Marine protected areas

This as well as the next category is not a common form of use of the marine area in terms of the existence of economic sectors as the main user. The purpose of the marine area is defined according to the dominant activities carried out in these areas, which are primarily the protection of ecologically important marine and coastal species and habitats, as well as the prevention of harmful activities that may endanger them.

It refers to established or planned zones where the dominant activity is the protection of the marine environment and natural values in it. Protection zones include:

- Nature parks Platamuni and Katič (established);
- Stari Ulcinj Island (in the process of establishment);
- Special nature reserves Sopot and Dražin vrt (preliminary protection).

Criteria for protection regulation, by zones, are explained in more detail through protection regimes (see 6.1.1).

10. Underwater cultural heritage

The sea use plan identifies underwater localities and cultural heritage zones where a number of possible conservation activities are carried out, which are group-qualified as underwater cultural heritage.

In the preparation of more detailed plans and definition of zones and future interventions, it is obligatory to protect the integrity of immobile underwater cultural heritage with active involvement and cooperation with the competent conservation authorities. Special attention and consideration for the sites and zones of underwater cultural heritage should be paid in planning port and nautical anchorages, mariculture and underwater infrastructure.

The cartographic outputs of this category of sea use show:

- sites of protected and potentially valuable underwater cultural heritage (about 40 sites);
- underwater protection zone of valuable underwater cultural heritage (1 zone in Risan Bay);
- the zone of the Natural and cultural-historical area of Kotor under UNESCO protection;
- the protected environment of the Natural and cultural-historical area of Kotor (buffer zone).



*Figure 5.13. Risan Bay: zone of valuable underwater cultural heritage
(A. Mlakar)*



Figure 5.14. Sunken ship with the ghost nets (M. Mandić, Institute of Marine Biology)

6.

Marine area protection, uses and remediation regimes

The assessment of the state of the marine environment (see Chapter 2.2) determined the existence of areas with significant pressures from pollutants, trophism, marine litter and other impacts from land to sea. Due to urbanization pressures, the extent of coastal artificialization from manmade structures is big, especially in the Boka Kotorska Bay. Anthropogenic influence is visible on at least half of the bay shore, with a third of the shoreline containing manmade structures. On the other hand, there is still a high degree of biodiversity in the sea, with significant parts of the preserved, natural coastal area and areas that are not affected by pollution.

In order to ensure the sustainable use of preserved, valuable parts of the coastal and marine environment, and the remediation of parts that are already under pressure, the concept of protection and remediation is implemented through:

- Protection and use regimes;
- Remediation regimes for the endangered marine environment.

6.1. Implementation conditions for protection and uses

Given the level of pressures on the marine environment, the obligation to implement measures that completely eliminate or minimize negative anthropogenic impacts of activities taking place in the marine ecosystem of Montenegro has been prescribed. For current protected areas that are adjacent to the sea or partially include the marine area, the applicable protection regimes and uses have been taken into account.

6.1.1. Marine protected areas

1. Nature parks Platamuni and Katič; Stari Ulcinj Island – Nature park in the designation process

After the designation of the first marine protected areas – Nature parks Platamuni and Katič, in order to protect valuable species and habitats, an additional marine protected area is currently in the designation process, Stari Ulcinj Island, in the Nature Park category (protected area category IV). A nature park is a vast natural or partially cultivated area of land and/or sea, which is characterized by a high level of biodiversity and/or valuable geological features with significant landscape, cultural and historical values and ecological features of national and international importance. Any type of work, actions or activities that endanger the characteristics, values and role of the park are strictly forbidden. In relation to the presence of valuable habitats and species, zoning was performed in all three marine protected areas (in larger areas – protection regime II, and for less protection – protection regime III; protection regime I as the most restrictive was not specified anywhere), and preliminarily allowed and prohibited activities by protection zones were determined as follows:¹

Activities allowed in parts of the protected area under the protection regime II are:

- Commercial and sport-recreational fishing with floating longlines and angling tools that do not come into contact with the seabed and do not damage species and habitats on the seabed, and in accordance with the conditions issued in fishing licenses, with priority given to holders of commercial fishing licenses;
- Installation and use of underwater diving trails for the interpretation of nature – a maximum of 2 trails in separate parts of protection zone II, which will be determined based on appropriate expert assessment;

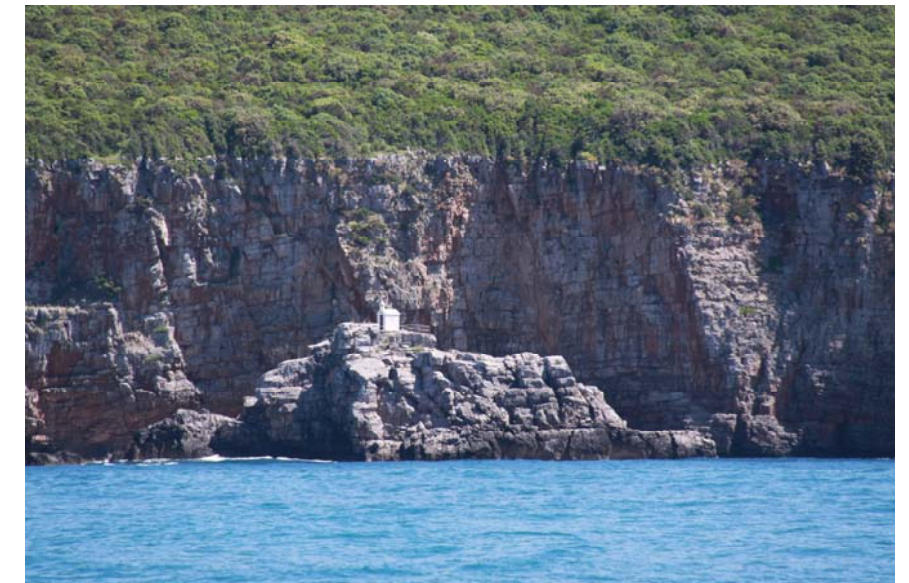


Figure 6.1. Platamuni Nature Park: Church of St. Nicholas (A. Mlakar)



Figure 6.2. Posidonia and coralligenous habitat (Agency for Nature and Environmental Protection)

¹ "Protection Study for Platamuni Nature Park", Agency for Nature and Environmental Protection, November 2020.

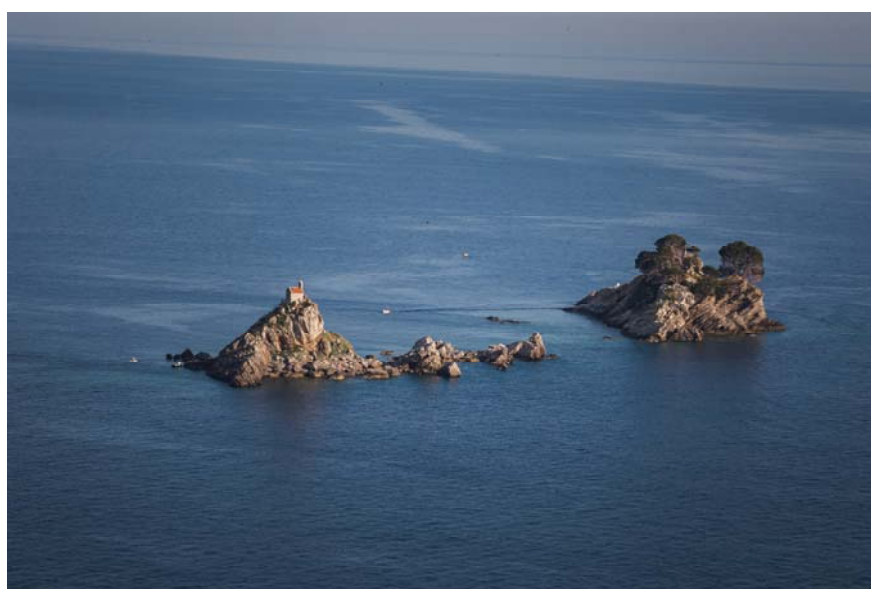


Figure 6.3. Nature Park Katič (in designation process) (PAP/RAC)



Figure 6.4. Katič (B. Strugar)

- Controlled scientific research and monitoring of natural processes;
- Controlled visits for educational, recreational and tourist purposes, exclusively in part II of the protection zone, which will be determined on the basis of an appropriate expert assessment;
- Protective, remedial and other necessary measures for area conservation;
- Implementation of special intervention measures for the protection of the marine ecosystem.

Prohibited activities under the protection **regime II** are:

- Fishing, with the exception of fishing with floating longlines and fishing gear which does not come into contact with the seabed and does not damage the species and habitats on the seabed, and in accordance with the conditions issued in fishing licenses, with priority given to commercial fishing license holders;
- Use of natural resources;
- Anchoring vessels;
- Movement of motor-powered vessels at speeds exceeding 10 knots, except for official steering vessels and competent services for the control and inspection of activities at sea;
- Mariculture;
- Erection or construction of facilities;
- Change of surface purpose;
- Dispersing, capturing, harassing and killing animal and plant species;
- Settlement of allochthonous and invasive species;
- Undertaking works that could damage species, habitats and archaeological heritage;
- Use of substances that may endanger the vitality and fundamental natural values of the marine ecosystem;
- Accidental or intentional disposal or dumping of municipal and other waste;
- Damage to underwater geological and geomorphological values;

- Reducing the number of wild species;
- Pollution or endangerment of the sea.

Level III protection regime – sustainable use, implies selective and limited use of natural resources, which enables functional-ecological connections and preserves the integrity of the protected area.

Allowed activities under the protection **regime III** are:

- Commercial and sport-recreational fishing, in accordance with the regulations governing sea fishing, until the conditions for the introduction of restrictions can be met, based on scientific data of targeted research of fishery resources in the protected area, to be defined in the Protected Area Management Plan, fishing permits and regulations for sea fishing;
- Movement and stopping of motor-powered vessels;
- Arranging and using hiking and recreational trails on land;
- Controlled installation and construction of one adventure park and one take-off and one landing point (zone) for paragliding;
- Interventions for the purpose of restoration, revitalization and overall improvement of the protected area;
- Scientific research and monitoring of natural processes;
- Implementation of protective and remedial measures;
- Intervention measures for ecosystem protection in the event of natural disasters and accidents.

Prohibited activities under the protection **regime III** are:

- Erection or construction of facilities that pollute, damage or endanger the marine and coastal ecosystem, natural habitats and species;
- Change of surface purpose;
- Dispersing, capturing, harassing and killing animal species;
- Settlement of allochthonous species.

Allowed activities in the buffer zone are:

- Construction of facilities in accordance with the valid spatial planning documentation, along with the application of conditions and guidelines for nature protection, as well

as environmental protection measures related to spatial planning and project documentation, are carried out through the strategic impact assessment and environmental impact assessment procedures;

- Construction of a system for the collection/drainage and treatment of waste water, with the abolition of the use of septic tanks and absorption wells;
- Development of activities and projects for agro-ecotourism with the construction of facilities of small accommodation capacity, with low "space consumption" in zones defined by appropriate planning documentation.

Prohibited activities in the buffer zone are:

- Construction of facilities that pollute groundwater and surface water with their wastewater or if the efficiency of their treatment system is below the legally prescribed standards and quality parameters;
- Construction of facilities and performance of work, actions and activities which cause wastewater to be discharged without treatment into the underground (septic tanks and wells);
- Construction of facilities that lead to significant degradation of natural habitats.

2. Special nature reserves Sopot and Dražin vrt (preliminary designation)

For the areas near Sopot and Dražin vrt, a preventive protection was designated until the development of the Protection Study, as stipulated by the Law on Nature Protection (Official Gazette of Montenegro 54/16).

The preliminarily assessed category of protection for this area is the category of Special nature reserve (category IV according to IUCN) which represents land or sea areas, or land and sea areas of special importance due to the uniqueness, rarity or representativeness of natural values, and which includes endangered habitat wildlife such as plants, animals and fungi, where man lives in harmony with nature and which is protected in order to preserve natural conditions and values. A special nature reserve can be in a natural, semi-natural or anthropogenic area. Performing

work, actions and activities that may impair the properties of the protected area are strictly prohibited in a special nature reserve. Work, actions and activities performed on the basis of a permit in accordance with the management plan are allowed in a special nature reserve.

In a special nature reserve, visits may be made to monitor the state of nature, education, recreation and tourism on the basis of the approval of the manager, provided that wildlife populations and habitats are not disturbed, to the extent that it does not endanger the protected natural good as well as intervention measures to protect ecosystems from natural disasters and accidents.

The following are prohibited in this area:

- activities that may violate the primary values of protected sites and affect their original characteristics, performance of hydrogeological works, construction of offshore infrastructure, storage and disposal of all types of waste and surplus land;
- deliberate introduction and spread of non-indigenous plant and animal species, harassment, capture and killing of animals, commercial fishing, mariculture;
- changing the natural values of the area, any change in the existing morphology of the terrain, anchoring (throwing an anchor physically breaks and destroys corals and other organisms that are there).

This prohibition should also be marked in nautical charts.



Figure 6.5. Nature Park Stari Ulcinj Island (in designation process) (PAP/RAC)



Figure 6.6. *Axinella damicornis* (Agency for Nature and Environmental Protection)

Map 6.1. Protected areas and the protection of other important areas of biodiversity conservation



6.1.2.

Areas with valuable and potentially valuable habitats

1. Areas of valuable marine habitats:

- Trašte Bay, the area in front of Ratac, the area in front of Budva – Budvanska Tunja (although sporadic surveys have been done for these areas, detailed surveys have not yet been conducted except for the Ratac area);
- the area in front of Velika plaža, where activities that may additionally contribute to endangerment should be prevented, especially embankment, military use, construction of marinas, ports, as well as ensuring the regulation of discharges;
- the aquatorium of Tivat salt pans should be protected as an area in front of a nationally protected location, by limiting activities such as construction, embankment and urbanization;
- significant habitats such as sandy habitats (which are spread along the coast in Montenegro and which include beaches such as Plavi horizonti, Petrovac, Čanj, Velika plaža, Sutomore, Slovenska plaža, Bečići, etc.), sea caves and pits (on the line Luštica – Donji Grbalj and in the area of Ulcinj, of which Volujica, Plava Špilja, Krekavica are especially interesting (Gurdić spring, springs below the steep banks of Lovćen between Ljuta and Perast, as well as below the slopes of Orjen between Risan and Morinj), the most interesting is Risanka vrulja which is located directly below the Sopot spring) require certain protection measures.

2. Wider areas of potentially valuable habitats:

- Mamula Bay to Cape Mačka;
- Rt Volujica to Dobra Voda;
- Seka Đeran and southern Velika Plaža to the Bojana delta.

In order to determine the suitability for formal protection, further research is recommended in these areas.

Wider areas of potentially valuable habitats and areas of valuable marine habitats are sites that need special treatment through activity planning. For activities that cover locations of valuable marine habitats, no activities should be planned that may additionally threaten present habitat types, in particular:

- construction and urbanization, including the construction of tourist zones;
- embankment;
- discharges;
- anchoring (above coralligenous communities and Posidonia meadow communities);
- military use;
- ports and marinas;
- mariculture (fish farming);
- in the areas of sea caves, strictly prohibit the dumping of waste in cave openings, educate diving guides and diving instructors on the value of sea caves and limit the number of visits/divers.

So far more detailed research on habitat distribution has been carried out in some locations in open seas and the Kotor-Risan part of the bay, while for the rest of the bay area detailed research has not been conducted, much like for the significant part of the open sea. These could also become additional sites included in future protection measures.

3. Underwater sea meadows of Posidonia and seagrass communities; valuable coralligenous biocenoses

Due to their sensitivity, they suffer the greatest pressure from discharges, tourist activities and other pressures resulting from human activities, especially due to the presence of waste in the sea. Therefore, it is necessary to:

- install wastewater treatment plants;
- remediate marine litter pollution;
- control and plan anchorages outside the area of distribution, or, if the same is not possible, envisage the use of eco-buoys that serve as moorings;



Figure 6.7. *Acanthella cannabina* (E. Trainito)



Figure 6.8. *Savalia savaglia* (E. Trainito)

- minimize, restrict and control construction, embankment and tourism development activities;
- control and limit the presence of cruisers in the bay;
- control waste discharges from ships;
- control diving activities (important for coral protection);
- avoiding locations where this habitat type is present for mariculture planning and set up (fish farming);
- prohibit the use of fishing gear in the habitat area, which may damage such habitat types.

4. Emerald ecological network

Montenegro has established a list of 32 areas, candidates for the Emerald ecological network (defined as areas of special interest for protection at the European level – ASCIs), of which 12 are located in the coastal area or at sea: Skadar Lake; Velika Plaža with Solana Ulcinj; Buljarica; Tivat salt pans; Šasko Lake; river Bojana, Knete, Ada Bojana; Kotor-Risan Bay; Orjen; Pećin beach; Spas hill in Budva; the islands of Katič, Donkova and Velja seka; Platamuni.

6.1.3. Important areas for fishing, fish reproduction and feeding

1. Protected fishing areas

Protected fishing areas are determined by the competent regulation and include parts of the fishing waters that are favorable for the reproduction and feeding of fish and fry, as well as other marine organisms. Protected fishing areas are:

- Port Milena canal: from the mouth of the canal to the sea to Solana, including the peripheral canal of Solana to the river Brdel, with an area of 28.5 ha;
- Tivat salt pans: area covered by existing pans encompassing 50 ha/139.8 ha;
- Krtolska bay with Kukuljina bay, stretch from the port of Kaliman, island Milosrđa to the outer cape at the entrance to Bjelila bay, area 659.9 ha;

- Morinjska river mouth: from the river mouth upstream in the length of 700 m to the mill of Čatović and Milinović;
- Mrčevska river mouth: from the river mouth to the bridge on the new road to the Luštica peninsula in the length of 700 m;
- Gradiošnica river mouth: from the river mouth to the bridge on the main road in the length of 450 m;
- The mouth of Veliki potok (Široka rijeka): from the mouth of the river to the sea, upstream in the length of 1,000 m, with the average width of the riverbed 13 m;
- The mouth of the river Sutorina, from the mouth of the river to the sea, upstream, to the bridge on the main road Herceg Novi – Debeli Brijeg;
- Škurda river mouth (Škurda 1 and Škurda 2 – Mala rijeka): from the source to the mouth to the sea and the port, in front of the Faculty of Maritime Studies and the beginning of the settlement Muo, surface area 21.4 ha.

2. Kotor-Risan Bay: an area of special importance for the reproduction and feeding of fish and fry

Long-term research of the early developmental stages of fish (ichthyoplankton) has established that the area of the Boka Kotorska Bay is a feeding zone and spawning zone for a significant number of pelagic and demersal fish species. The main spawning zones are:

- the central part of the Bay of Kotor and Risan;
- Tivat Bay (in front of the Solila nature reserve).

Considering the fact that the Bays of Kotor and Risan are areas of special importance for the reproduction and feeding of fish and fry, that the main zones of fish reproduction coincide with zones of high productivity, but also the fact that the Bay of Kotor-Risan is an area rich in biodiversity, valuable habitats, underwater archaeological sites, and that it is under the protection of UNESCO as a natural and cultural asset, the **aquatorium of the Bay of Kotor-Risan should be designated as an area of exceptional features**, as a protected area of category VI pursuant to the Nature Protection Act (OG of Montenegro no. 054/16 and 018/19) ("*Category VI protected area which includes areas intended for the conservation of ecosystems*

and habitats, as well as accompanying cultural values and traditional ways of managing natural resources where natural resources are managed and used sustainably").

3. Deep-sea fishing

Analyses have shown the existence of two valuable spawning zones of anchovies:

- from Bigova Bay to Budva Bay;
- from the cape Crni rt to the border with Albania;

The spatial distribution of the adult part of the anchovy and sardine populations showed the existence of two significant zones as well:

- on the stretch Platamuni – Budva;
- area in front of Ulcinj.

As far as demersal resources are concerned, the area from Cape Jaz to Dobra Voda is marked as the most valuable area of biomass.

As fish represent migratory organisms, especially pelagic fish that travel long distances in a short period of time, the identified zones important for spawning and zones of high biomass density should not be taken as definitive because the analysis was done on the basis of a small data set. It is necessary to continue continuous research and monitoring of early developmental stages and biomass assessment of the adult population, and to repeat the analysis on a longer series of data to ensure that all significant spawning, feeding, and high biomass zones are identified, providing a good basis for future management and protection measures. Although the currently identified significant areas should be considered preliminary, a **precautionary approach should be applied** (and not greatly increase fishing efforts, but continue to implement national and international management and protection measures, introduce more selective tools in use) to ensure that stocks are not endangered and that resources are used rationally.

6.1.4. Beach protection

1. Protection of beaches designated as natural assets

Some of the beaches have the status of protected natural assets, which is why the organization of bathing areas and their use is carried out in accordance with the general conditions for the protection of natural assets, taking into account the preservation of biological and landscape diversity.

- On such beaches **it is forbidden** to use protected natural assets in a way that causes:
 - soil damage and loss of its natural fertility;
 - damage to surface or underground geological, hydrogeological and geomorphological values;
 - impoverishment of the natural fund of wild species of plants, animals and fungi;
 - reduction of biological and regional diversity; pollution or endangerment of groundwater and surface water.
- Objects of permanent character, concreting works, exploitation of sand, removal of vegetation, change of the coastline and structural remodelling of the sandy beach cannot be executed at the protected natural asset itself.
- Temporary facilities that are placed on the sandy surface of a protected natural asset must occupy the minimum areas necessary to perform activities in these facilities, with mandatory removal in the off-season. Only temporary public toilets that do not pollute the environment and are regularly maintained may be installed at the protected natural asset, unless there is a possibility of their connection to the public sewerage system.
- Protected dune zones on Velika plaža must be free from any facilities and activities, visibly fenced, with clearly traced public access (wooden walkways) to each individual beach. It is forbidden to level surfaces in the dune area, to remove halophytic vegetation, to organize parking spaces, or clear access roads. Remediation measures need to be implemented at locations where dunes have been devastated.

2. Ensuring beach stability

In tackling the problem of beach coastal erosion, technical, economic, environmental and social aspects need to be taken into account in order to meet all the requirements for sustainable coastal management. **To ensure that the effects of coastal erosion are prevented or mitigated, it is necessary to:**

- Carry out replenishment of beaches without construction of protective facilities; exceptionally, with the construction of spokes – facilities to prevent the longitudinal movement of bulk material along the coast; top-dressing must be done on the basis of special analyses on the possible impact on the living world in the coastal zone;
- On beaches where the intensity of erosion is not excessive, construction of underwater breakwaters to reduce the effects of waves;
- Implement biological measures to protect coasts from erosion by establishing a vegetation zone in the coastal zone exposed to erosion.



Figure 6.9. Urgent remediation measures (by placing sandy groyne and nourishing the beach with the sand from Bojana river dredging during previous years), temporarily stopped the erosion of the beach on the west side of Ada Bojana. Upper image- the situation in January 2021; middle image – June 2021 (PEMDM); bottom image – works in March 2021 (MESPU)..



Figure 6.10. Mamula (S. Vilus)



Figure 6.12. Buljarica (A. Mlakar)



Figure 6.11. Kraljičina beach (archive of the National Tourist Organization of Montenegro)



Figure 6.13. Ulcinj (S. Vilus)

6.1.5. Preservation and development of landscape features

1. Measures to preserve extremely valuable areas

The protection of the Kotor-Risan Bay area is carried out within the UNESCO Natural and Cultural-Historical Area of Kotor. It is important to strictly follow the rules for the area, along with the buffer zone.

Within the framework of the **marine protected area** (see Chapter 6.1.1) – Platamuni Nature Park – includes a part of the coastal area, so that formal protection would have positive outcomes like the preservation of landscape features. In this sense, it is important that the boundaries of Nature park Katič (extremely valuable area on the stretch Buljarica – Dubovica – Pećin and Čanj – Crni rt) and the future Nature Park Island of Stari Ulcinj (partially already degraded area under great development pressures where the conservation of regional characteristics is that much more important) extend to the land zone as well. This zone should be wide enough, and defined on the basis of regional characteristics.

2. Significant coastal and marine areas

The Special Use Spatial Plan of the Coastal Area (2018) also includes a landscape plan. These starting points in the marine spatial plan are upgraded by extending regional planning solutions from the mainland (protected and valuable areas of nature, valuable cultural landscapes, caesura regions) to the sea.

It is especially important to leave **green open areas** between construction areas. These areas do not stop on the shore, but extend into the hinterland and the sea. With such intersections, continuous construction along the coast is prevented. In that way, the recognizability and completeness of the settlement is ensured, the orientation in space is improved and the natural link between the coast and the hinterland is enabled. In addition to having visual benefits, this enables a quality tourist and residential environment, more favourable microclimatic conditions, and the preservation of biodiversity.

Map 6.2. The preservation and development of landscape features

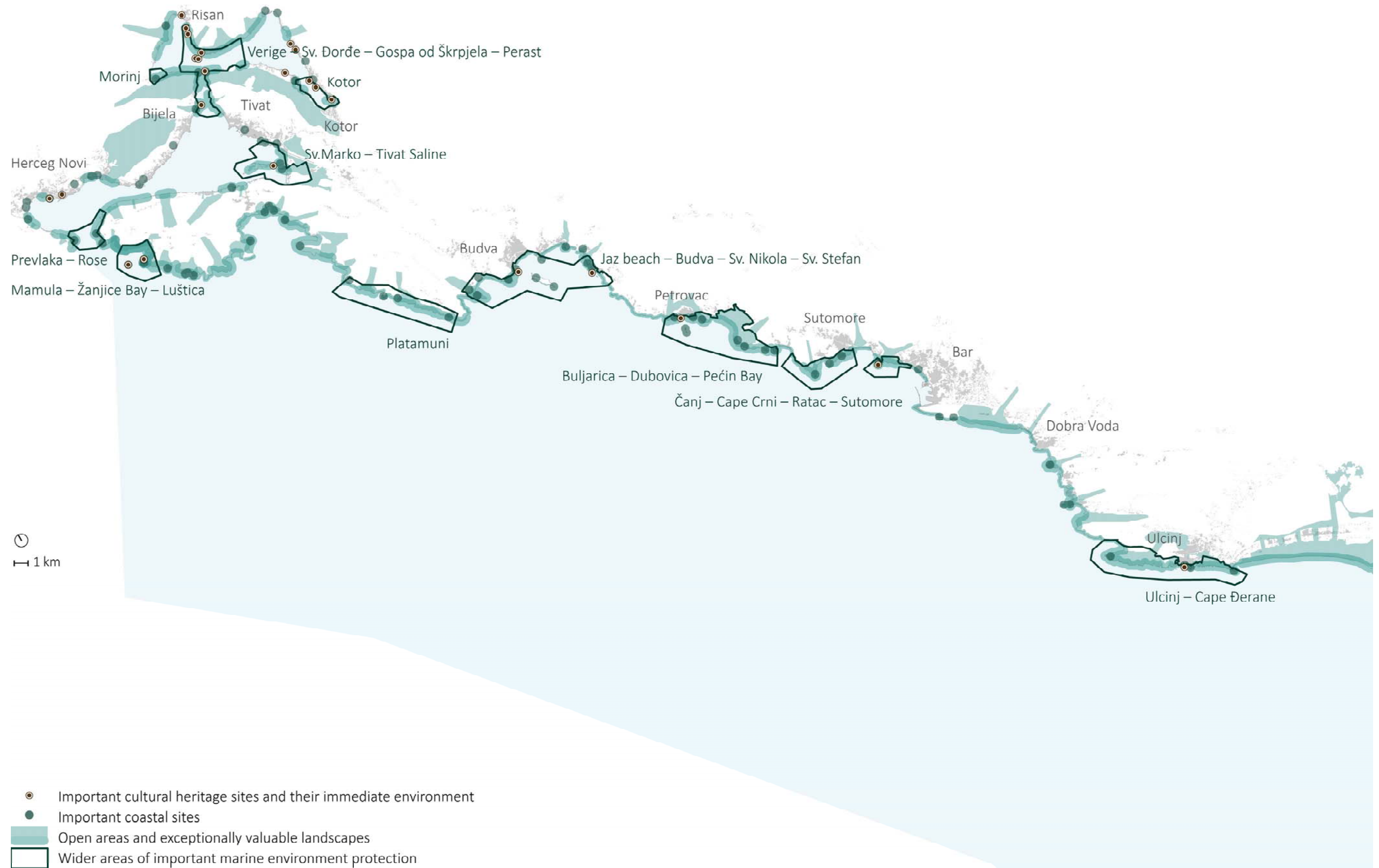




Figure 6.14. Banja monastery (A. Mlakar)

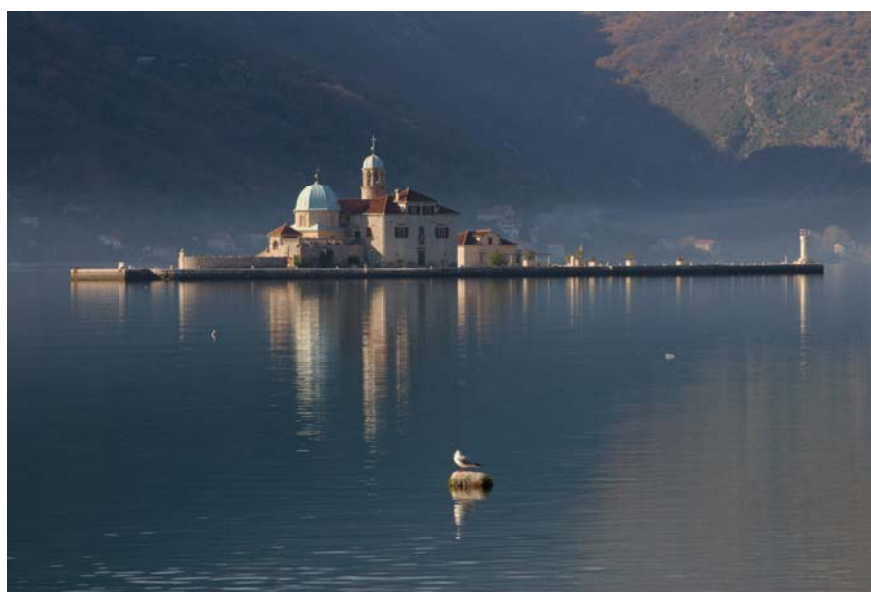


Figure 6.15. Lady of the Rocks
(archive of the National Tourist Organization of Montenegro)

Significant locations of the coastal area have been identified on the mainland, which are important to the perception, recognizability and symbolic meaning of the coastal zone – so-called spatial landmarks and nodes (capes, cliffs, fortifications, sacral buildings, city parks). These locations require preservation of their spatial environment.

Wider zones of significant marine areas – complete areas of inalienable (natural and cultural) interaction of land and sea in the Boka Kotorska Bay:

- Mamula – Žanjice bay;
- Prevlaka – Rose;
- Sv. Marko – Tivat salt pans;
- Morinj;
- Verige – Sv. Đorđe – Gospa od Škrpjela – Perast;
- Kotor.

In the open sea, such areas include:

- Mamula – Luštica;
- Platamuni;
- Jaz beach – Budva – Sv. Nikola – Sv. Stefan;
- Buljarica – Dubovica – Pećin bay;
- Čanj – Crni rt – Ratac – Sutomore;
- Ulcinj – rt Đeran.

Landscape conservation of this areas mostly refers to favourable spatial planning (strategic) solutions and architectural and landscape solutions (detailed design and construction) on land and sea. These areas should be protected from uncontrolled individual construction and intensive tourism development, while the potential for different types of development, complementary to tourism development, should be recognized.

6.1.6. Protection of cultural heritage

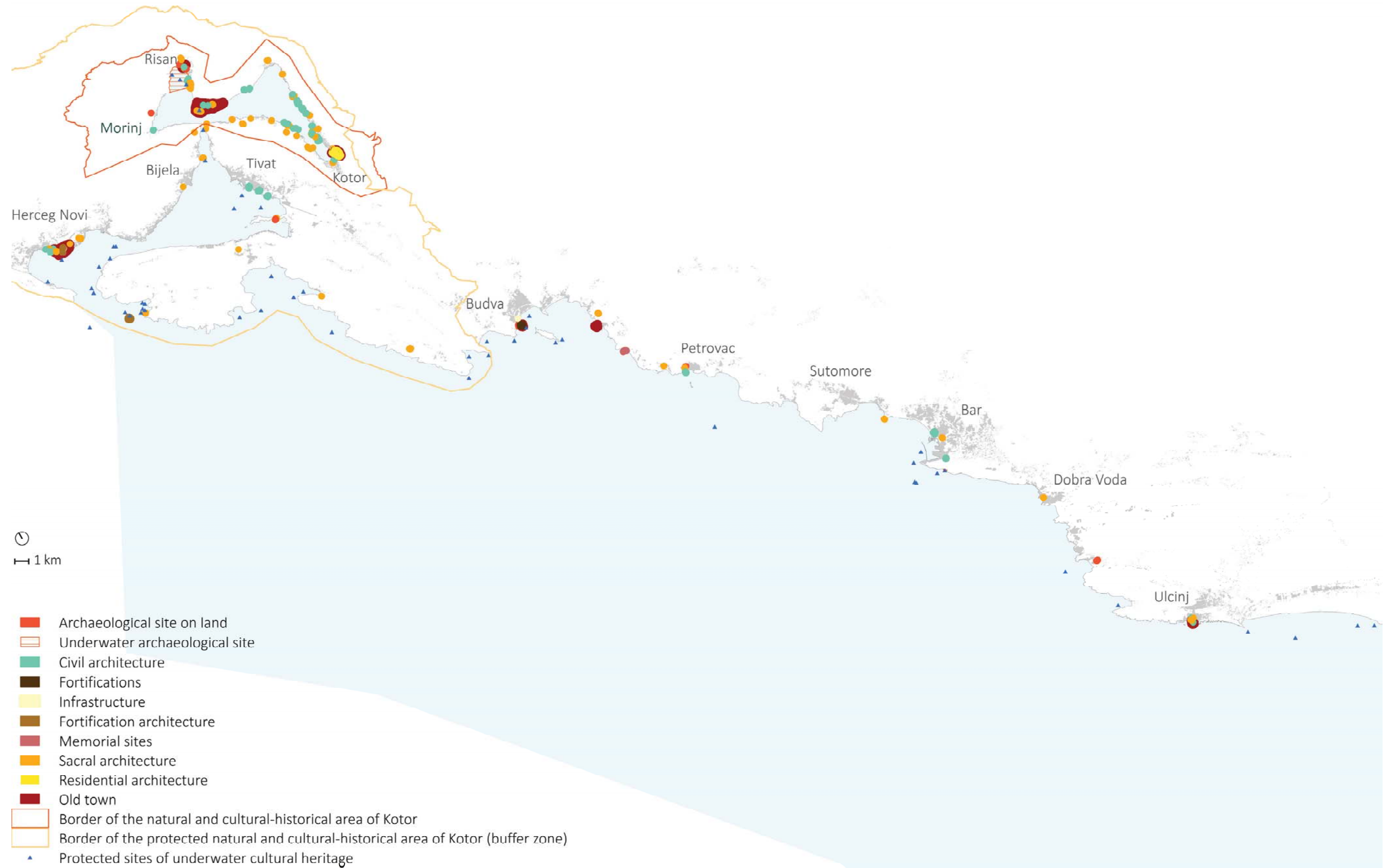
The current protection regimes of the **Natural and Cultural-Historical Area of Kotor** and its protected environment (buffer zone) are consistently respected.

The protection of urban units implies a clear definition of the protected ambient unit and its protective, contact zone of urban city centres. Marine areas are considered part of that ambient whole. This applies to the historic urban core and suburbs of medieval origin in Herceg Novi, Risan, Perast, Kotor, Budva, Sveti Stefan and Ulcinj.

Other important cultural heritage sites (such as Banja Monastery, Sveti Vavedanje Monastery, St. Nicholas Church) along the coastal zone and their spatial environments (included in significant coastal areas) are also taken into account.

Protection of underwater archaeological sites includes the prohibition of all activities that may disrupt the cultural, social, economic, research, educational and other significance of archaeological sites (construction of facilities, dredging of the seabed, anchoring, fishing with deep trawls, shellfish farms). The locations and regimes in this document are informative and will be elaborated in the continuation of marine spatial planning. In the past three years, the Centre for Conservation and Archaeology of Montenegro has conducted a comprehensive project of national importance during which the necessary prospecting and assessments of the current state of previously known sites have been conducted, and newly discovered sites and their spatial boundaries have been typologically and chronologically defined. The conclusions derived from the obtained data on 50 inspected positions to depths of 40 meters along the entire coast, resulted in the start of initiatives by the Directorate for the Protection of Cultural Heritage, to confirm the regime of their protection, or to determine the status of newly registered cultural sites.

Cultural heritage protection regimes may be subordinate to activities for the needs of defence, navigation safety, protection and rescue, all in accordance with special regulations. Other maritime activities, primarily those involving the use of marine areas for economic purposes, if they take place on the site of protected underwater heritage or in its vicinity, should be in accordance with the established protection regimes and conservation guidelines issued by the competent state authorities.



6.1.7. Restriction of high impact activities

The following high impact activities are restricted:

- **shipbuilding** poses one of the potentially greatest risks of increasing contamination of the sea, sediments and marine life with toxic and hazardous substances; apart from the existing location in Bijela (with remediation and measures in place) and smaller plants (with pollution prevention measures), it is not sensible to develop such activities in the Boka Kotorska Bay;
- **oil and gas exploitation** is an activity which is not acceptable in the Boka Kotorska Bay under any circumstances due to its high impact; outside the Gulf, exploitation should be accompanied by the implementation of highest environmental precautions, as far away as possible from the coast;
- it is necessary to define the capacity of the environment in terms of receiving **large ships**, which significantly affect air quality, and contribute to noise, low sea water quality and disturbance of fish stocks. In addition, a detailed study of the impact of cruisers and cruise tourism should be made and this activity has to be regulated (speed of navigation, noise, turbidity from propellers, intensity and number of cruisers/yachts/ships per day, waste at sea, ballast water, etc.) in order to reduce pressures; it is also necessary to develop a visitor management plan for cruise tourism;
- locations of valuable/vulnerable habitat types should be avoided when determining **anchorages**;
- as a particularly vulnerable area, first in Kotor-Risan, and later in the entire Boka Kotorska Bay, gradually introduce the rule of access only to vessels with a built-in holding tank;
- activities that take place in **the port aquatorium and marinas** include those that contribute to increased levels of organic matter and lead to increased eutrophication; the construction of ports leads to the physical destruction of habitats and coastal areas, therefore activities of ports and marinas should be maintained at existing locations;

- **exploitation of raw mineral materials** leads to permanent degradation and physical damage of all habitat types due to the impacts that occur from the works and disposal of material. Given the value of the present habitat types, it was assessed that this activity is not acceptable in the Boka Kotorska Bay;
- Considering the fact that **fish farming** can have negative consequences for the marine living world, it is recommended to develop fish farming at high seas of the Montenegrin coast, as well as to relocate the existing fish farms from the Boka Kotorska Bay;
- **dredging activities** can lead to degradation and physical damage of all habitat types. Therefore, activity should be limited to occasional dredging to deepen waterways and port waters;
- it is forbidden to **dispose waste** in the sea.



Figure 6.16. Restriction of high impact activities (A. Mlakar)

6.2. Endangered marine environment remediation, with implementation conditions

6.2.1. Remediation of areas impacted by contaminants

As part of the remediation efforts of Bijela Shipyard, the following should be implemented:

- remediate and eliminate all hazardous waste – used sandblasting grit mixed with contaminated land at the shipyard site which indirectly pollutes the marine environment, as well as hazardous waste from condensers, transformers and other equipment;
- remediate groundwater pollution in Bijela that is contaminated with mineral oils and petroleum hydrocarbons. It is necessary to apply a curtain injection under the remediation works in order to prevent the leakage of highly polluted – oily groundwater from the location into the sea;

Used grit from the former Arsenal, which is currently still stored near Porto Montenegro, **should be eliminated or neutralized**.

In the **Port of Bar**, plants for the reception of waste petroleum products should be relocated and all hazardous waste from condensers, transformers and other equipment containing pyralene oils based on polychlorinated biphenyls as transformer oil should be eliminated.

6.2.2. Reduce existing and prevent future pollution and anthropogenic impacts on the trophic nature of the marine environment

1. Plan the construction of a complete infrastructure for the collection and treatment of municipal wastewater:

- through the construction of a sewage system and a device for the treatment of municipal wastewater for all agglomerations in the Boka Kotorska Bay. To this end, connect the municipal wastewater outlets of Trašte and the settlements of Ljuta, Orahovac and Dražin vrt to the sewerage system, and for Risan and Perast, as well as the settlements of Muo, Prčanj, Stoliv, Markov Rt, possibly build special smaller local treatment plants;
- by remediating and connecting to the central sewerage system numerous small individual sewage outlets in the Boka Kotorska Bay that still remain unconnected;
- by connecting individual facilities with septic tanks to the new sewage system;
- by accelerating the connection of all settlements in the Municipality of Herceg Novi to the new collector system in the wastewater treatment plant in Meljine. It is obligatory to connect the hotel settlement in Njivice;
- through the construction of new sewage systems and wastewater treatment plants for all new tourist complexes (e.g. Luštica bay, etc.), if it is not possible to connect them to existing ones;
- in the non-Gulf part of the coastal sea, by implementing the planned activities for connecting all local sewers to the WWTP, preventing their discharge into the sea through emergency discharges, as is done in Bar, Sutomore, Ulcinj;
- by building a sewage system for Ulcinj and Velika plaža with a device for wastewater treatment of all built hotels that are now discharged to Bratica and Port Milen. After connecting to the sewer, remediate the Port Milena canal in accordance with the project of excavating its bottom and disposing of polluted sludge at the Hija landfill or connect it with the canal to the river Bojana in accordance with the existing project in the current PUP Ulcinj;

- by connecting catering facilities, as well as individual raft-houses to the sewage system (alternatively, to condition the installation of individual-house devices for wastewater treatment).

2. Strictly apply the coastal setback criteria. Protect areas that are particularly sensitive to pollution. This primarily refers to:

- peloids in accordance with the measures in point 4;
- shellfish farms, in accordance with point 3 of this chapter;
- beaches – all locations of public beaches and bathing areas must be covered by planned measures of protection against planning of industrial and other facilities that could lead to water pollution with toxic and dangerous substances or microbiological pollution.

3. Ensure that facilities that may endanger water quality for mariculture (industrial and similar plants) are not planned near sites of special importance for mariculture.

- In doing so, care must be taken not only to prevent negative impacts on such farms, but also negative impacts that can be generated by the fish farms themselves on the marine environment, especially in the Boka Kotorska Bay;
- Detailed control of the level of pollutants in biota should be introduced on farms near the Bijela shipyard and the former Arsenal.



Figure 6.17. Port Milena (S. Vilus)



Figure 6.18. Waste extraction (Ministry of Ecology, Spatial Planning and Urbanism)

4. Protect peloids and medicinal mud in Igalo Bay, due to the uniqueness of the mineral mud used for medicinal purposes. Therefore, it is necessary to:

- Develop a technical base and, if necessary, establish formal peloid protection, together with defined sanitary protection zones for peloid sites in the hinterland and the routes of their transport to the sea;
- Prohibit the construction of industrial plants without treatment near the mouth of the river Sutorina and Igalo Bay, prevent sewage pollution of Sutorina, and protect its catchment area as it significantly contributes to the formation and quality of medicinal mud;
- Make an analysis, define the area and provide protection from the effects of contaminants for the location from Ulcinj to Cape Đeran (so-called "Women's beach") and other locations where there are also medicinal peloids (Kalardovo, Bigova, Velika plaža);
- Ensure the preservation of Bigova Bay, as a potential archaeological site and area rich in natural peloid deposits; more detailed conditions for the protection and presentation of archaeological finds can be defined only after a systematic field inspection and urban architectural tender.

5. Remediate existing landfills for municipal waste in the coastal area in order to prevent seepage and leaching of toxicants by groundwater into marine waters.

- These are landfills Lovanja I and II in Tivat field, the wild landfill on Orijena, the landfills "Pode" and "Dugonja" where the waste of the Municipality of Herceg Novi was dumped and whose leachate is drained into the Risan Bay, the landfill Čafo on Volujica and the old landfill Ulcinj – Hije near Kruč. Existing unregulated (wild) solid waste landfills near the sea shore and in the hinterland should be recorded and remediated in order to prevent solid waste from reaching the marine environment, as during the 2010 floods.

6. Control and supervision measures to prevent the discharge of wastewater from ships and yachts in the entire area of the Boka Kotorska Bay, and especially in Kotor, Tivat and Herceg Novi.

- Ban on entry of ships without holding tanks and the construction of devices for the reception and treatment of wastewater from ships and yachts in all ports in the Boka Kotorska Bay is a prerequisite for a permanent solution to the problems generated by this group of effects;
- The port of Kotor is a particularly problematic location because it is located in a part of the bay with very slow water circulation, and the pressure of pollution due to the discharge of municipal wastewater and pollution from cruise ships is increasing. Therefore, the proposition is to define the absorptive capacity of the marine environment and a strict regime of port entrance and exit.

7. Construction of new port capacities, as well as locations for ship repair.

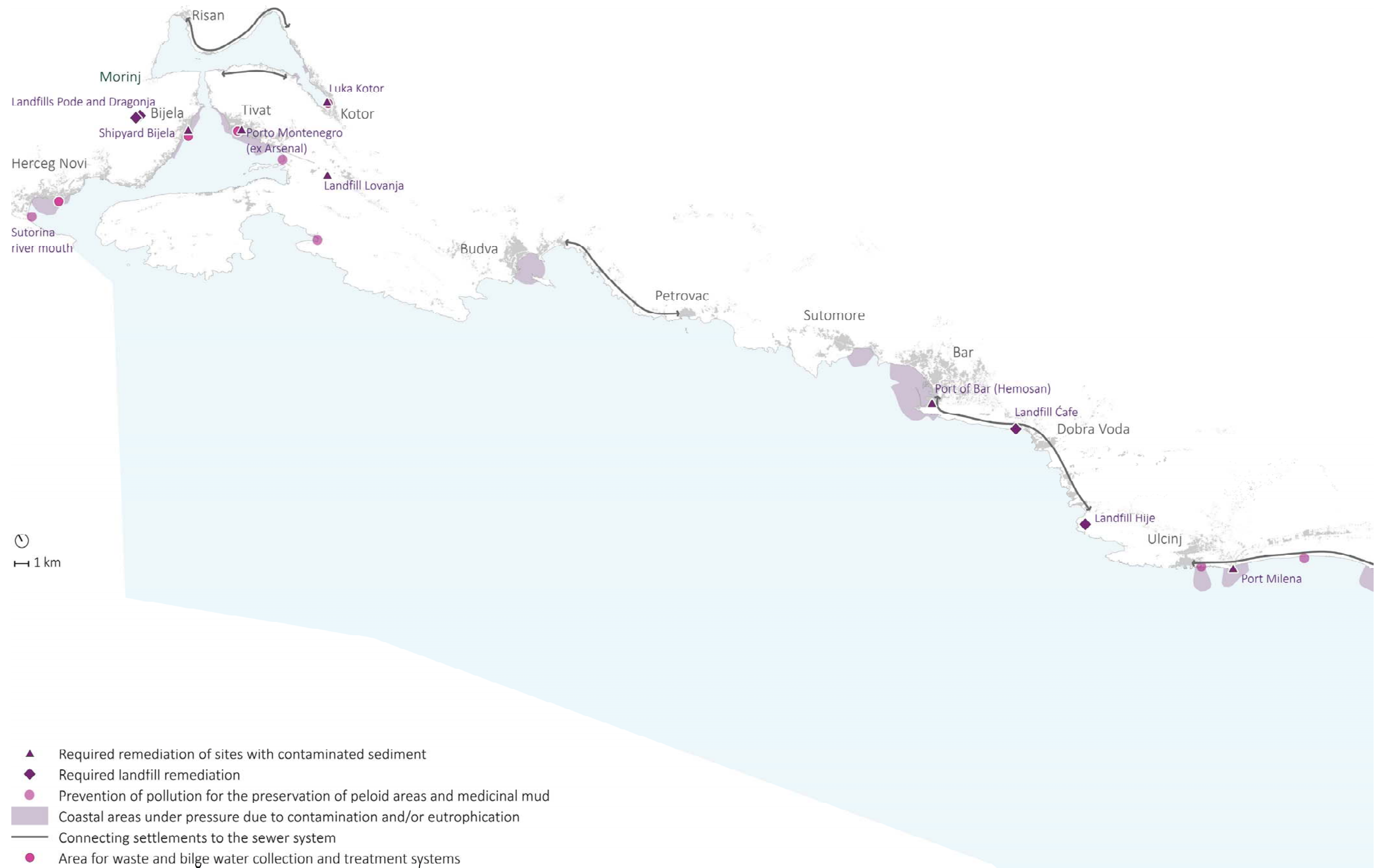
- Construction of new port capacities, as well as locations for ship repair, is not recommended in undeveloped/ natural areas (greenfield) in order to preserve marine biodiversity and eutrophication of sea water.

6.2.3. Managing marine litter

The condition of the marine ecosystem in relation to litter pollution is worrying and it is necessary to introduce measures to reduce, eliminate, prevent and change the pattern of behaviour as soon as possible.

In doing so, it is important to organize activities for the removal of marine litter from priority locations: Kotor, Risan and Tivat bays and the coastal area from Petrovac to Bar. The involvement of professional divers in clean-ups in those parts where important marine habitats or species of special importance are located is important.

Map 6.4. Measures to reduce the existing and prevent future pollution and anthropogenic impacts on the trophic nature of the marine environment, and remediation of the polluted areas



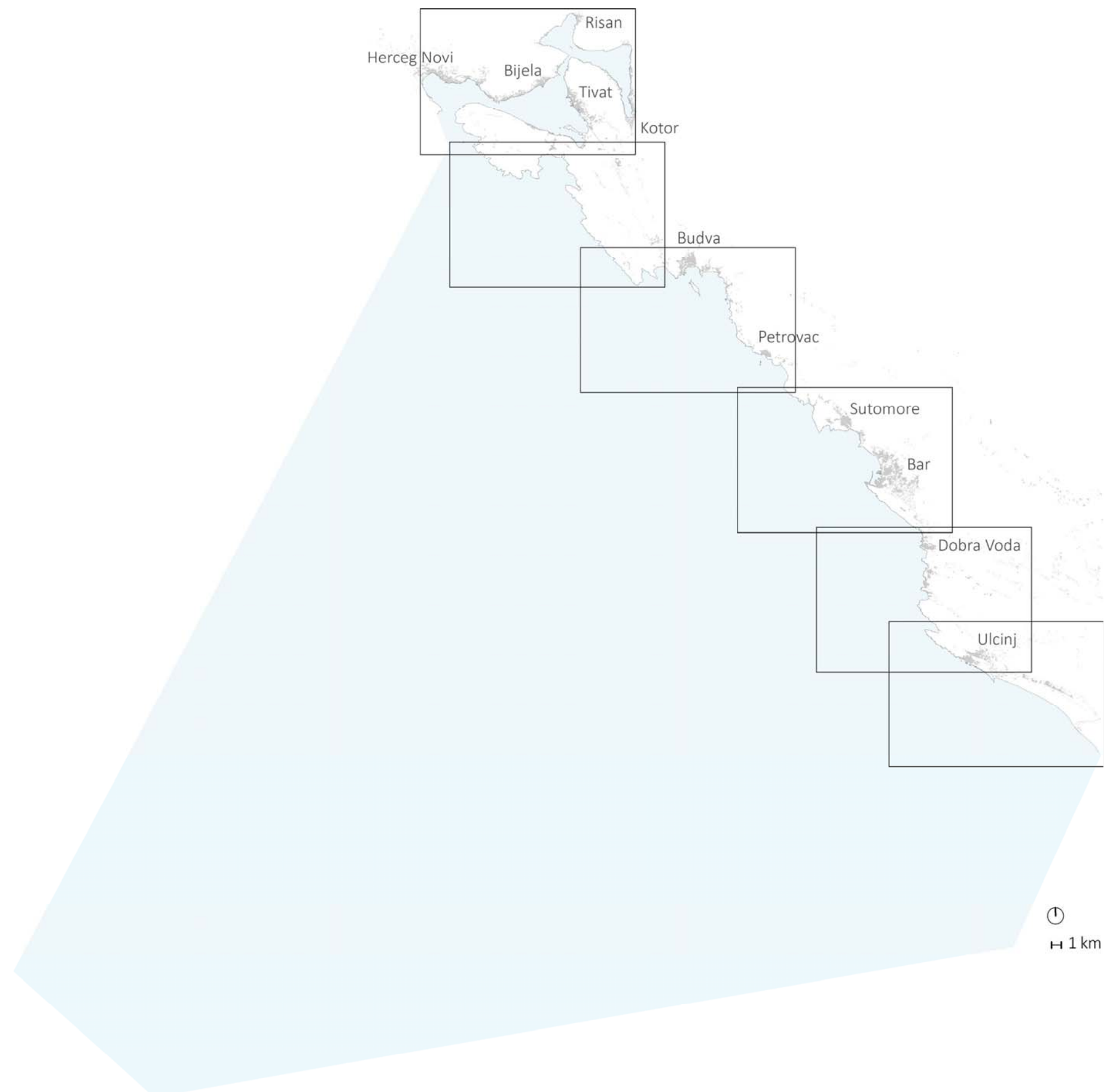
7. Protection and use of the marine area – cartographic outputs

The following cartographic representations are given in this chapter:

- **maps of sea use** by sections in the scale of 1: 60,000 showing all categories of use;
- **maps of integrated illustrations of protection, use and remediation regimes** for the sea area by sections in the scale of 1: 60,000 on the basis of digital orthophoto.

The proposed planning solutions from these views, in the next steps of marine spatial planning, should be **integrated into spatial planning documents** prescribed by the spatial planning system of Montenegro and upgraded through **more detailed plans with more precise guidelines for marine and land spatial planning** (see Chapter 8.2).

Links showing marine area uses and protection, use and remediation regimes



Key

Sea use maps

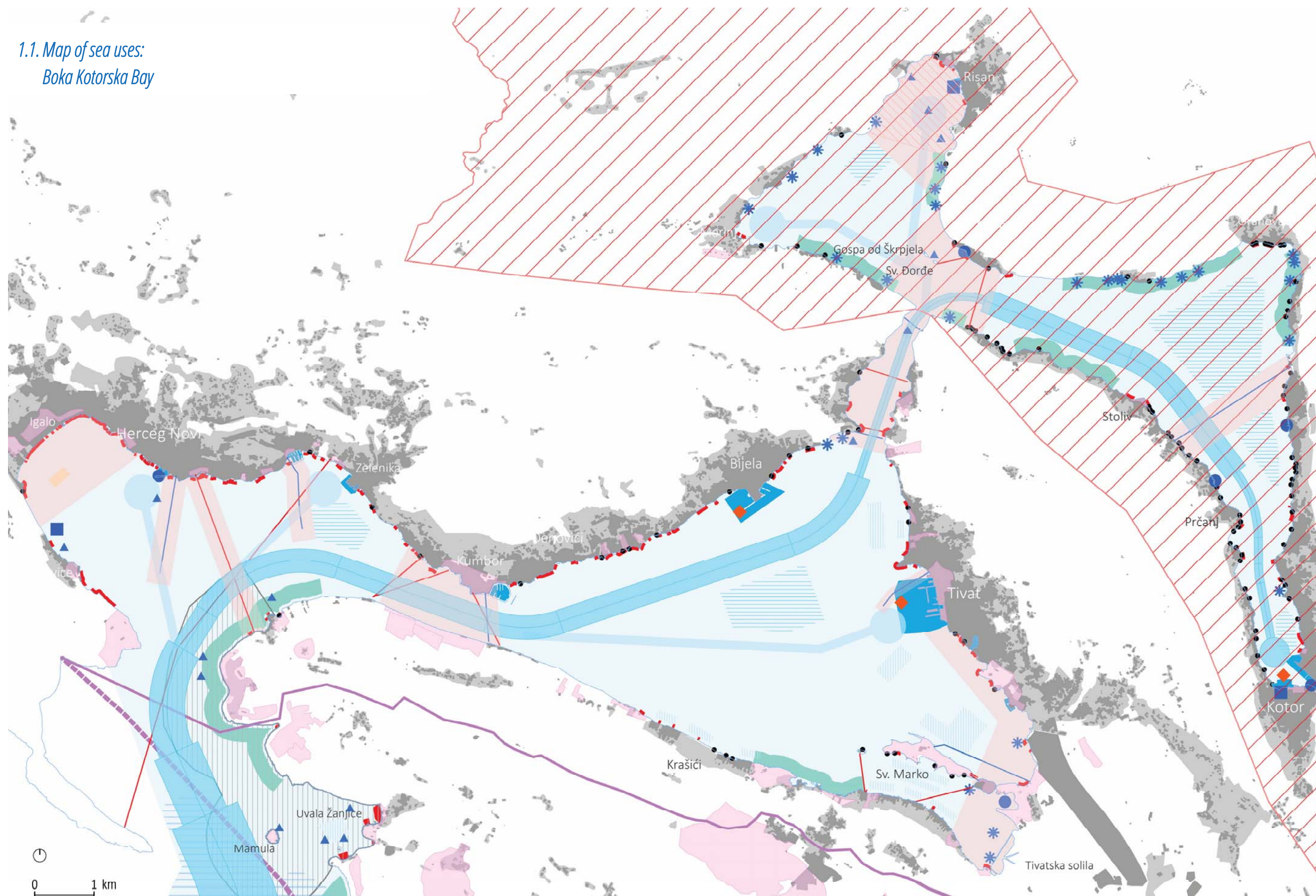
Maritime transport	
	External waterway, coastal
	Main waterway, Boka Kotorska Bay
	Access waterways, Boka Kotorska Bay
	Anchorage ban zones
	Port aquatorium
	Port anchorages
Fishing and mariculture	
	Small seine fishing area
	Fishing area for all vessel types
	Fishing posts
	Mariculture development zones
	Existing mariculture zones
Coastal Tourism	
	Bathing area and beach aquatorium
	Area for sports and recreational activities at sea
Nautical tourism	
	Planned nautical tourism ports
	Important docks and moorings
	Wider area of the nautical anchorage aquatorium
Underwater infrastructure	
	Ionian Adriatic Pipeline route
	IAP underwater option
	Underwater cables
	Underwater pipelines
Exploitation of mineral resources	
	Hydrocarbon exploration blocks
	Peloid exploitation zone
Seabed dredging	
	Seabed dredging and remediation dredging

Protective coastal structures	
	Protective coastal structures, under investigation
Military use	
	Military waste disposal
Marine protected areas	
	Marine protected areas, current and planned
Underwater cultural heritage	
	UNESCO protected area scope
	Underwater archaeological site
	Underwater cultural heritage sites
Use and construction of land surfaces	
	Planned settlement areas
	Planned tourist zones
	Existing manmade structures

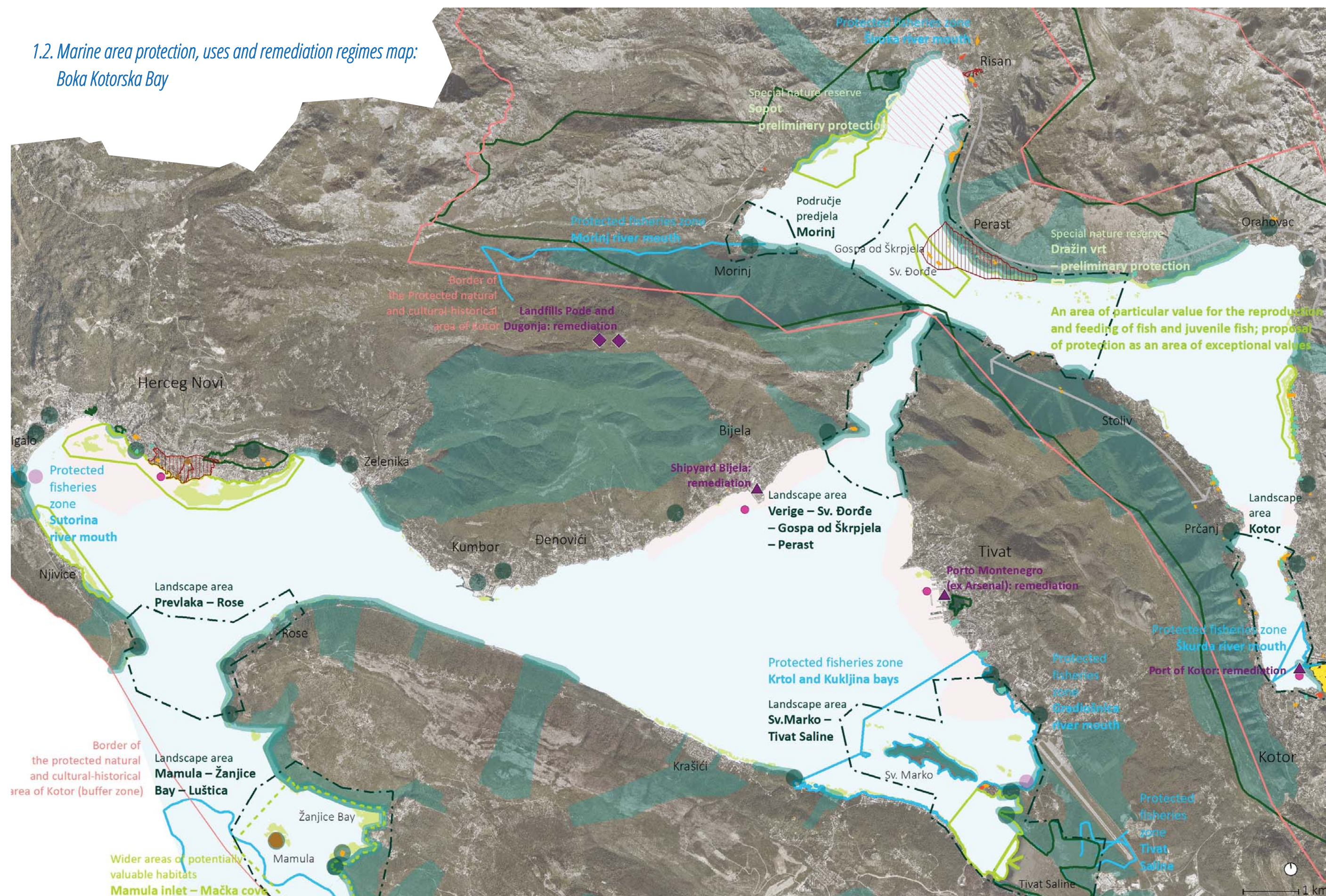
Marine area protection, uses and remediation regimes maps

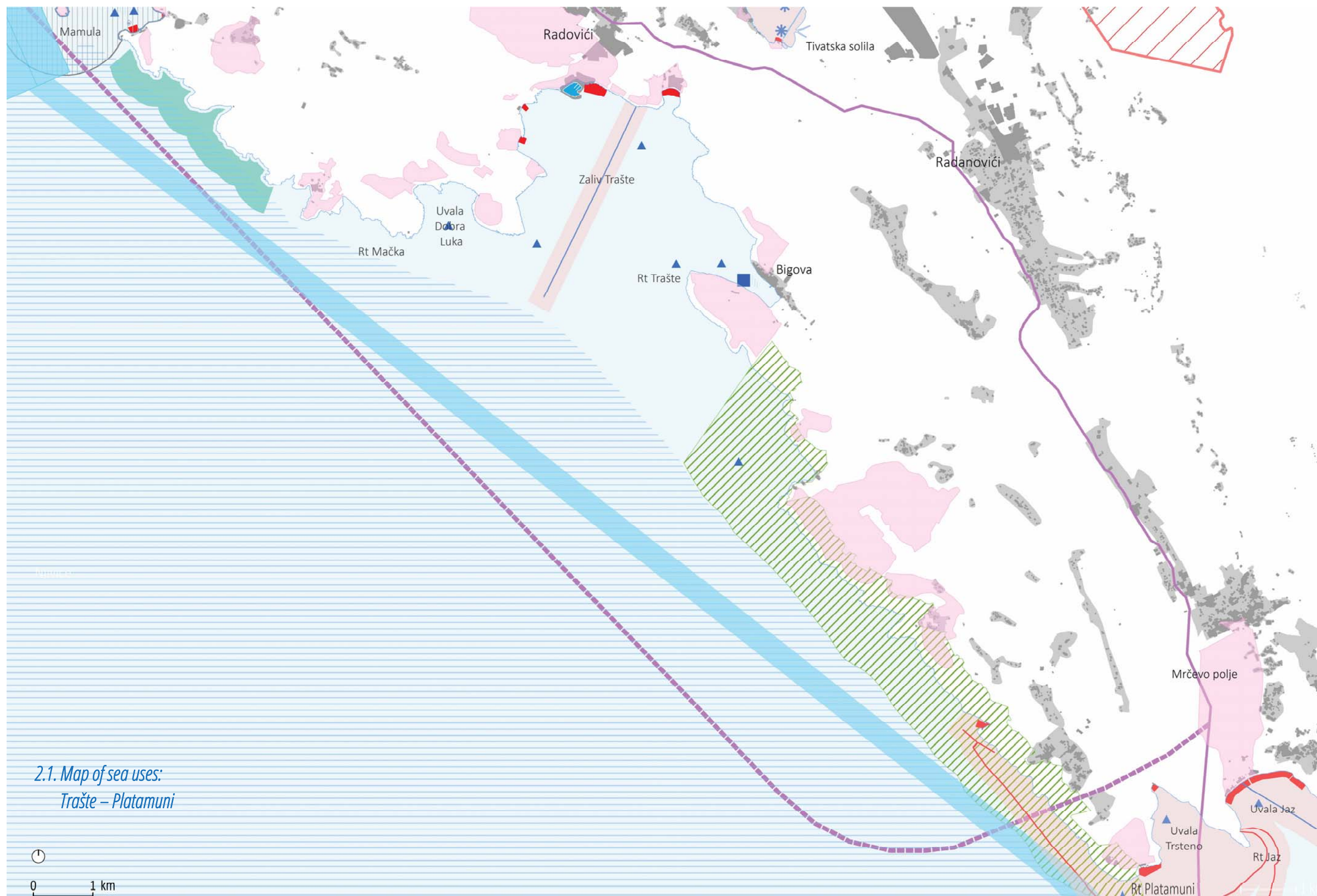
Biodiversity and protection of natural areas	
	Protected areas on land
	Marine protected areas: Nature Parks Platamuni and Katič (protection zone II, protection zone III, protection zone on land)
	Marine protected areas – in designation process: nature park
	Marine protected areas –preliminary designation: special nature reserve
	Areas of valuable marine habitats
	Wider areas of potentially valuable habitats
	Other areas of Posidonia meadows, corals, and sea caves
Landscapes	
	Important coastal sites
	Open areas and exceptionally valuable landscapes
	Wider areas of important marine environment protection
Cultural heritage	
	Archaeological site on land
	Underwater archaeological site
	Civil architecture
	Fortifications
	Infrastructure
	Fortification architecture
	Memorial sites
	Sacral architecture
	Residential architecture
	Old town
	Border of the natural and cultural-historical area of Kotor
	Border of the protected natural and cultural-historical area of Kotor (buffer zone)
Reduction of pollution and eutrophic levels	
	Remediation of polluted sites
	Landfill remediation
	Prevention of pollution for the preservation of peloid areas and medicinal mud
	Coastal areas under pressure due to contamination and/or eutrophication
	Connecting settlements to the sewer system
	Area for waste and bilge water collection and treatment systems
	Protected fisheries zones

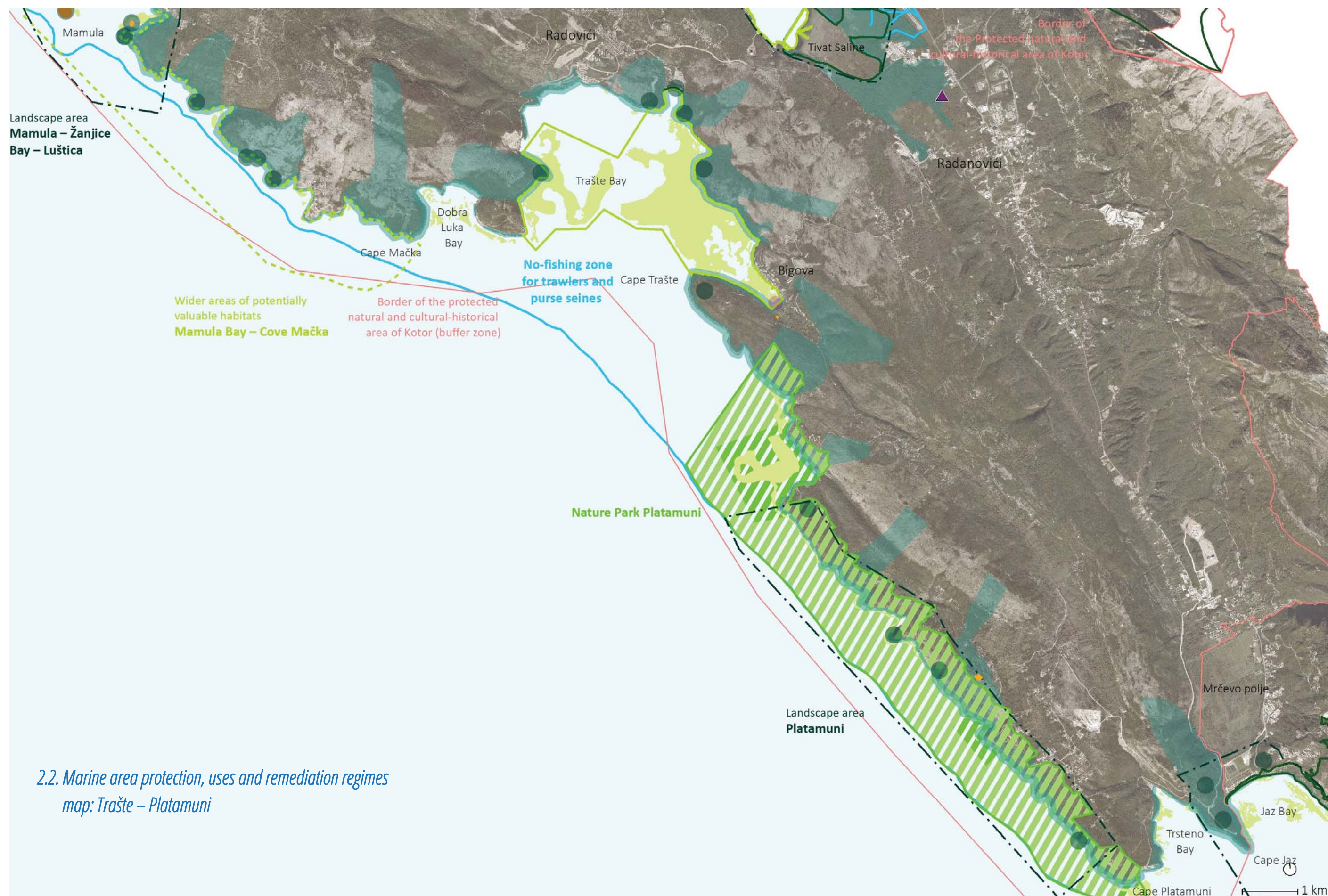
1.1. Map of sea uses:
Boka Kotorska Bay



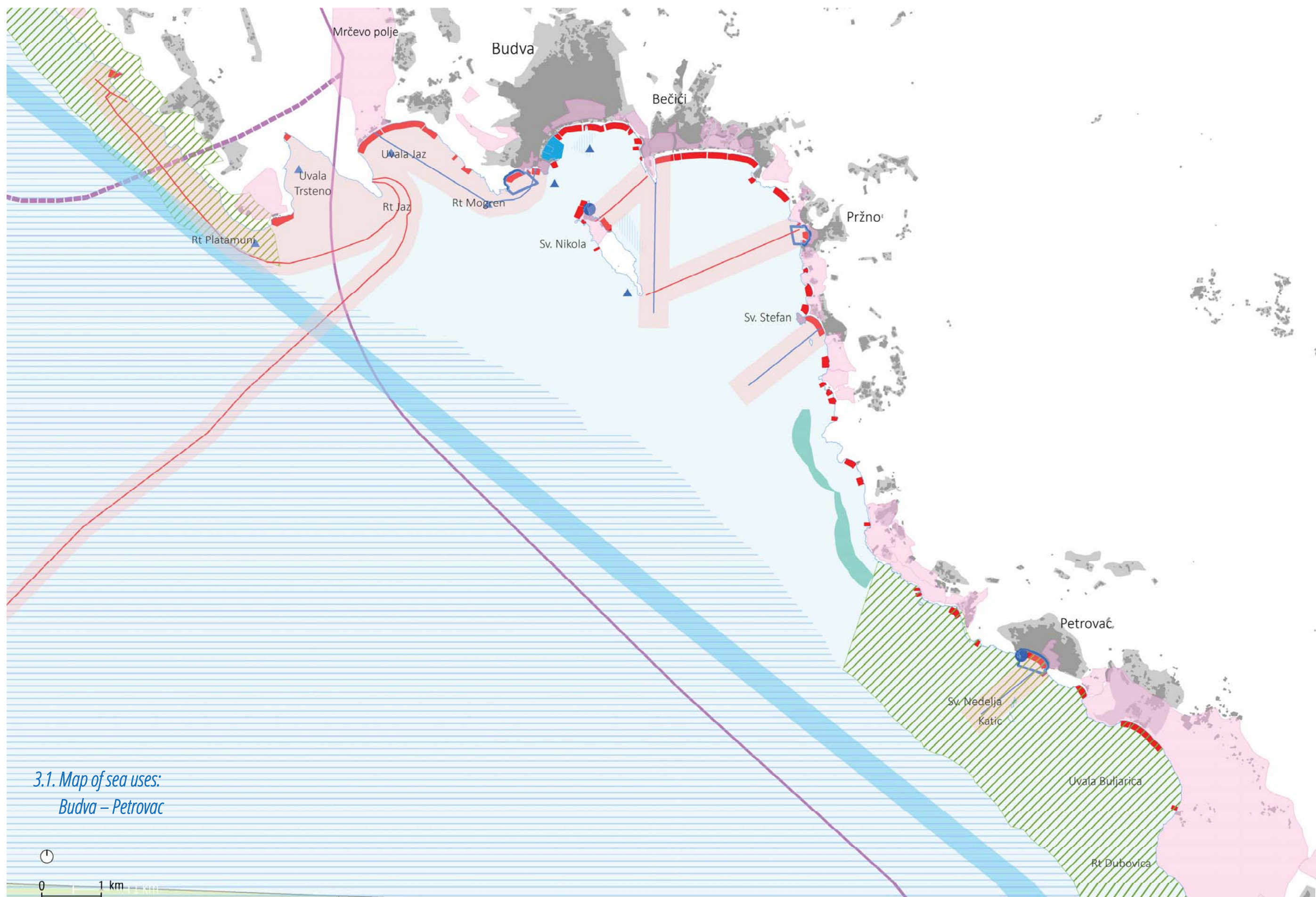
1.2. Marine area protection, uses and remediation regimes map:
Boka Kotorska Bay



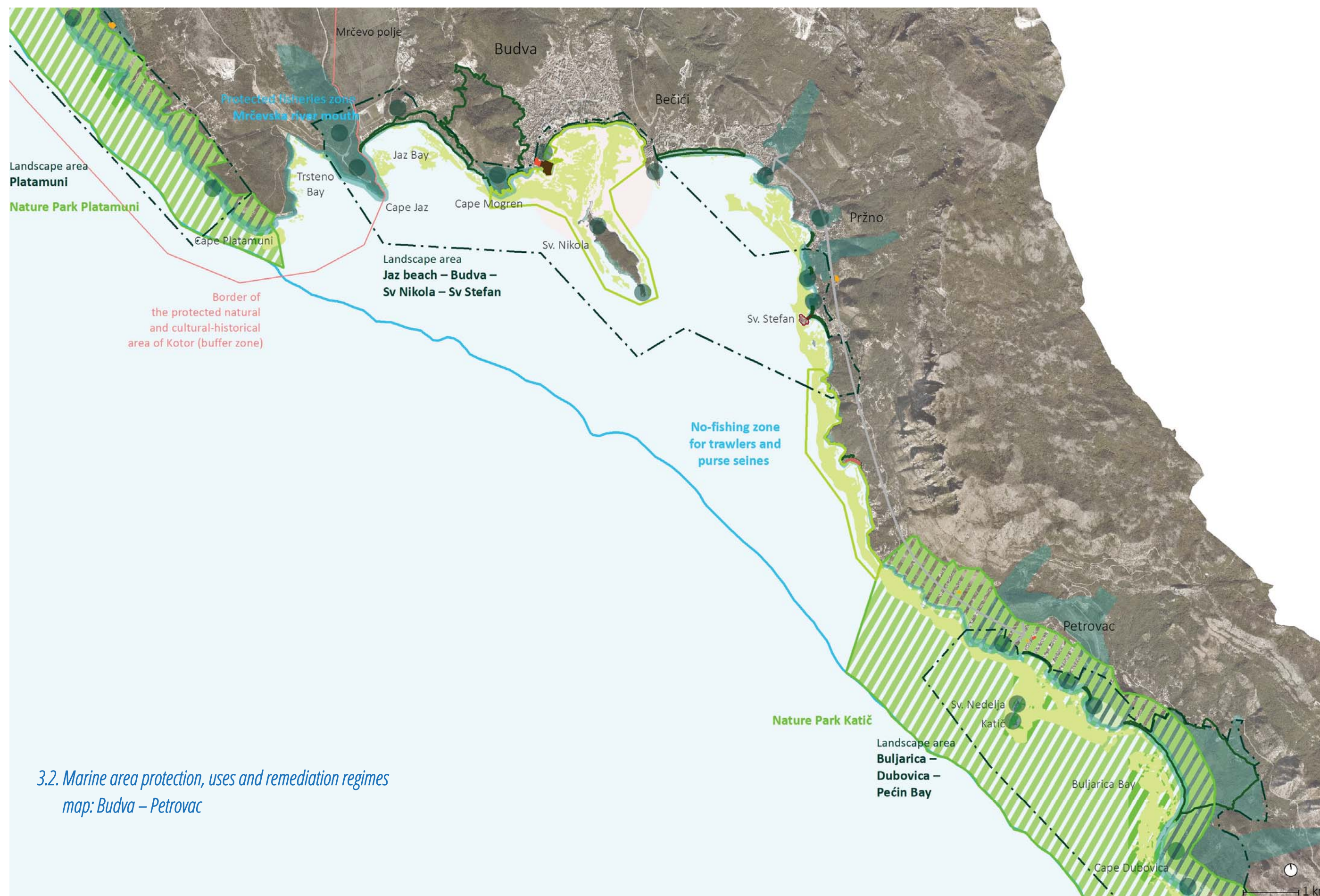




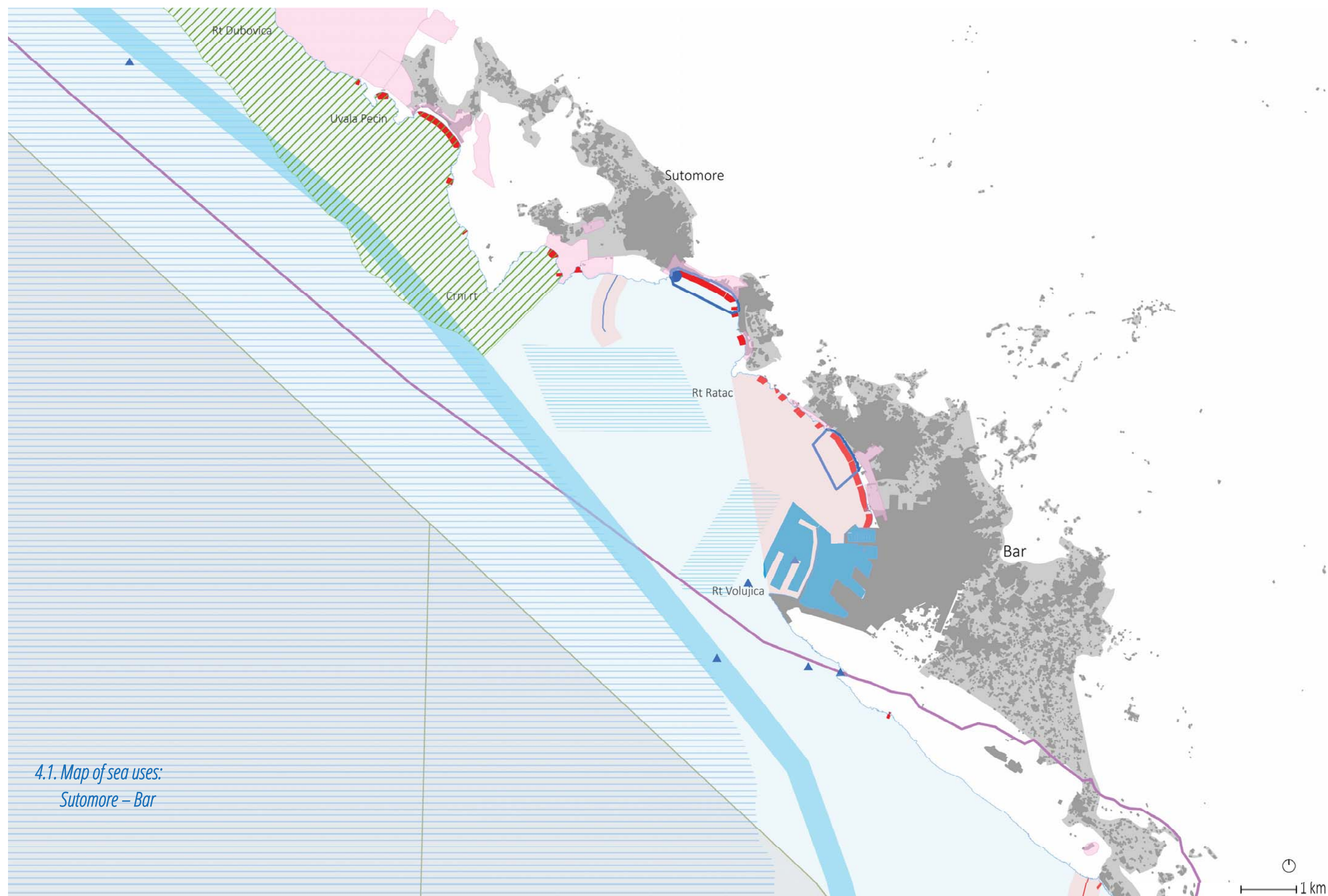
2.2. Marine area protection, uses and remediation regimes
map: Trašte – Platamuni

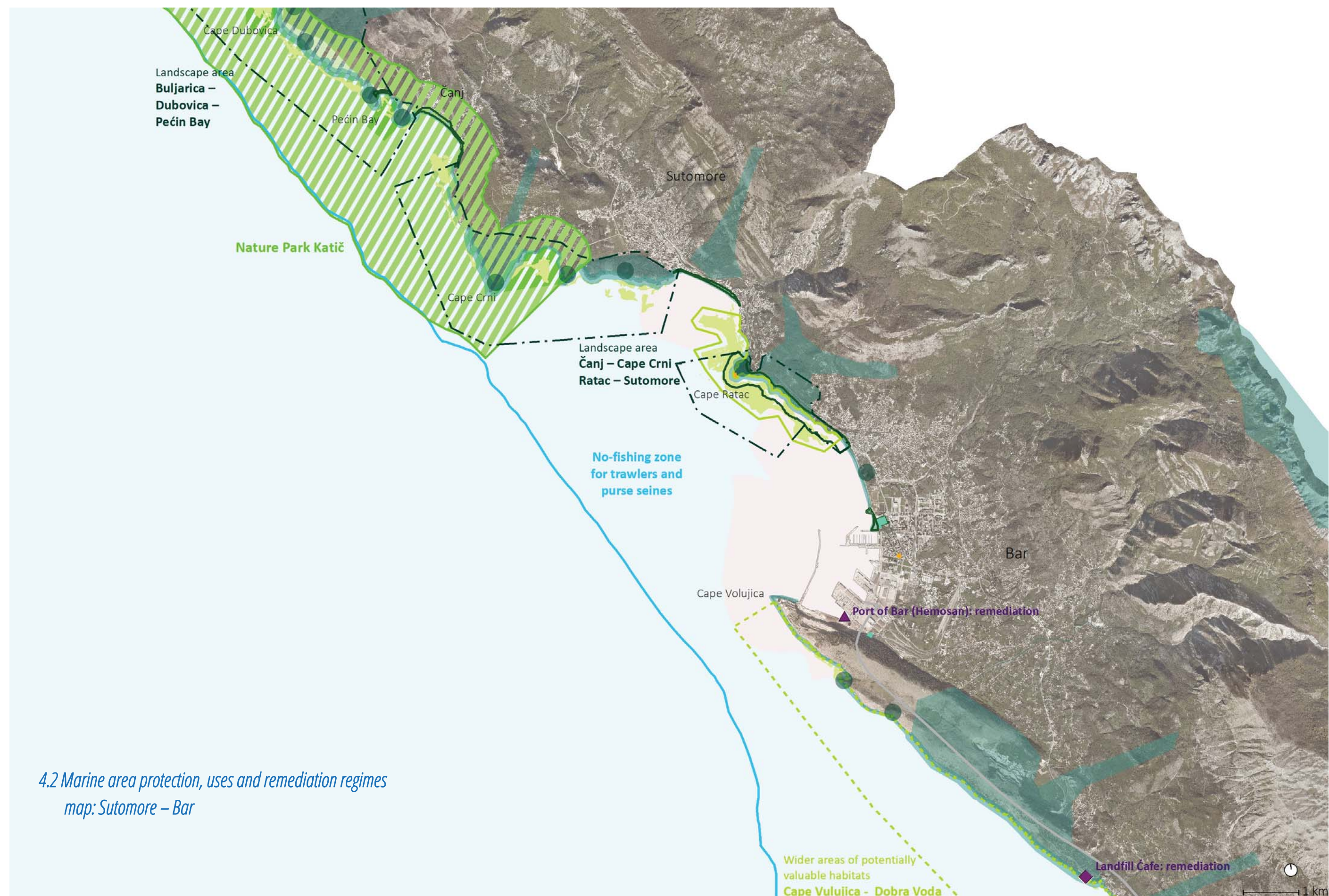


3.1. Map of sea uses:
Budva – Petrovac

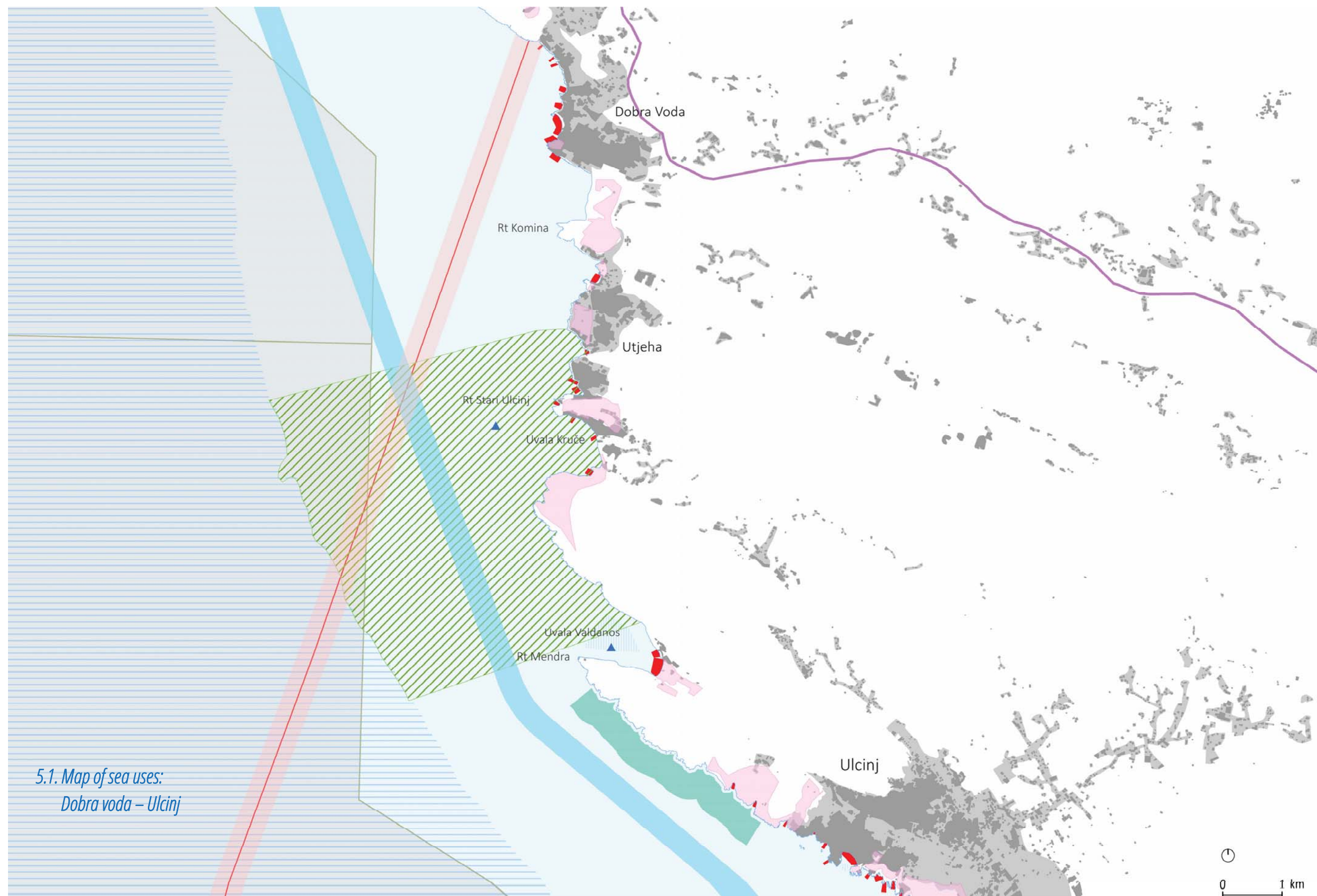


3.2. Marine area protection, uses and remediation regimes
map: Budva – Petrovac

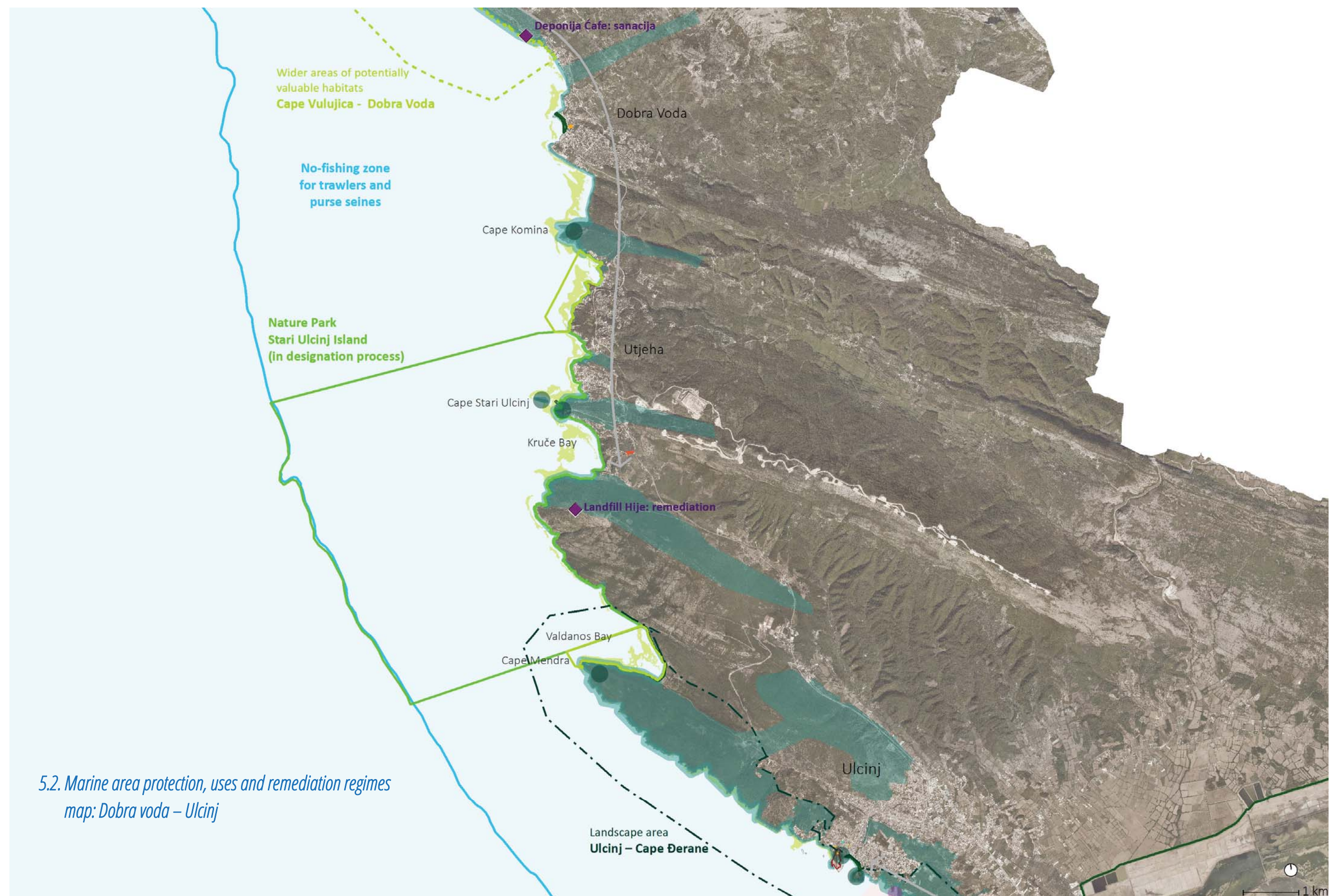




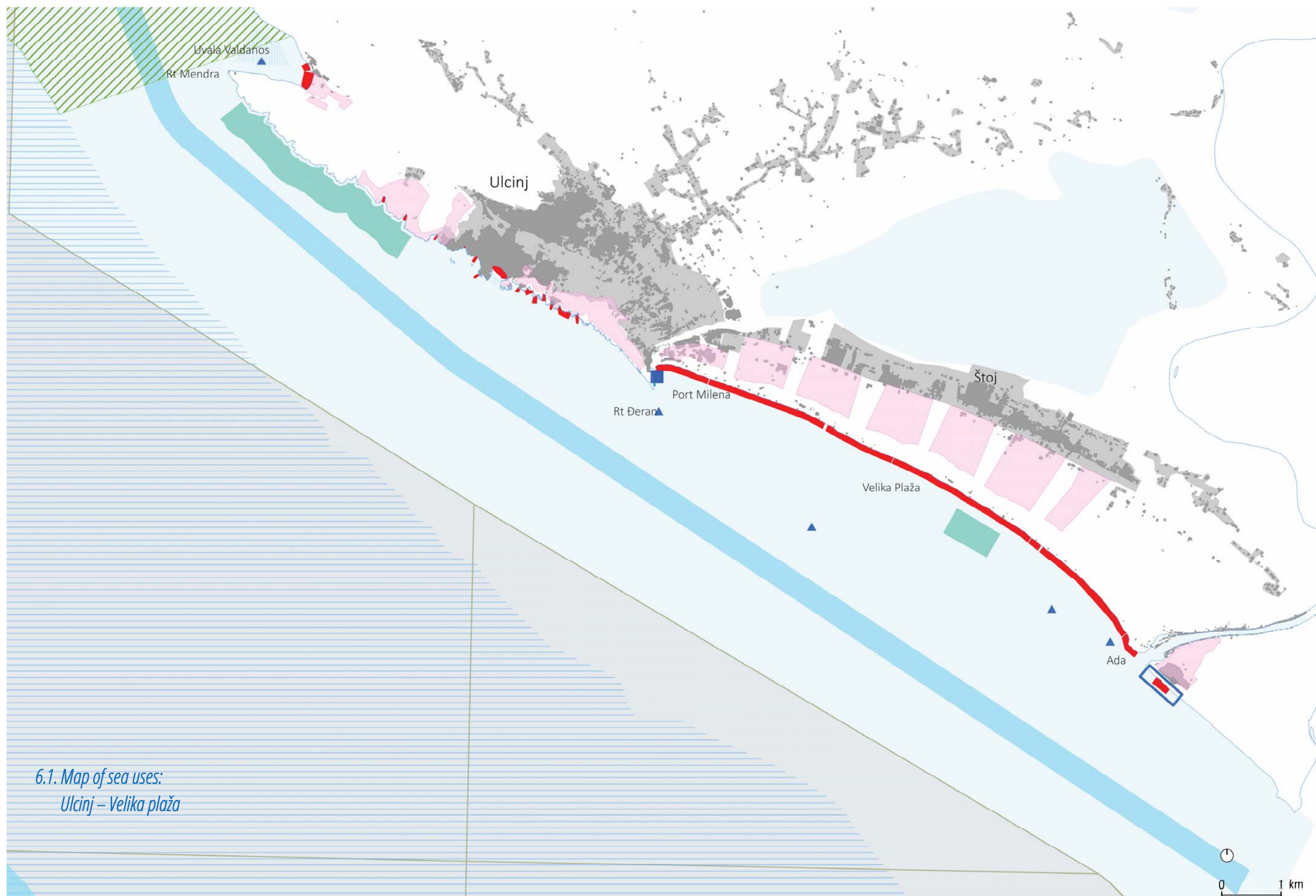
4.2 Marine area protection, uses and remediation regimes
map: Sutomore – Bar



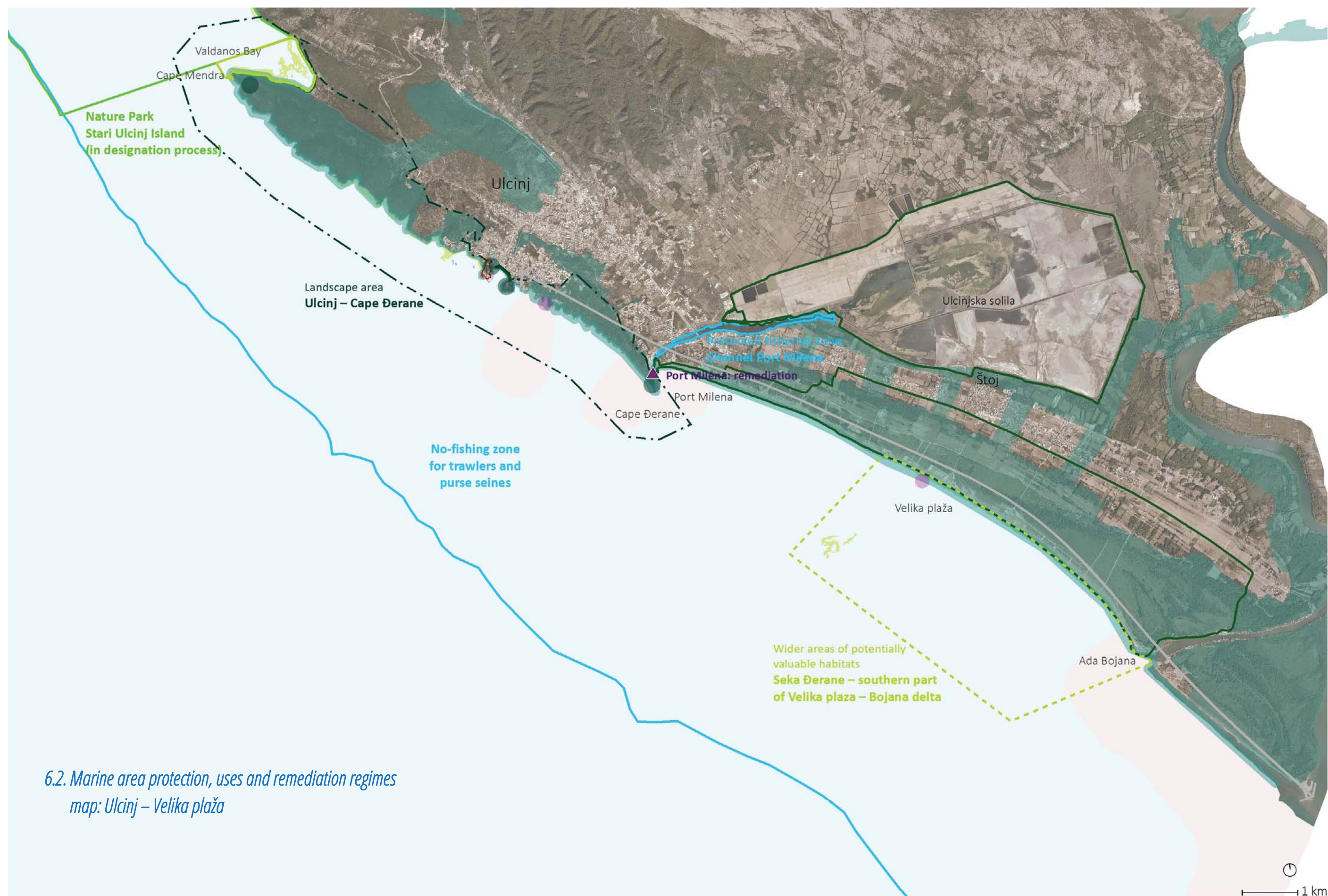
5.1. Map of sea uses:
Dobra voda – Ulcinj



5.2. Marine area protection, uses and remediation regimes
map: Dobra voda – Ulcinj



6.1. Map of sea uses:
Ulcinj – Velika plaža



6.2. Marine area protection, uses and remediation regimes
map: Ulcinj – Velika plaža

8. Implementation guidelines

8.1. Spatial data management

Marine spatial planning is a multidisciplinary activity where efficient collection of data from various sources, their processing and georeferencing of spatial data, performing spatial analyses and preparation of cartographic outputs present special challenges. In the implementation of the GEF Adriatic project and the development of technical bases for marine spatial planning, the lack of appropriate data and especially the lack of geospatial data has been repeatedly confirmed.

The availability of quality data, especially spatial data, is an important prerequisite for successful marine spatial planning. Article 10 of the MSP Directive defines the conditions for use and exchange of data and stipulates that Member States are responsible for organizing the use of best available data and exchange of information necessary for marine spatial planning. This includes in particular data on the marine environment, social and economic data, as well as oceanographic data on the waters for which the marine spatial plan is being prepared.

Implementation of the EU Directive 2007/2/EC – INSPIRE can improve and strengthen national information management capacity and the overall data infrastructure needed to establish a marine spatial planning framework. In this sense, Montenegro has a legal framework for the development of a national geospatial data infrastructure (NIGP). This is the Act on State Survey and Real Estate Cadastre that NIGP defines as the strategy, technology, rules, standards and human resources required for the collection, processing, storage, access, exchange and optimal use of geospatial data of Montenegro.

The Regulation on the content and management of the database and information system and indicators for monitoring the implementation of planning documents is also used for drafting, adopting and implementing planning documents, performing supervision, monitoring spatial development and preparing reports on it. The Regulation also defines a system of indicators for monitoring the implementation of planning documents and monitoring the state of spatial planning with an emphasis on the land area.

The Maritime Domain Act prescribes the establishment and maintenance of a cadastre of the maritime domain which should contain data on the maritime domain and its facilities in terms of their position, shape, area as well as data on the right of use and users of the maritime domain.

All of the above shows that in Montenegro there is an adequate legal foundation for the development of geospatial information systems, which would include the marine area. The obvious problem is the implementation of all these regulations in practice. With few exceptions, the existing layers of spatial data on the marine area were created as part of the implemented projects and were not organized and systematized in accordance with the principles of development of the national infrastructure of geospatial data. A significant part of the spatial data in this project was generated through the conversion of layers of valid spatial planning documents without any metadata that would validate data layers.

The described problems are also recognized in the National Strategy for Integrated Coastal Zone Management, where one of the planned priority actions is the realization of the first phase of the spatial information system. Emphasis was also placed on the importance of providing data that are a professional priority and have the widest use, which is a very important guideline when resources are limited. The aforementioned Regulation shows the correct approach in terms of selected priority indicators of the sustainability of spatial development on land, i.e. the layers of spatial data from which they are derived. Among the data related to the situation on land, the lack of available statistical data on tourist capacities by basic accommodation categories at the level of settlements in coastal municipalities is particularly noteworthy. These are key data for any responsible planning (spatial, developmental and even sectoral) in the coastal area of Montenegro. In addition to the ministry in charge of spatial planning, the ministry in charge of tourism and certainly MONSTAT should cooperate as stakeholders in this task.

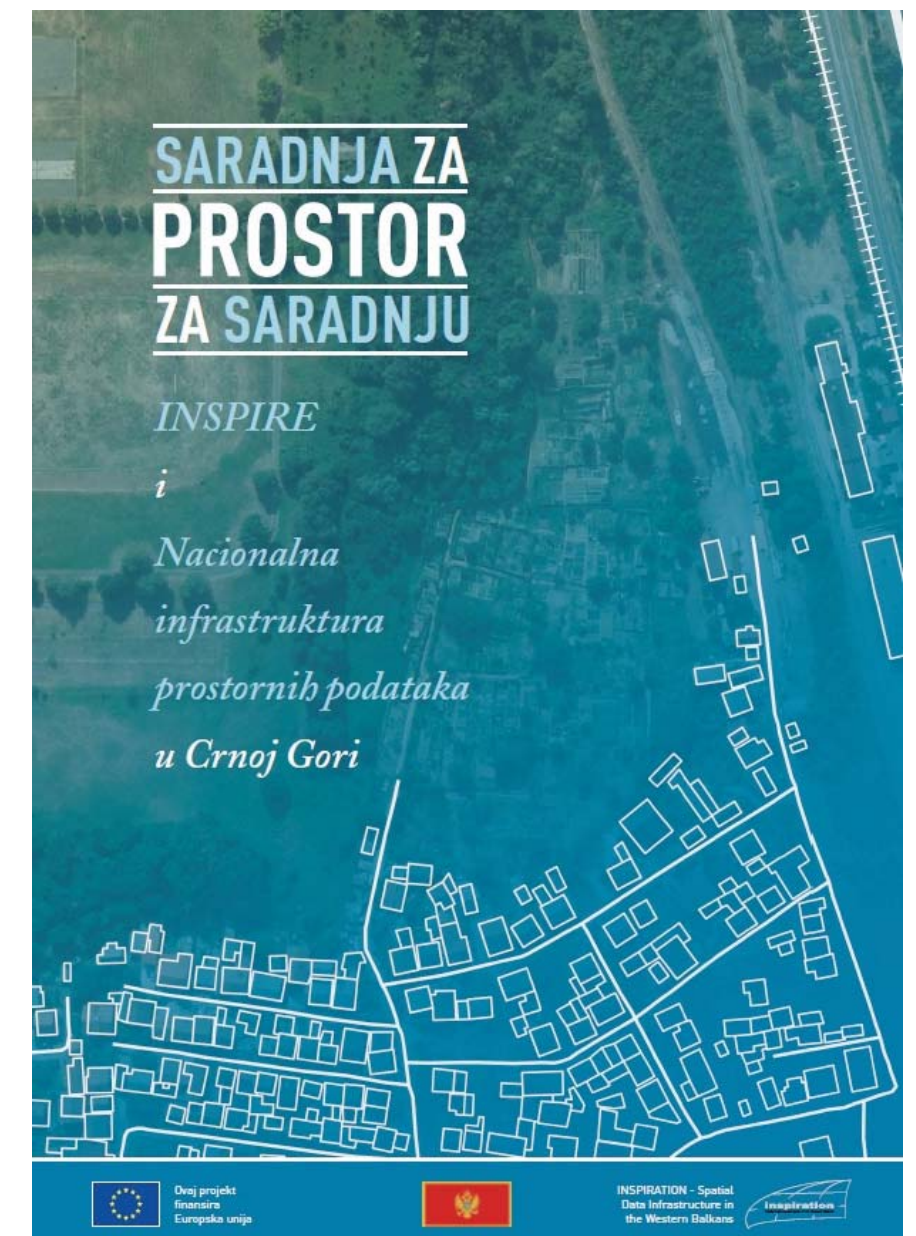


Figure 8.1. Publication of the Real Estate Administration and the EU Project INSPIRATION from 2013 which encourages institutional cooperation in order to build efficient spatial data infrastructure in Montenegro



Figure 8.2. Urban areas are in need of green wedges as settlement breaks, a sufficient share of greenery and public areas such as promenades along the coast: Herceg Novi (S. Vilus)



Figure 8.3. Special attention should be paid to the landscape-architectural arrangements of open spaces in settlements: Porto Novi (S. Karajović)

Regarding the marine area, the development of the maritime domain cadastre with a register of all forms of use and users, as well as other operational data related to maritime domain management is a priority. The first generation of the operational spatial database can be established with the use and refinement of the GIS database developed under the GEF Adriatic project and with the use and conversion of the existing documentation of PE Maritime domain. Final solutions will be developed through the activities of the state administration body responsible for cadastre affairs. For both institutions, the ministry in charge of spatial planning and PE Maritime domain, it is crucial to ensure capacity building for the use of GIS technologies.

8.2. Guidelines for the preparation of spatial planning documentation

The coastal area and the sea next to it is considered an indivisible spatial (perceptual, functional, ecological) whole. Land-based planning extends to the sea and planning objectives of the marine spatial plan can only be achieved through adequate land-based planning solutions. This is especially important in areas of pronounced land-sea interactions (natural processes and activities). The new generation of spatial plans as well as amendments of the existing ones should therefore pay special attention to the protection, planning and management of landscapes, remediation of inappropriately urbanized areas and introduction of sustainable forms of future urbanization, solutions for remediation of degraded areas along the coast and detailed regulation of the coastal zone (in accordance with the guidelines in Chapter 6). For areas of complex spatial planning issues, it is recommended to formulate variant solutions.

1. Landscape protection, planning and management

It is important to affirm the concept of landscape in its complete (synthetic) meaning, i.e. as the bearer of all spatial values, natural, ecological, cultural, tangible and intangible. When preparing spatial planning documentation at all levels

it is mandatory to develop a landscape plan or include landscaping solutions, harmonized with the overall planning proposal, which should contain a clear concept of development and conservation of significant/recognizable landscapes, certain conditions for the development of activities/ interventions, as well as guidelines for the development and protection of areas characterized by their need for special protection. Landscaping can go beyond the traditional conservation concept, meaning that where necessary, the approach to creating new landscapes may be assessed as necessary/meaningful.

Special attention should be paid to:

- The preparation of more detailed typologies and assessment of the entire coast, together with the sea;
- Landscape in a narrow coastal area, planning of a green system (green infrastructure) and landscape-architectural arrangements of open space in settlements, arrangement of the coastline and hinterland of beaches, preservation of existing green settlement breaks (caesura or green wedges), creation of green protection zones between beaches and urban areas, promenades along the coast, architectural design of buildings on beaches and remediation of degraded areas through landscaping;
- Planning of new manmade coastal structures require comprehensive approach, having in mind not only functional, but also perceptual/aesthetic and environmental characteristics;
- In addition to protected/valuable areas in the sea (habitats), appropriate spatial planning solutions on land are necessary, in a way that creates sustainable spatial units of land and sea;
- Applying coastal setback as one of the basic instruments for the preservation of the coastal area, which in terms of the development of tourist capacities is not a limitation, but a potential for creating a quality landscape and architectural design.

For individual valuable/significant landscape areas, it should be decided whether planned protection is sufficient or some formal/sectoral protection is still needed. This means that the protection of landscapes should be improved from the identification and implementation of typology of landscapes,

to the establishment of new protected landscapes. It is necessary to harmonize the regulations for the protection of landscapes in different areas, create a unique framework for the identification of extremely valuable landscapes, build a register and protect the identified areas (as a region of exceptional features and/or protected cultural landscape).

2. Urbanization

The biggest problem of the coastal area is inadequately urbanized areas. Areas of sprawl development and areas of settlements and tourist zones without a clear urban concept, without character, public space and green areas or inappropriate scale and typology are especially problematic. Thus the National Strategy for Integrated Coastal Zone Management in Montenegro (2015) assumes two priority actions:

- Preparation of manuals for remediation planning and restoration of inadequately urbanized areas and implementation of professional development programs;
- Realization of a remediation pilot project and restoration of inadequately urbanized areas.

Spatial plans should, above all, more decisively **reduce/limit further dispersed construction**. This refers to individual facilities and new settlements (tourist zones) in the middle of untouched, naturally preserved areas, especially along (future) nature parks and wider areas of significant coastal/marine areas. At all levels of planning, the key message should be continued that the opening of new construction zones outside settlements usually means great pressure on natural and landscape values and the environment, and that this is allowed only exceptionally and through strict and transparent procedures.

Planning of detached zones of construction land outside settlement means a permanent loss of natural features of the spatial unit from which the new project is conceived. This is an irreversible process which continuously reduces the share of natural land and gradually changes the visual experience and (tourist) attractiveness of the entire Montenegrin coast. Under future spatial planning proposals, it is necessary to keep the **obligation to apply the coastal setback as** established by the SPCAM.

The second upgrade of the plans should be to **prescribe in more detail the conditions for interventions** in settlements and open rural areas outside the construction area of the settlement. An important instrument can be some form of guidelines for architectural design based on predefined typologies. One can feel aversion coming from a part of the professional community to any regulation of this type, although design guidelines are a common instrument in practically all developed spatial planning systems. This is often justified by the extraordinary diversity of local conditions that are then impossible to process by type, as well as the possible constraint on design creativity. The situation on site as well as the situation in the budgets at all levels does not speak in favour of these negative attitudes and the main advantage of such auxiliary instruments of planned regulation is efficiency, transparency, favouring local characteristics and preventing excessive solutions (unfavourable colours, materials, scales). As a basis, it would be useful to prepare a document that would deal with general regulation at the level of Montenegro with the determination of general planning rules and recommendations with typical examples of good practice.

An additional mandatory condition for new interventions should be **architectural excellence**, which should be ensured through appropriate procedures and National Guidelines for Architecture Development (in progress). Only understanding and creative interpretation of the local cultural context can ensure harmonious future interventions in space. This is the fundamental reason why the cultural heritage of a territory is also its important economic capital, in addition to the value it has alone and its value as the foundation of the identity of the community living there.

The world is becoming more and more crowded with similar projects of globalist architectural confection that neglect the local cultural context. If their economic effects are short-term, as is the case with predominantly real estate occasional housing projects, then their meaning is even more questionable. This means that the uniqueness, attractiveness and value of regions and destinations that manage to preserve their identity and the spirit of the place through new projects will be greater in the future.



Figure 8.4. Waterfronts should be primarily in public use: Waterfront Pine, Tivat (M. Đuričić, TO Tivat)



Figure 8.5. At the time of its development, the tourist settlement "Slovenska plaža" in Budva, represented a new spatial paradigm that interpreted humanity, dialogue between the new and the old and complexity of urban processes (Photo: Budva Riviera)



Figure 8.6. Luštica bay – an example of new tourist resort design with a modern marina inspired by the scale and structure of traditional forms of coastal settlements (S. Karajović)



Figure 8.7. Oblatno quarry: a degraded area that requires remediation and at the same time represents development potential (S. Vilus)

3. Remediation of degraded areas and prevention of marine pollution from land

Spatial planning documentation or other relevant documentation should contain solutions for degraded areas – define the technical aspect of remediation, use and appearance of these areas. This refers to:

- **Remediation of existing municipal waste landfills in the coastal area in** order to prevent seepage and leaching of toxicants by groundwater into the marine aquatorium: These are landfill sites Lovanja I and II in Tivat, the wild landfill on Orijena, the landfills "Pode" and "Dugonja" where the garbage of the Municipality of Herceg Novi was dumped and whose leachate is drained into the Risan Bay, the landfill Čađe on Volujica and the old landfill Ulcinj – Hije near Kruč. Existing unregulated (wild) solid waste landfills near the sea shore and in the hinterland should be recorded and remediated in order to prevent solid waste from reaching the marine environment, as during the 2010 floods.
- Remediation of existing **quarries** along the coast: Lipci, Oblatno, Lješevići and Višnjevo – Krimovica.

- Industrial plants should not be planned at a distance of less than 1 km from the sea shore and without devices for purification and neutralization of contaminants.

8.3. Monitoring and evaluation

Monitoring of the implementation of the marine area plan, in the protection segment, should be harmonized with the monitoring of the marine environment, established in the context of the implementation of the Barcelona Convention. Monitoring is based on 11 environmental objectives and related indicators. Monitoring and reporting based on these indicators is performed using a spatial database prepared under the GEF Adriatic project.

Indicators that are particularly important for the marine area plan are related to monitoring the condition of Posidonia oceanica meadows and coralligenous habitats, pressure levels due to eutrophication and contamination, coastline construction and marine litter.

Table 8.1. Indicators of good environmental status and monitoring of implementation of marine spatial plan

ECOLOGICAL OBJECTIVE	INDICATOR	PLAN LINK
Biodiversity	Habitat distribution range (Posidonia oceanica, coralligenous habitats)	Protection and uses (areas of valuable and potentially valuable habitats)
Commercial species	Spawning stock biomass	Protection and uses (significant areas for fishing, fish reproduction and feeding)
Eutrophication	Concentration of key nutrients in water column Chlorophyll-a concentration in the water column	Regimes for remediation of the vulnerable marine environment (reduction of existing and prevention of future pollution and anthropogenic impacts on the trophic nature of the marine environment)
Coastal ecosystems and landscapes	Length of coastline subject to physical disturbance due to the influence of manmade structures	Protection and uses (preservation and development of landscape features)
Contamination	Concentration of key harmful contaminants in seawater, sediment, and biota	Remediation regimes for the vulnerable marine environment (remediation of areas impacted by contaminants)
Marine Litter	Trends in the amount of litter in the water column including microplastics and on the seafloor	Remediation regimes for the vulnerable marine environment (managing marine litter)

Table 8.2 Indicators of the implementation of the marine spatial plan

PLANNING GOAL	INDICATOR	TARGET VALUE
Improve the system of monitoring coastal and marine processes and activities in the coastal area	Establishment of spatial information system – development of GIS databases and priority cadastre of existing and planned use of marine resources	Construction of priority layers of the GIS spatial database for the maritime domain – time frame for implementation will be determined with the competent state bodies through a formal spatial planning process
Achieving satisfactory effects of coastal zone economic development	Increasing the number of jobs and/or income/traffic in the most important maritime sectors (coastal tourism, fishing, mariculture, nautical tourism, cruise tourism, seamanship, ...)	Quantified target values will be determined through a participatory process with representatives of maritime economic sectors
Ensuring spatial needs for sustainable development of maritime activities and sectors (blue growth)	Establishment of formal competencies and clear procedures for issuing acts for marine use for all types of maritime activities	The time frame for implementation will be determined with the competent state bodies through a formal marine spatial planning process
Provide broader preconditions for the functioning of the spatial planning system	Establishment of field inspection instruments in the function of controlling marine area use and application of prescribed regimes, if necessary separately for certain maritime activities, primarily for zones of increased vulnerability of the marine environment	The time frame for implementation will be determined with the competent state bodies through a formal marine spatial planning process
Ensure the achievement and preservation of good environmental status	Development and construction of nautical infrastructure for the purposes of implementing the no discharge area for all vessels in the Boka Kotorska Bay	The time frame for implementation – construction of appropriate onshore infrastructure for receiving sanitary wastewater as well as installation of appropriate equipment on vessels – will be determined with the competent state bodies and sector representatives through a formal marine spatial planning process.

The results of the analysis of the state and pressures presented in Chapter 3.2 should be taken as a starting point.

Indicators for monitoring the implementation of the marine spatial plan and the state of the marine environment should be the basis for regular evaluations and reporting and for the necessary amendments to the plan, as well as the basis for the next generation of marine spatial planning. Indicators of marine environment monitoring and uses need to be integrated and fully analysed with indicators of sustainability of spatial development on land (indicators prescribed by the current Regulation and recommended through the NS ICZM of Montenegro). The results of monitoring and evaluation as well as the analysis of all indicators may indicate the need to review some planning objectives (which is usually done in the next generation of the marine spatial plan) or only make changes and amendments to individual planning solutions.

The added value of monitoring and evaluation should be the identification of critical data that are missing or the need for applied research in order to be able to make more informed assessments in the future or to suggest better planning solutions in the next round of marine spatial planning.

Documentation base

Land-Sea Interaction Analysis. Authors: Aleš Mlakar, Nika Cigoj Sitar, Marina Marković.

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Implementation of the ecosystem approach
in the Adriatic through marine spatial planning

The GEF-funded project “Implementation of the Ecosystem Approach in the Adriatic Sea through Marine Spatial Planning” (GEF Adriatic) is carried out across the Adriatic-Ionian region with focus on two countries: Albania and Montenegro.

The main objective of the project is to restore the ecological balance of the Adriatic Sea through the use of the ecosystem approach and marine spatial planning. Also, the project aims at accelerating the enforcement of the Integrated Coastal Zone Management Protocol and facilitating the implementation of the Integrated Monitoring and Assessment Program. Eventually, it will contribute to the achievement of the good environmental status of the entire Adriatic. The project is jointly lead by UNEP/MAP, PAP/RAC and SPA/RAC. In Montenegro, the project is being implemented with the coordination of the Ministry of Ecology, Spatial Planning and Urbanism.

The project duration is from 2018 to 2021.



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