

Status of the marine environment in Montenegro

Marine and coastal areas in Montenegro

2540 km² of marine waters

15% of the total country area

250 inhabitants per km² of marine waters

~320 km of total coastline

0.5 m of available coastline per person



■ Good Environmental Status (GES) Assessment for Montenegro

The GES assessment of the marine and coastal environment in Montenegro was conducted adopting the Integrated Monitoring and Assessment Programme (IMAP) and related criteria. This is the first attempt to assess GES in Montenegro using this methodology, and to apply an integrated approach which focuses on different Ecological Objectives:

- E01 – Biodiversity
- E02 – Non-Indigenous Species
- E05 – Eutrophication
- E07 – Hydrography
- E08 – Coastal ecosystems and landscapes
- E09 – Contaminants
- E010 – Marine Litter

The main finding derived from this analysis is that, for the time being, a GES assessment can only be done **partially**, due to gaps or the small quantity of data and baseline knowledge available (especially regarding long-term data series).

Despite this, some preliminary and indicative conclusions can be drawn. Regarding the components which were possible to assess (under E01, E05, E09, and E010), it appears that **GES has been achieved under most indicators**, with some exceptions under E09 and E010.

Legend

GES ACHIEVED	
GES NOT ACHIEVED	
NOT POSSIBLE TO ASSESS	

Table the next page: GES Assessment for Montenegro (2020)

Indicator	Assessment		
	Posidonia meadows	Photophilic algae	Coralligen assemblages
E01 – Benthic Habitats			
Benthic habitat extent			
Benthic habitat condition			
E01 – Pelagic habitat condition	Phytoplankton	Zooplankton	
Population size and density of habitat-defining species and species composition of the community being within reference conditions, ensuring the long-term maintenance of the habitat			
E01 – Species: Marine mammals	<i>Tursiops truncatus</i>	<i>Stenella coeruleoalba</i>	
Species distributional range			
Population abundance			
Population demographic characteristics			
E01 – Species: Marine turtles	<i>Caretta caretta</i>		
Species distributional range			
Population abundance			
Population demographic characteristics			
E01 – Species: Seabirds	True seabirds	Breeding species	
Species distributional range			
Population abundance			
Population demographic characteristics			
E02 – Non-Indigenous Species	Trends in the abundance of introduced species, notably in risk areas		
E05 – Eutrophication	Concentration of key nutrients		
Chlorophyll-a			
E07 – Hydrography	Location and extent of the habitats impacted directly by hydrographical alterations		
E08 – Coastal ecosystems and landscapes	Length of coastline subject to physical disturbance due to the influence of human-made structures		
E09 – Contaminants	Concentration of key harmful contaminants measured in the relevant matrix		
Level of pollution effects of key contaminants where a cause and effect relationship has been established			
Occurrence, origin (where possible), and extent of acute pollution events (e.g. slicks from oil, oil products and hazardous substances) and their impact on biota affected by this pollution			
Actual levels of contaminants that have been detected and number of contaminants which have exceeded maximum regulatory levels in commonly consumed seafood			
Percentage of intestinal enterococci concentration measurements within established standards			
E010 – Marine Litter	Trends in the amount of litter washed ashore and/or deposited on coastlines		
Trends in the amount of litter in the water column including microplastics and on the seafloor			

■ Status of marine habitats and species

The status of marine biodiversity in Montenegro (E01) could only be assessed partially due to limited or lacking data. Despite this, it appears that GES has been achieved in large part in the assessed benthic and pelagic habitats in the coastal area, despite increased pressures here.

GES has been mostly achieved in assessed habitats

Habitats

GES assessment is focused on three selected benthic habitat types and one pelagic habitat.

Benthic



The shallowest parts of infra-littoral and exposed rocky areas are inhabited by stands of photophilic algal communities and other species belonging to genus *Cystoseira*, which are widely distributed throughout the Mediterranean and the Adriatic Sea. The areas surveyed indicate that GES is achieved, despite the increasing trend of new infrastructural constructions on the coast.

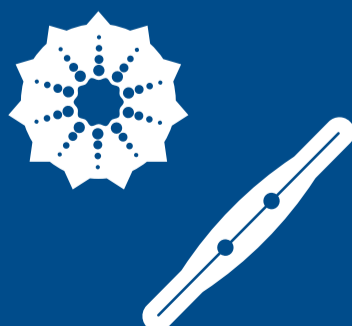


Coralligenous assemblages are confirmed only in three locations in Boka Kotorska Bay; in total, these habitats were identified in 0.24% of the marine area (up to the end of the circalittoral limit). *Savalia savaglia* was recorded as a typical species, and *Spinimuricea klavereni* was also found. There are no recorded signs, yet, of *Corallium rubrum* (a typical GES indicator species in the Adriatic). While for Boka Kotorska GES is achieved, that status is still not awardable for open sea coralligenous assemblages, due to a lack of data.



In Montenegro, *Posidonia* meadows have not been studied in depth so far, despite their many important characteristics. These habitats were identified in 2.5% of the marine area (up to the end of the circalittoral limit). *Posidonia* meadows in Boka Kotorska Bay have lower density than those in the open sea, due to the specific environmental conditions and anthropogenic pressures (mainly eutrophication) found there. In the open part of the Montenegrin coast, *Posidonia* meadows are mostly in good condition, in some areas up to 30 m deep. While preliminary results indicate good environmental status, more data is required for a full assessment.

Pelagic



Phyto- and zooplankton are crucial for the correct functioning of marine ecosystems, particularly as a food base for many different species. Considering the existing data from recent years, recorded values for phyto- and zooplankton indicate that their composition and abundance is as expected in the Adriatic, and that GES is achieved. However, for full GES assessment there's a need for long-term data series, based on systematic monitoring.

■ Status of marine habitats and species

Similarly, the assessment of marine species shows positive indications for population abundance and species distributional range, despite this status only being able to be measured partially.

GES for species could not be fully assessed

Species

GES assessment is focused on marine mammal, marine turtle and seabird species.



In broader Montenegrin waters (including the continental shelf), 5% of the estimated Adriatic population of bottlenose dolphin could be observed. Since there is a lack of long-term data series which would allow measurement of the species' distributional range and pattern, it is not possible to assess GES at this point in time.



In broader Montenegrin waters (including the continental shelf), 5% of the estimated Adriatic population of loggerhead turtle could be observed. However, there are no records of nesting activity in Montenegro; recent research shows that 75% of the loggerhead turtles inhabiting the Adriatic belong to populations nesting in Greece. Since there is a lack of long-term data series that would allow the measurement of the species' distributional range and pattern, it is not possible to assess GES for the time being.



The status of true seabirds in Montenegro, considering summer visitors, migrating and wintering species, could not be fully assessed. GES for breeding birds (*Larus genei*, *Mycrocarbo pygmeus*, *Phoenicopterus roseus*, *Sterna albifrons*) has mostly been achieved. However, the future of these species in Montenegro may be threatened, as the lack of management of Ulcinj Salina, the most important breeding site for these species, is already causing negative effects.

■ Coastal ecosystems and landscapes

Coastal ecosystems and landscapes (E08) are increasingly being altered by the construction of human-made structures. According to the initial analysis undertaken within the scope of the GEF Adriatic project, at least 32.51% of the length of Montenegrin coasts is artificial. Most of the artificial structures are located in close proximity to major settlements, particularly in Boka Kotorska Bay.

More than 32% of the Montenegrin coast is urbanised

■ Pressures in marine waters

The level of pressures in marine waters (E02, E05, E07, E09, E010) could only be assessed partially, due to limited or lacking data. Based on the existing data, it appears that GES has been achieved for eutrophication (E05), while there are some significant signs of pressures with regard to contaminants (E09). Marine litter (E010) data indicate that GES has not been achieved, and that effective measures are needed to change this trend.

**Pressures
could only be
partially assessed**



Non-indigenous species (NIS), and especially invasive alien species, are one of the already present and ever-growing pressures on local biodiversity. Their status was assessed through E02. Although non-indigenous species have been recorded in Montenegro, there is

insufficient information to assess GES. In order to do so, it's crucial to define specific thresholds; this requires continuous and active transboundary cooperation.



The preliminary assessment of **pollution (E09)** shows higher concentration of contaminants in the coastal area, particularly in Boka Kotorska Bay. The levels of some contaminants exceed the established limit, specifically legacy pollutants (such as heavy metals and

organohalogen compounds): mercury contained in sediments in the open coastal areas of Budva and Bar, and cadmium and lead around Bar. This means that GES has not been achieved with respect to these contaminants, and that there may be negative impacts on biodiversity. The assessed parameters for other types of pollutants are either at a level that meets the achievement of GES, or could not be assessed due to lack of data.



Changes in hydrography (E07) have already been recorded in the Adriatic Sea, as the semi-enclosed sea is especially sensitive to climate change. Recent research on the climatology of the entire Adriatic has analysed large data sets (spanning from 1911 to 2009), including

records on temperature, salinity and dissolved oxygen, and shows that the deepest part of the southern Adriatic is becoming much saltier and warmer. In Montenegro, due to lack of systematic data on hydrographic conditions, it was not possible to assess GES. However, anthropic activities in Montenegrin waters, such as construction and sewer outflows, have the potential to permanently change hydrographic conditions near the coast. Currently, there are no such deteriorating activities in open waters, but recent hydrocarbon survey drillings should be carefully observed to avoid significant hydrographic changes in the future.



Marine litter (E010) is currently one of the most serious threats to the health of the marine and coastal environment. Based on the available data and established thresholds, it can be concluded that GES for marine beach litter in Montenegro has not yet been achieved.

Significant amounts of floating and seabed litter have also been observed. Based on the available data, coastal areas seem to be under the greatest pressure, with particular concern to the area of Boka Kotorska Bay.

■ Final remarks

In order to fully implement an Integrated Monitoring and Assessment Programme (IMAP) in Montenegro in the future, and be able to fully assess and achieve Good Environmental Status, it's important to **improve the legislative framework and knowledge base,**

supported by human, institutional and financial capacity. Finally, it is necessary to promote stable and continuous **transboundary cooperation** with other Adriatic countries, both to understand and to achieve Good Environmental Status.