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ADRIATIC

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

Towards an Integrated Marine Good Environmental Status (GES) Assessment for Albania

Assessment of the Marine Environment and the Sustainability of Ecosystem Values

UN environment programme

Mediterranean Action Plan
Barcelona Convention

PAP/RAC

SPA/RAC

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AGJENCIA KOMBËTARE E ZONAVE TË MBROJTURA

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List of acronyms

ACCOBAMS	Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic Area
ASI	ACCOBAMS Survey Initiative project
Barcelona Convention	Convention for the Protection of the Mediterranean Sea against the pollution
BQE	Biological Quality Element
CARLIT	Cartography of littoral and upper-sublittoral rocky-shore communities
CBD	Convention of biological diversity
COP	Conference of (Contracting) Parties
EcAp	Ecosystem approach
EMODNet	European Marine Observation and Data Network
EO	Ecological Objective
EU	European Union
GEF	Global Environment Facility
GES	Good Environmental Status
GFCM	General Fisheries Commission for the Mediterranean
ICZM	Integrated Coastal Zone Management
IMAP	Integrated Mediterranean Monitoring and Assessment Programme
IPA Adriatic	Adriatic IPA Cross-border cooperation programme of the EU
IUCN	International Union for Conservation of Nature
MSP	Maritime Spatial Planning
MSFD	Marine Strategy Framework Directive
NETCET	Network for the Conservation of Cetaceans and Sea turtles project
NIMP	National integrated monitoring programme
NIS	Non-indigenous species
PAP/RAC	Priority Actions Programme/Regional Activity Centre
SPA/BD Protocol	Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean, under Barcelona Convention
SPA/RAC	Regional Activity Centre for Specially Protected Areas
UNCLOS	United Nations Convention on the Law of the Sea
UNEP/MAP	Mediterranean Action Plan of the UN Programme for Environment
WTTC	World Travel & Tourism Council

Foreword

The seas and coastal areas are among the most valuable and vital components to sustain our life on planet Earth. At the same time, they are under exponentially increasing pressures by human activities, having already shown tangible negative consequences to economy and society, beyond the impact in nature itself. To maintain, to protect, and to conserve the Mediterranean's coastal and marine environment and its resources in a healthy and productive state is the main premise on which the marine environment regional policies and legislation are built upon.

The UNEP/MAP Barcelona Convention for the Protection of the Marine Environment and Coastal Region of the Mediterranean (the Barcelona Convention) and the European Union Regional Seas context (EU Regional Seas) are the two main science-policy frameworks with legal instruments involving all the Mediterranean riparian countries, either EU member states or Contracting Parties to the Barcelona Convention, on which the achievement of the Good Environmental Status (GES) of the Mediterranean Sea is dependent. This requirement also applies to the Adriatic Sea basin and the IPA countries, including the Republic of Albania, as an integral part of the Mediterranean region.

The preparation of the *Towards an integrated marine GES assessment for Albania* report has been developed under the project "Implementation of Ecosystem Approach in the Adriatic Sea through Marine Spatial Planning" (i.e., the GEF Adriatic project), financed by the GEF and implemented jointly by PAP/RAC, SPA/RAC, and UNEP/MAP Coordinating unit in collaboration with relevant national institutional partners from Albania, as well as international collaboration. The document represents the first attempt to assess GES in the Albanian marine and coastal areas in an integrated manner, based on principles and criteria set under the Barcelona Convention and its Integrated Monitoring and Assessment Programme of the Mediterranean Sea and Coast and Related Assessment Criteria (UNEP/MAP/IMAP). Other documents relevant for the GES assessment in the framework of the Barcelona Convention, including Common Regional Framework for ICZM and its Methodological Guidance for Reaching GES through ICZM, were used while preparing the document. The objective of the document is to shed a light on the marine ecosystem's state and current pressures, although assessing as a whole a number of ecological defined components and welfare processes of importance, such as biodiversity and non-indigenous species, eutrophication, hydrographic conditions, coastal ecosystems, contaminants, and marine litter to mention few, as well as to identify shortcomings and existing gaps for future coastal and marine management towards GES.

This assessment should be of particular use for the ongoing and future Albanian efforts to implement the UNEP/MAP/IMAP, as well as the European Marine Strategy Framework Directive (EU MSFD) at national level.

Summary

Preparation of the *Towards an integrated marine Good Environmental Status (GES) for Albania* document, as one of the major outputs of the GEF-Adriatic project, is the first attempt to assess GES in Albania's coastal and marine area. This initial GES assessment was methodologically based on the Barcelona Convention's Integrated Mediterranean Monitoring and Assessment Programme (IMAP). However, for the assessment of EO1 Biodiversity, some additions were made using the advantages of the latest MSFD criteria under the 2017 Commission's Decision (2017/848) and considering some of the national specificities.

The document was developed by the team of national and international experts under the supervision and guidance of UNEP/MAP, PAP/RAC, and SPA/RAC. It consists of an initial overview of the combined economic activities, as drivers of pressures and impacts to the marine and coastal environment; a resumé of the initial GES assessments (the entire version will be published separately) for the set of individual Ecological Objectives (EO1, EO2, EO7, EO8, EO9, EO10) including a baseline analysis. These chapters are followed by the study of the interrelationships between EOs and the GES assessment gaps and needs, and an initial proposal of related further actions to achieve and maintain GES objectives in Albania.

The anthropogenic activities represent the main sources of **pressures and adverse impacts** to the marine and coastal environment. In Albania, tourism appears to be the most significant economic activity generating pressures, particularly marine litter and microbial pathogens. At the same time tourism is important generator of income, with total contribution to Albanian GDP and employment amounting approximately 21 %. It should be stressed that pressures do not appear alone, but rather combined, thus bringing cumulative and synergistic impacts.

Different pressures reflect on the state of biodiversity, assessed through **EO1 Biodiversity**. However, due to significant lack of data, this state could not be properly assessed. One of the already present and ever-growing pressure to the biodiversity are **Non-indigenous species** (NIS), with emphasis on invasive alien species, assessed through **EO2**. Although there are some records about NIS in Albania, this information is still not sufficient for GES assessment. Furthermore, thresholds at the Adriatic Sea level, which are needed as reference points for NIS GES assessment, are still unknown. The setting of thresholds requires a good and active transboundary cooperation.

The **Eutrophication (EO5)** status along the Albanian coastline has not yet been adequately characterised due to lack of data. However, it is already evident that there are two distinct areas of influence: moderately influenced northern part of the coast, mainly affected by terrestrial inputs through rivers, and the southern part, below Vlora Bay, featured with distinct oligotrophic characteristics.

Changes in **Hydrography (EO7)** have been already recorded in the Adriatic Sea, as the semi-enclosed sea is particularly sensitive to climate change. These dynamic processes are to great extent associated with the processes on a scale larger than simply the Adriatic basin, notably from Ionian Sea which is particularly relevant for Albanian sea waters. In addition, the coastal sea in Albania is subject to influence from rivers. Due to lack of systematic data on hydrographic conditions it was not possible to assess GES in Albania. However, it is already evident that in achieving and preserving GES, it is important to pay attention to all the coastal interventions at a local level related to the infrastructural maintenance and development, maritime transport, sand extraction, tourism, and recreation, to mention few.

Coastal ecosystems and landscapes (EO8) are increasingly being altered by construction of human-made structures. According to the 2020 spatial analysis of the length of Albania's coastline occupied by human-made structures, carried out within the GEF Adriatic project, 85.26% of the coastal length of Albania is natural coast, and 14.47 % is artificial. Most of the artificial structures on the Albanian coast are located close to the major settlements with strong economic activities. However, due to lack of relevant datasets to observe the trend, at the moment GES could not be assessed.

The initial GES assessment of **Pollution (EO9)** shows higher concentrations of several key harmful contaminants, such as concentrations of mercury and organo-chlorinated compounds in certain coastal areas. On the other hand, GES seems to be achieved regarding the occurrence of oil

spills and concentration of faecal bacteria. However, more monitoring data under EO9 CIs is needed to ensure full GES assessment.

Marine litter (EO10) is at present one of the most serious threats to the marine and coastal environment. It is clear that this is an issue that extends beyond national borders, particularly evident in the Adriatic Sea. Namely, facilitated by the direction of the main sea current, marine litter coming from the south moves north along the entire Adriatic coast. Data on marine litter in Albania were mostly collected through implementation of several transboundary projects. The existing data indicate that beach litter pollution is above the proposed baseline and threshold values, while for other indicators it was not possible to assess GES due to lack of data.

Understanding **interrelationships between Ecological Objectives** and their Common Indicators is important for having a comprehensive overview of GES. To this regard, the very limited availability and representativity of both existing and recent datasets impaired assessment in full of the relevance of these interactions for Albania, and therefore, the interrelationships are mainly inferred from empirical knowledge from other Mediterranean basins through UNEP/MAP.

The main **gaps and needs** found for carrying out the integrated GES assessment are:

- *Lack of legislative framework for GES assessment and some specific EOs related topics*, notably marine litter and water quality;
- *Lack or limitation of data and information* relevant for GES assessment of majority of indicators;
- *Institutional gaps, limited human and financial capacities*, notably the absence of a scientific institution dedicated specifically to the sea, as well as the lack of experts in certain fields;
- *Limited monitoring implementation*, particularly the lack of systematic monitoring based on IMAP EOs and national coverage;
- *Transboundary cooperation*, which already exists to some extent but has the potential for improvement. It is particularly important for Biodiversity (EO1), NIS (EO2, Fisheries (EO3), Pollution (EO9), Marine litter (EO10), and Noise (EO11).

In addition, there are a few methodological issues related to GES assessment, such as lack of elaboration of certain EOs (EO4 and EO6) and CIs under IMAP, as well as lack of defined thresholds at national and regional levels.

Based on the results of the initial GES assessment, a number of **preliminary targets and supportive measures** are proposed in accordance with IMAP of Albania, with the overall aims to enable adequate future GES assessment and ensure maintenance and/or achievement of GES for all previously assessed components. In order to be able to fully implement all these measures, it is important to fulfil several structural pre-conditions, particularly focusing on ensuring adequate legislative framework for GES assessment, improving institutional and human capacities, and ensuring long-term financial capacities. Finally, good transboundary cooperation for the protection of the marine and coastal environment is a must for the Adriatic Sea countries and further efforts are needed in that direction.

1 Introduction

This chapter briefly describes the marine policy frameworks at the Mediterranean Sea and European Seas level, emphasising the concept and requirements of the EcAp IMAP process under the MAP – Barcelona Convention system and its links with the European MSFD. It also provides a short overview of the main features of the Adriatic Sea, thus recognising a need to consider a subregional context for national GES assessments. Finally, it explains the methodology and approach towards the integrated GES assessment.

1.1 GES assessment policy context

Mediterranean Sea level

Under the **UNEP/MAP Barcelona Convention** and its seven protocols, as a unique political and legal framework for the protection of the marine environment and the coastal areas of the entire Mediterranean Sea region, the Decision IG.17/6 on Ecosystem Approach Roadmap was adopted at COP 15 in 2008 by Contracting Parties (CPs) and a process to achieve Good Environmental Status of the Mediterranean Sea was initiated. Furthermore, at COP 17 in 2012 under the vision of *A healthy Mediterranean with marine and coastal ecosystems that are productive and biologically diverse for the benefit of present and future generations*, Contracting Parties adopted a list of 11 Ecological Objectives and have been further broken down into Operational Objectives (COP 17 Decision IG.20/4), as well as GES definitions and associated targets (COP 18 Decision IG.21/3) established. In 2016, the Contracting Parties adopted the Integrated Monitoring and Assessment Programme of the Mediterranean Sea and Coast and Related Assessment Criteria (IMAP) (COP 19 Decision IG.22/7), a major component of the ecosystem approach implementation on the road for GES achievement. The steps undertaken from 2008 until 2016, with the publication of the *State of the Mediterranean Marine and Coastal Environment* report in 2012 and the first *Quality Status* report 2017 (endorsed by COP 20 Decision IG.23/6) consolidated the implementation of the Ecosystem Approach and the initiation of the 6-cyclic IMAP for the Mediterranean Sea (Figure 1.1), in synergy and coherence with the implementation of the European MSFD. In order to assist the Contracting Parties to interpret what GES means in practice, the Integrated Monitoring and Assessment Programme and related Assessment Criteria (IMAP), elaborating the 11 Ecological Objectives (EO), with specific GES definitions for each them, and with Common Indicators (Table 1.1) and targets, was adopted together with a timeline and deliveries for the implementation of this Programme, which should cover the 2016-2021 period (Decisions IG.20/4, IG.21/3, IG.22/7).

The IMAP implementation has evolved with the establishment of national IMAPs, development of an IMAP centralised data collection and management infrastructure (within the InfoMAP System), refinement of technical specifications on IMAP Common Indicators and assessment criteria, further developed and implemented candidate indicators, as well as developing methodologies for integrated assessment. A specific roadmap is currently under implementation for the preparation of a fully data-based Quality Status Report in 2023 (2023 MED QSR), as adopted by the Contracting Parties in 2019, through their COP 21 Decision IG.24/4 (Figure 1.1).

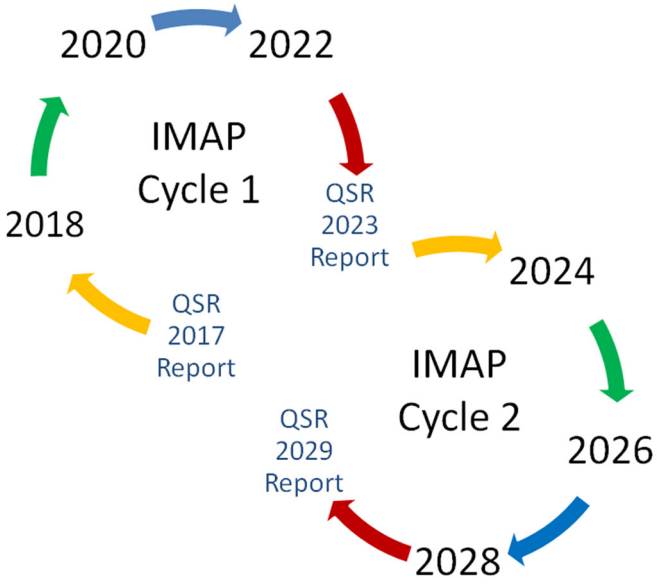


Figure 1.1. With the publication of the first ever Mediterranean Quality Status Report in 2017 (Initial Assessment) and the finalisation of the EcAp Roadmap, the formal IMAP 6-year management cycles have been initiated in order to achieve GES and inform both policy and decision makers

Table 1.1. List of IMAP Ecological Objectives (EOs) and Common Indicators (CIs)

Ecological Objective GES	IMAP Indicators	
EO1 Biodiversity		
Biological diversity is maintained or enhanced. The quality and occurrence of coastal and marine habitats and the distribution and abundance of coastal and marine species are in line with prevailing physiographic, hydrographic, geographic, and climatic conditions	Common Indicator 1:	Habitat distributional range (EO1) to also consider habitat extent as a relevant attribute
	Common Indicator 2:	Condition of the habitat's typical species and communities (EO1)
	Common Indicator 3:	Species distributional range (EO1 related to marine mammals, seabirds, marine reptiles)
	Common Indicator 4:	Population abundance of selected species (EO1, related to marine mammals, seabirds, marine reptiles)
	Common indicator 5:	Population demographic characteristics (EO1, e.g. body size or age class structure, sex ratio, fecundity rates, survival/mortality rates related to marine mammals, seabirds, marine reptiles)
EO2 Non-indigenous species		
Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystem	Common Indicator 6:	Trends in abundance, temporal occurrence, and spatial distribution of non-indigenous species, particularly invasive, non-indigenous species, notably in risk areas (EO2, in relation to the main vectors and pathways of spreading of such species)
EO3 Harvest of commercially exploited fish and shellfish		
Populations of selected commercially exploited fish and shellfish are within biologically safe limits, exhibiting a population age and size distribution that is indicative of a healthy stock	Common Indicator 7:	Spawning stock biomass (EO3)
	Common Indicator 8:	Total landings (EO3)
	Common Indicator 9:	Fishing mortality (EO3)
	Common Indicator 10:	Fishing effort (EO3)
	Common Indicator 11:	Catch per unit of effort (CPUE) or Landing per unit of effort (LPUE) as a proxy (EO3)
	Common Indicator 12:	Bycatch of vulnerable and non-target species (EO1 and EO3)

Ecological Objective GES	IMAP Indicators	
EO4 Marine food webs		
Alterations to components of marine food webs caused by resource extraction or human-induced environmental changes do not have long-term adverse effects on food web dynamics and related viability	To be developed further	
EO5 Eutrophication		
Human-induced eutrophication is prevented, especially adverse effects thereof, such as losses in biodiversity, ecosystem degradation, harmful algal blooms, and oxygen deficiency in bottom waters	Common Indicator 13:	Concentration of key nutrients in water column
	Common Indicator 14:	Chlorophyll *a* concentration in water column
EO6 Sea-floor integrity		
Sea-floor integrity is maintained, especially in priority benthic habitats	To be developed further	
EO7 Hydrography		
Alteration of hydrographic conditions does not adversely affect coastal and marine ecosystems	Common Indicator 15:	Location and extent of the habitats impacted directly by hydrographic alterations
EO8 Coastal ecosystems and landscapes		
The natural dynamics of coastal areas are maintained and coastal ecosystems and landscapes are preserved	Common Indicator 16:	Length of coastline subject to physical disturbance due to the influence of human-made structures
	Candidate Indicator 25:	Land cover change
EO9 Pollution Contaminants		
Contaminants cause no significant impact on coastal and marine ecosystems and human health	Common Indicator 17:	Concentration of key harmful contaminants measured in the relevant matrix (related to biota, sediment, seawater)
	Common Indicator 18:	Level of pollution effects of key contaminants where a cause and effect relationship has been established
	Common Indicator 19:	Occurrence, origin (where possible), extent of acute pollution events (e.g., slicks from oil, oil products, and hazardous substances), and their impact on biota affected by this pollution
	Common Indicator 20:	Actual levels of contaminants that have been detected and number of contaminants which have exceeded maximum regulatory levels in commonly consumed seafood
	Common Indicator 21:	Percentage of intestinal enterococci concentration measurements within established standards
EO10 Marine litter		
Marine and coastal litter do not adversely affect coastal and marine environment	Common Indicator 22:	Trends in the amount of litter washed ashore and/or deposited on coastlines
	Common Indicator 23:	Trends in the amount of litter in the water column including microplastics and on the seafloor
	Candidate Indicator 24:	Trends in the amount of litter ingested by or entangling marine organisms, focusing on selected mammals, marine birds, and marine turtles
EO11 Energy including underwater noise		
Noise from human activities cause no significant impact on marine and coastal ecosystems	Candidate Indicator 26:	Proportion of days and geographical distribution where loud, low, and mid-frequency impulsive sounds exceed levels that are likely to entail significant impact on marine animal
	Candidate Indicator 27:	Levels of continuous low frequency sounds with the use of models as appropriate

European level

In order to protect coastal and marine environments in Europe, the European Union adopted the **Marine Strategy Framework Directive (MSFD)** in 2008 (2008/56/EC). The MSFD aimed to achieve the Good Environmental Status (GES) of the EU marine waters by 2020 and to protect the resources upon which relevant economic and social activities are based (the European Regional Seas, including the Mediterranean Sea through few riparian EU members). The MSFD also applies the foundational ecosystem approach to the management of human activities with impacts on the marine environment, balancing environmental protection and sustainable use. Furthermore, the need for regional and sub-regional cooperation for conservation is recognised, including cooperation with countries beyond the EU borders. Thus, the MSFD recognises four European marine regions, including the Mediterranean Sea.

The achievement of GES was initially set for 2020 and the Member States were required to develop a strategy for their marine waters (the Marine Strategy) in 2008 and review them periodically. Other EU directives and regulations support the goals of the MSFD, including Maritime Spatial Planning (MSP) Directive, Birds and Habitat Directive, Water Framework Directive (WFD), and Common Fisheries Policy. The MSP in particular, should ensure that human activities in the marine environment are implemented in a sustainable way. The EU-Mediterranean Member States are Contracting Parties to the Barcelona Convention; and therefore, the processes and approaches under IMAP and EU MSFD are shared, aligned, and optimised in order to be effectively implemented by those countries. The Figure 1.2 shows the similarities between the two marine environmental policies in the Mediterranean Sea, in terms of Ecological Objectives and Descriptors of the marine ecosystem for the IMAP and EU MSFD, respectively.

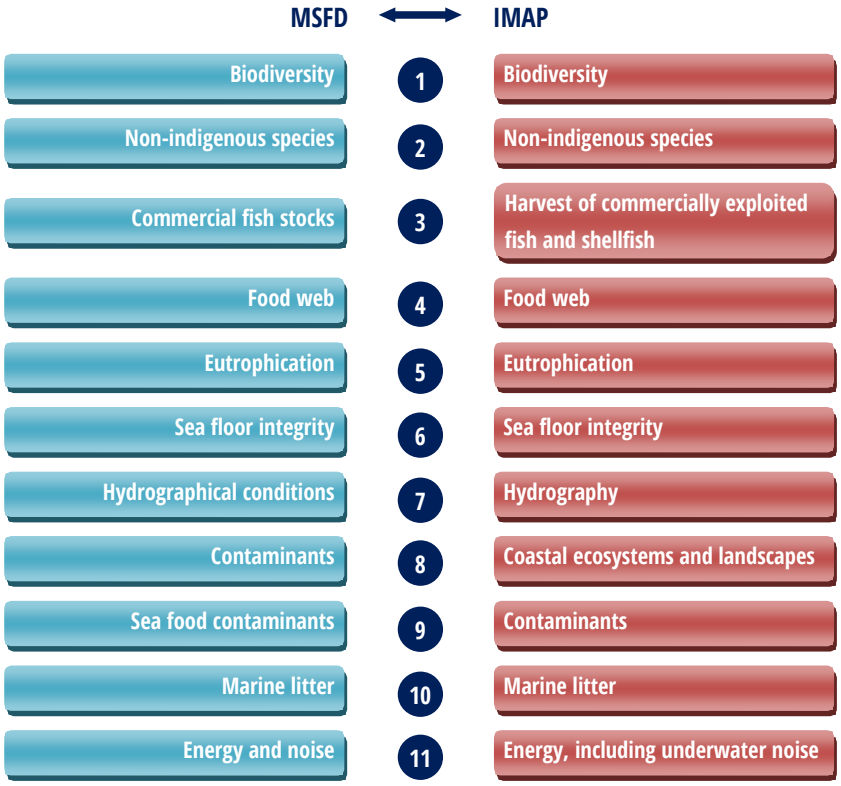


Figure 1.2. Similarities between the UNEP/MAP IMAP and the European MSFD. *Source: UNEP/MAP*

The Adriatic Sea

The Adriatic Sea is the northern semi-enclosed arm of the Mediterranean Sea. Based on hydrological conditions, three distinctive sub-areas can be observed (Figure 1.3): the shallow northern Adriatic, the central and middle Adriatic featured by three depressions, and the deep southern Adriatic. The southern sub-basin consists of ca. 80% of the total volume of the Adriatic Sea.

The Adriatic Sea is bordered by Albania, Bosnia and Herzegovina, Croatia, Italy, Montenegro, and Slovenia. All Adriatic countries are Contracting Parties to the Barcelona Convention and follow the requirements under the UNEP/MAP IMAP to achieve GES in the Mediterranean Sea. In addition, the Adriatic Sea area affiliates predominantly to the European Union, since Croatia, Italy, and Slovenia are members of the EU. As such, these countries have harmonised their legislation with the EU *aqui,* including the MSFD and MSP.

All indicated features of the Adriatic Sea emphasise a need for strong cooperation and communication between the Adriatic countries in order to ensure the healthy environmental state of the Adriatic Sea.

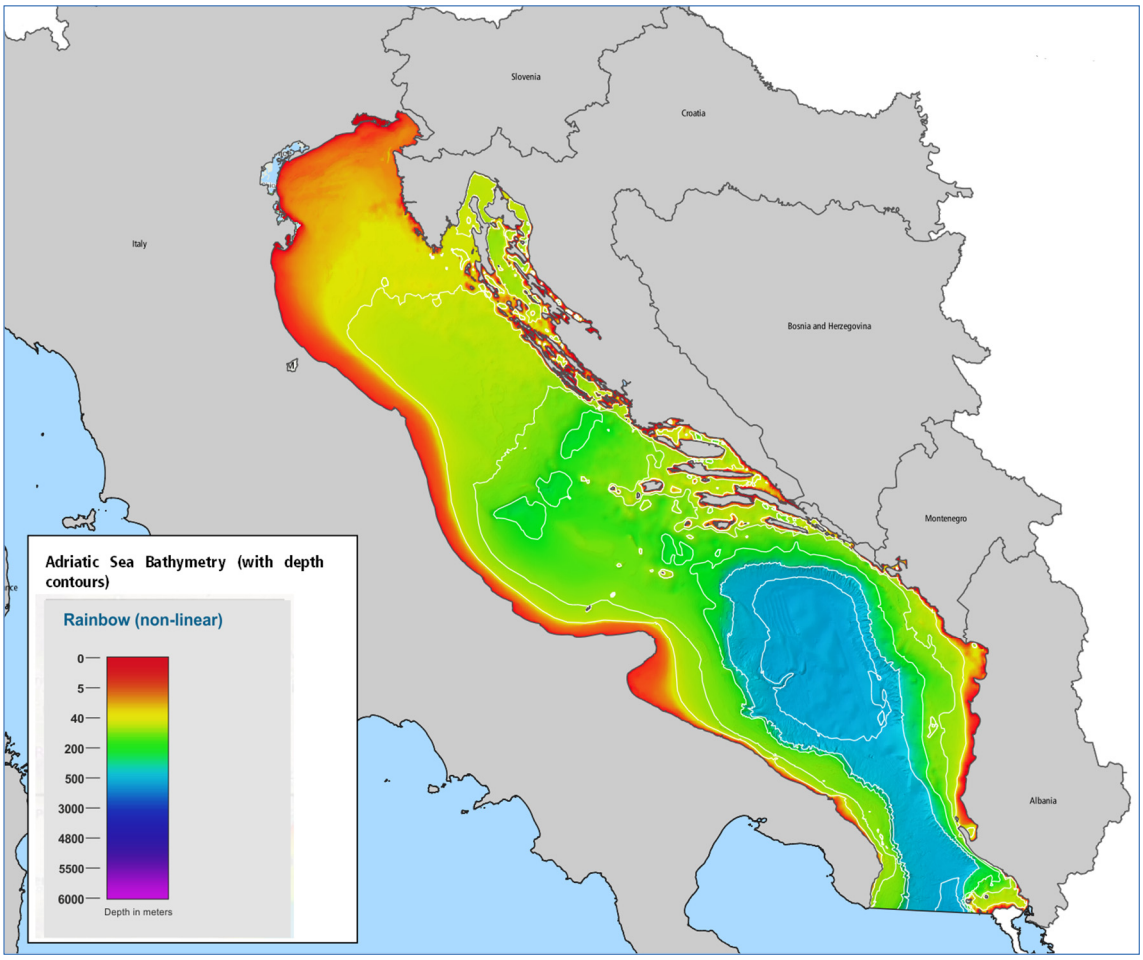


Figure 1.3. Adriatic Sea bathymetry, as the basis for division on sub-basins.
Prepared by Petra Štrbenac (Stenella consulting, Croatia) based on EMODnet Bathymetry Consortium, 2018: EMODnet Digital Bathymetry)

1.2 Approach to integrated GES assessment preparation

The development of the document *Towards an integrated marine GES assessment* document was coordinated by PAP/RAC and SPA/RAC and elaborated by a group of relevant international and national experts (more details in the *Impressum*).

The integrated assessment is based on the existing and available data on Biodiversity (EO1), Non-indigenous species (EO2), Hydrographic conditions (EO7), Eutrophication, contaminants (EO9), Marine litter (EO10), and Coastal artificialisation (EO8) through the integration of the sectoral IMAP EOs assessments elaborated under the GEF Adriatic by a number of coordinated national teams in Albania together with international experts.

The content of the document is aligned with the IMAP and it is based on the following elements:

- The initial overview of economic activities (chapter 2.1), being drivers of the predominant pressures and their impacts on the marine and coastal environment (chapter 2.2);
- Elaboration of initial GES assessment for the individual EOs , including the baseline analysis based on recent studies (chapter 3.1);
- Interrelationships between Ecological Objectives (chapter 3.2);
- GES assessment gaps and needs (chapter 4);
- Initial proposal of measures to achieve GES targets (chapter 5).

The evidence base limits are particularly addressed through several sections of the document. Regional context has also been taken into account.

As previously mentioned, as part of the preparation of this document, the separate GES assessments per individual EOs were first undertaken (in publication). These thematic assessments contain detailed information on GES findings, methodologies, analyses of particular states and pressures as well as proposed policy responses and further actions required to achieve GES. Where appropriate, the links with MSFD have also been highlighted.

The present document contains only the key summarised elements of the thematic GES assessments per individual EOs in order to establish interrelationships between them as an effort to produce an integrated evaluation of the marine environment in Albania.

This document puts significant emphasis on the interlinks between different Ecological Objectives, status of marine biodiversity, and predominant pressures and their impacts on the overall marine and coastal environment of Albania. As such, it is the first attempt towards a national integrated GES assessment following the UNEP/MAP IMAP framework. Further national monitoring and assessment are needed to be able to have better understanding of the overall marine environment status as there is some information lacking for some specific IMAP EOs, despite the fact that a common harmonised, integrated, methodological approach to be able to assess GES as a whole in a fully integrated manner is still in debate by Contracting Parties of the Barcelona Convention at a regional level. Similarly, the initial MSFD framework was also revised in 2017 to improve the integrated GES assessment of the marine environment.

2 Socio-economic drivers, pressures, and impacts existing in the marine and coastal environment of Albania

This chapter summarises economic and social uses of marine and coastal area, pressures coming from these activities, and potential or actual impacts on the state of the environment. Identification of economic drivers, pressures, and impacts is an important step for their mitigation through adequate responses. All uses, pressures, and impacts in Albania are also viewed in a broader regional context. Furthermore, the integrated assessment of GES is based on the interrelationships between state, pressures, and impact based on the individual Ecological Objectives assessments and for some of which the drivers might be common. A more specific elaboration of pressures, state, and impacts related to specific Ecological Objectives are given in the thematic GES assessments.

2.1 Socio-economic drivers relevant for the state of marine environment in Albania

Anthropogenic activities represent the main sources of pressures and adverse impacts to the marine and coastal environment. Several economic sectors challenge the health of the Adriatic Sea: urbanisation and industry, tourism, maritime transport, the energy sector, agriculture, fisheries, and aquaculture (Table 2.1).

In Albania the most populated regions are located in the broader coastal area: prefectures of Shkodër, Lezhë, Durrës, Tirana, Fier, and Vlora According to the 2018 UNECE report, there is high rate of **urbanisation**, with 58% of populations living in urban areas. In addition, Albania has the largest decline of rural populations (-2.4%) amongst all Mediterranean countries (UNEP/MAP and Plan Bleu, 2020). **Industry**, such as manufacturing industry, mining, and quarrying, is not intensive, but it contributes 6–10% of GDP.

Maritime transport is highest in the northern central Adriatic and along the Italian coast in the southern part of the Adriatic (Figure 2.1). However, all transport to the Adriatic from the Mediterranean Sea has to pass through the narrow Otranto Strait, including the transport of oil and gas, which may have potential impacts even to the Albanian marine environment. The Albanian fleet (including fishery boats) is concentrated in four main ports, with Durrës being the largest.

Primary supply of **energy** in Albania is dominated by oil products, hydropower plants, and imported electric energy. Albania is one of the transit countries for the Trans Adriatic Pipeline that will transport the Azerbaijan gas to Italy. There are no operational oil and gas installations in Albanian waters nor wind farms, although the latter are planned in nearby Greek waters (Figure 2.2). The use of renewables is still low, but it is supposed to increase if relevant international agreements (Paris Agreement) and the EU policies are followed.

Marine **fisheries** is the most important segment of fishery industry in Albania. According to FAO 2017 data, aquaculture produced mainly marine fish (77%) in 24 fish farms. Furthermore, almost 45% of the needs for fish and fish products are met through import; there is a growing demand for fish by consumers. Additionally, fishing vessels in Albania are among the oldest in the Mediterranean (with an average of 38 years old), which is similar to those of other Adriatic countries.

Agriculture is the most important sector in Albania. It contributes 19% to the GDP (UNEP/MAP and Plan Bleu, 2020) which is the highest among Mediterranean countries. In addition, it accounts for ca. 40.7% of employment (in 2017), although this is a significant decrease in 20 years (it was 70.3% in 1995; FAO, 2018). Although the emphasis is on livestock farming, climate change may have negative impact on crop production in the future.

Albania, like other Adriatic countries, is an important **tourist** destination. According to estimates of the World Travel and Tourism Council (WTTC), the total contribution of tourism and travel to Albanian GDP in 2019 was 21.2 %. Furthermore, in 2019, the total contribution of tourism and travel to employment was 22.2%. Albania had the highest ten-year growth rates of international tourist arrivals (from 1.2 million in 2008 to 4.6 million in 2017; UNEP/MAP and Plan Bleu, 2020). Although tourism requires qualified and specialised employees, it can provide a good salary and as such it attracts young unemployed people. Tourist facilities are concentrated in the coastal area. Nautical tourism and visits from cruisers are still not significant.

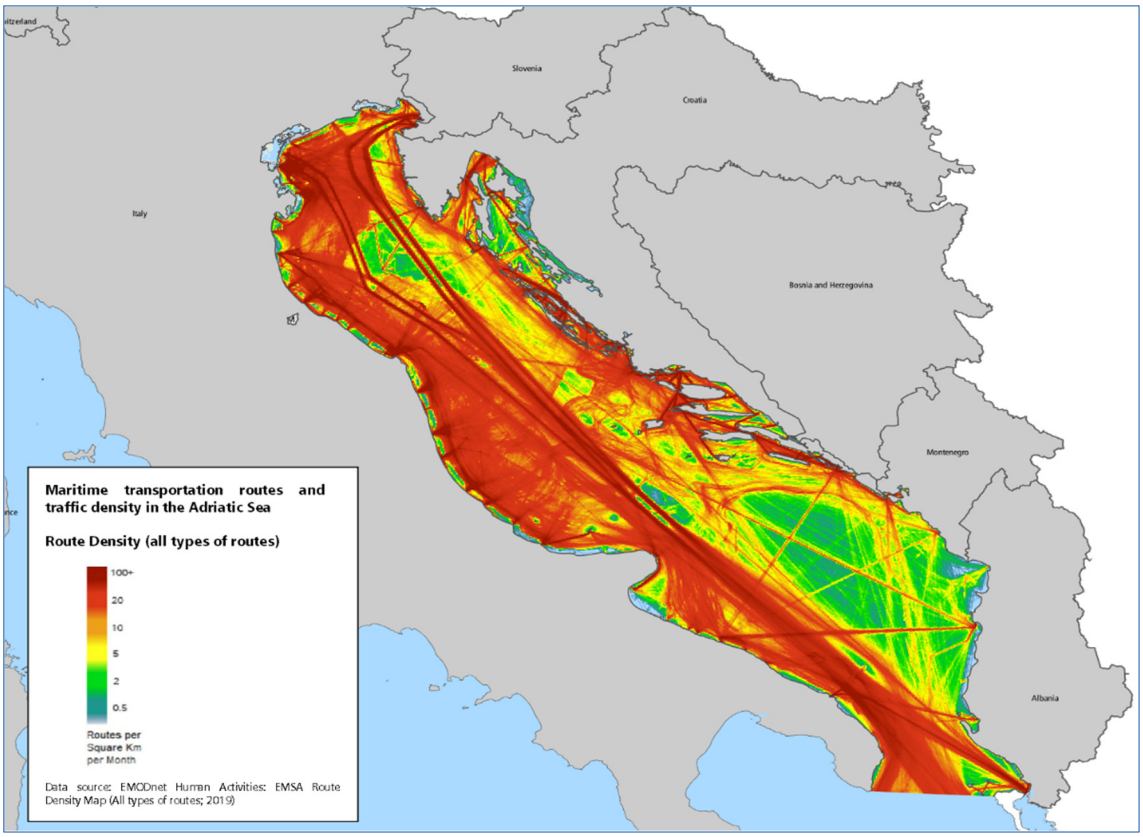


Figure 2.1. A snapshot of maritime transportation routes and traffic density (all types of vessels) in the Adriatic Sea.
Prepared by P. Štrbenac (Stenella Consulting Croatia), based on EMODnet Human Activities. EMSA Route Density Maps (all types of routes), 2019

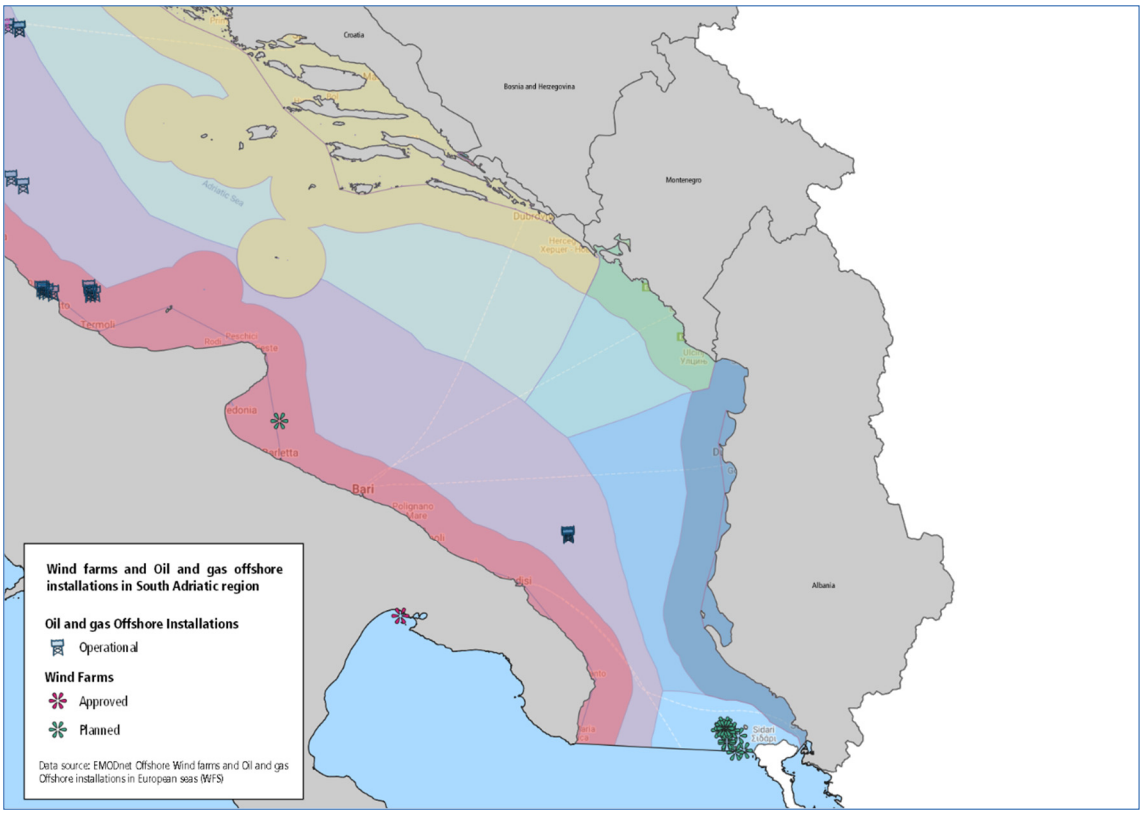


Figure 2.2. Potential and planned wind farms, and oil and gas offshore installations in the south Adriatic.
Prepared by P. Štrbenac (Stenella Consulting, Croatia) based on EMODnet (WFS), 2020

Table 2.1. Overview of main economic and social characteristics of human activities in the Albanian marine and coastal area.
Based on the UNECE Environmental Performance Reviews – Albania, 2018; UNEP/MAP, 2012; FAO, 2020; ClimateChangePost, 2020; Caca et al., 2016

Human activities (sectors)	Economic and social characteristics	Anticipated future trends
Urbanisation and industry	▪ Highest population density is in broader coastal and urban areas of Shkodër, Lezhë, Durrës, Tirana, Fier, and Vlorë ▪ High urbanisation rate (58% of total population) ▪ Manufacturing and mining industry contribute 6–10 % of GDP	▪ Further Increase of urban population could be anticipated, accompanied with industrial development
Maritime transport	▪ Maritime sector is focused around the four major ports of Durrës, Vlorë, Shengjin, and Sarandë. The largest port is Durrës ▪ National fleet is small, particularly compared to other Adriatic countries ▪ International maritime transport is of moderate intensity, mainly flowing along the Italian coast	▪ Improved infrastructure in Central and Eastern Europe could lead to an increase in bulk cargo through the Adriatic ports ▪ International traffic is likely to increase, particularly due to energy sector (exploitation and exploration of oil and gas)
Energy	▪ Energy production is concentrated in the terrestrial area, with crude oil as the main energy source. No oil and gas exploration in the marine area ▪ Use of renewables still modest – 0.6% of total energy production. No installations in the marine area ▪ Fossil fuel combustion and fugitive emissions are main source of greenhouse emissions in Albania – contributions to climate change	▪ Use of renewables is expected to increase – obligations from Paris Agreement ▪ Potential increase in fossil fuels exploration and exploitation in southern part of the neighbouring Montenegro and Greece
Agriculture	▪ Agriculture is the most important sector in Albania, in terms of value added and employment, accounting for ca. 58% of employment ▪ Livestock constitutes more than half of the total value of agricultural production ▪ Agriculture contributes 19% to the country's GDP ▪ The share of agricultural land represents only 24% of the total area of the country	▪ Climate change is likely to pose a threat to agriculture in the future. It may result, among others, with decrease of yield in the absence of relevant climate adaptation measures
Fisheries (incl. aquaculture)	▪ Small fishery production, particularly compared to Italy and Croatia, ▪ Fishing activity is mainly concentrated on the continental shelf ▪ Marine fisheries are the most important sector of the fisheries industry as well as lagoon and inland fisheries ▪ Capture production in 2017 was 8,300 t, with 75% of marine fisheries ▪ In 2017 aquaculture produced 4,430 t, with 77% of marine fishes ▪ In 2017 imports of fish and fishery products were valued at USD 75.7 million, exports were worth USD 94 million, mostly prepared and preserved anchovies ▪ The consumption of fish in Albania has increased gradually and the consumption per capita is estimated to be ca. 5.3 kg/year in 2016	▪ Higher demand for fish could be anticipated based on existing trends, leading to higher demand on resources
Tourism	▪ Total contribution of tourism and travel to the GDP – 21.2% ▪ Offers 4.3% of new jobs directly and 15.2% indirectly ▪ Increased number of tourist visits (from 2005 to 2012 – 840 %) ▪ The majority of tourist industry is concentrated along the Adriatic and Ionian Sea coasts ▪ Nautical tourism and visits of cruise ships is still not significant	▪ Further increase of tourists is anticipated ▪ Risk of further unsustainable development of tourism – more pressures to natural habitats

2.2 Pressures and impacts on marine and coastal environment

Different uses of marine and coastal areas lead to a range of pressures, which generate impacts to the environment. In addition, the same types of pressures often come from different activities; for example, the sources of litter are urbanisation and industry, maritime transport, fishery (e.g., ghost fishing gear), and tourism. Urbanisation and industry, as well as tourism development, contribute to the deterioration of biodiversity, especially coastal and marine habitats distributional ranges and populations abundances. In addition, they are, together with the energy sector, the major drivers of climate change due to their dependence on fossil fuels (e.g., construction, transportation, heating, etc).

Based on existing data at the Adriatic level there are few pressures that are significant for the southern Adriatic and Albanian waters. Namely, part of the area is identified as one of the hot spot regions for possible oil spills (Figure 2.3), which is linked to intensive traffic of tankers containing oil and gas. The 2012 UNEP/MAP analysis of the mean surface productivity and eutrophic and hypoxic hot spots in the Mediterranean indicated an area on the northern part of the Albanian coast as one of the eutrophic hot spots. On the other hand, demersal fishing activity is not so destructive in Albania as it is in other parts of the Adriatic Sea. The increase of sea surface temperature is also not yet significant, which is important information related to the impacts of climate change and the spread of NIS. However, based on current levels of human activities and practices that cause climate change, more significant increase in temperature could be anticipated in the future.

The generic overview of pressures at the national level shows that geographically the most extensive pressures in Albania come from the tourism sector, particularly marine litter and microbial pathogens (Table 2.2). It should be stressed that pressures do not appear alone, but rather in combination, which results in cumulative and synergistic impacts; however, this aspect in Albanian waters is still not known, primarily due to the lack of adequate data.

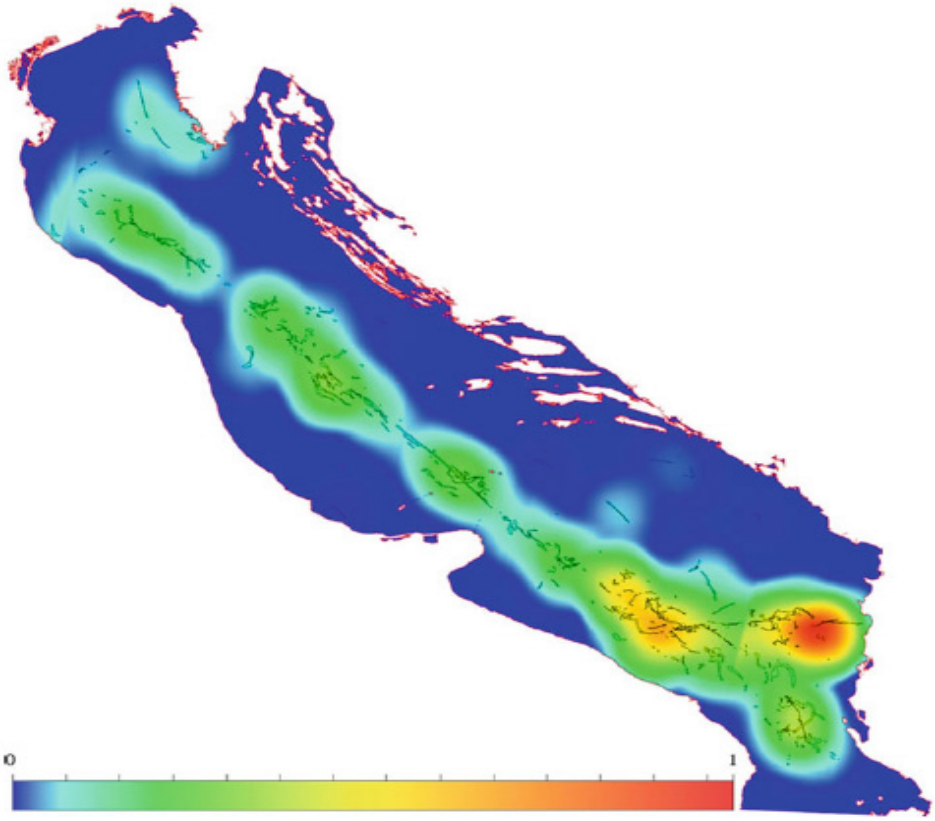


Figure 2.3. Probable spills and normalised pollution density in the Adriatic Sea (green – low probability, red – high probability).
Source: Perković et al., 2016

Table 2.2. Preliminary assessment of pressures' extent in Albanian marine and coastal area

Sector – Driver	Priority pressures (Regional level)	Geographical extent of pressure in Albania	Total per sector in Albania	Total all sectors combined in Albania	Potential impacts (regional level)	Likely affected habitat types and species groups relevant for IMAP (Albania)
Urbanisation and industry	Physical loss – Seabed integrity (EO6)	Low	Low-Medium	Low	▪ Habitat loss and degradation (pelagic and benthic habitats), ▪ Species populations disturbance ▪ Incidental mortality ▪ Reduction of population abundance (for sedentary species) or populations relocations	▪ Photophilic algal communities ▪ Coralligenous assemblages ▪ Posidonia meadows ▪ Phytoplankton ▪ Zooplankton ▪ Marine mammals ▪ Marine turtles ▪ Seabirds
	Litter (EO10)	Medium	Low-Medium	Low		
	Nutrient and organic matter enrichment (EO5)	Medium	Low-Medium	Low		
	Contamination by hazardous substances (EO9)	Low	Low-Medium	Low		
	Microbial pathogens (EO9)	Medium	Low-Medium	Low		
Maritime transport	Litter (EO10)	Low	Low	Low	▪ Habitat loss and degradation (particularly pelagic habitats) ▪ Species populations disturbance ▪ Population's relocations ▪ Incidental mortality (collisions)	▪ Marine mammals ▪ Marine turtles ▪ Seabirds
	Noise (EO11)	Medium	Low	Low		
	Non-indigenous species (EO2)	Not known	Low	Low		
	Physical loss (EO6)	Low	Low	Low		
	Contamination by hazardous substances (EO9)	Low	Low	Low		
Energy	Noise (EO11)	Low	Low	Low	▪ Habitat loss and degradation (pelagic and benthic habitats) induced by climate change ▪ Species populations disturbance	▪ Coralligenous assemblages ▪ Posidonia meadows ▪ Phytoplankton ▪ Zooplankton ▪ Marine mammals ▪ Marine turtles ▪ Seabirds
	Physical loss (EO6)	Low	Low	Low		
	Indirectly – focus on fossil fuels – promotor of climate change	Low	Low	Low		
	Contamination by hazardous substances (EO9)	Low	Low	Low		
Agriculture	Contamination by hazardous substances (EO9)	Low	Low	Low	▪ Habitat loss and degradation (pelagic and benthic habitats), ▪ Reduces species resilience to other threats ▪ Reduction of population abundance	▪ Photophilic algal communities ▪ Coralligenous assemblages ▪ Posidonia meadows ▪ Phytoplankton ▪ Zooplankton ▪ Seabirds
	Microbial pathogens (EO9)	Low	Low	Low		
	Nutrient and organic matter enrichment (EO5)	Low	Low	Low		
Fishery (including aquaculture)	Removal of target and non-target species (lethal) (EO3)	Low	Low	Low	▪ Habitat loss and degradation	
	Physical damage (abrasion) (EO6)	Low	Low	Low		

Sector – Driver	Priority pressures (Regional level)	Geographical extent of pressure in Albania	Total per sector in Albania	Total all sectors combined in Albania	Potential impacts (regional level)	Likely affected habitat types and species groups relevant for IMAP (Albania)
	Litter (EO10)	Low	Low	Low	(particularly benthic habitats) ▪ Reduction of food resources, ▪ Incidental mortality of non-targeted (threatened) species (by-catch) ▪ Reduction of population abundance	▪ Coralligenous assemblages ▪ Posidonia meadows ▪ Marine mammals ▪ Marine turtles ▪ Seabirds
	Non-indigenous species (EO2)	Low	Low	Low		
	Contamination by hazardous substances (EO9)	Low	Low	Low		
	Nutrient and organic matter enrichment (EO5)	Low	Low	Low		
	Microbial pathogens (EO9)	Low	Low	Low		
Tourism	Physical loss – Seabed integrity (EO6)	Low	Medium	Low	▪ Habitat loss and degradation (pelagic and benthic habitats) ▪ Species populations disturbance ▪ Incidental mortality (collisions) ▪ Reduction of population abundance	▪ Coralligenous assemblages ▪ Posidonia meadows ▪ Marine mammals ▪ Marine turtles ▪ Seabirds
	Litter (EO10)	High	Medium	Low		
	Nutrient and organic matter enrichment (EO5)	Medium	Medium	Low		
	Noise (EO11)	Low	Medium	Low		
	Microbial pathogens (EO9)	High	Medium	Low		
	Contamination by hazardous substances (EO9)	Low	Medium	Low		

3 Towards an integrated GES Assessment

Chapter 3 briefly describes the approach to GES assessment, including criteria and methodological standards for each Ecological Objective. Based on criteria and elaborated methodology this chapter provides the summarised assessment of GES for Ecological Objectives 1, 2, 7, 8, 9, and 10, to the extent allowed by the existing and available data. In this chapter, major interrelationships among Ecological Objectives are highlighted.

3.1 Overview of GES assessment

Assessment for each Ecological Objective was undertaken by defining specific GES assessment criteria. In addition, a baseline assessment was carried out using the most recent data and literature. Analysis of the length of the coastline subject to physical disturbance (CI16) as part of EO8 was undertaken as part of the Project (2020; see chapter 3.1d).

3.1.a Biodiversity – EO1

GES criteria and definitions

The EO1 Biodiversity is a state related objective, which is defined as: Biological diversity is maintained or enhanced. The quality and occurrence of coastal and marine habitats and the distribution and abundance of coastal and marine species are in line with prevailing physiographic, hydrographic, geographic, and climatic conditions. As such, it corresponds to the Descriptor 1 of the GES under MSFD. The main criteria for EcAp/IMAP's GES assessment of the state of biodiversity are five Common Indicators, including habitat distribution and condition, species distribution, population abundance and demographics (see Table 3.1), with corresponding GES definitions. The focus of GES assessment are representative benthic and pelagic habitat types and groups of species, as listed in Table 3.2. It should be stressed that when choosing criteria for the preliminary Albania EO1 GES assessment, a few additions were made to the EcAp/IMAP's criteria, utilising advantages of the latest MSFD criteria under the previously mentioned 2017 Commission's Decision and considering some of the national specifics, as follows:

- Pelagic habitats are addressed due to their relevance for the state of biodiversity, even though IMAP tackles them to some extent, for the moment, only under EO5 Eutrophication;
- True seabird species, common species selected for GES assessment, are only wintering species in Albanian waters. Hence, the representative breeding species with habitats in coastal area are added to the list of selected seabirds.

The most critical parts are selecting the appropriate methods to measure indicators and set up thresholds, providing a set of reference values for each indicator against which it would be possible to assess GES characteristics. Namely, it is difficult to quantify biodiversity, as so many thresholds are of a qualitative nature. In addition, identification of certain thresholds requires a regional cooperation and harmonisation at the European level. In general, identification of thresholds for biodiversity is still an ongoing process, both at Mediterranean and European levels. However, for the purpose of the first Albanian GES assessment, an attempt was made to set thresholds, following as much as possible requirements and guidance related to implementation of IMAP, as well as the MSFD and the approach of Croatia, as the neighbouring country with the largest coastal area in the eastern Adriatic (more details in Table 3.3).

Regarding the scale of assessment, national level assessment was made for the majority of parameters. However, for migratory species in particularly, the Adriatic (sub-regional) level was considered, although the main limit was the lack of identified sub-regional thresholds.

Table 3.1. Overview of Common Indicators on biodiversity under EcAp/IMAP's EO1.
Source: UNEP/MAP, IMAP Common Indicator Guidance Facts Sheets (Biodiversity and Fisheries), Greece, 2017

Ecological Objective	IMAP Indicators	Relevant GES definition
EO1 Biodiversity Biological diversity is maintained or enhanced. The quality and occurrence of coastal and marine habitats and the distribution and abundance of coastal and marine species are in line with prevailing physiographic, hydrographic, geographic, and climatic conditions	Common Indicator 1: Habitat distributional range (EO1) to also consider habitat extent as a relevant attribute.	The habitat is present in all its natural distributional range.
	Common Indicator 2: Condition of the habitat's typical species and communities (EO1).	The population size and density of habitat-defining species, and species composition of the community, are within reference conditions ensuring the long-term maintenance of the habitat.
	Common Indicator 3: Species distributional range (EO1 related to marine mammals, seabirds, marine reptiles).	Marine mammals: The species are present in all their natural distributional range. Seabirds: The distribution of seabird species continues to occur in all their Mediterranean natural habitat. Biological diversity is maintained. The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic, and climatic conditions. (EO1, Biodiversity). Marine reptiles: The species continue to occur in all natural ranges in the Mediterranean, including nesting, mating, feeding, and wintering and nursery sites (where different to those of adults).
	Common Indicator 4: Population abundance of selected species (EO1, related to marine mammals, seabirds, marine reptiles).	Marine mammals: The species population has abundance levels allowing qualification to Least Concern Category of IUCN Red List or has abundance levels that are improving and moving away from the more critical IUCN category. Seabirds: Population size of selected species (of seabirds) is maintained. The species population has abundance levels allowing to qualify to Least Concern Category of IUCN (less than 30% variation over a time period equivalent to three generation periods). Marine reptiles: The population size allows to achieve and maintain a favourable conservation status taking into account all life stages of the population.
	Common Indicator 5: Population demographic characteristics (EO1, e.g., body size or age class structure, sex ratio, fecundity rates, and survival/mortality rates related to marine mammals, seabirds, marine reptiles).	Marine mammals: *Cetaceans:* species populations are in good condition: low human-induced mortality, balanced sex ratio, and no decline in calf production. *Monk seal:* species populations are in good condition: low human-induced mortality, appropriate pupping seasonality, high annual pup production, balanced reproductive rate, and sex ratio. Seabirds: Species populations are in good condition: natural levels of breeding success and acceptable levels of survival of young and adult birds. Marine reptiles: Low mortality induced by incidental catch; favourable sex ratios and no decline in hatching rates.

Table 3.2. Selected habitat types and species for the initial GES assessment for Albania.
Based on IMAP, 2016 and National integrated monitoring programme for Albania, 2020

Criteria element	Selected habitat types and species
HABITATS	
Benthic habitats	Posidonia meadows – *Posidonia oceanica* as representative species
	Coralligenous assemblages – *Corallium rubrum* as representative species
	Photophilic algal communities and species belonging to genus *Cystoseira* – *Cystoseira amantacea* as representative species
Pelagic habitats	Phythoplankton
	Zooplankton
SPECIES	
Marine mammals	*Tursiops truncatus*
	Stenella coeruleoalba
Marine reptiles	*Caretta caretta*
Seabirds	*Calonectris diomedea**
	*Puffinus yelkouan**
	*Phalacrocorax aristotelis**
	*Larus audouinii**
	Larus genei (B)
	Sterna albifrons (B)

**True seabird species, wintering species in Albania. B = breeding species*

Table 3.3. Criteria and methodological standards for GES assessment for EO1 Biodiversity in marine and adjacent coastal area of Albania. *Based on: IMAP, 2016; Barcelona Convention 19th COP Decision IG.22/7, 2016; Commission Decision (EU) 2017/848; NIMP for Albania, 2020; Update on marine strategy documents in Croatia, 2019.* EO = Ecological objective, CI = Common indicator

Criteria elements	**Criteria** ***Indicator with related GES definition (minimum requirements for achieving GES)***	***Indicator measurement and thresholds***	**Methodological standards** ***Scale of assessment***	***Use of criteria***
Benthic habitats (relating to EO1 and EO6)				
Selected priority benthic habitats and relevant species: ▪ Photophilic algal communities and species belonging to genus *Cystoseira – Cystoseira amantacea* ▪ Posidonia meadows – *Posidonia oceanica* ▪ Coralligen assemblages – *Corallium rubrum*	Benthic habitat distributional range EO1, CI1 **GES definition IMAP:** The habitat is present in all its natural range.	*For Photophilic algal communities* **What is measured:** CARLIT index. **Thresholds:** CARLIT index assessed as „very good“, „good” or „moderate“ conditions for coastal waters (as defined under the Directive, 2000/60/EC, Annex V).	National level assessment	CARLIT index should be measured and assessed against indicated threshold. „very good“, „good“ or „moderate“ values are considered as GES.
		For Posidonia meadows **What is measured:** Changed POMI index of Directive, 2000/60/EC. **Thresholds:** Changed POMI index assessed as „very good“, „good“ and „moderate“ conditions for coastal waters.	National level assessment	Changed POMI should be implemented (as it is in Croatia) and density of seagrass meadow, coverage, depth and type of lower limit will be measured. Values of “very good”, “good” and “moderate” thresholds are evaluated according to RAC SPA 2014 document.
		For coralligen assemblages **What is measured:** *C. rubrum* distribution and abundance trend. **Thresholds:** *C. rubrum* distribution and abundance is stable or increasing and not less than favourable conservation status values (to be determined).	National level assessment	Thresholds for coralligen assemblages with *C. rubrum* should be determined, and where possible, GES should be assessed against them.
	Benthic habitat condition EO1, CI2 **GES definition IMAP:** The population size and density of the habitat-defining species, and species composition of the community, are within	*For Photophilic algal communities* **What is measured:** CARLIT index. **Threshold:** CARLIT index assessed as „very good“, „good” and “moderate” conditions for coastal waters (as defined under the Directive, 2000/60/EC, Annex V).		

Criteria elements	Criteria *Indicator with related GES definition (minimum requirements for achieving GES)*	*Indicator measurement and thresholds*	Methodological standards *Scale of assessment*	*Use of criteria*
	reference conditions ensuring the long-term maintenance of the habitat.	*For Posidonia meadows* **What is measured:** Changed POMI tool of Directive, 2000/60/EC. **Threshold:** Changed POMI index assessed as „very good ", „good" and „moderate" conditions for coastal waters. *For coralligen assemblages* **What is measured:** Structure and functionality of coralligen assemblages (*C. rubrum*). **Threshold:** Threshold for structure and functionality of coralligen assemblages (*C. rubrum*) are not yet determined.		
Pelagic habitats (relating to EO1, EO4 and EO5)				
Selected priority pelagic habitats: ▪ *Phythoplankton* ▪ *Zooplankton*	Pelagic habitat condition EO1, CI2 **GES definition IMAP:** The population size and density of the habitat-defining species, and species composition of the community, are within reference conditions ensuring the long-term maintenance of the habitat.	*For Phytoplankton* **What is measured:** ▪ Composition (species groups), and abundance ▪ Composition and abundance trend (Box-isker overview) ▪ Margalef, Shannon, Pielou, and Simpson indexes (MSPS) for diversity of phytoplankton (Box-whisker overview) ▪ Trend in blooming of plankton In general, a 6-year data series would be most appropriate for GES assessment. **Thresholds:** ▪ MSPS indexes indicate relatively high phytoplankton biodiversity ▪ Low blooming rate, declining blooming trend *For Zooplankton* **What is measured:** ▪ Composition and abundance of meso-zooplankton ▪ Composition and abundance trends	National level of assessment	All proposed elements should be measured per each selected group of pelagic habitats and assessed against the proposed thresholds, in each assessed area. Based on outcomes, it should be estimated whether the GES is achieved or not.

Criteria elements	Criteria *Indicator with related GES definition (minimum requirements for achieving GES)*	*Indicator measurement and thresholds*	Methodological standards *Scale of assessment*	*Use of criteria*
		▪ Ratio of holo- and mero-zooplankton (this ratio could be linked to impacts of climate change) ▪ Ratio of juvenile and adult individuals in copepods ▪ Biodiversity indexes of dominant group; Copepods In general, six years data series would be most appropriate for GES assessment. **Thresholds:** ▪ Composition and abundance trend as expected naturally ▪ Holoplankton dominated in holo-and mero-zooplankton ratio ▪ Juvenile individuals are in higher abundance in ratio juvenile/adults ▪ Number of Copepoda species, Margalef, Shannon-Wienerov biodiversity, Pielou, and Simpson dominance indexes indicate relatively high biodiversity		
SPECIES				
Selected group of species: **Marine mammals** ▪ *Tursiops truncatus* ▪ *Stenella coeruleoalba* **Marine reptiles** ▪ *Caretta caretta* **Seabirds**	**Species distributional range** EO1, CI3 ***GES definition IMAP Marine mammals***: The species are present in all their natural distributional range. ***GES definition IMAP Marine reptiles:*** The species continues to occur in all its natural range in the Mediterranean, including nesting, mating, feeding, and wintering and developmental sites (where different to those of adults). ***GES definition IMAP Seabirds***: The distribution of seabird species continues to occur in all their Mediterranean natural habitat Biological diversity	***For all selected species*** **What is measured:** Species distributional range and pattern. **Thresholds:** Species distributional range and pattern correspond to ones expected naturally. For cetaceans and marine turtles in the Adriatic the reference values are those recorded during the 2010 and 2013 summer season aerial surveys.	For cetaceans, marine turtles, and wintering seabirds – primarily Adriatic (sub-regional) level assessment should be made. For breeding birds – national level assessment.	In the absence of certain sub-regional thresholds, a baseline national overview could be made as a starting point for future sub-regional GES assessment.

Criteria elements	Criteria *Indicator with related GES definition (minimum requirements for achieving GES)*	*Indicator measurement and thresholds*	Methodological standards *Scale of assessment*	*Use of criteria*
▪ *Calonectris diomedea (W)* ▪ *Puffinus yelkouan (W)* ▪ *Phalacrocorax aristotelis (W)* ▪ *Larus audouinii (W)* ▪ *Larus genei (B)* ▪ *Sterna albifrons (B)* Note: Wintering true seabird species are included (W) and coastal – breeding species (B).	is maintained. The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic, and climatic conditions.			
	Population abundance EO1, CI4 *GES definition IMAP Marine Mammals*: The species population has abundance levels allowing it to qualify for Least Concern Category of IUCN or has abundance levels that are improving and moving away from the more critical IUCN category. *GES definition IMAP Marine reptiles*: Population size allows to achieve and maintain a favourable conservation status, taking into account all life stages of the population. *GES definition IMAP Seabirds*: Population size of selected species (of seabirds) is maintained. The species population has abundance levels allowing to qualify to Least Concern Category of IUCN (less than 30% variation over a time period equivalent to 3 generation lengths).	*For all selected species* What is measured: Population abundance trend. Thresholds: Population abundance has levels allowing to qualify to Least Concern Category of IUCN. For cetaceans and marine turtles in the Adriatic the reference values are those recorded during the 2010 and 2013 summer season aerial surveys.	For cetaceans, marine turtles, and wintering seabirds – primarily Adriatic level assessment (sub-regional) should be made. For breeding bird species – national level assessment.	The population abundance should be assessed individually for each species at the Adriatic (sub-regional) level. In the absence of sub-regional thresholds, a baseline national overview could be made as a starting point for future sub-regional GES assessment.
	Population demographic characteristics EO1, CI5 EO3, CI12 *GES definition IMAP Marine Mammals:* Species populations are in good condition: low human-induced mortality, balanced sex ratio and no decline in calf production. *GES definition IMAP Marine reptiles*: Low mortality induced by incidental catch, Favourable sex ratio and no decline in hatching rate.	*For marine mammals and marine turtles* What is measured: ▪ Trend in number of incidentally by-caught animals per group of species (at least a 6-year period) ▪ Sex ratio ▪ For mammals – calf production Thresholds:	National level assessment	The extent to which GES has been achieved should be expressed for each area assessed as level of change of mortality trend per species. Any increase in mortality could be described as non-GES. The sex ratio and calf production (marine mammals), breeding success and survival rate of young birds should be assessed for each species, on the basis of the criteria selected for

Criteria elements	Criteria *Indicator with related GES definition (minimum requirements for achieving GES)*	*Indicator measurement and thresholds*	Methodological standards *Scale of assessment*	*Use of criteria*
	GES definition IMAP Seabirds: Species populations are in good conditions: natural levels of breeding success and acceptable levels of survival of young and adult birds.	▪ Mortality trend is stable or declining at national level ▪ Balanced sex ratio ▪ For mammals, no decline of calf production due to human influence *For seabirds* **What is measured:** ▪ Trend in number of incidentally by-caught animals per group of species (at least a 6-year period) ▪ Survival of young and adult birds (breeding success) **Thresholds:** ▪ Mortality trend is stable or declining at national level ▪ Natural levels of breeding success		use. If the proposed thresholds are achieved, it indicates GES.

EO1 GES assessment

Habitats: Benthic habitats

As already indicated, GES assessment is focused on three selected benthic habitat types: photophilic algal communities and species (the genus *Cystoseira* as atypical genus), *Posidonia* meadows (*Posidonia oceanica* as a typical species), coralligenous assemblages (*Corallium rubrum* as a typical species) and for pelagic habitats, phytoplankton and zooplankton.

The **photophilic algae communities'** most relevant species of conservation interest and GES indicators (Ballesteros *et al., 2*007) are the long-lived species *Lithophyllum byssoides* (Rhodobionta, Archaeplastida) and *Cystoseira* spp. (Phaeophyceae, Stramenopiles), which are usually regarded as sensitive to pollution and coastal development. Among the *Cystoseira*, *C. amentacea* (= *C. stricta* and *C. spicata*) is a species widely distributed in the Mediterranean Sea (Blanfuné *et al., 2*016). Other species belonging to the habitat known as "fucal forest" in Albania are *Cystoseira barbata, C. crinita, C. compressa, C. corniculata,* and *Sargassum vulgare.* An assessment of distribution and state of conservation of the *Lithophyllum byssoides* rims, the *Cystoseira amentacea* stands and shallow subtidal communities, as well as the ecological status of coastal waters of the region by means of the CARLIT method, was carried out along the coastline of Sazani Island and Karaburuni Peninsula (Blanfuné, *et al., 2*016). From this assessment it was evident that *Cystoseira amentacea* is well-distributed on the western and northern sides of the Karaburuni Peninsula and the western part of Sazani Island. On the eastern side of the Karaburuni Peninsula, *C. amentacea* populations are less continuous and are replaced southwards by *C. compressa*. Still, no time series do exist to measure distribution and other trends and available data are limited to few descriptive studies of existing and proposed marine protected areas (MPAs).

Although there were no national studies for the photophilic algal communities in the selected areas that are proposed for the monitoring, the main assumed pressures for this community are:

- coastal erosion;
- urban and tourism-related pollution;
- tourist infrastructure;
- aquaculture; and
- illegal fishery activities.

The majority of the data and studies on benthic habitats are related to the ***Posidonia* meadows**. As part of the studies carried out in Albania, in total, 11 *Posidonia* meadows have been identified, located in the area between Cape Rodon (northern boundary) and Cape Stillo (southern limit). The results of the mapping of *Posidonia* meadows in Albania show that this habitat covers ca. 4,803 ha of the shallow coastal area (Kashta *et al., 2*008; Pititto *et al., 2*009; Maiorano *et al., 2*011; SPA/RAC (ed.), 2014; Telesca. *et al., 2*015; Andromede Oceanology, 2016). Large *Posidonia* meadows are found along the Adriatic coast, forming isolated beds around Rodoni Cape, Porto Romano, and Vlora Bay. However, the meadows in the Adriatic part are very affected and hence almost inexistent from Velipoja to Rodoni Cape and from Durrës to Vlora. Continuous and healthy meadows are found almost throughout the Ionian coastline, from Palasa in the Himara area to the southern Albanian border (Stillo Cape). There is no regular time series and regular available data to know trends and changes in distribution and composition.

The main pressures for the *Posidonia* meadows on the Albania coastline are human activities and related pollution, the latter especially present near the ports and coastal industrial areas. All these factors have altered the lower depth limit for this community and/or in the dynamics of the dead meadows (*matte morte*). *Posidonia oceanica* is included on the Red List of Wild Flora and Fauna of Albania, approved by Ministerial Order No. 1280, 20.11.2013, as vulnerable (VU). The meadows are also protected from trawling by a national fishery ban (trawling is forbidden at less than 3 nautical miles from the coastline or in waters less than 50 m depth) (Law n° 64/2012, dated 31.5.2012, "On fishery", amended, VKM n° 402, dated 8.5.2013 and on Regulation n° 1/2014).

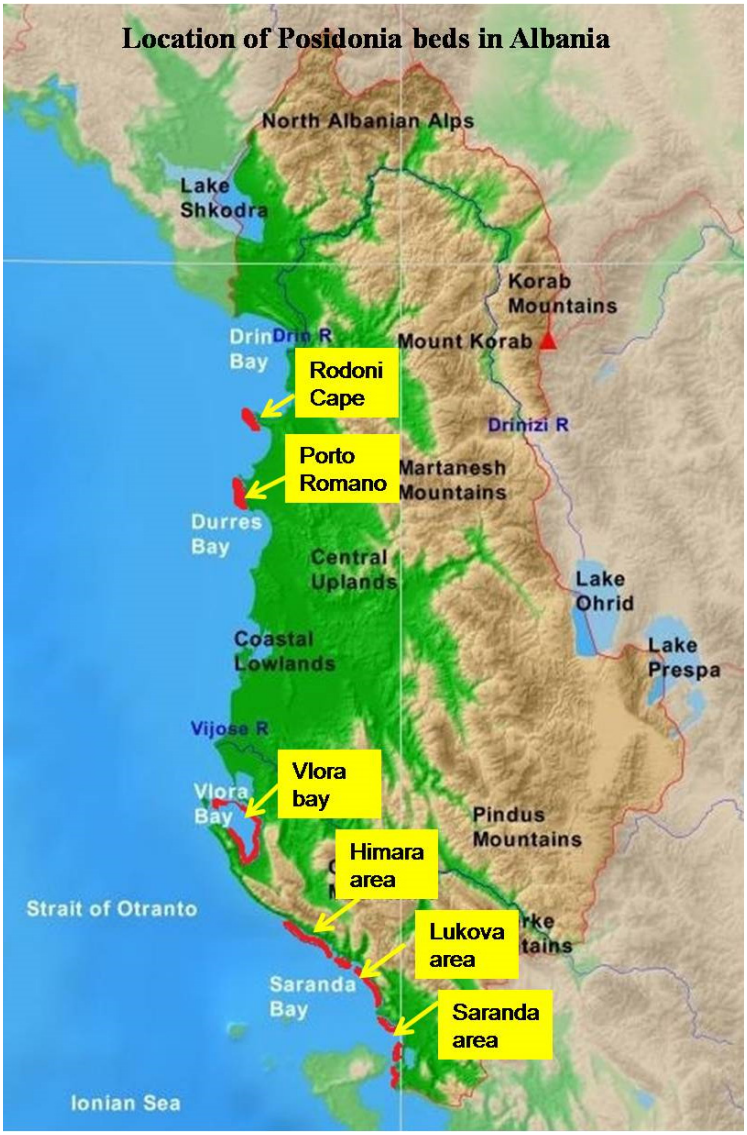


Figure 3.1. Distribution of Posidonia oceanica in Albania based on literature data. *Sources: Kashta et al., 2005; Pititto et al., 2009; INCA – GEF/SGP, 2010; Maiorano et al., 2011; RAC/SPA (ed.), 2014; Andromede Oceanology, 2016*

In Albania, the baseline data on **coralligenous assemblages** are scarce, and complete distributions of this habitat is still unknown. The only scientific survey aimed at studying and mapping of coralligenous assemblages was carried out in April 2016 at the National Marine Park of Karaburun-Sazan (Andromede Oceanology, 2016). Other data are sporadic as they come from studies that did not specifically focus on coralligenous habitats, and did not follow any standardised approach. A list of typical/indicator species occurring within the coralligenous habitat along the Albanian part of the Adriatic Sea has been compiled mainly according to the 2016 study (Andromede Oceanology, 2016) and classified according to UNEP/MAP-SPA/RAC (2011) and Garrabou *et al.* (2014) as shown in Table 3.4.

Coralligenous assemblages are under pressure by direct and indirect human activities, which affect the stability of this precious ecosystem and thus strongly compromise their future maintenance. The effects of climate change, direct or indirect man-induced disturbances (mechanical damage), and the synergistic effects of these stressors are impacting these coralligenous assemblages. Due to lack of or limited existing and available data, it was not possible to carry out GES assessment of benthic habitats, as shown in Table 3.5.

Table 3.4. A list of typical/indicator species of coralligenous habitats in Albania. *Source: Andromede Oceanology, 2016*

Role in the corallgen habitat	Taxa
Algal builders	Rhodophyta ▪ Coralline algae: *Mesophyllum* sp., *Lithophyllum* sp. ▪ Encrusting *Peyssonnelia* spp.
Animal builders	Bryozoans ▪ *Myriapora truncata* ▪ *Pentapora fascialis* ▪ *Smittina cervicornis* ▪ Schizomavella mamillata Serpulids ▪ *Filograna* sp. Scleractinians ▪ *Caryophyllia inornata* ▪ *Leptopsammia pruvoti* ▪ *Madracis pharensis*
'Agglomerative' animals	Sponges ▪ *Geodia* sp. Bryozoans
Bioeroders	*Sponges* ▪ *Cliona viridis* *Echinoids* ▪ *Sphaerechinus granularis*
Species of particular importance (particularly abundant, sensitive, architecturally important or economically valuable)	Rhodophyta *Uncalcified Peyssonnelia spp.* Chlorophyta *Halimeda tuna* Sponges ▪ *Crambe crambe* ▪ *Hemimycale columella* ▪ *Chondrosia reniformis* ▪ *Petrosia ficiformis* ▪ *Axinella cannabina* ▪ *Axinella polypoides* Gorgonians ▪ *Paramuricea clavata* ▪ *Eunicella cavolini* ▪ *Corallium rubrum* Tunicates ▪ *Halocynthia papillosa*
Invasive species	Chlorophyta ▪ *Caulerpa cylindracea* Rhodophyta ▪ *Womersleyella setacea*

Table 3.5. Assessment of GES for benthic habitats in Albania, based on selected habitat types

Criteria Indicator	GES definition	GES Assessment *Posidonia meadows*	*Photophilic algae*	*Coralligen assemblages*
Benthic habitat extent	The habitat is present in all its natural range.	Not possible to assess GES due to lack of systematically collected data.		
Benthic habitat condition	The population size and density of the habitat-defining species, and species composition of the community, are within reference conditions ensuring the long-term maintenance of the habitat.	Not possible to assess GES due to lack of systematically collected data.		

Habitats: Pelagic habitats

Pelagic habitats, represented by phyto- and zooplankton, are crucial for functioning of the marine ecosystem, particularly as a food base for a number of species. Hence, even though pelagic habitats are not the focus of IMAP GES assessment of EO1 Biodiversity, they will be addressed.

During the last three decades, the studies focused on the microscopic organisms, such as phytoplankton or periphyton community, have been carried in Albanian coastal wetlands and adjacent marine habitats, mainly in the wetlands of Butrint, Narta, Karavasta, and Patok. Already more than 930 taxa of microscopic organisms have been recorded in these areas. However, the studies for the phytoplankton in marine waters are very limited. From a study carried out in 2006 (Saracino and Rubino, 2006), a total of 119 phytoplankton counting categories was recognised (98 of them were identified to the species level, 13 to the genus level, while 8 remained undetermined). In the whole southern Adriatic Sea, the phytoplankton is dominated by the nanoplanktonic component, mostly represented by phytoflagellates < 10 µm. This is typical for oligotrophic systems and the previous studies carried out in this area (Viličić *et al., 2*002) already showed the oligotrophic character of this sub-basin, strongly reflected in the phytoplankton assemblages, both in terms of low densities and nanoplankton dominance.

Low nutrient concentrations influence relatively low productivity not only above the Albanian shelf but also further to the north along the Montenegrin and Croatian coastal Adriatic Sea (Viličić *et al., 2*010).

Very few studies have been carried out related to zooplankton as well. According to a study of 2012 (Miloslavić *et al., 2*012), the highest total microzooplankton abundance of 63 individuals/L was noted at the surface and then abundances decreased with depth, and towards the open sea; 14 tintinnid species were recorded. In the same study a total of 97 meso-zooplankton taxa was identified with the highest species richness was found in the deep layer.

Due to lack of or limited existing and available data, it was not possible to carry out the GES assessment of pelagic habitats, as shown in Table 3.6.

Table 3.6. Assessment of GES for pelagic habitats in Albania, based on selected habitat types

Criteria Indicator	GES definition	GES Assessment *Phytoplankton*	*Zooplankton*
Pelagic habitat condition	The population size and density of the habitat-defining species, and species composition of the community, are within reference conditions ensuring the long-term maintenance of the habitat.	Not possible to assess GES due to lack of systematically collected data.	

Species: Marine mammals – Cetaceans

Ten species of Cetaceans were recorded in Adriatic Sea, with four regulars in the southern Adriatic: bottlenose dolphin (*Tursiops truncatus*), stripped dolphin (*Stenella coeruleoalba),* Cuvier's beaked whale (*Ziphius cavirostris*) and Risso's dolphin (*Grampus griseus*) (Table 3.7). The Mediterranean monk seal (*Monachus monachus*) is occasionally observed in the Albanian waters, with the last known record of one specimen spotted in Vlora Bay in March 2019.

Bottlenose and striped dolphins, the two cetacean species selected for the GES assessment, are present in relatively large numbers and all year-round (see Figures 3.2. and 3.3). The striped dolphin is considered the most abundant species in the Mediterranean Sea, which appears also to be the case in the Adriatic Sea, although it is regularly present only in the southern Adriatic, in the depths more than 300 m (Fortuna *et al., 2*015).

Table 3.7. Cetacean species recorded and confirmed in the Adriatic Sea. *Source: Fortuna et al., 2015*

Species scientific name	Species common name	Current occurrence in the Adriatic
Tursiops truncatus	Common bottlenose dolphin (hereafter bottlenose dolphin)	Regular
Stenella coeruleoalba	Striped dolphin	Regular (southern Adriatic), occasional (northern and central Adriatic)
Delphinus delphis	Common dolphin	Rare visitor
Ziphius cavirostris	Cuvier's beaked whale	Regular
Grampus griseus	Risso's dolphin	Regular (southern Adriatic)
Balaenoptera physalus	Fin whale	Seasonally regular (central and southern Adriatic)
Physeter macrocephalus	Sperm whale	Rare visitor (all basin), potentially regular (southern Adriatic)
Pseudorca crassidens	False killer whale	Not occurring
Globicephala melas	Long-finned pilot whale	Not occurring
Megaptera novaeangliae	Humpback whale	Rare visitor or not occurring

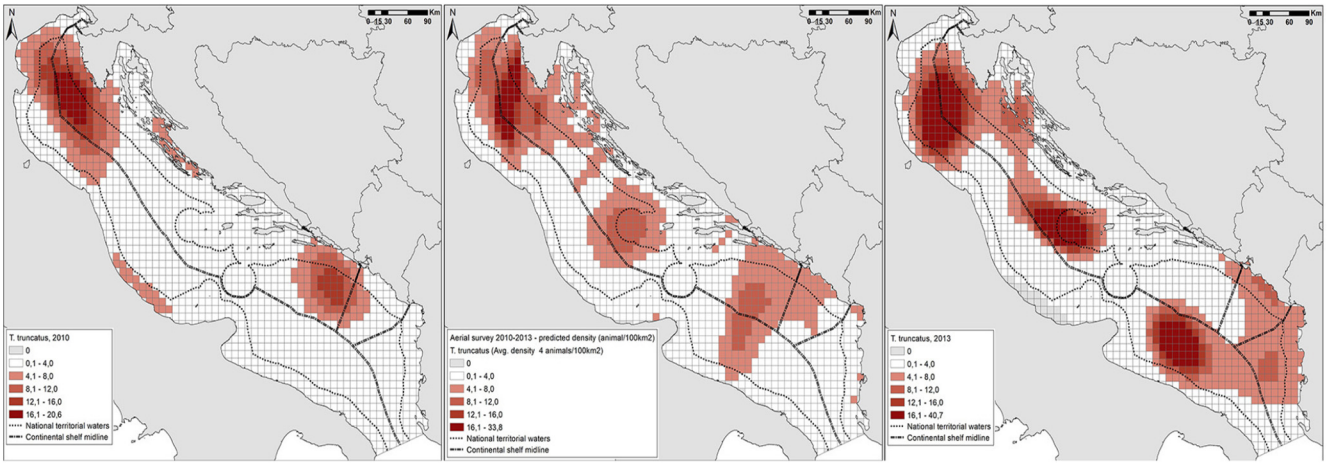


Figure 3.2. Bottlenose dolphin densities for the data from 2010 (left); 2010–2013 (centre), and 2013 (right). The scales represent below average (white), and then up to twice, up to three times, up to four times, and greater than four times the average (shades of dark red). *Source: Fortuna et al., 2018*

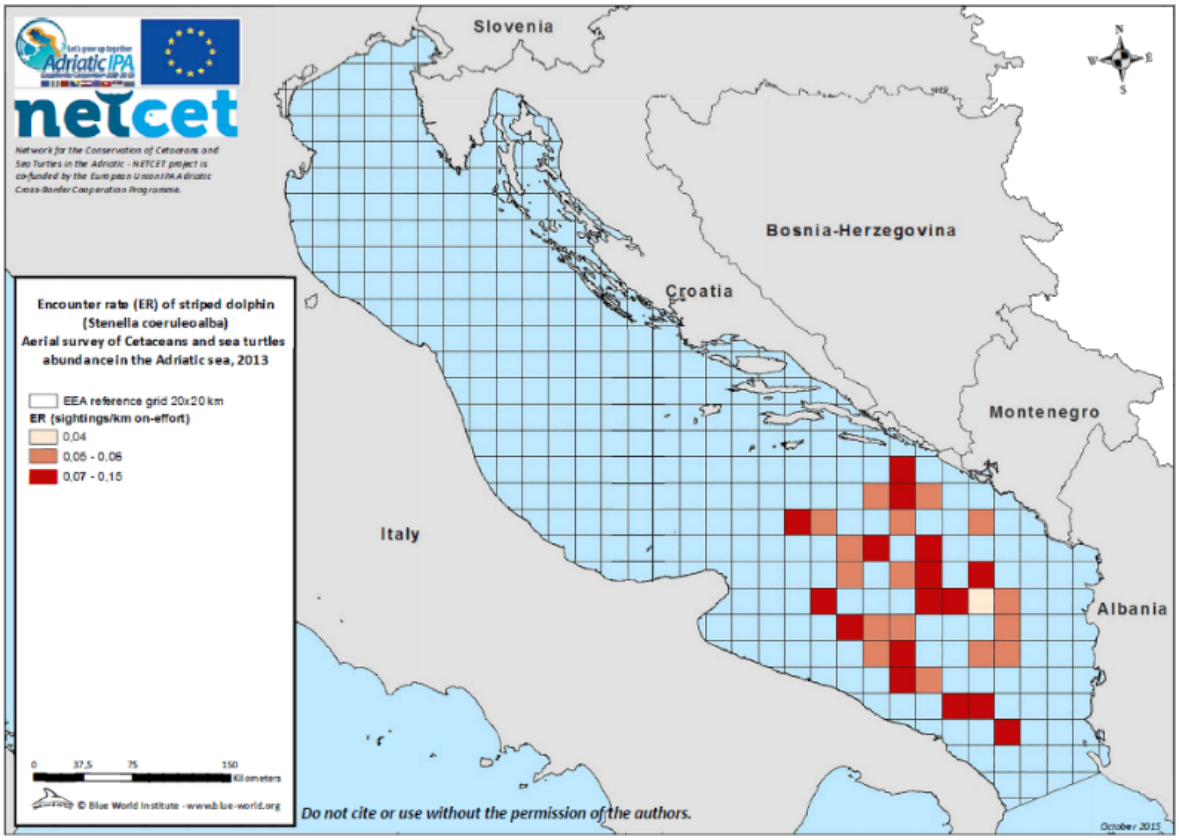


Figure 3.3. Striped dolphin encounter rates from aerial survey data of 2013. *Source: Holcer and Fortuna, 2015*

Based on combined results of the first two aerial surveys, carried out in the summers of 2010 and 2013, 5,700 specimens of bottlenose dolphin are estimated in the entire Adriatic, with 0.042 specimen per km^2; out of this 1,800 specimens are in the southern Adriatic or 0.032 specimen per km^2. The relative density estimated both in Albanian territorial waters and Albanian continental shelf margin (CMS) are slightly below the relative density in the southern Adriatic (Table 3.8). Estimated abundance of striped dolphins in 2010 is minimally 15,343 individuals and 41,533 in the 2013 survey (Fortuna *et al.,* 2015). The third aerial survey was carried out in 2018 in the scope of the ACCOBAMS Survey Initiative (ASI) project, but the data are still being processed. As for other data relevant for Albania, information is lacking on population demographics, particularly the incidental mortality rate. There were no assessments of conservation status of bottlenose and striped dolphins at the Adriatic Sea level yet, such as regional assessments based on the IUCN criteria.

Table 3.8. Population abundance estimates of bottlenose dolphin (*Tursiops truncatus*) in the Adriatic Sea and in Albanian waters based on 2010 and 2013 summer aerial surveys. *Source: Fortuna et al., 2018*

Stratum	*Tursiops truncatus*		
	Abundance (N)	(CI=confidence interval)	Relative density (ind/km^2)
Adriatic	5,700	(CIs = 4.300 – 7.600)	0.042
North	2,600	(Cis = 2.200 – 2.900)	0.057
Central	1,100	(Cis = 800 – 1.500)	0.034
South	1,800	(Cis = 1.500 – 2.400)	0.032
Non-EU 12 nm – Albania	100	(CI = 40-200)	0.023
Non-EU CSM* – Albania	300	(CI = 100-1.000)	0.031

**Continental shelf margin*

The main pressures to cetaceans at the Adriatic level are interactions with fisheries – bycatch and marine litter (Table 3.9). Climate change is a powerful driver of negative impacts, with medium intensity in the southern Adriatic (UNEP/MAP SPA/RAC, 2015). Cumulative impacts of anthropogenic activities on species are also of concern. National level specificities regarding pressures and impacts are still not known.

For several indicators it was not possible to assess GES, due to lack of or limited existing and available data (Table 3.10). For population abundance and species distribution specifically, data from two closely implemented aerial surveys show no decline or negative trends in general. Still, in the absence of longer data series, it is too early to draw conclusions about GES. The results of the ASI 2018 and future aerial surveys should enable future GES assessment.

Table 3.9. Summary of main pressures and impacts to cetaceans and marine turtles in the Adriatic Sea. *Source: Fortuna et al., 2015*

Pressure	Impact type	Significance	Species affected
Fishery – bycatch	Direct mortality	High	All cetaceans and marine turtle species
Marine litter	Direct mortality	Medium/High	All cetaceans and marine turtle species
Seasonal tourism	Behavioural changes	Medium	Bottlenose dolphin, low impact on marine turtles (still)
Oil and gas exploration	Behavioural changes, direct and indirect mortality	Medium	All cetaceans, possibly marine turtles
Chemical pollution	Indirect and direct mortality	Medium	All cetaceans and marine turtle species
Fishery – depredation	Behavioural changes, direct mortality	Low	Bottlenose dolphin
Biological pollution	Direct mortality	Low	Bottlenose and striped dolphins, sperm whale

Table 3.10. Assessment of GES for Cetaceans in Albania, based on selected species

Criteria		GES Assessment	
Indicator	GES definition	*Tursiops truncatus*	*Stenella coeruleoalba*
Species distributional range	The species are present in all their natural distributional range.	Not possible to assess GES. There is no long-time data series to allow measurement of species distributional range and patterns. Even if the data gathered in 2 closely implemented aerial surveys do not indicate any decline, it is too early to conclude that species distributional range meets the GES.	
Population abundance	The species population has abundance levels allowing it to qualify for Least Concern Category of IUCN or has abundance levels that are improving and moving away from the more critical IUCN category.	Not possible to assess GES. There is no long-time data series to allow measurement of population abundance trends. Even if the data gathered in 2 closely implemented aerial surveys do not indicate any decline, it is too early to assume whether this means that anthropogenic pressures have not significantly impacted the population abundance and whether GES is achieved.	
Population demographic characteristics	Species populations are in good condition: low human induced mortality, balanced sex ratio and no decline in calf production.	Not possible to assess GES due to lack of data on human mortality, sex ratio and calf production.	

Marine reptiles – marine turtles

Three species of marine turtles are recorded in the Albanian waters ranked in order of abundance:

- the loggerhead turtle (*Caretta caretta*);
- the green turtle (*Chelonia mydas*); and the leatherback turtle (*Dermochelys coriacea*).

Presence of the Hawksbill Turtle (*Eretmochelys imbricata*) was recorded only once, in 1997.

Due to its relatively high abundance and presence in almost any part of the Adriatic Sea, as well as a species present in the list of protected species, the loggerhead turtle (*Caretta caretta*) is a suitable component for the assessment and monitoring of GES.

The northern and central Adriatic represent some of the largest neritic habitats and pelagic habitats are present in the parts of Ionian and southern Adriatic Sea (UNEP/MAP-SPA/RAC, 2015). Furthermore, recent research showed that loggerhead turtles inhabiting the Adriatic dominantly belong to Greek nesting population (75%). Indeed, several studies has determined important areas for over-wintering, foraging and development grounds for C. Caretta in Albania (Haxhiu & Rumano, 2005; 2006; White *et al., 2*008; 2009; 2010; Saçdanaku & Haxhiu, 2012; Saçdanaku & Haxhiu, 2013).

Information on nesting activity in Albania was mainly anecdotal, until the first empirical evidence was recorded in 2017 (Sacdanaku and Rae, 2019). Although no nesting was recorded afterwards, number of beaches were identified as potential nesting sites. Combined data from previously mentioned 2010 and 2013 summer aerial surveys in the Adriatic Sea, show the northern Adriatic is the most abundant area for loggerhead turtle, with the estimated 18,200 of 27,000 specimens in the entire Adriatic (Fortuna, Canadas *et al., 2*018) (Table 3.11; Figures 3.4 and 3.5).

Relative density in the southern Adriatic is below the Adriatic average, with 0.114 specimen/km^2, and measured relative density in Albanian waters is even lower, particularly in Albanian territorial waters. As previously mentioned, third aerial survey was carried out in 2018 in the scope of the ASI project, but the data are still being processed. In addition, knowledge about marine turtles should be improved through implementation of the ongoing LIFE EUROTURTLES project.

Table 3.11. Population abundance estimates of loggerhead turtle (*Caretta caretta*) in the Adriatic Sea and in Albanian waters based on 2010 and 2013 summer aerial surveys. *Source: Fortuna, Canadas et al., 2018*

Stratum	*Caretta caretta*		
	Abundance (N) (CI=confidence interval)		Relative density (ind/km^2)
Adriatic	27,000	(Cis = 24.000 – 31.000)	0.203
North	18,200	(Cis = 17.700 – 20.000)	0.405
Central	1,900	(Cis = 1.600 – 2.200)	0.057
South	6,300	(Cis = 5.000 – 7.500)	0.114
Non-EU 12 nm – Albania	200	(Cis = 100 – 300)	0.041
Non-EU CSM* – Albania	700	(Cis = 300 – 1.000)	0.074

**Continental shelf margin*

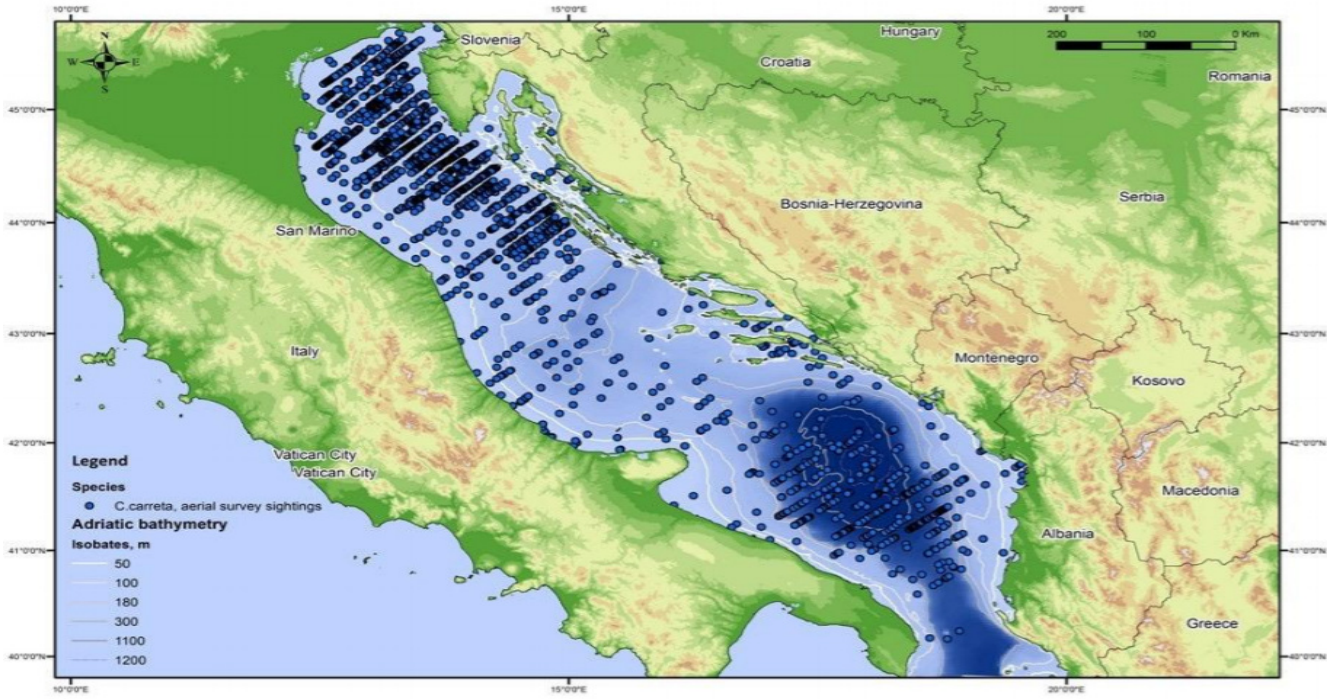


Figure 3.4. Map of sightings of (mostly) loggerhead turtles during 2010 and 2013 summer aerial surveys. *Source: UNEP-MAP-SPA/RAC, 2015*

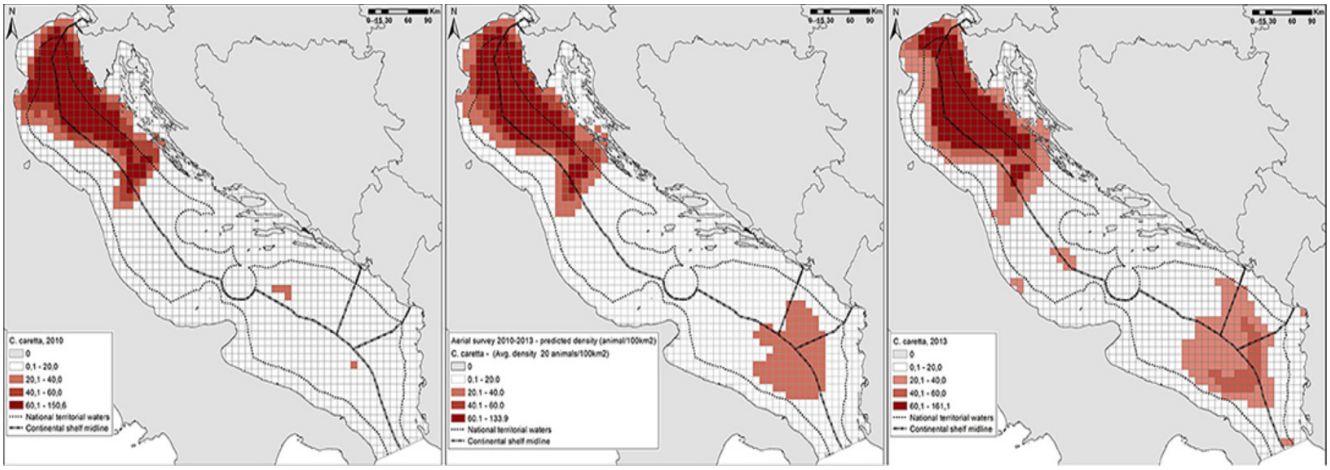


Figure 3.5. Loggerhead turtle densities for the data from 2010 (left); 2010–2013 (centre), and 2013 (right). The scales represent below average (white), and then up to twice, up to three times, up to four times and greater than four times the average (shades of dark red). *Source: Fortuna et al., 2018*

Studies on sea turtles in Albania have started after 2002 (Haxhiu 2011). Before this period, data on sea turtles (studies and publications), had been very scarce and sporadic. Drini Bay (northern Albania) is a regionally and nationally important habitat that is used by sea turtles for foraging, as a refuge and as part of a key migratory corridor between the Ionian and Adriatic Seas, while the presence of marine turtles in Vlora Bay shows that they use this area as a migratory corridor (Sacdanaku and Haxhiu, 2015).

As for other data relevant for Albania, information is lacking on population demographics and human-induced mortality. There were no assessments of conservation status done at the Adriatic Sea level yet, such as regional assessment based on the IUCN criteria.

The main pressures on marine turtles are fishery by-catch and marine litter (Table 3.8). Despite few records on loggerhead nesting, there are also potential pressures to the nesting sites, such as tourism-related disturbance or habitat loss. Climate change is a powerful driver of negative

impacts, with medium intensity in the southern Adriatic (UNEP/MAP SPA/RAC, 2015). National level specifics regarding pressures and impacts are still not known. Additionally, sea turtles' distributions and nesting areas may be extremely vulnerable to the future impacts of climate change in the Adriatic and some Albanian beaches are identified as eventual future nesting areas.

For several indicators it was not possible to assess GES due to lack of or limited existing and available data (Table 3.12). For population abundances and species distributions specifically, data from two closely implemented aerial surveys show no general decline or negative trends. Still, in the absence of longer data series, it is too early to draw conclusions about GES. The results of the ASI 2018 and future aerial surveys should provide a better picture of the GES in the future assessments.

Table 3.12. Assessment of GES for marine turtles in Albania, based on selected species

Criteria		GES Assessment
Indicator	GES definition	*Caretta caretta*
Species distributional range	The species continues to occur in all its natural range in the Mediterranean, including nesting, mating, feeding and wintering and developmental (where different to those of adults) sites.	Not possible to assess GES. There is no long-time data series to allow measurement of species distributional range and patterns. Even if the data gathered in 2 closely implemented aerial surveys do not indicate any decline, it is too early to conclude that species distributional range meets the GES.
Population abundance	Population size allows to achieve and maintain a favourable conservation status, taking into account all life stages of the population.	Not possible to assess GES. There is no long-time data series to allow measurement of population abundance trends. Even if the data gathered in 2 closely implemented aerial surveys do not indicate any decline, it is too early to assume whether this means that anthropogenic pressures have not significantly impacted the population abundance and whether GES is achieved.
Population demographic characteristics	Low mortality induced by incidental catch, favourable sex ratio and no decline in hatching rate.	Not possible to assess GES due to lack of data on human induced mortality, sex ratio and balanced sex ratio.

Seabirds

The seabird community in the Adriatic Sea represents only a small fraction of all the seabirds found in the Mediterranean. The small size of the Adriatic Sea and the absence of significant oceanographic features explain the small size of its seabird populations (UNEP/MAP-SPA/RAC, (b) 2015). True seabird species (*Calonectris diomedea*, *Puffinus yelkouan*, *Phalacrocorax aristotelis desmarestii,* and *Larus audouinii*) highly depend on good status of marine environment, because they feed on the sea, mainly on large areas. Main habitats of true seabirds are located in the central and northern part of the Adriatic (Figure 3.6).

These species are not reported to breed in Albania, where they are known only during migration and winter periods.

Some species included in the SPA/BD protocol partly depend upon the marine environment during their life cycle breed in Albania, notably *Larus genei* and *Sterna albifrons,* and these two species are proposed to be included in the list of seabirds to be monitored during the breeding season, while the true seabird species are proposed to be monitored during winter and migration periods.

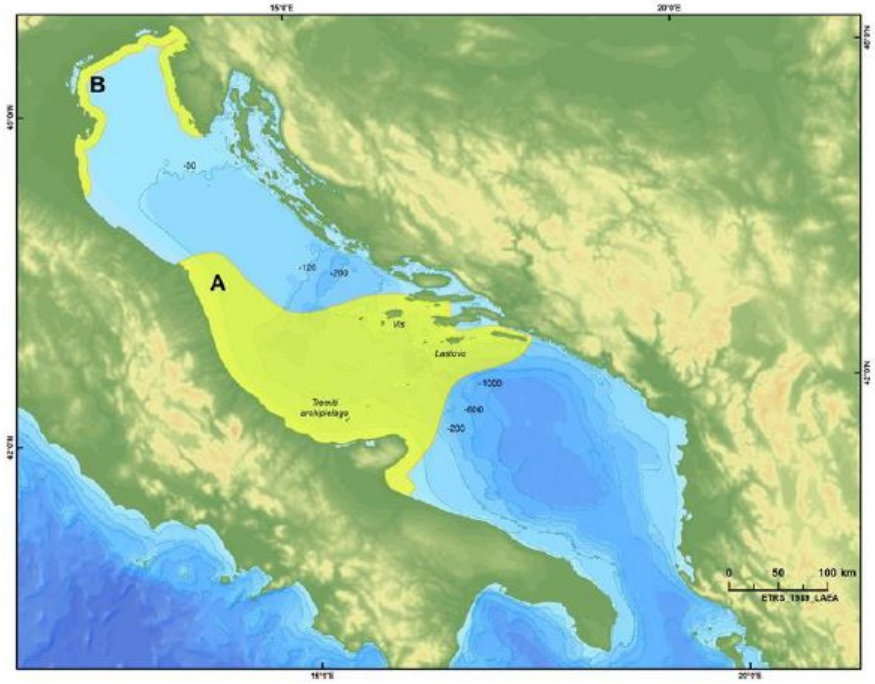


Figure 3.6. View of the study area (Adriatic Sea), showing the Important Areas for the conservation of seabirds proposed. A: Central Adriatic Sea, B: Northern Adriatic Sea. *Source: S. Requena, 2015 for SPA/RAC*

There are some data for the selected sea birds and water birds that have been monitored during the International Waterbird Census (IWC) in Albania since 1995, while for the true seabirds the data are more sporadic. In general, it could be concluded that the existing and available data are insufficient for assessing the GES. Additionally, no quantitative thresholds have been so far defined for seabird populations in Albania.

Due to lack of or limited data on seabirds, it was not possible to assess GES (Table 3.13).

Table 3.13. Assessment of GES for seabirds in Albania, based on selected species

Criteria		**GES Assessment**	
Indicator	**GES definition**	**Wintering species** ▪ *Calonectris diomedea* ▪ *Puffinus yelkouan* ▪ *Phalacrocorax aristotelis* ▪ *Larus audouinii*	**Breeding species** ▪ *Larus genei* ▪ *Sterna albifrons*
Species distributional range	The distribution of seabird species continues to occur in all their Mediterranean natural habitat Biological diversity is maintained. The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions.	**Not possible to assess GES** due to lack of data on species distributional range.	
Population abundance	Population size of selected species (of seabirds) is maintained. The species population has abundance levels allowing to qualify to Least Concern Category of IUCN (less than 30% variation over a time period equivalent to 3 generation lengths).	**Not possible to assess GES** due to lack of data on population abundance.	
Population demographic characteristics	Species populations are in good conditions: Natural levels of breeding success & acceptable levels of survival of young and adult birds.	**Not possible to assess GES** due to lack of data on breeding success and survival rate of young birds, as well as on incidental mortality.	

3.1.b Non-indigenous species (NIS) – EO2

Invasive alien species (IAS) are regarded as one of the main causes of biodiversity loss in the Mediterranean Sea. According to the latest regional reviews, more than 6% of the marine species in the Mediterranean are now considered non-indigenous species (NIS), of which 13.5% are considered as IAS (Zenetos *et al.,* 2012). In the Adriatic Sea the presence of non-indigenous species (NIS) is increasing and their impact on biological and ecological diversity as well as on the economy and human health becomes more significant. The main pathways of NIS introductions into Adriatic Sea are associated with the shipping and corridor pathways (mainly the Suez Canal).

GES criteria and definitions

EO2 Non-indigenous species is a pressure-related objective, which is defined as: *Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystem.* As such, it corresponds to Descriptor 2 of the MSFD. The main criterion for GES assessment of the EO2 is the Common Indicator 6, encompassing trends in abundance, temporal occurrence, and spatial distribution of non-indigenous species, particularly invasive, non-indigenous species, notably in risk areas (Table 3.14).

As with assessing GES for biodiversity, the biggest challenge is selecting the appropriate method to measure indicators and set up thresholds, which is a set of reference values for each indicator against which it would be possible to assess GES characteristics. The main obstacle for assessment for the entire Adriatic region is limited data and still-not-agreed threshold values at sub-regional levels. Hence, it is not possible to assess GES for NIS. However, a national baseline overview of existing and potential newly introduced NIS will be prepared, as a starting point for the future GES assessments.

Table 3.14. Criteria and methodological standards for GES assessment for EO2 Non-indigenous species in marine area of Albania.
Based on: IMAP, 2016; Barcelona Convention 19th COP Decision IG.22/7, 2016; Commission Decision (EU) 2017/848; NIMP for Albania and Update on marine strategy cuments in Croatia, 2019. EO = Ecological objective, CI = Common indicator

Criteria			Methodological standards	
	Indicator with related GES definition (minimum requirements for achieving GES)	**Indicator measurement and thresholds**	**Scale of assessment**	**Use of criteria**
Newly-introduced non-indigenous species introductions, particularly invasive NIS	Trends in the abundance of introduced species, notably in risk areas EO2, CI6 GES definition IMAP: Decreasing abundance of introduced NIS in risk areas.	What is measured: ▪ Number of non-indigenous species newly introduced via human activity, in the 6-year assessment period ▪ Abundance trends of introduced species, particularly of IAS and in risk areas Thresholds: ▪ Thresholds should be agreed at the Adriatic level	Adriatic level (sub-regional)	In the absence of the Adriatic level thresholds, GES assessment could not be performed. However, a baseline national overview of existing and potential newly introduced NIS will be prepared, as a starting point for the future GES assessments.

EO2 GES assessment

A preliminary list of NIS in the Albanian waters includes 35 species, and the predominant groups are the molluscs (12), macroalgae (9), and fish (7) (Table 3.15). The majority of NIS in the Albanian seas were recorded in the last 20 years (Figure 3.7). It should be stressed that these data were collected from different marine expeditions, research surveys, diploma and doctoral theses, scientific papers, and project reports. However, an updated list or database does not exist.

Table 3.15. List of NIS present in Albanian sea. *Source: NIMP for Albania, 2020*

No. and higher taxa	Species	Detection Year
Polychaeta		
1	*Ficopomatus enigmaticus*	1986
Mollusca		
2	*Anadara kagoshimensis*	2001
3	*Arcuatula senhousia*	2011
4	*Brachidontes pharaonic*	2005
5	*Bursatella leachii*	2013
6	*Cellana rota*	2007
7	*Conomurex persicus*	2015
8	*Dendostrea cf folium*	2000
9	*Fulvia fragilis*	2016
10	*Magallana / Crassostrea gigas*	2013
11	*Pinctada imbricata radiata*	2010
12	*Rapana venosa*	2011
13	*Ruditapes philippinarum*	1995
Crustacea		
14	*Callinectes sapidus*	2006
15	*Penaeus aztecus*	2018
16	*Penaeus japonicus*	1994
17	*Percnon gibbesi*	2010
Ascidiacea		
18	*Styela plicata*	2014
Fish		
19	*Hemiramphus far*	1985
20	*Lagocephalus sceleratus*	2015
21	*Parexocoetus mento*	1985
22	*Saurida lessepsianus*	1995
23	*Siganus luridus*	2014
24	*Siganus rivulatus*	2014
Plants		
25	*Aglaothamnion feldmanniae*	2014
26	*Antithamnion nipponicum*	2014
27	*Antithamnionella elegans*	2014
28	*Asparagopsis armata*	2014
29	*Asparagopsis taxiformis*	2005
30	*Caulerpa cylindracea*	1993
31	*Chondria pygmaea*	1974
32	*Colpomenia peregrina*	1986
33	*Halophila stipulacea*	1974
34	*Lophocladia lallemandi*	2010
35	*Womersleyella setacea*	2015

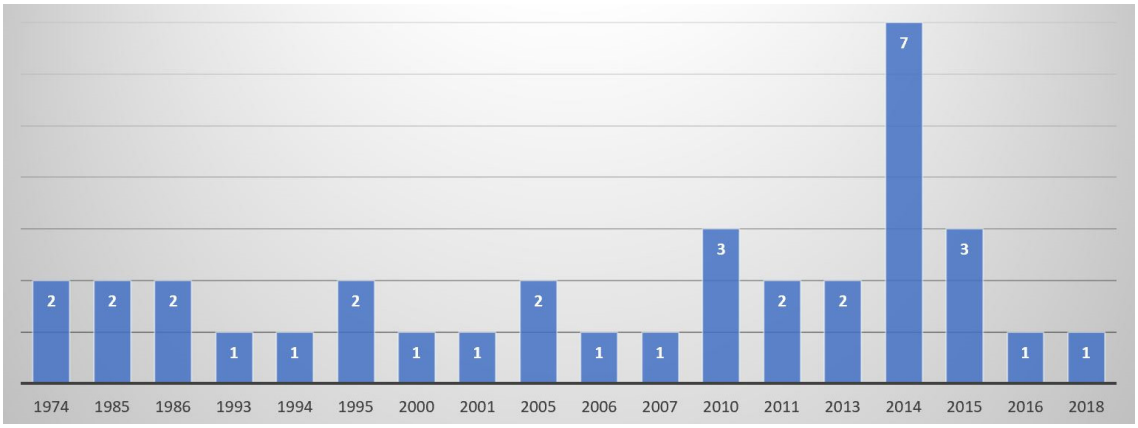


Figure 3.7. Dynamics of newly detected NIS records in Albania. *Based on data from NIMP Albania, 2020*

- Some of the species that should be particularly emphasised are: *Caulerpa cylindracea* is the most widespread invasive species along the Albanian coast. In many areas it seems to have successfully competed with the seagrasses and largely covered benthic habitats, on both hard and soft substrates.
- *Womersleyella setacea* has an invasive character well documented from different parts of the Mediterranean, especially from the Italian coasts (Nikolić *et al.,* 2010). Its turfs significantly reduce the diversity of the epiphytic community on *Posidonia oceanica* rhizomes and also changes the assemblage structure and reduces species richness in coralligenous communities, particularly decreasing the diversity and abundance of other turf algae.
- *Callinectes sapidus* has started its massive and quick distribution along the Albanian coast in 2006 and within a few years it has been established in most coastal lagoons and estuaries of Albania and became a common species in the fish market.
- *Siganus luridus*, first recorded in Albania in 2014, has been observed with a high detection frequency in 2015 along the Ionian coast and in Karaburun Peninsula that is a transitional area between the Ionian Sea and the Adriatic Sea. The grazing behaviour of *S. luridus* negatively impacts the structure of the local algal community, often resulting in the eradication of algae locally.
- *Lagocephalus sceleratus*, observed since 2015, is extremely poisonous if eaten, because it contains tetrodotoxin in its ovaries and to a lesser extent its skin, muscles, and liver, which protects it from voracious predators. It becomes toxic as it eats bacteria that contain the toxin.

A first Horizon Scanning exercise has highlighted the ten species most likely to be introduced in Albania in the near future (Table 3.16).In general, GES for NIS could not be assessed due to limited data on NIS in Albania and lack of thresholds set at the Adriatic level (Table 3.17).

Table 3.16. List of invasive species the most likely to invade Albania, with pathways other than the Suez Canal (unaided)*, ranked according to their assessed impact, in decreasing order (after Horizon Scanning methodology). *Source: NIMP for Albania, 2020*

Species scientific name	Species common name	Overall impact on biodiversity score	Overall impact on ecosystem services score
Amathia verticillata	Spaghetti bryozoan	100	300
Codium fragile	Green fleece	64	256
Mnemiopsis leidyi	Sea walnut	64	256
Ciona robusta	Tunicate	64	254
Anadara transversa	Transverse arc	60	120
*Pterois miles**	Lionfish / Devil firefish	36	144
Garveia franciscana	Rope-grass hydroid	36	144
Styela clava	Asian clubbed tunicate	36	144
Clytia hummelincki	Hydrozoan	36	108
Megabalanus tintinnabulum	Titan Acorn Barnacle	36	108

* *This species (P.miles), although its arrival pathway is the Suez Channel, is inserted in this list because of its impact to human health.*

Table 3.17. Assessment of GES for NIS (EO2) in Albania

Criteria Indicator	GES definition	GES Assessment
Trends in the abundance of introduced species, notably in risk areas	Decreasing abundance of introduced NIS in risk areas.	Not possible to assess GES due to lack of data on newly introduced NIS and population trends, particularly invasive NIS. In addition, there are no thresholds set at the Adriatic Sea level.

3.1.c Hydrography – EO7

The physical parameters of seawater, temperature, salinity, depth, currents, waves, turbulence, and turbidity (related to the load of suspended particulate matter), play a crucial role in the dynamics of marine ecosystems and can be altered by human activities, especially in coastal areas. The physical properties of the water masses also determine different habitats that provide the environmental conditions favoured by marine life. These conditions, for example, influence the production and the growth of plankton and fish species. The dispersion and survival of larvae for many benthic and pelagic species depend on hydrographical factors. They also play an important role for the exchanges between the sea and the atmosphere and between the various layers of water. Hydrographical factors also control some features of the sea floor (for instance muddy sea beds require weak currents). Changes in the physical parameters of seawater can then have an impact on the spawning, breeding, and feeding areas of marine organisms.

Changes in hydrographical conditions caused by natural processes and anthropogenic activities are evident as changes in the regimes of temperature, salinity, waves, and currents, and transparency. Dynamic hydrographic processes in the Adriatic Sea are to great extent associated with the processes on a scale larger than the Adriatic basin. This is relevant for Albanian sea waters since the southern Adriatic (where most of Albanian sea waters are located) is influenced by water masses of a different origin (as summarised in Cushman-Roisin *et al.,* 2001). For example, salty waters (Levantine Intermediate and Ionian surface waters) are advected from the Ionian Sea into the southern Adriatic through the Strait of Otranto (Figure 3.8).

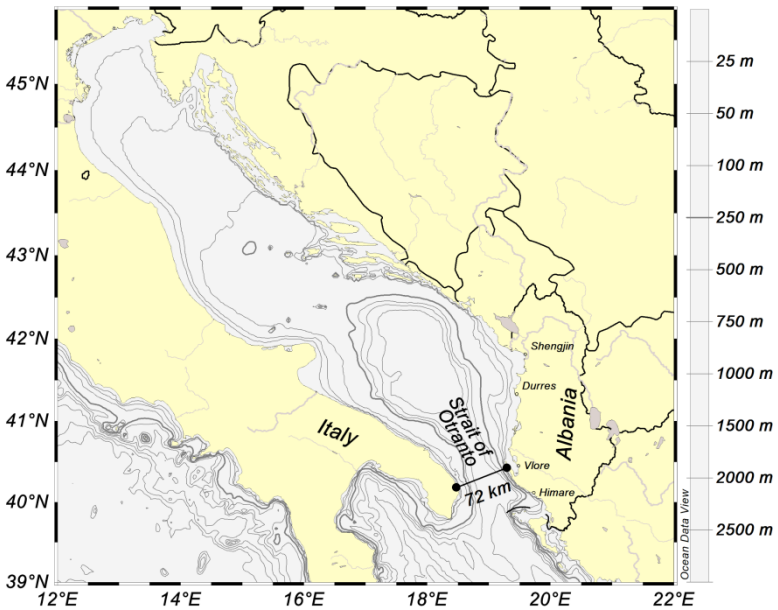


Figure 3.8. The Adriatic Sea. The Strait of Otranto connects the southern Adriatic with the northern Ionian Sea. The isobath of 250 m is indicated. The bathymetric map was created by Ocean Data View, incorporating high-resolution coastline and bathymetry contour resources for the Mediterranean Sea. *Source: Schlitzer, 2020*

Near-shore hydrographic properties of the Albanian coastal sea are without doubt affected by a riverine discharge, like in the Bay of Drini (Campanelli *et al., 2*013). Only the southernmost Albanian shores are instead directly exposed to the deep open-sea waters of Ionian and Levantine origins, as there is no wide continental shelf there. However, there are not many observational studies from the continental shelf and slope of offshore Albania.

Permanent hydrographic changes due to construction and maintenance of infrastructure in near-shore areas, maritime transport, sand extraction, tourism, and recreation have been observed in several locations along the coast of the Adriatic Sea. Therefore, the first step in achieving and preserving GES is to pay attention to such interventions at the local level.

GES criteria and definitions

Monitoring changes in hydrographic conditions is carried out through the IMAP's Ecological Objective EO7 and its Common Indicator 15 (CI 15), which addresses the location and extent of habitats impacted directly by hydrographic alterations (Table 3.18). The main obstacle for CI 15 assessment in general is the limited data availability at a national level. In addition, although EIAs are regularly undertaken, assessments of the hydrographic alterations and impacts on coastal and marine habitats are scarce. Moreover, there are no agreed threshold values at sub-regional levels. However, a baseline overview of hydrographic conditions on the (southern) Adriatic and Albanian level is presented here, as a starting point for the future GES assessments.

Table 3.18. Criteria and methodological standards for GES assessment for EO7 Hydrography in Albania.
Based on: Barcelona Convention *19th COP Decision IG.22/7, 2019; Commission Decision (EU) 2017/848.* EO = Ecological objective, CI = common indicator

Criteria			Methodological standards	
Parameters	**Indicator with related GES definition (minimum requirements for achieving GES)**	**Indicator measurements and thresholds**	**Scale of assessment**	**Use of criteria**
Selected hydrographic parameters: ▪ bathymetry, seabed substrate, morphology; ▪ temperature and salinity; ▪ tide/sea level (at least offshore conditions); ▪ currents; ▪ waves; ▪ transparency; ▪ sediment transport. Location and extent of benthic habitats	CI15: Location and extent of the habitats impacted directly by hydrographical alterations. GES definition: Negative impacts due to new structure are minimal with no influence on the larger scale coastal and marine system.	What is measured: Hydrographic changes and links with extent of selected benthic habitats. Thresholds: Thresholds have not been defined.	Local level Adriatic level (sub-regional)	Area/habitat and the proportion of the total area/habitat where alterations of hydrographical conditions have occurred or are expected to occur (estimates by modelling or semi-quantitative estimation). Preferably these are done as part of EIA. In order to be able to identify hydrographic changes and its impacts to habitats, it is necessary to have continuous monitoring of basic hydrographic parameters.

EO7 GES assessment

In order to achieve/maintain GES, the changes in hydrographical conditions, whether induced by humans or natural processes, should be such that they do not harm the marine ecosystem. The maintenance/achievement of the GES considering Hydrography cannot be considered the objective of a single isolated country, because the maintenance of a good quality of the marine environment must consider the characteristics and dynamics of the entire Adriatic basin. The dynamics of the Adriatic Sea, controlled by key oceanographic parameters such as temperature, salinity, transparency, dissolved oxygen, etc., is particularly linked with the exchange through the Strait of

Otranto, which connects the Adriatic with the Ionian Sea and thus with the rest of the Mediterranean. Furthermore, the coastal sea in Albania is a subject to influence from rivers but also from the open sea, and as such will feel the effect of both pressures, that of the climate change as well as that of direct human actions.

To fully assess GES in Albanian Sea the knowledge about the oceanographic characteristics of the southern Adriatic needs to consider a long-term component of the temporal variability, at time scales much longer than daily, weekly, or seasonal signals. The importance of this is illustrated in examples of the variability of sea surface temperature (SST) and salinity, i.e., the thermohaline conditions. The thermohaline properties of the Adriatic Sea are determined mainly by air-sea interaction, water exchange through the Otranto Strait, river discharge, mixing, currents, and the topography of the basin.

Sea surface temperature

The SST distribution illustrates the observational evidence about the contrast between the Ionian and Adriatic Sea during winter (Figure 3.9a) and during summer (Figure 3.9b). During winter months, there is an inflow of the surface Ionian waters along the eastern flank of the Strait of Otranto, their veering pathway within the cyclonic gyre, as well as their spread over the Albanian shelf, where coastal fronts may develop. During summer, the temperature contrast is smaller; however, the temperature differences between the open sea, for example in the South Adriatic Pit, and the Albanian coastal area, are still evident.

As a whole, the Adriatic is temperate warm sea. Temperatures of even the deepest layer are almost always above 10°C. The south Adriatic is 8-10°C warmer than its central and norther parts during winter. In other seasons the horizontal temperature distributions are more uniform.

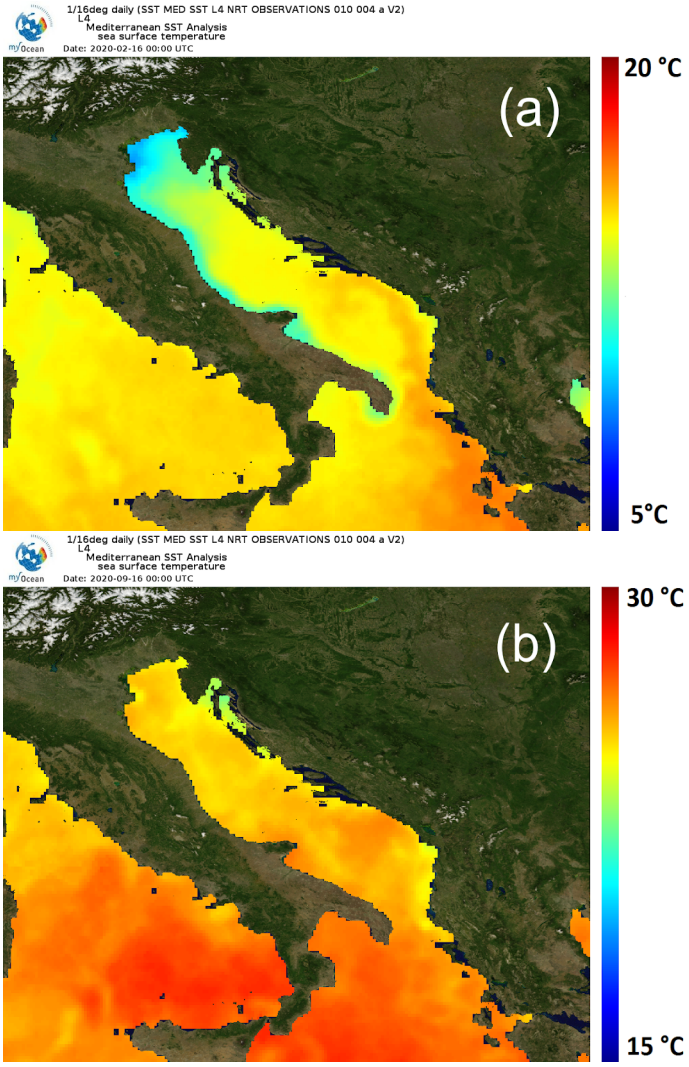


Figure 3.9. Sea surface temperature daily distribution (CMEMS) on 16 Feb 2020 (a) and 16 Sep 2020 (b). *Source EU Copernicus, 2021*

Salinity

An important decadal signal is associated with the fluctuations of salt content imported into the Adriatic from the Ionian Sea. Historical observations (Buljan, 1953) already pointed at significant salinity variations in the Middle Adriatic, and the increasing number of research expeditions in the southern Adriatic verified this phenomenon (Figure 3.10, adopted from Civitarese *et al., 2*010). On the other side, extensive *in situ* surveys indicated the inversions of the North Ionian Gyre (NIG), a vortex of sub-basin scale placed to the south of the Strait of Otranto (Malanotte *et al., 1*999). This gyre, as confirmed also by the satellite sea surface altimetry and Langrangian measurements (Menna *et al., 2*019), alternates the sense of its rotation between cyclonic (counter-clockwise) and anticyclonic (clockwise) every ten years approximately.

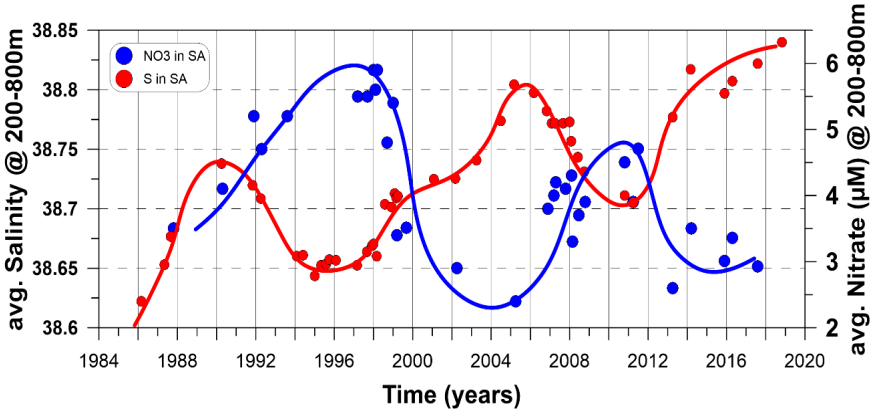


Figure 3.10. Salinity (solid red line) and nutrients (solid blue line) in the South Adriatic. *Source: Civitarese et al., 2010*

Inversions are not affected by the wind, but are a consequence of the internal mechanism, named the **Adriatic-Ionian Bimodal Oscillating System (BiOS)** (Gačić *et al., 2*010), which strongly couples the southern Adriatic and northern Ionian seas through a negative feedback mechanism. Its essence lies in the fact that different water masses, with different salt content, travel across the northern Ionian and eventually enter the southern Adriatic. Schematically (Figure 3.11, from Gačić *et al., 2*010) when the NIG is cyclonic, it favours advection of the salty Ionian surface and Levantine intermediate waters into the Adriatic. The increased salt content facilitates formation of the dense waters in the Adriatic in general, and particularly in the southern Adriatic Sea. The destiny of dense waters is to overflow through the Strait of Otranto into the northern Ionian, and from there spread into the deep layers of the Eastern Mediterranean, ventilating and oxygenating the deeper layers, and taking a role in maintaining the thermohaline belt of the Eastern Mediterranean circulation. This dense water affects the density gradients along the northern Ionian border in such a way that it induces the inversion from the cyclonic to anticyclonic sense of rotation (Rubino *et al., 2*020). This, in turn, favours the spreading of the low-salinity Atlantic water toward the Adriatic. Less salty water in the southern Adriatic will eventually be involved in the wintertime convection, producing dense water, but not as dense as the one with a larger salt content.

The consequences of such inversions do not affect only the thermohaline and circulation variability, they also reflect on the varying nutrient supply into the Adriatic, which is significant for primary production, and also on the variability of specific marine organisms related to the species either of Atlantic or Levantine origin (Civitarese *et al., 2*010, Batistić *et al., 2*019). Changes in the organism abundance and in the biodiversity, patterns are related to, and could perhaps be partly associated with, the circulation changes in the Eastern Mediterranean during the last 20 years and the modification of the water masses entering the southern Adriatic.

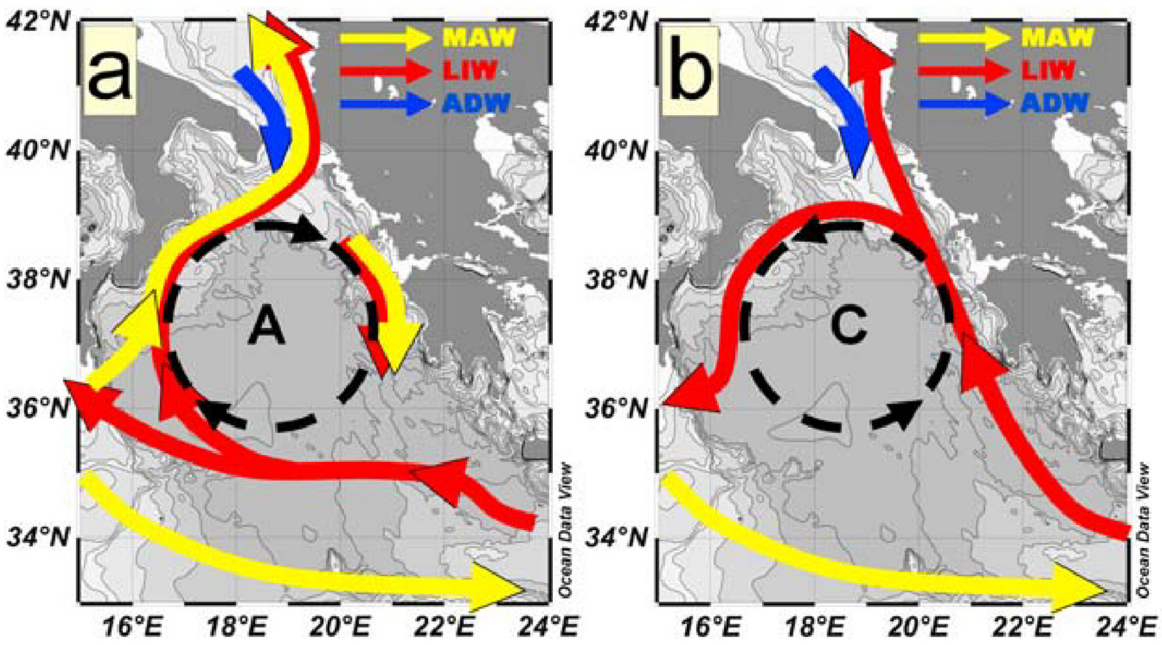


Figure 3.11. Schematics of the BiOS feedback mechanism.
Source: Gacic et al., 2010. MAW – Modified Atlantic Water, LIW – Levantine Intermediate Water, ADW – Adriatic Deep Water

The role of climate change

The expected climate change scenario for Albania projects an annual increase in air temperature of up to 1.7°C and a decrease in precipitation of up to -8.5% by 2050 (Bruci *et al.,* 2016). The projected sea level rise of 15–70 cm for 2100 indicates that most urban areas along the Albanian coast will be exposed to higher inundations risks, with consequences for coastal lagoons, erosion of riverbeds and sandy coastal areas, and modification of transparency and sediment load.

In the southern Adriatic, various climate scenarios show changes in the wind patterns, which cause changes in the vertical stability of the water column, and thus in the intensity of vertical convection, changes in the structure of temperature and salinity, and in the formation of water masses.

In general, Mediterranean hydrographic and meteo-climatic system is rather complex and interconnected, and it reflects largely on the Adriatic hydrographic properties. It is subject to pressures of both anthropogenic origin (release of CO_2 and other greenhouse gasses into the atmosphere, construction of large marine infrastructures on the coast and in the open sea) and of naturally evolving changes. Construction of coastal infrastructures must be controlled by environmental impact studies, prescribed by local or state authorities, in order to reduce their cumulative impacts to a minimum.

All these pressures act on both open seas and coastal waters, with different contributions and different impacts. Therefore, as stated in Crise *et al. (*2015), in the assessment of hydrographic conditions it is difficult to discern "between the impact of direct anthropogenic pressures and the consequences of global change." This is partly due to data gaps, especially those stemming from the lack of long time-series datasets, that can be overcome by adequately optimised monitoring programmes. Therefore, it is not yet possible to fully assess GES for EO7 (Table 3.19).

However, it should be pointed out that the first step in achieving and preserving GES is to pay attention to all the coastal interventions at the local level related to the infrastructural maintenance and development, maritime transport, sand extraction, tourism, and recreation. Their impact must be controlled by environmental impact studies, which are prescribed by local or state authorities, which reduces the cumulative impact of the interventions.

Table 3.19. Assessment of GES for Hydrography (EO7) in Albania

Criteria Indicator	GES target	GES Assessment
Location and extent of the habitats impacted directly by hydrographical alterations	Planning of new structures takes into account all possible mitigation measures to minimise the impact on the coastal and marine ecosystem and its services integrity and cultural/historic assets.	Not possible to assess GES due to lack of systematic data on hydrographic conditions. In addition, there are no thresholds set at either the Mediterranean and Adriatic Sea level. In particular, more observational studies regarding hydrographic dynamics on the continental shelf are needed since this could be crucial in determining GES for Albanian sea regarding hydrography.

3.1.d Coastal ecosystems and landscapes – EO8

Coastal zones are increasingly being altered by construction of human-made structures. These structures (e.g., ports, marinas, jetties etc.) cause irreversible damage to landscapes, with the loss and fragmentation of habitats, loss of biodiversity, and they have strong influences on the configuration of the shoreline. Physical disturbance due to artificial structures in the coastal fringe can disrupt sediment transport, reduce the ability of the shoreline to respond to natural forcing, and fragment the coastal space. Coastal defence structures, together with beach nourishment, have been implemented to solve the problem, but preserving the natural shoreline system with adequate sediment transport from rivers and dunes has proven to be the most preferred solution.

The closer the artificial structures are to a coastline, the more exposed they are to waves and storm surges, and sea level rises. Therefore, each further construction in coastal zones should be carefully thought through since it can create the additional financial burden of protecting and repairing such structures from the damage caused by climate hazards.

On the other hand, emerging climate hazards will require the construction of certain protective structures to tackle erosion/flooding. In Albania there is a lack of quantitative evaluation of the coastal erosion. However, coastal erosion phenomenon is evident in beaches such as Shengjini, Patogu, Lalzi, Qerret, Semani, and the Old Beach in Vlora (Zaimi, 2019). According to Gruda and Dolima (2013) important causes for the erosion are the measures in the river systems (such as dam construction) that reduce the sediment input by rivers into the coastal zone. Some parts of the coast erode at rates of 0.3–20 m/year, even up to 30 m/year at one spot. After 1990, some hard defence structures (seawalls and revetments) were built to counteract beach erosion, but the erosion problem has not yet been solved.

The key climatic pressures that affect coastal artificialisation (and consequently can impact marine biota and seawater quality) are rising sea levels, storm surges, stormy winds, and heavy rains. From the aspect of vulnerability of the narrow coastal area due to the impact of sea level rises, an increase of 15–70 cm in sea level (depending on different IPCC scenarios) is anticipated (Bruci *et al.,* 2016). indicates that most urban areas along Albanian coast will be exposed to higher inundations risks, with consequences for coastal lagoons, erosion of riverbeds and sandy coastal areas, and modification of transparency and sediment load.

In this sense, better implementation of the ICZM Protocol, which Albania ratified in 2011, and in particular its Article 8 that implies the establishment of coastal setback zone, is needed.

GES criteria and definitions

IMAP's Common Indicator 16, the common indicator belonging to EO8, addresses the length of coastline subjected to physical disturbance by human-made structures.

In 2019, at the meeting of the Ecosystem Approach Correspondence Group on Monitoring (CORMON) of Coast and Hydrography cluster, the Contracting Parties to the

Barcelona Convention expressed the importance of defining the Good Environmental Status (GES) for Common Indicator 16. It was emphasised that, due to national circumstances such as socio-economic, historic, cultural, and the like, unique targets and GES cannot be applicable to all Mediterranean countries and hence, cannot be specified quantitatively as a threshold value (UNEP/MED WG. 467/6). Therefore, the agreement was that the definition of GES and related targets and measures should be left to each Contracting Party, taking legal obligations of the Barcelona Convention into account, in particular the ICZM Protocol (its Articles 8 and 16 in particular).

Although Albania developed the Integrated Cross-Sectorial Plan (ICSP) for the Coastal Belt, which is the most important planning document for the integrated management of the coastal area in the country, there are no thresholds set for the planned amount of coastal development for 2030, i.e., the final year that the Plan covers.

EO8 GES assessment

In 2020 spatial analysis along the length of Albania's coastline occupied by human-made structures was carried out within the GEF Adriatic project, i.e., the monitoring of the Common Indicator 16 (CI16) was implemented. The area of assessment covered the whole coastline of Albania, i.e., it included coastlines belonging to both the Adriatic and Ionian seas. Administratively, this area includes 11 coastal municipalities: Shkodër, Lezhë, Kurbin, Durrës, Kavajë, Rrogozhinë, Divjakë, Fier, Vlora, Himarë, and Sarandë.

Primary input data for this analysis was the digital orthophoto imagery taken in 2015, with spatial resolution of 20 cm and provided by State Authority for Geospatial Information (ASIG, http://www.asig.gov.al). The developed vector coastline was corrected using Google Earth 2020-year imagery to include the most recent shoreline changes. The minimum distance between coastal defence structures that classifies such segments as natural was set to 10 m, following the instructions by the Indicator Guidance Fact Sheet for CI16 (UNEP/MED WG.467/6).

According to the analysis, the total length of Albania's coastline is 542.61 km, of which 462.65 km is natural coast (or 85.26% of the total coastline) while the total length of artificial coastline is 79.96 km (or 14.47% of the total coastline) (Figure 3.11). Various information on the length of total Albanian coastline can be found in different literature sources, but this is mainly due to the fact that, previously, different spatial resolutions and methods of analysis were used. Most of the artificial structures on the Albanian coast are located close to the major settlements with strong economic activities. Certain areas with more prominent coastal artificialisation in Albania are:

- in the north, the area around Shëngjin in Lezhë County;
- in the central part, the area around Durrës, and beaches northward and southward of Durrës; and
- in the southern part, the area surrounding Vlora Bay.

Spatial distribution of different types of artificial infrastructure is shown in Figure 3.13. The artificial structures are dominated by "Ports and marinas" (55.4%), "Groins" (18.45%), and "Seawall/Revetments/Sea dikes" (17.34%), while "Breakwaters" (3.07%), "River Mouth Structures" (1.92%), and "Jetties" (1.84%) are less represented. Furthermore, a part of artificial structures (1.96%) does not belong to any of the above-mentioned categories set by CI16 Information Standard (UNEP/MED WG.467/10). This "Other" category is mostly represented by construction sites, parking lots, artificial beaches, etc.

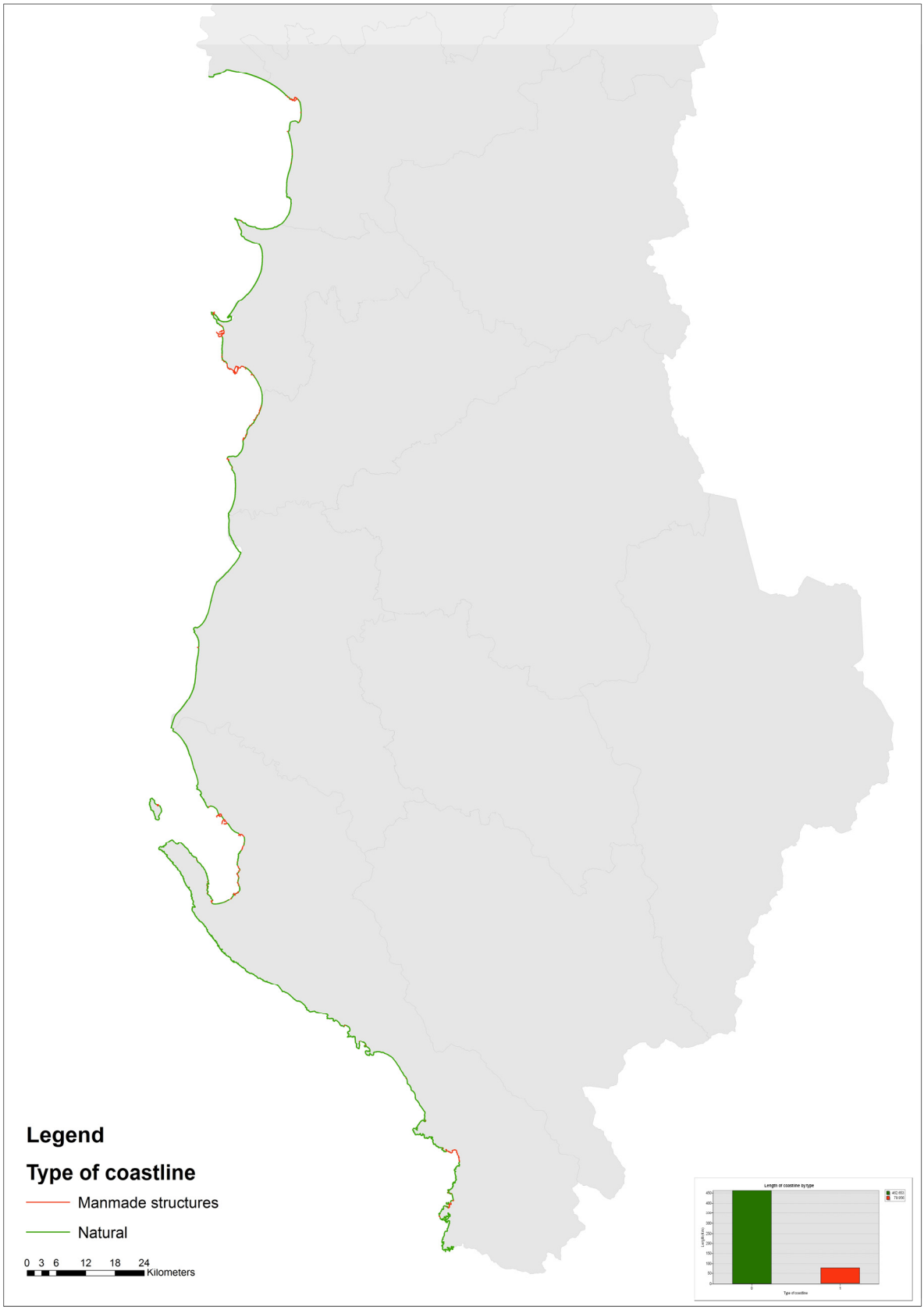


Figure 3.12. Coastline delineation by type (artificial/natural) of Albania

Table 3.20. Length of artificial coastline in Albania, according to type of structure

As code		Length (Metres)	%
0*		1,564.705009	1.959893
1	Breakwaters	2,451.627004	3.07082
2	Seawall/Revetment/Sea dike	13,849.40165	17.34726
3	Groins	14,731.72574	18.45243
4	Jetties	1,469.212762	1.840283
5	River mouth structures	1,539.556362	1.928393
12	Port and marinas	44,230.01249	55.40092
Grand Total		79,836.24102	

**Cannot be classified under the existing list of categories*

Since the GES regarding IMAP's CI16 reflects in minimising negative impacts due to new structures with no influence on the larger scale coastal and marine system, it is essential to observe the temporal trends in coastal artificialisation. Until today in Albania there was no survey for the coastline occupied by man-made structures according to the methodology defined in IMAP's Indicator Guidance Factsheet for CI16 (UNEP/MED WG.467/6).

In other words, the temporal trend cannot be established and hence, GES for this indicator cannot be assessed in Albania at the moment (Table 3.21). New assessment should be carried out after six years (as set by the Albania's monitoring programme for CI16) to observe the trend, i.e., to estimate the GES for this indicator.

Table 3.21. Assessment of GES for Coastal ecosystems and landscapes (EO8) in Albania

Criteria Indicator	GES definition	GES Assessment
Length of coastline subject to physical disturbance due to the influence of human-made structures	Physical disturbance to coastal areas induced by human activities should be minimised.	Not possible to assess GES, because there are not enough relevant datasets to observe the trend. New assessment should be carried out after 6 years to observe the trend, i.e., to estimate the GES for this indicator.

3.1.e Pollution – EO9

Ecological Objective 9 (EO9) is related to the introduction of chemical contaminants and hazardous microbiological substances in the marine ecosystem from land-based and sea-based sources, thereby affecting the structure and functions of the marine ecosystems, as well as its ecosystem services. It is primarily monitored by means of pressure and impact-based Common Indicators (CIs 17-21) allowing assessment of Good Environmental Status (GES) against regional established standards and thresholds. The EO9 GES assessment provides, with other pollution related EOs (EO5 Eutrophication and EO10 Marine Litter), inputs to the overall integrated GES assessment of the marine environment. Integrated GES is based on the achievement of the targets of all Ecological Objectives set for the marine environment and structured within the UNEP/MAP program.

The current IMAP EO9 evaluation considers a selection of chemicals and groups of substances which should be revised periodically according to monitoring and assessment results of the consecutive IMAP 6-year cycle

implementation, as well as similarly updated in light of new research and monitoring findings. Chemical contaminants information is based primarily in available international lists of chemicals of concern, such as:

- OSPAR and HELCOM Regional Seas conventions Priority List of Chemicals and Substances of concern;
- The European Commission WFD and MSFD Directives and the JRC "Watch List" of priority substances;
- The Stockholm, Rotterdam and Basel Conventions lists;
- The US Environmental Protection Agency (US EPA) lists.

There are a number of potential current and future human activities leading to pressures and impacts in the Albanian coastal and marine environment related to the IMAP Pollution Cluster (including Ecological Objective 9) reported in a recent publication in the Integrated Cross-Sectorial Plan for the Coastal Belt, which is the result of the joint contribution of the National Territorial Planning Agency (NTPA) and the Ministry of Urban Development (MoUD) during two years. The first of its kind, it describes in detail the Albanian shores and brings forward an integrated framework for a quality model for developments in the coastal belt. To this regard, the IMAP and Ecosystem Approach framework implementation of the Barcelona Convention – MAP system become excellent tools to achieve the sustainability goal for the ecosystem services provided by national coastal and marine waters (i.e., marine ecosystems) of Albania, through national integrated GES assessments (such as this report under the GEF Adriatic Project).

GES criteria and definitions

The EO9 GES will be defined by evaluating the achievement of the CI targets of IMAP EO9 in the Mediterranean Sea proposed for the current cycle. Firstly, to undertake the EO9 GES assessment, a review of the existing monitoring networks and defined scales of assessment for EO9 in Albania has to be performed to state operational areas and subareas, namely the operational scales. Once the operational scales for the EO9 GES assessment are set, and the quantitative or qualitative data/information availability for the period of study evaluated (2015-2019 period, with few research data spanning back to 2009), the assessment by individual CIs can be performed and in a qualitative manner (see Table 3.22).

The EO9 GES targets achievement in the Mediterranean Sea requires undertaking a review of the national existing monitoring networks according to both UNEP/MAP/-IMAP and other international policies, such as EU WFD and EU MSFD, including potential links with drivers and pressures (see chapter 2). In Albania, the historical MEDPOL biomonitoring network stations were discontinued in the early 2000s. Table 3.22 shows the availability of datasets and/or information for the different EO9 CIs, namely, CI17 (Chemical contaminants), CI18 (Toxicological effects), CI19 (Oil and HNS spills), CI20 (Seafood contamination), and CI21 (Microbiological pathogens/Bathing water quality). A distinction is made among the operational areas and subareas selected to perform the present EO9 GES assessment based on existing geographical characteristics, human pressures, and impact knowledge.

A key observation is that for CI17, CI18, and CI20 the datasets from national monitoring programs are non-existent. The data related to the past implementation of the MEDPOL monitoring program in Albania for CI17 and CI18 are considered invalid to assess the present state of the marine environment (ca. before 2009), as the limit of the most recent ten years of data is set as environmental reliable information for EO9. Therefore, the assessment of impacts derived from chemical contaminants will be based on research input and information using a qualitative approach for all the CIs within EO9, except for CI19 and CI21, for which Albania has an oil spill surveillance/contingency program and a network of coastline monitoring sites for bathing waters microbial pathogens, respectively. For this reason and until the national monitoring implementation will take place, the overall EO9 GES assessment in Albania will have a high level of uncertainty and any Program of Measures will need to be reassessed accordingly (i.e., by implementing from local to national fit-for-purpose monitoring and assessment as required).

Table 3.22. Summary of the availability of datasets/information from the monitoring networks and institutional efforts for the period 2009-2019 according the proposed operational areas and subareas for the EO9 GES assessment

Core indicators EO9 Marine areas		CI17			CI18	CI19	CI20	CI21
Operational Area	Subarea	Contaminants in seawater	Contaminants in biota	Contaminants in Sediments	Biomarkers-toxicology	Oil&HNS occurrence	Seafood regulated contaminants	Bathing water quality (microbiology)
Northern part of the Sea of Albania	CW1 – Patok-Rodoni Bay	RES		N.E.	N.E.		N.E.	
	CW2 – Cape of Rodon	N.E.	N.E.	N.E.	N.E.		N.E.	
	OW1	N.E.	N.E.	N.E.	N.E.		N.E.	
Middle part of the Sea of Albania	CW3 – Bay of Durrës	RES – 2016, 2018		RES – 2016, 2018	N.E.		N.E.	
	CW4 – Div jaka-Karavasta National Park	RES – 2013, 2014	N.E.	N.E.	N.E.		N.E.	
	OW2	N.E.	N.E.	N.E.	N.E.		N.E.	
Southern part of the Sea of Albania	CW5 – Vjosë-Nartë/Vlora Bay	RES – 2012-2019	N.E.	N.E.	N.E.		N.E.	
	CW6 – Sazani Island	N.E.	N.E.	N.E.	N.E.		N.E.	
	CW7 – Karaburuni Peninsula	N.E.	N.E.	N.E.	N.E.		N.E.	
	CW8 – Kanali Coast	N.E.	N.E.	N.E.	N.E.		N.E.	
	CW9 – Dhërmi	N.E.	N.E.	N.E.	N.E.		N.E.	
	CW10 – Porto Palermo	N.E.	N.E.	N.E.	N.E.		N.E.	
	CW11 – Qeparoi -Cape Qefali	N.E.	N.E.	N.E.	N.E.		N.E.	
	CW12 – Saranda-Cuka	RES 2009	RES 2009	RES 2009	N.E.		N.E.	
	CW13 – Ksamili-Butrinti	N.E.		N.E.	N.E.		N.E.	
	CW14 – Cape Stillo	N.E.	N.E.	N.E.	N.E.		N.E.	
	OW3 – (Adriatic Sea part)	N.E.	N.E.	N.E.	N.E.		N.E.	
	OW4 – (Ionian Sea part)	N.E.	N.E.	N.E.	N.E.		N.E.	

N.E.: Not evaluated (monitored), RES: Research data and year; CW, Coastal waters; OW, Offshore waters

Some of five EO9 CIs are multiparametric indicators. For example, CI17 should be integrated by observing the different groups of chemical compounds monitored exhibiting a pressure to the marine ecosystems (organisms or habitats, namely targeted biota and sediments); before an upper level of integration/aggregation could be undertaken among CIs. Similarly, for CI18 and CI20, but not for CI19 and CI21 which are based on a single parameter each for evaluation. However, either uniparametric or multiparametric CIs these should be assessed according the operational objectives and targets defined (for each) to examine whether the defined GES was achieved and according to the scientific-based criteria established and agreed under the IMAP implementation processes in the Mediterranean Sea.

The Decision IG. 22/7 (COP19, February 2016) on IMAP included in its Annexes the Related Assessment Criteria to perform the EO9 CI17 and CI18 GES assessment, as well as for EO5. Since then, the main output during the initial phase of IMAP have refined these assessment criteria (UNEP (DEPI)/MED 439/15 Meeting of the MED POL Focal Points,

Rome, Italy, 29–31 May 2017) initially communicated in Decision IG.23/6 (COP20, 2017) on 2017 Mediterranean Quality Status Report (http://www.medqsr.org) for the EO9 GES assessment.

Under EO9, and particularly for CI17 and CI18, these assessment criteria include Background Concentrations (BCs), Background Assessment Criteria (BACs), and Environmental Assessment Criteria (EACs), for hazardous chemical substances and biomarkers for the Mediterranean Sea. In the UNEP(DEPI)/MED 439/15 document, BCs and Mediterranean BACs were estimated at regional and sub-regional scales using the reference datasets provided by the Contracting Parties. The methodology and results can be found in the document UNEP(DEPI)/MED WG.427/Inf.3 containing all the detailed data/metadata information, datasets characteristics, statistical results, and scientific rationales of the performed analyses and estimations of IMAP Related Assessment Criteria for these CIs. In relation to multiparametric CI20 (similarly to CI17), the European criteria established for seafood chemical levels for human consumption should be observed with the IMAP methodologies to set thresholds (Commission Regulation (EC) No 1881/2006 of 19 December 2006 setting maximum levels for certain contaminants in foodstuffs).

In relation to CI19 and CI21, the former is evaluated pursuant to the occurrence trends of oil and harmful and noxious substances (HNS) accidental pollution events, based on the number of pollution events of 50 m^3/yr or higher, according the IMAP CI Factsheets; the latter is evaluated according to the threshold values and methodology established by EU Bathing Water Quality Directive and also agreed by the Contracting Parties of the Barcelona Convention. For those two CIs within EO9, the evaluations and GES status elucidation were approached based on the communications and discussions with the responsible authorities and national experts in Albania.

EO9 GES assessment

The EO9 assessment reviewed the existing literature regarding pollutant occurrence in the Albanian coastal and marine environment. Tables 3.23 and 3.24 show the semi-quantitative assessment for those CI17 data collected from research publications for the period 2009-2019. Thus, they are divided by chemical groups and evaluated against the established thresholds (and colour scales) for each matrix, namely, BCs, Med BACs, and EACs/ERLs according the IMAP guidance. As defined by IMAP CI17 assessment criteria, a red colour cells indicate "concern", indicating concentrations are at levels where probable toxicological effects to organisms are probable, whilst blue and green/orange indicates "no concern", despite the latter showing concentrations above the background levels for the area.

Table 3.23. Assessment of heavy metals information related to CI17 multiparametric indicator from research publications and datasets 2009-2019 against IMAP EO9 assessment criteria for CI17

C17 (Substance&Matrix) – Period 2009 – 2019			Cadmium		Mercury		Lead	
Operational Area	Subarea	Location	Biota	Sed	Biota	Sed	Biota	Sed
Northern part of the Sea of Albania	CW1 – Patok-Rodoni Bay							
	CW2 – Cape of Rodon		(CI20)		(CI20)		(CI20)	
	OW1							
Middle part of the Sea of Albania	CW3 – Bay of Durrës	Porto Romano						
		Durrës						
		Golem						
	CW4 – Divjaka-Karavasta National Park	Karavasta Lagoon	Water		> Hg water		Water	
	OW2							
Southern part of the Sea of Albania	CW5 – Vjosë-Nartë/Vlora Bay	Vlora Bay	Water		> Hg water		Water	Water
		Orikumi Lagoon	Water				Water	water
	CW6 – Sazani Island							
	CW7 – Karaburuni Peninsula							

C17 (Substance&Matrix) – Period 2009 – 2019			Cadmium		Mercury		Lead	
Operational Area	Subarea	Location	Biota	Sed	Biota	Sed	Biota	Sed
	CW8 – Kanali Coast							
	CW9 – Dhërmi							
	CW10 – Porto Palermo							
	CW11 – Qeparoi -Cape Qefali							
	CW12 – Saranda-Cuka							
	CW13 – Ksamili-Butrinti							
	CW14 – Cape Stillo							
	OW3 – (Adriatic Sea part)							
	OW4 – (Ionian Sea part)							

Note: Seawater (water) criteria are not included under IMAP; thus, expert judgment and conclusions from scientific publications have been used to replace the missing matrix in the table. Sed = sediment

Table 3.24. Assessment of organic contaminants information related to CI17 multiparametric indicator from research publications and datasets 2009-2019 against IMAP EO9 assessment criteria for CI17

C17 (Substance&Matrix) – Period 2009 – 2019			PCBs		HCB, Lindane, DDTs		PAHs	
Operational Area	Subarea	Location	Biota	Sed	Biota	Sed	Biota	Sed
Northern part of the Sea of Albania	CW1 – Patok-Rodoni Bay		Water		Water		Water	
	CW2 – Cape of Rodon							
	OW1							
Middle part of the Sea of Albania	CW3 – Bay of Durrës	Porto Romano	Water		Water		Water	
		Durrës	Water		Water		Water	
		Golem					Water	
	CW4 – Divjaka-Karavasta National Park	Karavasta Lagoon	Water		Water		Water	
	OW2							
Southern part of the Sea of Albania	CW5 – Vjosë-Nartë/Vlora Bay	Vlora Bay	Water		Water		Water	
		Orikumi Lagoon						
	CW6 – Sazani Island							
	CW7 – Karaburuni Peninsula							
	CW8 – Kanali Coast							
	CW9 – Dhërmi							
	CW10 – Porto Palermo							
	CW11 – Qeparoi -Cape Qefali							
	CW12 – Saranda-Cuka							
	CW13 – Ksamili-Butrinti							
	CW14 – Cape Stillo							
	OW3 – (Adriatic Sea part)							
	OW4 – (Ionian Sea part)							

Note: Seawater (water) criteria are not included under IMAP (no mandatory matrix); thus expert judgment and conclusions from scientific publications have been used to replace them in the table. Sed = sediment

In general terms, it can be observed in Tables 3.23 and 3.24 that there are significant concentrations of mercury and organochlorinated compounds (red colour) in some of the operational areas assessed in the northern and middle part of the sea and coastlines of Albania, including some data in Vlora Bay in the southern part. Despite that these results were obtained from the non-mandatory seawater matrix, the high levels encountered for those substances might clearly indicate persistent inputs of contaminants from nearby agricultural and coastal urbanised areas and ports.

In the Bay of Durrës, there is a clear concern in Porto Romano as preliminary screening datasets indicate high toxicological levels in sediment samples for PCBs and pesticides (Table 3.24). It is important to highlight that this information arises from locally monitoring attempts and the comparability between the datasets provided by different studies cannot be fully validated. The individual EO CIs assessment was based, despite CI17, in the combined expert judgment (CI18, CI19, CI20) and reports (CI21), such as the EEA 2017-2019 Bathing Quality Reports (i.e., including Albania with a 65.7% of excellent quality for coastal bathing areas in 2018).

In general, GES could be assessed for several indicators (Table 3.25).

Table 3.25. Assessment of GES for Pollution (EO9) in Albania

Criteria Indicator	GES definition	GES Assessment
Concentration of key harmful contaminants measured in the relevant matrix	Level of pollution is below a determined threshold defined for the area and species.	**Overall, GES is not achieved.** There are not enough continued monitoring evidence nor assessments to determine this indicator, although in some studied locations, the levels are above thresholds for compounds such as Hg and organochlorinated compounds indicating high risk of degradation by chemical pollution.
Level of pollution effects of key contaminants where a cause and effect relationship has been established	Concentrations of contaminants are not giving rise to acute pollution events.	**Not possible to assess GES.** There are no continuous monitoring evidence nor assessments to determine this indicator; in locations with compounds above the threshold levels, potential toxicological effects are highly probable (e.g., Vlora Bay).
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	Occurrence of acute pollution events is reduced to the minimum.	There have been no oil spillages of concern reported under this indicator in the coastal and marine area of Albania, concluding that **GES is achieved**.
Actual levels of contaminants that have been detected and number of contaminants which have exceeded maximum regulatory levels in commonly consumed seafood	Concentrations of contaminants are within the regulatory limits for consumption by humans. No regulatory levels of contaminants in seafood are exceeded.	**Not possible to assess GES.** There is no empirical scientific evidences of wild fisheries stocks affected by chemical compounds, and therefore concentrations of contaminants in seafood. It is important to point out that the GES should be assessed by addressing wild populations of commercial fisheries and aquaculture species rather than the caged ones.
Percentage of Intestinal enterococcal concentration measurements within established standards	Concentrations of intestinal enterococci are within established standards.	A national monitoring programme established in Albania has reported some concerns for this indicator. Overall, **GES is partly achieved**.

3.1.f Marine litter – EO10

Marine pollution is, to a large extent, generated by various human activities. Marine litter increasingly impacts the health of marine ecosystems and biota, and, in addition, creates further pressures for already endangered organisms, habitats, and the overall ecosystem health. Of the seven protocols of the Barcelona Convention, the most relevant to marine litter is the Land-based Sources and Activities Protocol (LBS Protocol). This Protocol states that parties need to undertake action to eliminate pollution deriving from land-based sources and activities, in particular to phase out inputs of the substances that are toxic, persistent, and liable to bio-accumulate as listed in its Annex I, including litter. In addition, the Dumping Protocol has relevance to marine litter, stating that dumping of wastes and other matter is prohibited except for dredged material, food waste, platforms and other human-made structures, and inert geological materials.

In addition, in 2013 Contracting Parties to the Barcelona Convention and its LBS Protocol adopted the first ever Regional Plan for the Management of Marine litter – RPML (Decision IG. 21/7), legally binding since 2014. This Plan envisages a number of programs and measures and an implementation timeframe, all with the aim of reducing the amount and adverse impact of marine litter on the marine and coastal environment.

There is a significant number of laws that are related to the conservation of the environment, nature, coastal and sea management, and waste management in Albania. The primary national policy document in Albania is the National Strategy for Development and Integration (NSDI) 2014-2020, while the basic law in the maritime sector is the Law on "Maritime Code of the Republic of Albania" (Law n°. 9251, dated 08.07.2004, as amended). National legislations that deal with the issue of marine ecosystems and the one tackling the marine litter issues are numerous. They include Law on Environmental Protection (Law n° 10431, dated 9.6.2011, as amended), on Environmental Impact Assessment (Law n° 10440, dated 7.7.2011, as amended), Law on Integrated Waste Management (Law n° 10463, dated 6.3.2012, as amended) and Law on the Protection of maritime environment from pollution and deterioration (Law n° 8905, dated 6.6.2002, as amended) and such-like. There are also a number of Decisions of Council of Ministers (DCM) and national strategies which are very important for the protection of the marine environment and maritime sector.

It is important to note that in September 2018, the Government took an initiative to ban the use of single use plastic bags. However, the legal document that would enable this decision is not yet adopted.

GES criteria and definitions

In order to contribute to the identification of a set of GES characteristics and enable assessment of the extent to which GES is being achieved, definitions of baseline and threshold values are mandatory. In order to adequately assess trends and possibly correct baseline and threshold values, it is necessary to have a database including at least four years data collection. For this reason, baseline and threshold values have not yet been agreed on the regional level for all marine litter indicators.

Therefore, the assessment of GES in this document will be made in accordance with the already defined and accepted baseline and threshold values related only to beach litter (CI22). Values for floating and seabed marine litter (CI23) have only been proposed but are not yet regionally agreed and therefore GES will not be assessed (Table 3.26). Assessments for Albania that form part of this document have been made at the national level. Although marine litter is a problem that, for the majority of cases, cannot be observed only at the national level, as it knows no borders, the available data are presented only for the territorial sea and coast of Albania. In addition to the assessment at the national level for each group of processed data (indicators), available data at the level of the Adriatic and the Mediterranean Sea are presented (depending on availability).

What appears as a problem for an adequate assessment of GES is the lack of a series of data (at least the six-year assessment cycle) on the basis of which trends would be determined. Nevertheless, for all indicators covered in this document, GES was assessed on the basis of available data and available baseline and threshold values.

Table 3.26. Criteria and methodological standards for GES assessment for EO10 Marine litter in Albania.
Based on: IMAP, 2016; Barcelona Convention 19th COP Decision IG.22/7; UNEP/MED WG.482/23, 2020. EO = Ecological objective, CI = Common indicator

Criteria			Methodological standards	
Elements/parameters	**Indicator with related GES definition (minimum requirements for achieving GES)**	**Indicator measurement and thresholds**	**Scale of assessment**	**Use of criteria**
MARINE LITTER (EO10)				
Beach litter: trends in the amount of litter washed ashore and/or deposited on coastlines (CI22)				
Selected beaches in the Albanian coast	GES definition IMAP: Number/amount of marine litter items on the coastline does not have negative impacts on human health, marine life and ecosystem services.	What is monitored: ▪ Distribution of beach litter expressed as number of items/100 m stretch ▪ CCI (Clean Coastal Index) Proposed Baseline: Baseline on Mediterranean level 329 items/100 m of beach transects (UNEP/MED WG.482/23, 2020). Baseline on EU level – 149 items/100 m of beach transects (Hanke *et al.*, 2019). Reduction trend in the number of/amount of marine litter (items) deposited on the coast. Real trend should be based on at least the six-year assessment cycle. Threshold: TV on Mediterranean level – 59 litter items/100 m beach length (UNEP/MED WG.482/23, 2020). TV on EU level -20 litter items/100 m beach length (Hanke *et al.*, 2019).	Adriatic level assessment (sub-regional) and national level	Amount of beach litter per main litter categories and its distribution (N of items/100 m of transect, and whether the threshold values set have been achieved (% of decrease).
Floating litter and sea floor litter – Trends in the amount of litter in the water column including microplastics and on the seafloor (CI23)				
Sea floor litter				
MEDITS surveys (27 transects at open sea area)	GES definition IMAP: Number/amount of marine litter items in the water surface and the seafloor do not have negative impacts on human health, marine life, ecosystem services and do not create risk to navigation.	What is monitored: Distribution of sea floor litter at 27 transects at the open waters of Albania, expressed as N of plastic items/km^2. Proposed baseline (51-61 items/km^2) and threshold values (4 items/km^2) are not yet adopted due to the scarcity of available data.	Adriatic level assessment (sub-regional) and national level	Amount of litter items per main litter categories and its distribution (number of items/km^2, and whether the threshold values set have been achieved (statistically significant % of decrease).

EO10 GES assessment

In accordance with the recommendations of Decision IG.22/7 for the estimation of GES of marine environment in Albania, available data for beach litter and sea-floor litter were used. The assessment of GES was made on the basis of available data collected through different international projects (EU IPA DeFishGear project, Act4Litter project, UNEP/MAP "Adopt a beach" project, and MEDITS surveys).

Beach litter

Within the **IPA EU DeFishGear** project three beaches were monitored by seasonal dynamics during 2014 and 2015 (Figure 3.13). Monitoring of beaches was done by the Agricultural University of Tirana, while data presented are extracted from Vlachogianni *et al. (*2017). Two beaches (Velipojë and Shëngjin) belong to semi-urban beaches, while Plepa belongs to urban beaches.

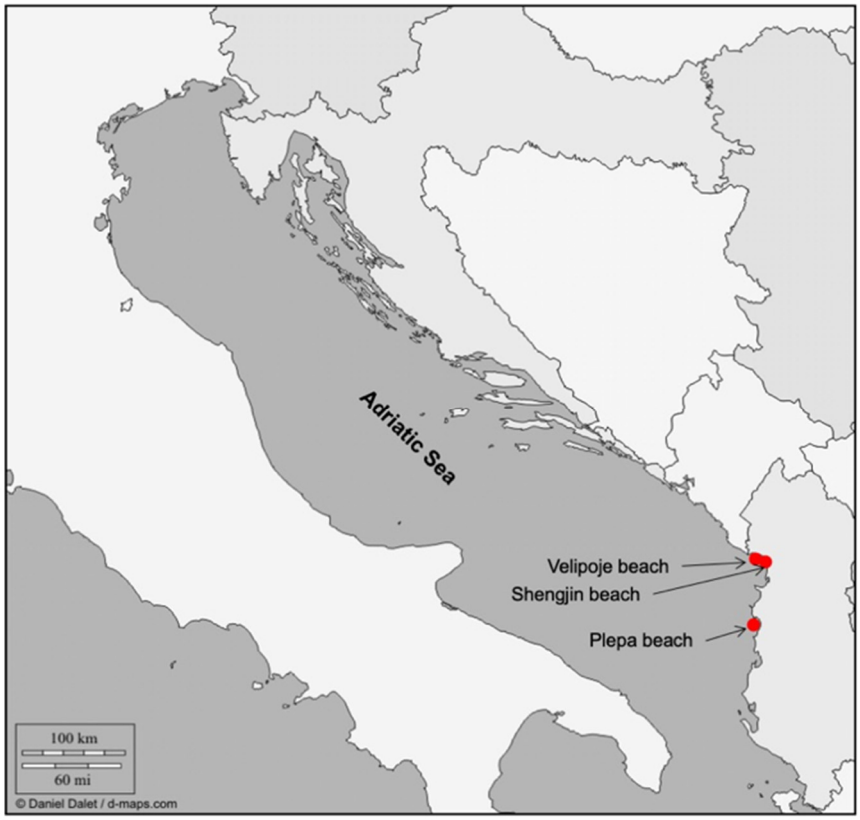


Figure 3.13. Three beaches (Velipoje, Shengjin, and Plepa) monitored for marine litter during the DeFishGear project

Average number of marine litter items for all beaches was 0.22 items/m^2 (219 items/100 m stretch). According to clean coastal index (CCI) Velipojë beach belongs to "clean" beaches (CCI = 4.1), Shëngjin beach also belongs to "clean" beaches (CCI = 3.1), while Plepa beach belongs to "moderately clean" beaches (CCI = 5.9). According to the CCI scale, values from 0–2 indicate very clean beaches, 2–5 clean, 5–10 moderately clean, 10–20 dirty, and > 20 extremely dirty beaches (Alkalay *et al., 2*007).

During April 2018, abundance, composition, and sources of marine litter were monitored on five Albanian beaches located at the bays of Durrës and of Lalzi (Gjyli *et al., 2*020). The sites investigated differed in terms of human-induced pressures with two sites being classified as semi-urban; two sites as urban, and one as semi-rural. Marine litter was determined on the following five free-access beaches: Dajlani Bridge, Apollonia, Golem, Iliria, and Shën Pjetri. The first four beaches are located in the Bay of Durrës, while the latter is located in the Bay of Lalzi (Figure 3.14).

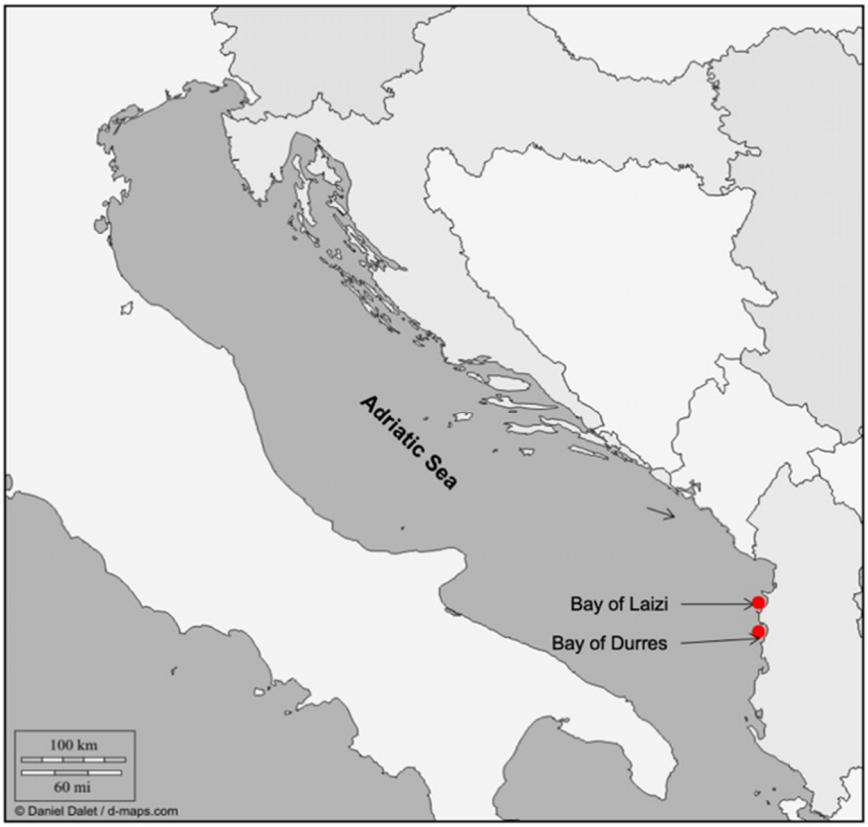


Figure 3.14. Location of Bay of Durrës and Bay of Lalzi where five beaches were monitored during April 2018

The majority of litter items at an aggregated level were made of artificial polymer materials (65% or 3,321 of total items). The second most abundant type of material was glass/ceramics (23% or 776 items). The highest percentage of plastics was recorded at Shën Pjetri (92% or 940 items), followed by Iliria (82% or 566), Dajlani Brigde (62% or 123), and Golem (55% or 316). The lowest percentage of plastics was recorded for Apollonia (25% or 210 items).

The average number of marine litter items for all beaches was 0.14 items/m² (333 items/100 m stretch). According to clean coastal index (CCI) all five beaches belong to "clean "beaches (CCI = 1.8-4.2). In the framework of Interreg MED **Act4Litter project** (during winter 2017/2018) marine litter monitoring activities were conducted in a marine protected area, Zvërnec beach in Narta wetland protected area in Albania (Figure 3.15) (Vlachogianni *et al.,* 2019). Although the monitoring was conducted during four seasons, data are available only for the winter period.

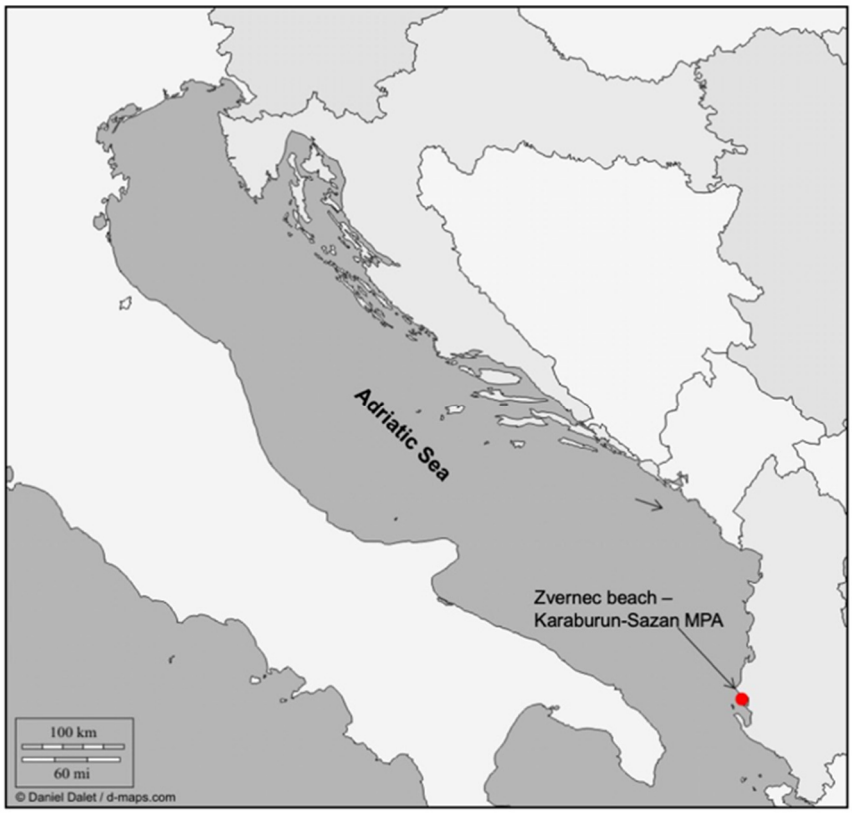


Figure 3.15. Zvërnec beach (part of the Narta wetland protected area) monitored during winter 2017/2018

The majority of litter items (more than 90%) were made of artificial polymer materials, followed by rubber, cloth/textile, paper/cardboard, and glass/ceramics. Marine litter items were also classified into three major groups of items: single use plastics, non-single use plastics, and non-plastic marine litter items. Single-use plastics accounted for ca. 40% of total litter collected, followed by non-single-use plastics (ca. 52%), while the lowest percentage belong to non-plastic material (ca. 8%).

The average value of number of marine litter items on Zvërnec beach was 444 items/100 m stretch. As a part of the Cooperation Agreement between UNEP/MAP 2016-2021 and the Italian Ministry of Environment, Land and Sea (IMELS), during the 2018-2019 period Albanian Urban Research Institute (URI) conducted **UNEP/MAP's "Adopt a beach" pilot project** on two beaches: the beach on Buna delta, located in a semi-urban area; and the second beach located along the northern part of the Cape of Rodon (Figure 3.16).

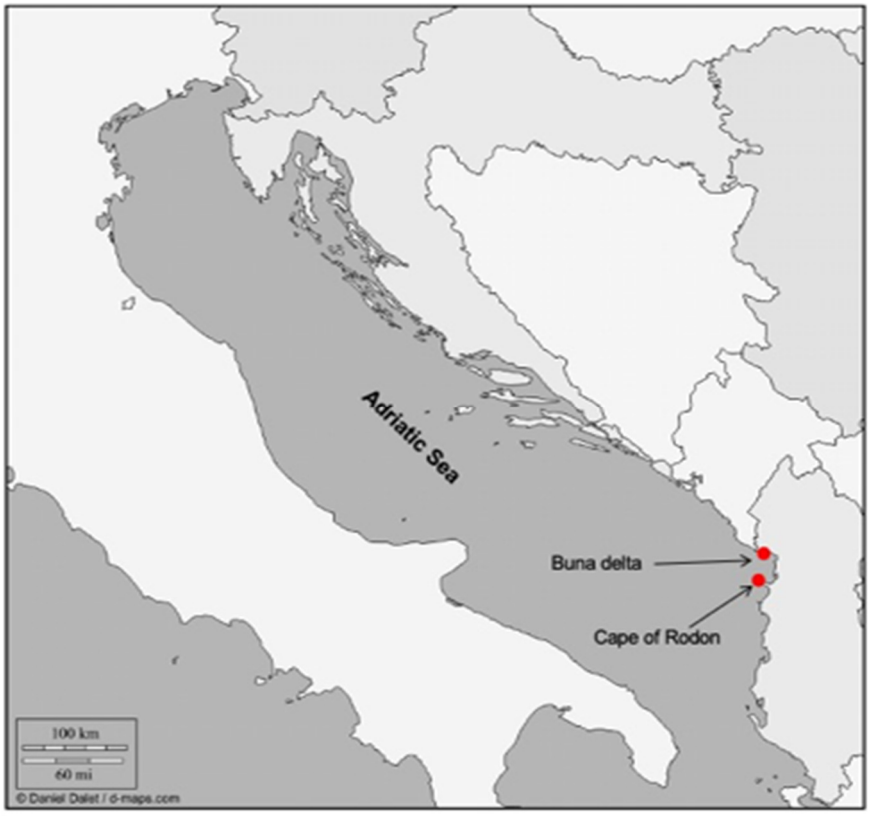


Figure 3.16. Buna delta and Cape of Rodon beaches monitored during UNEP/MAP "Adopt a beach" project

The majority of litter items (for both surveyed beaches for all monitoring periods) were made of artificial polymer materials (69% or 3373 of total items). The second most abundant material type was metal (9.6% or 639 items). The highest percentage of plastics was recorded at Buna delta during the spring period 2019 with a total plastic percentage share of 96%, followed by Cape of Rodon during autumn 2018 with a plastic percentage share of 87%.

The mean litter density was 669 items/100 m (range: 348–1,282 items/100 m) with an average litter density of and 0.18 and 3.1 items/m^2 for Buna delta and Cape Rodon, respectively. The largest abundance in terms of items was observed in Cape of Rodon with 1282 items/100 m stretch of beach. According to the Clean coastal index (CCI) Buna delta beach belongs to "clean" beaches (CCI = 3.64), while Cape of Rodon beach belongs to extremely dirty beaches (CCI = 62).

Table 3.27. Average values of beach litter on all the surveyed beaches, compared with baseline and threshold values

Beach name	Month/year of sampling	Beach type	N of items per 100 m stretch (average)	Reference
Velipojë beach	Seasonal dynamics 2014/2015	Semi-urban	204	Vlachogianni *et al.*, 2017
Shëngjin beach	Seasonal dynamics 2014/2015	Semi-urban	156	Vlachogianni *et al.*, 2017
Plepa beach – Bay of Durrës	Seasonal dynamics 2014/2015	Urban	297	Vlachogianni *et al.*, 2017
Dajlani Bridge – Bay of Durrës	April 2018	Semi-urban	99	Gjyli *et al.*, 2020
Apollonia– Bay of Durrës	April 2018	Semi-urban	419	Gjyli *et al.*, 2020
Golem– Bay of Durrës	April 2018	Semi-urban	291	Gjyli *et al.*, 2020
Iliria– Bay of Durrës	April 2018	Semi-urban	347	Gjyli *et al.*, 2020
Shën Pjetri– Bay of Leizi	April 2018	Semi-rural	510	Gjyli *et al.*, 2020
Zvërnec beach – Karaburun-Sazan MPA	Winter 2017/2018	MPA	444	Vlachogianni, Th., 2019
Buna delta	2018-2019	Semi-urban	563	URI Report, 2019
Cape of Rodon	2018-2019	Rural	775	URI Report, 2019
Average total			373	

The existing data indicate that beach litter pollution is above the proposed baseline and threshold values (according to UNEP/MED WG.476/3), and for the amount of litter on the beaches, expressed as the number of items/100 m, it can be said that the **GES has not been achieved**. Available data on the amount of beach litter for the Adriatic-Ionian region (Table 3.28) indicate that in most countries the amount of beach litter has an increasing trend. This indicates that the issue of marine litter is unresolved and it is likely that GES will not be achieved in all Adriatic countries if the values are compared with the defined baseline and threshold values.

Table 3.28. Comparative data of beach litter abundance (average number of items/100 m^2) in the Adriatic-Ionian region

Country	N of items/100 m^2 2014/2015 (average)	N of items/100 m^2 2017/2018 (average)	References
Albania	220	130	Vlachogianni *et al.* 2017, Vlachogianni *et al.*, 2019
Croatia	2,920	3,350	Vlachogianni *et al.* 2017, Mokos *et al.* 2019
Italy	280	760	Vlachogianni *et al.* 2017, Vlachogianni *et al.*, 2019
Greece	240	1,680	Vlachogianni *et al.* 2017, Vlachogianni *et al.*, 2019
Montenegro	370	600	Vlachogianni *et al.* 2017, Vlachogianni *et al.*, 2019
Slovenia	490	320	Vlachogianni *et al.* 2017, Vlachogianni *et al.*, 2019

Sea-floor litter

Data related to the sea-floor litter for Albanian waters are very scarce. Like the majority of Mediterranean countries, Albania is also one of the countries where MEDITS surveys are performed on a regular basis (during the summer period). In Albania, a total of 27 hauls are monitored each year for the analyses of spatial distribution and abundance of demersal fisheries resources (Figure 3.17). The research was conducted by the research vessel "Pasquale e Cristina" at the same positions during the summer period each year using a specially designed bottom trawl net used by all other Mediterranean countries. Simultaneously with monitoring of fisheries resources, data related to the amount, composition, and spatial distribution of marine litter are collected.

There are only few published studies providing detailed data on the amount of marine litter in Albania. The first, published by Kolitari *et al. (*2016) provides data related to the weight of total litter collected during MEDITS survey conducted in 2015. The drawback of that study is that there are no calculated number of items/km^2 or kg/km^2, as well as no data relating to the swept area which would allow calculation of the total litter amount per unit of surface. Only the data related to the total weight of marine litter collected at each haul are presented and cannot be used for GES assessment.

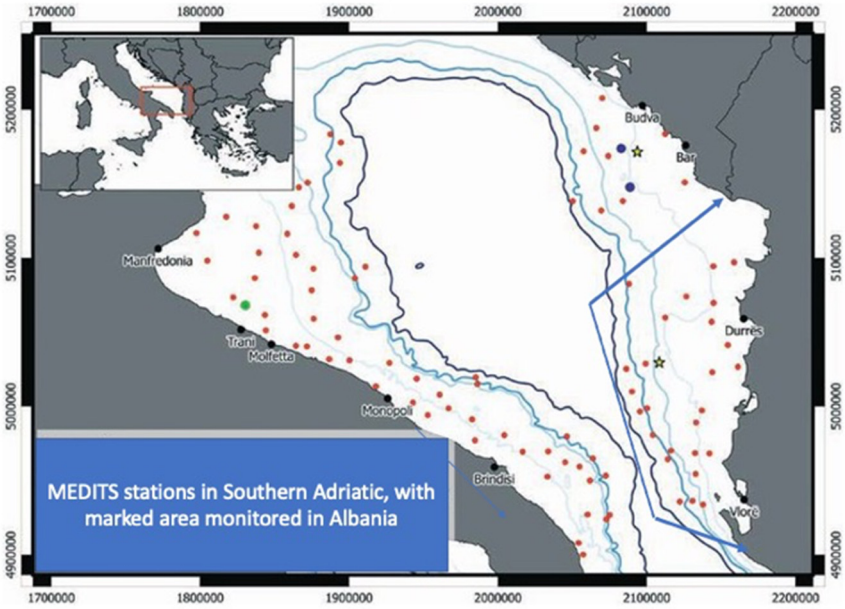


Figure 3.17. MEDITS stations in Albanian waters. *Source: Carbonara et al., 2017, modified*

Spedicato *et al. (*2019) published data related to marine litter pollution for the period 2013-2015 for the south-eastern part of the Adriatic Sea, including data on Albanian waters. Although that study does not present details by litter category, from the map of spatial distribution of marine litter (Figure 3.18) it can be seen that the average abundance of plastic litter in Albania is in range of 47-2,034 items/km^2 of the sea floor. On average, depths ranging from 50 m to 200 m depth (approximately the border of the continental shelf) were the most affected by the presence of plastic.

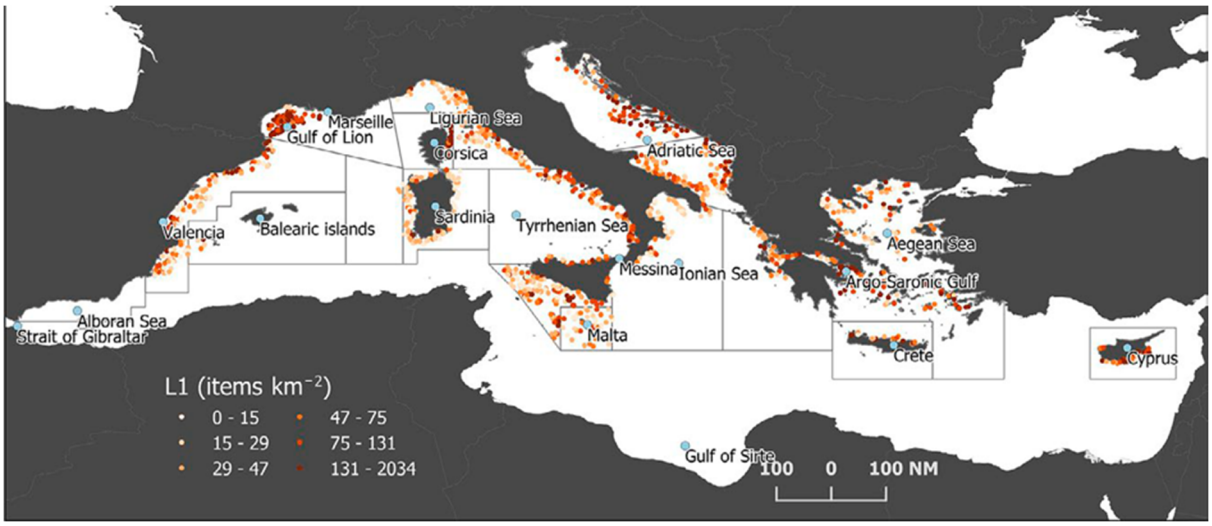


Figure 3.18. Abundance of plastic marine litter items (L1 – N items/km^2) in the southern Adriatic including Albanian waters. *Source: Spedicato et al., 2019*

Due to the data scarcity on the basis of which baseline and threshold values could be proposed and agreed, **the assessment of GES for sea-floor litter in the open sea of Albania is not possible at this stage.**

The following table provides available data on the amount of sea-floor litter in the Mediterranean (Table 3.29). The data indicate that the Adriatic Sea is one of the most polluted seas when it comes to marine litter pollution.

In general, based on the data presented in this document, it can be preliminary concluded that, regarding marine litter pollution, **GES has not been achieved** (Table 3.30).

Table 3.29. Comparative data of sea-floor litter abundance (average N of items/km^2) in the Mediterranean

Area	Average litter abundance	% plastics	Reference
North and central Adriatic (western part)	85 kg/km^2	34%	Strafella *et al.*, 2015
North and central Adriatic (western part)	913 items/km^2, 82 kg/km^2	80%, 62%	Pasquini *et al.*, 2016
Sicilian channel	66 items/km^2	55%	Fiorentino *et al.*, 2015
Adriatic-Ionian	510 items/km^2, 65 kg/km^2	89.4%	Vlachogianni *et al.*, 2017
Sardinia (GSA[1] 11)	39 items/km^2	58%	Spedicato *et al.*, 2019
Lionski Zaliv (GSA[1]7)		99%	
Eastern Corsica (GSA[1] 8)	534 items/km^2	33%	
Cyprus (GSA[1] 25)	198 items/km^2	35%	
Aegean Sea (GSA[1] 19)	136 items/km^2	50%	
Northern and central Adriatic (eastern part) (GSA[1] 17)	112 items/km^2	45%	

[1] GSA – Geographical Sub-Area (Resolution GFCM/33/2009/2)

Table 3.30. GES assessment for marine litter in Albania

Criteria Indicator	GES definition	GES Assessment
Trends in the amount of litter washed ashore and/or deposited on coastlines (CI22)	Number/amount of marine litter items on the coastline does not have negative impacts on human health, marine life, and ecosystem services	The existing data indicate that beach litter pollution is above the proposed baseline and threshold values (according to UNEP/MED WG.482/23), and, for the amount of litter on the beaches, expressed as the number of items/100 m, it can be said that the GES has not been achieved.
Trends in the amount of litter in the water column including microplastics and on the sea floor (CI23)	Number/amount of marine litter items in the water surface and the sea floor do not have negative impacts on human health, marine life, ecosystem services, and do not create risk to navigation	Not possible to assess GES. There are no data regarding floating litter in Albania. In addition, there is a data scarcity on the basis of which regional baseline and threshold values could be agreed.
		Not possible to assess GES. The existing data indicate that sea-floor litter amount in Albania is above proposed threshold values. In addition, there is a data scarcity on the basis of which regional baseline and threshold values could be proposed and agreed.

3.1.g Eutrophication – EO5

Eutrophication is a process driven by enrichment of water by nutrients, especially compounds of nitrogen and/or phosphorus, leading to increased growth, primary production, and biomass of algae; changes in the balance of organisms; and water quality degradation. The consequences of eutrophication are undesirable if they degrade ecosystem health and/or the sustainable provision of goods and services. These changes may occur due to natural processes; but management concerns arise when they are attributed to anthropogenic sources. Although these shifts may not be harmful in themselves, the main worries concern 'undesirable disturbance' – the potential effects of increased production, and related changes of the balance of organisms, on the ecosystem structure, function, goods, and services.

GES criteria and definitions

In 2013, the initial GES definitions for Common Indicators within each IMAP Ecological Objective were defined and agreed at the Conference of the Parties (COP18) by Decision IG.21/3 [UNEP(DEPI)/MED IG.21/9 Annex II]. Since then, some of those definitions have been slightly updated and modified, namely in Decision IG 22/7 (COP19, 2016), and the IMAP Common Indicator guidance factsheets presented at the Meeting of the MED POL Focal Points in Rome in 2017 (UNEP(DEPI)/MED WG. 439/12).

The first step in this study was the establishment of water typology for Albania. The water typology is mainly focused on hydrological parameters, characterising water body dynamics and circulation, and is based on the introduction of the static stability parameter (derived from temperature and salinity values in the water column). Such a parameter, having a robust numerical basis, can describe the dynamic behaviour of a coastal system. Surface density is adopted as a proxy indicator for static stability as both temperature and salinity are relevant in the dynamic behaviour of a coastal marine system: both are involved in circulation and mixing dynamics and all information is then nested in the surface density parameter (Giovanardi *et al., 2*006).

Based on surface density (σ_t) values, three major water types with subdivisions have been defined:

- Type I: coastal sites highly influenced by freshwater input;
- Type IIA: coastal sites moderately influenced but not directly affected by freshwater input (Continent influence);
- Type IIIW: continental coast, coastal sites not influenced/affected by freshwater inputs (western basin);
- Type IIIE: not influenced by freshwater input (eastern basin);
- Type Island: coast (western basin).

Thus, it is recommended to define the major coastal water types in the Mediterranean Sea to assess eutrophication (Table 3.31). This subdivision, based only on salinity, is perfectly comparable with the previous ones, based on density.

Table 3.31. Major coastal water types in the Mediterranean

	Type I	Type IIA, IIA Adriatic	Type IIIW	Type IIIE	Type Island-W
σ_t (density)	< 25	25 < d < 27	> 27	> 27	All range
S (salinity)	< 34.5	34.5 < S < 37.5	> 37.5	> 37.5	All range

The major coastal water types and related criteria in the Mediterranean were defined following their intercalibration that was applicable for phytoplankton only, as provided in Decision IG.22/7 on IMAP (COP 19, 2016).

For Albania, as part of the Adriatic Sub-region the relevant coastal water types are Type I, Type IIA Adriatic, and Type IIIW.

GES thresholds and trends are recommended to be used in a combined way, according to data availability and agreement on GES threshold levels. In the framework of UNEP/MAP MED POL there is experience with regards to using quantitative thresholds. It is proposed that for the Mediterranean region, quantitative thresholds between "good" (GES) and "moderate" (non-GES) conditions (i.e., G/M thresholds) for coastal waters could be considered as appropriate, based on the work carried out in the framework of the MEDGIG intercalibration process of the EU Water Framework Directive (WFD). It is recommended to rely on the classification scheme on chlorophyll *a* concentration (µg L^{-1}) in coastal waters as a parameter easily applicable and based on the indicative thresholds and reference values of chlorophyll *a* in Mediterranean coastal water types (according to 2013/480/EU), recalling the reference conditions and boundaries of good/moderate status (G/M). The thresholds and reference values are presented in Tables 3.32 and 3.33 for Type I and Type IIA Adriatic (UNEP(DEPI)/MED WG. 463.Inf.13).

Table 3.32. Reference conditions and boundaries of ecological quality classes for BQE phytoplankton expressed by different parameters for Type I coastal waters. The G/M boundary (orange) is also the accepted GES boundary

Boundaries	TRIX	Chl-*a* annual *G_Mean* µg L^{-1}	TP annual *G_Mean* µmol L^{-1}
Reference Conditions	-	1.40	0.19
H/G	4.25	2.0	0.26
G/M	5.25	5.0	0.55
M/P	6.25	12.6	1.15
P/B	7	25.0	2.00

Table 3.33. Reference conditions and boundaries of ecological quality classes for BQE phytoplankton expressed by different parameters for Type IIA Adriatic coastal waters. The G/M boundary (orange) is also the accepted GES boundary

Boundaries	TRIX	Chl-*a* annual *G_Mean* µg/L	TP annual *G_Mean* µmol/L
Reference Conditions	-	0.33	0,16
H/G	4	0.64	0.26
G/M	5	1.5	0.48
M/P	6	3.5	0.91
P/B	7	8.2	1.71

At the moment, integrative classification schemes based on CI13 key nutrients in the water column are under development. There are only the proposed values for the concentration of Total Phosphorous (TP) and these are based on the preliminary documents accepted at the CORMON meeting in 2021 (UNEP(DEPI)/MED WG. 492.11).

Type IIIW for the Adriatic

No correlation of chlorophyll *a*, during the boundary setting, with the dilution factor, DIN, and TP was found for Type IIIW (Giovanardi *et al., 2*018). Additionally, overall values of G_mean of chlorophyll *a* ranged from ca. 0.1 to ca. 0.4 µg L^{-1}. Since the ecological classification scheme consists of five ecological quality classes, the discrimination limit between two contiguous chlorophyll *a* annual G_mean values would not be suitable for proper and safe classification (Giovanardi *et al., 2*018). For that reason, a single threshold value, for the G/M boundary, is therefore proposed for Type IIIW Adriatic coastal waters that is the H/G value for Type IIA Adriatic of 0.64 µg L^{-1}.

Table 3.34. Criteria and methodological standards for GES assessment for EO5 Eutrophication in Albania.
EO = Ecological objective, CI = Common indicator

Criteria			**Methodological standards**	
Parameters	**Indicator with related GES definition (minimum requirements for achieving GES)**	**Indicator measurement and thresholds**	**Scale of assessment**	**Use of criteria**
CI13: Concentration of key nutrients in water column				
Concentration of Dissolved Inorganic Nitrogen (DIN) and ammonium Concentration of Total Phosphorous (TP) and orthophosphate N/P ratio	GES definition: Concentrations of nutrients in the euphotic layer are in line with prevailing physiographic, geographic, and climate conditions	What is measured: At the moment there are only proposed values for the concentration of Total Phosphorous (TP), and are based on the UNEP(DEPI)/MED WG. 492.11. Thresholds: Annual geometric mean of concentration of total phosphorus (TP) that separates the Good from Moderate state – for Type I – 0.55 µmol/L, for Type IIA Adriatic – 0.48 µmol/L.	National level	GES for the indicator concentration of nutrients in the water column is achieved if the average annual value (geometric mean) for individual nutrients is not higher than thresholds for total phosphorus (TP) (Good/Moderate threshold)
CI14: Chlorophyll *a* concentration in water column				
Concentration of chlorophyll *a*	GES definition: Natural levels of algal biomass, water transparency and oxygen concentrations in line with prevailing physiographic, geographic, and weather conditions	What is measured: Concentration of chlorophyll *a* Thresholds: Annual geometric mean of concentration of total phosphorus (TP) that separates the Good from Moderate state – for Type I – 5.0 µg/L, Type IIA Adriatic – 1.50 µg/L, and for Type IIW Adriatic – 0.64 µg/L	National level	GES for the indicator concentration of chlorophyll *a* in the water column is achieved if the average annual value (geometric mean) is not higher than thresholds for chlorophyll α (Good/Moderate thresholds)

EO5 GES assessment

As the qualitative and quantitative description of the marine environment is insufficient for objective, comparable and internationally harmonised expression of the ecological status of individual components of the marine system, different indices have been introduced for individual biological quality elements (AMBI, M-AMBI, EFI, BENTIX, etc.). One of them is the index for describing the trophic state of the water column (TRIX) proposed by Vollenweider *et al., (*1998) which includes data on water column oxygen saturation, nitrogen and phosphorus nutrient concentrations, and chlorophyll *a.* For the purpose of assessing the ecological condition of the coastal sea the use of TRIX is recommended in the Adriatic. However, as the monitoring data are scarce, the use of TRIX is not possible and only partial data of the state of the environment (RiGnM, 2018) are summarised in Table 3.34.

Table 3.35. Concentrations (c) of Total nitrogen (TN), Total phosphorous (TP), and Chlorophyll *a* (Chl *a*) during samplings (Apr-May, Aug-Sep) in 2018 at ten locations along the Albanian coast. *Source: RiGnM, 2018.*

N	Station	*c*(TN)/µmol L^{-1}		*c*(TP)/µmol L^{-1}		*c*(Chl *a*)/µg L^{-1}	
		Apr-May	Aug-Sep	Apr-May	Aug-Sep	Apr-May	Aug-Sep
1	Shengjin Port	160.7	238.6	1.61	0.65	1.89	2.97
2	The Drini estuary	147.1	221.4	1.29	1.94	1.69	2.36
3	Tales Beach	207.9	258.6	1.61	1.29	1.50	2.21
4	Porto Romano	37.1	228.6	26.80	26.47	0.72	3.18
5	Triport (Zvërnec)	13.6	64.3	0.32	0.32	0.37	2.15
6	Port of Vlora	92.1	128.6	5.49	0.97	1.84	2.14
7	Baths in Karaburun	14.3	60.0	0.32	0.65	0.23	0.88
8	Borsh Beach	27.9	42.9	0.65	0.65	0.17	0.39
9	Saranda Port	31.4	48.6	0.97	2.58	0.20	0.55
10	Fishing Port (Saranda)	18.6	28.6	0.65	1.94	0.21	0.35

The concentrations of TN and TP (*R*(TN)=27.9-258.6 µmol L^{-1}; *R*(TP)=0.32-26.8 µmol L^{-1}) show a wide range indicating that in some areas such as Porto Romano, where the highest values were observed, the input of nutrients is high. Such high values indicate a hot spot area. It is usual that the sampling is performed in the nearest influenced area (not directly in the "hot spot"), because the values are always the highest at the source of contamination. The lowest values were observed at the southern part of the Albanian coast, where there is no influence from freshwater sources.

The range for the concentrations of chlorophyll *a* were *R*(Chl *a*) = 0.20-3.18 µg L^{-1} and are not in line with the high values of TN and TP indicating that either the input of nutrients are quite recent and have not jet produced the reaction of the ecosystem or a methodological problem is present, which is more realistic. The values observed for the stations in the Otranto Strait and Ionian Sea are in line with the values usually observed for an oligotrophic coastal sea. The values for the Adriatic part of the Albanian coast show a moderate influence of the freshwater input of nutrients that is also confirmed from satellite images (Figure 3.19) during the sampling period. On those images it can be observed also a significant variability of the Chlorophyll *a* value along the Adriatic part of the coast, showing that the processes of enrichment with nutrients and the effect of this processes can be very variable in space and time and depending on many factors.

A high chlorophyll *a* region occurs in the south-eastern Adriatic Sea along the coasts of Montenegro and Albania (Figure 3.20). The River Buna in Albania partially forms the border between the two countries and provides the primary freshwater inflow to the south-eastern Adriatic region. The regionally high chlorophyll *a* concentration is associated with the Buna/Bojana River plume and elevated chlorophyll *a* concentrations can extend northwards for more than 150 km along the eastern coastline (Marini *et al., 2*010).

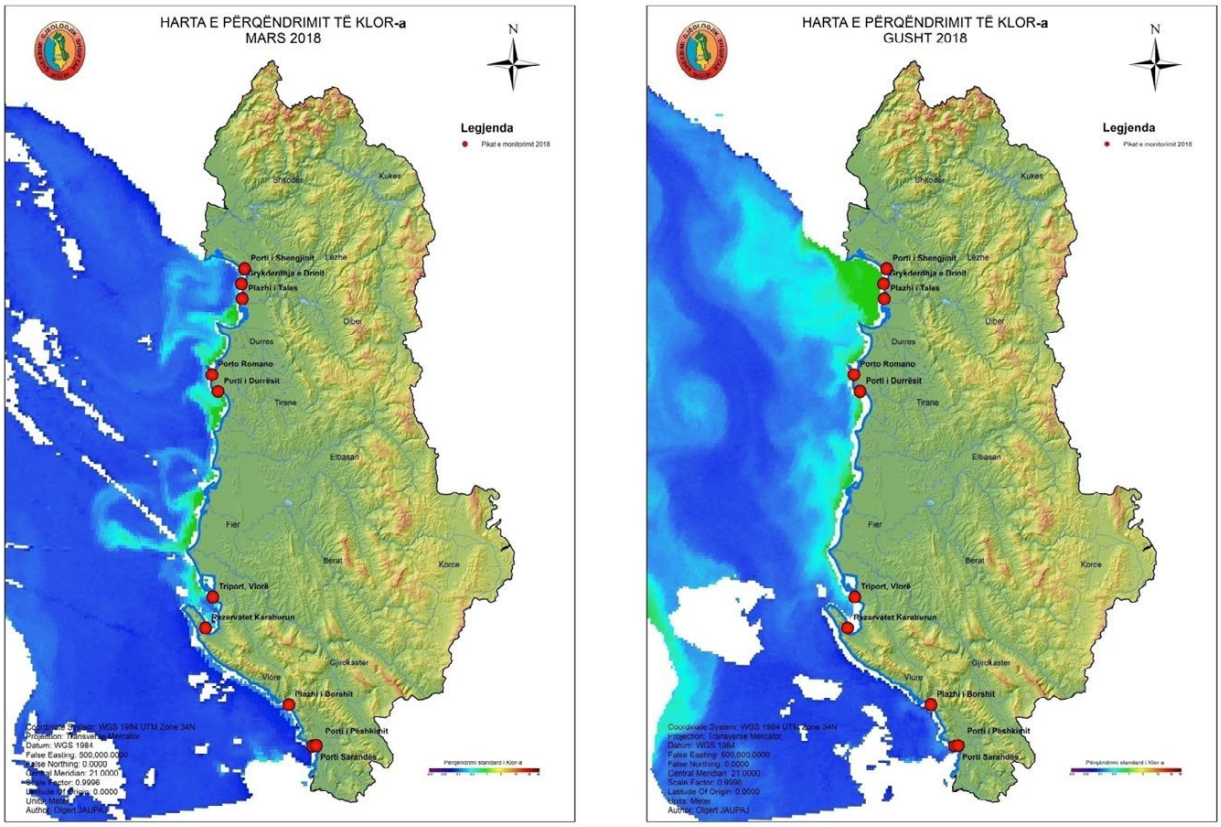


Figure 3.19. Satellite image (Modis) of concentrations of chlorophyll *a* along the Albanian coast for March and August 2018 with sampling stations indicated. *Source: RiGnM, 2018*

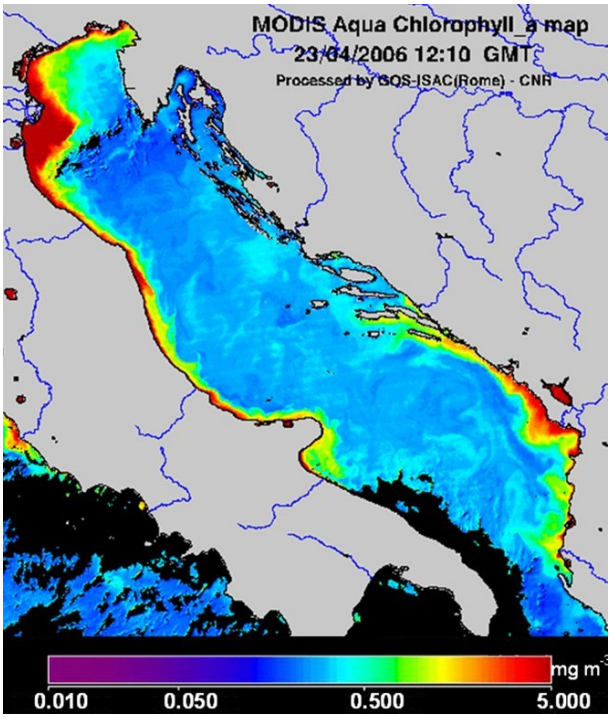


Figure 3.20. MODIS image of chlorophyll *a* concentration on 23 April 2006. *Source: Marini et al., 2010*

The eutrophication status along the Albanian has not been adequately characterised due to lack of observations. However, it can be concluded that, in addition to the flow from the Buna River, the concentrations of the chlorophyll along the coastline are likely a result of the river-borne nutrient input from the freshwater flux of the Drini, Mati, Ishimi, Erzeni, Shkumbini, Semani, and Vjosa rivers. No information exists in the literature regarding nutrient and biogeochemical characteristics for the region. This evaluation will be based on two not so recent studies (2006 and 2007/2008 respectively), one that partially encompass the northern part of the Albanian cost (Marini *et al., 2*010) and the other Vlora Bay (Mangoni *et al., 2*011).

In study of Marini *et al. (2*010), the distribution of salinity shows that the northern part of the Albanian coast is a hydrographically dynamic area due to substantial and variable freshwater input during the sampling period. The input of nutrients is traceable mainly through the concentration of DIN; even orthophosphate was measured but arise not presented in the publication. The value range, *R*(DIN) = 2-18 µmol L^{-1}, was higher than the one observed for the Po River for similar salinity ranges (Marini *et al., 2*010). The concentration of chlorophyll *a* ranged from 1-2.1 µg L^{-1} and is in line with values observed in similar coastal areas.

The Buna/Bojana area contains higher nutrient concentrations compared with the Po River plume, yet near-surface chlorophyll *a* concentrations appear to be similar. These differences should contribute to differences in the phytoplankton community structure and to the nutrient recycling pathways in the system. On the other hand, the observations in Vlora Bay are indicative of a less impacted system, suggesting a more oligotrophic area but still showing few distinct characteristics. The main outputs of the study are presented in Table 3.35.

Table 3.36. Maximum, minimum, and average values of temperature, salinity, nutrients, chlorophyll *a* for the two cruises (CISM_1 in spring 2007 and CISM_2 in winter 2008)

	d(NH_4) µmol L^{-1}	d(NO_2) µmol L^{-1}	d(NO_3) µmol L^{-1}	d(PO_4) µmol L^{-1}	d(SiO_4) µmol L^{-1}	d(DIN) µmol L^{-1}	d(Chla) µg L^{-1}
CISM_1 (May 26–31, 2007)							
Max	0.87	0.18	0.42	0.15	4.36	1.24	0.84
Min	0.20	< 0.01	< 0.01	< 0.01	0.97	0.25	0.07
Avg	0.34	0.04	0.06	0.03	1.89	0.44	0.25
SD	0.09	0.04	0.09	0.02	0.76	0.18	0.16
CISM_2 (Jan 19–22, 2008)							
Max	0.30	0.45	0.65	0.06	4.17	0.99	0.49
Min	0.06	0.06	0.07	0.01	1.20	0.22	0.21
Avg	0.14	0.21	0.19	0.03	1.93	0.54	0.35
SD	0.05	0.10	0.09	0.01	0.45	0.19	0.06

During spring, the E-W surface gradient was characterised by low salinity in the eastern and central areas, and by high salinity in the western area. The distribution of these variables in the bottom layer was strictly related to bathymetry, i.e., the presence of open-sea waters was evident.

During both sampled seasons, the concentrations of NO_3 and PO_4 were low and, at times, near or below the detection limits, especially in spring (Table 3.35.). The PO_4 concentrations were similar to those observed in spring. The SiO_4 concentrations were relatively low (range 4.36–0.97 µmol L^{-1}) and similar in both seasons. The NH_4 concentrations were quite high in spring, as high as 0.87 µmol L^{-1}, whereas in winter the mean concentration was only half of that measured in spring.

During spring, the mean Chl a value was 0.25 µg L^{-1}, a value that is typical of the oligotrophic areas, and the surface spatial distribution showed high concentrations along the eastern coast of the bay. In winter, the highest values of chlorophyll *a* were recorded in the eastern and central areas of the bay. The surface spatial distribution of the phytoplankton biomass showed a clear E-W gradient, with the highest concentrations along the eastern coast, thus emphasising the role of terrestrial input from the city of Vlora and from Narta Lagoon. These distributions were consistent with the salinity gradients. In addition, the low PO_4 and NO_3 concentrations, which were often near or below the detection limit, indicated a condition of nutrient depletion.

These two studies, even sporadic in time, **show the main characteristic along the Albanian coast: the moderately influenced northern part of the coast, mainly from terrestrial input through rivers and the southern part, below Vlora Bay of distinct oligotrophic characteristics.**

As for the EO5 GES assessment, it must begin with the water type definition for the assessed stations. Figure 3.21 presents a tentative definition of the water typology. All data for the wider area collected in the Seadatanet cloud were analysed and the salinity distribution presented along the Albanian coast.

It can be argued that most probably the northern part of the Adriatic coast of Albania, which is moderately influenced from terrestrial input of freshwater, will mostly be of type IIA Adriatic and in same parts where the freshwater input is substantial of type I. The rest of the coastal waters will be of type IIIW Adriatic denoting waters that are not impacted from land.

In order to estimate GES before establishing an appropriate monitoring program, the part related to the typology definition can be achieved through a modelling effort, which can result with better defined assessment areas until monitoring data are available.

For the Common indicators 13 and 14, GES assessment is not possible at the moment due to the lack of monitoring data.

An assessment of the current state, however, showed that two distinct areas exist: the moderately influenced northern part of the coast, mainly from terrestrial input through rivers, and the southern part, below Vlora Bay, with distinct oligotrophic characteristics.

Measures to implement a harmonised and coordinated implementation of the national monitoring program in accordance with the IMAP (developed within the GEF Adriatic project), and with other national monitoring programs implemented in the Adriatic waters under the sovereignty of Albania, must be undertaken.

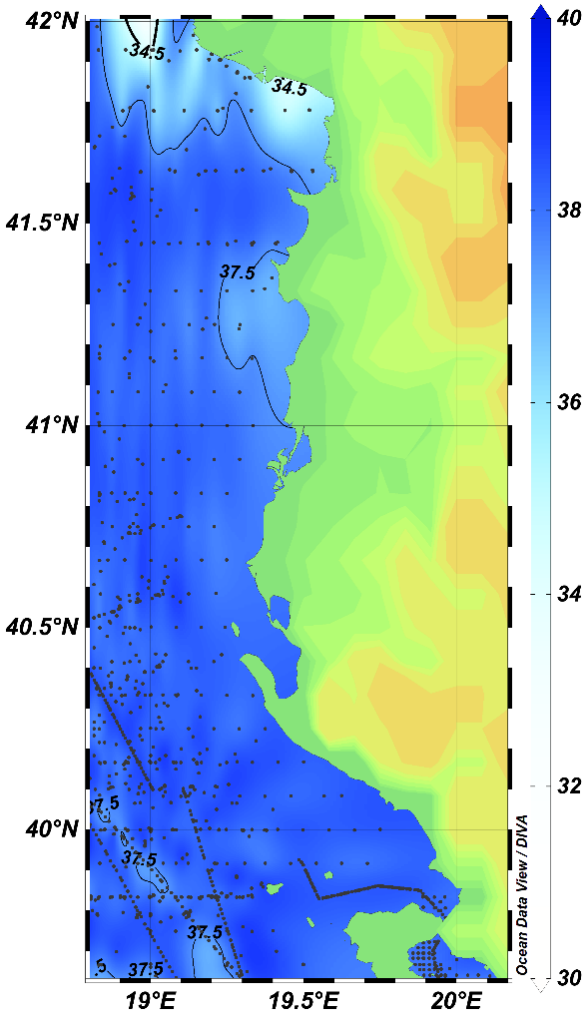


Figure 3.21. Distribution of salinity along the Albanian coast.
Source: Seadatanet cloud. Elaborated in: Ocean Data View.

Table 3.37. GES assessment for EO5 Eutrophication in Albania

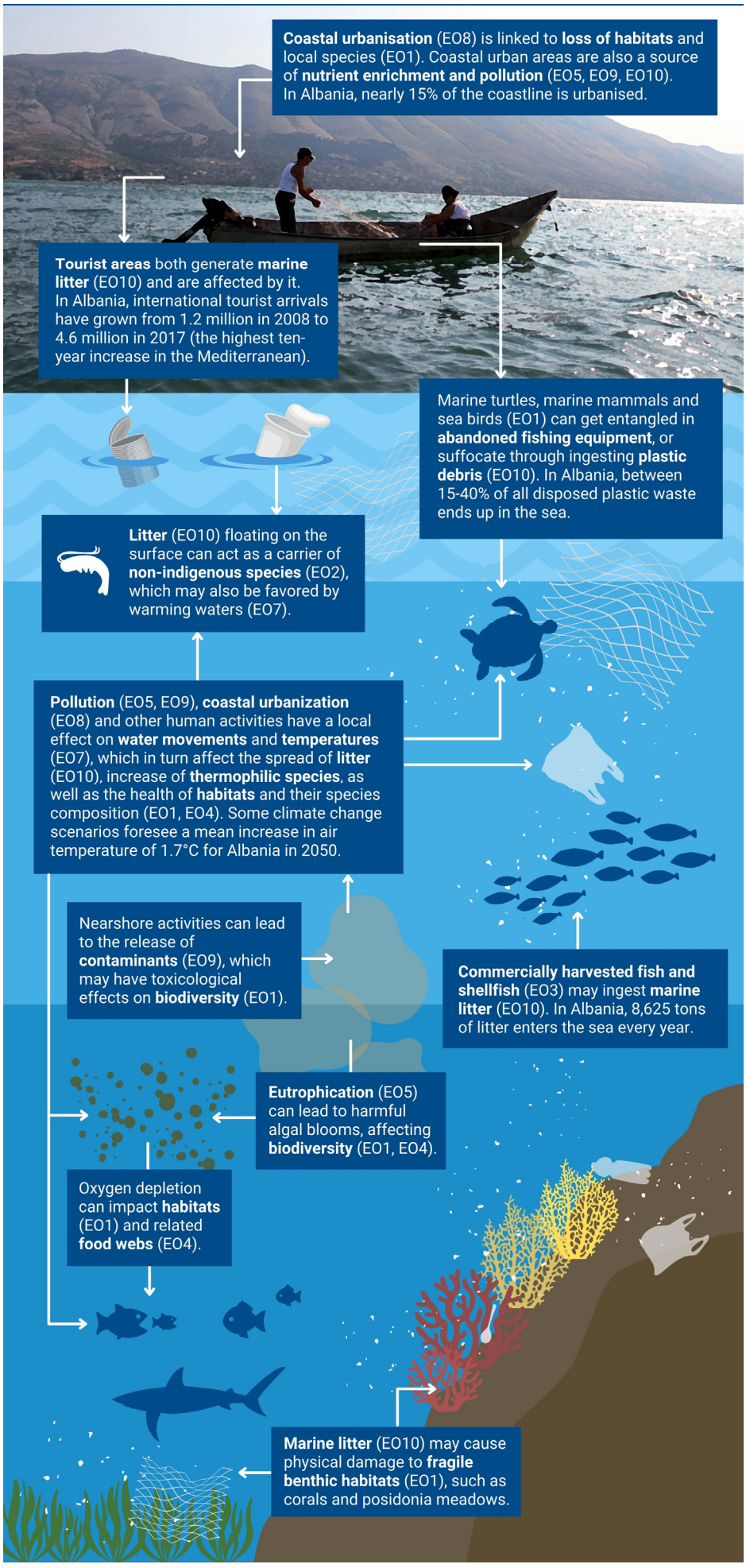
Criteria		GES Assessment
Indicator	GES definition	
Concentration of key nutrients in water column (CI13)	Concentrations of nutrients in the euphotic layer are in line with prevailing physiographic, geographic, and climate conditions	GES assessment for the Albanian sea regarding CI13 is not possible at the moment
Chlorophyll *a* concentration in water column (CI14)	Natural levels of algal biomass, water transparency and oxygen concentrations in line with prevailing physiographic, geographic, and weather conditions	GES assessment for the Albanian sea regarding CI13 is not possible at the moment

3.2 Interrelations between Ecological Objectives

The interrelations between Ecological Objectives and their Common Indicators are evident and they stress out the need for an integrated approach to the overall GES assessment. A need for an integrated approach was endorsed at the 7th meeting of the Ecosystem Approach Coordination Group of the UNEP/MAP in 2019 (UNEP MED WG. 467/7).

In general, the pressures expressed through majority of Ecological Objectives (EO2, EO3, EO9, EO10, EO11) may foremostly affect the status of biodiversity, but also partially explain it. For instance, Common indicator 12 under EO3 provides information on by-catch of vulnerable and non-targeted species and the state of pelagic habitats. EO4 (Marine food webs) and EO6 (Sea-floor integrity) are still not elaborated under IMAP, but under MSFD with EO7 (Hydrography), they are considered as descriptors of the extent and condition of benthic habitats under EO1. It is not possible to draw any conclusions for the Albanian GES assessment specifically, apart from the assumption that pressures may have certain impacts on different environmental components, as already explained under chapter 2, but it is not known to which extent or level. However, tables describing the established general interconnections between Ecological Objectives can be found in Annex 1, and can be seen as a guidance for future GES assessments in Albania. Here also, it is evident that state of Biodiversity (EO1) is affected by majority of Ecological Objectives, but there is also a significant level of interaction between Pollution/Contaminants (EO9) and Hydrography (EO7) with other Ecological Objectives. For example, toxicological effects of Harmful chemicals (EO9) may affect not only Biodiversity (EO1), but NIS (EO2). Recent research studies also show that chemical plasticisers and other known persistent substances can leach from Marine litter (EO10) into the sea water. Furthermore, increasing Seawater temperatures (EO7) due to global warming facilitates the spread of NIS (EO2), which will need careful monitoring.

Figure 3.22. Interrelations between the marine environment and human activities in Albania, as a basis for assessing interrelations between the Ecological Objectives



4 Integrated GES gaps and needs

This chapter explains challenges with carrying out the first GES assessment and needs that should be met to be able to enable future GES assessments.

4.1 Lack of legislative framework for GES assessment and some specific EOs-related topics

It is important to highlight that the GES assessment is an obligation stipulated in national legislation in order to provide strong support so that all data are regularly and timely collected and processed, with adequate human and financial capacities allocated to this effort. The relevant national legislation, foremostly Law No. 8905/02, *On the protection of marine environment from pollution and deterioration*, does not include any provisions related to GES assessment. As a Contracting Party to the Barcelona Convention, Albania is bound to carry out the GES Assessment, but such an obligation would be more robust if clearly emphasised in the national legislation. Albania is entering the negotiation process for accession in the EU and as such, the Albanian legislation should be approximated with the EU *acquis*. In this regard, there is particular need for approval of a new law that transposes the MSFD provisions. This act will then pave the way for the preparation of regulatory acts related to implementation issues, including GES assessment. Another issue that should be considered is the lack of a proper maritime spatial planning legislative framework in Albania. In the future there is a need to start the process of the approximation of the Maritime Spatial Planning Directive that will also help with the planning issues related to the MSFD.

Some specific legislations covering EO topics need to be amended. Namely, shortcomings in national legislation in the fields of water quality and waste management prevent the introduction of adequate measures for prevention and reduction of marine litter, as well as the introduction of penalty provisions for any dumping of waste into the sea. However, since 2018, government initiatives to ban the use of single use plastic bags in Albania was put forward and is expected to be approved by the parliament, which, once in place, will certainly partially reduce the total amount of marine litter. Poor waste management in general, low recycling rates, insufficient waste disposal infrastructure on the coast and beaches, and a low level of waste disposal control are just some of the problems that reduce the ability to address marine litter issue in Albania.

4.2 Lack or limitation of data and knowledge

The first attempt to assess GES in Albania showed significant **lack or limitation of data and knowledge**, and as a result GES could not be assessed in most EOs, except for a few indicators under Pollution (EO9) and Marine litter (EO10).

The scientific research of the marine phyto- and zooplankton, coralligenous assemblages, cetaceans, and NIS presence and distribution is particularly needed, as well as research on impacts and effects that other activities may have on the coastal and marine ecosystems. Links can be made to monitoring within other sectors, for instance, there is an annual monitoring program that screens commercial fish species and is attempting to incorporate all the requirements from the GFCM Data Collection Reference Framework (DCRF). Although this program is focused on the pelagic and demersal species of economic importance, monitoring of fishing activity (especially of by-catch and discards) could provide useful information for the monitoring of cetaceans, marine turtles, seabirds, NIS, and also for other species that are not directly assessed under EO1 and EO2 such as sharks and rays.

4.3 Institutional gaps, limited human and financial capacities

For the management of water resources (inland, coastal, and marine) there is already an institutional set-up in place; however, most of the functions related especially to marine and open sea waters need to be clarified. As happens often, ad not only in Albania, the management of the marine waters involves several sectors, and coordination and planning is crucial. However, for the moment, not much focus is given to the management of the marine areas, nor maritime spatial planning. The Albanian National Agency of Water Resources has plans of transposing the MSFD and preparing a strategy for the Adriatic-Ionian waters in Albania. This is also directly related to the clarification of the GES assessment and the process related to it, e.g., institution(s) that will carry out the monitoring, determine the thresholds, process the data, maintain the database, finance the monitoring program, etc.

There is a need for a scientific institution dedicated specifically to the sea, such as an institute for marine biology and/or oceanography. There are several institutions such as the Faculty of Natural Sciences and the Centre for Flora and Fauna (within Tirana University); the Laboratory of Fishery and Aquaculture (within the Agricultural University of Tirana), the Institute of GeoSciences, Energy, Water and Environment, etc., but none of these is dedicated or specialised for studies on the coastal and marine ecosystems, and especially not for the GES assessment. This should also include hiring of new staff and acquisition of adequate laboratory infrastructure (highly consolidated laboratory standards), particularly for the purpose of analysing parameters contained in the IMAP – EO9 CIs and GES assessment, as well as vessels and equipment for field /*in situ* measurements.

Furthermore, there is a need to improve the capacities of experts in marine and coastal ecosystems; currently only few national experts deal with these issues. They are engaged only sporadically and the replacement of older experts with new ones is proceeding at a slow pace. Several fields of expertise have only one expert and in some areas, there are no properly trained experts.

Financial capacities are also limited, and results will depend on the projects and activities funded from different international sources.

4.4 Limited monitoring implementation

National Environmental Agency (NEA), as the main institution responsible for environmental monitoring in Albania, prepares an annual National Environmental Monitoring Program, using its own capacities or other institutions through service contracts. NEA operates this program based on the Decision of Council of Ministers (DCM) no. 1189, dated 18.11.2009, which includes a set of indicators of environmental status of the coastal and marine waters, as follows:

1. Biochemical oxygen demand (BOD);
2. Chemical oxygen demand (COD);
3. Microbiological parameters for marine waters and beaches;
4. Quantity of phyto- and zooplankton;
5. Chlorophyll & net primary productivity;
6. Heavy metals, POPs, and radioactive content in marine mussels;
7. Water radioactivity;
8. Sea-lagoon water exchange;
9. River delta dynamics;
10. Morphology and topography of the continental shelf; and
11. Coast morphology.

For the moment only bathing water quality of the marine waters is being assessed in line with the EU Bathing Water Directive (2006/7/EC), and limited monitoring is carried out for the marine and coastal habitats and biodiversity (International Waterbird Census and Fishery dependent and independent data collection). This DCM will need to be amended to improve the indicators, methodology, monitoring set-up, and data formats. This will also facilitate the use of data coming from the annual monitoring for the GES assessment. The National IMP, which was developed within the GEF-Adriatic project with the help of international and national experts, should be strongly considered when preparing the new DCM.

Furthermore, it is also important to ensure adequate data storage and availability through national information system linked to the IMAP INFO System, also developed through the GEF Adriatic Project.

4.5 Transboundary cooperation

There is already a certain transboundary cooperation at the Adriatic level, but it needs to be further improved. Good examples, like the one of joint regular scientific campaigns for the monitoring of pelagic and demersal resources in commercial fish species, as well as Adriatic level projects on conservation of cetaceans and marine turtles, should also be implemented for other transboundary featured components. Transboundary cooperation is important for the Biodiversity (EO1), NIS (EO2, Fisheries (EO3), Pollution (EO9), Marine litter (EO10), and Noise (EO11) Ecological Objectives. Such a collaboration is particularly imperative in identifying certain thresholds at a sub-regional level (more details in section 4.7).

Cooperation should be extended not only to other Adriatic countries, but also to other countries with similar biodiversity issues and which may have extensive knowledge on these issues. Joint meetings to improve national capacities, share data, and discuss thresholds among countries should be organised on regular basis, and at least at the Adriatic level.

4.6 General methodological issues

There were several general methodological considerations when preparing the GES document:

For number of EOs, indicators and assessment criteria were completely lacking (such as EOs 3, 4, 6, and 11), and where appropriate, these were partially substituted with latest MSFD GES assessment criteria.

Threshold values have not been set for all the Common Indicators. For this assessment, GES was estimated mainly for those indicators where threshold values are (regionally) adopted.

On the regional level, there is still no agreed approach for integrated GES assessment. This document is the first attempt in that direction. However, it can easily be adapted and improved based on new criteria and guidelines.

Regarding the overall GES assessment, information technologies could be used to facilitate future GES assessments once all necessary data will be available, and increase the visibility to all relevant authorities and institutions through appropriate web tools. Hence, for the next GES assessments, such options should be explored.

5 GES targets and recommended measures

This chapter attempts to identify preliminary targets and recommended measures for achievement of GES, based on results of GES assessment elaborated in chapter 3.

The identified preliminary GES targets are mostly focused on ensuring sufficient level of knowledge to be able to fully assess GES in the future. In addition, even if the GES for certain assessed parameters is achieved, a set of preliminary targets and general measures is proposed to address the identified threats to maintaining the GES. It should be stressed that in order to be able to implement all measures, it is important to fulfil several structural pre-conditions, as already indicated in chapter 4, particularly focusing on:

- ensuring adequate legislative framework for GES assessment;
- improving institutional capacities;
- ensuring long-term financial capacities.

In particular it is of paramount importance to fully implement the IMAP-based Integrated monitoring programme for Albania (NIMP for Albania), in a way that all measured elements are collected in a systematic and standardised way. Furthermore, acquired information should be adequately managed, stored, shared, and made available using information technology and web tools, such as national databases linked to regional databases and platforms, as developed within the GEF Adriatic project.

Table 5.1. Preliminary GES targets and recommendations to achieve them in Albania, based on results of the first GES assessment of EO1 Biodiversity*

Indicator	GES definition	GES characteristics	Preliminary GES target(s)	Recommendation(s)
HABITATS				
Benthic habitat extent	The habitat is present in all its natural range.	**Not possible to assess GES** due to lack of systematically collected data.	The knowledge on abundance, distribution, and anthropogenic impacts on selected benthic habitat types (*Posidonia* meadows, coralligenous assemblages and photophilic algae) is sufficient to enable GES assessment.	▪ Carry out inventories and establish systematic monitoring of selected habitat types, as elaborated in the National Integrated Monitoring Programme (NIMP for Albania). ▪ Use and further update national IMAP-related database linked with IMAP Info System.
Benthic habitat condition	The population size and density of the habitat-defining species, and species composition of the community, are within reference conditions ensuring the long-term maintenance of the habitat.	**Not possible to assess GES** due to lack of systematically collected data.	The knowledge on selected benthic habitat types condition and state of typical habitat species (*P. oceanica, C. rubrum, and Cystoseira* spp.) is sufficient to enable GES assessment.	
Pelagic habitat condition	The population size and density of the habitat-defining species, and species composition of the community, are within reference conditions ensuring the long-term maintenance of the habitat.	**Not possible to assess GES** due to lack of systematically collected data.	The knowledge on condition of phytoplankton and zooplankton is sufficient to enable GES assessment.	
SPECIES				
Cetaceans distribution range	The species are present in all their natural distributional range.	**Not possible to assess GES.** There is no long-time data series to allow measurement of species distributional range and patterns. Even if the data gathered in two closely implemented aerial surveys do not indicate any decline, it is too early to conclude that species distributional range meets the GES.	The bottlenose and striped dolphin distributional range trend is known, based on regular monitoring at the Adriatic and national levels.	▪ Continue with monitoring of distribution range at the Adriatic level through aerial surveys and other methods, in cooperation with Adriatic countries, as elaborated in NIMP for Albania. ▪ Establish monitoring of distribution of local populations, as elaborated in NIMP for Albania. ▪ Use and further update national IMAP-related database linked with IMAP Info System.

Indicator	GES definition	GES characteristics	Preliminary GES target(s)	Recommendation(s)
Cetaceans population abundance	The species population has abundance levels allowing it to qualify for Least Concern Category of IUCN or has abundance levels that are improving and moving away from the more critical IUCN category.	**Not possible to assess GES.** There is no long-time data series to allow measurement of population abundance trends. Even if the data gathered in two closely implemented aerial surveys do not indicate any decline, it is too early to assume whether this means that anthropogenic pressures have not significantly impacted the population abundance.	The population abundance trends are known, based on regular monitoring at the Adriatic and national levels.	▪ Continue with monitoring of population abundance at the Adriatic level through aerial surveys and other methods, in cooperation with Adriatic countries, as elaborated in NIMP for Albania. ▪ Establish monitoring of abundance of local populations, as elaborated in NIMP for Albania. ▪ Use and further update national IMAP- related database linked with IMAP Info System. ▪ Assess the regional IUCN Red List status of bottlenose dolphin and regularly review it.
Cetaceans population demographic characteristics	Species populations are in good condition: low human-induced mortality, balanced sex ratio and no decline in calf production.	**Not possible to assess GES** due to lack of data on human-induced mortality, sex ratios, and calf production.	The knowledge of human- induced mortality (by-catch) of cetaceans is sufficient to enable GES assessment.	▪ Establish functional national stranding network, as elaborated in NIMP for Albania. ▪ Assess by-catch rate, as elaborated in NIMP for Albania. ▪ Use and further update national IMAP – related database linked with IMAP Info System.
			Anthropogenic pressures that cause mortality of bottlenose and striped dolphin are recognised and addressed through mitigation measures.	▪ Once the data on mortality are being monitored, further analyse the causes of mortality and propose concrete mitigation measures.
			The knowledge on sex ration and calf production of bottlenose and striped dolphin is sufficient to enable GES assessment.	▪ Identify population structure, as elaborated in NIMP for Albania, as well as units to conserve.
Marine turtle distributional range	The species continues to occur in all its natural range in the Mediterranean, including nesting, mating, feeding, and wintering and developmental (where different to those of adults) sites.	**Not possible to assess GES.** There is no long-time data series to allow measurement of species distributional range and patterns. Even if the data gathered in two closely implemented aerial surveys do not indicate any decline, it is too early to conclude that species distributional range meets the GES.	The loggerhead turtle distributional range trend is known, based on regular monitoring at the Adriatic and national level. The distribution of potential and recorded nesting sites is known.	▪ Continue with monitoring of distribution range at the Adriatic level through aerial surveys and other methods, in cooperation with Adriatic countries, as elaborated in NIMP for Albania. ▪ Establish national level monitoring of potential and already recorded nesting sites, as elaborated in NIMP for Albania. ▪ Use and further update national IMAP – related database linked with IMAP Info System.

Indicator	GES definition	GES characteristics	Preliminary GES target(s)	Recommendation(s)
Marine turtle population abundance	Population size allows to achieve and maintain a favourable conservation status, taking into account all life stages of the population.	Not possible to assess GES. There is no long-time data series to allow measurement of population abundance trends. Even if the data gathered in 2 closely implemented aerial surveys do not indicate any decline, it is too early to assume whether this means that anthropogenic pressures have not significantly impacted the population abundance.	The population abundance trend of loggerhead turtle is known, based on regular monitoring.	▪ Continue with monitoring of population abundance at the Adriatic level through aerial surveys and other methods, in cooperation with Adriatic countries, as elaborated in NIMP for Albania. ▪ Establish monitoring of abundance of local populations, as elaborated in NIMP for Albania. ▪ Use and further update national IMAP – related database linked with IMAP Info System. ▪ Assess the regional IUCN Red List status of loggerhead turtle and regularly review it.
Marine turtle population demographic characteristics	Low mortality induced by incidental catch, favourable sex ratio and no decline in hatching rate.	Not possible to assess GES due to lack of data on human- induced mortality, sex ratio and balanced sex ratio.	The knowledge on human- induced mortality (by-catch) of loggerhead turtle is sufficient to enable GES assessment.	▪ Establish functional national stranding network, as elaborated in NIMP for Albania (could be joint with the cetaceans stranding network). ▪ Use and further update national IMAP – related database linked with IMAP Info System.
			Anthropogenic pressures that cause mortality of loggerhead turtle are recognised and addressed through mitigation measures.	▪ Once the monitoring of mortality rate is established, analyse the causes of mortality and propose concrete mitigation measures.
			The knowledge on sex ratio of loggerhead turtle is sufficient to enable GES assessment.	▪ Continue monitoring of potential and already recorded nesting sites, and if possible, monitor breeding and survival success.
Seabirds distributional range	The distribution of seabird species continues to occur in all their Mediterranean natural habitat Biological diversity is maintained. The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic, and climatic conditions.	Not possible to assess GES due to lack of data on species distributional range.	The selected seabirds (wintering and breeding) distributional range trend is known, based on regular monitoring.	▪ Establish monitoring of distribution of breeding and non-breeding seabirds, as elaborated in NIMP for Albania. ▪ Use and further update national IMAP – related database linked with IMAP Info System.

Indicator	GES definition	GES characteristics	Preliminary GES target(s)	Recommendation(s)
Seabirds population abundance	Population size of selected species (of seabirds) is maintained. The species population has abundance levels allowing to qualify to Least Concern Category of IUCN (less than 30% variation over a time period equivalent to three generation lengths).	Not possible to assess GES due to lack of data on population abundance.	The population abundance trends of selected seabirds (wintering and breeding) is known, based on regular monitoring.	▪ Establish monitoring of abundance of seabirds, as elaborated in NIMP for Albania. ▪ Use and further update national IMAP – related database linked with IMAP Info System. ▪ Assess the regional IUCN Red List status of selected seabirds and regularly review it.
Seabirds' population demographic characteristics	Species populations are in good conditions: Natural levels of breeding success and acceptable levels of survival of young and adult birds.	Not possible to assess GES due to lack of data on breeding success and survival rate of young birds, as well as on incidental mortality.	The knowledge on human-induced mortality (by-catch) of selected wintering and breeding seabirds is sufficient to enable GES assessment.	▪ Establish functional national stranding network (could be joint with the cetaceans/marine turtles stranding network). ▪ Use and further update national IMAP – related database linked with IMAP Info System.
			Anthropogenic pressures that cause mortality of seabirds are recognised and addressed through mitigation measures.	▪ Once the monitoring of mortality rate is established, analyse the causes of mortality, and propose concrete mitigation measures.
			The knowledge on breeding success and young bird's survival rate of breeding seabirds is sufficient to enable GES assessment.	▪ Carry out inventory and establish monitoring of breeding colonial species, as elaborated in NIMP for Albania.

Table 5.2. Preliminary GES targets and recommendations to achieve them in Albania, based on results of the first GES assessment of EO2 Non-indigenous species (NIS)

Indicator	GES definition	GES characteristics	Preliminary GES target(s)	Recommendation(s)
Trends in the abundance of introduced species, notably in risk areas	Decreasing abundance of introduced NIS in risk areas.	Not possible to assess GES due to lack of data on newly introduced NIS and population trends, particularly invasive NIS. In addition, there are no thresholds set at the Adriatic Sea level.	The knowledge on newly-introduced NIS and their abundance is sufficient to enable measurement of introduction trends (in 6-year intervals).	▪ Assess presence of selected potential invasive alien species, as elaborated in NIMP for Albania. ▪ Assess abundance and spatial distribution of selected IAS, as elaborated in NIMP for Albania. ▪ Establish early-warning systems for NIS, particularly IAS. ▪ Establish standardised NIS information management, exchange and sharing.
			Adriatic level thresholds are identified to enable GES assessment.	▪ Engage in active cooperation with other Adriatic countries to set the Adriatic level thresholds for NIS.

Table 5.3. Preliminary GES targets and recommendations to achieve them in Albania, based on results of the first GES assessment for E07 Hydrography

Indicator	GES definition	GES characteristics	Preliminary GES target(s)	Recommendation(s)
Location and extent of the habitats impacted directly by hydrographic alterations (CI15)	Negative impacts due to new structures are minimal with no influence on the larger scale coastal and marine system.	Not possible to assess GES, mainly due to the lack of long time-series datasets and the difficulty to discern between the impact of direct anthropogenic pressures and the impacts of global change.	Planning of new structures must take into account all possible mitigation measures in order to minimise the impact on coastal and marine ecosystem and its services integrity and cultural/historic assets.	▪ Implement yearly monitoring of key oceanographic data, as defined by National Integrated Monitoring Programme (NIMP) for Albania. ▪ Create and continuously update the data base (GIS) of all relevant parameters related to hydrography (temperature, salinity, currents, wind-waves statistics etc.). ▪ During any physical intervention, for which the permanent changes in hydrographic properties (more than 10 years) can be expected, the spreading (in km2) of the negative impacts should be estimated by using adequate hydrodynamic models for each particular case. Particular attention should be given on benthic habitats in vicinity of planned constructions. ▪ Wastewater discharges must be positioned in a such way that the stratification (summer thermocline position) prevents the upwelling of contaminants/pollutants to the surface. ▪ An Environmental Impact Assessment (EIA) including measurements of thermohaline conditions, currents and hydrodynamic modelling should be carried out for all planned waste water discharges. After construction, control monitoring should be carried out for each wastewater discharge.

Table 5.4. Preliminary GES targets and recommendations to achieve them in Albania, based on results of the first GES assessment for EO8 Coastal ecosystems and landscapes

Indicator	GES definition	GES characteristics	Preliminary GES target(s)	Recommendation(s)
Length of coastline subject to physical disturbance due to the influence of human-made structures (CI16)	Physical disturbance to coastal areas induced by human activities should be minimised.	2020 assessment of built-up coastline identified 14.47% of coastline being built. Since there was no other such assessment in Albania, it is not possible it is not possible to observe the trend and hence, it is not possible to assess GES.	Negative impacts of human activities on coastal areas are minimised through appropriate management measures.	▪ Systemically monitor and assess the state and processes in the coastal zone, update the CI16 assessment after six years to observe the trend. ▪ Identify and use all relevant sources of high-resolution geographic information systems to monitor coastal and marine development. ▪ Establish specific measures for limiting spatial development in the narrow coastal zone.

Table 5.5. Preliminary GES targets and recommendations to achieve them in Albania, based on results of the first GES assessment for EO9 Pollution

Indicator	GES definition	GES characteristics	Preliminary GES target(s)	Recommendation(s)
Concentration of key harmful contaminants measured in the relevant matrix (related to biota, sediment, seawater) (CI17)	Level of pollution is below a determined threshold defined for the area and species.	GES could be solely inferred from scarce existing scientific literature datasets (2015-2019) for the majority of target harmful chemical compounds. Some high levels of pollution exceeding average concentrations have been observed.	▪ Concentrations of specific contaminants below either Background Assessment Criteria or Environmental Assessment Criteria (BACs/EACs) or below reference concentrations (from other sources). ▪ No deterioration trends in contaminants concentrations in sediment and biota from human impacted areas statistically defined. ▪ Reduction of contaminants emissions from land-based sources.	▪ Both increased and coordinated monitoring (ca. the Integrated National Programme of Albania developed) should be initiated as soon as possible to determine concentrations and trends according UNEP/MAP/IMAP (i.e., biota and sediments). ▪ Socio-economic measures and policy implementation should be effective towards the reduction of pollution observed in wetlands, coastal and marine area hot spots.
Level of pollution effects of key contaminants where a cause and effect relationship has been established (CI18)	Concentrations of contaminants are not giving rise to acute pollution events.	GES has not been evaluated and there are no adequate datasets.	▪ Contaminants effects below thresholds. Levels of biomarkers identified comply with agreed Mediterranean Background Assessment Criteria or Environmental Assessment Criteria (BACs/EACs).	▪ To increase CI18 national monitoring activities to assess toxicological effects in biota (and habitats, e.g. sediments) at a national scale. ▪ Latest research developments in terms of toxicological tools should be considered as this scientific field advances rapidly. Therefore, improved and cost-efficient alternative toxicological tools should be considered.

Indicator	GES definition	GES characteristics	Preliminary GES target(s)	Recommendation(s)
Occurrence origin (where possible) extent of acute pollution events (e.g. slicks from oil products and hazardous substances) and their impact on biota affected by this pollution (CI19)	Occurrence of acute pollution events is reduced to the minimum.	GES is achieved under IMAP reporting characteristics.	▪ Decreasing trend in the occurrences of acute pollution events (achieve the elimination of intentional pollution of the marine environment by oil and other harmful and noxious substances (HNS) and the minimisation of accidental discharge of such substances).	▪ The national agencies and contingency plans for oil spillages and maritime incidents should continue their efforts in collecting statistical data according to IMAP.
Actual levels of contaminants that have been detected and number of contaminants which have exceeded maximum regulatory levels in commonly consumed seafood (CI20)	Concentrations of contaminants are within the regulatory limits for consumption by humans. No regulatory levels of contaminants in seafood are exceeded.	GES has not been evaluated and there are no datasets.	▪ Concentrations of contaminants are within the regulatory limits set by legislation. ▪ Decreasing trend in the frequency of cases of seafood samples above regulatory limits for contaminants.	▪ National food health programs for seafood should be embedded within the National Monitoring Programmes in a higher degree, as well as consider sampling alternatives to measure this indicator.
Percentage of intestinal enterococcal concentration measurements within established standards (CI21)	Concentrations of intestinal enterococci are within established standards.	GES is sufficiently achieved according to the reported datasets and external EEA reports. However, improvements are needed as only 65.7% of sampling sites were of excellent quality for coastal bathing areas.	▪ Increasing trend in the measurements within established standards (levels of intestinal enterococci comply with established national or international standards, such as EU 2006/7 Directive).	▪ For this indicator (CI21) the combined monitoring and necessary actions/measures to be taken (e.g. waste water treatments) should improve the (%) percentage of bathing water quality in known hot spots. Datasets should continue to be reported according IMAP (and EU MSFD) methodologies for regional and European harmonisation, as well as to benefit from further comparability and developments in this field.

Table 5.6. Preliminary GES targets and recommendations to achieve them in Albania, based on results of the first GES assessment for EO10 Marine litter

Indicator	GES definition	GES characteristics	Preliminary GES target(s)	Recommendation(s)
Trends in the amount of litter washed ashore and/or deposited on coastlines (CI22)	Number/amount of the marine litter items on the coastline does not have negative impacts on human health, marine life, and ecosystem services.	GES is not achieved.	Reduction trend in the number of/amount of marine litter (items) deposited on the coast, for at least 20%.	▪ Adopt and make operational a Government initiative to ban the use of single use plastic bags. ▪ Organise activities that address a change of companies' and people's behaviour in terms of production of environmentally friendly designs, in particular for packaging, reuse, and recycling. ▪ Ensure appropriate waste disposal measures on the beaches. ▪ Involve different stakeholder groups in the activities of beach cleaning and record-keeping of types and quantities of marine litter on the beaches.
Trends in the amount of litter in the water column, including microplastics, and on the sea floor (CI23)	Number/amount of the marine litter items in the water surface and the sea floor do not have negative impacts on human health, marine life and ecosystem services and do not create risk to navigation.	Not possible to assess GES, as there are not yet regionally agreed thresholds.	Reduction trend in the number of/amount of marine litter (items) in the water column and on the sea floor.	▪ Adopt and make operational the government initiative to ban the use of single use plastic bags. ▪ Organise activities that address a change of companies' and people's behaviour in terms of production of environmentally friendly designs, in particular for packaging, reuse, and recycling. ▪ Prevent inflow and/or reduce the quantity of marine litter inflow via rivers and main torrent flows into the sea. ▪ Implement programs on regular removal and thorough disposal of accumulations/hot spots of marine litter. ▪ Development of scientific/research projects to test microplastics in the water and its impact on the marine ecosystem.

Table 5.7. Preliminary GES targets and recommendations to achieve them in Albania, based on results of the first GES assessment for EO5 Eutrophication. *Based also on UNEP(DEPI)/MED WG. 463.Inf.13*

Indicator	GES definition	GES characteristics	Preliminary GES target(s)	Recommendation(s)

Concentration of key nutrients in the water column (CI13)	Concentrations of nutrients in the euphotic layer are in line with prevailing physiographic, geographic and climate conditions.	Not possible to asses GES at the moment.	▪ Reference nutrients concentrations according to the local hydrological, chemical, and morphological characteristics of the un-impacted marine region.
			▪ Decreasing trend of nutrients concentrations in water column of human impacted areas, statistically defined.
			▪ Reduction of BOD emissions from land-based sources.
			▪ Reduction of nutrients emissions from land-based sources.
				▪ Establish a harmonised system for monitoring the state of coastal and marine ecosystems and processes:
				  ▪ Coordinated implementation of the prepared national monitoring program in accordance with the IMAP and with other national monitoring programs implemented in the Adriatic waters under the sovereignty of Albania; and
				  ▪ Establish a transnational (Adriatic) program for monitoring the state of the marine environment. This would rationalise costs and manage the maritime area as efficiently as possible. This particularly refers to the implementation of monitoring programs in waters outside the external borders of the territorial sea of Albania.
				▪ Integrated monitoring plans (also for transboundary waters) should be regularly updated and a comprehensive database on water pollution should be created and maintained.
				▪ Document all sources of water contamination and types of organic and inorganic contaminants.
				▪ Quantify amounts and fluxes of contaminants from sources to surface and ground waters.
				▪ Determine the best research-based remedial strategies to minimise (and remove) contaminants from waters and decrease risks to humans and marine biota.
				▪ Where needed (e.g. in areas of inappropriate and partially treated waste water disposal), consider higher sampling frequency to achieve a sufficient data set which will enable pressure management as monitoring the effectiveness of measures.

Chlorophyll α concentration in the water column (CI14)	Natural levels of algal biomass, water transparency and oxygen concentrations in line with prevailing physiographic, geographic, and weather conditions.	Not possible to asses GES at the moment.	▪ Chlorophyll *a* concentration in high-risk areas below thresholds. ▪ Decreasing trend in chlorophyll α concentration in high risk areas affected by human activities.	

6 Conclusions

The first attempt to assess GES in Albania is based on criteria and methodologies developed under IMAP, implementing as far as possible an integrated approach focused on EO1 Biodiversity, EO2 NIS, EO7 Hydrography, EO5 Eutrophication, EO8 Coastal ecosystems and landscapes, EO9 Pollution, and EO10 Marine Litter. The main lessons learnt are that, at present, GES could not be assessed due to limitations or lack of data. Only under EO9 Pollution more than half of the indicators could be assessed, providing mixed results. In addition, one assessed indicator under EO10 Marine Litter, notably trends in the amount of litter washed ashore and/or deposited on coastlines (CI22), showed that GES is not achieved.

In order to fully implement IMAP of Albania in the future and be able to fully assess and achieve GES, it important to establish or improve legislative framework on GES assessment and specific topics such as marine litter, and to significantly improve the knowledge base, supported by adequate human, institutional, and financial capacities. There is a particular need for the establishment of scientific institutions dedicated specifically to the sea and for improvement of capacities of researchers and experts related to the marine and coastal ecosystems. Finally, it is necessary to have a good and continuous transboundary cooperation with other Adriatic countries both in understanding and achieving GES.

GES achieved (for the existing information)

GES not achieved

Not possible to assess

Table 6.1. Final GES assessment table for Albania

EO	Indicator	*Assessment*		
		Posidonia meadows	*Photophilic algae*	*Coralligenous assemblages*
EO1 Benthic Habitats	Benthic habitat extent			
	Benthic habitat condition			
EO1 Pelagic habitats		*Phytoplankton*	*Zooplankton*	
	Pelagic habitat condition			
EO1 Species: Marine mammals – Cetaceans		*Tursiops truncatus*	*Stenella coeruleoalba*	
	Species distributional range			
	Population abundance			
	Population demographic characteristics			
EO1 Species: Marine reptiles – marine turtles		*Caretta caretta*		
	Species distributional range			
	Population abundance			
	Population demographic characteristics			
EO1 Species: Seabirds		*Wintering species* ▪ *Calonectris diomedea* ▪ *Puffinus yelkouan* ▪ *Phalacrocorax aristotelis* ▪ *Larus audouinii*	*Breeding species* Larus genei Sterna albifrons	
	Species distributional range			
	Population abundance			
	Population demographic characteristics			
EO2 Non-indigenous species	Trends in the abundance of introduced species, notably in risk areas			
EO5 Eutrophication	Concentration of key nutrients			
	Chlorophyl a			
EO7 Hydrography	Location and extent of the habitats impacted directly by hydrographical alterations			
EO8 Coastal ecosystems and landscapes	Length of coastline subject to physical disturbance due to the influence of human-made structures			
EO9 Pollution	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			
EO10 Marine Litter	Trends in the amount of litter washed ashore and/or deposited on coastlines (CI22)			
	Trends in the amount of litter in the water column including microplastics and on the sea floor (CI23)			

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8 Annex 1: Interrelations between ecological objectives

Table 8.1. Interconnection between Biodiversity and NIS cluster (EO1 and EO2) and other Ecological Objectives

	EO1	EO2	EO5	EO7	EO8	EO9	EO10
EO1		NIS may cause habitat degradation and destruction; decline of certain species; and spread diseases that may affect biodiversity.	Eutrophication may significantly impact species and habitats via nutrient and organic matter enrichment in coastal environments (e.g. harmful algal blooms (HABs) and consequent hypoxic conditions near the sea floor).	Hydrographic alterations impact benthic habitats via altered sedimentation rates; primary production and pelagic habitats via transparency; and species composition and distribution due to increases in temperature/salinity.	Tourism-driven urbanisation and construction of coastal area contributes to littoral zones GES reduction; among others coastal and benthic habitats destruction impacting monk seal habitats (e.g. coastal caves), as well as suitable nesting area for sea turtles, and therefore biodiversity reduction.	Pollution may foremostly cause degradation and destruction of habitats including its species in all its forms, mainly these might be oil spills, microbial pathogens, and surely, toxic chemicals which tend to accumulate in invertebrates and producing toxicological effects in vertebrates, as impacting economically commercial species (e.g. fisheries).	Marine litter can affect marine biodiversity. Most evident cases relate to entanglement of marine turtles and marine mammals in fishing gear, as well as suffocation through ingestion of plastic. Microplastic is also problematic, entering food-web and cumulating in shellfish and fish. Benthic habitats can also be severely impacted via physical damage by litter, such as corals (Karaburun Sazan and Porto Palermo are hot spot areas for corals).
EO2	NIS may cause habitat degradation and destruction; decline of certain species; and spread diseases that may affect biodiversity.			Increasing sea temperature can favour the introduction of NIS and facilitate the spread of thermophilic species. Change in currents in certain environmental conditions can favour the inflow of NIS from southern/eastern parts of Mediterranean Sea.			Floating litter could be a favourable vector for the transmission of organisms to the distant places and it can cause transporting NIS to new locations.

Table 8.2. Interconnection between Eutrophication and Pollution cluster (EO5, EO9, and EO10) and other Ecological Objectives

	EO1	EO2	EO5	EO7	EO8	EO9	EO10
EO5	Eutrophication can cause a severe impact on biodiversity of habitats and the ecosystem as a whole. It is considered one of the principal causes of harmful algal blooms, hypoxia in certain (benthic) areas, which can impact the whole food web (and fisheries in particular). Particularly relevant for semi-enclosed bays (such as Vlora Bay and Patok-Rodoni Bay).			Local (small scale) and mesoscale coastal currents can extend the eutrophication and its potential effects. Information on hydrographic conditions (e.g. temperature, salinity, and density) are particularly relevant for eutrophication. assessment. it is always advisable that the monitoring of parameters belonging to these EO takes place at the same stations at the same time with nitrate, chemical, species, and chlorophyl *a* measurements as proxies.	Urbanised areas in the coastal zone in the absence of the appropriate wastewater treatment are a source of nutrients enrichment in near-shore marine areas.	Eutrophication sources could be also related to other sources of pollution (e.g. chemical pollution and microbial pathogens) through WWTP outflows.	
EO9	Toxicological effects of harmful chemicals and pathogens can affect the biodiversity, from individual specimens to entire communities (e.g. TBT – organotin compounds) and not to mention in acute oil spill episodes impairing the economic sectors.		Chemical pollution and microbial pathogens could be related to eutrophication sources through WWTP outflows.	Near-shore currents and the local hydrographic conditions can expand the pollution outbreaks in the marine environments both from diffuse and point sources.	The four major ports (Durrës, Vlora, Shengjin and Sarandë) and their related coastal constructions are among the targeted sources of marine contamination in Albania.		Recent research studies show that chemical plasticisers and other known persistent substances can leach from marine litter (both macro and micro-litter items).

	EO1	EO2	EO5	EO7	EO8	EO9	EO10
EO10	Entanglement of marine turtles and marine mammals in fishing gear, as well as suffocation through ingestion of plastic. Marine litter can severely impact benthic habitats via physical damage by litter, such as corals (Karaburun Sazan and Porto Palermo are hot spot areas for corals).	Floating marine litter can be a vector for transmission of NIS.		Key hydrographic processes and parameters – bathymetry and currents have significant impact on marine litter accumulation and transport. Input via rivers should be particularly highlighted.	Link between more urbanised areas and marine litter depositions is important in Albanian marine areas.	Recent research studies show that chemical plasticisers and other known persistent substances can leach from marine litter (both macro and micro-litter items).	

Table 8.3. Interconnection between Coast and Hydrography cluster (EO7 and EO8) and other Ecological Objectives

	EO1	EO2	EO5	EO7	EO8	EO9	EO10
EO7	Currents and other type of water movement directly influence sedimentation rates and can influence benthic habitats. Studies in the Adriatic since 1970s show correlations between oceanographic changes with composition of habitats, plankton. and fish species.	Increasing seawater temperatures facilitated the spread of thermophilic species; in recent decades an increasing number of non-indigenous species has been recorded. Currents can favour redistribution of NIS (inflow from the southern/eastern Mediterranean).	Information on key hydrographic parameters (T, S) are relevant for the interpretation of eutrophication results. Integrated Monitoring Programme for Albania envisaged monitoring of EO5 and EO7 on same locations. The concentration of wastewater outfalls could result in reduced circulations and hydro-morphological quality. Local (small scale) and mesoscale coastal currents can extend the eutrophication.		Physical changes of certain coastline areas in Albania probably affect near-shore hydrographic conditions.	Contaminants can be redistributed or transported throughout the environment by hydrographic processes. Contaminants might remain mainly in the water phase (e.g. polar contaminants) or be transferred to organisms, and especially in the sediment (hydrophobic contaminants), from which they can be re-suspended depending on the currents, waves, turbulence, and other environmental features.	Hydrographic conditions, in particular currents have significant impacts on accumulation, transport and distribution of marine litter.
EO8	Artificialisation occupies only 14,47 % of Albanian coastline which locally affects supra and mediolittoral habitats and nearshore benthic habitats.		Urbanised areas (mainly Vlora bay area) in coastal zone are source of nutrient enrichment in near-shore areas, in particular in the absence of the appropriate wastewater treatment.	Human-made structures can have direct impact on the changes of hydrographic conditions, which can in turn impact marine habitats and biodiversity.		The four major ports (Durrës, Vlorë, Shengjin and Sarandë) and their related coastal constructions are among the targeted sources of marine contamination in Albania.	Link between more urbanised areas and marine litter depositions is important in Albanian marine areas.

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. Furthermore, the project aims to accelerate the implementation of the Integrated Coastal Zone Management Protocol and facilitate the implementation of the Integrated Monitoring and Assessment Programme. Just as importantly, it will contribute to the achievement of the good environmental status of the entire Adriatic. The project is jointly led by UNEP/MAP, PAP/RAC and SPA/RAC. In Albania, the project implementation is coordinated by the Ministry of Tourism and Environment with National Agency for Protected Areas. The project duration is from 2018 to 2021.

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