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

Towards a Marine Good Environmental Status (GES) in Albania

Assessment of Contaminants (EO9)

UN environment programme

Mediterranean Action Plan
Barcelona Convention

PAP/RAC

SPA/RAC

AKZM
AGJENCIA KOMBËTARE E ZONAVE TË MBROJTURA

MINISTRIA E TURIZMIT DHE MJEDISIT

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Preamble

This work has been prepared under the “Implementation of ecosystem approach in the Adriatic Sea through marine spatial planning” project (i.e. the GEF Adriatic project) based on the agreement between UNEP and PAP/RAC (UNEP/PCA/ECOSYSTEMS/2017/MCEB-MAP/025). The document elaborates the IMAP Ecological Objective 9 (EO9) “Contaminants” Good Environmental Status (GES) assessment under the framework of the UNEP/MAP/IMAP (Integrated Monitoring and Assessment Program of the Coasts and Sea and related Assessment Criteria). The GES or non-GES status is expounded by assessing progresses, objectives and targets achieved from EO9 Common Indicators (CIs). The EO9 CIs sums up different aspects of the marine pollution thematic, namely, chemical compounds (CI17), toxicology (CI18), acute pollution events (CI19), seafood contamination (CI20) and pathogenic microbes (CI21), to assess the status of the marine environment into these regards. A scarce number of datasets for the period 2015-2019 have been obtained solely from research publications and with limited information (assessed in Excel files prepared for this document), and therefore, the result is mostly a qualitative assessment with large uncertainty in terms of spatial and temporal scales for the Albanian marine environment.

The EO9 is one of the Ecological Objectives within the IMAP approach for marine environmental integrated assessments in the context of the Ecosystem Approach; and therefore, the final GES Assessment for the Albanian marine environment should consider all of them.

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Summary

An initial introduction of the Ecological Objective 9, their Common Indicators and the Good Environmental Status (GES) definition within the IMAP 6-year cyclic management program for the marine environment under UNEP/MAP is given, including a legal and institutional framework (Section 1). In the following section (Section 2), an examination and update of the existing work was performed to assess the drivers and pressures along the coasts of Albania related to marine pollution issues including maps and tables (reproduced), particularly, inferred from recent publications (e.g. Integrated Cross – Sectorial Plan for the Coastal Belt, Albania, 2017) are presented. The Section 3, defines the methodology for EO9 GES assessment, as well as the necessary spatial and temporal scales to be considered according the existing national monitoring programs and further related environmental and coastal projects (e.g. the upcoming CAMP Italy-Albania). To this regard, the three areas considered during the elaboration of the National Monitoring Programs (in 2020) are used; namely, Northern part of the Sea of Albania, Middle part of the Sea of Albania and Southern part of the Sea of Albania. Thus, the available research datasets and information are fitted within these subareas accordingly and focusing on the 2015-2019 period, as well as using some data up to back 2009 as a limit. In Section 4, the evaluation of the degree of achievement for the targets proposed under EO9 IMAP Common Indicators (i.e. CI17, CI18, CI19, CI20 and CI21) is elaborated to some extent (based on the assessment of the limited datasets of the CIs available for the period in separated Excel files according the IMAP assessment criteria and summarized within the tables in the section) for the monitoring/operational areas and for the Albanian marine environment as a whole. The use of a matrix scorecard allows accounting for the targets achievement and aggregating the CIs for the period within the operational scales for EO9. As a result, a total combined percentage of GES achievement (%) for each operational area is obtained being 51%, 34% and 54% for the Northern, Middle and Southern parts of the Sea of Albania respectively, whilst Albania's entire marine environment reaches up to a 48% of GES. To conclude the assessment the Sections 5, 6 and 7 briefly explain the main gaps and the consequent steps, in order to improve GES under IMAP and the links with other clusters and Ecological Objectives.

1 Introduction

The Integrated Monitoring and Assessment Program – Ecological Objective 9 (IMAP – EO9) is one of the fundamental ecosystem ecological objectives within the IMAP. It is primarily established on both pressure and impact-based Common Indicators (CIs) related to the introduction of chemical contaminants and hazardous microbiological substances in the marine ecosystem from land-based and sea-based sources affecting the structure and functions of the marine ecosystems. The evaluation of all the five CIs within EO9 allows assessing the Good Environmental Status (GES) to this regard. Further, the EO9 GES assessment should provide along other related EOs further inputs to the overall GES assessment of the marine environment. The Good Environmental Status (GES) is based on the achievement of the targets of all Ecological Objectives (EOs) set for the marine environment and structured within the IMAP program.

At present, the achievement of the GES for EO9, and similarly for EO5 (eutrophication) and EO10 (marine litter) related to pollution, is assessed by using a scientific-based assessment criteria for a number of CIs targets and objectives for which different levels of assessment criteria have been defined and implemented across the Mediterranean region. The integrated ecosystem approach, jointly addressing different EOs and their CIs, can provide better science-based response about the state of the marine environment to allow the implementation of programs of measures when and where needed. These methodological assessment approaches are a dynamic process which requires revision and update in light of new and coordinated efforts by contracting parties of the Barcelona Convention.

The achievement of GES of the marine environment over time, in other words to maintain the ecosystem services over the IMAP 6-year cycles, by implementing a subsequent program of measures is the main objective of the overall program.

1.1 Common Indicators

The Ecological Objective 9 consist in five Common Indicators (i.e. CI17, CI18, CI19, CI20 and CI21) tackling the human-induced introduction of harmful substances in the marine ecosystems which might adversely impact the ecosystem services and therefore would require taking environmental responses, such as programmes of measures, new policy or remediation actions.

The five Common Indicators to define the GES for the EO9 are the following:

- **Common Indicator 17:** Concentration of key harmful contaminants measured in the relevant matrix (EO9);
- **Common Indicator 18:** Level of pollution effects of key contaminants where a cause and effect relationship has been established (EO9);
- **Common Indicator 19:** 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 (EO9);
- **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 (EO9);
- **Common Indicator 21:** Percentage of Intestinal enterococci concentration measurements within established standards (EO9)

It needs to be mentioned that within each of the CIs of EO9 there is a different number of parameters. As well, the CIs have primarily a targeted role within the framework of the DPSIR (Drivers-Pressures-State-Impact-Response) framework used worldwide for environmental and environmental policy management. To this regard, CI17, CI19 and CI21 are pressure-based common indicators (i.e. objectively measurable and a direct consequence of the pressures affecting the marine environment), whilst CI18 and CI20 tend to be impact-based common indicators (i.e. reflect the impact of these pressures on

the ecosystem) allowing to assess the state of the environment combined with a number of other state-based common indicators primarily of the EO1 (ca. Biodiversity) within the IMAP Biodiversity Cluster.

The Table 1 summarizes the functional interrelation within CIs and EOs of the IMAP to define the GES towards a marine environment management, sustainability and conservation. The table has been updated and extended by including EO7 and EO8 within the conceptual framework for the "integrated" IMAP GES assessment interlinking Pressure, Impact and State-based Common Indicators scientifically selected for the marine environment and discussed at the 7th Meeting of the Ecosystem Approach Coordination Group in Athens in September 2019 (UNEP/MED WG.467/7, see References).

Table 1. Conceptual framework for the integrated IMAP GES assessment in the marine environment. Modified from: UNEP/MED WG.467/7, 7th Meeting of the Ecosystem Approach Coordination Group. Athens, Greece, 9 September 2019

					Assessment of Pressures						
					EO2	EO3	EO5	EO7	EO8	EO9	EO10
ASESSMENT OF GOOD ENVIRONMENTAL STATUS (GES)					NIS (Non-indigenous species)	Fisheries (wild species)	Eutrophication	Hydrography	Coasts (land use change)	Contamination/ Pollution/ Bathing Water Quality/	Marine Litter
					Common Indicators of Pressure						
					CI6	CI8, CI10, CI11	CI13	CI15	CI16	CI17, CI19, CI21	CI22, CI23
Assessment of State	EO1, 3	Species	State Indicators	CI 1 to 5, 7, 9	CI3-5, CI7	CI9, CI12	?	?	CI25	CI18, CI20-21	CI24
	EO1, 3	Pelagic habitats		CI 1 to 5, 7, 9	CI3-5, CI7	CI7, CI9, CI12	CI14	CI15	?	CI18, CI20-21	CI24
	EO1, 3	Benthic habitats		CI 1 to 5, 7, 9	CI3-5, CI7	CI7, CI9, CI12	CI14	CI15	?	CI18, CI20-21	CI24
	EO1, 2, 3 & 4, 6	Ecosystems		CI 1 to 5, 7, 9	CI3-5, CI7	CI7, CI9, CI12	CI14	?	CI25	CI18, CI20-21	?

Note: EOs/CI cells in orange concern pressure (P), yellow concern impacts (I) and grey cells concern state (S). Some CIs are repeated, as they are applicable to several ecosystem elements (species groups, pelagic and benthic habitats) in Assessment of State (CI1-5, 7 and 9), as well as CI15 and CI21 considered both pressure and impact indicators; whilst cells marked with "?" indicate situations where an impact assessment indicator still to be defined. IMAP EOs for which Common Indicators are not agreed or defined yet (EO4, 6 and 11) are not included in the table.

1.2 GES definition

Back 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 Decision IG 22/7 (COP19, 2016), 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), and continues (see References and next Section). The Table 2 below shows the current GES requirements and components for each EO9 CI, namely, the GES definition, the Operational Objectives and the Targets. The GES depends on the successful achievement of its requirements.

Table 2. The GES definition, Operational Objectives and Targets for each CI within IMAP EO9 needed to fulfil the requirements to achieve the GES. Source: UNEP(DEPI)/MED WG. 439/12

EO9	GES definition	Operational Objective	Targets
CI17	Level of pollution is below a determined threshold defined for the area and species	Concentration of priority contaminants is kept within acceptable limits and does not increase	1. Concentrations of specific contaminants below either Background Assessment Criteria or Environmental Assessment Criteria (BACs/EACs) or below reference concentrations (from other sources) 2. No deterioration trends in contaminants concentrations in sediment and biota from human impacted areas statistically defined 3. Reduction of contaminants emissions from land based sources
CI18	Concentrations of contaminants are not giving rise to acute pollution events	Effects of released contaminants are minimized	1. Contaminants effects below thresholds. Levels of biomarkers identified comply with agreed Mediterranean Background Assessment Criteria or Environmental Assessment Criteria (BACs/EACs)
CI19	Occurrence of acute pollution events is reduced to the minimum	Acute pollution events are prevented and their impacts are minimized	1. 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 minimization of accidental discharge of such substances)
CI20	Concentrations of contaminants are within the regulatory limits for consumption by humans. No regulatory levels of contaminants in seafood are exceeded	Levels of known harmful contaminants in major types of seafood do not exceed established standards	1. Concentrations of contaminants are within the regulatory limits set by legislation 2. Decreasing trend in the frequency of cases of seafood samples above regulatory limits for contaminants
CI21	Concentrations of intestinal enterococci are within established standards	Water quality in bathing waters and other recreational areas does not undermine human health	1. 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)

Therefore, the GES requirements are defined for each of the EO9 CIs. Reaching GES benchmarks with regard harmful substances introduced in the marine environment will provide the achievement of the EO9 GES as a whole, or alternatively, provide the distance from the GES and the way forward for its accomplishment.

1.3 Legal and institutional framework

The recent legal framework in relation to the marine assessment under the Barcelona Convention and its Protocols in the Mediterranean Sea was adopted by the Contracting Parties in two consecutive decisions during theCOP19 and COP20, namely, Decision IG 22/7 (COP19, 2016) on the Integrated Monitoring and Assessment Program of the Mediterranean Sea and Coast and Related Assessment Criteria and Decision IG.23/6 (COP20, 2017) on the 2017 Mediterranean Quality Status Report, respectively. Moreover, a number of specific protocols apply to chemical substances, such as the Land Based Sources (LBS) Protocol for the reduction of pollution from land-based sources, as well as other Regional Plans tackling issues, such as oil spills and waste.

At present, both the Land and Sea-based Pollution strategic themes of the Mid Term Strategy (2016-2021) provide continuity to the long track record of the Barcelona Convention and its Protocols in the combat of Mediterranean marine pollution. The core theme "Land and Sea- Based Pollution" has been designed to provide support to the Contracting Parties implementing the five pollution-related Protocols of the Barcelona Convention with a particular focus on legally binding commitments arising from Articles 5 and 15 of the LBS Protocol. These Protocols aim at ensuring the GES of the Mediterranean Sea and prevent pollution due to different types of land and sea-based sources.

In February 2016, Decision IG. 22/7 at the 19th Meeting of Contracting Parties (COP19) agreed on the Integrated Monitoring and Assessment Program (IMAP) of the Mediterranean Sea and Coast and Related Assessment Criteria, with a list of regionally agreed good environmental status descriptions, common indicators and targets, with principles and clear timeline for its implementation.Since then, the main outputs during the initial phase of IMAP has included further update of GES definitions, refinement of the assessment criteria and development of national level IMAPs.

In parallel, the European Union set the EU Marine Strategy Framework Directive (EU MSFD) back in 2008 (Directive 2008/56/EC) which applies majorly to the EU-Mediterranean countries and Contracting Parties of the Barcelona Convention; and therefore, the processes and approaches are shared, aligned and optimized in order to be implemented by those countries effectively. The Figure 1 below shows the similarities between the two marine environmental policies in the Mediterranean Sea, in terms of Ecological Objectives and Descriptors for the IMAP and MSFD, respectively.

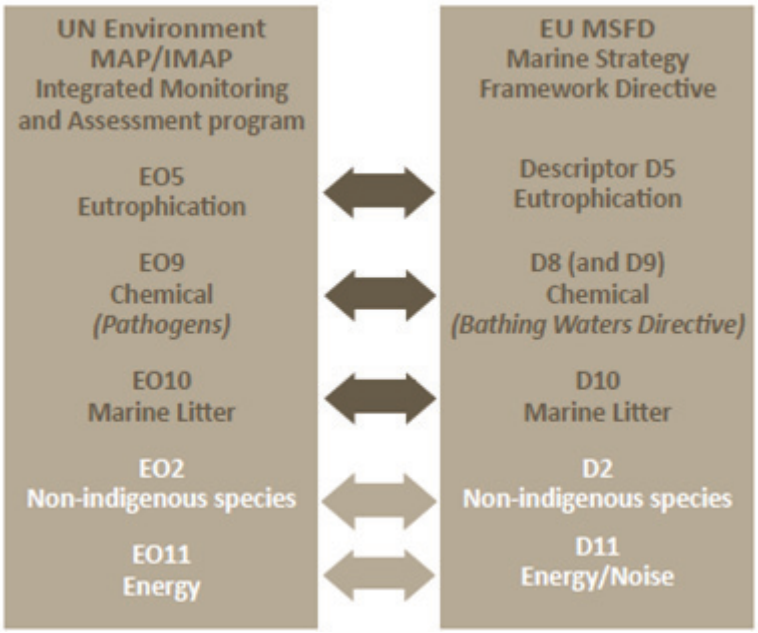

Figure 1. Similarities between the UNEP/MAP IMAP and the European MSFD policies related to marine ecosystem pollution. Source: PlanBleu

In terms of indicators and chemical compounds within Ecological Objective 9, the implementation of the MAP/Barcelona Convention and its Protocols for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources (the LBS Protocol) and the Protection of the Mediterranean Sea against Pollution resulting from Exploration and Exploitation of the Continental Shelf and the Sea Bed and its Subsoil (the Offshore Protocol), as the main legal framework regarding the reduction of pollutants within the Mediterranean region, may require an update of the priority chemicals list to be monitored and assessed overtime.

The Meeting of the MED POL Focal Points, held on 29-31 May 2017 in Rome considered the first updated list of priority contaminants in the Mediterranean (UNEP(DEPI)/MED WG.439/16, Report on Specific Issues) for the potential inclusion into national IMAP monitoring programmes, if so decided. The meeting highlighted the importance of ongoing national monitoring programmes and the need to continue periodic reviews carried out by the Barcelona Convention Secretariat taking also into consideration the work of EU and other Regional Seas Conventions.

A second follow up at the Meeting of the Ecosystem Approach Correspondence Group on Pollution Monitoring in Podgorica, Montenegro, 2-3 April 2019 (UNEP/MED WG.463/Inf.4) proposed additional amendments to the list of priority contaminants to be considered in the framework of the Integrated Monitoring and Assessment Programme (IMAP) and its Ecological Objective 9 (see Table 3).

At present, some selected chemicals and groups of substances are included into the IMAP process (see Section 3) and should be revised according the monitoring and assessment outcomes, as well as new research findings. Additionally, the information sources to perform the selection of these substances are also based mainly in international available 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 list;
- The US Environmental Protection Agency (US EPA) lists.

Table 3. Comparison of groups of chemicals under Regional Seas Conventions
(note: only chemicals and categories which are listed by two or more RSCs are shown)

Categories and/or chemical compounds	MAP/Barcelona Convention (MED POL, 2009)	HELCOM (2010)	OSPAR (2013)
Metallic compounds			
Cadmium	x	x	x
Lead and organic lead compounds	x		x
Mercury and organic mercury compounds	x	x	x
Organometallic compounds			
Organic tin compounds	x	x	x
Organohalogenated compounds			
Perfluorooctanylsulphonic acid (PFOS)		x	x
Brominated flame retardants (PBDEs)	x	x	x
Polychlorinated biphenyls (PCBs)	x	x	x
Polychlorinated dibenzodioxins (PCDDs)	x	x	x
Polychlorinated dibenzofurans (PCDFs)	x	x	x
Short chain chlorinated paraffins (SCCP)	x	x	x
Endosulfan	x	x	x
Hexachlorocyclohexane isomers (HCH)	x		x
Pentachlorophenol (PCP)			x
Nonylphenol/ethoxylates (NP/NPEs)	x	x	x
Octylphenol/ethoxylates (OP/OPEs)	x	x	x
Polychlorinated naphthalenes (PCNs)	x		x
Polycyclic aromatic compounds			
Polyaromatic hydrocarbons (PAHs)	x		x
Phthalates			
Diethylhexylphthalate (DEHP)	x		x

2 Pressures and impacts

The main recent work on anthropogenic pressures and impacts in the Albanian coastal and marine environment related to the IMAP Pollution Cluster and linked to the Ecological Objective 9 object of this assessment are reported 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) over 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 the territorial developments in the coastal belt. To this regard, the IMAP and Ecosystem Approach implementation are the tools to achieve the sustainability goal for the ecosystem services provided by national coastal and marine waters (ca. marine ecosystems) of Albania, through GES assessments, such as this report undertaken as a part of the GEF Adriatic project. In parallel, an Integrated Cross-Sectorial Plan for Tirana-Durrës area has also been developed specifically for this coastal area and infers to the main drivers and pressures from the projected territorial and economic developments (e.g. sectoral economic activities). The Figure 2 below shows the main coastal cities along the Albanian coast of nearly 500 km covering the Adriatic and Ionian Seas.

Figure 2. Main cities along the Albanian coastline. Source: Integrated Cross-Sectorial Plan for the Coastal Belt

According the Integrated Cross-Sectorial Plan for the Coastal Belt some economic sectors can be highlighted, such as the maritime transport (harbors), the agricultural sectors (coastal and inland) and fishing and aquaculture.

With regard to the anthropogenic pressures and impacts in the marine environment, the national policy responses in the form of natural protected areas and Marine Protected Areas (MPAs) designated by Albania have been numerous since 2010.

Examples of national parks including marine areas are the National Park of Butrinti and the National Maritime Park of Karaburun-Sazan. Nevertheless, the Albanian coastline ecosystems are under pressure due to these main factors: 1) deficiencies in waste management, water management and sewage management, 2) coastal urbanization and tourism and 3) coastal aquaculture. Those are particularly relevant beyond the maritime economic sector, namely the maritime transport. The Figure 3 presents the main economic sectors versus natural values of the Albanian coastline.

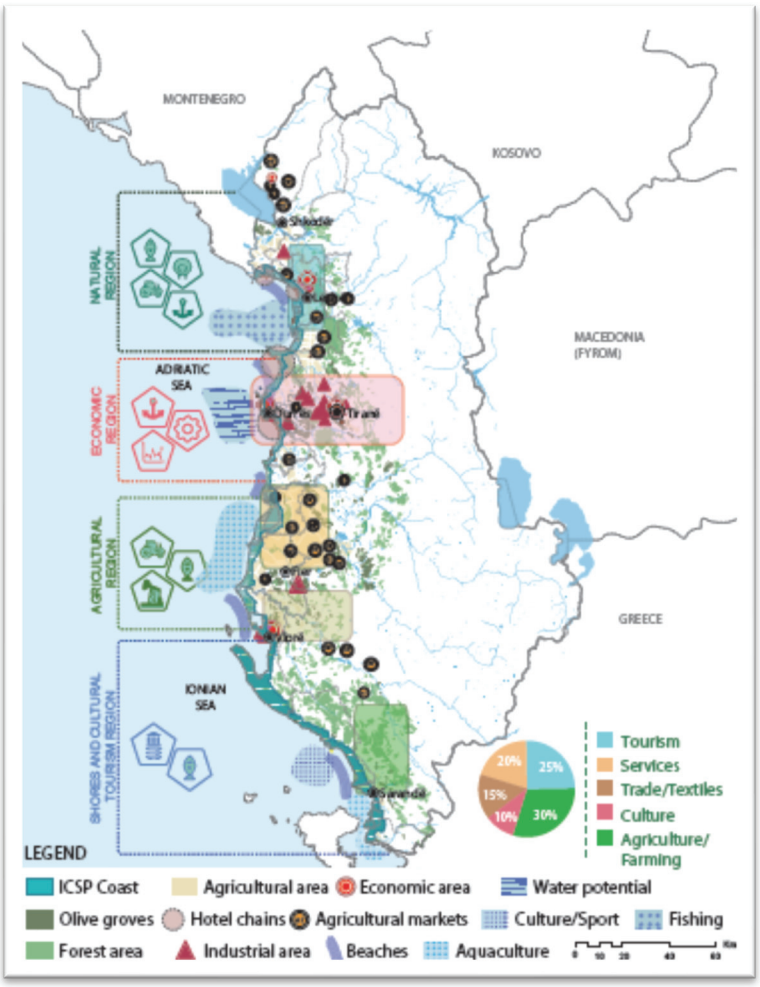

Figure 3. Economic sectors of the coastal belt. Source: Integrated Cross-Sectorial Plan for the Coastal Belt

A detailed description of the economic sectors and activities that cause pressure to the sustainability and conservation of the marine environment can be found, as mentioned earlier, in the document "Integrated Cross-Sectorial Plan for the Coastal Belt". Apart from this latest study, earlier programs (ca. UNEP/MAP/MEDPOL), projects and efforts have contributed to the knowledge of the coastal environment and contributed to enlighten the main pressures and impacts in the coastal and marine environment (see also references in the abovementioned study).

According to the methodology presented at the 7th Meeting of the Ecosystem Approach Coordination Group in Athens, Greece, 9 September 2019, a model to summarize the country drivers-pressures-impacts have been set and are presented in this section (UNEP/MED WG.467/7).

To do so, the Albanian national waters (12 NM from the coast) have been subdivided into different operational/assessment areas. These areas would be used to assess impacts from drivers and pressures as well as to assess GES, as part of this document. These areas are proposed latitudinal from the border with the Republic of Montenegro down to the Greek border

in the Ionian Sea area, and therefore, are the main areas of study with the refinements proposed in this EO9 GES assessment in accordance to:

- the above mentioned Integrated Cross-Sectorial Plan for the Coastal Belt document;
- three operational subareas: North, Central and Southern part of the Sea of Albania, considered during elaboration of the Integrated Monitoring Programme in 2020 (see Figure 4, next section);
- match-matching existing known high and low impacted marine environments (coastal cities and MPAs, respectively); namely, Bay of Durrës, Vlora Bay, Sazani Island (MPAs), Karaburuni Peninsula (MPAs), Ksamili – Butrinti (MPAs), to mention few;
- taking into account proposed divisional coastal belt for the southern Albanian coast, under the CAMP Albania-Italy proposal document (see Figure 5, next section).

It should be noted that these are not formal assessment (nor reporting) areas. However, having in mind that most of these areas have been given sets of monitoring stations for Ecological Objective 9 under the GEF Adriatic project developments of an integrated monitoring programme project (see Figure 4, next section), they could be used as preliminary assessment areas for the purposes of this document. After the first monitoring and assessment studies will take place, these could be further modified, also in line with ongoing regional work for defining the scales of assessment within IMAP implementation, as well as national MSFD and WFD processes.

Therefore, the following Tables 4 and 5 present an approximation based on known drivers and pressures distributed among those areas, to be later on interrelated with the available and existing monitoring datasets allowing a comprehensive interpretation.

Table 4. The general Drivers-Activities-Pressures-Impacts related to the EO9 GES within the IMAP Pollution Cluster

EO9 Pressure (P) and Impact (I) CIs/Drivers	Agriculture	Fisheries	Tourism	Energy	Maritime transport	Urbanization and Industry
CI17 (P)						
CI18 (I)						
CI19 (P)						
CI20 (I)						
CI21 (P)						

No contribution
Minor of activity/pressure to CI
Medium of activity/pressure to CI
High contribution of activity/pressure to CI

Note: the main Drivers are in accordance of the UNEP/MAP ICZM Protocol definitions and according UNEP/MED WG.467/7 model table from 2019.

Table 5. The Drivers-Activities-Pressures-Impacts potential among the 3 operational assessment areas and subareas for EO9 (see also Table 4)

Core indicators EO9/Marine areas		Agriculture CI17, CI18	Fisheries CI20	Tourism CI17-CI21	Energy CI17-CI19	Maritime transport CI17-CI19	Urbanization and Industry CI17-CI18, CI21
Operational Area	Subarea						
Northern part of the Sea of Albania	CW1 – Patok-Rodoni Bay						
	CW2 – Cape of Rodon						
	OW1						
Middle part of the Sea of Albania	CW3 – Bay of Durrës						
	CW4 – Divjaka-Karavasta National Park						
	OW2						
Southern part of the Sea of Albania	CW5 – Vjosë-Nartë/Vlora Bay						
	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: Idem color scale as in Table 5. CW: Coastal Waters (EU WFD), OW: Open water (see next section 3.1 for Operational Subareas selection)

3 Elements for GES Assessment

As mentioned in the Introduction, the overall GES assessment under the IMAP Ecosystem Approach framework requires the aggregation of the individual GES assessments for each EOs within IMAP, as well as the mid-level aggregation by IMAP Clusters, although the harmonized methodology through the Mediterranean region is not yet agreed nor fully defined.

Nowadays, the EOs GES assessment requires the scientific-based monitoring data on CIs and the defined geographical and temporal scales, as an earlier step to undertake the GES assessment (see Section 3.1). For the EO9 GES assessment, the ultimate compliance with GES requirements is evaluated based on specific assessment criteria (see Section 3.2) defined for the Mediterranean region.

The final GES assessment that includes all relevant EOs, namely the overall marine environment assessment for Albania (based on IMAP), will need to include the use of methodological approaches to address the interrelation of pressures and state of marine environment as discussed at IMAP Best Practices Meeting of July 2017, recent CorMon Meetings, and at the 7th Meeting of the Ecosystem Approach Coordination Group in Athens, Greece, 9 September 2019 (UNEP/MED WG.467/7) and referred to in the Introduction of this document.

3.1 Methodology to define GES

The EO9 GES will be defined by evaluating the achievement of the CIs targets of the 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 define operational areas and subareas, namely the operational scales. Figures 4-6 show some of the current and proposed integrated monitoring areas under the proposed national IMAP networks for EO5 and EO9 in Albania (developed under the GEF Adriatic project, see also previous section) matching those operational areas, as well as other current marine geographical areas, such as the proposed areas in the Southern part of the Albanian coast (Figure 6). Ultimately, these should be entities exhibiting biological (ca. biodiversity features), geological, oceanographic, landscape and/or anthropogenic characteristics. The areas and subareas used in this document are only preliminary and should be further refined following the first integrated monitoring cycle. The definition of the operational areas and subareas, adding to the existing knowledge and ongoing work is the first step to asses EO9 GES (Table 6).

As mentioned, the initial step to perform the EO9 GEs assessment is to observe the availability of monitoring environmental information from established national monitoring networks according UNEP/MAP IMAP and other international policy, such as EU WFD and EU MSFD. Based on the existing knowledge and research undertaken to elaborate this document, the Table 6 summarizes the monitoring elements for the period 2009-2019, within each Common Indicator available for Ecological Objective 9 and according IMAP requirements. It should be noted here, that the amount of information generated by Albania for each CI either is very limited or not evaluated according the IMAP basic requirements. Therefore, the information of the status and impacts in the marine ecosystem will be based on few datasets from research publications (see Annex) within this period in the present document. More, the EO9 GES assessment for Albania will have a qualitative character rather than a semi-quantitative or quantitative assessment due to this limited available information.

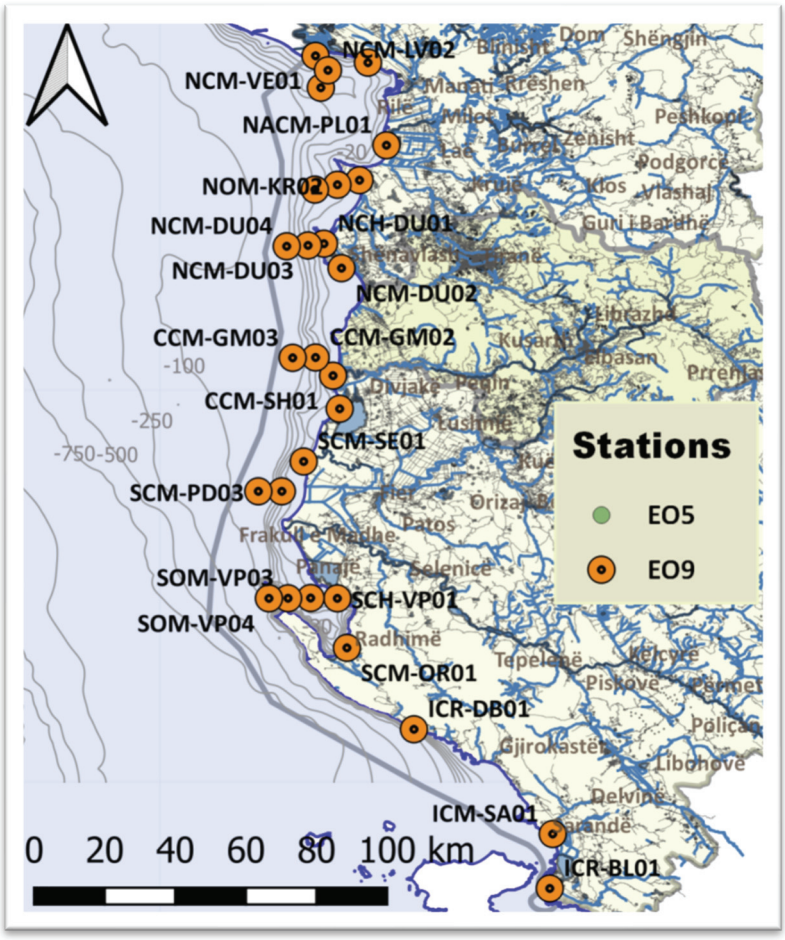

Figure 4. Monitoring stations distribution proposed for the National Integrated Monitoring Programme for Albania for EO5 (eutrophication) and EO9 (contaminants). Source: GEF Adriatic project

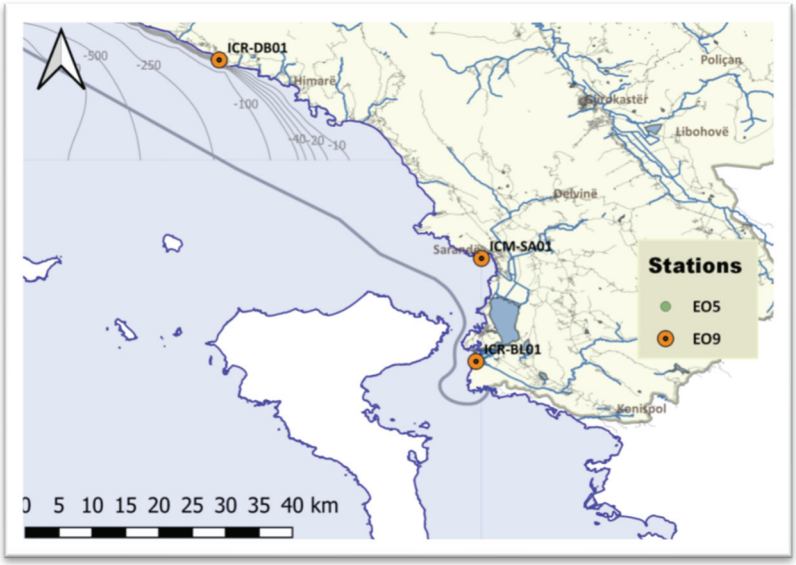

Figure 5. Map of three proposed stations in the Southern part of the Albanian coastline. Source: GEF Adriatic project

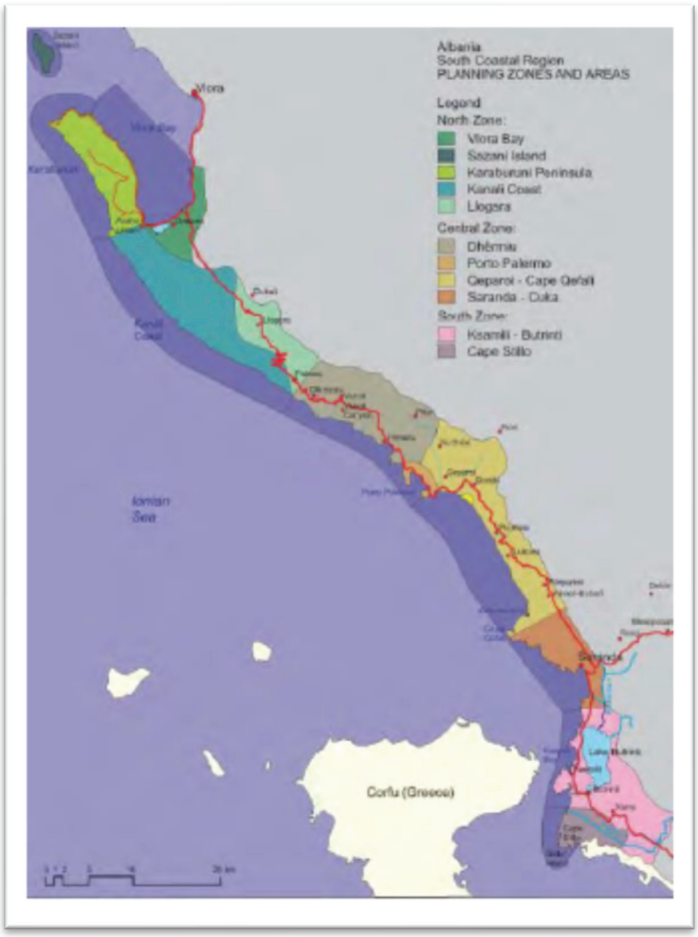

Figure 6. Proposed divisional coastal belt for the southern Albanian coast, under the CAMP Albania-Italy proposal document. Source: UNEP/MED WG.468/Inf.21, Meeting of MAP Focal Points, Athens, September 2019)

The Table 6 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). The distinction is made among the operational areas and subareas selected to perform the present EO9 GES assessment according to the rationale explained above, based on existing knowledge.

A main observation from Table 6 is that for CI17, CI18 and CI20 the datasets from national monitoring programs are nonexistent. 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 marine environment (ca. before year 2009), as the limit of the most recent 10 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 inputs 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 pathogenic microbes, 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 or actions will need to be reassessed accordingly (i.e. by implementing from local to national fit-for-purpose monitoring and assessment as required).

Table 6. 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 – Divjaka-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.A.: Not available, N.E.: Not evaluated (monitored), RES: Research data and year; see also Table 5 for acronyms

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 with few research data spanning up to back 2009), the assessment by individual CIs could be performed and, in this case for Albania, in a qualitative manner (see Table 6).

At the level of an Ecological Objective such as EO9, some CIs are multiparametric indicators within the five CIs. For example, CI17 should be integrated by observing the different groups of chemical compounds exhibiting a pressure to marine ecosystems before an upper level of integration/aggregation could be undertaken. Similarly, for CI18 and CI20, but not for CI19 and CI21 which are based on a single parameter for its evaluation. Either uniparametric or multiparametric CIs for EO9 these should be assessed according the operational objectives and targets defined under IMAP (or any refinements stipulated under national requirements) to examine the achievement of the defined GES (see Section 4). Later on, the process would be

followed by considering their potential interlinkages (for example, CI17-CI18, CI17-CI19, CI17-CI20, CI18-CI19, CI18-CI20, CI19-CI20 and C21) which is the rationale behind the Ecosystem Approach framework rather than evaluating a single pressure or impact in the marine environment.

The overall methodology for an EO9 GES assessment conclusion will consist of aggregating the outcomes of the evaluation (ca. Scoring) of the different CIs targets for EO9, based on simple matrix score tables (Tables 9 and 10, Section 4). The whole GES result based on this methodology will consider both the temporal and spatial operational defined scales and it will be interpreted objectively as the percentage of GES achievement based on the current IMAP framework.

3.2 GES boundaries/thresholds

The Decision IG. 22/7 (COP19, February 2016) on IMAP included in its Annexes the Related Assessment Criteria to perform the GES assessment, particularly for EO5 and EO9. Since then, the main outputs during the initial phase of IMAP have refined those assessment (UNEP(DEPI)/MED 439/15 Meeting of the MED POL Focal Points, Rome, Italy, 29 – 31 May 2017) initially used in Decision IG.23/6 (COP20, 2017) on 2017 Mediterranean Quality Status Report (http://www.medqsr.org) for the EO9 GES assessment.

Under EO9, 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 incorporated in the document UNEP (DEPI)/MED WG.427/Inf.3 contain all the detailed data/metadata information, datasets characteristics, statistical results and scientific rationale of the performed analysis and estimation of IMAP Related Assessment Criteria for these CIs. In relation to CI20 (similarly to CI17), a multiparametric CI, the European criteria established for seafood chemical levels for human consumption (COMMISSION REGULATION (EC) No 1881/2006 of 19 December 2006 setting maximum levels for certain contaminants in foodstuffs) should be observed along the IMAP methodologies to set thresholds.

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, that is the number of pollution events of 50 cubic meters or higher per year, whilst the latter is evaluated according to the threshold values and methodology established by EU Bathing Water Quality Directive and agreed by the Contracting Parties of the Barcelona Convention. For those two CIs within EO9, information and knowledge will be used, as well as the final assessment based on the communications and discussions with the contributors to this report.

4 Baseline: initial assessment

The initial assessment for EO9 starts with the assessment of the research data available for CI17 (provided in a separate Excel file). The following Tables 7 and 8 shows the semi-quantitative assessment for those CI17 data collected from research publications for the period 2009-2019 (see Annex). Thus, they are divided by chemical groups and evaluated against the established thresholds (and color scales) for each matrix, namely, BC, Med BAC and EACs/ERLs according the IMAP guidance. As defined by IMAP CI17 assessment criteria, red colour cells indicate "concern", thus concentration are at levels were probable toxicological effects to organisms are probable, whilst blue and green/orange indicates "no concern", despite the later shows concentrations above the background levels for the area.

Table 7. Assessment of heavy metals information related to CI17 multiparametric indicator from research publications and datasets 2009-2019 (see Annex) 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							
	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: both station coordinates and yearly concentrations are provided in the Excel file. 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.

Table 8. Assessment of organic contaminants information related to CI17 multiparametric indicator from research publications and datasets 2009-2019 (see Annex) 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: both station coordinates and concentrations are provided in the Excel file. 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.

In general terms, in Tables 7 and 8 it can be observed that there are significant concentrations of mercury and organochlorinated compounds (red color) 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 these are research screening one-off monitoring datasets obtained in seawater matrix, the high levels encountered for those substances might clearly indicate persistent inputs of contaminants nearby agricultural and coastal urbanized areas and ports.

In the Bay of Durrës, there is a clear concern in Porto Romano as these preliminary screening datasets indicate high toxicological levels in sediment samples for PCBs and pesticides (Table 9). 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 validated in full.

The following step as mentioned in the methodology (section 3.1) is the aggregation of the different CIs integrating the Ecological Objective 9 in order to assess the achievement of the Good Environmental Status (GES). In Table 9, a scorecard based on each CI target (Table 2) scoring is presented and the total score and percentage of EO9 GES achievement is demonstrated. The scorecard model is based on a simple linear model with equally weighted components (EO9 individual CIs targets) and has been used assuming that no monitored CIs is equal to not fulfilling the IMAP criteria, and therefore, a zero score is given. The scoring ranges from 0 to 5 based on scientific publications (CI17), 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, thus equivalent to a 3.3 score for a range 0 to 5 in Table 9). To note also, that if any of the multiparametric values (chemicals) of CI17 are over toxicological levels for Target 1 the minimum score is assigned without regard the matrix affected within a given operational area unit. In Table 10 the overall EO9 GES assessment is estimated for the entire marine environment of Albania.

Table 9. The GES assessment scorecard by area, subarea and location

EO9 CI Targets			CI17			CI18	CI19	CI20		CI21	Total score	IMAP GES %
Operational Area	Subarea	Location	T1	T2	T3	T1	T1	T1	T2	T1		
Northern part of the Sea of Albania			5	13	13	0	15	3	0	11.6	60.6	51
	CW1 – Patok-Rodoni Bay		0	4	4	0	5	0	0	3.3	16.3	41
	CW2 – Cape of Rodon		0	4	4	0	5	3	0	3.3	19.3	48
	OW1		5	5	5	0	5	0	0	5	25	63
Middle part of the Sea of Albania			5	5	15	0	25	0	0	18.2	68.2	34
	CW3 – Bay of Durrës	Porto Romano	0	0	3	0	5	0	0	3.3	11.3	28
		Durrës	0	0	3	0	5	0	0	3.3	11.3	28
		Golem	0	0	3	0	5	0	0	3.3	11.3	28
	CW4 – Divjaka-Karavasta National Park	Karavasta Lagoon	0	0	1	0	5	0	0	3.3	9.3	23
	OW2		5	5	5	0	5	0	0	5	25	63
Southern part of the Sea of Albania			58	55	54	0	65	0	0	46.3	278.3	54
	CW5 – Vjosë-Nartë/Vlora Bay	Vlora Bay	0	0	4	0	5	0	0	3.3	12.3	31
		Orikumi Lagoon	5	0	4	0	5	0	0	3.3	17.3	43
	CW6 – Sazani Island		5	5	4	0	5	0	0	3.3	22.3	56
	CW7 – Karaburuni Peninsula		5	5	4	0	5	0	0	3.3	22.3	56
	CW8 – Kanali Coast		5	5	4	0	5	0	0	3.3	22.3	56
	CW9 – Dhërmi		5	5	4	0	5	0	0	3.3	22.3	56
	CW10 – Porto Palermo		5	5	4	0	5	0	0	3.3	22.3	56
	CW11 – Qeparoi -Cape Qefali		5	5	4	0	5	0	0	3.3	22.3	56
	CW12 – Saranda-Cuka		3	5	4	0	5	0	0	3.3	20.3	51
	CW13 – Ksamili-Butrinti		5	5	4	0	5	0	0	3.3	22.3	56
	CW14 – Cape Stillo		5	5	4	0	5	0	0	3.3	22.3	56
	OW3 – (Adriatic Sea part)		5	5	5	0	5	0	0	5	25	63
	OW4 – (Ionian Sea part)		5	5	5	0	5	0	0	5	25	63

The evaluation of distance from GES according IMAP EO9 GES definition is based on the achievement of the targets for each CIs (Range 0-5). The grey cells indicate that no monitoring datasets/information is available, and therefore, a zero score is given or alternatively are based solely on expert judgment.

Table 10. The GES assessment for the entire marine environment of Albania

EO9 CI Targets	CI17			CI18	CI19	CI20		CI21	Total score	IMAP GES %
National Montenegrin marine environment	T1	T2	T3	T1	T1	T1	T2	T1		
Montenegro open area (12 NM)	68	73	82	0	105	3	0	76.1	407.1	48

As this, the percentage of EO9 GES achievement can be derived (Table 9 and 10). As mention, the scoring ranges from 0 to 5 points for each CI target and based on a simple linear model with equally weighted components. Finally, the GES achievement scale has been divided in 4 colours referring to 25, 50, 75 and 100% of GES accomplishment:

As above mentioned, the lack of monitoring datasets has been an obstacle and has constrained to perform mostly a qualitative judgment based on existing environmental data and information.

5 Targets and proposed measures

The use of operational areas and subareas within the boundary limits of Albania's national waters should allow to accurately proposing different measures to improve the achievement of GES, through actions and remediation activities. However, as mentioned through the document, the nonexistent datasets yet from the national IMAP networks proposed in 2020 is the limiting factor to move forward and to propose an adequate Program of Measures. Therefore, it should be emphasized that the EO9 GES assessment cannot be reliable discussed in full until some consistent spatial and temporal information will be available for CI17, CI18 and CI20.

Under the precautionary principle applied to the lack of environmental knowledge, a score for non-evaluated CIs have been set for unknown targets achievement to minimum (0 points) or scored using expert judgment based on the available information (i.e. reports and communication with responsible authorities). In any case, it should be observed as well that drifting from stations (one spatial dimension) to operational areas (two spatial dimensions) requires some spatial considerations in order to fully interpret the GES scorecard assessment compared to using MSP and GIS technology.

To this regard, for example, the normalization of the known impacted area (by data driven evidences) against the operational area or subarea would be needed or at least taken into account for the interpretation and to propose measures in the near future. Such procedures will improve the accuracy of the national GES assessment and will lay foundation for further adequate policy measures and monitoring plans.

6 Gaps/development needs

Taking into consideration all the remarks presented in the previous sections, is it evident the need to start the national integrated monitoring program for the IMAP first cycle (2016-2021) as a matter of urgency. Otherwise, the EO9 GES assessment can not be performed with certainty to elaborate accurate measures. To accomplish this imperative task, some indispensable institutional and financial interventions are needed, such as :

- Strengthening of institutional capacities by hiring new staff for that specific purpose and supplying with the adequate laboratory infrastructure (highly consolidated laboratory standards) to analyze all the parameters contained in the IMAP – EO9 CIs and GES assessment. On the other side, vessels and equipment for in-field /in-situ measurements should be also ensured.
- The establishment of a fully operational monitoring and assessment unit (most probably within NEA), particularly entrusted with marine ecosystem environmental common indicators control, monitoring and reporting procedures (e.g. UNEP/MAP/IMAP EOs and CIs).
- Providing with the necessary annual budget dedicated for seawater (ca. ecosystem matrices) monitoring, including the funds for technical assistance consisting of equipment maintenance and staff training. It is suggested that the staff be trained in various periods, so as to establish competent working groups in order to correctly implement all the IMAP requirements. When facing ambiguities and difficulties, they should be provided with the necessary consultancy from subject-field experts from EU countries that have already applied such procedures.
- Engaging the research working teams from Universities in the field trips and further analysis of contaminants and other parameters.
- Establishing a strong coordination between national authorities, in order to fully accomplish the requirements of Barcelona Convention. Establish a database of all monitored CI's under EO9, following the IMAP models and templates and make it public/accessible in the official website.

7 Connections with other descriptors

The IMAP concept, similarly to the EU Marine Strategy Framework Directive (EU MSFD), uses selected Ecological Objectives of the marine ecosystems to evaluate separately the impacts of the drivers and pressures in the coastal and marine environments, although the final objective is the integrated assessment of those. In addition, the focal interest behind those environmental policies is the sustainability and conservation of the resources and ecosystem services.

To this regard, the Biodiversity Cluster is the central focus of ecosystem assessments, thus the other EOs within clusters (mainly based on pressure and impact CIs) support the EO1-EO5 and related biological EOs formed by state-indicator CIs.

Such interrelation within the EOs is presented already in the Figure 1 in the Introduction section.

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

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

The main objective of the project is to restore the ecological balance of the Adriatic Sea through the use of the ecosystem approach and marine spatial planning. 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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