MEDITERRANEAN ACTION PLAN (MAP)
REGIONAL MARINE POLLUTION EMERGENCY RESPONSE CENTRE FOR THE MEDITERRANEAN SEA (REMPEC)

Fifteenth Meeting of the Focal Points of the Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea (REMPEC)

Kappara, Malta, 13-15 June 2023

REMPEC/WG.56/INF.7
2 June 2023
Original: English only

Agenda Item 3: Illegal and accidental oil and HNS pollution from ships

Proposed IMAP Pollution Cluster Chapters for the 2023 Mediterranean Quality Status Report (MED QSR 2023)

REMPEC
Malta, 2023

Note by the Secretariat

This document presents the first version of elements of IMAP Common Indicator 19, developed by REMPEC, in the view of the Ecosystem Approach Correspondence Group on Pollution Monitoring Meeting (CORMON on Pollution) March 2023, to be considered in the IMAP Pollution Cluster Chapters of the 2023 MED QSR. It will be followed by a revised version to the Integrated CORMONs Meeting, June 2023, considering the findings of the CORMON on Pollution meeting.

UNITED NATIONS

UNEP

EP

UNEP/MED WG.556/3/Add.1

United Nations
Environment Programme
Mediterranean Action Plan

Distr.: General
24 February 2023

Original: English

Meeting of the Ecosystem Approach Correspondence Group on Pollution Monitoring

Athens, Greece, 1-2 March 2023

Agenda item 3: 2023 Mediterranean Quality Status Report (QSR) - Pollution Ecological Objectives (EO5, EO9):

The Proposal of the IMAP Pollution Cluster Chapters of the 2023 MED QSR

Addendum

This Addendum has been prepared to present additional text to the Proposal of the IMAP Pollution Cluster Chapters of the 2023 MED QSR incorporating in Section 2 elaboration of the assessment methodology applied for IMAP 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, along with related assessment findings in Sections 4 and 5.

UNEP/MAP
Athens, 2023

Additional Text to the Proposal of the IMAP Pollution Cluster Chapters of the 2023 MED QSR

2.1 An overall interrelationship of the scope of the 2023 MED QSR with the 2017 MED QSR

1. As for the MED QSR 2017, the assessment was based on data about spills of oil and other substances. For the 2023 assessment the base of data was enlarged: data were derived from MEDGIS-MAR, Lloyd List Intelligence Seasearcher and CleanSeaNet Service. The spatial component of the analysis was detailed: the 2023 MED considers the sub-regions and the relative sub-divisions identified in the Mediterranean Sea. The approach to the assessment was changed: from a purely qualitative description of trends of observed spills, an assessment based on expert judgment was proposed, jointly considering the frequency of spills per square km and the trend of occurrence (considering the variation in comparison with the previous period 2013-2017). The latter element (variation of spill density) is based on a CHASE-like approach and capitalizes some elements of the methodology adopted by HELCOM for the assessment of oil spill in the Baltic Sea (HELCOM 2018).

2.5 The methodologies applied to support aggregation and integration of IMAP Pollution Cluster assessments

Table 2.5.1. The spatial distribution of the methodologies used for assessment of the four Mediterranean Sub-regions

CI 13&14		
Sub-region	**Sub-division**	**Methodology**
Aegean and Levantine Seas (AEL)	Aegean Sea (AEGS)	Ongoing
	Levantine Sea (LEVS)	G/M comparison
Adriatic Sea (ADR)	North Adriatic (NAS) *	NEAT assessment methodology
	Central Adriatic (CAS) *	
	South Adriatic (SAS) *	
Central Mediterranean Sea (CEN)	Central Mediterranean (CEN)	Ongoing
	Ionian Sea (IONS)	Ongoing
Western Mediterranean Sea (WMS)	Alboran Sea (ALBS)	G/M comparison
	Central Western Mediterranean Sea (CWMS)	Ongoing
	Tyrrhenian Sea (TYRS)	Ongoing
CI 17		
Sub-region	**Sub-division**	**Methodology**
Aegean and Levantine Seas (AEL)	Aegean Sea (AEGS)	CHASE+ assessment methodology
	Levantine Sea (LEVS)	
Adriatic Sea (ADR)	North Adriatic (NAS) *	NEAT assessment methodology
	Centrale Adriatic (CAS)*	
	South Adriatic (SAS) *	
Central Mediterranean Sea (CEN)	Central Mediterranean Sea (CEN)	CHASE+ assessment methodology
	Ionian Sea (IONS)	
Western Mediterranean Sea (WMS)	Alboran Sea (ALBS)	NEAT assessment methodology
	Central Western Mediterranean Sea (CWMS)	
	Tyrrhenian Sea (TYRS)	
CI 18		
The four Mediterranean Sub-regions: AEL, ADR,		The assessment approach for biological effects based on

<table>
<tr><td colspan="2">CEN and WMS</td><td>the use of the literature sources only</td></tr>
<tr><td colspan="3">CI 19</td></tr>
<tr><td>Sub-region</td><td>Sub-division</td><td>Methodology</td></tr>
<tr><td rowspan="2">Aegean and Levantine Seas (AEL)</td><td>Aegean Sea (AEGS)</td><td rowspan="9">Assessment based on expert judgment, considering frequency of spill occurrence trend. CHASE-like approach applied.</td></tr>
<tr><td>Levantine Sea (LEVS)</td></tr>
<tr><td rowspan="3">Adriatic Sea (ADR)</td><td>North Adriatic (NAS)</td></tr>
<tr><td>Centrale Adriatic (CAS)</td></tr>
<tr><td>South Adriatic (SAS)</td></tr>
<tr><td rowspan="2">Central Mediterranean Sea (CEN)</td><td>Central Mediterranean Sea (CEN)</td></tr>
<tr><td>Ionian Sea (IONS)</td></tr>
<tr><td rowspan="3">Western Mediterranean Sea (WMS)</td><td>Alboran Sea (ALBS)</td></tr>
<tr><td>Central Western Mediterranean Sea (CWMS)</td></tr>
<tr><td>Tyrrhenian Sea (TYRS)</td></tr>
<tr><td colspan="3">CI 20</td></tr>
<tr><td colspan="2">The four Mediterranean Sub-regions: AEL, ADR, CEN and WMS</td><td>The assessment approach for contaminants in seafood based on the concentration limits for the contaminants regulated in EU Regulations</td></tr>
<tr><td colspan="3">CI 21</td></tr>
<tr><td colspan="2">The four Mediterranean Sub-regions: AEL, ADR, CEN and WMS</td><td>The assessment approach for bathing water quality based on complementary use of the assessment results as presented in the Assessment report from the European Environment Agency (EEA) on the State of Bathing Water Quality in 2020 and the assessment of monitoring data reported for IMAP</td></tr>
</table>

2.5.5 The Environmental Assessment methodology applied for assessment of IMAP Common Indicator 19

2. The assessment for CI 19 in the period 2018-2021 is based on expert judgment, by jointly considering: (1) the information on the frequency of spill occurrence i.e., yearly average number of spills/10000 km^2 and yearly average extension of areas interested by pollution/10000 km^2, and (2) the information on the trend of such frequency i.e., increasing, decreasing, stable with no spill, represented by the variation in % in comparison with the previous assessment period (2013-2017). This element is based on a CHASE-like approach and capitalizes some elements of the methodology adopted by HELCOM for the assessment of oil spill in the Baltic Sea (HELCOM 2018).

4.5 Assessment of Common Indicator 19

Geographical scale of the assessment	The Sub-regions within the Mediterranean region based on expert-based judgment integration of the assessments at Sub-division levels
Contributing countries	Data from MEDGIS-MAR, Lloyd List Intelligence Seasearcher, CleanSeaNet Service
Mid-Term Strategy (MTS) Core Theme	1-Land and Sea Based Pollution
Ecological Objective	EO9. Contaminants cause no significant impact on coastal and marine ecosystems and human health
IMAP Common Indicator	CI19. 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
GES Definition (REMPEC/WG.51/9/1)	Occurrence of acute pollution events are reduced to the minimum.
GES Targets (REMPEC/WG.51/9/1)	1. Decreasing trend in the occurrence of acute pollution events
GES Operational Objective (REMPEC/WG.51/9/1)	Acute pollution events are prevented, and their impacts are minimized

Available data

3. Three major datasets are available to extract data on oil and HNS spills at the Mediterranean scale: MEDGIS-MAR, Lloyd List Intelligence Seasearcher (hereafter Lloyd), CleanSeaNet Service.

4. The Mediterranean Integrated Geographical Information System on Marine Pollution Risk Assessment and Response (MEDGIS-MAR) is a database managed by REMPEC containing national data about response equipment, accidents, oil and gas installations, and oil handling facilities. Data on accidents are collected in MEDGIS-MAR since 1977. For this assessment, MEDGIS-MAR data were filtered considering the events causing pollution ("Pollution" = YES) and located into the sea or within a 1 km inland buffer (to include events in any case occurring close to the sea, as for example in port areas).

5. The Lloyd List Intelligence Seasearcher, privately managed, gathers several data on shipping, including ship incidents, recorded since the 70s. The exportable tables do not include information about the spilled substances and volumes. Several incidents registered in the Lloyd database are also included in MEDGIS-MAR. For this assessment, Lloyd data were filtered considering the events causing pollution ("Pollution indicator = YES") and located in the Mediterranean Sea (thus, excluding those in the Black Sea).

6. CleanSeaNet is a European satellite-based service for oil spills and vessel detections managed by the European Maritime Safety Agency (EMSA). The full access to CleanSeaNet database is granted to Member States National Competent Authorities, while the open access website provides access to the so-called yearly "Detection and Feedback data", for the period 2015-2021. These pdf documents have been used for this assessment and include the parameters of interest for the assessment. The available dataset does not include information enabling to distinguish the spilled substance. For the assessment Class A events (high confidence of detection) were considered.

7. The above databases are based on the two different approaches: MEDGIS-MAR and Lloyd are populated with incident reports provided by ships or countries. CleanSeaNet includes satellite observations of possible spills. The number of events reported in each database is therefore very different: MEDGIS-MAR and Lloyd register tens of events per year in the Mediterranean while CleanSeaNet registers hundreds of events per year in the sea basin. CleanSeaNet detections can be caused by mineral oil and other pollutants, but may also indicate naturally occurring features (e.g. algae blooms, areas of upwelling, etc.). CleanSeaNet includes observations spills of different sizes, including also very small ones, not only related to incidents but also to accidental or illicit discharges. In addition to that, it should be observed that spills recorded by CleanSeaNet can derive from offshore (O&G prospections and extractions) or coastal activities, not linked to maritime transport. The datasets extracted from the three databases provide different and complementary information and were therefore assessed separately.

The integrated assessment of datasets related to CI 19

8. For the purpose of the present assessment of CI 19, the four main sub-regions and related sub-divisions have been established (2.5.1) namely: the Western Mediterranean Sea (including the Alboran Sea characterized by the exchange of the Mediterranean waters with the Atlantic Ocean), the Adriatic Sea (which is a double semi-enclosed area by itself and the Mediterranean Sea), the Central

Mediterranean (acting as the nexus for the eco-regions and located in the centre of the basin with a low anthropogenic influence), and the Aegean and Levantine Sea in the Eastern Mediterranean part.

9. The application of the environmental assessment methodology for CI 19 as explained in 2.5.5., is based on the integration of evidences from all the three analysed datasets.

10. For each of the datasets, the assessment was based on the following steps:

i. Quantification of the average number of oil spills per year in the period 2018-2021 for the entire Mediterranean Sea and its sub-divisions.

ii. The average number of oil spills was standardised on the extension of each sub-division, thus enabling to calculate the average number of spills per 10000 km^2 in the assessment period for the entire Mediterranean and its sub-divisions.

iii. The three sub-divisions characterised by higher values of the indicator calculated in step 2 were highlighted in dark red/red/orange to remark the three highest oil spill occurrences.

iv. Percentage of variation (2018-2021 vs. 2013-2017) of average yearly spill occurrence was then calculated for the entire Mediterranean and for each sub-division.

v. Based on the computed percentage variation, the following colour-based classes were defined for variation in percentage: blue = no spills recorded in the sub-division, in the period of assessment (2018-2021) nor in the previous reference period (2013-2017); green = decreased frequency of spill occurrence in the sub-division; yellow = increased frequency of spill occurrence ≤ 100% in the sub-division; red = increased frequency of spill occurrence > 100% in the sub-division.

11. In the case of CleanSeaNet dataset, the same assessment above described was implemented also for the extension of areas interested by pollution due to oil spills, still comparing 2018-2021 with the previous 2015-2017 period. MEDGIS-MAR enabled to implement the same assessment also on the number of spills of substances other than oil: Hazardous and Noxious Substances (HNS), other substances (non-HNS) and Unknown substances.

12. This integrated assessment of the evidences from the three data sets was based on the following three criteria:

a) Occurrence of spills reported through MEDGIS-MAR and Lloyds, which are mainly linked to relatively large pollution events and to incidents. Occurrence of reported events is considered as a "negative" factor in the overall assessment of the quality status of a given sub-division, while the absence of reported events is considered as "positive". As additional element informing expert judgment, to the sub-divisions ranked among the first three for frequency of occurrence of spills, an additional "negative" factor was considered.

b) CleanSeaNet data are used as an indicator of relatively smaller spills, related to minor incidents or illicit discharges. In particular, a negative contribution to the overall status was considered for the sub-divisions ranking among the first three in terms of average extension of areas affected by oil pollution.

c) The temporal variation of the average number of spills (for all the three datasets) and their extension (for CleanSeaNet) between the assessment period (2018-2021) and the previous reference period (2013-2017 for MEDGIS-MAR and Lloyds; 2015-2017 for CleanSeaNet) was considered. An increasing trend was considered as negative for the overall assessment of the quality status, while a decreasing trend provided a positive indication.

Results of the IMAP Environmental Assessment of CI 19 in the Mediterranean region

13. Table 4.5.1 provides an overview of the synthetic data extracted from the datasets and used for the assessment. Considering the spills reported by the ships and countries regarding the incidents, MEDGIS-MAR and Lloyd List data indicate for the entire Mediterranean in the assessment period an average occurrence frequency of 0.033 and 0.051 n/y/10000 km2, respectively. The most affected sea

is the Aegean Sea, followed by the Ionian Sea, according to MEDGIS-MAR (no incidents reported by Lloyd List, instead) and the Alboran Sea according to Lloyd List (no incidents reported by MEDGIS-MAR, instead). The Northern Adriatic Sea ranks third for occurrence of incidents, according to the Lloyd List (no incidents reported by MEDGIS-MAR, instead). These results are in accordance with the relative intensity of vessel traffic (hours/km), that indicates the Aegean Sea, the Alboran Sean and the Northern Adriatic as the most trafficked areas of the Mediterranean.

14. Focusing on the spills detected by satellite monitoring (CleanSeaNet data), the Adriatic Sea is the area with the highest standardised (per 10000 km^2) frequency of spill occurrence and the area where the largest extension of polluted areas is detected. This could be explained by the fact that satellite monitoring enables to detect also small spills, (including small, non-reported incidents, illicit discharges, spills due to other offshore activities. These are particularly numerous in the Adriatic where, beside significant traffic density due to cargos, tankers and passenger vessels, other type of vessels are present in large number,including fishing vessels.

15. The temporal variations in spill occurrence computed from the three different databases are very different. According to MEDGIS-MAR a general improvement of the status can be observed for this indicator, with Alboran Sea, Tyrrhenian Sea and the whole Adriatic Sea reporting no spills both in the considered and in the previous assessment period. Considering Lloyd, a general worsening of the status of the indicator can be observed in the Alboran Sea, Western Mediterranean, the Tyrrhenian Sea, the Northern Adriatic the Aegean Sea showing increased spill occurrence. These findings mostly agree with the ones from CleanSeaNet which additionally highlight an increase of spill occurrence also for the Central Mediterranean, the Middle Adriatic Sea, the Ionian Sea and the Levantine Sea.

16. It is worth noting that CleanSeaNet datasets might be biased by increasing monitoring effort from 2015 to the present. Within present assessment of CI 19, it was possible to obtain information on this aspect.

17. MEDGIS-MAR is the only datasets among the three considered in this assessment allowing to describe the trend in the number of spills of substances other than oil. In MEDGIS-MAR, such substances are categorized as Hazardous and Noxious Substances (HNS), other substances (non-HNS) and Unknown substances. Decrease in number of events with respect to the previous period, or no events recorded, was observed in the last four year in all sub-divisions, with the exception of Ionian Sea and the Aegean Sea. The Levantine sea scores third in number of events, even if with a decreasing trend. iLarge (above 700t) and medium size spills (7-700t) have not been reported since 2018. The last four years are characterised only by small spill events, although several events with unknow size (4 in 2019) have been registered.

18. **Table 4.5.1~~8~~**: CI 19 assessment. (1) average number of oil spills in the assessment period (2018-2021) per 10000 km^2 for the three datasets; (2) average extension of areas interested by oil pollution in the assessment period (2018-2021) per 10000 km^2 (from CleanSeaNet) (3) average number of other substances spills in the assessment period (2018-2021) per 10000 km^2 (form MEDGIS-MAR); (4) % of variation compared to the previous period of the above indicators for oil spills; (5) % of variation compared to the previous period of the above indicator on other substance spills. Colour code for spill frequency and variation in the extension of the area affected by pollution: dark red = highest value; red = second highest; orange = third highest. Colour code for % variations: blue = no spills recorded, in the assessment period, nor in the previous period; green = decreased frequency of spill occurrence; yellow = increased frequency of spill occurrence <= 100%; red = increased frequency of spill occurrence > 100%. Data sources: MEDGIS-MAR, Lloyd List Intelligence Seasearcher, CleanSeaNet.

Frequency of spills / total polluted area (average values in the period 2018-2021, per 10000 km^2)											
	TOT MED	**ALBS**	**WMS**	**TYRS**	**CEN**	**NADR**	**MADR**	**SADR**	**IONS**	**AEGS**	**LEVS**
Oil											
(1) MEDGIS-MAR	0.033	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.089**	**0.334**	0.000
(1) LLOYD	0.051	**0.178**	0.039	0.012	0.000	**0.075**	0.000	0.000	0.000	**0.371**	0.028
(1) CleanSeaNet (n)	9.3	11.3	9.0	6.8	5.9	**16.5**	**15.4**	**15.6**	9.6	10.9	11.3
(2) CleanSeaNet (km^2)	68.2	57.5	76.6	44.6	62.8	**104.7**	**130.5**	**120.3**	54.4	39.6	75.9
Other substances											
(3) MEDGIS-MAR	0.031	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.104**	**0.284**	**0.004**
Summary of variation %											
	TOT MED	**ALBS**	**WMS**	**TYRS**	**CEN**	**NADR**	**MADR**	**SADR**	**IONS**	**AEGS**	**LEVS**
Oil											
(4) MEDGIS-MAR	-57	-	-100	-	-100	-	-	-	25	-56	-100
(4) LLOYD	12	67	41	25	-100	-	-	-100	-100	34	-27
(4) CleanSeaNet (n)	85	32	62	22	139	207	100	79	137	60	108
(4) CleanSeaNet (km^2)	103	64	106	24	244	197	48	87	141	12	99
Other substances											
(5) MEDGIS-MAR	-14	-100	-100	-	-100	-	-100	-	192	31	-89

19. The combined, expert-based application of the three assessment criteria defined above (a, b, c) led to the classification of the quality status of CI 19 in the Mediterranean sub-divisions in five classes: bad (red), poor (brown), moderate (yellow), good (green), high (blue). As reported in Table 4.5.2, and mapped in Figure 4.5.1, according to the adopted methodology, four sub-divisions are classified as bad or poor, five as moderate, one as good and none as high.

20. It is worth noting that the methodology applied is subjected to uncertainty, mostly linked to the heterogeneity of the data sets it is based on. The results from the assessment should be interpreted as best knowledge-based indications on the status of CI 19, aiming at providing a relative indication of priority areas for future monitoring, assessment and, most importantly, pollution prevention measures.

Table 4.5.2: Assessment of the marine environment status for CI 19 for sub-divisions of the Mediterranean Sea

Sub-division	Considerations for expert judgment	Status of CI 19
ALBS	Spills reported, second highest | Increase (in most of the datasets)	POOR
WMS	Spill reported | Increase (in most of the datasets)	MODERATE

TYRS	Spills reported | Increase (in most of the datasets)	MODERATE
CEN	No spills reported | Increase (only CSN)	GOOD
NADR	Spills reported, third highest | Third ranked for satellite observation (area extension) | Increase (in most of the datasets)	POOR
MADR	No spills reported | First ranked for satellite observation (area extension) | Increase (only CSN)	MODERATE
SADR	No spills reported | Second ranked for satellite observation (area extension) | Increase (only CSN)	MODERATE
IONS	Spills reported, second highest | Increase (for most of the datasets)	POOR
AEGS	Spills reported, first highest in two datasets | Increase (for most of the datasets)	BAD
LEVS	Spills reported | Increase (only CSN)	MODERATE

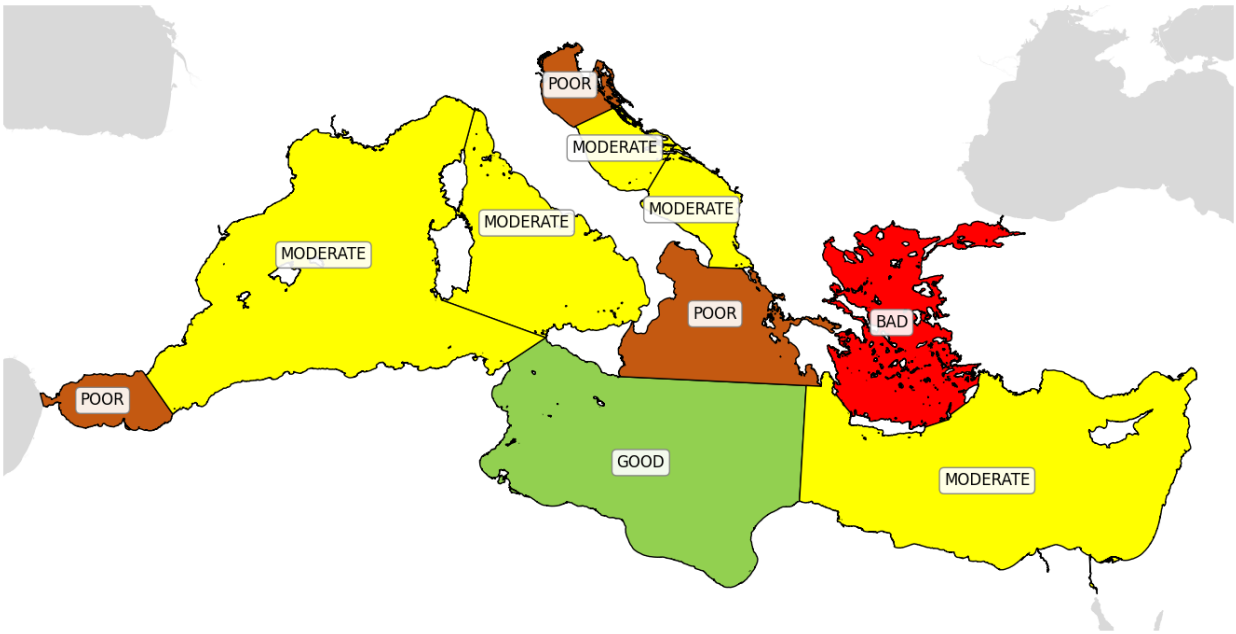

Figure 4.5.1 Map of the assessment of the marine environment status for CI 19 for sub-divisions of the Mediterranean Sea

5.4 Key assessment findings for IMAP Common Indicator 19

21. The assessments of the ten subdivisions (Table 4.5.1**)** have been aggregated (Figure MED 5.4.1.) based on the expert judgement, in order to obtain the assessment for the four Sub-regions of the Mediterranean Sea. This resulted in the following integrated assessment findings:

- the (Entire) Western Mediterranean Sea (WMS) Sub-region, is assigned to “Moderate”, because this category prevails in its sub-divisions (WMS and TYRS), while the “Poor” status value characterises only the Alboran Sea (ALBS);
- “Moderate” has been assigned to the Adriatic Sea (ADR) Sub-region , considering the prevalence of this category in its sub-divisions (MADR and SADR).

- "Moderate" has been assigned to the (Entire) Central Mediterranean Sea (CEN) Sub-region, by qualitative averaging of the poor status of the Ionian Sea (IONS) and the good status of the Central Mediterranean (CEN);
- In the case of the Aegean and Levantine Seas (AEL) Sub-region, the qualitative average evaluation led to d a" poor" status for this Sub-region.

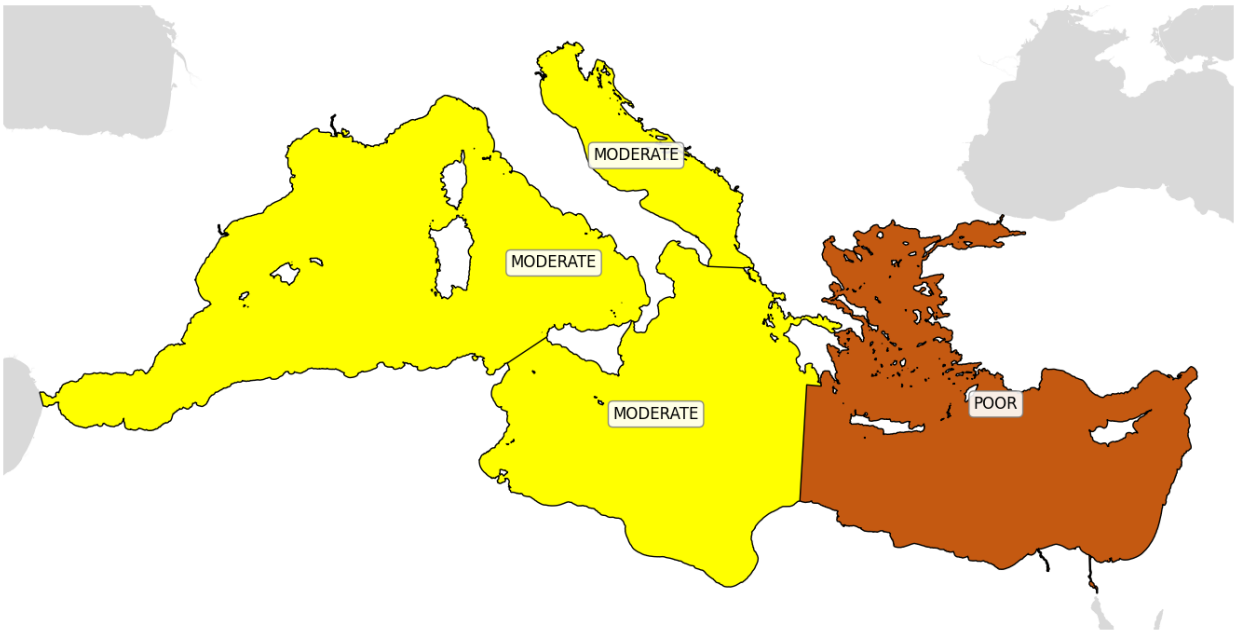

Figure MED 5.4.1. Map of the integrated assessment of the marine environment status for CI 19 in the four Sub-regions of the Mediterranean Sea