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The Results of GES Assessment for IMAP Common Indicators 13 and 14 in the Adriatic Sea Sub-region by Applying the NEAT GES Assessment Methodology

UNEP/MAP
Athens, 2023

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List of Abbreviations / Acronyms

BDL	Below Detection Limit
CAS	Central Adriatic Sea
Chl *a*	Chlorophyll *a*
CI	Common Indicator
COP	Conference of the Parties
CORMON	Correspondence Group on Monitoring
CPs	Contracting Parties
DIN	Dissolved Inorganic Nitrogen
DL	Detection Limit
EIONET	European Environment Information and Observation Network
EO	Ecological Objective
ESRI	Environmental Systems Research Institute
EU	European Union
GES	Good Environmental Status
nonGES	not Good Environmental Status
IMAP	Integrated Monitoring and Assessment Programme of the Mediterranean Sea and Coast and Related Assessment Criteria
MAP	Mediterranean Action Plan
MED POL	Programme for the Assessment and Control of Marine Pollution in the Mediterranean Sea
MED QSR	Mediterranean Quality Status Report
MSFD	Marine Strategy Framework Directive
MRU	Marine Reporting Unit
MSs	Member States
NAS	North Adriatic Sea
NEAT	Nested Environmental Assessment Tool
SAS	South Adriatic Sea
SAU	Spatial Assessment Unit
TP	Total Phosphorous

1. Introduction

1. During the implementation of the recommendations of the Meeting of CorMon on Pollution Monitoring (Teleconference, 26-27 April 2021) and the Meeting of the MEDPOL Focal Points (Resumed Session, 9 July 2021) that are related to the adjustment of the Meeting document on Integration and Aggregation Rules for Monitoring and Assessment[1], the Secretariat started a testing process of the proposed methodology in the Adriatic Sea Sub-region. Therefore, the scope of the current document is to show the outcome of the NEAT GES assessment methodology application for IMAP CIs 13 and 14, further to the results of its application for IMAP CI 17 approved for the Adriatic Sea Sub-region by the Meeting of CorMon on Pollution Monitoring (Teleconference, 27 and 30 May 2021).

2. The work is aimed at providing an assessment of the Quality Status for the Adriatic Sea subregion of the Mediterranean Sea within the preparation of the 2023 Mediterranean Quality Status Report focusing on nutrients and chlorophyll a which reporting is mandatory according to IMAP Cis 13 and 14. In brief, within application of the NEAT GES assessment, the nested approach was followed, ensuring a balance between a too broad scale, that can mask significant areas of impact in certain parts of a region or subregion, and a very fine scale that could lead to very complicated assessment processes. The assessment was provided only for TP, DIN and Chl *a*, as mandatory parameters monitored for CIs 13 and 14, given significant lack of data reported for other parameters.

3. The results obtained from the application of the NEAT tool are shown in Table 8 below. It provides detail GES assessment results for CIs 13 and 14 per TP, DIN and Chl *a* which resulted from the aggregation-integration within the nested scheme at i) the IMAP national SAUs and subSAUs, as the finest level; ii) the IMAP coastal and offshore assessment zones of sub-divisions (NAS-1, NAS-12, CAS-1, CAS-12, SAS-1, SAS-12); iii) the sub-division level (NAS, CAS, SAS) and iv) the sub-regional level (the Adriatic Sea).

4. The rationale for the harmonized application of the nested approach, including within the application of the NEAT GES assessment methodology, further, to define the Integration Rules for Assessments, is explained in the documents UNEP/MED WG.533/10, Appendix III and UNEP/MED WG.533/Inf. 4/Rev 1.

5. The first element that needs to be considered for the implementation of the nested approach was the definition of the areas of assessment within the Adriatic Sea based on the areas of monitoring defined by the CPs for IMAP CIs 13 and 14. The monitoring areas were used as they were defined by the concerned CPs within their respective national IMAPs, as well as within MSFD implementation. When inconsistency appeared in terms of IMAP and MSFD implementation, the necessary adjustments were undertaken.

6. The harmonization of the scales approach among the concerned CPs, as a starting point for the integration process for IMAP CIs 13 and 14, was used to scale up the marine assessment areas from the national to sub-regional and regional scales as required under IMAP in line with the work already undertaken for IMAP CI 17 (UNEP/MED WG.533/Inf.4/Rev 1). For the purposes of the present work, data generated for IMAP CIs 13 and 14 within the implementation of the national monitoring programmes of the CPs and reported either to the IMAP Info System or shared with the MED POL have been gathered. Information on the availability of data and the approaches applied to ensure their use for GES assessment are shown in chapter 3 here-below.

[1] For the purpose of building the methodology for aggregation and integration rules contained in this document only the scientific elements have been considered from any reference included in this document. Legal considerations are out of the scope of the present document, which serves exclusively scientific purposes.

7. The assessment of CIs 13 and 14 in the Adriatic Sea Sub-region follows on integration and aggregation rules (UNEP/MED WG. 509/Inf.10/Rev 2) in line with the principles that underlie meaningful assessments on appropriate scales of assessment.

2. From monitoring areas to IMAP Spatial Assessment Units (IMAP SAUs) in the Adriatic Sea in line with the nested approach

8. In the absence of declared areas of monitoring by all the concerned CPs, following the rationale of the IMAP national monitoring programmes and distribution of the monitoring stations, as well as the methodology described in UNEP/MED WG. WG.509/Inf.10/Rev.2, the two zones of areas of monitoring are defined for the purposes of the present work: i) the coastal zone and ii) the offshore zone, as elaborated in UNEP/MED WG.533/10, Appendix III; UNEP/MED WG. 533/Inf.4/Rev.1 and UNEP/MED WG.533 Inf.5/Rev.1.

9. For the purpose of work undertaken to assess IMAP CIs 13 and 14, in summary, it should be recalled that GIS layers collected from different sources (International Hydrographic Organization - IHO, European Environment Information and Observation Network - EIONET, VLIZ Maritime Boundaries Geodatabase) by the MEDCIS project were used for the present work for Slovenia, Croatia and Italy. For Albania, Montenegro and Greece these data were not accurate or do not include the relevant information and therefore were replaced/corrected in line with relevant national sources i.e. results of GEF Adriatic Project and provisions of relevant national legal acts. The MEDCIS work takes into consideration the existence of bays and inlets which are numerous in the east part of the Adriatic Sea and calculates the baseline using the straight baseline method by joining appropriate points, as explained here-below.

10. Following the rules of integration of assessments within the nested approach, for the assessment of EO9 Common Indicators, the coastal monitoring zone is equal to the respective assessment zone as defined for the purposes of the present work. For the offshore zone, monitoring areas may be representative of broader assessment areas and in these cases the offshore monitoring areas are not necessarily equal to the offshore assessment areas. For those CPs which are EU MSs, the stations positioned within the offshore zone are considered representative of a wider offshore area, as officially declared by the countries for the purposes of the MSFD implementation. For these cases, the offshore IMAP SAUs are based on the MSFD MRUs.

11. For IMAP CIs 13, 14 and 17, the integration of assessments up to the subdivision level is considered meaningful. Therefore, the three main subdivisions of the Adriatic Sea, namely, North, Central and South Adriatic (NAS, CAS, SAS) have been chosen following the specific geomorphological features as available in relevant scientific sources (e.g., bottom depths and slope areas, existence of deep depression, salinity and temperature gradient, water mass exchanges) (Cushman-Roisin et al., 2001)[2]. The coverage of the 3 sub-divisions is shown in Figure 1.

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[2] Cushman-Roisin, B., Gačić, M., Poulain, P-M., Artegianni, A., 2001. Physical Oceanography of the Adriatic Sea, Past, Present and Future, Springer Science + Business Media, Dordrecht, 312 pp.

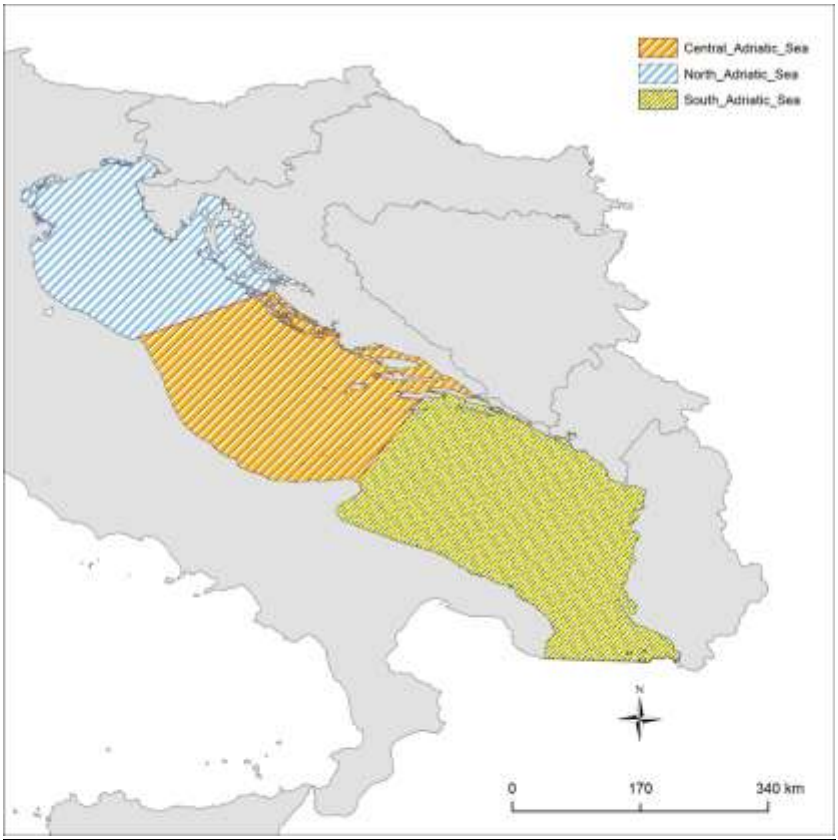

Figure 1. The 3 subdivisions of the Adriatic subregion defined based on Cushman-Roisin et al. (2001).

12. For setting the IMAP areas of assessment for IMAP CIs 13 and 14, the 4 levels nesting approach was followed as elaborated for IMAP CI 17 (UNEP/MED WG.533/10, Appendix III; UNEP/MED 533/Inf.4/Rev 1 and 533/Inf.5/Rev.1 (amended for the purpose of CIs 13 and 14)):

- **Step 1 Defining coastal and offshore waters,**
- **Step 2 "Recognizing scope of IMAP areas of monitoring",**
- **Step 3 "Setting IMAP area of assessment"**, and
- **Step 4 "Nesting of the areas of assessment within application of NEAT tool"** which followed the 4 levels nesting scheme where 1st level is the finest and 4th level is the highest:
  - 1st level provided nesting of all national IMAP SAUs and subSAUs within the two key IMAP assessment zones per country i.e., coastal and offshore zones;
  - 2nd level provided nesting of the assessment areas set in the key IMAP assessment zones i.e. coastal and offshore zones, on the subdivision level i.e. i) NAS coastal, NAS offshore; ii) CAS coastal, CAS offshore; iii) SAS coastal, SAS offshore);
  - 3rd level provided nesting of the areas of assessment within the 3 subdivisions (NAS, CAS, SAS); and
  - 4th level provided nesting of the areas of assessment within the Adriatic Sea Sub-region.

13. However, for setting the finest areas of assessment for IMAP CIs 13 and 14, one additional GIS layer was created within Step 3. This layer shows a distribution of the water classes within the coastal and offshore zones. It was overlaid on the IMAP sub-SAUs defined for IMAP CI 17, which resulted in an adjustment of the finest areas of assessment for IMAP CIs 13 and14.

After setting of the finest IMAP areas of assessment, similarly the integration of the assessment results is conducted by following the 4 levels nesting approach applied for IMAP CI 17:

- 1st level: Detailed assessment results provided per subSAUs and SAUs;
- 2nd level: Integrated assessment results provided per i) NAS coastal (NAS-1), NAS offshore (NAS-12); ii) CAS coastal (CAS-1), CAS offshore (CAS-12); iii) SAS coastal (SAS-1), SAS offshore (SAS-12);
- 3rd level: Integrated assessment results provided per subdivision NAS, CAS, SAS; and
- 4thlevel: Integrated assessment results provided for the Adriatic Sea Sub-region.

14. The graphical representation of this nesting scheme is shown in Figure 9. The description of the IMAP SAUs and details on specificities for each country are provided in UNEP/MED WG.533/Inf. 5/Rev.1 (amended for the purpose of CIs 13 and 14), while the summary is provided here-below in Section 2.1.

2.1 Defining the IMAP areas of assessment (IMAP SAUs) for the Adriatic countries

15. The application of the 3 first working steps for the definition of IMAP SAUs per each of the Adriatic countries separately are described below. After setting all national SAUs, the 4th step of the nesting approach was followed. Given Albania, Bosnia and Herzegovina, and Greece faced the lack of data for CIs 13 and 14, they were not considered in the present work aimed at providing the GES assessment for IMAP EO5. It should also be noted that the finest areas of assessment set for CI 17 (UNEP/MED WG.533/10, Appendix III; UNEP/MED 533/Inf.4/Rev 1) were further adjusted to serve the purpose of EO5 assessment, i.e., IMAP Common Indicators 13 and 14. The distribution of the finest areas of assessment is mainly related to the scientific knowledge which takes into account the specifics of the monitoring and assessment of national waters. Where it was possible, the distribution of water types existing in the Adriatic Sea Sub-region (I, IIA and IIIW) also guided the adjustment of the finest areas of assessment for IMAP EO5. Namely, the three types of water are mainly discriminated by freshwater content which on the other side is correlated with the pressures from land. This leaded to a separate aggregation of the assessment results per water types in order to get the status of CIs 13 and 14 in different water types for all SAUs. Accordingly, details on setting the finest areas of assessment for IMAP EO 5 are presented here-below per countries.

16. **Albania:** The IMAP areas of assessment were proposed as defined for EO9 (CI17) UNEP/MED WG.533/Inf.4/Rev.1 and UNEP/MED WG.533/Inf.5/Rev.1 (amended for the purposed of CIs 13 and 14). Two IMAP SAUs have been set, i.e., the coastal waters AL-1 and the offshore waters AL-12 (Figure 2). The surface area of the Albanian IMAP SAUs is given in Table 1. No further split into finer areas of assessment was made; however, when monitoring stations will be established, further work will be needed to tune and further define the areas of assessment, both in the small area tested for NEAT CI 17 assessment and in the entire marine waters of Albania (Figure 2). During 2020 data were collected on the stations given on Figure 2 and probably will be part of the permanent monitoring ones. Given the absence of any data reported for CIs 13 and 14, adjustment of the finest areas of assessment set for IMAP CI 17 was not provided to include the water typology for marine waters of Albania.

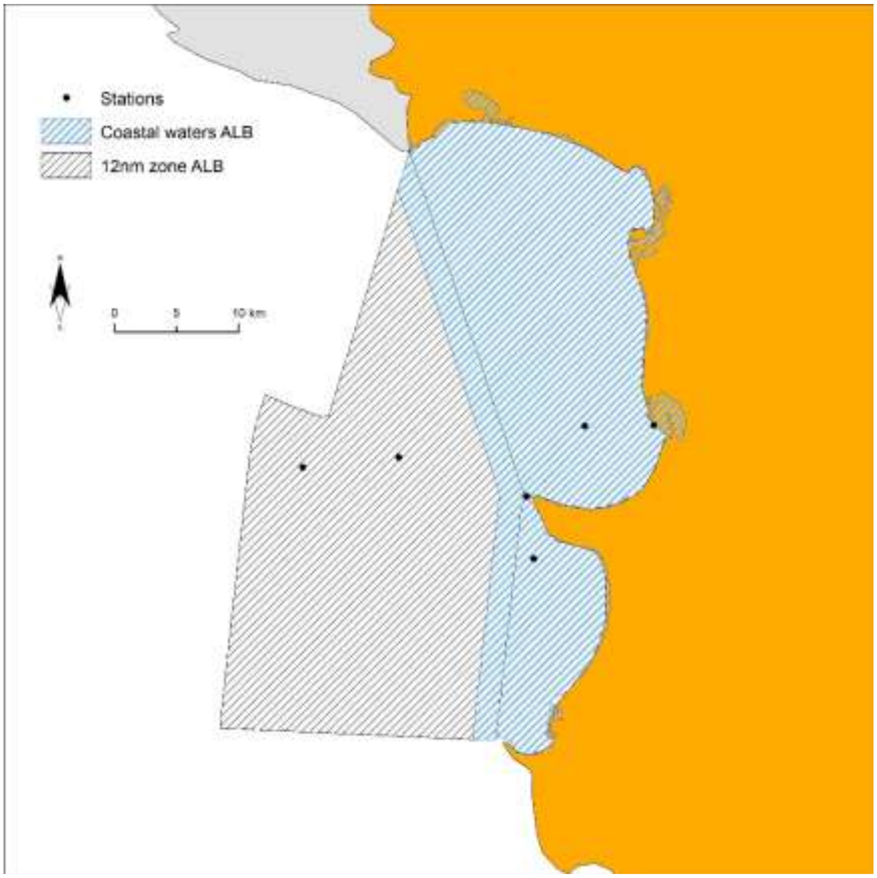

Figure 2. The IMAP areas of assessment (IMAP SAUs) of Albania, proposed within present NEAT application for IMAP CIs 13, 14, and CI 17 in the Adriatic Sea. The resulting IMAP SAUs for Albania are coastal AL-1 and offshore AL-12.

17. **Bosnia and Herzegovina:** As found during a harmonized and homogenized application of the NEAT tool for GES assessment of IMAP CI 17 in the Adriatic Sea Subregion (UNEP/MED WG.533/10, Appendix III; UNEP/MED WG. 533/Inf.4/Rev.1 and UNEP/MED WG.533/Inf.5/Rev.1 (amended for the purposed of CIs 13 and 14)), one zone of coastal waters was set for B&H based on data from the MEDCIS project. The identified SAU is also considered the finest IMAP sub SAUs for IMAP CIs 13 and 14 as CI17.

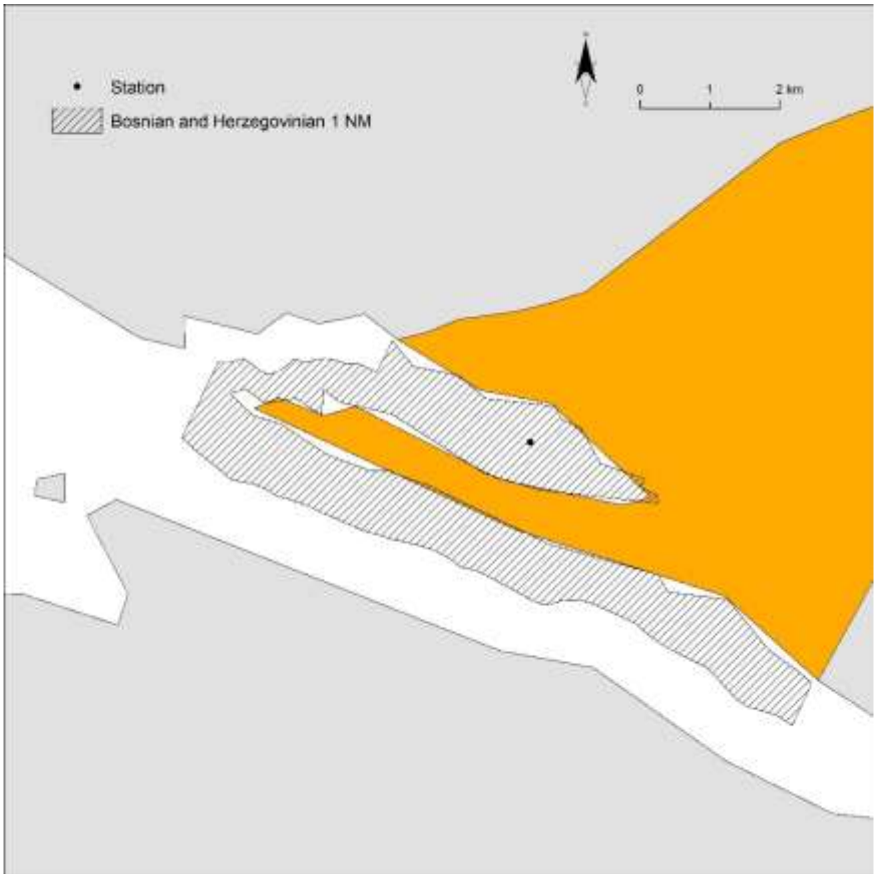

Figure 3. The IMAP areas of assessment (IMAP SAUs) of Bosnia and Herzegovina, proposed within present NEAT application for IMAP CIs 13, 14, and CI 17 in the Adriatic Sea. The IMAP SAU is part of the coastal zone in CAS.

18. **Croatia:** As found during a harmonized and homogenized application of the NEAT tool for GES assessment of IMAP CI 17 in the Adriatic Sea Subregion (UNEP/MED WG.533/10, Appendix III; UNEP/MED WG. 533/Inf.4/Rev.1 and UNEP/MED WG.533/Inf.5/Rev.1 (amended for the purpose of CIs 13 and 14)), the two zones of coastal and offshore waters set for Croatia based on data from the MEDCIS project comply well with the 4 officially declared MRUs for the purposes of the MSFD implementation. MAD_HR_MRU_2 and MAD_HR_MRU_3 correspond to the coastal zone and are considered as IMAP SAUs (Figure 4). In addition, the country has officially defined subMRUs for the purposes of the implementation of the WFD and the MSFD. The WFD delimitations, that corresponds with water bodies, are used for setting the areas of assessment for EOs 5 and 9. In particular, the MAD_HR_MRU_2 and MAD_HR_MRU_3 are further divided to 15 and 26 WFD water bodies respectively as shown in Figure 4. All these water bodies are considered the finest IMAP sub SAUs for IMAP CIs 13 and 14 in coastal waters.

19. Two MRUs namely MAD_HR_MRU_4 and MAD_HR_MRU_5 correspond to the offshore zone as developed for IMAP CI 17 (UNEP/MED WG.533/Inf.5/Rev.1 (amended for the purposed of CIs 13 and 14)). For the purpose of EO5 assessment, these two areas are unified and split in the two offshore areas. The first one is the part of the offshore zone that is set outward of the coastal zone to roughly 20 km where the most of the national monitoring activities is performed, and abbreviated MC. The second one is the remaining part of marine waters of Croatia in the Adriatic Sea, and can be identified as the offshore open waters, abbreviated MO. This part coincides with the epicontinental zone of Croatia where

the monitoring of marine environment has not yet been implemented. These subSAUs are mainly related to the hydrographical conditions and characteristics relevant for the EO5 in the offshore marine waters of Croatia. The areas are then divided based on the Adriatic Sea assessment zones (NAS, CAS, and SAS) and where needed, based on the expert knowledge, even on smaller units as given in Table 1 and Figure 4.

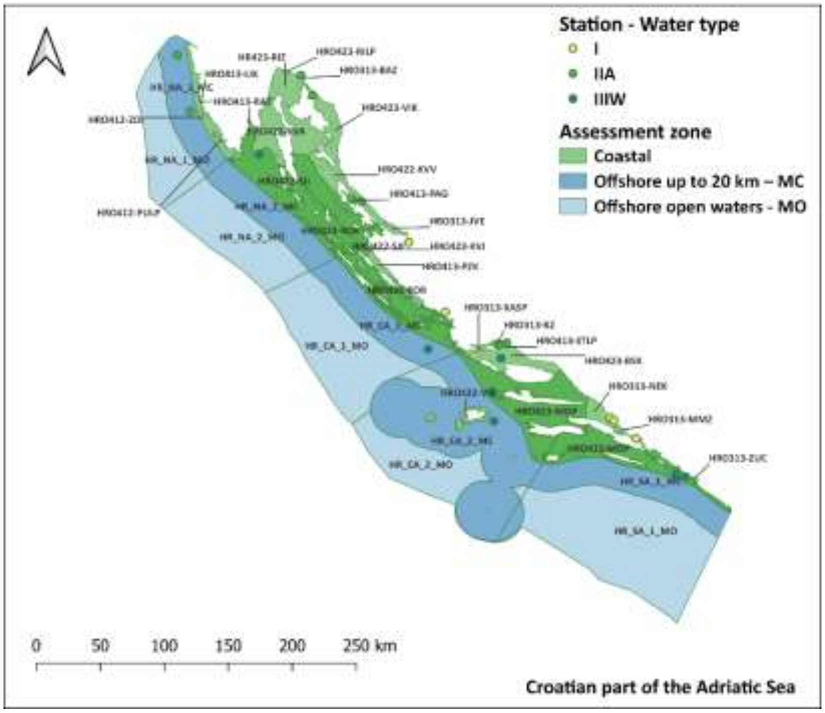

Figure 4. The finest IMAP subSAUs set for IMAP CIs 13 and 14 in the marine waters of Croatian, including the positions of monitoring stations.

20. **Greece:** One official MRU of Greece related to the MSFD implementation falls within the south part of the Adriatic Sea (SAS) (MAD-EL-MS-AD) with one offshore monitoring station at 6 nm from the closest land (Othonoi). This MRU is detached from the Greek mainland, and the coast therein corresponds to areas with no pollution pressures. Therefore, it is considered as representative of offshore waters and considered as an IMAP SAU for IMAP CIs 13 and14, and IMAP CI 17, in the offshore zone. The surface area of the Greek MRU is given in Table 1.

Figure 5. The Greek official MSFD MRU in the South part of the Adriatic Sea used as offshore IMAP SAU. The source of data for MRUs is the EIONET folder of Greece.

21. **Italy:** The distribution of monitoring stations of Italy and their relation to the coastal and offshore zones is shown in Figure 6 further to the elaboration provided in UNEP/MED WG.533/10, Appendix III; UNEP/MED WG. 533/Inf.4/Rev.1 and UNEP/MED WG.533/Inf.5/Rev 1 (amended for the purposed of CIs 13 and 14). Italy has officially declared Marine Reporting Units at 3 levels. For the Adriatic Sea, the 3 subMRUs are available namely IT-NAS-0001, IT-CAS-0001 and IT-SAS-0001 (Figure 6).

22. Further to elaboration provided in UNEP/MED WG.533/Inf.5/Rev 1 (amended for the purposed of CIs 13 and 14), and in order to reach a common, harmonized IMAP spatial scale among all the Adriatic countries for EO5 and EO9, the Italian coastal zone was further subdivided. In the absence of ecological characterization of the area this was done according to the Regional/Administrative subdivision of Italy. The coastal zone was further sub-divided into finer IMAP SAUs (subSAUs) according to the administrative units of Italy (Figure 7).

23. This was then followed by derivation of the IMAP assessment areas (IMAP SAUs) of the offshore waters of Italy. They were derived from the official subMRUs (IT-NAS-001, IT-CAS-001, IT-SAS-001) by excluding the coastal part. In addition, for the purpose of EO5 assessment, these three areas are split in two offshore areas. The first one is the part of the offshore zone that is set outward of the coastal zone to roughly 20 km where the most of the national monitoring activities is performed, and abbreviated MC. The second one is the remaining part of the marine water of Italy in the Adriatic Sea, and can be identified as the offshore open waters, abbreviated MO. This part coincides with the epicontinental zone of Italy, where the monitoring programme has not yet been implemented.

24. Both, the coastal and offshore zone was further subdivided, based on expert knowledge, taking into account the distribution of the monitoring station profiles as they extend outward, the distribution of water types and the distribution of freshwater plumes. On the Figure 7 showing the finest subSAUs for IMAP CIs 13 and 14, the position of the monitoring stations and water types are also shown. Their coding and surface of the areas of assessment are given in Table 1. The subSAU code is built from 1) the short name of the administrative division (Regione) (Friuli Venezia Giulia – FVG, Veneto – VE, Emilia Romagna – ER, Marche – MA, Molise – MO, Abruzzo – AB and Puglia – PU), 2) progressive number of subdivision in the administrative region, and 3) type of assessment zone (Coastal – C, Offshore up to 20 km – MC, and Offshore open waters – MO), resulting at the end in the code FVG-1-C for Friuli Venezia Giulia for the area related to the first profile in the administrative division and coastal assessment zone.

This represents only a finer net of subSAUs for EO5, set at a lower level of the subSAUs compared to EO9 (CI17).

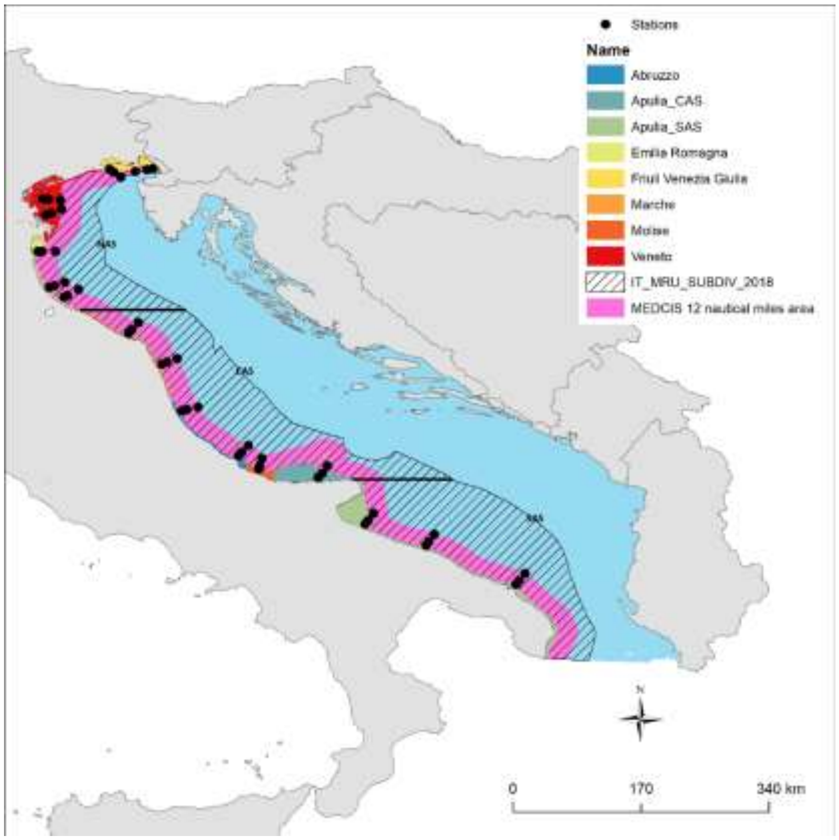

Figure 6. The finest IMAP subSAUs set for IMAP CI 17 in the coastal zone of Italy in the Adriatic Sea Sub-region. Monitoring stations for IMAP CIs 13 and14 are overlaid.

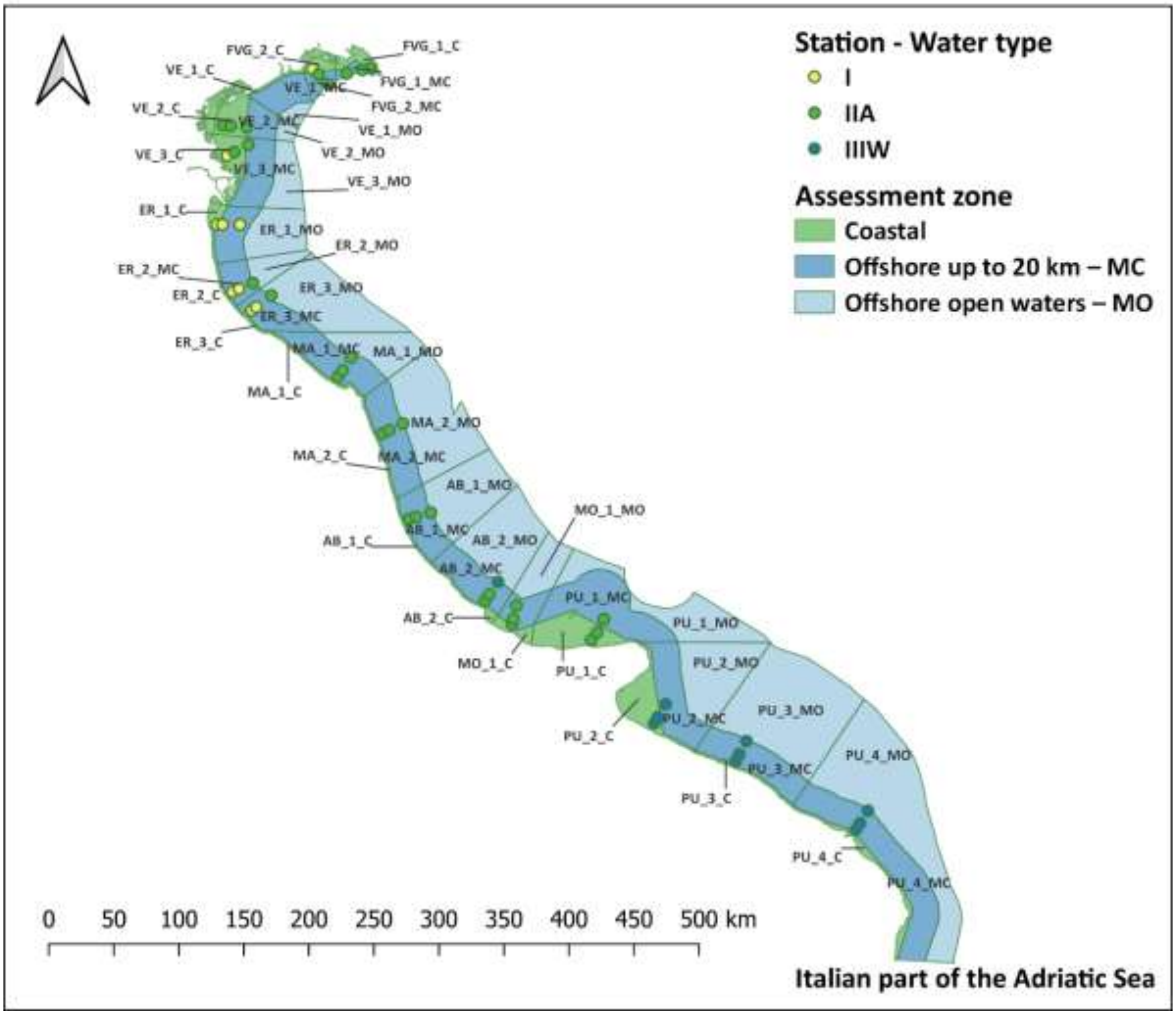

Figure 7. The IMAP subSAUs for CIs 13 and 14 in the water of Italy in the Adriatic Sea Sub-region, as shown in Figure 6, including the codes assigned to IMAP subSAUs.

25. **Montenegro:** The monitoring areas have not been defined in the National IMAP of Montenegro prepared in the framework of GEF Adriatic Project. The IMAP areas of assessment are proposed considering the distribution of monitoring stations (Figure 8), as provided in National IMAP. The work pertinent to the definition of the nesting scheme for the assessment of EO5 is built on the work provided for IMAP CI 17 within the national maritime boundaries of Montenegro as elaborated in UNEP/MED WG.533/10, Appendix III; UNEP/MED WG. 533/Inf.4/Rev.1 and UNEP/MED WG.533/Inf.5/Rev 1 (amended for the purposed of CIs 13 and 14).

26. Three main assessments zones have been set, the Boka Kotorska Bay, the coastal waters, and the offshore zone. For the purpose of setting the finest areas of assessment, the two latter have been split into the North, the Central and the South areas by considering ecological and hydrological characteristic as found in the scientific literature used to support NEAT GES assessment application. These IMAP SAUs are shown below in Figure 8.

27. By that, three areas of monitoring for the coastal waters i.e. the North, the Central, the South and three for the open sea-offshore waters were recognized i.e. the North, the Central, the South. For the purpose of EO 5 assessment, a fourth area is added and coincide with the epicontinental zone of

Montenegro. The area is beyond the 20 km line where usually the national monitoring activities are not performed and in future will be part of the open waters monitoring. From such recognized areas of monitoring, eight areas of assessment were proposed for IMAP CIs 13 and 14 assessment in marine waters of Montenegro as shown on Figure 8 and given in Table 1.

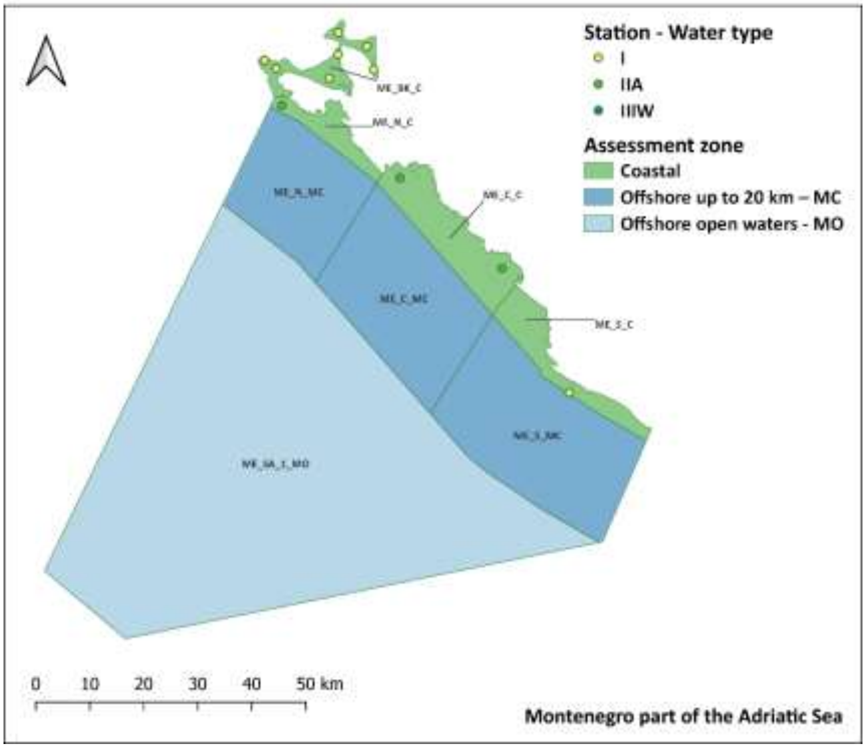

Figure 8. The IMAP subSAUs for CIs 13 and 14 in the marine water of Montenegro overlaid on the positions of monitoring stations, showing also the codes assigned to IMAP subSAUs.

28. **Slovenia:** In Figure 9, the distribution of monitoring stations of Slovenia for IMAP CIs 13 and 14 is shown. Two official MRUs MAD-SI-MRU-11 and MAD-SI-MRU-12 are declared by Slovenia. In order to ensure compatibility with the national assessments, the MAD-SI-MRU-11 was considered in the coastal IMAP SAU and the MAD-SI-MRU-12 in the offshore IMAP SAU. For Slovenia the two IMAP SAUs used are MAD-SI-MRU-11 representative of the coastal IMAP SAU and MAD-SI-MRU-12 representative of the offshore one. Since all monitoring stations belong to the water type IIA, no adjustments have been performed from the SAUs designed for CI 17 and therefore SAUs for CIs 13 and 14 are common also for CI 17.

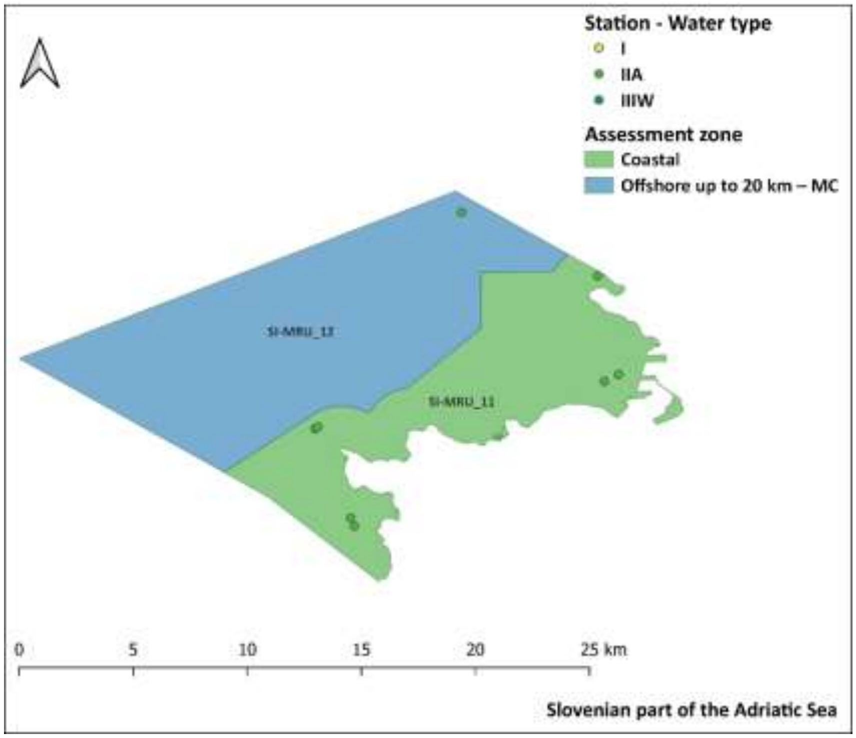

Figure 9. The IMAP SAUs for CIs 13 and 14 in marine waters of Slovenia, used for the NEAT application in the Adriatic Sea Sub-region, including the positions of monitoring stations.

2.2 The nesting approach for SAUs in the Adriatic Sea Sub-region

29. After setting the finest IMAP areas of assessment, their nesting within three sub-divisions of the Adriatic Sea sub-region was undertaken in the same manner as already provided for IMAP CI 17. As it is explained above in chapter 2, the approach followed for the nesting of the areas is 4 levels nesting scheme (1 - being the finest level, 4 - the highest):

- 1st level provided nesting of all national IMAP SAUs and subSAUs within the two key IMAP assessment zones per country i.e. coastal and offshore zone;
- 2nd level provided nesting of the assessment areas set in IMAP assessment zones i.e. the coastal and offshore zones, on the subdivision level i.e. i) NAS coastal (NAS-1), NAS offshore (NAS-12); ii) CAS coastal (CAS-1), CAS offshore (CAS-12); iii) SAS coastal (SAS-1), SAS offshore (SAS-12);
- 3rd level provided nesting of the areas of assessment within the 3 subdivisions (NAS, CAS, SAS);
- 4th level provided nesting of the areas of assessment within the Adriatic Sea Sub Region.

This nesting scheme is shown schematically in Figure 10.

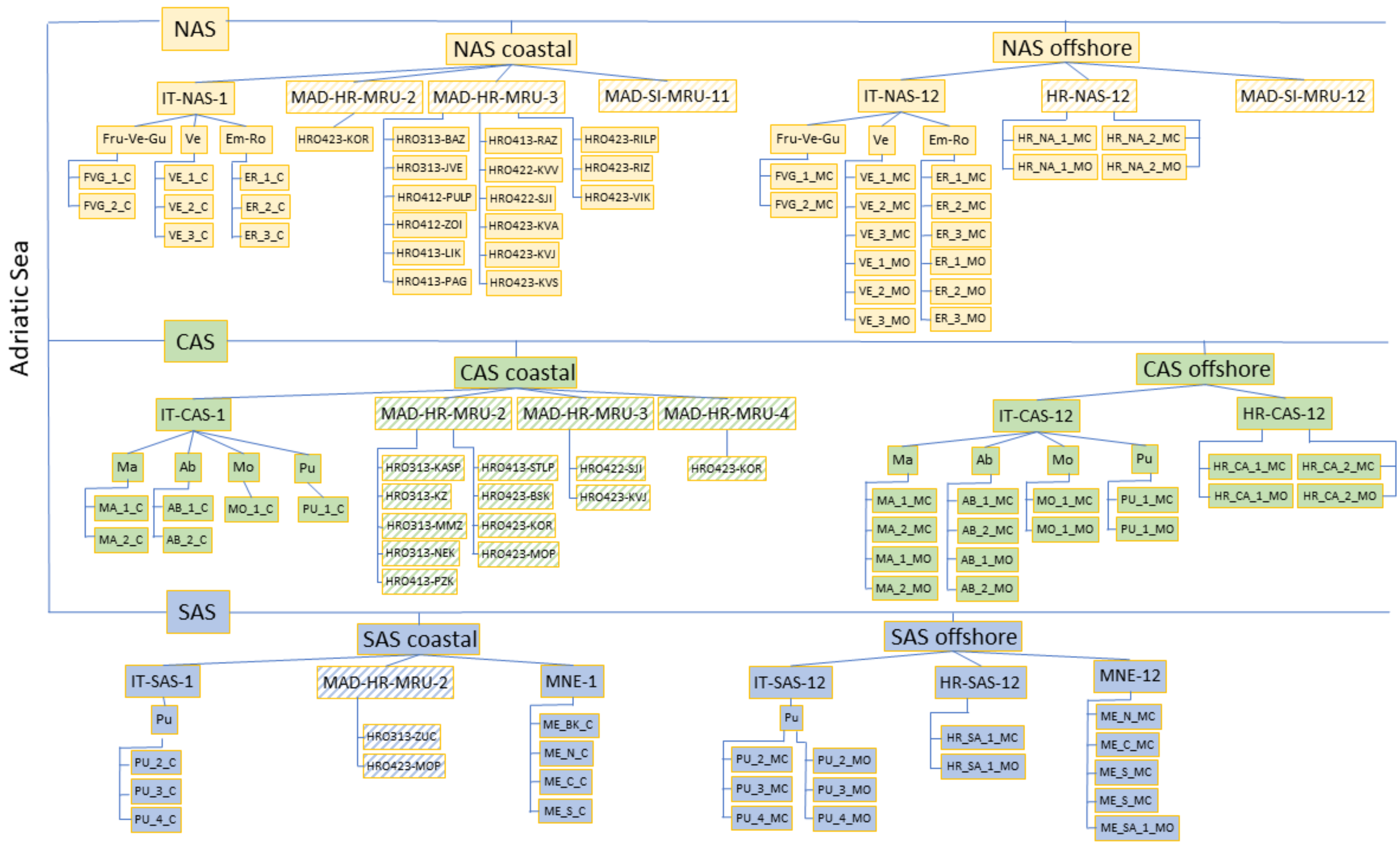

Figure 10: The nesting scheme of the SAUs defined for the Adriatic Sea based on the available information. Shaded boxes correspond to official MRUs declared by the countries that are EU MSs and that were decided to be used as IMAP SAUs.

30. The following maps show the result of applying the nested approach per sub-divisions of the Adriatic Sea Sub-region. For each sub-division, the IMAP SAUs of every country have been selected and shown in Figures 10 - 12, whereby Table 1 provides consolidated information to support further use of the maps.

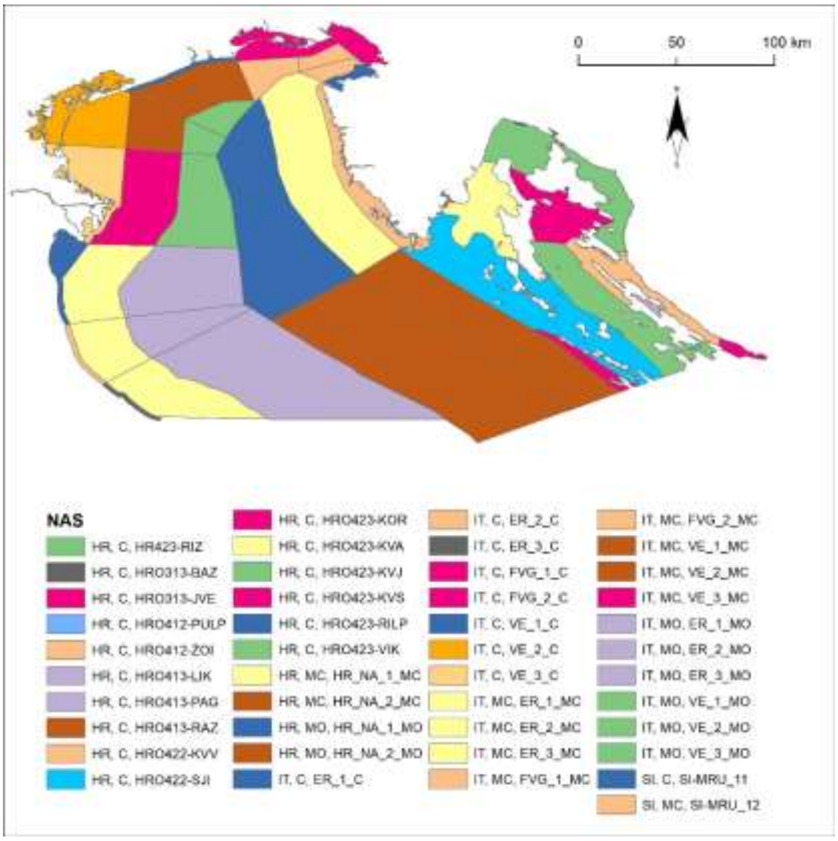

Figure 11. The nesting of the IMAP SAUs set for IMAP CIs 13&14 in the North Adriatic Sea.

31. In the North Adriatic Sea (NAS) (Figure 11), Italy has 14 offshore SAU and 8 coastal SAUs, Slovenia has 1 offshore SAU and 1 coastal SAU and Croatia has 4 offshore SAUs and 16 coastal SAUs.

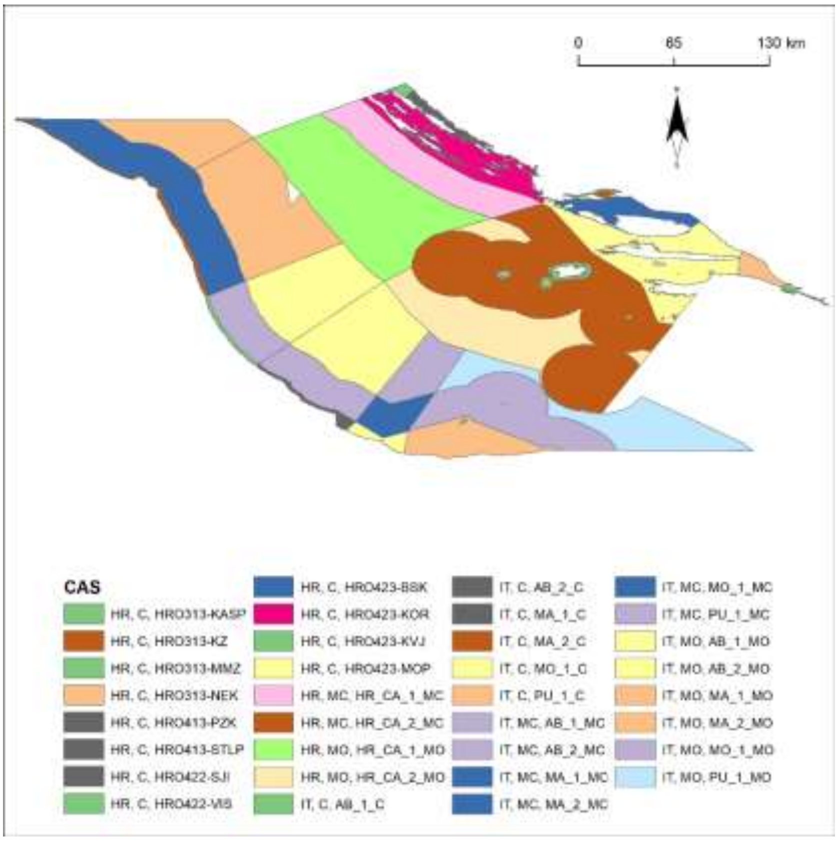

Figure 12. The nesting of the IMAP SAUs in the Central Adriatic Sea.

32. In the Central Adriatic Sea (CAS) (Figure 12), Italy has 1 offshore SAU and 4 coastal SAUs, Croatia has 1 offshore SAU, and 12 coastal SAUs[3]. In Italy the offshore SAU of the Central Adriatic Sea has a different shape defined by its official Central Adriatic Sea MRU as explained above in 2.1 section related to Italy and in UNEP/MED WG.533/Inf.5/Rev.1 (amended for the purposed of CIs 13 and 14). Therefore, data from monitoring stations of Italy falling into the NAS are aggregated under CAS.

3 In Central Adriatic Sea (CAS), Bosnia and Herzegovina has 1 coastal SAU as explained in UNEP/MED WG.533/10, Appendix III

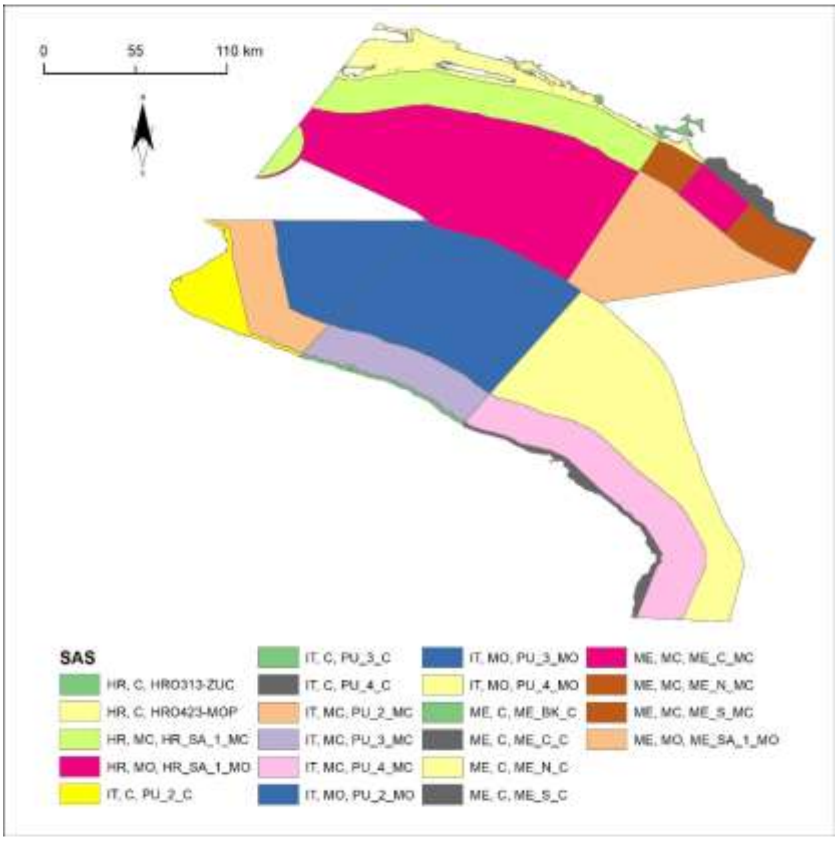

Figure 13. The nesting of the IMAP SAUs in the South Adriatic Sea based on the spatial assessment units defined within testing of NEAT in Adriatic Sea.

33. In the South Adriatic Sea (SAS; Figure 13), Italy has 9 offshore SAU and 3 coastal SAU, Croatia has 2 offshore SAU and 2 coastal SAUs, Montenegro 4 offshore SAUs and 4 coastal SAUs, Albania has 1 offshore SAU and 1 coastal SAU and Greece 1 offshore SAU in absence of coastal stations.

Table 1. The spatial assessment units (SAUs) for the Adriatic Sea Sub-region and their respective surface area (km^2) and number of monitoring stations located in the SAUs.

Sub_div	**A_zone**	**SAU**	**Sub_SAU Name_L0**	**Area/km^2**	**Stations**	**Stat./area**
Adriatic				124.565.1	76	0,001
Northern Adriatic Sea				30.864,5	31	0,001
Central Adriatic Sea				48.801,8	23	0,000
Southern Adriatic Sea				44.898,8	22	0,000
NAS	Coastal	IT-NAS-1	FVG_1_C	276,6	1	0,004
			FVG_2_C	282,5	1	0,004
			VE_1_C	87,5		
			VE_2_C	905,1	3	0,003
			VE_3_C	653,5	2	0,003
			ER_1_C	253,5	1	0,004
			ER_2_C	63,7		
			ER_3_C	53,9		
		MAD-HR-MRU_2	HRO423-KOR	166,0		
		MAD-HR-MRU_3	HRO313-BAZ	3,8	1	0,260

Sub_div	A_zone	SAU	Sub_SAU Name_L0	Area/km²	Stations	Stat./area
			HRO313-JVE	73,1		
			HRO412-PULP	6,7		
			HRO412-ZOI	467,0		
			HRO413-LIK	6,6		
			HRO413-PAG	29,8	1	0,034
			HRO413-RAZ	10,2		
			HRO422-KVV	494,3		
			HRO422-SJI	1.923,5		
			HRO423-KVA	686,5	1	0,001
			HRO423-KVJ	1.088,6		
			HRO423-KVS	576,8		
			HRO423-RILP	5,6		
			HRO423-RIZ	474,7		
			HRO423-VIK	454,9	1	0,002
		MAD-SI-MRU-11	MAD-SI-MRU-11	85,3	4	0,047
	Offshore	HR-NAS-12	HR_NA_1_MC	2.057,1	2	0,001
			HR_NA_2_MC	2.182,6		
			HR_NA_1_MO	2.566,1		
			HR_NA_2_MO	3.659,1		
		IT-NAS-12	FVG_1_MC	138,6	2	0,014
			FVG_2_MC	271,0	2	0,007
			VE_1_MC	713,9		
			VE_2_MC	467,3		
			VE_3_MC	1.041,3	1	0,001
			VE_1_MO	234,0		
			VE_2_MO	189,9		
			VE_3_MO	941,3		
			ER_1_MC	858,3	2	0,002
			ER_2_MC	586,3	3	0,005
			ER_3_MC	892,7	2	0,002
			ER_1_MO	1.319,1		
			ER_2_MO	599,7		
			ER_3_MO	2.887,7	1	0,000
		MAD-SI-MRU-12	MAD-SI-MRU-12	128,8	1	
2CAS	Coastal	IT-CAS-1	MA_1_C	172,0		
			MA_2_C	147,5		
			AB_1_C	103,3		
			AB_2_C	179,1		
			MO_1_C	228,8		
			PU_1_C	1.260,5	1	0,001
		MAD-HR-MRU_2	HRO313-KASP	44,1	1	0,023
			HRO313-KZ	34,1	1	0,029
			HRO313-MMZ	55,5		
			HRO313-NEK	252,6		
			HRO413-PZK	195,7		
			HRO413-STLP	0,6		
			HRO423-BSK	613,2	1	0,002
			HRO423-KOR	1.564,2		
			HRO423-MOP	2.480,1	1	0,000
		MAD-HR-MRU_3	HRO422-SJI	14,0		
			HRO423-KVJ	53,2		

Sub_div	**A_zone**	**SAU**	**Sub_SAU Name_L0**	**Area/km²**	**Stations**	**Stat./area**
		MAD-HR-MRU_4	HRO422-VIS	183,9		
	Offshore	HR-CAS-12	HR_CA_1_MC	2.336,7	1	0,000
			HR_CA_2_MC	7.744,7	1	0,000
			HR_CA_1_MO	5.327,9		
			HR_CA_2_MO	3.388,1		
		IT-CAS-12	MA_1_MC	1.479,9	3	0,002
			MA_2_MC	1.629,2	3	0,002
			MA_1_MO	1.390,6		
			MA_2_MO	3.597,3		
			AB_1_MC	1.055,8	3	0,003
			AB_2_MC	1.249,5	3	0,002
			AB_1_MO	2.479,9		
			AB_2_MO	2.741,2		
			MO_1_MC	654,3	3	0,005
			MO_1_MO	1.048,2		
			PU_1_MC	2.618,0	1	0,000
			PU_1_MO	2.478,2		
SAS	Coastal	IT-SAS-1	PU_2_C	1.139,5	2	0,002
			PU_3_C	172,2		
			PU_4_C	497,9		
		MAD-HR-MRU_2	HRO313-ZUC	12,8		
			HRO423-MOP	1.755,8	2	0,001
		MNE-1	ME_BK_C	84,8	7	0,083
			ME_C_C	246,2	2	0,008
			ME_N_C	86,0	1	0,012
			ME_S_C	151,2	1	0,007
	Offshore	HR-SAS-12	HR_SA_1_MC	3.396,8		
			HR_SA_1_MO	8.888,5		
		IT-SAS-12	PU_2_MC	1.752,9	1	0,001
			PU_3_MC	1.760,4	3	0,002
			PU_4_MC	3.581,3	3	0,001
			PU_2_MO	2.618,6		
			PU_3_MO	6.066,1		
SAS	Offshore	IT-SAS-12	PU_4_MO	6.915,2		
		MNE-12	ME_C_MC	653,4		
			ME_N_MC	468,4		
			ME_S_MC	781,1		
			ME_SA_1_MO	3.869,5		

3. Data availability and elaboration

34. The data reported to the IMAP Pilot Info System by the Contracting Parties bordering the Adriatic Sea i.e. Croatia, Italy, Montenegro, and Slovenia for the period 2015-2020 were used for the sub-regional assessment for Chl *a*, TP and DIN, within present NEAT GES assessment for IMAP CIs 13 and14. Data reported by Albania, Bosnia and Herzegovina and Greece were missing or were insufficient or not reported in line with mandatory data standards. The geographical coverage and stations for which data were reported in IMAP IS are shown in Table 2 and on Figure 14.

Table 2. Sampling period, stations, and number of data records in the dataset that was used for calculation of the assessment criteria.

Country	Sampling period	Stations	Number of data records
Croatia	2016-2019	20	6 216
Italy	2015-2020	54	415 188
Montenegro	2015-2019	12	6 204
Slovenia	2015-2020	7	13 147

35. Data elaborations were performed by using R, an open-source language widely used for statistical analysis and graphical presentation (R Development Core Team, 2022)[4]. Maps are elaborated using QGIS 3.24, an open-source GIS tool.

Figure 14. The stations used to propose the assessment criteria for the Adriatic Sea sub-region. Data collected in the period from 2015 to 2020 were used.

36. Data were aggregated, evaluated, and corrected when necessary, using the database management software Paradox for Windows 11. Prepared data were transferred to R and additionally validated and transformed using the database capabilities of R. Special care was dedicated to the handling of Below Detection Limit (BDL) data since they may represent a substantial part of the data and introduce erratic evaluation. The BDL data were recalculated using the *NADA* (Nondetects and Data Analysis for Environmental Data) statistical package in R. *ROS* estimator were used i.e., all BDL values were statistically elaborated and can only be used for the calculation of averaged values.

[4] R Development Core Team (2022). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. ISBN 3-900051-07-0. http://www.R-project.org

37. *ROS* function in R is an implementation of a Regression on Order Statistics. It is a semiparametric method for censored data that assumes an underlying parametric distribution for the uncensored values. The method is based on a simple linear regression model using ordered detected values and distributional (normal or log-normal) quantiles to estimate the concentration of the censored values. It is a procedure of probability plotting and regression that imputes the censored data using the estimated parameters of a linear regression model of uncensored observed values vs their normal quantiles (or log-normal quantile).

38. The required assumption is that the response variable is a linear function of the normal (log-normal) quantiles. The imputed values are only used collectively to estimate summary statistics and they are not considered estimates for specific samples. It is recommended for large (n>50) data sets with less than 50% censoring and multiple censoring levels as for small (n<50) data sets with less than 80% censoring and multiple censoring levels. It can also be used for data sets with only one censoring level. The reconstructed data set (where for BDL *ROS* values were substituted) were used to calculate the required values foe NEAT assessment for the concentration of Chl*a*, TP and DIN.

39. The data elaboration was done only for the surface layer as the main layer of eutrophication impact. Namely, freshwaters are the main pressure driver and mostly contribute to the stratification of the water column, therefore they confine the newly fetched nutrients mainly to the surface layer.

Table 3: Temporal coverage of the monitoring data collected for the Adriatic Sea shown against the finest areas of assessment (IMAP subSAUs). The years of data collected per SAU are shown.

Sub-division	Zone	SAU	Years monitored
North Adriatic (NAS)			
	NAS coastal/intercoastal		
		MAD-HR-MRU-3	2016-2019
		IT-NAS-1	2015-2020
		MAD-SI-MRU-11	2015-2020
	NAS offshore		
		HR-NAS-12	2016-2019
		IT-NAS-12	2015-2020
		MAD-SI-MRU-12	2015-2020
Central Adriatic (CAS)			
	CAS coastal/intercoastal		
		MAD-HR-MRU-2	2016-2019
		IT-CAS-1	2015-2020
	CAS offshore		
		HR-CAS-12	2016-2019
		IT-CAS-12	2015-2020
South Adriatic (SAS)			
	SAS coastal/intercoastal		
		MAD-HR-MRU-2	2016-2019
		IT-SAS-1	2015-2020
		MNE-1	
		AL-1	-
	SAS offshore		
		HR-CAS-12	-
		IT-SAS-12	2015-2020
		MNE-12	
		AL-12	-
		MAD-EL-MS-AD	-

4. Setting the assessment criteria

40. The definition of baselines and threshold values for IMAP Cis 13 and 14 in the Mediterranean Sea is an ongoing process. Detail information on their present status is provided in UNEP/MED WG.533/4/Rev.1 and UNEP/MED WG. 533/Inf.3/Rev.1. The setting of GES-nonGEs boundaries within NEAT GES assessment for IMAP Cis 13 and 14 are based on the boundary values defined for TP and DIN, and updated ones for Chl *a*, in the Adriatic Sea, as approved in UNEP/MED WG.533/4 by the Meeting of CorMon on Pollution Monitoring (17 and 30 May 2022).

41. Following the methodology applied for setting GES-nonGES threshold for IMAP CI17 (UNEP/MED WG.533/10, Appendix III), the NEAT GES assessment of IMAP CIs 13 and 14 in the Adritic Sea sub-region considers that the range of concentrations equal to or below the G/M values corresponds to the good environmental status i.e. in GES, and the range of concentrations above the G/M values corresponds to non-good environmental status

i.e. non-GES. This principle was also used for application of the traffic light approach within the 2017 MED QSR.

42. The use of NEAT tool for IMAP GES status requires in total five status classes i.e. high, good, moderate, poor, bad, in order to optimally discriminate the status related to different classes. The NEAT application also requires the two boundary limit values for the best and worse conditions (these are not threshold values but minimum and maximum values that determine the scale of the GES assessment) and one threshold value for the GES – nonGES status. This is mandatory by the tool which then produces five status classes linearly, depending on the distance of the concentrations from the two boundary limit values and the GES-nonGES threshold.

43. For the present analysis, the two boundary limit values are: i) Reference Conditions (RC); and ii) for maximum concentration of nutrients and chlorophyll *a*, the value calculated from the relationship (equation) of DIN and TP (the parameters of CI 13) and TRIX (as internal standard) for the value of 8 which is supposed to be highest one. For CI14 (Chl *a*) the equation is related to the pressure variable, in our case the equation for DIN and TP was possible. All the equations and boundary values by water types are given in Table 4.

Table 4: Boundary limits of the NEAT GES Cis 13 & 14 assessment scale and threshold values between five status classes.

Type	**Equation**	RC	H/G	**G/M**	M/P	P/B	Worst
Coastal							
I	**[TRIX]**		4.25	**5.25**	6.25	7	8
	[TP] = exp [(TRIX – 6.064)/1.349]	0.19	0.26	**0.55**	1.15	2.00	4.20
	[Chla] = 10.591 [TP]^1.237	1.4	2.01	**5.02**	12.56	24.99	62.5
IIA	**[TRIX]**	-	4	**5**	6	7	8
	[TP] = exp [(TRIX – 6.148)/1.583]	0.16	0.26	**0.48**	0.91	1.71	3.2
	[Chla] = 3.978 [TP]^1.347	0.33	0.64	**1.50**	3.51	8.21	19.2
IIIW	**[TRIX]**	2	3	**4**	5	6	7
	[TP] = exp [(TRIX – 6.148)/1.583]	0.07	0.14	**0.26**	0.48	0.91	1.7
	[Chla] = 3.978 [TP]^1.347	0.12	0.27	**0.64**	1.50	3.51	8.2
Offshore							
I	**[TRIX]**		4.25	**5.25**	6.25	7	8
	[DIN] = 10^[(TRIX – 3.08)/1.61]	0.15*; 0.29**	5.33	**22.28**	93.1	272	1 137
	[Chla] = 0.4295 [DIN]^0.64	0.21*; 0.66**	1.25	**3.13**	7.82	15.53	38.79
IIA	**[TRIX]**	-	4	**5**	6	7	8
	[TP] = exp [(TRIX – 6.148)/1.583]	0.16	0.26	**0.48**	0.91	1.71	3.22
	[Chla] = 3.978 [TP]^1.347	0.33	0.64	**1.50**	3.51	8.21	19.23
IIIW	**[TRIX]**	2	3	**4**	5	6	7
	[TP] = exp [(TRIX – 6.148)/1.583]	0.07	0.14	**0.26**	0.48	0.91	1.71
	[Chla] = 3.978 [TP]^1.347	0.12	0.27	**0.64**	1.50	3.51	8.21
*ME; **HR. IT							

44. In line with such defined the two boundary limits, the following five status classes are produced: i) the high status (H) referring to RC (best conditions) < good status; ii) the good status (G); iii) the moderate status (M); iv) the poor status (P); v) the bad status (B) referring to values > than poor status and < than the maximum concentration. The five classes are divided by the boundary between them as follows: H/G; G/M (also the GES-nonGES threshold); M/P; and P/B.

45. For the application of the NEAT software, data were grouped per parameters, ecosystem and SAUs in all the Adriatic sub-divisions (NAS, CAS, SAS). Average concentrations (geometric means) and respective geometric standard deviation, and standard error of geometric means were then calculated in the respective groups as shown here-below.

46. **The geometric mean (*GM*)** is defined as the n^{th} root of the product of n numbers, i.e., for a set of numbers $x_1, x_2, ..., x_n$, the geometric mean is defined as

$$GM[x] = \left(\prod x_i\right)^{\frac{1}{n}} \quad (1)$$

or, equivalently, as the arithmetic mean (*AM*) in logscale:

$$GM[x] = e^{AM[\log x]} \quad (2)$$

47. **The geometric standard deviation (*GSD*)** is calculated as the regular statistic on the log data, $SD[logx]$ then rescaled back:

$$GSD[x] = e^{SD[\log x]} \quad (3)$$

48. **The standard error of geometric mean (*SEGM*):** Since the through mean of the population (μ_G) is not normally known the sample mean $GM[x]$ is used, but then, like with the regular standard deviation and error in the equation $N-1$ instead of N is used:

$$SEGM[x, N] = \frac{GM[x]}{\sqrt{N-1}} SD[\log x] \quad (4)$$

49. Common practice in analysing log-normal data is to use a logarithmic transformation, so that standard normal-theory methods may be used, and problems of heteroscedasticity are minimized. However, the conclusions from such analyses must be converted back into the original scales of measurement if they are to be widely understood. The standard deviation of the untransformed distribution is unsatisfactory since ranges of a given number of standard deviations either side of the mean (geometric or arithmetic) are not equiprobable and do not adequately reflect the multiplicative nature of the variation. Therefore Kirkwood (1979)[5] proposed the term geometric standard deviation (GSD) to be e^{SD}. The GSD is then a multiplicative factor such that a range for Z of $\mu+SD$ is directly later equivalent to the range ($e^{\mu \pm SD}$) for x that is obtained by dividing and multiplying the geometric mean by GSD. Similarly, we can define the geometric standard error (GSE) for a log-normally distributed estimator to be the anti-logarithm of the standard error of its log. For NEAT calculation of the GSE was not used but the SEGM (equation 4), that is additive as suggested by Norris (1940)[6] and in line with the NEAT requirements.

50. A difference between EO9/CI 17 and EO5/CIS 13&14 must be noted. For the NEAT assessment different metrics were used. For EO9 as a measure of central tendency, the arithmetic mean and standard error were used, on opposite to the use of geometric mean and the standard error of geometric mean for EO5. It was necessary given the assessment criteria for EO5 were developed by applying the later metrics.

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[5] Kirkwood, T.B.L., 1979. Geometric means and measures of dispersion. Biometrics, 35, 908-909.
[6] Norris, N. 1940. The Standard Errors of the Geometric and Harmonic Means and Their Application to Index Numbers. Ann. Math. Statist. 11(4)

Table 5: Average concentrations and standard error for concentration of chlorophyll *a* (CHL) per subSAU of the Adriatic Sea Sub-region.

Sub_div	A_zone	Coun	SAU	Sub_SAU	Name_L0	Type	Area	N_Stat	CHL_N	CHL_GM	CHL_Mean	CHL_Med	CHL_SD	CHL_SE	CHL_GeoSD	CHL_GeoSE	CHL_SEGM
1NAS	Coastal	HR	MAD-HR-MRU_3		HRO313-BAZ	IIA	3,8	1	6	0,811	1,150	0,860	1,044	0,426	2,561	1,468	0,341
1NAS	Coastal	HR	MAD-HR-MRU_3		HRO413-PAG	IIA	29,8	1	8	0,181	0,212	0,175	0,136	0,048	1,811	1,234	0,041
1NAS	Coastal	HR	MAD-HR-MRU_3		HRO423-KVA	IIIW	686,5	1	6	0,181	0,215	0,185	0,140	0,057	1,906	1,301	0,052
1NAS	Coastal	HR	MAD-HR-MRU_3		HRO423-VIK	IIA	454,9	1	6	0,242	0,313	0,190	0,302	0,123	2,025	1,334	0,076
1NAS	Coastal	IT	IT-NAS-1	1Friuli Venezia Giulia	FVG_1_C	IIA	276,6	1	27	0,591	0,684	0,599	0,364	0,070	1,766	1,116	0,066
1NAS	Coastal	IT	IT-NAS-1	1Friuli Venezia Giulia	FVG_2_C	I	282,5	1	27	0,678	0,785	0,800	0,396	0,076	1,812	1,121	0,079
1NAS	Coastal	IT	IT-NAS-1	2Veneto	VE_2_C	IIA	905,1	3	75	0,832	1,173	0,860	1,026	0,123	2,348	1,108	0,083
1NAS	Coastal	IT	IT-NAS-1	2Veneto	VE_3_C	IIA	653,5	2	53	1,336	1,920	1,185	1,789	0,253	2,331	1,127	0,157
1NAS	Coastal	IT	IT-NAS-1	3Emilia Romagna	ER_1_C	I	253,5	1	54	2,652	5,120	2,954	7,379	1,004	3,338	1,178	0,439
1NAS	Coastal	SI	MAD-SI-MRU_11		SI-MRU_11	IIA	85,3	4	237	0,480	0,649	0,520	0,509	0,033	2,396	1,059	0,027
1NAS	Offshore	HR	HR-NAS-12		HR_NA_1_MC	IIA	2.057,1	2	12	0,286	0,325	0,260	0,181	0,055	1,691	1,172	0,045
1NAS	Offshore	IT	IT-NAS-12	1Friuli Venezia Giulia	FVG_1_MC	IIA	138,6	2	54	0,679	0,817	0,758	0,544	0,074	1,860	1,088	0,058
1NAS	Offshore	IT	IT-NAS-12	1Friuli Venezia Giulia	FVG_2_MC	IIA	271,0	2	54	0,421	0,529	0,395	0,393	0,053	1,951	1,095	0,039
1NAS	Offshore	IT	IT-NAS-12	2Veneto	VE_3_MC	IIA	1.041,3	1	24	0,623	1,002	0,590	1,537	0,321	2,447	1,205	0,116
1NAS	Offshore	IT	IT-NAS-12	3Emilia Romagna	ER_1_MC	I	858,3	2	108	1,862	4,792	1,772	8,472	0,815	4,075	1,145	0,253
1NAS	Offshore	IT	IT-NAS-12	3Emilia Romagna	ER_2_MC	I	586,3	3	162	1,718	3,757	1,802	6,888	0,541	3,566	1,105	0,172
1NAS	Offshore	IT	IT-NAS-12	3Emilia Romagna	ER_3_MC	I	892,7	2	108	1,073	2,409	1,146	4,768	0,459	3,426	1,126	0,128
1NAS	Offshore	IT	IT-NAS-12	3Emilia Romagna	ER_3_MO	IIA	2.887,7	1	54	0,902	1,935	0,880	4,672	0,636	3,086	1,166	0,140
1NAS	Offshore	SI	MAD-SI-MRU_12		SI-MRU_12	IIA	128,8	1	47	0,531	0,659	0,570	0,448	0,065	2,152	1,118	0,060
2CAS	Coastal	HR	MAD-HR-MRU_2		HRO313-KASP	IIA	44,1	1	8	0,856	0,944	0,865	0,451	0,160	1,607	1,182	0,153
2CAS	Coastal	HR	MAD-HR-MRU_2		HRO313-KZ	IIA	34,1	1	8	0,344	0,441	0,290	0,358	0,127	2,074	1,294	0,095
2CAS	Coastal	HR	MAD-HR-MRU_2		HRO423-BSK	IIIW	613,2	1	8	0,131	0,160	0,120	0,134	0,047	1,845	1,242	0,030
2CAS	Coastal	HR	MAD-HR-MRU_2		HRO423-MOP	IIIW	2.480,1	1	8	0,087	0,096	0,075	0,049	0,017	1,611	1,184	0,016
2CAS	Coastal	IT	IT-CAS-1	7Puglia	PU_1_C	IIA	1.260,5	2	54	0,195	0,274	0,185	0,259	0,035	2,348	1,123	0,023
2CAS	Offshore	HR	HR-CAS-12		HR_CA_1_MC	IIIW	2.336,7	1	8	0,092	0,111	0,080	0,075	0,027	1,901	1,255	0,022
2CAS	Offshore	HR	HR-CAS-12		HR_CA_2_MC	IIIW	7.744,7	1	9	0,071	0,088	0,070	0,059	0,021	1,998	1,277	0,017
2CAS	Offshore	IT	IT-CAS-12	4Marche	MA_1_MC	IIA	1.479,9	3	132	0,532	0,847	0,500	1,016	0,091	2,522	1,086	0,043
2CAS	Offshore	IT	IT-CAS-12	4Marche	MA_2_MC	IIA	1.629,2	3	129	0,422	0,629	0,400	0,694	0,062	2,418	1,082	0,033
2CAS	Offshore	IT	IT-CAS-12	5Abruzzo	AB_1_MC	IIA	1.055,8	3	78	0,217	0,350	0,190	0,469	0,053	2,544	1,112	0,023
2CAS	Offshore	IT	IT-CAS-12	5Abruzzo	AB_2_MC	IIA	1.249,5	3	81	0,191	0,239	0,190	0,181	0,021	1,929	1,078	0,014
2CAS	Offshore	IT	IT-CAS-12	6Molise	MO_1_MC	IIA	654,3	3	78	0,343	0,459	0,355	0,400	0,045	2,176	1,092	0,030
2CAS	Offshore	IT	IT-CAS-12	7Puglia	PU_1_MC	IIA	2.618,0	1	27	0,173	2,103	0,130	10,059	1,936	3,635	1,282	0,044
3SAS	Coastal	HR	MAD-HR-MRU_2		HRO423-MOP	IIIW	1.755,8	2	9	0,128	0,164	0,120	0,136	0,048	2,057	1,290	0,033
3SAS	Coastal	IT	IT-SAS-1	7Puglia	PU_2_C	IIIW	1.139,5	2	54	0,218	0,293	0,200	0,234	0,032	2,243	1,116	0,024
3SAS	Coastal	ME	MNE-1		ME_BK_C	I	84,8	7	235	0,851	1,490	1,100	1,470	0,096	3,514	1,085	0,070
3SAS	Coastal	ME	MNE-1		ME_C_C	IIA	246,2	2	72	0,427	0,706	0,415	0,822	0,097	2,795	1,129	0,052
3SAS	Coastal	ME	MNE-1		ME_N_C	IIA	86,0	1	38	0,559	0,755	0,565	0,592	0,096	2,339	1,148	0,078
3SAS	Coastal	ME	MNE-1		ME_S_C	I	151,2	1	37	0,438	0,670	0,400	0,643	0,106	2,678	1,176	0,072
3SAS	Offshore	IT	IT-SAS-12	7Puglia	PU_2_MC	IIIW	1.752,9	1	27	0,174	0,231	0,160	0,224	0,043	2,044	1,147	0,024
3SAS	Offshore	IT	IT-SAS-12	7Puglia	PU_3_MC	IIIW	1.760,4	3	81	0,165	0,228	0,150	0,211	0,023	2,275	1,096	0,015
3SAS	Offshore	IT	IT-SAS-12	7Puglia	PU_4_MC	IIIW	3.581,3	3	81	0,114	0,135	0,130	0,072	0,008	1,919	1,075	0,008

Table 6: Average concentrations and standard error for concentration of total phosphorous (TP) per subSAU of the Adriatic Sea Sub-region.

Sub_div	A_zone	Coun	SAU	Sub_SAU	Name_L0	Type	Area	N_Stat	TP_N	TP_GM	TP_Mean	TP_Med	TP_SD	TP_SE	TP_GeoSD	TP_GeoSE	TP_SEGM
1NAS	Coastal	HR	MAD-HR-MRU_3		HRO313-BAZ	IIA	3,8	1	6	0,253	0,260	0,240	0,069	0,028	1,287	1,108	0,029
1NAS	Coastal	HR	MAD-HR-MRU_3		HRO413-PAG	IIA	29,8	1	8	0,265	0,277	0,249	0,098	0,035	1,342	1,110	0,029
1NAS	Coastal	HR	MAD-HR-MRU_3		HRO423-KVA	IIIW	686,5	1	6	0,154	0,160	0,165	0,046	0,019	1,348	1,130	0,021
1NAS	Coastal	HR	MAD-HR-MRU_3		HRO423-VIK	IIA	454,9	1	6	0,181	0,185	0,195	0,038	0,016	1,247	1,094	0,018
1NAS	Coastal	IT	IT-NAS-1	1Friuli Venezia Giulia	FVG_1_C	IIA	276,6	1	27	0,142	0,248	0,100	0,361	0,071	2,580	1,204	0,026
1NAS	Coastal	IT	IT-NAS-1	1Friuli Venezia Giulia	FVG_2_C	I	282,5	1	27	0,135	0,296	0,120	0,674	0,132	2,810	1,225	0,027
1NAS	Coastal	IT	IT-NAS-1	2Veneto	VE_2_C	IIA	905,1	3	75	0,247	0,334	0,230	0,396	0,047	2,010	1,086	0,020
1NAS	Coastal	IT	IT-NAS-1	2Veneto	VE_3_C	IIA	653,5	2	53	0,341	0,439	0,360	0,333	0,049	2,088	1,115	0,035
1NAS	Coastal	IT	IT-NAS-1	3Emilia Romagna	ER_1_C	I	253,5	1	54	0,539	0,734	0,540	0,906	0,123	2,083	1,105	0,054
1NAS	Coastal	SI	MAD-SI-MRU_11		SI-MRU_11	IIA	85,3	4	237	0,189	0,217	0,200	0,138	0,010	1,709	1,038	0,007
1NAS	Offshore	HR	HR-NAS-12		HR_NA_1_MC	IIA	2.057,1	2	12	0,195	0,200	0,195	0,048	0,014	1,279	1,074	0,014
1NAS	Offshore	IT	IT-NAS-12	1Friuli Venezia Giulia	FVG_1_MC	IIA	138,6	2	54	0,126	0,259	0,117	0,600	0,083	2,570	1,140	0,016
1NAS	Offshore	IT	IT-NAS-12	1Friuli Venezia Giulia	FVG_2_MC	IIA	271,0	2	54	0,116	0,213	0,100	0,423	0,059	2,435	1,131	0,014
1NAS	Offshore	IT	IT-NAS-12	2Veneto	VE_3_MC	IIA	1.041,3	1	24	0,211	0,255	0,190	0,207	0,042	1,756	1,122	0,025
1NAS	Offshore	IT	IT-NAS-12	3Emilia Romagna	ER_1_MC	I	858,3	2	108	0,423	0,507	0,460	0,297	0,029	1,906	1,064	0,026
1NAS	Offshore	IT	IT-NAS-12	3Emilia Romagna	ER_2_MC	I	586,3	3	162	0,302	0,368	0,300	0,267	0,021	1,856	1,050	0,015
1NAS	Offshore	IT	IT-NAS-12	3Emilia Romagna	ER_3_MC	I	892,7	2	108	0,250	0,301	0,240	0,188	0,018	1,902	1,064	0,016
1NAS	Offshore	IT	IT-NAS-12	3Emilia Romagna	ER_3_MO	IIA	2.887,7	1	54	0,216	0,256	0,240	0,133	0,018	1,945	1,096	0,020
1NAS	Offshore	SI	MAD-SI-MRU_12		SI-MRU_12	IIA	128,8	1	47	0,130	0,163	0,158	0,085	0,014	2,208	1,135	0,015
2CAS	Coastal	HR	MAD-HR-MRU_2		HRO313-KASP	IIA	44,1	1	8	0,252	0,266	0,236	0,094	0,033	1,417	1,131	0,033
2CAS	Coastal	HR	MAD-HR-MRU_2		HRO313-KZ	IIA	34,1	1	8	0,217	0,229	0,193	0,084	0,030	1,406	1,128	0,028
2CAS	Coastal	HR	MAD-HR-MRU_2		HRO423-BSK	IIIW	613,2	1	8	0,199	0,210	0,220	0,071	0,025	1,432	1,135	0,027
2CAS	Coastal	HR	MAD-HR-MRU_2		HRO423-MOP	IIIW	2.480,1	1	8	0,167	0,178	0,165	0,078	0,027	1,456	1,142	0,024
2CAS	Coastal	IT	IT-CAS-1	7Puglia	PU_1_C	IIA	1.260,5	2	54	0,455	0,679	0,500	0,748	0,104	2,652	1,145	0,061
2CAS	Offshore	HR	HR-CAS-12		HR_CA_1_MC	IIIW	2.336,7	1	8	0,198	0,220	0,192	0,105	0,037	1,660	1,196	0,038
2CAS	Offshore	HR	HR-CAS-12		HR_CA_2_MC	IIIW	7.744,7	1	9	0,208	0,211	0,196	0,042	0,015	1,222	1,073	0,015
2CAS	Offshore	IT	IT-CAS-12	4Marche	MA_1_MC	IIA	1.479,9	3	132	0,288	0,399	0,290	0,434	0,038	2,153	1,070	0,019
2CAS	Offshore	IT	IT-CAS-12	4Marche	MA_2_MC	IIA	1.629,2	3	129	0,215	0,541	0,194	1,214	0,107	3,343	1,112	0,023
2CAS	Offshore	IT	IT-CAS-12	5Abruzzo	AB_1_MC	IIA	1.055,8	3	78	0,887	1,266	0,945	0,983	0,111	2,521	1,110	0,094
2CAS	Offshore	IT	IT-CAS-12	5Abruzzo	AB_2_MC	IIA	1.249,5	3	81	0,778	1,144	0,730	0,953	0,106	2,569	1,111	0,082
2CAS	Offshore	IT	IT-CAS-12	6Molise	MO_1_MC	IIA	654,3	3	78	0,321	0,453	0,285	0,476	0,054	2,197	1,093	0,029
2CAS	Offshore	IT	IT-CAS-12	7Puglia	PU_1_MC	IIA	2.618,0	1	27	0,387	0,793	0,400	1,822	0,357	2,863	1,229	0,080
3SAS	Coastal	HR	MAD-HR-MRU_2		HRO423-MOP	IIIW	1.755,8	2	9	0,238	0,250	0,211	0,084	0,030	1,376	1,120	0,027
3SAS	Coastal	IT	IT-SAS-1	7Puglia	PU_2_C	IIIW	1.139,5	2	54	0,386	0,685	0,480	1,086	0,160	2,885	1,169	0,056
3SAS	Coastal	ME	MNE-1		ME_BK_C	I	84,8	7	235	0,255	0,362	0,280	0,405	0,027	2,298	1,056	0,014
3SAS	Coastal	ME	MNE-1		ME_C_C	IIA	246,2	2	72	0,245	0,417	0,281	0,489	0,058	2,975	1,137	0,032
3SAS	Coastal	ME	MNE-1		ME_N_C	IIA	86,0	1	38	0,258	0,369	0,275	0,456	0,074	2,266	1,142	0,035
3SAS	Coastal	ME	MNE-1		ME_S_C	I	151,2	1	37	0,247	0,399	0,260	0,518	0,085	2,581	1,169	0,039
3SAS	Offshore	IT	IT-SAS-12	7Puglia	PU_2_MC	IIIW	1.752,9	1	27	0,337	0,690	0,300	1,076	0,224	3,248	1,278	0,078
3SAS	Offshore	IT	IT-SAS-12	7Puglia	PU_3_MC	IIIW	1.760,4	3	81	0,409	1,086	0,380	2,181	0,263	3,608	1,167	0,059
3SAS	Offshore	IT	IT-SAS-12	7Puglia	PU_4_MC	IIIW	3.581,3	3	81	0,289	0,586	0,245	1,197	0,136	2,677	1,118	0,032

Table 7: Average concentrations and standard error for Dissolved Inorganic Nitrogen (DIN) per subSAUs of the Adriatic Sea Sub-region.

Sub_div	A_zone	Coun	SAU	Sub_SAU	Name_L0	Type	Area	N_Stat	TIN_N	TIN_GM	TIN_Mean	TIN_Med	TIN_SD	TIN_SE	TIN_GeoSD	TIN_GeoSE	TIN_SEGM
1NAS	Coastal	HR	MAD-HR-MRU_3		HRO313-BAZ	IIA	3,8	1	6	10,410	11,947	10,665	6,262	2,557	1,855	1,287	2,876
1NAS	Coastal	HR	MAD-HR-MRU_3		HRO413-PAG	IIA	29,8	1	8	1,121	1,394	1,148	0,933	0,330	2,098	1,300	0,314
1NAS	Coastal	HR	MAD-HR-MRU_3		HRO423-KVA	IIIW	686,5	1	6	0,420	0,517	0,348	0,399	0,163	1,964	1,317	0,127
1NAS	Coastal	HR	MAD-HR-MRU_3		HRO423-VIK	IIA	454,9	1	6	1,421	1,500	1,375	0,536	0,219	1,433	1,158	0,229
1NAS	Coastal	IT	IT-NAS-1	1Friuli Venezia Giulia	FVG_1_C	IIA	276,6	1	27	6,558	10,593	5,521	13,228	2,546	2,565	1,199	1,212
1NAS	Coastal	IT	IT-NAS-1	1Friuli Venezia Giulia	FVG_2_C	I	282,5	1	27	9,917	14,171	7,250	14,683	2,826	2,213	1,165	1,545
1NAS	Coastal	IT	IT-NAS-1	2Veneto	VE_2_C	IIA	905,1	3	75	3,028	4,988	2,728	6,555	0,773	2,563	1,117	0,331
1NAS	Coastal	IT	IT-NAS-1	2Veneto	VE_3_C	IIA	653,5	2	53	4,573	10,703	4,191	16,943	2,498	3,621	1,209	0,816
1NAS	Coastal	IT	IT-NAS-1	3Emilia Romagna	ER_1_C	I	253,5	1	54	13,551	34,059	20,075	51,642	7,028	5,452	1,260	3,157
1NAS	Coastal	SI	MAD-SI-MRU_11		SI-MRU_11	IIA	85,3	4	237	2,458	3,026	2,636	1,872	0,131	2,048	1,052	0,115
1NAS	Offshore	HR	HR-NAS-12		HR_NA_1_MC	IIA	2.057,1	2	12	0,723	0,827	0,611	0,530	0,153	1,648	1,155	0,109
1NAS	Offshore	IT	IT-NAS-12	1Friuli Venezia Giulia	FVG_1_MC	IIA	138,6	2	54	6,020	8,785	5,507	10,065	1,370	2,272	1,118	0,679
1NAS	Offshore	IT	IT-NAS-12	1Friuli Venezia Giulia	FVG_2_MC	IIA	271,0	2	54	5,062	6,475	5,385	6,363	0,866	1,923	1,093	0,455
1NAS	Offshore	IT	IT-NAS-12	2Veneto	VE_3_MC	IIA	1.041,3	1	24	2,546	3,558	1,971	3,990	0,814	2,091	1,163	0,392
1NAS	Offshore	IT	IT-NAS-12	3Emilia Romagna	ER_1_MC	I	858,3	2	108	7,888	22,942	15,622	26,422	2,542	6,698	1,201	1,450
1NAS	Offshore	IT	IT-NAS-12	3Emilia Romagna	ER_2_MC	I	586,3	3	162	3,810	10,464	5,290	14,139	1,121	5,132	1,138	0,491
1NAS	Offshore	IT	IT-NAS-12	3Emilia Romagna	ER_3_MC	I	892,7	2	108	3,598	9,750	5,300	13,889	1,349	4,986	1,169	0,559
1NAS	Offshore	IT	IT-NAS-12	3Emilia Romagna	ER_3_MO	IIA	2.887,7	1	54	1,920	4,044	2,150	4,998	0,686	3,740	1,199	0,348
1NAS	Offshore	SI	MAD-SI-MRU_12		SI-MRU_12	IIA	128,8	1	47	2,482	3,643	2,847	3,038	0,487	3,072	1,197	0,411
2CAS	Coastal	HR	MAD-HR-MRU_2		HRO313-KASP	IIA	44,1	1	8	1,141	1,673	1,105	1,607	0,568	2,520	1,387	0,399
2CAS	Coastal	HR	MAD-HR-MRU_2		HRO313-KZ	IIA	34,1	1	8	0,957	1,630	0,822	1,800	0,636	3,045	1,482	0,403
2CAS	Coastal	HR	MAD-HR-MRU_2		HRO423-BSK	IIIW	613,2	1	8	0,556	0,832	0,532	0,785	0,277	2,643	1,410	0,204
2CAS	Coastal	HR	MAD-HR-MRU_2		HRO423-MOP	IIIW	2.480,1	1	8	0,706	0,959	0,847	0,707	0,250	2,437	1,370	0,238
2CAS	Coastal	IT	IT-CAS-1	7Puglia	PU_1_C	IIA	1.260,5	2	54	1,397	2,859	1,370	3,362	0,466	3,949	1,210	0,264
2CAS	Offshore	HR	HR-CAS-12		HR_CA_1_MC	IIIW	2.336,7	1	8	1,054	1,244	1,248	0,684	0,242	1,927	1,261	0,261
2CAS	Offshore	HR	HR-CAS-12		HR_CA_2_MC	IIIW	7.744,7	1	9	0,960	1,095	1,020	0,550	0,194	1,809	1,233	0,201
2CAS	Offshore	IT	IT-CAS-12	4Marche	MA_1_MC	IIA	1.479,9	3	132	3,395	5,626	2,956	6,752	0,592	2,645	1,089	0,289
2CAS	Offshore	IT	IT-CAS-12	4Marche	MA_2_MC	IIA	1.629,2	3	129	1,956	5,214	3,128	6,921	0,609	5,095	1,154	0,282
2CAS	Offshore	IT	IT-CAS-12	5Abruzzo	AB_1_MC	IIA	1.055,8	3	78	3,809	5,330	3,880	5,313	0,602	2,278	1,098	0,357
2CAS	Offshore	IT	IT-CAS-12	5Abruzzo	AB_2_MC	IIA	1.249,5	3	81	3,275	4,208	3,440	2,849	0,317	2,151	1,089	0,280
2CAS	Offshore	IT	IT-CAS-12	6Molise	MO_1_MC	IIA	654,3	3	78	4,705	4,983	4,625	1,737	0,197	1,405	1,039	0,182
2CAS	Offshore	IT	IT-CAS-12	7Puglia	PU_1_MC	IIA	2.618,0	1	27	1,108	2,035	0,944	2,933	0,575	2,984	1,239	0,238
3SAS	Coastal	HR	MAD-HR-MRU_2		HRO423-MOP	IIIW	1.755,8	2	9	0,363	0,787	0,617	0,787	0,278	4,538	1,707	0,194
3SAS	Coastal	IT	IT-SAS-1	7Puglia	PU_2_C	IIIW	1.139,5	2	54	1,716	2,670	1,666	3,070	0,453	2,597	1,151	0,225
3SAS	Coastal	ME	MNE-1		ME_BK_C	I	84,8	7	235	2,833	4,291	3,300	4,297	0,290	2,712	1,070	0,185
3SAS	Coastal	ME	MNE-1		ME_C_C	IIA	246,2	2	72	1,687	2,647	1,902	2,868	0,340	2,673	1,124	0,197
3SAS	Coastal	ME	MNE-1		ME_N_C	IIA	86,0	1	38	2,072	2,606	1,873	2,005	0,325	1,948	1,114	0,227
3SAS	Coastal	ME	MNE-1		ME_S_C	I	151,2	1	37	1,882	3,168	2,090	3,985	0,655	2,823	1,186	0,325
3SAS	Offshore	IT	IT-SAS-12	7Puglia	PU_2_MC	IIIW	1.752,9	1	27	1,861	2,852	2,300	3,162	0,659	2,638	1,224	0,354
3SAS	Offshore	IT	IT-SAS-12	7Puglia	PU_3_MC	IIIW	1.760,4	3	81	1,674	2,429	1,665	2,978	0,359	2,233	1,102	0,150
3SAS	Offshore	IT	IT-SAS-12	7Puglia	PU_4_MC	IIIW	3.581,3	3	81	2,202	2,627	2,239	1,604	0,182	1,836	1,071	0,150

5. Adjusted application of the NEAT software for the assessment of IMAP Common Indicators 13 and 14

51. NEAT is a structured, hierarchical tool for making marine status assessments (Berg et al., 2017[7]; Borja et al., 2016[8]), and freely available at www.devotes-project.eu/neat. NEAT was developed to assess biodiversity status of marine waters under the MSFD and has been used to assess different ecosystem components and geographical areas (Nemati et al., 2017[9]; Borja et al., 2019[10]; Pavlidou et al. 2019[11]; Kazanidis et al., 2020[12]; Borja et al., 2021[13]).

52. The rationale and the requirements of the NEAT tools are in details explained in the document UNEP/MED WG.533/10, Appendix III and UNEP/MED WG. 533/Inf.4/Rev.1. For the transparent assessment of IMAP CIs 13 and 14, it is considered useful to get the information on the status of each separately per SAUs. In order to get this information, the following adjustments were made for eutrophication in the NEAT software, regarding the use and meaning of 'Indicators', 'Habitats' and 'Ecosystem Components'.

- *NEAT Indicators*: These refer to 3 mandatory parameters of IMAP CI13 (DIN and TP), and CI14 (Chla) as presented on Figure 15.
- *Habitats*: Water is the habitat of choice for CIs 13 and 14. Due to the fact that the indicators were measured in different type of waters (for Adriatic Sea I, IIA and IIIW) in line with Decisions IG.22/7, the three types of water were considered as the habitat. The three types of water are mainly discriminated by freshwater content which on the other side is correlated with the pressures from land. This allowed a separate aggregation of the assessment results per water types to get the status of CIs 13 and 14 (which represent waters with naturally different load from land) for all SAUs (Figure 16).
- *Ecosystem Components*: Instead of using ecosystem categories, the EO5 is used as ecosystem component, and the 'Indicators' are listed again as subcategories of EO5 in a hierarchical structure. In this way an aggregated assessment status on the EO5 level can be achieved and at the same time the assessment results can be generated on the level of each of the Indicators (Figure 17).

53. Given NEAT GES assessment methodology was primarily developed for EO9, then confirmed and tested with the present work for EO5, and suggested for EO10, the further work should be undertaken in order to generate the final assessment on the IMAP Pollution Cluster level.

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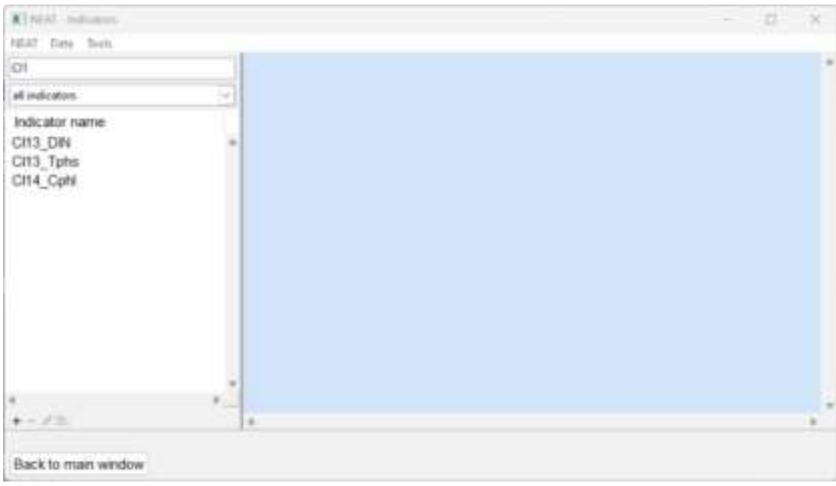


Figure 15. Depiction of IMAP Cis 13 and 14 chemical parameters as used in the NEAT tool for the NEAT GES assessment.

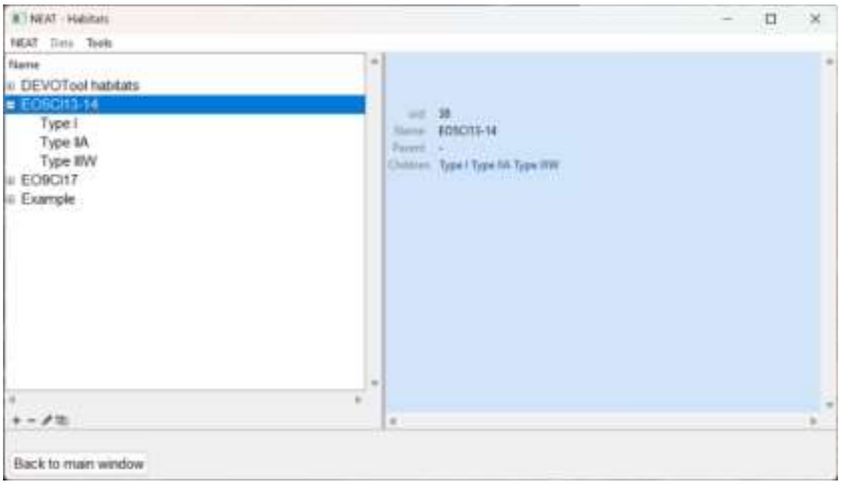


Figure 16. Depiction of IMAP Cis 13 and 14 used in the NEAT tool under the Habitats assessment item.

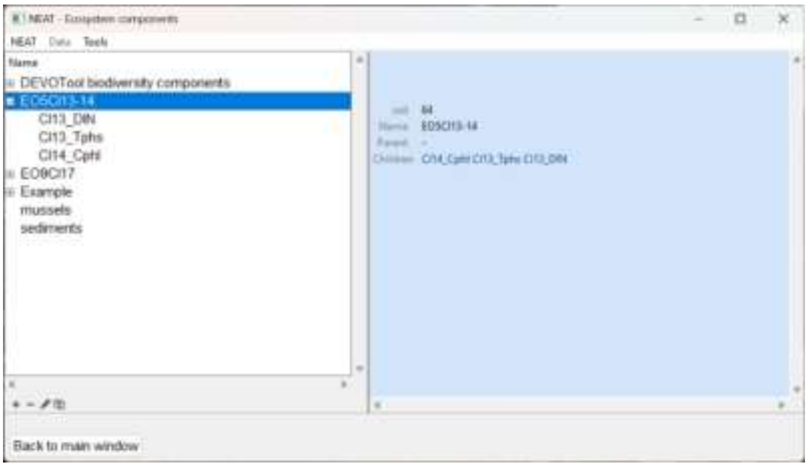


Figure 17. Depiction of IMAP Cis 13 and 14 chemical used in the NEAT tool under the Ecosystem Component assessment item.

5. 1 Insertion of data, boundary limits and class thresholds in the NEAT software per each Indicator and SAUs.

54. Further to spatial analysis of the monitoring stations distribution, along with recognition of corresponding monitoring and assessment areas, as well as optimal nesting of the finest areas of assessment, as described in Chapter 2, the scope of all Adriatic SAUs and subSAUs were defined. All of them were introduced in the NEAT tool along with their respective codes and surface area (km^2) as provided in Table 1 and Figure 18.

55. Within each SAU under 'habitats' the water type is introduced. Under 'ecosystem component' the 3 measured parameters i.e. DIN, TP and Chl *a* are assigned.

56. For each SAU and 'Ecological Component' and 'Habitat' (Water type), geometric mean and standard error of the geometric mean per parameter are inserted as explained in Chapter 4 and provided in Tables 5 - 7.

57. Boundary limits and class threshold values per SAU per parameter and per matrix (i.e. NEAT habitat) are applied. The tool obligatory requires 2 limits which define the best and the worse conditions and one threshold discriminating between GES-nonGES status. A five classes assessment scale 'High-Good-Moderate-Poor-Bad' is then produced. The GES-nonGES threshold discriminates between the Good-Moderate classes. Details on boundary limits and threshold values are given in Chapter 4 and in Table 4.

58. Then the data (i.e. average values), as well as limits and threshold values are normalized by NEAT in a scale of 0 to 1 to be comparable among parameters and to facilitate aggregation on the CI or EO level.

59. Threshold concentrations are normalized in a 0 to 1 scale as follows:

$$0 \leq \text{bad} < 0.2 \leq \text{poor} < 0.4 \leq \text{moderate} < 0.6 \leq \text{good} < 0.8 \leq \text{high} \leq 1$$

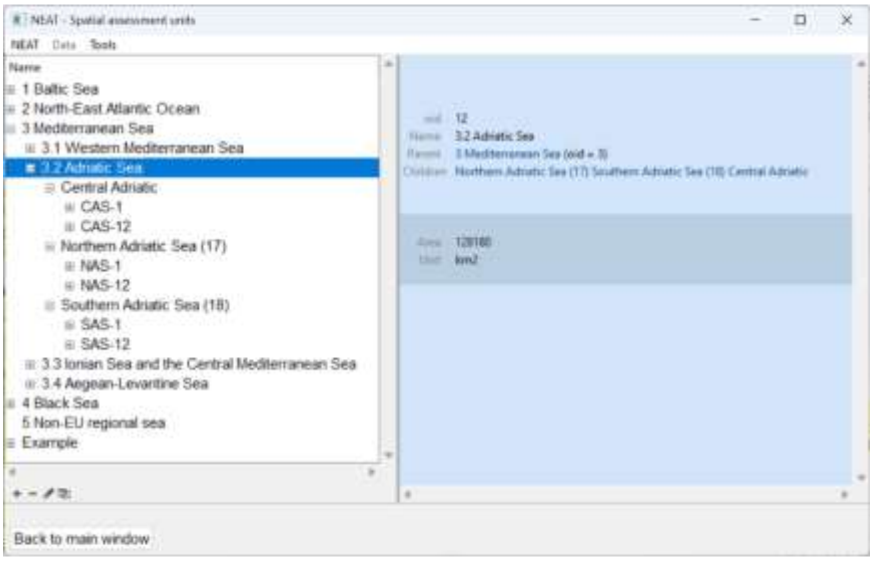
60. As explained in UNEP/MED WG.533/10, Appendix III and UNEP/MED WG 533/Inf.4/Rev.1, the NEAT tool further aggregates data by calculating the average of normalized values of indicators (DIN, TP; Chla) on the SAU level. This can be done either per each indicator per habitat separately or for all indicators i.e. parameters per habitats within the specific SAU. The first option leads to one value for each indicator separately for the specific SAU.

61. The process is then repeated for all nested SAUs (in a weighted or non- weighted mode). At the end one NEAT value for the highest area of assessment is obtained (i.e. for the Adriatic Sea) either for all ecosystem components i.e., indicators/parameters assessed (TP, DIN – CI 13, Chla – CI 14) separately, or for all ecosystem components by habitat (water). In the weighted mode a weighting factor based on the surface area of each SAU is used.

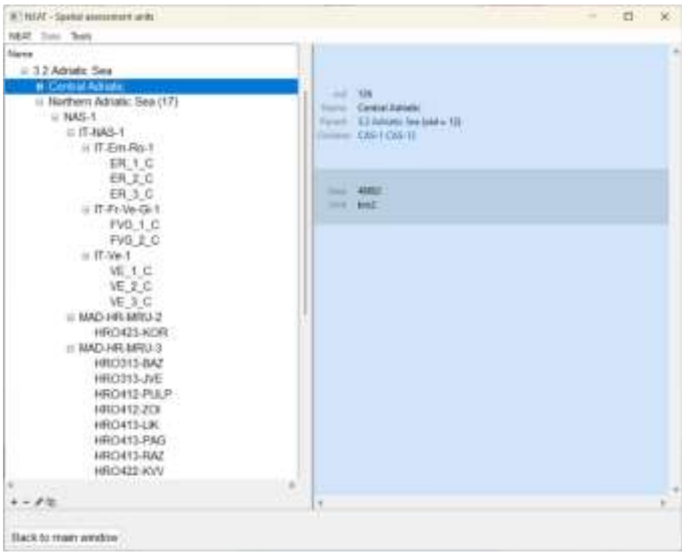
62. The NEAT values are values between 0 to 1 and correspond to an overall assessment status per contaminant according to the 5-class scale.

63. The decision rule of GES-nonGES is by comparison to the boundary class defined by the G/M threshold, and this is above/below Good (0.6).

64. Examples of the data insertion process are given in Figure 19.

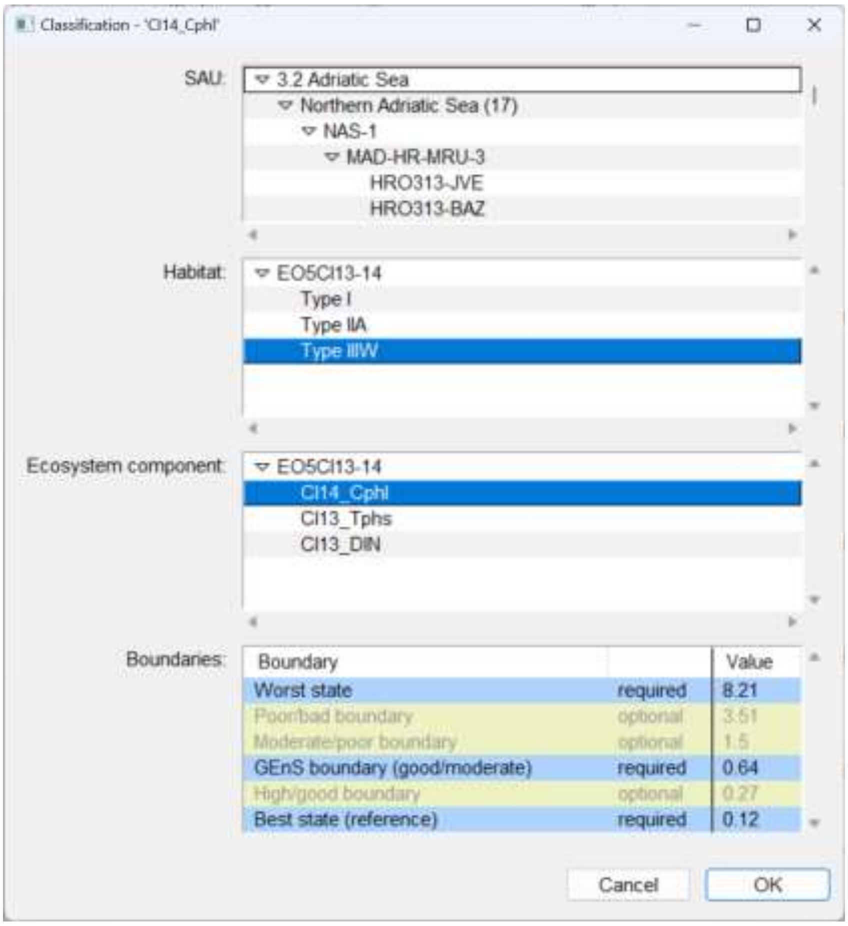


(a)

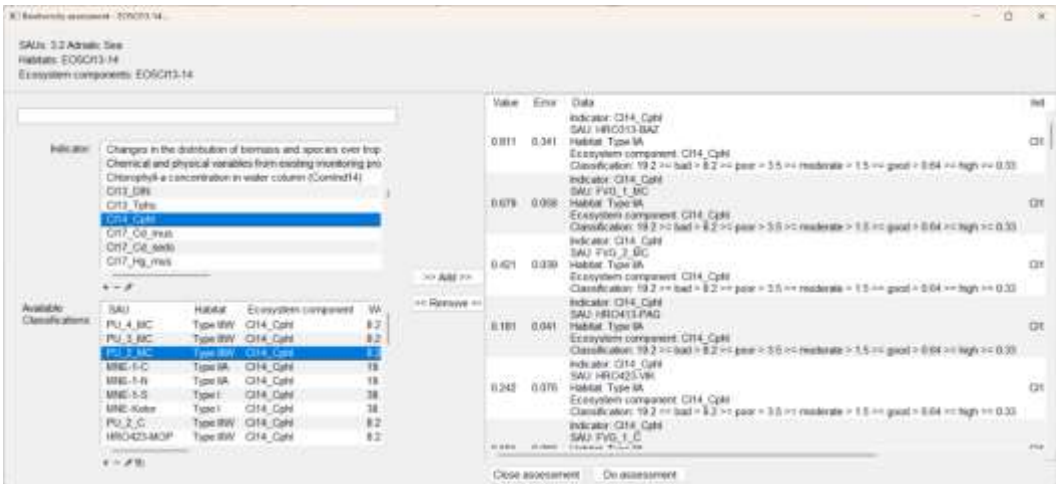


(b)

Figure 18. The nesting of Adriatic SAUs in the NEAT tool. (a) The 3 highest levels (4th, 3rd, 2nd) sub-region, sub-division, key IMAP coastal and offshore assessment zones of sub-divisions; (b) the 1st level of nesting of national SAUs and subSAUs within the two coastal and offshore assessment zones per country.



(a)



(b)

Figure 19. NEAT windows for: (a) the insertion of boundary values per SAU, Habitat and Ecosystem component; (b) Indicator data.

6. Results of the NEAT tool for the Assessment of the IMAP EO5-CI13 and -CI14 status in the Adriatic subregion

65. The results obtained from the application of NEAT tool are shown in Table 8 below. It provides detailed assessment results on the CI 13 and CI14 level per TP, DIN and Chl *a*, as mandatory parameters measured within monitoring of these two indicators. Other parameters were not considered given lack of data reported by the CPs. The assessment results which resulted from the aggregation-integration within the nested scheme are provided at i) the IMAP national SAUs & subSAUs, as the finest level; ii) the IMAP coastal and offshore assessment zones of sub-divisions (NAS-1, NAS-12, CAS-1, CAS-12, SAS-1, SAS-12); iii) the sub-division level (NAS, CAS, SAS) and iv) the sub-regional level (the Adriatic Sea).

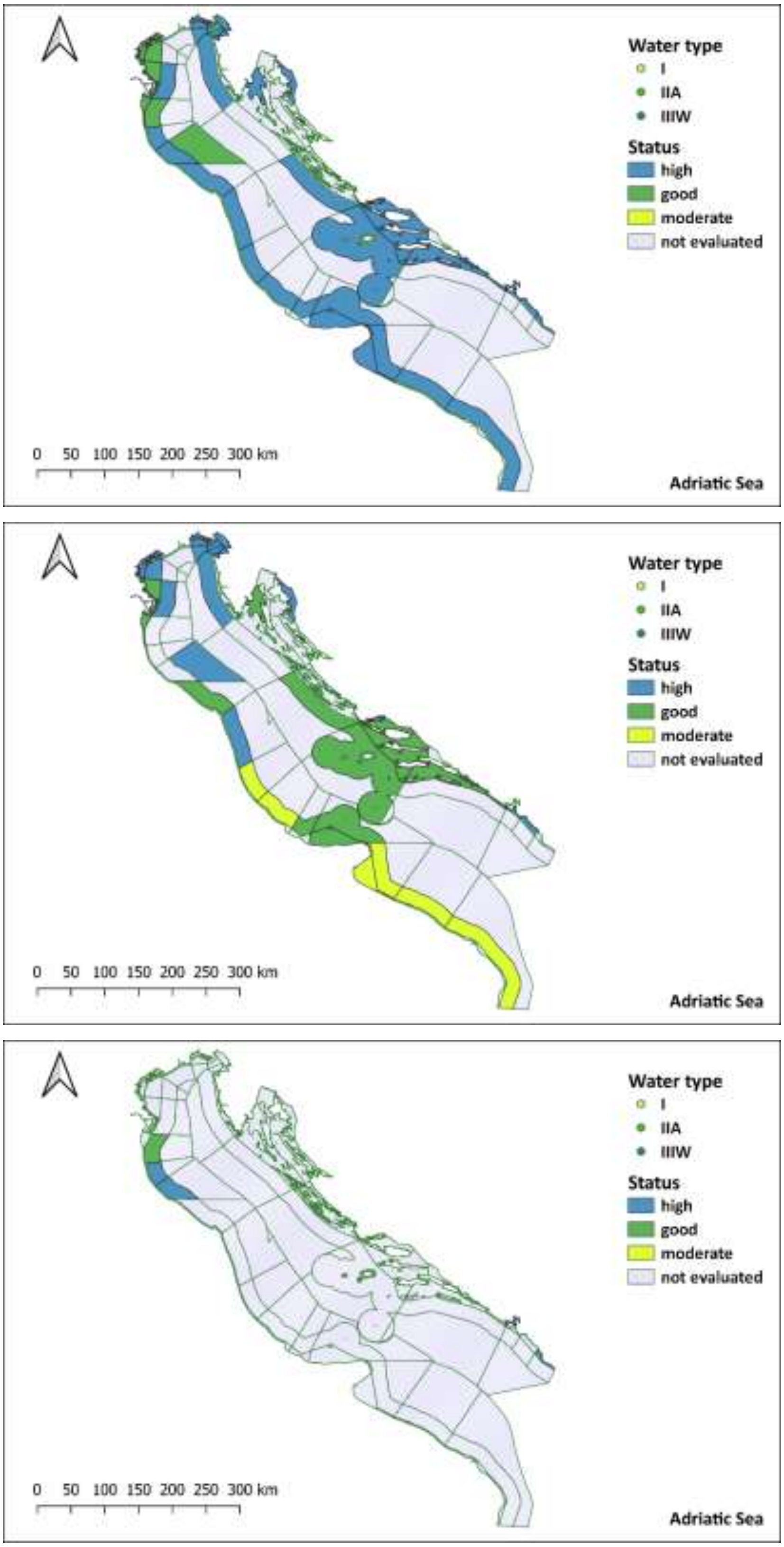
66. The Tabulated NEAT results as shown in Table 8 are also schematically presented in Annex I herein. The integrated results for the sub-divisions (NAS, CAS, SAS) are shown in bold. The NEAT classes are marked per all three parameters to show the status.

67. The aggregation of the assessment findings related to TP, DIN and Chl *a* resulted in the NEAT value per specific SAU which represents the assessment status of that SAU. Then NEAT values per SAUs were spatially integrated to the sub-divisions and regional levels.

68. Along with the aggregation of the parameters per SAUs, the NEAT tool has the possibility to also provide assessment results by aggregating data per habitat in this case water types and then to provide their spatial integration within the nested scheme. This possibility was not used for the present assessment since the water types are more relevant in the coastal waters and less in the offshore waters. The final integrated result per SAUs (NEAT value) are expected to be the same irrespective of the two ways of aggregation of the assessment results (i.e. per indicator or per habitat).

69. The detailed status assessment results show that all the SAUs achieve GES conditions (high, good status) that is indicated by the blue and green cells in Table 8. The GES status per assessment units and parameter is shown on Figure 20. For all three parameters (CI13 – DIN, TP and CI14 – Chla), the results show that all SAUs and subSAUs are in GES. The only exception is the results for TP in a part of CAS and the SAS along the Italian coast, where a few subSAUs (AB_1_MC, AB_2_MC, PU_2_MC, PU_3_MC, PU_4_MC) are in moderate status. The assessment status for TP was possible for the whole Adriatic Sea given data availability at the level of subSAUs. The results of TP assessment indicate that probably an accumulation of phosphorus is present in the area. It is necessary to explore if the problem is related to nitrogen limitation of the area and subsequent accumulation of phosphorus, or a local sources of pollution contribute to the generation of the pressure on marine environment. Non-GES status of a few subSAUs do not affect the overall assessment status and all SAUs fall under the GES status (high, good). The absence of some SAUs evaluation is related to the decision of the countries to monitor areas that are found relevant for the assessment of eutrophication and therefore excluding the areas where problems were not historically observed.

70. As already observed for IMAP CI17 (UNEP/MED WG.533/10, Appendix III), the present integrated assessment status results produced by applying the NEAT tool on the sub-division (NAS, CAS, SAS) and/or the Adriatic sub-Region level (shown in Tables 8 and Annex II) can only be considered as an example of how the tool works (4th and 3rd nesting levels). This is related to the fact that many SAUs lack data (blank cells in Tables 8 and blank boxes in Annex I). The lack of data can be related to the recognition that many CPs monitor an area of interest, therefore excluding the areas where problems were not historically observed. Anyway, the assessment per SAUs and integrated assessment on the two key nesting IMAP assessment zones i.e. coastal and offshore (NAS-1, NAS-12; CAS-1, CAS-12; SAS-1, SAS-12) (1st and 2nd nesting levels) can be considered more detailed for decision making.



Chl *a*

TP

DIN

Figure 20: The NEAT assessment results for IMAP CI13 (TP, DIN) and CI14 (Chl *a*), in the Adriatic Sea. Blank area corresponds to non-assessed subSAUs.

Table 8. Status assessment results of the NEAT tool applied on the Adriatic nesting scheme for the assessment of IMAP CIs 13 and 14. The various levels of spatial integration (nesting) are marked in bold. Blank cells denote absence of data. The % confidence is based on the sensitivity analysis described in 6.1.

SAU	Area	Total SAU weight	NEAT value	Status class	Confidence	CI14_Cphl	CI13-TP	CI13-DIN
Adriatic Sea	**128180**	**0**	**0.815**	**high**	**99.8**	**0.954**	**0.673**	**0.845**
Northern Adriatic Sea	**30865**	**0**	**0.888**	**high**	**100.0**	**0.892**	**0.890**	**0.84**
NAS-1	**9130**	**0**	**0.866**	**high**	**100.0**	**0.896**	**0.837**	
MAD-HR-MRU-3	6302	0	0.900	high	100.0	0.952	0.847	
HRO313-JVE	73	0						
HRO313-BAZ	4	0	0.787	good	56.9	0.760	0.814	
HRO412-PULP	7	0						
HRO412-ZOI	467	0						
HRO413-LIK	7	0						
HRO413-PAG	30	0.001	0.898	high	100.0	1.000	0.795	
HRO413-RAZ	10	0						
HRO422-KVV	494	0						
HRO422-SJI	1924	0						
HRO423-KVA	687	0.029	0.848	high	90.2	0.919	0.777	
HRO423-KVJ	1089	0						
HRO423-KVS	577	0						
HRO423-RILP	6	0						
HRO423-RIZ	475	0						
HRO423-VIK	455	0.019	0.979	high	100.0	1.000	0.958	
IT-NAS-1	2576	0	0.783	good	92.7	0.759	0.806	
IT-Em-Ro-1	372	0	0.682	good	99.6	0.757	0.608	
ER_1_C	254	0.003	0.682	good	99.6	0.757	0.608	
ER_2_C	64	0						
ER_3_C	54	0						
IT-Fr-Ve-Gi-1	560	0	0.958	high	100.0	0.917	1.000	
FVG_1_C	277	0.002	0.916	high	100.0	0.832	1.000	
FVG_2_C	283	0.002	1.000	high	100.0	1.000	1.000	
IT-Ve-1	1646	0	0.746	good	100.0	0.706	0.785	

SAU	Area	Total SAU weight	NEAT value	Status class	Confidence	CI14_Cphl	CI13-TP	CI13-DIN
VE_1_C	88	0						
VE_2_C	905	0.008	0.792	good	63.5	0.755	0.828	
VE_3_C	653	0.005	0.682	good	99.9	0.638	0.726	
MAD-Sl-MRU-11	85	0.001	0.923	high	100.0	0.903	0.942	
MAD-HR-MRU-2	166	0						
HRO423-KOR	166	0						
NAS-12	**21735**	**0**	**0.897**	**high**	**100.0**	**0.890**	**0.917**	**0.840**
IT-NAS-12	11141	0	0.832	high	98.8	0.777	0.898	0.840
IT-Em-Ro-12	7144	0	0.814	high	82.3	0.750	0.888	0.840
ER_1_MC	858	0.009	0.752	good	99.4	0.735		0.770
ER_2_MC	586	0.006	0.824	high	92.8	0.805		0.860
ER_3_MC	893	0.010	0.864	high	100.0	0.860		0.869
ER_3_MO	2888	0.031	0.814	high	67.9	0.739	0.888	
ER_2_MO	600	0						
ER_1_MO	1319	0						
IT-Fr-Ve-Gi-12	410	0	0.945	high	100.0	0.890	1.000	
FVG_1_MC	139	0.001	0.895	high	100.0	0.791	1.000	
FVG_2_MC	271	0.002	0.971	high	100.0	0.941	1.000	
IT-Ve-12	3588	0	0.854	high	95.9	0.811	0.898	
VE_1_MC	714	0						
VE_2_MC	467	0						
VE_3_MC	1041	0.028	0.854	high	95.9	0.811	0.898	
VE_1_MO	234	0						
VE_2_MO	190	0						
VE_3_MO	941	0						
MAD-Sl-MRU-12	129	0.001	0.935	high	100.0	0.870	1.000	
HR-NAS-12	10465	0	0.965	high	100.0	1.000	0.930	
HR_NA_1_MC	2057	0.082	0.965	high	100.0	1.000	0.930	
HR_NA_2_MC	2183	0						
HR_NA_1_MO	2566	0						
HR_NA_2_MO	3659	0						

SAU	Area	Total SAU weight	NEAT value	Status class	Confidence	CI14_Cphl	CI13-TP	CI13-DIN
Central Adriatic	**48802**	**0**	**0.832**	**high**	**100.0**	**0.984**	**0.680**	
CAS-1	**7582**	**0**	**0.853**	**high**	**100.0**	**0.995**	**0.712**	
MAD-HR-MRU-2	5240	0	0.870	high	100.0	0.994	0.747	
HRO313-NEK	253	0						
HRO313-KASP	44	0.001	0.783	good	66.7	0.750	0.816	
HRO313-KZ	34	0	0.938	high	100.0	0.991	0.886	
HRO313-MMZ	56	0						
HRO413-PZK	196	0						
HRO413-STLP	1	0						
HRO423-BSK	613	0.008	0.844	high	91.1	0.985	0.702	
HRO423-KOR	1564	0						
HRO423-MOP	2480	0.033	0.877	high	100.0	1.000	0.755	
IT-CAS-1	2091	0	0.811	high	66.6	1.000	0.623	
IT-Ab-1	282	0						
AB_1_C	103	0						
AB_2_C	179	0						
IT-Ma-1	320	0						
MA_1_C	172	0						
MA_2_C	148	0						
IT-Mo-1	229	0						
MO_1_C	229	0						
IT-Ap-1	1261	0	0.811	high	66.6	1.000	0.623	
PU_1_C	1261	0.017	0.811	high	66.6	1.000	0.623	
MAD-HR-MRU-4	184	0						
HRO422-VIS	184	0						
MAD-HR-MRU-3	67	0						
HRO422-SJI	14	0						
HRO423-KVJ	53	0						
CAS-12	**41219**	**0**	**0.828**	**high**	**100.0**	**0.981**	**0.674**	
HR-CAS-12	18797	0	0.845	high	100.0	1.000	0.691	
HR_CA_1_MC	2337	0.034	0.852	high	94.6	1.000	0.703	

SAU	Area	Total SAU weight	NEAT value	Status class	Confidence	CI14_Cphl	CI13-TP	CI13-DIN
HR_CA_2_MC	7745	0.113	0.843	high	100.0	1.000	0.687	
HR_CA_1_MO	5328	0						
HR_CA_2_MO	3388	0						
IT-CAS-12	22422	0	0.813	high	90.4	0.966	0.661	
IT-Ab-12	7526	0	0.719	good	100.0	1.000	0.438	
AB_1_MC	1056	0.027	0.705	good	100.0	1.000	0.411	
AB_2_MC	1250	0.032	0.731	good	100.0	1.000	0.461	
AB_1_MO	2480	0						
AB_2_MO	2741	0						
IT-Ap-12	5096	0	0.842	high	87.9	1.000	0.685	
PU_1_MC	2618	0.04	0.842	high	87.9	1.000	0.685	
PU_1_MO	2478	0						
IT-Ma-12	8097	0	0.871	high	100.0	0.907	0.835	
MA_1_MC	1480	0.03	0.822	high	90.0	0.870	0.775	
MA_2_MC	1629	0.033	0.915	high	100.0	0.941	0.890	
MA_1_MO	1391	0						
MA_2_MO	3597	0						
IT-Mo-12	1702	0	0.868	high	100.0	0.992	0.745	
MO_1_MC	654	0.013	0.868	high	100.0	0.992	0.745	
MO_1_MO	1048	0						
Southern Adriatic Sea	**48514**	**0**	**0.753**	**good**	**99.9**	**0.963**	**0.540**	**0.920**
SAS-1	**4793**	**0**	**0.765**	**good**	**98.7**	**0.928**	**0.583**	**0.920**
MAD-HR-MRU-2	1769	0	0.813	high	59.7	0.989	0.637	
HRO313-ZUC	13	0						
HRO423-MOP	1756	0.016	0.813	high	59.7	0.989	0.637	
IT-SAS-1 (Ap-1)	1810	0	0.677	good	99.8	0.869	0.485	
PU_2_C	1140	0.016	0.677	good	99.8	0.869	0.485	
PU_3_C	172	0						
PU_4_C	498	0						
MNE-SAS-1	568	0	0.892	high	100.0	0.920	0.823	0.920
MNE-1-N	86	0.001	0.828	high	85.0	0.852	0.804	

SAU	Area	Total SAU weight	NEAT value	Status class	Confidence	CI14_Cphl	CI13-TP	CI13-DIN
MNE-1-C	246	0.002	0.884	high	100.0	0.937	0.830	
MNE-1-S	151	0.001	0.945	high	100.0	0.956		0.933
MNE-Kotor	85	0.001	0.887	high	100.0	0.877		0.896
AL-SAS-1	646	0						
SAS-12	**43721**	**0**	**0.752**	**good**	**99.5**	**0.967**	**0.536**	
IT-SAS-12	22695	0	0.752	good	99.5	0.967	0.536	
PU_2_MC	1753	0.084	0.729	good	93.9	0.928	0.530	
PU_3_MC	1760	0.085	0.702	good	99.9	0.940	0.465	
PU_4_MC	3581	0.172	0.787	good	81.2	1.000	0.574	
PU_2_MO	2619	0						
PU_3_MO	6066	0						
PU_4_MO	6915	0						
MNE-SAS-12	5772	0						
MNE-12-N	468	0						
MNE-12-C	653	0						
MNE-12-S	781	0						
ME_SA_1_MO	3870	0						
AL-SAS-12	716	0						
MAD-EL-MS-AD	2253	0						
HR-SAS-12	12286	0						
HR_SA_1_MC	3397	0						
HR_SA_1_MO	8889	0						

71. The results of the assessment findings provided per TP, DIN and chlorophyll a, as presented in Table 8, are visualized in the schematic diagrams provided in Annex I. Also, the final GES assessment findings for all the IMAP SAUs in the Adriatic Sea, as provided in Table 8 are shown by the respective colour in the maps included in the following Figures 21-23. The maps depict the integrated NEAT value for each SAU i.e. aggregated NEAT value for the three parameters assessed i.e. TP, DIN and chlorophyll a, as provided in Table 8.

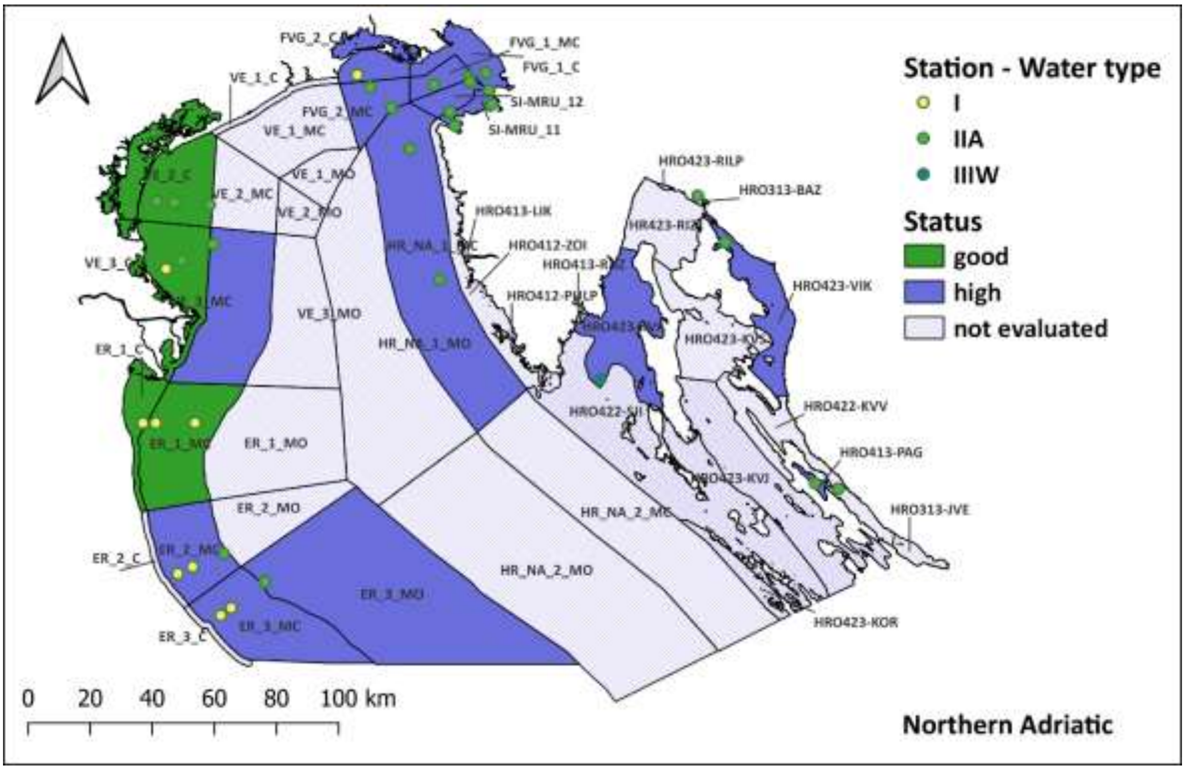


Figure 21: The NEAT assessment results for IMAP CIs 13 and 14 in the North Adriatic Sea. All IMAP SAUs are in GES characterized by High or Good status. Blank area corresponds to not evaluated subSAUs.

72. The overall status of IMAP CI13 and CI14 on the sub-division level for NAS is Good and in GES. Thirteen out of 20 SAUs are classified under High status and six under Good.

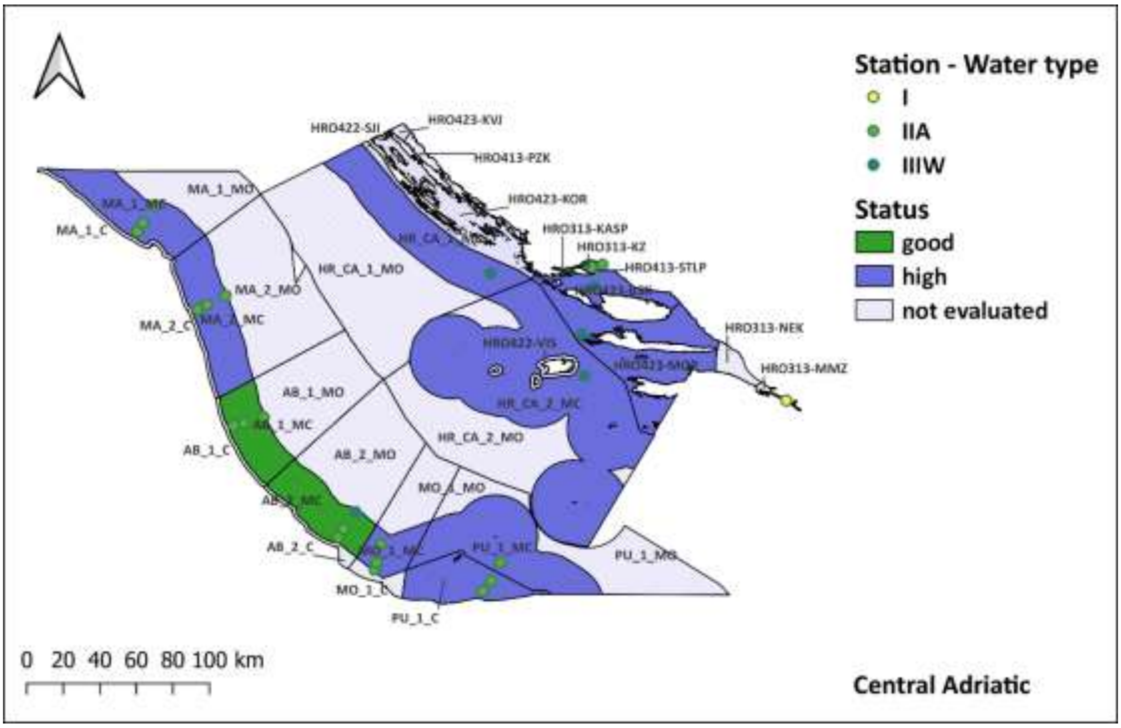


Figure 22: The NEAT assessment results for IMAP CIs 13 and 14 in the Central Adriatic Sea. All IMAP SAUs are in GES, characterized by High or Good status.

73. The overall status of IMAP CIs 13 and 14 on the sub-division level for CAS is High and in GES. Nine out of fourteen SAUs are classified under High status and five under Good.

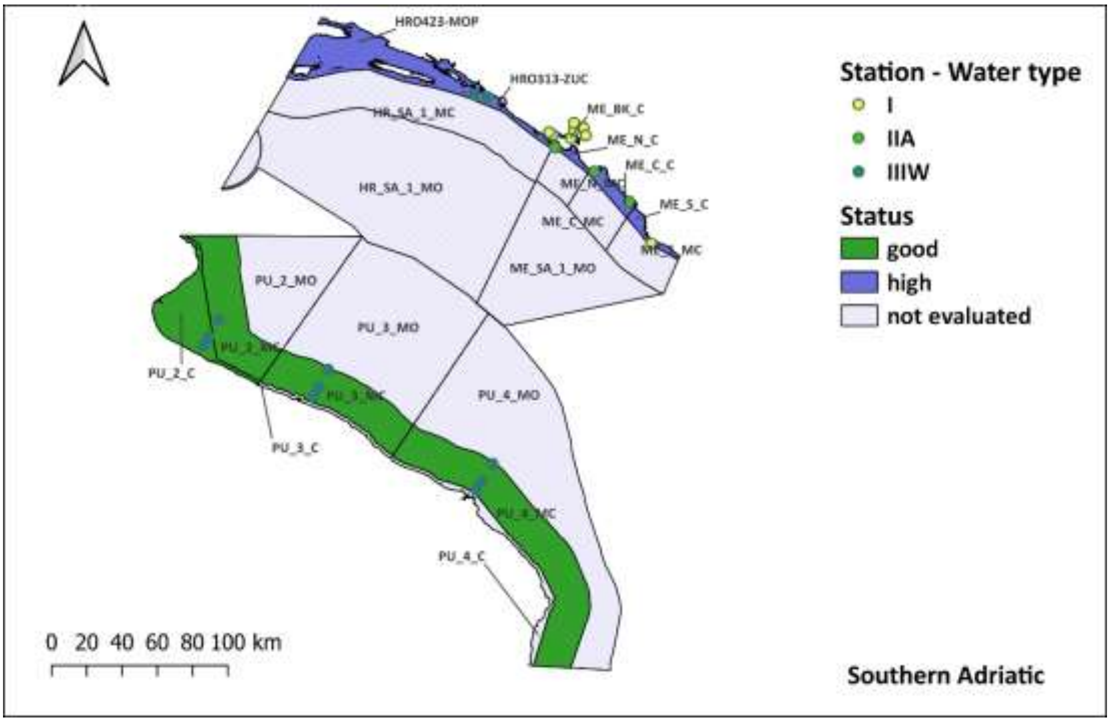


Figure 23: The NEAT assessment results for IMAP CIs 13 and 14 in the South Adriatic Sea. All IMAP SAUs are in GES, characterized by High or Good status. Blank area corresponds to no available data.

74. The overall status for CIs 13 and 14 on the sub-division level for SAS is in GES. Four out of 14 SAUs are classified under Good conditions the rest under High. The Good status is observed along the Italian coast.

6.1 Sensitivity analysis of the assessment results

75. As already elaborated in UNEP/MED WG.533/10, Appendix III, the assessment status as obtained by the application of NEAT tool is the one based on the average value of monitoring data. However, based on the standard deviation per chemical compound and per SAU, the NEAT tool provides a sensitivity analysis for calculating the uncertainty of the assessment results using a Monte-Carlo simulation model for 1000 iterations.

76. In other words, 1000 assessments are run using different random combinations of the data. Instead of using the average value of the parameters inserted by the user, other random values are used by the tool to run the assessment. The selection of these random values is done based on the standard deviation and it is repeated 1000 times with different combinations. The resulting assessment value of each of these 1000 assessment runs is recorded and may lead to a different assessment classification than the one based on the average value. The number of times (out of 1000) of the appearance of these different assessments is given in Table 9.

Table 9. Confidence assessment of all SAU/assessment classes combinations for IMAP CIs 13 and 14 as absolute counts falling into the specified classes (maximum possible count = 1000). The final level of confidence assessment for SAU is the one with the highest number of iterations.

SAU	Sensitivity	bad	poor	moderate	good	high
Adriatic Sea	1,00	0	0	0	5	995
Northern Adriatic Sea	1,00	0	0	0	0	1000
Southern Adriatic Sea	1,00	0	0	0	999	1
Central Adriatic	1,00	0	0	0	0	1000
NAS-1	1,00	0	0	0	0	1000
NAS-12	1,00	0	0	0	0	1000
SAS-1	0,99	0	0	0	990	10
SAS-12	1,00	0	0	0	997	3
CAS-1	1,00	0	0	0	0	1000
CAS-12	1,00	0	0	0	0	1000
MAD-HR-MRU-3	1,00	0	0	0	0	1000
IT-NAS-1	0,93	0	0	0	931	69
MAD-Sl-MRU-11	1,00	0	0	0	0	1000
MAD-HR-MRU-2	-					
IT-NAS-12	1,00	0	0	0	4	996
MAD-Sl-MRU-12	1,00	0	0	0	0	1000
HR-NAS-12	1,00	0	0	0	0	1000
MAD-HR-MRU-2	0,59	0	0	0	407	593
IT-SAS-1 (Ap-1)	1,00	0	0	0	1000	0
MNE-SAS-1	1,00	0	0	0	0	1000
AL-SAS-1	-					
IT-SAS-12	1,00	0	0	0	997	3
MNE-SAS-12	-					
AL-SAS-12	-					
MAD-EL-MS-AD	-					

SAU	Sensitivity	bad	poor	moderate	good	high
HR-SAS-12	-					
MAD-HR-MRU-2	1,00	0	0	0	0	1000
IT-CAS-1	0,65	0	0	0	346	654
MAD-HR-MRU-4	-					
MAD-HR-MRU-3	-					
HR-CAS-12	1,00	0	0	0	1	999
IT-CAS-12	0,91	0	0	0	91	909
HRO313-JVE	-					
HRO313-BAZ	0,55	0	0	0	550	450
HRO412-PULP	-					
HRO412-ZOI	-					
HRO413-LIK	-					
HRO413-PAG	1,00	0	0	0	0	1000
HRO413-RAZ	-					
HRO422-KVV	-					
HRO422-SJI	-					
HRO423-KVA	0,89	0	0	0	109	891
HRO423-KVJ	-					
HRO423-KVS	-					
HRO423-RILP	-					
HRO423-RIZ	-					
HRO423-VIK	1,00	0	0	0	0	1000
IT-Em-Ro-1	1,00	0	0	0	995	5
IT-Fr-Ve-Gi-1	1,00	0	0	0	0	1000
IT-Ve-1	1,00	0	0	0	1000	0
HRO423-KOR	-					
IT-Em-Ro-12	0,83	0	0	0	172	828
IT-Fr-Ve-Gi-12	1,00	0	0	0	0	1000
IT-Ve-12	0,97	0	0	0	30	970
HR_NA_1_MC	1,00	0	0	0	0	1000
HR_NA_2_MC	-					
HR_NA_1_MO	-					
HR_NA_2_MO	-					
HRO313-ZUC	-					
HRO423-MOP	0,59	0	0	0	407	593
PU_2_C	1,00	0	0	0	1000	0
PU_3_C	-					
PU_4_C	-					
MNE-1-N	0,86	0	0	0	140	860
MNE-1-C	1,00	0	0	0	0	1000
MNE-1-S	1,00	0	0	0	0	1000
MNE-Kotor	1,00	0	0	0	0	1000
PU_2_MC	0,94	0	0	0	937	63
PU_3_MC	1,00	0	0	0	1000	0
PU_4_MC	0,84	0	0	0	840	160
PU_2_MO	-					

SAU	Sensitivity	bad	poor	moderate	good	high
PU_3_MO	-					
PU_4_MO	-					
MNE-12-N	-					
MNE-12-C	-					
MNE-12-S	-					
ME_SA_1_MO	-					
HR_SA_1_MC	-					
HR_SA_1_MO	-					
HRO313-NEK	-					
HRO313-KASP	0,65	0	0	0	652	348
HRO313-KZ	1,00	0	0	0	0	1000
HRO313-MMZ	-					
HRO413-PZK	-					
HRO413-STLP	-					
HRO423-BSK	0,91	0	0	0	90	910
HRO423-KOR	-					
HRO423-MOP	1,00	0	0	0	0	1000
IT-Ab-1	-					
IT-Ma-1	-					
IT-Mo-1	-					
IT-Ap-1	0,65	0	0	0	346	654
HRO422-VIS	-					
HRO422-SJI	-					
HRO423-KVJ	-					
HR_CA_1_MC	0,95	0	0	0	55	945
HR_CA_2_MC	1,00	0	0	0	1	999
HR_CA_1_MO	-					
HR_CA_2_MO	-					
IT-Ab-12	1,00	0	0	0	1000	0
IT-Ap-12	0,88	0	0	0	122	878
IT-Ma-12	1,00	0	0	0	0	1000
IT-Mo-12	1,00	0	0	0	0	1000
ER_1_C	1,00	0	0	0	995	5
ER_2_C	-					
ER_3_C	-					
FVG_1_C	1,00	0	0	0	0	1000
FVG_2_C	1,00	0	0	0	0	1000
VE_1_C	-					
VE_2_C	0,62	0	0	0	619	381
VE_3_C	1,00	0	0	0	1000	0
ER_1_MC	0,99	0	0	0	993	7
ER_2_MC	0,92	0	0	0	85	915
ER_3_MC	1,00	0	0	0	0	1000
ER_3_MO	0,69	0	0	0	306	694
ER_2_MO	-					

SAU	Sensitivity	bad	poor	moderate	good	high
ER_1_MO	-					
FVG_1_MC	1,00	0	0	0	0	1000
FVG_2_MC	1,00	0	0	0	0	1000
VE_1_MC	-					
VE_2_MC	-					
VE_3_MC	0,97	0	0	0	30	970
VE_1_MO	-					
VE_2_MO	-					
VE_3_MO	-					
AB_1_C	-					
AB_2_C	-					
MA_1_C	-					
MA_2_C	-					
MO_1_C	-					
PU_1_C	0,65	0	0	0	346	654
AB_1_MC	1,00	0	0	0	1000	0
AB_2_MC	1,00	0	0	0	1000	0
AB_1_MO	-					
AB_2_MO	-					
PU_1_MC	0,88	0	0	0	122	878
PU_1_MO	-					
MA_1_MC	0,91	0	0	0	95	905
MA_2_MC	1,00	0	0	0	0	1000
MA_1_MO	-					
MA_2_MO	-					
MO_1_MC	1,00	0	0	0	0	1000
MO_1_MO	-					

77. For example, the overall status for the SAU HRO313-BAZ is reported as ‘good’. However, from Table 9 it is understood that out of 1000 iterations, 550 lead to Good status, and 450 to High Status. These results imply a rather high uncertainty (confidence 55.0%), in contrast to HRO413-PAG where 1000 iterations led to High status and no one to Good (confidence 100,0%).

78. As for any assessment results, the accuracy of the results described above, is dependent on the analytical accuracy of the chemical data i.e. the quality of data reported to IMAP IS and their reproducibility and comparability among all the laboratories as well by the amount of data available for each SAU. It should be stressed here, that the sensitivity analysis described above cannot compensate for the analytical differences among the laboratories or for the lack of data. For instance, in many of the subSAUs data were representative of one monitoring station visited once. Despite to small quantum of data assessed in this case, the value of standard error inserted in the NEAT tool is equal to zero and the propagated error is extremely low, therefore there is high confidence value. In other cases, many subSAUs totally lack of data (blank cells in Table 8 and Annex I), therefore the integrated results on the upper SAU level reflect the status of one or two subSAUs and cannot be considered indicative of the overall SAU status with confidence. In conclusion, the interpretation of the NEAT assessment results should always take into consideration the afore mentioned factors, having in mind that NEAT is just a tool which calculates numbers based on input data.

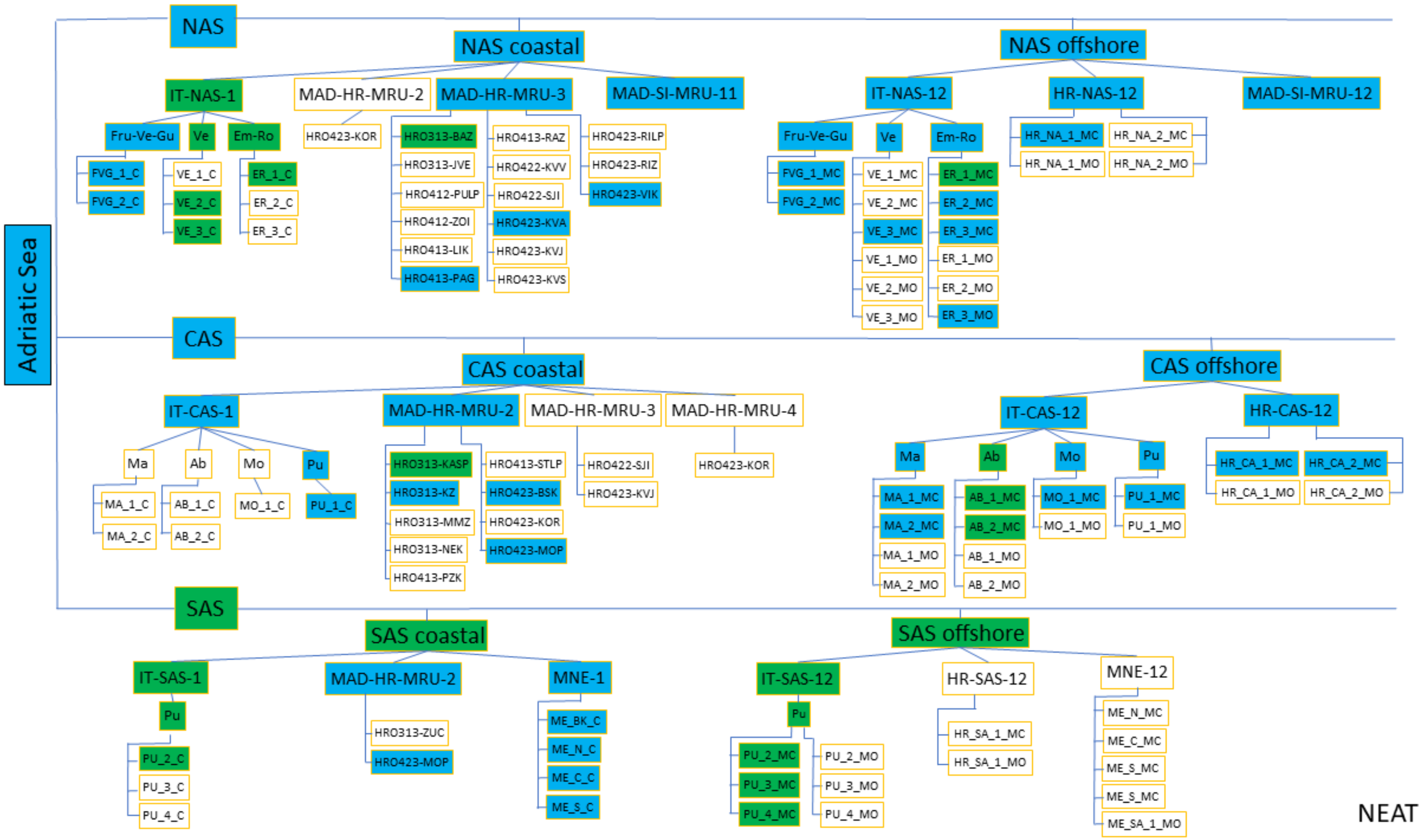
Annex I

Schematic representation of the NEAT assessment results in the nesting scheme of the Adriatic Sea sub-region according to the NEAT colour scale

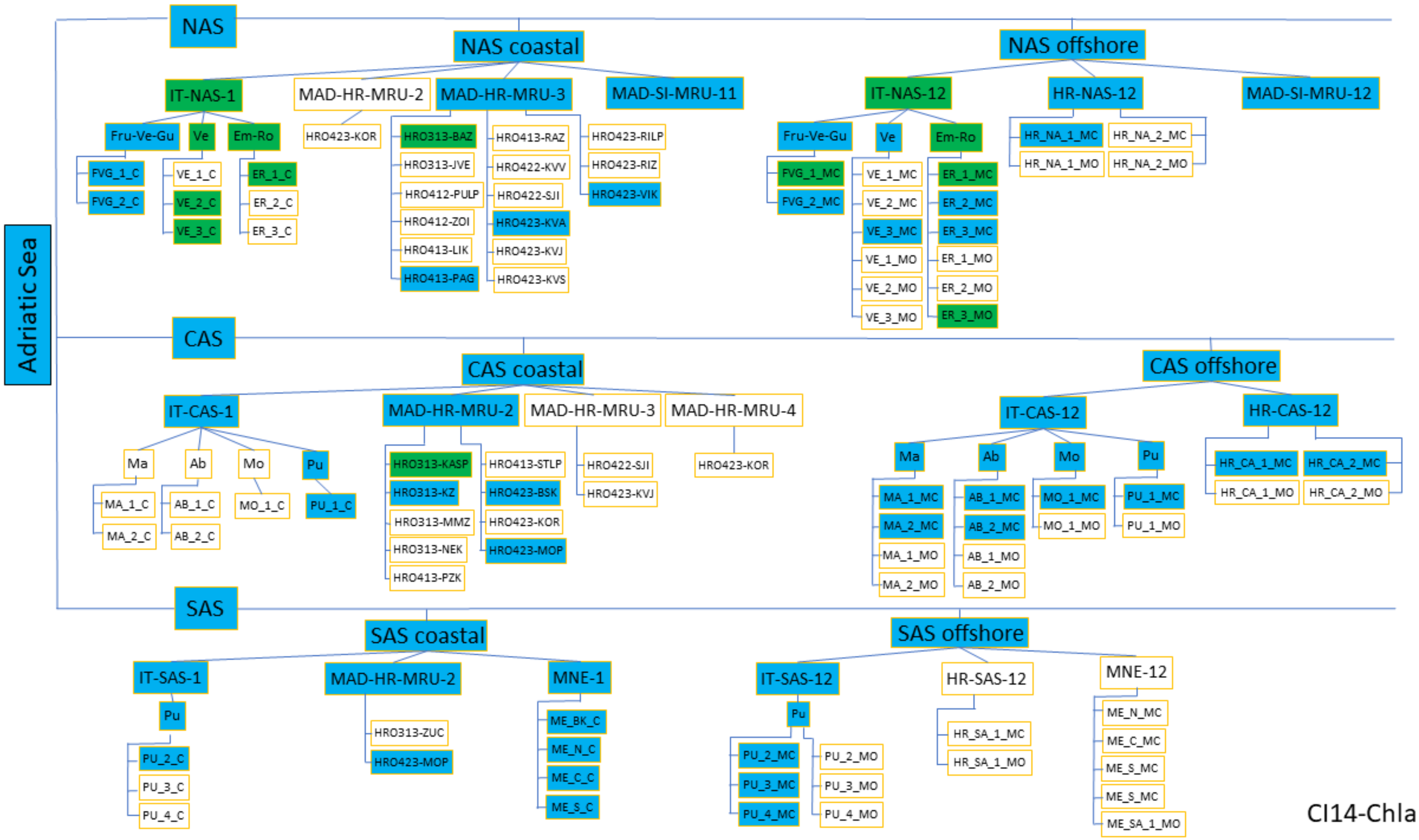
	GES		non-GES		
IMAP/NEAT	High	Good	Moderate	Poor	Bad
Boundary limits RC	H/G	G/M	M/P	P/B	
Thresholds		G/M			

Schematic presentation of the assessment results as presented in Table 8 for EO5/CI13 and CI14 at the regional level in the Adriatic Sea

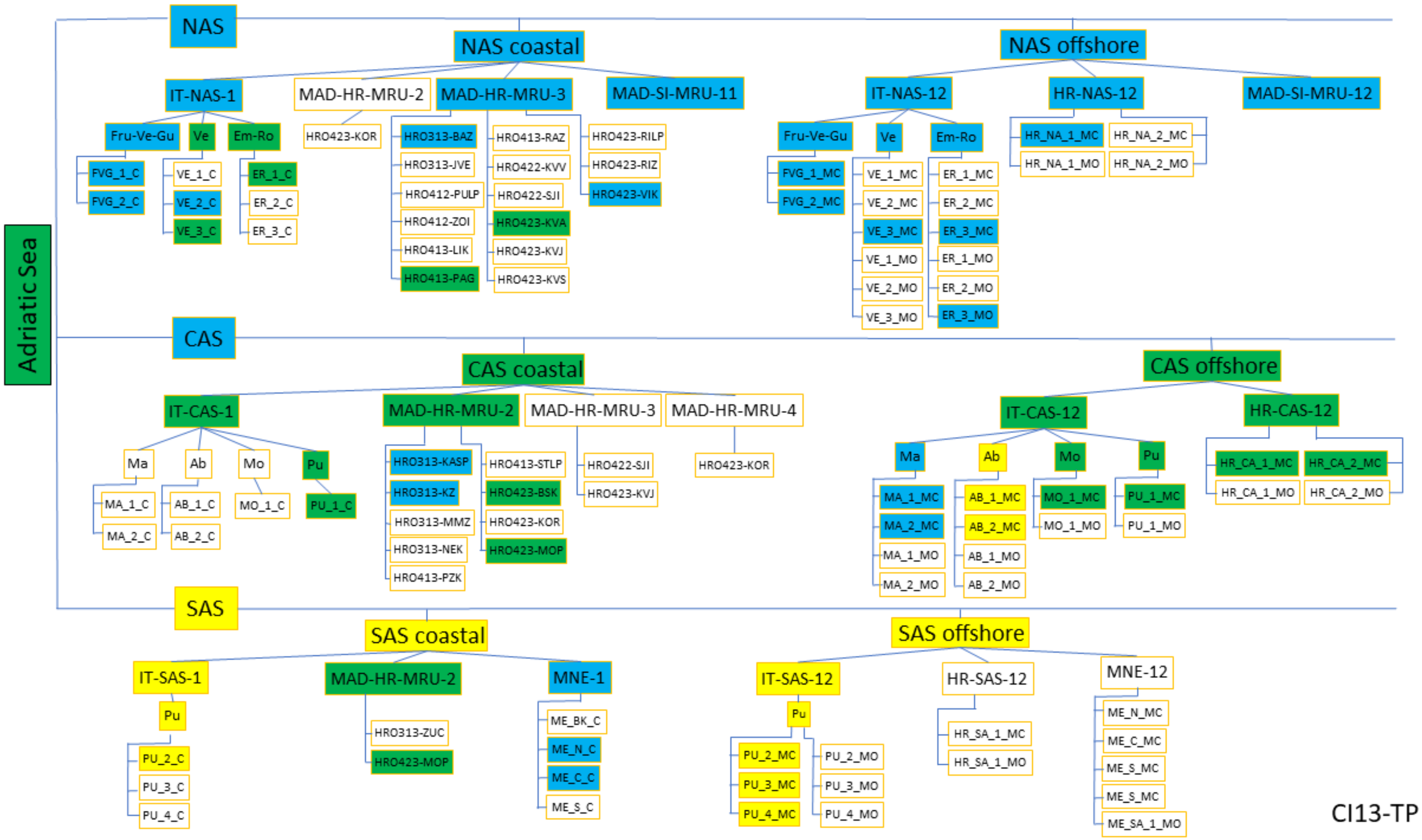
Blank boxes denote absence of data



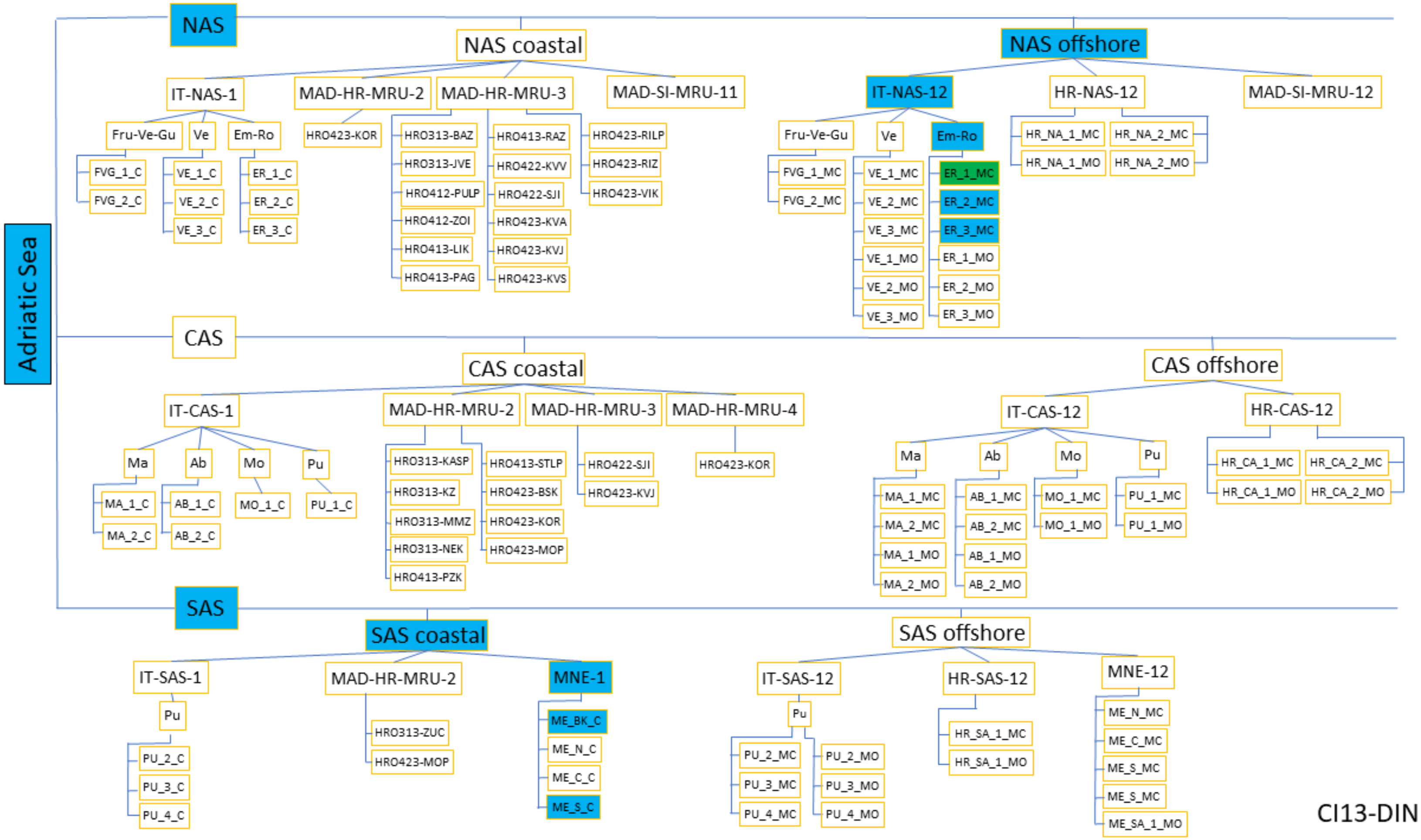
Schematic presentation of the assessment results as presented in Table 8 for EO5/CI13 and CI14 in the Adriatic Sea for Chlorophyll a concentration.
(Blank boxes denote absence of data)



Schematic presentation of the assessment results as presented in Table 11 for EO5/CI13 and CI14 in the Adriatic Sea for Total Phosphorous concentration. (Blank boxes denote absence of data)



Schematic presentation of the assessment results as presented in Table 8 for EO5/CI13 and CI14 in the Adriatic Sea for Dissolved Inorganic Nitrogen concentrataion. (Blank boxes denote absence of data)



Annex II

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UNEP/MED WG. 533/Inf.4/Rev.1, Agenda Item 5: GES Assessment for IMAP Common Indicator 17 in the Areas with Limited Data Availability. The Methodology and the Results of the NEAT Tool Application for GES assessment of IMAP Common Indicator 17 in the Adriatic Sea Sub-region

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