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The Updated Results of GES Assessment for IMAP Common Indicator 17 in the Adriatic Sea Sub-region by Applying the NEAT GES Assessment Methodology Harmonized with the CHASE+ Environmental Assessment Methodology

UNEP/MAP
Athens, 2023

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List of Abbreviations / Acronyms

BAC	Background Assessment Concentration
BC	Background Concentration
BDL	Below Detection Limit
CAS	Central Adriatic Sea
CI	Common Indicator
COP	Conference of the Parties
CORMON	Correspondence Group on Monitoring
CPs	Contracting Parties
DL	Detection Limit
EMODNET	European Marine Observation and Data Network
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
MedEAC	Mediterranean Environmental Assessment Concertation
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

1. Introduction

1. In the course of 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), related to the adjustment needed for 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 testing of the proposed methodology for IMAP CI 17 in the Adriatic Sea Sub-region.

2. The harmonized application of the nested approach, including within the application of the NEAT tool, requires defining the Integration Rules for Assessments. Therefore, this document applies the definition of integration and aggregation as provided in UNEP/MED WG.509/Inf.10/Rev.2. 'Rules of Integration of Assessments' refer to the principles that underlie meaningful assessments on appropriate scales of assessment. The rules already defined for the Eutrophication, Pollution and Marine Litter Cluster in UNEP/MAP 2021 ('*4.2 Rules for integration of assessments within the nested approach'* and Table 5 therein) are applied.

3. As it is indicated in several UNEP/MAP documents (UNEP/MAP (2016; 2019; 2021)), the NEAT approach ensures that a balance is achieved 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. To this aim, the two types of scales (i.e. scales of monitoring and scales of assessment) are interrelated; however, a clear description of them is needed for a better comprehension of this interrelationship. The scales or units of monitoring refer to the physical spatiotemporal space where the observations are made (or samples taken) i.e. the points in time and space which are monitored. Monitoring scales are usually defined upon significance of the environmental parameters that are monitored, the expected variability and the types of pressures posed on a particular area/habitat. The parameters monitored within a specific monitoring unit may reflect the environmental conditions/impacts/extent of impacts of the monitoring unit itself or the environmental conditions/ impacts/ extent of impacts of a larger unit.

4. The first element that needs to be considered for the implementation of the nested approach is the definition of the areas of assessment within the Adriatic Sea based on the areas of monitoring. This can be defined as indicated in IMAP by applying relevant criteria, e.g. representativeness/importance of the areas of monitoring for establishing areas of assessment; presence of impacts of pressures in monitoring areas; sufficiency of quality assured data for establishing the areas of assessment covering as many as possible IMAP Common Indicators to the extent possible, and ensuring that adequate consideration is given to the risk based principle (both in pristine areas and areas under pressure). The existing monitoring and assessment areas defined by the concerned CPs were used, in case they were compatible with IMAP requirements; in case inconsistency appeared, the necessary adjustments were undertaken.

5. The harmonization of the scales approach among the concerned Contracting Parties (CPs) is the starting point for the integration process for IMAP CI 17 i.e. to scale up the marine assessment areas from the national to sub-regional and regional scales as required under IMAP. In order to support harmonization, there is a need to define Integration Rules for Monitoring Activities, which refer to a set of guidelines that should be followed when implementing monitoring programmes, in order to produce coherent data sets that will facilitate the subsequent process of providing nested GES assessments.

[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.

6. For the purposes of the present work data on contaminants produced within implementation of the national monitoring programmes of the CPs and delivered either to the IMAP Info System or to the European Marine Observation and Data Network (EMODnet) have been gathered. Information on the availability of data is given in chapter 3 below.

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

7. 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.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.

8. Detailed explanation on the data sources used and methodology followed for setting of the two zones (coastal and offshore) is provided for the purpose of the present work, as elaborated in UNEP/MED WG.556/Inf.16. In summary, 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 particular in the east part of the Adriatic Sea and calculates the baseline using the straight baseline method by joining appropriate points.

9. 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 (UNEP/MED WG.556/Inf.16) and explained above. For the offshore zone, monitoring areas may be representative of broader assessment areas beyond territorial waters and in these cases the offshore monitoring areas are not necessarily equal to the offshore assessment areas. The stations positioned within the offshore zone are considered representative of a wider offshore area, as officially declared by the countries.

10. For IMAP CI 17, 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). The coverage of the 3 sub-divisions is shown in Figure 1.

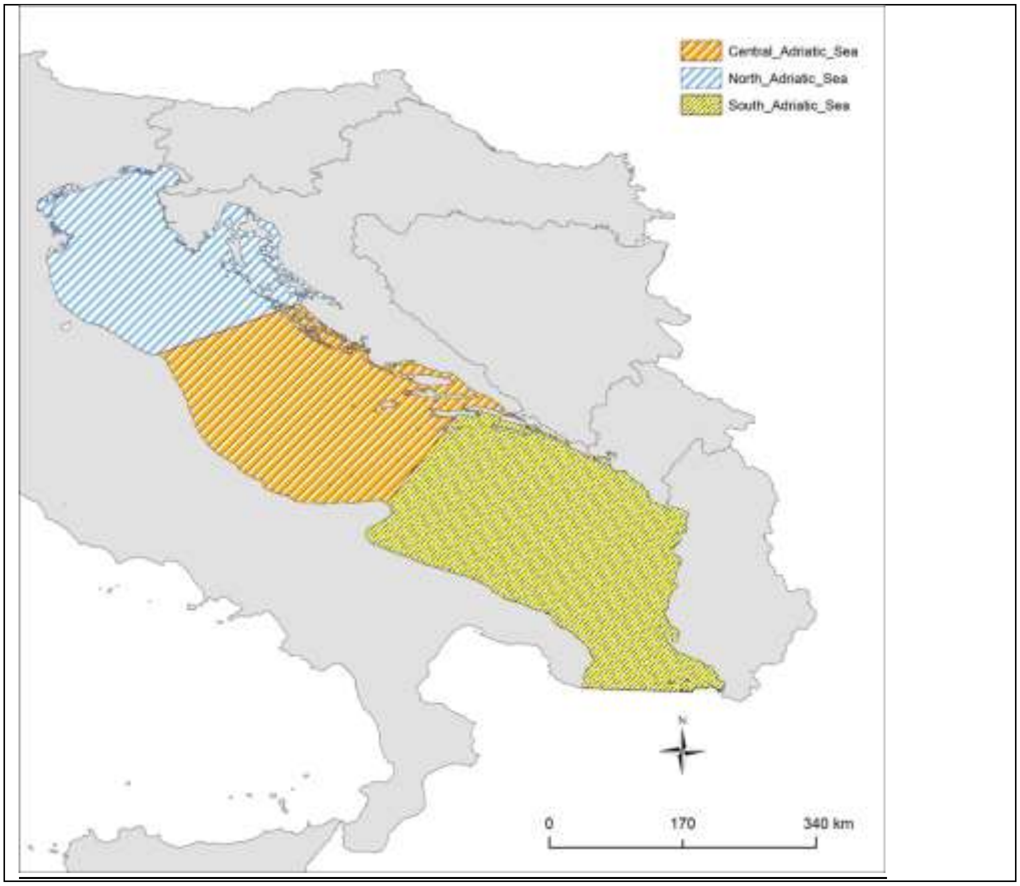

Figure 1. The 3 subdivisions of the Adriatic subregion defined based on Cushman-Roisin et al. (2001).

11. The following 4 working steps have been followed to accomplish the objectives of the current work.

12. **Step 1 Defining coastal and offshore waters**. By using the information from the MEDCIS project, it was possible to define the two zones i.e. the coastal zone and the offshore zones for the purposes of the present work in the Adriatic Sea Subregion as elaborated in UNEP/MED WG.556/Inf.16. It was found however that this MEDCIS datasets had errors for the case of Montenegro and Albania. Therefore, for these two countries data from the GEF Adriatic project were used as well as the national legislation of Albania and Montenegro (*Albania:* Degree No. 4650 of March 1970 and the Decree on a Modification to Decree No. 4650, dated 9 March 1970, on the State Border of the People's Socialist Republic of Albania, 1990; ; *Montenegro*: Decree on the Proclamation of the Law on the Sea "Official Gazette of Montenegro", No. 17/07 date on 31.12.2007, 06/08 dated on 25.01.2008, 40/11 dated on 08.08.2011). In addition, the MEDCIS data do not include any information for Greece, however the number and position of monitoring stations were pointed in the offshore waters only, as explained in detail in UNEP/MED WG.556/Inf.16.

13. **Step 2 "Recognizing scope of IMAP areas of monitoring"**: In the absence of monitoring areas reported by the CPs, the distribution of monitoring stations was investigated by considering the coordinates of their positions provided by the CPs in the IMAP Info System. Monitoring stations are grouped under the two zones coastal and offshore defined under Step 1, following the IMAP methodology as described in UNEP/MED WG. 509/Inf.10/Rev.2 for the needs of EO9, and in line with the IMAP monitoring stations` design (hotspots, coastal, offshore). This was followed by the preparation of relevant GIS layers/maps containing positions of IMAP monitoring stations on the two zones; in this way and in the absence of the areas of monitoring (i.e. monitoring transects) set by the CPs, the areas of

monitoring were recognized based on distribution of the monitoring stations. As explained above, spatial coverage of the coastal waters and the offshore territorial waters is based on available data from MEDCIS and the GEF Adriatic Projects. For Greece only one monitoring station exists in South Adriatic waters at a distance 6 nm from land. In the absence of any known pollution sources in this area, for this country only the offshore monitoring area is considered.

14. **Step 3 "Setting IMAP area of assessment"**: This step included the definition of the IMAP areas of assessment (IMAP SAUs) based on the anticipated areas of monitoring. To recognize the areas of monitoring, the criteria already set for that purpose in UNEP/MED WG.509/Inf.10/Rev2 were taken into consideration to the largest possible extent. Namely i) the spatial distribution of monitoring stations in relation to the sufficiency of quality-assured data as collated for NEAT application, having in mind the risk-based principle; ii) representativeness/importance of the areas of monitoring for setting of the areas of assessment; iii) in the case of Montenegro, information available regarding the presence of impacts of pressures in monitoring areas was also taken into account; to that purpose the cumulative pressures layer from GEF Adriatic Project has been used. In addition, the interrelations of the MRUs for the CPs that are EU MSs with the IMAP monitoring areas was investigated and whether these fit for their use as IMAP SAUs, following the criteria described previously. Final results are GIS layers/maps of IMAP SAUs prepared per country from the GIS layers. They also provide the positions of monitoring stations in the areas of monitoring that were recognized within present work. This was based on the equalization of the areas of monitoring with the SAUs for Albania and Montenegro, while for Slovenia, Croatia and Greece the SAUs uses to the extent possible the areas already set by the CPs. For Italy, the approach followed is slightly different because its MRUs do not fully fit the purposes of the IMAP. Details per each country separately are presented here - below.

15. **Step 4 "Nesting of the areas of assessment within application of NEAT tool"**: For the step of nesting, the areas of assessment were first classified under the 3 subdivisions of the Adriatic Sea (i.e. North, Central, South); then a nesting scheme approach was followed. The delimitation of the three Adriatic subdivisions was made according to Cushman-Roisin et al, (2001)[2] . The approach followed for the nesting of the areas is 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 & 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);
- 4th level provided nesting of the areas of assessment within the Adriatic Sea Sub-region.

16. Similarly, the integration of the assessment results is conducted following the 4 levels nesting approach:

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

The graphical depiction of this nesting scheme is shown in Figure 2. The description of the IMAP SAUs and details on specificities for each country are provided in UNEP/MED WG.556/Inf.16, while the summary is provided in Section 2.1 of this document.

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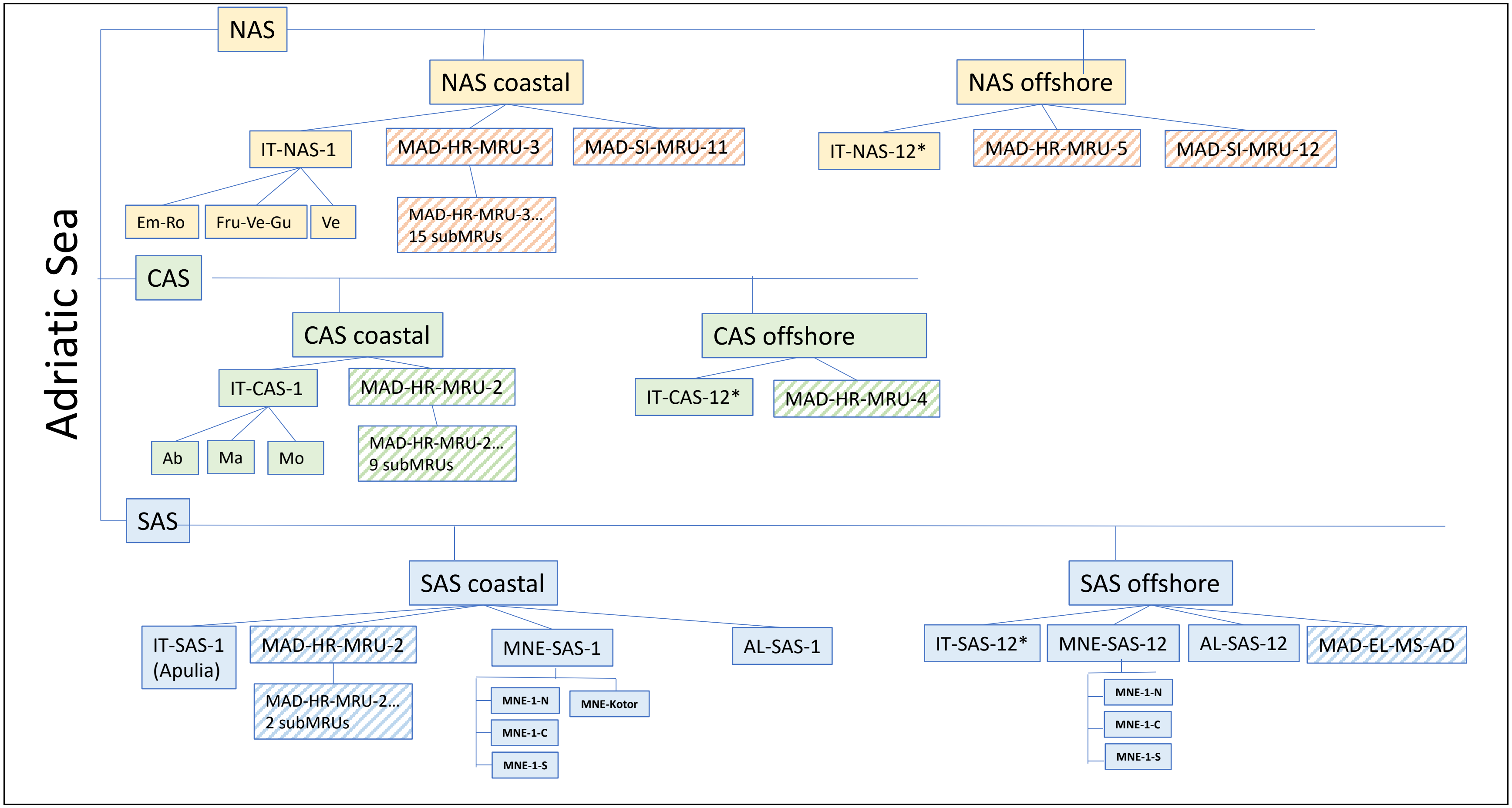
[2] Cushman-Roisin, B., Gačić, M., Poulain, P-M., Artegiani, A., 2001. Physical Oceanography of the Adriatic Sea, Past, Present and Future, Springer Science + Business Media, Dordrecht, 312 pp



*For Italy the offshore IMAP SAUs areas (IT-NAS-O, IT-CAS-O, IT-SAS-O) is calculated by subtracting the surface of area of the coastal zone from the surface area of the 3 official MRUs (IT-NAS-0001, IT-CAS-0001, IT-SAS-0001).

Figure 2: 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.

17. The following maps show 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 showed in the maps of Figures 3, 4, 5, while Table 1 in Annex I provides consolidated information of the maps for further use.

18. In North Adriatic Sea (NAS) (Figure 3), Italy has 1 offshore SAU and 3 coastal SAUs, Slovenia has 1 offshore SAU and 1 coastal SAU and Croatia has 2 offshore SAUs and 16 coastal SAUs.

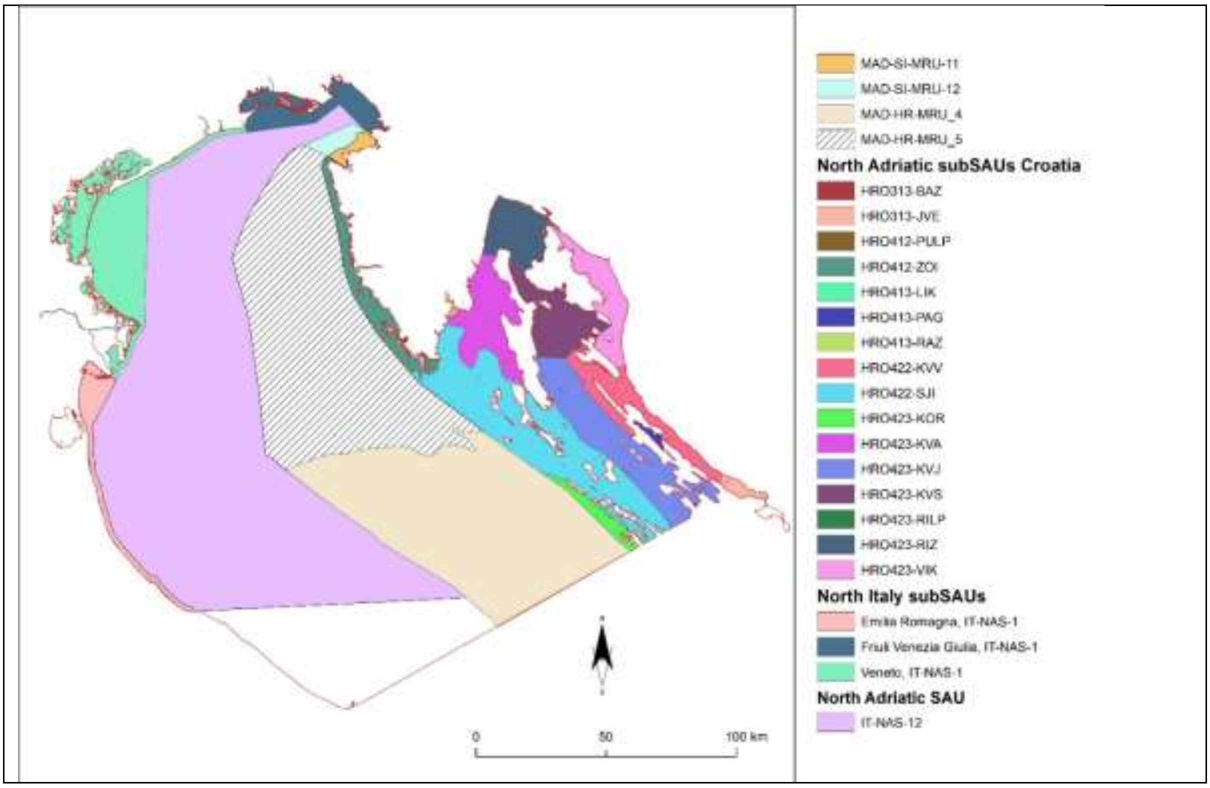


Figure 3. The nesting approach of the IMAP SAUs in North Adriatic Sea based on spatial assessment units defined for testing of NEAT application in the Adriatic Sea Sub-region.

19. In Central Adriatic Sea (CAS) (Figure 4), Italy has 1 offshore SAU and 4 coastal SAUs, Croatia has 1 offshore SAU, and 12 coastal SAUs. In Italy the offshore SAU of the Central Adriatic Sea has a shape defined by its official Central Adriatic Sea MRU as explained in the Meeting documents UNEP/MED WG.556/Inf.16, and data from monitoring stations falling into the NAS are aggregated under CAS.

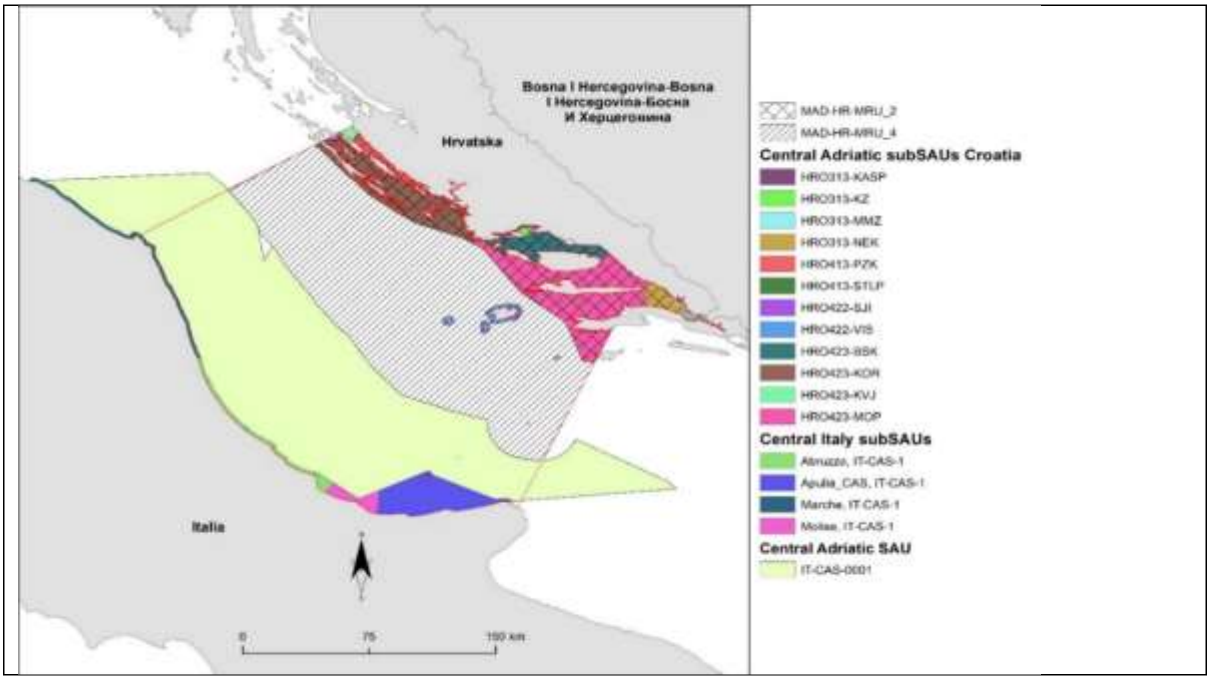


Figure 4. The nesting approach of the IMAP SAUs in Central Adriatic Sea based on the spatial assessment units defined within testing of NEAT application in the Adriatic Sea Sub-region.

20. In South Adriatic Sea (SAS) (Figure 5), Italy has 1 offshore SAU and 1 coastal SAU, Croatia has 1 offshore SAU and 2 coastal SAUs, Montenegro 3 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.

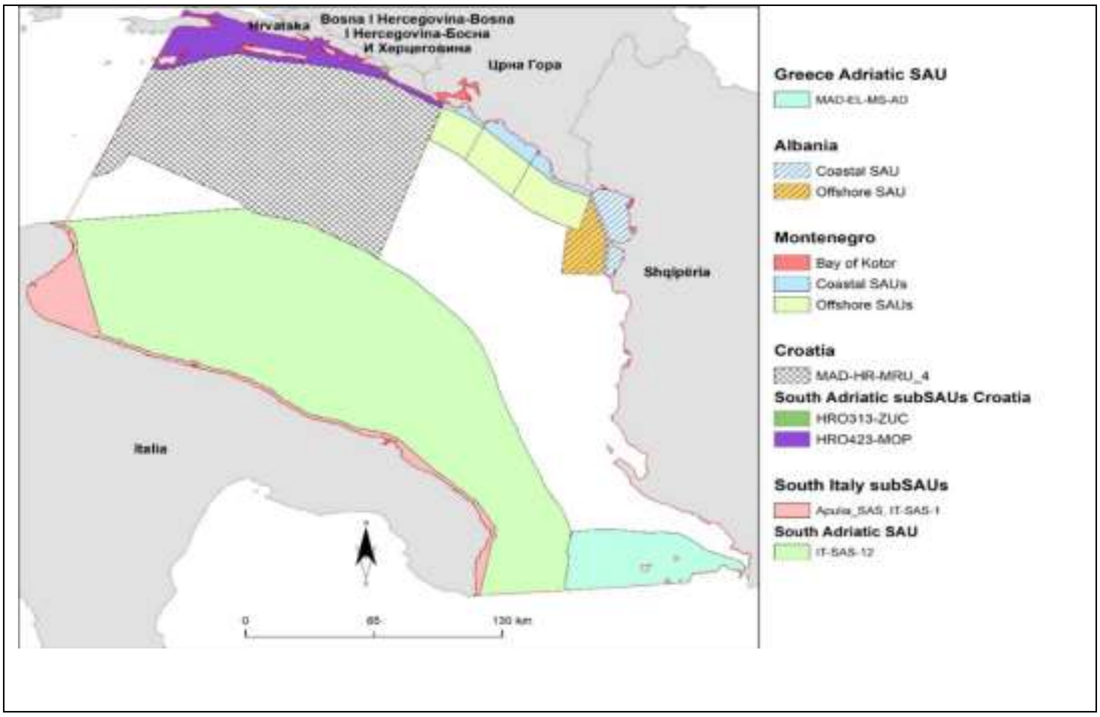


Figure 5. The nesting approach of the SAUs in South Adriatic Sea based on the spatial assessment units defined within testing of NEAT in Adriatic Sea.

3. Data availability

21. Data on contaminants (Cd, Hg, Pb, PAHs and PCBs) have been collected from all Contracting Parties bordering the Adriatic Sea for the years 2015 to 2021, except from Bosnia & Herzegovina[3] that does not monitor contaminants in marine environment. Details on the temporal and spatial availability of data per IMAP SAUs, per environmental matrix (sediments, biota) and per contaminants group (trace metals (TM), PAHs, PCBs) are provided in Tables 2 and 3 in Annex II. The spatiotemporal coverage varies largely among the various IMAP SAUs. Sediments stations have in general higher spatial coverage. For some IMAP SAUs data are not existent or correspond to only 1 or 2 stations sampled once. Trace metals in sediments are monitored in the highest number of stations (205) and all SAUs have at least one station sampled once, followed by PAHs stations (125) and PCBs (59). The Central Adriatic subdivision is the least monitored for PAHs in sediments while it is not at all monitored for PCBs in sediments. All monitoring stations for biota refer to samplings of the mussel species, *Mytilus galloprovincialis*, therefore no data on organic compounds are available for fish matrix. Regarding the spatial coverage of monitoring stations for biota this is by far lower than that in sediments. Trace metals are monitored in 64 stations, PAHs in 29 and PCBs in 38. Contaminants' data in fish were scarce, reported only for trace metals in 27 stations in Croatian waters and 4 stations in Montenegrin waters. In addition, not always the same fish species was sampled making comparisons and harmonized assessment difficult.

22. As explained above in chapter 2, a set of criteria was applied to propose the scope of the areas of monitoring. To better understand differences in the spatial coverage of the SAUs the ratio of number of stations to surface of the area (no of stations/km^2) is calculated as shown in Table 1 in Annex II. This ratio was calculated to support application of the criteria related to representativeness of the areas of monitoring for establishing areas of assessment. It is understood that the highest the ratio, the better the spatial coverage. However, in areas with limited presence of pressures a low ratio may be equally suitable for the purposes of a sound assessment. For this reason, the calculated ratios are only indicative and comparisons among them should be made keeping in mind the specific features of the SAUs. On the Adriatic sub-division level, the North Adriatic Sea is better covered by monitoring stations. Further to this criterion, the spatial distribution of monitoring stations and its comparison with the sufficiency of quality-assured data as collated for NEAT application were analyzed as provided in Tables 2 and 3 of Annex II. Table 2 provides the spatial coverage of monitoring data collected per each SAU in the Adriatic Sea and per environmental matrix (sediments, biota) and per contaminant group (trace metals (TM), PAHs, PCBs) separately. Table 3 provides the temporal coverage of monitoring data used again per each SAU in the Adriatic Sea and per environmental matrix (sediments, biota) and per contaminant group (trace metals (TM), PAHs, PCBs) separately.

4. Setting the assessment criteria for the harmonized application of NEAT and CHASE+ assessment methodologies

23. Upgrading of the baselines and threshold values for IMAP CI 17 in the Mediterranean Sea is an ongoing process. Detailed information on their present status, as approved by the Meeting of CorMon on Pollution Monitoring (27 and 30 May 2022) for their application within the preparation of the 2023 MED QSR, is provided in Meeting documents UNEP/MED WG.533/10, Appendix I and UNEP/MED WG. 533/Inf.3/Rev.1. The present assessment analysis applying the NEAT tool was conducted for each subdivision using the assessment criteria for the GES-nonGES threshold, based on BAC values as presented in UNEP/MED WG.533/10, Appendix I (Table 1) and following the recommendations related to the Tyrrhenian Sea as discussed during the Meeting of the SIDA funded Project "Toward integration ecosystem assessment and ecosystems management approach in the Adriatic Sea Sub-region" (10 November 2022, Tunisia).

[3] B&H has not been included in present GES assessment due to lack of data on contaminants as explained in the following text, however IMAP SAUs were set for B&H as explained in UNEP/MED WG. 533/ Inf 5/Rev.1.

Table 1: The BAC values calculated for the Adriatic Sea (UNEP/MED WG. WG. UNEP/MED WG.533/10, Appendix I) and used for the present assessment

	Adriatic BAC (µg/kg)	
	Sediments	**Biota**
Cd	180	944
Hg	75	113
Pb	23550	1500
$^{*}\Sigma_{16}$ PAHs	61.5	9.9
$^{+}\Sigma_{7}$ PCBs	0.21	17.3

24. The final marine environment quality status assessment regarding CI17 in the Mediterranean Sea provides in a consolidated manner the individual assessments for each of the sub-regions and/or sub-divisions. Therefore, all individual assessments should be harmonized to the extent possible in order to ensure the compatibility of the assessments.

25. A first step to achieve harmonized assessments is the use of compatible GES/nGES threshold values for all sub-regions, sub-divisions. The MedEAC threshold was originally used for the assessment of the Adriatic Sea Sub-region, following the IG.22/7 and IG.23/6. Within initial assessment of the Levantine Sea (UNEP/MED WG.533/10, Appendix IV), it was found that this threshold does not fit the purpose of a meaningful assessment, and it was suggested to use GES/nGES thresholds based on the BAC values of the area (xBAC). BAC values were chosen as thresholds given that the high values of the EACs in combination with the lack of the spatial assessment units nesting would result in non-reliable assessment findings. For TM, the threshold was set as 1.5 BACs while for organic contaminants, with less available data than TM, the threshold was set as 2 BACs. These coefficients were also selected further to the experience of the EEA (2019) regarding application of the CHASE+ methodology in the European Seas. In this way a finer classification of areas with concentrations >BAC is achieved, in line with the precautionary principle. Recognizing subregional differences in the background concentrations, the (xBAC) approach, is based on the relative distance of contaminants concentrations from the sub regional BAC values, in contrast to the MedEAC thresholds which is based on toxicological effects on biota species in specific area from other areas. This decision aligns the present work with the GES target set for CI 17 indicating that GES cconcentrations of specific contaminants need to be held below Environmental Assessment Criteria (EACs) or below reference concentrations. Further comparison of the NEAT and CHASE+ assessment methodologies was undertaken in the WMS (UNEP/MED 556/Inf.14) by applying this approach showed that using the (xBAC) as GES/nGES thresholds clearly provides finer assessment classifications.

26. For some subregions of the Mediterranean Sea, it was possible to define IMAP spatial assessment units (IMAP SAUs) based on the distribution of monitoring stations (e.g. Adriatic Sea, Western Mediterranean Sea), while for others with insufficient data reported for GES assessment this was not possible (e.g. Levantine Sea). A quality status assessment for all areas is desirable either on a SAU level or on individual monitoring stations level. The NEAT tool has the ability to provide assessments in areas where SAUs are defined (e.g. Adriatic Sea; Western Mediterranean Sea). For areas where this is not possible, the CHASE+ tool has been applied for assessment at the stations level (UNEP/MED WG.533/10, Appendix IV; UNEP/MED WG.556/Inf.8; UNEP/MED WG.556/Inf.9; UNEP/MED WG.556/Inf.10). The above explained comparisons of the two methodologies i.e. NEAT and CHASE+ were undertaken to ensure compatibility of the quality status assessment results regarding CI17 for all subregions/subdivisions of the Mediterranean Sea.

27. Further to findings of the comparison of the performance of the NEAT and CHASE+ assessment methodologies in the sub-regions of the Mediterranean Sea, using available data as reported by the CPs, it was concluded that the two methodologies were compatible only on the very basic assessment per contaminant, per SAU. Still on this level some discrepancies appeared for the nGES moderate and poor categories. When aggregation of all contaminants data was attempted to obtain the overall pollution (CI17) assessment, the two methodologies behaved differently. These discrepancies are related to different calculation methods for the aggregation of contaminants as well as differences in setting the moderate/poor, poor/bad boundary limits.

28. To overcome the above-described discrepancies and to ensure compatible assessments for all subregions/sub-divisions of the Mediterranean Sea on the SAU and on station levels for the purposes of the preparation of 2023 MED QSR, the approach described here-below is followed. The approach is based on the application of a tailor-made assessment based on the general rationale of the CHASE+ tool while ensuring compatibility with the NEAT tool:

i) For sub-regions where the CHASE+ assessment methodology is applicable: Calculation of contamination ratios (CRs) based on the (xBAC) thresholds;
ii) For sub-regions where the CHASE+ assessment methodology is applicable: Calculate the CS for the overall CI17 aggregated assessment per station as a simple average of CRs and not as used by the EEA, where CS is calculated as the sum of CR divided by the square root of the number of CRs in the sum;For all Sub-regions and for both NEAT and CHASE+ assessment methodologies: The GES/non-GES boundaries are based on the BAC values. The BAC values (xBAC) multiplied by 1.5 for Cd, Hg, Pb and by 2 for PAHs and PCBs were approved by the Meeting of CorMon Pollution (27 and 30 May 2022). This approach was chosen because it is based on the Mediterranean sub-regional background concentrations of contaminants, therefore having the boundary limits based on the values calculated form monitoring data reported by the CPs, and because it is more stringent than the Med_EAC approach. approach. At the same time, it corresponds to the definition of the GES CI 17 target according to which the concentrations of specific contaminants need to be kept below Environmental Assessment Criteria (EACs) or below reference concentrations (UNEP/MED WG 473/7). In many cases the Med_EAC thresholds are higher than the maximum value recorded for a particular contaminant, resulting in a very lenient classification of the SAUs/stations. In this way biased assessments in different Mediterranean sub-regions are avoided.
iii) For all subregions: Align the moderate/poor and the poor/bad boundary limits/thresholds between the two assessment methodologies. For the moderate/poor the use of 2(xBAC) value is proposed and for the poor/bad the 5(xBAC) value. In this way, a fine classification in line with the precautionary principle is provided. The NEAT tool is flexible and accepts either calculated thresholds values by the tool itself (based on the GES/nGES and the maximum concentration of contaminants), or threshold values predefined by the user. In the present assessment all thresholds are user defined. In the CHASE+ tool the CR or CS ratios for the moderate/poor and poor/bad are set at 2x and 5x times the GES/nGES threshold, instead of 5x and 10x that are suggested by the tool. The updating of the thresholds is shown in Table 2 below.

Table 2. Updated assessment classification boundary limits/thresholds for a harmonized application of NEAT and CHASE+ tools in the Mediterannean Sea sub-regions.

	GES		**non-GEs**		
IMAP – traffic light approach	Good	Moderate	Bad		
NEAT tool	High	Good	Moderate	Poor	Bad
	0< meas. conc. ≤ BAC	BAC<meas. conc. ≤GES/nGES threshold	GES/nGES<meas. conc. ≤ moderate/poor threshold	moderate/poor threshold <meas. conc. ≤ max. conc.	
Boundary limits and NEAT scores	**0** 1 < score ≤0.8	0.8<score≤ 0.6	0.6<score ≤ 0.4	0.4< score ≤0.2	Score<0.2 **Max. conc.**
Thresholds	**BAC**	**(xBAC)**	**2 (xBAC)**	**5 (xBAC)**	
CHASE+ tool	High	Good	Moderate	Poor	Bad
Thresholds	**1/2(xBAC)**	**(xBAC)**	**2(xBAC)**	**5(xBAC)**	
CHASE+ Scores	0 <CR,CS ≤0.5	0.5<CR,CS≤ 1	1<CR,CS ≤ 2	2< CR,CS ≤5	CR,CS> 5

29. A comparison between the NEAT and CHASE+ results for the WMS sub-region was performed by applying above approach further to the recommendations for the harmonization of the two assessment methods as provided and described in UNEP/MED WG. 556/Inf.7; UNEP/MED WG. 556/Inf.14. Briefly all thresholds used were identical in the two methodologies, while the CHASE+ methodology was adapted regarding the calculation of the CS score for compatibility reasons. Consolidated results on the percentage of SAUs as classified by the two assessment methodologies are presented in UNEP/MED WG. 556/Inf.7, Table 14, using the xBAC GES/nGES boundary limit/threshold. Based on these comparisons it is apparent that the harmonization of the two tools in this case gives identical results for the classification (in-GES or non-GES) of the individual contaminants assessments per SAU. There are very small differences between the statuses found for the individual contaminants per SAU, i.e., small differences in the division between high and good statuses the in-GES classification and between moderate and poor in the non-GES classification.

Table 3: Boundary limits of the assessment scale and class Threshold values used for the application of the NEAT tool for IMAP.

	Low Boundary limit	**Threshold** High/Good	**Threshold** Good/Moderate	**Threshold** Moderate/poor	**Threshold** Poor/Bad	**Upper Boundary Limit**
Sediments	**(µg/kg)**	**0.5 (xBAC) (µg/kg)**	**xBAC (µg/kg)**	**2(x BAC) (µg/kg)**	**5(xBAC)**	**Max. conc. (µg/kg)**
Cd	0	135	270	540	1350	9000
Hg	0	56.5	113	225	563	14200
Pb	0	17662	35325	70650	176625	356000
$^{*}\Sigma_{16}$ PAHs	0	61.5	123	246	615	26649
$^{+}\Sigma_{7}$ PCBs	0	0.21	0.42	0.8	2.1	434
Biota (*M. galloprovincialis*)						
Cd	0	708	1416	2832	7080	9000
Hg	0	85	170	339	848	10000
Pb	0	1125	2250	4500	11250	167884
$^{+}\Sigma_{7}$ PCBs	0	17.3	34.6	69	173	180

*sum of the individual BACs or xBACs values of the 16 PAH compounds
+ sum of the individual BACs or xBACs values of the 7 PCB compounds

30. For the application of the NEAT software, data on contaminants were grouped per parameters, ecosystem components (i.e. for the purpose of present NEAT application these are considered biota and sediment matrixes) and SAUs in all the Adriatic sub-divisions (NAS, CAS, SAS). Average concentrations (arithmetic means) and their respective standard errors were then calculated in the respective groups as follows:

Arithmetic mean concentration: $\bar{C} = \frac{\sum_{i=1}^{n} C_i}{n}$,

Standard Deviation: $SD = \sqrt{\frac{\sum_{i=1}^{n}(C_i - \bar{C})^2}{n-1}}$,

Standard Error : $SE = \frac{SD}{\sqrt{n}}$

where, $\bar{C}$ is the average (arithmetic mean) concentration for each SAU, C_i is the individual contaminant concentration measured in each station/date in the SAU, and n is the total number of concentration records for each SAU; SD is the sample standard deviation for a specific contaminant and SAU and SE is the standard error for a specific contaminant and SAU.

31. Several records on PAHs and PCBs individual compounds were reported as below detection limit values (DL) or were left blank. In a separate technical paper, prepared by MEDPOL in consultations with OWG EO9, it was recommended to incorporate into the BC and BAC calculations of the BDL values and not to exclude them[4]. For the present application of NEAT these cases were

[4] In a separate technical paper, prepared by MEDPOL in consultations with OWG on Contaminants, it was suggested to 'replace BDL values with a fraction of the reported value. The fraction could be 1 (BDL value), 0.5 (BDL/2), 0.7

substituted by the BDL/2 value, given a rather small quantum of data available, this does not influence the calculation of the assessment findings. In the Slovenian data, the BDL values were left blank so these were substituted by a value equal to 1µg/kg which corresponds to the average BDL/2 value from the whole data set. Furthermore, due to this fact, but also considering the list of substances the monitoring of which is mandatory according to IMAP[5], the sum of the 16 EPA compounds (Σ_{16}PAHs) and sum of the 7 PCBs compounds (Σ_7PCBs) was taken into account for the present assessment. In this way the assessment results show the cumulative impact by each of these two groups of contaminants.

32. A data matrix used for the NEAT software was prepared and given below in Tables 4 – 8.

(BDL/SQRT(2)), other' and not exclude BDL values from BC calculation. The decision to replace BDL with the reported value or a fraction of it should be based on the available data and expert evaluation. Italy, Spain and France supported the use of LOD/2 or LOQ/2 in the BCs calculation. Israel pointed out that the US- EPA suggests this only when less than 15% of the data is BDLs. Therefore, the calculation for the assessment criteria was performed with the reported value and not half of it (UNEP/MED WG.533/10, Appendix I and UNEP/MED WG. 533/Inf.3/Rev.1). This is because the wide range of BDL values for a specific contaminant in a specific matrix, depending on the country and it varies even within the country.

[5] According to IMAP i.e. IMAP Guidance Fact Sheet and Data Dictionaries for IMAP CI 17, monitoring of the sum of 7 PCB congeners: 28, 52,101,118,138,153 and 180 and sum of 16 US EPA PAHs is considered mandatory.

Table 4: Average values (in bold) and standard error for Cd, Hg, Pb (µg/kg) in sediments per SAU of the Adriatic subregion. (*n* the number of records per SAU)

TM -SEDS		**Coastal**					**Offshore**				
	Subdivision area (km2)	**SAU**	**subSAU**	**Cd (µg/kg)**	**Hg (µg/kg)**	**Pb (µg/kg)**	**SAU**	**subSAU**	**Cd (µg/kg)**	**Hg (µg/kg)**	**Pb (µg/kg)**
North Adriatic	**31856**										
		NAS coastal					**NAS offshore**				
		MAD-HR-MRU_3					MAD-HR-MRU_5				
			HRO313-JVE	**132**	**48**	**28766**					
			n = 2	16	6	788					
			HRO313-BAZ	**232**	**338**	**50753**					
			n = 1	-	-	-					
			HRO412-PULP	**177**	**2993**	**59625**					
			n = 1	-	-	-					
			HRO412-ZOI	**95**	**52**	**14794**					
			n = 6	2	7	915					
			HRO413-LIK	**103**	**82**	**33994**					
			n = 2	13	1	1631					
			HRO413-PAG	**151**	**61**	**25868**					
			n = 2	1.00	11	2449					
			HRO413-RAZ	**133**	**44**	**27044**					
			n = 1	-	-	-					
			HRO422-KVV	**120**	**32**	**17836**					
			n = 4	12	6	2914					
			HRO422-SJI	**76**	**21**	**11050**					
			n = 4	11	5	641					
			HRO423-KVA	**109**	**40**	**21605**					
			n = 1	-	-	-					
			HRO423-KVJ	**101**	**35**	**24089**					
			n = 4	9	7	1587					
			HRO423-KVS	**87**	**55**	**18041**					
			n = 2	14	25	1884					
			HRO423-RILP	**547**	**108**	**37254**					

TM -SEDS		**Coastal**					**Offshore**				
	Subdivision area (km2)	**SAU**	**subSAU**	**Cd (µg/kg)**	**Hg (µg/kg)**	**Pb (µg/kg)**	**SAU**	**subSAU**	**Cd (µg/kg)**	**Hg (µg/kg)**	**Pb (µg/kg)**
			n = 1	-	-	-					
			HRO423-RIZ	**111**	**52**	**27782**					
			n = 2	6	9	6651					
			HRO423-VIK	**118**	**94**	**27272**					
			n = 2	15	70	3712					
		IT-NAS-C					IT-NAS-O				
			Emilia Romagna	**179**	**104**	**15446**			**140**	**456**	**18898**
			n = 6	18	2	1169			8	68	1017
			Friuli Venezia Giulia	**141**	**3538**	**33750**					
			n = 11	10	732	1733					
			Veneto	**412**	**441**	**15325**					
			n = 18	36	21	1496					
		MAD_SI_MRU_11					MAD_SI_MRU_12				
				102.5	**308**	**29250**			**100**	**1400**	**40000**
			n=4	3	78	1931	n=1		0	0	0
Central Adriatc	**63696**										
		CAS Coastal					**CAS Offshore**				
		MAD-HR-MRU_2					MAD-HR-MRU_4				
			HRO313-NEK	**187**	**66**	**30089**		HRO422-VIS	**102**	**34**	**12489**
			n = 2	0.35	4	2032			8	68	1017
			HRO313-KASP	**214**	**451**	**30279**					
			n = 4	31	190	4620					
			HRO313-KZ	**166**	**410**	**22391**					
			n = 1	-	-	-					
			HRO313-MMZ	**147**	**39**	**24250**					
			n = 2	0	5	1024					

TM -SEDS	Subdivision area (km2)	Coastal SAU	subSAU	Cd (µg/kg)	Hg (µg/kg)	Pb (µg/kg)	Offshore SAU	subSAU	Cd (µg/kg)	Hg (µg/kg)	Pb (µg/kg)
			HRO413-PZK	**102**	**87**	**25546**					
			n = 4	19	37	5361					
			HRO413-STLP	**190**	**335**	**21202**					
			n = 1	-	-	-					
			HRO423-BSK	**180**	**93**	**24005**					
			n = 4	12	22	651					
			HRO423-KOR	**103**	**40**	**13238**					
			n = 6	17	12	2766					
			HRO423-MOP	**131**	**22**	**17405**					
			n = 2	27	7	2420					
		IT-CAS-C					IT-CAS-O				
			Abruzzo	**172**	**50**	**8025**			**225**	**86**	**11883**
			n = 24	16	-	354			23	13	577
			Marche	**214**		**6236**					
			n = 10	7		735					
			Molise	**122**	**108**	**7817**					
			n = 6	21	38	1799					
South Adriatic	**44231**										
		SAS Coastal					**SAS Offshore**				
		MAD-HR-MRU_2									
			HRO313-ZUC	**141**	**42**	**11452**					
			n = 4	4	7	736					
			HRO423-MOP	**136**	**46**	**27554**					
			n = 2	19	13	3297					
		IT-SAS-C					IT-SAS-O				
			Apulia-SAS	**176**	**21**	**6660**			**125**	**46**	**12879**
				19	4	733			9	4	1104
				n = 9	*n = 6*	*n = 9*				*n = 15*	*n = 15*
		MNE-1					MNE-O				

TM -SEDS		Coastal					Offshore				
	Subdivision area (km2)	SAU	subSAU	Cd (µg/kg)	Hg (µg/kg)	Pb (µg/kg)	SAU	subSAU	Cd (µg/kg)	Hg (µg/kg)	Pb (µg/kg)
			MNE-1-N	**168**	**27**	**7984**		MNE-12-N	**66**	**27**	**18281**
				25	9	3342			29	17	7951
			MNE-1-C	**378**	**155**	**72806**		MNE-12-C	**103**	**22**	**22500**
				138	50	27194			3	5	3122
			MNE-1-S	116	50	9336		MNE-12-S	**72**	**35**	**18918**
				23	10	1135			32	19	8036
			MNE_Kotor								
				215	**1778**	**62449**					
				58	889	11547					
		AL-C					AL-O				
				75	**645**	**6670**			**68**	**169**	**10059**
		n=4		7	285	368	*n=2*		7	142	809
							MAD-EL-MS-AD		**77**		**13674**
							n=1				

Table 5: Average values (in bold) and standard error for Σ_{16}PAHs (µg/kg) in sediments per SAU of the Adriatic subregion. (*n* the number of records per SAU)

PAHS-SEDS	Subdivision area (km2)	Coastal SAU	subSAU	Σ16 PAHs (µg/kg)	Offshore SAU	subSAU	Σ16 PAHs (µg/kg)
North Adriatic	**31856**						
		NAS coastal			**NAS offshore**		
		IT-NAS-C			IT-NAS-O		
			Emilia Romagna	**236**			**69**
			n = 40	79			8
			Veneto	**264**			
			n = 7	60			
		MAD_SI_MRU_11			MAD_SI_MRU_12		**254**
				210			**38**
			n = 10	37	*n = 2*		
Central Adriatic	**63696**						
		CAS Coastal			**CAS Offshore**		
			IT-CAS-C		IT-CAS-O		
			Abruzzo	**19**			**23**
			n = 52	2	*n = 45*		4
South Adriatic	**44231**						
		SAS Coastal			**SAS Offshore**		
		MNE-1			MNE-O		
			MNE-1-N	**908**		MNE-12-N	**42**
				856			13
			MNE-1-C	**547**		MNE-12-C	**18**
				199			1
			MNE-1-S	**2952**		MNE-12-S	**31**
				2920			11
			MNE_Kotor				
				5250			
				1528			
					MAD-EL-MS-AD		**43**

Table 6: Average values (in bold) and standard error for Σ_7PCBs (µg/kg) in sediments per SAU of the Adriatic subregion. (*n* the number of records per SAU)

PCBs-SEDS	**Subdivision area (km2)**	**Coastal SAU**	**subSAU**	**Σ7PCBs (µg/kg)**	**Offshore SAU**	**subSAU**	**Σ7PCBs (µg/kg)**
North Adriatic	**31856**						
		NAS Coastal			**NAS Offshore**		
		IT-NAS-C			IT-NAS-O		
			Emilia Romagna	**3.88**			**1.84**
			n = 16	0.92	*n = 50*		0.30
			Veneto	**3.50**			
			n = 14	0.80			
Central Adriatic	**63696**						
		CAS Coastal			**CAS Offshore**		
South Adriatic	**44231**						
		SAS Coastal			**SAS Offshore**		
		MNE-1			MNE-O		
			MNE-1-N	**0.39**		MNE-12-N	**0.23**
				0.10			0.141
			MNE-1-C	**2.90**		MNE-12-C	**0.13**
				1.41			0.04
			MNE-1-S	**0.91**		MNE-12-S	**0.16**
				0.32			0.08
			MNE-Kotor	**110.11**			
				57.40			

Table 7: Average values (in bold) and standard error for Cd, Hg, Pb (µg/kg) in mussels per SAU of the Adriatic subregion. (*n* the number of records per SAU)

TM-MG	**Subdivision area (km2)**	**Coastal SAU**	**subSAU**	**Cd (µg/kg)**	**Hg, (µg/kg)**	**Pb (µg/kg)**	**Offshore SAU**	**subSAU**	**Cd (µg/kg)**	**Hg (µg/kg)**	**Pb (µg/kg)**
North Adriatic	**31856**										
		NAS Coastal					**NAS Offshore**				
		MAD-HR-MRU_3					MAD-HR-MRU_5				
			HRO313-JVE	**1052**	**192**	**1840**					
			n = 2	37	85	559					
			HRO412-ZOI	**521**	**81**	**1059**					
			n = 1	-	-	-					
			HRO413-LIK	**726**	**108**	**1124**					
			n = 2	228	15	160					
			HRO413-PAG	**757**	**83**	**1394**					
			n = 2	61.00	1	286					
			HRO422-KVV	**917**	**139**	**1620**					
			n = 2	9	4	370					
			HRO422-SJI	**825**	**82**	**1377**					
			n = 2	124	-	10					
			HRO423-KVA	**722**	**85**	**1032**					
			n = 2	135	-	338					
			HRO423-KVJ	**1057**	**93**	**683**					
			n = 2	305	3	138					
			HRO423-KVS	**799**	**116**	**1861**					
			n = 2	201	46	682					
			HRO423-RIZ	**1044**	**148**	**1991**					
			n = 2	110	70	551					
			HRO423-VIK	**979**	**107**	**1797**					
			n = 2	117	44	484					
		IT-NAS-C					IT-NAS-O				
			Veneto	**355**	**47**	**467**				**301**	
				59	7	78				47	
				n = 25	*n = 31*	*n = 26*	*n = 10*				
			MAD_SI_MRU_11				MAD_SI_MRU_12				

TM-MG		**Coastal**					**Offshore**				
	Subdivision area (km2)	**SAU**	**subSAU**	**Cd (µg/kg)**	**Hg, (µg/kg)**	**Pb (µg/kg)**	**SAU**	**subSAU**	**Cd (µg/kg)**	**Hg (µg/kg)**	**Pb (µg/kg)**
				750	**216**	**1733**					
				40	16	246					
Central Adriatic	**63696**		*n = 9*								
		CAS Coastal					**CAS Offshore**				
		MAD-HR-MRU_2					MAD-HR-MRU_4				
			HRO313-NEK	**669**	**76**	**877**					
			n = 2	41.00	15	202					
			HRO313-KASP	**589**	**144**	**1643**					
			n = 2	100	14	5					
			HRO313-MMZ	**811**	**104**	**1668**					
			n = 2	113	21	325					
			HRO413-PZK	**738**	**89**	**2426**					
			n = 2	170	0	953					
			HRO423-BSK	**897**	**102**	**1470**					
			n = 2	240	9	404					
			HRO423-KOR	**719**	**102**	**1757**					
			n = 2	13	13	21					
		IT-CAS-C					IT-CAS-O				
										543	
							n = 22			451	
South Adriatic	**44231**										
		SAS Coastal					**SAS Offshore**				
		MAD-HR-MRU_2									
			HRO313-ZUC	**1017**	**90**	**1785**					
			n = 2	108	6	642					
			HRO423-MOP	**999**	**129**	**2457**					
			n = 2								
				193	35	97					
		IT-SAS-C					IT-SAS-O				

TM-MG		**Coastal**					**Offshore**				
	Subdivision area (km2)	**SAU**	**subSAU**	**Cd (µg/kg)**	**Hg, (µg/kg)**	**Pb (µg/kg)**	**SAU**	**subSAU**	**Cd (µg/kg)**	**Hg (µg/kg)**	**Pb (µg/kg)**
			Apulia-SAS		**20**						
			n=10		4						
		MNE-1					MNE-O				
			MNE-1-C	**1303**	**104**	**50211**					
				360	10	39741					
			MNE-1-S	**66**	**15**	**162**					
				18	4	71					
			MNE_Kotor	**669**	**86**	**3466**					
				99	10	2013					

Table 8: Average values (in bold) and standard error for Σ_7PCBs (μg/kg) in mussels per SAU of the Adriatic subregion. (*n* the number of records per SAU)

PCBs-MG	**Subdivision area (km2)**	**Coastal SAU**	**subSAU**	**Σ7PCBs (μg/kg)**	**Offshore SAU**	**SubSAU**	**Σ7PCBs (μg/kg)**
North Adriatic	**31856**						
		NASCoastal			**NAS Offshore**		
		MAD-HR-MRU_3			MAD-HR-MRU_5		
			HRO313-JVE *n = 1*	**48**			
			HRO412-ZOI *n = 1*	**17**			
			HRO413-LIK *n = 1*	**18**			
			HRO413-PAG *n = 1*	**33**			
			HRO422-KVV *n = 1*	**35**			
			HRO422-SJI *n = 1*	**27**			
			HRO423-KVA *n = 1*	**19**			
			HRO423-KVJ *n = 1*	**23**			
			HRO423-KVS *n = 1*	**38**			
			HRO423-RIZ *n = 1*	**23**			
			HRO423-VIK *n = 1*	**11**			
		IT-NAS-C			IT-NAS-O		
			Veneto *n=28*	**8** 3			

PCBs-MG	Subdivision area (km2)	Coastal SAU	subSAU	Σ7PCBs (µg/kg)	Offshore SAU	SubSAU	Σ7PCBs (µg/kg)
Central Adriatic	**63696**						
		CAS Coastal			**CAS Offshore**		
		MAD-HR-MRU_2			MAD-HR-MRU_4		
			HRO313-NEK *n = 1*	**21**			
			HRO313-KASP *n = 1*	**173**			
			HRO313-MMZ *n = 1*	**28**			
			HRO413-PZK *n = 1*	**68**			
			HRO423-BSK *n = 1*	**17**			
			HRO423-KOR *n = 1*	**81**			
South Adriatic	**44231**						
		SAS Coastal			**SAS Offshore**		
		MAD-HR-MRU_2					
			HRO313-ZUC *n = 1*	**54**			
			HRO423-MOP *n = 1*	**49**			
		MNE-1			MNE-O		
			MNE-1-C *n = 4*	**14** 10			
			MNE-1-S *n = 2*	**1.23** 0.53			
			MNE Kotor *n = 15*	**14** 3			

5. Adjusted application of the NEAT software for the assessment of IMAP Common Indicators related to Ecological Objective 9

32. NEAT is a structured, hierarchical tool for making marine status assessments (Berg et al., 2017; Borja et al., 2016), 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; Borja et al., 2019; Pavlidou et al. 2019; Kazanidis et al., 2020; Borga et al., 2021). NEAT uses a combination of high-level integration of habitats and spatial units and an averaging approach, allowing for specification on structural and spatial levels, applicable to any geographical scale. As explained here-below, the use of NEAT is not limited to the assessment of biodiversity but can be used for assessment of pollution impact. The analysis provides an overall assessment for each case study area and a separate assessment for each of the ecosystem components included in the assessment. The final value has an associated uncertainty value, which is the probability of being determinative in a certain class status (GES - nonGES) (Uusitalo et al., 2016). Essentially, the final assessment value is calculated as a weighted average. The weighting factors are based on the respective surface of the areas and are combined with the respective monitoring data for the indicator/chemical contaminant in question. The total weight of a SAU is not the simple ratio of each SAU area to the total area of the parent SAU. The process of distributing the weight is more complex. SAU weighting by the NEAT tool has two options: i) do not weight by SAU area: weights are calculated based just on the nesting hierarchy of the SAUs; ii) weight by SAU area: weights are calculated based on the nesting hierarchy and the SAU surface area. For the present assessment the option ii) was followed. In all cases, the number of nesting levels and data availability per SAU is considered in the calculation of weights. Detailed explanation on the calculation of the weighting factors is given in Annex I.

33. No special rules are applied but the tool design allows assigning different aggregation rules at the various steps in the calculation of the overall assessment value. In order to assess the uncertainty in the final assessment value, the standard error/ standard deviation of every observed indicator value is used (Borja et al., 2016). Therefore, the standard deviation values as obtained from the monitoring data play a major role in the uncertainty associated with the final assessment result. This emphasizes the importance of the standard deviation for the accuracy and evaluation of the final assessment result. Detailed elaboration of adjusted application of NEAT software GES assessment of IMAP CI 17 is provided UNEP/MED WG.533/Inf.10, Appendix III; UNEP/MED 533/Inf.4/Rev.1.

34. 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 Section 2 and UNEP/MED WG. 533/Inf. 4/Rev.1, 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).

35. Within each SAU under ‘habitats’ the sediments and biota are introduced. Under ‘ecosystem component’ the 5 chemical compounds of EO9/CI17 are assigned. For each SAU and ‘Ecological Component’ (EO9 contaminants in our case) and ‘Habitat’ (sediments, biota), average value and standard deviation per chemical compound is inserted.

36. The use of NEAT tool requires two boundary limit values for the best and worse conditions (these are not threshold values but the minimum and maximum values that determine the scale of the assessment) and one threshold value for the GES – nonGEs status. For the present analysis, the two boundary limit values are: i) zero contaminant concentration for the best conditions; ii) the maximum concentration of contaminants used for the present analysis for the worse conditions

37. These are 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. However, the user may also assign threshold values for all other status classes as appropriate. A 5-class assessment scale ‘High-Good-Moderate-Poor-Bad’ is then produced (Tables 2 and 3). NEAT aggregates data by calculating the average of normalized values of contaminants (Cd, Pb, PAHs, etc.) on the SAU level. This can be done either per each contaminant per habitat (i.e., sediments, biota) separately or for all contaminants per habitats (i.e. sediments, biota) within specific SAU. The first option leads to one value for each chemical compound separately for a specific SAU.

38. The process is then repeated for all nested SAUs (in a weighted or non- weighted mode) for all ecosystem components - contaminants separately, or for all ecosystem components by habitat (sediments, biota). In the weighted mode a weighting factor based on the surface area of each SAU is used.
39. The NEAT values are values between 0 to 1 and correspond to an overall assessment status per contaminant according to the 5-class scale.
40. The decision rule of GES/ non-GES is by comparison to the boundary class defined by the (xBAC) and this is above/ below Good (0.6).

6. Results of the NEAT tool for the Assessment of the IMAP EO9-CI 17 status in the Adriatic Sea subregion using the (xBAC) GES/nGES thresholds

41. The results obtained from the NEAT tool are shown in Tables 9 and 10 below. Table 9 provides detailed assessment results on the EO9/CI 17 level per contaminant and also spatially integrated within the nested scheme at i) the IMAP national SAUs & subSAUs, as the finest level; ii) the IMAP coastal and offshore assessment zones of SubDivisions (NAS Coastal, NAS Offshore, CAS Coastal, CAS Offshore, SAS Coastal, SAS Offshore); iii) the sub-division level (NAS, CAS, SAS) and iv) the sub-regional level (Adriatic Sea). At the same time aggregation of all contaminants data is done in order to obtain one chemical status value (NEAT value) for all the levels of the nesting scheme. In other words the data matrix in Table 10 shows the results per contaminant per habitat per SAU in the finest level which are i) integrated along the nesting scheme (in columns A- I bold lines); and ii) are aggregated for all contaminants and habitats per SAU (in rows) leading to one NEAT value per SAU (column EO9). The latter is further integrated along the nesting scheme (column EO9 bold lines).

42. The tool has the possibility also to provide assessment results by aggregating data per habitat in this case sediments and biota (mussels) and then spatially integrated within the nested scheme. The final integrated result per SAU (NEAT value) is the same for the two ways of assessment (i.e. per contaminants (Table 9) or per habitats (Table 10)) as expected.

43. The Tabulated NEAT results of Tables 9 and 10 are presented also schematically in Annex III herein.

44. The detailed status assessment results per contaminant per SAU at the 1st level of assessment (no aggregation or integration) show that in the most cases GES conditions are achieved (High, Good status) i.e., for 80% of SAUs, which are indicated by the blue and green cells in Table 9; 9% are classified under the moderate status, 6% under the poor and 5% under the bad. For the sediment matrix, the highest contamination is observed from PCBs, PAHs and Hg resulting in non-GES status for 60%, 57% and 27 % of sub-SAUs respectively. For the mussels matrix, the highest contamination is observed from PCBs which results in 39% of sub-SAUs in non-GES status. In the NAS 19% of sub-SAUs are classified as non-GEs, in the CAS this percentage falls to 12%, while in the SAS it rises again to 22 %. The most affected sub-SAUs in the NAS are HRO-0313-BAZ, HRO-0412-PULP and HRO-0423-RILP in Croatia; Emiglia-Romana', 'Fruili-Venezia-Giulia-1' and 'Veneto-1' in Italy. Also, offshore SAUs IT-NAS-O and MAD-Sl-MRU-12. In the CAS most affected sub-SAUs are HRO-0313-KASP, HRO-0313-KZ, HRO-0423-KOR in Croatia. Finally in the SAS affected SAUs are HRO-0313-ZUC, HRO-0423-MOP and HRO-0313-ZUC in Croatia; and MNE-1-N, MNE-1-C, MNE-1-S, MNE-Kotor, in Montenegro which are found in poor or bad conditions regarding several contaminants.

45. The aggregation of the chemical parameters data per SAU leads to the NEAT value per SAU which represents the overall chemical status of the SAUs, as shown in Table 9 (4th column). It is clear that the above described non-GES classifications affect the overall chemical status and 80% of the SAUs are classified as in GES (High or Good), while 20% of the subSAUs are classified under moderate status.

46. The integration of SAUs data per chemical parameter (Table 9, bold lines), shows that: i) The NAS subdivision suffers from Hg contamination (moderate status) in sediments and mussels and PCBs (poor status) contamination in sediments; ii) The CAS sub-division suffers from Hg (poor status) and PCBs (moderate status) contamination in mussels; iii) Finally, the SAS sub-division is affected by Pb (moderate status) and PCBs (moderate status) contamination in mussels.

47. In Table 10 the NEAT assessment results are aggregated per habitat (sediments, mussels). It is apparent that both the sediments and the mussels matrices are equally affected by chemical contaminants with 27% and 24% of Sub-SAUs classified as non-GES respectively., All other cases are classified in GES (High, Good status).

48. Overall, it can be seen from the Tables 9 and 10 and schematic diagrams of Annex III, that TM in sediments have the largest spatial coverage with 49 out of 49 SAUs covered. For the other compounds and 'habitats' (sediments, mussels) several SAUs totally lack of data. In these cases, the integrated assessment result on the subdivision level (NAS, CAS, SAS) is based on only a few SAUs and cannot be considered representative. This is true for the assessment of Σ_{16}PAHs in sediments which is based on 14 out 49 SAUs and data delivered by from Italy, Slovenia, Montenegro; Σ_7PCBs in sediments which is based on 10 out of 49 SAUs and data delivered by Italy and Montenegro. In addition, Σ_7PCBs data in sediments for the CAS are non-existent. For the mussels, TM have the largest coverage and are measured in 28 out of the 49 SAUs, based on data delivered by Croatia, Italy, Slovenia (only in the coastal SAUs), Montenegro (only in the coastal SAUs). Σ_7PCBs in mussels are measured in 22 out of 49 SAUs based on data delivered by Croatia and Montenegro, however most of the SAUs have been sampled only once.

49. With the exception of TM in sediments, based on the availability of data for contaminants as delivered by the CPs in the Adriatic Sea sub-region, 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 9 and 10 and Annex III) can only be considered indicative. This is related to the fact that several SAUs either lack data or to the decision of the countries to monitor areas that are found relevant for the assessment of contaminants and therefore excluding the areas where problems were not historically observed (blank cells in Tables 9 and 10, and blank boxes in Annex III). The assessment per SAU and integrated assessment on the two key nesting IMAP assessment zones i.e., the coastal and offshore (NAS-coastal, NAS-offshore; CAS-coastal, CAS-offshore; SAS-coastal, SAS-offshore) (1st and 2nd nesting levels) can be considered more detailed for decision making[6].

[6] Given lack of data for some SAUs, integration at a higher level that also includes these SAUs makes the uncertainty high.

Table 9. Status assessment results of the NEAT tool applied on the Adriatic nesting scheme for the assessment of EO9/CI17. 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.

			EO9			**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**
SAU	**Area (km^2)**	**SAU weight factor**	**NEAT value**	**Status class**	**% Confidence**	**CI17_Cd seds**	**CI17_Hg seds**	**CI17_Pb seds**	**Σ16 PAHs seds**	**Σ7 PCBs seds**	**CI17_Cd mus**	**CI17_Hg mus**	**CI17_Pb mus**	**Σ7 PCBs mus**
Adriatic Sea	**139783**	**0**	**0.738**	**good**	**88**	**0.841**	**0.807**	**0.878**	**0.786**	**0.346**	**0.821**	**0.421**	**0.748**	**0.631**
Northern Adriatic Sea	**31856**	**0**	**0.592**	**moderate**	**84**	**0.842**	**0.466**	**0.827**	**0.733**	**0.236**	**0.835**	**0.47**	**0.842**	**0.743**
NAS coastal	**9069**	**0**	**0.774**	**good**	**100**	**0.838**	**0.739**	**0.814**	**0.4**	**0.199**	**0.834**	**0.809**	**0.842**	**0.743**
MAD-HR-MRU-3	6422	0	0.829	high	100	0.891	0.887	0.833			0.811	0.813	0.818	0.696
HRO-0313-JVE	73	0.001	0.726	good	100	0.853	0.872	0.711			0.754	0.574	0.709	0.522
HRO-0313-BAZ	4	0	0.51	moderate	100	0.684	0.333	0.513						
HRO-0412-PULP	7	0	0.477	moderate	100	0.803	0.166	0.462						
HRO-0412-ZOI	473	0.003	0.864	high	100	0.894	0.861	0.874			0.89	0.857	0.859	0.803
HRO-0413-LIK	7	0	0.791	good	86	0.886	0.763	0.623			0.846	0.809	0.85	0.792
HRO-0413-PAG	30	0	0.796	good	69	0.832	0.837	0.761			0.84	0.853	0.814	0.618
HRO-0413-RAZ	10	0	0.825	high	100	0.852	0.883	0.741						
HRO-0422-KVV	494	0.004	0.798	good	57	0.867	0.915	0.849			0.806	0.709	0.768	0.598
HRO-0422-SJI	1923	0.014	0.859	high	100	0.916	0.944	0.906			0.825	0.855	0.816	0.688
HRO-0423-KVA	686	0.005	0.849	high	100	0.879	0.893	0.817			0.847	0.85	0.862	0.78
HRO-0423-KVJ	1089	0.008	0.826	high	97	0.888	0.907	0.791			0.752	0.835	0.992	0.734
HRO-0423-KVS	577	0.004	0.797	good	72	0.903	0.853	0.847			0.831	0.789	0.704	0.58
HRO-0423-RILP	6	0	0.538	moderate	100	0.398	0.626	0.589						
HRO-0423-RIZ	475	0.003	0.766	good	89	0.877	0.861	0.728			0.758	0.677	0.669	0.734
HRO-0423-VIK	455	0.003	0.783	good	71	0.869	0.7	0.737			0.785	0.811	0.721	0.873
IT-NAS-C	2592	0	0.638	good	100	0.703	0.284	0.761	0.398	0.199	0.925	0.917	0.938	0.908

			EO9			A	B	C	D	E	F	G	H	I
SAU	**Area (km^2)**	**SAU weight factor**	**NEAT value**	**Status class**	**% Confidence**	**CI17_Cd seds**	**CI17_Hg seds**	**CI17_Pb seds**	**Σ16 PAHs seds**	**Σ7 PCBs seds**	**CI17_Cd mus**	**CI17_Hg mus**	**CI17_Pb mus**	**Σ7 PCBs mus**
IT-Em-Ro-1	371	0.003	0.587	moderate	71	0.801	0.647	0.869	0.416	0.199				
IT-Fr-Ve-Gi-1	575	0.004	0.543	moderate	100	0.843	0.159	0.627						
IT-Ve-1	1646	0.012	0.684	good	100	0.495	0.272	0.87	0.39	0.199	0.925	0.917	0.938	0.908
MAD-SI-MRU-11	55	0	0.752	good	100	0.886	0.351	0.975	0.446		0.87	0.453	0.881	
NAS offshore	**22788**	**0**	**0.52**	**moderate**	**100**	**0.845**	**0.262**	**0.835**	**0.769**	**0.24**	**0.869**	**0.446**	**0.833**	
MAD-HR-MRU-5	5571	0			0									
IT-NAS-O	10540	0.161	0.519	moderate	100	0.844	0.263	0.84	0.775	0.24		0.445		
MAD-SI-MRU-12	129	0.002	0.477	moderate	0	0.889	0.188	0.574	0.375					
Central Adriatic	**63696**	**0**	**0.728**	**good**	**80**	**0.82**	**0.852**	**0.892**	**0.938**		**0.84**	**0.336**	**0.752**	**0.513**
CAS coastal	**9394**	**0**	**0.833**	**high**	**100**	**0.831**	**0.868**	**0.874**	**0.938**		**0.84**	**0.823**	**0.752**	**0.513**
MAD-HR-MRU-2	7302	0	0.83	high	100	0.854	0.894	0.845			0.84	0.823	0.752	0.513
HRO-0313-NEK	253	0.003	0.803	high	67	0.784	0.824	0.689			0.858	0.865	0.883	0.757
HRO-0313-KASP	44	0	0.595	moderate	55	0.724	0.266	0.686			0.875	0.691	0.762	0.2
HRO-0313-KZ	34	0	0.639	good	100	0.816	0.291	0.81						
HRO-0313-MMZ	55	0.001	0.805	high	60	0.837	0.896	0.788			0.828	0.816	0.755	0.676
HRO-0413-PZK	196	0.002	0.733	good	97	0.887	0.737	0.766			0.844	0.842	0.584	0.406
HRO-0413-STLP	1	0	0.644	good	100	0.778	0.335	0.82						
HRO-0423-BSK	613	0.006	0.788	good	76	0.8	0.705	0.792			0.81	0.819	0.804	0.803
HRO-0423-KOR	1564	0.016	0.791	good	85	0.886	0.893	0.888			0.848	0.819	0.731	0.377
HRO-0423-MOP	2480	0.025	0.883	high	100	0.854	0.941	0.852						
IT-CAS-C	2092	0	0.845	high	100	0.779	0.742	0.94	0.938					

			EO9			A	B	C	D	E	F	G	H	I
SAU	**Area (km^2)**	**SAU weight factor**	**NEAT value**	**Status class**	**% Confidence**	**CI17_Cd seds**	**CI17_Hg seds**	**CI17_Pb seds**	**Σ16 PAHs seds**	**Σ7 PCBs seds**	**CI17_Cd mus**	**CI17_Hg mus**	**CI17_Pb mus**	**Σ7 PCBs mus**
IT-Ab-1	282	0.005	0.886	high	100	0.809	0.867	0.932	0.938					
IT-Ma-1	319	0.006	0.836	high	100	0.724		0.947						
IT-Mo-1	229	0.004	0.808	high	61	0.864	0.626	0.934						
CAS offshore	**54303**	**0**	**0.71**	**good**	**80**	**0.817**	**0.85**	**0.896**	**0.925**			**0.32**		
MAD-HR-MRU-4	18963	0.178	0.897	high	100	0.887	0.909	0.894						
IT-CAS-O	22393	0.21	0.551	moderate	69	0.7	0.749	0.899	0.925			0.32		
Southern Adriatic Sea	**44231**	**0**	**0.858**	**high**	**100**	**0.868**	**0.859**	**0.877**	**0.853**	**0.795**	**0.778**	**0.883**	**0.573**	**0.548**
SAS coastal	**7276**	**0**	**0.769**	**good**	**99**	**0.837**	**0.793**	**0.797**	**0.204**	**0.348**	**0.778**	**0.883**	**0.573**	**0.548**
MAD-HR-MRU-2	4252	0	0.73	good	100	0.843	0.877	0.733			0.777	0.745	0.583	0.516
HRO-0313-ZUC	13	0	0.792	good	68	0.843	0.888	0.903			0.769	0.841	0.724	0.487
HRO-0423-MOP	1756	0.031	0.73	good	100		0.877	0.732			0.777	0.744	0.582	0.516
IT-SAS-C (Ap-1)	1810	0.013	0.931	high	100	0.804	0.944	0.943				0.965		
MNE-SAS-C	483	0	0.618	good	99	0.7	0.665	0.667	0.204	0.348	0.791	0.871	0.47	0.884
MNE-1-N	86	0.001	0.7	good	81	0.813	0.928	0.932	0.198	0.629				
MNE-1-C	246	0.002	0.494	moderate	92	0.52	0.525	0.396	0.237	0.2	0.648	0.816	0.15	0.838
MNE-1-S	151	0.001	0.812	high	94	0.852	0.867	0.931	0.182	0.383	0.986	0.973	0.978	0.986
MNE-Kotor	85	0.001	0.546	moderate	99	0.722	0.183	0.446	0.164	0.15	0.858	0.848	0.492	0.838
AL-SAS-C	646	0.005	0.686	good	95	0.917	0.199	0.943						
SAS offshore	**36955**	**0**	**0.875**	**high**	**100**	**0.87**	**0.869**	**0.888**	**0.876**	**0.841**				
IT-SAS-O	22715	0.216	0.876	high	100	0.861	0.877	0.891						
MNE-SAS-O	2076	0	0.882	high	100	0.91	0.924	0.83	0.905	0.841				
MNE-12-N	513	0.005	0.869	high	100	0.927	0.928	0.845	0.863	0.781				
MNE-12-C	713	0.007	0.891	high	100	0.886	0.941	0.809	0.941	0.876				

			EO9			A	B	C	D	E	F	G	H	I
SAU	**Area (km²)**	**SAU weight factor**	**NEAT value**	**Status class**	**% Confidence**	**CI17_Cd seds**	**CI17_Hg seds**	**CI17_Pb seds**	**Σ16 PAHs seds**	**Σ7 PCBs seds**	**CI17_Cd mus**	**CI17_Hg mus**	**CI17_Pb mus**	**Σ7 PCBs mus**
MNE-12-S	849	0.008	0.883	high	100	0.92	0.907	0.839	0.899	0.848				
AL-SAS-O	716	0.007	0.78	good	61	0.924	0.5	0.915						
MAD-EL-MS-AD	2253	0.021	0.886	high	100	0.914		0.884	0.86					

Table 10: Status assessment results of the NEAT tool applied on the Adriatic nested scheme for the assessment of EO9/CI 17. Contaminants' data are aggregated and integrated per habitat (sediments, mussels). 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 (km²)**	**Total SAU weight factor**	**NEAT value**	**Status Class**	**% Confidence**	**sediments**	**mussels**
Adriatic Sea	**139783**	**0**	**0.738**	**good**	**88**	**0.825**	**0.48**
Northern Adriatic Sea	**31856**	**0**	**0.592**	**moderate**	**84**	**0.637**	**0.545**
NAS coastal	**9069**	**0**	**0.774**	**good**	**100**	**0.741**	**0.814**
MAD-HR-MRU-3	6422	0	0.829	high	100	0.87	0.787
HRO-0313-JVE	73	0.001	0.726	good	100	0.812	0.64
HRO-0313-BAZ	4	0	0.51	moderate	100	0.51	
HRO-0412-PULP	7	0	0.477	moderate	100	0.477	
HRO-0412-ZOI	473	0.003	0.864	high	100	0.877	0.852
HRO-0413-LIK	7	0	0.791	good	86	0.757	0.824
HRO-0413-PAG	30	0	0.796	good	69	0.81	0.781
HRO-0413-RAZ	10	0	0.825	high	100	0.825	
HRO-0422-KVV	494	0.004	0.798	good	57	0.877	0.72
HRO-0422-SJI	1923	0.014	0.859	high	100	0.922	0.796
HRO-0423-KVA	686	0.005	0.849	high	100	0.863	0.835
HRO-0423-KVJ	1089	0.008	0.846	high	97	0.862	0.828

SAU	Area (km^2)	Total SAU weight factor	NEAT value	Status Class	% Confidence	sediments	mussels
HRO-0423-KVS	577	0.004	0.797	good	72	0.868	0.726
HRO-0423-RILP	6	0	0.538	moderate	100	0.538	
HRO-0423-RIZ	475	0.003	0.766	good	89	0.822	0.709
HRO-0423-VIK	455	0.003	0.783	good	71	0.769	0.797
IT-NAS-C	2592	0	0.638	good	100	0.507	0.922
IT-Em-Ro-1	371	0.003	0.587	moderate	71	0.587	
IT-Fr-Ve-Gi-1	575	0.004	0.543	moderate	100	0.543	
IT-Ve-1	1646	0.012	0.684	good	100	0.445	0.922
MAD-SI-MRU-11	55	0	0.7	good	100	0.664	0.735
NAS offshore	**22788**	**0**	**0.52**	**moderate**	**100**	**0.591**	**0.449**
MAD-HR-MRU-5	5571	0			0		
IT-NAS-O	10540	0.161	0.519	moderate	100	0.592	0.445
MAD-SI-MRU-12	129	0.002	0.477	moderate	0	0.477	
Central Adriatic	**63696**	**0**	**0.728**	**good**	**80**	**0.855**	**0.367**
CAS coastal	**9394**	**0**	**0.833**	**high**	**100**	**0.859**	**0.732**
MAD-HR-MRU-2	7302	0	0.83	high	100	0.864	0.732
HRO-0313-NEK	253	0.003	0.803	high	67	0.766	0.841
HRO-0313-KASP	44	0	0.595	moderate	55	0.559	0.632
HRO-0313-KZ	34	0	0.639	good	100	0.639	
HRO-0313-MMZ	55	0.001	0.805	high	60	0.84	0.769
HRO-0413-PZK	196	0.002	0.733	good	97	0.797	0.669
HRO-0413-STLP	1	0	0.644	good	100	0.644	
HRO-0423-BSK	613	0.006	0.788	good	76	0.766	0.809
HRO-0423-KOR	1564	0.016	0.791	good	85	0.889	0.694
HRO-0423-MOP	2480	0.025	0.883	high	100	0.883	
IT-CAS-C	2092	0	0.845	high	100	0.845	
IT-Ab-1	282	0.005	0.886	high	100	0.886	
IT-Ma-1	319	0.006	0.836	high	100	0.836	

SAU	**Area (km²)**	**Total SAU weight factor**	**NEAT value**	**Status Class**	**% Confidence**	**sediments**	**mussels**
IT-Mo-1	229	0.004	0.808	high	61	0.808	
CAS offshore	**54303**	**0**	**0.71**	**good**	**80**	**0.854**	**0.32**
MAD-HR-MRU-4	18963	0.178	0.897	high	100	0.897	
IT-CAS-O	22393	0.21	0.551	moderate	69	0.783	0.32
Southern Adriatic Sea	**44231**	**0**	**0.858**	**high**	**100**	**0.866**	**0.748**
SAS coastal	**7276**	**0**	**0.769**	**good**	**99**	**0.787**	**0.748**
MAD-HR-MRU-2	4252	0	0.73	good	100	0.805	0.655
HRO-0313-ZUC	13	0	0.792	good	68	0.878	0.705
HRO-0423-MOP	1756	0.031	0.73	good	100	0.805	0.655
IT-SAS-C (Ap-1)	1810	0.013	0.931	high	100	0.897	0.965
MNE-SAS-C	483	0	0.618	good	99	0.517	0.754
MNE-1-N	86	0.001	0.7	good	81	0.7	
MNE-1-C	246	0.002	0.494	moderate	92	0.375	0.613
MNE-1-S	151	0.001	0.812	high	94	0.643	0.981
MNE-Kotor	85	0.001	0.546	moderate	99	0.333	0.759
AL-SAS-C	646	0.005	0.686	good	95	0.686	
SAS offshore	**36955**	**0**	**0.875**	**high**	**100**	**0.875**	
IT-SAS-O	22715	0.216	0.876	high	100	0.876	
MNE-SAS-O	2076	0	0.882	high	100	0.882	
MNE-12-N	513	0.005	0.869	high	100	0.869	
MNE-12-C	713	0.007	0.891	high	100	0.891	
MNE-12-S	849	0.008	0.883	high	100	0.883	
AL-SAS-O	716	0.007	0.78	good	61	0.78	
MAD-EL-MS-AD	2253	0.021	0.886	high	100	0.886	

50. The results of the assessment findings provided per contaminants of EO9/CI 17 without aggregation per habitat, i.e. sediment and biota, as presented in Table 9, are visualized in the schematic diagrams provided in Annex III. Also, the final GES assessment findings for all the IMAP SAUs in the Adriatic Sea, as provided in Table 9 are shown by the respective color in the maps included in the following Figures 6-8. The maps depict the integrated NEAT value for each sub-SAU (i.e. aggregated value for all contaminants as provided in the 4th column of Table 9).

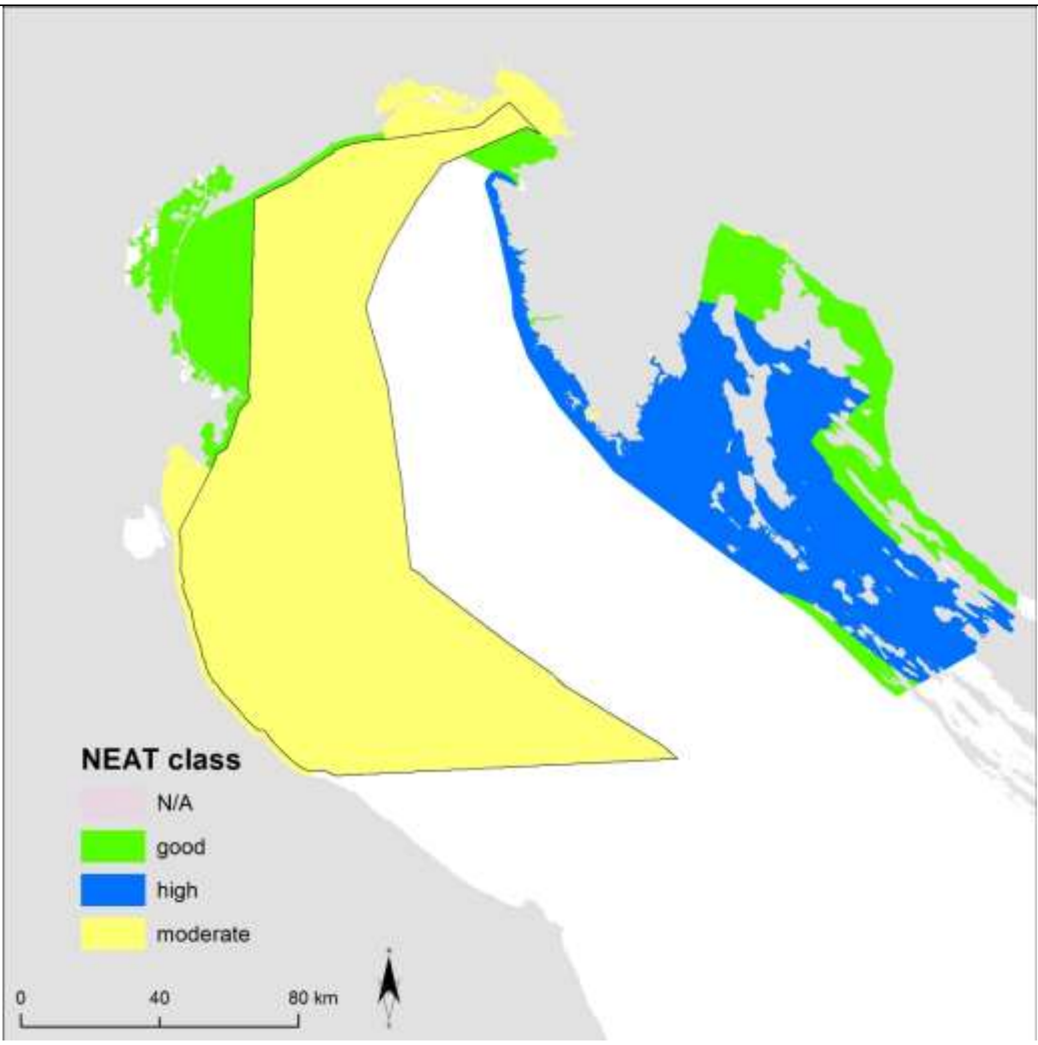


Figure 6: The NEAT assessment results for IMAP CI17 in the North Adriatic Sea. Aggregation of all contaminants per sub-SAU. Blank area corresponds to no available data/decision or not established monitoring.

51. When all contaminants are aggregated, most sub-SAUs in the NAS Sub-division, are classified under High or Good status and in-GES. Six (6) sub-SAUs are classified under Moderate status, namely the three small coastal sub-SAUs HRO-0313-BAZ, HRO-412-PULP, HRO-0423-RILP in Croatia, two coastal sub-SAUs IT-Em-Ro-1, IT-Fr-Ve-Gi-1 and one offshore SAU IT-NAS-O in Italy.

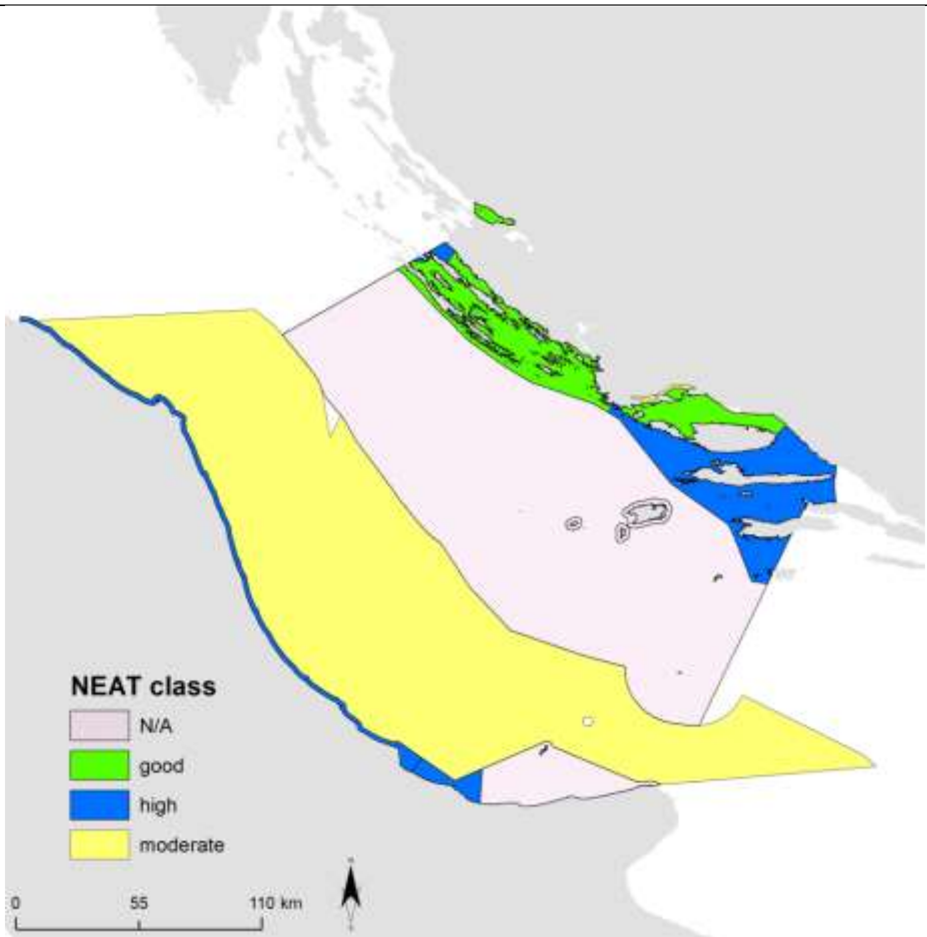


Figure 7: The NEAT assessment results for IMAP EO9/CI17 in the Central Adriatic Sea. Aggregation of all contaminants per sub-SAU.

52. When all contaminants are aggregated, most sub-SAUs in the CAS Sub-division, are classified under High or Good status and in-GES. Only one coastal sub-SAU is classified under Moderate status, namely the coastal sub-SAUs HRO-0313-KASP, HRO-412-PULP, HRO-0423-RILP in Croatia, two coastal sub-SAUs IT-Em-Ro-1, IT-Fr-Ve-Gi-1 and one offshore SAU IT-NAS-O in Italy.

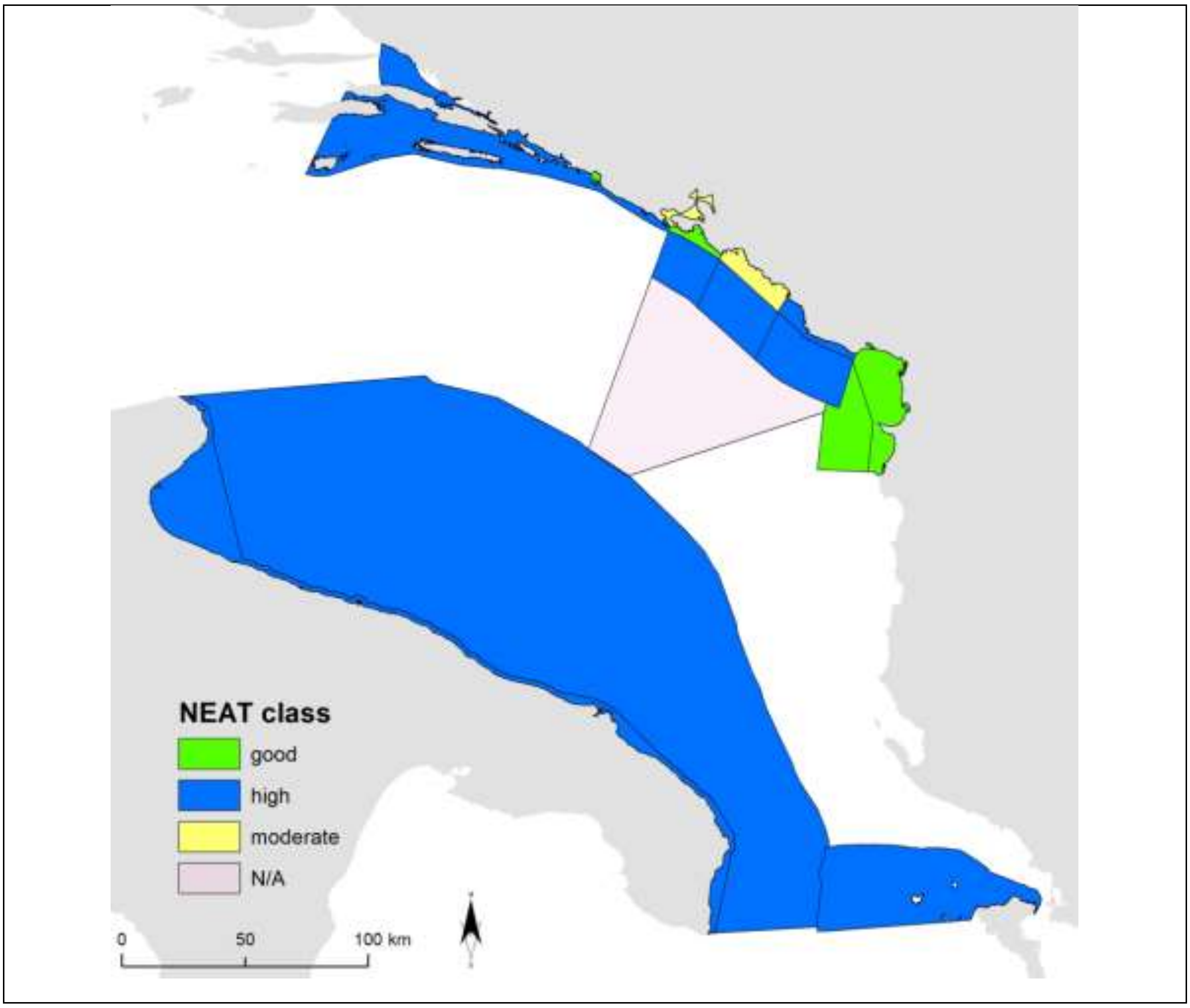


Figure 8: The NEAT assessment results for IMAP CI17 in the South Adriatic Sea. Aggregation of all contaminants per sub-SAU. Blank area corresponds to no available data/decision or not established monitoring.

53. When all contaminants are aggregated, most sub-SAUs in the SAS Sub-division, are classified under High or Good status and in-GES. Only two coastal sub-SAUs are classified under Moderate status, namely the coastal sub-SAUs MNE-1-C and MNE-Kotor in Montenegro.

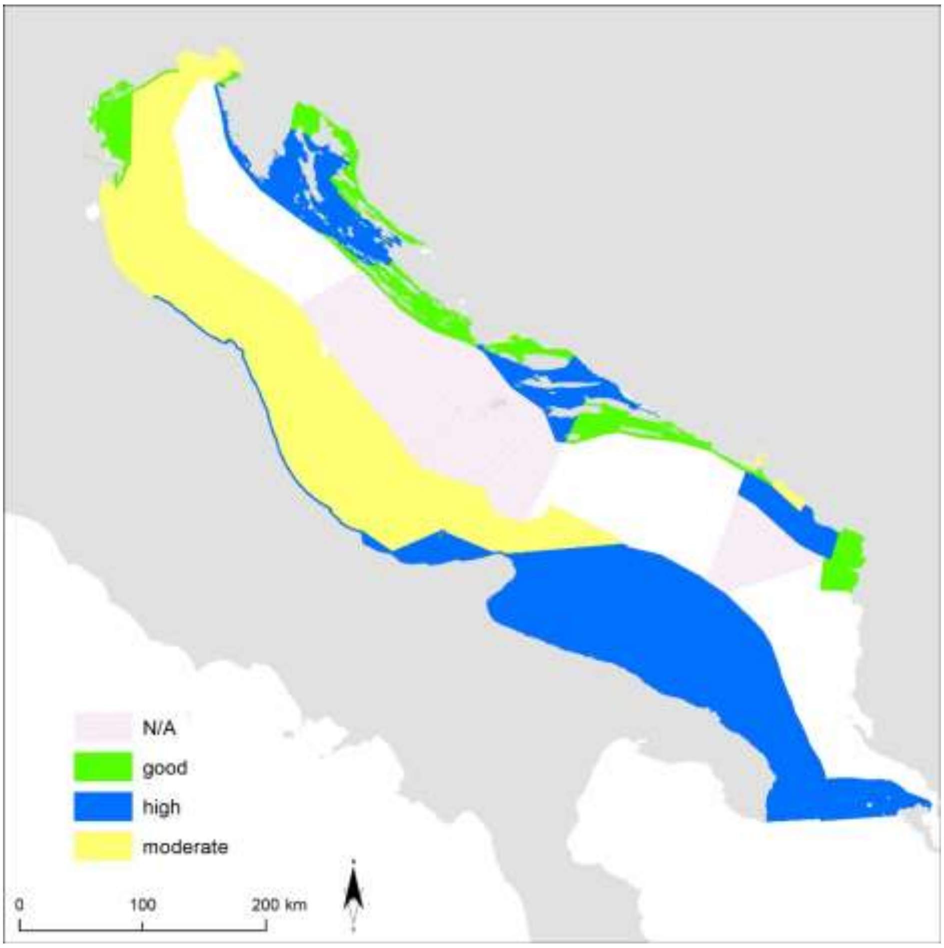


Figure 9: The NEAT assessment results for IMAP CI17 in the Adriatic Sea sub-region. Aggregation of all contaminants per sub-SAU. Blank area corresponds to no available data/decision or not established monitoring.

6.1 Sensitivity an analysis of the assessment results

54. The assessment status as obtained by the 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.

55. 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 11. For example, the overall status for the SAU AL-SAS OFFSHORE is reported as ‘good’. However, from Table 11, it is understood that out of 1000 iterations, 607 lead to Good status, and 341 to High Status. These results imply a rather high uncertainty (confidence 61%), in contrast to HRO-0313-JVE where all 1000 iterations led to High status (confidence 100%).

56. 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 Tables 3, 4 and Annex III), therefore the integrated results on the upper SAU level actually 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.

Table 11. Confidence assessment of all SAU/assessment class combinations as absolute counts falling into the specified classes (maximum possible count = 1000). Results for the ADR using the xBAC GES-nGES threshold.

SAU	bad	poor	moderate	good	high	% Confidence
Adriatic Sea	0	0	0	875	125	88
Northern Adriatic Sea	0	0	835	165	0	84
NAS- coastal	0	0	0	1000	0	100
MAD-HR-MRU-3	0	0	0	0	1000	100
HRO-0313-JVE	0	0	0	1000	0	100
HRO-0313-BAZ	0	0	1000	0	0	100
HRO-0412-PULP	0	0	1000	0	0	100
HRO-0412-ZOI	0	0	0	0	1000	100
HRO-0413-LIK	0	0	0	856	144	86
HRO-0413-PAG	0	0	0	692	308	69
HRO-0413-RAZ	0	0	0	0	1000	100
HRO-0422-KVV	0	0	0	567	433	57
HRO-0422-SJI	0	0	0	0	1000	100
HRO-0423-KVA	0	0	0	0	1000	100
HRO-0423-KVJ	0	0	0	35	965	97
HRO-0423-KVS	0	0	0	285	715	72
HRO-0423-RILP	0	0	1000	0	0	100
HRO-0423-RIZ	0	0	0	892	108	89
HRO-0423-VIK	0	0	0	710	290	71
IT-NAS-C	0	0	1000	0	0	100
IT-Em-Ro-1	0	0	710	290	0	71
IT-Fr-Ve-Gi-1	0	0	1000	0	0	100
IT-Ve-1	0	0	1000	0	0	100
MAD-Sl-MRU-11	0	0	0	998	2	100
NAS offshore	0	0	999	1	0	100
MAD-HR-MRU-5						0
IT-NAS-CO	0	0	999	1	0	100

SAU	bad	poor	moderate	good	high	% Confidence
MAD-Sl-MRU-12						0
Central Adriatic	0	0	0	799	201	80
CAS coastal	0	0	0	0	1000	100
MAD-HR-MRU-2	0	0	0	1000	0	100
HRO-0313-NEK	0	0	0	332	668	67
HRO-0313-KASP	0	0	549	451	0	55
HRO-0313-KZ	0	0	0	1000	0	100
HRO-0313-MMZ	0	0	0	398	602	60
HRO-0413-PZK	0	0	0	970	30	97
HRO-0413-STLP	0	0	0	1000	0	100
HRO-0423-BSK	0	0	0	764	236	76
HRO-0423-KOR	0	0	0	851	149	85
HRO-0423-MOP	0	0	0	0	1000	100
IT-CAS-C	0	0	0	0	1000	100
IT-Ab-1	0	0	0	0	1000	100
IT-Ma-1	0	0	0	0	1000	100
IT-Mo-1	0	0	0	394	606	61
CAS offshore	0	0	0	803	197	80
MAD-HR-MRU-4	0	0	0	0	1000	100
IT-CAS-O	0	0	688	149	163	69
Southern Adriatic Sea (18)	0	0	0	0	1000	100
SAS- coastal	0	0	0	986	14	99
MAD-HR-MRU-2	0	0	0	0	1000	100
HRO-0313-ZUC	0	0	0	675	325	68
HRO-0423-MOP	0	0	0	1000	0	100
IT-SAS-C (Ap-1)	0	0	0	0	1000	100
MNE-SAS-C	0	0	14	986	0	99
MNE-1-N	0	0	0	805	195	81
MNE-1-C	0	0	915	85	0	92
MNE-1-S	0	0	0	64	936	94
MNE-Kotor	0	0	987	13	0	99
AL-SAS-C	0	0	0	949	51	95
SAS offshore	0	0	0	0	1000	100
IT-SAS-O	0	0	0	0	1000	100
MNE-SAS-O	0	0	0	0	1000	100
MNE-12-N	0	0	0	0	1000	100
MNE-12-C	0	0	0	0	1000	100
MNE-12-S	0	0	0	0	1000	100
AL-SAS-O	0	0	0	609	391	61
MAD-EL-MS-AD	0	0	0	0	1000	100

Annex I

Calculation of the SAU weight factors by the NEAT tool

(provided by the NEAT developers: Torsten Berg and Angel Borja)

The total weight of a SAU is not the simple ratio of each SAU area to the total area of the parent SAU. The process of distributing the weight is more complex. SAU weighting by the NEAT tool has two options: i) do not weight by SAU area: weights are calculated based just on the nesting hierarchy of the SAUs; ii) weight by SAU area: weights are calculated based on the nesting hierarchy and the SAU surface area.

The overall principle is that the sum of all weights in the nesting scheme (SAU tree) is equal to 1. By adding up the weights of all individual SAUs in a SAU nesting scheme, this sum will always be 1.

The next thing is, a SAU without data will have a total weight of zero, e.g. for the present case there is no contaminants data for the top SAU, the Adriatic Sea. So, its weight will be zero and this will give more weight to the SAU lower in the hierarchy (or to siblings on the same hierarchy level).

<u>i) Weighting based on the nesting hierarchy only - NEAT option *'Do not weight by SAU area'*:</u>

For the case that every SAU has data for at least one chemical parameter and we do not weight by area (and we use no priority factors). Then the area is treated as if it were 1. There is one top-level SAU (the Adriatic Sea) and below there are the Northern, Central and Southern Adriatic Seas. Hypothetically it is assumed there are also 4 SAUs beneath the Northern Adriatic Sea.

The calculation starts by assigning that the total weight of the SAU tree must be 1. This weight needs to be distributed among all SAUs in the tree. That means, the top SAU cannot have it all, it must share the 1 with its three children (Northern, Central, Southern). In total, this makes 4 SAUs that need to share the total weight of 1. So, the top-level SAU (the Adriatic Sea as a whole) and each of the children (Norther, Central, Southern) get 0.25 of the total tree weight:

w(total) = 1

w(Adriatic) = 0.25
v(Northern) = 0.25
v(Central) = 0.25
v(Southern) = 0.25

Note that we write w = final weight, and v = inherited weight.

For the top-level SAU, the 'w(Adriatic) = 0.25' is its final weight as it has shared the weight of 1 (which was inherited in the first place) among itself and its children. Now, each of the children must do the same. The weight which they now got, is not their final weight (named w above). It is the weight they inherit from their parent SAU (named v above) and that they need to share with their children. Hypothetically it is assumed that the 4 children of the Northern Adriatic Sea are called N1, N2, N3 and N4. The inherited weight of 0.25 needs to be shared among the Northern Adriatic Sea and N1, N2, N3 and N4. This is 5 SAUs. So, 0.25 is divided by 5 and it gets 0.05. That is the final weight of the Northern Adriatic Sea and the weight its children will inherit in the first place:

w(total) = 1 = v(Adriatic)
w(Adriatic) = v(Adriatic)/4 = 0.25

w(Northern) = v(Northern)/5 = 0.05
v(N1) = 0.05
v(N2) = 0.05
v(N3) = 0.05
v(N4) = 0.05

The total weight of 1 is the same as the weight inherited to the whole Adriatic Sea. And the final weight is its inherited weight divided by the number of SAUs involved.

The same principle can be applied to all further children in any possible SAU tree. If the tree stopped here, the one could take all w(...) values and add them together. As N1 through N4 have no children (as well as the Central and the Southern Adriatic) their inherited weight is the same as their total weight as they do not need to share it with any children. There are no further children anymore:
w(Adriatic) + w(Northern) + w(Central) + w(Southern) + w(N1) + w(N2) + w(N3) + w(N4)
= 0.25 + 0.05 + 0.25 + 0.25 + 0.05 + 0.05 + 0.05 + 0.05 = 1
The total weight of the tree is 1, as expected.

ii) <u>Weighting based on the nesting hierarchy and the SAU surface area - NEAT option: *'Weight by SAU area'*:</u>

In this case, the area is used instead of 1 but making sure the total weight is still 1. The one use a for the area, for example:

a(Adriatic) = 139783 km^2
a(Northern) = 31856 km^2
a(Central) = 63696 km^2
a(Southern) = 44231 km^2

w(total) = 1 = v(Adriatic)
w(Adriatic) = v(Adriatic)*a(Adriatic)/[a(Adriatic) + a(Northern) + a(Central) + a(Southern)]
= 1 * 139783 / (139783 + 31856 + 63696 + 44231)
= 1 * 139783 / 297566
= 0.4698

Here, instead of adding the number of SAUs (the one at the top-level plus all its children), their areas are just added. The value of 0.4698 will now be the inherited weight for the Northern, Central and Southern Adriatic sub-divisions and is placed in the formula instead of the 1 above. So, v(Northern) will be 0.4698 and this weight is distributed among itself and N1 through N4. Again, the one add the areas of all those 5 SAUs, divide the area of the Northern Adriatic Sea by this sum and multiply with the inherited weight of 0.4698 and this will give the final weight of the Northern Adriatic Sea (and of its children if they do not have any children themselves).

The above apply under the assumption that there are data inserted to each of the nested SAUs. In the present analysis for the IMAP CI17 this is not the case and the weight calculation becomes more complex.

Annex II

The spatial assessment units (SAUs) along with the spatial and temporal coverage of monitoring data collected for the Adriatic Sea Sub-region

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-division	IMAP Assessment Zone	IMAP SAU	IMAP sub SAU	Area (km^2)	Total No stations	stations / area
North Adriatic (NAS)				**31856**	**84**	**0.003**
	NAS coastal			**9069**		
		MAD-HR-MRU_3		6422	19	0.003
			HRO3-0313-JVE	73	1	0.014
			HRO-O313-BAZ	4	1	0.259
			HRO-O412-PULP	7	1	0.149
			HRO-O412-ZOI	473	3	0.006
			HRO-O413-LIK	7	1	0.150
			HRO-O413-PAG	30	1	0.033
			HRO-O413-RAZ	10	1	0.097
			HRO-O422-KVV	494	2	0.004
			HRO-O422-SJI	1923	2	0.001
			HRO-O423-KVA	686	1	0.001
			HRO-O423-KVJ	1089	1	0.001
			HRO-O423-KVS	577	1	0.002
			HRO-O423-RILP	6	1	0.178
			HRO-O423-RIZ	475	1	0.002
			HRO-O423-VIK	455	1	0.002
		IT-NAS-C		2592	27	0.010
			Emilia Romagna	371	6	0.016
			Friuli Venezia Giulia	575	4	0.007
			Veneto	1646	17	0.010
		MAD_SI_MRU_11		55	8	0.127
	NAS offshore			**22788**		
		IT-NAS-O		10540	23	0.002
		MAD_SI_MRU_12		129	1	0.062
Central Adriatic (CAS)				**63696**	**60**	**0.001**
	CAS coastal			**9394**		
		MAD-HR-MRU-2		7302	14	0.002
			HRO-0313-NEK	253	1	0.004
			HRO-O313-KASP	44	2	0.045
			HRO-O313-KZ	34	1	0.029
			HRO-O313-MMZ	55	1	0.018
			HRO-O413-PZK	196	2	0.010
			HRO-O413-STLP	1	1	1.580
			HRO-O423-BSK	613	2	0.003
			HRO-O423-KOR	1564	3	0.002
			HRO-O423-MOP	2480	1	0.000
		IT-CAS-C		2092	20	0.010

Sub-division	**IMAP Assessment Zone**	**IMAP SAU**	**IMAP sub SAU**	**Area (km²)**	**Total No stations**	**stations / area**
			Abruzzo	282	8	0.028
			Marche	319	8	0.025
			Molise	229	2	0.009
	CAS offshore			**54303**		
		IT-CAS-O		22393	25	0.001
		MAD-HR-MRU_4		18963	1	0.000
South Adriatic (SAS)				**44231**	**78**	**0.002**
	SAS coastal			**7276**		
		MAD-HR-MRU_2		4252	3	0.001
			HRO313-ZUC	13	1	0.078
			HRO423-MOP	1756	2	0.001
		IT-SAS-C	(Apulia)	1810	8	0.004
		MNE-1		483	45	0.093
			MNE-1-N	86	5	0.098
			MNE-1-C	246	12	0.049
			MNE-1-S	151	7	0.046
			MNE-Kotor	85	21	0.247
		AL-C		646	4	0.006
	SAS offshore			**36955**		
		IT-SAS-O		22715	5	0.000
		MNE-O		2076	14	0.007
			MNE-12-N	513	4	0.008
			MNE-12-C	713	4	0.006
			MNE-12-S	849	7	0.008
		AL-O		716	2	0.003
		MAD-EL-MS-AD		2253	1	0.0004

Table 2: Spatial coverage of monitoring data collected for the Adriatic Sea. The number /of monitoring stations in the IMAP SAUs of the Adriatic Sea per environmental matrix (sediments, biota) and per contaminant group (trace metals (TM), PAHs, PCBs) is shown.

Sub-division	**Zone**	**SAU**	**sub SAU**	**No stations sediment**			**No stations biota**		
				TM	**PAHs**	**PCBs**	**TM**	**PAHs**	**PCBs**
North Adriatic (NAS)				**71**	**45**	**23**	**31**	**14**	**19**
	NAS coastal/								
		MAD-HR-MRU-3		**19**	**-**		**11**		**11**
			HRO3-0313-JVE	1			1		1
			HRO-O313-BAZ	1					
			HRO-O412-PULP	1					
			HRO-O412-ZOI	3			1		1
			HRO-O413-LIK	1			1		1
			HRO-O413-PAG	1			1		1
			HRO-O413-RAZ	1					
			HRO-O422-KVV	2			1		1
			HRO-O422-SJI	2			1		1
			HRO-O423-KVA	1			1		1
			HRO-O423-KVJ	1			1		1
			HRO-O423-KVS	1			1		1
			HRO-O423-RILP	1					
			HRO-O423-RIZ	1			1		1
			HRO-O423-VIK	1			1		1
		IT-NAS-C		**19**	**23**	**13**	**8**	**8**	**8**
			Emilia Romagna	6	16	6			
			Friuli Venezia Giulia	4					
			Veneto	9	7	7	8	8	8
		MAD_SI_MRU_11		**4**	**6**		**3**	**5**	
	NAS offshore								
		IT-NAS-O		**23**	**12**	**10**	**2**		
		MAD_SI_MRU_12		**1**	**1**				
Central Adriatic (CAS)				**58**	**23**		**12**		**6**
	CAS coastal								
		MAD-HR-MRU-2		**14**			**6**		**6**
			HRO-0313-NEK	1			1		1
			HRO-O313-KASP	2			1		1
			HRO-O313-KZ	1					

Sub-division	**Zone**	**SAU**	**sub SAU**	**No stations sediment**			**No stations biota**		
				TM	**PAHs**	**PCBs**	**TM**	**PAHs**	**PCBs**
			HRO-O313-MMZ	1			1		1
			HRO-O413-PZK	2			1		1
			HRO-O413-STLP	1					
			HRO-O423-BSK	2			1		1
			HRO-O423-KOR	3			1		1
			HRO-O423-MOP	1					
		IT-CAS-C		**18**	**8**				
			Abruzzo	8	8				
			Marche	8					
			Molise	2					
	CAS offshore								
		IT-CAS-O		25	**7**		**6**		
		MAD-HR-MRU_4		1					
South Adriatic (SAS)				**78**	**52**	**45**	**22**	**14**	**15**
	SAS coastal								
		MAD-HR-MRU_2		**3**			**5**		**2**
			HRO313-ZUC	1			1		1
			HRO423-MOP	2			2		1
		IT-SAS-C	**(Apulia)**	**8**			**2**		
		MNE-1		**46**	**41**	**34**	**15**	**12**	**11**
			MNE-1-N	5	5	3			
			MNE-1-C	12	12	11	2	2	2
			MNE-1-S	8	8	6	1	1	1
			MNE-Kotor	21	16	14	12	9	8
		AL-C		**4**					
	SAS offshore								
		IT-SAS-O		**5**					
		MNE-12		**12**	**11**	**11**	**2**	**2**	**2**
			MNE-12-N	3	2	2	1	1	1
			MNE-12-C	4	4	4			
			MNE-12-S	6	5	5	1	1	1
		AL-O		**2**					
		MAD-EL-MS-AD		**1**	**1**				

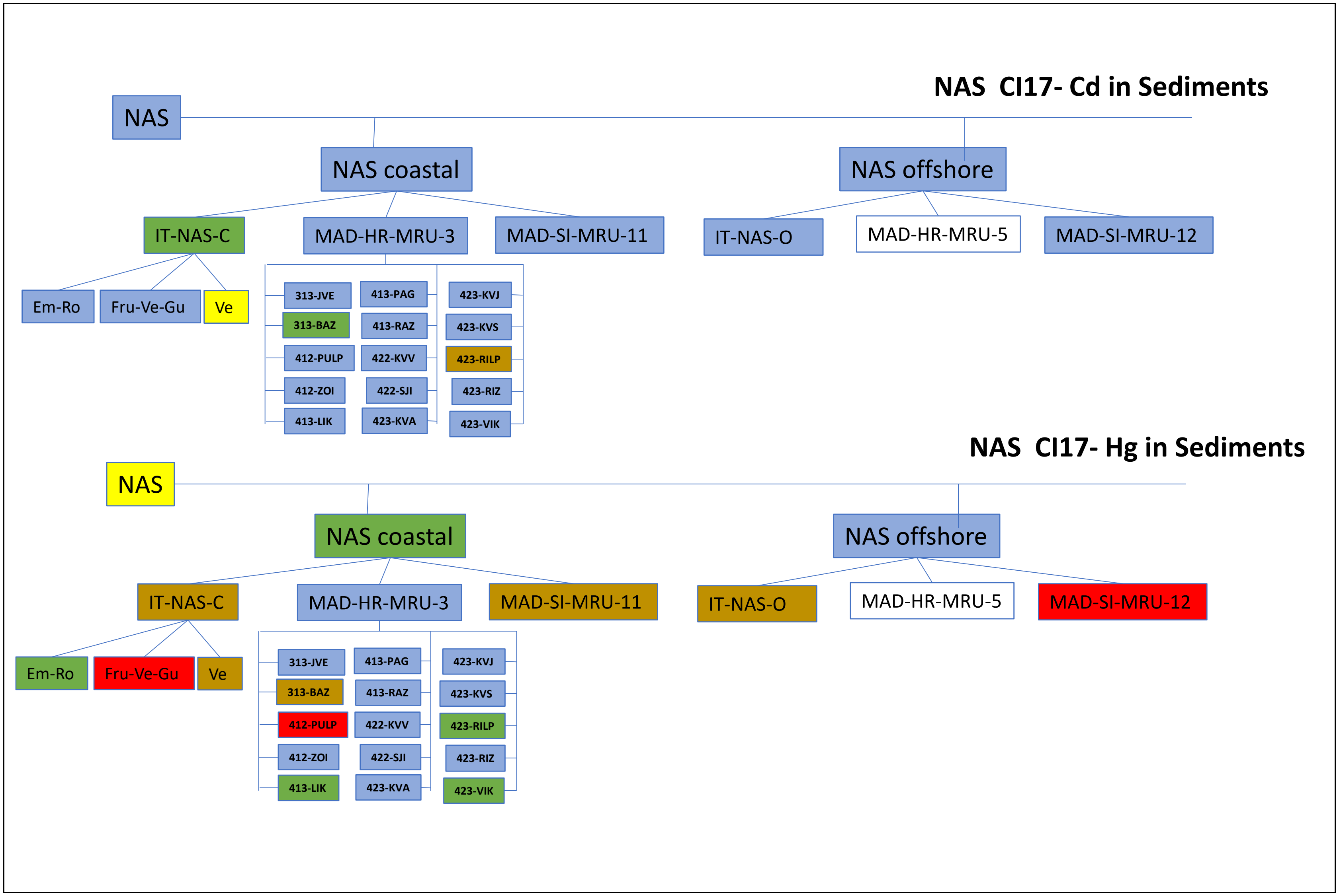
Table 3: Temporal coverage of the monitoring data collected for the Adriatic Sea. The years of data collected per SAU and per contaminant group (trace metals (TM), PAHs, PCBs) are shown.

Sub-division	Zone	SAU	Years monitored Sediments			Years monitored biota		
			TM	**PAHs**	**PCBs**	**TM**	**PAHs**	**PCBs**
North Adriatic (NAS)								
	NAS coastal/intercoastal							
		MAD-HR-MRU-3	’17, ’19			’19, ’20		‘19
		IT-NAS-C	’15, ’16, ’17, ‘18, ‘19	’16, ’17, ‘18, ‘19	’16, ’17, ‘18, ‘19	’16, ‘17, ’18	’16, ‘17, ’18	’16, ‘17, ’18
		MAD_SI_ MRU_11	‘19	, ‘16, ‘19		’19, ’20, ‘21	’16,’17, ’18, ’19, ’20, ‘21	
	NAS offshore							
		IT-NAS-O	’16,’17, 18, ‘19	’16, ’17, ‘18,	’16, ’17, ‘18,	’15, ’16, ‘17		
		MAD_SI_ MRU_12	‘19	’16, ‘19				
Central Adriatic (CAS)								
	CAS coastal/intercoastal							
		MAD-HR-MRU-2	’17, ‘19			’19, ’20		‘19
		IT-CAS-C	’15, ’16, ’17, ‘18, ‘19	’16, ’17, ‘18				
	CAS offshore							
		IT-CAS-O	’15, ’16, ’17, ‘18,	’16, ’17, ‘18		’15, ’16, ‘17		
		MAD-HR-MRU_4	’17, ‘19					
South Adriatic (SAS)								
	SAS coastal/intercoastal							
		MAD-HR-MRU_2	’17, ‘19			’19, ’20		‘19
		IT-SAS-C	’15, ’16, ’17, ‘18, ‘19			’15, ’16, ’17, ‘18,		
		MNE-1	’16, ’17, ’19, ’20, ‘21	’18, ’19, ’20, ‘21	’19, ’20, ‘21	’19, ’20	’19, ’20,	’19, ’20
		AL-C	‘20					
	SAS offshore							
		IT-SAS-O	’16, ‘17					
		MNE-12	’19, ‘21	’18, ’19, ’20, ‘21	’19, ’20, ‘21	‘18, ’19, ‘20		’19, ‘20
		AL-O	‘20					
		MAD-EL-MS-AD	‘18	‘18				

Annex III
Schematic representation of the NEAT assessment results in the nesting scheme of the Adriatic Sea Sub-region according to the NEAT color scale

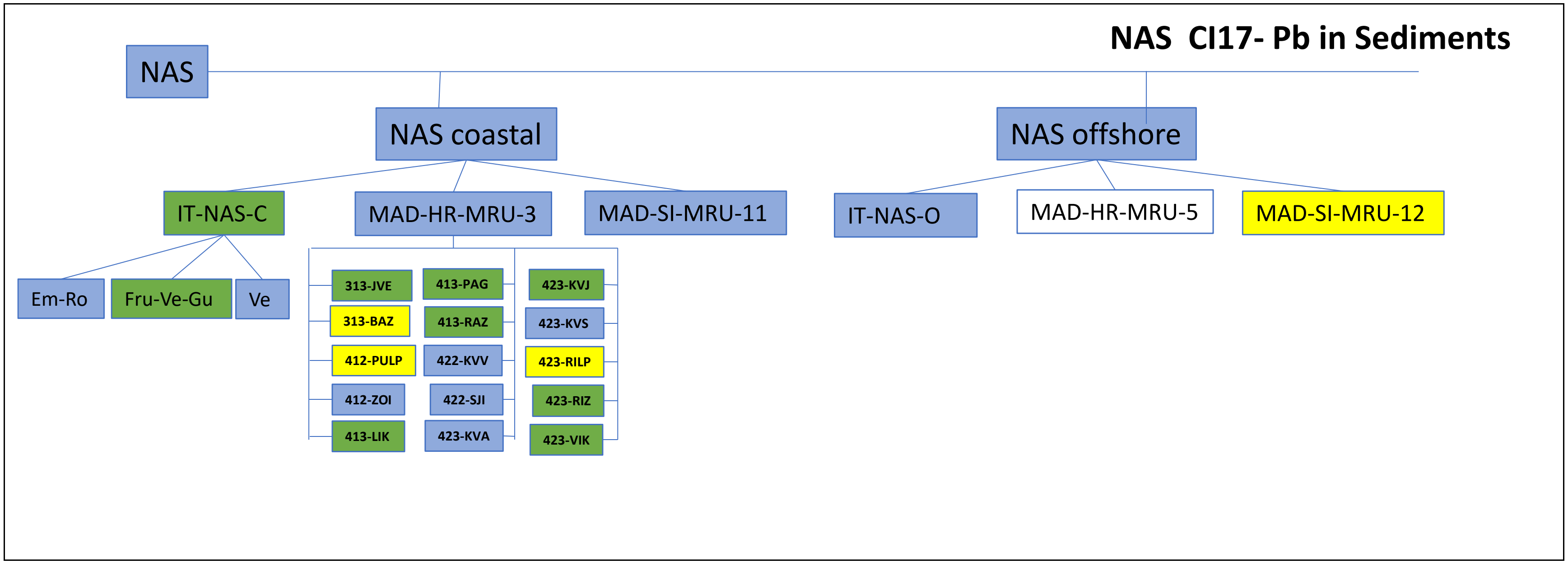
Schematic presentation of the assessment results as presented in Table 9 for EO9/CI17 in the North Adriatic Sea (NAS) sub-division per contaminant in sediments (Cd & Hg).

Blank boxes denote absence of data



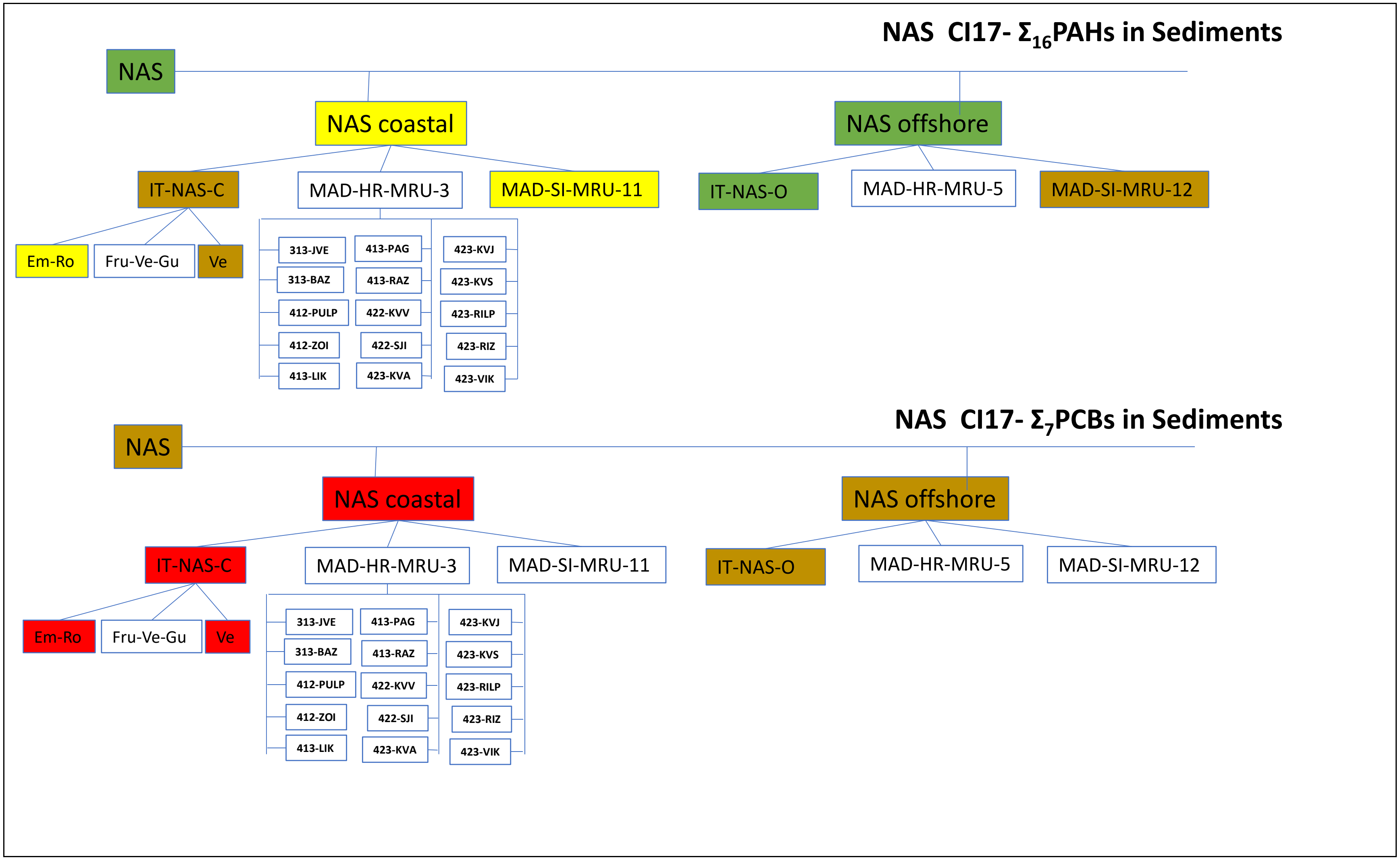
Schematic presentation of the assessment results as presented in Table 9 for EO9/CI17 in the North Adriatic Sea (NAS) sub-division per contaminant in sediments (Pb)

Blank boxes denote absence of data



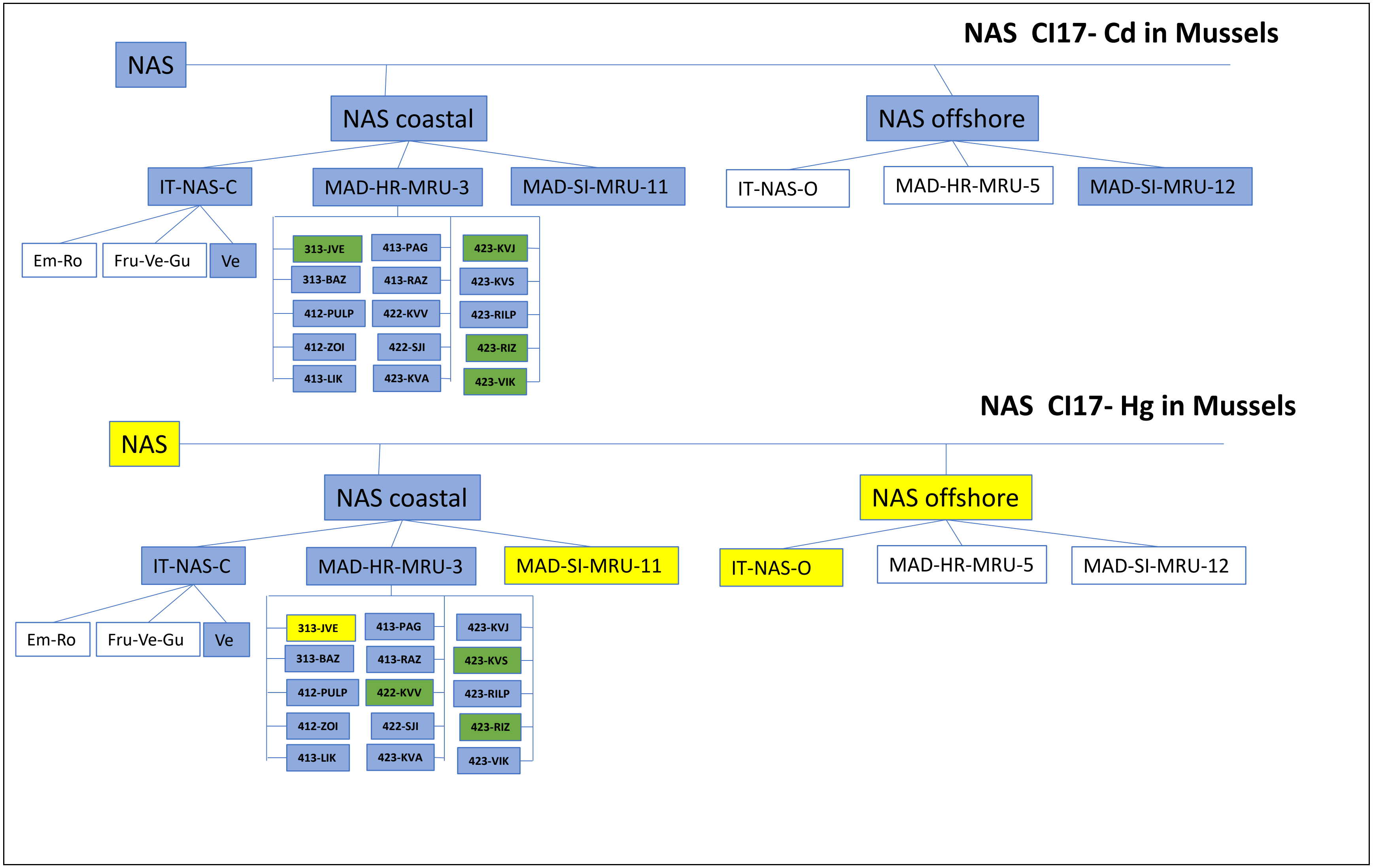
Schematic presentation of the assessment results as presented in Table 9 for EO9/CI17 in the North Adriatic Sea (NAS) sub-division per contaminant in sediments (Σ_{16}PAHs & Σ_7PCBs)

Blank boxes denote absence of data



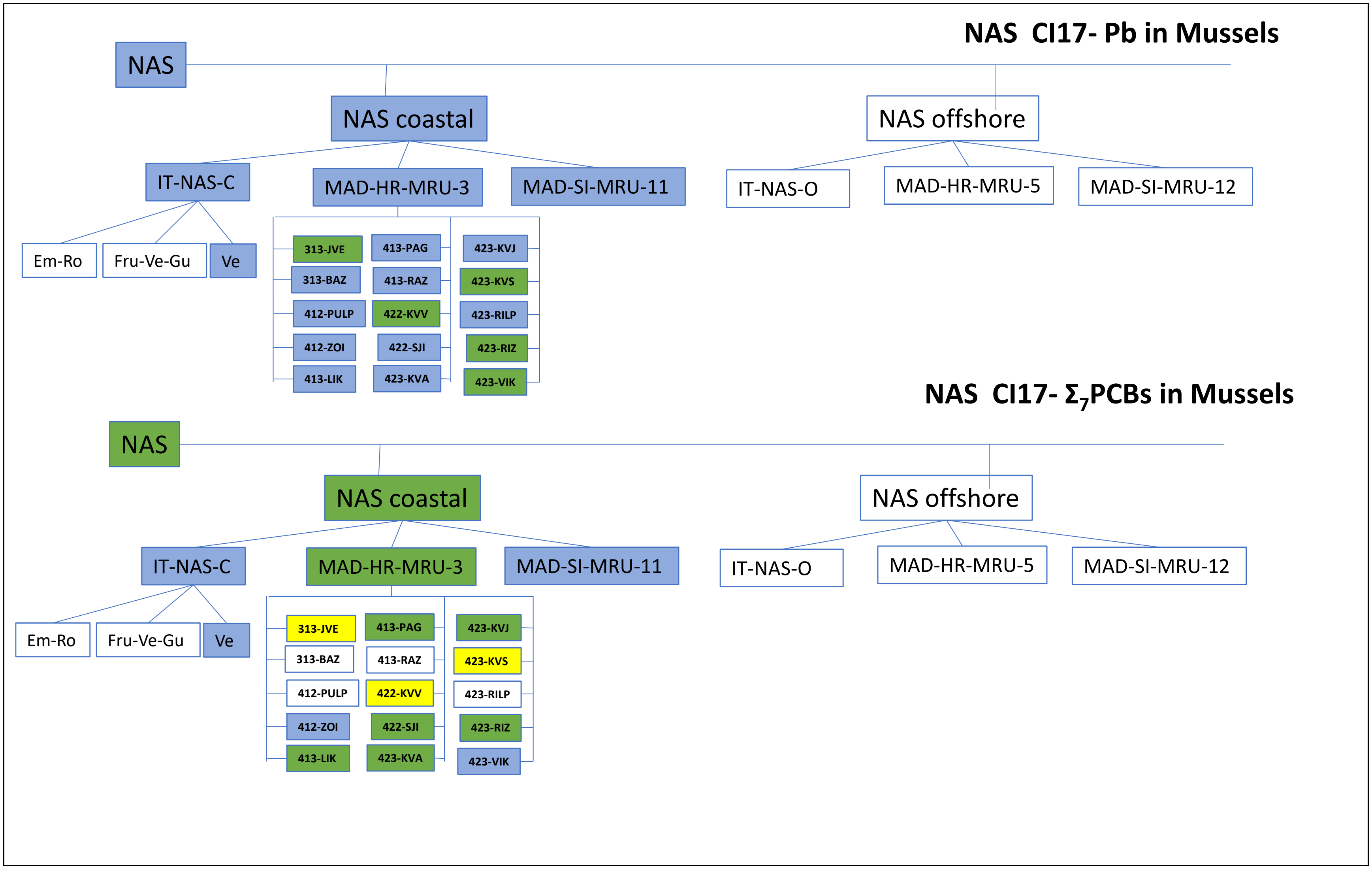
Schematic presentation of the assessment results as presented in Table 9 for EO9/CI17 in the North Adriatic Sea (NAS) sub-division per contaminant in mussels (Cd & Hg)

Blank boxes denote absence of data


NAS CI17- Cd in Mussels
NAS
NAS coastal
NAS offshore
IT-NAS-C
MAD-HR-MRU-3
MAD-SI-MRU-11
IT-NAS-O
MAD-HR-MRU-5
MAD-SI-MRU-12
Em-Ro
Fru-Ve-Gu
Ve
313-JVE
413-PAG
423-KVJ
313-BAZ
413-RAZ
423-KVS
412-PULP
422-KVV
423-RILP
412-ZOI
422-SJI
423-RIZ
413-LIK
423-KVA
423-VIK
NAS CI17- Hg in Mussels
NAS
NAS coastal
NAS offshore
IT-NAS-C
MAD-HR-MRU-3
MAD-SI-MRU-11
IT-NAS-O
MAD-HR-MRU-5
MAD-SI-MRU-12
Em-Ro
Fru-Ve-Gu
Ve
313-JVE
413-PAG
423-KVJ
313-BAZ
413-RAZ
423-KVS
412-PULP
422-KVV
423-RILP
412-ZOI
422-SJI
423-RIZ
413-LIK
423-KVA
423-VIK

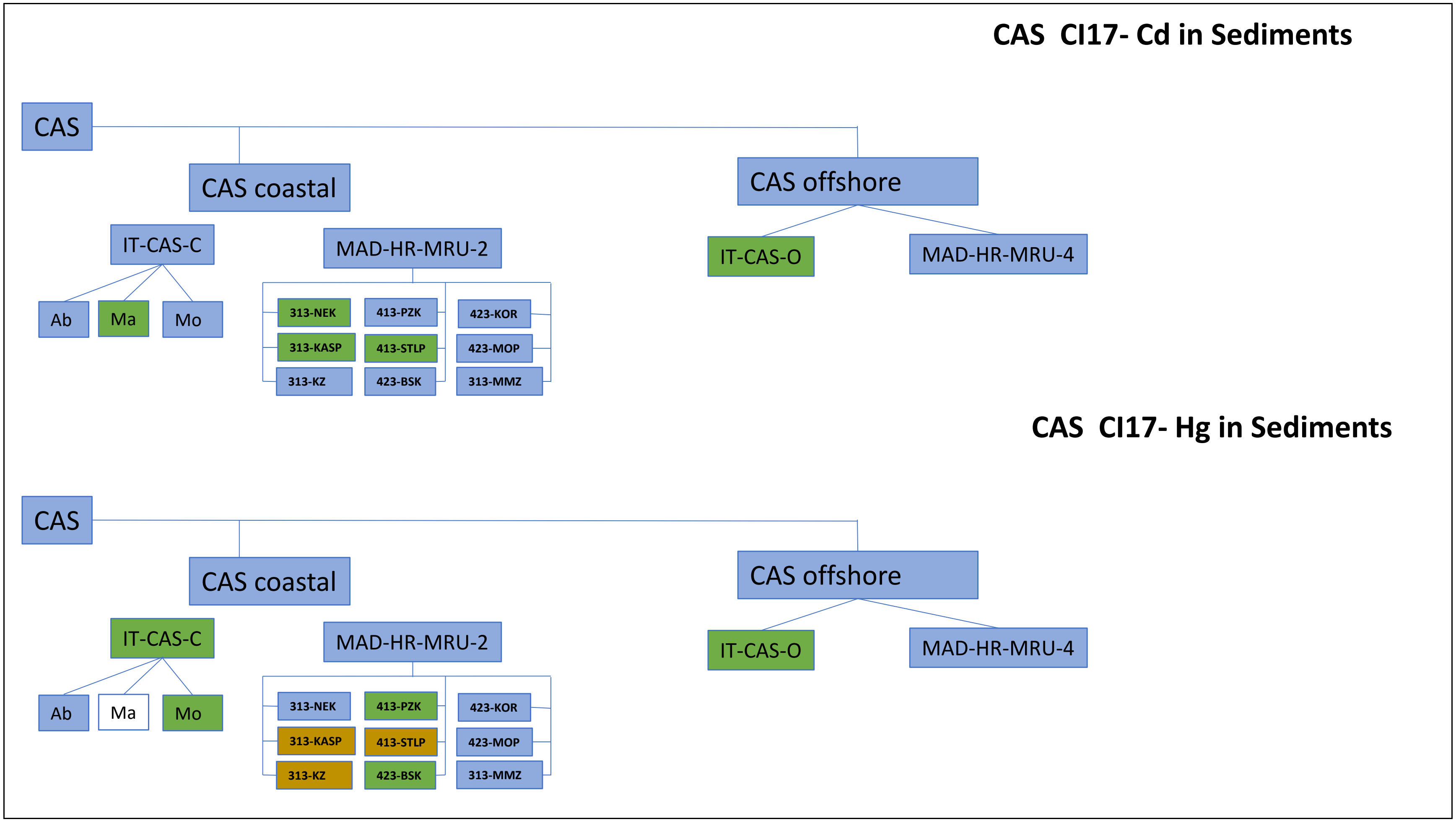
Schematic presentation of the assessment results as presented in Table 9 for EO9/CI17 in the North Adriatic Sea (NAS) sub-division per contaminant in mussels (Pb & Σ_7PCBs)

Blank boxes denote absence of data


NAS CI17- Pb in Mussels
NAS
NAS coastal
NAS offshore
IT-NAS-C
MAD-HR-MRU-3
MAD-SI-MRU-11
IT-NAS-O
MAD-HR-MRU-5
MAD-SI-MRU-12
Em-Ro
Fru-Ve-Gu
Ve
313-JVE
313-BAZ
412-PULP
412-ZOI
413-LIK
413-PAG
413-RAZ
422-KVV
422-SJI
423-KVA
423-KVJ
423-KVS
423-RILP
423-RIZ
423-VIK
NAS CI17- Σ7PCBs in Mussels
NAS
NAS coastal
NAS offshore
IT-NAS-C
MAD-HR-MRU-3
MAD-SI-MRU-11
IT-NAS-O
MAD-HR-MRU-5
MAD-SI-MRU-12
Em-Ro
Fru-Ve-Gu
Ve
313-JVE
313-BAZ
412-PULP
412-ZOI
413-LIK
413-PAG
413-RAZ
422-KVV
422-SJI
423-KVA
423-KVJ
423-KVS
423-RILP
423-RIZ
423-VIK

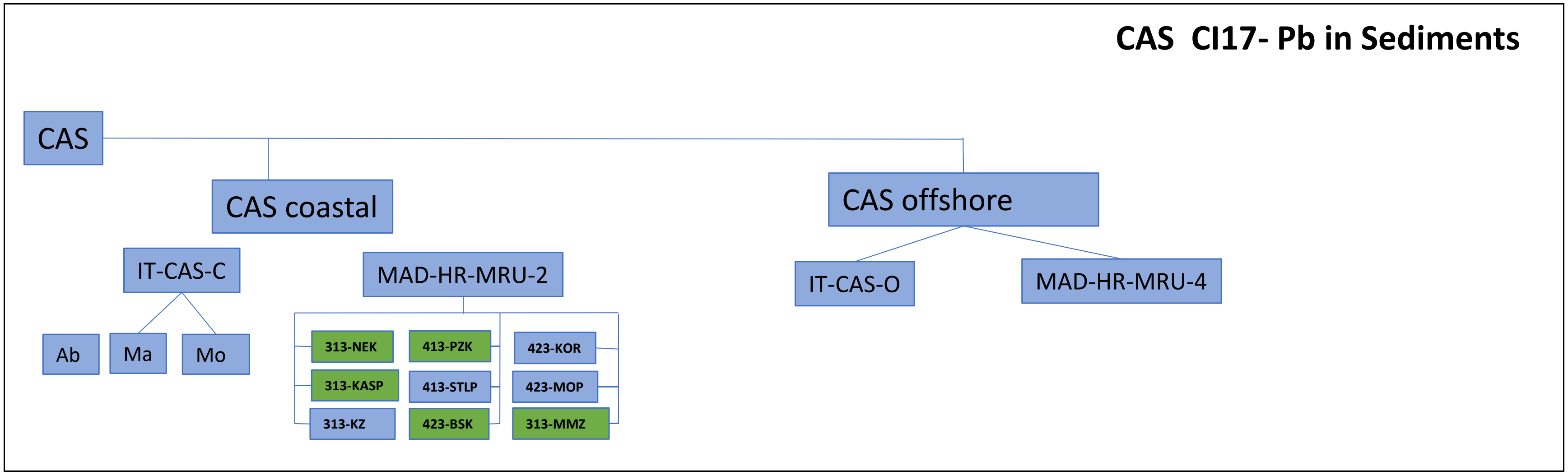
Schematic presentation of the assessment results as presented in Table 9 for EO9/CI17 in the Central Adriatic Sea (CAS) sub -division per contaminant in sediments (Cd & Hg)

Blank boxes denote absence of data



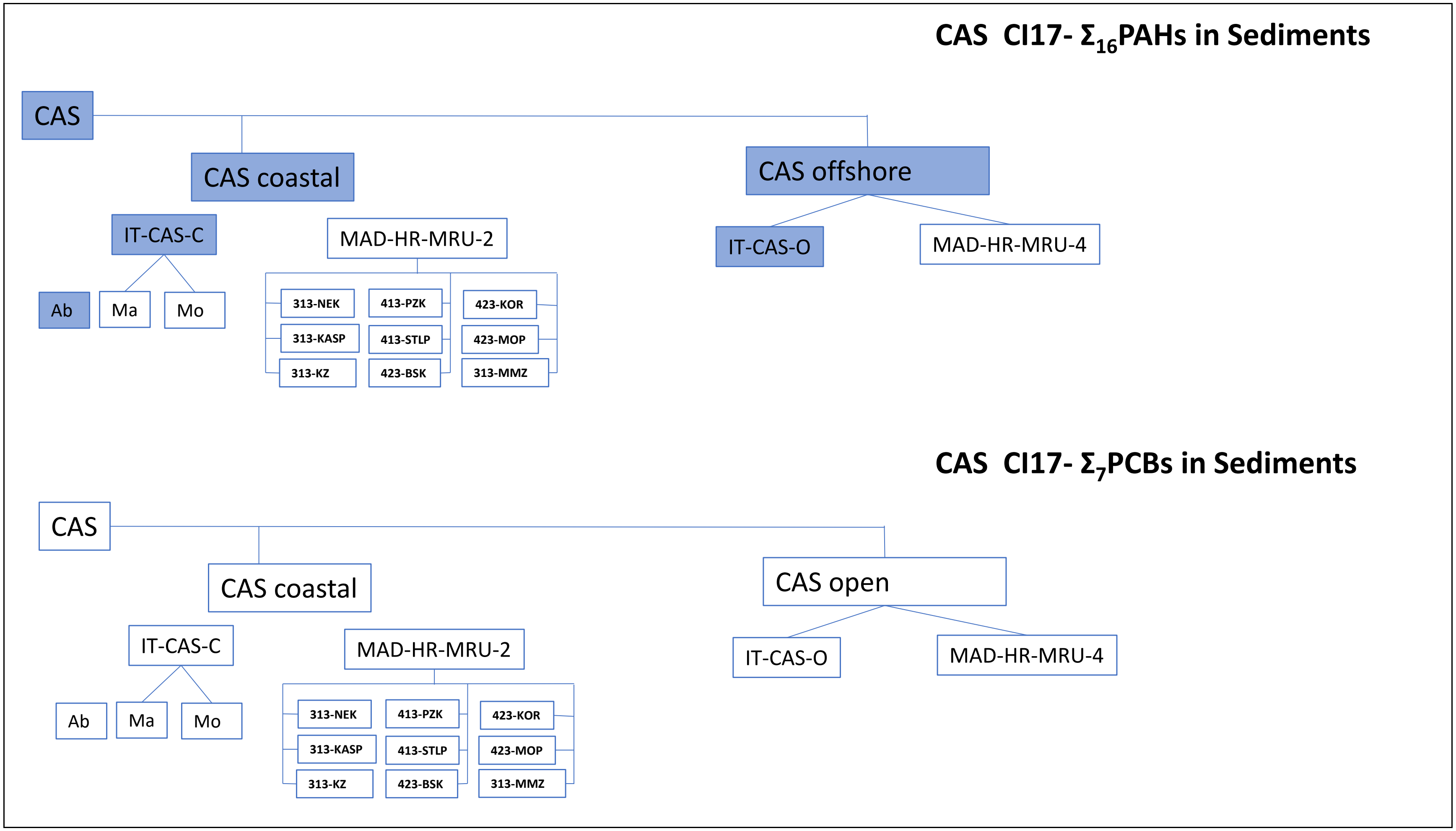
Schematic presentation of the assessment results as presented in Table 9 for EO9/CI17 in the Central Adriatic Sea (CAS) sub -division per contaminant in sediments (Pb)

Blank boxes denote absence of data



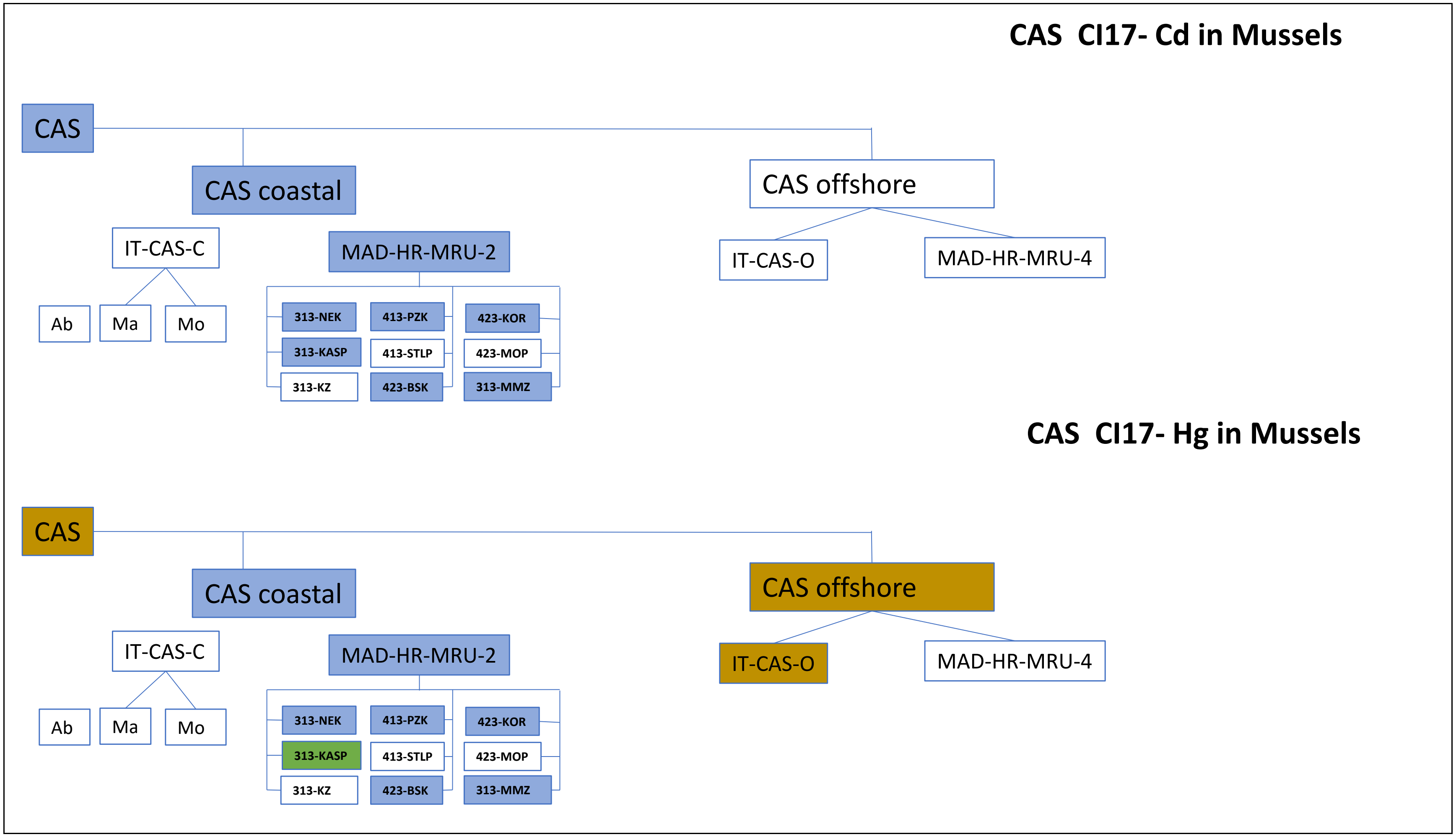
Schematic presentation of the assessment results as presented in Table 9 for EO9/CI17 in the Central Adriatic Sea (CAS) sub -division per contaminant in sediments (Σ_{16}PAHs & Σ_7PCBs)

Blank boxes denote absence of data



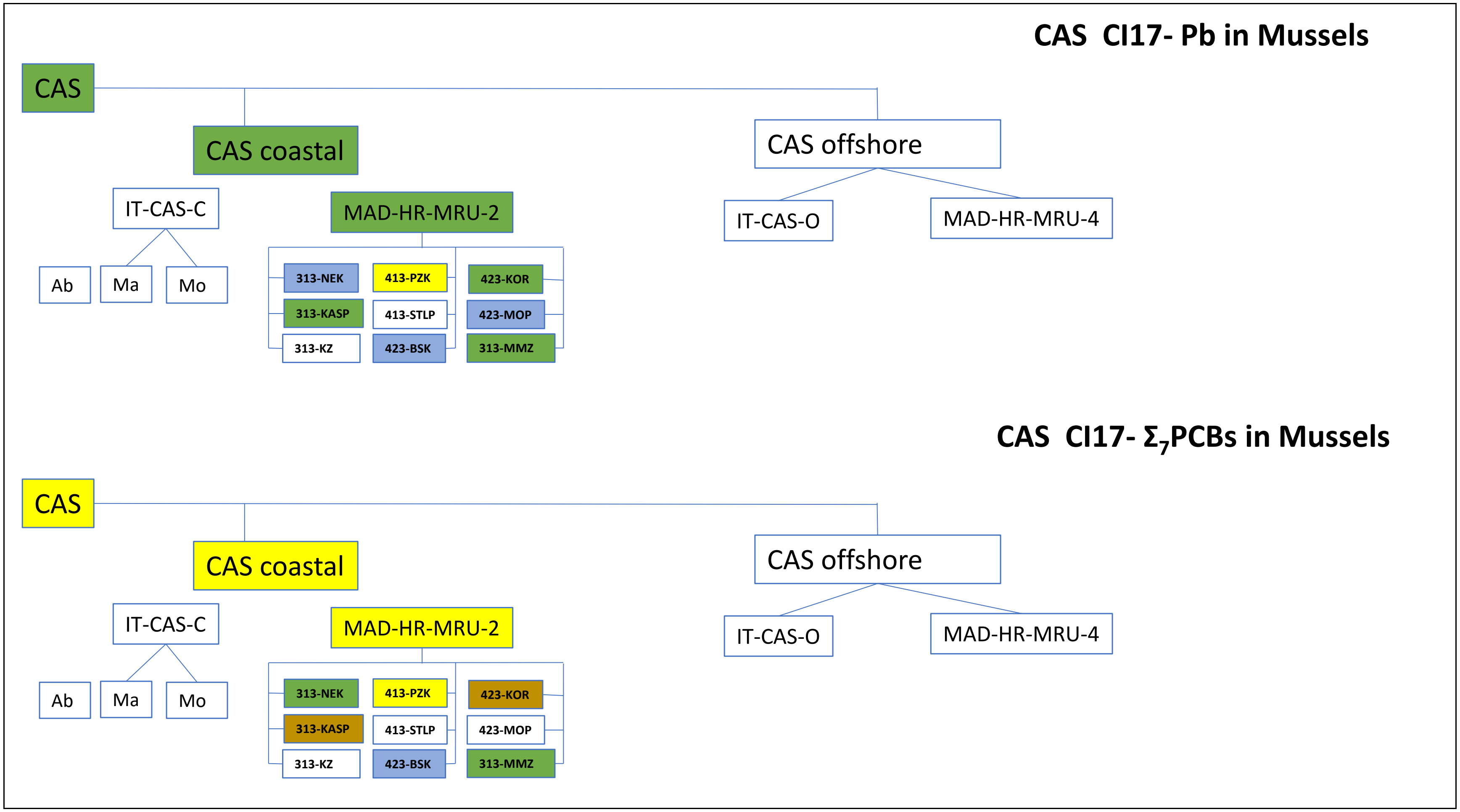
Schematic presentation of the assessment results as presented in Table 9 for EO9/CI17 in the Central Adriatic Sea (CAS) sub -division per contaminant in mussels (Cd & Hg)

Blank boxes denote absence of data



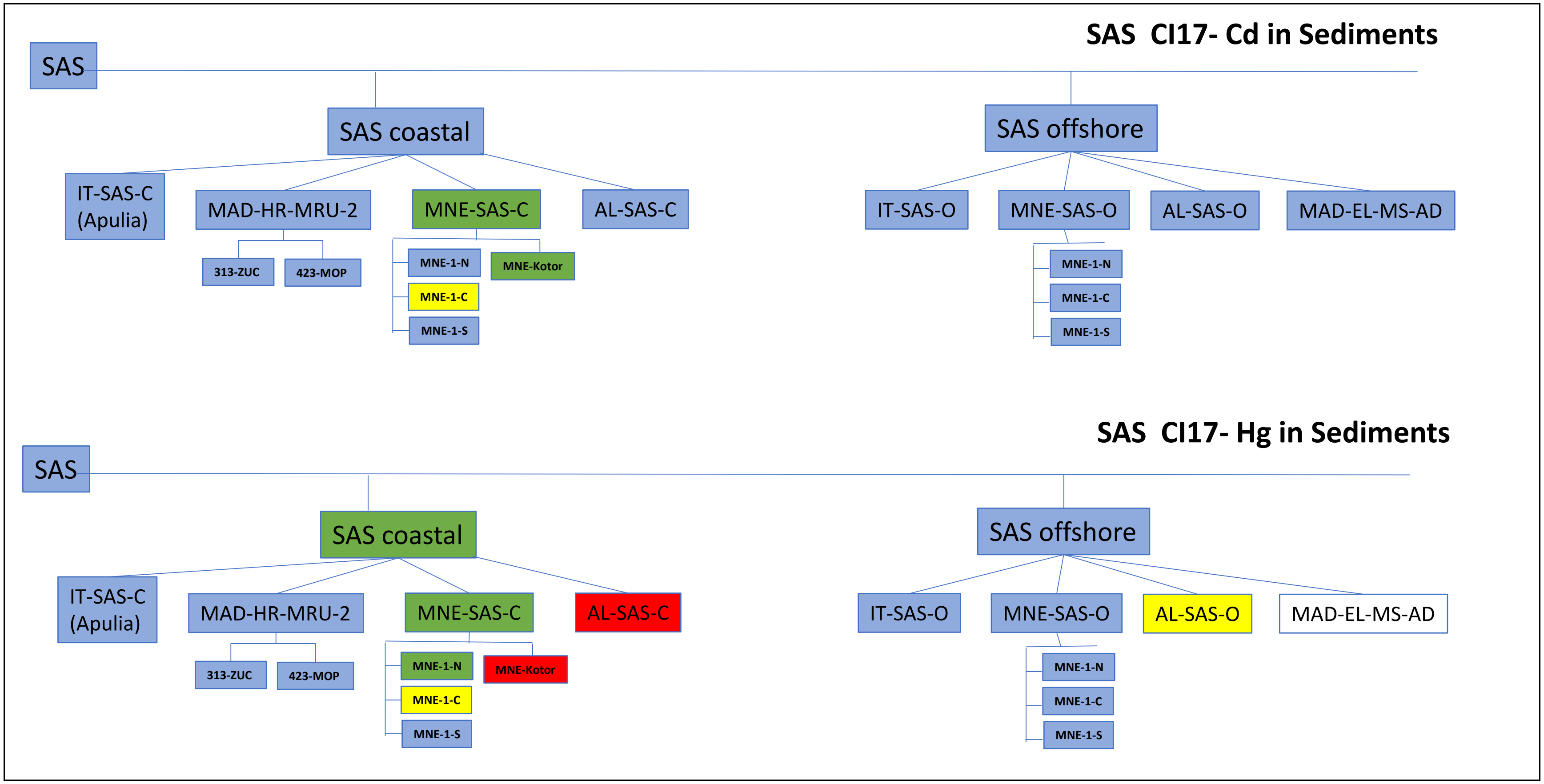
Schematic presentation of the assessment results as presented in Table 9 for EO9/CI17 in the Central Adriatic Sea (CAS) sub -division per contaminant in mussels (Pb & Σ_7PCBs)

Blank boxes denote absence of data



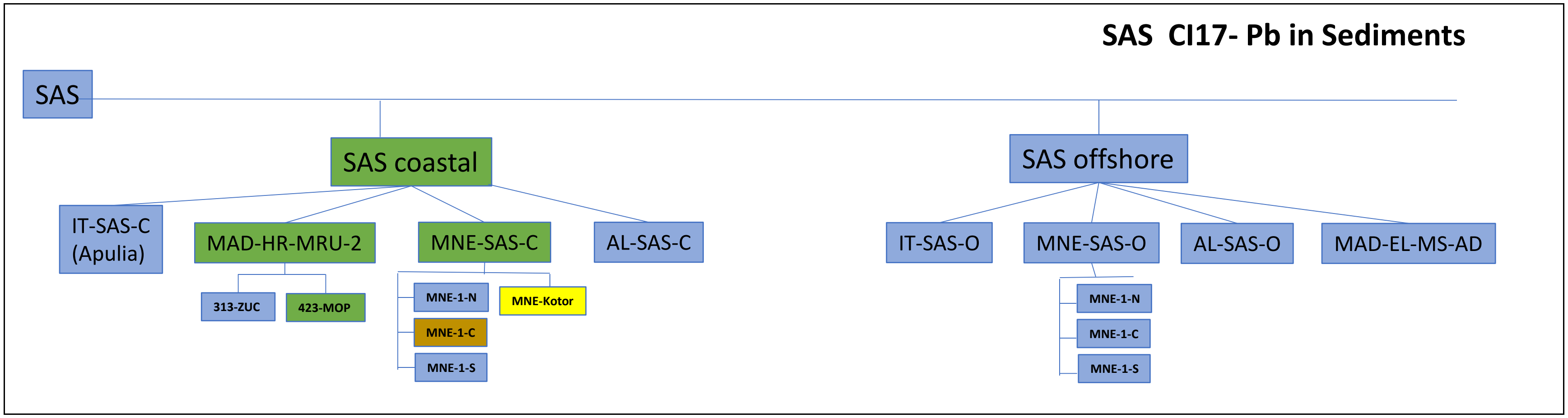
Schematic presentation of the assessment results as presented in Table 9 for EO9/CI17 in the South Adriatic Sea (SAS) sub -division per contaminant in sediments (Cd & Hg)

Blank boxes denote absence of data



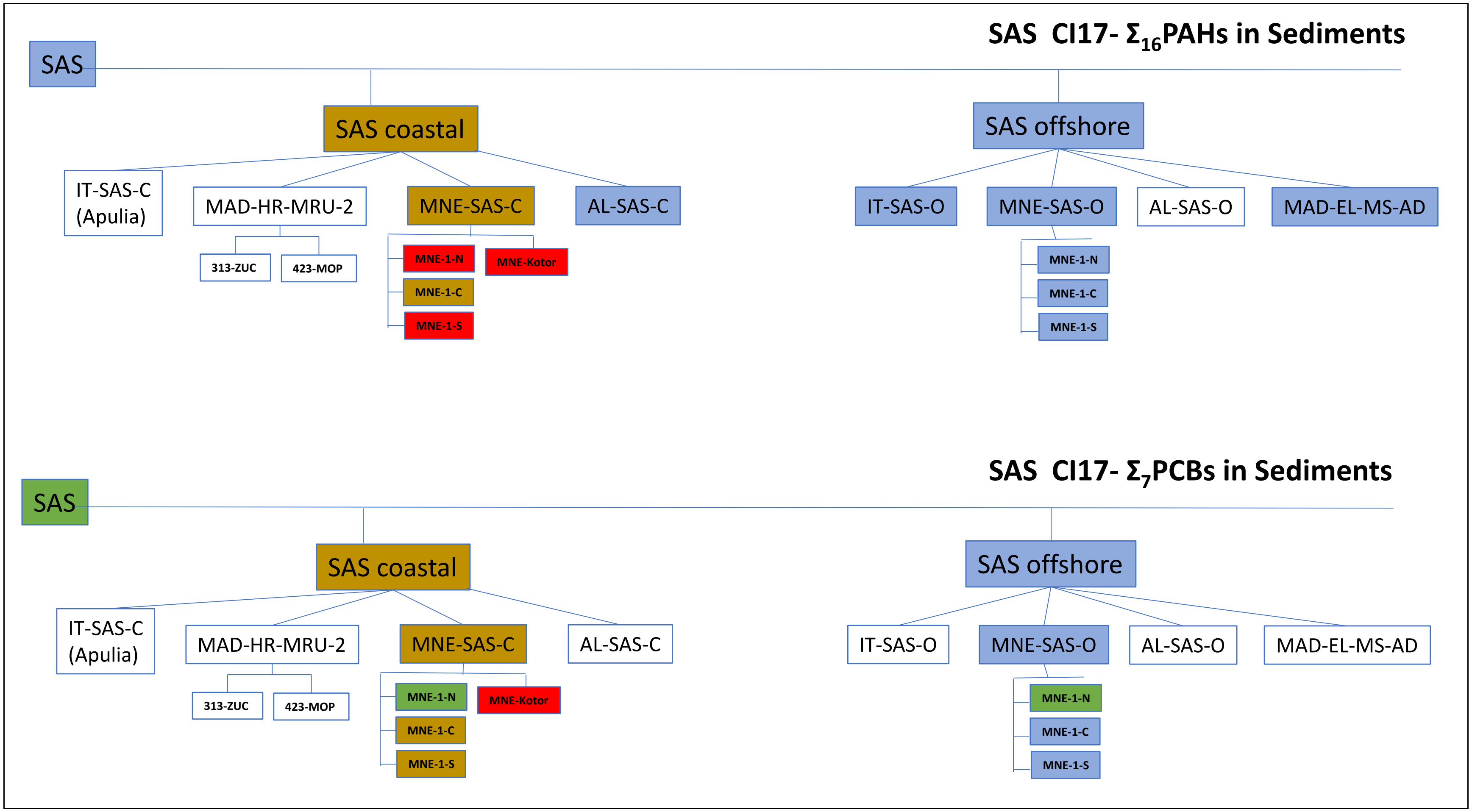
Schematic presentation of the assessment results as presented in Table 9 for EO9/CI17 in the South Adriatic Sea (SAS) sub -division per contaminant in sediments (Pb)

Blank boxes denote absence of data



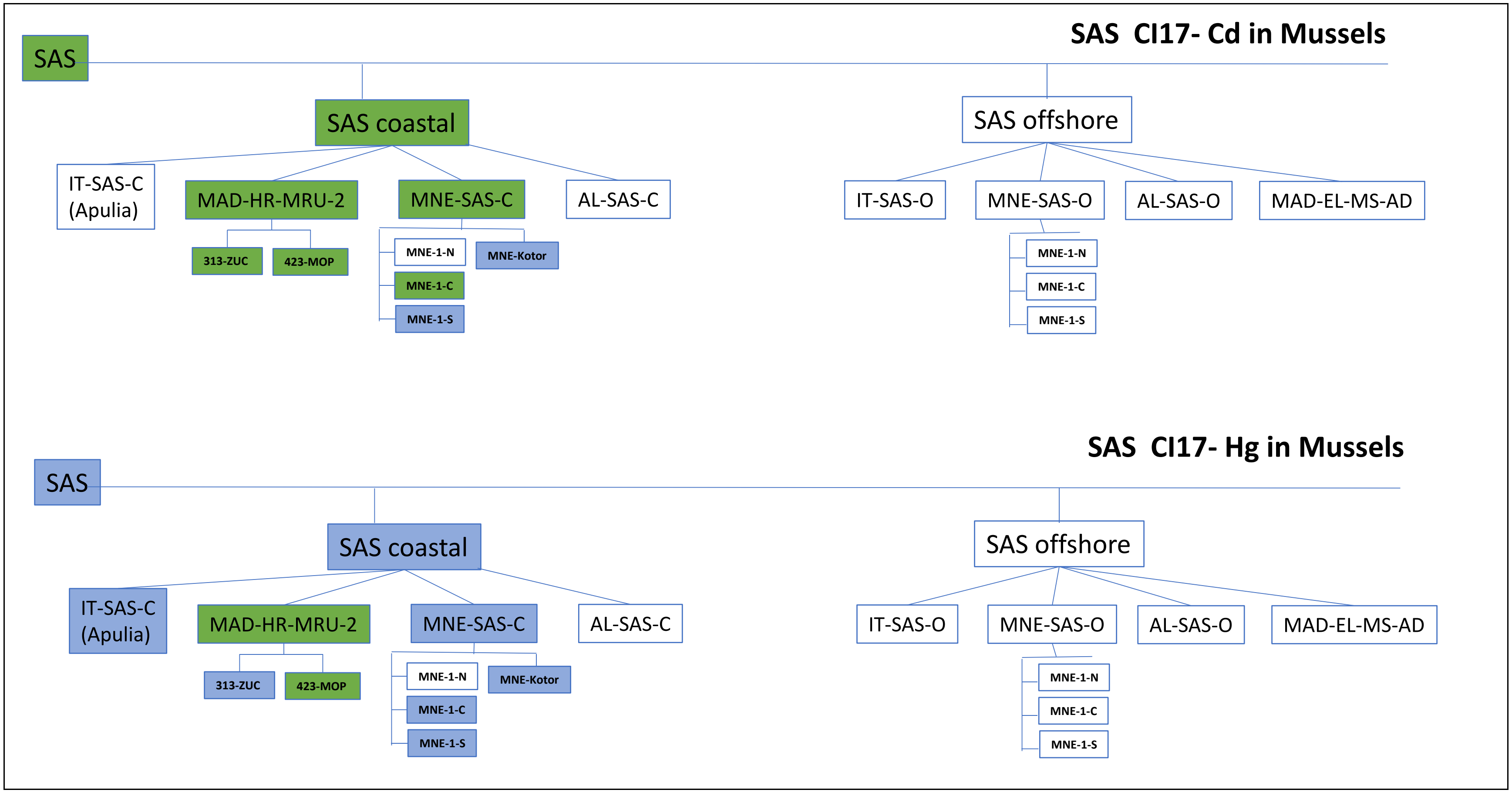
Schematic presentation of the assessment results as presented in Table 9 for EO9/CI17 in the South Adriatic Sea (SAS) sub -division per contaminant in sediments (Σ_{16}PAHs & Σ_7PCBs)

Blank boxes denote absence of data



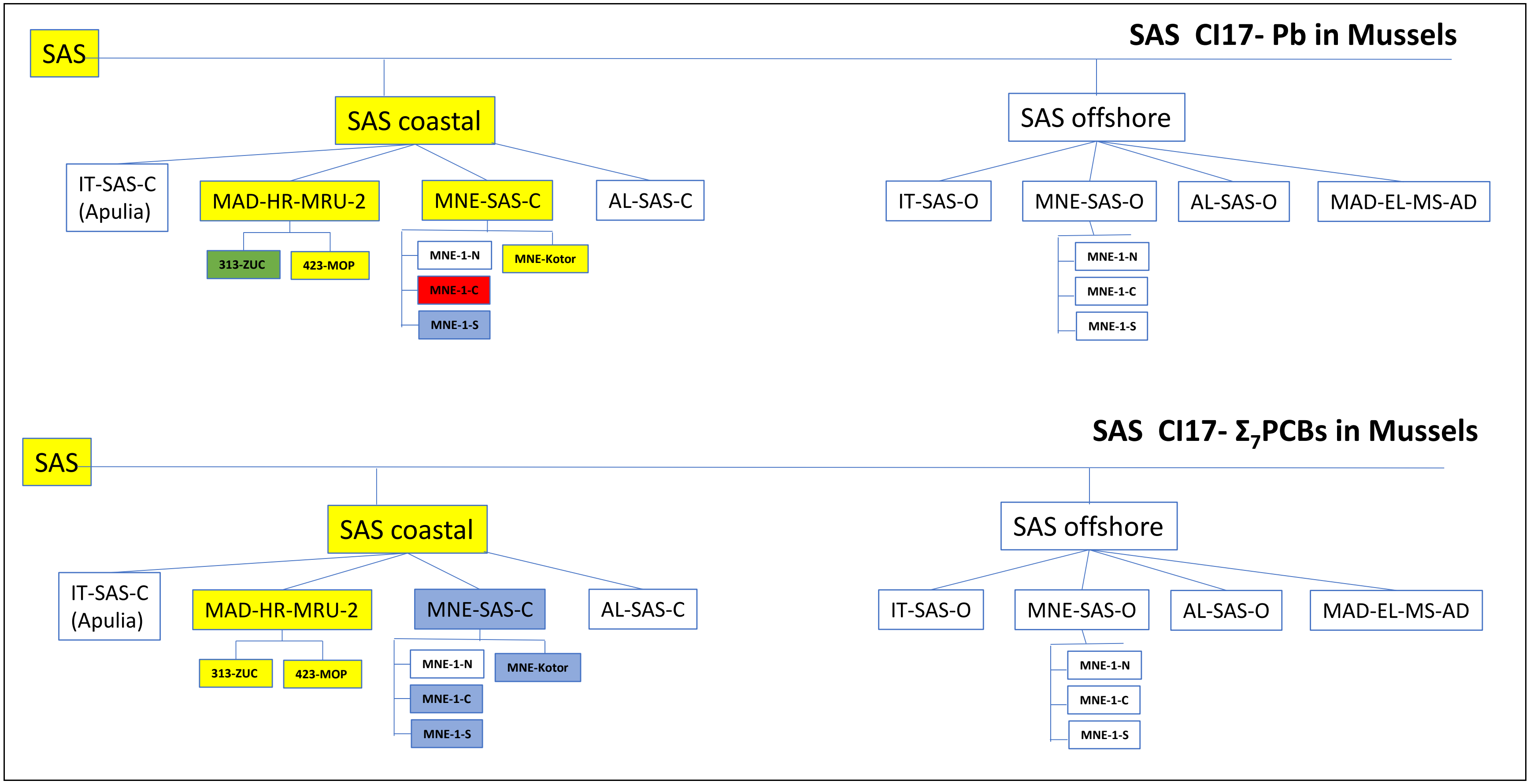
Schematic presentation of the assessment results as presented in Table 9 for EO9/CI17 in the South Adriatic Sea (SAS) sub -division per contaminant in mussels (Cd & Hg)

Blank boxes denote absence of data



Schematic presentation of the assessment results as presented in Table 9 for EO9/CI17 in the South Adriatic Sea (SAS) sub -division per contaminant in mussels (Pb & Σ7PCBs)

Blank boxes denote absence of data



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