522. Overall, it can be seen from Tables 3.1.4.3.4.a and Table 3.1.4.3.4.b. 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 sub-division 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 and 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.

523.
The comparison and harmonization of the assessment methodologies applied for IMAP CI 17:

To avoid possible bias in the Mediterranean regional assessment that may occur as a result of the use of different assessment methodologies in different areas, comparisons were performed i.e., between i) the “traffic light” and the CHASE+ in the LEVS Sub-division; ii) the NEAT and the CHASE+ in the ADR Sub-region and iii) the NEAT and the CHASE+ in the WMS Sub-region. The comparisons were performed to decrease uncertainty and to harmonize among assessments performed in different sub-regions and sub-divisions, with different number of sampling locations and measurements.

It was shown in the assessment of the Levantine Sea basin that the traffic light system is more lenient than CHASE+ and may mask the classification as non-GES of possible problematic areas for certain contaminants. Therefore, the “traffic light” was not further utilized.

Further to setting of the compatible GES/nGES threshold values for all sub-regions/sub-divisions, the approach described here-below is followed 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 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;
iii) 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 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 from monitoring data reported by the CPs, and because it is more stringent than the Med_EAC 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. 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.
iv) For all Sub-regions: 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.

A comparison between the NEAT and CHASE+ results for the WMS sub-region was performed by applying above approach. 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. The harmonization of the two tools 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, regarding delineation between high and good statuses, the in-GES classification, and between moderate and poor, the non-GES classification. When aggregation is conducted for all contaminants on the individual SAU level comparisons differ by 5% and still can be considered acceptable.

The harmonization of the NEAT and CHASE+ assessment methodologies was as good as possible. They are still different methodologies and the results will not be identical, however the harmonization ensured their alignment to the extent which prevents bias assessment of the four Mediterranean sub-regions within the preparation of the 2023 MED QSR. The NEAT is the methodology which properly supports efforts aimed at the GES assessment in line with the Decision IG. 23/6 on the 2017 MED QSR, and therefore its further application across all four Mediterranean sub-regions should be foreseen within preparation of the future QSR. The CHASE+ assessment methodology may continue being used in specific cases, i.e., for the local areas and limited assessments with insufficient data reported for the GES assessment to guide decision making.

Assessment classification boundary limits/thresholds for a harmonized application of IMAP NEAT and CHASE+ assessment methodologies for IMAP CI 17 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 <m conc. ≤ max. 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
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

524. 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 3.1.4.3.4.a (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.

525. The integration of SAUs data per chemical parameter (Table 3.1.4.3.4.a, 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.

526. In Table 3.1.4.3.4.b 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).

527. 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 3.1.4.3.4.a and 3.1.4.3.4.b) can only be considered indicative. This is related to the fact that several SAUs either lack of data or the countries eventually decided not to monitor the areas that are found irrelevant for the assessment of contaminants and therefore excluded the areas where problems were not historically observed (blank cells in Tables 3.1.4.3.4.a and 3.1.4.3.4.b).

528. , The final GES assessment findings for all the IMAP SAUs in the Adriatic Sea, as provided in Table 3.1.4.3.4.a, are shown by the respective color in the maps included in the Figures ADR 3.1.4.3.3.C - 3.1.4.3.6.C. 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 3.1.4.3.4.a).

Table 3.1.4.3.4.a. 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. * Light green coloured cell corresponds to subSAU MNE-1-C reconsidered as in good status following justification provided by authorities of Montenegro. The status of this unit was adjusted from moderate to good i.e., color was changed from yellow to light green, without changing the NEAT values, further to the justification related to the status of marine protected area Katic as provided by national authorities**.**
The % confidence is based on the sensitivity analysis.

			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**
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

			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**
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
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						

			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-CAS-C	2092	0	0.845		high	100	0.779	0.742	0.94	0.938					
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*		good*	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 (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**
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 3.1.4.3.4.b: 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. * Light green coloured cell corresponds to subSAU MNE-1-C reconsidered as in good status following justification provided by authorities of Montenegro. The status of this unit was adjusted from moderate to good i.e., color was changed from yellow to light green, without changing the NEAT values, further to the justification related to the status of marine protected area Katic as provided by national authorities**.** The % confidence is based on the sensitivity analysis .

SAU	Area (km^2)	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
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	

SAU	Area (km^2)	Total SAU weight factor	NEAT value	Status Class	% Confidence	sediments	mussels
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	
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

SAU	Area (km^2)	Total SAU weight factor	NEAT value	Status Class	% Confidence	sediments	mussels
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*	good*	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	

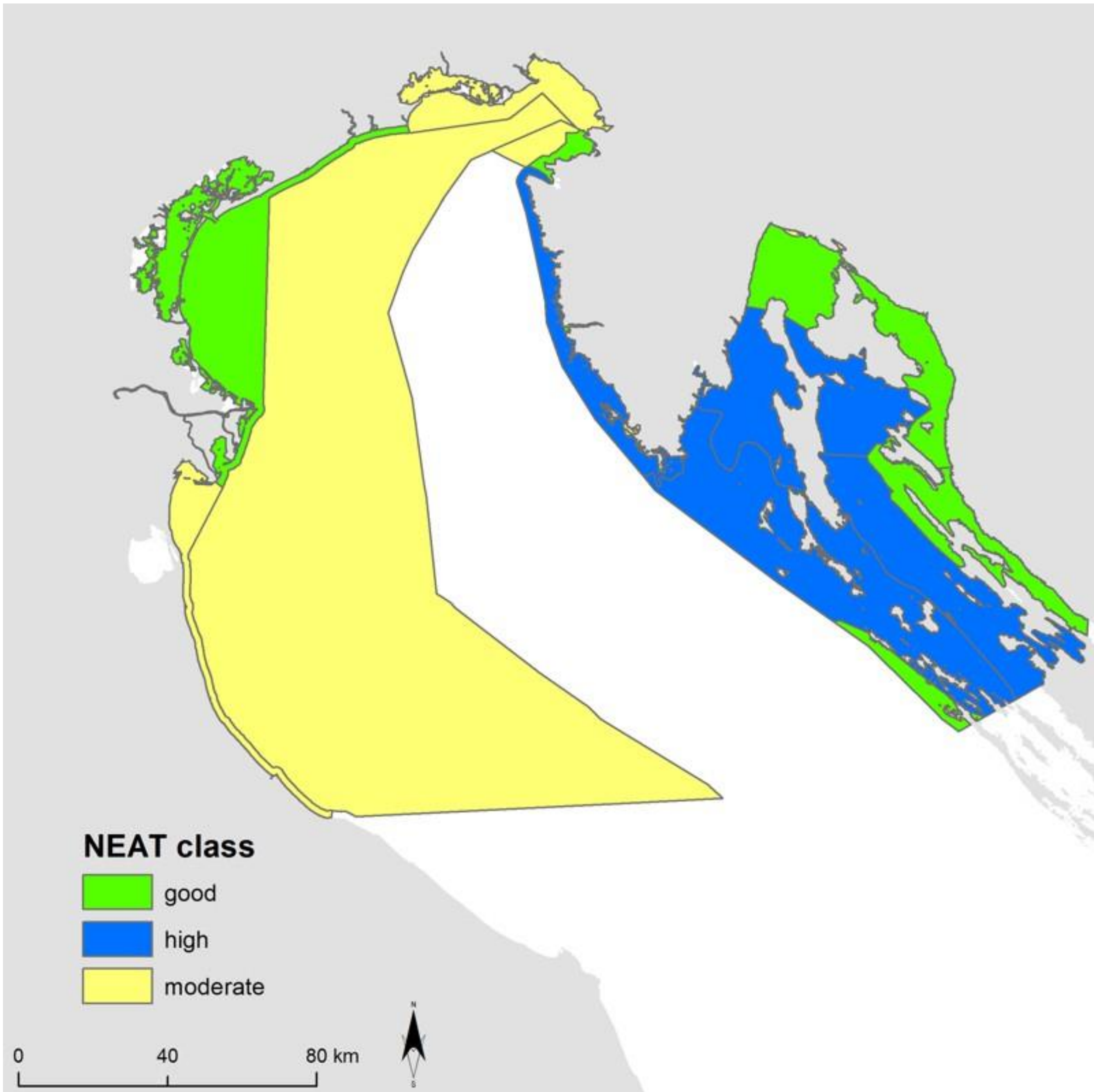

Figure ADR 3.1.4.3.3.C: The NEAT assessment results for IMAP CI17 in the North Adriatic Sea. Aggregation of all contaminants per sub-SAU. Blank area corresponds to no available data/decision or not established monitoring.

529. 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.

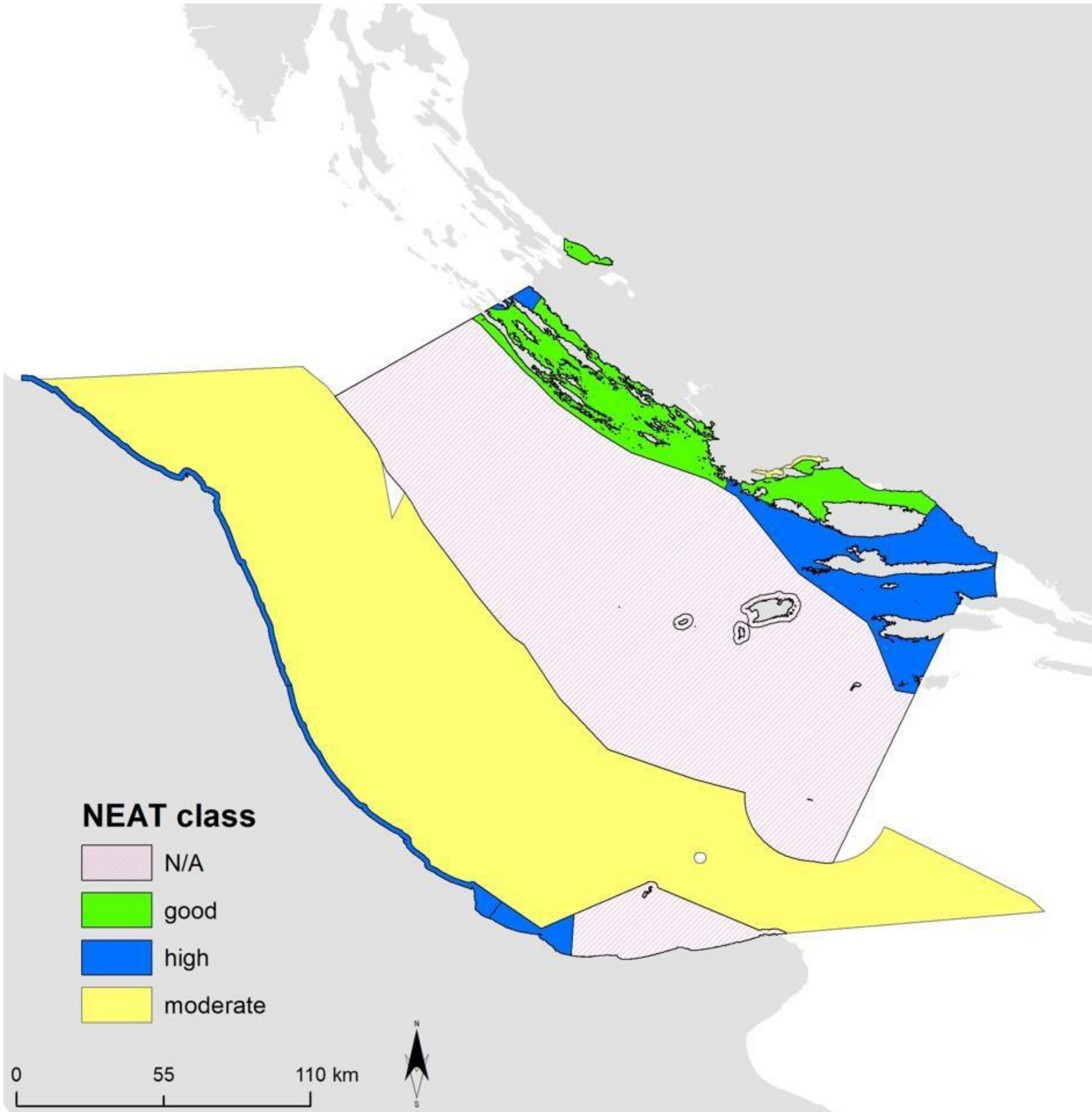

Figure ADR 3.1.4.3.4.C: The NEAT assessment results for IMAP EO9/CI17 in the Central Adriatic Sea. All IMAP SAUs are in GES, characterized by High or Good status.

530. 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.

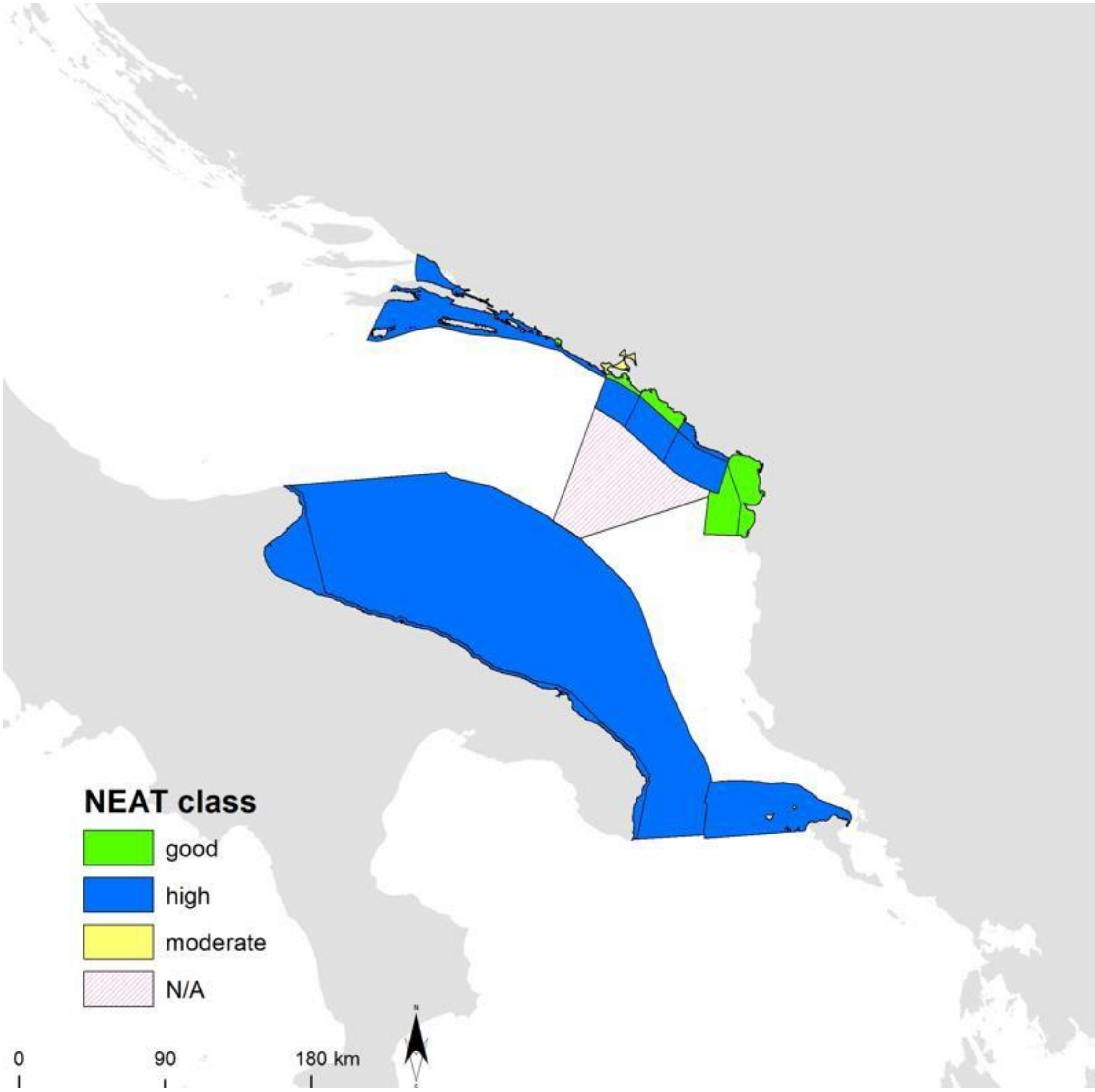

Figure ADR 3.1.4.3.5.C: The NEAT assessment results for IMAP CI17 in the South Adriatic Sea. Aggregation of all contaminants per sub-SAU. Blank area corresponds to no available data/decision or not established monitoring.

531. When all contaminants are aggregated, most sub-SAUs in the SAS 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-SAU MNE-Kotor in Montenegro.

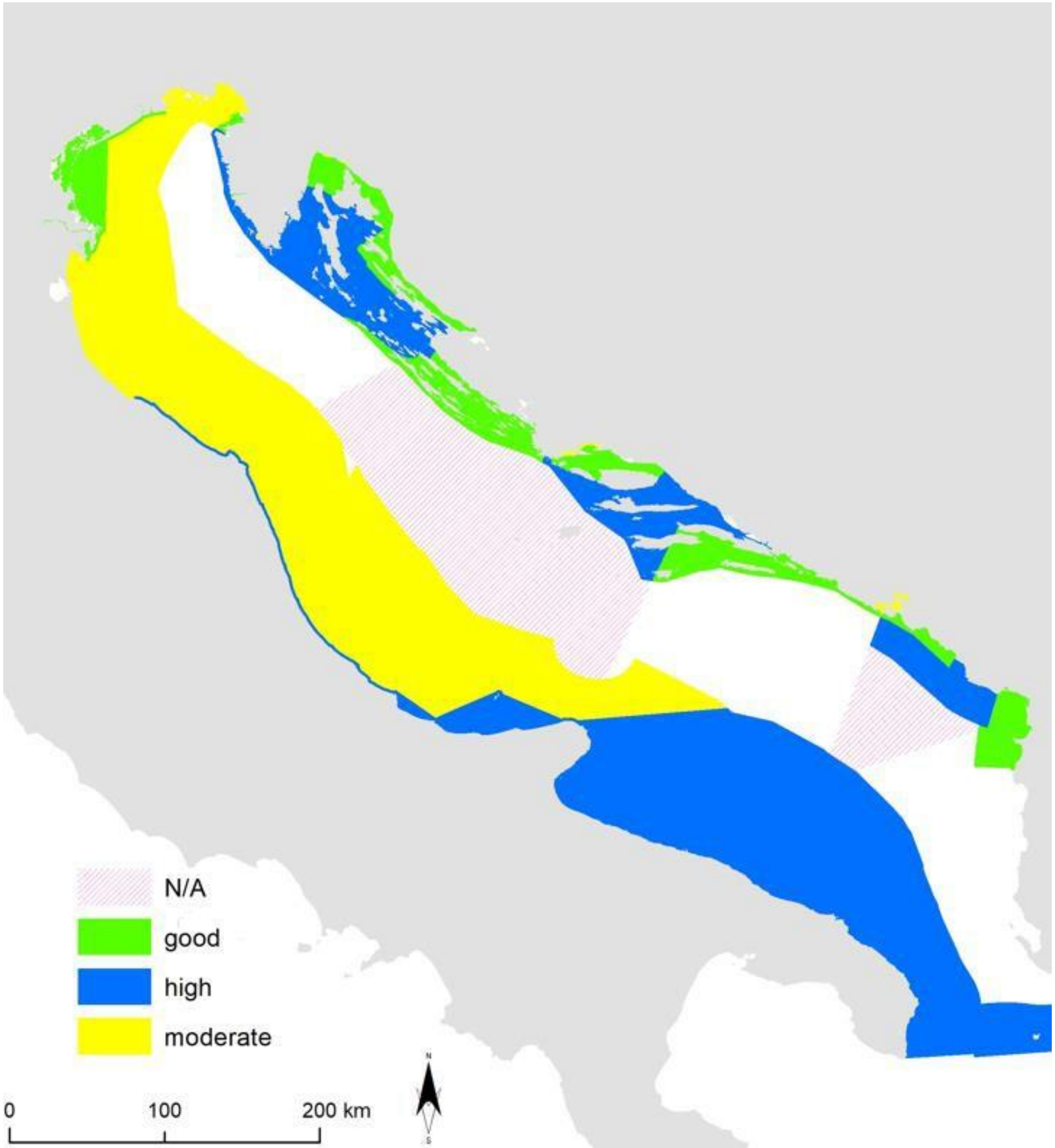

Figure ADR 3.1.4.3.6.C: The NEAT assessment results for IMAP CI17 in the Adriatic Sea sub-region. Aggregation of all contaminants per sub-SAU. Blank area corresponds to no available data/decision or not established monitoring.

The IMAP GES assessment of the Western Mediterranean Sea (WMS) Sub-region

532. The GES for IMAP CI 17 was assessed by applying the NEAT tool on the Western Mediterranean nested scheme in line with the elaboration of the integration and aggregation rules provided for the NEAT tool application in the Adriatic Sea Sub-region, including optimal temporal and spatial integration and aggregation of the assessment findings within nested approach agreed for IMAP implementation. For the purposes of the present work data on contaminants produced within implementation of the national monitoring programmes of the CPs and reported to the IMAP IS or

submitted to UNEP/MAP have been gathered. IMAP SAUs have been defined for the whole WMS, however, based on data availability it was possible to obtain reliable assessment results by using the NEAT tool only for the coastal assessment zones of the Alboran and the Tyrrhenian sub-divisions (ALBS, TYRS), whereby a simplified application of the NEAT tool was chosen only for the IMAP SAUs for which data exist without any spatial integration on the CWMS level.

Available data

533. Data on contaminants (Cd, Hg, Pb, PAHs and PCBs) have been collected from the following Contracting Parties bordering the Western Mediterranean Sea for the years 2017 to 2022: France, Italy, Morocco, Spain. In addition, some data for sediments acquired in 2016 and not used in previous assessment have been included in the present work, in order to increase the amount of data, i.e. reliability of the assessment findings. 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 here-below in Table 3.1.4.4.1. The biota matrix is monitored for mussels *Mytilus galloprovincialis* in all cases. The spatiotemporal coverage varies largely among the various IMAP SAUs. Data for the Alboran Sea were reported for 5 out of 8 coastal SAUs, and no data were reported for any offshore SAUs. Data reported by Morocco refer to Cd, Hg, Pb in sediments and biota, while data reported by Spain refer to Cd, Hg, Pb and PCB on biota only. Algeria has not reported any data for the period 2017-2022. Data for the Central part of the Western Mediterranean Sea (CWMS) have been reported only by France, Spain and Italy. France and Spain reported data mostly for biota and only for stations situated in the coastal zone, i.e. France on Cd, Hg, Pb, PAHs and PCBs, and Spain on Cd, Hg, Pb and PCBs. Data for sediments were reported by France (Cd, Hg, Pb) and Spain (PAHs, PCBs, Cd, Hg, Pb) for 2016 only, mostly in coastal waters. Italy in CWMS reports data for sediments only (Cd, Hg, Pb, PAHs, PCBs). In the Tyrrhenian Sea (TYRS) for 6 out 7 coastal SAUs data were reported on contaminants. These are data reported by Italy for sediments on Cd, Hg, Pb, PAHs and PCBs, and data reported by France for biota on Cd, Hg, Pb, PAHs and PCBs and for sediments on Cd, Hg, Pb. Data for biota reported by Italy are very limited, confined to only 2 coastal SAUs and only for Hg, hexachlorobenzene and fluoranthene, hence they were not included in the assessment. Overall, for all sub-divisions of the WMS no data were reported for offshore IMAP SAUs, with the exception of one station sampled once for metals in biota in ES-CWM-LEV1-O SAU and 9 stations sampled for PAHs, PCBs, Cd, Hg, Pb in ES-CWM-LEV1-O SAU and one station in ES-CWM-LEVOS-O SAU, all during 2016.

534. A set of 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) was applied to propose the scope of the areas of monitoring. Namely, the first element that was considered for the implementation of the nested approach is the definition of the areas of assessment within the Western Mediterranean Sea based on the areas of monitoring. The existing monitoring and assessment areas defined by the concerned CPs were used, in case they were compatible with IMAP requirements; in case of the Contracting Parties that are EU MSs, if inconsistency appeared between IMAP requirements and MSFD MRUs, the necessary adjustments were undertaken.

535. The percentage (%) of surface area of the IMAP SAUs with monitoring data reported to the total area of the coastal assessment zone was calculated in order to better understand differences in the spatial coverage of the SAUs,. 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 here-below further to the analysis provided regarding the spatial coverage of monitoring data collected per each SAU in the Western Mediterranean Sea and per environmental matrix

(sediments, biota) and per contaminant group (trace metals (TM), PAHs, PCBs) separately. Table 3.1.4.4.1 provides the temporal coverage of monitoring data used again per each SAU in the Western Mediterranean Sea and per environmental matrix (sediments, biota) and per contaminant group (trace metals (TM), PAHs, PCBs) separately.

536. For the scope of CI17 monitoring in the Western Mediterranean Sea, the CPs have set 91.5% of the monitoring stations in the coastal zone and no data on contaminants were reported for the period 2017-2022 for any of the offshore stations. Only some data on sediments in Spanish offshore waters were reported for 2016 corresponding to 4% of total number of records. Despite that data were reported for 67% of the coastal IMAP SAUs in the CWMS by France, Spain and Italy, whereby there is a lack of data for whole southern coasts of Algeria and Tunisia. Hence the integrated assessment using the NEAT tool for this subdivision would be unreliable. In addition, based on the highest spatiotemporal coverage of data per matrix and per contaminant, reliable assessments using the NEAT tool can be made for the coastal zone of ALBS subdivision for metals in sediments and biota and for the coastal zone of TYRS subdivision for metals, PAHs and PCBs in sediments. The coastal part of the subdivision CWMS corresponding to French, Spanish and Italian monitoring areas was assessed just for the 1st level using the NEAT tool without any further spatial integration.

Table 3.1.4.4.1. Data availability per year and country for the assessment of EO 9 – CI 17 (contaminants) in the Western Mediterranean Sea (WMS) Sub-region, as available by 31st October 2022.

Source	**IMAP-File**	**Country**	**Year**	**Cd**	**Hg**	**Pb**	**Σ_{16} PAHs**	**Σ_5 PAHs**	**Σ_7 PCBs**	**Lindane**	**Dieldrin**	**Hexachlorobenzene**	**p,p' DDE**
Sediment													
IMAP_IS	224	France	2016	23	23	23							
EMODNet		France	2016	27	27	27	29	29					
IMAP_IS	469	Italy	2016	98	56	98		49	7	77		77	
IMAP_IS	469	Italy	2017	55	50	42		14		31		31	
IMAP_IS	469	Italy	2018	98	94	88		56	25	68		68	
IMAP_IS	469	Italy	2019	55	42	53		24		25		15	
IMAP_IS	243	Morocco	2016	11		11							
IMAP_IS	243	Morocco	2017	11	11	11							
IMAP_IS	243	Morocco	2018	11	11	11							
IMAP_IS	593	Spain	2016	54	54	54			54	54	54	54	54
IMAP_IS	623	Spain	2016					54					
M. galloprovincialis													
IMAP-IS	495	France	2018	23	23	23	23	23		23	23	23	
Reported to UNEP/MAP ('Extraction_RNOMV_2018_2022.csv'		France	2018	19	38	19	7		7				
Reported to UNEP/MAP		France	2019	20	40	20	15		15				
Reported to UNEP/MAP		France	2020	30	30	30	13		13				
Reported to UNEP/MAP		France	2021	28	28	28	15		15				
IMAP-IS	494	Italy	2016		12							12	
IMAP-IS	494	Italy	2017		23							23	
IMAP-IS	494	Italy	2018		15							13	

Source	IMAP-File	Country	Year	Cd	Hg	Pb	Σ_{16} PAHs	Σ_5 PAHs	Σ_7 PCBs	Lindane	Dieldrin	Hexachlorobenzene	p,p' DDE
IMAP_IS	494	Italy	2019									2	
IMAP_IS	650	Morocco	2019	4	4	4							
IMAP_IS	650	Morocco	2020	4	4	1							
IMAP_IS	650	Morocco	2021	4	4	4							
IMAP_IS	517	Spain	2017						25	25	25	25	25
IMAP_IS	619	Spain	2017	25	25	25							
IMAP_IS	620	Spain	2019	45	45	45							
M. barbatus													
IMAP_IS	516	Spain	2016						73	73	73	73	73

537. 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 the Western Mediterranean sub-divisions. Average concentrations (arithmetic means) and their respective standard errors were then calculated in the respective groups as explained above for the Adriatic Sea Sub-region.

538. 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 MED POL 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. For the present application of NEAT these cases were 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[98], 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.

539. Several records on PAHs and PCBs individual compounds were reported as below detection limit values (DL) or equal to the limit of quantification (LOQ). In a separate technical paper, prepared by MED POL in consultations with OWG EO9, it was recommended to incorporate the calculations of the BDL values into the calculation of the BC and BAC and not to exclude them[99]. For the present application of NEAT, BDL were substituted by the BDL/2 value for data reported by Morocco for Hg in sediments. All data reported by Spain are above DL. In data reported by Italy, LOQ values were reported, and these were not uniform for the whole data set. LOQs for the same chemical parameter varied from 0.1 to 10 µg/kg. To compensate the high variability in the LOQs, the LOQ/2 value was used only for those records with reported LOQs equal to 5 and 10 µg/kg. The LOD, LOQ values were analyzed in detail, as reported by the CPs in tdata files. Furthermore, considering the list of substances the monitoring of which is

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[98] 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.

[99] 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 (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 data is BDLs. Therefore, the calculation for the assessment criteria was performed with the reported value and not half of it. 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.

mandatory according to IMAP[100], the sum of the 16 EPA compounds (Σ_{16}PAHs) and sum of the 7 PCBs compounds (Σ_7PCBs) were 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, similarly to the CI17 assessment made for the Adriatic Sea subregions.

The integration of the areas of assessment and assessment results by applying the 4 levels nesting approach

540. Following the rules of integration of assessments within the nested approach, for the assessment of EO9 Common Indicators, the coastal and the offshore monitoring zones were set as explained above .

541. Detailed explanation on data sources used and methodology followed for setting of the two zones (coastal and offshore) along with SAUs was provided for the purpose of the present work in the Western Mediterranean. In summary, GIS layers collected from different sources (International Hydrographic Organization - IHO, European Environment Information and Observation Network - EIONET, VLIZ Maritime Boundaries Geodatabase; EEA Marine Regions portal) were used for the present work for Italy, France, Spain, Morocco, Algeria, Tunisia.

542. For IMAP CI 17, integration of assessments up to the subdivision level is considered meaningful. Therefore, three main subdivisions of the Western Mediterranean Sea, have been considered: The Alboran Sea (ALBS); The Tyrrhenian Sea (TYRS) and the Central part of the Western Mediterranean Sea (CWMS), following the specific geomorphological features based on the IHO data[101]. The coverage of the 3 sub-divisions is shown in Figure 3.1.4.4.1.

[100] 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.
[101] Limits of oceans and seas (1953). 3rd edition. IHO Special Publication, 23. International Hydrographic Organization (IHO): Monaco. 38 pp.

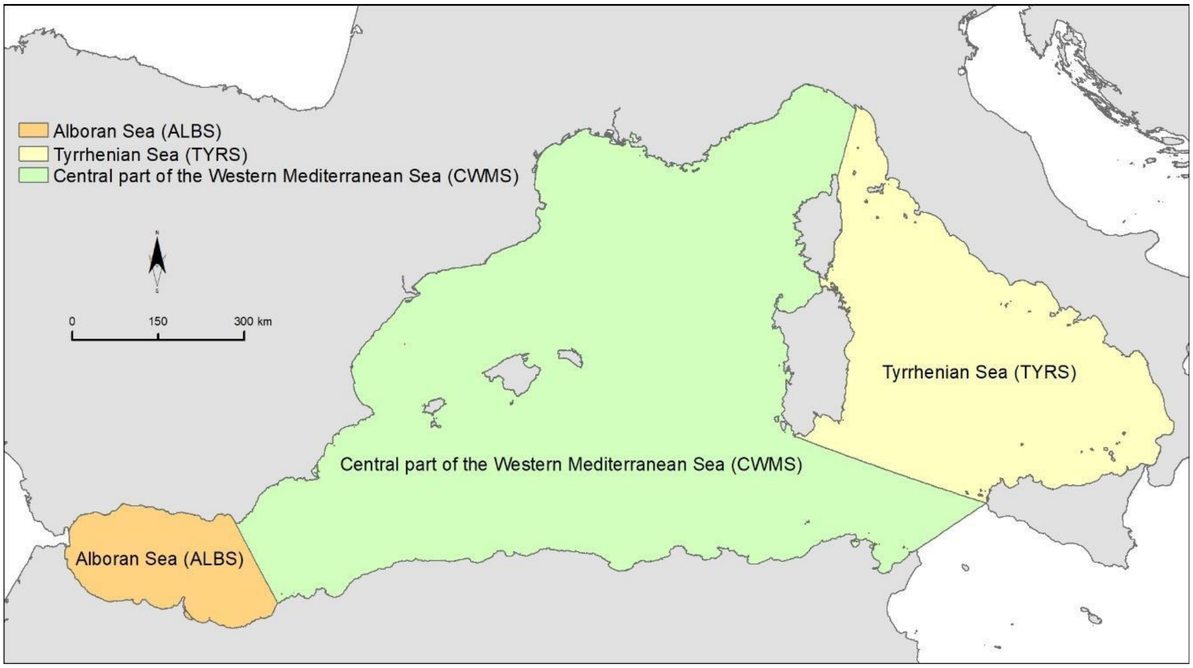

Figure 3.1.4.4.1. The 3 subdivisions of the Western Mediterranean Sub-Region defined, based on IHO data.

543. The four following steps for integration of the areas of assessment was followed to accomplish the objectives of the NEAT IMAP GES Assessment :

- Step 1 "Defining coastal and offshore waters";
- Step 2 "Recognizing scope of IMAP areas of monitoring";
- Step 3 "Setting IMAP area of assessment":
- Step 4 **"**Nesting of the areas of assessment within the application of NEAT tool": For this step of nesting, the areas of assessment were first classified under the 3 subdivisions of the Western Mediterranean Sea (i.e. ALBS, CWMS, TYRS). A 4 levels nesting approach, as applied in the Adriatic Sea Sub-region was also set for the Western Mediterranean Sub-region (Figure 3.1.4.4.2a), where the 1st level is the finest, providing nesting of all the finest areas of assessment i.e. the national IMAP SAUs & subSAUs within the two key IMAP assessment zones per country i.e. coastal and offshore zones and the 4th level is the highest.

544. However, for the scope of CI17 monitoring in the Western Mediterranean Sea, the CPs have set 91,5% of the monitoring stations in the coastal zone and no data on contaminants were reported for the period 2017-2022 for any of the offshore stations. In addition, only 53% of the coastal IMAP SAUs & sub SAUs for the CWMS reported data (by France and Spain) which makes any spatial integrated assessment using the NEAT tool unreliable for this subdivision. For these reasons, it was not considered meaningful to proceed with a 4 levels' nesting scheme in all 3 sub-divisions as shown in Figure 3.1.4.4.2.a.

545. Therefore, only the coastal SAUs were considered and nested under a 2 levels` hierarchical scheme and the integration of the assessment results was conducted for the coastal zone of the Alboran (ALBS) and Tyrrhenian Seas (TYRS) sub-divisions as follows:

- 1st level provided nesting of all national IMAP subSAUs within the coastal IMAP assessment zone per country;
- 2nd level provided nesting of the national coastal IMAP assessment zones on the subdivision level i.e., i) ALBS coastal; ii) TYRS coastal.

546. Similarly, the integration of the assessment was conducted in 2 levels as follows:

- 1st level: Detailed assessment results provided for all national coastal subSAUs and SAUs (ALBS, TYRS, some IMAP subSAUs of CWMS)
- 2nd level: Integrated assessment results provided for the coastal zone: i) ALBS coastal; ii) TYRS coastal.

547. The graphical depiction of this nesting scheme for the ALBs and TYRS is shown in Figure 3.1.4.4.2.b. The description of the IMAP SAUs and details on specificities for each country are also provided..

548. Given the integrated assessment up to the 2nd level using the NEAT tool was unreliable for CWMS, the assessment of this subdivision was undertaken just for the 1st level and only for those IMAP subSAUs for which data exist.

549. 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, the scope of all WMS SAUs and subSAUS were defined. All of them were introduced in the NEAT tool along with their respective codes and surface area (km^2).

550. The procedure for use by the NEAT tool of data related to SAUs surface, boundary limits, the class threshold values, the concentrations of the group of contaminants assessed, along with normalization of the values, is explained above for the Adriatic Sea Sub-region.

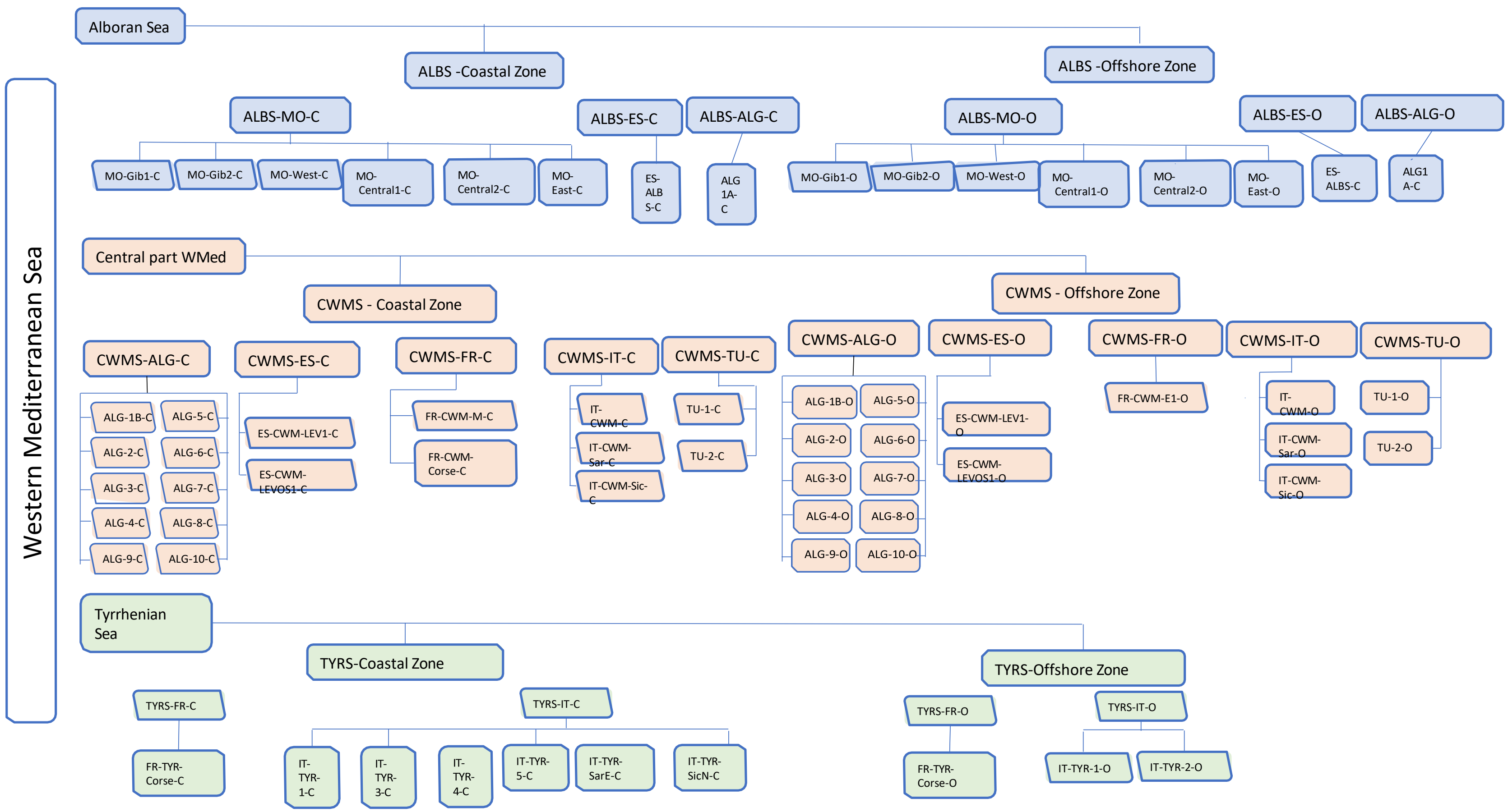

Figure 3.1.4.4.2 (a): The nesting scheme of the SAUs defined for the Western Mediterranean Sea Sub-region based on the available information.

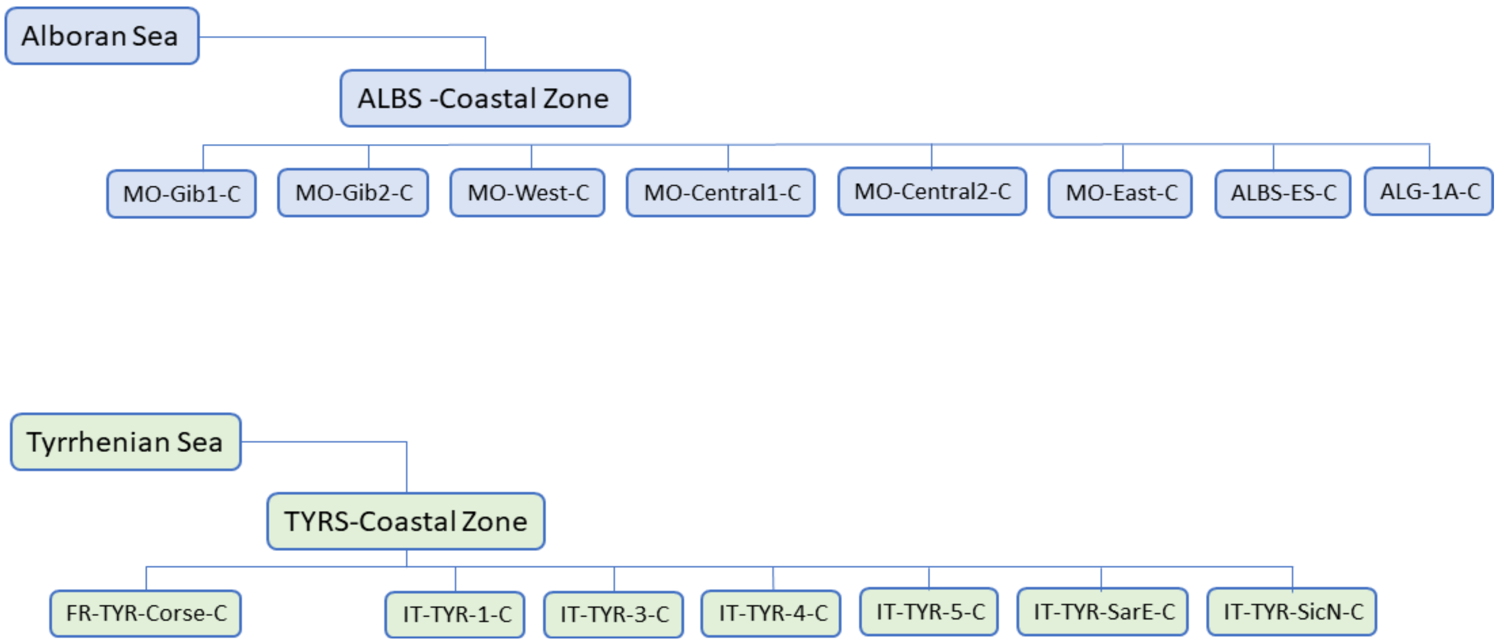

Figure 3.1.4.4.2(b): The 2-level nesting scheme for the Alboran and Tyrrhenian Seas Sub-divisions used for the present assessment of CI17 by applying the NEAT tool.

Setting the GES/non GES boundary value/threshold

551. As explained, the present assessment analysis applying the NEAT tool was conducted for each subdivision using the assessment criteria for the GES-non GES threshold, based on BAC values are shown in Table 3.1.4.4.2.

Table 3.1.4.4.2: The BAC values calculated for the Western Mediterranean Sea and used for the present assessment

	WMED BAC (µg/kg dry wt)	
	Sediments	**Biota (MG)**
Cd	210	1545
Hg	135	120
Pb	24000	1890
*Σ_{16} PAHs	240	8.4
+Σ_7 PCBs	1.6	28.6

552. In line with an updated assessment classification for a harmonized application of NEAT and CHASE+ tools in the four Mediterannean Sea sub-regions, the Boundary limits of the 5-class assessment scale and class Threshold values were applied for NEAT GES Assessment of the Western Mediterranean Sea-Sub-region (Table 3.1.4.4.3).

Table 3.1.4.4.3: Boundary limits of the assessment scale and class Threshold values used for the application of the NEAT tool for IMAP. All concentrations are in dry weight.

	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(xBAC) (µg/kg)**	**5(xBAC) (µg/kg)**	**Max. conc. (µg/kg)**
Cd	0	157	315	630	1575	1600
Hg	0	101	202	404	1013	1950
Pb	0	18000	36000	72000	180000	190000
*Σ_{16} PAHs	0	240	480	960	2400	30690
+Σ_7 PCBs	0	1.6	3.2	6.4	16	120
Biota (*M. galloprovincialis*)						
Cd	0	1159	2318	4635	11588	12000
Hg	0	90	180	*360*	900	1214
Pb	0	1417	2835	*5670*	14175	15000
*Σ_{16} PAHs	0	8.4	16.8	33.6	84	286
+Σ_7 PCBs	0	28.5	57	114	285	290

*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

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