





**EOs OF POLLUTION AND LITTER CLUSTER  
EUTROPHICATION**

**Human-induced eutrophication is prevented, especially adverse effects thereof, such as losses in biodiversity, ecosystem degradation, harmful algal blooms and oxygen deficiency in bottom waters.**

Operational Objectives	Indicators	Proposed GES	Proposed Target	Data availability	Proposed baseline
5.1 Human introduction of nutrients in the marine environment is not conducive to eutrophication	<b>5.1.1 Concentration of key nutrients in the water column<sup>1</sup></b>	Concentrations of nutrients in the eutrophic layer are in line with prevailing physiographic, geographic and climate conditions	State	<ul style="list-style-type: none"> <li>MED POL monitoring programme under LBS protocol</li> <li>Specific information provided by countries<sup>3</sup></li> <li>Initial assessment reports under MSFD implementation<sup>4</sup></li> </ul>	Nitrate: 0.6 µg/l Nitrite: 0.15 µg/l Ammonium : 0.5 µg/l Phosphate: 0.08 µg/l Silicate: 0.80 µg/l
			<ol style="list-style-type: none"> <li>Reference nutrients concentrations according to the local hydrological, chemical and morphological characteristics of the un-impacted marine region<sup>2</sup></li> <li>Decreasing trend of nutrients concentrations in water column of human impacted areas, statistically defined</li> </ol>		
	Pressure	<ol style="list-style-type: none"> <li>Reduction of BOD emissions from land based sources</li> <li>Reduction of nutrients emissions from land based sources</li> </ol>	SAP MED		
	<b>5.1.2 Nutrient ratios (silica,</b>	Natural ratios of nutrients		<ul style="list-style-type: none"> <li>MED POL</li> </ul>	N:P = 5 N:Si = 0.8

<sup>1</sup> Indicators in bold have been selected for agreement at COP18 (Istanbul, December 2013) mainly for data availability

<sup>2</sup> Thresholds to be set in the future, subject to decision of Contracting Parties

<sup>3</sup> Information requested in Sarajevo meeting (partial data).

<sup>4</sup> Partial data, only from European Mediterranean countries, and not harmonised between countries.

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	<b>nitrogen and phosphorus), where appropriate</b>	are kept		monitoring programme under LBS protocol <ul style="list-style-type: none"> <li>Initial assessment reports under MSFD implementation</li> </ul>	Si:P = 10
5.2 Direct effects of nutrient over-enrichment are prevented	<b>5.2.1 Chlorophyll-a concentration in the water column</b>	Natural levels of algal biomass in line with prevailing physiographic, geographic and climate conditions	State 1. Chl-a concentrations in high-risk areas below thresholds <sup>5</sup>  2. Decreasing trend in chl-a concentrations in high risk areas affected by human activities	<ul style="list-style-type: none"> <li>MED POL monitoring programme under LBS protocol</li> <li>Specific information provided by countries</li> <li>Initial assessment reports under MSFD implementation</li> </ul>	Chlorophyll a: 0.8 µg/l
	<b>5.2.2 Water transparency where relevant</b>	Clear water in line with prevailing physiographic, geographic and climate conditions	State 1. Secchi disk depth above threshold in risk areas  2. Increasing trend of transparency in areas impacted by human activities	Initial assessment reports under MSFD implementation	Secchi disk depth: 15 m
	<b>5.2.3 Number and location of major events of nuisance/toxic algal blooms caused by human activities<sup>6</sup></b>	No HABs	State Decreasing trend in the frequency of the occurrence of HABs	Initial assessment reports under MSFD implementation	HABs: 0

<sup>5</sup> Thresholds to be set in the future, subject to decision of Contracting Parties

<sup>6</sup> The connection between eutrophication and toxic algal blooms is subject of devoted research at the moment. The connection between the two is not clearly established as not all the ecosystems react in

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5.3 Indirect effects of nutrient over-enrichment are prevented	<b>5.3.1 Dissolved oxygen near the bottom, i.e. changes due to increased organic matter decomposition, and size of the area concerned</b> <sup>*7</sup>	Bottom water fully oxygenated in line with prevailing physiographic, geographic and climate conditions	State 1. Dissolved oxygen concentrations in high-risk areas above local threshold <sup>8</sup> 2. Increasing trend in dissolved oxygen concentrations in areas impacted by human activities	Initial assessment reports under MSFD implementation	Oxygen: 85% saturation

the same way. In fact recent surveys in UK/Ireland in the framework of OSPAR have allowed concluding on the lack of relation between the them and therefore the number and location of major events of nuisance/toxic algal blooms should always be regarded cautiously as an indicator of a direct effect of nutrient over-enrichment.

<sup>7</sup>Monitoring to be carried out where appropriate

<sup>8</sup> Thresholds to be set in the future, subject to decision of Contracting Parties

## POLLUTION

Operational Objectives	Indicators	Proposed GES	Proposed Target	Data availability	Proposed baseline
9.1 Concentration of priority <sup>9</sup> contaminants is kept within acceptable limits and does not increase	9.1.1 Concentration of key harmful contaminants in biota, sediment or water	Level of pollution effects are below a determined threshold defined for the area and species.	State Concentrations of specific contaminants below EACs or below reference concentrations <sup>10</sup>  Decreasing trend in contaminants concentrations in sediment and biota from human impacted areas, statistically defined	<ul style="list-style-type: none"> <li>• MED POL monitoring programme under LBS protocol</li> <li>• Specific information provided by countries</li> </ul>	<b>Mussels:</b> <ul style="list-style-type: none"> <li>• Trace metals Cadmium: 5 mg/kg d.w Mercury: 2.5 mg/kg d.w Lead: 7.5 mg/kg d.w</li> <li>• PCBs and Pesticides CB28: 0.64 µg/kg w.w. CB52: 1.08 µg/kg w.w. CB101: 1.20 µg/kg w.w. CB118: 0.24 µg/kg w.w. CB138: 3.16 µg/kg w.w. CB153: 16.0 µg/kg w.w. CB180: 4.80 µg/kg w.w. Lindane: 0.29 µg/kg w.w. pp' DDE: 10 µg/kg w.w. Dieldrin: 10 µg/kg w.w.</li> <li>• PAHs Phenanthrene: 24.3 µg/kg d.w. Anthracene: 4.1 µg/kg d.w. Fluoranthene: 6.8 µg/kg d.w. Pyrene: 6.1 µg/kg d.w. Benzo[a]anthracene: 1.3 µg/kg d.w. Chrysene: 2.4 µg/kg d.w. Benzo[k]fluoranthene: 1.8 µg/kg d.w. Benzo[a]pyrene: 1.3 µg/kg d.w. Benzo[ghi]perylene: 1.3 µg/kg d.w.</li> </ul>

<sup>9</sup> Priority contaminants as listed under the Barcelona Convention and LBS Protocol  
<sup>10</sup> Thresholds to be set in the future, subject to decision of Contracting Parties

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					<p>Indeno[123-c,d]pyrene: 0.8 µg/kg d.w.</p> <p><b>Red mullet:</b></p> <ul style="list-style-type: none"> <li>• Trace metals</li> </ul> <p>Cadmium: 0.2 mg/kg d.w Mercury: 4.1 mg/kg d.w Lead: 1.3 mg/kg d.w</p> <ul style="list-style-type: none"> <li>• PCBs and Pesticides</li> </ul> <p>CB28: 64 µg/kg lipid CB52: 108 µg/kg lipid CB101: 120 µg/kg lipid CB118: 24 µg/kg lipid CB138: 316 µg/kg lipid CB153: 1600 µg/kg lipid CB180: 480 µg/kg lipid Lindane: 11 µg/kg w.w.</p> <p><b>Sediment:</b></p> <ul style="list-style-type: none"> <li>• Trace metals</li> </ul> <p>Cadmium: 1200 µg/kg d.w Mercury: 150 µg/kg d.w Lead: 46700 µg /kg d.w</p> <ul style="list-style-type: none"> <li>• PCBs and Pesticides</li> </ul> <p>Sum of CB 28, 52, 101, 118, 138, 153 and 180: 0,46 µg/kg d.w. Lindane: 0,13 µg/kg d.w. pp' DDE: 0.09 µg/kg d.w. HCB: 0.16 µg/kg d.w. Dieldrin: 0.19 µg/kg d.w.</p> <ul style="list-style-type: none"> <li>• PAHs</li> </ul> <p>Phenanthrene: 7.3 µg/kg d.w. Anthracene: 1.8</p>

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					µg/kg d.w. Fluoranthene: 14.4 µg/kg d.w. Pyrene: 11.3 µg/kg d.w. Benzo[a]anthracene : 7.1 µg/kg d.w. Chrysene: 8.0 µg/kg d.w. Benzo[a]pyrene: 8.2 µg/kg d.w. Benzo[ghi]perylene: 6.9 µg/kg d.w. Indeno[123- c,d]pyrene: 8.3 µg/kg d.w.
			Pressure Reduction of contaminants emissions from land based sources	SAP MED	
9.2 Effects of released contaminant s are minimized	9.2.1 Level of pollution effects of key contaminants where a cause and effect relationship has been established	Concentration s of contaminants are not giving rise to pollution effects	State Contaminants effects below threshold <sup>11</sup>	Initial assessment reports under MSFD implementatio n	

<sup>11</sup> Thresholds to be set in the future, subject to decision of Contracting Parties



Operational Objectives	Indicators	Proposed GES	Proposed Target	Data availability	Proposed baseline
9.3 Acute pollution events are prevented and their impacts are minimized	9.3.1 Occurrence, origin (where possible), extent of significant acute pollution events (e.g. slicks from oil, oil products and hazardous substances) and their impact on biota affected by this pollution	Non-occurrence of pollution events	<p>State</p> <p>1. Decreasing trends in the concentrations of oil in the water column and the occurrence of tar balls on the beach</p>	<ul style="list-style-type: none"> <li>• National monitoring programmes under WFD implementation (partial data, only from European Mediterranean countries)</li> <li>• Initial assessment reports under MSFD implementation</li> </ul>	
			<p><b>Pressure</b></p> <p>1. Decreasing trend in the occurrences of pollution events</p> <p>2. Decreasing trend in the operational releases of oil and other contaminants from coastal, maritime and off-shore activities</p>	<p>REMPEC under Prevention and Emergency Protocol</p>	
9.4 Levels of known harmful contaminants in major types of seafood do not exceed established standards	9.4.1 Actual levels of contaminants that have been detected and number of contaminants which have exceeded maximum	Concentrations of contaminants are within the regulatory limits for consumption by humans	State Concentrations of contaminants are within the regulatory limits set by legislation	Initial assessment reports under MSFD implementation	<p><b>Fish:</b></p> <p>Cadmium: 0.05 mg/kg w.w</p> <p>Mercury: 0.5 mg/kg w.w</p> <p>Lead: 0.3 mg/kg w.w</p> <p>Sum of dioxins (WHOPCDD/F-TEQ): 3.5 pg/g w.w.</p> <p>Sum of dioxins and</p>

Operational Objectives	Indicators	Proposed GES	Proposed Target	Data availability	Proposed baseline
	regulatory levels in commonly consumed seafood <sup>12</sup>				<p>dioxin-like PCBs (WHOPCDD/F-PCB-TEQ): 6.5 pg/g w.w. Sum of PCB28, PCB52, PCB101, PCB138, PCB153 and PCB180: 75 ng/g w.w. Benzo[a]pyrene: 2 µg/kg w.w.</p> <p><b>Other fish species<sup>13</sup>:</b> Cadmium: 0.010-0.30 mg/kg w.w Mercury: 1.0 mg/kg w.w</p> <p><b>Eel (<i>Anguilla anguilla</i>):</b> Sum of dioxins (WHOPCDD/F-TEQ): 3.5 pg/g w.w. Sum of dioxins and dioxin-like PCBs (WHOPCDD/F-PCB-TEQ): 10.0 pg/g w.w. Sum of PCB28, PCB52, PCB101, PCB138, PCB153 and PCB180: 300.0 ng/g w.w.</p> <p><b>Crustaceans:</b> Cadmium: 0.5 mg/kg w.w Mercury: 0.5 mg/kg w.w Lead: 0.5 mg/kg w.w Sum of dioxins (WHOPCDD/F-TEQ): 3.5 pg/g w.w. Sum of dioxins and dioxin-like PCBs (WHOPCDD/F-PCB-TEQ): 6.5 pg/g w.w. Sum of PCB28,</p>

<sup>12</sup> Traceability of the origin of seafood sampled should be ensured

<sup>13</sup> Species listed on the Annex of the COMMISSION REGULATION (EC) No 629/2008 of 2 July 2008 amending Regulation (EC) No 1881/2006 setting maximum levels for certain contaminants in foodstuffs.

Operational Objectives	Indicators	Proposed GES	Proposed Target	Data availability	Proposed baseline
					<p>PCB52, PCB101, PCB138, PCB153 and PCB180: 75 ng/g w.w. Benzo[a]pyrene: 5 µg/kg w.w.</p> <p><b>Bivalve molluscs:</b> Cadmium: 1 mg/kg w.w Mercury: 0.5 mg/kg w.w Lead: 1.5 mg/kg w.w Sum of dioxins (WHOPCDD/F-TEQ): 3.5 pg/g w.w. Sum of dioxins and dioxin-like PCBs (WHOPCDD/F-PCB-TEQ): 6.5 pg/g w.w. Sum of PCB28, PCB52, PCB101, PCB138, PCB153 and PCB180: 75 ng/g w.w. Benzo[a]pyrene: 5 µg/kg w.w. Sum of benzo(a)pyrene, benz(a)anthracene, benzo(b)fluoranthene and chrysene: 30 µg/kg w.w.</p> <p><b>Cephalopods:</b> Cadmium: 1 mg/kg w.w Mercury: 0.5 mg/kg w.w Lead: 1 mg/kg w.w Sum of dioxins (WHOPCDD/F-TEQ): 3.5 pg/g w.w. Sum of dioxins and dioxin-like PCBs (WHOPCDD/F-PCB-TEQ): 6.5 pg/g w.w. Sum of PCB28, PCB52, PCB101, PCB138, PCB153 and PCB180: 75 ng/g w.w. Benzo[a]pyrene: 5</p>

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					µg/kg w.w.
	9.4.2 Frequency that regulatory levels of contaminants are exceeded	No regulatory levels of contaminants in seafood are exceeded	State Decreasing trend in the frequency of cases of seafood samples above regulatory limits for contaminants	Initial assessment reports under MSFD implementation	Frequency of regulatory levels exceeded: 0
9.5 Water quality in bathing waters and other recreational areas does not undermine human health	9.5.1 Percentage of intestinal enterococci concentration measurements within established standards	Concentrations of intestinal enterococci are within established standards	State Increasing trend in the percentage of intestinal enterococci concentrations within established standards	National monitoring programmes under BWD implementation (partial data, only from European Mediterranean countries)	Intestinal enterococci: 400 cfu/100 ml
	9.5.2 Occurrence of Harmful Algal Blooms within bathing and recreational areas	No occurrence of HABs	State Decreasing trend in the frequency of the occurrence of HABs	National monitoring programmes under BWD implementation (partial data, only from European Mediterranean countries)	HABs: 0

## MARINE LITTER

### Marine and coastal litter do not adversely affect coastal and marine environment

Operational Objectives	Indicators	Proposed GES	Proposed Target	Data availability	Proposed baseline
10.1 The impacts related to properties and quantities of marine litter in the marine and coastal environment are minimized	10.1.1 Trends in the amount of litter washed ashore and/or deposited on coastlines, including analysis of its composition, spatial distribution and, where possible, source	Number of marine litter items on the coastline do not have negative impacts on human health, marine life and ecosystem services	State Decreasing trend in the number of marine litter items deposited on the coast	UNEP/MAP, 2009. Results of the assessment of the status of marine litter in the Mediterranean	640-23100 items/100 m
	10.1.2 Trends in amounts of litter in the water column, including microplastics, and on the seafloor	Number of marine litter items in the water surface and the seafloor do not have negative impacts on human health, marine life, ecosystem services and do not create risk to navigation	State Decreasing trend in the number of marine litter items in the water surface and the seafloor	<ul style="list-style-type: none"> <li>• UNEP/MAP, 2009. Results of the assessment of the status of marine litter in the Mediterranean</li> <li>• Initial assessment reports under MSFD implementation</li> </ul>	Floating litter: 2.1 items/km <sup>2</sup>  Seafloor: 0-8500 items/km <sup>2</sup> 1-1449 Kg/km <sup>2</sup>
10.2 Impacts of litter on marine life are controlled to the maximum extent practicable	10.2.1 Trends in the amount of litter ingested by or entangling marine organisms, especially mammals, marine birds and turtles <sup>14</sup>		Decreasing trend in the cases of entanglement or/and a decreasing trend in the stomach content of the sentinel species.	EcoQO for plastic particles in fulmars in OSPAR region	0.1 gram of plastic in the stomach

<sup>14</sup> Marine mammals, marine birds and turtles included in the regional action plans of the SPA/BD Protocol.

(\*)The Secretariat will cooperate with ACCOBAMS and provide detailed information at a later stage. Also, the work of the Marine Litter WG of EU in the context of MSFD will be followed and taken into account as appropriate.

## ENERGY INCLUDING UNDERWATER NOISE

### Noise from human activities cause no significant impact on marine and coastal ecosystems

Operational Objectives	Indicators	Proposed GES	Proposed Target	Data availability	Proposed baseline
11.1 Energy inputs into the marine environment, especially noise from human activities is minimized	11.1.1 Proportion of days and geographical distribution where loud, low and mid-frequency impulsive sounds exceed levels that are likely to entail significant impact on marine animals	*	*	*	*
	11.1.2 Trends in continuous low frequency sounds with the use of models as appropriate	*	*	*	*

(\*)The Secretariat will cooperate with ACCOBAMS and provide detailed information at a later stage. Also, the work of the Noise WG of EU in the context of MSFD will be followed and taken into account as appropriate.