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

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

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

Best Practices Review of Descriptor 8 (D08C03, D08C04) of the Marine Strategy Framework Directive (MSFD)

For environmental and cost-saving reasons, this document will not be printed and is made available in electronic format only. Delegates are encouraged to consult the document in its electronic format and limit printing.

Note by the Secretariat

The document presents the study on best practices review of descriptor 8 (D08C03, D08C04) of the Marine Strategy Framework Directive (MSFD) to contribute to the development of Common Indicator 19 under the Integrated Monitoring and Assessment Programme (IMAP).

Background

1 The present study developed by REMPEC aims at illustrating the monitoring activities required after pollution events due to ship and offshore activities through Common Indicator 19 (CI19) under the Integrated Monitoring and Assessment Programme (IMAP), and through D8C3 and D8C4 under the Marine Strategy Framework Directive (MSFD) and the Bonn Agreement.

2 It also aims at providing recommendations for the definition of the data standards and data dictionary of CI19.

3 The study is presented in the **Annex** to the present document.

Action requested by the Meeting

4 **The Meeting is invited to take note** of the information provided in the present document.

Annex

**Study on best practices review of descriptor 8 (D08C03, D08C04) of the Marine Strategy
Framework Directive (MSFD)**

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**Best Practices Review of Descriptor 8 (D08C03, D08C04) of
the Marine Strategy Framework Directive (MSFD)**

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1 Introduction and background

The Ecosystem Approach (EcAp) represents the overarching guiding principle to policy development and implementation under the auspices of the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (“the Barcelona Convention”). EcAp refers to a specific roadmap: Contracting Parties have committed to implementing EcAp with the ultimate objective of achieving Good Environmental Status (GES) of the Mediterranean Sea and coast.

At their 19th ordinary meeting (COP19) (Athens, Greece, 9-12 February 2016), the Contracting Parties to the Barcelona Convention adopted the IG decision. 22/7 on the **Integrated Monitoring and Assessment Program (IMAP)** of the Mediterranean Sea and Coasts and related assessment criteria. This decision includes a specific list of 27 Common Indicators (CI) for the 11 Environmental Objectives (EOs) which will make possible an integrated and quantitative analysis of the state of the marine and coastal environment to be achieved in order to achieve “Good Ecological Status”, encompassing both Ecological Objectives (EO) in three main clusters: pollution, including marine litter or litter; biodiversity, including non-native species; and the coastline and hydrography.

The **Common Indicator 19** on “**Occurrence, origin (where possible), and extent of acute pollution events (e.g., slick from oil, oil products and hazardous substances) and their impact on biota affected by this pollution**” aims at assessing the environmental impacts that may arise from Oil and Hazardous and Noxious Substances (HNS) released at sea. Key effects may include physical smothering with an impact on physiological functions, chemical toxicity, ecological changes, primarily the loss of key organisms, and indirect effects, such as the loss of habitat and consequent ecologically important species. Oil and HNS pollution might also determine socio-economic impacts on activities taking place in marine-coastal areas (e.g., recreational activities, fisheries, shipping, power plants, seawater desalinization). Therefore, monitoring is needed to control pollution events.

Acute pollution events from oil and HNS, resulting from maritime incidents or from ships’ routine operations, are addressed in multiple international and regional legal instruments, e.g., International Maritime Organization (IMO), the United Nations specialized agency, and regional ones, such as the Barcelona Convention, notably in the Protocol concerning the Cooperation in Preventing Pollution from Ships, and Cases of Emergency, Combating Pollution of the Mediterranean Sea (“the 2002 Prevention and Emergency Protocol”) and the Protocol for the protection of the Mediterranean Sea resulting from exploration and exploitation of the continental shelf and the seabed and its subsoil (“the Offshore protocol”). They are crucial instruments enabling cooperation and supporting actions to Mediterranean coastal States.

At European level, a key framework is the **Marine Strategy Framework Directive (MSFD)**, which also tackles chemical contaminants, being one of the pressures affecting the GES of marine waters. Chemical contaminants are considered under **Descriptor 8 (Contaminants are at a level not giving rise to pollution effects)**. The MSFD defines four criteria and methodological standards that shall be used for assessing Descriptor 8. Particularly, **D8C1 refers to the concentration and type of contaminants** that should be considered within coastal and territorial waters; **D8C2 considers the effects of contaminants on the health of species and the condition of habitats**; **D8C3 addresses significant acute pollution events in terms of spatial extent and duration of such events**; and **D8C4 defines the conditions to evaluate when a significant acute pollution event has occurred**. The Member States (MS) assess and report on D8, despite many factors defining the criteria are not commonly agreed and hence the parameters used vary highly among MS.

In the North Sea, the Bonn Agreement (BA) - a mechanism by which ten Governments together with EU cooperate for pollution by oil and other harmful substances in the North Sea - also addresses accidental and illegal pollution from shipping, offshore oil and gas operations and other maritime activities. The BA has been reflecting, for several years, on the definition of significant acute pollution events and the set-up of threshold values for their monitoring and assessment.

The present document aims at illustrating the monitoring activities required after pollution events due to ship and offshore activities through the CI19 under the IMAP, and through D8C3 and D8C4 criteria under the Marine Strategy Framework Directive and the Bonn Agreement. It also aims at providing recommendations for the definition of the data standards and data dictionary of CI19.

2 Reporting and monitoring pollution events from ships and offshore activities under IMAP (CI 19)

Reporting obligations and requirements are requested to the Members of the Barcelona Convention on Legal and regulatory measures, as well as on Operational measures. The **Revised reporting format for the implementation of the Barcelona Convention**, also known as the Barcelona Convention Reporting System (BCRS) was adopted by the Contracting Parties, in their 20th ordinary Meeting (Tirana, Albania, 17-20 December 2017) under the [Decision IG.23/1](#).

In particular, section 3 indicates the reporting obligations relative to the implementation of the 2002 Prevention and Emergency Protocol, including

1. Legal and regulatory measures, notably under Article 5 – Monitoring, **which format is reported below.**

Article 5	4	Development of monitoring and surveillance programmes and activities aimed at detecting oil and HNS pollution incidents whether accidental or operational and illicit discharges	If your answer is "Yes", please provide link to MENELAS information system and/or title, date of enactment and a summary of the relevant provisions (Indicate website/URL link or other reference)				On a voluntary basis, please briefly describe difficulties/challenges and the type of attention or assistance that is required	If your answer is "Yes", please update accordingly If your answer is "No", please go to next question
			If your answer is "No", please in the column difficulties/challenges, tick all that apply					

2. Pollution preparedness and response: operative measures
3. **Pollution incidents, which format is reported below.**

Information on Pollution Incidents provided in MEDGIS-MAR for the current biennium (please tick the box that applies)	Latitude: decimal (36.406944) or DMS (36°24'25"N)	Longitude: decimal (4.646111) or DMS (4°38'46"E)	Alternative geographical information	Country	Accident Type	Date	Pollution		Pollution type
							Yes	No	
If your answer is "Yes, no need to fill out this table			e.g. closest shore location		Blow-out, cargo transfer failure, contact, collision, engine or machine breakdown, fire or explosion, grounding, foundering, hull structural failure, installation structural failure, oil and gas leak, other	(DD/MM/YY)	Yes	No	MARPOL Annex I, MARPOL Annex II or MARPOL Annex III
If your answer is "No" please fill out this Table									

Ship name or IMO number	Ship Category	Ship flag	Offshore installation name or ID number	Offshore installation type	Oil handling facility name or ID number	Oil handling facility type	Have any actions been taken?	If yes, specify the actions taken
	passenger ship, fishing vessel, bulk carrier, oil tanker, general cargo ship, ro-ro cargo ship, container, chemical tanker,			floating concrete, gravity-based concrete, floating steel, fixed steel, subsea steel or other		Oil terminal, port, power station refinery		

Section 6 of the BCRS indicates the reporting obligations relative to the implementation of the Offshore protocol, including:

1. Legal and regulatory measures, notably under "Article 12 – Monitoring", **which format is reported below.**

Article 12 Monitoring	15	Establishment of environmental and compliance monitoring programmes and activities	If your answer is "Yes", on a voluntary basis please provide title, date of enactment and a summary of the relevant provisions (<i>Indicate website/URL link or other reference</i>)	On a voluntary basis, please briefly describe difficulties/challenges and the type of attention or assistance that is required	If your answer is "Yes", please update accordingly If your answer is "No", please go to next question
			If your answer is "No", please in the column difficulties/challenges, tick all that apply		

2. Permits and quantities
3. Inventory of offshore installation
4. Enforcement measures.

Unlike the reporting format defined above under the 2002 Prevention and Emergency Protocol, reporting format for accidents under the Offshore Protocol is not foreseen.

Under the **2002 Prevention and Emergency Protocol**, Contracting Parties thereto established a reporting procedure (Article 9) whereby the following information should be reported (according to the formats described below) by masters or other persons having charge of ships flying their flags and to the pilots of aircraft registered in their territories:

1. all incidents which result or may result in a discharge of oil or hazardous and noxious substances; and
2. the presence, characteristics and extent of spillages of oil or hazardous and noxious substances, including hazardous and noxious substances in packaged form, observed at sea which pose or are likely to pose a threat to the marine environment or to the coast or related interests of one or more of the Contracting Parties.

Moreover, in accordance with Article 10 (Operational Measures) of the said Protocol, any Contracting Party thereto faced with a pollution incident shall, amongst others:

1. immediately inform all Contracting Parties thereto likely to be affected by the pollution incident of their assessments and of any action which it has taken or intends to take, and simultaneously provide the same information to Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea (REMPEC), which shall communicate it to all other Contracting Parties thereto; and
2. continue to observe the situation for as long as possible and report thereon in accordance with Article 9.

In the framework of the Barcelona Convention, the standard pollution accidents reporting format ([POLREP](#)) is composed of three parts POLWARN, POLINF and POLFAC.

POLWARN gives the first information or warning of the pollution or the threat:

- Date and time
- Position
- Incident
- Outflow
- Acknowledge

POLINF gives a detailed supplementary report, as well as situation reports:

- Date and time
- Position and/or extent of pollution on/above/in the sea
- Characteristics of pollution
- Source and cause of pollution
- Wind direction and speed
- Current direction and speed and/or tide

- Sea state and visibility
- Drift of pollution
- Forecast of likely effect of pollution and zones affected
- Identity of observer/reporter identity of ships on the scene
- Actions taken
- Photographs or samples
- Names of other States and organization informed
- Spare for any other relevant information
- Acknowledge

POLFAC is used to requests assistance from other Contracting Parties, and for defining operational matters related to the assistance:

- Date and time
- Request for assistance
- Cost
- Pre-arrangements for the delivery of assistance
- To where assistance should be rendered and how
- Name of other States requested
- Change of command
- Exchange of information
- Spare for any other relevant requirements or instructions.

Such reporting formats are also functional to report under the Mediterranean Integrated Geographical Information System on Marine Pollution Risk Assessment and Response (MEDGIS-MAR). In fact, the Barcelona Convention allows Contracting Parties to report and directly upload data on acute pollutions events onto the MEDGIS-MAR, to facilitate compliance with their biannual reporting obligation and avoid duplication. MEDGIS-MAR reporting format for accidental pollution includes the following fields:

- a. Date
- b. Accident location: latitude and longitude or closest shore location and country
- c. Accident type: blow-out, cargo transfer failure, contact, collision, engine or machine breakdown, fire/explosion, grounding, foundering, hull structural failure, installation structural failure, oil and gas leak, other
- d. Whether any product has been released or not. If yes, pollution range (0, <7 tonnes, 7<x<700, >700 tonnes) and the type of pollution (non-hazardous substance, non-volatile oil, other hazardous substance, volatile oil, unknown) shall be reported
- e. Vessel IMO number, MMSI (Maritime Mobile Service Identity) or vessel name
- f. Vessel flag and other vessel information;
- g. Fix object name, ID number and category
- h. Oil handling facility name, ID number and category.

3 Monitoring pollution events from ships and offshore activities under MSFD (D8C3, D8C4)

Chemical contaminants are one of the main pressures affecting marine waters and their good environmental status (GES) under MSFD. They are considered under the Descriptor 8 on “*Concentration of contaminants are at a level not giving rise to pollution effects*”. Descriptor 8 should be assessed using a set of criteria and methodological standards:

- **D8C1 concentration of contaminants:** Member States (MS) shall consider contaminants within coastal and territorial waters. Each contaminant should be expressed according to its concentration, the monitoring matrix, whether the threshold values have been achieved, and the proportion of contaminants assessed that have achieved the threshold levels, indicating also

substances behaving as ubiquitous persistent, bioaccumulative and toxic substances.

- **D8C2 effects of contaminants on the health of species and the condition of habitats:** MS should provide an estimate of the abundance of species population and the extent of the adversely affected area.
- **D8C3 significant acute pollution event:** MS should consider spatial extent and duration of significant acute pollution events.
- **D8C4 adverse effects of significant acute pollution events:** should be used when a significant acute pollution event has occurred and its use should be agreed at regional or subregional level.

The EC defines “acute pollution” as “*events which can cause short time and severe pollution to the marine environment. They can be deliberate or accidental, e.g. illegal discharges and oil spills*”. The term “significant acute pollution” is hence not strictly defined at EU level in the context of the MSFD, but suggests that the GES of the marine environment may be significantly affected in a localized area.

“Significant acute pollution events” involving polluting substances (substances covered by Annex 1 (oil) and II (noxious liquid substances in bulk) to MARPOL 73/78 as defined in Article 2(2) of Directive 2005/35/EC) should be considered according to D8C3 and D8C4 criteria. They should be assessed when MS evaluate the good status of marine environment.

The assessment of significant acute pollution events is primarily evaluated with D8C3 criterion, named “the spatial extent and duration of significant acute pollution events are minimized”, as identified by the MSFD Commission Decision (EU) 2017/848. The scale of assessment should be at regional or subregional level, divided where needed by national boundaries. The extent to which GES has been achieved shall be expressed for each area assessed as an estimate of the total spatial extent of significant acute pollution events and their distribution and total duration for each year (duration in days and spatial extent in square kilometres (km²) of significant acute pollution events per year). The event-based assessment of D8C3 shall be used to trigger assessment of criterion D8C4 “the adverse effects of significant acute pollution events on the health of species and on the condition of habitats are minimised and, where possible, eliminated”. The use of criterion D8C4 in the overall assessment of GES for Descriptor 8 shall be agreed at regional or subregional level.

3.1 State of implementation: reporting under D8C3 and D8C4

In the last MSFD reporting cycle (2018), 18 out of 21 MS have reported on D8C3. However, the parameters used for reporting vary highly among MS (*Figure 1*). The figure illustrates the parameters reported on D8C3 by 18 out of 21 MS to evaluate acute pollution events.

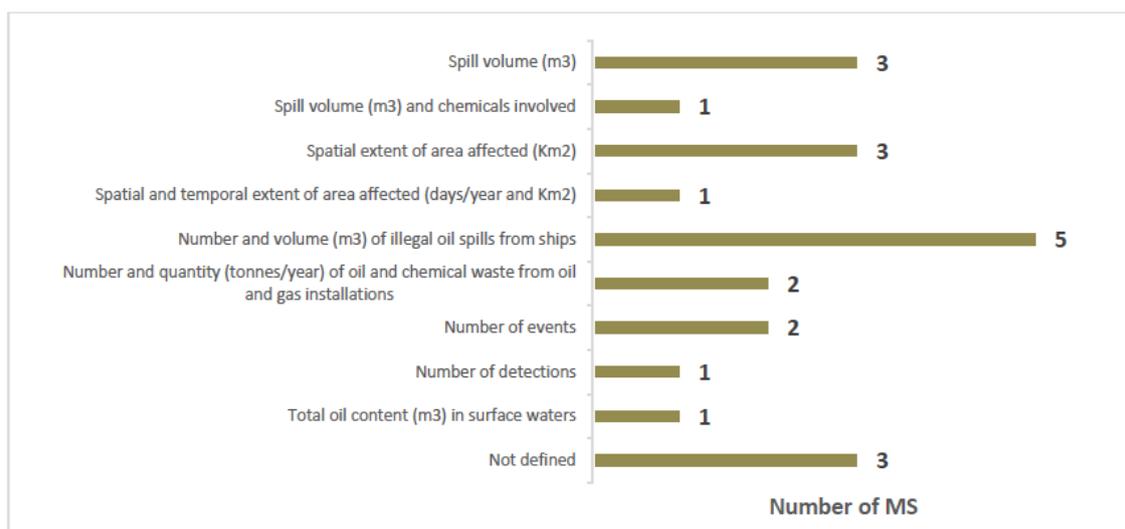


Figure 1. Parameters used by MS for reporting acute pollution events (D8C3) under MSFD. Source: JRC 2018.

The levels at which an “acute pollution event” is considered as “significant” are not defined under the MSFD and there is still need for a comparable approach. MS currently use different concepts for the “minimum threshold(s)” of reporting acute pollution events they assess. In some cases, they consider the spatial extension of the spill, the tonnage volume, different factors and in many none (Table 1).

Table 1, Concepts used by MS for reporting the acute pollution events assessed. Source: JRC, 2018 report.

Concepts	Number of MS
Spills of > 1 tonnes	1
Spills of > 7 m3	1
Spills of > 50 tonnes	1
Spatial extent of area affected >1 Km2	1
(a) Oil spills: 50 m3 of oil in the open sea area (on the sea side of the 10 m deep line), 10 m3 of oil on the shore and coastal seam (on the land side of the 10 m deep line), 5 m3 of oil on the shipping lanes; (b) other chemicals: sustained damage has occurred or is to be expected	1
HELCOM indicator: oil spills detected as illegal discharges of oil during a defined reference period, without classifying it as "significant" or not	5
OSPAR indicator: frequency of oil and chemical waste spills from oil and gas installations displayed according to size of accidental spills (less and more than 1 tonne) per country	2
Not defined	7

Notably, the table above considers different aspects: criteria used to define significant events (and therefore to report them) and indicators that can be used to assess the status of waters in a given period. At (sub)regional level, there is not yet a suitable indicator to assess criteria D8C3 and D8C4.

North-East Atlantic (NEA) regions regularly monitor the number and quantity of oil and chemical spills on marine environment due to offshore oil and gas installations. In the Baltic Sea (BAL) region, five MS report according to HELCOM core indicator “Operational oil spills from ships”, which is based on estimated volumes of oil detected by surveillance flights in Baltic Sea as illegal discharges of oil during a referenced period (2008-2013). In the Mediterranean (MED) region, countries differently report the volume of oil spilled. Some countries consider the spatial and temporal extents of the incidents, assessing a combination of factors (e.g., type of pollutants, scale of spill, location) to evaluate its significance, other only report the number of pollution cases occurred, without considering the environmental status.

D8C3 should be used to trigger the assessment of criterion D8C4 on the adverse effects of significant pollution events on species health. However, only three out of 18 countries that reported on D8C3 did so on D8C4, specifically BE, DE and IT. But only BE effectively monitored the adverse effects of an oil pollution after the FLINTERSTAR incident in front of the port of Zeebrugge, where ca. 200 m³ of oil were accidentally released in ecologically and socio-economically sensitive coastal waters. Particularly, they monitor the levels of PAHs in marine sediments and organisms, the macroecological characteristics of seabed, and the impacts on seabird.

3.2 State of implementation: assessing GES for acute pollution events and their impacts

According to GES Common Decision (EU 2017/848), no threshold values are required for D8C3/C4. There are significant differences in the way GES for D8C3 has been assessed by MS and in many cases the meaning of GES is not specified. A threshold value for oil spills from ships is applied by MS in the Baltic region (oil spill volume in each sub-area defined based on a reference period 2008-2013, where the estimated amount of oil spill was at a historically low level). Finland also set 1.0 µg/L as threshold value (annual mean in the sea area) of oil content in the surface waters (total oil content) (Tornero et al., 2022).

The information provided by MS for GES description under D8C3 and D8C4 can be summarized as follows (Tornero et al., 2022).

For D8C3. GES description is provided by BE, CY, DK, EE, HR, IE, IT, MT, NL, PL and SE. However, information provided is rather poor by most MS.

- HR mentions that this criterion cannot be assessed due to the lack of an agreed definition for significant acute pollution events
- BE, DK, (NEA) region, IE, IT, NL, PL and SE only provide the MSFD definition
- CY only indicates that no pollution events occurred
- MT refers to decreasing trends to define GES.

Only three MS provide a more detailed description

- DK and FI refer to the HELCOM threshold values for illegal oil spill from ships
- FI also refers to the threshold for oil content in seawater and the use of the HELCOM CHASE tool
- EE provides a definition for significant events: extent of the spill exceeds 4,6 km², removal time of the spill exceeds 48 hours (from first alert of the spill until removal of the spill), volume of the spill exceeds 10 m³.

For D8C4, only DK, EE and FR provide a GES description, but it is basically the MSFD definition.

Overall, the assessment of monitoring pollution events from ships and offshore activities under the MSFD points out some gaps. Specifically, the findings reported in this chapter highlight:

- the need of better understanding which spills should be considered under D8C3 (minimum threshold for reporting) and which spills should lead to D8C4 (spill impact monitoring and assessment). On the other hand, specific values are already set up for D8C1 and D8C2;
- harmonised D8C3 assessments would require an agreement on the factors (volume/extent, substances released, distance to a sensitive area, threatened habitats/species etc.) that will determine when a single spill event should be considered for MSFD reporting and when the obligation of spill impact monitoring under D8C4 should be triggered (Tornero et al, 2022). The assessment of these criteria contributes to determine the GES;
- overall, the methodological standards for D8C3 assessment should be developed at EU level. Since is still missing an EU definition of “significant acute pollution event”, many MS do not use this criterion for the assessment of the good environmental status. On the other hand, D8C4 is only assessed if significant and acute spill events have occurred. The use of criterion D8C4 should be agreed at regional or sub-regional level.

Table 2 summarizes the main elements for D8C3 and D8C4 used by MS in the 2018 MSFD reporting. It reports the definition adopted by single countries for “significant acute pollution”, the parameters and threshold values used, and if D8C4 has been triggered and the definition of GES under the MSFD D8C.

Table 2. MSFD D8C3-D8C4 in the 2018 MSFD reporting on updates for Articles 8, 9 and 10 (based on 13 MS so far). Source: JRC 2018.

MS	D8C3 reported (MSFD Art. 8)	Definition of significant acute pollution event (Minimum value (size/amount) considered for reporting)	Parameters reported	Threshold	D8C4 triggered	D8C3 GES definition (MSFD Art. 9)
BE	Yes	The order of magnitude of the volume released is an indicative factor to assess whether the incident is "significant". Reference to IMO, which considers as serious a volume of 50 m ³ [1]. However, besides volume, other factors should be considered: the nature, disaggregation and behaviour of the substance(s) released, the sensitivity and vulnerability of the affected/threatened region (and of the species and habitats present), natural circumstances and possible interactions between substances. The severity or importance of pollution must therefore be assessed on a case-by-case basis.	Duration (days) and extension of impacted zone (km ²). Also mentioned volume spilled (m ³), type and characteristics of oil released, significance and vulnerability of the affected area and species and the proximity to vulnerable areas.	Not specified	Once, after the significant acute pollution event caused by the "Flinterstar" in 2015. Monitoring of PAHS in sediment and marine organisms; macroecological characteristics of the seabed; and impact on seabirds (estimate based on mainly visual observation of oil on plumage)	The spatial extent and duration of the significant serious contaminants are kept to a minimum.

MS	D8C3 reported (MSFD Art. 8)	Definition of significant acute pollution event (Minimum value (size/amount) considered for reporting)	Parameters reported	Threshold	D8C4 triggered	D8C3 GES definition (MSFD Art. 9)
DE	Yes	Criteria laid down in the Convention on the Prevention of Marine Pollution (2002): (a) Oil spills: 50 m ³ of oil in the open sea area (on the sea side of the 10 m deep line), 10 m ³ of oil on the shore and coastal seam (on the land side of the 10 m deep line), 5 m ³ of oil on the shipping lanes; (b) Pollutant accidents other than oil spills (chemicals): sustained damage has occurred or is to be expected in the areas specified in the Convention.	NE Atlantic: Not specified. Baltic: HELCOM indicator (Volume of oil (m ³) per year of illegal oil spills from ships detected during surveillance flights).	NE Atlantic: Not specified Baltic: HELCOM threshold for oil spills from ships (oil spill volume in each sub-area defined on the basis of a reference period (2008-2013), where the estimated amount of oil spill was at a historically low level).	No. A monitoring concept has been available since the beginning of 2017 to monitor the consequences of pollutant accidents in accordance with criterion D8C4, and will be used in the future for complex pollutant accidents.	None
DK	Yes	No	NE Atlantic: OSPAR indicator (number of spills per year and amount (tonnes) spilled). Baltic: HELCOM indicator.	NE Atlantic: Not specified Baltic: HELCOM threshold for oil spills from ships	No. Towards the next monitoring program (2020), the Danish Environmental Protection Agency is investigating how adverse effects of significant pollution events can be monitored and recorded in the specific cases: preliminary indicator: Number of dead / killed birds due to significant acute pollution events (number/ years).	HELCOM's threshold values for illegal oil spills from ships are complied with in all sub-areas.

MS	D8C3 reported (MSFD Art. 8)	Definition of significant acute pollution event (Minimum value (size/amount) considered for reporting)	Parameters reported	Threshold	D8C4 triggered	D8C3 GES definition (MSFD Art. 9)
EE	Yes	No	Number of significant acute pollution events	Not specified	No	GES is achieved if no significant pollution event occurs in the assessment period. The significant acute pollution event is determined as follows: extent of the spill exceeds 4,5 km ² ; removal time of the spill exceeds 48 hours (from first alert of the spill until removal of the spill); volume of the spill exceeds 10 m ³ .
ES	Yes	No	Extension of impacted zone (km ²).	Not specified	No. GES cannot be defined and evaluated due to lack of data on abundance of affected species and extension (km ²) of general type of habitat affected.	None
FI	Yes	No	HELCOM indicator	HELCOM threshold for oil spills from ships. For "total oil content", the threshold is 1.0 µg L ⁻¹ (annual mean in the sea area).	No	Marine oil emissions are below the agreed HELCOM threshold. The status of undesirable substances in the marine environment is assessed for coastal and offshore elements of marine waters, first for each substance or indicator separately and then as a weighted average of indicators, using HELCOM Chase. Seawater oil content is below 1.0 µg L ⁻¹ (annual mean in the sea area).
FR	No	No	Data from accidental pollution reports (POLREP) could not be collected and the information associated		Not assessed, but there is information regarding oiled beached birds in the North Sea related to D8C4.	None

MS	D8C3 reported (MSFD Art.8)	Definition of significant acute pollution event (Minimum value (size/amount) considered for reporting)	Parameters reported	Threshold	D8C4 triggered	D8C3 GES definition (MSFD Art. 9)
			with POLREP does not allow us to offer a robust evaluation of this criterion.			
HR	Yes	No, but it is mentioned that taking into account the area covered for the recorded cases of marine pollution (from ships, platforms, land or unidentified sources), they are considered minor operational spills.	Incidence and extent	Not specified	No	There is not yet an agreed definition of "significant acute pollution events" or relevant threshold levels on the EU or the national level; therefore, GES can not be evaluated based on this criteria.
LV	Yes	No	Number of events	National (but not specified)	No	None
NL	Yes	No	Ratio: Count spills/Flight hours	Negative trends as GES definition.	No	The spatial extent and duration of the significant serious contaminants are kept to a minimum.
PL	Yes	No	HELCOM indicator	HELCOM threshold for oil spills from ships.		The spatial extent and duration of significant acute pollution events are minimised.
RO	No				No	None
SE	Yes	No, but in the text report they mention that large spills (those exceeding 10 m ³) have become increasingly uncommon (HELCOM's Indicators 2018).	HELCOM indicator. Also annual number of detected oil spills from shipping and number of detected oil spills per flight surveillance hour in the North Sea (excl. Kattegat) from the 1980s to the present.	HELCOM threshold for oil spills from ships in two marine reporting units. Bonn Agreement in Skagerrak.		The spatial extent and duration of significant acute pollution events are minimised. GES: When the threshold values are achieved in the assesement areas.

^[1] Indeed, IMO refers to a threshold value of 50 tons. Some documents erroneously report the value of 50 m³. This consideration is relevant also for other parts of this report, referring to such erroneous IMO threshold.

4 Monitoring pollution events from ships and offshore activities under the Bonn Agreement

The Bonn Agreement (BA) (1983) is the mechanism by which ten Governments together with the EU, cooperate in dealing with pollution due to oil and other harmful substances in the North Sea. The signatories of the Agreement are the Governments of the Kingdom of Belgium, the Kingdom of Denmark, the French Republic, the Federal Republic of Germany, the Republic of Ireland, the Kingdom of the Netherlands, the Kingdom of Norway, the Kingdom of Sweden, the United Kingdom of Great Britain and Northern Ireland and the European Union. Spain joined as a Bonn Agreement Contracting Party in 2019.

In case of a major spill at sea, BA contracting parties will carry out monitoring activities through aerial surveillance in combination with satellite imagery. This will help to monitor the spill, to estimate the spilled oil volumes and to identify the thicker, compatible parts. Surveillance will help also the response units at sea throughout the duration of the spill accident. The Bonn Agreement is also the key international forum for cooperation among contracting parties to combat pollution from oil and other harmful substances in the North Sea.

For Contracting Parties that are also EU Member States, the Bonn Agreement can be considered as the key international forum for cooperation on combating pollution in the North Sea from oil and other harmful substances, that can fully cover the MSFD obligations under criterion D8C3 (Bonn Agreement, 2020).

In the event of a significant acute pollution, however, criterion D8C4 is triggered meaning that EU Member States should also monitor and assess the adverse effects of the pollution on marine species and habitats. This MSFD obligation under D8C4 does not directly fall within the BA scope of work: although environmental impact monitoring and assessment is generally considered as part of the emergency response activities performed under the BA umbrella, it is not really part of the BA core business nor expertise (Bonn Agreement, 2020).

Therefore, the BA acknowledged a lack in the definition of significant acute pollution and in the use of a threshold, such as spilled volume (Bonn Agreement, 2020). Based on the discussion papers presented by Belgium (Bonn Agreement, 2020), the BA reported the volume thresholds referred by different institutions in setting up a volume threshold factor to define significant acute pollution. Belgium hence referred to the following reference thresholds:

- OSPAR Commission's MSFD Advice document on GES-D8 (2012) with a reference to ITOPF (International Tanker Owners Pollution Federation): classify oil spills into three categories, <7 tonnes, 7-700 tonnes and >700 tonnes, suggesting that the latter breakpoint could be considered as the threshold value for "significant acute pollution". However, this classification is not used in operational sense to classify the severity of spills, but it depends on many other factors, such as when and where the incident happened, type of product spilled, etc. ITOPF also suggests that if they have concerns about the potential environmental impact of an incident, they recommend a suitable programme of sampling and analysis to carry out since the early stages. They would not advise sampling on the basis of the quantity of oil or other pollutant spilled, since this is not always the most appropriate measure of the severity and nature of an impact.
- Obligations within IMO on reporting oil spills of more than 50 m³. Indeed, spilled oil quantities >50 m³ are considered as threshold between minor and potentially significant spills (obligation to report according to MARPOL); <50m³ reporting of spill is optional.
- UK Premium guidelines on post incident monitoring and assessment: monitoring is needed when an incident is expected, or has the potential, to have significant environmental impact. à qualitative definition of significant acute pollution event.

In light of these references, Belgium concluded that the size of a spill is different from the significance

of a spill, which is referred to its severity and nature (Bonn Agreement, 2020). Although the spilled volume is an important factor to consider when evaluating a spill incident as significant acute pollution, the significance of a spill and the obligation to monitor and assess spill impact according to MSFD depend to a combination of factors:

- outflow volume, the IMO threshold of 50 m³ might be an appropriate as rough, initial threshold to trigger an evaluation for monitoring assessment. However, BA expressed some doubts since also spills with minor outflow volumes may still cause significant impacts. Hence, the BA did not reach a consensus on this point.
- The nature, behaviour and weathering of the spilled product
- Ecological and socio-economic sensitivity of a threatened or impacted area and its resources; the natural conditions at the time of the spillage; the effectiveness of response operations, the impact on the public.

BA Contracting Parties agree that the evaluation whether or not a spill incident is a significant acute pollution is multifactorial and not limited to spilled volume alone.

Bonn Agreement concludes on this point (Bonn Agreement, 2020): *“Significant acute pollution is not defined under either the Bonn Agreement or the EU MSFD as it is dependent on the specific location and extent of the accident or illegal incident and the scope and scale of the resources which are affected by the spilled oil or chemicals. There is therefore a need to consider and assess the impact of such incidents on a case-by-case basis, rather than trying to work towards further refined definitions for approaches to target setting.”*

5 Open issues in relation to monitoring of pollution events from ships and offshore activities

Considering the open issues reported above (see sections 2, 3, 4), the Bonn Agreement has enhanced the discussion on spill impact/effect monitoring and assessment and how significant spill effects can feed the assessment of GES under the MSFD Directive. The different organizations involved and MS of MSFD expressed different point of view on what criteria to adopt.

The fact that many MS do not use a definition for acute pollution events reflect that there are no threshold values used for reporting them. Therefore, since it is missing a common agreed definition of “significant oil spills” and its indicators, the EU JRC has established in 2020 a core group to make progress on this issue.

Overall, the following points have been raised by JRC on MSFD indications on pollution events:

- Acute pollution events can be deliberate or accidental, e.g. illegal discharges and oil spills, the (potential) impact is independent from the source. The management options might differ, therefore information about the origin is needed.
- According to GES Commission Decision¹, no threshold values are required for significant acute pollution events. The determination of GES needs to express an ambition to prevent/reduce significant pollution events (D8C3) and when they occur, to prevent/minimize impacts from them (D8C4).
- Agreed criteria for MSFD D8C3 assessments are necessary as a first step, which will have also implications on D8C4. Whilst D8C4 is a secondary criterion and assessment is only expected when a significant acute pollution event has occurred, a determination of GES (MSFD Art 9) needs to be in place for cases when a significant pollution event takes place.

¹ Commission Decision (EU) 2017/848 of 17 May 2017 laying down criteria and methodological standards on good environmental status of marine waters and specifications and standardised methods for monitoring and assessment, and repealing Decision 2010/477/EU (Text with EEA relevance).

5.1 Definition of criteria for reporting oil spill events (D8C3)

“Significance” of oil pollution and the use of a minimum limit for reporting under MSFD is still under debate and no consensus has been reached yet within the MSFD Expert Network on Contaminants. The oil pollution significance can be interpreted in different terms, principally because it can refer to both oil discharge violations and accidental spills, which are very different in terms of average volume and environmental impact risk, as well as in terms of the typical follow-up action initiated by a State (Table 2).

Under MSFD a pragmatic approach is being discussed to set a minimum value at which a single detected spill should be reported for MSFD, expressed as spatial extent [km²] and amount [m³]. This would refer to verified and confirmed spills, i.e. a fraction of the total number of detections. This would mean that all spills above that lower limit should be reported under D8C3, but it does not mean that such a limit will automatically denote the spill is “significant” (and therefore should trigger D8C4 monitoring and assessment). This approach would enable the establishing of baselines, derived from comparable spill data, which then can inform further work and the need for the implementation of measures, including transboundary aspects (Tornero et al., 2022).

Pros and cons of defining a minimum limit for reporting spills have been identified by the MSFD Expert Network on Contaminants Chemical Substances (Table 3).

Table 3 Pros and Cons of defining a minimum limit for reporting spills (Tornero et al., 2022).

PROS	CONS
<p>Increased harmonisation in MSFD reporting.</p> <p>Help to get MS statistics of the occurrence of pollution events, including minor spills.</p> <p>Take into account the precautionary approach.</p> <p>Support trend analysis.</p>	<p>A lower limit for reporting purposes is not currently used in other frameworks (e.g., Bonn Agreement), so setting one for MSFD might difficult alignment with existing reporting fora.</p> <p>A volume-based reporting limit can have limitations, e.g., volume estimations are problematic when contaminants are released from lost containers or for subsurface spills. The possibility could be left open for MSs to report spills with a volume below this threshold (or with unknown volume), if that spill is considered to be significant.</p> <p>Setting a lower reporting limit might have undesirable consequences if intended as to “what can be considered significant”. The juridical consequences with regards to enforcement and prosecution for an illegal discharge lower than the threshold should then be clear and would not lead to obstruction.</p> <p>If intended as the general likelihood that a spill of a given magnitude would lead to concrete action (in terms of response operations, environmental impact monitoring) a differentiated limit might be needed for accidental and deliberate discharges.</p>

The following threshold values have been considered (Table 4).

Table 4. Possible threshold values to be considered for reporting under D8C3.

Possible values	Pros	Cons
0.5 m ³	Account for the accumulated amount and effects of (frequent) minor spills during an assessment period.	Far too low for accidental spills. There would be many small spill reports.
1 tonne	Operational oil spills of more than 1 tonne (first estimate) are, in some EU MS (e.g. Belgium), considered 'major spills' in a MARPOL enforcement context, i.e. in interpretation of Art.220 of UNCLOS on coastal State powers of enforcement (i.e. 1 tonne is a threshold for stepping up the judicial follow-up of illegal ship-source pollution). However, lower volumes of spills are subject to juridical follow-up.	Very low for accidental spills, very high for illegal discharges. There would be many small spill reports, so most of them would be reported under 1 tonne, to not warrant additional work.
7 tonnes	Value used to categorize spills by the ITOPF (spill monitoring since they began; a good source of data).	ITOPF uses this threshold for statistical reasons, but in any way to attribute or describe to describe the severity of a spill.
50 m ³	IMO value to differentiate minor from significant spills. Used for spill reporting under REMPEC.	Too high for operational and deliberate discharges
Different threshold depending on the zone of the spill (e.g., open sea; ports, shore, shipping lanes...)	Used by one MS.	Lengthy and cumbersome for a harmonized approach at the regional or European scale.

In conclusion, although a volume threshold could be useful for large spills, there still will be challenges with small oil spills, in particular in shallow areas. These smaller spills constitute a risk of significant pollution, despite their limited extent/volume.

However, a commonly agreed minimum value (e.g., volume/weight/extension) of oil spilled is still missing under MSFD and the IMO value of 50 m³ (indeed IMO refers to a threshold value of 50 tons; some documents erroneously report the value of 50 m³) to differentiate minor from significant spills appears very high.

5.2 Definition of criteria for when and how to monitor oil spill impacts (D8C4)

Monitoring activities are fundamental to minimize the risks on public and marine environment arising from oil spill events. These activities are primarily carried out for significant polluting events.

The MSFD Expert Network on Contaminants (Tornero et al., 2022) has identified some potential factors for considering an oil spill as significant for MSFD purposes. Since for significant oil spills monitoring of impact is needed, these factors should be considered when reporting spills, in order to allow identification of significant spills. Large-scale definition of oil spill significance will require the availability of a baseline of spills, based on a low limit of reporting. Yet, considering metadata would add complexity to the assessment process, requiring therefore a risk-based approach to balance against

a precautionary approach.

Table 5. Potential factors for considering an oil spill as “significant” for MSFD purposes

Factor	Pros	Cons
Volume spilled (m ³)	Most relevant Data availability	In some cases, difficult to determine (e.g., as explained above, a container carrying contaminants that is lost at sea)
Spatial extent of area affected (Km ²)	Data availability Valuable for the full description and reporting of a significant spill event	Difficult to determine, so not very practical Too rough and limited, provide very little information on the potential severity of the spill
Type of substance (oil) spilled/toxicity		Not always available or reported
Duration of the spill	Relevant in cases of ship wrecks that oil is released for months or years	The persistence of the spill will depend on the quality of oil, weather and sea conditions, so should not be used as criterion
Distance to the coast	Quantitative Support the precautionary principle	
Type of coast (e.g. beach, rocky)		Relevant, but could lead to a complex assessment procedure
Distance to sensitive/vulnerable areas (e.g., Natura 2000 sites); threatened habitats or species	Can be quantitative and pragmatic	Relevant, but could lead to a complex assessment procedure
Meteorological and oceanographic conditions (roughness, temperature, sun light, season, currents...)		Relevant, but could lead to a complex assessment procedure
Need for emergency response and clean up measures		Differ greatly between Member States, so using response activities as a proxy for spill significance, while relevant, can also lead to bias in the definition of “real” risks. Response capacity is an issue for measures
Judicial follow-up		Within the scope of SSPD, not relevant to define significance under MSFD. Moreover, the timing for the legal actions can take much longer than response operations. Existing statistics are not robust enough. Legal follow-up actions may not be feasible for all MS
Socio-economic issues		Appear difficult to be evaluated

D8C4 is not a common criterion in the whole MSFD, but it is a provision that mainly triggers monitoring but not immediate measures. If there is a potential environmental problem due to a spill/discharge, MS will anyway carry out more in-depth investigations and monitoring to understand what is happening. Monitoring and assessment activities should not be too strictly defined but be determined on a case-by-case basis and planned and coordinated at regional level (if such a spill is affecting more than one MS). There are some available guidelines on typical elements for consideration in the planning of the monitoring programme (e.g. UK PREMIAM guidelines;

<https://www.cefas.co.uk/premium/guidelines/>). The results of this monitoring (impact on species/habitat) need to be used in the GES determination. This would be developed in consideration of and inform the assessments of other relevant descriptors (D1, D3, D4, D6).

The practical approach that triggers monitoring and assessment follow-up could be based on a volume threshold of oil spilled and agreed incident-specific factors. This means agreeing on the size of oil spilled to be considered as significant (e.g., ≥ 300 tonnes/m³)² and defining the size range of “potentially significant” incidents (e.g., 10-300 tonnes/m³), and consequently better considering other factors. While the volume threshold approach is effective with large oil spill events, there are still some challenges with small oil spills in shallow areas or small spills of certain types of oil in particularly sensitive ecosystems or sensitive geographical areas. Therefore, a baseline of spills, both for small and big events, based on a low limit of reporting, would address a large-scale understanding of oil spill significance and support discussions on what should be considered non-GES, according to size, frequency or total numbers (Tornero et al., 2022)

Furthermore, the challenges arising with the volume-based approach can be met by integrating a basic risk assessment approach, that combines the size of the spill with basic limits for distance to vulnerable areas and distance to coast, and to align with Habitats Directive in terms of proximity of spills to designated areas (Tornero et al., 2022).

Therefore, open issues are still pending on the monitoring activities occurring after pollution events. Guidelines are necessary for setting up the minimum threshold levels above which implementing monitoring activities and defining criteria and metrics of assessment (Tornero et al., 2022). A practical approach would assess “potentially significant” spills considering multiple factors that would be a prerequisite for accepting or rejecting their significance. However, together with the volume threshold approach, the practical approach would help meeting the reporting requirements for significant pollution events under the MSFD.

5.3 Substances to be covered under D8C3/D8C4 assessments

HNS are defined by the IMO Protocol on Preparedness, Response and Co-operation to pollution Incidents by Hazardous and Noxious Substances (OPRC-HNS Protocol) as substances that, if introduced into the marine environment, are likely to create hazards to human health, harm living resources and marine life, and to damage amenities and/or to interfere with other legitimate uses of the sea. Depending on the substances, HNS monitoring and assessment after spill events might be more difficult because of the limited knowledge on their transportation volumes and on the exact quantities of different substances transported and spilled (Tornero and Hanke, 2016).

The MSFD Expert Network on Contaminants does not Hazardous and Noxious Substances (HNS) but instead calls for a detailed and separated discussion to be dedicated to identify the major knowledge gaps on HNS spills, primarily detection uses, HNS characteristics and reporting obligations.

6 Monitoring of impacts of pollution events

Oil spills and chemicals into the marine environment can cause significant environmental impacts. Effective response to marine spills is essential to reduce the risks it may pose to human and marine environment. Therefore, national authorities require the develop and maintenance of effective responses and clean-up processes, including post-incident environmental monitoring and impact

² The BE AWARE I and II project showed that spills lower than 300 tonnes, although frequent, did not pose a major environmental risk, but this grew rapidly above 300 tonnes.
https://www.bonnagreement.org/site/assets/files/1129/be-aware_technical_sub_report_8_maritime_oil_spill_risk_analysis.pdf.

assessment. Prompt and effective environmental monitoring activities are of key importance for an integrated spill response to risks and impacts to human food chain, marine ecosystems and commercial and marine resources. Furthermore, it is only through monitoring that the necessary data can be collected to establish the effectiveness of response operations and any actions taken to mitigate impacts and promote recovery.

The UK PREMIAM initiative (Pollution Response in Emergencies: Marine Impact Assessment and Monitoring) has developed a monitoring plan to promote effective post-spill assessment. Principles of a monitoring plan define (Kirby et al., 2018):

- **When** monitoring: when an accident is expected to have the potential for a significant environmental impact.
- **Why** monitoring: to assess the impact on species/habitats of nature conservation importance; to assess the impacts of commercial stockfish and shellfish; to assess the impacts on ecosystems and their functionality; to assess the impact on human food chain; to inform fishery closure/re-opening; to assess the efficacy of chosen response and clean up options; to assess any impact on the local human population; to provide evidence to support compensation or insurance claims; to provide public reassurance.
- **What** to monitor: the exact elements that are included in a monitoring programme may need to be limited and depend on the nature of the incident and on a case-by-case basis. However, typical elements assessed in the monitoring programme include: important commercial species of fishes and shellfish, species and habitats of important for nature conservation, oiled and rescued birds or birds likely to be impacted, seawater and sediments, public health impacts, and the general state of marine ecosystem.
- **Where** to monitor: three main categories, i.e., impacted areas, unimpacted areas nearby, which may be impacted later, and unimpacted areas nearby likely to remain so as reference sites. Therefore, the geographic scale of the incident drives the spatial scale of the monitoring programme. On the other hand, the extent to which oil or chemicals might be transported will define the maximum size of the impacted area.
- **How frequently** to monitor: several drivers affect the frequency of monitoring, but monitoring activities should be carried out frequently enough to follow changes in status; sufficiently frequently to ensure that conservation status is maintained for species/habitats of conservation importance in Marine Protected Areas (MPAs); enough time to generate sufficient time-series measurements. Overall, the frequency of monitoring is more intensive initially and scales back over time.
- **When to stop** monitoring: the speed of environmental recovery varies across habitats, species, impacted sites, and other variables. However, there is the expectation that monitoring activities run for a finite time and then cease, after which the impact assessment can be made.

Designing a damage assessment requires considerable attention to detail and reference to literature. Each damage assessment study should be based on selected biological features and key indicators, essential environmental parameters (e.g., chemical-physical characteristics of the habitat), chemical analysis of pollutant. Indicator species can also be adopted to give a general indication of the scale and extent of the impact.

Usually, three main strategies are used for damage assessment following oil or chemical incidents:

- i. comparison of post-incident data with pre-incident data, which is valuable if appropriate data are available and those data will greatly affect the conclusions that can be derived from them;
- ii. comparison of data from impacted sites with data from reference sites. Since the environmental conditions are not the same as prior to the incident, it is difficult to demonstrate with certainty that differences in the parameters between reference sites and impacted sites are due to the effects of the incident and chemicals involved;
- iii. analyzing post-incident data monitored over a period of time to identify a recovery process. The monitoring ex-post the incident aims at identifying and describing recovery processes that occur.

However, the monitoring process requires detailed information, good environmental analysis and data and financial availability to support these activities. Frequently, these factors are difficult to achieve, especially in the Mediterranean region, due to the funds available for ex-post monitoring of oil spill incidents. At Mediterranean level there are few references regarding monitoring of impacts from oil spills. In the present study we have identified three case studies in Syria, Greece and Lebanon, respectively.

Considering the Syrian case, in August 2021, a fuel oil spill incident occurred in the Baniyas electric plant. The damaged tank contained 12,000 m³ of fuel, of which 4 m³ leaked into the sea, while the rest was contained and pumped into the nearby reservoirs (REMPEC, 2021b). The spillage spread along the norther Syrian coastline and required the technical support of REMPEC and the Regional Activity Centre for Specially Protected Areas (SPA/RAC). Objectives of the mission were to assess: the environmental impact and set up possible remediation measures to restore the environment, the clean-up operations carried out, the need for advice and training, and provide guidance on oil waste management.

On September 2017, the chemical tanker *Agia Zoni II* sank in the Piraeus anchorage area (Greece). Oil was immediately observed in the sea surface and after few days it extended to 4 km of shoreline on Salamis Island and approximately 25 km from the Piraeus/Athens Riviera shoreline on the mainland. Following the incident, a series of systematic surveys were carried out to monitor possible short-term and medium-term impacts on marine ecosystems. The outcomes of the environmental impact assessment found out that:

- the major consequences of the oil spill were constrained along the shoreline for a period of three months after the incident;
- petroleum hydrocarbons were not identified along the shoreline after December 2017;
- marine organisms seemed unaffected by the incident and no evidence of bioaccumulation have been identified; and
- no petroleum residues were detected in the zone of 3 to 20 m depth after the clean-up operations (REMPEC, 2019).

On July 2006 an oil spill incident occurred in the Jieh power plant in Lebanon, which released 15,000 to 20,000 tons of heavy fuel oil into the Mediterranean Sea. The oil spill was partly carried out to sea and partly dispersed along the Lebanon coast, reaching also the Syrian coastline. Overall, the incident affected about 140 km of both public and private beaches, including public marinas and ports. The monitoring strategy set up to assess the environmental impact was divided into three phases: short term phase (2006), mid-term phase (2007) and long-term phase (2008-2010) (Saab et al., 2006).

Table 6 synthesizes the features that have been monitored after three oil spill accidents occurred in the three case studies in Syria, Lebanon and Greece, differentiating by coastal areas and open sea areas of assessment.

Table 6. Features monitored after oil spill accidents occurred in three case study areas.

		Greece		Syria		Lebanon	
		Coastal zone	Open sea	Coastal zone	Open sea	Coastal zone	Open sea
Matrix	bivalves	x				x	
	fish		x				x
	fuel					x	
	surface sediments		x				
	water	x	x			x	
	zoobenthic communities						
	macroalgae	x					
	seabed						
Parameters on field	fresh oil			x			
	impact on species			x			
	oil layers			x			
	Tar-patches			x			
	Underwater visual survey					x	
	Species mortality signs					x	
Parameters in LAB	bioaccumulation	x	x				
	Chlorophyll a					x	
	meiofauna					x	
	metals	x	x				
	nitrates					x	
	nitrites					x	
	orthophosphates					x	
	Petroleum hydrocarbons	x	x				
	phytoplankton					x	x
Polycyclic aromatic hydrocarbon	x	x					
Frequency		3 phases: short term mid term long term		1 phase mid term 4 months after accident		3 phases: short term mid term long term	

7 Considerations for revision of CI 19 reporting and monitoring under IMAP

It is worth underlining that this review and its conclusions and suggestions fall within the scope of reporting by Countries to REMPEC for the purpose of monitoring in the context of IMAP. The elements discussed in this review (reporting threshold, parameters, etc.) are not intended to suggest requirements for ships to report, as set out in article II of Protocol I of MARPOL.

Minimum threshold for reporting

At present, under the Barcelona Convention, spills above 50 tonnes are to be reported, whereas countries could also opt to report on spillages of lower amounts (MED POL and REMPEC Focal Points Meetings, Attard, Malta - 17 June 2015). At European level there is currently no consistent spill reporting framework. Discussions undertaken in the framework of the MSFD Expert Network on Contaminants highlight pros and cons of defining a minimum threshold for reporting. Availability of such a threshold would provide a common base of data for analysis at sea basin and EU scale (Tornero et al., 2022).

According to the MSFD Expert Network on Contaminants (Tornero et al., 2022) the threshold level for reporting of 50 tons is too high and it could be confused with the threshold for identifying an acute event as regards the impact that such event can produce. According to the MSFD Expert Network a lower threshold value for reporting could be considered.

In line with above considerations, a lower minimum threshold for reporting oil spill events is recommended also for the Mediterranean Sea. This could be the lowest category defined by ITOPF, corresponding to 7 tonnes of oil, thus allowing comparability with ITOPF records for statistics. In case of a volumetric estimation (e.g. for aerial survey) an indicative threshold of 7 m³ could be equally considered. Today, the MEDGIS-MAR database already contains information for oil spills <7t, 7-700t, >700t, providing a reference database for the assessment of oil spill occurrence at the Mediterranean scale. However, it is worth underlining that the '7's (7 tonnes, 700 tonnes) in ITOPF thresholds, and to which OSPAR initially also referred, came from recording of incidents in barrels since the 70's, with a threshold for 'major' spills at 5,000 barrels, which correspond to approximately 700 metric tonnes, using the average density of a standard crude oil. ITOPF however considers the '7's as purely statistical threshold values and does not apply them as a threshold on significance. For this reason, the Bonn Agreement no longer considered these ITOPF thresholds in the context of MSFD. Instead, the Bonn Agreement and HELCOM reports uses 10 t/m³ as threshold, in line with the orders of magnitude that are used in application of the Bonn Agreement Oil Appearance Code (BAOAC) volume estimation method. In order to align practices, it is therefore **recommended to use 10 t = 10 m³ as minimum threshold for reporting.**

Reporting HNS spill events

There is an evident need for an in-depth discussion at the EU and sea-basin level about HNS characteristics and behaviour as well as knowledge availability and gaps on HNS spill events, to advance initial proposals about when and how reporting shall be done. It is recommended to start such expert-based discussion at the Mediterranean level, also taking in consideration the different nature and properties of the various HNS substances. Such discussion shall also tackle the important issue of operational criteria for the assessment of HNS significant pollution events. Meanwhile a reporting threshold of 7 tonnes, like for oil, could be adopted.

Significance of oil spill and definition of acute pollution events

The definition of "acute pollution events" is highly debated under the Marine Strategy Framework Directive (Tornero et al., 2022) and other Regional Sea Programmes and Agreements, in particular the Bonn agreement (Bonn Agreement, 2020). It remains a complex issue for which consensus has yet to be reached.

Spilled quantity/volume is one of the factors that can be relevant for defining significant acute

pollution events. However, the proper evaluation of polluting spills is a typical multifactorial problem, to be approached on a case-by-case basis. In this perspective, it is recommended to take factors other than volume into consideration, including the nature of the spilled product(s), proximity and sensitivity of threatened areas and/or human activities, environmental conditions (i.e. evidence of an environmental impact), and need for response operations.

Operational criteria for the identification of acute pollution events

The definition of criteria for identification of acute pollution events is relevant to define the cases when monitoring of environmental impacts shall be performed.

Spilled volume threshold for oil

The definition of a spilled volume threshold for acute pollution events is surely useful from an operational perspective. Based on the reflections from the MSFD Expert Network on Contaminants (Tornero et al., 2022), a pragmatic approach based on a defined threshold value for significant oil pollution events is suggested at first instance. This threshold could be set to 50 tonnes (or 50 m³ in case of volumetric estimations). This would allow to keep reference to the IMO threshold. Notably, this threshold is much lower than the one suggested by ITOPI for “significant acute pollution” (700 t) because it is aimed at strengthening monitoring of environmental impacts in order to reach a stronger level of protection of the Mediterranean Sea and coasts from this type of pollution. It shall be noted that the suggested volume threshold should be intended only for pragmatic operational purposes and not as a proxy to discriminate all acute pollution events. Significant impacts can be determined also by lower volumes, requiring the adoption of a multifactor approach (as expressed in the following suggested elements) and considering case-by-case conditions.

Nature of Hazardous Noxious Substance

When dealing with HNS, the nature of spilled products should also be evaluated in order to assess the need to trigger monitoring of environmental impacts. To consider this aspect, reference to [MARPOL Annex II - Carriage of noxious liquid substances in bulk](#) can be made. This MARPOL Annex sets out a pollution categorization system for noxious and liquid substances, distinguishing four categories:

- Category X: Noxious Liquid Substances which, if discharged into the sea from tank cleaning or deballasting operations, are deemed to present a major hazard to either marine resources or human health and, therefore, justify the prohibition of the discharge into the marine environment;
- Category Y: Noxious Liquid Substances which, if discharged into the sea from tank cleaning or deballasting operations, are deemed to present a hazard to either marine resources or human health or cause harm to amenities or other legitimate uses of the sea and therefore justify a limitation on the quality and quantity of the discharge into the marine environment;
- Category Z: Noxious Liquid Substances which, if discharged into the sea from tank cleaning or deballasting operations, are deemed to present a minor hazard to either marine resources or human health and therefore justify less stringent restrictions on the quality and quantity of the discharge into the marine environment; and
- Other Substances: substances which have been evaluated and found to fall outside Category X, Y or Z because they are considered to present no harm to marine resources, human health, amenities or other legitimate uses of the sea when discharged into the sea from tank cleaning or deballasting operations. The discharge of bilge or ballast water or other residues or mixtures containing these substances are not subject to any requirements of MARPOL Annex II.

As indicated in [Appendix 1 to MARPOL Annex II](#), Guidelines for the categorization of noxious liquid substances are given. Products are assigned to pollution categories based on an evaluation of their properties, as reflected in the resultant GESAMP Hazard Profile.

With reference to MARPOL Annex II categorization, it is recommended that monitoring of impacts

should be triggered for noxious substances in category X and Y at a lower threshold (not yet available) than that of 50 tonnes set for oil. Monitoring of impacts should be triggered also in case of chemicals transported in package form (threshold to be defined). **It should be recalled that the 50t threshold applies to the case of Administrations reporting to IMAP, and that the obligation of the ship to report (in accordance with article II of Protocol I of MARPOL) to the nearest coastal State incidents that exceed the quantity or the instantaneous level permitted by MARPOL as well as probable discharges remains unaffected.**

Distance from the coast

Distance from the coast should also be considered when assessing the need for triggering environmental monitoring of spill impacts. To this regard, the [Guidelines for the use of dispersants for combating oil pollution at sea in the Mediterranean region](#) can be used as reference to define operational criteria. It is suggested to undertake environmental impact monitoring of oil or HNS spill with environmental effects occurring within the 20 m isobath depth and / or within 1 Km distance from the shore.

Distance from vulnerable areas

In case of presence of vulnerable areas (Marine Protected Areas, Natura 2000 areas, Marine Parks, Biodiversity Reserves, etc.), it is recommendable to undertake monitoring of oil or NHS spills with environmental effects occurring within 1 Km of distance from the vulnerable area.

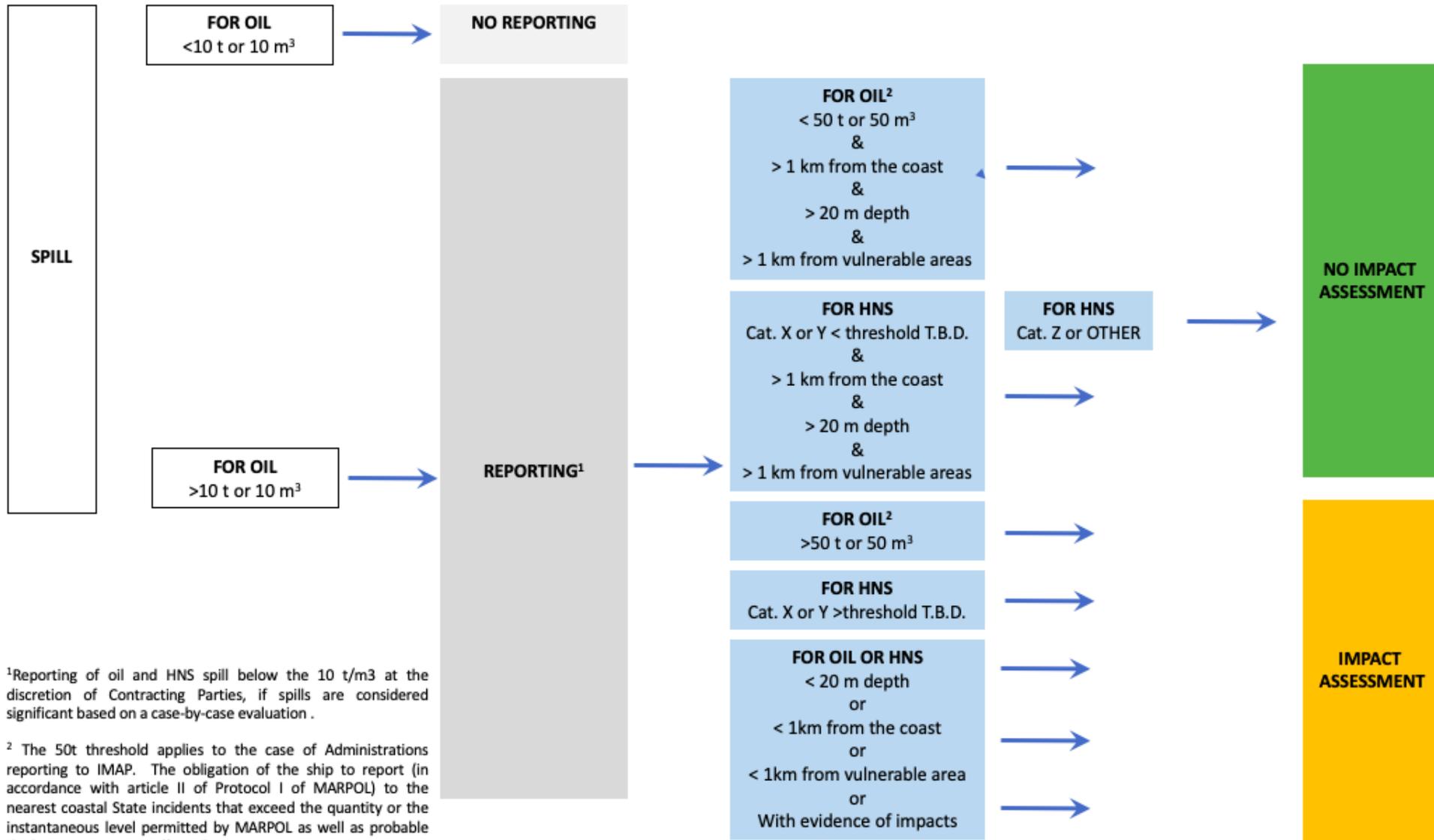
Evidence criteria

Finally, the evidence criteria should be used: monitoring of environmental impacts should be triggered in any case - also in absence of the above criteria – when an of evidence of impacts (e.g. dead animals, large presence of oil in coastal areas, etc.) occurs.

From the proposals above on the adoption of thresholds for reporting and impact assessment, an operational diagram for actions (decision tree) has been defined (Figure 2).

Parameters to be monitored in case of acute pollution events of oil

There are few examples from the Mediterranean of results from monitoring of oil spill impacts. From available guidelines and the experience available at European level (e.g. Belgium) the following elements are recommended to be considered: visual survey of macroscopic evidences of pollution both on land and underwater (presence and extension of oil layers, tar-patches, dead or contaminated animals); chemical contamination of waters and sediments (total petroleum hydrocarbons, IPA, heavy metals); benthic communities (phytobenthos and zoobenthos); fish community; bioaccumulation in bivalves and fish.



¹Reporting of oil and HNS spill below the 10 t/m³ at the discretion of Contracting Parties, if spills are considered significant based on a case-by-case evaluation .

² The 50t threshold applies to the case of Administrations reporting to IMAF. The obligation of the ship to report (in accordance with article II of Protocol I of MARPOL) to the nearest coastal State incidents that exceed the quantity or the instantaneous level permitted by MARPOL as well as probable discharges remains unaffected.

Figure 2. Diagram (decision tree) illustrating actions to be undertaken according to the proposals for definition of thresholds for spill reporting and impact assessment

8 References

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