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)

REMPEC/WG.56/3/4/Rev.1
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Agenda Item 3: Illegal and accidental oil and HNS pollution from ships

Data sharing, monitoring and reporting

REMPEC
Malta, 2023

Note by the Secretariat

This document sets out an outline of progress made on data sharing, monitoring and reporting since the last Meeting of the Focal Points of REMPEC (online, 31 May-2 June 2021).

Background

1 The Fourteenth Meeting of the Focal Points of the Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea (REMPEC) (online, 31 May-2 June 2021) reviewed the document REMPEC/WG.51/9, which outlined the progress made on data sharing, monitoring and reporting since the 13th Meeting of the Focal Points of REMPEC (Malta, June 2019).

REMPEC Platforms

2 Noting that the Centre received only a minimal number of reports, revisions, and updates through the different regional decision support tools, the 14th Meeting of the Focal Points of REMPEC invited the Contracting Parties (CPs) to:

.1 regularly update their Country Profiles, the Mediterranean Integrated Geographical Information System on Marine Pollution Risk Assessment and Response (MEDGIS-MAR), the Information System of the Mediterranean Network of Law Enforcement Officials relating to MARPOL within the framework of the Barcelona Convention (MENELAS); and

.2 use the Waste Management Decision Support Tool to establish or review their national waste management strategy for oily waste resulting from accidental marine pollution; and

.3 liaise with the respective MAP Focal Points to contribute to the revision of the InfoMAP Data Management Policy and to explore the best way forward to reach a consensus on the access rights of national data, with a view to improving the quality, speed and effectiveness of the decision-making process in case of marine pollution incidents.

3 During the period under review, MEDGIS-MAR was used at different levels to contribute to the work of INFO/RAC on the development of the Knowledge Management Platform, which will represent the unique access point for all the MAP knowledge, and to the development of the 2023 Mediterranean Quality Status Report (2023 MED QSR).

4 Acknowledging the importance of MEDGIS-MAR databases and datasets, and the expressed need for the availability of updated data and information on MEDGIS-MAR and on Country Profile make it crucial the involvement of the CPs in the maintenance and update of these databases. In this context, the Secretariat proposes to:

.1 agree on the approach of periodic update through online surveys enabling the CPs to inform, in return, about their last update on both databases; and

.2 encourage the CPs to contribute to this work, which is also beneficial for their reporting on the implementation of the MARPOL Convention and the Barcelona Convention and its Protocols respectively to the to the International Maritime Organization (IMO) and to UNEP/MAP Coordination Unit.

5 MEDGIS-MAR remains the unique source of information provided by the CPs and REMPEC about accidents, in the Mediterranean, through its feature ‘Accidents’. The latter being also the source of information about Oil and HNS spills in the region.

6 Although the results obtained about spills are considered as satisfactory, however, these data remain limited and not representative when it comes to acute pollution, spills from ships under the threshold of 50m^3, and those from other sources other than ships. In this respect, the Secretariat proposes to:

.1 create a new layer on MEDGIS-MAR named ‘‘Spills in the Mediterranean’’ during a test period leading to a first assessment in the view of the forthcoming regional workshop ‘MEDEXPOL 2024’ on data sharing, monitoring and reporting; and

.2 develop an evaluation report on the way forward to enhance the reporting by the CPs on Spills in the Mediterranean, through MEDGIS-MAR, for approval by the next Meeting of the Focal Points of REMPEC.

7 The Waste Management Tool was designed by REMPEC to assist CPs in developing an ‘Oil Spill Waste Management Plan – OSWMP’. For the Preparedness aspect, it foresees the development of an OSWMP and for the Response aspect, to choose the best oil spill waste treatment (REMPEC/WG.45/8). The tool was presented during a national workshop, March 2022, the findings of which showed the lack of visibility and knowledge about the Tool and the need to facilitate its use by the CPs. In this regard, the Secretariat proposes to:

.1 incorporate the OSWMP procedures into national and regional systems for preparedness and response to marine pollution;

.2 include the use of the tool in the scenario of exercises and drills;

.3 examine the feasibility of maintaining the use of individual credentials to allow the input of national information in the application, to cove all potential sections of the OSWMP; and

.4 agree on the proposal of uploading the final OSWMP on the Country Profile.

Common Emergency Communication System for the Mediterranean

8 The Secretariat presented the proposed way forward for the establishment of the Common Emergency Communication System for the Mediterranean, herein after referred to the ‘Common system’, as laid down in document REMPEC/WG.51/9/2, notably the use of the Common Emergency Communication and Information System for Marine Pollution (CECIS MP) as the platform of the Common System.

9 The 14th Meeting of the Focal Points of REMPEC agreed on the use by all the CPs of CECIS MP for the request and offer of assistance, and its set of functionalities to facilitate its access to REMPEC Focal Points, establish a common procedure for the request of assistance, interconnect its databases to REMPEC Country Profile and MEDGIS-MAR equipment database.

10 To progress in the setting up of the Common System, the 14th Meeting of the Focal Points of REMPEC requested the Secretariat to liaise with the European Commission (EC) to implement the above agreed adaptations and to continue exploring, in consultation with CPs, communication streamlining processes and tasked the MTWG to assist the Secretariat in this process.

11 Considering that following the launch by the EC of the project for the renewal and upgrade of CECIS MP, to be completed by the end of 2023, and, hence, the progress in the setting up of the Common System is presently suspended, and expected to be reinitiated in 2024, the Secretariat proposes to continue the work with the EC.

Manual on national mechanisms for the mobilisation of response equipment and experts in case of emergency

12 The Secretariat introduced the template of the ‘Manual on national mechanisms for the mobilisation of response equipment and experts in case of emergency’ developed in the context of the EU West MOPoCo Project (2019-2020), as set out in document REMPEC/WG.51/9/3.

13 Beneficiary countries of the West MOPoCo project Algeria, France, Italy, Malta, Morocco, Spain and Tunisia shared, during MEDEXPOL 2020 (Malta, October 2020), their experience on the use of the Manual. They recognized the ease of collecting information on response equipment and personnel from various actors and operators, the immediate access to relevant information on the availability of pre-positioned equipment at the national level, and the steps to be taken for a rapid mobilization of other sources according to the risks incurred. The data provided by the Manual also enabled these countries as well as Monaco to review and update their respective Country Profile and their list of response equipment and experts on MEDGIS-MAR.

14 Following these interventions, the 14th Meeting of the Focal Points of REMPEC agreed upon the use of the Manual by all CPs as laid down in the Appendix to document REMPEC/WG.51/9/3, and requested the Secretariat to make the necessary amendments to the Template to make it more user friendly.

15 In accordance with the recommendations the 14th Meeting of the Focal Points of REMPEC, as detailed in paragraph 62.2 of the above-mentioned document, the Secretariat proceeded with the following changes on the Template:

.1 summarising the introductive paragraphs of the tables of Parts 1 and 2 of the Template; and divided the Part 3 into two Parts one related to the prepositioned equipment and the other for the mobilisation of supporting equipment within the international assistance,

.2 adapting the format of the tables to match the MEDGIS-MAR and Country Profile databases, considering the outcomes of the discussion on the Common Emergency Communication System in the Mediterranean, referred to in document REMPEC/WG.51/9/2;

.3 updating the insertion of the links to these databases in the Template, and

.4 giving option to produce a list of response equipment and field of expertise instead the indicative table of the response equipment annexed to the Manual.

16 Considering the feedback of the beneficiary countries and the recommendation of the 14th Meeting of the Focal Points of REMPEC inviting the Secretariat to submit, every two years, to all Mediterranean coastal States, a pre-filled Manual, and other relevant forms, to support the CPs in their reporting obligations, the Secretariat proposes to:

.1 endorse the revised template of the ‘Manual on national mechanisms for the mobilisation of response equipment and experts in case of emergency’, provided in **Annex 1** to the present document;

.2 request the CPs to:

.1 popularise the use of the revised template;

.2 update the produced information directly on MEDGIS-MAR and REMPEC Country Profile page, or by updating the latest pre-filed forms;

.3 report to the Secretariat any suggestion to improve the revised Template, to facilitate its use, and link with other databases in relation with the response equipment; and

.4 agree to upload the latest version of the Manual on respective Country Profile on REMPEC website.

Reporting on the Protocols implementation

17 The 14th Meeting of the Focal Points of REMPEC requested the CPs to:

.1 submit their annual reports to the International Maritime Organization (IMO) by 31 December of each year, using the revised reporting format set out in MEPC/Circ.318, for those who are Parties to MARPOL; and

.2 liaise with the respective MAP Focal Points to report on the implementation of the 2002 Prevention and Emergency Protocol, through the Barcelona Convention Reporting System (BCRS).

18 During the review period, the Centre assessed the reports prepared by the CPs on the implementation of the Prevention and Emergency Protocol of 2002 and the Offshore Protocol for the biennium 2020-2021. The first results of the assessment showed an increase in the number of CPs that have prepared their respective reports. The digitalisation of the reporting through the BCRS enabled in fact to note detailed completions and progress in several objectives of the Protocols by the CPs. However, discrepancies between the information on operational aspects and incidents and those available on the Country Profile and the MEDGIS-MAR 'accidents' and 'equipment' databases supposed to be updated by the CPs and used for several purposes including the said reporting.

19 In this context, the Secretariat recalls the proposals in paragraphs 4.1, 6.1, 16.2.2 of the present report and proposes to encourage the CPs to maintain updated these sources of information to facilitate their periodic reporting.

IMAP revised Guidance Fact Sheets for the Common Indicator 6 and 19

20 In the framework of the Decision IG.22/7 on the Integrated Monitoring and Assessment Programme of the Mediterranean Sea and Coast and Related Assessment Criteria (IMAP), adopted by COP 19 (Athens, Greece, February 2016), the Secretariat provided an overview of the revised IMAP Guidance Fact Sheets notably the Common Indicator 19 (CI 19): 'Occurrence, origin (where possible), extent of acute pollution events (e.g. slicks from oil, oil products and hazardous substances), and their impact on biota affected by this pollution', as presented in document REMPEC/WG.51/9/1.

21 Following the discussion on these revised Guidance Fact Sheets, the 14th Meeting of the Focal Points of REMPEC requested the Secretariat to coordinate the finalisation of the Guidance Factsheets Common Indicator 19 and Common Indicator 6 on Non-indigenous species.

22 In order to complete and maintain IMAP Info System with all IMAP Common Indicators fully implemented for the CPs to upload their monitoring data, the Secretariat proceeded, during the period under review, with the:

.1 best practice review of Descriptor 8 (D08C04, 2018 Reporting) of the Marine Strategy Framework Directive (MSFD), as laid down in document REMPEC/WG.56/INF.6, illustrating the monitoring activities required after pollution events due to ship and offshore activities to be considered in the review of the Common Indicator 19 under the IMAP. It also aimed at providing recommendations for the definition of the data standards and data dictionary of the Common Indicator 19, and

.2 revision of the Data Standard and Data Dictionaries for IMAP Common Indicator 19, in coordination with INFORAC, incorporating more details to the original template including link to the monitoring of other Common Indicators on habitat and biota.

23 The Centre also produced the assessment findings related to IMAP Common Indicator 19, illustrating the results of the related Good Environmental Status (GES) assessment, to be considered for the 2023 Med QSR and the finalisation of the CI 19 and CI 6 Guidance Factsheets. To undertake the

assessment, different databases, particularly MEDGIS-MAR, were considered related to spills of oil and other substances. The assessment also considered the frequency of spills in the period 2018-2021 and its variation in comparison to the past (previous assessment period 2013-2017), and the sub-regions and the relative sub-divisions identified in the Mediterranean Sea.

24 In this context the Secretariat proposes to:

.1 invite the CPs to provide data using the revised Data Standards and Data Dictionaries for IMAP Common 1ndicator 19, as approved by INFORAC, according to the established criteria for OIL and HNS spills as laid down in the **Annex 2** to the present document; and

.2 endorse the document Initial assessment findings related to IMAP Common Indicator 19 to contribute to the preparation of the 2023 MED QSR as provided in **Annex 3** to the present document.

25 The document 'Proposed IMAP Pollution Cluster Chapters for the 2023 MED QSR', as laid down in document REMPEC/WG.56/INF.7, was submitted by the Secretariat to the Integrated CORMONs Meeting (Greece end June 2023) for consideration in the view of the finalisation of the 2023 MED QSR.

Actions requested by the Meeting

26 **The Meeting is invited to**:

.1 **take note** of the information provided in the present document;

.2 **comment** as deemed appropriate; and

.3 **consider** the proposals put forward by the Secretariat, as reproduced in paragraphs 4, 6, 7, 11, 16, 19 and 24 of the present document.

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Annex 1

Revised template of the 'Manual on National Mechanisms for the Mobilisation of Response Equipment and Experts in case of Emergency'

National system for preparedness for and response to marine pollution

[Country]

Flag

***

Revised template of the

MANUAL ON NATIONAL MECHANISMS FOR THE MOBILISATION OF RESPONSE EQUIPMENT AND EXPERTS IN CASE OF EMERGENCY

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… / …. / …

REMPEC
Malta, 2023

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Preface

Marine pollution accidents revealed the importance of being well prepared, the need for a prompt and effective response, and the importance of mutual assistance and cooperation. The International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990 (OPRC Convention) provides an international framework for preparedness for and response to Marine pollution.

Contracting Parties to the OPRC Convention are requested, amongst other elements, to establish measures for dealing with pollution incidents, nationally and if needed in cooperation with other countries. According to paragraph 2.a of Article 6 of the OPRC Convention: ''*Each Party, within its capabilities either individually or through bilateral or multilateral co-operation and as appropriate, in co-operation with the oil and shipping industries, port authorities and other relevant entities, shall establish: A minimum level of pre-positioned oil spill combating equipment, commensurate with the risk involved, and programmes for its use.*'' However, the Convention does not provide a definition of the minimum level of response equipment, hence the idea of detailing the procedures beforehand to ensure the availability as quickly as possible of supporting means through bilateral or multilateral co-operation commensurate with the risk. This led to the development, within the EU WestMOPoCo Project 2019-2021, of the template of the 'Manual on national mechanisms for the mobilisation of response equipment and experts in case of emergency', the Manual, aiming at assisting the Contracting Parties to comply with their obligations under the OPRC convention and the Protocol concerning cooperation in preventing pollution from ships and, in cases of emergency, combating pollution of the Mediterranean sea, 2002 (Prevention and Emergency Protocol).

The 2002 Prevention and Emergency Protocol states in its Article 4: ''*The Parties shall endeavour to maintain and promote, either individually or through bilateral or multilateral cooperation, contingency plans and other means of preventing and combating pollution incidents. These means shall include, in particular, equipment, ships, aircraft and personnel prepared for operations in cases of emergency…*'. In this context, the Fourteenth Meeting of the Focal Points of Regional Marine Pollution Emergency Centre for the Mediterranean Sea (REMPEC), Online 31 May – 2 June 2021 agreed upon the use by the CPs of the Manual and requested the Secretariat to proceed with further improvement to make more user friendly and to enable update of data on the Country Profile and the MEDGIS-MAR, in both directions.

The revision period of the Manual is two years, to also facilitate the development of the report on the implementation of the Prevention and Emergency Protocol of 2002, through the Barcelona Convention Reporting System (BCRS).

PART I
COUNTRY INFORMATION

Introduction

Draft an overview on the general data on traffic oil maritime trade and routes, the coastal oil industry and infrastructure, the offshore activity and on the other hand, the sensitivity and vulnerability of the coastal environmental and economic interest referring, where relevant, to the following elements and illustrated in the Table 1 Map (One page max).

1.1 Country details

Capital city:
Information uploaded from / updating Country Profile Page[1]

Official language(s)
Information uploaded from / updating Country Profile Page
Second language
Add

Coastline (km):
Information uploaded from / updating Country Profile Page
Types of coastlines: sandy, rocky …(km)
Information uploaded from / updating MEDGIS-MAR (Basemaps)[2]

1.2. General data on infrastructures

Main Ports
Information uploaded from / updating Country Profile Page
Additional Ports
Information uploaded from / updating Country Profile Page
Oil Terminal
Information uploaded from / updating MEDGIS-MAR (Oil handling Facilities)
Power Station
Information uploaded from / updating MEDGIS-MAR (Oil handling Facilities)
Refinery
Information uploaded from / updating MEDGIS-MAR (Oil handling Facilities)
Offshore oil and gas installations
Information uploaded from / updating MEDGIS-MAR (Oil and Gas offshore intallations)

Production (bbl/day)
Information uploaded from / updating Country Profile Page
Production (bbl/day)
Information uploaded from / updating Country Profile Page
Imports (bbl/day)
Information uploaded from / updating Country Profile Page

1.3. Sensitivity and risks

[1] Country Profiles page: https://www.rempec.org/en/knowledge-centre/country-profiles
[2] MEDGIS-MAR: https://medgismar.rempec.org/

NCP – Oil spill risk study ?
Add details and link if available
Contingency plans for oil handling facilities, ports and offshore installations – Risk analysis ?
Add details and link if available
Sensitivity Study ?
If yes, GIS-based or paper document? Add Link or Details

Table 1 Country map

Add map illustrating the above information
Legend: - Ports and harbours - Oil handling facilities - Offshore structures - Coastal refineries and power stations - Sensitive and protected marine and coastal areas - VST, etc.

PART II
CONTINGENCY PLANNING

2.1 National Contingency Plan (Plan)

Title of the Plan
Information uploaded from / updating Country Profile Page
Official Language / Other Language of the Plan
Information uploaded from / updating Country Profile Page
Relevant national legislation adopting the Plan
Information uploaded from / updating Country Profile Page - Link to the text of the Plan if available

List of supporting documents of the Plan :
Annexes, Manual of Procedure providing additional information, details or lists
Activation of the Plan
List and details of incidents and dates that necessitated the activation of the Plan
Evaluation of the Plan using evaluation tools such as RETOS
If yes: Context, dates, score and identified improvements areas
Revision or update of the Plan
If yes: Context, update or review, parts reviewed

Geographical response Plan(s)
Information to be provided
Oiled wildlife response
Information to be provided
Deployment / configuration booming plans
Information to be provided

2.2 Components of the national system for preparedness and response in relation with response equipment

National and multi-lateral (if applicable) plans providing policies on the use of treating agents (chemical dispersants, cleaning agents, bioremediation agents, herders, etc.) and strategies (i.e. in-situ burning) for spill response
Information to be provided and used to update Country Profile (response strategy)
Does the plan include procedures for cooperation and emergency mobilisation (equipment, expertise, personnel…) with regional/local/harbours authorities?
Information to be provided and used to update Country Profile (response strategy)
Does the plan include procedures for cooperation and emergency mobilisation (equipment, expertise, personnel…) with Industry/Private sector (oil and gas companies, shipping industries, response and clean-up companies…)?
Information to be provided and used to update Country Profile (response strategy)
Does the plan include procedures for cooperation and emergency mobilisation (equipment, expertise, personnel…) with volunteers/fishermen/NGOs…?
Information to be provided and used to update Country Profile (response strategy)

Waste Management Plan for oil and HNS response in place:

Information to be provided and reference to the use of the Mediterranean Oil Spill Waste Management Decision Support Tool plan its use to develop the OSWMP Plan (for Oil)[3] and the Maritime Integrated Decision Support Information System Transport of Chemical Substances MIDSIS TROCS (for HNS)[4]

2.3 Oiled wildlife response

Wildlife responders
Name, Institution, address, contact details
Permanent facilities
Location
Specialised equipment
Location, type, time for mobilisation

2.4. National competent authorities

Competent National Authority (IMO / OPRC terminology) or Authority in charge of implementing the Plan
Name, Institution, address, contact details
Designated Authorities to address and monitor site safety and security during an Oil or HNS spill response
Name, Institution, address, contact details
Designated Authorities to address and monitor an Oil or HNS spill response at sea
Name, Institution, address, contact details
Designated Authorities to address and monitor an Oil or HNS spill response on the shoreline
Name, Institution, address, contact details
Authority which is entitled to act on behalf of the State to request assistance or to decide to render requested assistance
Name, Institution, address, contact details
REMPEC Government Focal Point
Name, Institution, address, contact details
REMPEC Prevention Focal Point
Name, Institution, address, contact details
REMPEC OPRC Focal Point
Name, Institution, address, contact details

2.5 Articles / Chapters of the Plan related to response equipment

Reproduce a row for each chapter and article of the Plan, or extracts of them, to provide an overview of the legal and financial aspects related to response equipment

[3] https://wastemanagement.rempec.org/en

[4] https://midsis.rempec.org/en

PART III
MOBILISATION OF PREPOSITIONED RESPONSE EQUIPMENT AND PERSONNEL

Introduction

Part III of the manual provides relevant information for the mobilisation of response equipment commensurate to the response to Oil spills.

It provides details on the localisation, the ownership, the contact entity(ies) and responsible (s) etc. It also provides additional information on the equipment's logistic, for their handling, transport as well as quantities, type, cost, links to inventories, etc.

Overview on stockpile of the different public entities as well the oil and shipping industries, port authorities and other relevant entities stockpile of response equipment. The obligations, duties and rules that applies to these entities as regard to the response equipment (Max 1 page).

Available spill movements and weathering tracking and forecasting systems
List

3.1 Response at sea

Aerial survey aircrafts
Location / Quantity / Characteristics / Type / Owner and contact details - Time for mobilisation: Information uploaded from/updating MEDGIS-MAR (Equipment)
Monitoring Spraying and response vessels
Location / Quantity / Characteristics / Type / Owner and contact details - Time for mobilisation: Information uploaded from/updating MEDGIS-MAR (Equipment)

Containment equipment
Location / Quantity / Characteristics / Type / Owner and contact details - Time for mobilisation Information uploaded from/updating MEDGIS-MAR (Equipment)
Skimmers and ancillaries (pumps and power packs)
Location / Quantity / Characteristics / Type / Owner and contact details - Time for mobilisation: Information uploaded from/updating MEDGIS-MAR (Equipment)
Storage capacities
Location / Quantity / Characteristics / Type / Owner and contact details - Time for mobilisation: Information uploaded from/updating MEDGIS-MAR (Equipment)
Dispersant stockpiles - Dispersant spraying systems
Location / Quantity / Characteristics / Type / Owner and contact details - Time for mobilisation: Information uploaded from/updating MEDGIS-MAR (Equipment)

3.2 Shoreline response

Containment / Protection equipment
Location / Quantity / Characteristics / Type / Owner and contact details - Time for mobilisation: Information uploaded from/updating MEDGIS-MAR (Equipment)
Pumping devices: Skimmers and ancillaries (pumps and power packs), Vacuum systems, Others
Location / Quantity / Characteristics / Type / Owner and contact details - Time for mobilisation: Information uploaded from/updating MEDGIS-MAR (Equipment)
Storage capacities
Location / Quantity / Characteristics / Type / Owner and contact details - Time for mobilisation: Information uploaded from/updating MEDGIS-MAR (Equipment)
Beach cleaning equipment (screening machines,…)
Location / Quantity / Characteristics / Type / Owner and contact details - Time for mobilisation: Information uploaded from/updating MEDGIS-MAR (Equipment)
Flushing and flooding systems
Location / Quantity / Characteristics / Type / Owner and contact details - Time for mobilisation: Information uploaded from/updating MEDGIS-MAR (Equipment)

3.3 Oily waste landfills / treatment sites

Location, Owner and contact details, Storage capacity, Type of treatment (incineration, landfill etc)

3.4 Mobilisation of Personnel

- **Response teams**

Administration / Public bodies involved in response at sea (aerial observation, monitoring, response…):
Name, Institution, address, contact details
Administration / Public bodies involved in response on the shoreline (survey, clean-up, waste management…):
Name, Institution, address, contact details
Private companies involved at sea or on the shoreline response, national contractors:
Name, address, contact details
Others: NGOs, Volunteers …
Name, Institution, address, contact details For beneficiary countries of the POSOW Project, also refer to the database of volunteers[5]

- **Technical-scientific personnel:**

Oil/HNS spills response experts at sea and on shoreline response

[5] https://www.posow.org/volunteersdb/welcome/view

Name, Institution, address, contact details
Oiled wildlife experts (seabird species, marine reptiles, marine mammals):
Name, Institution, address, contact details
Technical experts for the use of equipment, health, safety:
Name, address, contact details
Environmental impact and post spill monitoring experts or labs
Name, Institution, address, contact details
Other
Name, Institution, address, contact details

Table 2: Map of the location of prepositioned response equipment

Add map illustrating the location of the prepositioned equipment public (national capabilities public and oil and shipping industries, port authorities and other relevant entities)
Legend.

PART IV
MOBILISATION OF RESPONSE EQUIPMENT THROUGH INTERNATIONAL ASSISTANCE

Introduction

According to Article 7.1 of the OPRC Convention: ‘’International co-operation in pollution response’’, when the severity of a marine pollution incident so justifies, and upon request of a Party affected or likely to be affected by the incident, CPs, subject to their capabilities and the availability of relevant resources, will co-operate and provide advisory services, technical support and equipment for the purpose of responding to an oil pollution incident.

According to Art. 3, Decision 1313/2013/EU, the Union Civil Protection Mechanism aims to strengthen cooperation between the Union and Member States and facilitate coordination in the field of civil protection in order to improve the effectiveness of systems for preventing, preparing for and responding to natural and man-made disasters, including marine pollution. The work programme for 2019 includes the development of cross-border regional disaster response plans and inter-operable procedures and response capacities.

The 2002 Prevention and Emergency Protocol stipulates in its Article 12.1:’’Assistance’’: Any Party requiring assistance to deal with a pollution incident may call for assistance from other Parties, either directly or through the Regional Centre, starting with the Parties which appear likely to be affected by the pollution. This assistance may comprise, in particular, expert advice and the supply to or placing at the disposal of the Party concerned of the required specialised personnel, products, equipment and nautical facilities. Parties so requested shall use their best endeavours to render this assistance. The request for assistance shall be formulated in a clear and precise manner, using the standard form defined in Annex 1 and 2 of the Mediterranean Guide[6]. It shall contain a detailed description of the kind of assistance required and the purpose for which personnel, equipment, products and/or other means will be used.

4.1. National authority in charge of the request of assistance

Authority and responsible person
Detail
Customs and immigration policies defined to streamline emergency transport and delivery of personnel and equipment between regions/areas:
List
Available emergency fund to enable immediate response actions
Reference

[6] Request and offer of Assistance standard forms : https://www.rempec.org/en/our-work/pollution-preparedness-and-response/emergency-response/request-assistance-1/request-assistance#autotoc-item-autotoc-2

4.2 Assistance within bilateral and sub-regional agreements

In case of a marine pollution emergency, Contracting Parties of the Barcelona Convention could request assistance from other Parties regarding response means and expertise, through existing bilateral or multilateral agreements, or through REMPEC.

List procedures for cooperation and emergency mobilisation (equipment, expertise, personnel…) in the framework of bilateral and subregional agreements
Information to be collected from the text and relevant annexes of the Sub-regional Contingency Plan(s) and used to update Country Profile Page (Sub-regional Agreement)

4.3. Assistance from REMPEC

REMPEC provides assistance to the coastal States of the Mediterranean region, which in cases of emergency so request, in obtaining assistance of the other Parties to the Prevention and Emergency Protocol or, when the possibilities for assistance do not exist within the region, in obtaining assistance from outside the region

The Centre can send REMPEC officers or mobilize the Mediterranean Assistance Unit (MAU) to provide national authorities with advice and technical expertise which they may need during the initial period of a marine pollution incident to decide which measures to take.

The Request and Offer of assistance is composed on two (2) forms[7]:

- Standard Form for Request of MAU experts
- Standard Form for Request of Equipment, Products and Specialized Personnel

They should be communicated to REMPEC by email on emergency@rempec.org

For further assistance contact REMPEC on the Emergency line +356 79 50 50 11 (operational 24/7)

4.4 Activation of the Union Civil Protection Mechanism

The Union Civil Protection Mechanism (UCPM) covers both civil protection and marine pollution emergencies inside and outside the EU. The UCPM aims to strengthen the co-operation and co-ordination among the EU Member States and the Participating States[8] and to improve prevention, preparedness and response to disasters. Any country in the world, but also the United Nations and its agencies or a relevant international organisation, can call on the UCPM for assistance in case of an emergency that overwhelms national response capabilities.

ERCC can facilitate mobilisation and deployment of pollution response capacity and expertise from the EU Member States, Participating States and the European Maritime Safety Agency (EMSA).

A written request for international assistance has to be submitted by a national responsible authority to the Emergency Response Coordination Centre (ERCC), which acts 24/7.
More information on the UCPM and its tools can be found at https://ec.europa.eu/echo/what/civil-protection_en

[7] https://www.rempec.org/en/our-work/pollution-preparedness-and-response/emergency-response/request-assistance-1/request-assistance#autotoc-item-autotoc-2

[8] Iceland, North Macedonia, Montenegro, Norway, Serbia and Turkey.

4.5 Assistance from the European Maritime Safety Agency

The European Maritime Safety Agency (EMSA) has established a network of stand-by oil spill response vessels through contracts with commercial vessel operators available to Member States and neighbouring countries in need of additional means of at-sea oil recovery.

Member State authorities are the main beneficiaries of the network of vessels. However, support can be extended to other third parties upon authorisation by EMSA/Member States, under the supervision of the national competent authority, and if conditions are clearly determined in advance.

Add or refer to any supporting document, form, facilitating the request of stand-by oil spill response vessels

4.6 Mobilisation of Equipment from private suppliers

In case of complex incidents which necessitate mobilisation of multiple and diverse types of response equipment that could be difficult to mobilise through mutual assistance, countries may request the services of international private suppliers, which can provide additional preparedness, response and intervention services ready 24/7, 365 days of the year. These services are widely recognised by the international and non-governmental organizations, namely the IOPF Funds.

Request for the services of these companies can be made through normal procedures or within the context of exceptional circumstances developed under the national contingency plan.

List and contacts of potential private suppliers
Details
Procedures for cooperation and emergency mobilisation (equipment, expertise, personnel…) with international private suppliers?
Details

ANNEX
LIST OF EQUIPMENT AND EXPERTS

Indicative list of equipment based on Annex II.4 of the Mediterranean Guide on Cooperation and Mutual Assistance in Responding to Marine Pollution Incidents (Standard Form for Request of Equipment, Products and Specialized Personnel)[9] and the IMO Manual on oil pollution, Section II.

Parties, through respective OPRC Focal Points, may also use the MEDGIS-MAR Database (Equipment)[10] , or to provide a list of response equipment and field of expertise.

- **Equipment and products**

Booms

Type	Specifications (e.g. Connection types[11])	Quantity	Remarks
Inflatable booms			
Water ballast booms			
Offshore booms			
Harbour booms			
Fire Booms			
Other booms			
Blower			

Sorbent

Type	Quantity	Remarks
Sheets or pads		
Rolls		
Pillows		
Booms		
Mops		
Bulk Hydrophobic		
Bulk all liquid		
Other		

Skimmer

Type	Quantity	Remarks
Oleophilic Disc		
Oleophilicrop mop		
Oleophilic Drum		
Oleophilic brush		
Oleophilic belt		
Non-Oleophilic vacuum/suction		

[9] https://www.rempec.org/en/our-work/pollution-preparedness-and-response/response/tools/cooperation-and-mutual-assistance
[10] https://medgismar.rempec.org/#
[11] ASTM, Universal type 1, Universal type 2, Us Navy, Hinge & Pin or NOFI

Non-Oleophilic weir		
Non-Oleophilic belt		
Non-Oleophilic drum		
Other		

Pump

Type	Quantity	Remarks
Pump alone		
Pump with water injection		
Underwater pumping system		
Cargo transfer pump		
Other		

Storage

Type	Quantity	Remarks
Floating Storage Units (tanks)		
Floating Storage Units (barge)		
Big Bag on barge		
Open top collapsible containers with supporting frame		
Shoreline recovery pillow tanks		
Other		

Dispersant / Bioremediation agent

Type	Specifications	Quantity	Remarks
Conventional dispersants (2nd generation)			
Concentrate dispersants (3rd generation)			
Bioremediation agent			
Other			

Dispersant spraying systems

Type	Quantity	Remarks
Fixed spraying systems for helicopter		
Independent spraying bucket		
Conventional dispersant spraying system for boat		
Systems for spraying conventional dispersants		
Systems for spraying concentrate pre-diluted into sea water		
Systems for spraying neat dispersants		
Portable units for individual use		
Other		

Spraying carrier Type

Type	Specifications	Quantity	Remarks
Crop spraying aircraft			

Spraying multi-engine aircraft			
POD spraying aircraft			
Large Self Contained spraying system			
Other			

Vessel

Type	Quantity	Remarks
Response vessel		
Rescue vessel		
Tug boat		
Dinghy		
Egmopol		
Multipurpose vessel		
Offshore supply vessel		
Other		

Aircraft

Type	Specifications	Quantity	Remarks

Personal Protective Equipment

Type	Specifications	Quantity	Remarks
Protective clothing			
Respiratory system			
Specialized diving equipment			
Other			

Other Devices

Type	Specifications	Quantity	Remarks
Subsea location devices			
Subsea recovery device			
Subsea dispersant application device			
Well capping			
Other			

- **Specialized Personnel**

Type	Field of competences	Quantity	Remarks
Experts	Salvage		
	Diving		
	Naval Architect		
	Health and Safety		
	Chemical		

	Firefighting		
Tasks	Field of competences		
Supervisors	Shoreline clean-up Chemical Firefighting		
Team Leader			
On Scene Coordinator			
Strike team			

Annex 2

Revised Data Standards (DS) and Data Dictionaries (DD) for IMAP CI 19

Note accompanying the revised Data Standards (DS) and Data Dictionaries (DD)

1 The proposed revision of Data Standards (DS) and Data Dictionaries (DD) for Common Indictor 19 (CI 19) is provided as Excel file, produced here in PDF version, where proposed changes are introduced.

2 In this proposal, changes have been indicated only in the four DD related sheets, namely: DD_Stations, DD_OnBoard_Oil, DD_OnShoreOil, DD_OnBoard_HNS, the DD Impact is reproduced without any changes. The corresponding DS sheets will be updated accordingly.

3 The proposed changes include:

.1 changes in DD only (reformulation of already present records); and

.2 changes in DS&DD (identification of additional records with their definition).

4 In each of the four sheets indicated above a column has been added (as last column), entitled "Proposed changes". In addition, where appropriate, additional rows have been added (for additional proposed records).

5 The proposed changes of the sheets **DD_Stations** and **DD_OnBoardOil** are derived from the analysis of MSFD related documents. Both sheets have been checked in order to ensure availability of all essential elements to assess whether monitoring of impacts should be triggered (see proposals for triggering monitoring of spill impacts, ref. Best practices review report of Descriptor 08 of MFSD).

6 The proposed changes of the sheets **DD_OnBoardHNS** are aimed at aligning the essential elements for reporting with those indicated for oil. Suggested changes are also aimed at providing essential elements to assess whether monitoring of impacts should be triggered or not (see proposals for triggering monitoring of spill impacts, ref. Best practices review report of Descriptor 08 of MFSD).

7 The proposed changes to **DD_OnShore_Oil** have been derived from the analysis of the few spill impact monitoring cases available for the Mediterranean and from other background documents (e.g. from ITOPF, PREMIAM) as well as from and scientific literature. Expert judgment has been considered in order to provide a reasonable trade-off between the complexity of monitoring of ecological impacts at sea and technical/economic feasibility.

8 Links with IMAP indicators have been indicated where pertinent.

9 The revised DS&DD alone cannot provide alone a complete guidance to countries on how to operate in case of ned for monitoring of environmental impact of a spill. They should be complemented with indications about spatial and temporal features of the monitoring program: number and location of sampling stations, suggestions about the number of samples to be collected (replicates, sampling depths, etc.), indications about the expected duration of the monitoring programs for the different environmental matrices. These elements could be provided in a revised version of the Fact-sheet for this indicator, or in other supporting documents to be prepared *ad hoc*.

DD Stations

Field	Description (EN)	Description (FR)	List of values	Remarks
CountryCode	Enter member country code as ISO two digits, for example "IT" for Italy.	Entrez le code ISO à deux chiffres du pays membre, par exemple "IT" pour l'Italie		
NationalStationID	Station Identification code as reference point or centroid of the impacted area	Code d'identification de la station comme point de référence ou centroïde de la zone affecté		
StationName	Station name as reference point or centroid of the impacted area	Nom de la station comme point de référence ou centroïde de la zone impactée		
Region	Adminstrative subdivision of first level which the station belongs to (according to the country subdivision)	Subdivision administrative de premier niveau à laquelle la station appartient (selon la sous-division par pays)		
Latitude	Latitude in the WGS84 decimal degrees reference system of centroid or reference point of the impacted area with at least 5 digits (xx.xxxxx).	Latitude dans le système de référence en degrés décimaux WGS84 du centroïde ou du point de référence dans la zone affecté avec au moins 5 chiffres (xx.xxxxx).		
Longitude	Longitude in the reference system WGS84 decimal degrees of centroid or reference point of the impacted area with at least 5 digits (xx.xxxxx) Use negative values for coordinates west of the Greenwich Meridian (0°).	Longitude dans le système de référence WGS84 degrés décimaux du centre de gravité ou du point de référence dans la zone affecté avec au moins 5 chiffres (xx.xxxxx) Utilisez des valeurs négatives pour les coordonnées à l'ouest du méridien de Greenwich (0°).		
ClosestCoast	Station distance from the coast in km	Indiquer en km la distance de la station à partir de la côte		
IncidentID	POLREP database identification number if identificable	Numéro d'identification de la base de données POLREP si identifiable		
IMO_number	If identificable, please specify IMO Ship Identification Number	Si identifiable, veuillez spécifier le numéro d'identification du navire de l'OMI		
Ship_name	In case of incident, specify the ship name	En cas d'incident, précisez le nom du navire		
IncidentType	Specify the type of incident. Enter one value of the list	Précisez le type d'incident. Entrez une valeur de la liste	1 = Blowout 2 = Grounding 3 = Collision 4 = Oil or gas slick 5 = Offshore platform 6 = Fire or Explosion 7 = Engine or machinery breakdown 8 = Cargo transfer failure 9 = Contact 10 = Hull structural failure 11 = Installation structural failure 12 = Other 13 = None	
SensitiveArea	Name of sensitive areas close to the identified area, if present. Sensitive areas include (non-exhaustive list): Marine Protected Areas, national and sub-national coastal and marine parks, EU Natura 2000 sites, SPAMI, Ramsar sites, Fishery Restricted Areas (ex GFCM), areas of importance for sensitive species like birds, cetaceans and sea mammals in general (IBA, CCH, IMMA, etc.)	Nom des zones sensibles, des aires marines protégées, etc. fermées à la zone identifiée, le cas échéant		
SensitiveAreaDistance	Distance from the identified sensitive areas in km			
EconomicAreaTypology	Identification of sensitive areas relevant for maritime economic activities. Enter one value of the list		AP = Aquaculture plan PT = Ports M = Marinas FH = Fishing harbours IS = Industrial seawater intakes	
EconomicAreaDistance	Distance from the identified sensitive areas relevant for maritime activities in km			
Remarks	Please include any additional comment that you find important and of relevance	Veuillez inclure tout commentaire supplémentaire que vous jugez important et pertinent.		

DD On-board Oil

Field	Description (EN)	Description (FR)	List of values	Liste des valeurs	Remarks
CountryCode	Enter member country code as ISO two digits, for example "IT" for Italy.	Entrez le code ISO à deux chiffres du pays membre, par exemple "IT" pour l'Italie			
NationalStationID	Station Identification code as reference point or centroid of the impacted area	Code d'identification de la station comme point de référence ou centroïde de la zone touchée			
IncidentID	POLREP database identification number if identifi	Numéro d'identification de la base de données POLREP si identifiable			
IMO_number	If identifiable, please specify IMO Ship Identification Number	Si identifiable, veuillez spécifier le numéro d'identification du navire de l'OMI			
Ship_name	In case of incident, specify the ship name	En cas d'incident, précisez le nom du navire			
IDSurvey	Survey code	Code d'étude			
Year	Year of sampling in YYYY format	Année d'échantillonnage au format AAAA			
Month	Month of sampling in 1-12 format	Mois d'échantillonnage au format 1-12			
Day	Day of sampling in 1-31 format	Jour d'échantillonnage au format 1-31			
Time	Hours-minutes-seconds of sampling in HH:MM:SS format	Heures-minutes-secondes d'échantillonnage au format HH: MM: SS			
ObservationMethod	Specify observation methods for oil monitoring on board. Enter one of the value of the list	Spécifier les méthodes d'observation pour la surveillance des hydrocarbures à bord. Entrez une des valeurs de la liste	V= Expert human eye observation AH= Human eye aerial observation RS = Aerial observation with remote sensing equipment AHR= human eye observation and remote sensing equipment SAT= Satellite imagery SA = Sampling and analysis		
PrevailingWinds	Prevailing winds. Enter one value of the list.	Vents dominants. Entrez une valeur de la liste.	N = North (Nord) NE = North-East (Nord-Est) E = East (Est) SE = South-East (Sud-Est) S = South (Sud) SW = South-West (Sud-Ouest) W = West (Ouest) NW = North-West (Nord-Ouest)		
PrevailingCurrents	Prevailing currents off the beach. Enter one value of the list.	Les courants dominants au large de la plage. Entrez une valeur de la liste.	N = North (Nord) NE = North-East (Nord-Est) E = East (Est) SE = South-East (Sud-Est) S = South (Sud) SW - South-West (Sud-Ouest) W = West (Ouest) NW = North-West (Nord-Ouest)		
Visiblity	Use a subjective scale from 0 to 3. Enter one value of the list	Utilisez une échelle subjective de 0 à 3	0 = Very poor - Visibility less than 1,000 metres 1 = Poor - Visibility between 1,000 metres and 2 nautical miles 2 = Moderate-Visibility between 2 and 5 nautical miles 3 = Good - Visibility more than 5 nautical miles		
Sea_state	Sea state based of Beaufort scale. Enter one value of the list		0 = no wave = calm (glassy) 1 = 0-0.10 m = calm (rippled) 2 = 0.10-0.50 m = smooth 3 = 0.50 - 1.25 m = slight 4 = 1.25 - 2.50 m = moderate 5 = 2.50 - 4.00 m = rough 6 = 4.00 - 6.00 m = very rough 7 = 6.00 - 9.00 m = high 8 = 9.00 - 14.00 m = very high 9 = > 14.00 m = phenomenal		
DeterminHazSubsName	Name of the contaminant, enter one value of the column 'Label' of the list 'List_contaminants'	Nom du contaminant, entrez une valeur de la colonne 'Label' de la liste 'List_contaminants'			
DeterminHazSubsID	ID of the contaminant, enter one value of the column 'ID_Contaminant' of the list 'List_contaminants'	ID du contaminant, entrez une valeur de la colonne 'ID_Contaminant' de la liste 'List_contaminants'			
CASNumber	CAS number of contaminant, enter one value of the column CASNumber of list 'List_contaminants'	Numéro CAS du contaminant, entrez une valeur de la colonne Numéro CAS de la liste 'List_contaminants'			
Persistence	Persistence of the hydrocarbon in the sea. Enter one value of the list	Indiquez si persistant ou non persistant	1 = Persistent 2 = Not Persistente		
QuantityDischarged	Quantity of oil discharged (tonnes)				
DurationSpill	Duration of the spill. Hour Minutes Second in HH:MM:SS format				
Volume	Volume of oil (m3/km2). Bonn Agreement Oil Appearance Code – BAOAC	Volume de pétrole (m3/km2). Code d'apparence des huiles de l'Accord de Bonn - BAOAC			
Thickness	Thickness identified (mm). Bonn Agreement Oil Appearance Code – BAOAC)	Épaisseur identifiée (mm). Bonn Agreement Oil Appearance Code - BAOAC)			
SlickLatitude	Latitude of slick at sea from GPS - Latitude in the WGS84 decimal degrees reference system with at least 5 digits (xx.xxxxx)	Latitude de la nappe en mer du GPS			
SlickLongitude	Longitude of slick at sea from GPS - Longitude in the WGS84 decimal degrees reference system with at least 5 digits (xx.xxxxx)	Longitude de la nappe en mer à partir du GPS			
Coverage	Coverage of slick in km2	Couverture de nappe en km2			
Remarks	Notes Please include any additional comment that you find important and of relevance	Veuillez inclure tout commentaire supplémentaire que vous jugez important et pertinent.			

DD On-shore Oil

Field	Description (EN)	Description (FR)	List of values	Liste des valeurs	Remarks
CountryCode	Enter member country code as ISO two digits, for example "IT" for Italy.	Entrez le code ISO à deux chiffres du pays membre, par exemple "IT" pour l'Italie			
NationalStationID	Station Identification code as reference point or centroid of the impacted area	Code d'identification de la station comme point de référence ou centroïde de la zone affecté			
IncidentID	POLREP database identification number if identificable	Numéro d'identification de la base de données POLREP si identifiable			
IMO_number	If identificable, please specify IMO Ship Identification Number	Si identifiable, veuillez spécifier le numéro d'identification du navire de l'OMI			
Ship_name	In case of incident, specify the ship name	En cas d'incident, précisez le nom du navire			
IDSurvey	Survey code	Code d'étude			
Year	Year of sampling in YYYY format	Année d'échantillonnage au format AAAA			
Month	Month of sampling in 1-12 format	Mois d'échantillonnage au format 1-12			
Day	Day of sampling in 1-31 format	Jour d'échantillonnage au format 1-31			
Time	Hours-minutes-seconds of sampling in HH:MM:SS format	Heures-minutes-secondes d'échantillonnage au format HH: MM: SS			
SegmentID	Segment identification Code	Code d'identification de segment			
DeterminHazSubsName	Name of the contaminant, enter one value of the column 'Label' of the list 'List_contaminants'	Nom du contaminant, entrez une valeur de la colonne 'Label' de la liste 'List_contaminants'			
DeterminHazSubsID	ID of the contaminant, enter one value of the column 'ID_Contaminant' of the list 'List_contaminants'	ID du contaminant, entrez une valeur de la colonne 'ID_Contaminant' de la liste 'List_contaminants'			
CASNumber	CAS number of contaminant, enter one value of the column CASNumber of list 'List_contaminants'	Numéro CAS du contaminant, entrez une valeur de la colonne Numéro CAS de la liste 'List_contaminants'			
Municipality	First level administrative subdivision to which the station belongs to	Subdivision administrative de premier niveau à laquelle appartient la station			
CoastLenght	Total length of the coast monitored (m)	Longueur totale de la côte surveillée (m)			
SegmentLength	Segment survey length (m)	Longueur de l'enquête de segment			
LatitudeStart	Latitude of the starting point of the area on the coast in the WGS84 decimal degrees reference system with at least 5 digits (xx.xxxxx).	Latitude du point de départ de la zone sur la côte dans le système de référence en degrés décimaux WGS84 avec au moins 5 chiffres (xx.xxxxx).			
LongitudeStart	Longitude of the starting point of the area on the coast in the WGS84 decimal degrees reference system with at least 5 digits (xx.xxxxx). Use negative values for coordinates west of the Greenwich Meridian (0°).	Latitude du point de départ de la zone sur la côte dans le système de référence en degrés décimaux WGS84 avec au moins 5 chiffres (xx.xxxxx). Utilisez des valeurs négatives pour les coordonnées à l'ouest du méridien de Greenwich (0 °).			
LatitudeEnd	Latitude of the ending point of the area on the coast in the WGS84 decimal degrees reference system with at least 5 digits (xx.xxxxx).	Latitude du point de départ de la zone sur la côte dans le système de référence en degrés décimaux WGS84 avec au moins 5 chiffres (xx.xxxxx).			
LongitudeEnd	Longitude of the ending point of the area on the coast in the WGS84 decimal degrees reference system with at least 5 digits (xx.xxxxx). Use negative values for coordinates west of the Greenwich Meridian (0°).	Latitude du point de départ de la zone sur la côte dans le système de référence en degrés décimaux WGS84 avec au moins 5 chiffres (xx.xxxxx). Utilisez des valeurs négatives pour les coordonnées à l'ouest du méridien de Greenwich (0 °).			
CoastTypology	Specify the coast typology. Enter one of the value of the list	Précisez la typologie des côtes. Entrez une des valeurs de la liste	1=Bedrock cliff 2=Bedrock slope/platform 3=Man-made solid 4=Man-made permeable 5=Salt marsh 6=Mud sediments 7=Sand sediments 8=Mixed sediments 9=Pebble-cobble-shingle 10=Boulder		
CoastExposition	Specify the coast exposition. Enter one of the value of the list	Spécifiez l'exposition de la côte. Entrez une des valeurs de	1=Very Exposed 2=Exposed 3=Partially Sheltered 4=Very Sheltered		
OtherFeatures	Specify other features of the area. Enter one of the value of the list	Spécifiez les autres caractéristiques de la zone. Entrez une des valeurs de la liste	1=Estuary/River 2=Historical artefact/structure 3=Dead seagrass (Posidonia) deposits 4=Amenity area 5=Pools 6=Deep crack or crevices 7=protected areas (MPAs, Natura2000, Marine Park, etc.) 8=Areas for marine/coastal activities (port, marina, fishing harbour, industrial seawater intake including desalination, etc.)		
Nspecimen_Dead	Number of dead animals at the level of species or at higher systematic category	Nombre d'animaux impliqués par l'événement de pollution. Considérant uniquement les animaux morts			
Nspecimen_Injured	Number of injured animals of species level or at higher systematic categories	Nombre d'animaux impliqués par l'événement de pollution. Ne considérer que les animaux blessés			

SurfaceOilPosition	Specify surface oil position. Enter one of the value of the list	Spécifiez la position de l'huile de surface. Entrez une des valeurs de la liste	L=Lower beach U=Upper beach M=Middle beach S=Supra tidal		
SurfaceOilLength	Specify surface oil length in meters (m)	Précisez la longueur du pétrole en surface en mètres (m)			
SurfaceOilWidth	Specify surface oil width in meters (m)	Spécifiez la largeur de surface de l'huile en mètres (m)			
SurfaceOilDistribution	Specify surface oil distribution. Enter one of the value of the list	Précisez la répartition de l'huile en surface. Entrez une des valeurs de la liste	TR = Trace < 1% SP = Sporadic (1-10%) PA= Patchy (11-50%) BR = Broken (51-90%) CO=Continous (91-100%)		
SurfaceOilThick	Specify surface oil thick. Enter one of the value of the list	Spécifiez l'épaisseur de l'huile de surface. Entrez une des valeurs de la liste	PO = Pooled Oil (fresh oil or mousse > 1 cm thick) CV = Cover (oil or mousse from >0.1 cm to <1 cm on any surface) CT = Coat (visible oil <0.1 cm, which can be scraped off with fingernail) ST = Stain (visible oil, which cannot be scraped off with fingernail) FL = Film (transparent or iridescent sheen or oily film)		
SurfaceOilCharacter	Specify surface oil characteristics. Enter one of the value of the list	Spécifiez les caractéristiques de l'huile de surface. Entrez une des valeurs de la liste	FR = Fresh Oil (un-weathered, liquid oil) MS = Mousse (emulsified oil occurring over broad areas) TB = Tar balls (discrete accumulations of oil <10 cm in diameter) PT = Tar Patties (discrete lumps or patches >10 cm diameter) SR = Surface Oil Residue (non-cohesive, oiled surface sediments) AP = Asphalt Pavements (cohesive, heavily oiled surface sediments)		
SubSurfaceOilPosition	Specify sub-surface (buried) oil position. Enter one of the value of the list	Spécifiez la position de l'huile sous la surface (enterrée). Entrez une des valeurs de la liste	L=Lower beach U=Upper beach M=Middle beach S=Supra tidal		
SubSurfacePitDepth	Specify sub-surface (buried) oil depth in centimeters (cm)	Spécifiez la profondeur d'huile sous la surface (enfouie) en centimètres (cm)			
SubSurfacePitOiledZone	Specify pit depth in centimeters (cm)	Spécifiez la profondeur de la fosse en centimètres (cm)			
SubSurfaceOilThickness	Specify sub-surface (buried) oil thick in centimeters (cm)	Spécifiez l'épaisseur du pétrole souterrain (enfoui) en centimètres (cm)			
SubSurfaceOilWater	specify distance of sub-surface (buried) oil from water in centimeters (cm)	spécifier la distance entre le pétrole souterrain (enfoui) et l'eau en centimètres (cm)			
SubSurfaceOilCharacter	Specify sub-surface oil characteristics. Enter one of the value of the list	Spécifiez les caractéristiques de l'huile sous la surface. Entrez une des valeurs de la liste	OF=Oil filled pores - pore spaces are completely filled with oil PF=Partial filled - the oil does not flow out of the sediments when disturbed R= Oil residue - sediments are visibly oiled with black/brown coat or cover, but little or no accumulation of oil within the pore spaces FL =Oil film - sediments are lightly oiled with an oil film or stain TR= Trace - discontinuous film or spots of oil, or an odour or tackiness		
Photo	Name of PhotoFrame for the cave discovered. Specifcy the name as follow SurveyID_<year>_<month>_<day>.zip	Nom du PhotoFrame de la grotte découverte. Spécifiez le nom comme suit SurveyID_<année>_<mois>_<jour>.zip			
MacrophytobenthosCoveragePercentag	Macrophytobenthos: Coverage percentage with respect to the sampling square and the surface square equal 0.1 m2. Enter a value between 0-100. In the case of a species showing a percentage coverage <1%, enter the value of 0.5.	Le pourcentage de couverture par rapport au carré d'échantillonnage et au carré de surface est égal à 0,1 m2. Entrez une valeur comprise entre 0 et 100. Dans le cas d'une espèce présentant un pourcentage de couverture <1%, entrez la valeur 0,5.			
MacrophytobenthosBiomass	Macrophytobenthos: Biomass (g/m2)				
MacrozoobenthosSpeciesAbundance	Macrozoobenthos: Number of individuals/m2	Nombre d'individus/m2			
PhytoplanktonDensity	Phytoplankton: Number of individuals/liter	Nombre d'individus/m2			
PhytoplanktonDiversityIndex	Phytoplankton: the variety of phytoplankton types determined using the Shannon-Wiener index	La variété des types de phytoplancton déterminée à l'aide de l'indice de Shannon-Wiener			
Remarks	Please include any additional comment that you find important and of relevance	Veuillez inclure tout commentaire supplémentaire que vous jugez important et pertinent.			

DD On-board HNS

Field	Description (EN)	Description (FR)	List of values	Liste des valeurs	Remarks
CountryCode	Enter member country code as ISO two digits, for example "IT" for Italy.	Entrez le code ISO à deux chiffres du pays membre, par exemple "IT" pour l'Italie			
NationalStationID	Station Identification code as reference point or centroid of the impacted area	Code d'identification de la station comme point de référence ou centroïde de la zone affecté			
IncidentID	POLREP database identification number if	Numéro d'identification de la base de données POLREP si identifiable			
IMO_number	If identificable, please specify IMO Ship Identification Number	Si identifiable, veuillez spécifier le numéro d'identification du navire de l'OMI			
Ship_name	In case of incident, specify the ship name	En cas d'incident, précisez le nom du navire			
IDSurvey	Survey code	Code d'étude			
Year	Year of sampling in YYYY format	Année d'échantillonnage au format AAAA			
Month	Month of sampling in 1-12 format	Mois d'échantillonnage au format 1-12			
Day	Day of sampling in 1-31 format	Jour d'échantillonnage au format 1-31			
Time	Hours-minutes-seconds of sampling in HH:MM:SS format	Heures-minutes-secondes d'échantillonnage au format HH: MM: SS			
SampleID	Sample Code if multiple replies are made with the same value as Year, Month, Day and Time	Indiquer le code de l'échantillon si plusieurs réponses sont effectuées avec la même valeur que l'année, le mois, le jour et l'heure			
ObservationMethod	Specify observation methods for oil monitoring on board. Enter one of the value of the list	Spécifier les méthodes d'observation pour la surveillance des hydrocarbures à bord. Entrez une des valeurs de la liste	V= Expert human eye observation AH= Human eye aerial observation RS = Aerial observation with remote sensing equipment AHR= human eye observation and remote sensing equipment SAT= Satellite imagery SA = Sampling and analysis		
PrevailingWinds	Prevailing winds. Enter one value of the list.	Vents dominants. Entrez une valeur de la liste.	N = North (Nord) NE = North-East (Nord-Est) E = East (Est) SE = South-East (Sud-Est) S = South (Sud) SW - South-West (Sud-Ouest) W = West (Ouest) NW = North-West (Nord-Ouest)		
PrevailingCurrents	Prevailing currents off the beach. Enter one value of the list.	Les courants dominants au large de la plage. Entrez une valeur de la liste.	N = North (Nord) NE = North-East (Nord-Est) E = East (Est) SE = South-East (Sud-Est) S = South (Sud) SW - South-West (Sud-Ouest) W = West (Ouest) NW = North-West (Nord-Ouest)		
Visiblity	Use a subjective scale from 0 to 3. Enter one value of the list	Utilisez une échelle subjective de 0 à 3	0 = Very poor - Visibility less than 1,000 metres 1 = Poor - Visibility between 1,000 metres and 2 nautical miles 2 = Moderate-Visibility between 2 and 5 nautical miles 3 = Good - Visibility more than 5 nautical miles		
Sea_state	Sea state based of Beaufort scale. Enter one value of the list		0 = no wave calm (glassy) 1 = 0-0.10 m calm (rippled) 2 = 0.10-0.50 m smooth 3 = 0.50 - 1.25 m slight 4 = 1.25 - 2.50 m moderate 5 = 2.50 - 4.00 m rough 6 = 4.00 - 6.00 m very rough 7 = 6.00 - 9.00 m high 8 = 9.00 - 14.00 m very high 9 = >14.00 m phenomenal		
HazardClassification	Specify classification hazard in order to define toxicity and substance properties. Enter one value of the list	Spécifiez le danger de classification afin de définir la toxicité et les propriétés de la substance. Entrez une valeur de la liste	Class1 = Explosives and their hazard signs Class 2 = Gases and their hazard signs Class 3 = Flammable liquids and their hazard signs Class 4 = Flammable solids and their hazard signs Class 5 = Oxidizing substances and organic peroxides, and their hazard signs Class 6 = Toxic and infectious substances and their hazard signs Class 7 = Radioactive material Class 8 = Corrosive substances Class 9 = Miscellaneous and dangerous substances		

DeterminHazSubsName	Name of the contaminant, enter one value of the column 'Label' of the list 'List_contaminants'	Nom du contaminant, entrez une valeur de la colonne 'Label' de la liste 'List_contaminants'			
DeterminHazSubsID	ID of the contaminant, enter one value of the column 'ID_Contaminant' of the list 'List_contaminants'	ID du contaminant, entrez une valeur de la colonne 'ID_Contaminant' de la liste 'List_contaminants'			
CASNumber	CAS number of contaminant, enter one value of the column CASNumber of list 'List_contaminants'	Numéro CAS du contaminant, entrez une valeur de la colonne Numéro CAS de la liste 'List_contaminants'			
CategoirizationSubs	Categorise the contaminant according to MARPOL Annex II. Enter one value of the list		X = Category X for noxious Liquid Substances which, if discharged, are deemed to present a major hazard to either marine resources or human health; Y = Category Y for noxious Liquid Substances which, if discharged, 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; Z: Category Z for noxious Liquid Substances which, if discharged, are deemed to present a minor hazard to either marine resources or human health; Other = Other substances which have been evaluated and found to fall outside Category X, Y or Z.		
HNS_Transport	Specify transport typology	Spécifier la typologie de transport	P = Packaged B = Bulk		
HNS_Category	Specify the category of the substance spilted. Enter one value of the list	Précisez la catégorie de la substance déversée. Entrez une valeur de la liste	1 = Gas 2 = Floating liquids 3 = Floating solids 4 = Sinking liquids 5 = Sinking solids		
HNS_Behaviour	Specify the behaviour of the substance splitted in order to define the way in which it is altered during the first few hours after coming into contact with water. enter one value of the list	Préciser le comportement de la substance clivée afin de définir la manière dont elle est altérée durant les premières heures après son contact avec l'eau. entrer une valeur de la liste	G = Gas GD = Gas which dissolves E = Evaporates ED = Evaporates and dissolves FE = Floats and evaporates FED = Floats, evaporates and dissolves F = Floats FD =Float and dissolves DE = Dissolves and evaporates D = Dissolves SD = Sinks and dissolves S= Sinks		
QuantityDischarged	Quantity of HNS discharged (tonnes)				
Coverage	Coverage of slick in km2	Couverture de nappe en km2			
OriginSlick	If visible ship name and IMO number, offshore installations identification number	si visible nom du navire et numéro OMI, numéro d'identification des installations offshore			
Remarks	Please include any additional comment that you find important and of relevance	Veuillez inclure tout commentaire supplémentaire que vous jugez important et pertinent.			

DD Impact

Field	Description (EN)	Description (FR)	List of values	Liste des valeurs	Remarks
NationalStationID	Station Identification code as reference point or centroid of the impacted area	Code d'identification de la station comme point de référence ou centroïde de la zone affecté			
IDSurvey	Survey code	Code d'étude			
Matrix	Sample matrix, enter one value of the list	Exemple de matrice, entrez une valeur de la liste	W = Water S = Sediments B = Biota		
DepthLevel	Depth level. Enter one value of the list.	Niveau de profondeur. Entrez une valeur de la liste	S = Surface D = Depth O = Other		
DepthOther	Specify the depth in meters if the 'DepthLevel' filed has been filled in with 'O'	Spécifiez la profondeur en mètres si le champ 'DepthLevel' a été rempli avec 'O'			
DeterminHazSubsNam	Name of the contaminant, enter one value of the column 'Label' of the list 'List_contaminants'	Nom du contaminant, entrez une valeur de la colonne 'Label' de la liste 'List_contaminants'			
DeterminHazSubsID	ID of the contaminant, enter one value of the column 'ID_Contaminant' of the list 'List_contaminants'	ID du contaminant, entrez une valeur de la colonne 'ID_Contaminant' de la liste 'List_contaminants'			
CASNumber	CAS number of contaminant, enter one value of the column CASNumber of list 'List_contaminants'	Numéro CAS du contaminant, entrez une valeur de la colonne Numéro CAS de la liste 'List_contaminants'			
HazSubs_unit	Unit of measurement for the contaminant, enter one value of the list	Unité de mesure du contaminant, entrez une valeur de la liste	µg/l = water matrix mg/kg = sediments and biota matrices		
HazSubs_WD	For sediment or biota specify dry or wet weight, enter one value of the list	Pour les sédiments ou le biote, indiquez le poids sec ou humide, entrez une valeur de la liste.	WW = Wet weight DW = Dry weight	WW = poids humide DW = Poids sec	
LOD_LOQ_Flag	Enter the value '<' in case the concentration value is less than the quantification limit or the value '[' in case the concentration value is less than the detection limit. In the other cases, leave the field empty.	Entrez la valeur "<" si la valeur de la concentration est inférieure à la limite de quantification ou la valeur "[" si la valeur de la concentration est inférieure à la limite de détection. Dans les autres cas, laissez le champ vide.	<= Concentration value below the quantification limit [= Concentration value below detection limit	<= Valeur de concentration inférieure à la limite de quantification [= Valeur de concentration inférieure à la limite de détection	
Concentration	Concentration measure	Mesure de concentration			Not mandatory
FileSidescansonar	Filename containing the morphology of the survey area. The file must be returned as a georeferenced tiff mosaic (WGS84) and compressed in .zip format. The filename must conform to the following composition rule: "**ModuleCI19_Seabed_ <Region> _ <AreaName> _ <gg_mm_aaaa> .zip**", eg. ModuleCI19_Seabed_Liguria_Portofino_12_05_2016.zip. In the case Region and / or AreaName contain spaces, replace these spaces with "_"	Nom du fichier contenant la morphologie de la zone d'étude. Le fichier doit être renvoyé sous la forme d'une mosaïque tiff géoréférencée (WGS84) et compressé au format .zip. Le nom du fichier doit être conforme à la règle de composition suivante: "**ModuleCI19_Seabed_ <Region> _ <AreaName> _ <gg_mm_aaaa> .zip**", par exemple: ModuleCI19_Seabed_Liguria_Portofino_12_05_2016.zip. Si les champs <Région> et / ou <AreaName> contiennent des espaces, remplacez ces espaces par "_"				Not mandatory
Seabed	Underwater visual surveys to investigate macroscopic seabed conditions, as the presence and distribution of oil on the seabed, the eventual presence of accumulation points, the eventual coverage by oil of important seabed habitats like seagrasses, corals, etc. The file must be returned as a georeferenced tiff mosaic (WGS84) and compressed in .zip format. The filename must conform to the following composition rule: "ModuleCI19_Seabed_ <Region> _ <AreaName> _ <gg_mm_aaaa> .zip", eg. ModuleCI19_Seabed_Liguria_Portofino_12_05_2016.zip. In the case Region and / or AreaName contain spaces, replace these spaces with "_"	Relevés visuels sous-marins pour étudier les conditions macroscopiques du fond marin, telles que la présence et la distribution de pétrole sur le fond marin, la présence éventuelle de points d'accumulation, la couverture éventuelle par le pétrole d'importants habitats du fond marin comme les herbiers marins, les coraux, etc. Le fichier doit être retourné sous forme de mosaïque tiff géoréférencée (WGS84) et compressé au format .zip. Le nom du fichier doit respecter la règle de composition suivante : "ModuleCI19_Seabed_ <Region> _ <AreaName> _ <dd_mm_yyyy> .zip", ex. ModuleCI19_Seabed_Liguria_Portofino_12_05_2016.zip. Dans le cas où Region et/ou AreaName contiennent des espaces, remplacez ces espaces par "_"			
SedimentToxicityBioassay	Sediment toxicity bioassay. Enter one value of the list		1 = Amphipod 2 = Poluchaete		Not mandatory
SedimentToxicity	Amphipod or Poluchaete whole sediment bioassay result (e.g. Corophyum volutator 10d LC50; Arenicola marina 10d EC/LC50)				Not mandatory
WaterToxicityTest	Water toxicity test. Enter one value of the list		1 = Copepode acute toxicity 2 = Oyster embrio development 3 = Algal growth inibition test		Not mandatory
WaterToxicity	Enter the result of the water toxicity test, referring to the one inserted in the 'WaterToxicityTest'				Not mandatory
Remarks	Please include any additional comment that you find important and of relevance	Veuillez inclure tout commentaire supplémentaire que vous jugez important et pertinent.			

Annex 3

Initial Assessment Findings related to IMAP Cormon Indicator 19

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

Initial assessment findings related to IMAP Common Indicator 19

to contribute to the preparation of the 2023 MED QSR

REMPEC
Malta, 2023

Note by the Secretariat

The present document aims at illustrating the results of the Good Environmental Status (GES) assessment related to IMAP Common Indicator (CI) 19, to be considered for the 2023 Mediterranean Quality Status Report (2023 Med QSR). To undertake the assessment, different data sets were considered related to spills of oil and other substances. Based on the features of available data and the experience related to the assessment of other indicators belonging to the IMAP Pollution Cluster, a methodology for the assessment was identified and it is described herein. The assessment considers the frequency of spills in the period 2018-2021 and its variation in comparison to the past (previous assessment period 2013-2017). The assessment considers the sub-regions and the relative sub-divisions identified in the Mediterranean Sea.

Contents

List of acronyms

ADR	Adriatic Sea
AEGS	Aegean Sea
AEL	Aegean Sea and Levantine Sea
AIS	Automatic Identification System
ALBS	Alboran Sea
BAC	Background Assessment Concentration
CAS	Central Adriatic Sea
CHASE	Chemical Status Assessment Tool
CI	Common Indicator
CSN	Clean sea Net Service
DPSIR	Driver-Pressure-Status-Impact-Response
ECAP	Ecosystem Approach
ECEN	Entire Central Mediterranean Sea
EMODNET	European Marine Observation and Data Network
EMSA	European Maritime Safety Agency
EO	Ecological Objective
EWMS	Entire Western Mediterranean Sea
GES	Good Environmental Status
HFO	Heavy Fuel Oil
HNS	Hazardous and Noxious Substances
ICZM	Integrated Coastal Zone Management
IMAP	Integrated Monitoring and Assessment Program
ITOPF	International Tanker Owners Pollution Federation Limited
LEVS	Levantine Sea
MADR	Middle Adriatic Sea
MEDGIS-MAR	Mediterranean Integrated Geographical Information System on Marine Pollution Risk Assessment and Response
NADR	Northern Adriatic Sea
NEAT	Nexus Environment Assessment Tool
NPA	Non-problem area
O&G	Oil and Gas
QSR	Quality Status Report
SADR	Southern Adriatic Sea

1 Methodology and datasets considered for the assessment

1.1 Available databases

For the present study the following databases have been considered:

- MEDGIS-MAR
- Lloyd List Intelligence Seasearcher (hereafter Lloyd)
- CleanSeaNet Service

MEDGIS-MAR

The Mediterranean Integrated Geographical Information System on Marine Pollution Risk Assessment and Response (MEDGIS-MAR) is a database managed by REMPEC containing national data about response equipment, accidents, oil and gas installations, and oil handling facilities. Data on accidents are collected in MEDGIS-MAR since 1977 and include following parameters of interest for the assessment:

- Country
- Date
- Latitude and longitude
- Type of accident
- Whether the accident caused or not pollution (YES or NO field)
- Pollution size (volume or affected surface) expressed in different measure units
- Spilled substance
- Name and characteristics of the ship involved in the accident.

It shall be noted that data are not fully homogeneous. In particular, data about the spilled substance and size are missing for some events classified as polluting events.

For this assessment, MEDGIS-MAR data were filtered considering the events causing pollution ("Pollution" = YES) and located into the sea or within a 1 km inland buffer (to include events in any case occurring close to the sea, as for example in port areas).

Lloyd List Intelligence Seasearcher

This database, privately managed, gathers several data on shipping, including ship incidents, recorded since the 70s. This data can be retrieved for pre-defined geographic areas, including the "Western Mediterranean" and the "Eastern Mediterranean and Black Sea" regions. Downloadable data (paid service) includes following parameters of interest for the assessment:

- Location and date of the incident
- Name and characteristics of the ship involved in the incident
- Type of incident
- Whether the accident caused or not pollution (YES or NO field).

The exportable tables do not include information about the spilled substances and volumes. The information on spilled substances is included in the textual report for most of the reported incidents, while the information about volumes is present only in some cases. Finally, it shall be noted that several incidents registered in the Lloyd database are also included in MEDGIS-MAR.

For this assessment, Lloyd data were filtered considering the events causing pollution ("Pollution indicator = YES") and located in the Mediterranean Sea (thus, excluding those in the Black Sea).

CleanSeaNet Service

CleanSeaNet is a European satellite-based service for oil spills and vessel detections managed by the

European Maritime Safety Agency (EMSA). The information retrieved by satellites includes among others: spill location, spill area and length, confidence level of the detection and supporting information on the potential source of the spill (i.e. detection of vessels and oil and gas installations).
The full access to CleanSeaNet database is granted to Member States National Competent Authorities, while the open access website provides access to the so-called yearly "Detection and Feedback data", for the period 2015-2021. These pdf documents have been used for this assessment and include the following parameters of interest for the assessment:

- Classification of the detected event: A = high confidence, B = low confidence
- Latitude and Longitude
- Length of the detection
- Area of the detection

The available dataset does not include information enabling to distinguish the spilled substance. For the assessment Class A events (high confidence of detection) were considered.

It is worth noting that the considered databases are based on two different approaches: MEDGIS-MAR and Lloyd are populated with incident reports provided by ships or countries. CleanSeaNet includes satellite observations of possible spills. The number of events reported in each database is therefore very different: MEDGIS-MAR and Lloyd register tens of events per year in the Mediterranean while CleanSeaNet registers hundreds of events per year in the sea basin. CleanSeaNet detections can be caused by mineral oil and other pollutants, but may also indicate naturally occurring features (e.g. algae blooms, areas of upwelling, etc.). CleanSeaNet includes observations spills of different sizes (very small ones, too), not only related to incidents but also to accidental or illicit discharges. In addition to that, it should be observed that spills recorded by CleanSeaNet can derive from offshore (O&G prospections and extractions) or coastal activities, not linked to maritime transport. **The datasets extracted from the three databases provide different and complementary information and were therefore assessed separately.**

1.2 Contents of the report and methodology for the assessment

Besides this first chapter about data sets and methodology, this assessment includes five chapters plus a sixth one providing some conclusive considerations.
Based on the results of several technical meetings held in the frame of IMAP, **chapter 2** summarises and illustrates the most relevant human pressures affecting the status of the indicator CI 19 on acute pollution events. Most relevant pressures are then briefly described based the literature and including a more detailed analysis on vessel density data provided by the EMODnet Human Activity Portal.

The following two chapters form the core of the integrated spatial-temporal assessment of the CI 19.

Chapter 3 provides the temporal analysis of data on spills events in the Mediterranean. Such analysis is distinguished for oil and other substances. The trend analysis of oil spill events (section 3.1) considered the following parameters:

- Yearly number of oil spills in the Mediterranean and its sub-divisions (as identified in section 1.3) for the period 2002-2021 in the case of MEDGIS-MAR and Lloyds datasets and for the period 2015-2021 for CleanSeaNet (due to unavailability of data before 2015).
- Yearly number of oil spills in the Mediterranean categorised according to ITOPF classes of spilled volume in the period 2002-2021 for MEDGIS-MAR.
- Polluted surface per year in the Mediterranean and its sub-divisions (as identified in section 1.3) for the period 2015-2021, derived by CleanSeaNet data.

MEDGIS-MAR is the only dataset among the three which also enabled to assess the temporal evolution of the number of spills events related to substances other than oil: Hazardous and Noxious Substances (HNS), other substances (non-HNS) and Unknown substances (section 3.2).

Chapter 4 focuses on the assessment of the status for the indicator CI 19 in the period 2018-2021. The assessment jointly considers the density of spills and the trend of occurrence (considering the variation in comparison with the previous period 2013-2017). The latter element (variation of spill density) is based on a CHASE-like approach and capitalises some elements of the methodology adopted by Helcom for the assessment of oil spill in the Baltic Sea (HELCOM 2018).

More details on how the status was assessed are reported in par. 4.3.

As for the temporal analysis, the three datasets were assessed slightly differently in chapter 4, considering the different information they provide. For each dataset, the assessment was based on the following steps:

1. Quantification of the average number of oil spills per year in the period 2018-2021 for the entire Mediterranean Sea and its sub-divisions as identified in section 1.3.
2. The average number of oil spills was standardised on the extension of each sub-division, thus enabling to calculate the average number of spills per 10000 km^2 in the assessment period for the entire Mediterranean and its sub-divisions.
3. The three sub-divisions characterised by higher values of the indicator calculated in step 2 were highlighted in dark red/red/orange to remark the three highest oil spill occurrences.
4. Steps 1 and 2 were repeated for the reference period: 2013-2017 for MEDGIS-MAR and Lloyds and 2015-2017 for CleanSeaNet.
5. Percentage of variation (2018-2021 vs. 2013-2017) of average yearly spill occurrence was then calculated for the entire Mediterranean and for each sub-division.
6. Based on the computed percentage variation, following colour-based classes were defined for variation in percentage: blue = no spills recorded in the sub-division, in the period of assessment (2018-2021) nor in the previous reference period (2013-2017); green = decreased frequency of spill occurrence in the sub-division; yellow = increased frequency of spill occurrence ≤ 100% in the sub-division; red = increased frequency of spill occurrence > 100% in the sub-division.

In the case of CleanSeaNet dataset, the same assessment above described was implemented also for the extension of areas interested by pollution due to oil spills, still comparing 2018-2021 with the previous 2015-2017 period.

MEDGIS-MAR enabled to implement the same assessment also on the number of spills of substances other than oil: Hazardous and Noxious Substances (HNS), other substances (non-HNS) and Unknown substances (section 4.2).

Chapter 5 provides a brief summary of evidences of environmental impacts from oil spills documented for the Mediterranean.

Chapter 6 includes some conclusive considerations.

1.3 Areas of analysis

In the Mediterranean Sea region, four main sub-regions and related sub-divisions have been established for assessment purposes (Figure 1 and Table 1) namely: the Western Mediterranean Sea (including the Alboran Sea characterized by the exchange of the Mediterranean waters with the Atlantic Ocean), the Adriatic Sea (which is a double semi-enclosed area by itself and the Mediterranean Sea), the Central Mediterranean (acting as the nexus for the eco-regions and located in the centre of the basin with a low anthropogenic influence), and the Aegean and Levantine Sea in the Eastern Mediterranean part.

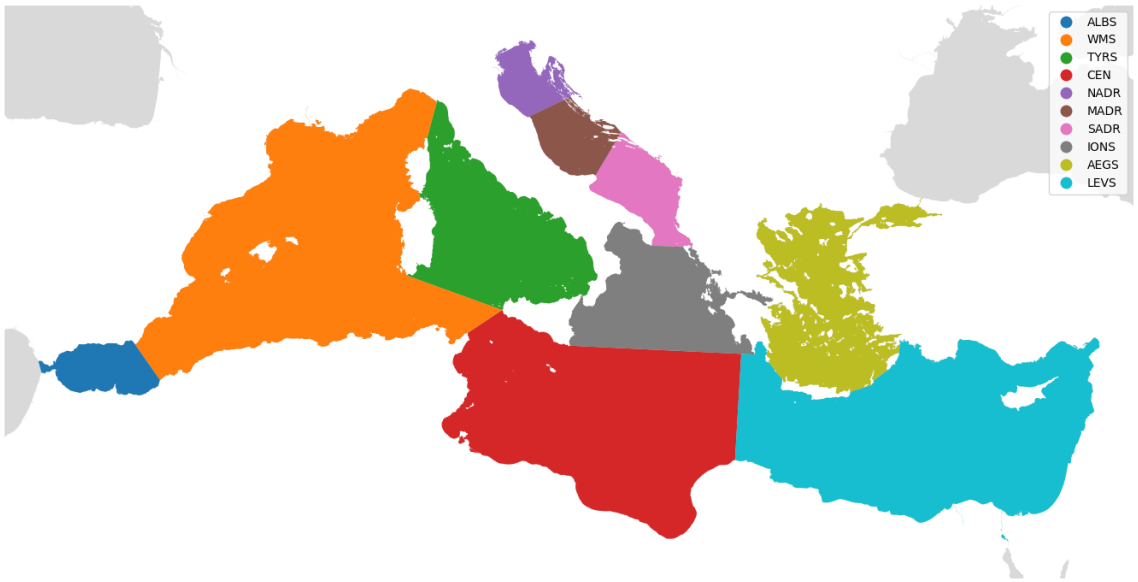

Figure 1. Map of the sub-divisions considered for the purposes of the present assessment.

Table 1. The Mediterranean sub-regions and sub-divisions considered for the purposes of the present assessment and related extension

Sub-regions	**Sub-divisions**	**Surface (km^2)**
(Entire) Western Mediterranean Sea (EWMS)	Alboran Sea (ALBS)	56,130
	North Western Mediterranean Sea and Western Mediterranean Islands and Archipelago (WMS)	572,548
	Tyrrhenian Sea (TYRS)	216,810
(Entire) Central Mediterranean (ECEN)	Central Mediterranean (CEN)	550,205
	Ionian Sea (IONS)	168,842
Adriatic Sea (ADR)	North Adriatic (NADR)	33,445
	Middle Adriatic (MADR)	44,107
	South Adriatic (SADR)	61,739
Aegean and Levantine Seas (AEL)	Aegean Sea (AEGS)	202,388
	Levantine (LEVS)	619,105

2 DPSIR elements most relevant for the CI 19

The interactions between pressures and impacts for EO5 and EO9, as measured by IMAP Common Indicators, is shown here below in Table 2. The interrelations reported in the Table were agreed during the Meetings of CorMon Pollution Monitoring (April 2019); Meeting of MED POL Focal Points (May 2019), 7th Meeting of the Ecosystem Approach Coordination Group (September 2019) and Integrated Meetings of the Ecosystem Approach Correspondence Groups on IMAP Implementation (CORMONs) (December 2020). The interrelations served as a basis for proposing the GES/Environmental Assessment methodologies for IMAP CIs, as well as the approaches aimed at interrelating the DPSIR and GES assessment findings.

Table 2. Natural and anthropogenic pressures (selected based on the main activities in terms of pressures as provided by ICZM Protocol and other Barcelona Convention`s Protocols) affecting the marine ecosystems and the related measurement of IMAP Common Indicators for EO5 and EO9. Following the analysis presented in this table that is based on the expert judgement, the members of the EcAp Coordination Group can better define/refine specific interactions, for activities contributing to pressures at Common Indicator level.

Pressures vs. measured IMAP Common Indicators (EO5 and EO9)	**Non-Construction Zone**	**Natural Hazards**	**Natural disasters**	**Climate Change**	**Agric. and forestry runoffs**	**Coastal Urbanization**	**Damming (demand on**	**Waste water discharges**	**Industry**	**Tourism frequentation**	**Yachting**	**Marine mining**	**Dredging**	**Desalinization**	**Coastal artificialization.**	**Port operations**	**Offshore structures**	**Cables and pipelines**	**Shipping**	**Oil and gas extraction**	**Renewable energy**	**Fishing (incl. recreational)**	**Sea-based food harvesting**	**Extraction of genetic**	**Aquaculture**	**Solid waste disposal**	**Storage of gases**	**Research and education**	**Defence operations**	**Damping of munitions**
C13. Nutrients																														
C14. Chlorophyll *a*																														
CI17: Key harmful contaminants																														
CI18: Pollution effects																														
CI19: Acute pollution events																														
C20: Contaminants in seafood																														
CI21: Intestinal enterococci																														

Some main anthropogenic pressures relevant for CI 19 are briefly described here below.

Maritime traffic

Due to its strategic position at the interface between Africa, Asia and Europe, and connected with three strategic maritime passages, the Strait of Gibraltar, the Suez Canal and the Strait of Bosporus, the Mediterranean Sea is a key area for maritime transport at world level.

Mediterranean port calls in 2019 due to passenger and merchant vessels were about 453,000, made by 14,403 ships (REMPEC, 2020). These, together with ships transiting through the basin without making a port call (5,251 in 2019), represented a little more than 24% of the global fleet of ships. Passenger vessels, mostly ferries, accounted for 42.8% of the total port calls. Container carriers accounted for the 18% of the total port calls in the Mediterranean, while other dry and ro-ro vessels for the 16.9%, tankers for the 16.8% and bulk carriers for the 5.6% (REMPEC, 2021).

Considering only the oil and chemical tankers calling to ports or passing through the Mediterranean, they represented in 2019 27% of the world fleet (REMPEC 2020). Passengers transport is another important activity in the Mediterranean, related to shipping between different countries and also within the same country. This is also linked to the need to connect the numerous Mediterranean islands with the mainland (Randone et al., 2019). Cruise traffic also contributes to passenger transport: the Mediterranean is the second largest market globally for cruising, after the Caribbean. The sector has been extremely impacted by the Covid-19 pandemic: the total number of cruise ship calls in 2021 reached 5,182 but still represents only 38.1% of the pre-pandemic period (2019) (Med Cruise 2021).

The maps below illustrate the distribution of vessel density in the Mediterranean Sea expressed as yearly average of total monthly hours of vessels presence per square kilometre in the year 2021. These data are provided by European Marine Observation and Data Network (EMODnet) Human Activities portal and are derived from AIS data. The first maps reported below, refer to the three most relevant categories of vessels in terms of pressures for CI 19, respectively: tankers (Figure 2), cargo (Figure 3) and passengers (Figure 4).

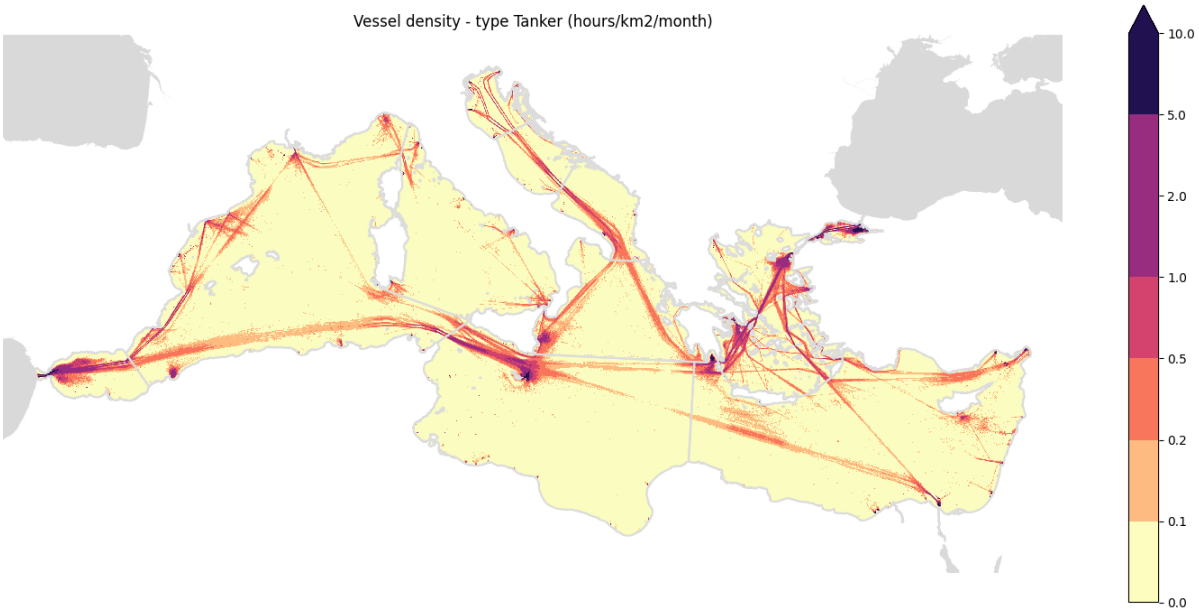

Figure 2. Vessel density of tankers in 2021 expressed as yearly average of total monthly hours per square kilometre. Data source: EMODnet Human Activities portal.

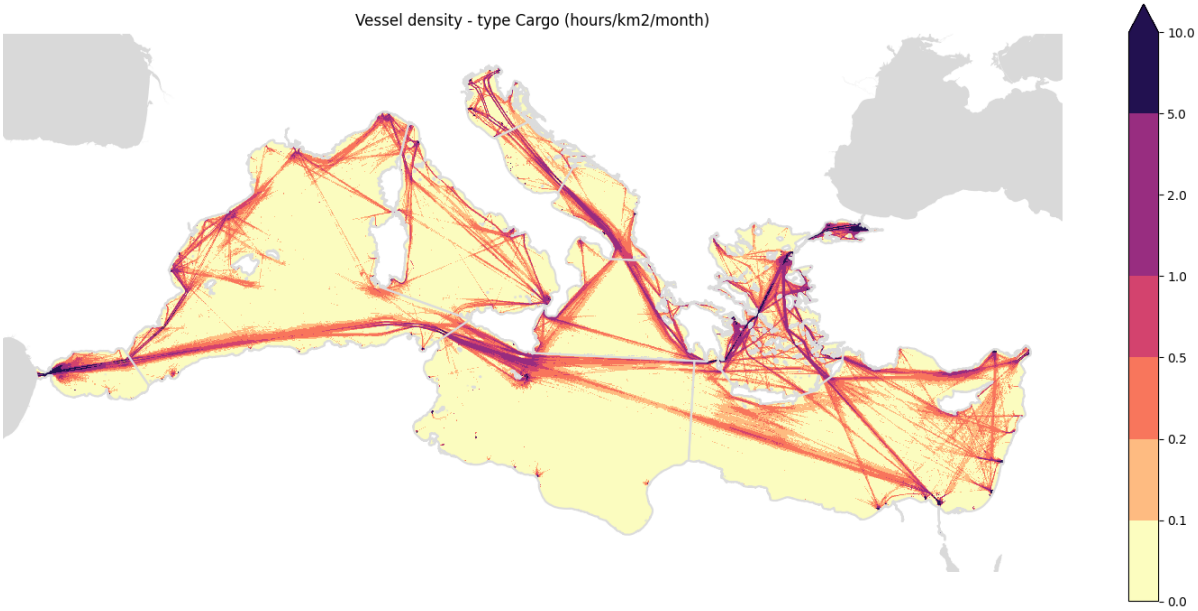

Figure 3. Vessel density of cargos in 2021 expressed as expressed as yearly average of total monthly hours per square kilometre. Data source: EMODnet Human Activities portal.

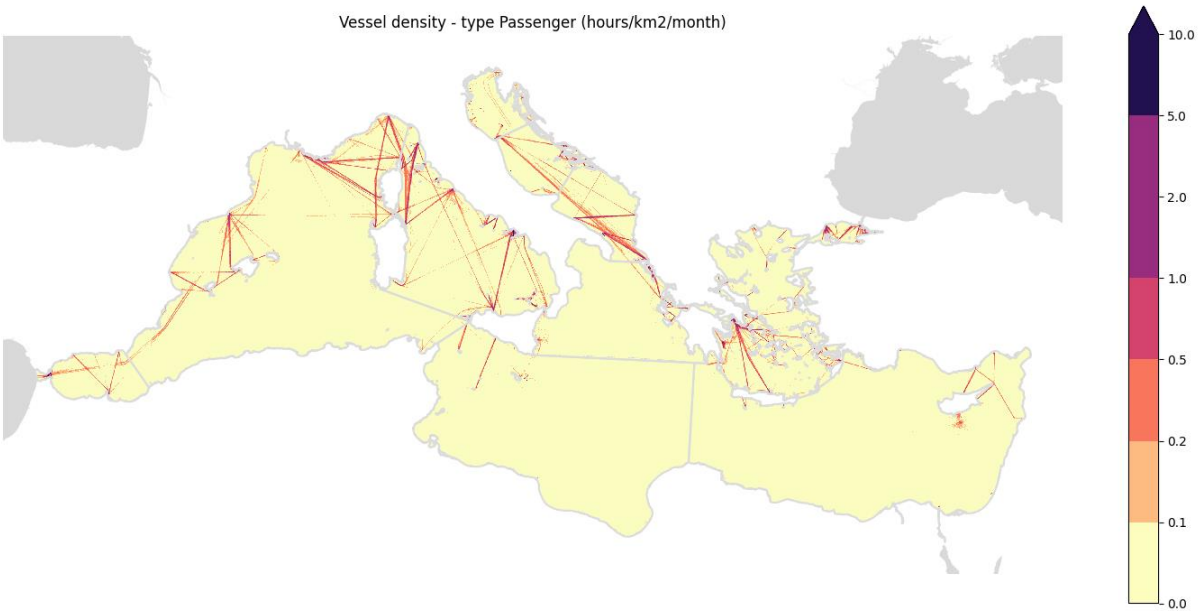

Figure 4. Vessel density of passenger vessels in 2021 expressed as yearly average of total monthly hours per square kilometre. Data source: EMODnet Human Activities portal.

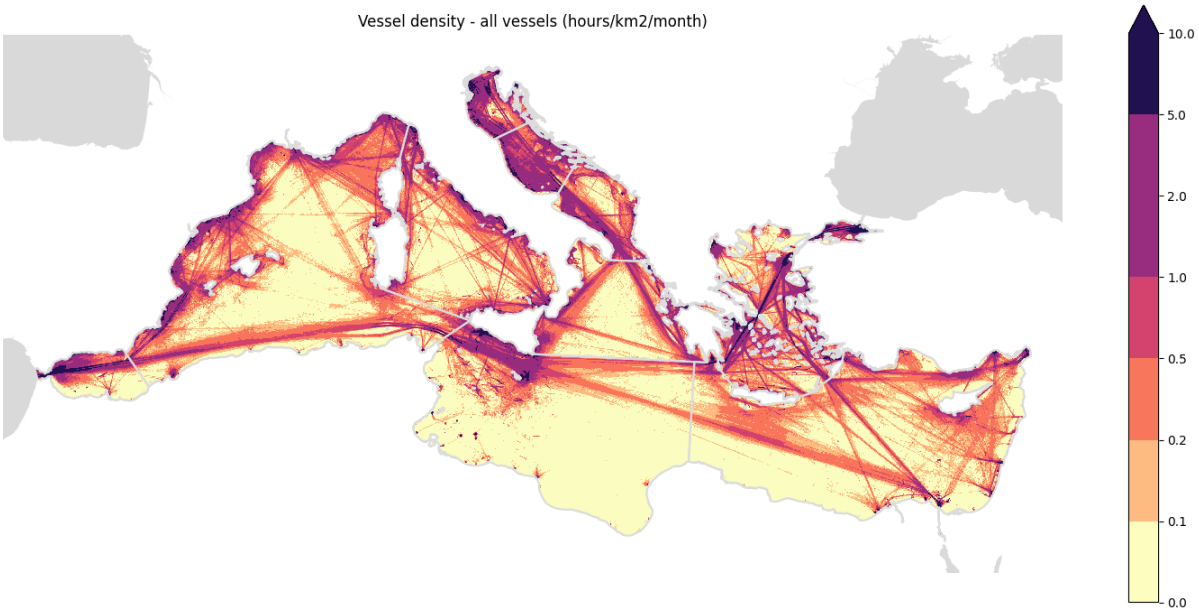

Figure 5. Vessel density of all the typologies of vessels transiting in the Mediterranean (tankers, cargos, passenger vessels and all other typologies) expressed as yearly average of total monthly hours per square kilometre. Data source: EMODnet Human Activities portal.

The data represented in the maps above are presented in Table 3 and Figure 6 (here the traffic data are standardised for the extension of each sub-division) in order to highlight the most trafficked areas of the Mediterranean basin. The Aegean Sea is the area most affected by maritime traffic: all other typology of vessels represents the 42% of the total traffic, followed by cargos (30%), tankers (16%) and passenger vessels (12%). The second more trafficked area is the Alboran sea, being the passage from and to the Atlantic Ocean. In this sub-division the percentage of traffic related to all other typologies of vessel is 43%, the one related to cargos is 31%, takers reach 23% while passenger vessel represents a minor component (only the 3%). The Northern Adriatic Sea ranks third as most trafficked area, with other typologies of vessel reaching 63% (importance of fishing vessels), cargos being the second most important component (21%), followed by tankers (9%) and passengers (7%). The maps also show that high vessel density occur in areas close the coasts of Northern and Eastern Mediterranean counties, and in particular in front of major ports.

Table 3. Yearly average of total monthly hours spent in each sub-division of the Mediterranean Sea by typology of vessel (main categories) in 2021. Data source: EMODnet Human Activities portal.

	ALBS	**TYRS**	**AEGS**	**SADR**	**CEN**	**NADR**	**MADR**	**IONS**	**WMS**	**LEVS**
Cargo	223,717	1,082,688	325,482	231,226	184,567	155,316	170,131	126,170	1,218,813	501,469
Tanker	69,078	131,899	40,971	73,108	43,084	31,935	15,218	27,513	366,864	218,256
Passenger	52,160	68,813	25,481	53,773	27,440	14,443	4,501	9,266	192,098	65,946
Other types of vessel, including fishing ones	6,691	42,729	47,050	4,754	24,278	10,537	18,025	12,387	145,663	20,550

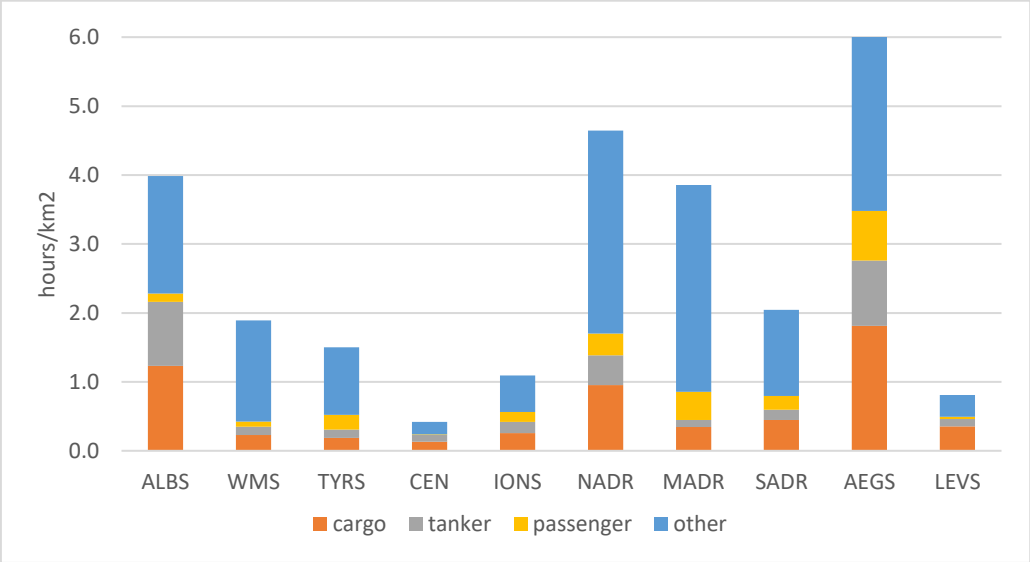

Figure 6. Yearly average of monthly vessel density per sub-division (total hours spent in a month/km^2) per typology of vessel in 2021. Data source: EMODnet Human Activities portal.

Port operations

The Mediterranean includes 706 ports: 497 in Southern Europe, 96 in North Africa and 113 in the Eastern Mediterranean (REMPEC, 2021). A great number of ports are located in Italy (191) and in Greece (153). Some of these ports rank among the 100 most important ones according to various criteria.

The ports of the Mediterranean host different core activities. Ports like the Spanish ports of Valencia and Algeciras, the Tanger-Med in Morocco, Malta's Marsaxlokk along with the Egyptian ports like Damietta, Port Said and Alexandria are transhipment hubs not only for freight moving throughout the greater Mediterranean region but act as a connector to ports as distant as the Americas or the Far East. Other ports like Genoa or Marseille serve their own industrial regions and connect to Northern European markets (Lauriat, 2019).

#	Port	Country	2018 TEUs	2017 TEUs	#	Port (cont.)	Country	2018 TEUs	2017 TEUs
1.	Valencia	Spain	5,104,000	4,832,136	11.	Port Said	Egypt	2,610,000	2,528,000
2.	Algeciras	Spain	4,772,000	4,380,849	12.	Alexandria	Egypt	1,757,000	1,589,000
3.	Marport	Turkey	1,591,983	1,711,357	13.	Haifa	Israel	1,464,000	1,343,000
4.	Piraeus	Greece	4,908,000	4,060,000	14.	Ashdod	Israel	N/A	1,525,000
5.	Gioa Tauro	Italy	2,301,000	2,448,570	15.	Beirut	Lebanon	1,300,000	1,305,038
6.	Marsaxlokk	Malta	3,310,000	3,150,000	16.	Marseille-Fos	France	1,400,000	1,362,204
7.	Genoa (Savona-Vado)	Italy	2,609,000	2,622,187	17.	Izmir-Alsancak	Turkey	610,908	610,908
8.	Barcelona	Spain	3,423,000	3,006,872	18.	Tanger-Med	Morocco	3,472,451	3,312,409
9.	Mersin	Turkey	1,723,000	1,591,983	19.	Damietta	Egypt	1,150,132	1,131,226
10.	La Spezia	Italy	1,543,000	1,473,571	20.	Koper	Slovenia	988,501	911,528

Figure 7 Mediterranean ports and volume handled in 2010. Source: Lauriat, 2019.

Oil and Gas extraction

The Mediterranean Sea is a relatively small producer of offshore oil and gas at world level. Today, the principal countries extracting offshore oil are Egypt and Libya. Indeed, in the case of Egypt the great majority of offshore oil fields and the biggest ones are located in the Gulf of Suez in the Red Sea, with marginal activity in the Mediterranean. Other countries such as Italy and Tunisia (and to a minor extent Greece and Spain) contribute with a more marginal production (REMPEC, 2021). Egypt is also the main offshore gas producer in the Mediterranean, historically followed by Italy. In recent years the Italian production of offshore natural gas significantly decreased, while the production of Israel has greatly increased, in particular thanks to the discovery of and production in the rich Leviathan gas field. Libya, Croatia and Tunisia contribute marginally to the offshore production of natural gas in the Mediterranean basin. However, in the next years other Eastern Mediterranean countries (e.g. Turkey and Cyprus) are expected to play a significant role as producers in the Mediterranean offshore gas market, also due to new gas fields recently discovered (REMPEC, 2021).

According to REMPEC (2021), four major areas of oil and gas production can be identified in the Mediterranean basin: (i) the Levantine Sea where Egyptian and Israeli offshore production occur (mainly gas) and where other countries are expected to increase their activities, (ii) the Channel of Sicily (Italian and Tunisian activities), (iii) the Gulf of Gabes (Tunisia) and the neighbouring Libyan marine area, and (iv) the northern Adriatic, where most of the Italian offshore gas activities are concentrated and where Croatian gas production is located.

3 Spills in the Mediterranean: a temporal analysis

In this chapter the temporal evolution of spill events in the Mediterranean is illustrated. The period of analysis varies in relation to the availability of data in the considered data set: 2002-2021 for MEDGIS-MAR and Lloyd and 2015-2021 for CleanSeaNet. As highlighted in chapter 1, the number of spills reported in the considered database is very different: MEDGIS-MAR and Lloyd accounts for tens of spills per year in the overall Mediterranean, due to incidents, while CleanSeaNet, being based on satellite data acquisition, records hundreds of potential spills per year. The data from such heterogenous database should not be compared, but used as complementary information, as proposed in this assessment.

3.1 Analysis on oil

The temporal evolution of oil spills events reported in the MEDGIS-MAR (considering only those events for which the spilled substance is identified as volatile or non-volatile oil in the dataset) is illustrated in Table 4 and Figure 8 for the period 2002-2021. In particular, Figure 8 illustrates the evolution of the yearly number of events occurred in the entire Mediterranean in the period 2002-2021, classified according to the ITOPF categorisation of spilled volumes.

A more detailed analysis about the size (volume or affected extension) of oil spills was not possible, as the MEDGIS-MAR dataset includes heterogenous data for this parameter (characterised by diverse units of measure), as well as missing information for several polluting events. Large spills above 700t have not been recorded since 2015 and medium size spills (7-700t) that represented the most frequent class until 2017 (e.g. 68% in 2012, 50% in 2013 and 44% in 2017) have not been recorded in the last four years. The overall number of spills has significantly decreased in the last four years, but the number of small spills (<7t) have increased. The spatial distribution of oil spills events registered by MEDGIS-MAR in the period 2002-2021 is reported in Figure 9, highlighting the Aegean Sea – and to a minor extent the Ionian Sea – as the mostly affected sub-divisions.

Table 4. Number of oil spills events (volatile and non-volatile oil) per year in the Mediterranean and related sub-divisions in the period 2002-2021 reported by MEDGIS-MAR.

Year	TOTMED	ALBS	WMS	TYRS	CEN	NADR	MADR	SADR	IONS	AEGS	LEVS
2002	0	0	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0	0	0	0
2006	0	0	0	0	0	0	0	0	0	0	0
2007	2	0	0	0	0	0	0	1	0	0	1
2008	0	0	0	0	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0	0	0	0	0
2012	16	0	0	1	0	0	0	0	3	12	0
2013	22	0	2	0	2	0	0	0	1	15	2
2014	9	0	0	0	1	0	0	0	2	6	0
2015	14	0	1	0	0	0	0	0	1	10	2
2016	19	0	1	0	0	0	0	0	1	16	1
2017	32	0	0	0	0	0	0	0	1	29	2
2018	7	0	0	0	0	0	0	0	1	6	0
2019	8	0	0	0	0	0	0	0	1	7	0
2020	14	0	0	0	0	0	0	0	4	10	0
2021	4	0	0	0	0	0	0	0	0	4	0

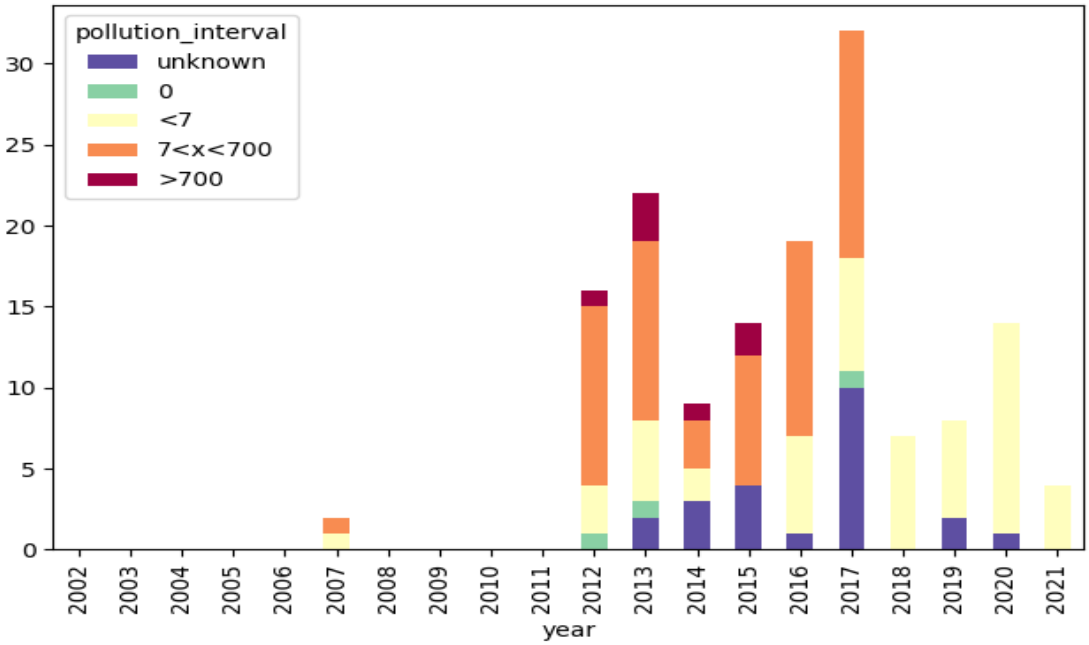

Figure 8. Number of oil spills events (volatile and non-volatile oil) per year in the period 2002-2021 in the Mediterranean. Events are categorised according to ITOPF classes of spilled volumes (values in legend = tonnes). Data source: MEDGIS-MAR,

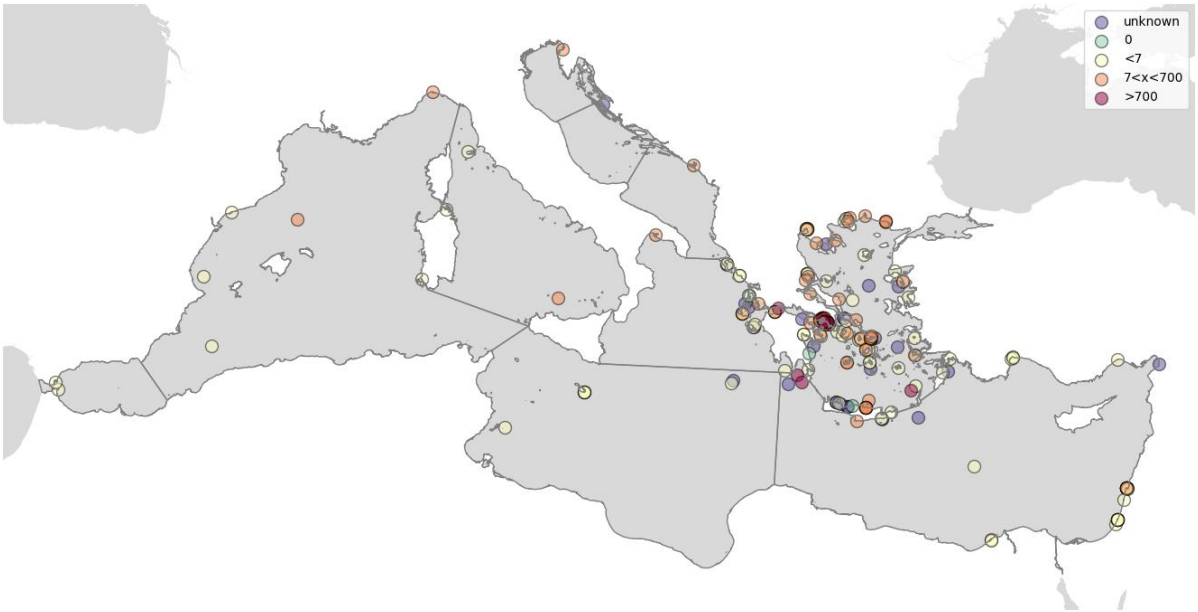

Figure 9. Spatial distribution of oil spills events (volatile and non-volatile oil) in the Mediterranean in the period 2002-2021 per ITOPF class of spilled volume (values in legend = tonnes). Data source: MEDGIS-MAR

A similar analysis was conducted for the data included in the Lloyds database still for the period 2002-2021. This database does not provide detailed information on the spilled substance and the category of spilled volume. Therefore, in this case, differently from MEDGIS-MAR, all registered incidents causing polluting events have been considered for the temporal analysis. The annual number of events for each sub-division is reported in Table 5, while the for the entire Mediterranean is also visualised in the graphic of Figure 10; Figure 11 illustrate their spatial distribution. In this case, the temporal evolution of the number of spills does not highlight a clear trend, rather an heterogenous behaviour with peaks in 2006, 2009 and 2016. The comparison of the average number of annual events in the last four years (2018-2021) with those in the previous four years shows a modest decrease.

Table 5. Number of spill events per year in the Mediterranean and its sub-divisions in the period 2002-2021 reported by Lloyd List Intelligence Seasearcher.

Year	TOTMED	ALBS	WMS	TYRS	CEN	NADR	MADR	SADR	IONS	AEGS	LEVS
2002	6	3	0	0	0	0	0	0	0	3	0
2003	6	1	0	0	0	0	1	0	0	3	1
2004	12	0	3	0	0	0	0	0	0	6	3
2005	7	1	0	2	0	0	0	0	1	2	1
2006	5	0	0	0	0	0	0	0	1	3	1
2007	6	2	2	0	0	0	0	0	1	1	0
2008	23	3	1	0	1	0	0	0	0	14	4
2009	23	2	1	0	0	0	0	1	2	16	1
2010	9	0	2	1	0	0	1	0	0	4	1
2011	12	4	3	0	0	0	0	0	1	3	1
2012	6	1	0	0	0	0	0	0	3	2	0
2013	9	1	1	0	0	0	0	0	1	2	4
2014	11	1	1	0	0	0	0	0	1	6	2
2015	9	0	2	0	2	0	0	0	0	5	0
2016	25	1	4	1	0	0	0	1	0	13	5
2017	4	0	0	0	1	0	0	0	0	2	1
2018	14	0	5	0	0	0	0	0	0	7	2
2019	8	1	0	0	0	1	0	0	0	5	1
2020	15	2	2	0	0	0	0	0	0	10	1
2021	15	1	2	1	0	0	0	0	0	8	3

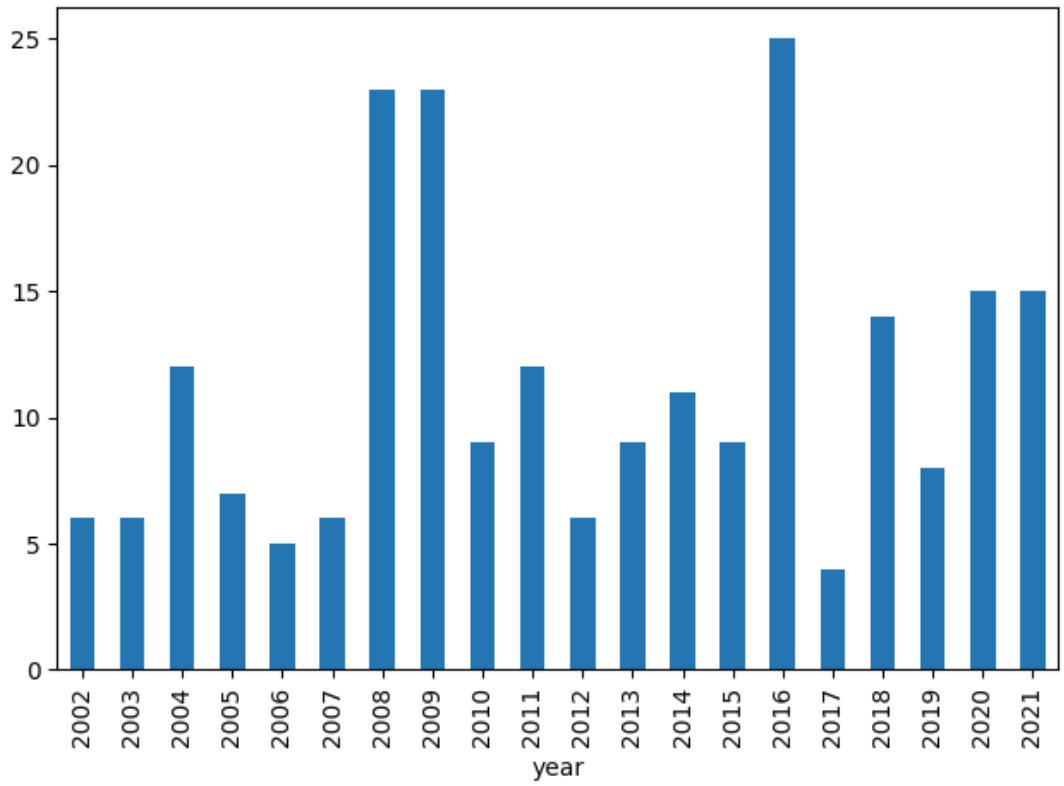

Figure 10. Number of spills events per year in the period 2002-2021 in the Mediterranean reported by Lloyd List Intelligence Seasearcher.

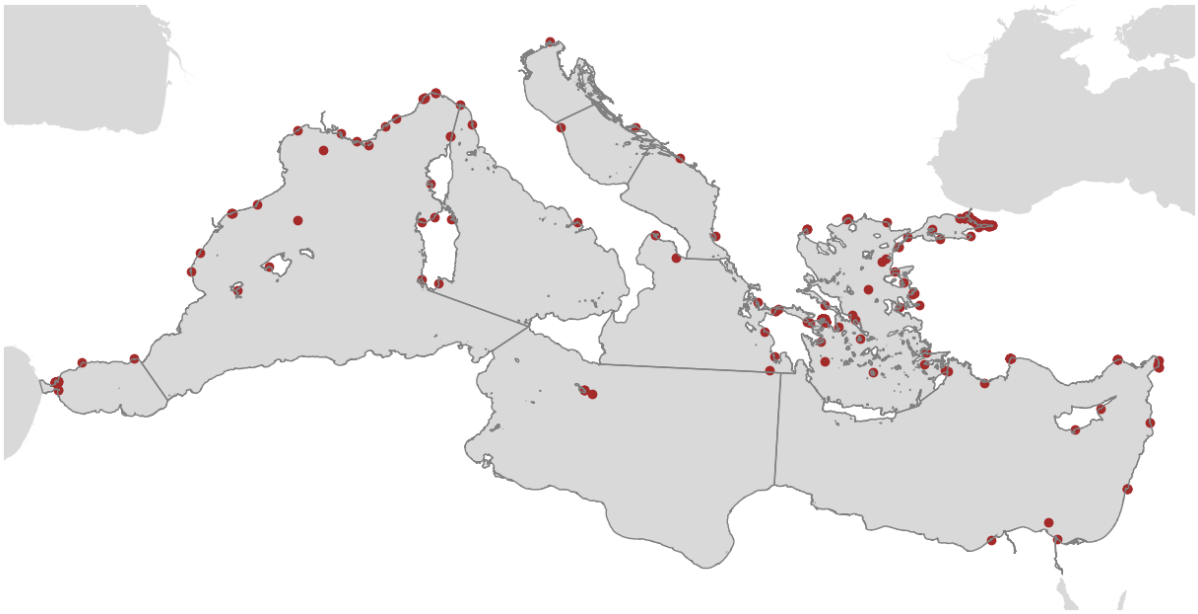

Figure 11. Spatial distribution of spills events in the Mediterranean in the period 2002-2021 reported by Lloyd List Intelligence Seasearcher.

From CleanSeaNet, data on the number of and extension of potential spills are available from 2015. This service processes satellite data into images to extract several information, including those on spills. Being based on remotely acquired data, the dataset can also include false detection. For the specific scope of this assessment only spills with a high confidence level (class A) were used. Moreover, it shall also be recalled that CleanSeaNet detections can be caused by oil and other pollutants, but may also indicate naturally occurring features (e.g. algae blooms, areas of upwelling, etc.). Table 6 and Figure 12 respectively report the number of Class A detected spills and visualise their trend, while Table 7 and Figure 13 report total surface (in km^2) affected by spills. Both the number of spills and the affected surface show an increasing trend from 2015 to 2021. The two trends are similar, with a minor exception in the last two years (2020-2021), when the number of registered spills keeps increasing while the total polluted surface shows a slight decrease.

The observed trend disagrees with those from MEDGIS-MAR and Lloyds. However, it shall be highlighted again that these datasets are based on different approaches and provide different information. In any case, the increase in the frequency of small spills seems to be captured by both MEDGIS-MAR and CleanSeaNet. Finally, it shall be noted that the trend of CleanSeaNet detected spills and related affected sea surface could be biased from an increase in the monitoring effort (e.g. extension of the sea surface which has been annually surveyed through the analysis of satellite data). It was not possible to obtain information on this aspect from European Maritime Safety Agency.

Table 6. Number of spill events per year in the Mediterranean and its sub-divisions in the period 2015-2021. Source: CleanSeaNet service.

Year	TOTMED	ALBS	WMS	TYRS	CEN	NADR	MADR	SADR	IONS	AEGS	LEVS
2015	488	8	122	72	67	9	30	49	16	9	106
2016	602	20	181	61	63	14	13	22	31	38	159
2017	875	56	283	87	118	10	16	30	50	73	152
2018	911	37	322	70	85	49	36	29	34	53	196
2019	1385	26	257	77	264	33	60	82	120	95	371
2020	1576	34	324	104	270	32	52	99	122	142	397
2021	1443	27	363	90	258	39	38	53	103	77	395

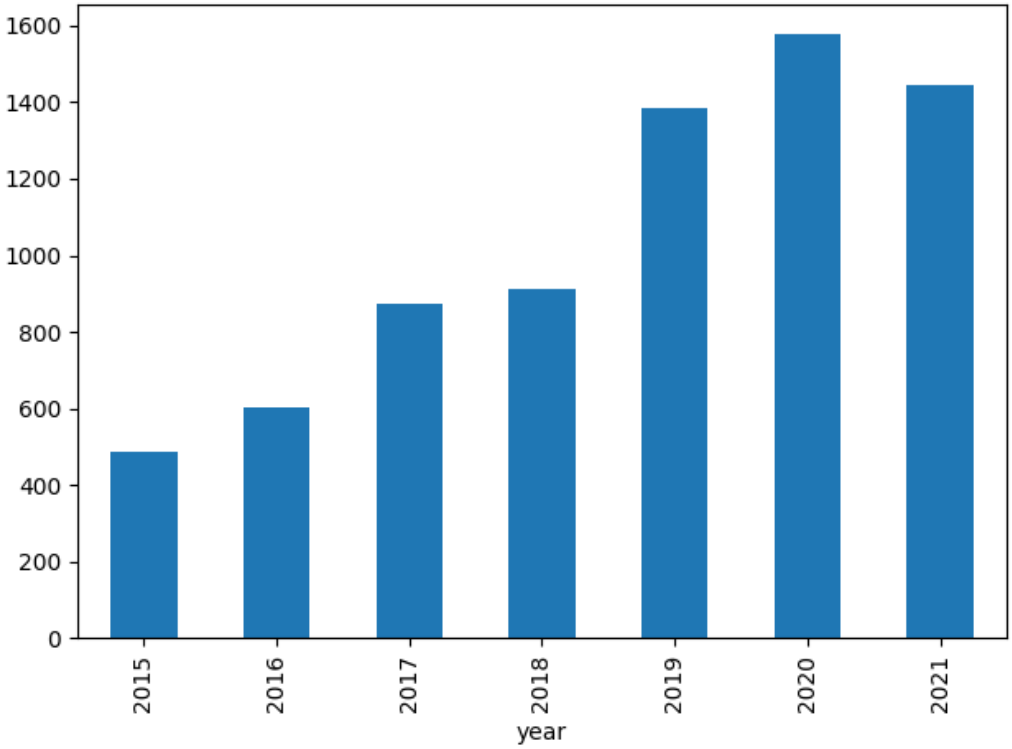

Figure 12. Number of spills events per year in the period 2015-2021 in the Mediterranean. Source: CleanSeaNet service.

Table 7. Polluted surface (km^2) per year in the Mediterranean and its sub-divisions in the period 2015-2021. Source: CleanSeaNet service.

Year	TOTMED	ALBS	WMS	TYRS	CEN	NADR	MADR	SADR	IONS	AEGS	LEVS
2015	5572.5	39.5	1249.4	609.2	571.9	129.4	469.8	691.8	202.4	99.6	1509.6
2016	4292.6	63.3	1181.8	322.3	367.0	69.8	157.5	194.6	251.8	172.1	1512.4
2017	6368.5	319.6	2088.9	690.6	1075.4	39.2	160.0	125.2	347.9	729.1	792.6
2018	7578.3	153.5	3020.8	535.1	971.2	467.6	293.3	197.0	217.7	311.9	1410.2
2019	10432.7	89.4	2106.5	411.3	2096.9	219.5	578.9	605.5	796.0	338.8	3189.9
2020	14007.1	216.4	3099.4	713.5	3844.6	186.5	607.5	990.5	738.7	753.3	2856.6
2021	14936.6	151.1	4776.0	1097.9	3121.5	296.1	219.8	575.7	657.0	219.8	3821.8

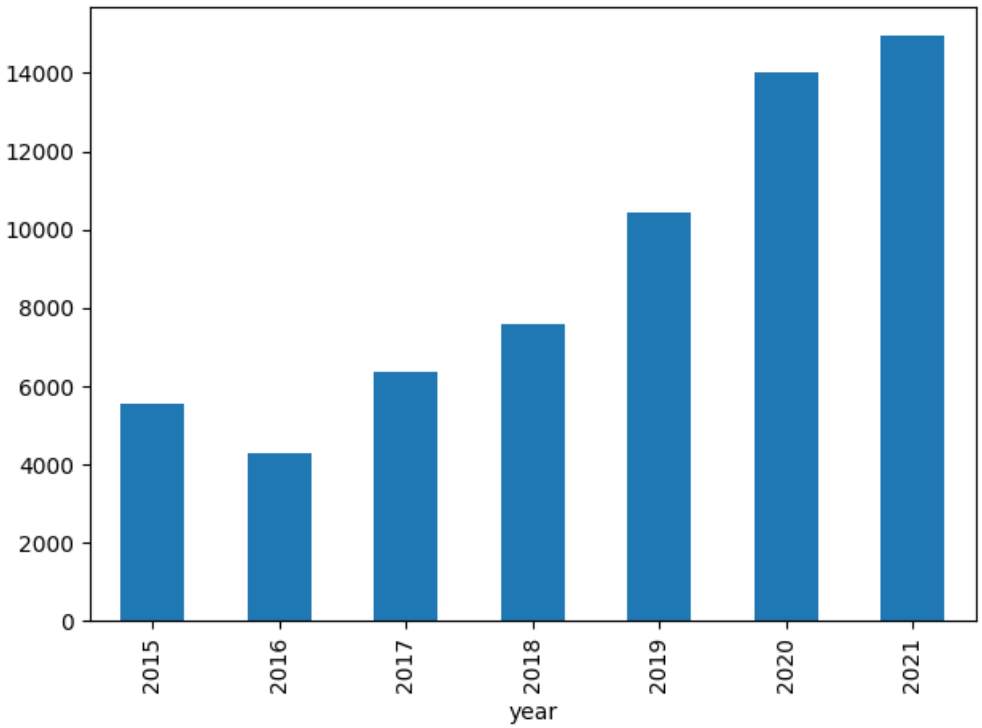

Figure 13. Polluted surface (km^2) per year in the Mediterranean in the period 2015-2021. Data source: CleanSeaNet service.

3.2 Analysis of other substances

MEDGIS-MAR is the only datasets among the three considered in this assessment allowing to describe the trend in the number of spills of substances other than oil (Table 8 and Figure 14). In MEDGIS-MAR, such substances are categorized as Hazardous and Noxious Substances (HNS), other substances (non-HNS) and Unknown substances. In general, the number of reported events is smaller than those attributed to volatile and non-volatile oil; the two trends are similar. The number of spills related to substances other than oil reported in MEDGIS-MAR is very small (and often null) before 2012 and tends to increase consistently in the period 2012-2016. The total number of events is slightly smaller in the last four years. Large (above 700t) and medium size spills (7-700t) have not been reported since 2018. The last four years are characterised only by small spill events, although several events with unknow size (4 in 2019) have been registered. The most affected sub-divisions are the Aegean Sea (as remarked also for the oil spill events), the Levantine Sea and to a minor extent the Ionian Sea.

Table 8. Number of non-oil related spills events (HNS, non-HNS and unknow) per year in the Mediterranean and related sub-divisions in the period 2002-2021 reported by MEDGIS-MAR.

Year	TOTMED	ALBS	WMS	TYRS	CEN	NADR	MADR	SADR	IONS	AEGS	LEVS
2002	3	0	0	0	0	0	0	0	0	0	3
2003	4	0	0	0	0	0	0	0	0	0	4
2004	6	0	0	0	0	0	0	0	0	0	6
2005	4	0	0	0	0	1	0	0	0	0	3
2006	0	0	0	0	0	0	0	0	0	0	0
2007	0	0	0	0	0	0	0	0	0	0	0
2008	1	0	0	0	0	0	0	0	0	0	1
2009	0	0	0	0	0	0	0	0	0	0	0
2010	2	0	0	0	0	0	0	0	0	0	2
2011	3	0	0	0	0	0	0	0	0	0	3
2012	5	0	0	2	0	0	0	0	0	3	0
2013	3	0	0	0	0	0	0	0	0	2	1
2014	8	1	1	0	0	0	0	0	1	3	2
2015	15	0	0	0	3	0	0	0	2	6	4
2016	13	1	1	0	1	0	0	0	0	7	3
2017	6	0	0	0	0	0	1	0	0	4	1
2018	9	0	0	0	0	0	0	0	4	5	0
2019	9	0	0	0	0	0	0	0	2	6	1
2020	12	0	0	0	0	0	0	0	1	11	0
2021	1	0	0	0	0	0	0	0	0	1	0

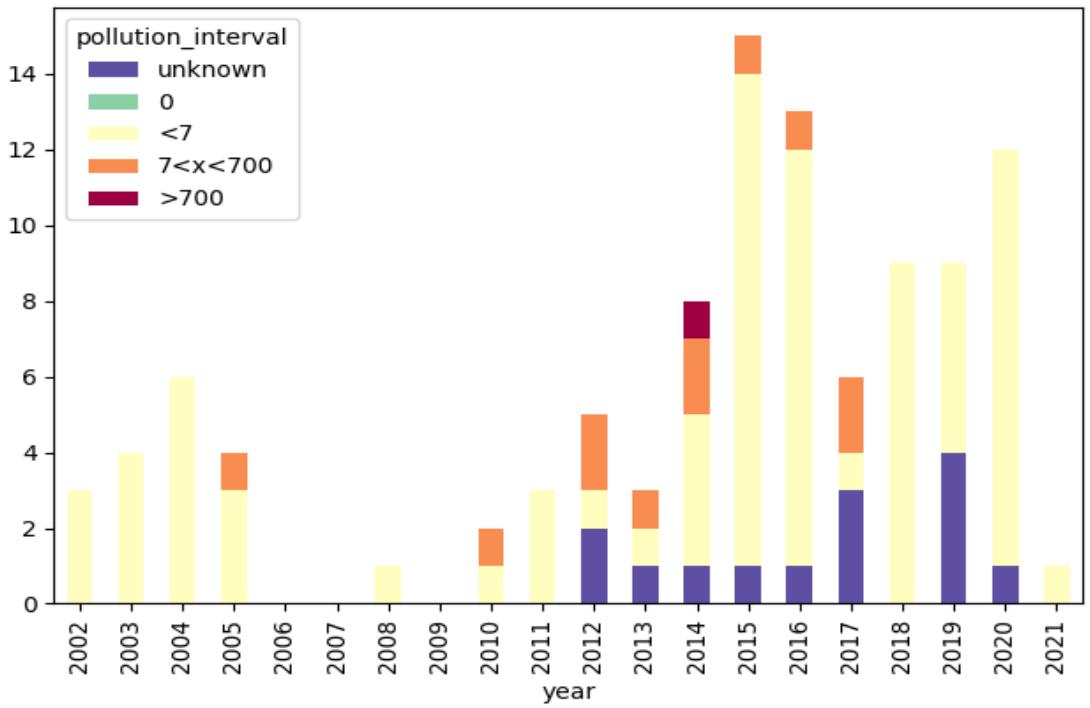

Figure 14. Number of non-related oil spills events (HNS, non-HNS and unknow) per year in the period 2002-2021 in the Mediterranean reported by MEDGIS-MAR. Events are categorised according ITOPF classes of spilled volumes (values in legend = tonnes).

4 Assessment of marine environment status for CI 19

4.1 Acute pollution from oil

Based on the data from MEDGIS-MAR, Figure 15 illustrates the distribution of spills in the Mediterranean in the assessment period (2018-2021). Figure 16 shows the relative occurrence in the different sub-divisions (seas) and occurrence in the same period. The Aegean Sea is the area where occurrence of spills is higher in the period. 2020 was the year with most numerous events registered.

Figure 15. Spatial distribution of oil spills events (volatile and non-volatile oil) in the Mediterranean in the period 2018-2021 per ITOPF class of spilled volume (values in legend = tonnes). Only events if volume <7 tonnes or unknown occurred in the considered period. Data source: MEDGIS-MAR.

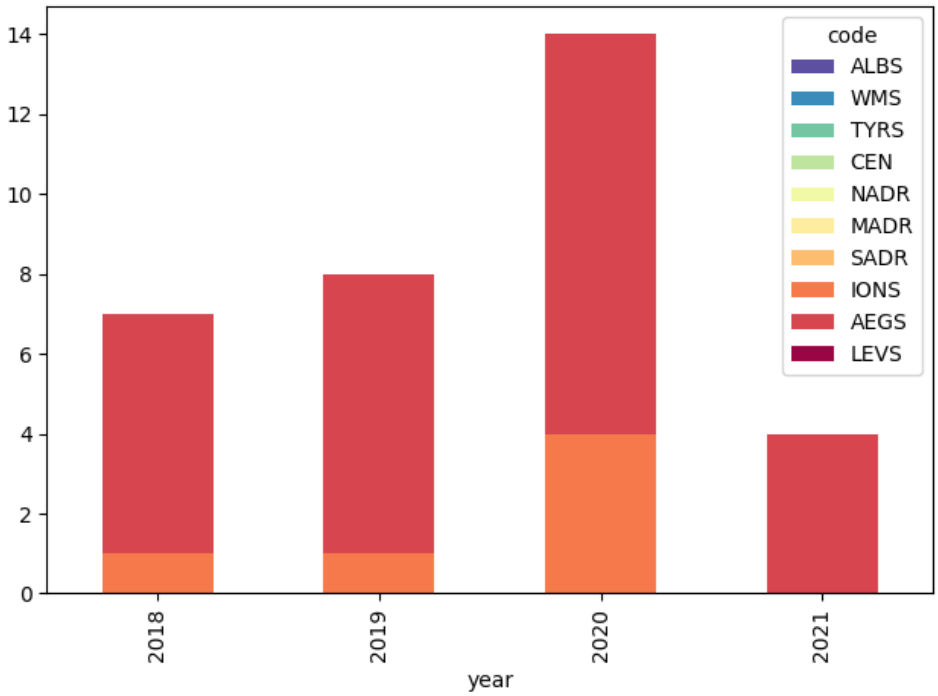

Figure 16. Number of oil spills events (volatile and non-volatile oil) per year in the period 2018-2021 per sub-division.

As indicated in the methodology, both the frequency of occurrence of oil spills in the considered period (2018-2021) and the relative variation of the frequency with respect to the previous reporting period (2013-2017) are considered for the assessment. Average yearly frequencies are normalized over the extension of each sub-division of analysis. *Table 9* summarizes data and results of the assessment. The yearly average number of oil spills per 10000 km^2 in the period 2018-2021 and the classification of its percentage variation between the periods 2018-2021 and 2013-2017 (in colour-based classes) are also mapped in *Figure 17*.

Table 9. Assessment of oil (Part 1). (1) Extension of the assessment areas (10000 km^2); (2) average number of spills in the period and average number of spills per 10000 km^2 in the assessment period (2018-2021) - the three highest values only are highlighted; (3) average number of spills in the previous period and average number of spills per 10000 km^2 in the previous period (2013-2017); (4) % of variation of average yearly spill occurrence.
Colour code for spill frequency: dark red = highest value; red = second highest; orange = third highest. Colour code for % variations: blue = no spills recorded, in the assessment nor in the previous period; green = decreased frequency of spill occurrence; yellow = increased frequency of spill occurrence <= 100%; red = increased frequency of spill occurrence > 100%. Data source: MEDGIS-MAR.

	TOT MED	ALBS	WMS	TYRS	CEN	NADR	MADR	SADR	IONS	AEGS	LEVS
(1) Extension of the areas of assessment											
Area /10000 km^2	252.53	5.61	57.25	21.68	55.02	3.34	4.41	6.17	16.88	20.24	61.91
(2) 2018-2021 frequency of spill occurrence											
n/y	8.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	6.8	0.0
n/y/10000 km^2	0.033	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.089**	**0.334**	0.000
(3) 2013-2017 frequency of spill occurrence											
n/y	19.2	0	0.8	0	0.6	0	0	0	1.2	15.2	1.4
n/y/10000 km^2	0.076	0.000	0.014	0.000	0.011	0.000	0.000	0.000	0.071	0.751	0.023
(4) Variation % between the two periods											
Variation % of n/y	-57	-	-100	-	-100	-	-	-	25	-56	-100

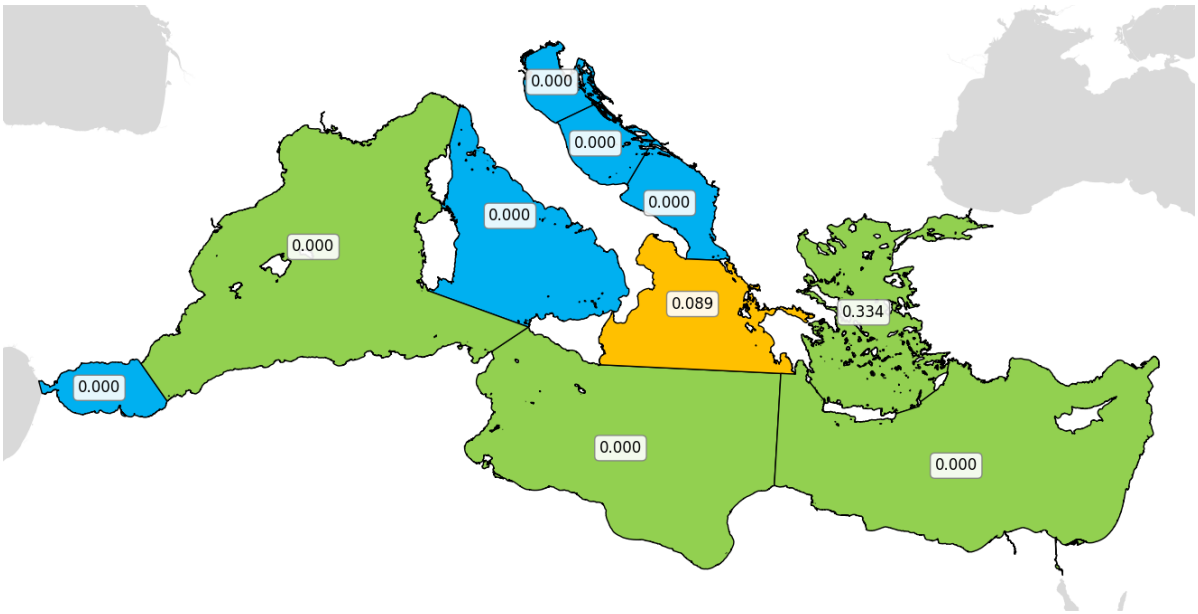

Figure 17. Yearly average number of oil spills per 10000 km^2 in the period 2018-2021 and classification of its percentage variation between the periods 2018-2021 and 2013-2017; Colour code for % variations: blue = no spills recorded, in the assessment nor in the previous period; green = decreased frequency of spill occurrence; yellow = increased frequency of spill occurrence <= 100%; red = increased frequency of spill occurrence > 100%. Data source: MEDGIS-MAR.

The same approach is used here below to assess the status on the basis of the Lloyd List Intelligence Seasearcher database in the assessment period (2018-2021). *Figure 18* shows the relative occurrence in the different sub-divisions and *Figure 19* shows the occurrence in the four years of assessment. The Aegean Sea is again the area where occurrence of spills is higher. In 2020 and 2021 the highest number of events are registered.

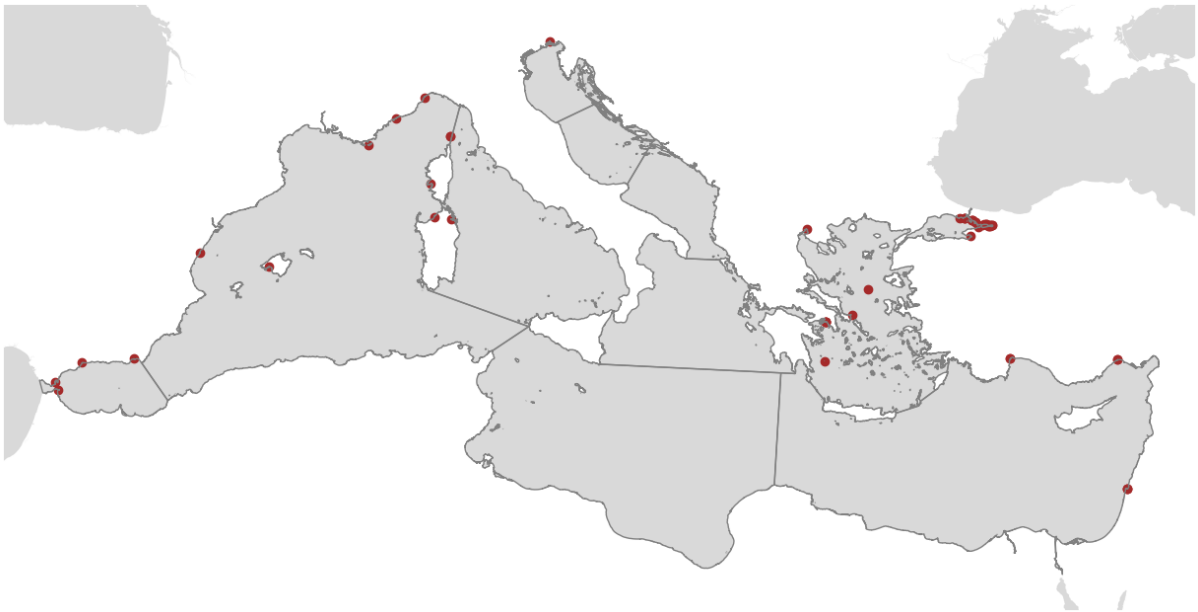

Figure 18. Spatial distribution of oil spills events (volatile and non-volatile oil) in the Mediterranean in the period 2018-2021. Data source: Lloyd List Intelligence Seasearcher.

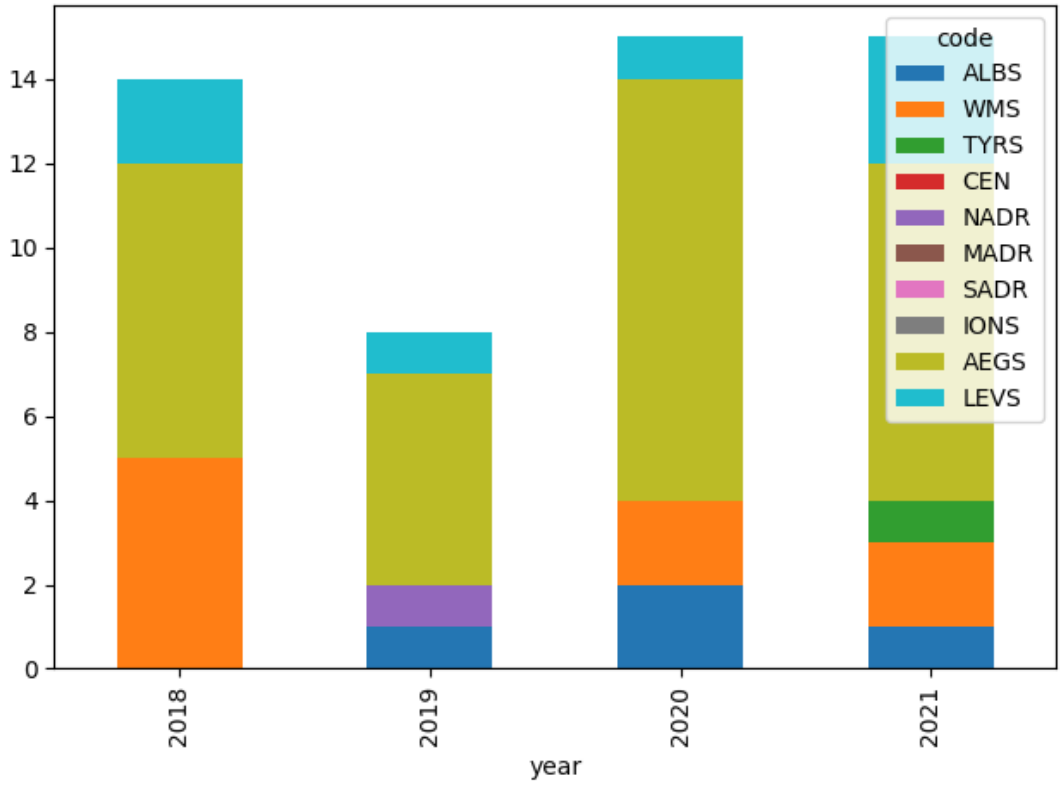

Figure 19. Number of oil spills events per year in the period 2018-2021 per sub-division. Data source: Lloyd List Intelligence Seasearcher.

As above, to provide an assessment of the status for this indicator, both the frequency of occurrence of oil spills in the considered period (2018-2021) and the relative variation of the frequency with respect to the previous reporting period (2013-2017) are considered with reference to the Lloyd List Intelligence Seasearcher database. Average frequencies are normalized over the extension of each sub-division of analysis.

Table 10 summarizes data and results of the assessment.

The yearly average number of oil spills per 10000 km^2 in the period 2018-2021 and the classification of its percentage variation between the periods 2018-2021 and 2013-2017 (in colour-based classes) are also mapped in *Figure 20*.

Table 10. Assessment for oil (Part 2). (1) Extension of the assessment areas (10000 km^2); (2) average number of spills in the period and average number of spills per 10000 km^2 in the assessment period (2018-2021) - the three highest values only are highlighted; (3) average number of spills in the previous period and average number of spills per 10000 km^2 in the previous period (2013-2017); (4) % of variation of average yearly spill occurrence.
Colour code for spill frequency: dark red = highest value; red = second highest; orange = third highest. Colour code for variations: blue = no spills recorded in the assessment period, nor in the previous period; green = decreased frequency of spill occurrence; yellow = increased frequency of spill occurrence <= 100%; red = increased frequency of spill occurrence > 100%. Data source: Lloyd List Intelligence Seasercher.

	TOT MED	ALBS	WMS	TYRS	CEN	NADR	MADR	SADR	IONS	AEGS	LEVS
(1) Extension of the areas of assessment											
Area /10000 km^2	252.53	5.61	57.25	21.68	55.02	3.34	4.41	6.17	16.88	20.24	61.91
(2) 2018-2021 frequency of spill occurrence											
n/y	13.0	1.0	2.3	0.3	0.0	0.3	0.0	0.0	0.0	7.5	1.8
n/y/10000 km^2	0.051	**0.178**	0.039	0.012	0.000	**0.075**	0.000	0.000	0.000	**0.371**	0.028
(3) 2013-2017 frequency of spill occurrence											
n/y	11.6	0.6	1.6	0.2	0.6	0.0	0.0	0.2	0.4	5.6	2.4
n/y/10000 km^2	0.046	0.107	0.028	0.009	0.011	0.000	0.000	0.032	0.024	0.277	0.039
(4) Variation % between the two periods											
Variation % of n/y	12	67	41	25	-100	-	-	-100	-100	34	-27

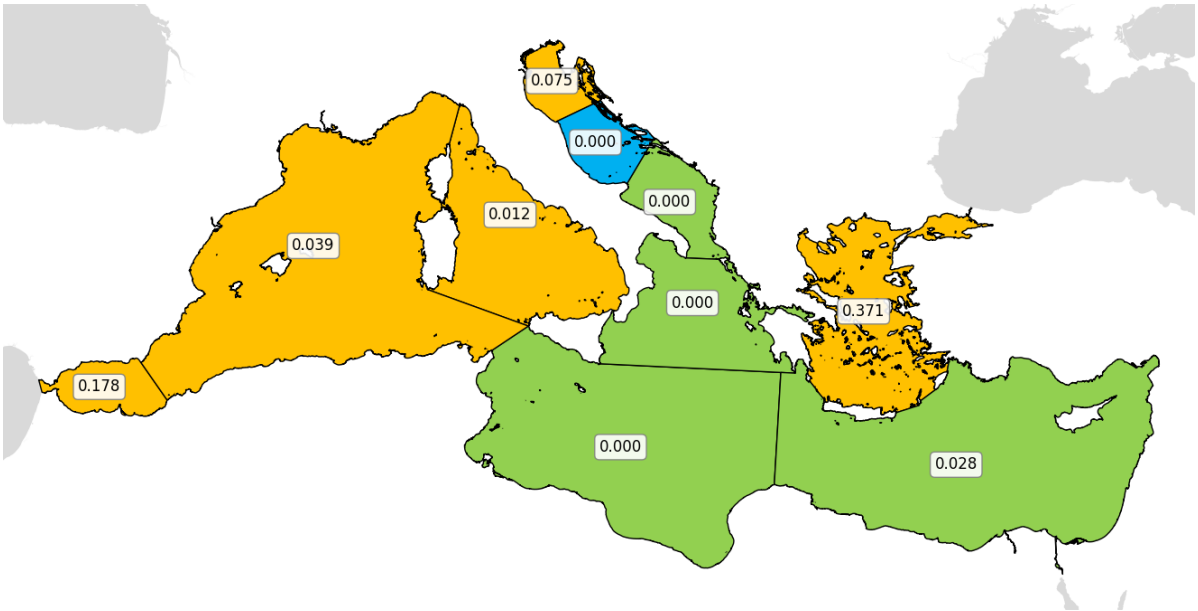

Figure 20. Yearly average number of oil spills (n/y/10000 km^2) in the period 2018-2021 and classification of its percentage variation between the periods 2018-2021 and 2013-2017; Colour code for % variations: blue = no spills recorded, in the assessment nor in the previous period; green = decreased frequency of spill occurrence; yellow = increased frequency of spill occurrence <= 100%; red = increased frequency of spill occurrence > 100%. Data source: Lloyd List Intelligence Seasearcher.

Again, the same approach is used here below to assess the status of the indicator on the basis of the CleanSeaNet database in the assessment period (2018-2021). *Figure 21* shows the relative occurrence in the different areas (sub-divisions) and *Figure 22* shows the occurrence in the four years of assessment. The Levantine Sea shows the highest frequency of spill detection, followed by the Western Mediterranean and by the Central Mediterranean. Within the assessment period, 2020 is the year showing the highest frequency of spills.

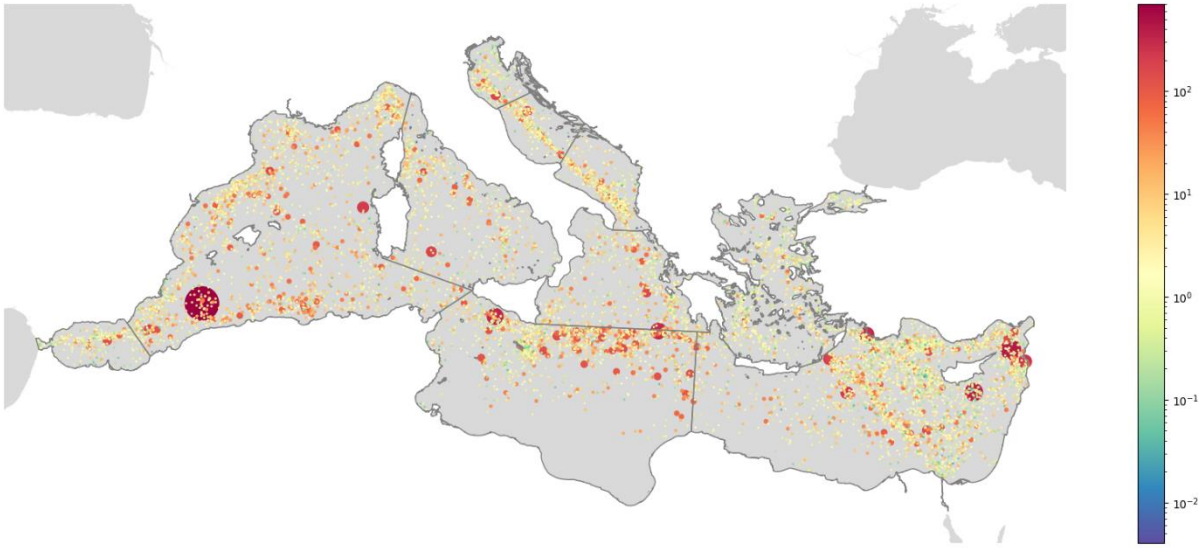

Figure 21. Spatial distribution of spills in the Mediterranean in the period 2018-2021 with their relative polluted area extension. Data source: CleanSeaNet.

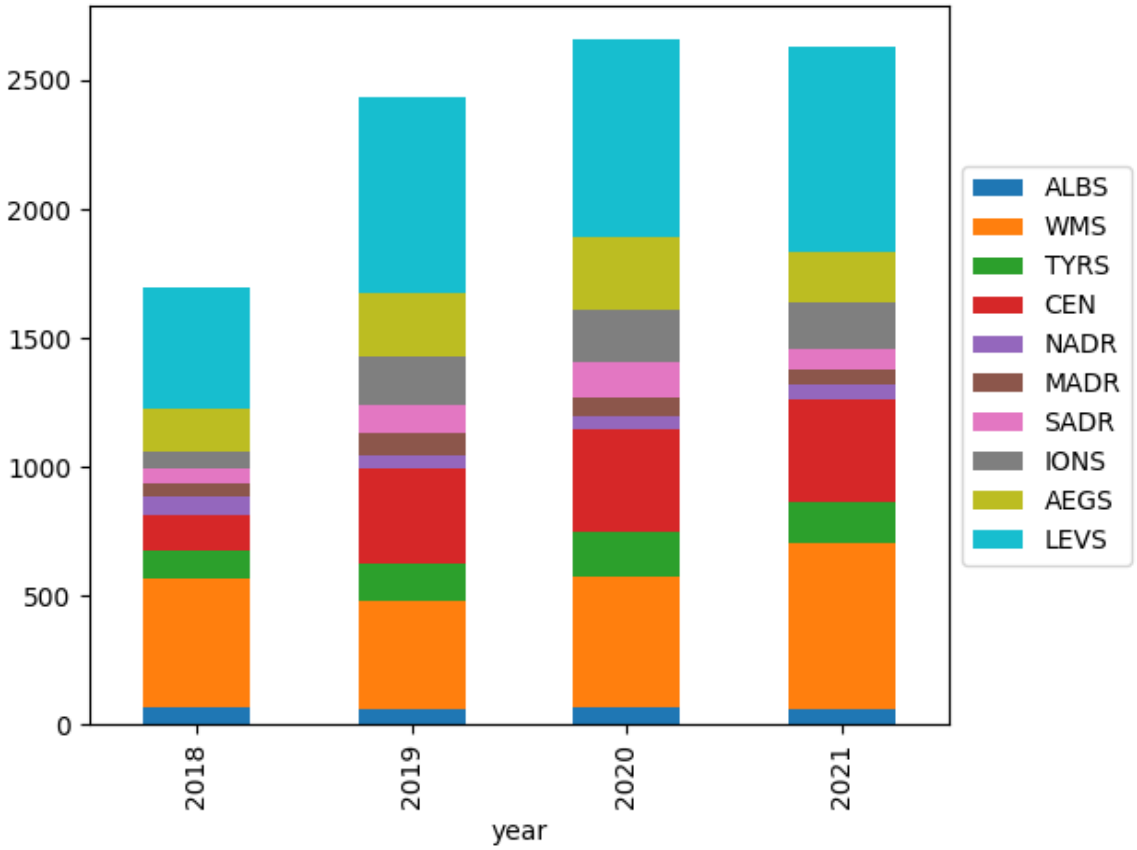

Figure 22. Number of spills per year in the period 2018-2021 per sub-division. Data source: CleanSeaNet.

As for the previous data sets, both the frequency of occurrence of oil spills in the considered period (2018-2021) and the relative variation of the frequency with respect to the previous reporting period (2013-2017) are considered with reference to CleanSeaNet database. Average frequencies are normalized over the extension of each sub-division of analysis. Table 11 summarizes data and results of the assessment. The yearly average number of oil spills per 10000 km^2 in the period 2018-2021 and the classification of its percentage variation between the periods 2018-2021 and 2015-2017 (in colour-based classes) are also mapped in *Figure 23*.

Table 11. Assessment for oil (Part 3). (1) Extension of the assessment areas (10000 km^2); (2) average number of spills in the period and average number of spills per 10000 km^2 in the assessment period (2018-2021) - the three highest values only are highlighted; (3) average number of spills in the previous period and average number of spills per 10000 km^2 in the previous period (2015-2017); (4) % of variation of average yearly spill occurrence.
Colour code for spill frequency: dark red = highest value; red = second highest; orange = third highest. Colour code for variations: blue = no spills recorded in the assessment period, nor in the previous period; green = decreased frequency of spill occurrence; yellow = increased frequency of spill occurrence <= 100%; red = increased frequency of spill occurrence > 100%. Data source: CleanSeaNet.

	TOT MED	ALBS	WMS	TYRS	CEN	NADR	MADR	SADR	IONS	AEGS	LEVS
(1) Extension of the areas of assessment											
Area /10000 km^2	252.53	5.61	57.25	21.68	55.02	3.34	4.41	6.17	16.88	20.24	61.91
(2) 2018-2021 frequency of spill occurrence											
n/y	2353.8	63.3	517.0	148.0	327.0	55.3	68.0	96.5	161.3	221.0	696.5
n/y/10000 km^2	9.321	11.269	9.030	6.826	5.943	**16.520**	**15.417**	**15.630**	9.550	10.920	11.250

(3) 2015-2017 frequency of spill occurrence											
n/y	1271	48	319	121	137	18	34	54	68	138	335
n/y/10000 km^2	5.033	8.552	5.572	5.581	2.490	5.382	7.708	8.746	4.027	6.819	5.411
(4) Variation % between the two periods											
Variation % of n/y	85	32	62	22	139	207	100	79	137	60	108

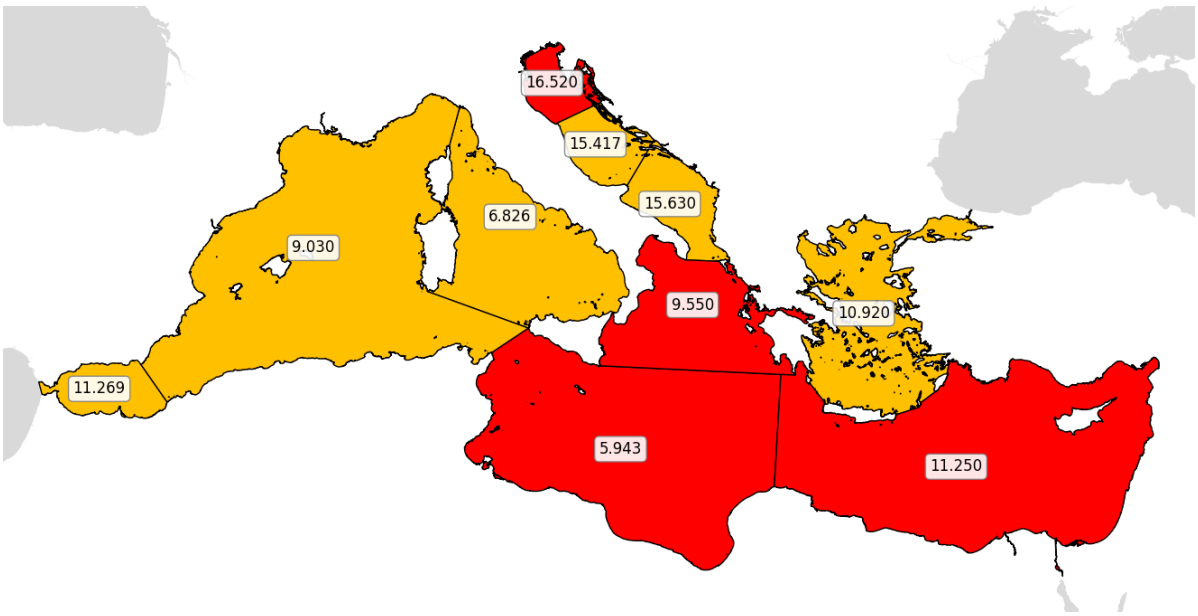

Figure 23. Yearly average number of oil spills (n/y/10000 km^2) in the period 2018-2021 and classification of its percentage variation between the periods 2018-2021 and 2013-2017; Colour code for % variations: blue = no spills recorded, in the assessment nor in the previous period; green = decreased frequency of spill occurrence; yellow = increased frequency of spill occurrence <= 100%; red = increased frequency of spill occurrence > 100%. Data source: CleanSeaNet.

Finally, CleanSeaNet data referring to the extension of areas interested by pollution are considered with reference to the same assessment period (2018-2021). *Figure 24* shows the total extension of areas interested by pollution in the four years of assessment. The Levantine Sea shows the highest extension of polluted areas detected over the period, followed by the Western Mediterranean and the

Central Mediterranean. Within the assessment period and increasing trends in the overall extension of polluted areas is observed.

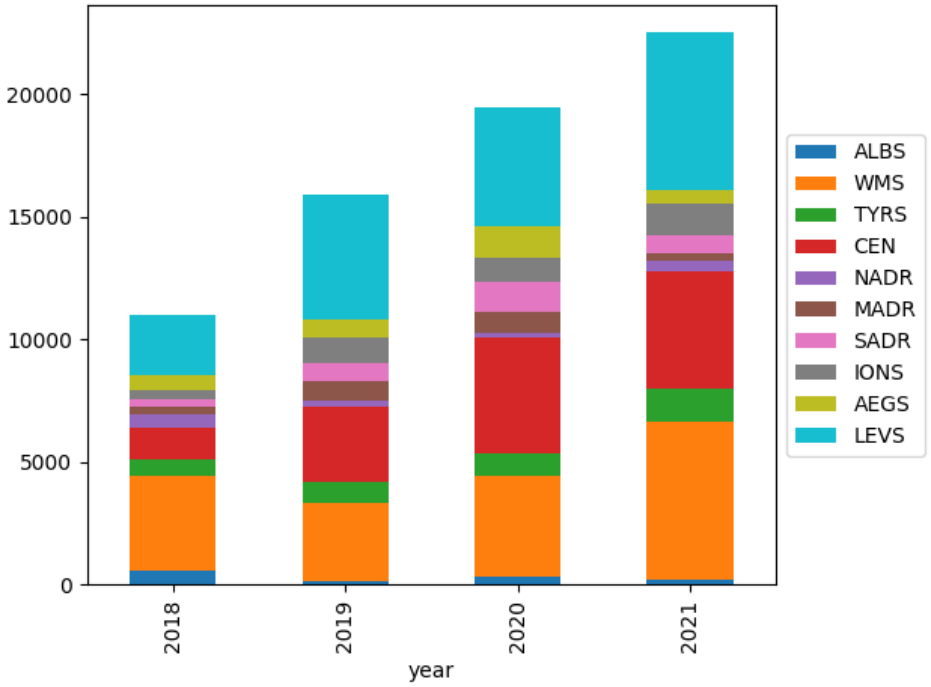

Figure 24. Extension of areas interested by spill events per year in the period 2018-2021 per sub-division. Data source: CleanSeaNet.

With the same approach as above, both the overall surface interested by spills in the considered period (2018-2021) and the relative variation of such surface with respect to the previous reporting period (2015-2017) are considered with reference to CleanSeaNet database for each of the areas (sub-divisions) of assessment. Extension of surface where pollution was detected is normalized over the extension of each area of analysis (sub-division). *Table 12* summarizes the data used for the assessment. The yearly average extension of areas interested by pollution per 10000 km^2 in the assessment period (2018-2021) and the classification of its percentage variation between the periods 2018-2021 and 2015-2017 (in colour-based classes) are also mapped in *Figure 25*.

Table 12. Assessment for oil (Part 4). (1) Extension of the assessment areas (10000 km^2); (2) average extension of areas interested by pollution in the period and relative extension per 10000 km^2 in the assessment period (2018-2021) - the three highest values only are highlighted; (3) average extension of areas interested by pollution in the previous period and relative extension per 10000 km^2 in the previous period (2015-2017); (4) % of variation of extension of polluted areas per 10000 km^2. Colour code for spill frequency: dark red = highest value; red = second highest; orange = third highest. Colour code for variations: blue = no polluted areas detected in the assessment period, nor in the previous period; green = decreased extension of polluted area; yellow = increased extension of polluted area <= 100%; red = increased extension of polluted areas > 100%. Data source: CleanSeaNet.

	TOT MED	ALBS	WMS	TYRS	CEN	NADR	MADR	SADR	IONS	AEGS	LEVS
(1) Extension of the areas of assessment											
Area /10000 km^2	252.53	5.61	57.25	21.68	55.02	3.34	4.41	6.17	16.88	20.24	61.91
(2) 2018-2021 extension of polluted area											
Km^2/y	17214.6	322.5	4387.0	966.2	3453.5	350.2	575.7	742.8	918.5	800.9	4697.2

$Km^2/y/$ 10000 km^2	68.2	57.5	76.6	44.6	62.8	**104.7**	**130.5**	**120.3**	54.4	39.6	75.9
(3) 2015-2017 extension of polluted area											
Km^2/y	196.4	2134.6	782.0	1005.1	118.0	389.5	396.6	381.2	717.6	2365.3	196.4
$Km^2/y/$ 10000 km^2	35.0	37.3	36.1	18.3	35.3	88.3	64.2	22.6	35.5	38.2	35.0
(4) Variation % between the two periods											
Variation % of n/y	103	64	106	24	244	197	48	87	141	12	99

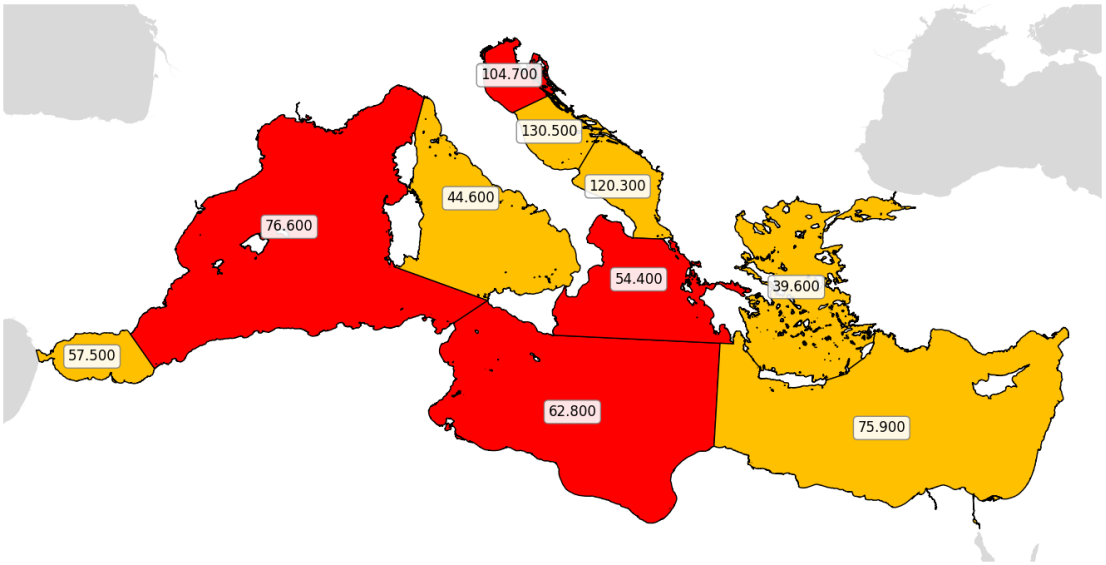

Figure 25. yearly average extension of areas interested by pollution per 10000 km^2 in the assessment period (2018-2021) and classification of its percentage variation between the periods 2018-2021 and 2015-2017; Colour code for % variations: blue = no spills recorded, in the assessment nor in the previous period; green = decreased frequency of spill occurrence; yellow = increased frequency of spill occurrence <= 100%; red = increased frequency of spill occurrence > 100%. Data source: CleanSeaNet.

4.2 Acute pollution from other substances (non-oil)

Assessment of the status of the indicator with reference to other substances (non-oil) is undertaken on the basis of the MEDGIS-MAR data set in the assessment period (2018-2021). The datasets considered spills determining dispersion of Hazardous and Noxious Substances (HNS), other substances non-HNS and other unknown substances. *Figure 26* shows the relative occurrence in the different areas (sub-divisions) and *Figure 27* shows the occurrence in the four years of assessment. The Aegean Sea shows the highest frequency for these spills, with only some events registered for the Ionian Sea and the Levantine sea. Within the assessment period, 2020 is the year showing the highest frequency of spills.

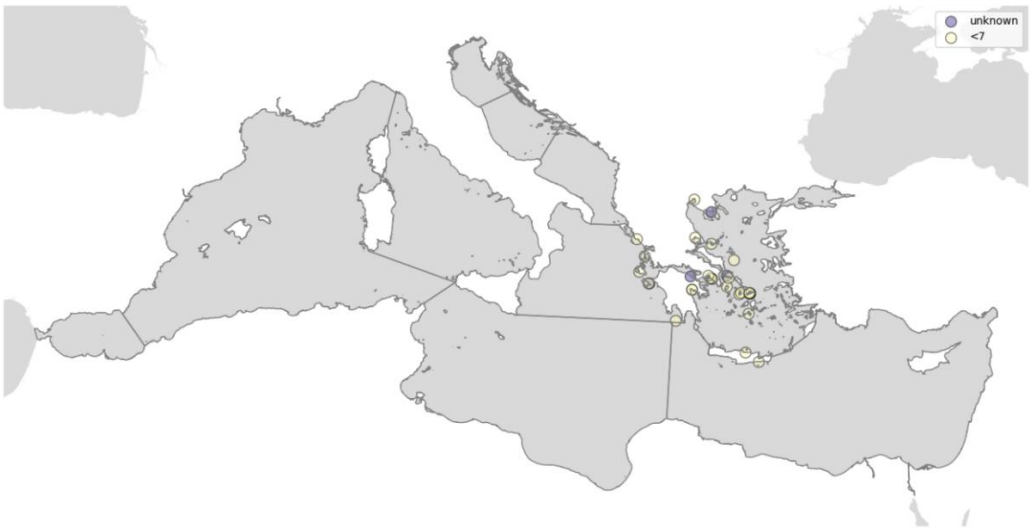

Figure 26. Spatial distribution of spills events related to non-oil substances in the Mediterranean in the period 2018-2021 per ITOPF class of spilled volume (values in legend = tonnes). Data source: MEDGIS-MAR.

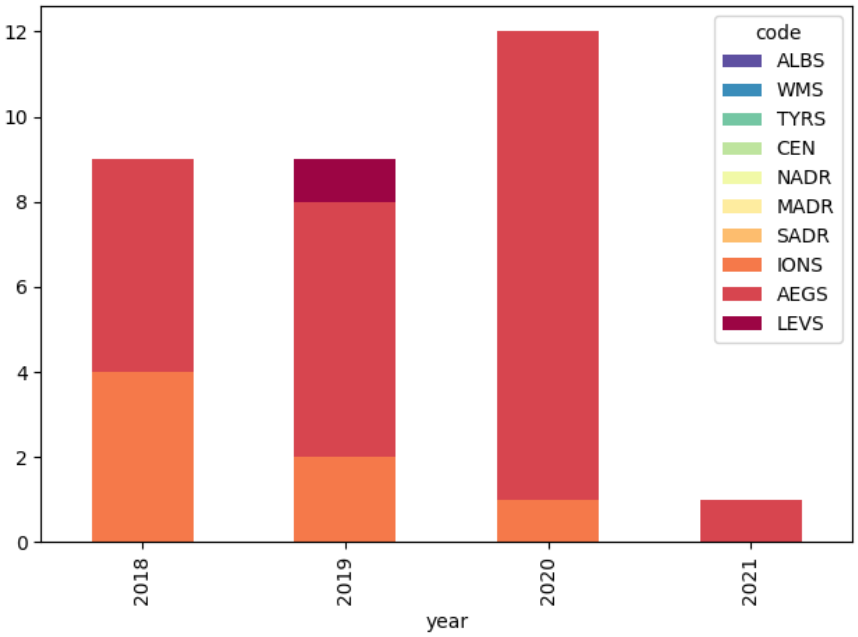

Figure 27. Number of spills related with other substances (non-oil) per year in the period 2018-2021 per sub-division.

The frequency of occurrence of spills (other substances, non-oil) in the considered period (2018-2021) and the relative variation of the frequency with respect to the previous reporting period (2013-2017) are considered with reference to MEDGIS-MAR database. Average frequencies are normalized over the extension of each area of analysis (sub-division). Table 13 summarizes data and results of the assessment. The yearly average number of spills (other substances, non-oil) per 10000 km^2 in the period 2018-2021 and the classification of its percentage variation between the periods 2018-2021 and 2013-2017 (in colour-based classes) are also mapped in *Figure 28*.

Table 13. Assessment for other substances (non-oil). (1) Extension of the assessment areas (10000 km^2); (2) average number of spills in the period and average number of spills per 10000 km^2 in the assessment period (2018-2021) - the three highest values only are highlighted; (3) average number of spills in the previous period and average number of spills per 10000 km^2 in the previous period (2013-2017); (4) % of variation of average yearly spill occurrence. Colour code for spill frequency: dark red = highest value; red = second highest; orange = third highest. Colour code for variations: blue = no

spills recorded in the assessment period, nor in the previous period; green = decreased frequency of spill occurrence; yellow = increased frequency of spill occurrence <= 100%; red = increased frequency of spill occurrence > 100%. Data source: MEDGIS-MAR.

	TOT MED	ALBS	WMS	TYRS	CEN	NADR	MADR	SADR	IONS	AEGS	LEVS
(1) Extension of the areas of assessment											
Area /10000 km^2	252.53	5.61	57.25	21.68	55.02	3.34	4.41	6.17	16.88	20.24	61.91
(2) 2018-2021 frequency of spill occurrence											
n/y	7.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.75	5.75	0.25
n/y/10000 km^2	0.031	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.104**	**0.284**	**0.004**
(3) 2015-2017 frequency of spill occurrence											
n/y	9.00	0.40	0.40	0.00	0.80	0.00	0.20	0.00	0.60	4.40	2.20
n/y/10000 km^2	0.036	0.071	0.007	0.000	0.015	0.000	0.045	0.000	0.036	0.217	0.036
(4) Variation % between the two periods											
Variation % of n/y	-14	-100	-100	-	-100	-	-100	-	192	31	-89

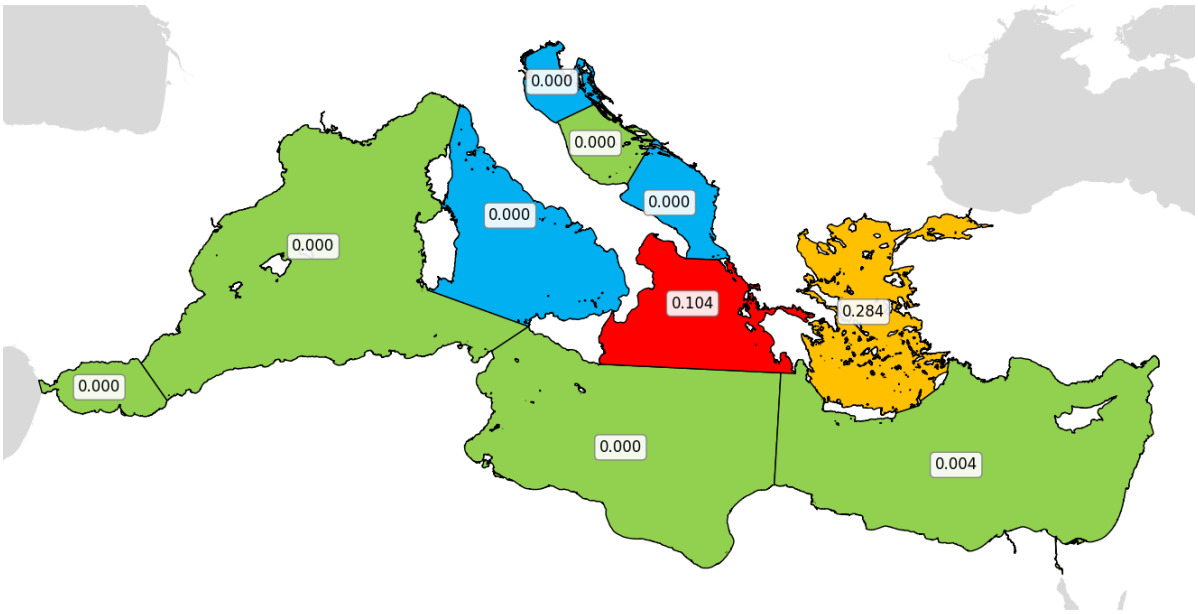

Figure 28. Yearly average number of spills (other substances, non-oil) per 10000 km^2 in the period 2018-2021 and classification of its percentage variation between the periods 2018-2021 and 2013-2017; Colour code for % variations: blue = no spills recorded, in the assessment nor in the previous period; green = decreased frequency of spill occurrence; yellow = increased frequency of spill occurrence <= 100%; red = increased frequency of spill occurrence > 100%. Data source: MEDGIS-MAR.

4.3 Assessment of the status for CI 19

The status for CI 19 in the period 2018-2021 is assessed by jointly considering:

- the information on the frequency of spill occurrence (yearly average number of spills/10000 km^2 and yearly average extension of areas interested by pollution/10000 km^2), and
- the information on the trend of such frequency (increasing, decreasing, stable with no spill), represented by the variation in % in comparison with the previous assessment period (2013-2017).

The assessment is based on all the three analysed datasets. *Table 14* provides a complete overview of the data used for the assessment.

Considering the spills reported by the ships and the countries, MEDGIS-MAR and Lloyd List data indicate for the entire Mediterranean in the assessment period an average occurrence frequency of 0.033 and 0.051 n/y/10000 km^2, respectively (*Table 14*). The most affected sea is the Aegean Sea, followed by the Ionian Sea, according to MEDGIS-MAR (no incidents reported by Lloyd List, instead) and the Alboran Sea according to Lloyd List (no incidents reported by MEDGIS-MAR, instead). The Northern Adriatic Sea ranks third for occurrence of incidents, according to the Lloyd List (no incidents reported by MEDGIS-MAR, instead). These results are in accordance with the relative intensity of vessel traffic (hours/km) (see *Figure 6*), that indicates the Aegean Sea, the Alboran Sean and the Northern Adriatic as the most trafficked areas of the Mediterranean.

Focusing on the spills detected by satellite monitoring (CleanSeaNet data), the Adriatic Sea is the area with the highest standardised (per 10000 km^2) frequency of spill occurrence and the area where the largest extension of polluted areas is detected. This could be explained by the fact that satellite monitoring enables to detect also small spills (including small, non-reported incidents, illicit discharges, spills due to other offshore activities). These are particularly numerous in the Adriatic where, beside significant traffic density due to cargos, tankers and passenger vessels, other type of vessels are present in large number (including fishing vessels).

The temporal variations in spill occurrence computed from the three different databases are very different: according to MEDGIS-MAR a general improvement of the status can be observed for this indicator, with Alboran Sea, Tyrrhenian Sea and the whole Adriatic Sea reporting no spills both in the considered and in the previous assessment period. Considering Lloyd, a general worsening of the status of the indicator can be observed, with the Alboran Sea, Western Mediterranean, the Tyrrhenian Sea, the Northern Adriatic the Aegean Sea showing increasing of spill occurrence. These findings mostly agree with the ones from CleanSeaNet which, additionally, highlight an increase of spill occurrence also for the Central Mediterranean, the Middle Adriatic Sea, the Ionian Sea and the Levantine Sea.
It is worth noting that CleanSeaNet datasets might be biased by increasing monitoring effort from 2015 to the present. Within the present assessment, it was to possible to obtain information on this aspect from EMSA.

Table 14. Assessment summary. (1) average number of oil spills in the assessment period (2018-2021) per 10000 km² for the three datasets - the three highest values only are highlighted; (2) average extension of areas interested by oil pollution in the assessment period (2018-2021) per 10000 km² (from CleanSeaNet) - the three highest values only are highlighted (3) average number of other substances spills in the assessment period (2018-2021) per 10000 km² (from MEDGIS-MAR) - the three highest values only are highlighted; (4) % of variation compared to the previous period of the above indicators for oil spills; (5) % of variation compared to the previous period of the above indicator on other substance spills. Colour code for spill frequency and variation in the extension of the area affected by pollution: dark red = highest value; red = second highest; orange = third highest. Colour code for % variations: blue = no spills recorded, in the assessment period, nor in the previous period; green = decreased frequency of spill occurrence; yellow = increased frequency of spill occurrence <= 100%; red = increased frequency of spill occurrence > 100%. Data sources: MEDGIS-MAR, Lloyd List Intelligence Seasearcher, CleanSeaNet.

Frequency of spills / total polluted area (average values in the period 2018-2021, per 10000 km²)											
	TOT MED	**ALBS**	**WMS**	**TYRS**	**CEN**	**NADR**	**MADR**	**SADR**	**IONS**	**AEGS**	**LEVS**
Oil											
(1) MEDGIS-MAR	0.033	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.089**	**0.334**	0.000
(1) LLOYD	0.051	**0.178**	0.039	0.012	0.000	**0.075**	0.000	0.000	0.000	**0.371**	0.028
(1) CleanSeaNet (n)	9.3	11.3	9.0	6.8	5.9	**16.5**	**15.4**	**15.6**	9.6	10.9	11.3
(2) CleanSeaNet (km²)	68.2	57.5	76.6	44.6	62.8	**104.7**	**130.5**	**120.3**	54.4	39.6	75.9
Other substances											
(3) MEDGIS-MAR	0.031	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.104**	**0.284**	**0.004**
Summary of variation %											
	TOT MED	**ALBS**	**WMS**	**TYRS**	**CEN**	**NADR**	**MADR**	**SADR**	**IONS**	**AEGS**	**LEVS**
Oil											
(4) MEDGIS-MAR	-57	-	-100	-	-100	-	-	-	25	-56	-100
(4) LLOYD	12	67	41	25	-100	-	-	-100	-100	34	-27
(4) CleanSeaNet (n)	85	32	62	22	139	207	100	79	137	60	108
(4) CleanSeaNet (km²)	103	64	106	24	244	197	48	87	141	12	99
Other substances											
(5) MEDGIS-MAR	-14	-100	-100	-	-100	-	-100	-	192	31	-89

In order to summarize the above findings and provide an overall assessment of the status of CI 19 in the Mediterranean, the summary results from the analysis of the three datasets included in Table 14 are jointly considered. This assessment is provided through integration of the three major criteria described below:

- The first criterion refers to the occurrence of spills reported through MEDGIS-MAR and Lloyds, which are mainly linked to relatively large pollution events and to incidents. Occurrence of reported events is considered as a "negative" factor in the overall assessment of the quality status of a given sub-division, while the absence of reported events is considered as "positive". As additional element, to the sub-divisions ranked among the first three for frequency of occurrence of spills, an additional "negative" factor was considered.

- The second criterion focuses on CleanSeaNet data, which are used as an indicator of relatively smaller spills, related to minor incidents or illicit discharges. In particular, a negative contribution to the overall status was considered for the sub-divisions ranking among the first three in terms of average extension of areas affected by oil pollution.

- Finally, the third criterion refers to the temporal variation of the average number of spills (for all the three datasets) and their extension (for CleanSeaNet) between the assessment period (2018-2021) and the previous reference period (2013-2017 for MEDGIS-MAR and Lloyds; 2015-2017 for CleanSeaNet). An increasing trend is considered as negative for the overall assessment of the quality status, while a decreasing trend provides a positive indication.

The combined application of the three criteria led to the classification of the quality status of CI 19 in the Mediterranean sub-divisions in five classes: bad (red), poor (brown), moderate (yellow), good (green), high (blue). As reported in *Table 15*, and mapped in Table 15, according to the adopted methodology, four sub-divisions are classified as bad or poor, five as moderate, one as good and none as high.

In addition, the summary assessments of the ten subdivisions have been qualitatively aggregated, to obtain a summary assessment for the four marine sub-regions of the Mediterranean Sea. This aggregation also considered the extension of the different sub-division included in each sub-region:
"Moderate" has been assigned to the (Entire) Western Mediterranean Sea (EWMS), as this category prevails in its sub-divisions (WMS and TYRS), while the poor status value characterises only the relatively smaller Alboran Sea (ALBS)Similarly, "moderate" has been assigned to the Adriatic Sea (ADR) too, considering the prevalence of this category in its sub-divisions (MADR and SADR).

The qualitative average between the poor status of the Ionian Sea (IONS) and the good status of the Central Mediterranean (CEN) has determined the assignment of "moderate" to the (Entire) Central Mediterranean.

In the case of the Aegean and Levantine Seas (AEL) sub-region, the qualitative average evaluation led to define a" poor" status for the sub-region.

Table 15. Summary assessment of the marine environment status for CI 19 for sub-divisions of the Mediterranean Sea

Sub-division	Considerations for the assessment	Status of CI 19
ALBS	Spills reported, second highest | Increase (in most of the datasets)	POOR
WMS	Spill reported | Increase (in most of the datasets)	MODERATE
TYRS	Spills reported | Increase (in most of the datasets)	MODERATE
CEN	No spills reported | Increase (only CSN)	GOOD
NADR	Spills reported, third highest | Third ranked for satellite observation (area extension) | Increase (in most of the datasets)	POOR
MADR	No spills reported | First ranked for satellite observation (area extension) | Increase (only CSN)	MODERATE
SADR	No spills reported | Second ranked for satellite observation (area extension) | Increase (only CSN)	MODERATE
IONS	Spills reported, second highest | Increase (for most of the datasets)	POOR
AEGS	Spills reported, first highest in two datasets | Increase (for most of the datasets)	BAD
LEVS	Spills reported | Increase (only CSN)	MODERATE

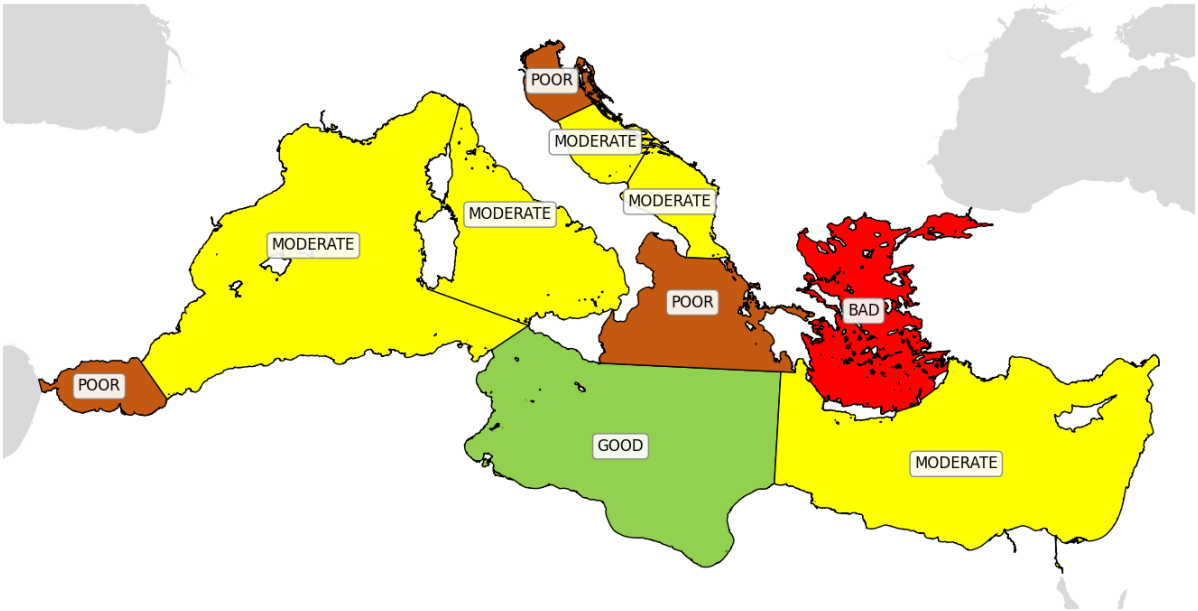

Figure 29. Map of the integrated assessment of the marine environment status for CI 19 for the sub-divisions of the Mediterranean Sea

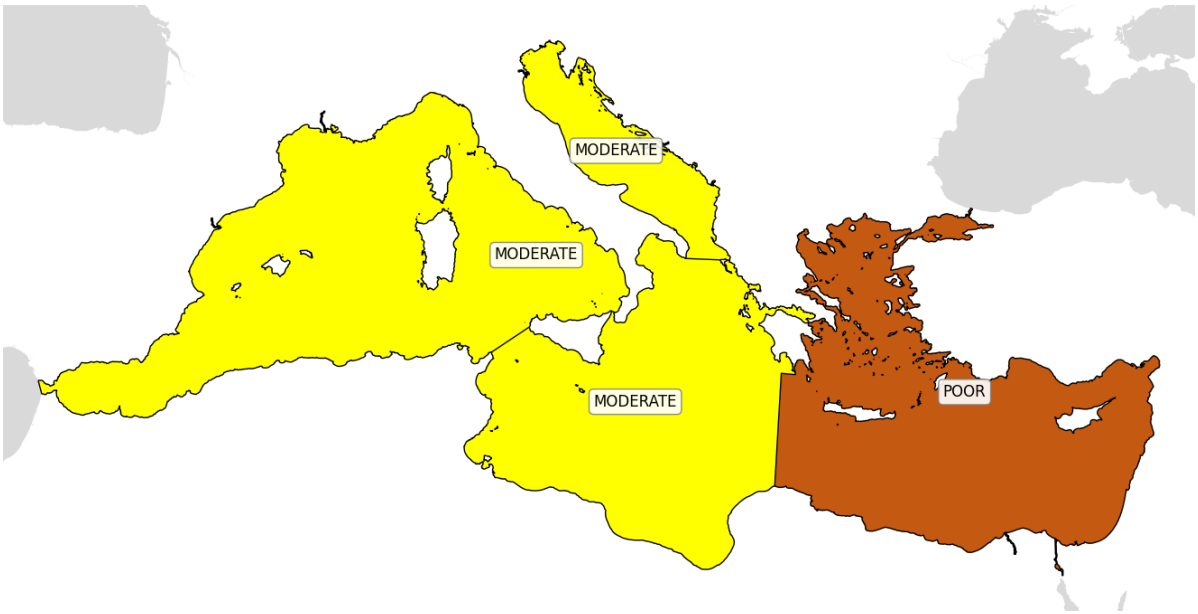

Figure 30. Map of the integrated assessment of the marine environment status for CI 19 for the four sub-regions of the Mediterranean Sea

It is worth noting that the methodology applied is subjected to uncertainty, mostly linked to the heterogeneity of the data sets it is based on. The results from the assessment should be interpreted as best knowledge-based indications on the status of CI 19, aiming at providing a relative indication of priority areas for future monitoring, assessment and, most importantly, pollution prevention measures.

5 Impacts from oil spills

Oil spills can determine severe impacts on the marine environment. Smothering, chemical toxicity (lethal or sub-lethal effects), direct ecological effects (e.g. loss of key organisms from an ecological community) and indirect ones (loss of habitat or shelter) are amongst the worldwide most frequently observed impacts. Oil characteristics are important in determining the extent of impact: heavy fuel oil (HFO) is less likely to cause toxic effects because its chemical components have low biological availability. Notwithstanding this such a type of fuel can cause extended damages in the intertidal zone of shoreline through smothering. Impacts can vary in severity also depending on the ambient conditions (winds. wave, currents, temperature, sunlight). Different sensitivity of organisms and their habitats to oil pollution is also relevant and it depends on the characteristic of the species, the period of the year, the stage of development of organisms and the environmental conditions.

Different impacts have been observed on different marine organisms (ITOPF, 2014a). In the case of plankton, significant declines in adult populations have not been observed due to the high recruitment rate of populations in the areas adjacent to the spill. Fish mass mortalities are rare too: adult fish are quite resilient to oil pollution and effects on wild stock levels have seldom been detected. Instead, seabirds are particularly vulnerable to oil because this substance damages the insulating properties of their plumage, which they require to survive in a maritime environment. Seabirds that spend most of their time afloat and that have little contact with the coast are the most vulnerable to oil pollution. Small amounts of oil in the plumage cause a bird to give up feeding and most casualties are due to starvation.

Large amounts of oil on the plumage cause instant immobility and possibly immediate death through suffocation and drowning (IFAW, 2013). Whales, dolphins and other cetaceans may be at risk from floating oil. Seals are more likely to suffer from the effects of oil, because they spend time onshore (ITOPF, 2014a). Floating oil may be a threat to turtles: loss of eggs and hatchings may occur if oil strands on sand beaches or if nests are disrupted during clean-up operations.

Regarding benthic habitats, seagrass and associated organisms may be impacted by oil spills at sufficiently high concentrations. Thanks to exposure to the scouring effects of wave action and tidal currents, rocky and sandy shores are the most resilient to the effects of a spill. While fine sediments are not as readily impacted, oil can become incorporated through flocculation with sediments stirred up by storm activity or penetration through worm burrows and open plat stems (ITOPF, 2014a). For example, the sinking of the tanker Eurobulker in the Southern Evoikos Gulf (Aegean Sea, Greece) in September 2000 resulted in a spill of 700 tons of crude oil. The most severe and direct effects were evidenced on the muddy benthic communities in the close vicinity, sampled shortly after the spill. The effects included reduction of the species richness and community diversity, but the communities reached full recovery 8 months later. The impact of the spill was more indirect and delayed in the coastal stations, whereas the hydrocarbon measurements indicated, the pollutants were transported later and induced their effects on the benthic communities 6 months after the accident (Zenetos et al., 2004)

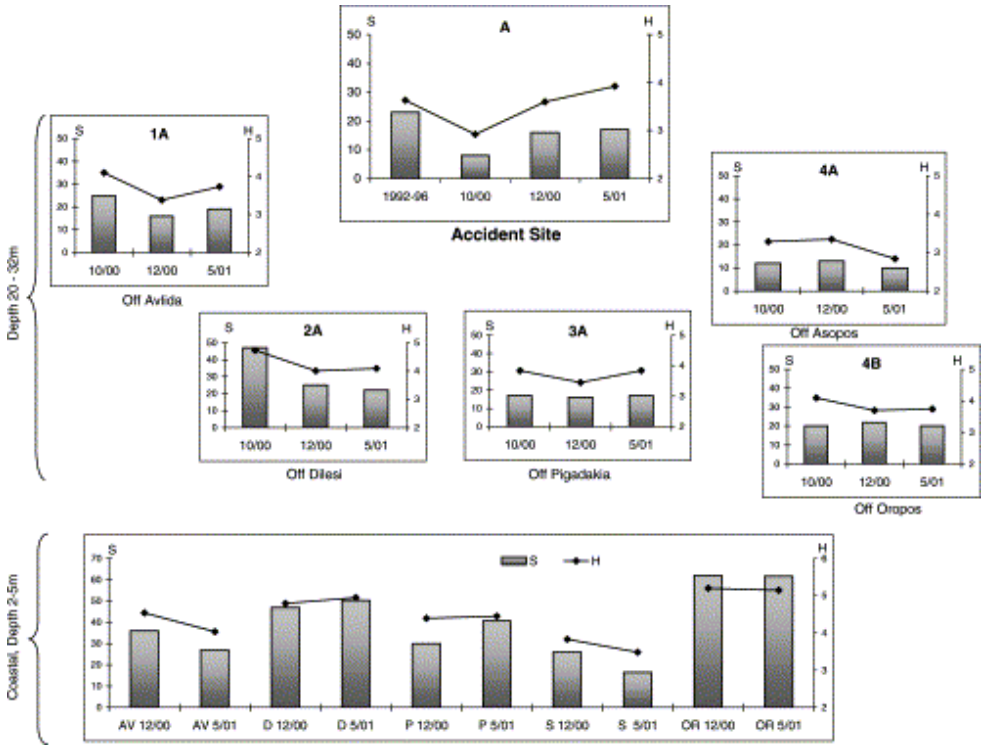

Figure 31. Temporal changes in the ecological indices (S: number of species, H: community diversity) at the sampling sites over the 8-month study period. The position of the plot frames in the figure represents the geographical orientation of the sampling sites in relation to the accident site. Source: Zenetos et al. (2004)

Following the chemical tanker Agia Zoni II sank in the Piraeus anchorage area in September 2017, the major consequences of the oil spill were constrained along the shoreline for a period of three months following the incident. No major findings regarding the presence of petroleum hydrocarbons were identified along the shoreline after December 2017 (REMPEC, 2019).

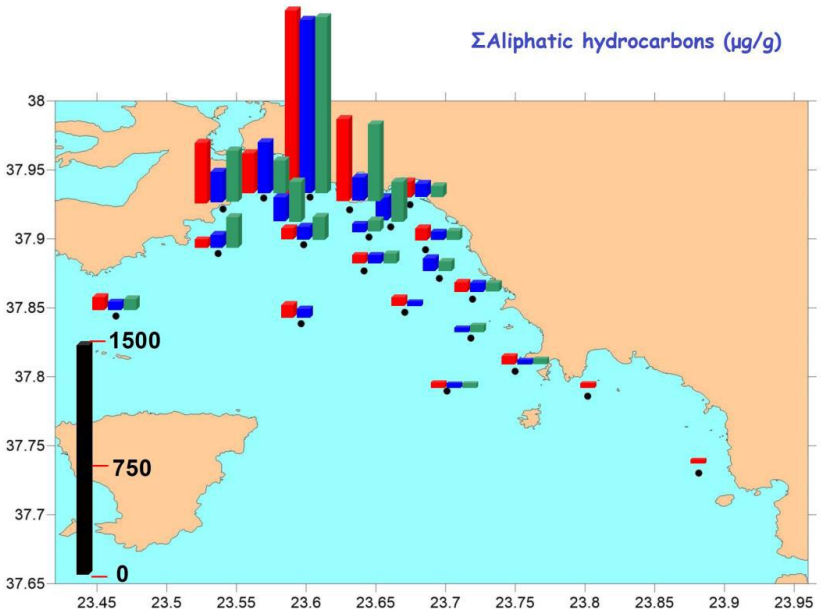

Figure 32. Concentrations of total aliphatic hydrocarbons (in μg/g of dry sediment) for the collected sediment samples on September 21-22nd 2017 (red colour), November 13-14th 2017 (blue colour) and January 23-24th 2018 (green colour) in the open Saronikos Gulf. Source: REMPEC (2019).

Oil spills can determine a wide variety of impacts on human activities, damaging economic sectors but also hindering the utilization of marine and coastal ecosystems by local communities, determining economic and societal impacts.

Oil spills can cause serious damage to fishery and mariculture resources through physical contamination, toxic effects on stocks and by disrupting business activities (ITOPF, 2014b). Main consequences are mortality of fish/shellfish caused by toxicity, damage to gears, facilities and boats, damage to the final product quality (through the tainting effect, meaning that the odour or flavour of oil is transferred to seafood). The occurrence of contamination in seafood organisms or products following a major spill can lead to public health concerns and may give raise to the imposition of fishing restrictions. Public health concerns and detection of taint are likely to lead to produce beige withdrawn from the market. A loss of primary market confidence may also occur leading to price reductions or outright rejection of seafood products by commercial buyers and consumers (ITOPF, 2014b).

Coastal tourism can also be impacted by disruption of traditional coastal activities such as bathing, boating, angling and diving. Such damages can determine a consequent effect for hotels, restaurants and bar, as well as sailing schools, camp sites, caravan parks and the many other businesses and individuals who gain their livelihood from tourism (ITOPF, 2014c).

Port operations are also susceptible to impacts related with oil spill (ITOPF, 2014c). Large vessels, leaving or entering the port, should move at slow speed to reduce wash that could disturb booms and other deployed resources, as well as to minimize the spread of floating oil around the port. Port, marinas and fishing harbours are usually enclosed by sea defences to protect moored vessels against adverse sea conditions. If oiled, these structures can be difficult to clean and they may become a source of secondary pollution. Once oil has entered a marina or a port the hull of vessels, mooring lines and berths can become oiled.

Sea water is widely used in a broad range of industries: as a coolant for thermal and nuclear power station and refineries, as a feedstock and as a coolant for desalination plants. The possibility the oil will be entrained into the water flow depends on the type of oil, the weather conditions and the design of the intake itself. Occasionally, following an oil spill, water intake of electricity power plants are shut down as a precaution against damage to machinery and to avoid the more extensive shout-down of the entire plant should condenser tubes and other equipment need to be cleaned (ITOPF, 2014c).

5.1 CI 19 assessment: impact on biota

Common Indicator 19 is defined as “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 (EO9)”. In the Mediterranean the data presently available do not allow to include in the assessment of this indicator the component related to the impacts on biota. In fact, as described above, few examples are available of monitoring of oil spill impacts in the region Mediterranean (e.g. spill in Baniyas, Syria in 2021- REMPEC, 2021; sinking of the Agia Zoni II, Piraeus, Greece in 2017 - REMPEC, 2019; spill from the Jieh power plant in Lebanon in 2006 - Saab et al., 2006). From available guidelines (re.g. the UK PREMIAM initiative: Kirby et al., 2018) and the experience available at European level (e.g. Belgium – Tornero et al. 2022), as well as from the above cases, monitoring of the following elements are recommended: 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. Based on such guidelines and experiences, REMPEC has recently prepared a revision of the Data Dictionary and Data Standard for CI19, by including also data aimed at assessment of impact on biota.

Based on the data that will be collected as indicated in the revised version of the Data Dictionary and Data Standard for CI19, we can expect the future QSR assessments will consider the impacts on biota too.

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