EUROPEAN
COMMISSION

Brussels, 31.7.2018
SWD(2018) 394 final

PART 2/2

COMMISSION STAFF WORKING DOCUMENT
Accompanying the document

REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL

Mid-term evaluation of Regulation (EU) No 911/2014 on multiannual funding for the action of the European Maritime Safety Agency in the field of response to marine pollution caused by ships and oil and gas installations

{COM(2018) 564 final}

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APPENDIX 1: PROCEDURAL INFORMATION

1. Lead DG, D*e*CIDE PLANNING/CWP REFERENCES

DG MOVE is the lead DG. The Decide Planning entry is: 2017/MOVE/029.

2. Organisation and timing

The evaluation was launched in December 2016.

The ISG met 3 times in December 2016, in March 2017 and in February 2018 to discuss the roadmap, the consultation strategy, the work and the results of the external study contracted by EMSA in relation to the network of stand-by vessels, and the draft evaluation report.

3. The ISG is composed of DG MOVE (units D2 and A3), SG, BUDG, ECHO, ENER and ENV.Exceptions to the better regulation guidelines

The Better Regulation Guidelines were followed.

4. Consultation of the RSB (if applicable)

5. N/AEvidence, sources and quality

The evidence supporting the evaluation includes:

- Evidence gathered by the Agency which has some extensive and strict obligations regarding planning and reporting on the implementation of its activities. The Agency's planned activities are outlined in the annually updated Single Programming Document for the next three-year period and the detailed work programme for the following year. The annual reporting obligations of the Agency's activities are also addressed in detail in an Annex to EMSA's Consolidated Annual Activity Report as required under Regulation (EU) No 911/2014.
- Evidence from the Action Plans drafted by the Agency in consultation with national authorities, regional agreements and industry: Action Plan for HNS Pollution Preparedness and Response (June 2007); Action Plan for Oil Pollution Preparedness and Response (February 2010); Action Plan for Response to Marine Pollution from Oil and Gas Installations (January 2014).
- Evidence gathered by the Agency in-house and through several events like workshops with stakeholders such as EMSA's Consultative Technical Group on Marine Pollution Preparedness
- Results of the various consultation processes: open public consultation, targeted consultations, etc. (see below)

Furthermore, the present evaluation is supported by an external independent study on the cost efficiency and cost effectiveness of EMSA's operational pollution response services consisting of the network of contracted standby oil spill response vessels, the stockpiles of specialised oil pollution response equipment, and the stockpiles of oil spill dispersants. The study was contracted by EMSA and conducted by the consulting firm Ramboll.

The findings of the study rely on the assessment of evidence based on triangulated data collected from a range of different sources, including internal and external documentation, a targeted stakeholder consultation conducted by EMSA consisting of a survey administered to Member States, plus interviews with key stakeholders conducted by Ramboll. In addition, industry and cost data provided by shipyards and shipbrokers were collected and expert assessments were provided by oil pollution response experts subcontracted by Ramboll.

In telephone interviews with relevant stakeholders of EMSA's services, questions were asked to assess EMSA's oil pollution response services and to compare EMSA's capabilities with that of Member States. Countries that had not responded to EMSA's online survey were asked additional questions in line with the EMSA consultation. Additionally, third countries that may also utilise EMSA's services were interviewed as well. Further information regarding these interviews could be found in Annex 6 to this report.

Regarding consultation processes, EMSA conducted directly an online targeted survey with the EU/EFTA coastal Member States as the main stakeholders of the Agency. A total of 23 individual sets of answers were received from 19 out of 23 EU Member States and the EFTA countries Iceland and Norway. More details on the outcome of this survey can be found in Annex 5 of this report.

In order to also consider the opinion of the public at large, the Commission conducted a public online consultation[1] between August and October 2017. Overall, 23 replies from 13 EU countries were received. Of these, 3 were from private citizens, 2 from NGOs, 1 from the unions, 5 from industry associations, 2 from companies (of which one is an oil spill response organisation) and 10 from governmental organisations (this included 4 from different ministries of 1 country). More details on the outcome of this survey can be found in Annex 6 of this report.

One limitation has been the lack of data and evidence regarding the socioeconomic, ecological and financial implications of the Agency's response preparedness relating to marine pollution caused by ships and oil and gas installations, an analysis that was requested by the co-legislator.

Another limitation of this evaluation relates to the low response rate of the open public consultation and consequent lack of input from stakeholders beyond national administrations. The latter are however the main stakeholders as beneficiary of the Agency's assistance and they were consulted extensively both by Ramboll and EMSA. Some still responded to the open public consultation.

[1] https://ec.europa.eu/info/consultations/public-consultation-evaluation-european-maritime-safety-agency-including-its-pollution-response-services_en

APPENDIX 2: STAKEHOLDERS CONSULTATION

1. Methodology

The goal of the consultation was to collect views and opinions on the scope of Regulation (EU) No 911/2014, including the tasks assigned to EMSA and the financial envelope associated to these tasks.

The initial roadmap was published from 3 to 31 of March 2017 and no feedback was received.

In order to prepare this report, a consultation strategy was drafted. The consultation activities included an online survey of EMSA stakeholders in the maritime administrations of coastal EU/EFTA Member States and an open public consultation that was held between August and October 2017 covering the five evaluation criteria and addressing non-technical issues to ensure that non-organised interests (like any interested citizen) were consulted.

In addition, further evidence was gathered through the external study contracted by EMSA on the Cost effectiveness and cost-efficiency of EMSA's network of oil pollution response vessels and Equipment Assistance Service. This external study also included telephone interviews with EMSA stakeholders.

2. Results of the consultations

a) EMSA online targeted consultation

EMSA consulted the EU/EFTA coastal Member States as the main stakeholders of the Agency. In thirty-three questions, the Member States were given the opportunity to provide feedback on the Agency activities by subject. Scores between 1 (very poor) and 5 (very good) allowed an assessment of the level of satisfaction. In addition to the numeric scores, each question invited written comments. A total of 23 individual sets of answers were received from 19 out of 23 EU coastal Member States and EFTA countries Iceland and Norway.

The targeted consultation attested the Agency positive marks on its pollution response services. The overall average score was 3.7. The best scores were given to the CleanSeaNet service. High marks were also awarded to the Agency's activities with regard to information materials including the EU Claims Management Guidelines. Lower scores (although still above the medium value) were given to the oil spill dispersant related activities. Here one must remember that not all EU countries consider dispersants an important response option. In fact, the riparian countries of the Baltic Sea for instance have decided to only consider dispersants as a last response option.

Numeric results of EMSA's online targeted consultation:

- Best score (4.3) for CleanSeaNet
- Vessel Network: 3.6
- EAS: 3.5
- MAR-ICE: 3.8
- Cooperation and Information: 3.7
- Information material such as Inventories, 4.0
- Claims Management: 4.0
- Dispersants (stockpiles and seaborne systems) 3.2

More details of the outcome of the targeted consultation are presented in Annex 5 and in the Ramboll study (Annex 7).

b) Open public online consultation

The Commission conducted an online consultation on all EMSA activities between August and October 2017. In addition to general questions about the responders and their affiliation, 48 questions related to anti-pollution measures on seven subjects (such as the vessel network, EAS, CSN, HNS, etc.) were asked. All subject categories allowed for free text comments in addition to a selection of pre-defined answers.

The scope of the open public consultation covered the public perception on:

(1) the relevance of EMSA's measures to respond to pollution and whether these measures address current pollution risks and pollution response needs.

(2) the effectiveness of EMSA's measures to respond to pollution and how effective was the use by EMSA of the Union contribution.

(3) the efficiency of EMSA's measures to respond to pollution and of the use by EMSA of the Union contribution and whether the costs were proportionate to the benefits.

(4) the coherence of EMSA's measures to respond to pollution with other EU interventions means such as ECHO's civil protection mechanism.

(5) the EU added value of EMSA's measures to respond to pollution compared to interventions at regional (in particular those of regional agreements and organisation) or national levels by public authorities or the private sector.

Overall, 23 replies from 13 EU countries were received. Of these, 3 were from private citizens, 2 from NGOs, 1 from the Unions, 5 from industry associations, 2 from companies (of which one is an oil spill response organisation) and 10 from governmental organisations (this included 4 from different ministries of 1 country).

This rather small sample (of only 23 replies) cannot be seen as representative of the public opinion regarding EMSA and its anti-pollution measures. The 3 responses from citizens do not provide much information as the responders introduced themselves as “not familiar with the work of the agency” and their comments are not on the subject matter (i.e.: complaints that EMSA does not address marine noise pollution).

However the public consultation allowed reaching out to other interested stakeholders than the Member States and even for the latter other national departments replied which gives a complementary viewpoint to the views expressed through the EMSA online targeted consultation.

Even if the sample is very small and therefore cannot provide strong evidence of a general satisfaction or dissatisfaction regarding EMSA services, the replies are quite informative.

Overall respondents are generally positive about EMSA contribution to adequate preparedness and response to marine pollution from ships. The positive contribution regarding an adequate preparedness and response to marine pollution from oil and gas installations gets lower scores which could be explained by lack of awareness and the relatively recent nature of this activity. The same can be said for the Equipment Assistance Service relatively recent as well. On the other hand the network of vessels is viewed as adequate and well equipped by a majority of respondents.

CleanSeaNet is generally perceived as very useful for marine pollution detection and the deterrent effect with regard to illegal discharges is confirmed by a majority of respondents. Finally regarding EMSA activities for chemical spill response, respondents consider that EMSA could do more by helping Member States to develop their capacity.

A full analysis of the results is presented in annex 6.

c) External Study on the Cost Effectiveness and Cost Efficiency of EMSA's Oil Pollution Response Services – targeted consultations

The study conducted by EMSA's contractor Ramboll has a more limited scope than the present evaluation. It contains an assessment of the cost effectiveness and cost efficiency of the EMSA's Oil Pollution Response Services, comprising the network of contracted standby oil spill response vessels, the stockpiles of specialised oil pollution response equipment, and the stockpiles of oil spill dispersants.

The findings of the study rely on the assessment of evidence based on triangulated data collected from a range of different sources, including internal and external documentation, a targeted stakeholder consultation conducted by EMSA consisting of a survey administered to Member States (referred under (a)), plus interviews with key stakeholders conducted by Ramboll. In addition, industry and cost data provided by shipyards and shipbrokers were collected and expert assessments were provided by oil pollution response experts subcontracted by Ramboll.

In telephone interviews with relevant stakeholders of EMSA's services, questions were asked to assess EMSA's oil pollution response services and to compare EMSA's capabilities with that of Member States. Countries that had not responded to EMSA's online survey were asked additional questions in line with the EMSA consultation. Additionally, third countries that may also utilise EMSA's services, but were neither consulted in EMSA's survey nor by DG ECHO, were interviewed as well. Further information regarding these interviews could be found in Annex 7 to this report.

APPENDIX 3: OVERVIEW OF THE VESSEL NETWORK BUILDING ACTIVITIES IN YEARS 2014, 2015, AND 2016

AREA COVERED	CONTRACTOR / CONTRACT	VESSEL / S	VESSEL TYPE / STORAGE CAPACITY (m^3)	SERVICE		
				2014	2015	2016
Northern Baltic	Arctia Icebreaking Ltd VAC 09/NEG/01/2009 Lot 1	*Kontio*	Icebreaker / 2033	✓	✓	Expired on 13/04/2016 Tender launched
Southern Baltic	OW Tankers A/S VAC NEG/01/2011 Lot 1	*OW Copenhagen*	Chemical Tanker / 4450	✓	Terminated [2] 16/04/2015 Tender launched	-
	Stena Oil EMSA/NEG/1/2015 Lot 2	*Norden*	Oil Tanker / 2880	-	-	Replace-ment started on 03/06/2016
Northern North Sea	James Fisher Everard Ltd EMSA/NEG/1/2013 Lot 1	*Mersey Fisher, Thames Fisher*	Product Tankers / 5028 / 5028	New Service started on 14/08/2014	✓	✓
North Sea	DC Industrial S.A. VAC 08/NEG/03/2008 Lot 2	*DC Vlaanderen 3000, Interballast 3*	Hopper Dredgers / 2744 / 1886	✓	Expired on 20/06/2015 Tender launched	-
Channel and Southern North Sea	DC Industrial S.A. 2014/EMSA/NEG/1/2014 Lot 3.1	*Interballast 3*	Hopper Dredger / 1886	-	Replace-ment started on 24/09/2015	✓
	DC Industrial S.A. 2014/EMSA/NEG/1/2014 Lot 3.2	*DC Vlaanderen 3000*	Hopper Dredger / 2744	-	Replace-ment started on 01/10/2015	✓

[2] EMSA terminated the contract due to bankruptcy of the contractor.

Atlantic North	James Fisher Everard Ltd EMSA/NEG /1/2013 Lot 2	*Galway Fisher,* *Forth Fisher*	Product Tankers / 4754 / 4754	Replace-ment started on 13/06/2014	✓	✓
Atlantic Coast	James Fisher Everard Ltd VAC 07-NEG/01/2007 Lot 1	*Forth Fisher,* *Mersey Fisher, Galway Fisher*	Product Tankers / 4754 / 5028 / 4754	Contract expired on 20/04/2014 Tender launched	-	-
	Remolcadores Nossa Terra S.A. EMSA/NEG/1/2014 Lot 1	*Ria de Vigo*	Offshore Supply / 1522	-	Replace-ment started on 12/06/2015	✓
Bay of Biscay	Ibaizabal VAC NEG/01/2012 Lot 3	*Monte Arucas*	Oil tanker / 2952	✓	✓	✓
	Remolcadores Nossa Terra S.A. VAC 08-NEG/07/2008	*Ria de Vigo*	Offshore Supply / 1522	Expired on 31/12/2014 Tender launched	-	-
Southern Atlantic Coast	Mureloil VAC NEG/1/2012 Lot 1	*Bahia Tres*	Oil Tanker / 7413	✓	✓	✓
Canary Islands and Madeira	Petrogas EMSA/NEG/1/2015 Lot 1	*Mencey*	Oil Tanker / 3500	-	-	New Service started on 15/07/2016
Western Mediterranean	Naviera Altube EMSA NEG/1/2011 Lot 4	*Monte Anaga*	Oil Tanker / 4096	✓	✓	Renewed on 20/03/2016
	Ciane EMSA/NEG/34/2012	*Brezzamare*	Oil Tanker / 3288	✓	✓	✓
Central Mediterranean	Tankship EMSA NEG/1/2011 Lot 2	*Balluta Bay*	Oil Tanker /2800	✓	✓	Renewed on 15/05/2016
	SL Ship Management Ltd EMSA NEG/1/2012 Lot	*Santa Maria*	Oil Tanker / 2421	✓	✓	✓

	2					
Adriatic Sea	Castalia EMSA/NEG/1/2013 Lot 4	*Marisa N*	Oil Tanker / 1562	-	New Service started on 16/01/2015	✓
Aegean Sea	Environmental Protection Engineering S.A. VAC 07-NEG/01/2007 Lot 3	*Aktea OSRV* *(Aegis I as a back-up vessel)*	Oil Tanker/ 3000 (Offshore Supply / 950)	Expired on 22/02/2014 Tender launched	-	-
	Environmental Protection Engineering S.A. EMSA/NEG/1/2013 Lot 3	*Aktea OSRV* *(Aegis I as a back-up vessel)*	Oil Tanker / 3000 Offshore Supply / 950	Replace-ment started on 13/03/2014 Aegis I - 22/05/2014	✓	✓
Eastern Mediterranean	Petronav EMSA NEG/1/2010 Lot 1	*Alexandria*	Oil Tanker / 7458	✓	Renewed on 05/05/2015	✓
Black Sea	Bon Marine Ltd EMSA NEG/1/2011 Lot 5	*Enterprise*	Oil Tanker / 1374	✓	✓	Expired on 20/09/2016 Tender launched
	Grup Servicii Petroliere VAC 08-NEG/03/2008 Lot 1	*GSP Orion*	Offshore Supply / 1334	Expired on 31/12/2014 Tender launched	-	-
Northern Black Sea	Petronav EMSA/NEG/1/2014 Lot 2	*Amalthia*	Oil Tanker / 5154	-	Replace-ment started on 21/08/2015	✓

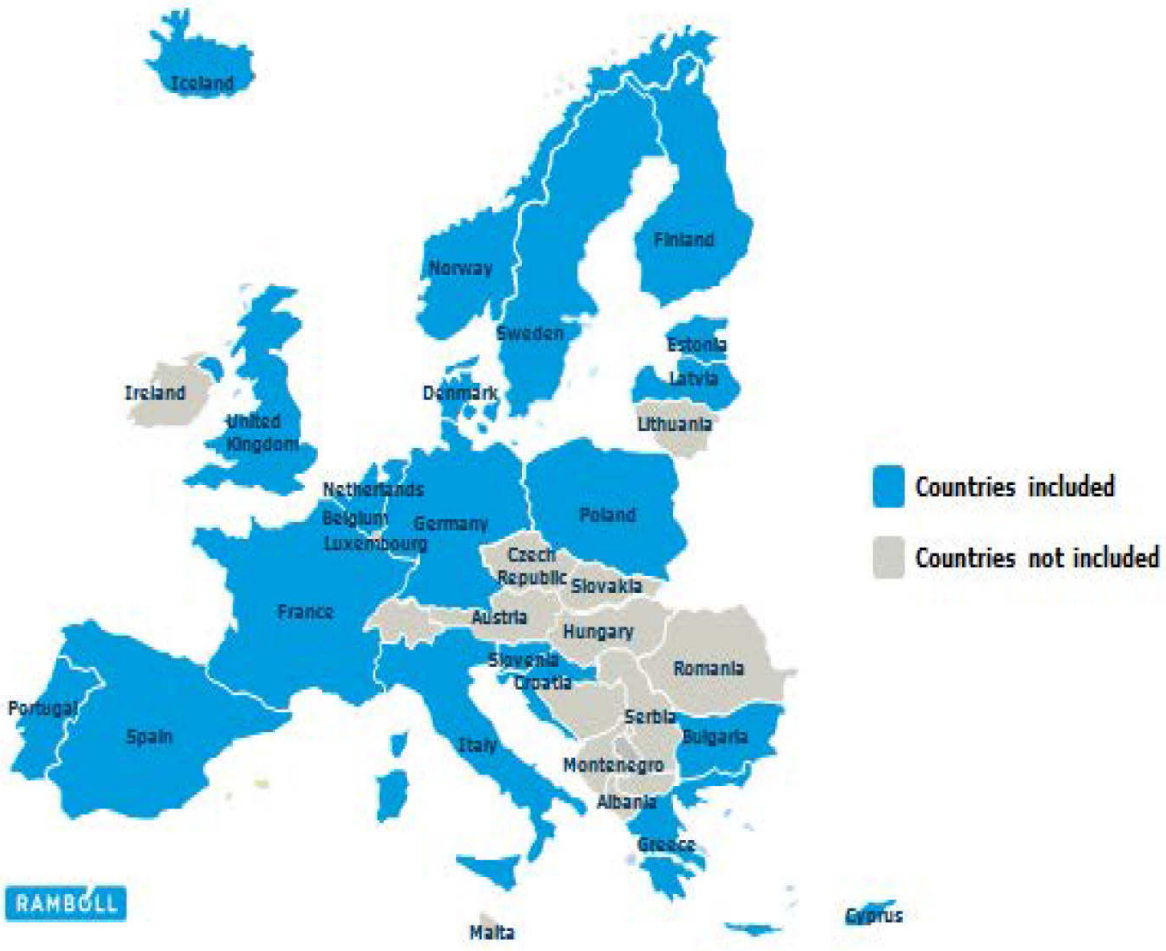
APPENDIX 4: INTERNATIONAL EXERCISES WITH EMSA VESSELS PARTICIPATION IN YEARS 2014 – 2016

N°	Name	Date	Location	Participating Parties	EMSA vessel/s
2014					
1	**OIL IN ICE**	27/03/2014	Kotka, Finland	Finland, EMSA	*Kontio (arctic skimmer)*
2	**NEMESIS, CYPRUS**	10/04/2014	Cyprus	Cyprus, Israel, Greece, USA, EMSA	*Alexandria*
3	**BALEX DELTA 2014**	11/06/2014	Ventspils, Latvia	Denmark, Estonia, Finland, Latvia, Lithuania, Poland, Sweden and EMSA	*OW Copenhagen*
4	**GALICIA 2014**	18/06/2014	Ria de Arousa, Spain	Spain, EMSA	*Ria de Vigo*
5	**ORSEC BISCAYE 33**	19/06/2014	Arcachon, France	France, EMSA	*Monte Arucas*
6	**MALTEX 2014**	03/09/2014	Valetta, Malta	Malta, EMSA	*Santa Maria, Balluta Bay*
7	**RAMOGEPOL**	17/09/2014	Elba Island, Italy	Italy, France, Spain, Monaco, EMSA	*Brezzamare*
8	**MASTIA 2014**	25/09/2014	Cartagena Roads, Spain	Spain, EMSA	*Monte Anaga*
9	**MANCHEX 2014**	30/09/2014	Calais, France	France, EMSA	*Thames Fisher*
10	**POLLEX 2014**	02/10/2014	Vlakte van de Raan, The Netherlands	The Netherlands, Belgium, EMSA	*DC Vlaanderen 3000, Interballast 3*
2015					
1	**SAFEMED III**	21-23 April 2015	Bilbao, Spain	EMSA, Observers from SAFEMED III beneficiary countries	*Monte Arucas*
2	**POLMAR MER 2015**	12-13 May 2015	Port of Sete, France	France, EMSA	*Brezzamare*
3	**ANEMONA 2015**	13-14 May 2015	Leixoes, Portugal	Portugal, Spain, EMSA	*Monte Arucas*
4	**ROCHES DOUVRES**	27-28 May 2015	Port Saint Malo, France	France, EMSA	*Forth Fisher*
5	**TRITON 2015**	03 June 2015	Gulf of Elefsis, Greece	Greece, EMSA	*Aktea OSRV, Aegis I*
6	**NEMESIS 2015**	01 July 2015	Limassol, Cyprus	Cyprus, Greece, Israel, USA, EMSA.	*Alexandria*
7	**MALTEX 2015**	2 September 2015	Valetta, Malta	Malta, EMSA	*Balluta Bay, Santa Maria*
8	**POLEX 2015**	2 September	Ostend, Belgium	Belgium, The Netherlands, EMSA	*Mersey Fisher*

		2015			
9	**OPEN SHIP**	23 September 2015	Helsinki, Finland	Finland, EMSA	*Kontio*
2016					
1	**RAMOGEPOL**	27 April 2016	Monaco	Monaco, France, Italy, Spain, EMSA	*Brezzamare*
2	**SIMULEX**	25-27 April 2016	Nador, Morocco	Safemed III participants, Morocco, EMSA	*Monte Anaga*
3	**POLMAR**	11 May 2016	Le Havre,France	France, EMSA	*Interballast III*
4	**GASCOGNE**	25 May 2016	Golfe of Gascogne, France	France, EMSA	*Monte Arucas*
5	**TRACECA II**	15-16 June 2016	Constanta, Romania	TRACECA II beneficiary Countries, Romania, EMSA	*Amalthia*
6	**BREEZE**	15 July 2016	Burgas Bay,Bulgaria	Bulgaria, Romania Turkey, US, EMSA	*Enterprise*
7	**COPENHAGEN AGREEMENT**	20-22 September 2016	Lysekil, Sweden	Parties to the Copenhagen Agreement, Sweden, EMSA	*Norden*
8	**MALTA OPEN SHIP**	4 October 2016	Valetta, Malta	Malta, EMSA	*Balluta Bay*
9	**NEMESIS 2016**	12 October 2016	Limassol, Cyprus	Cyprus, Greece, France, UK, Egypt, US, EMSA	*Alexandria*
10	**ATLANTIC POLEX.PT**	20 October 2016	Portimao, Portugal	Portugal, Spain, EMSA	*Bahia Tres* *Monte Anaga*

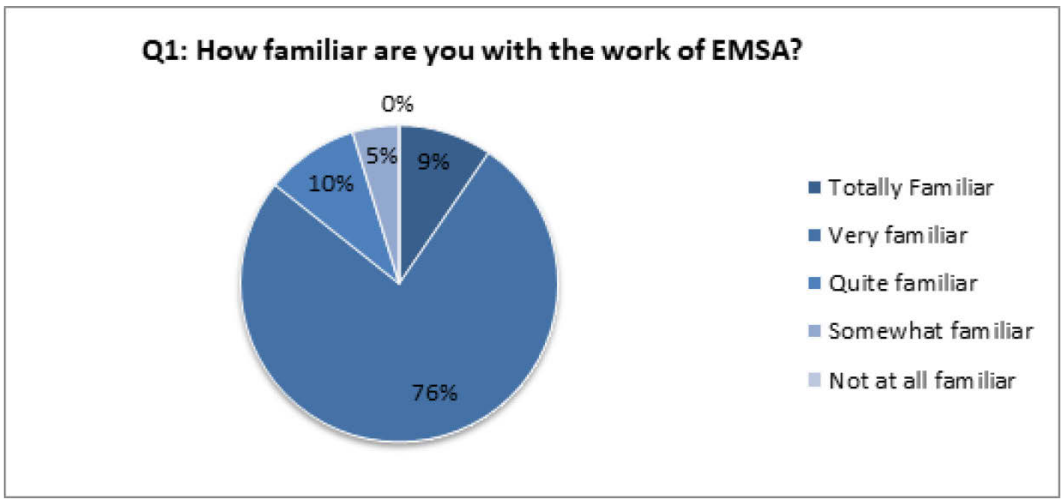
APPENDIX 5: ANALYSIS OF EMSA SURVEY TO MEMBER STATES

The following is an analysis of data from 19 out of 28 MSs, as well as from Iceland and Norway. However, the total of the answers given amounts at 23, since HR and IT gave two answers for each question of the questionnaire.



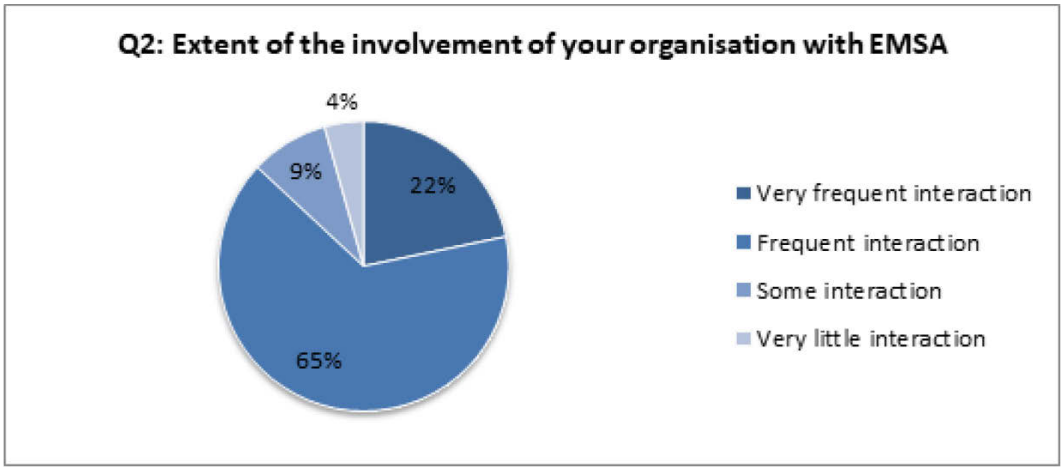
How familiar are you with the work of EMSA?

The majority of the MS (15/21) were very familiar with the work done by EMSA, only one Member State did not have any knowledge of EMSA.



1. **To what extent does the work of your organisation involve interaction with EMSA?**

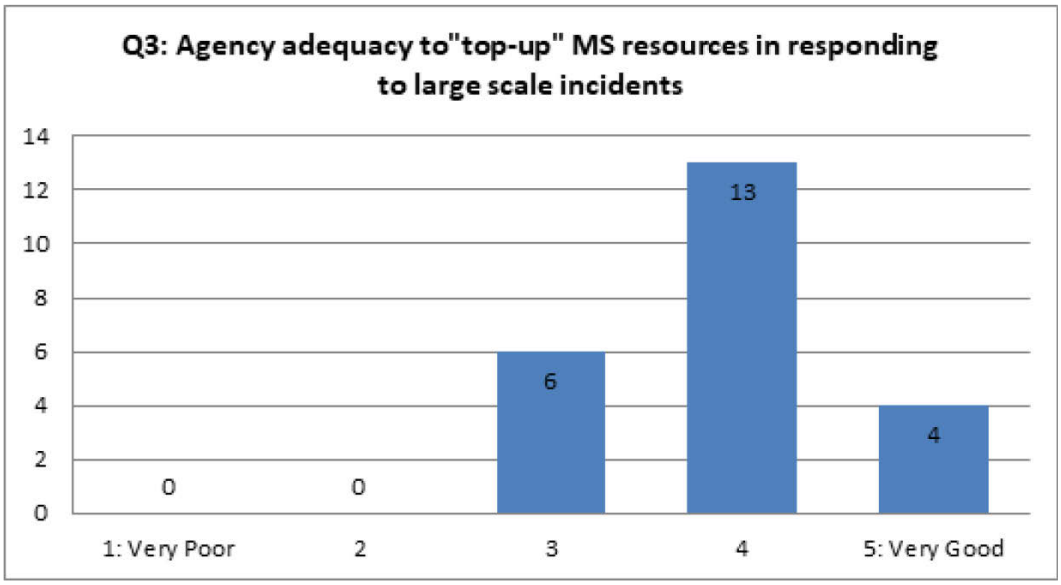
15/21 MS´s respondents had very frequent interaction with EMSA. 5/21 had frequent interaction with EMSA. 2/21had some interaction with the work of EMSA, while one had very little interaction with the Agency.



Given the absence of a European Standard for national response mechanisms and capacities, has the Agency adequately addressed its operational task of "topping-up" Member States resources in responding to large scale incidents?

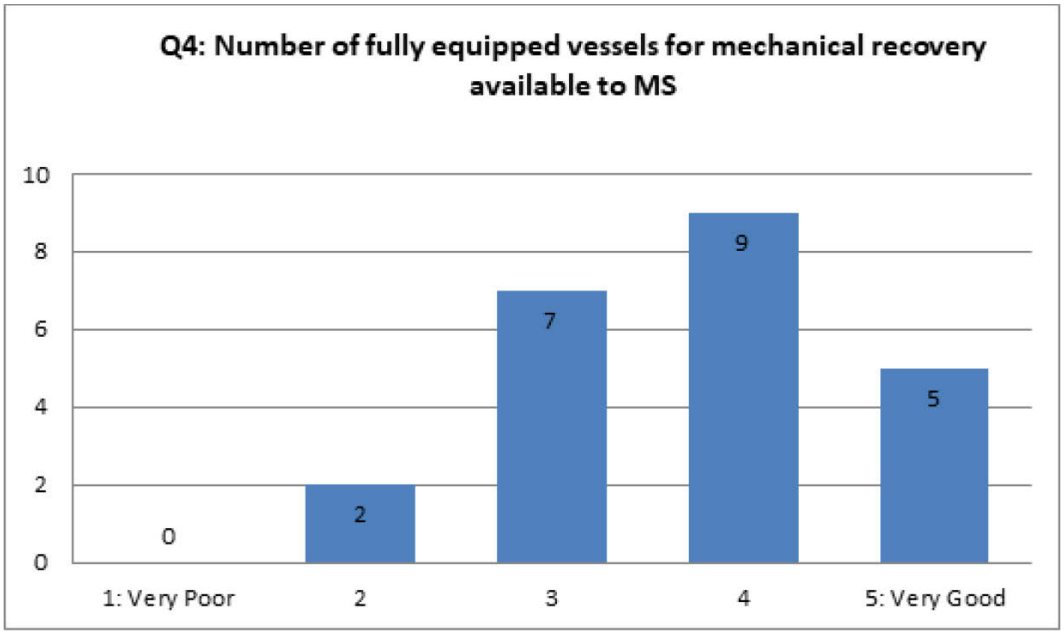
The majority of respondents (11/21) were satisfied with the way the Agency addressed its task of "topping-up" MS resources in responding to large scale incidents (4/5). The reasons for lower degree of satisfaction were:

- The country has never requested assistance from a standby Oil response Vessel;
- The available response capacity should be better taken into account;
- Capacity gaps should be better identified regionally through a new standard method.



2. How do you rate the number of fully equipped vessels for mechanical recovery that are available to the EU Member States?

Generally speaking, MSs consider the number of fully equipped vessels for mechanical recovery between satisfying and very good.

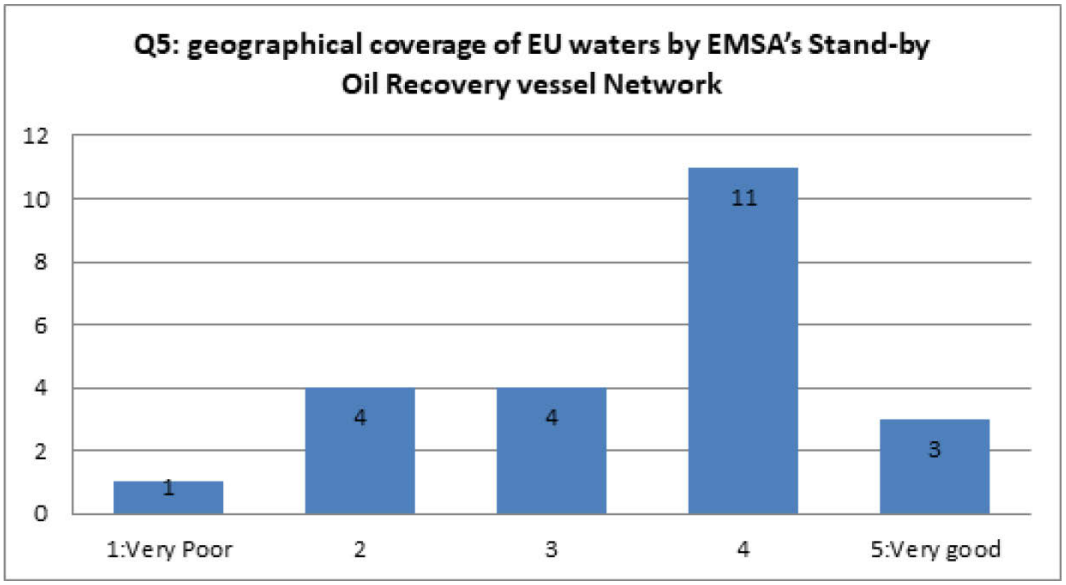


How do you rate the geographical coverage of European waters by EMSA's Stand-by Oil Recovery vessel Network?

Among the Countries that poorly rated this question, some of them pointed out that the location of the EMSA vessels is inadequate, since it is too far to reach the available ships.

On the other hand, some MS find the location of the vessels extremely convenient. Moreover, some question whether the coverage of all EU waters is necessary.

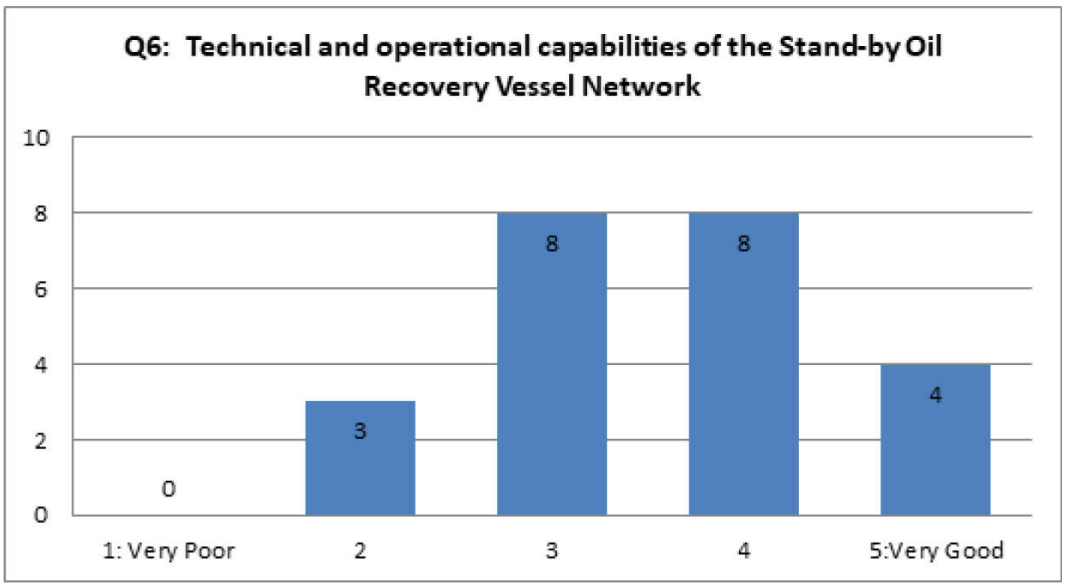
Generally speaking, MS are rather satisfied with the geographical coverage of EU waters.



3. How do you rate the technical and operational capabilities of the EMSA contracted Stand-by Oil Recovery Vessel Network?

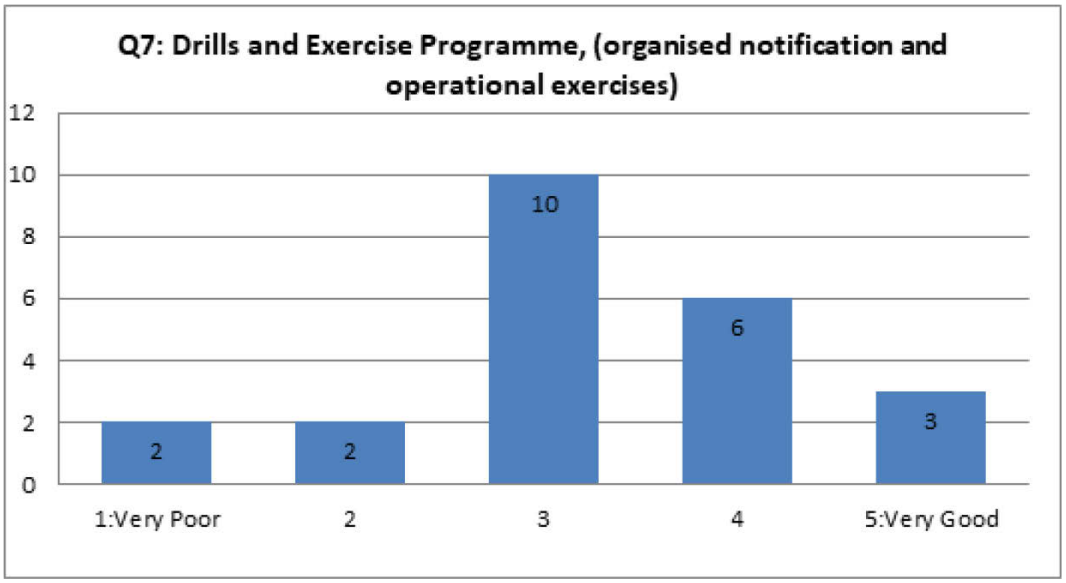
Among the countries which gave the lowest quotations (mark 2 or 3) the given reasons for that were:

- the ships are not fit to operate with flash point below 60° (10/17 vessels are certified for operations with flashpoint below 60°);
- doubts about the capability of the crew (the concerned MSs did not attend any drill or exercise);
- no information on the type of equipment on board was available (all information is available on the website);
- the carrying capacity is quite small (with a minimum storage capacity of 1500M3, EMSA vessels are above the capacity available in the MS inventories).



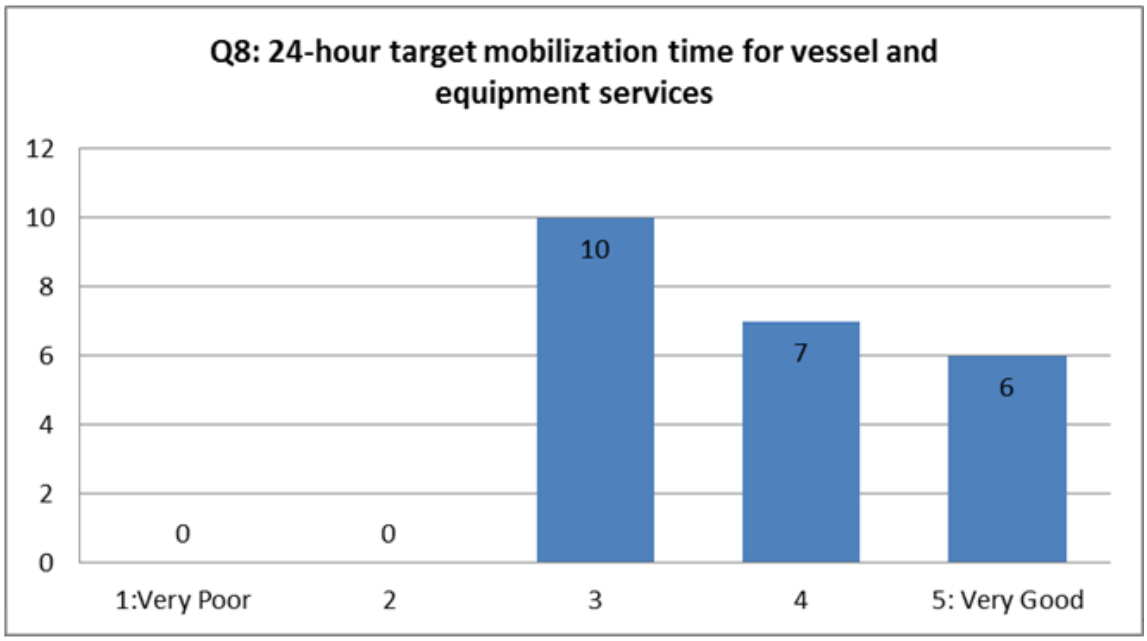
4. How do you rate the EMSA Drills and Exercise Program, and more specifically the notification and operational exercises that EMSA has organized in the given period?

Most of the comments are related to the absence of knowledge about these drills. Several MS rated highly the participation in operational exercises and requested them to be even more frequent.



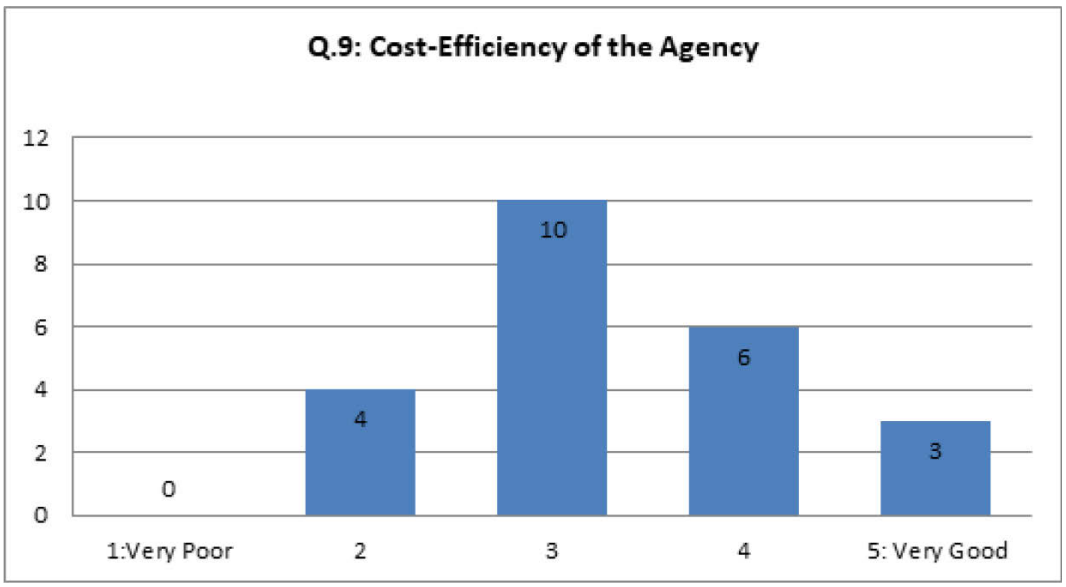
5. **How do you rate the 24-hour target mobilization time for vessel and equipment services as of 2016?**

Overall the comments were positive, taking into account in particular that EMSA assets are top-up means and are not supposed to be the first response means on site.



6. **How cost-efficient do you consider that the Agency been in implementing its operational tasks in the field of response to ship-sourced pollution and pollution from oil and gas installations?**

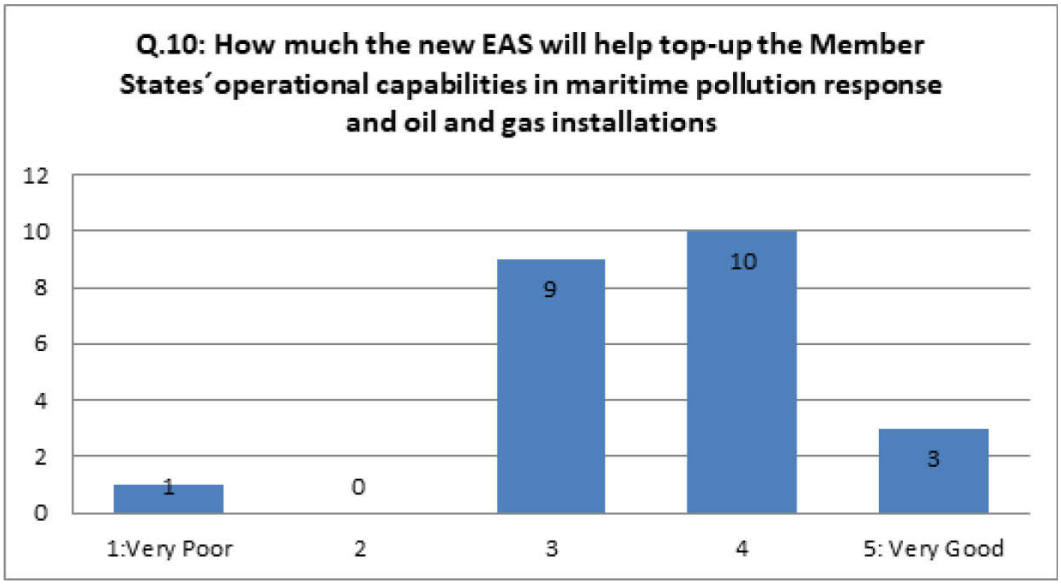
The replies are divided mainly for the reason that it is difficult to appreciate.



7. **To what extent do you consider that the newly established Equipment Assistance Service (EAS) will help top-up the Member States' operational**

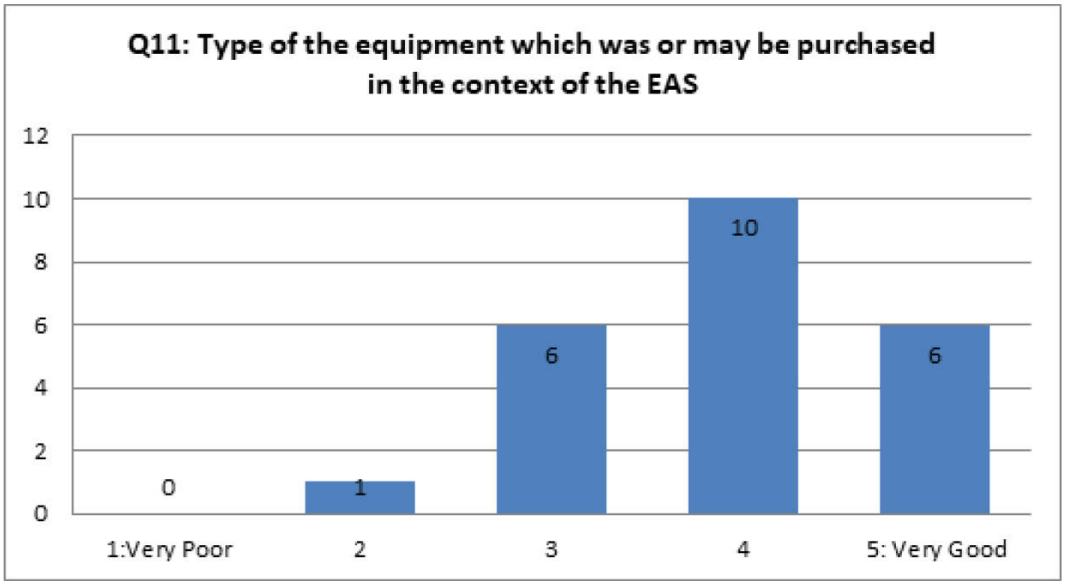
capabilities in the field of response to marine pollution from ships and also oil and gas installations?

Generally speaking EAS is considered useful, but some comments on the fact that equipment is already shared at regional level.



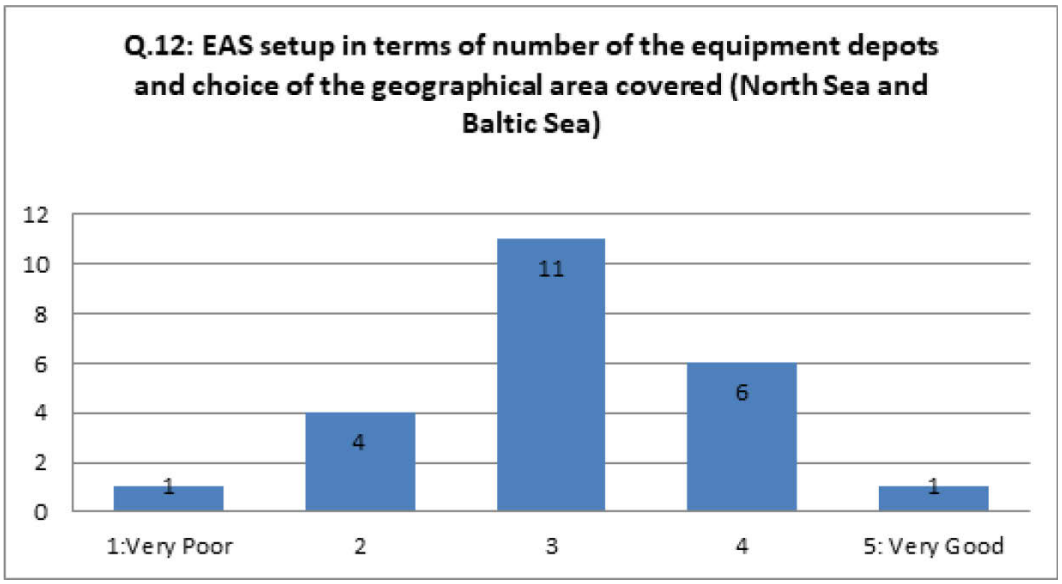
8. How do you rate the type of the equipment, as well as its technical characteristics, which was or may in the future be purchased in the context of the EAS? (e.g. fire booms, high speed containment, decanting and recovery systems, integrated containment and recovery system, oil trawl nets).

MSs were widely satisfied with the type of equipment that has been or will be purchased in the context of EAS, especially if it complements the types already available in MS stockpiles.



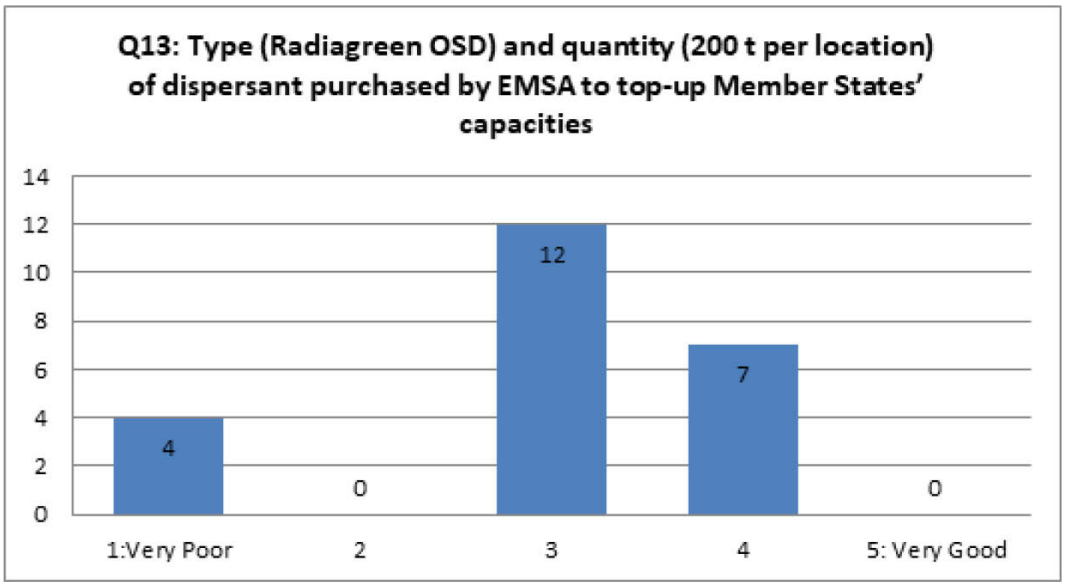
9. How do you evaluate the EAS setup in terms of the number of the equipment depots, as well as the choice of the geographical area that they currently cover (North Sea and Baltic Sea)?

There is a more diverse appreciation regarding the location and also the number, the comments go towards a better coverage with more depots where there is a need.



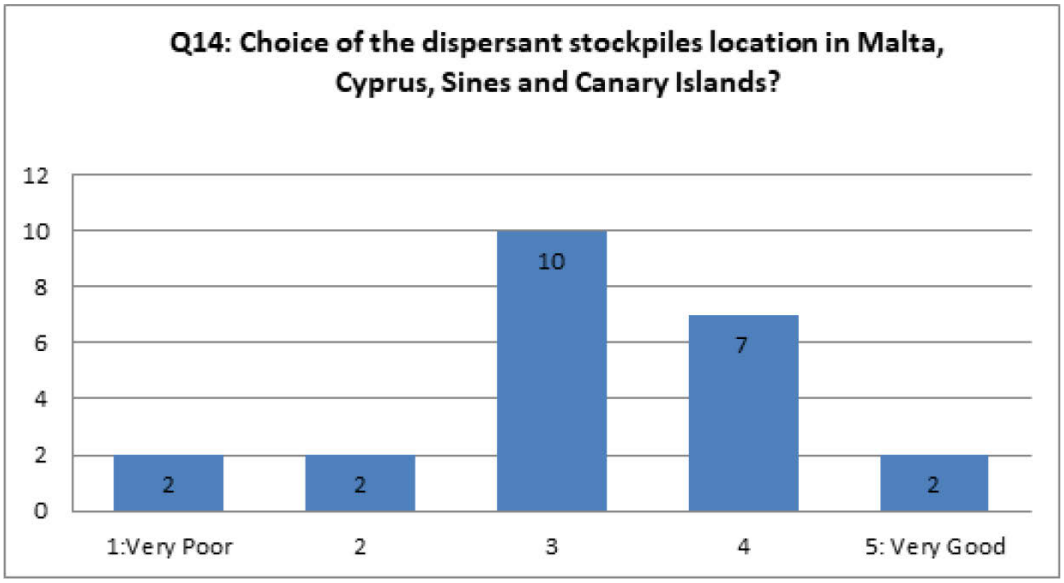
10. How do you rate the type (Radiagreen OSD) and quantity (200 t per location) of dispersant that EMSA has purchased to top-up Member States' capacities?

The lowest quotations are given by countries which do not use dispersant, other MS not also using dispersant gave the mid mark as a neutral position. Several comments were made regarding the fact that this particular product is not in the list of approved products from several MS.



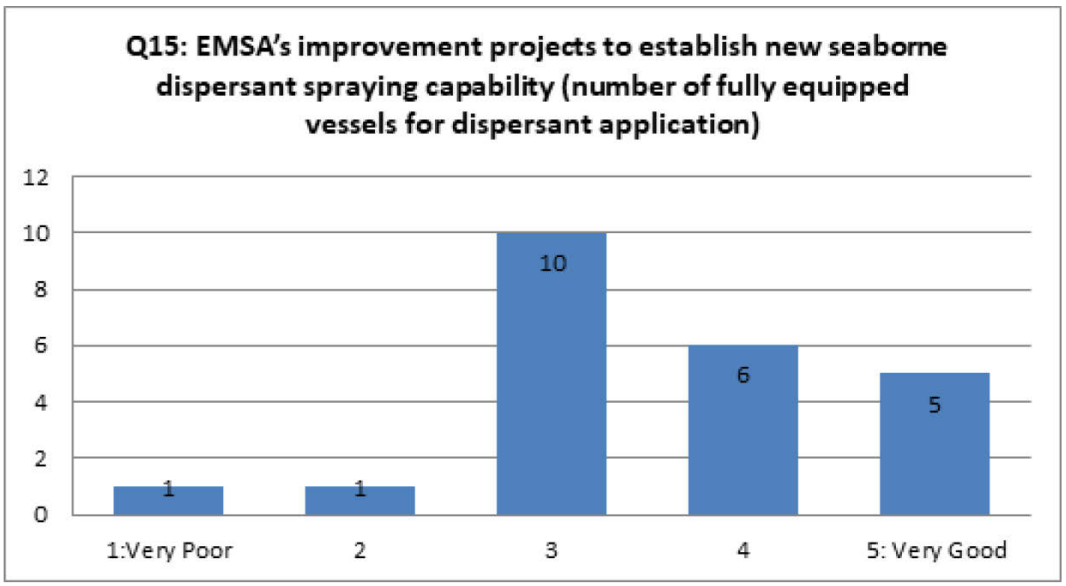
11. How do you rate the choice of the dispersant stockpiles location in Malta, Cyprus, Sines (Portugal) and Canary Islands (Spain)?

The comments reflect the national policies on the use of dispersant as well as the appreciation of the respondent regarding the accessibility to the stockpile for his country.



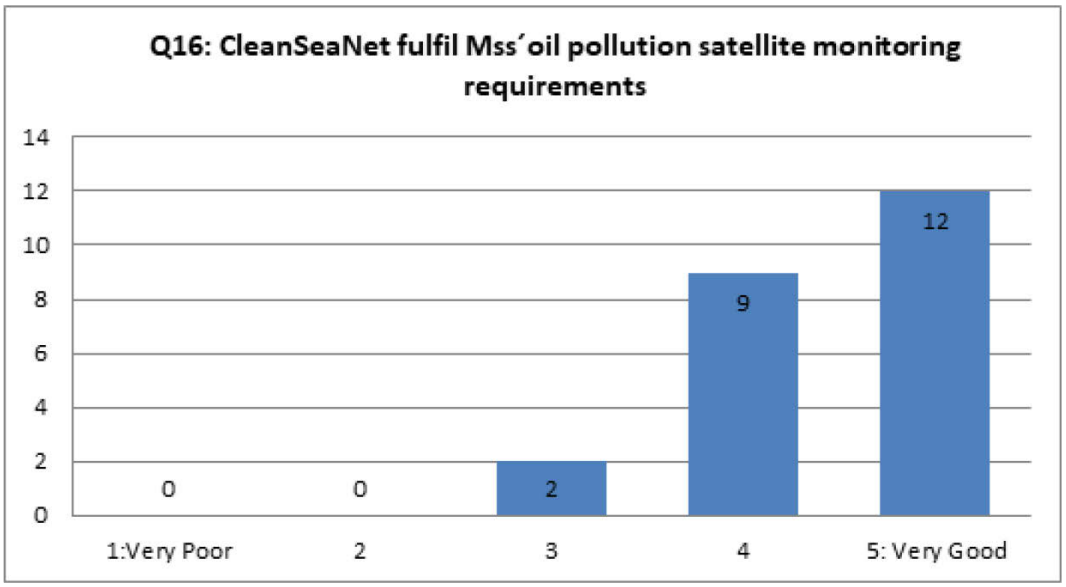
12. How do you rate EMSA's improvement projects to establish new seaborne dispersant spraying capability, and in particular the number of fully equipped vessels for dispersant application?

These improvements projects are rather well received but several comments were made on the need to try and secure an airborne capacity.

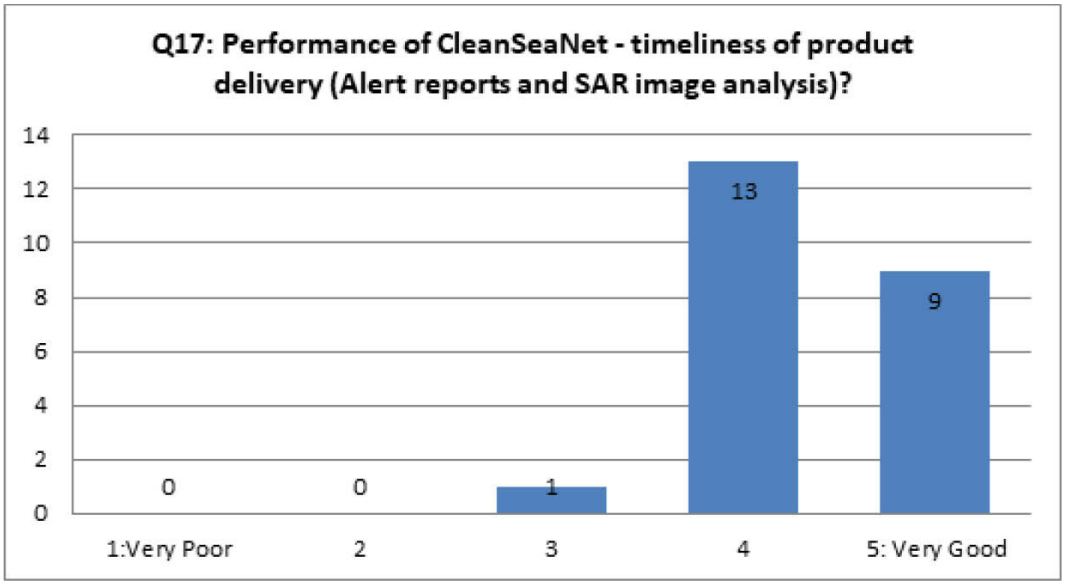


13. To what extent does the CleanSeaNet service fulfil your oil pollution satellite monitoring requirements?

MSs have all a positive experience with CleanSeaNet, since it is considered a useful, unique and valuable service by many of them.

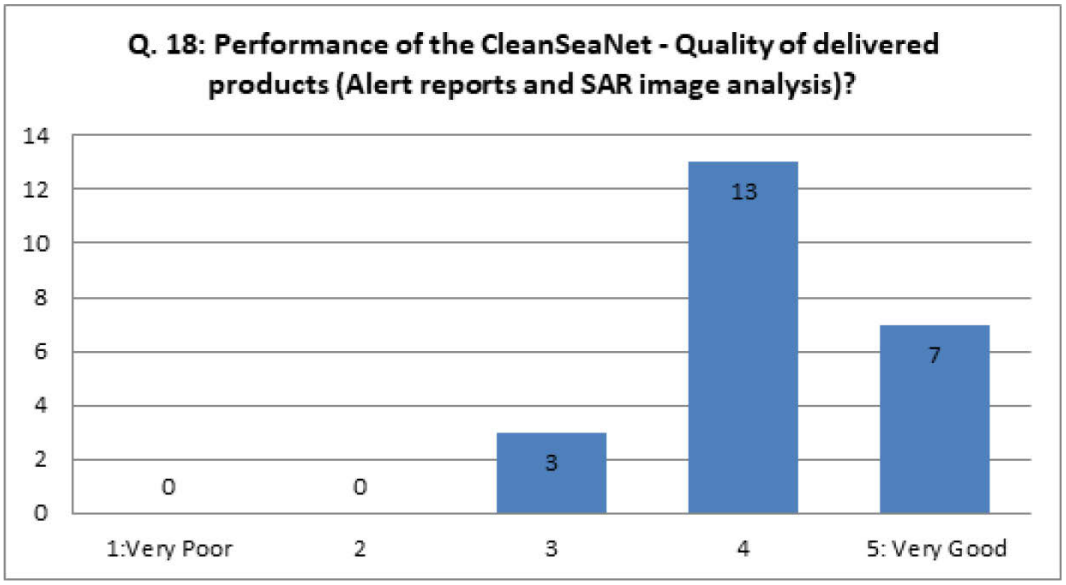


14. How would you assess the performance of the CleanSeaNet service, in terms of timeliness of product delivery (Alert reports and SAR image analysis)?



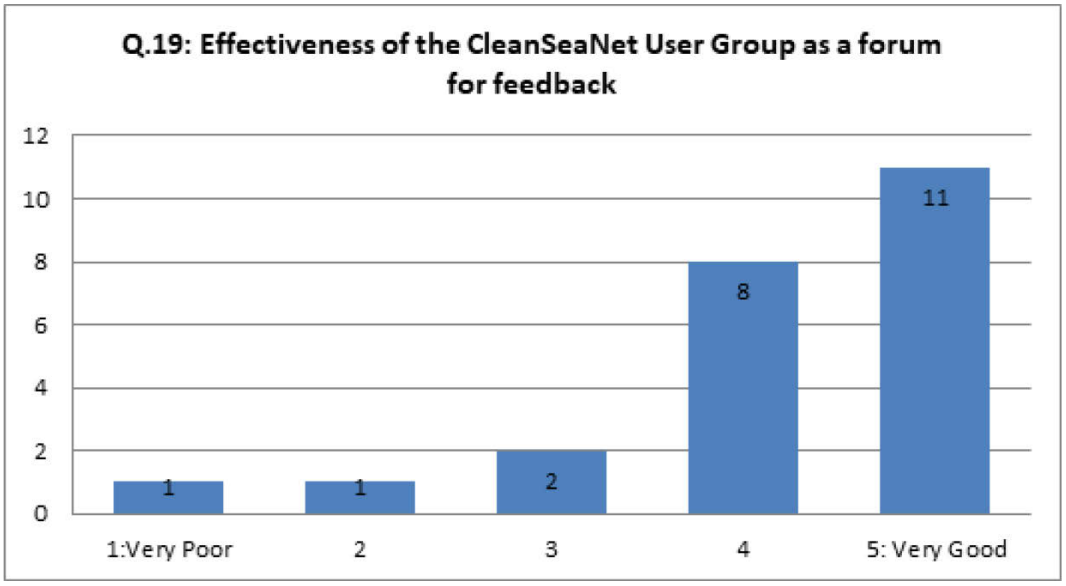
15. How would you assess the performance of the CleanSeaNet service, in terms of quality of delivered products (Alert reports and SAR image analysis)?

The quality is overall positively assessed, the limitation being the difficulty to discriminate between oil spills and natural phenomena.



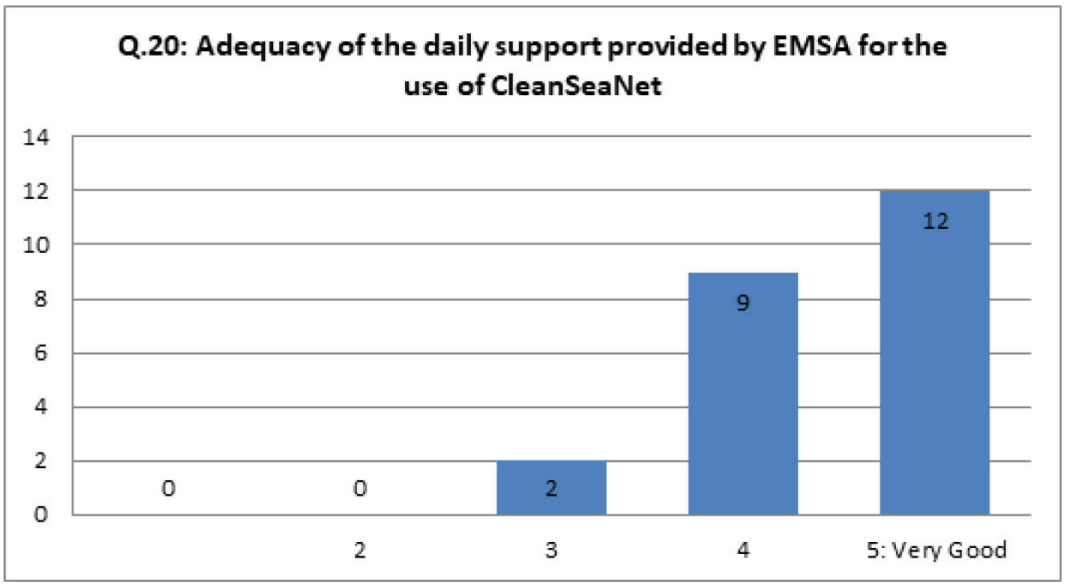
16. How would you assess the effectiveness of the CleanSeaNet User Group as a forum for feedback (e.g. did you have the opportunity to present your views, to benefit from other Member States experience and to contribute to the improvement of the service)?

On the overall, the User Group is considered very effective, since it provides for an opportunity to share experience, meet CSN system developers and discuss with MS representatives the efficiency of this service, as well as present real case studies.



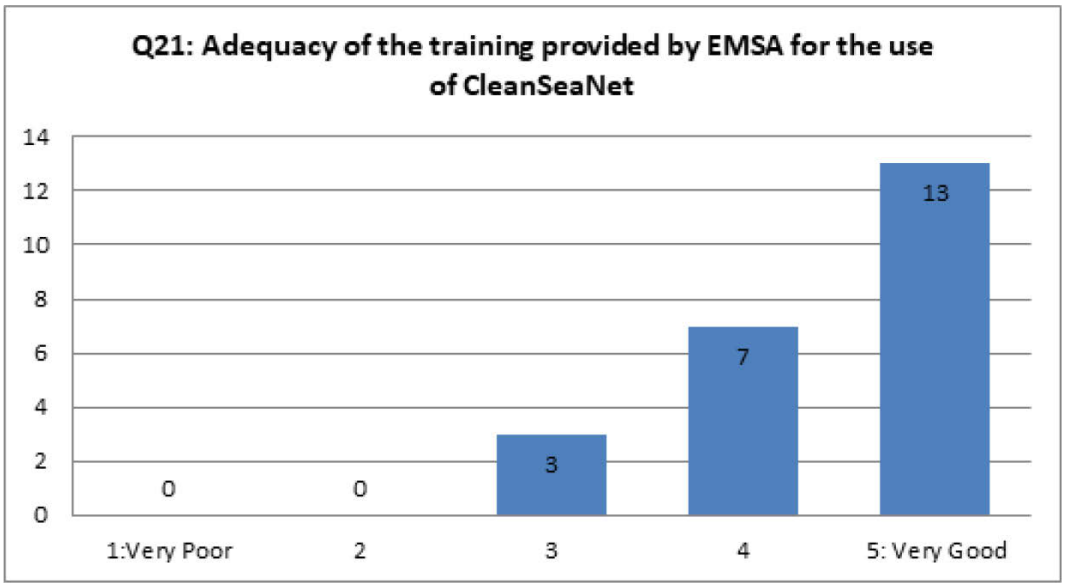
17. How adequate was daily support provided by EMSA for the use of CleanSeaNet in your operational activities?

Generally well rated.



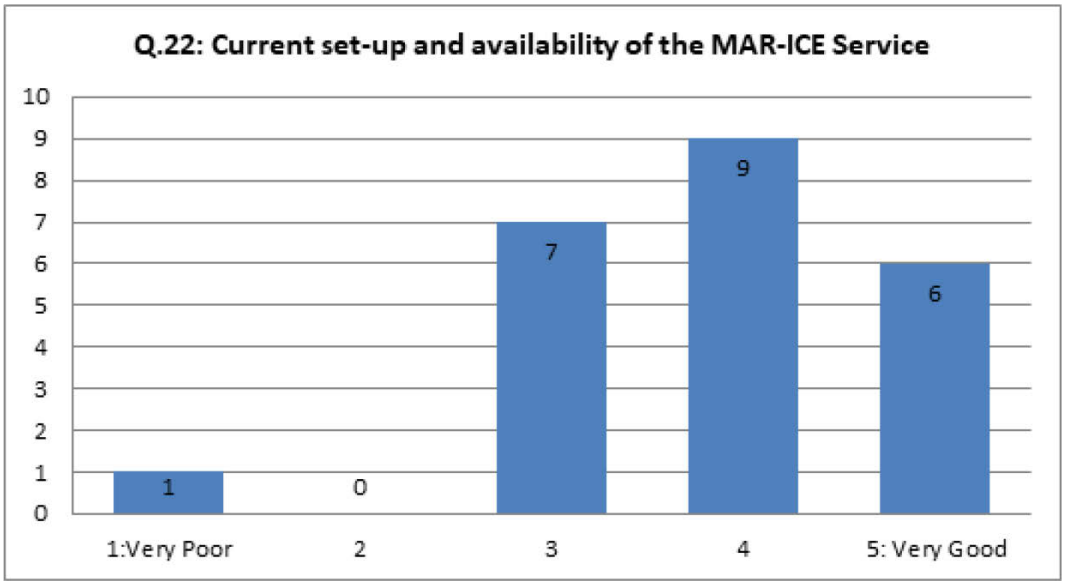
18. How adequate was the training provided by EMSA for the use of CleanSeaNet in your operational activities?

The Trainings have been positively evaluated by all MS. The only remarks were about duration – since they should be done more frequently and last at least 2 days (– and contents – which should be more practical and based on real case scenarios.



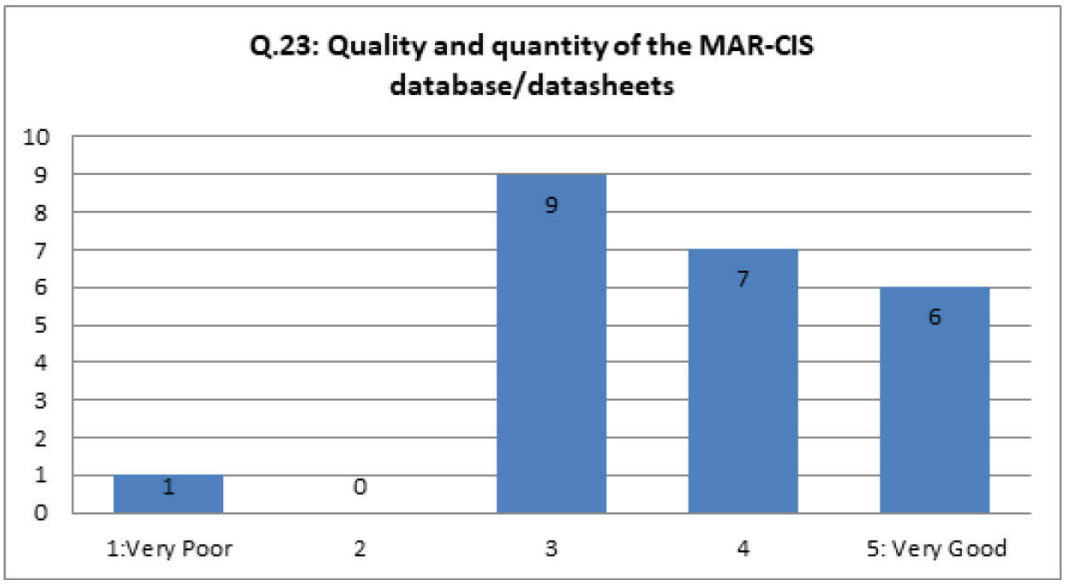
19. How do you rate the current set-up and availability of the MAR-ICE Service?

Generally speaking, although this service has not been largely used, MSs consider it to be valuable.



20. How do you assess the quality and quantity of the MAR-CIS database/datasheets?

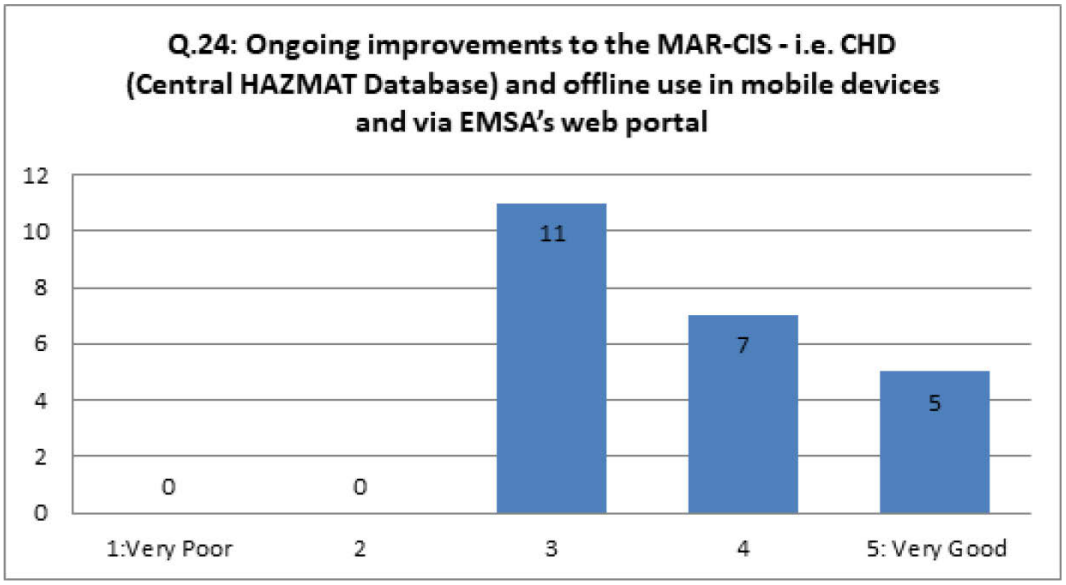
Most of the "3" marks were given by MS which didn't use the system. Those who actually used it gave higher marks.



21. How do you assess the ongoing improvements to the MAR-CIS, such as the creation of links to the new CHD (Central HAZMAT Database) application in

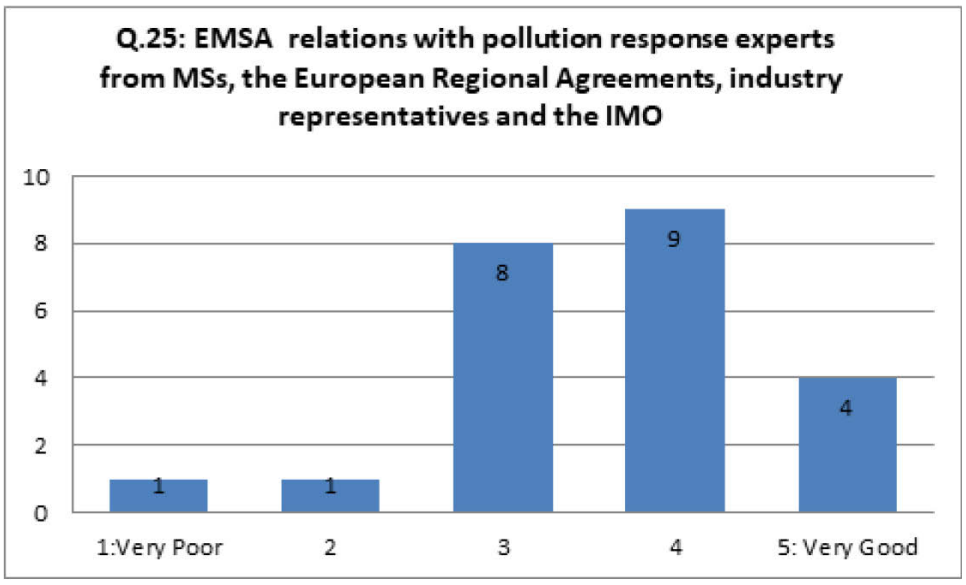
SafeSeaNet and the possibility of offline use in mobile devices and via EMSA's web portal?

Half of the respondents were not aware of these developments, the other welcome them as particularly relevant for assistance in an emergency.



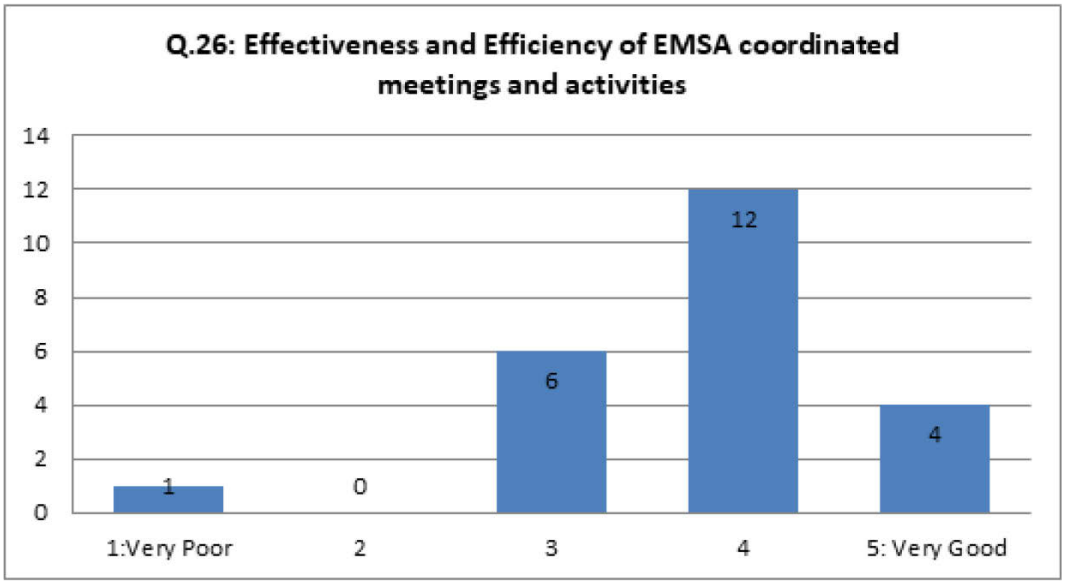
22. To which extent has EMSA (within the framework of its three Action Plans) developed relations with pollution response experts from Member States, the European Regional Agreements, industry representatives (e.g. oil spill associations and chemical industry) and the International Maritime Organisation? Please provide examples of successful cooperation.

Generally speaking, MS are satisfied with the extent to which EMSA has developed relations with pollution response experts from MS and other stakeholders. Some MS noticed that there have been large improvements in this sector over the last few years and consider these relations largely successful. However some MS noted that there should be stronger interaction with the industry.



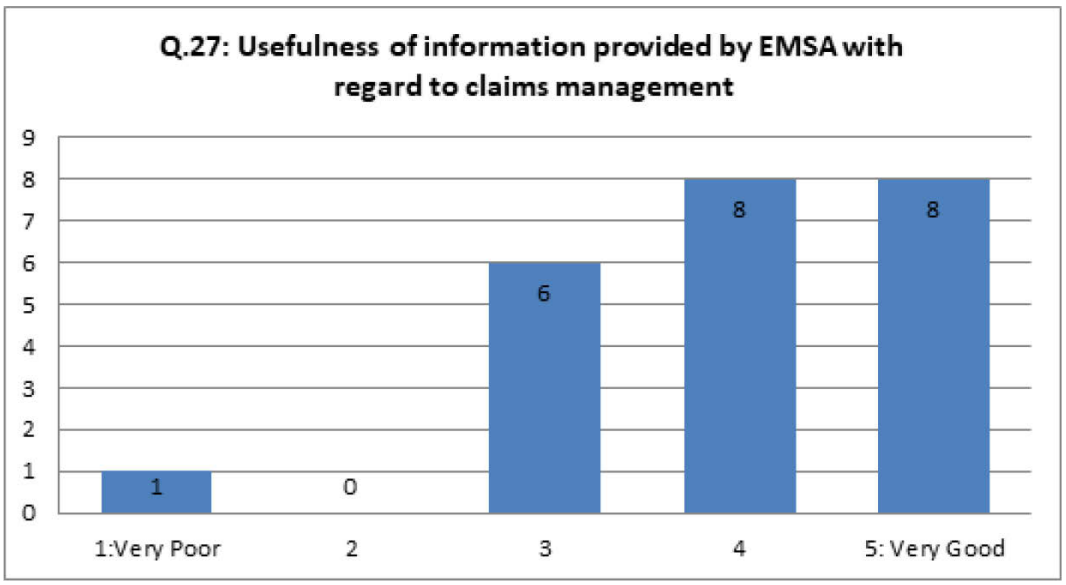
23. How effective and efficient do you consider the EMSA coordinated meetings and activities, such as the CTG MPPR, the Vessel User Group, Empollex, TCG Dispersants, other workshops?

There is generally appreciation of these meetings and activities although some mentioned that the meetings are too numerous and too short in duration to really maximize the benefit of meeting with the experts from the other MS**.**



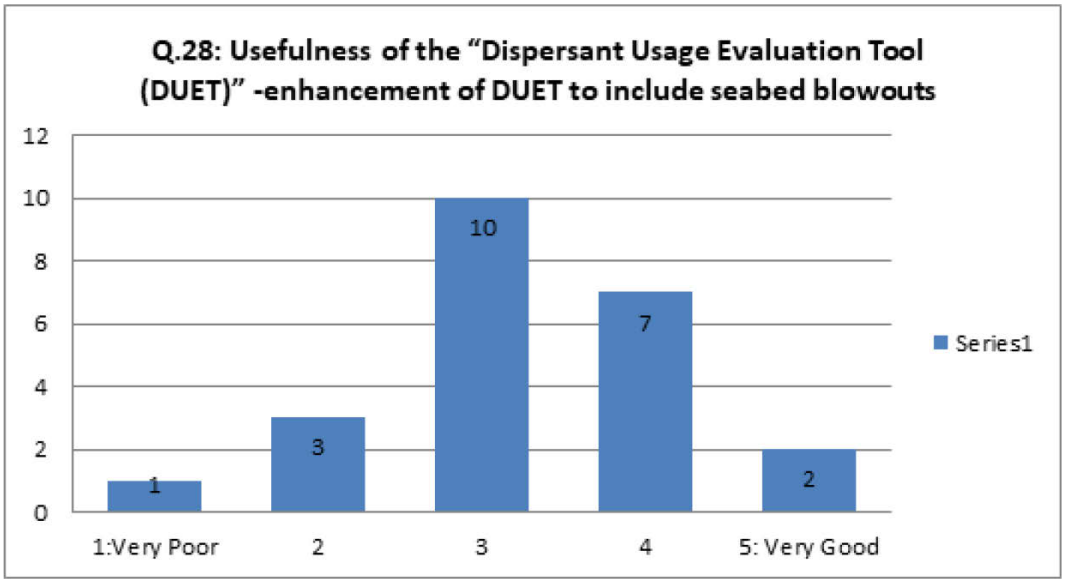
24. How useful do you consider the provision of information provided by EMSA with regard to claims management, including the "EU States Claims Management Guidelines"?

Generally the information provided by EMSA with regard to claims management is considered to be useful.



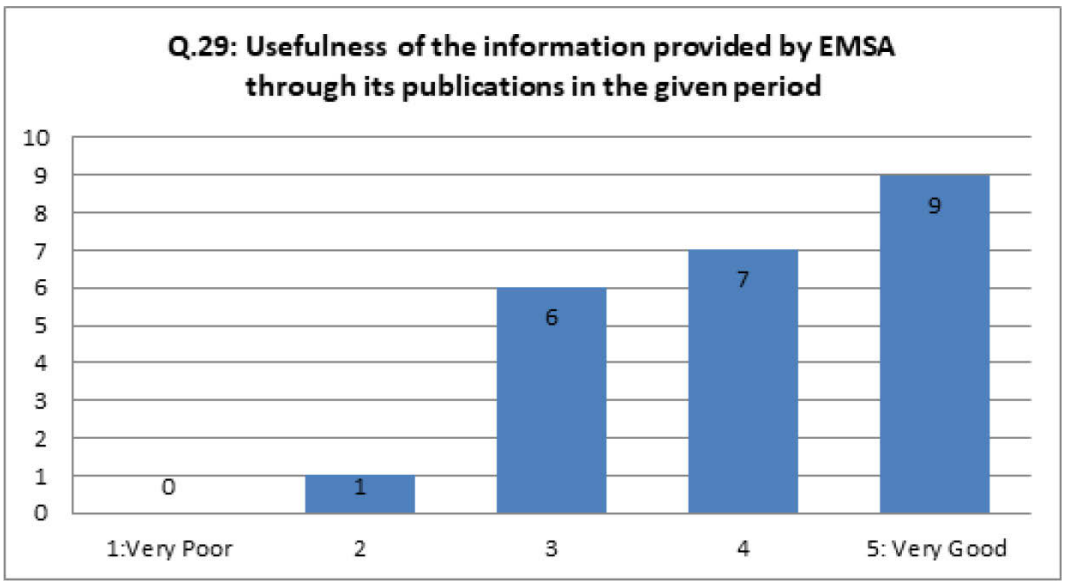
25. How useful do you consider the "Dispersant Usage Evaluation Tool (DUET)", and in particular the enhancement of DUET in order for it to include seabed blowouts?

The answer reflects the fact that many countries do not consider the use of dispersant, some considered the toll as being too theoretical, others welcome it.



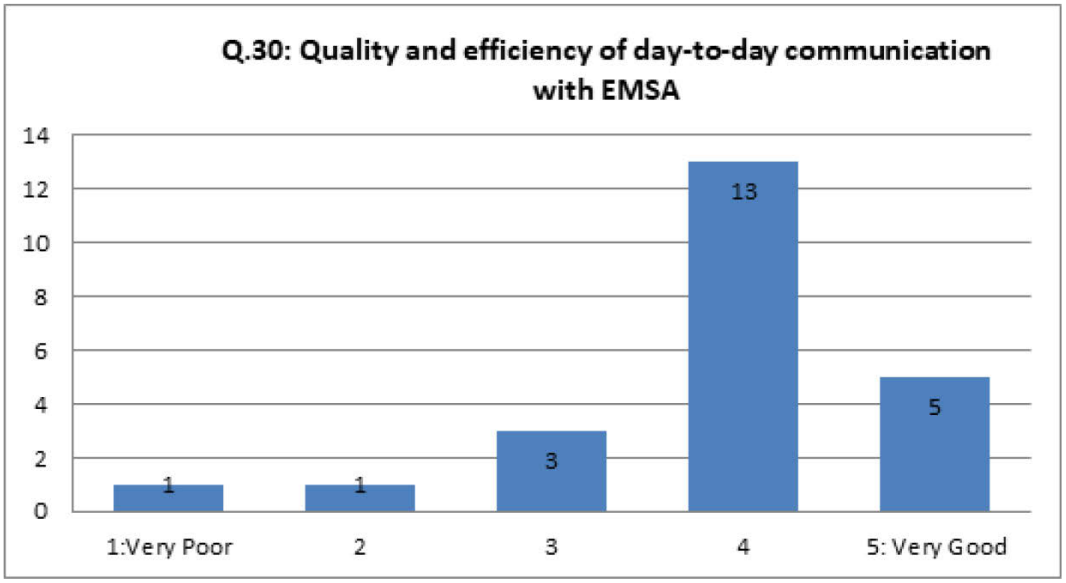
26. How useful do you consider the provision of information provided by EMSA though its publications in the given period? (e.g. the Inventory of national policies regarding the use of oil spill dispersants in the EU, and the Handbook for the Network of Stand-by Oil Spill Response Vessels and Equipment)

Generally the provision of information provided by EMSA through its publications is considered useful.



27. How do you rate the quality and efficiency of day-to-day communication with EMSA in the given period?

Communication with EMSA is considered to be prompt, of high quality, constructive and direct. Nevertheless, it has been noted that EMSA should be a bit more active in informing MSs on new products or procedures.



28. How do you evaluate EMSA in promoting its own pollution response activities to the MS, and in proactively informing them about new developments through brochures, meetings, workshops etc.?

Meetings and workshops are considered to give good information and it is acknowledged that generally EMSA introduces its activities very well and in a professional way. However EMSA should deliver more proactive information to MS on new developments.

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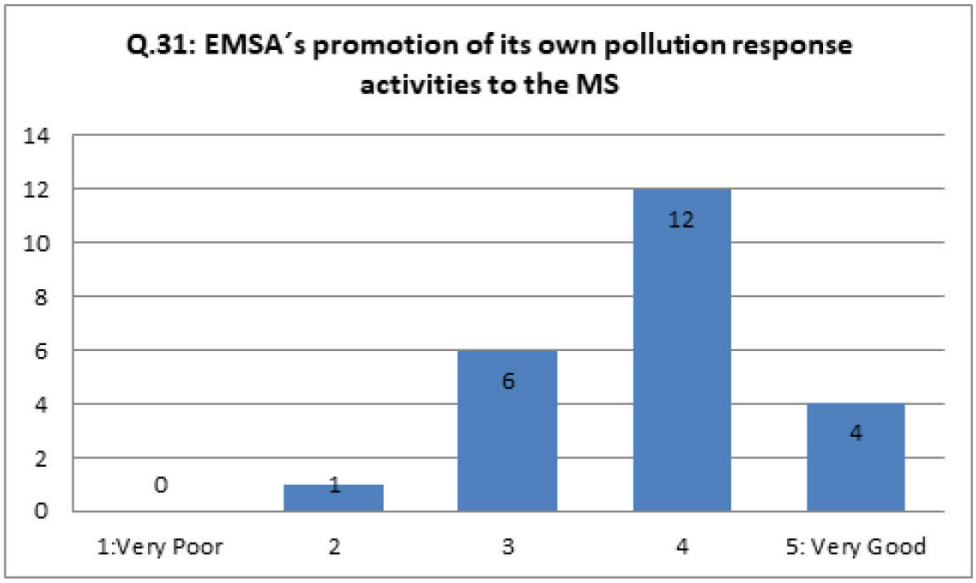
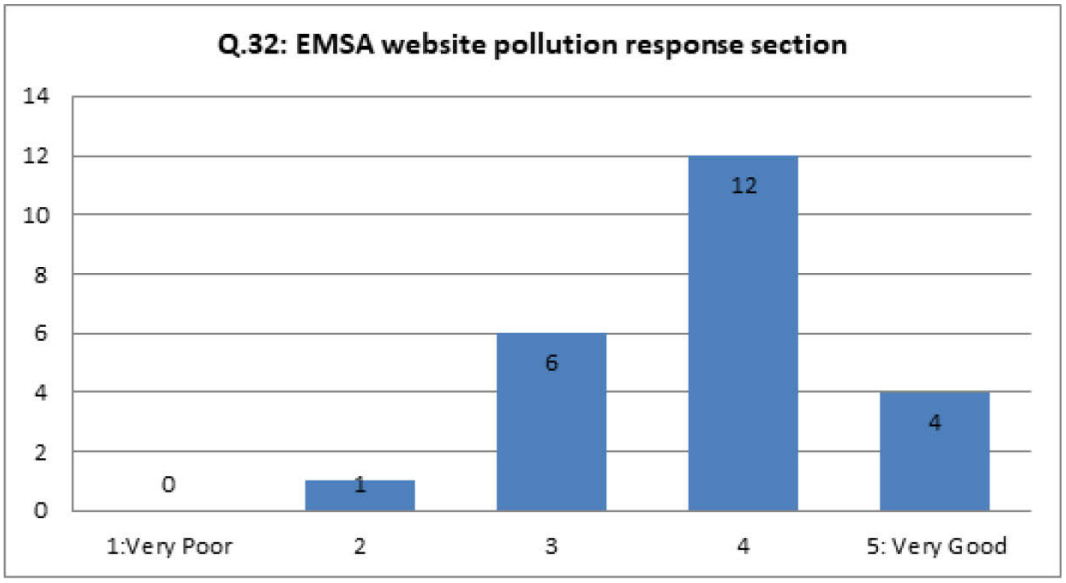


29. How do you rate the EMSA website pollution response section (e.g. is it user friendly, updated, easy to find relevant information)?

It is generally well perceived by MS, even though it could be improved by:

- Including IRC form, equipment prices
- Publishing all presentations and meeting documents from every EMSA meeting
- Adding personal contact details (email, office telephone number) of EMSA's personnel

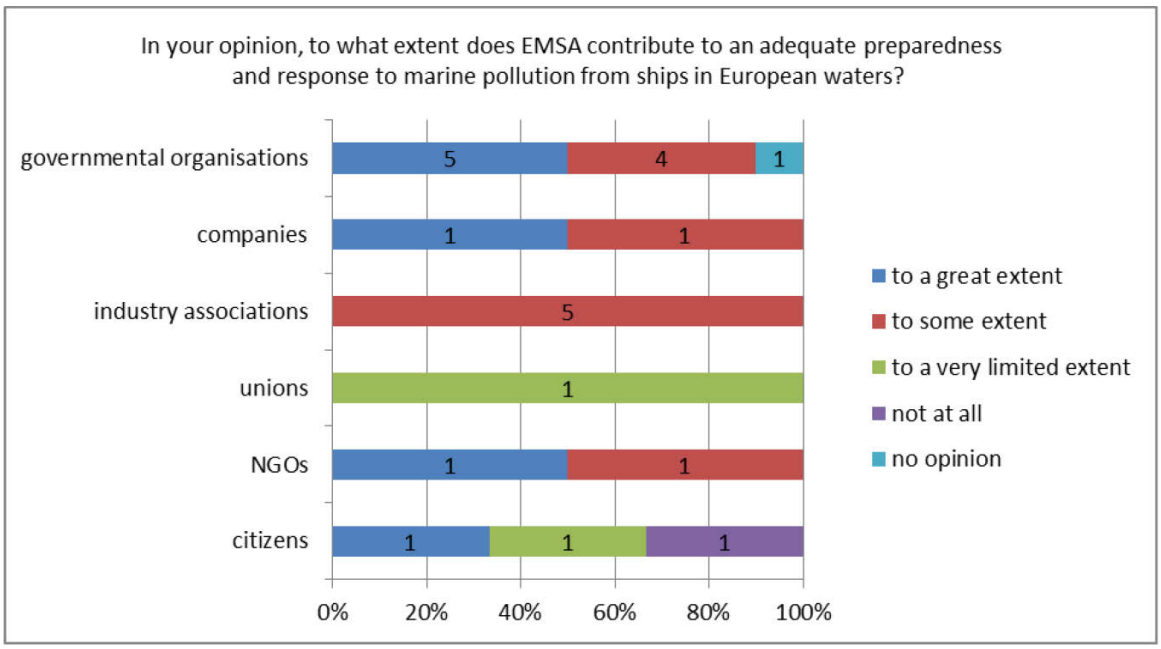


30. What are your general thoughts on EMSA's ongoing and planned activities in relation to pollution response?

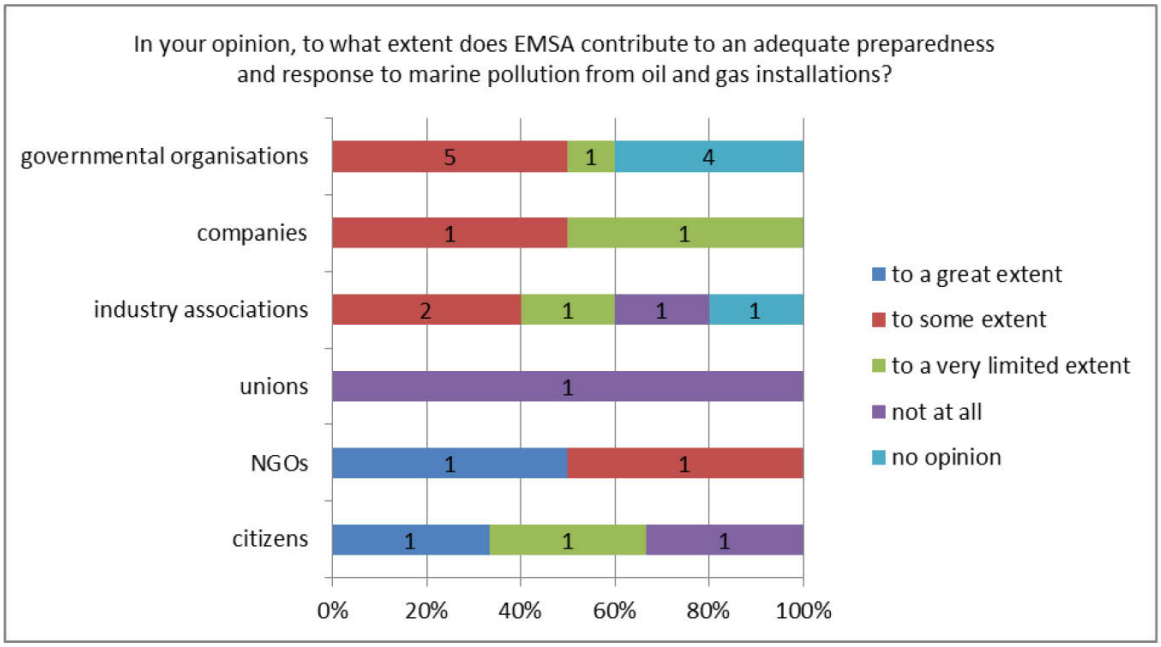
All but 2 MS support continuing the current activities, several MS raise their expectations for EMSA to be more involved in research and new tehcnologies. Some also expressed their opinion that EMSA should work more closely with the Regional Agreements. The 2 who disagree with this general support expressed, in one case, doubts about the relevance of EMSA and, in the second case, considered it has no sufficient information about what EMSA does.

APPENDIX 6: RESULTS OF THE PUBLIC ONLINE CONSULTATION

In your opinion, to what extent does EMSA contribute to an adequate preparedness and response to marine pollution from ships in European waters?



In your opinion, to what extent does EMSA contribute to an adequate preparedness and response to marine pollution from oil and gas installations?

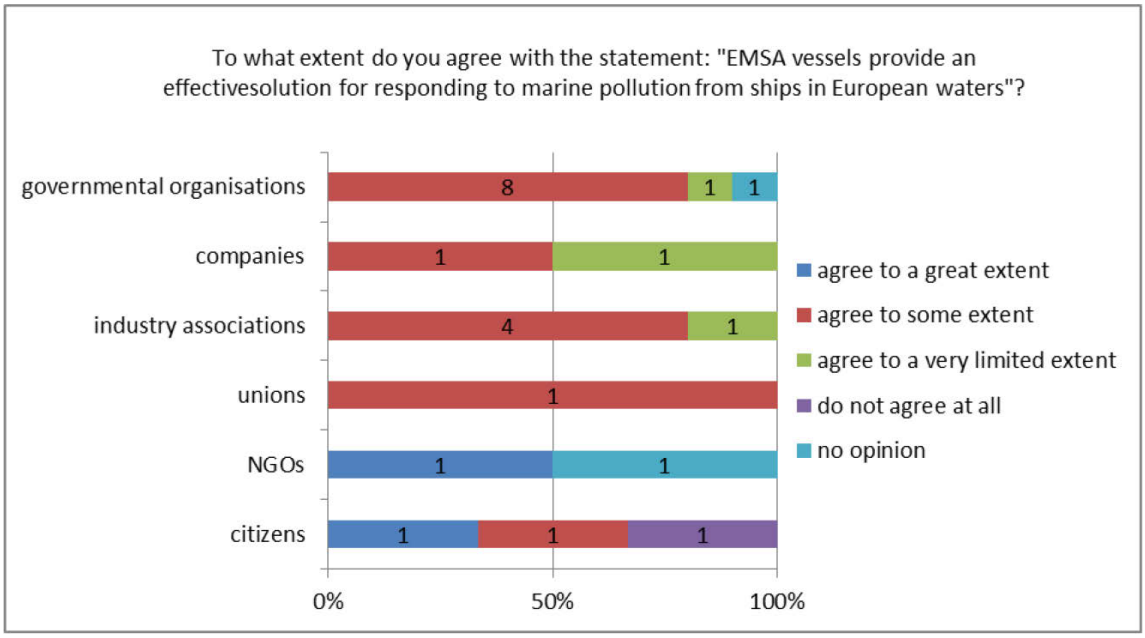


The majority of respondents gave a positive answer when asked about the EMSA Pollution Response Services. Nevertheless, there are some differences among the opinions regarding the response to ship pollution and pollution coming from oil and gas installations. Most of the respondents (9 governmental organisations, 2 companies, 5 industry associations, 2 NGOs and 1 citizen) believe that EMSA contribute to an

adequate preparedness and response to marine pollution from ships to a great or to some extent, but when asked about pollution from oil and gas installations, less governmental organisations, companies and industry associations (5 governmental organisations, 1 company and 2 industry associations) gave a positive answer (to a great or to some extent). 4 of the governmental organisations preferred to not give an opinion in the second answer. The union also gave a more negative answer in the second questions. The opinions from NGOs and citizens remained the same for both questions.

Negative opinions are due to the lack of approach of EMSA to noise pollution and the lack of an evaluation to the EMSA contribution to an adequate response to oil and gas installations, as these responsibilities have been added to EMSA recently.

Network of Stand-by Oil Spill Response Vessels



The majority of respondents answered that EMSA vessels provide 'to some extent' an effective solution for responding to marine pollution from ships in European waters (8 governmental organisations, 1 company, 4 industry associations, 1 union and 1 citizen). In addition, 1 NGO and 1 citizen answered 'to a great extent'.

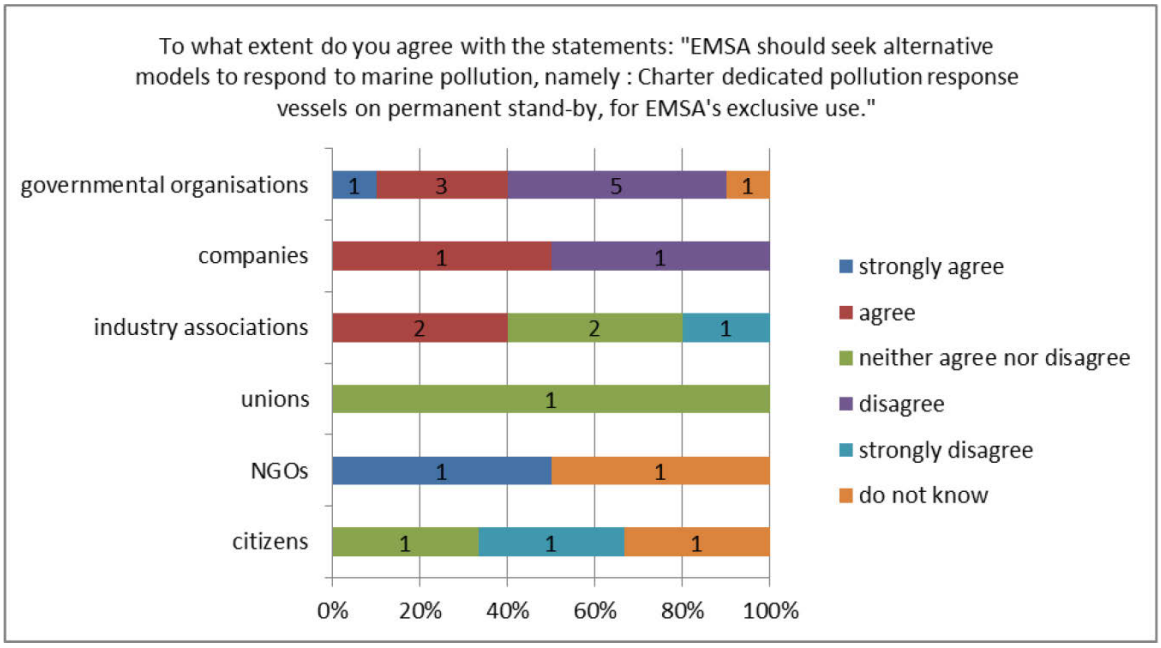
The reasons for this positive perception relate to the answers given in the questions 13, 14 and 15. The majority of respondents (15 of 23) consider that the network of EMSA vessels is adequate to complement existing resources at national level and 10 of 23 of the respondents also consider that the network of EMSA vessels is adequate at regional level. In addition, the majority of the respondents think that EMSA vessels are equipped enough: 'very well equipped' (1 of 23), 'well equipped' (6 of 23), or 'adequately equipped' (8 of 23).

Some of the negative comments point out the need for a more balanced geographical coverage ("only 5 vessels are located in the sea areas north from Bay of Bisca"). In addition to this, 8 of 23 of the respondents consider that the coverage at regional level is insufficient, mainly because of the lack of national resources. Last, 2 of the industry associations consider EMSA vessels poorly equipped. They mention that some vessels

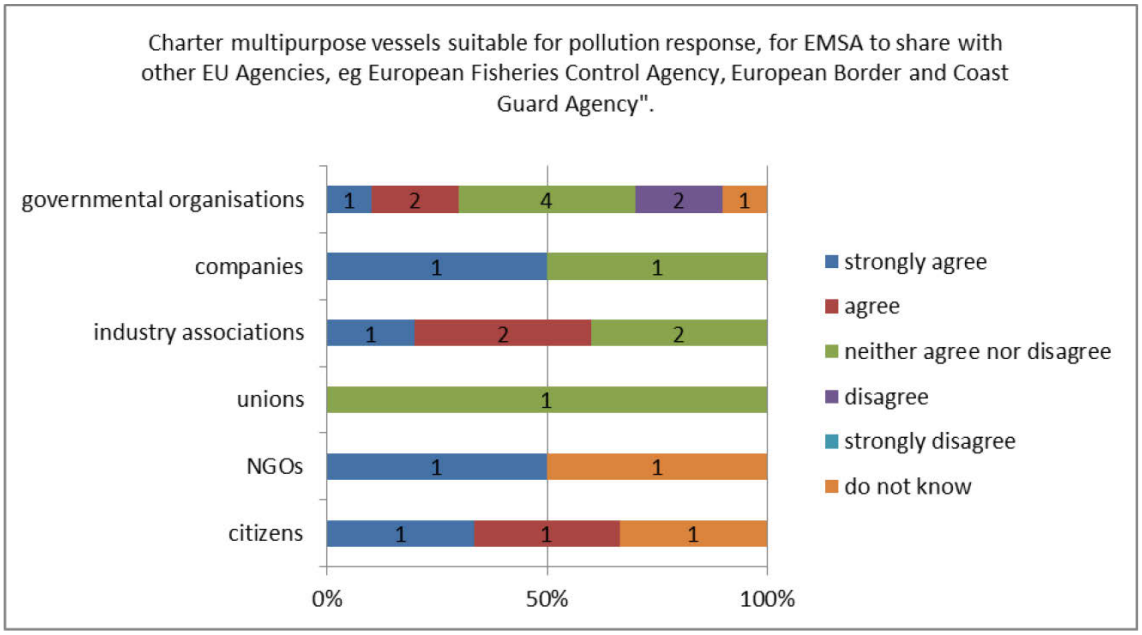
are not ideal for the multi operational task assigned (e.g. Storage, Dispersant spraying, mechanical Oil recovery and booming).

To what extent do you agree with the statements "EMSA should seek alternative models to respond to marine pollution, namely:

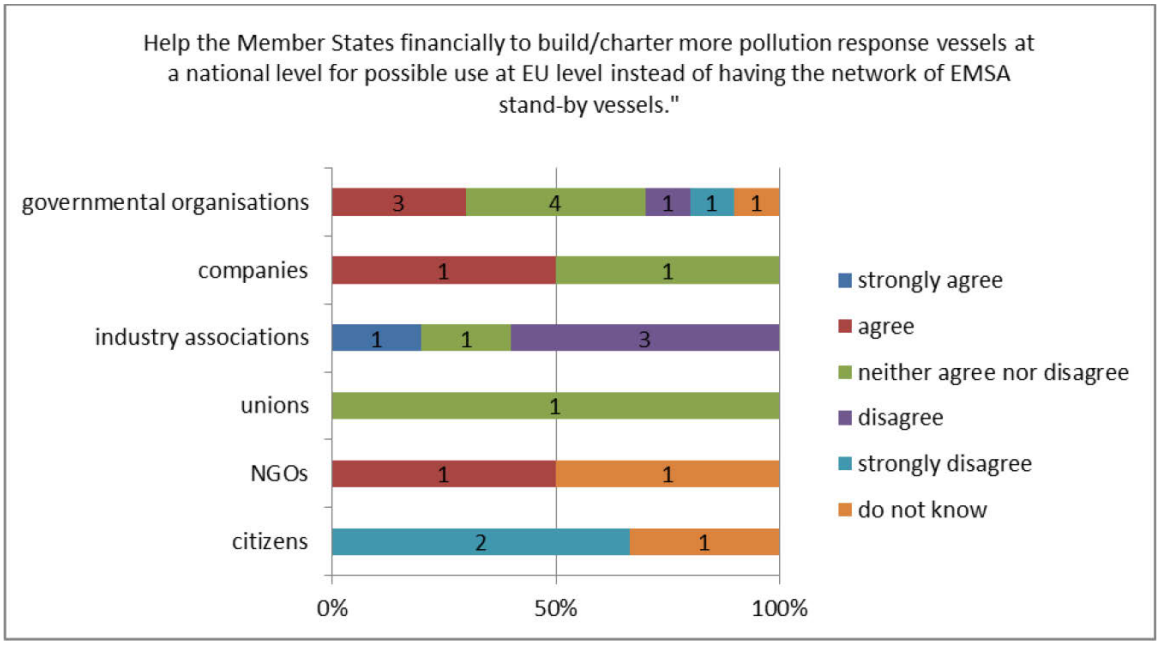
a) Charter dedicated pollution response vessels on permanent stand-by, for EMSA's exclusive use."



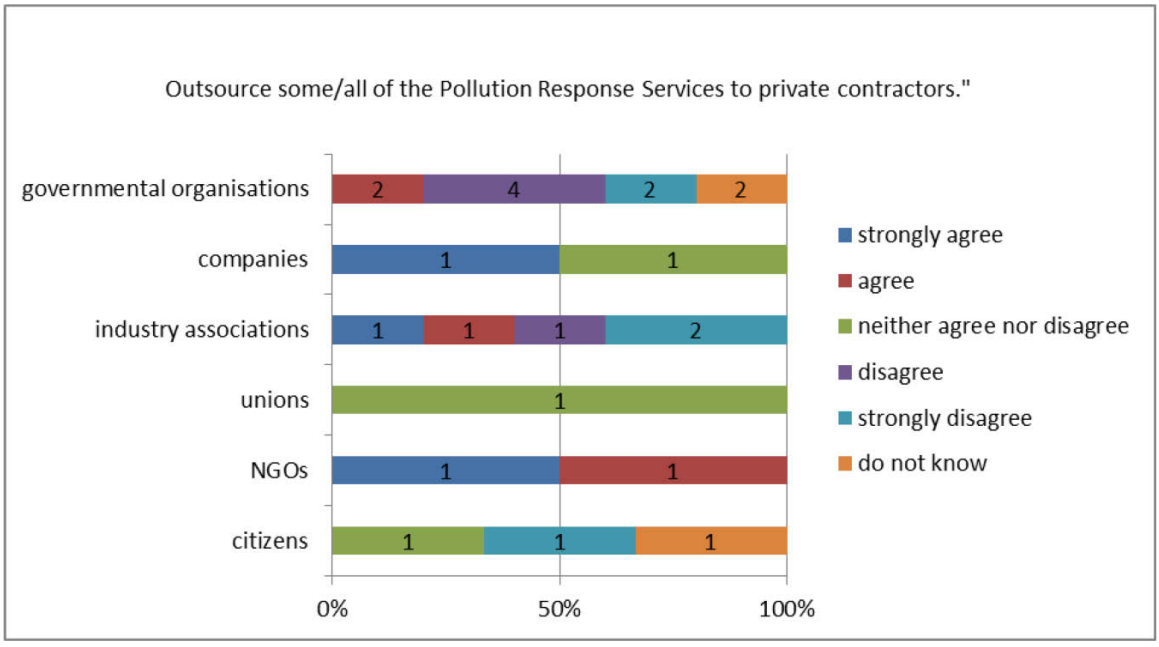
b) Charter multipurpose vessels suitable for pollution response, for EMSA to share with other EU Agencies, eg European Fisheries Control Agency, European Border and Coast Guard Agency."



c) Help the Member States financially to build/charter more pollution response vessels at a national level for possible use at EU level instead of having the network of EMSA stand-by vessels."



d) Outsource some/all of the Pollution Response Services to private contractors."



There is no clear majority to consider whether EMSA should seek alternative models to respond to marine pollution in general.

To the question related to charter dedicated pollution response vessels on permanent stand-by, for EMSA's exclusive use, 8 of 23 respondents agree. Most of the respondents that did not agree were governments (5), in addition to 1 company. The other half of governments agree or strongly agree, in addition to 1 company, 2 industry associations and 1 NGO.

Only when considering if EMSA should seek charter multipurpose vessels suitable for pollution response, for EMSA to share with other EU Agencies, there is a general

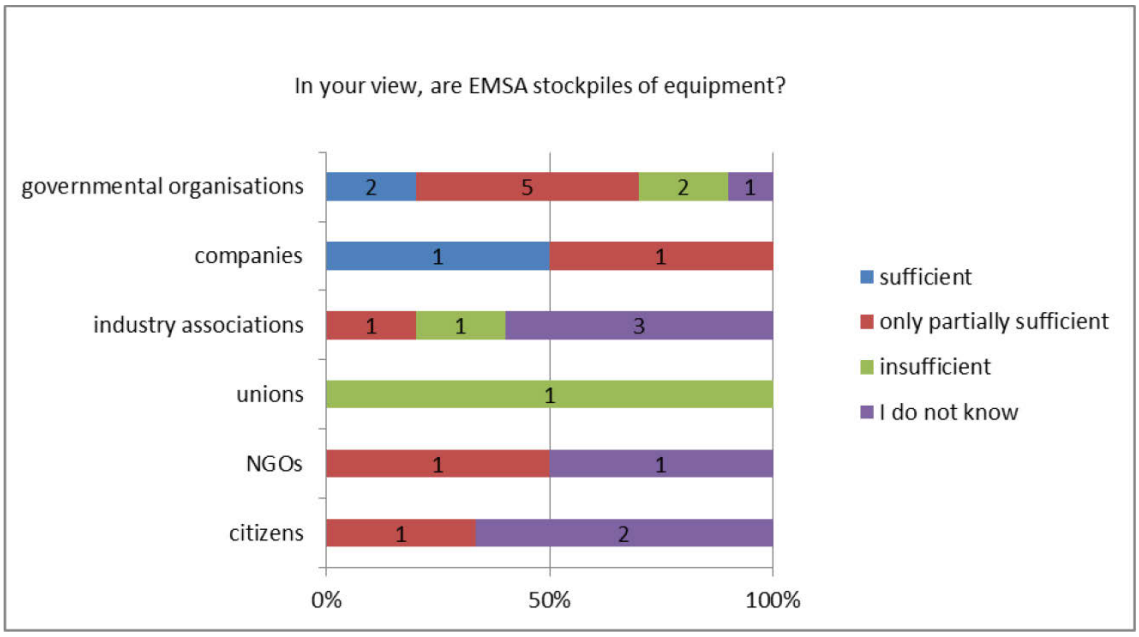
agreement among the respondents (10 out 23 agree or strongly agree). A significant number (8 out of 23) neither agree nor disagree. Only two disagree (2 governments) and no respondent strongly disagrees.

To the question if EMSA should 'help the Member States financially to build/charter more pollution response vessels at a national level for possible use at EU level instead of having the network of EMSA stand-by vessels', most of the citizens and industry associations that answered disagree; while most of governmental organisations; in addition to 1 company and 1 NGO, agree. 7 out of 23 respondents neither agree nor disagree.

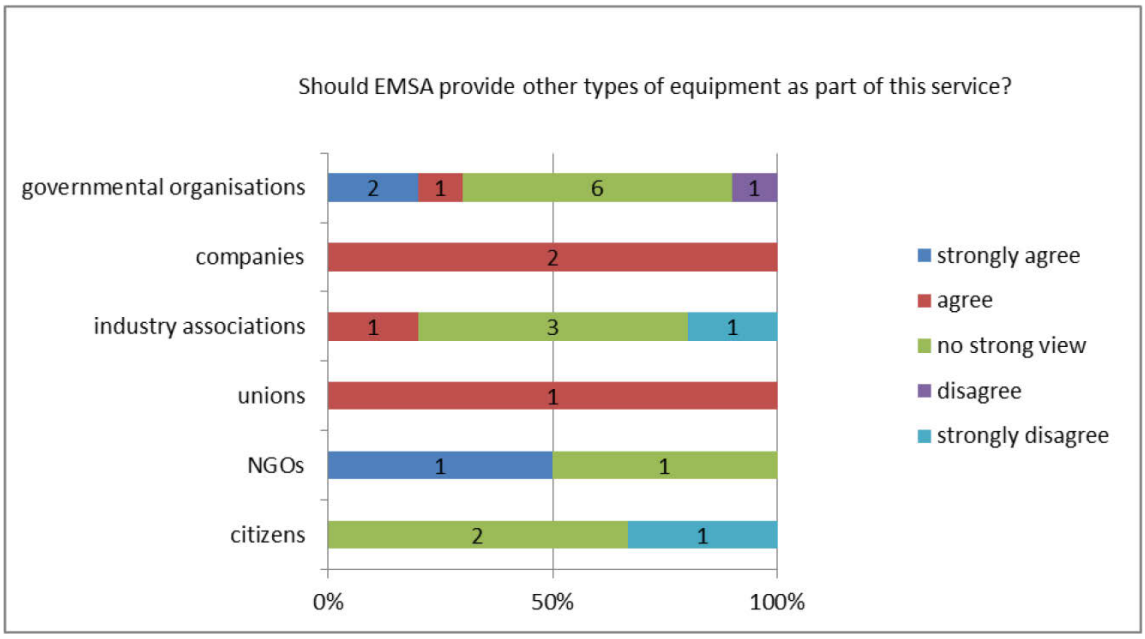
To the contrary, most governmental organisations disagree with outsourcing the Pollution Response Services to private contractors (10 out of 23 respondents in total), while 7 out of 23 respondents (including the 2 companies, 1 NGO and 2 of the industry associations) agree with this alternative model.

Equipment Assistance Service

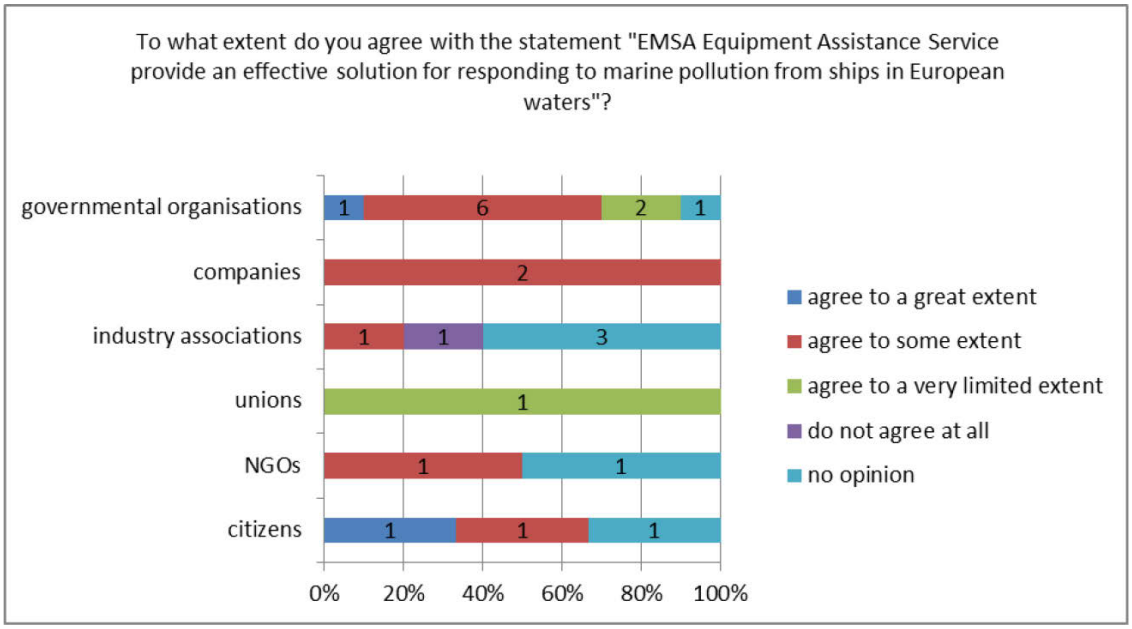
In your view, are EMSA stockpiles of equipment?



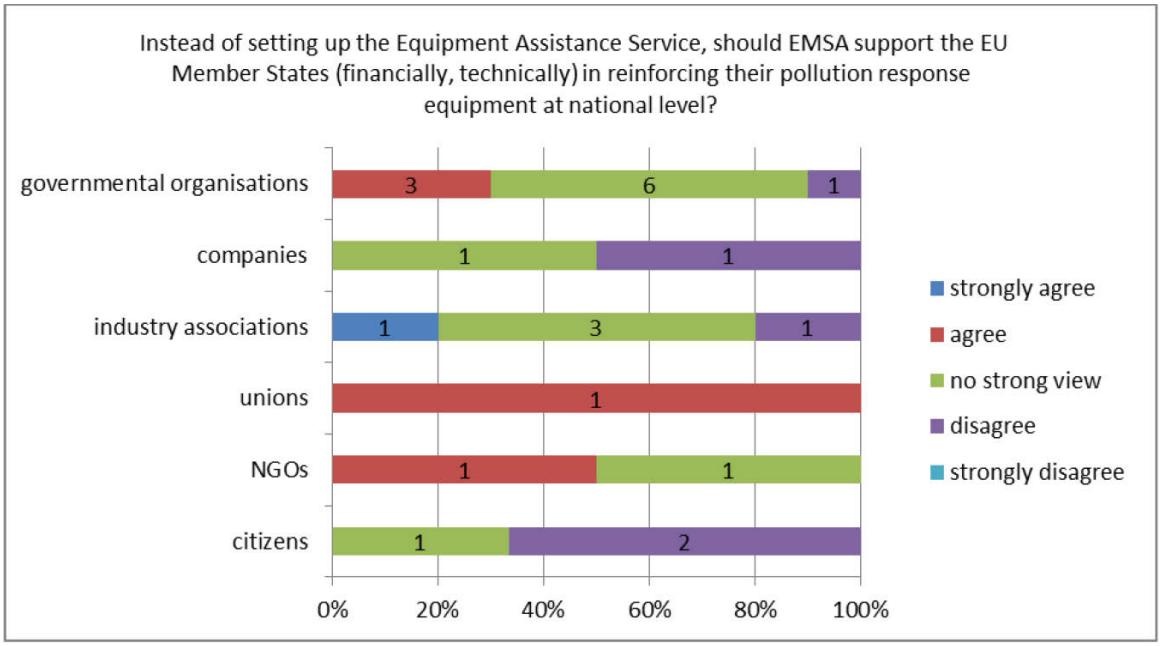
Should EMSA provide other types of equipment as part of this service?



To what extent do you agree with the statement "EMSA Equipment Assistance Service provide an effective solution for responding to marine pollution from ships in European waters"?



Instead of setting up the Equipment Assistance Service, should EMSA support the EU Member States (financially, technically) in reinforcing their pollution response equipment at national level?



The majority of respondents (6 governments, 2 companies, 1 industry association, 1 NGO and 1 citizen) agree to some extent with the statement "EMSA Equipment Assistance Service provide an effective solution for responding to marine pollution from ships in European waters". 2 respondents (1 governmental organisation and 1 citizen) agree to a great extent. Only 1 respondent (1 industry) does not consider that the Equipment Assistance Service provides an effective solution to marine pollution from ships in European waters.

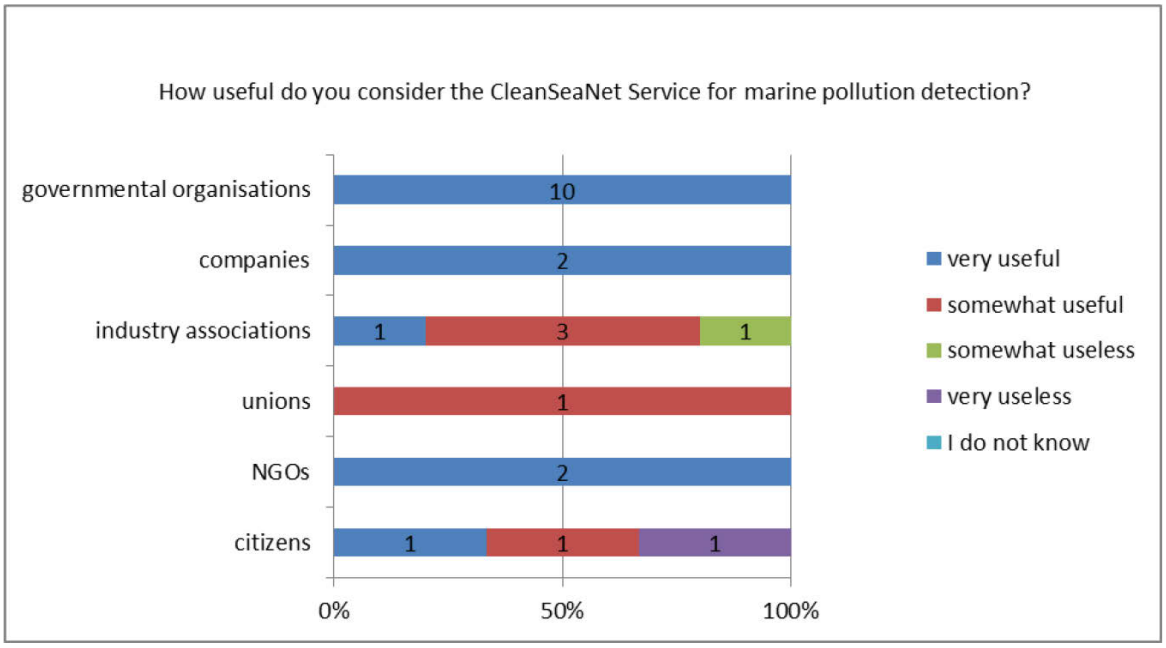
Overall, the most selected answer is positive. This answer is consistent with the answers to the previous questions (18 and 19). Most of the respondents think that EMSA stockpiles of equipment are partially sufficient. Some propose to consult the Member States before deciding on which equipment should the EMSA depots have as the regional needs vary. 4 of the respondents consider the stockpiles of equipment insufficient.

The majority of respondents (12 of 23) do not have a strong view regarding the question if EMSA should provide other types of equipment. The number of respondents that consider that EMSA should provide other types of equipment is consistent with the number that believes that the Equipment Assistance Service does not provide an effective solution. These respondents propose: aerial surveillance, coastal waters response equipment and protocols, emergency lightering equipment, tank capacity and wildlife response equipment stockpile.

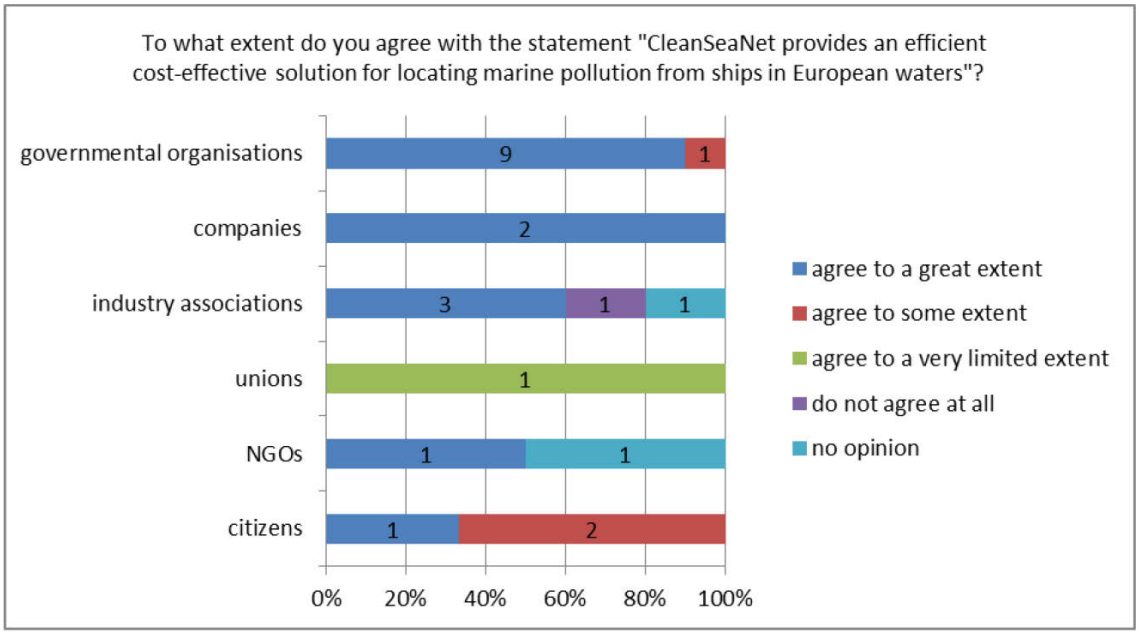
A similar answer was given by the respondents to the question whether EMSA should support the EU Member States in reinforcing their pollution response equipment at national level. The majority of respondents do not have a strong view, mostly governments and industry associations. 1 respondent strongly agrees, 5 respondents agree; and other 5 respondents disagree.

Earth Observation Services – CleanSeaNet

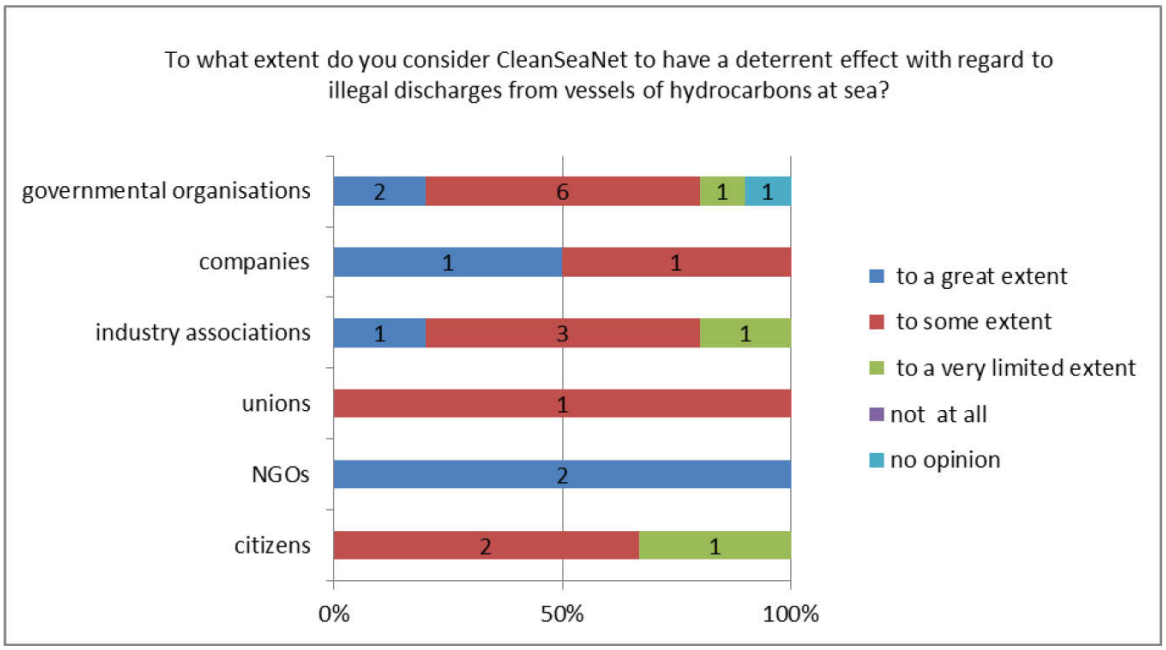
How useful do you consider the CleanSeaNet Service for marine pollution detection?



To what extent do you agree with the statement "CleanSeaNet provide an efficient solution for locating marine pollution from ships in European waters"?

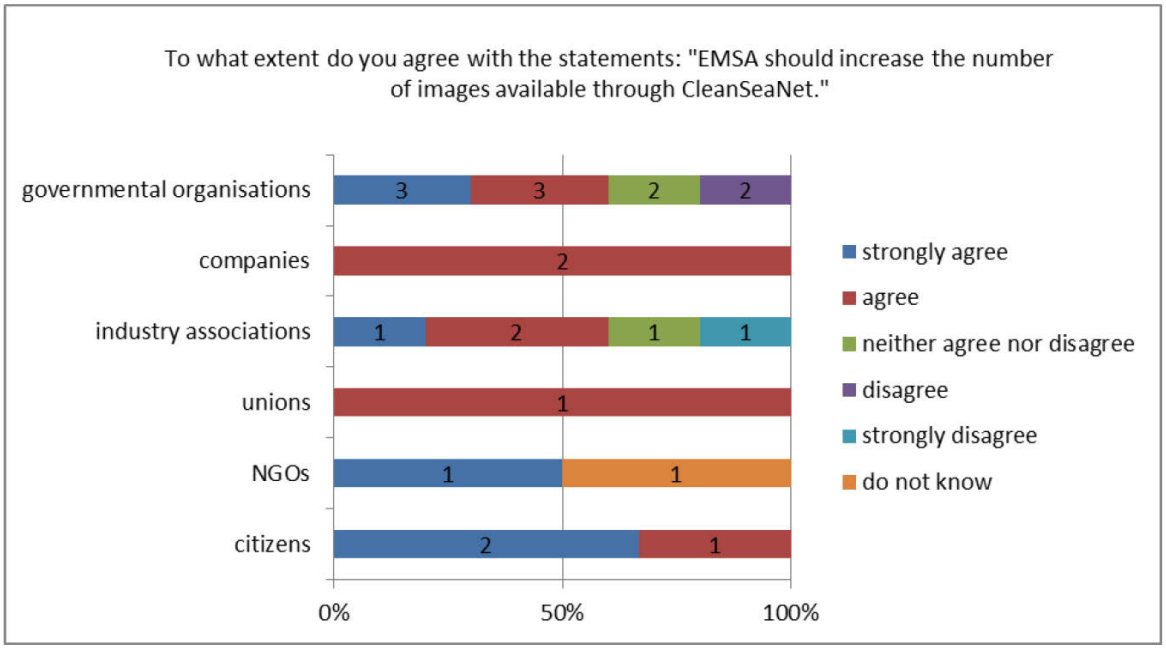


To what extent do you consider CleanSeaNet to have a deterrent effect with regard to illegal discharges from vessels of hydrocarbons at sea?

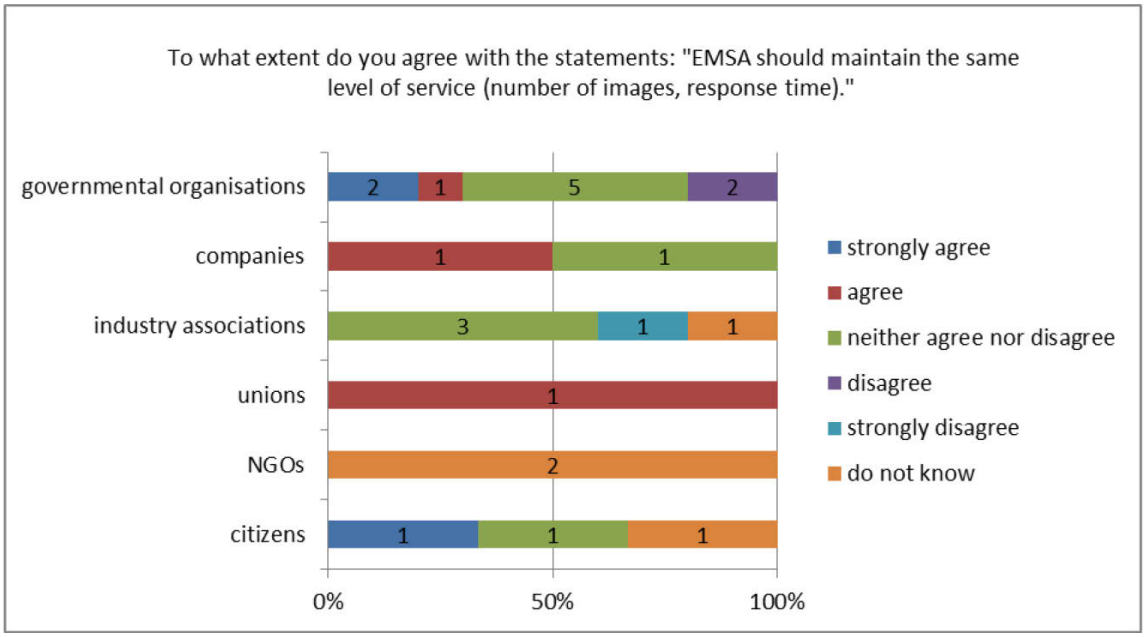


To what extent do you agree with the statements: "EMSA should:

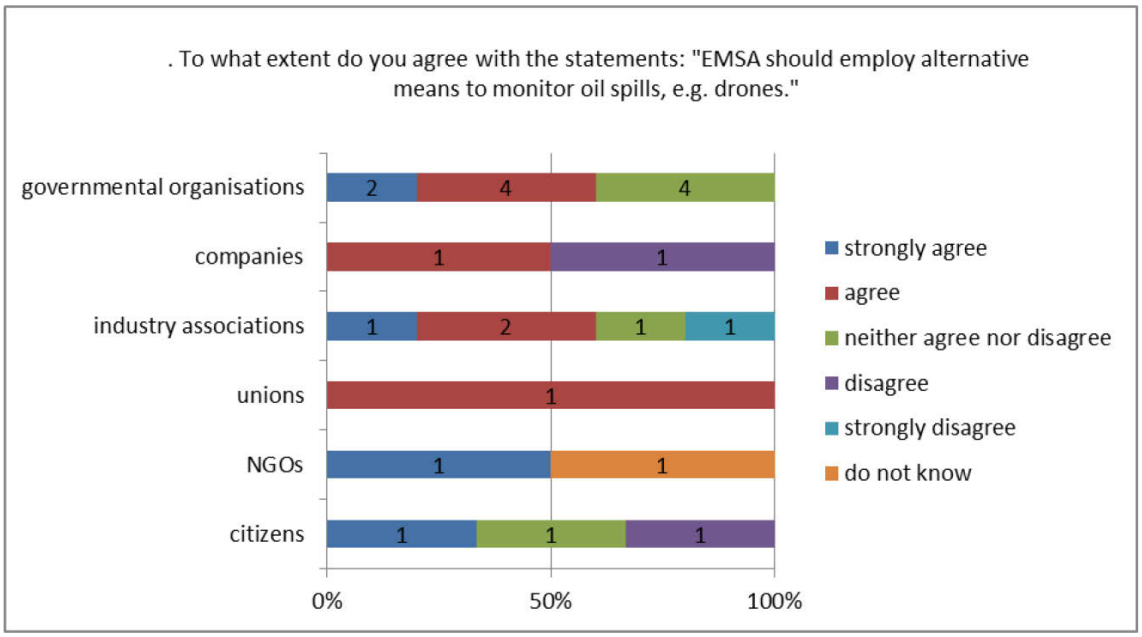
a) Increase the number of images available through CleanSeaNet."



b) Maintain the same level of service (number of images, response time)."



c) Employ alternative means to monitor oil spills, e.g. drones."



The great majority of respondents consider the CleanSeaNet Service very useful or useful for marine pollution detection. Only two respondents consider this Service somewhat useless or very useless.

The majority of respondents (9 governments, 2 companies, 3 industry associations, 1 NGO and 1 citizen) consider the CleanSeaNet Service very useful for marine pollution detection. In this regard, the majority of respondents agree to a great extent with that CleanSeaNet provides an effective solution for locating marine pollution from ships in European waters. In addition, other 3 respondents agree to some extent. One respondent (1 union) agree to a very limited extent and another respondent (1 industry association) do not agree at all.

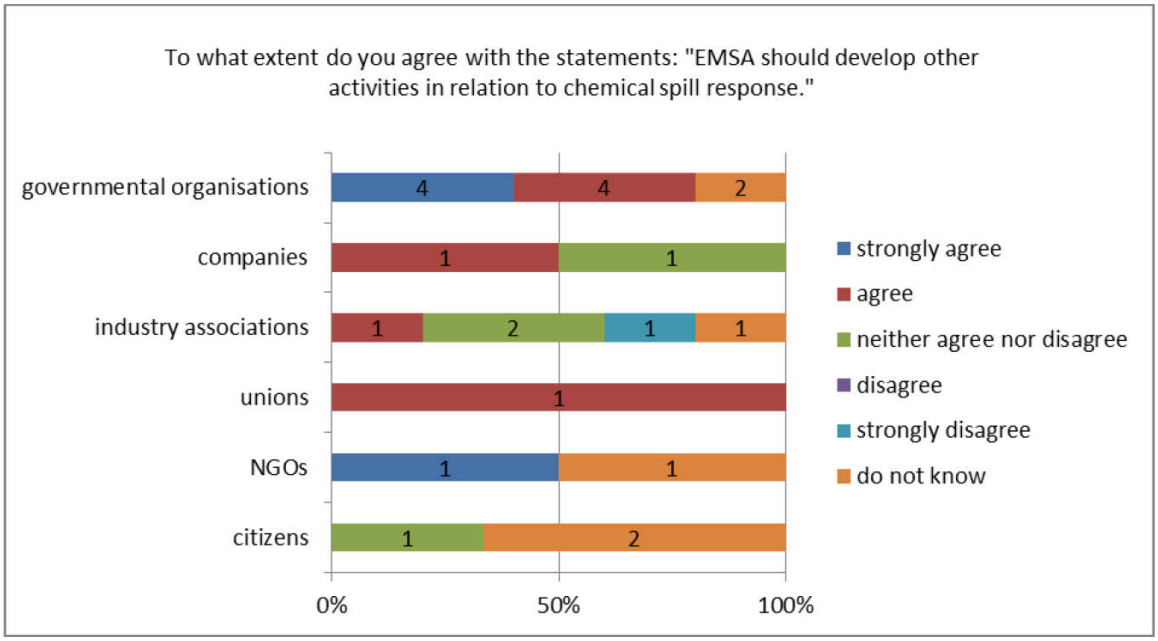
The answers to the question if CleanSeaNet has a deterrent effect with regard to illegal discharges from vessels of hydrocarbons at sea are also mostly positive. 6 of the respondents (2 governmental organisations, 1 company, 1 industry association and 1 NGO) answered 'to a great extent' and 13 (6 governmental organisations, 1 company, 3 industry associations, 1 union and 2 citizens) 'to some extent'. Only 3 respondents (1 government, 1 industry, 1 citizen) consider that CleanSeaNet has a very limited deterrent effect.

In addition, the majority of respondents consider that EMSA should increase the number of images available through CleanSeaNet (7 strongly agree and 9 agree). It is also worth mentioning that the majority agrees with EMSA employing alternative means to monitor oil spills (5 strongly agree and 8 agree). The industry association that strongly disagrees with those statements underlines that this type of service often benefits from outsourcing to expert industry bodies e.g. ITOPF, OSRL etc. One government considers that drone surveillance seems to be problematic at the moment due to varying national regulations, and drone use in monitoring and identifying spills of other hazardous and noxious substances would be highly interesting. One of the companies considers that drones are a more tactical tool for local level response and that EMSA should maintain focus on providing the broad-scale CleanSeasNet satellite coverage with the minimal-possible image processing time.

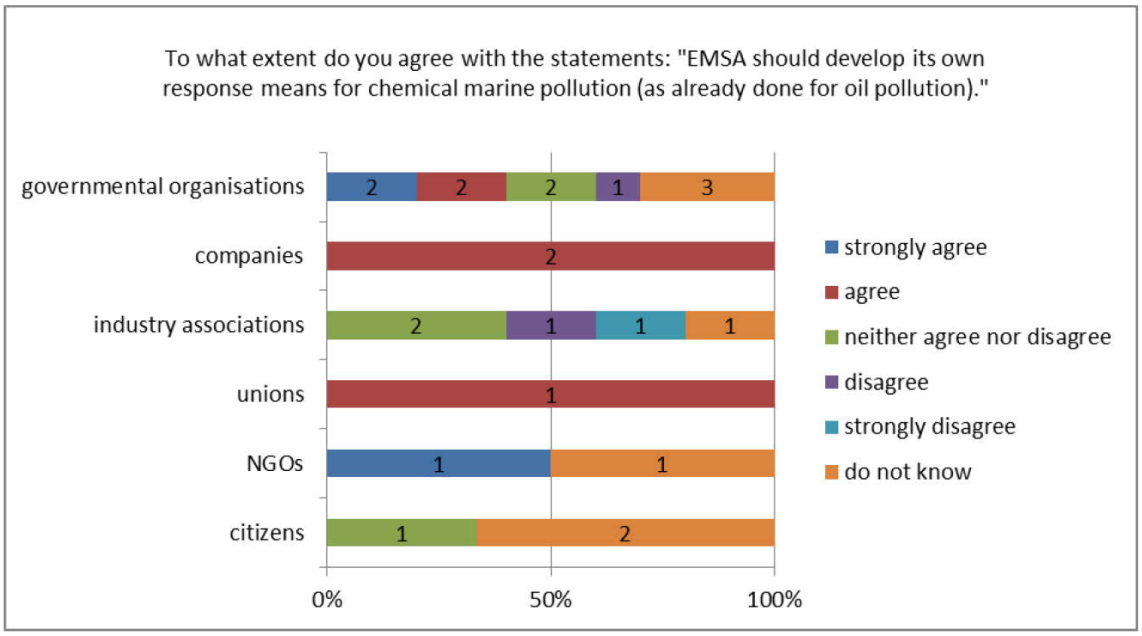
Chemical Spill Response

To what extent do you agree with the statements: "EMSA should:

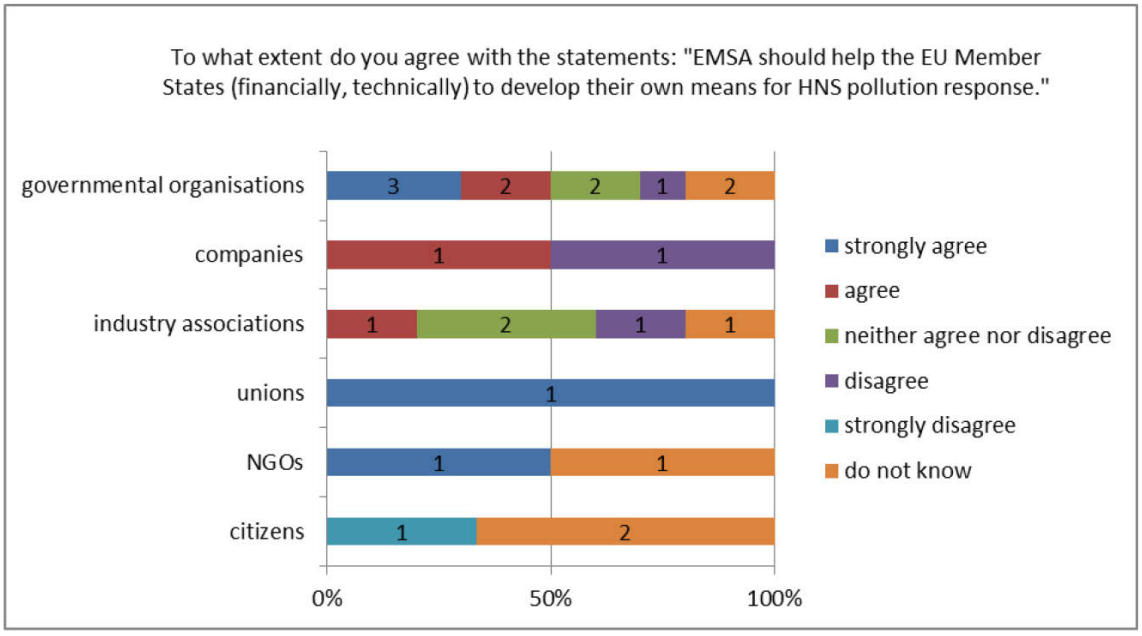
a) Develop other activities in relation to chemical spill response."



b) Develop its own response means for chemical marine pollution (as already done for oil pollution)."



c) To what extent do you agree with the statements: "EMSA should help the EU Member States (financially, technically) to develop their own means for HNS pollution response."



The majority of respondents agree or strongly agree with that EMSA should develop other activities in relation to chemical spill response (5 strongly agree - 4 governmental organisations and 1 NGO, and 7 agree - 4 governmental organisations, 1 company, 1 industry association, 1 union). Only 1 respondent (1 industry association) strongly disagrees.

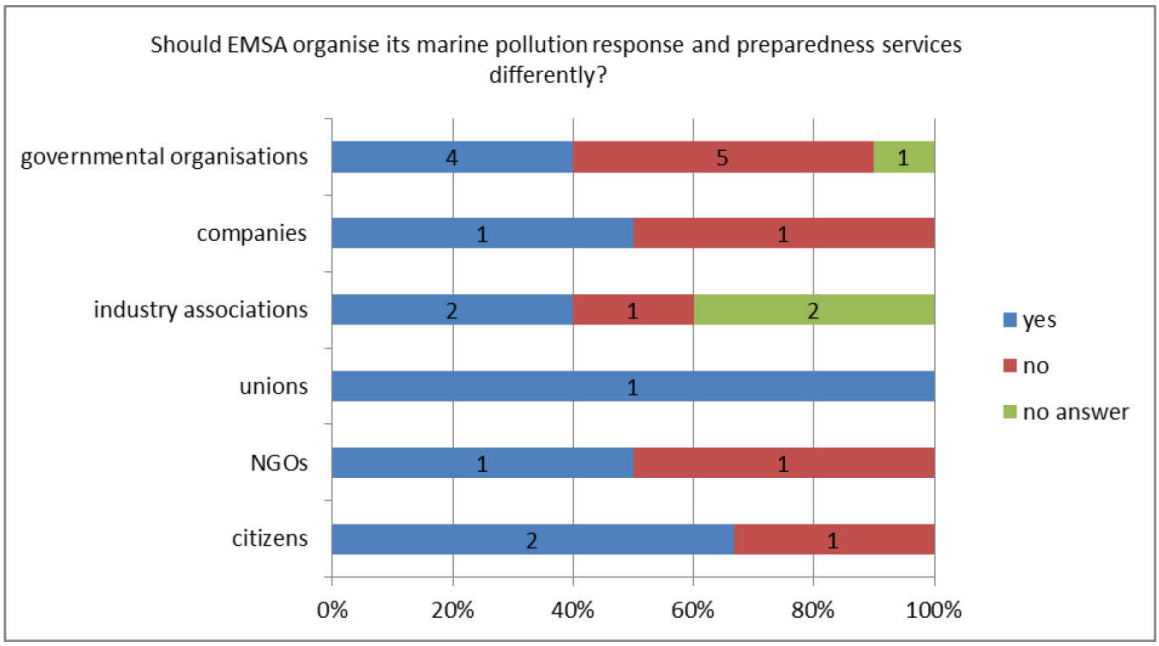
There is no general strong opinion whether EMSA should develop its own response means for chemical marine pollution. 7 respondents (3 governmental organisations, 1 industry association and 2 citizens) no not know. In addition, 5 of the respondents (2

governmental organisations, 2 industries, 1 citizen) neither agree nor disagree. On the other hand, 3 strongly agree (2 governmental organisations and 1 NGO) and 5 agree (2 governmental organisations, 2 companies and 1 union). Also 2 disagree (1governmental organisation and 1 industry association) and 1 (industry association) strongly disagrees.

Lastly, 9 of the respondents agree or strongly agree with that EMSA should help the EU Member States to develop their own means for HNS pollution response. Among the ones that strongly agree, there are 3 governmental organisations, 1 union and 1 NGO. Among the ones that agree, there are 2 governmental organisations, 1 company and 1 industry association. The rest of the respondents mostly do not know (6 of 23) or neither agree nor disagree (4 of 23). There are 3 respondents (1 government, 1 company and 1 industry association) that disagree and 1 citizen that strongly disagrees. One of the respondents mentions in this regard that most Member States have very little experience with chemical spill response so the centralising of information resources and service make sense.

Conclusions regarding the pollution response services of EMSA

Should EMSA organise its marine pollution response and preparedness services differently?



The stakeholders groups are divided whether EMSA should organise its marine pollution response and preparedness services differently, with exception of the union, which has answered affirmatively. 11 of the respondents answer 'yes', while 9 answer 'no'. 3 did no answer.

Some of the proposals mentioned are:

"EMSA's role should be setting national and industry requirements to meet global regulation needs and assisting national bodies to develop appropriate responses".

"EMSA needs to address noise pollution".

"There needs to be a clearer demonstration as to how the EMSA capability provision meets the assessed risk and dovetails efficiently with resources and capability provided by Member States and also by industry".

"EMSA should take into account all the EU coastguards services and brings the services not only at national level but also at regional level".

"The competence extension to offshore oil and gas pollution would benefit from a larger cooperation with industry representatives".

"More proactive role in monitoring oil spill and HNS contingency planning".

"EMSA should play a more pro-active role in helping to bridge the link between offshore and shoreline preparedness and encourage national authorities to develop more cohesive and effective approaches that integrate all aspects of a response EMSA is well positioned to support national authorities in this role and to aid in the dissemination of good practice in preparedness and response".

"EMSA should cooperate more with other stakeholders".

APPENDIX 7: SIMULATIONS ON THE POTENTIAL AMOUNT OF POLLUTANT RECOVERED AT-SEA BY EMSA CONTRACTED VESSELS

Important note:

The following simulations of oil spill responses operations have to be considered as a theoretical attempt to estimate the added value of EMSA's oil recovery vessels. In no way the figures resulting from this exercise should be construed as representing the capacity of EMSA recovery vessels in a real incident as many different parameters may interact during an oil spill response operation making the overall modelling difficult. To identify a few:

- There are a considerable number of variables related to the operating environment (daylight, wind, waves, sea temperature, air temperature) as well as changes to the chemical and physical properties of the oil (surface concentration, viscosity, VOCs) that effect the fate of the oil after its release. This has an effect on the recovery capabilities.
- The recovered product will, in almost all cases, be some oil mixed with water to a certain content. This water content will depend either of the stage of weathering of the oil and of the type of equipment used or a combination of these two factors.
- Decision by the authorities in charge of leading the response may also greatly influence the success of the recovery: once the oily mixture is on board, a decantation process is used to separate the oil from the water. Consequently, decanted clean water in accordance with MARPOL threshold could be discharged at sea, allowing for the recovery vessel to operate longer on scene. However, quite often, authorities do not allow this discharge; this decision resulting in the need for the ships to go back more frequently to a discharging facility, thus reducing their operational time and increasing the volume of waste.
- The location of the incident also greatly influence the result of the scenario: Near the shoreline, the window of opportunity for efficient at sea operations may be limited as oil is expected to strand onshore faster, while on the high seas it will influence directly the operational time for the response vessels as they will have to go back, discharge and return on scene. When oil has spread, the encounter rate of slick will also decrease.

Integrating all these parameters in a model requires making assumptions for each element which may affect the confidence in the final results. In any case, for the purpose of this report, it was not possible to create such a model. Therefore the calculations are based on conservative rates of effectiveness and operational time. The results represent a fair estimate of what could be the added value of EMSA recovery vessels in several scenarios. But is has to stressed again that this is a theoretical exercise and should not be taken as guaranteed.

Background

One of the ways in which EMSA is implementing its task in the pollution response field is by providing a stand-by service to Member States based on at-sea mechanical recovery by specialised ships with large storage capacity for recovered oil. For this purpose, a network of oil spill response vessels stationed along the EU coastline has been built up in the last 12 years. The objective of these simulations is to estimate the potential amount of pollutant recovered at-sea by EMSA contracted vessels and analyse the benefits and limitations of this network using a few spill scenarios. It needs to be taken into account that neither the Equipment Assistance Service (EAS) for vessels of opportunity nor the dispersant spraying capabilities of EMSA vessels are taken into account for these simulations. In the case of dispersant the choice is guided by the fact that the oil concerned by the scenarios is heavy fuel oil which has a low dispersibility, therefore this response strategy has been disregarded. For the Equipment Assistance Service, the efficiency of its use will depend on the capacity of the concerned Member States to mobilise vessels of opportunity and to arrange for storage capacities.

Along the same line, the scenarios have not used the resources of the Member States as they generally do not offer large storage capacity and consequently their efficiency will be heavily affected by the time spent in transfer operations to the discharging facility. However the available resources identified by the Member States in the vicinity of the incident have been summed up in a table.

The circumstances under which the large spills occurred in Europe differed significantly. Weather conditions, type of coastline, distance from coast, type of oil, etc., made each incident a unique case. Any future incident will probably be different from any other in the past but will have common elements.

Selected scenarios

These scenarios were geographically spread to cover different four European sea areas. In this way, it was possible to analyse the distribution of the network and potential regional imbalances. The scenarios include past incidents, like *Prestige* or *Baltic Carrier*, and hypothetical scenarios based on potential new risks expected in near future, as follows:

- Black Sea: Hypothetical scenario – Bourgas, Bulgaria;
- Mediterranean Sea: Hypothetical scenario – Genoa, Italy;
- Atlantic Coast: Actual past scenario – Prestige;
- Baltic Sea: Actual past scenario – Baltic Carrier.

Performance indicators

The amount of oil recovered by each EMSA contracted vessel is estimated by analysing the oil recovery cycle divided into the steps identified in the figure below. Depending on the ‘window of opportunity’, each vessel may be able to carry out more than one cycle.

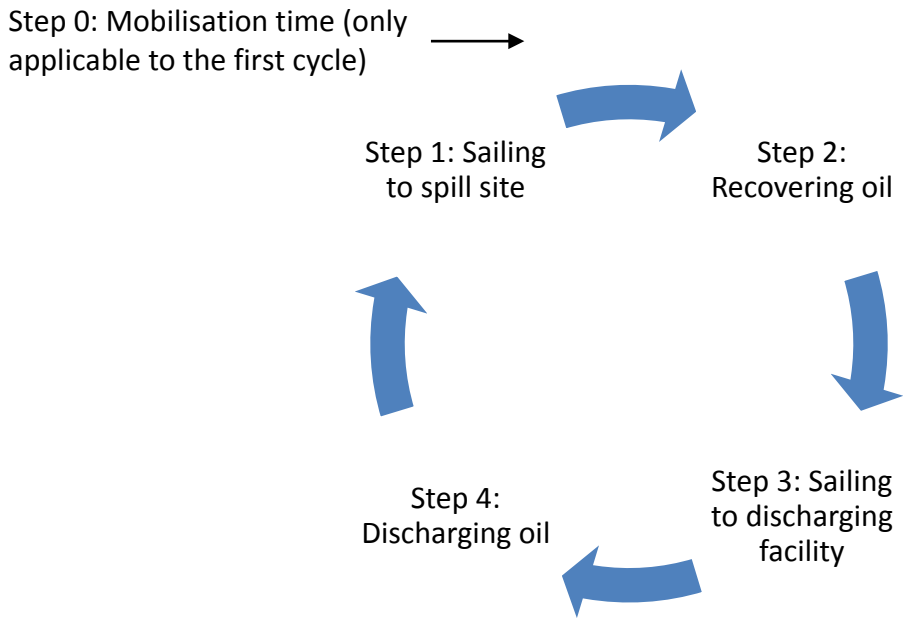


Figure 1 - Oil recovery cycle

Step 0: Mobilisation time. The time elapsed since the incident occurred until the moment in which the vessel would be ready to sail from its home port with the equipment on board. In past incidents (prior to EMSA), the mobilisation of vessels was delayed due to the negotiations of the contractual terms. To minimise the delays, EMSA has introduced a system by which no time is spent negotiating the contract. Tariffs and conditions are pre-agreed. The mobilisation time varies between contracts, but is usually 24h. It has been assumed that all EMSA vessels in the vicinity of the incident would be mobilised immediately by the Requesting State.

Step 1: Sailing to the spill site. During the first cycle, the time taken to sail to the spill site depends on the distance from the vessel's home port to the spill site and on the speed of the vessel. The speed considered for all the vessels was 10 knots (12 knots being the maximum speed for most of the EMSA vessels). For the remaining oil recovery cycles, where applicable, this time has been estimated considering the distance from the discharging port to the spill site. Such a distance varies from case to case.

Step 2: Recovering oil. The following factors affect the efficiency of this phase:

2.1. Spill area: The distance between the incident and the coast is a crucial factor during an oil spill. In general, the closer to the coast, the sooner the oil will wash ashore. Another key element related to the at-sea recovery operation is the depth of the waters in which the spill occurs. In general, the EMSA vessels will operate more efficiently in open waters than in a coastal area where the sea depth may limit the operation.

2.2. Oil recovery device: All EMSA vessels have two independent oil recovery systems on-board: sweeping arms and boom and skimmer. For these simulations, it has been assumed that vessels would use the rigid sweeping arms as these devices, in addition to

being more efficient in adverse weather conditions, allow the vessel to work independently[3].

2.3. Pump type and capacity: All EMSA vessels are equipped with two types of pumps for the oil recovery devices. Depending on the type of oil, a different pump will be used. The Positive Displacement Archimedes Screw (PDAS) pump has a lower capacity ($150m^3/h$) but higher discharge pressure (max. 10 bar) than centrifugal pumps ($360m^3/h$ and max. 7 bar). Accordingly, the use of the PDAS pump was considered for heavy oils and the centrifugal pump for crude oils. The capacity of the pumps for the purpose of this report was set to 33% of their nominal values to include the effect of the high viscosity of the oil recovered[4] and the percentage of water, which is recovered together with the oil.

2.4. Daily hours recovering oil: The percentage of time in which the pumps are running and the vessel is actually recovering oil. All EMSA vessels have a radar-based system to remotely detect the position of oil slicks. These slicks are, in general, compact during the first hours/days following the spill. However, as time elapses, the oil spreads, and therefore the vessel must chase the oil longer so decreasing the actual oil recovery time (the encounter rate). For this calculation, it has been assumed, unless otherwise indicated, that the percentage of time recovering oil was 50% for the first cycle (12 hours per day), 25% for the second cycle (6 hours per day) and 12.5% for the third cycle and onwards (3 hours per day).

2.5. Time to fill the tanks: The larger the capacity of the vessel, the more time it can be recovering oil at-sea (the time for sailing back to port and discharge is minimised). It has been assumed that the vessel would sail to port for discharging when the vessel is 80% full of pollutant (oil-water mixture). The remaining 20% capacity is filled with water, which is needed to facilitate discharging. Therefore, the time to fill the tanks has been estimated as follows:

$$\text{Time to fill the tanks (days)} = \frac{80\%\ \text{Storage Capacity } (m^3)}{33\%\text{Pump Capacity}\left(m^3/h\right) * \text{Daily Hours Recovering Oil (12h/day or 6h/day or 3h/day)}}$$

Sometimes, the vessels are unable to complete a full cycle. When the limit of the 'window of opportunity' has passed, the operation would finish regardless of the amount of pollutant in the storage tanks.

2.6. Pollutant recovered: This is calculated by summing up the amounts of pollutant recovered at each cycle. It has also been considered that the water content in the emulsion was 60% during the first cycle, 70% during the second cycle and 80% during the third and following cycles. It was also considered that $1m^3$=1 tonne of pollutant.

Step 3: Sailing to the discharging port. The sailing time to the discharging port is equivalent to the sailing time to the spill site (see Step 1), and accordingly has been estimated on a case-by-case basis.

[3] In order to deploy the booms, at least one additional vessel is needed.

[4] Usually the capacity of the pumps is expressed in cubic metres per hour (m^3/hr) of water that it would be able to deliver. Therefore, with high viscous oil, the capacity is reduced accordingly.

Step 4: Discharging. It has been assumed that the discharging process would take one day. The EMSA vessels, equipped with heating and specialised pumps, are able to discharge the full cargo in less than one day. However, factors like manoeuvring in port, availability of discharging facilities and potential replenishment have also been taken into account. Therefore, the discharging time has increased accordingly.

For the simulations, the weather parameters have been considered unchanged during the spill operations. The spill forecast has been done using the OIL/MAP software.

Scenario 1: Bourgas, Bulgaria (hypothetical scenario using OILMAP)

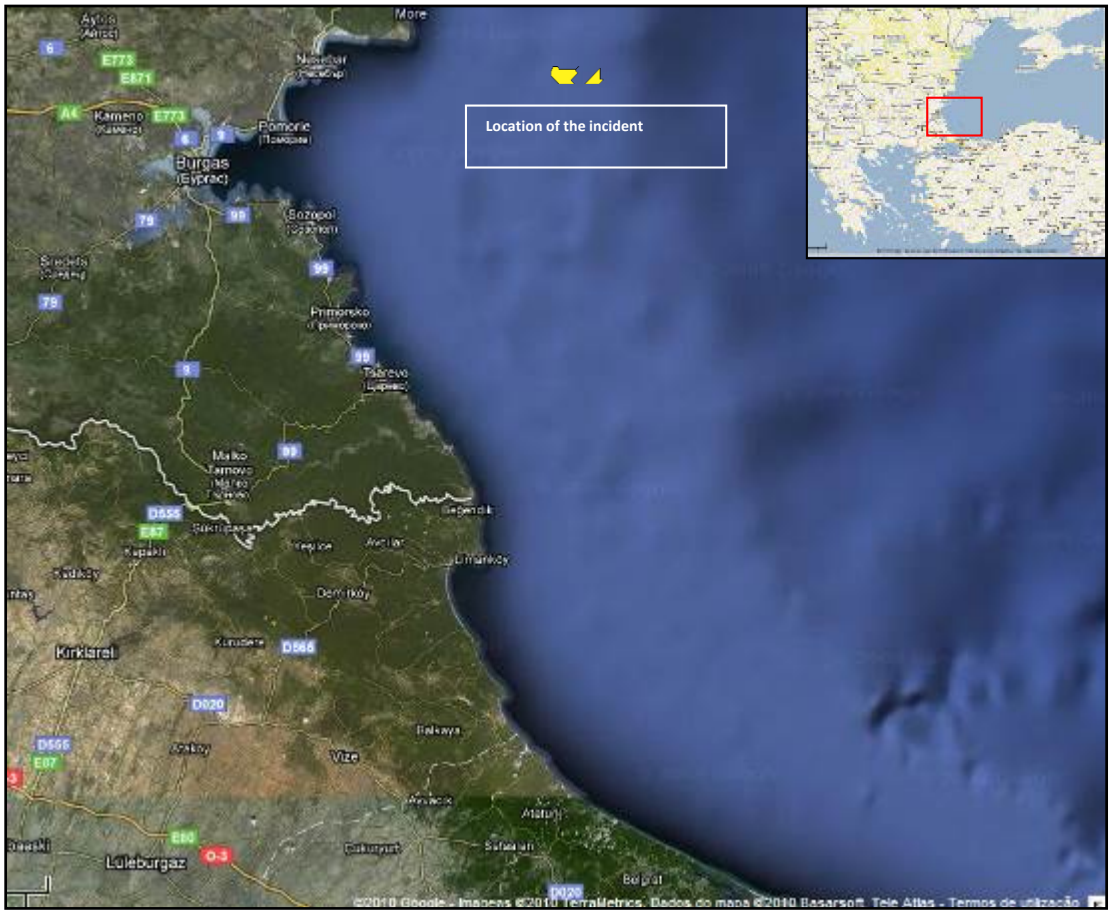


Figure 1 – Location of the Bourgas incident

- Incident area: Off Bourgas, Bulgaria
- Location: 42°39'N; 28°19'E
- Type of oil: Bunker C heavy fuel oil
- Quantity spilled: 50,000m^3
- Type of release: Continuous 24 hours
- Distance from shore: 38 nm
- Wind: Variable, NNE

Window of opportunity for mechanical recovery

There were moderate to strong northeast winds at the time of the spill. The 'window of opportunity' considered for the calculation was **12 days**.

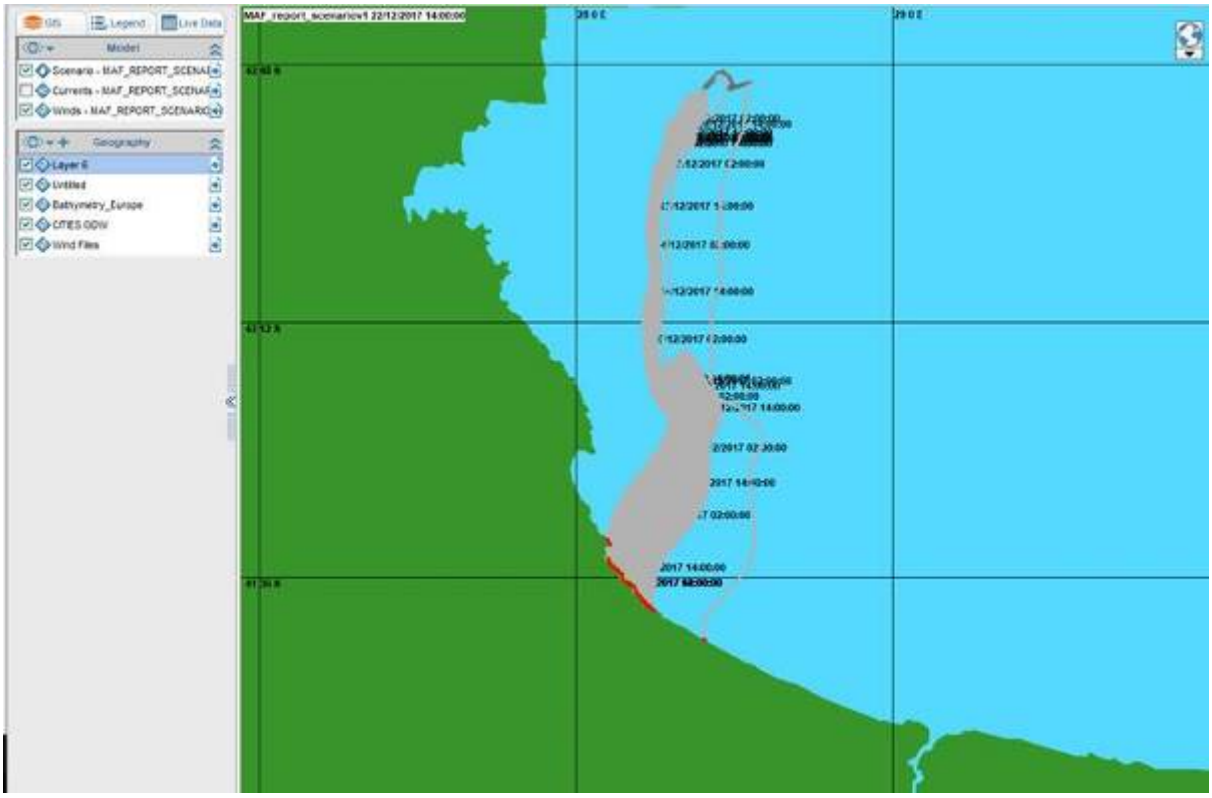


Fig.3 - The trajectory model shows that after 12 days all the oil would reach the shoreline of Turkey

EMSA total storage capacity mobilised

The resources available in the Black Sea (*Enterprise* and *Amalthia*), the East Mediterranean Sea (*Alexandria*), the Aegean Sea (*Aktea OSRV*), and Central Mediterranean (*Balluta Bay, Santa Maria*) would be mobilised due to the length of the 'window of opportunity'. The total storage capacity of these EMSA vessels is **22,207** m^3.

Oil recovery cycle analysis

Step 0: Mobilisation time: 24 hours.

Step 1: Sailing time to spill site: ranging from approx. 4 hours (*Enterprise*) to 4 days (*Balluta Bay* and *Santa Maria*)

Step 2: Recovering oil:

2.1. Spill area: Open sea.

2.2. Oil recovery device: Rigid sweeping arms.

2.3. Pump type and capacity: 2 x PDAS pumps (150m^3/h max. capacity per pump at 33%)

2.4. Daily hours recovering oil: 12 hours (1 cycle); 6 hours (second cycle); 3 hours (third cycle and onwards)

2.5. Time necessary to fill the tanks: Varies from 2 days (*Santa Maria*) to 4.5 days (*Amalthia*). On the other hand, Alexandria was not able to fill in tanks as the limit of the 'window of opportunity' has already passed before that.

2.6. Pollutant recovered: The total quantity of oil-water emulsion for the whole period (12 days) recovered by the 6 mobilised vessels equals to **31,644 m^3**. The quantity of recovered pure oil would be **11,270 tonnes** (23% of the total quantity of 50,000 m^3 spilled oil).

Step 4: Discharging: 24 hours per vessel

Summary of EMSA potential contribution to the Bourgas incident

Vessel Name	Distance from home port to spill Site (Nm)	Time to reach spill site (days)	Storage Capacity (m^3)	Recovered oil water emulsion (tonnes)	Recovered pure oil (tonnes)
Enterprise	35	1.15	1,374	3,838	1,261
Amalthia	95	1.40	5,154	7,629	2,701
Santa Maria	960	5.00	2,421	3,874	1,356
Balluta Bay	965	5.02	2,800	4,480	1,568
Alexandria	807	4.36	7,458	6,772	2,628
Aktea OSRV	470	2.96	3,000	5,052	1,756
	Total:		**23,802**	**31,644**	**11,270**

MS resources in the area

Country	Vessel Name	Vessel Type	Storage Capacity (m^3)	Heating system	Specialised Oil spill recovery equipment
BULGARIA	RUSALKA	Oil recovery vessel	128	No	Booms and skimmer
ROMANIA	GROZAVUL	Multipurpose	No	No	No
ROMANIA	MSV TIRRENO	Offshore supply	190	No	Booms and skimmer
ROMANIA	HERCULES	Multipurpose vessel	No	No	Booms and skimmer
ROMANIA	MAI0201	Offshore Patrol Vessel	No	No	No
ROMANIA	NICOLAE ZEICU	Multipurpose vessel	100	Yes	No
ROMANIA	BUCURESTI	Offshore supply	No	No	Booms and skimmer
ROMANIA	ASTANA	Offshore supply	No	No	No
ROMANIA	GSP QUEEN	Tug	No	No	No
ROMANIA	GSP KING	Tug	No	No	No
ROMANIA	GSP ALCOR	Tug	No	No	No
ROMANIA	GSP ANTARES	Tug	974	Yes	No
ROMANIA	GSP Orion	Tug	1,000	No	No
	Total:		**2,392**		

Scenario 2: Genoa, Italy (hypothetical scenario using OILMAP)

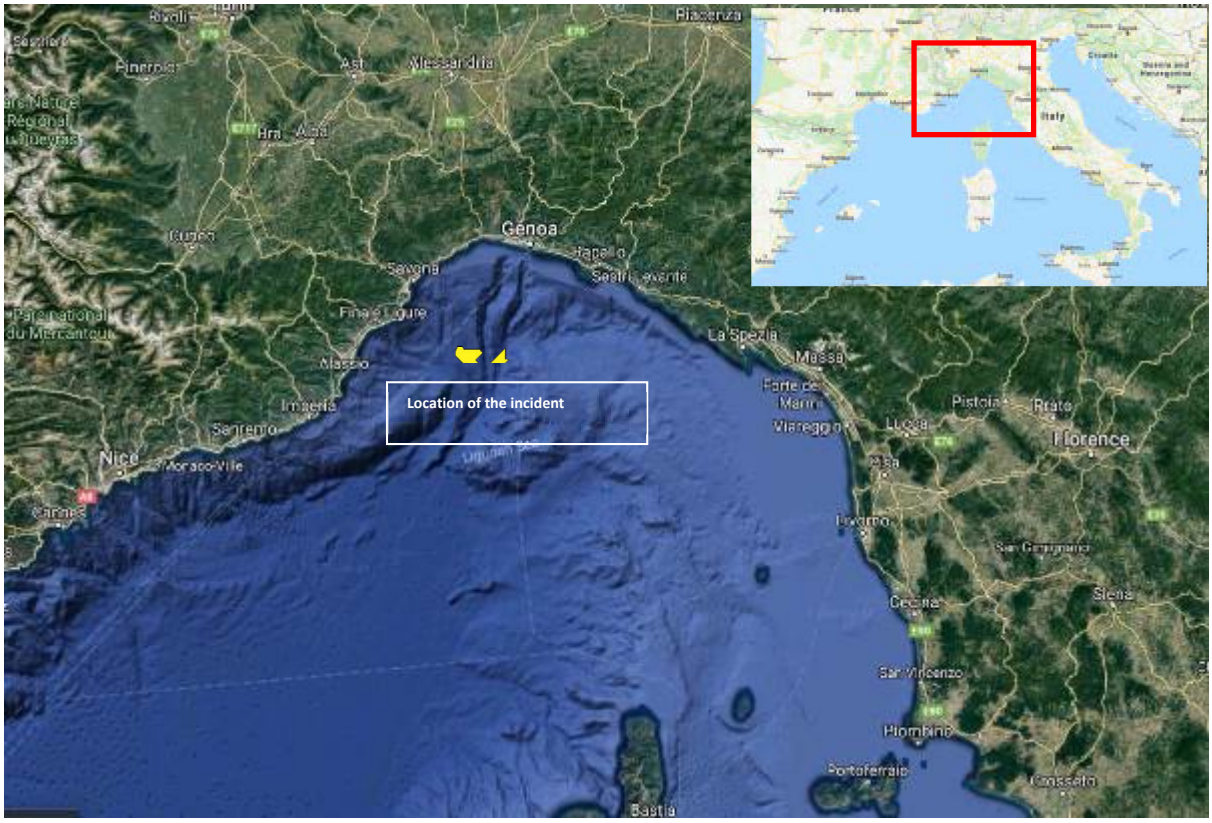


Figure 4 – Location of the Genoa incident

-
- Genoa, Italy
- Location: 42°57’N; 8°42’E
- Type of oil: Bunker C heavy fuel oil
- Quantity spilled: 50,000m^3
- Type of release: Continuous 24 hours
- Distance from shore: 30 nm
- Wind: Variable

Window of opportunity for mechanical recovery

There were moderate winds at the time of the spill. For the duration of the model (14 days) the spill was floating in open sea without reaching the shore. In any case, for the purpose of the calculation the 'window of opportunity' considered was **20 days**.

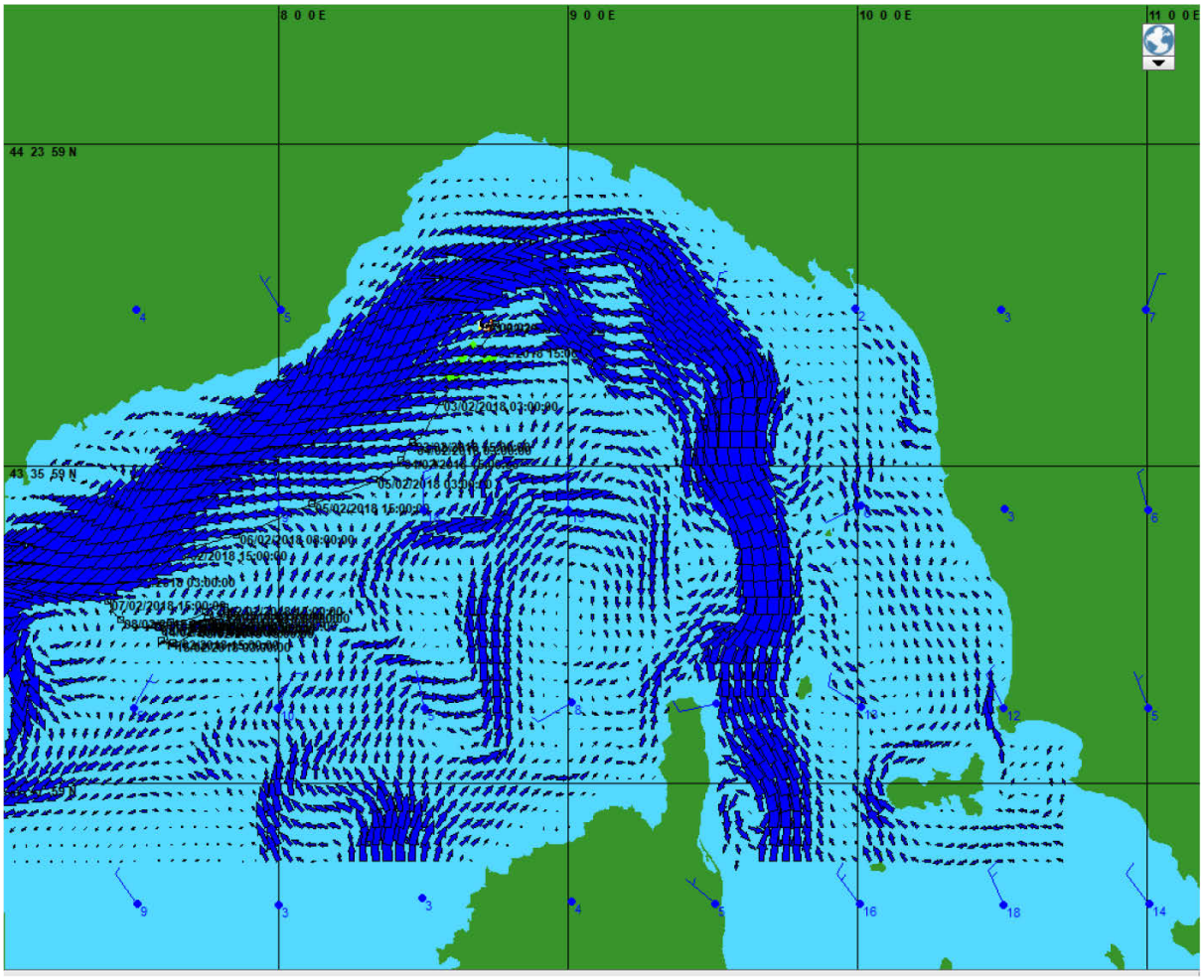


Fig.5 - The trajectory model shows that after 14 days the oil slick is still not reaching shore

EMSA total storage capacity mobilised

The resources available in the West Mediterranean Sea (*Monte Anaga* and *Brezzamare*), Central Mediterranean (*Balluta Bay, Santa Maria*) and Adriatic Sea (*Marisa N*) and would be mobilised due to the length of the 'window of opportunity'. The total capacity of these EMSA vessels is **14,140 m^3**.

Oil recovery cycle analysis

Step 0: Mobilisation time: 24 hours.

xxxxxxxxxxxxxxxxxxxxxxxxxxxxx. **Step 1: Time to spill site:** ranging from less than 3 hours (Brezzamare) to almost 5 days (Marisa N)

Step 2: Recovering oil:

2.7. Spill area: Open sea.

2.8. Oil recovery device: Rigid sweeping arms.

2.9. Pump type and capacity: 2 x PDAS pumps (150m^3/h max. capacity per pump at 33%)

2.10. Daily hours recovering oil: 12 hours (1 cycle); 6 hours (second cycle); 3 hours (third cycle and onwards)

2.11. Time necessary to fill the tanks: Varies from 1 day (*Marisa N*) to almost 3 days (*Monte Anaga*).

2.12. Pollutant recovered: The total quantity of oil-water emulsion for the whole period (12 days 0 recovered by the 5 mobilised vessels equals to **43,739 m^3**. The quantity of recovered pure oil would be **12,141 tonnes** (24% of the total quantity of 50,000 m^3 spilled oil).

Step 4: Discharging: 24 hours per vessel

Summary of EMSA potential contribution to the Genoa incident

Vessel Name	Distance from home port to spill site (Nm)	Time to reach spill site (days)	Storage Capacity (m^3)	Recovered oil water emulsion (tonnes)	Recovered pure oil (tonnes)
Brezzamare	29	1.12	3,288	10,518	2,893
Monte Anaga	850	4.54	4,069	9,766	2,930
Santa Maria	560	3.33	2,421	8,432	2,267
Balluta Bay	560	3.33	2,800	8,912	2,454
Marisa N	1,140	5.75	1,562	6,111	1,597
	Total:		**14,140**	**43,739**	**12,141**

MS resources in the area

Country	Vessel Name	Vessel Type	Storage Capacity (m^3)	Heating system	Specialised Oil spill recovery equipment
FRANCE	ABEILLE FLANDRE	Emergency Towing Vessel	No	No	No
FRANCE	JASON	Oil recovery vessel	1,000	Yes	Sweeping arm, booms and skimmer
FRANCE	AILETTE	Oil recovery vessel	480	Yes	Sweeping arm, booms and skimmer
ITALY	LUIGI DATTILO	Offshore patrol vessel	495	Not specified	Booms and skimmer
ITALY	UBALDO DICIOTTI	Offshore patrol vessel	495	Not specified	Booms and skimmer
ITALY	SPICA	Oil recovery vessel	267	Not specified	Booms and skimmer
ITALY	TITO	Oil recovery vessel	218	Not specified	Booms and skimmer
ITALY	KORAL	Oil recovery vessel	205	Not specified	Booms and skimmer
ITALY	SECOMAR QUATTRO	Oil recovery vessel	308	Not specified	Booms and skimmer

ITALY	ESINO	Oil recovery vessel	238	Not specified	Booms and skimmer
ITALY	IEVOLI RED	Oil recovery vessel	218	Not specified	Booms and skimmer
ITALY	IEVOLI WHITE	Oil recovery vessel	218	Not specified	Booms and skimmer
ITALY	SANTANGELO	Oil recovery vessel	203	Not specified	Booms and skimmer
SPAIN	PUNTA MAYOR	Multi-purpose vessel	198	No	Sweeping arms, booms and skimmer
SPAIN	SAR MASTELERO	Salvage tug	No	No	No
SPAIN	LUZ DE MAR	Multi-purpose vessel	287	Yes	Sweeping arms and skimmer
SPAIN	MARTA MATA	Salvage tug	No	No	No
SPAIN	MARIA ZAMBRANO	Salvage tug	No	No	No
	Total:		**4,830**		

Scenario 3: Prestige (based on the actual past incident)

Figure 6 – Location of the Prestige incident

- Date: 13 November 2002
- Incident area: Off Cape Finisterre, Galicia, Spain
- Vessel type: Single-hulled oil tanker
- Built date: 1976
- Length: 243.50 m
- Draught: 14.00 m
- Flag: Bahamas
- Cause of spill: Hull damage and sinking
- Type of cargo: IFO 650 (heavy fuel oil)
- Quantity transported: 77,000 tonnes (63,000 spilled and 14,000 recovered from wreck)
- First oil reached shore: 3 days after spill
- Length of coast affected: 1,900 km
- Distance to shore: 140 nm
- Prevailing winds: South West

The incident

On 13 November 2002, while some 30 nautical miles off Cape Finisterre (Galicia, Spain), the Bahamas registered oil tanker *Prestige* (81,564 DWT) began listing in adverse weather conditions and leaking oil. The vessel was carrying 76,972 tonnes of IFO 650 heavy fuel oil.

The *Prestige* incident led to four main oil releases:

First Release – Vessel Drifting Powerless, 13 – 15 November 2002

It is estimated that up to 1,000 tonnes of oil were lost initially, while drifting powerless (although on 14 November the engine ran for some hours) towards the Spanish coast from 13 to 15 November 2002. No oil recovery vessel was deployed at this time. Several tugs were deployed and one of them started to tow the vessel. The slick had a length of 37km.

Figure 7 – Tanker Prestige - the latest large spill in Europe

Second Release – Loss of Shell Plating of No.3 Starboard Ballast Tank, 15 – 19 November 2002

In the early hours of 15 November, while the *Prestige* was being towed away from the Spanish coast, a section of shell plating in the vicinity of No. 3 starboard ballast tank was lost and the rate of oil spillage increased. It is difficult to estimate the amount spilled during this period, but considering that the tank capacity, it can be estimated between 7,000 and 10,000 tonnes.

Third Release – The Vessel Sinks, 19 November 2002

On 19 November, the vessel finally broke in two and sank some 140 nautical miles west off Vigo (Spain). The bow section stayed at a depth of 3,500 metres and the stern section at a depth of 3,830 metres. The break-up and sinking released an estimated 25,000 tonnes of oil.

Fourth Release – Continuous Leaking from the Wreck

After sinking, oil continued leaking from the wreck at a slowly declining rate over several weeks. On 1 December, the French mini-submarine *Nautilus* was deployed. After the inspection of the wreck, it was estimated that the vessel was leaking oil at a rate of 125 tonnes/day.

The final amount of oil that leaked from the vessel is estimated at 63,000 tonnes. The 14,000 tonnes that remained in the wreck were recovered during an operation led by the oil company Repsol using shuttle tanks.

Window of opportunity

The oil was continuously leaking from the wreck for some weeks. One of the most efficient vessels in this incident, the *Arca*, arrived at the spill site ten days following the spill. The vessel was recovering oil for 31 continuous days, i.e. until day 41 after the incident. Other vessels, like the Danish *Gunnar Seidenfaden*, which arrived 22 days after the incident, was also able to recover oil, although with a significant lower efficiency. Two to three weeks after the spill, the efficiency of the at-sea oil recovery operation drops significantly, as the oil tends to spread over a large area and/or to break into small patches. In this situation, the vessels must spend a long time chasing the oil before recovering it. In addition, the oil will become more and more viscous when floating on the sea. Accordingly, the efficient 'window of opportunity' to recover oil at-sea has been estimated in **21 days**.

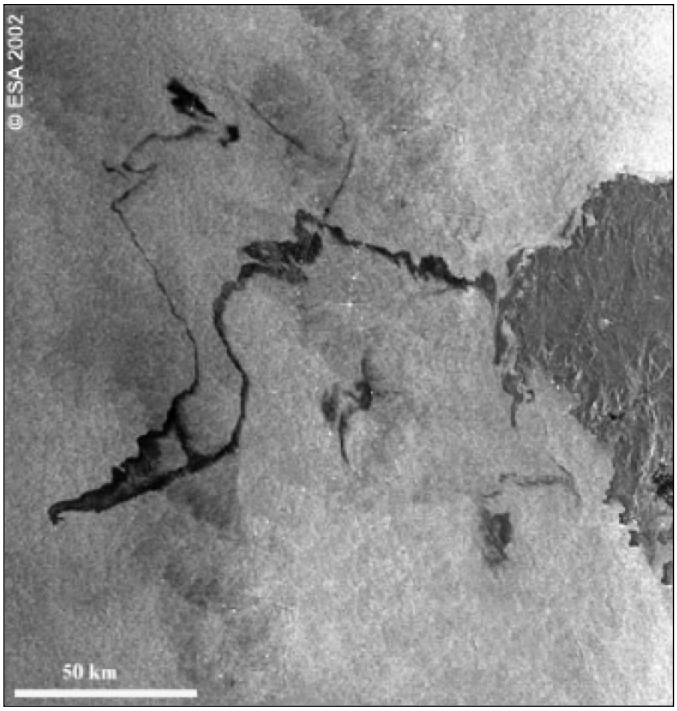


Figure 8 – Satellite image showing the main slick trajectories following the Prestige incident

Pollutant at-sea

The *Prestige* had 77,000 tonnes of fuel oil on board and 14,000 tonnes remained in the wreck. Therefore, 63,000 tonnes of pure oil spilled into the sea. Considering the percentage of water content in the emulsion approximately 120,000 tonnes of pollutant were at-sea.

EMSA total storage capacity mobilised

The resources available in the North Sea (*DC Vlaanderen, Interballast 3, Forth Fisher*), the Atlantic (*Ria de Vigo, Monte Arucas, Bahia Tres, Thames Fisher*), the Canary Islands (*Mencey*) *and Monte Anaga* (*Algeciras)* would be mobilised due to the length of the 'window of opportunity'. The total capacity of these EMSA vessels is **33,801 m^3**.

Oil recovery cycle analysis

Step 0: Mobilisation time: 24 hours.

Step 1: Sailing time to spill site: ranging from 12 hours (*Ria de Vigo*) to 7 days (*Thames Fisher*)

Step 2: Recovering oil:

2.13. Spill area: Open sea.

2.14. Oil recovery device: Rigid sweeping arms.

2.15. Pump type and capacity: 2 x PDAS pumps (150m^3/h max. capacity per pump at 33%)

2.16. Daily hours recovering oil: 12 hours (1 cycle); 6 hours (second cycle); 3 hours (third cycle and onwards)

2.17. Time to fill the tanks: Varies from 1 day (Ria de Vigo) to 5 days (*Bahia Tres*).

2.18. Pollutant recovered: The total quantity of oil-water emulsion for the whole period (21 days) recovered by the 8 mobilised vessels equals to **67,723 m^3**. The quantity of recovered pure oil would be **21,657 tonnes** (34% of the total quantity of 63,000 m^3 spilled oil).

Step 4: Discharging: 24 hours per vessel

Summary of EMSA potential contribution to the Prestige incident

Vessel Name	Distance from home port to spill Site (Nm)	Time to reach spill site (days)	Storage Capacity (m^3)	Recovered oil water emulsion (tonnes)	Recovered pure oil (tonnes)
Ria de Vigo	103	1.43	1,522	5,051	1,375
Monte Arucas	165	1.69	2,952	7,085	2,125
Monta Anaga	570	3.38	4,069	8,152	2,607
Bahia Tres	350	2.46	7,400	11,840	4,144
Forth Fisher	514	3.14	4,700	8,853	2,899
Thames Fisher	1,725	8.19	5,028	8,045	2,816
Mencey	950	4.96	3,500	7,109	2,262
Interballast III	682	3.84	1,886	5,137	1,480
DC Vlaanderen	682	2.84	2,744	6,189	1,896
	Total:		**33,801**	**67,723**	**21,657**

MS resources in the area

Country	Vessel Name	Vessel Type	Storage Capacity (m^3)	Heating system	Specialised Oil spill recovery equipment
FRANCE	ABEILLE LIBERTE	Emergency towing vessel	No	No	No
FRANCE	ABEILLE BOURBON	Emergency towing vessel	No	No	No
FRANCE	ARGONAUTE	Oil recovery vessel	1,500	Yes	Sweeping arm, booms and skimmer
SPAIN	SAPEUR	Oil recovery vessel	1,000	Yes	Sweeping arm, booms and skimmer
SPAIN	ALONSO DE CHAVES	Multipurpose vessel	25	No	Skimmer
SPAIN	PUNTA MAYOR	Multi-purpose vessel	198	No	Sweeping arms, booms and skimmer
SPAIN	SAR MASTELERO	Salvage tug	No	No	No
SPAIN	LUZ DE MAR	Multi-purpose vessel	287	Yes	Sweeping arms and skimmer
SPAIN	MARTA MATA	Salvage tug	No	No	No
SPAIN	MARIA ZAMBRANO	Salvage tug	No	No	No
SPAIN	PUNTA SALINAS	Multi-purpose vessel	145		Booms and skimmer
SPAIN	MIGUEL DE CERVANTES	Multi-purpose vessel	247	Yes	Sweeping arms and skimmer
SPAIN	DON INDA	Multi-purpose vessel	1,750	Yes	Sweeping arms and skimmer
SPAIN	CLARA CAMPOAMOR	Multi-purpose vessel	1,750	Yes	Sweeping arms and skimmer
SPAIN	SAR MESANA	Salvage tug	No	No	No
SPAIN	MARÍA DE MAEZTU	Salvage tug	No	No	No
SPAIN	MARÍA PITA	Salvage tug	No	No	No
NETHER-LANDS	ARCA	Oil recovery vessel	1,018	No	Booms and skimmer
GERMANY	BOTTSAND	Twin hull oil recovery Vessel	790	Yes	Skimmers
GERMANY	VILM	Oil recovery vessel	500	Yes	Sweeping arms
GERMANY	KIEL	Oil recovery vessel	325	No	Booms and skimmer
GERMANY	EVERSAND	Twin hull oil recovery Vessel	790	Yes	Skimmers
GERMANY	KNECHTSAND	Oil recovery vessel	400	No	Skimmer
GERMANY	NORDSEE	Oil recovery vessel	5,400	No	Sweeping arms
GERMANY	NEUWERK	Emergency towing vessel	1,000	Yes	Sweeping arms and booms
GERMANY	SCHARHÖRN	Emergency towing vessel	430	Yes	Sweeping arms
GERMANY	MELLUM	Emergency towing vessel	910	No	Sweeping arms
GERMANY	ARKONA	Emergency towing vessel	430	Yes	Booms
	Total:		**18,895**		

In the real incident, bad weather prohibited recovery operations during several days. Beside international response means, fishermen also participated efficiently in the response operations. From the 13 November 2002 until the end of December 2002, it is estimated that 18,000 m^3 of emulsion were collected.

Scenario 4: Baltic Carrier (based on the actual past incident)

Figure 9 – Location of the Baltic Carrier incident

Date: 29 March 2001
Incident area: Kadet fairway, Jutland islands (Denmark)
Vessel type: Oil and chemical tanker
Built date: 2000
Length: 175 m
Draught: 11.2 m
Flag: Marshall Islands
Cause of spill: Collision
Type of cargo: Heavy fuel oil
Quantity transported: 30,000 tonnes (2,700 tonnes spilled)
Oily waste collected onshore: 11,000 tonnes
First oil reached shore: 17 hours after the spill
Length of coast affected: 50 km
Distance to shore: 16 miles

The incident

Figure 10 – Picture of the Baltic Carrier following the collision

On the night of 28 March 2001 during a storm in the Baltic Sea (Beaufort 9 - very rough sea), the cargo vessel *Tern* collided with the oil tanker *Baltic Carrier* approximately 16 nautical miles southeast of the Danish islands Falster and Møn. The tanker was carrying 30,000 tonnes of HFO. The quantity of HFO released was estimated at 2,700 tonnes (capacity of tank number 6).

Fifteen Danish, Swedish and German vessels were mobilised to spot slicks or recover the oil. After the initial phase on Friday 30 March, it was established that vessels with shallow draught and capable of operating in shallow waters were required. Subsequently four vessels were chartered.

Window of opportunity

Excluding the first day due to adverse weather conditions, the 'window of opportunity' to recover oil at-sea was very limited due to the short distance to shore. Accordingly, it can be established at 3 days.

Estimated pollutant at-sea

According to the Danish official report, about 2,700 tonnes (by considering $1m^3 \approx 1$ tonne) of heavy fuel oil were spilled at-sea. However, due to the distance to the coast, only a part of the oil was recoverable at-sea. The National oil recovery vessels were mobilised very quickly and recovered practically all the pollutant which could be taken at open sea.

EMSA total storage capacity mobilised

Only one vessel available in the Southern Baltic Sea (*Norden*) would be mobilised due to the short duration of the 'window of opportunity' and small quantity of spilled oil. The total capacity of the vessel is **2,880 m^3**.

Oil recovery cycle analysis

Step 0: Mobilisation time: 24 hours.

Step 1: Sailing time to spill site:

Step 2: Recovering oil:

2.19. Spill area: Open sea.

2.20. Oil recovery device: Rigid sweeping arms.

2.21. Pump type and capacity: 2 x PDAS pumps (150m^3/h max. capacity per pump at 33%)

2.22. Daily hours recovering oil: 12 hours (1 cycle);

2.23. Time to fill the tanks: *Norden* was not able to fill in tanks as the limit of the 'window of opportunity' has already passed before that.

2.24. Pollutant recovered: The total quantity of oil-water emulsion for the whole period (3 days) recovered by the vessel equals to **609 m^3**. The quantity of recovered pure oil would be **913 tonnes** (22% of the total quantity of 2,700 m^3 spilled oil).

Step 4: Discharging: 24 hours per vessel

Summary of EMSA potential contribution to the Baltic Carrier incident

Vessel Name	Distance from home port to spill Site (Nm)	Time to reach spill site (days)	Storage Capacity (m^3)	Recovered oil water emulsion (tonnes)	Recovered pure oil (tonnes)
Norden	175	1.73	2,880	1,522	913
	Total:		**2,880**	**1,522**	**609**

MS resources in the area

Country	Vessel Name	Vessel Type	Storage Capacity (m^3)	Heating system	Specialised Oil spill recovery equipment
DENMARK	A561 GUNNAR SEIDENFADEN	Offshore supply	310	Partially	Booms and skimmer
DENMARK	A560 GUNNAR THORSEN	Offshore supply	310	Partially	Booms and skimmer
SWEDEN	KBV 034	Anti-pollution vessel	355	Partially	Sweeping arms, booms and skimmer
SWEDEN	KBV 001	Multi-purpose vessel	1,050	Yes	Sweeping arms and skimmer
SWEDEN	KBV 003	Multi-purpose vessel	1,100	Yes	Sweeping arms and skimmer
	Total:		**3,125**		

CONCLUSIONS

Added value

- In general, the type, size and location of the EMSA vessels are suitable to deal with major oil spills where at-sea oil recovery is possible. All the lessons learnt from past spills have been considered when designing the EMSA network. The estimated performance in the new scenarios confirms the suitability of the concept design.

- The pollution response equipment chosen by EMSA has been designed to cope with high viscosity oil and adverse weather conditions (up to Beaufort 5 approximately), taking into account the main lessons learnt from past spills.

- In general, the average individual capacity that could be mobilised is quite regular along the regions. The EMSA network has an average individual storage capacity considerably higher than other oil recovery vessels in Europe. This allows them to spend more time recovering oil at-sea.

- In the cases analysed, it has been estimated that the EMSA network would potentially recover between 22% and 34% of the pollutant at-sea. This wide range reflects the different circumstances that affect the efficiency of the at-sea oil recovery operation, especially the 'window of opportunity' available to recover oil at-sea. It must be remembered that each tonne of pollutant recovered at-sea, avoids several tonnes of solid waste onshore (up to 11 tonnes in some cases), thus dramatically reducing the environmental and socio-economic impact of any spill.

Overall Conclusion

For most of the scenarios considered, the EMSA network has proven to have a capacity to considerably reduce the amount of pollutant reaching the shore therefore reducing the environmental, social and economic impacts. For these reasons, it can be concluded that the network of stand-by oil spill recovery vessels is a powerful resource in the hands of the Member States to combat large oil spills. In all the areas analysed, EMSA would be able to mobilise, at request, a higher storage capacity than that available from National resources. Accordingly, with the current distribution and capacity, EMSA fulfils its mandate to "top-up" Member State oil pollution response capacity, as well as being a valuable reserve for disasters both from an environmental and economic perspective.