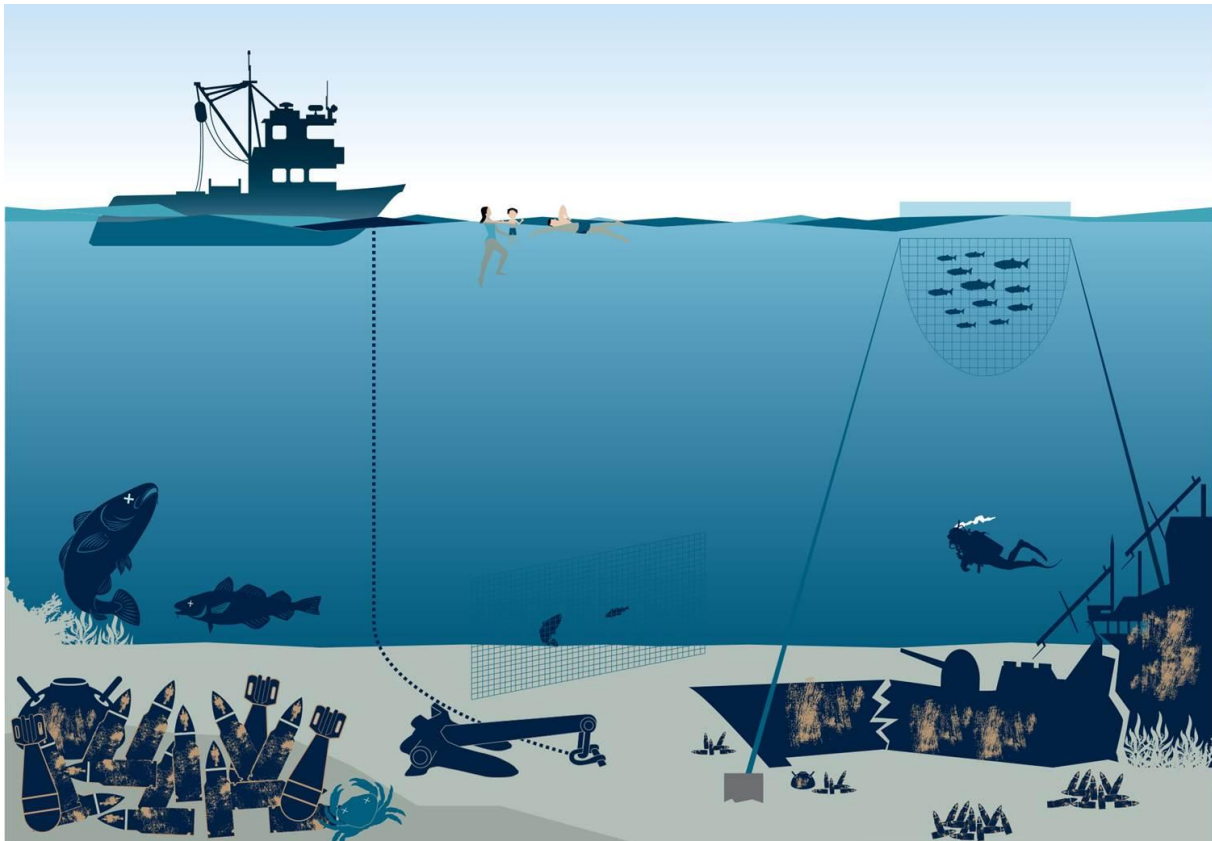

Support to the JPIO action on Munitions in the Sea
Operational proposal
Recommendations to JPI Ocean on the way forward
18 March 2019



Dumped munition and war remnants constitute a threat to the environment and to society. Illustration FFI

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BACKGROUND

Munitions in the sea is a problem that requires action in all European seas because munitions dumped in the sea or deployed during combat still rests on the sea floor in large quantities. Various types of munitions, chemical or conventional, fused or unfused, and in various states of deterioration require the development of a set of measures to mitigate societal and environmental risk.

JPI Oceans initiated a joint action on “munitions in the sea” in 2015, to facilitate research coordination and exchange of knowledge across European countries. Twelve EU countries joined the action.

The action mainly addresses the scientific and technological aspects that can contribute to provide solutions at EU level, including sharing experiences and the involvement of the relevant stakeholders in the process.

The end-users priorities and national offers have first been reviewed in order to estimate the feasibility and impact of joint activities. In October 2017, an implementation plan for the 2018 activities was agreed. This plan included the development of two workshops.

The first workshop was held in Oslo in June 2018 and was organized by RCN and FFI. It was designed in order to identify the practices and gaps to be filled. Despite that workshop was framed within a specific scenario of tackling the challenges of unexploded ordnances in areas where pipelines and cables are planned to be installed, the outputs can be considered more general for the aspects of risk assessments, remediation options and spatial planning.

A second workshop was held in Rome in December 2018 and organized by CNR. It was based on the outputs of the Oslo workshop and addressed some major aspects where research can bring substantial contributions for solutions or advances in knowledge.

In such a way, the two workshops were closely linked and the outputs of the last can be considered as the joint results of the process towards the identification of future activities where JPI Oceans can add value. Reports have been filed from both workshops.

Munition in the Sea involves diverse and interconnected aspects such as: awareness of huge amount of polluting chemical compounds and their impacts on environment and human health, social perception of the alarm, identification of options to remediate and management of risk. With increased anthropogenic activities at sea we are facing one of the most complex long-term challenges at the European level. Munitions in the Sea can be considered as one of the most comprehensive examples of multi-agent interventions. There is an urgent need for knowledge based risk/option assessments in support of implementation of the EU directives MSFD and MSPD.

The outputs of the two workshops have been presented to the JPIO Seminar and Management Board (MB) meeting held in Brussels respectively on 17 and 18 January 2019.

MB asked experts to prepare a final “operational proposal” of joint activities, specifying which funding instruments are considered appropriate, in order to evaluate the commitments. Experts were involved to prepare the following recommendations, in order to make MB representatives in a position to "commit" and start the implementation phase of the “munitions in the sea” action.

PRIORITIZED THEMES

This section describes some identified issues fundamental to manage the risk of underwater munitions to the society and environment. Specific topics fall within these overarching themes:

1. Management of underwater munition
2. Mapping and evaluation of underwater munition
3. Ecological and toxicological impact of underwater munition
4. Remediation methods

For each theme the key research questions, core deliverables and estimated timing are described. The themes are not listed in prioritized order.

1. Management of underwater munitions

1.1. Option assessment, management and public involvement

Today, we lack a common understanding of the risks that dumped ammunition represents for the environment, industry, human being and the society. A common understanding will make communication at all levels easier, as well as serving as a knowledge base on which to prioritize actions. Further more, the responsibility for managing dumped munition is often a bit unclear and the role of military and police authorities as well as private companies differ between countries.

How are dumped munitions managed in Europe and how can citizens be best informed, and potentially engaged in a way that is safe for citizens, useful, and also promotes public awareness?

How can authorities be informed to ensure that they take adequate consideration in their spatial management?

Deliverables:

- A comparative report describing how munitions are managed in European countries, including public outreach/involvement, management plans and deployed technologies.
- A report/study about how-to categorize risk from dumped ammunition for society, including humans, environment and industry, to facilitating decisions. The study should include identification of alternative interventions and the their consequences.
- Scouting/developing/introducing tools for supporting decisions and options assessments.
- A standardised decision making process

Timing: 1-3 years

2. Mapping and evaluation of underwater munitions

2.1. Mapping and imaging of munition dump sites

In many European waters we are still unaware of the present of munitions. Where are underwater munition present, and what types do they represent? Are munitions buried or proud, and are they found individually or in clusters? In planning of interventions access to existing information in maps is basic and important to avoid conflicts. Mapping is primarily a national responsibility within territorial waters, but in international waters collaboration would be beneficial.

Deliverables:

- Maps of munition dump sites as a basis for management and risk assessment (e.g. do the dumped munitions constitute any immediate threat to the environment or society, and how can the risk be managed)?
- Work out a joint protocol for how to make good maps for this kind of interventions.
- Create data sharing policy on European level

- How to map large areas more effectively and cost-efficiently according to the task?

Timing: 1-3 years

2.2. Improved technology to find and classify munition at sea.

Technologies need to be improved to better detect buried munition objects and to classify the type of munition and its corrosion status. Acoustic, optical and magnetic sensors are available to find dumped munition, but such technologies are often developed for military purposes and are expensive or unavailable. The military and civil communities have joint interests in such technologies, and the dual use should warrant reduced cost.

Deliverables:

- Cost effective technology to find and classify munition on the sea floor and buried in the sediments.
- Initiate a market for munition clearance services to reduce the cost?
- Networks of infrastructures or testbeds for experimentation with trans-national access.

Timing: 5-10 years.

2.3. Aging of munition

How quickly does underwater munition corrode in different regions and how does the chemical compounds age? What is the risk of current and future spontaneous detonations or chemical release? What hydrodynamic and biogeochemical factors control chemical release from underwater munitions? What chemical composition is contained in the UXOs, and how does this impact factors such as water solubility, destabilization and toxicological risk?

Deliverables:

- Better understanding of corrosion processes
- Better understanding of chemical destabilization of explosives in water.

Timing: 3-5 years

3. Ecological and toxicological impact of underwater munition

3.1. Ecological status of munition contaminated sites

To what extent are dump sites different from non-dump sites, and how has presence of munitions affected exposed organisms and ecological structure and function? What represents environmentally-relevant levels of munitions compounds and their degradation products in water, sediment and biota? What processes determine the persistence and fate of these compounds?

Deliverables:

- Increased understanding of the toxicity of munition compounds in the marine environment, including ecological effects (important to risk assessments).

Timing: 3-5 years

3.2. Fate of munition contaminants

To what extent are munitions compounds taken up by and accumulated in marine organisms, and does exposure to environmental levels have deleterious effects on organisms or human health via seafood consumption?

Deliverables:

- An increased understanding of the fate of munition contaminants and the risk that such compounds can end up in human seafood.
- Use of state-of-the-art oceanographic models, combined with field and experimental chemical data to produce realistic and reliable predictions of contamination release from underwater munitions?
- Networks of infrastructures or testbeds for experimentation with trans-national access.

Timing: 3-5 years

4. Remediation methods

4.1. EOD techniques analysis.

The safest and most cost-effective way to remediate (remove) munitions is often to simply detonate them on site (demolition). This creates shock waves which constitute a risk to the surrounding environment and sometimes also existing infrastructure. Pros/cons analysis and sharing of different techniques can impact on cost efficiency.

Deliverables:

- Assessment of effectiveness of “compact” cost effective bubble screens and assessment of effectiveness of deterrence devices (especially at larger distances from the detonation site), but also testing of alternative detonation strategies (e.g. at the surface, or low order deflagration).
- Toolbox (report/ handbook) of validated risk mitigation techniques, including pros and cons for others than detonation, and decision support aid (what measures are appropriate for what type of situations) including and how to balance environmental risk against other factors (risk for humans, chemical pollution, cost).

Timing: 3 years

4.2 EOD techniques and risk mitigation.

Development of effective and validated remediation techniques and mitigation measures appropriate for different circumstances (dump sites, projects, ad-hoc EOD clearance) is needed.

- Networks of infrastructures or testbeds for experimentation with trans-national access.
- Risk mitigation measures for the divers- increased knowledge of safe handling of chemical and conventional munition.
- Improved model predictions of shock wave propagation and better understanding of threshold of impact on infrastructure and marine life (marine mammals, wild and farmed fish, possibly also other species such as invertebrates or turtles).

Timing: 3-5 years

POSSIBLE FUNDING INSTRUMENTS

The previous chapter described thematic needs as possible initiatives. There is a need for research, for exchange of experience, development of common practice and common standards. In addition, this include a need for cooperation across sectors and between the military and the civil society.

JPI Oceans dispose several instruments as joint calls, workshops, working groups, access to each other's infrastructures and instruments. We have to consider which instruments are the appropriate ones for following up the different needs. The members of the activity have different capacities and specifics to join the operational phase with a diversity of contributions.

RECOMMENDATION TO THE JPI-OCEAN MANAGEMENT BOARD

- Establish a working group (in kind participation) with annual meetings/workshops for sharing experience and practices and develop the reports, studies and standards described above.
- Consider a joint call to address some of the research themes described above. Assess how many countries can contribute to a joint call for research projects.
- Establish a network of infrastructures or testbeds for experimentation with trans-national access.