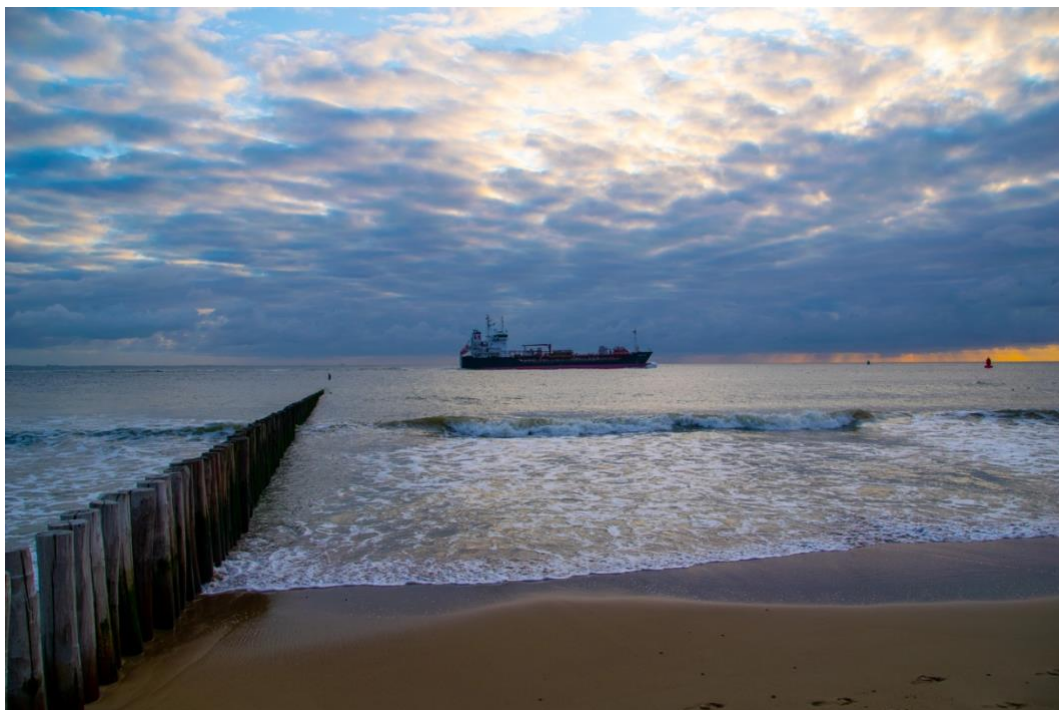*One Incident, One Response*
Towards a Framework for
Holistic and Integrated Management
of Maritime Incidents

Guidelines and Recommendations
Final
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	One Incident, One Response Towards a Framework for Holistic and Integrated Management of Maritime Incidents Guidelines and recommendations
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1 Introduction

This document provides a proposal for 'a framework for holistic/integrated management of marine emergencies involving at-sea response and on-shore response'. The proposal is the result of work package 6 of the IRA-MAR project (2022-2024), which was co-financed under the Union Civil Protection Mechanism (UCPM). The proposal was developed based on a background study, a questionnaire, a series of interviews, and a workshop which were also carried out as part of the IRA-MAR project. The findings from that study are summarised in chapter 2.

The proposed framework aims to provide a set of coherent perspectives and tools that allow maritime and coastal authorities to innovate their day-to-day collaboration in preparing an effective joint response to the complex maritime and coastal incidents of tomorrow. Implementing the framework is a journey that requires its participants to have a joint vision and a common understanding of the reason why this journey should be undertaken. This is explained in chapter 3. The aim for the journey is coined with the term '*One Incident, One Response'*, which has a philosophy, approach and methodology explained in chapter 4.

The aim of the framework is to provide a structure for progressively working towards a state of preparedness in which a timely and effective response can be delivered by authorities collaborating to act together as one. The approach of the One Incident One Response philosophy focuses on the response requirements of the "family of scenarios" in maritime incidents and the question what a timely and effective response should look like. It uses a scenario-driven methodology in which authorities and their experts jointly explore, recalibrate and define the response tasks that emerge from these scenarios. In that process also the less common, or possible future scenarios can be explored which may result from observed trends and changing risk profiles. The knowledge and insights from this methodology will inform authorities about possible weaknesses or identified gaps in their respective multi-disciplinary contributions and how to deal with them (investments, resources, training, exercises). The ideal state of a cross-sectoral response preparedness system should be that is proactive, effective, and can quickly anticipate the potential aspects of an unfolding scenario by having resources ready to intervene in short windows of opportunity. The OneX serious game tabletop package was developed as a prototype of tools that can visualise wide ranges of scenarios and that encourage and facilitate structured multi-disciplinary discussions between participants.

The proposed framework for implementing such holistic and integrated management is presented in chapter 5, and provides an overview of mechanisms that together can be tuned to direct processes of change. The framework is scalable as it can be used for the preparedness building of one authority system, a national response system, groups of regional authorities, or a system of international mutual assistance collaboration.

Chapter 6 presents the recommendations on how the proposed framework can applied to implement the philosophy.

2 Changing risk profiles in a changing world

The background study sketches a world in change, impacting the near- and off-shore environments, society and the maritime sector. Many changes are human-made, and are the result of a rapid implementation of the energy transition in a global effort to stop and limit climate change processes. The fast expansion of wind and solar energy farms at sea is an example of changes that increasingly become visible in the marine environment. Other changes aim at reducing the emission of marine vessels (introduction of low sulphur fuels) on the short term, and at net-zero on the long term. On the short-term, vessels can easily switch to the low sulphur fuels, but on the longer term considerable investments have to move the global fleet towards the net-zero target.

Climate change processes are expected to change various environmental conditions at sea. There will be changes in the sea temperature, resulting in changes in the physical and chemical properties of warming seawater. The rising sea level may eventually lead to changing nearshore currents and flooding risks, and challenges for harbours. More frequent extreme weather events are already reported, such as storms, periods of heavy rains and flooding, and periods of droughts.

Some of the above changes are going fast, others have a slower pace. They are leading to an array of changes in the design and operations of vessels, supply chains, and physically in the marine environment, for example to support the energy transition via renewables. Infrastructure is appearing at sea, both offshore and nearshore and with connecting cables, pipelines and related vessel dynamics for the building and maintenance of the installations. Global marine trade will follow the changes to keep serving society with supply chains for new fuels (hydrogen, methanol), energy carriers (e.g. ammonia, batteries), electrical vehicles and devices, and anything else to keep up with the changing trends, needs and demands.

Vessels are also changing as they become larger and propelled by changing energy systems which must be bunkered and stored onboard for long journeys. Harbours have to keep up with sea level rise, but meanwhile invest into the storage of new fuels, accommodation of producers of the new energy (e.g. hydrogen plants) and accommodate the expanding fleets of the offshore industry that build and maintain the growing offshore infrastructure. There will be more vessel traffic between harbour and offshore infrastructure, while the traffic patterns of trade vessels will change, following the global dynamics of demand and supply. Climate change will also increasingly free up Arctic routes from ice, which also will increasingly influence the routes and intensity of shipping in different regional seas, changing risk patterns. Extreme weather events in addition can create a variability of fast changing or enduring challenging weather conditions for operators at sea, in waterways, in harbours and on the shores. Storms in the coastal zone can lead to damage of infrastructure or floodings which could also lead to pollution events in waterways and the coastal zone.

The ongoing developments go fast and have both new and large-scale dimensions. Whereas the 'new' (e.g. renewables, net zero fuels) is positive, promising, exciting, urgently needed, and subject to large scale governmental and industry investments, the 'large-scale' aspects in combination with the fast pace are becoming a topic of attention and concern with some stakeholders. Maritime insurers are seriously monitoring the scope and complexities of new

risks that are related to these processes, and have little evidence about insurability of vessels, cargo and third party liabilities in relation to safety and risk profiles of the multiple technological innovations that are already becoming visible on the market and on drawing boards.

The changes that are becoming apparent should also become a principal topic on the national and international agenda of the maritime and coastal emergency response communities. The probability of new and previously unknown risks and incident profiles are emerging and may at some point grow out of the scope of the existing emergency preparedness systems which were developed based on historic marine incident experiences. Already the effectiveness of existing oil spill response equipment has become more limited now that vessels are increasingly running on low-sulphur oils, which have properties and behaviours that are different from traditional fuel oils.

In conclusion, the developments described above require pro-active thinking about new risks, the changing environment, the new scale of scenarios that may become apparent, scale and type of investments (vessels, equipment, expertise) needed to keep up with the changing risk profiles, and a tightening up of marine and coastal crisis management systems.

3   Difficulties of getting the response right

Regarding marine pollution incidents, the cooperation between maritime and coastal authorities is of crucial importance when a pollutant approaches and/or starts affecting the coastal area and its communities. Vessel incidents could happen close to the shore, in semi-enclosed waters such as estuaries, or harbours. Depending on the circumstances, cargo can be lost, damaged or get on fire. Substances of all kinds, including fuels, could possibly get released into the environment, via gas clouds, drifting slicks, high concentrations in the water, or as drifting packaged objects. Incidents can also involve ageing or new infrastructure such as pipelines, cables or installations in the onshore, nearshore or offshore. The closer to the shore these incidents happen, the more immediately coastal communities can be exposed to the potential effects.

Many stakeholders in the coastal zone could experience serious losses from such incidents in terms of environmental safety, health, biodiversity, or economic damage. A range of authorities, including ministries, agencies, institutes, regions, provinces, and municipalities, may have defined different roles and responsibilities in the response to such a scenario, with the overall intention to prevent damage and escalation, protect lives and properties, mitigate risks and impacts. In the case of a lack of awareness, lack of planning, and lack of understanding of the complexity of such scenarios and lack of trained and exercised resources, the right decisions may not be clear, not be taken, or not taken in time, to prevent further escalation. A long diverse coastline with multiple administrative divisions and multiple actors with little previous experience and unrealistic expectations of each other's capabilities and limitations will make an effective response more complex and harder to get right.

Complex maritime and coastal incidents have happened over the years, but they do not happen very often. When they do happen, the impact of a scenario on a coastal community can be large. These types of scenarios have therefore a so called high-impact, low-probability (high-low) profile. Because of the low probability (low documented or assessed frequency) authorities are not often challenged or motivated to work closely together at this scale in the sea-coast interface. Because of the high-low profile, coastal pollution scenarios also rank low in the list of regular exercises that each authority is working from. This means that marine incident scenarios may be discussed during risk assessment processes, but they are not frequently exercised.

This leaves a persistent but ungrounded assumption that the response will be effectively tackled in a real situation so long as all authorities are gathered around the table and switch to 'crisis-mode'. Such a gathering may be organised occasionally during an exercise with one scripted scenario, but these events seldomly scratch beneath the surface of a real situation.

The sometimes-high turnover of employees in critical authority roles further challenges the development of robust subject matter expertise that is needed to proactively manage the crisis. Decision making may fall back to directors who are not subject matter experts. They can often be advised by subject matter experts who also deal with such a scenario for the first time, without much experience from training, drills and exercises. These shortages in experience become apparent at critical moments when scenario analysis and pro-active

response decision making is required. Failing coordination and alignment resulting from these shortages will easily lead to windows of opportunity being missed, wrong decisions, escalation of the level of complexity, potential loss of life, larger economic costs, longer recuperation times, potential damage to reputation.

4 One Incident, One Response

4.1 The philosophy

The *One Incident, One Response* philosophy recognises that the success of responding to the complexity of a marine and coastal pollution incident depends on the degree in which multiple responsible authorities can jointly respond to emerging challenges from a given scenario *as if they were 'one'*. Responding *as one* in the future would mean that a group of actors with different roles, responsibilities and resources are able to work to the same goals, having a good understanding what these goals are, and how they can be achieved in a wide range of present and future scenarios (see Box 1). This needs to be enabled by a joint incident management system that is tailored to the family of scenarios (marine and coastal incidents), that connects and structures pre-identified resources and makes things work. That system is populated by personnel from different authorities and contractors who are jointly trained and exercised on multiple scenarios, able to recognise patterns and characteristics of the unfolding scenario, take proactive decisions, and can achieve consistency of operations across (or despite) administrative borders.

Box 1: Keeping up with the characteristics of future marine and coastal emergency scenarios that may emerge as a result of changing risk profiles.

To keep up with the characteristics of future scenarios, a tailored emergency response system should be:

- 'Holistic' in its continuous monitoring of global trends of anything that may affect what is considered a 'normal' risk scenario. This includes e.g. climate change trends, globalisation trends, geopolitical trends, AI trends, social-economic trends, political trends, etc.
- 'Integrated' in its aim that multiple governmental agencies and non-governmental services (contractors, specialists, NGOs) can effectively work together to deliver a timely, coordinated response, as if they were one.
- 'Out of the box' in its ability to explore new types of risk profiles with a series of less known or so far unknown scenarios to detect potential gaps in the existing capabilities of 24/7 emergency response agencies and their contracted resources.
- 'Extended' in its ability to fill these gaps, e.g. a) by extending the remits of the main 24/7 emergency response agencies and their contractors to deal with the identified challenges, or b) by extending into future 24/7 capabilities that can be developed in collaboration with civil community resources. This could include for example, scientists, rangers, fishermen, NGOs or volunteers who would be invited to fill specific gaps in a response and be empowered (education, training, exercises) to professionalise their assistance under emergency response conditions.

4.2   The approach

The approach of the One Incident One Response philosophy focuses on the response requirements of the "family of scenarios" in maritime incidents and the question what a timely and effective response should look like.

The approach to implement this philosophy is to focus on the response challenges from wide ranges of scenarios, and encourage "out of the box"-thinking as apposed to "tunnel vision"-thinking. The focus of the approach is to explicitly explore and discuss
1. what an effective approach to any given scenario should be, what it aims to achieve
2. which requirements this puts on resources, their availability and readiness, and the skills of a management system that deploys and operates them
3. which gaps, inconsistencies, and shortcomings of the existing response system this may reveal and what to do about it.

4.3   The methodology

The methodology that implements the philosophy is the application of discussion-based, scenario-driven exercises in which representatives of different key authorities participate. Such exercises aim at to jointly explore the required capabilities, resources, networks and management structure that are needed to effectively respond to challenges in a wide range of scenarios. Discussion-based exercises are designed to facilitate participants to share knowledge and learn from each other. In this way they make sure that all participants can develop a good understanding of a given scenario and the technical options (or limitations) that should be considered to mount an effective response. Together they list the resources needed, the timeline and duration of deployment, and expected effectiveness. They also analyse room for escalation if a strategy would not work, or if circumstances are not ideal.

By design, the discussions between the participants must take place regardless of who would be responsible for the identified tasks, or where the resources should come from. This is achieved by using an anonymous, fictitious setting for the scenarios considered.
Once participants are on the same page with what they think is needed, they can explore how much of what is needed is available from their own authorities and various contractors. In doing so they will be able to detect potential weaknesses or important gaps in the existing emergency response setup. As such, the methodology tests and recalibrates the assumptions that different actors may have of what is there and what is not (the second approach above in section 4.2), and possible restrictions or limitations in the use of resources.

The design of fact-finding discussions using a range of scenarios which must be analysed will stimulate active learning. Participants do not only learn from each other to analyse what the response needs of each scenario are, and which kind or resources should be applied. They also learn about key characteristics of managing a response, the essential contribution their own organisation is able to make, and if the success of that contribution will also depend on contributions that others have to make. The methodology will therefore lead to insights and processes of creativity in which alternative response strategies can be discussed, and which could be tested in practice as part of scheduled field exercises. In other words, the

methodology can also be used to train decision makers and for building trust and valuable mutual relationships within a community of responders who will have to manage a crisis.

The methodology can also be used to explore or clarify the contribution that international actors and resources could make to a national response and how such resources could be integrated into the national system to fill gaps, especially when there is a need to scale up.

A pilot for illustrating this methodology was developed under the IRA-MAR project (see Box 2).

Box 2: The OneX Serious Games package
As part of the EU funded IRA-MAR project, an innovative family of interactive 'serious games' named OneX was developed, as a pilot and demonstration of the kind of discussion-based and scenario-driven exercises that can be used to demonstrate and practice the *One Incident, One Response* philosophy. The OneX serious game package is therefore an illustration of the methodology as described in section 4.3. The OneX games facilitate cross-sectoral discussions by visualising scenarios that players (representatives from different authorities or other actors involved in a response) themselves can create and change. Through a process of active learning, participants can playfully discover and understand the aspects that must be considered in dealing with a response (e.g. planning, logistics, operations, finance, communication), the resources that are needed, and the scope of gaps that potentially could undermine the effectiveness of a response. The OneX game package is built around interactive and engaging scenario simulations in which participants can playfully co-create and explore multiple scenarios in a short time frame. The picture below shows the use of the pilot OneX package at an IRA-MAR workshop in Brussels

5   The framework for implementation

The framework proposed in this chapter can be used to implement the *One Incident, One Response* philosophy. As such the framework can be considered by single authorities, groups of authorities, or groups of neighbouring countries, in their efforts to improve their holistic and integrated management of marine and coastal incidents.

The proposed framework for implementation of the *One Incident, One Response* philosophy is illustrated in Figure 1, and explained in this chapter.
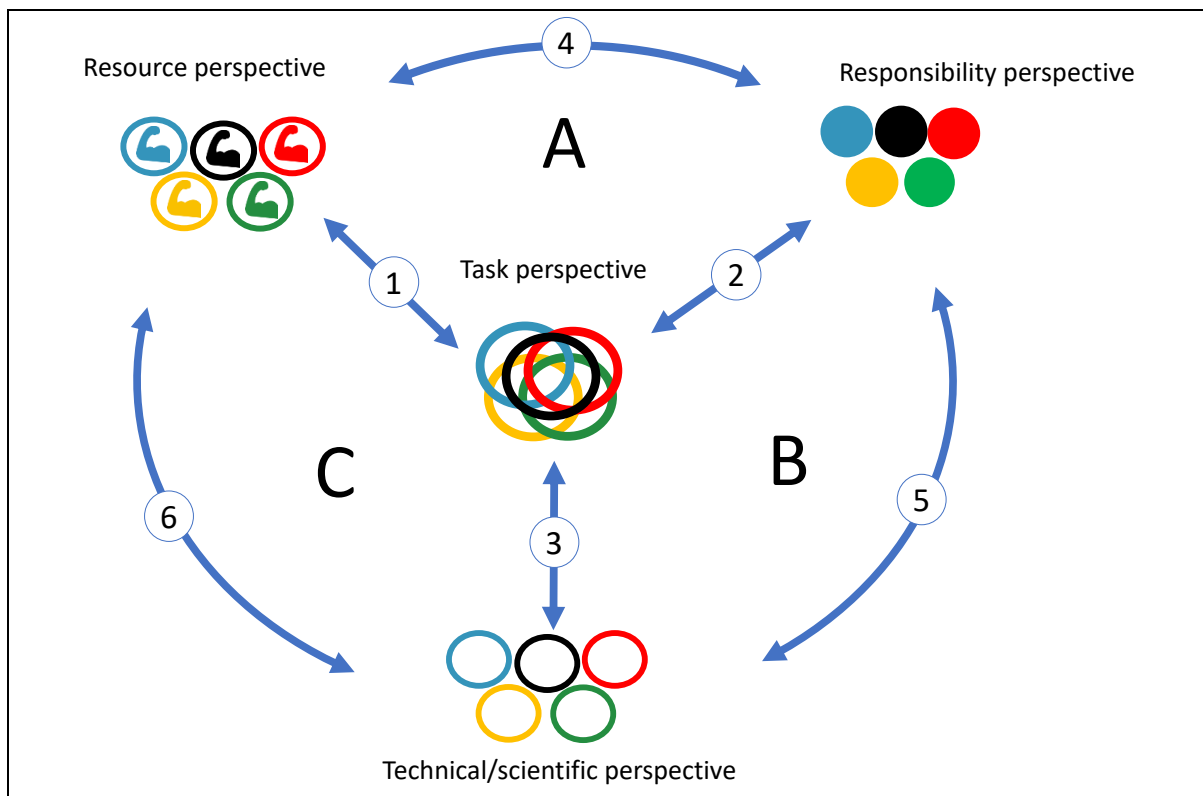

Figure 1: The framework for implementing the *One Incident, One Response* philosophy, as explained in this chapter. The framework consists of four perspectives that represent important pillars that an emergency preparedness system must be built on (see section 5.6.1). The arrows (numbered 1-6) represent the interactions that exist between the perspectives (see section 5.6.2). The letters (A,B,C) signify the underlying domains in which these twelve interactions take place (see section 5.6.3). These are relevant to identify who the main players in each of these domains are, and what they can do to influence the interactions. The symbols are based on 'Olympic rings' which are explained in the text (see section 5.4).

5.1   Explanation: Use of the framework by an entity

This Framework can be used by an entity that has a statutory responsibility for participating in an authority-led response and that is committed to have in place adequate resources that are ready to be deployed to deal with the challenges of a scenario related to this defined responsibility (**Responsibility perspective**). This entity will have identified which core-business tasks it must commit to as part of its statutory responsibility and the kind of

resources that ought to be in place to cover these defined tasks as part of that commitment (**Task perspective**). The entity has actioned these insights into a set of resources that have been developed, and that are trained, exercised, and ready to take care of the assigned tasks (**Resource perspective**). The entity is also aware of a wealth of nationally and internationally subject matter information, tools, and markets, including scientific papers, reports and insights, research programmes, international good practices, risk assessment studies, equipment based on latest technological innovations, etc. that can be consulted for planning purposes and making improvements in capabilities, strategies, tactics, effectiveness of resources, management systems, etc. (**Technical/scientific perspective**).

The entity is increasingly aware that the world (and risk profiles) are changing. How and when should the entity start to recalibrate if its preparedness is still up to par? Also for partner-entities who have a complementary share in the overall responsibility? What is, or should be the starting point of that process?
Passively the entity could wait for an incident to see if the system works. Actively the entity may call its partner-entities to thoroughly explore the potential new challenges from scenarios belonging to the future family of scenarios. That is where the framework can be used to design, manage and monitor the re-calibration and adjustment process at various levels:

- At single entity level, in your own organisation
- At multi-entity level: the regional or national crisis management system
- At international level: mutual assistance agreements and EU service arrangements

5.2 Perspectives and interactions between them

The four perspectives of the framework form the pillars of any emergency (or crisis) response preparedness system. The perspectives are closely connected and continuously interacting with each other from day to day, which is symbolised by the arrows between them. The aim of the proposed framework is to highlight interactions in a graphic representation, so that they can become tools for change and improvement of the system. It provides a common language that allows users to evaluate, propose changes and to monitor them individually and in mutual coherence. The arrows are in fact flexible mechanisms, representing individual processes that together can have a positive effect of the performance of the overall system. In other words, they can be manipulated in a concerted way to drive an agreed process of change towards an agreed common goal.

5.3 Task perspective in the heart of the framework

The Task perspective is positioned in the heart of the framework. This follows from the *One Incident, One Response* philosophy, as it is both the starting point and point on the horizon for building a system of adequate preparedness based on the expected challenges from new-risk scenarios. The task perspective must be recalibrated when a 'family of scenarios' is thought to change as a result of environmental, economic, social or geopolitical changes. However, even though the Task perspective is placed in the middle of the diagram, it should be noted that all perspectives are related to each other.

5.4 Olympic rings

The Olympic rings symbolise the fact that the framework is designed to enhance processes of building a level of preparedness that should result in a performance of excellence in a future competitive event. The analogy with the Olympic Games is used to emphasise that a strategy to win gold, silver or bronze in competition with the best athletes and teams across the world should follow a similar framework (see Annex 1). For an emergency response system, the competitor is not another emergency response system – but the complexity of a future crisis situation and the fact that such a situation can emerge quite unannounced. But when it happens, the emergency response system must peak, in the same way that an athlete must peak at the moment of performance at the Olympic Games. Skill sets and resources will have to be put in place that can prevent and mitigate the typical devastating impacts of such a developing emergency before it escalates out of control.

In analogy with the Olympic Games, winning gold in emergency response may not be a realistic objective, but one could aim for silver or bronze, or being good enough to be able to make it to the Games. Achieving any of these goals will be dependent upon the level at which the different perspectives of figure 5 are aligned and work into the same direction, meaning that the relationship between them are optimally tuned to the set objectives.

5.5 Focus on a 'family of crises'

When using the Framework, one should recognise that a given marine pollution scenario belongs to the "family of marine pollution scenarios". Within this family, any individual scenario is quite unique, but between all thinkable scenarios there are generic aspects they all have in common. These generic aspects make them different from the family of, for example, earthquake scenarios, wildfire scenarios, flooding scenarios, pandemic scenarios, etc.

Although a generic authority-led crisis management system can also deal with a marine pollution crisis, there is much value in building a specific crisis management system for such a 'family of scenarios'. As a 'family' they will require specific skill sets, resources, subject matter expertise, pro-activeness etc., on top of expertise that can perhaps deal with matters of civil protection when the pollution comes to shore.

For entities such as civil protection agencies, who will have multiple 'families of scenarios' to prepare for, it is important to know which tasks and resources they might be required to deliver in a marine pollution scenario. Such tasks and resources are probably generic from a civil protection point of view, but might have to be delivered in a slightly different context, with different timelines and different locations.
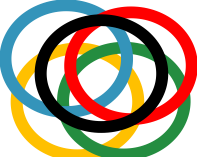
The *One Incident, One Response* methodology encourages maritime and coastal emergency response agencies to jointly explore the specifics of a marine pollution scenario, find gaps and areas for improvement on the basis of that exploration, and then use the framework for their concerted mission work to fill gaps and put improvements in place.
While the One Incident, One response framework is designed with a marine incident in mind, there is potential for it (along with its methodology and philosophy) to be applied to other emergency response preparedness systems.

5.6 Perspectives, interactions and domains in the framework

The framework for preparedness building identifies four main interactive perspectives that are key stepping stones via which multi-disciplinary incident response preparedness capabilities can be developed and kept up to date in relation to changing risk profiles. The perspectives are in continuous dialogue with each other (6 numbered arrows).

5.6.1 Perspectives

Perspective	Description and relationships with other perspectives
Task perspective	Multiple scenarios in a "family" of marine and coastal incidents can happen. Each scenario will demand a set of tasks that is to be carried out for a proactive, timely and effective response. Tasks that are not carried out will potentially lead to further escalation, damage, costs, and/or loss of lives. Scenarios can be experienced in a real time incident or as part of exercises. Exercises are an important tool to identify problems with tasks so that these problems can be solved before a real incident happens.
Resource perspective	Resources includes experts, work forces, equipment, facilities, machinery, aircrafts, vessels. etc. It encompasses anything that can be deployed to make a difference deal with tasks that are emerging from an incident scenario. Resources can be organised via a tiered response setup, e.g. tier-1 (locally available), tier-2 (nationally available), tier-3 (internationally available). Resources must be fit for purpose, and be activated, mobilised, deployed, coordinated and monitored. This requires a perspective on what resources really are, which tasks they serve, if they are available - from where and when, and the arrangements that must be in place so that they are guaranteed and ready to go.
Responsibility perspective	The responsibility perspective is the domain of policy, legislation, preparedness and response budget arrangements. It also is the domain of principle decision-making powers and the home of arrangements for crisis management, capacity building and preparedness programmes, research programmes, response contracts, crisis communication, political decision making.
Technical/scientific perspective	The technical/scientific perspective is the home of all that can be known about the "family of emergencies" and the options and markets for building capacities and preparedness. The technical/scientific perspective learns lessons from incidents and exercises, carries our research, develops guidelines and good practices, develops training modules and programmes, designs exercises, innovates equipment, designs functional facilities based on research and development, etc.

5.6.2 Relationships

Nr	Relationship between		Description
1	Task	Resource	An unfolding scenario (simulated in an exercise event, or a real-time incident) provides insights and lessons learnt about critical tasks emerging from that scenario and resources that are fit for purpose to deal with these tasks. Via this relationship strengths, weaknesses and gaps can be identified. Existing and new resources can be brought to test via exercises, and exercises are an invaluable tool for developing resources, by allowing expertise and experience to grow in the absence of frequent incidents.
2	Task	Responsibility	Recognition of exercises as tool to test and build capabilities around tasks. Recognition that inefficiencies in incident response may affect reputation. Evaluations from incidents and exercises are important to be actioned for further improvements. Feedback from incidents/exercises should lead to recalibration of objectives, plans, policy and existing relationships.
3	Task	Technical/Scientific	Independent (scientific) evaluation and analysis of recent exercises/incidents/near incidents provide opportunities to learn lessons, disseminate these lessons, which can be made subject to R&D, innovations, new risk analysis. Trend watching, risk assessment, lessons learnt, innovation, R&D, new equipment can inform exercise design, exercise planning, or create awareness on less-known scenarios.
4	Resources	Responsibility	Any statutory responsibility should lead to objectives, budgets, contracts and investments to support development and maintenance resource capacity and readiness. Cost-saving policies that affect resources can potentially undermine response capabilities. Monitoring of existing resource strength are constantly needed, in view of reported changes, also in relation to resources from other entities, their mutual dependency, and the awareness of new risks from observed trends.
5	Responsibility	Technical/Scientific	Investments into R&D, financial support for international collaboration, exchange and dissemination of knowledge; regular risk assessment projects, study and evaluation of trends, budget for research and international collaboration projects, national and international (e.g. EU funds) long term programmes, and related joint decision making on priorities, targets, policies, etc.
6	Resources	Technical/scientific	Resource experiences (gaps, strength, weaknesses, experiences, innovations on trainings, drills) are reported and shared to enrich the national and international communities, to

			update standards, to promote new approaches, to encourage Research & Development (R&D) initiatives. In turn, mechanisms in place (e.g. courses, conferences) to enrich resources with new scientific insights, experiences or capabilities elsewhere, R&D innovations, access to international standards of good practices. Exchange also facilitates cross-border mechanisms for tiered response capabilities and resources developed according to internationally agreed standards.

5.6.3   Domains of influence and concerted action

Domain	Title	Via relationships
A	Delivery of adequate response and preparedness capabilities in relation to the defined statutory responsibilities.	1,2,4
B	Domain of strategic investments, innovation, and international collaboration	2,3,5
C	Domain of resource capacity building, innovation, testing, learning, and participation	1,3,6

6 Proposed recommendations

Work Package 6 from the IRA-MAR project provided a set of deliveries that aim to motivate and initiate further discussions in four areas as presented in the table below.

Nr	Discussion on	Purpose
1	Changing risk profiles	Changing risk profiles in maritime and coastal environments and their threat to the effectiveness of existing response preparedness systems. The changing risk profiles may require a re-calibration of current emergency response and preparedness systems, which probably need to be diversified, scaled up and solidified.
2	The *One Incident, One Response* philosophy	Is this philosophy a useful tool to develop a common target for the collaboration of multiple and diverse authorities to prepare for and manage complex emergency scenarios in the marine and coastal environments?
3	Framework for implementation	Would this framework be fit for purpose as a "framework for holistic and integrated management of maritime and coastal emergencies", as the three regional conventions (HELCOM, Bonn Agreement, REMPEC/Barcelona Convention) are aiming to develop?
4	OneX serious game methodology	Are discussion-based and scenario driven tabletops such as the OneX serious games useful to facilitate discussions between multiple authorities in order to develop a better understanding of maritime and coastal emergency scenarios, and the requirements of a joint effective response to such scenarios?

The proposed recommendations below provide suggestions on how authorities can address these issues and answer the questions.

6.1 International initiation and coordination of the discussions

The discussions 1-4 above need to take place at subnational, national and international levels, but must kick-off at the international level, and more specifically at the Regional Conventions, in meetings of HELCOM, Bonn Agreement and REMPEC/Barcelona Convention. In addition, the discussions should also be held in meetings between these Conventions, e.g. EMSA CTG or Inter-Secretariat meetings, or joint workshops between EMSA and DG Echo, in order to harmonise potential actions at EU level. If these discussions are considered useful at the Regional Conventions, the national delegations can form a pivot to make sure that the discussions are passed on to the national and subnational levels too.

6.2 Discussions at Regional Agreements

It is recommended that future meetings of the Regional Agreements:
1. Take note of the results from IRA-MAR Work Package 6
2. Discuss the proposals and recommendations in this document
3. Take decisions on the question if those proposals and recommendations can be adopted for further implementation.

6.3 Establish think tanks at national and international levels

The fast development of trends in the marine and coastal environment may need a more coordinated approach to ensure that European countries keep up with their individual and joint response capabilities.

It is recommended that think tanks are established that are tasked to explore the developing maritime risks and their potential consequences for the marine and coastal environment. The groups in the think tank must represent both maritime and coastal response expertise, and expertise from a range of scientific and stakeholder groups. They form a bridge between the maritime emergency community and the coastal emergency community. Via a scenario-based approach, these groups should explore how scenarios could unfold, where and with which potential effects or challenges. Based on that analysis, response tasks and the related capabilities and capacities should be identified as well as solutions for how to fill apparent gaps.

Members of a national think tank can be assigned to act as a 24/7 specialist group that can carry out joint planning tasks in the command centre where they can help build up the common operating picture, identify risks down the line and help to identify and mobilise resources that could make a difference in their country.

Specialist from think tanks in different countries would benefit from exchanging with each other, as scenarios will be comparable and solutions found may have international relevance and importance.

Think tanks therefore could be established at two levels:
- National think tanks, with planning experts from coastal and maritime authorities
- International think tanks with representatives from the national think tanks, who could identify and develop solutions that could be further enhanced via Regional Agreements and the EU Civil Protection Mechanism.

6.4 Develop coastal protection and effective mitigation strategies

Coastal protection normally is considered from the viewpoint of maritime authorities who use sensitivity maps for making their tactical decisions for the deployment of counter-pollution equipment. But this should not prevent coastal authorities and stakeholders from assessing maritime emergency scenarios and developing pro-active strategies that would complement the at sea response. Tactical tools and concepts should be developed for protecting and mitigating impacts on sensitive locations and vulnerable areas in sensitive seasons.

Strategies and tactics can be developed for the clean-up or wildlife response involving long stretches of coastline. As part of this specific planning, good locations for coastal access and coastal collection points can be pre-identified and resources identified including those of local stakeholders. Having such tactical response concepts trained and exercised, will enable quick deployment and staffing in case of an emergency.

6.5 Wildlife response plans and preparedness

A maritime incident that causes the pollution of the marine environment has a large probability to affect marine wildlife. This is a known phenomenon in marine oil spills and in Europe an international response system has been developed (European Oiled Wildlife Assistance or EUROWA network). For other types of pollution there is a gap in terms of

wildlife protocols and procedures, first and foremost in terms of health and safety of responders. The arrival of tens or hundreds of animals impacted on the shore dead and alive should therefore be considered as part of coastal protection and effect mitigation strategies.

6.6   Develop capacities with resources from civil society

Using a scenario-based approach to identify tasks in a maritime and coastal response may reveal that certain tasks are relevant and important to be activated in certain scenarios but cannot be operated by the authorities themselves. This could, for example, include the need to have large work forces to carry out clean-up activities under supervision. Or to deal professionally with wildlife challenges. To this end, agreements can be made with NGOs or agencies where budgets provide support for development and maintenance of civil society capabilities. These parties are subsequently trained and exercised to function as part of the authority led emergency response system. In this way an extended task force can be built up that can complement the capabilities of authority emergency systems, and make sure that the identified tasks do not have to be improvised. Depending on the type of services identified, the systems created could also have potential for non-maritime emergencies.

Annex 1 Winning an Olympic gold medal

This story provides an illustration of the Framework described in Chapter 5, via the example of an athlete who aims to win an Olympic gold medal. This story of entry to and success at the Olympic Games is a useful analogy to explain the *One Incident, One Response* philosophy as it outlines the various perspectives needed to work towards the common goal of success.
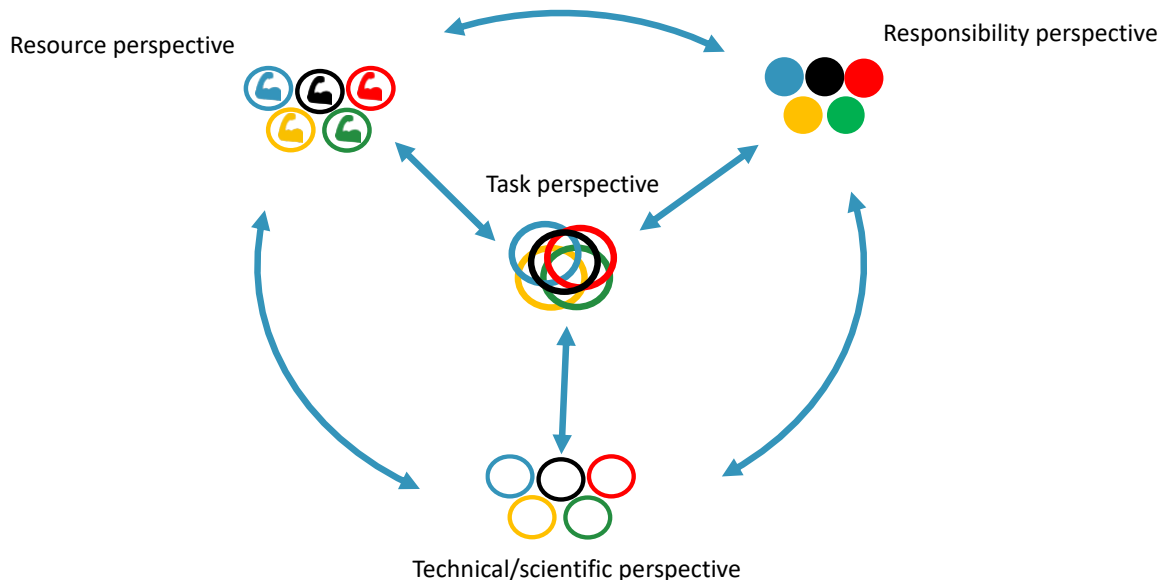
A talented athlete who is identified as a possible candidate for the Olympic Games cannot achieve the aim to win a gold medal on her own, despite her talent and achievements so far. She needs the support of an infrastructure around her to support her in these efforts. That infrastructure can be organised around the four perspectives of the framework. Looking at these perspectives in combination and knowing how they relate with each other allows a coherent investment in the athlete's programme and increases the probability that she will be successful.

Task perspective
- Which capabilities are needed to win and how can that victory be achieved, given the known or anticipated circumstances of the upcoming Olympic games, the competition that can be expected.
- Having regular competitive events by which absolute and relative progress can be measured, and by which the anticipated result at the Olympics can be measured.

Responsibility perspective
- Making sure that the infrastructure exists that allow the athlete's capabilities to peak on the day of the Olympics, including funds (sponsor), contracted trainer, training staff, supporting staff etc.
- The decision makers responsible for creating the continuous conditions for a winning performance are switched on and supportive, aware of what is needed to let the athlete win, and ensuring that conditions are always maximised where possible.

- Athletes of the past sometimes become decision makers of the future helping to further the quality of how athletes can best face their circumstances.

Technical/scientific perspective
- The whole undertaking is based on the most actual international knowledge of reported good practices, scientific insights and technologies and systems used in the field (including those used by the competitors).
- There is already an existing infrastructure available that is known to be fit for purpose and it is well known where the strengths and weaknesses are in relation to what is achieved elsewhere in the world.
- Athletes of the past often become trainers/coaches of the future passing on their expertise to the next generation.

Resource perspective
- The development and training of muscles, fitness, mental power.
- Following a well-designed programme that schedules activities.
- Interaction with trainer/coach to assist athlete to grow, help to analyse and monitor progress made in relation how good "good" should be, and which steps still to take.
- Awareness of/belief in the additional potential that is there, but still needs to be developed.

All different perspectives must be in continuous interaction with each other to make the winning plan work.

The Olympic rings analogy could also be used to extrapolate the perspectives designed in this paper for a marine incident to be applied to a broader range of emergencies, such as wildfires or floods.