EUROPEAN
COMMISSION

Brussels, 1.6.2023
SWD(2023) 145 final

COMMISSION STAFF WORKING DOCUMENT

IMPACT ASSESSMENT REPORT

Accompanying the document

Proposal for a Directive of the European Parliament and of the Council

amending Directive 2009/18/EC establishing the fundamental principles governing the investigation of accidents in the maritime transport sector

{COM(2023) 270 final} - {SEC(2023) 201 final} - {SWD(2023) 146 final}

Table of Contents

1. INTRODUCTION: POLITICAL AND LEGAL CONTEXT 1
2. PROBLEM DEFINITION 10
   2.1. What are the problems? 11
   2.2. What are the problem drivers? 13
   2.3. How likely are the problems to persist? 19
3. WHY SHOULD THE EU ACT? 20
   3.1. Legal basis 20
   3.2. Subsidiarity: Necessity of EU action 20
   3.3. Subsidiarity: Added value of EU action 21
4. OBJECTIVES: WHAT IS TO BE ACHIEVED? 21
   4.1. General objectives 21
   4.2. Specific objectives 21
5. WHAT ARE THE AVAILABLE POLICY OPTIONS? 23
   5.1. What is the baseline from which options are assessed? 23
   5.2. Policy measures and policy options 25
      5.2.1. Discarded policy measures 25
      5.2.2. Retained policy measures 25
   5.3. Description of the policy options 25
      5.3.1. Policy option A 27
      5.3.2. Policy option B 27
      5.3.3. Policy option C 28
6. WHAT ARE THE IMPACTS OF THE POLICY OPTIONS? 29
   6.1. Economic impacts 30
      6.1.1. Impacts on Accident Investigation Bodies 30
      6.1.2. Impacts on the ship operators 33
      6.1.3. Impact on EMSA 35
      6.1.4. Impacts on SMEs 37
      6.1.5. Functioning of the internal market and competition 38
      6.1.6. Impacts on competitiveness 39
   6.2. Social impacts 39
      6.2.1. Maritime safety 39
      6.2.2. Impacts on working conditions and skills 40
      6.2.3. Impacts on fundamental rights 40

6.3. Environmental impacts 41
7. HOW DO THE OPTIONS COMPARE? 43
7.1. Effectiveness 43
7.2. Efficiency 45
7.3. Coherence 47
7.4. Subsidiarity and proportionality 47
8. PREFERRED POLICY OPTION 48
8.1. Identification of the preferred policy option and stakeholders views 48
8.2. REFIT 49
8.3. Application of the 'one in, one out' approach 49
9. HOW WILL ACTUAL IMPACTS BE MONITORED AND EVALUATED? 50
ANNEX 1: PROCEDURAL INFORMATION 51
1. LEAD DG, DECIDE PLANNING/CWP REFERENCES 51
2. ORGANISATION AND TIMING 51
3. CONSULTATION OF THE RSB 51
4. EVIDENCE, SOURCES AND QUALITY 52
ANNEX 2: STAKEHOLDER CONSULTATION (SYNOPSIS REPORT) 54
ANNEX 3: WHO IS AFFECTED AND HOW? 60
1. PRACTICAL IMPLICATIONS OF THE INITIATIVE 60
2. SUMMARY OF COSTS AND BENEFITS 62
3. RELEVANT SUSTAINABLE DEVELOPMENT GOALS 63
ANNEX 4: ANALYTICAL METHODS 65
ANNEX 5: EU/EEA ACCIDENT INVESTIGATION BODIES FALLING WITHIN THE SCOPE OF DIRECTIVE 2009/18/EC BY TYPE AND YEAR OF ESTABLISHMENT 80
ANNEX 6: IMO SUPERSEDED OR OUT OF DATE REFERENCES 81
ANNEX 7: DISCARDED PROBLEM DRIVERS AND POLICY MEASURES 83
ANNEX 8: RETAINED POLICY MEASURES 87
ANNEX 9: EFFECTIVENESS OF THE DIFFERENT POLICY OPTIONS 91

Glossary

Term or acronym	*Meaning or definition*
AIB	Accident Investigation Body
AID	Accident Investigation Directive (Directive 2009/18/EC)
EC	European Commission
EMCIP	European Maritime Casualty Information Platform
EMSA	European Maritime Safety Agency
EU	European Union
FTE	Full-time equivalent
GDPR	General Data Protection Regulation (Regulation 2016/679)
GISIS	(IMO) Global Integrated Shipping Information System
IA	Impact assessment
IMO	International Maritime Organisation
LBP	Length Between Perpendiculars
LNG	Liquid Natural Gas
LOA	Length Overall
PCF	Permanent Cooperation Framework of EU/EEA Accident Investigation bodies
PM	Policy measure
PO	Policy option
MARPOL	International Convention for the Prevention of Pollution from Ships
SME	Small or Medium-sized Enterprise
SOLAS	International Convention for the Safety of Life at Sea
UNCLOS	United Nations Convention on the Law of the Sea
VSMC	Very Serious Marine Casualty

1. INTRODUCTION: POLITICAL AND LEGAL CONTEXT

This Impact Assessment accompanies a legislative proposal for a revision of **Directive 2009/18/EC establishing the fundamental principles governing the investigation of accidents in the maritime transport sector** (hereinafter "the AI Directive" or "the Directive")[1].

The AI Directive establishes the fundamental principles governing the investigation of accidents in the maritime transport sector. Under the Directive, maritime accidents falling within the scope of the Directive are investigated by independent national accident investigation bodies determine the cause of the accident so as to improve maritime safety, as well to protect the marine environment, by learning lessons from accidents to prevent their reoccurrence. These inquiries are called safety investigations.

Maritime transport is a key sector for the EU economy as it embodies the main transport mode for European imports and exports to the rest of the world. Maritime transport is estimated[2] to represent around 80% of worldwide goods transported and around 30% of intra-EU transport activity. In 2019, 1.9 billion tonnes were transported by short sea shipping[3] to/from the main EU ports. In addition, 418 million passengers aboard ferries and cruise vessels embarked and disembarked in EU ports in 2019.

At the same time, an average of 2,239 marine accidents were reported on average per year between 2014 and 2020 for EU Member States, of which 33% were categorised as very serious or serious casualties. In addition, 370 cases of marine pollution have been reported in total during 2014-2020[4].

The revision of the AI Directive has to be seen in the context of the Commission's Communication on a **Sustainable and Smart Mobility Strategy (SSMS)** which sets out the EU vision for the transport system of the future. The strategy announced that the Commission is planning to initiate a major review of existing legislation on **flag State responsibilities, port State control and accident investigation** in 2021. According to the SSMS, the overall objective of this review should be to enable safe, secure and efficient maritime transport and further stresses that "*safety and security of the transport system is paramount and should never be compromised and the EU should remain a world leader in this field. Continuous efforts with international, national and local authorities, stakeholders, and citizens is key [...]*[5]*."* The strategy sets as one of the goals that by 2050, the death toll for all modes of transport in the EU to be close to zero. The objective of the EU and its Member States to ensure a high and uniform level of maritime

[1] EUR-Lex - 32009L0018 - EN - EUR-Lex (europa.eu)
[2] European Commission (2021), The EU Blue Economy Report 2021.
[3] Short sea shipping is the maritime transport of goods over relatively short distances, as opposed to the intercontinental cross-ocean deep sea shipping.
[4] http://www.emsa.europa.eu/newsroom/latest-news/item/4266-annual-overview-of-marine-casualties-and-incidents-2020.html
[5] COM(2020) 789 final - Sustainable and Smart Mobility Strategy – putting European transport on track for the future; FLAGSHIP 10 – ENHANCING TRANSPORT SAFETY AND SECURITY point 98 and 101.

safety and environmental protection has also been underlined in several Council conclusions and in particular those from 2017[6] and 2020[7].

In the context of the AI Directive, maritime accidents are investigated to improve maritime safety, as well to protect the marine environment, by learning lessons from accidents to prevent their reoccurrence. Safety investigations of this type are separate from and independent of administrative and/or criminal investigations and do not seek to determine or assign any civil or criminal liability[8].

In relation to the protection of the environment from pollution caused by accidents, the initiative should deliver the zero pollution ambitions of the European Green Deal (EGD)[9] and the SSMS. The initiative contributes towards Sustainable Development Goal (SDG) 3 ("Ensure healthy lives and promote well-being for all at all ages") and SDG 14 ("Conserve and sustainably use the oceans, seas and marine resources for sustainable development").

International context

Due to its history and international nature, maritime transport has developed a specific regulatory structure. At the global level maritime safety and protection of the environment are promoted through an international legal framework adopted under the auspices of the United Nations' specialised agency responsible for regulating shipping, the **International Maritime Organisation** (IMO)[10].

The obligation to investigate marine casualties or navigation incidents finds its origin in the **United Nations Convention on the Law of the Sea**[11] (UNCLOS) which imposes an obligation on the flag State[12] to conduct an investigation. However, the scope of this obligation is limited to a small set of requirements: (i) accidents happening on the high seas[13], (ii) accidents which result in loss of life or serious injury to nationals of another State and/or (iii) accidents involving a ship or installation of another State[14].

The IMO, which plays a role in the implementation of UNCLOS, subsequently developed its Casualty Investigation Code[15]. The Code requires a safety investigation[16] to be conducted into casualties involving the total loss of the ship or a death or severe

---

[6] "Priorities for the EU's maritime transport policy until 2020: Competitiveness, Decarbonisation, Digitalisation to ensure global connectivity, an efficient internal market and a world-class maritime cluster"

[7] "EU Waterborne Transport Sector – Future outlook: Towards a carbon-neutral, zero accidents, automated and competitive EU Waterborne Transport Sector"

[8] As a consequence maritime safety investigations do not typically deal with deliberate acts which are investigated by other authorities.

[9] https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en#documents

[10] International Maritime Organization (imo.org) is a United Nations specialised agency; all EU Member States are IMO members. The European Union cannot be a member but the Commission holds observer status as an Intergovernmental Organisation.

[11] https://www.un.org/depts/los/convention_agreements/convention_overview_convention.htm

[12] The flag State of a vessel is the jurisdiction under whose laws the vessel is registered, the flag State is the "nationality" of the vessel.

[13] The high seas or international waters are those part of the sea which do not belong to any state's jurisdiction.

[14] Article 94 UNCLOS

[15] Code of International Standards and Recommended Practices for a Safety Investigation into a Marine Casualty or Marine Incident (Casualty Investigation Code)

[16] A safety investigation is carried out to determine the cause(s) of an accident and is independent of criminal or other parallel investigations held to determine liability or apportion blame

damage to the environment. It also recommends that investigations be carried out into other marine casualties and incidents, by the flag State of a ship involved, if it is considered likely that it would provide information that could be used to prevent future accidents. In addition, the IMO is progressing work under the International Convention for the Prevention of Pollution from Ships (MARPOL) including the Action Plan to address marine plastic litter from ships, including as a result of an accident.

EU context

EU action in the field of maritime safety both complements and implements the international framework as defined within IMO. The transposition of IMO rules into the EU legal system makes these provisions actionable before the European Court of Justice thereby ensuring their uniform enforcement across the Union.

The bulk of today's EU maritime safety policy was developed in the early 1990s, and was further worked upon between 2000-2009, in the wake of major maritime accidents causing substantial oil spills[17] and loss of life[18]. The overall objective of the EU has therefore been – and continues to be – a Union policy on *safe seas*[19], and continuous work to improve safety and thereby reduce accidents and pollution into the sea.

Although the colloquial term accident is used to describe these unplanned, undesired events, both the IMO Code and the AI Directive refer to the more precise legal terms "marine casualties"[20] and "incidents"[21].

The AI Directive goes further than the IMO Casualty Code. First, it obliges Member States to establish independent accident investigation bodies ("AIBs") and to provide in their legal order that these AIBs are notified of marine casualties and incidents[22]. The AIBs should investigate accidents depending upon their severity. For "very serious marine casualties"[23] (VSMC) the Directive, as does the IMO Casualty Code, provide that

[17] E.g. Aegean Sea in 1992, ES (74,000 tonnes of oil), Braer accident in 1993, UK (85,000 tonnes), etc.
[18] E.g. Estonia 1994, Baltic Sea claiming 852 lives
[19] Communication from the Commission COM (93) 66 'A common policy on safe seas'
[20] As defined by the IMO "A marine casualty is an event, or a sequence of events, that has occurred directly in connection with the operations of a ship and which has resulted in any of the following: the death of, or serious injury to, a person, the loss of a person from a ship; the loss, presumed loss or abandonment of a ship, material damage to a ship, the stranding or disabling of a ship, or the involvement of a ship in a collision, material damage to marine infrastructure external to a ship, that could seriously endanger the safety of the ship, another ship or an individual; or severe damage to the environment, or the potential for severe damage to the environment. A marine casualty does not include a deliberate act or omission, with the intention to cause harm to the safety of a ship, an individual or the environment (Article 2(a) of the AI Directive).
[21] As defined by the IMO "A marine incident means an event, or sequence of events, other than a marine casualty, which has occurred directly in connection with the operations of a ship that endangered, or, if not corrected, would endanger the safety of the ship, its occupants or any other person or the environment". Marine incidents are less serious than casualties and can include less serious injuries, minor damage to a ship or near misses (Article 2(c) of the AI Directive).
[22] This obligation covers casualties and incidents that involve ships flying the flag of one of the Member States; or occur within Member States' territorial seas and internal waters; or involve other substantial interests of the Member States. The territorial sea, is a belt of coastal waters extending at most 12 nautical miles (22 km) from the baseline (usually the mean low-water mark) of a coastal state. Internal waters are those waters on the landward side of the baseline of a nation's territorial waters. Internal waters can include rivers and canals as well as ports and harbours.(Article 6 of the AI Directive)
[23] As defined by the IMO Code for the Investigation of Marine Casualties and Incidents – in effect loss of a ship, death or severe damage to environment - referred to in Article 3(2)(b) of the AI Directive .

there must always be an investigation, so there is no discretion as to whether this accident type has to be investigated. The Directive also extends this obligation in fishing vessels of 15 metres in length and over.

For "serious casualties"[24] a preliminary assessment in order to decide whether or not to undertake a safety investigation should take place. For less serious casualties and incidents, it is for the AIB to decide to investigate when it considers that lessons to improve safety at sea can be learnt. Independence in the organisation, legal structure and decision-making means that the AIB can investigate and address safety recommendations without any appearance of bias or conflict of interest. Second, the types of vessels covered by the AI Directive is also different. The IMO rules mainly apply to commercial passenger or cargo craft while the AI Directive, is broader including fishing vessels of 15 metres in length and over and also includes pleasure yachts and pleasure crafts which can carry more than 12 passengers for commercial purposes.

Procedures on how to conduct investigations in the EU are laid down in a so-called "Common Methodology".[25] AIBs should publish reports on the basis of the investigations carried out and they should also notify the Commission of marine casualties and incidents via a database (the European Marine Casualty Information Platform – EMCIP), established and maintained by the European Maritime Safety Agency[26] (EMSA) for this purpose. The Directive allows for the collection, collation and sharing of safety data through EMCIP. This facilitates national administrations in responding to accidents, allowing for digitally sharing information both regarding the circumstances of occurrences and the safety reports resulting from the investigations. The use of digital tools optimises processes and means that the Directive is digital-ready. The carrying out of harmonised investigations and the electronic sharing of information and lessons learnt allows for the development of more targeted, evidence-based policy responses at international, EU and Member State level to accidents and incidents, and thereby it is part of continuous improvement.

Safety investigation reports set out the facts of the incident outlining the particulars of the ship and its voyage, its crew, the circumstances of the casualty and the sequence of events setting out the consequences in terms of impact on persons, vessels and the environment. The investigation must analyse the key events in the build up to the casualty and its aftermath to discover contributing factors and ultimately safety issues. The investigation then identifies findings, contributing factors and safety issues so as to be able to make safety recommendations. The Directive provides that Member States shall ensure that safety recommendations made by the investigative bodies are duly taken into account by the addressees and, where appropriate, are given an adequate follow-up in accordance with Union and international law. Furthermore, where appropriate, an investigative body or the Commission shall make safety recommendations on the basis of

[24] In accordance with the updated definition contained in Circular MSC-MEPC.3/Circ.3 of the IMO Maritime Safety Committee and Marine Environment Protection Committee of 18 December 2008; – in effect a fire, explosion, collision, grounding, contact, heavy weather damage, ice damage, hull cracking, or suspected hull defect, etc. referred to in Article 3(3) of the AI Directive

[25] Commission Regulation (EU) No 1286/2011 adopting a common methodology for investigating marine casualties and incidents developed pursuant to Article 5(4) of Directive 2009/18/EC (OJ L 328, 10.12.2011, p. 36)

[26] www.emsa.europa.eu

results of multiple investigations (so-called "abstract data analysis" according to Article 15(2) of the AI Directive) and of the overall results of safety investigations carried out.

The safety recommendations are addressed to ship owners/operators, to national authorities, to the Union or to international bodies such as the IMO. While the safety recommendations are recommendations and are therefore not legally enforceable, the status of a recommendation made by an independent AIB and addressed to ship operators, to national authorities or for example to the IMO means that these recommendations have considerable persuasive authority based as they are on a safety investigation. EMSA collates accident data and publishes an Annual Overview[27] and a Maritime Transport Environmental Report[28].

Since June 2011 when the Directive entered into effect some 2000 individual Safety Recommendations have been issued following safety investigations. 67% of them have been accepted, meaning that actions have been taken to improve safety of ships and pollution prevention. These are usually focused on a specific accident, as under the Directive and the IMO Casualty Code all very serious have to be investigated but there can be some repetitions (as accidents can inevitably resemble each other) but the recommendations and addressees remain different.

It is important to note that improvements in safety and the measurable perception thereof takes time. Changes to legislation or regulation are slow and the reason for this as there is a need to provide predictability and legitimate expectations, in view of the implementation and application. When changes to international conventions are involved it typically takes time for the international community (and in maritime this involves global action) and industry to recognise that there is a problem and to identify the root cause, to agree on the measures to be taken to address the problem; and for improvements to be observed in terms of reduced number of accidents. Changes involving the so-called "human element" where the safety recommendations are addressed to individual companies, to sectors or to administrations and which involve changes to practices, procedures, manning or training can however be quicker. This all forms part of continuous improvement in maritime safety.

Safety recommendations can result in the better enforcement of already existing IMO legislation. An example relates to the grounding of Hoegh Osaka which led to better and enhanced enforcement of the IMO Resolution A.582(14) related to the maximum securing load of lashings to be used when securing road vehicles on cargo decks. They can also lead to the improvement of EU legislation: the safety investigation into the fire on the MSC Flaminia concluded that the EU implementation related to Places of Refuge should be improved by virtue of further guidelines to better assist EU Member States. The same investigation also led to better implementation of IMO Resolution A.950(23) at the EU Member State level regarding the establishment and operation of maritime assistance services.

The conclusions of several safety investigations, as these relate to similar or repeated accidents, can also bring to light safety issues that might be individually disregarded, for example, the highest number of fire on-board ships is in the Engine Room. Most of these

[27] http://www.emsa.europa.eu/publications/item/4266-annual-overview-of-marine-casualties-and-incidents-2020.html
[28] European Maritime Transport Environmental Report 2021, https://data.europa.eu/doi/10.2800/650762

do not result in serious damages and unless they are catastrophic would not be regarded as very serious marine casualties (VSMCs) but such fires represent a regular threat to the ship. In that sense and drawing on accident investigations reports the International Association of Classification Societies[29] revised its unified interpretation related to hot surfaces in engine room in order to reduce the number of fires, whatever the ship type.

The Directive also provides that the Member States shall, in close cooperation with the Commission, establish a permanent cooperation framework (PCF)[30] to enable the AIBs to cooperate among themselves to the extent necessary to attain the objectives of the Directive.

Synergies with other EU policy instruments

The responsibility for maritime safety involves three overlapping lines of State intervention both internationally and at the EU level (see Figure 1). States have differing but complementary responsibilities either as a vessel's state of registration, a state which is being visited by a foreign flagged vessel or as a coastal state by which a vessel is travelling without calling. The first "line of defence" is provided by the flag State. However, as flag State rules only applies to vessels that fly that flag, many of the IMO's most important technical conventions contain provisions for ships to be inspected when the vessels visit foreign ports to ensure that they meet the international requirements. This control by port States is regarded as the second line of defence.

Although both the flag State control and the port State control have worked to improve maritime safety and improve the marine environment, accidents can still occur. Once this happens, it is important to investigate what went wrong and how a similar accident can be avoided in the future. To achieve this the third line of defence of accident investigation was created.

This impact assessment has been initiated in parallel to the related impact assessments of the Port State control Directive (Directive 2009/16/EC[31]) and the Flag State Directive (Directive 2009/21/EC[32]). All three EU maritime safety Directives are based on the rules and standards established by the IMO at the international level and while they each reflect the differing responsibilities of the EU Member States in their various roles as flag, port and coastal states they have to be coherent with each other and any proposed change to one has to take the other two Directives and the broader international regulatory environment into account.

The Directives work together to contribute to a higher level of maritime safety and maritime transport efficiency as well as a stronger level playing field between Member States. The counter factual situation would be international obligations transposed into national legislation with no means for supervision at Union level or to cooperate with the support of EMSA. This would lead to less protection for EU citizens.

---

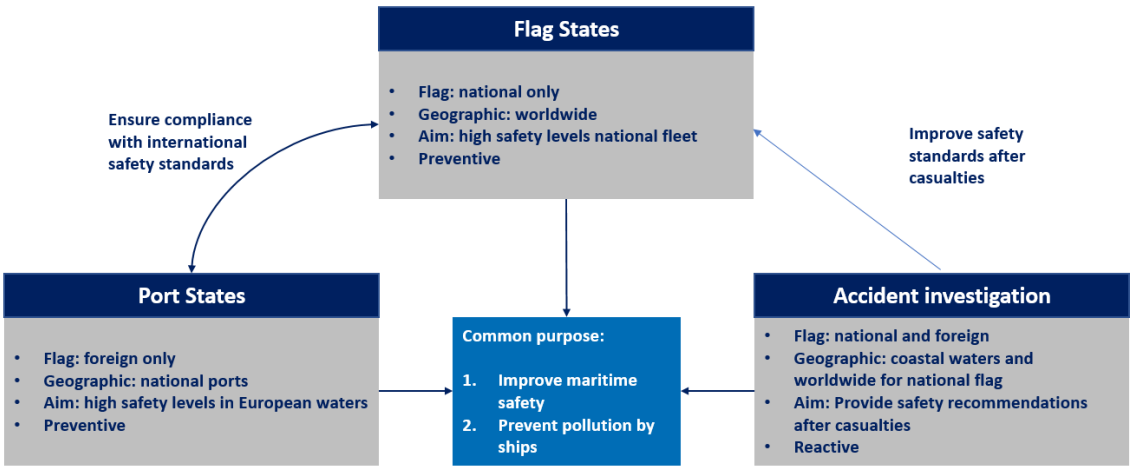
[29] The International Association of Classification Societies (IACS) is a technically based non-governmental organization that currently consists of twelve member marine classification societies. More than 90% of the world's cargo-carrying ships' tonnage is covered by the classification standards set by member societies of IACS.

[30] The rules of procedure and organisational arrangements of the PCF are set out in Commission Implementing Regulation (EU) No 651/2011 (OJ L177 of 6.7.2011, p.18)

[31] OJ L 131, 28.5.2009, p.57

[32] OJ L 131, 28.5.2009, p.132

Figure 1: The flag State, port State and accident investigation responsibilities of EU Member States



The impact assessment of the port State control Directive (PSC) looks at extending the scope of port State control to fishing vessels, which are currently not covered by PSC. It also seeks to update the Directive to take account of changes to the international legal and regulatory framework since 2009. It seeks to address issues related to the targeting of vessels for inspection, including the use of electronic data and certificates and seeking to make PSC more environmentally focused. It also looks at issue encountered by Member States' authorities in their implementation of the PSC regime.

The impact assessment of the Flag State Directive looks at updating and aligning the EU acquis with international rules maintaining the IMO-Audit provision and follow-up, to clarify and strengthen the flag States to perform their obligations, including monitoring of EU Recognised Organisations (otherwise known as Classification Societies). It also looks at digitalising the Flag registers, to revising the flag State performance measurement and rewarding good quality.

These three Directives are also part of and have significant interaction with the larger maritime safety acquis which includes elements such as the EU vessel traffic monitoring and information system (SafeSeaNet)[33], the EMSA founding Regulation[34], the fishing vessel safety Directive[35], the EU legilslation relating to Recognised Organisations[36]and other EU environmental legislation[37].

The interaction of the AI Directive with the EMSA oil pollution response capacity, is however limited as the AI Directive is designed to protect the marine environment by preventing accidents by finding out their root causes while the EMSA oil pollution

[33] Directive 2002/59/EC establishing a Community vessel traffic monitoring and information system (OJ L 208, 5.8.2002, p. 10)
[34] (OJ L 208, 5.8.2002, p. 1) which is under possible revision see https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13049-European-Maritime-Safety-Agency-review-of-mandate_en
[35] (OJ L 34, 9.2.1998, p. 1) which is under evaluation see https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12522-Fisheries-Fishing-Vessel-Safety-Directive-evaluation-_en
[36] Regulation (EC) No 391/2009 on common rules and standards for ship inspection and survey organisations (OJ L 131, 28.5.2009, p.11) and Directive 2009/15/EC on common rules and standards for ship inspection and survey organisations and for the relevant activities of maritime administrations (OJ L131, 28.5.2009, p.47)
[37] Such as Directive 92/43/EEC (the "Habitats Directive"), Directive 2009/147/EC (the "EU Birds Directive"), Directive (EU) 2019/904 (Single use Plastics Directive)

response is a damage clean up and mitigation measure. EMSA had a role in oil pollution response since 2006 and this was expanded to cover fixed spills from oil and gas installations in 2013.

In this regard, EMSA provides different services to ensure that EU coastal states respond quickly and effectively to marine pollution from vessels, oil and gas facilities. This includes a network of stand-by oil spill response vessels, a satellite-based oil spill monitoring service known as "CleanSeaNet".

In addition to the oil spill response vessels EMSA has pre-positioned oil spill response "Dispersant Stockpiles" in the Member States for fast response and this combined with the "Dispersant Usage Evaluation Tool " an e-dimensional numeric model to simulate oil spills with dispersant applications, which provides a quantitative comparison of response options according different levels of effectiveness depending on the dispersant and timing of its application can mitigate the damage cause by oil spills.

EMSA also provides other services to the Member States within the scope of emergency response to chemical spill into the sea, namely, (MAR-ICE) a network of chemical experts to strengthen information transfer on chemical substances involved in maritime pollution emergencies in EU waters and the "Marine Intervention in Chemical Emergencies Network (MAR-CIS) "Marine Chemical Information Sheets" which provide in a concise way substance-specific and maritime relevant information on chemicals aiming to assist the competent authorities during the initial stage of the response to maritime incidents involving such substances.

The linkage between the AI Directive and the Marine Strategy Framework Directive (MSFD)[38] is also limited as the latter provides for a framework within which Member States must take the necessary measures to achieve or maintain good environmental status in the marine environment by the year 2020 at the latest. By virtue of the MSFD, EU Member States are required to implement strategies aimed at (i) the protection and preservation of the marine environment, the prevention of its deterioration or, where practicable, the restoration of marine ecosystems in areas where they have been adversely affected; (ii) the prevention and reduction of inputs in the marine environment, in order to ensure that there are no significant impacts on or risks to marine biodiversity, marine ecosystems, human health or legitimate uses of the sea. This means that the MSFD is proactive in that it obliges Member States to have a plan in place to achieve good marine environmental status. Therefore and while the AI Directive has a role in environmental protection by seeking to prevent pollution and environmental damage by preventing accidents, it does not put any responsibilities on the MS to address marine damage or mitigate such damage nor does it require that damaged environments are restored. The AI Directive does not have the same overarching environmental objectives as the Marine Strategy Framework, the two pieces of legislation are parallel but separate in their scope of mechanism of action.

Linkage with the Green Deal

The Green Deal and more specifically the FuelEU maritime initiative will result in significantly higher uptake of renewable and low-carbon fuels and low and zero-emission propulsion systems over time. The change of type of fuels used can affect the reliability

[38] OJ L 164, 25.6.2008, p. 19

and performance of engines, calibrated for certain types of fuels, and the issue with this is the risk of loss of propulsion which is an obvious safety risk. Another risk relates to fire and explosion. At this stage however, in the context of no significant uptake of renewable and low-carbon fuels and low and zero-emission propulsion systems in the maritime sector it is difficult to predict what type of accidents may likely occur in the future. Nevertheless, a higher uptake of electric vessels in the long term is expected to result in lower pollution due to fuel lost.

Ex-post evaluation of the Directive and the Maritime Transport Fitness Check

The 2018 REFIT ex-post evaluation[39] and Maritime Transport Fitness Check[40] concluded that in the absence of the AI Directive, it is likely that the 16 AIBs established since 2009 would not have been put in place. The majority of the States without an AIB prior to 2009 primarily conducted investigations for criminal prosecution purposes if they did so at all. The creation of AIBs has given a boost to accident investigations for safety reasons, with an emphasis on independence and the development of safety recommendations for accident prevention purposes. In addition, the evaluation concluded that the Directive provides a consistent framework for conducting maritime accident investigations and thus ensures that accident investigations are conducted in a uniform and harmonised way throughout the EU.

While the IMO had developed its Investigation Code, the obligatory nature of the AI Directive has led to a harmonised reporting of accidents and incidents, as a standard set of requirements has to be met. The overall conclusion of the evaluation based on the assessment of relevance, effectiveness, efficiency, coherence and EU added-value was that AI Directive has largely met expectations, achieving EU-wide benefits.

However, shortcomings of the current policy framework with issues of resources, staffing and expertise widely reported as problematic. Resource constraints limit some Member State AIBs in discharging their responsibilities in a correct and timely manner. This is particularly the case for those Member States with small fleets and limited maritime transport activity where the establishment of a permanent dedicated AIB is seen as a disproportionate burden. In similar vein the Maritime Transport Fitness Check concluded that the capacity of Member States to fulfil their international obligations as a flag, port or coastal State in relation to the various Directives is under strain. Resources, staffing and expertise issues were widely reported as problematic for AIBs. The Fitness Check made a number of recommendations relevant to accident investigation including the better use of resources at national and EU level, including the pooling of resources building on the role and support provided by EMSA and exploiting the efficiency gains offered by digitalisation and information sharing. The results of the ex-post evaluation are reflected in this impact assessment as summarised in Table 1.

Table 1: Links between conclusions of the ex-post evaluation and the impact assessment

Main ex post evaluation conclusions	Impact Assessment
Conclusions on relevance	
The Directive provides consistency in the regulatory framework across Member States and the effective and enforceable application of international obligations in a more uniform and harmonised way.	Policy measures are defined to keep the Directive up to date with developments at international and EU level.
Conclusions on effectiveness	

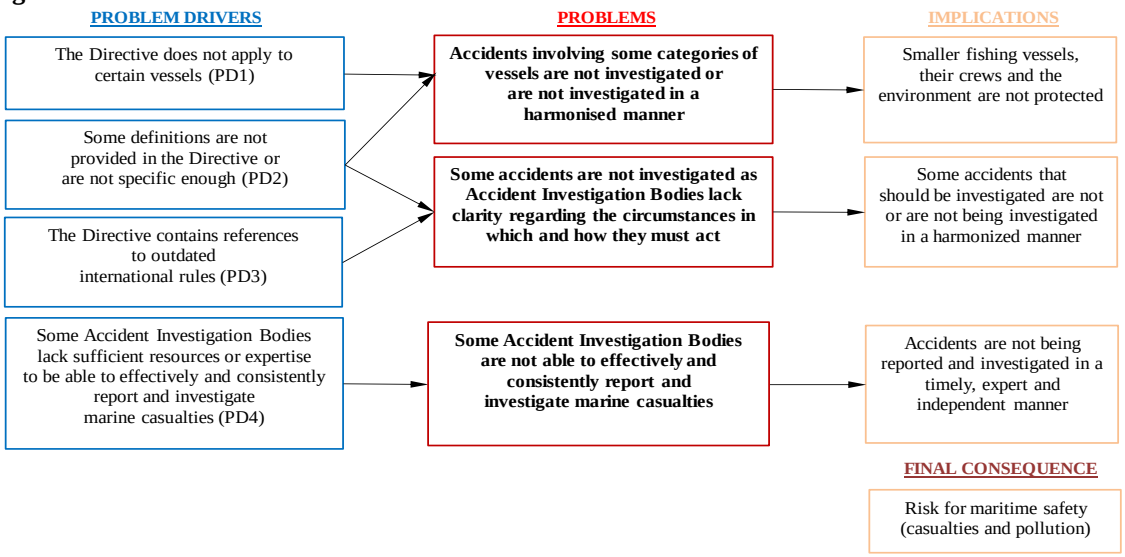
[39] SWD(2018) 232 final
[40] SWD(2018) 228 final

Main ex post evaluation conclusions	Impact Assessment
The AI Directive has been effective in achieving its intended objectives, although its contribution generally needs to be appreciated in light of the broader maritime safety framework that is developed by Member States, the EU and IMO.	Policy measures are defined to keep the Directive up to date with developments at international and EU level.
The Directive has been effective in requiring the creation of independent AIBs with, in most cases, defined budgets covering operational needs. However AIBs report constraints mostly in relation to lack of financial means and human resources availability while lack of appropriate skills and infrastructure are also identified. Consequently gaps in coverage can occur.	Policy measures are defined to support AIBs in discharging their reporting and investigative responsibilities.
Conclusions on efficiency	
Member States agree that EMCIP offers a harmonised system for accident investigations, facilitating cooperation between them. However, they also find that it represents an additional workload.	Policy measures are defined to support AIBs in discharging their reporting and investigative responsibilities.
Conclusions on coherence	
The Directive is internally coherent and is coherent with the other pieces of the maritime safety acquis.	The IA identifies smaller fishing vessels as being an area with significant impact on safety, not currently covered by the Directive, which may need to be addressed.
Conclusions on EU added value	
EU level intervention has brought benefits which would not have been possible at national level or at IMO level alone.	EU action continues to be needed to deliver on the policy objectives.

2. PROBLEM DEFINITION

Significant accidents involving certain categories of vessels are currently not reported and investigated across the Union in a coordinated and harmonised manner and the necessary safety improvements to prevent loss of life and protect the marine environment are unlikely to be made. The investigation level also varies greatly between Member States. Moreover, some of the definitions necessary for the correct functioning of the Directive are either not provided or are not specific enough while others essential to keep the Directive aligned with the relevant international legal framework have become outdated. At present, many AIBs lack sufficient resources to be able to carry out the responsibilities of reporting on investigating marine casualties and incidents in a timely and effective manner. This impacts on the proper functioning of the Directive and the harmonised safety level it was designed to underpin. The underlying drivers, problems and implications that are relevant for this revision are presented in Figure 2.

Figure 2: Problem tree



2.1. What are the problems?

Problem 1 – Accidents involving some categories of vessels are not investigated or are not investigated in a harmonised manner

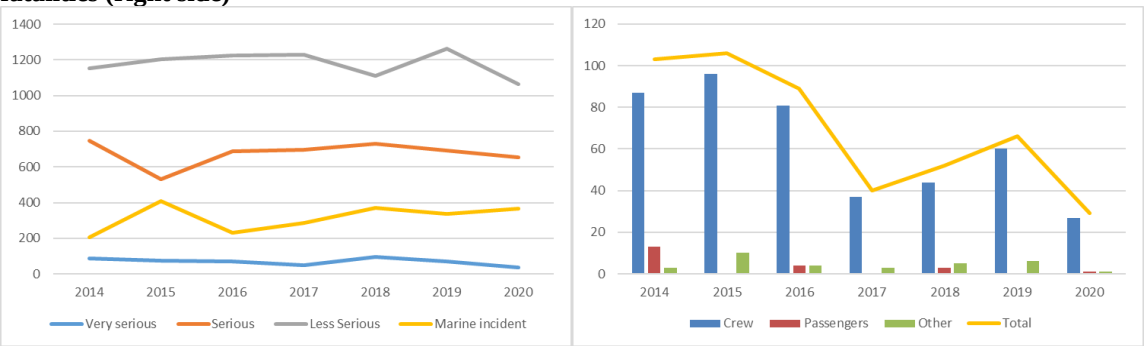
During 2014-2020, an average of 2,239 marine casualties and incidents were reported on average per year showing a relatively stable evolution over time (see Figure 3). VSMCs represented 3.1% of the total while serious casualties an additional 30.2%, resulting in an average of 69 fatalities. Crew is the most affected category of victims, representing around 89% of fatalities. Furthermore, a total of 145 ships were lost over the 2014-2020 period (21 per year on average) [41].

A total of 370 cases of marine pollution have been reported during 2014-2020, showing a decreasing trend over time. Marine pollution in the form of ship bunkers (fuel) and other pollutants (e.g. cargo residues, lubricating or hydraulic oils) represented 68% and 18%, respectively, of the total number of cases of pollution (Figure 4)[42].

However, not all maritime accidents in European waters or involving European vessels with severe consequences such as loss of life or loss of the ship are currently within the scope of the Directive. Several ships types are excluded from the scope of the Directive, namely: a) ships of war and troop ships and other ships owned or operated by a Member State and used only on government non-commercial service; b) ships not propelled by mechanical means, wooden ships of primitive build, pleasure yachts and pleasure craft not engaged in trade, unless they are or will be crewed and carrying more than 12 passengers for commercial purposes; c) inland waterway vessels operating in inland waterways; d) fishing vessels with a length of less than 15 metres; e) fixed offshore drilling units. The reasons why these vessel types were excluded from the scope of the Directive are various[43].

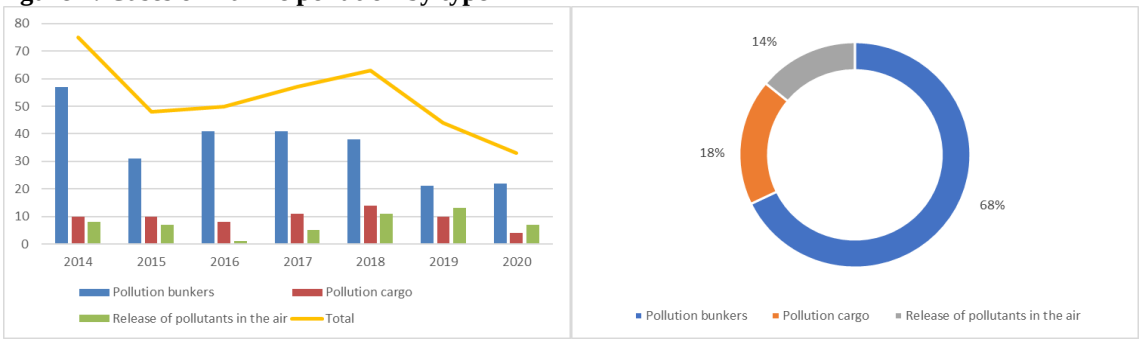
[41] European Maritime Safety Agency (2021), Annual overview of marine casualties and incidents 2021.
[42] European Maritime Safety Agency (2021), Annual overview of marine casualties and incidents 2021.
[43] As regards (a) it is because these vessels enjoy state immunity and due to the fact that the international conventions do not apply to them. For (b) it is because the international conventions do not apply, but also because they are certified and operated differently to maritime transport vessels and because these vessels

Figure 3: Number of reported marine casualties and incidents by type (left side) and number of fatalities (right side)



Source: European Maritime Safety Agency (2021)

Figure 4: Cases of marine pollution by type



Source: European Maritime Safety Agency (2021)

During 2014-2020, 810 investigations were finalised (116 investigations per year on average), 48% of these being related to VSMCs and 42% to serious casualties[44].

The need to further assess the inclusion of fishing vessels with a length of less than 15 metres in the scope of the Directive has been identified based on the feedback to the inception impact assessment and the targeted stakeholders' consultations. These maritime accidents are neither reported nor investigated in a systematic or harmonised manner, despite the fact that they represent around 90% of the EU fishing fleet[45]. There is therefore a gap in safety and the possibilities of learning from these accidents and preventing such accidents in the future are not being followed up, with negative consequences on their crews and the environment[46]. No issues resulting from the exclusion from the scope of the Directive were identified by stakeholders for the other categories of vessels.

Problem 2 – Some accidents are not investigated as AIBs lack clarity regarding the circumstances in which they must act and how they must act

The Directive contains a number of definitions which have given rise to questions of interpretation and to differences of approach between AIBs. This has also created a lack of legal certainty and an absence of harmonisation.

---

are not operated commercially/professionally. With regard to (c) and (e) the international maritime conventions generally do not apply to these vessels which are constructed, certified and operated differently to maritime transport vessels.

[44] Source: European Maritime Safety Agency

[45] DG MARE fleet register database (https://webgate.ec.europa.eu/fleet-europa/search_en) and Eurostat (https://ec.europa.eu/eurostat/databrowser/view/fish_fleet_alt/default/table?lang=en)

[46] In this regard the IMO is also looking into possible measures to address accidentally lost fishing gear which is a very significant element of marine litter.

In 2015, PCF members were asked to list issues related to the implementation of the Directive and the lessons learned thus far. During the course of this exercise several Member States reported that a number of definitions (i.e. definition of length of fishing vessel, definition of pleasure yachts and pleasure craft, definition of 'directly in connection with the operations of a ship', definition of a deadline for fatal/non-fatal injuries, conditions for a simplified investigation report) should be further clarified as there are different interpretations between Member States and between Member States and EMSA, when entering data in the EMCIP database.

While not all AIBs agree that all of the definitions mentioned above are problematic, the lack of a common understanding about these topics can have an impact on the day-to-day activities of the AIBs in the case of a joint investigation, and may affect the quality of the reports submitted to EMCIP.

In addition, the AI Directive refers to IMO definitions as well as other EU law. Since the adoption of the Directive, the IMO legislation impacting on the Directive has changed (see Annex 6). As a result, the Directive does not always refer to the up-to-date legislation. This creates a lack of legal certainty and harmonisation. This prevents cooperation with AIBs in third countries (which follow the more up to date IMO provisions).

It has not proved possible to estimate the extent to which less clear, ambiguous or outdated definitions have impacted on the number of investigations that have been carried out. This is because there is no information available on the number of investigations that have not been carried out due to definitions being unclear or un-harmonised or which do not correspond to the IMO standard. That being said, the issue of problematic and outdated definitions has been extensively discussed within the PCF. While agreement on some was reached (for example accidents involving the operations of a ship – while in port) these agreed interpretations have not been incorporated into a legislative text and are therefore not mandatory or enforceable.

Problem 3 – Some accident investigation bodies are not able to effectively and consistently report and investigate marine casualties

This problem was highlighted in the 2018 Maritime Transport Fitness Check. There are multiple reasons for this: it can be an internal resource issue if the number of employed investigators is limited, the AIBs may also not have sufficient budget available to hire external experts, even when additional personnel or technical or scientific expertise are required. Resource constraints can also be the result of unexpected events, such as multiple accidents occurring during a short period, or for example during the COVID-19 pandemic when investigators possibilities to travel to the scene of accidents were restricted. The evidence collected from the stakeholders, particularly the AIBs, indicates that the severity of the problem differs between Member States with the shortage of human and/or financial resources being a bigger issue for some AIBs than others.

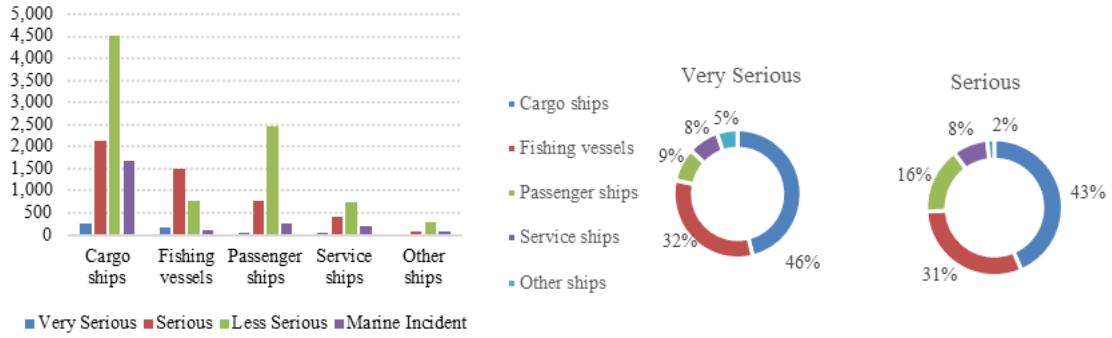
2.2. What are the problem drivers?

Problem Driver 1: The Directive does not apply to certain vessels

This problem driver links to Problem 1. Fishing vessels in general show a relatively high incidence of serious casualties and VSMCs. For 2014-2020, data reported to EMCIP for fishing vessels of more than 15 metres in length show a share of VSMCs in total number of marine casualties of 6.8% and of serious casualties of 59%, well above the average for other

ship types (2.6% and 24.3%, respectively). In terms of share in the number of VSMCs and serious casualties they come second after cargo ships, with 32% and 31% respectively (see Figure 5). In addition, fishing vessel crews constitute 34% of all fatalities[47].

Figure 5: Distribution of severity per ship type for 2014-2020 (cumulative number of accidents – left side; share in the total number of accidents – right side)



Source: European Maritime Safety Agency (2022)

The occurrence indicators, calculated by EMSA as the ratio between the number of reported accidents for a given ship type and the corresponding fleet size, also shows that safety level related to fishing vessels has negatively evolved during the past years. While the overall average occurrence indicator has decreased over time, the one for fishing vessels has continuously increased between 2014 and 2020. In addition, fishing vessels represented 61% of the total number of ships lost during the 2014-2020 period (13 fishing vessels of the 21 total ships lost per year on average)[48]. In contrast to larger vessels, EU-wide data is not systematically collected on accidents involving fishing vessels smaller than 15 metres. The data reported to EMCIP relating to fishing vessels in this category either relates to information voluntarily reported by the AIBs or because the accident in question also involves a vessel falling within the scope of the Directive.

Eleven AIBs stated that accidents involving fishing vessels below 15 metres in length are already investigated in their respective countries under national law. This activity generally only covers fatalities and/or serious accidents. Data concerning 2012-2019 from EMCIP validated through interviews with AIBs, shows that Denmark, France, Portugal, Sweden and Spain have uploaded accident reports concerning VSMCs with fishing vessels that are smaller than 15 meters (these Member States investigate these accidents based on national legislation even though there is no obligation to do so under EU law). Other AIBs (Germany, Greece, Malta, and Poland) have only uploaded accident reports for some years. While some other AIBs (e.g. Norway) have indicated that they also investigate these cases, but the reports are not uploaded in EMCIP.

As small fishing vessels are outside the scope of the Directive, EMSA does not follow up on this work and therefore it is not clear if these investigations are carried out in a systemic or harmonised manner. Furthermore, there is no broad or systematic dissemination of information on the results of these investigations – there is therefore no indication if the sporadic and uncoordinated non-harmonised investigation of these smaller fishing vessels accidents has a positive impact on safety in those Member States in which they are carried out. In addition, AIBs cannot benefit of lessons learned through investigations carried out and safety recommendations made in other Member States.

[47] European Maritime Safety Agency (2021), Annual overview of marine casualties and incidents 2021.
[48] European Maritime Safety Agency (2021), Annual overview of marine casualties and incidents 2021.

The Eurostat European Safety and Work data relating to accidents involving sea fisheries was also looked into. However, the Eurostat statistics only cover eight Member States and some of the Member States reporting to EMCIP do not appear in the Eurostat statistics, while some of the Member States who do report to EMCIP and appear in Eurostat statistics show conflicting numbers. Therefore, as these statistics cannot be reconciled, it has been decided to rely on the EMCIP data. The issue of fishing vessels safety has also been the subject of discussion by the Committee on Safe Seas and the Prevention of Pollution from Ships[49] where Member States agreed that there was a need to do more on this matter at EU level, including for smaller fishing vessels.

All stakeholders generally acknowledge the inherent risks involved in the operation of smaller fishing vessels. The AIBs interviewed noted that small fishing vessels are particularly prone to capsizing; falls overboard are also relatively common. It was also highlighted by multiple AIBs that often the operations of small fishing vessels are rather informal, with possibly only one (often elderly/retired) operator fishing alone, without an affiliation with a larger company. Consequently, there may be a lack of awareness, attention, or safety equipment at play, and in some cases, alcohol may be involved.

The exclusion of the mentioned category of vessels reduces the effectiveness of the Directive, as there is no obligation at the EU level for the AIBs to conduct a safety investigation. This in turn means that no harmonised EU-wide safety recommendations can be adopted to improve the safety of the EU fishing fleet. Consequently, the overall safety performance of smaller fishing vessels in the European fishing fleet cannot be improved on the basis of harmonised accident data. It appears however that the challenge with fishing vessels below 15 metres is that the incidents are often difficult to investigate particularly due to lack of witnesses, evidence (especially in the case of loss of one-person crew and/or vessel), and the causes of incidents are often difficult to address by recommendations. A balance is therefore needed between resources spent on and safety benefits expected from the investigation.

Problem Driver 2: Some definitions are not provided in the Directive or are not specific enough

This problem driver links to Problems 1 and 2. Three problematic definitions have been identified in this context.

Definition of length of fishing vessel. Marine casualties and incidents that involve only fishing vessels with a length of less than 15 metres are outside the scope of the Directive. There are a number of different methods by which the length of a vessel can be established with the two most common methods used globally being 'length overall' (LOA)[50] and 'length between perpendiculars' (LBP). This means that depending on the method used the same ship can have different lengths and could be within or outside the scope of the Directive. This ambiguity can create confusion and a non-harmonised approach between Member States regarding investigations involving this vessel type.

[49] COSS 46 meeting of November 2019. The committee established by Regulation (EC) No 2099/2002 to assist and advise the Commission on all matters of maritime safety and prevention or reduction of pollution of the environment by shipping activities.
[50] See Regulation (EU) 2017/1130 defining characteristics for fishing vessels (OJ L 169, 30.6.2017, p. 1)

A relevant consideration in this regard is why the threshold of 15 metres for fishing vessels in the Directive was chosen. This was linked with a requirement in Directive 2002/59/EC as amended by Directive 2009/17/EC on vessel traffic monitoring which was adopted at the same time as the AI Directive. This amendment provides that any fishing vessel flying the flag of a Member State, or operating in EU waters, or landing its catch in the port of a Member State and with a length of 15 metres LOA had to be fitted with an Automatic Identification of Ships - Class A automatic tracking system. It is therefore clear that LOA was the intention of the co-legislators at the time the AI Directive was drafted.

Definition of 'directly in connection with the operations of a ship'. For the purposes of the Directive, the terms "marine casualties" and "marine incidents" shall be understood in accordance with the IMO Casualty Code providing that these events have "occurred directly in connection with the operations of a ship". There is significant divergence of approach as regards what constitutes the "operations of a ship" and these differences in approach can have a considerable operational impact, particularly as regards what could be a joint investigation and as regards the gathering of meaningful accident and incident data. The question whether the accident or incident is directly connected to the operation of a ship is pivotal for assessing if the occurrence should be considered, or not, under the scope of the Directive and therefore has to be investigated. This is a particular issue with regard to accidents on board ships in ports involving stevedores/dock workers.

The matter has been extensively discussed between Member States AIBs in the context of PCF and there is agreement that the issue of what constitutes the operations of a ship particularly when that ship is in a port needs to be clarified.

Definition of a deadline for fatal/non-fatal injuries. The IMO Casualty Code defines a VSMC as "involving the total loss of the ship or a death or severe damage to the environment". This means a fatality will count as a VSMC triggering an obligation on the AIB to carry out an investigation. However, neither the relevant IMO nor the Directive provide any guidance on the time within which a death has to take place following the incident for it to qualify as a fatal incident.

A similar problem was encountered in the past in the aviation sector, but EU legislation[51] now provides, a clear time frame for a fatal injury. The absence of a unified single definition of fatal injury in the AI Directive may mean that maritime incidents which result in death are not being investigated as there is no harmonised approach to the time-frame within which death must occur for a fatality to be counted as a VSMC across the Union. The matter has been extensively discussed in the context of the PCF and there is agreement that a clarification is needed.

Problem Driver 3: References to outdated international and EU rules

This problem driver links to Problem 2. The Directive refers to a number of IMO legal texts which have been abrogated, amended or revised since the entry into force of the Directive (see Annex 6). As the Directive is built upon the IMO texts and as it is necessary that Member States fulfil both their international obligations as well as their EU obligations, it is important that the Directive be kept aligned with the relevant international instruments and that there is no contradiction in their obligations.

[51] Regulation (EU) No 996/2010 on the investigation and prevention of accidents and incidents in civil aviation (OJ L 295, 12.11.2010, p. 35)

The Directive refers to the "IMO Code for the Investigation of Marine Casualties and Incidents[52]" adopted in 1997. In May 2008 IMO adopted another text[53] to "incorporate and build upon" the 1997 IMO Code referred to in the Directive. However, in 2013 a further resolution was adopted[54] which revoked the 1997 IMO text. The Directive also refers to Circular MSC/MEPC. 3/Circ.3[55] of 2008 which provides the definition of a "serious casualty"; this IMO text was superseded by another IMO Circular in 2014[56] which no longer refers to "serious casualty".

If the Directive is not updated to take account of alignment with the international legal requirements, the Member States may face different obligations leading to confusion and extra effort for the AIBs, leading to an inefficient accident investigation process. Alignment between the EU acquis and the IMO regulatory environment is particularly important having regard to joint investigations carried out with third countries. This has not yet been done, as it requires that the Directive is updated. It is important to ensure that the Member States do not have contradictory obligations as regards the EU and IMO regulatory requirements.

Problem Driver 4 – Some AIBs lack sufficient resources and/or expertise to be able to effectively and consistently report on and investigate marine casualties

This problem driver links to Problem 3. A number of Member States already had an AIB before the adoption of the AI Directive and therefore the various AIBs have developed differently depending on their national context. The AI Directive is not prescriptive as to the form or structure the AIB had to take other than as to its independence. All 27 Member States now have AIBs with fifteen having established maritime-only AIBs, while twelve have multi-modal AIBs. Comparing the size and structure of different AIBs in different Member States is not useful as it ignores the fact that different Member States have different sized fleets, the flagged fleets are different in terms of composition, they vary as to the number and size of ports in their territory as well as their length of coastline. Moreover, some AIBs are multi-modal.

Accidents by their nature are not predictable and the issue of resource constraints becomes particularly pressing when there is a period with several VSMCs or serious marine casualties to investigate. Both the 2018 ex-post evaluation and the Maritime Transport Fitness Check showed that resource availability, either as regards available staff or with regard to external staff engaged to carry out a particular investigation can be critical considerations in deciding whether or not to perform an investigation into a less serious accident. Budget and personnel constraints might also influence the preliminary assessment in case of a serious accident. If an investigation is delayed due to insufficient resources, it may not be conducted in the most effective way, as due to time passed

[52] IMO Resolution A.849(20) of 27 November 1997

[53] Adoption of the Code of the International Standards and Recommended practices for a Safety Investigation into a Marine Casualty or Marine Incident (Casualty Investigation Code) Resolution MSC 255(84) of 16 May 2008.

[54] Resolution A.1075(28) Guidelines to Assist Investigators in the Implementation of the Casualty Investigation Code MSC.255(84)) Adopted on 4 December 2013

[55] Circular MSC/MEPC. 3/Circ.3 of the IMO Maritime Safety Committee and Marine Environment Protection Committee of 18 December 2008;

[56] Circular MSC-MEPC. 3/circ.4/rev.1 Reports on Marine Casualties and Incidents Revised Harmonized Reporting Procedures of 18 November 2014

between the accident and the start of the investigation evidence might be lost, or the memories of the witnesses may be affected.

Seven of the 17 AIBs who were involved in the targeted consultation stated that they suffer from lack of resources, or that they would carry out more investigations if they had more staff available. The AIBs reported that in principle they have the option to subcontract experts, particularly when specific knowledge is required, but many noted that budget and/or administrative complications make this impractical or impossible. Only four AIBs explicitly stated that resource availability is not currently an issue for them, however one of the four indicated that the obligations to notify marine casualties and incidents to EMCIP place a significant additional stress on their resources as the AIB does not deal with statistical data otherwise.

Issues relating to the obligation of the AI Directive to report accident and incidents to the EMCIP database had been identified in the ex-post evaluation. Underreporting of casualties and incidents is a significant issue – the difficulty being that it is hard to estimate what is not known. Nevertheless, EMSA has carried out an estimation of the size of the underreporting issue comparing reported accident data with publicly available information. On the basis of its research, EMSA concluded that the underreporting rate may be as high as 50%. This analysis is based on work carried out by EMSA as well as on academic theories of industrial accident prevention[57] whereby there is a numerical relationship between the number of accidents resulting in serious injuries, minor injuries or no injuries with the number of each increasing as their severity decreases.

On this basis the underreported accidents seem to relate more particularly to less serious incidents which are not always reported to AIBs by the shipping companies and therefore are not recorded in the EMCIP database. These are typically cuts, slips and trips usually involving crew members which do not result in lost days of work. Because of this, underreporting is not further considered in the assessment of impacts. At the same time, a number of AIBs see the reporting obligation as burdensome and a resource-intense obligation which could be better discharged by other competent authorities, allowing them to concentrate on investigation. The issue is also problematic because it means that there is no truly accurate picture of the accident situation.

Another aspect of this problem is the question of suitably trained staff with sufficient expertise in accident investigation and maritime transport. EMSA currently provides extensive training to AIB staff but it is the AIBs which have the responsibility for the recruitment and training of appropriately qualified investigators. The EGD and in particular the "Fit for 55" package will require boosting multimodal transport and ramping up the deployment of sustainable alternative transport fuels (for example through the "FuelEU maritime" initiative). This shift to renewable and low carbon fuels as well as to new technologies is expected to lead to a radical change in the maritime transport sector over the coming decades and will inevitably have an impact on the types of accidents that occur as well as impacting on the investigation thereof. This will present new challenges for the AIBs.

Other potential drivers considered in the impact assessment and discarded

[57] In the theory of industrial accident prevention, the accident triangle is known as Heinrich triangle or Birds triangle. The triangle first introduced by H.W Heinrich in 1931 and later expanded by Frank E. Bird (1969); it shows the relationships between Major, Minor and near miss.

A number of possible problem drivers (in relation to Member State acting as Substantially Interested State (SIS), the definition of pleasure yachts and pleasure craft and the COVID-19 pandemic) were considered during the impact assessment process but were discarded either because the identified problem driver was not validated by the stakeholders consulted, because the problem was not susceptible to a solution by means of EU legislation or because proposing an action to address the issue at EU level will not yield additional results. Further details on the discarded problem drivers and the reasons are set out in Annex 7.

2.3. How likely are the problems to persist?

Problem 1 - Accidents involving some categories of vessels are not investigated or are not investigated in a harmonised manner. As long as smaller fishing vessels are not included in the scope of the Directive, those Member States who do not currently investigate these accidents under national law will not do so. Those Member States that do investigate (under national law) smaller fishing vessels accidents do so in an uncoordinated way, and are not obliged to upload their reports and recommendations to EMCIP. Consequently, no lessons will be learnt with regards to safety on fishing vessels and no standardised EU wide data on this subject will be collected. There is no evidence to suggest that the situation will change in the future without EU level intervention. The lack of accident investigation reports, safety recommendations and lessons learnt could lead to a decline in safety in the fishing sector operating with ships below 15 meters in length. Without reminders and information about risks to avoid and safe practices to follow, safety standards may decline. The small size of the businesses in question would make it highly unlikely that they would promulgate such lessons within the industry themselves. As explained in section 2.2, the accident occurrence indicator[58] for fishing vessels has continuously increased between 2014 and 2020 showing that the safety level related to fishing vessels has negatively evolved during the past years[59].

Problem 2 – Some accidents are not investigated as AIBs lack clarity regarding the circumstances in which and how they must act. Without further EU level intervention, the unclear, ambiguous, or outdated definitions of the AI Directive will persist. This means that that AIBs will continue to lack clarity regarding the circumstances in which they must act (i.e. in relation to the length of fishing vessel within the scope, of the definition of 'directly in connection with the operations of a ship', and of the definition of a deadline for fatal/non-fatal injuries) and how they must act (i.e. in relation to conditions for a simplified investigation report). AIBs will be placed in the situation where they have to find ad hoc workable solutions not coordinated or harmonised across the EU.

Problem 3 – Some AIBs lack sufficient resources and/or expertise to be able to effectively and consistently report on and investigate marine casualties. As explained in section 2.2, some AIBs already lack sufficient human and financial resources and/or expertise to effectively and consistently report on and investigate marine casualties. Maritime traffic and ship calls are projected to increase over time. This in turn is expected to lead to an increase in the number of maritime accident investigations and put additional pressure on resources, despite the fact that improved technology may offer better means for investigators to investigate accidents. For example, most (larger) vessels that are built

[58] Calculated as the ratio between the number of reported accidents and the corresponding fleet size.
[59] European Maritime Safety Agency (2021), Annual overview of marine casualties and incidents 2021.

after 2002[60] are equipped with Voyage Data Recorders (VDR)[61] which should make the work of the investigators easier. On the other hand, the uptake of renewable and low carbon fuels in the maritime sector, in line with the "Fit for 55" package and in particular the "FuelEU maritime" initiative, will require resources to continuously update the staff skills. Problem 3 is thus expected to persist over time without further EU level intervention, although technological innovations are expected to facilitate to some extent the work of investigators. At the same time, an upgrade of staff skills is expected to be needed in the future.

3. WHY SHOULD THE EU ACT?

3.1. Legal basis

Title VI (Articles 90-100) of the Treaty on the Functioning of the EU (TFEU) establishes the EU's prerogative to make provisions for the Common Transport Policy. Pursuant to Article 100(2) TFEU, the Union legislator may lay down appropriate provisions for sea transport. Article 91(1)(c) of the TFEU provides that the Union has competence in the field of transport to lay down measures to improve transport safety.

Within this legal framework, the EU provides for a coordinated and harmonised safety standard, protecting life and the marine environment across the Union, instead of relying on the uncoordinated action of individual Member States only. Travellers, workers and citizens in general can be reassured that accidents will be investigated to the same high standard across the Union and that the lessons learned from such accidents can be disseminated, allowing for better evidence based policy responses at national and EU level.

3.2. Subsidiarity: Necessity of EU action

Under the principle of subsidiarity, in areas which do not fall within its exclusive competence, the Union shall act only if and in so far as the objectives of the proposed action cannot be sufficiently achieved by the Member States. To the extent that international instruments in the field of Accidents Investigation in the maritime transport sector are an exclusive Union competence pursuant to Article 3(2) TFEU, the subsidiarity principle does not apply, either to those instruments or to Union rules implementing those agreements.

In any case, in the absence of the AI Directive, 16 of the Member States' AIBs are unlikely to have been established. Furthermore, the majority of the States which did not have an AIB prior to 2009 used to conduct investigations primarily for criminal prosecution purposes. The Directive has therefore addressed a safety need.

In the absence of EU action, EU Member States would work in an uncoordinated and non-harmonised way. Given the international nature of maritime transport, there is therefore a "Union relevance" of improving the Directive to address the identified problems. It is essential that all Member States investigate similar accidents in the same way to ensure an appropriate safety net across the Union to protect life and the marine environment.

---

[60] The International Convention for the Safety of Life at Sea - SOLAS, Regulation 20 of Chapter V.

[61] A voyage data recorder (VDR) is a data recording system designed for vessels required to comply with the IMO's International Convention SOLAS Requirements (IMO Res.A.861(20)) to collect data from various sensors on board the vessel. The information is then digitized, compressed and stored, it performs a similar function to the "black box" recording device installed on commercial airliners.

The identified problems apply across the entire Union and have the same underlying causes. Only the issue of inadequate resources to discharge the Directive's obligations varies between Member States as some AIBs have sufficient human, financial and technical resources to be able to report or investigate all casualties that they would like to and others do not. Nevertheless, the fact that some AIBs have sufficient resources should not prevent those who do not from receiving the necessary assistance.

3.3. Subsidiarity: Added value of EU action

Shipping is an international sector, operating in different EU and international waters and regulated at the global as well as regional and national instances. Therefore, it has by nature a strong cross-border dimension. The 2018 ex-post evaluation of the AI Directive and the Maritime Fitness Check also underlined its EU added value in terms of its effectiveness, efficiency and synergies that it brings. The evaluation found that the obligation to create an independent AIB was regarded by the majority of stakeholders as the main added value of the Directive. This was done to avoid the situation that an AI body which is part of the maritime administration would in effect be investigating itself with the attendant risk of conflict of interest. Given the role and responsibilities of maritime administrations as regards certification of vessels, of equipment, of seafarer training as well as the control exercised over vessel traffic monitoring as well as of coast guards and other bodies, the EU co-legislators felt that it was important that the AIB was separated from the maritime administration. The Commission has been obliged to take a number of infringement actions in this regard[62]. The Directive also brings EU legislation in line with IMO regulation. EU action ensures a level playing field for shipowners, ports and between Member States. Harmonisation of investigations at EU level is essential in this respect.

Given the international nature of maritime transport and the need for a coordinated and harmonised approach to maritime safety, a multiplicity of Member State responses to the extent allowed, issues identified is not appropriate, therefore the issues previously identified are only susceptible to EU-wide solutions. Failure to adapt the Directive would remove the synergistic benefits gained through its implementation.

4. OBJECTIVES: WHAT IS TO BE ACHIEVED?

4.1. General objectives

In view of the problems identified in section 2.1, the review of the AI Directive should improve maritime safety and improve the protection of the marine environment. It should thus also contribute towards Sustainable Development Goal (SDG) 3 ("Ensure healthy lives and promote well-being for all at all ages") and SDG 14 ("Conserve and sustainably use the oceans, seas and marine resources for sustainable development").

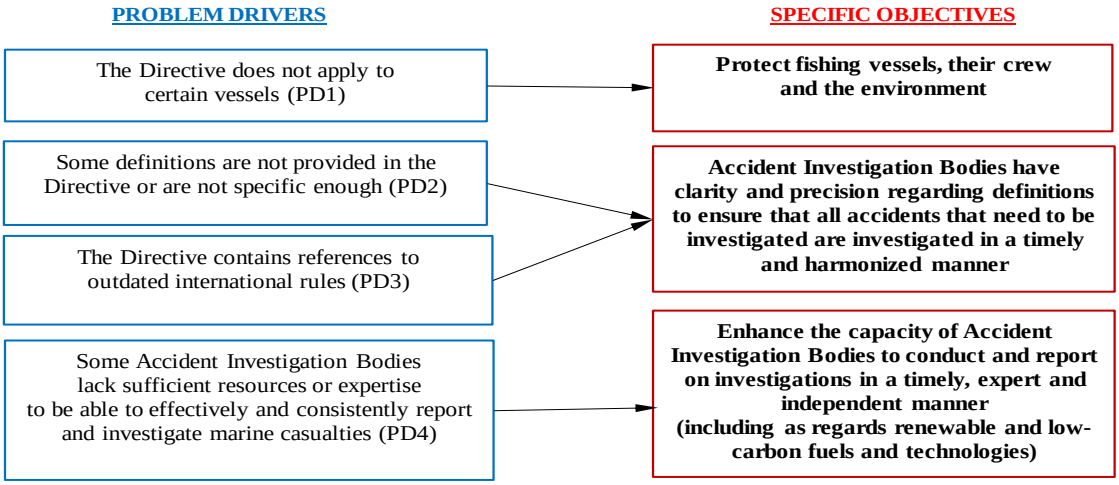
4.2. Specific objectives

This initiative is designed to effectively address the identified problems that hamper the coordinated and harmonised investigation of maritime accidents in the European Union. The specific objectives (SOs) and their correspondence with the problem drivers are presented in Figure 6.

[62] See in particular the Judgment of 9 July 2020 – European Commission v Ireland (C-257/19)

SO1: Protect fishing vessels, their crew and the environment. VSMCs of smaller fishing vessels of less than 15 meters in length including fatalities and loss of vessels are not investigated in a systematic and harmonised way across the European Union. Including VSMCs involving this vessel type within the Directive would require reporting and allow for more investigations and a better understanding of the safety problems that this segment faces. Systematic safety investigations of these accidents would lead to safety recommendations to the vessel operators, the sector, national administrations and other interested parties which should improve the safety picture. The conduct of systematic safety investigations will also provide policy makers at national and EU level with the information to prepare well-developed and evidence-based policy responses.

Figure 6: Correspondence between the specific objectives and the problem drivers



SO2: Member States accident investigation bodies to have clarity and precision regarding definitions to ensure that all accidents that need to be investigated are investigated in a timely and harmonised manner. AIBs need clarity on the circumstances in which they should carry out investigations. An absence of adequate harmonisation and a common understanding of definitions relating to the legislation means that similar accident are subject to different treatment as to whether they are investigated or not in different Member States. The Directive should also be aligned with the relevant international instruments so as to ensure better consistency between Member States obligations under the Directive and their international obligations – this is particularly an issue having regard to joint investigations with third countries.

SO3: Enhance the capacity of AIBs to conduct (and report on) accident investigations in a timely, expert and independent manner - including as regards renewable and low carbon fuels and technologies. Member States AIBs should be able to respond in a timely manner, report to EMCIP and to carry out appropriate safety investigations. Adequate resources are relevant in this context – if the AIBs need specialised training, operational or technical assistance there should be a mechanism within the Directive that provides for such a possibility. The uptake of renewable and low carbon fuels in the maritime sector, in line with the "Fit for 55" package and in particular the "FuelEU maritime" initiative, will require resources to continuously update the staff skills.

5. WHAT ARE THE AVAILABLE POLICY OPTIONS?

5.1. What is the baseline from which options are assessed?

The EU Reference scenario 2020 (REF2020) is the starting point for the impact assessment of this initiative. The REF2020 takes into account the impacts of the COVID-19 pandemic that had a significant impact on the transport sector. More detailed information about the preparation process, assumptions and results are included in the Reference scenario publication[63]. Building on REF2020, the baseline scenario for this impact assessment has been designed to include the initiatives of the 'Fit for 55' package proposed by the Commission on 14 July 2021. A common baseline was developed for this impact assessment, as well as for the Flag State and Port State control impact assessments, to ensure consistency. More details on the baseline scenario are provided in Annex 4.

The baseline scenario assumes no further EU level intervention beyond the current AI Directive and the continuation of the application of the IMO Casualty Code as it is. Smaller fishing vessels would continue to be outside the scope of the Directive and therefore Member States would adopt different approaches to similar accidents. Member States with inadequate financial, technical or operational resources to be able to report on and investigate accidents in a timely and efficient manner would have to make choices as to what accident to investigate and how. As previously stated, the role of EMSA in the implementation of the Directive is central. EMSA operates the EMCIP database, provides training to investigators on the request of AIBs and assists in the management of the PCF. The Commission has launched an impact assessment on the possible review of EMSA founding Regulation.[64] However, the outcome of this impact assessment cannot be prejudged and thus the baseline scenario does not account for changes in the EMSA founding Regulation.

The COVID-19 pandemic had a major impact on global shipping, affecting all its segments from passenger ships to container ships and oil tankers.[65] In the baseline scenario, international maritime freight transport activity (intra and extra-EU) is projected to be 21% lower in 2020 relative to 2015. From 2021 onwards however it is projected to start recovering and grow strongly by 2025 and beyond (i.e. 19% growth for 2015-2030 and 48% for 2015-2050), due to the rising demand for primary resources and container shipping. Relative to 2019, this is equivalent to 8% increase in transport activity by 2030 and 33% growth by 2050.

The number of port calls for 2025-2050 is projected to grow at lower rate than transport activity, following similar evolution over the historical period[66]. This reflects the fact that transport activity is also driven by other factors such as the increase in the size of vessels over time, and of the distance travelled. In the baseline scenario the number of port calls is projected to go up by 14% by 2030 relative to 2015 and by 36% by 2050 (equivalent to

[63] EU Reference Scenario 2020 | Energy (europa.eu)
[64] Regulation (EC) No 1406/2002/EC, the inception impact assessment at https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13049-European-Maritime-Safety-Agency-review-of-mandate_en
[65] COVID-19 did not however have a long term effects on the activities of the accident investigation bodies, as it can be seen in Annex 7.
[66] The same ratio between the growth in the number of port calls and the transport activity as for the historical period (2014-2019) has been assumed for the projection period.

6% growth by 2030 relative to 2019 and 26% increase by 2050), following the recovery from the COVID-19 pandemic.

Driven by the increase in the transport activity and the number of vessels, the number of marine casualties is projected to increase over time in the baseline scenario. Considering only the scope of the AI Directive (i.e. excluding fishing vessels below 15 meters) the number of casualties is projected to increase by 14% by 2030 relative to 2019 and by 45% by 2050 without further EU level action. At the same time, the degree of severity of marine casualties is projected to decrease, leading to a decrease in the number of vessels lost (by 5% for 2019-2030 and for 2019-2050) and a relative stabilisation of the number of fatalities by 2050 (11% decrease for 2019-2030 and 3% increase for 2019-2050).

Accounting also for the fishing vessels below 15 meters, which are currently outside the scope of AI Directive, the number of marine casualties is projected to increase by 9% by 2030 relative to 2019 and by 27% by 2050 in the baseline scenario. The lower growth in the number of marine casualties for fishing vessels below 15 meters (6% for 2019-2030 and 15% for 2019-2050) is explained however by the projected reduction in the number of fishing vessels by 2050, while the marine casualties' rate would still increase over time. The degree of severity of marine casualties including fishing vessels below 15 meters is projected to decrease over time but 210 fatalities are still projected in 2030 and 203 in 2050 in the baseline scenario, while 141 vessels are projected to be lost in 2030 and 129 in 2050. By 2050, the number of fatalities involving fishing vessels below 15 meters would represent 67% of the total number of fatalities while the vessels lost 85% of the total. In addition, the estimated number of fatalities and injuries where "other persons are involved" is projected to remain stable up to 2030 relative to 2019 but increase by 25% and 23%, respectively, up to 2050 (15 fatalities and 103 injuries). This is particularly relevant with regard to accidents on board ships in ports involving stevedores/dock workers. ***This is still far from the goal of the Sustainable and Smart Mobility Strategy of close to zero death toll for all modes of transport in the EU.***

The tonnes of bunker fuel lost at sea due to VSMCs involving all vessels, excluding fishing vessels below 15 meters, is estimated to go up from around 650 tonnes in 2019 to 740 tonnes in 2030 and 890 tonnes in 2050. When also considering fishing vessels below 15 meters the bunker fuels lost at sea is estimated to increase from 1,178 tonnes in 2019 to 1,301 tonnes in 2030 and 1,497 tonnes in 2050[67].

Driven by the projected number of marine casualties, the number of safety investigations in the scope of the AI Directive is projected to increase from 95 in 2019 to 111 in 2030 and 138 in 2050 in the baseline scenario. The baseline projections also account for the impact of Brexit[68], which is likely to be felt more significantly by some Member States

[67] An average level of 30 tonnes of bunker fuels lost per vessel (excluding fishing vessels) has been used for the estimations in the context of the impact assessment support study. For fishing vessels above 15 meters an average level of 22 tonnes of bunker fuels lost per vessel has been assumed, based on data from EMSA. Finally, for fishing vessels below 15 meters, 21% of the bunker fuels lost per fishing vessels above 15 meters has been assumed (i.e. 6.6 tonnes), drawing on information from the Scientific, Technical and Economic Committee for Fisheries (STECF), database of the 2021 Annual Economic Report on the EU Fishing Fleet, available at https://stecf.jrc.ec.europa.eu/reports/economic.

[68] From the entry into force of the AI Directive till the end of 2020, the UK has conducted 187 safety investigations out of 1,482 investigations in total. Amongst them, 53 included an EU interest. As a result of Brexit, and assuming no agreement with the UK AIB, these would now have to be done by EU AIBs. On

(e.g. Ireland, France, Belgium, Cyprus or the Netherlands) due to their links, either geographical or commercial, with the UK. The impact of the Russian invasion of Ukraine on maritime traffic, on maritime trade flows or safety and thereby indirectly on maritime accident investigation has not as yet been possible to quantify.

As explained, safety investigations for fishing vessels below 15 are not in the scope of the AI Directive and Member States that perform them do so in line with national legislation. In the baseline scenario, the number of safety investigations for VSMCs involving fishing vessels below 15 meters is projected to go up from a range between 53 and 156 investigations in 2019 to 58 to 171 investigations in 2030 and 63 to 186 investigations in 2050. These projections also take into account the effect of Brexit.

The costs for all EU AIBs for conducting investigations according to AI Directive (including administrative tasks) are projected to increase from a range between EUR 1.0 and 6.2 million in 2019 to EUR 1.2 to 7.2 million in 2030 and EUR 1.5 to 8.9 million in 2050. The investigations of VSMCs involving fishing vessels below 15 meters, performed by EU AIBs in line with the requirements of national law may add between EUR 0.6 to 10.1 million in 2019, to EUR 0.6 and 11.1 million in 2030 and to EUR 0.7 to 12.1 million in 2050.

5.2. Policy measures and policy options

As a first step, a comprehensive list of possible policy measures was established after extensive consultations with stakeholders, expert meetings, independent research and the Commission's own analysis. This list was subsequently screened based on the likely effectiveness, efficiency and proportionality of the proposed measures in relation to the given objectives, as well as their legal, political and technical feasibility.

5.2.1. Discarded policy measures

A number of possible problem drivers and policy measures were considered during the impact assessment process but were discarded either because the identified problem driver was not validated by the stakeholders consulted, because the problem was not susceptible to a solution by means of EU legislation or because proposing an action to address the issue at EU level will not yield additional results. Further details on the discarded problem drivers and policy measures and the reasons are set out in Annex 7.

5.2.2. Retained policy measures

The retained policy measures to address the problems identified in section 2 are provided in Table 2. A more detailed description of the policy measures is included in Annex 8.

5.3. Description of the policy options

The retained policy measures have been grouped in 3 policy options: policy option A (PO A), policy option B (PO B) and policy option C (PO C). Table 2 presents the links of policy measures included in the policy options with the problem drivers and specific objectives.

---

this basis, the number of investigations for all EU AIBs is estimated to increase by 3.5% each year relative to developments excluding Brexit.

Table 2: Overview of policy measures and policy options

Policy driver and specific objective	Policy measure	PO A	PO B	PO C
PD1 SO1	**PM 1a** – Member States will be **encouraged to report** all very serious marine casualties (crew fatalities or loss of vessel) involving fishing vessels of less than 15 metres in EMCIP	√		
	PM 1b – Member States will be **obliged to report** very serious marine casualties (crew fatalities or loss of vessel) involving fishing vessels of less than 15 metres in EMCIP		√	√
	PM 2 – Member States will be **obliged to carry out a preliminary assessment** of very serious marine casualties involving fishing vessels of less than 15 metres to determine whether they will open a safety investigation			√
PD2 SO2	**PM 3** - Length of fishing vessels to be defined as **Length overall** (LOA)	√	√	√
	PM 4a – The phrase "directly in connection with the operations of a ship" will be clarified in **interpretive guidelines** (non-regulatory measure) as regards accidents which take place in ports	√		
	PM 4b – The phrase 'directly in connection with the operations of a ship' will be **explicitly defined** in the Directive as regards accidents which take place in ports		√	√
	PM 5a – Interpretive guidelines will provide elements to support the AIB to decide when an accident classifies as **fatal** in case a person does not die immediately	√		
	PM 5b – An explicit **deadline** will be included in the Directive stating when an **accident classifies as fatal** in case a person does not die immediately		√	√
PD3 SO2	**PM 6** - The Directive will refer to the most up-to-date versions of the Code for the Investigation of Marine Casualties and Incidents (Casualty Investigation Code)	√	√	√
PD4 SO3	**PM 7** - **EMSA** could **provide highly specialised analytical support** during an individual investigation (soft skills)	√		√
	PM 8 - **EMSA** could **provide analytical tools and equipment** during an individual investigation (hardware)	√		√
	PM 9 - **EMSA** could **share knowledge or organise training** on specific techniques/tools on new developments and technologies which may be relevant for accident investigation in the future, including but not limited to renewable and low carbon fuels, which are particularly relevant in view of the "Fit for 55" package, and automation, as well as the General Data Protection Regulation (GDPR) rules	√	√	√
	PM 10 - Introduce the obligation that each Member State establishes a **quality management system** (QMS) for the accident investigation body	√	√	√
	PM 11 - The list of **authorities** that can input / add accident data to the **EMCIP database is modified,** so that AIBs must report VSMCs but all other occurrences can be reported by other nominated competent national authorities, the Commission and EMSA		√	√

All three policy options contain four common policy measures, namely: PM3 to clarify the length of fishing vessels, PM6 to align the Directive with the most up to date version of the IMO Casualty Code to avoid the situation where Member States have divergent responsibilities to the EU and IMO, PM9 on EMSA providing training on new developments and technologies as well as on the GDPR rules and PM10 requiring that EU AI bodies to have a quality management system.

5.3.1. Policy option A

This policy option proposes a number of changes to the Directive to better deliver on the goal of improving maritime safety and pollution prevention. Policy option A will leave the scope of the Directive as it is and the AIBs would continue to have the flexibility they currently have. The changes envisaged would add little in terms of new requirements in the AI Directive while EMSA assistance would offer some benefits.

On Specific Objective 1 "*Protect fishing vessels, their crew and the environment"* - **a non-regulatory measure** is proposed where Member States will be recommended to report on VSMCs (crew fatalities or loss of vessel) and in so doing should provide more insight into the number of accidents as well as some of the reasons behind them (PM 1a).

With regard to Specific Objective 2 "*Member States AIBs to have clarity and precision regarding definitions to ensure that all accidents that need to be are being investigated in a harmonised manner" the* **amendments** are focused both on **aligning** the Directive with new references in **IMO** legislation (PM 6) and on providing more guidance on how the effectiveness of accident investigation can be improved to ultimately positively impact maritime safety. Problems with **definitions** will be clarified by legislation (PM 3) or by using **non-regulatory measures** such as interpretative guidelines (PM 4a and PM 5a).

In relation to Specific Objective 3 "*Enhance the capacity of AIBs to conduct (and report on) accident investigations in a timely, expert and independent manner - including as regards renewable and low carbon fuels and technologies"* the policy option requires a **quality management system (QMS)** be put in place to assure each AIBs' effective management of resources and of inspection reports (PM 10). On the issue of resources, an enhanced role is provided for **EMSA in support of the Member States** by providing highly specialised analytical support (soft skills) during an investigation (PM 7), the supply of tools and equipment (hardware) to AIBs (PM 8) and the sharing of knowledge or the organisation of training on specific techniques/tools on issues such as renewable and low carbon fuels which are expected to have significant impacts on the way in which maritime transport operates and which will be relevant for accident investigation in the future as well as on issues relating to the General Data Protection Regulation "GDPR" (PM 9) and the sharing of information with third country authorities.

5.3.2. Policy option B

This policy option seeks to balance enhanced harmonisation by means of more clearly stated definitions with a limited additional requirement as regards smaller fishing vessels. In this policy option, flexibility for the AIBs is limited while **harmonisation is highlighted** as much as possible.

On Specific Objective 1 "*Protect fishing vessels, their crew and the environment"* the Directive would be amended so that Member States would be required to report all fatalities and vessel losses involving fishing vessels of less than 15 metres to the EMCIP (PM 1b). This should provide the Commission and Member States with empirical data for future policy making in this area.

With regard to Specific Objective 2 *"Member States AIBs to have clarity and precision regarding definitions to ensure that all accidents that need to be are being investigated in a harmonised manner",* the **same alignment** as in PO A on IMO (PM 6) is provided for.

On the possibly ambiguous terms and **definitions** which leave room for interpretation specifically how to measure the length of fishing vessels, how the phrase 'directly in connection with the operations of a ship' should be defined and the fixing of a time limit for situations when person does not die immediately after the accident are explicitly defined in the Directive to harmonise accident investigation further (PM3, PM 4b and PM 5b). Limiting the flexibility of AIBs as regards definitions will ensure a more harmonised approach to investigations and more coherent inspection results in terms of reports and safety recommendations.

In relation to Specific Objective 3 "*Enhance the capacity of AIBs to conduct (and report on) accident investigations in a timely, expert and independent manner - including as regards renewable and low carbon fuels and technologies"* there continues to be the requirement for a **QMS** (PM 10) like in PO A. The role of **EMSA in support of the Member States** is slightly enlarged beyond what is currently provided for in existing legislation by sharing of knowledge or the organisation of training on specific techniques/tools on issues such as renewable and low carbon fuels which are expected to have significant impacts on the way in which maritime transport operates and which will be relevant for accident investigation in the future as well as on issues relating to the General Data Protection Regulation "GDPR" (PM 9). However, the responsibility of AIBs to **report accident information to EMCIP** is reduced by broadening the scope of authorities who can input such data to include any competent authorities nominated by the Member States as well as the Commission and EMSA (PM 11). The EMCIP reporting burden on AIBs is somewhat lessened by broadening the range of competent authorities that can report to the database.

5.3.3. Policy option C

This policy option revises the Directive, increasing the level of policy intervention and focuses on the harmonisation. This policy option is the most ambitious in terms of increased administrative and investigatory requirements for the AIBs.

With respect to Specific Objective 1 "*Protect fishing vessels, their crew and the environment"* this option will oblige AIBs not only to report on fatalities and vessels losses of **smaller fishing vessels** (PM 1b), but also to carry out at least a preliminary assessment to determine if lessons can be learned and if a full investigation needs to be carried out (PM 2). At the moment, AIBs are not required to provide information on the safety record if smaller fishing vessels or their susceptibility to accidents at EU level. However, smaller fishing vessels are generally older, not typically appropriately invested in or operated by their owners and are frequently crewed by only one or two crewmembers. Therefore, if they are involved in a fatal incident there may not be any crew to interview. This does not mean however that there will be no evidence and that the lessons learned cannot be shared. Moreover, as they fall outside the scope of the Directive, accidents are not reported and therefore, there are no statistics that allow monitoring the evolution of accidents (even if they are not investigated).

All stakeholders generally acknowledged the inherent risks involved in the operation of smaller fishing vessels. The AIBs interviewed noted that small fishing vessels are particularly prone to capsizing; falls overboard are also relatively common.

However, there is mixed opinion among AIBs as to whether the scope should be extended. AIBs already investigating casualties involving smaller fishing vessels are in favour of

extending the scope. AIBs not yet investigating casualties involving smaller fishing vessels have mixed opinions. Some of them, especially the small ones, are against a scope extension as they fear that it will increase their workload substantially. The larger AIBs seem to be more in favour as they see advantages of investigating the accidents as in the long run it could improve safety. Social partners in the sea fisheries sector (employers and employees) on the other hand have expressed support for this measure, underlining the importance of gathering solid, detailed information on the causes of accidents.

At the same time, IMO has removed the reference to serious casualty and as part of alignment the Directive will be amended to abolish the requirement that a preliminary assessment is carried out in respect of all serious casualties. This means that apart from VSMCs (which currently make up 48% of European AIBs completed safety investigations and following the extension to smaller fishing vessels proposed in this revision whereby the AIB will only be obliged to carry out a preliminary assessment) all other safety investigations (currently just more than half of all investigations) will be at the discretion of the AI bodies. In other words, besides investigating VSMCs, AIBs already focus their work on the accidents where they consider that, a priori, some safety lessons can be learned.

With regard to Specific Objective 2 "*Member States AIBs to have clarity and precision regarding definitions to ensure that all accidents that need to be are being investigated in a harmonised manner"* the **same alignment as in PO A and B** on IMO (PM 6) is provided for. Potentially problematic **definitions** will be laid down in the Directive and clearly addressed. The effect of this policy option is that AIBs will still have some flexibility in some areas, while in other areas the room for interpretation is limited, to improve harmonisation in the EU (PM3, PM 4b and PM 5b).

On the resource issue set out in Specific Objective 3 "*Enhance the capacity of AIBs to conduct (and report on) accident investigations in a timely, expert and independent manner - including as regards renewable and low carbon fuels and technologies"* the role of **EMSA in support of the Member States** is enhanced by providing highly specialised analytical support (soft skills) during an investigation (PM 7), the supply of tools and equipment (hardware) to AIBs (PM 8) and the sharing of knowledge or the organisation of training on specific techniques/tools and new developments (in particular renewable and low carbon fuels following the "Fit for 55" package, automation etc.), as well as assistance on EU GDPR which will be relevant for accident investigation in the future (PM 9). EMSA's assistance both in terms of soft skills and hardware will partially mitigate the additional workload. The authorities which can **report data to EMCIP** will also be expanded (PM 11). The requirement for a **QMS** (PM10) is also contained within this option.

6. WHAT ARE THE IMPACTS OF THE POLICY OPTIONS?

This section summarizes the main expected economic, social and environmental impacts of each PO[69]. The proposed measures which involve the amendment of the Directive are assumed to be implemented from 2025 onwards, so that the assessment has been undertaken for the 2025-2050 period and refers to EU27. Costs and benefits are

[69] The analysis in this section is based on the Ecorys et al. (2022), *Impact assessment support study concerning possible revision of Directive 2009/18/EC*, and on the analysis of stakeholders' feedback.

expressed as present value over the 2022-2050 period, using a 3% discount rate. Further details on the methodological approach are provided in Annex 4.

The revision aims at improving how accident investigations are undertaken in the EU. Some measures aim at increasing efficiency and harmonisation through better definitions, to share resources (i.e. through EMSA) and alignment with other pieces of legislation[70]. Better investigation is expected to ultimately lead to enhanced safety and better protecting the environment.

6.1. Economic impacts

This section provides the economic impacts of the policy options on the AIBs, ship operators and EMSA. It also provides an assessment of impacts on SMEs, the functioning of the internal market and competition, and on competitiveness.

6.1.1. Impacts on Accident Investigation Bodies

Impact on the number of investigations. The *inclusion of the very serious casualties involving a fishing vessel below 15 meters* in PO C is projected to result in 37 to 110 additional investigations relative to the baseline in 2030 and 40 to 119 additional investigations in 2050 (Table 3) at EU level. It should be noted that for fishing vessels below 15 meters, as explained in section 5.1, the investigations in the baseline scenario are conducted in line with the requirements of national legislation in 11 Member States.

The *clarification of the length of fishing vessels definition*, defined as Length overall (LOA) in all three policy options, is projected to result in a limited increase in the number of investigations that are currently under the scope of the AI Directive (6 additional investigations in all three options relative to the baseline in 2030 and 2050).

As regards the definition of *"directly in connection with the operations of a ship"* and how this is interpreted having regard to port workers, the impact of a clearer definition explicitly extending the scope of the Directive to situations where there are casualties involving port workers which take place on board a ship in a port is expected to give rise to a limited number of additional investigations per year in PO B and PO C (8 additional investigations relative to the baseline in 2030 and 9 in 2050). The impact would be smaller in PO A whereas only interpretative guidelines are foreseen (4 additional investigations relative to the baseline in 2030 and 5 in 2050).

A number of policy measures further seek to specify or clarify definitions in the Directive. It was not possible to quantify their impact on the additional number of investigations, although their impact is expected to be limited.

On the *establishment of a time limit for fatal accidents*, this is expected to give rise to a very limited increase in the number of investigations per year in PO B and PO C. The 16 AIBs that responded to the AIB survey indicated that accidents with "delayed" loss of life only occur once a year or less. In many cases, such accidents are investigated anyway. All the AIBs responding to the survey mentioned that it never happened that a fatal accident was not investigated because the death occurred only after the decision not to undertake the investigation. However, several AIBs mentioned that it would be helpful

[70] For example the GDPR

to have an alignment with international standards or guidelines, to facilitate cooperation with non-EU countries.

The *alignment with the up to date IMO provisions in PO A, PO B and PO C means that the concept of a serious casualty* is removed from the Directive along with the obligation on AIBs to carry out a preliminary assessment of such casualties to determine if a safety investigation has to be carried out. While this alignment with the IMO provision will not necessarily reduce the number of non-mandatory safety investigations carried out it will mean that AIBs are not obliged to carry out preliminary assessments which may lead to a reduction of the costs. Given that all occurrences are subject to some sort of assessment to establish whether it falls within the scope of the Directive and should be investigated, it is not possible to quantify the possible reduction in costs.

Overall, PO A would lead to 10 additional investigations at EU level in 2030 and 11 in 2050 relative to the baseline. PO B is projected to result in slightly higher number of additional investigations than PO A (14 in 2030 and 15 in 2050), while PO C would result in 51 to 124 additional investigations in 2030 and 55 to 134 additional investigations in 2050 (Table 3). As explained above, the number of additional investigations may be slightly higher, in particular in PO B and PO C, which additionally *establish a time limit for fatal accidents*.

Table 3: Projected number of investigations (EU27)

	Baseline		Difference to the baseline					
			PO A		PO B		PO C	
	2030	2050	2030	2050	2030	2050	2030	2050
Number of investigations excluding fishing vessels below 15 meters	111	138	10	11	14	15	14	15
Number of investigations for fishing vessels below 15 meters	58 - 171	63 - 186	0	0	0	0	37 - 110	40 - 119
Total number of investigations	**169 - 282**	**201 - 324**	**10**	**11**	**14**	**15**	**51 - 124**	**55 - 134**

Source: Ecorys (2022), Impact assessment support study

Impact on the reporting requirements. All policy options include *requirements regarding the reporting of very serious marine casualties (VSMC) involving fishing vessels below 15 meters*. However, while in PO A Member States are encouraged to report VSMCs involving these vessels (on a voluntary basis), in PO B and PO C Member States are obliged to report them. In 2019, only Denmark, France, Malta, Portugal and Poland reported in total 21 VSMCs in EMCIP, which represent around 5% of the total number of VSMCs estimated for that year[71]. In the baseline scenario, the share of VSMCs involving fishing vessels below 15 meters that are reported in EMCIP is assumed to remain constant over time relative to 2019. In PO A the share is assumed to increase to 50% of the VSMCs involving fishing vessels below 15 meters, which however represents an upper bound and thus leads to conservative cost estimates. In PO B and PO C all the VSMCs would be reported in EMCIP, following the reporting obligation. Thus, PO A would result in 218 additional VSMCs reported in EMCIP in 2030 and 237 in 2050 relative to the baseline, while PO B and PO C would result in 436 additional VSMCs reported in EMCIP in 2030 and 474 in 2050 (Table 4).

[71] The shares are similar for 2014-2019.

Table 4: Projected number of VSMCs reported in EMCIP

	Baseline		Difference to the baseline					
			PO A		PO B		PO C	
	2030	2050	2030	2050	2030	2050	2030	2050
Number of VSMCs involving fishing vessels below 15 meters	22	24	218	237	436	474	436	474

Source: Ecorys (2022), Impact assessment support study

Impacts on costs for AIBs. The increase in the costs for AIBs in the policy options relative to the baseline originate from: 1) an increase in the number of investigations; 2) an increase in the reporting requirements; and 3) from the requirement of establishing a quality management system (QMS) for the AIBs.

The *costs related to the additional number of investigations (i.e.* ***adjustment costs****)* are estimated on the basis of the time needed to complete an investigation. Drawing on stakeholders' consultations, the time spent on an investigation is assumed to be between 250 and 1,500 hours[72]. It should be noted that PO C only requires a preliminary assessment of VSMCs involving fishing vessels below 15 meters, which may result in lower number of hours and lower workload for AIBs if a full investigation is not pursued. It is however not possible to estimate how many of the preliminary assessments would result in full investigations. For this reason, a conservative assumption is used, namely that all preliminary investigations result in full investigations, which represents the upper bound in terms of costs. PO A is projected to result in additional costs of between EUR 0.2 and 0.8 million in 2030 and EUR 0.3 to 0.8 million in 2050 relative to the baseline, while PO B would result in somewhat higher costs of EUR 0.3 to 1 million in 2030 and EUR 0.3 to 1.1 million in 2050. PO C shows the highest additional costs, estimated at EUR 0.7 to 8.2 million in 2030 relative to the baseline and at EUR 0.7 to 8.8 million in 2050. The much higher cost of PO C, relative to PO A and PO B, is related to the inclusion of the VSMCs involving fishing vessels below 15 meters in the scope of the AI Directive (Table 5).

The time for reporting is estimated by EMSA as being in the order of 15 minutes work per casualty. In any event, AIBs are notified on all casualties and have to sort through them to establish whether or not they will investigate. Any additional costs for AIBs will be small particularly as the possibility to upload data to EMCIP is broadened to allow this to be done by competent national authorities other than the AIBs in PO B and PO C. The *additional costs related to reporting of VSMCs (i.e.* ***the administrative costs****)* in PO A are estimated at EUR 1.6 thousand in 2030 relative to the baseline and EUR 1.8 thousand in 2050. For PO B and PO C the costs would be higher, due to the obligation of reporting all VSMCs involving fishing vessels below 15 meters (EUR 3.3 thousand in 2030 and EUR 3.6 thousand in 2050 relative to the baseline).

In addition, under all three POs Member States shall *develop, implement and maintain a quality management system (QMS)* for their AIBs[73]. This QMS shall be certified in

[72] The tariffs per hour draw on Eurostat Structure of earnings survey, Labour Force Survey data for Non-Wage Labour Costs.

[73] The quality management system (QMS) will allow for more efficient investigations, better management of resources and systems and would also allow to identify problems before these become serious. The need for such a QMS is to allow for better management of often scarce resources to identify system problems and to allow these to be addressed either by seeking help from EMSA or by making the case for additional resources at the national level. A key part of improvements in efficiency is to establish control conditions and a QMS supports this as it is supposed to indicate with more precision where there is a 'problem' or

accordance with the applicable international quality standards (ISO 9000 series). The QMS is required for all AIBs to identify and address system problems they may encounter and to thereby improve the quality of their work and in particular of their investigations. According to desk research in the context of the impact assessment support study, the one-off costs for putting in place such a QMS (ISO 9000) ranges between EUR 5,000 and EUR 15,000 per AIB, depending on the size and the system already in place. Annual auditing costs (i.e. ongoing costs) are assessed at EUR 5,000 per annum.

According to the impact assessment support study, only one AIB (i.e. in France) holds an ISO certified system while six other AIBs have indicated that they have a QMS in place, but not ISO certified. On that basis, no one-off costs are assumed for the MS with an ISO certified standard, EUR 5,000 one-off costs are assumed for each of the 6 MS that have an (uncertified) QMS in place and EUR 15,000 one-off costs for each of the 20 MS that have no QMS in place. Ongoing costs of EUR 5,000 per year are assumed for all MS that have an uncertified QMS in place or that do not have any QMS in place. Thus, total one-off costs for all EU MS are estimated at EUR 330,000 in 2025 while ongoing costs at EUR 130,000 per year from 2026 onwards.

The total costs for AIBs are provided in Table 5. In PO A, they are estimated at an additional EUR 0.2 to 0.8 million in 2030 relative to the baseline and EUR 0.3 to 0.8 million in 2050. PO B shows very slightly higher costs relative to PO A due to the reporting requirements for VSMCs and the requirements related to the definition of *"directly in connection with the operations of a ship"* in the Directive, estimated at an additional EUR 0.3 to 1 million in 2030 and EUR 0.3 to 1.1 million in 2050 relative to the baseline. Finally, PO C shows the highest additional costs for AIBs relative to the baseline due to the extension of the scope of the AI Directive to VSMCs involving fishing vessels below 15 meters (EUR 0.7 to 8.2 million in 2030 and EUR 0.7 to 8.8 million in 2050 relative to the baseline).

Table 5: Costs for AIBs (in thousand EUR, 2020 prices)

	Baseline		Difference to the baseline					
			PO A		PO B		PO C	
	2030	2050	2030	2050	2030	2050	2030	2050
Reporting costs (administrative costs)	21.7	27.6	1.6	1.8	3.3	3.6	3.3	3.6
Investigation costs (adjustment costs)	1199.2 - 7195	1490.9 - 8945.1	238 - 778.2	248.8 - 843	281.2 - 1037.5	292 - 1102.3	681 - 8167.6	724.2 - 8815.8
Total costs	1220.9 - 7216.7	1518.5 - 8972.8	239.7 - 779.8	250.6 - 844.8	284.5 - 1040.8	295.6 - 1105.9	684.3 - 8170.9	727.8 - 8819.4

Source: Ecorys (2022), Impact assessment support study

EMSA operational assistance to AIBs, included in PO A and PO C would not have any cost implication for AIBs. Rather it should ease their resource burden and allow them to either do all of the activities they would like to but have been unable to do because of resource limitations, or allow them to do their work better or in a more efficient and timely manner.

6.1.2. Impacts on the ship operators

In relation to the *reporting requirements for small fishing vessel VSMCs*, included in PO A as a non-regulatory action and in PO B and PO C as an obligation, it should be noted

systematic 'fault' so that the administration can take action where there is an identified need. It is to be noted that this includes availability of sufficient and adequate (technical) resources.

that the operators of fishing vessels below 15 meters are already obliged under national law to notify the maritime authorities of a loss of the vessel or of a fatality on-board detailing the circumstances. Therefore, such measure would not add any administrative costs for ship operators relative to the baseline in any of the options. ***The administrative costs to be considered under the 'One-in One-out' are thus zero.***

During investigations, investigators have to interview vessel crew or need to temporarily immobilise a vessel (for example to obtain information from on-board equipment). If the number of investigations of AIBs increases, the frequency that production processes are temporarily stopped (due to unavailability of the vessel and/or its crew) increases, resulting in higher ***enforcement costs for ship operators*** relative to the baseline. The policy measures included in the policy options that have such an impact are those involving fishing vessels and clarification of definitions.

The nature of investigations differs however case-by-case. For example, some AIBs have indicated during the consultation that it is not uncommon that, in a VSMC involving a small fishing vessel, the vessel has sunk and there are no witnesses. In these situations, the associated costs of cooperating with the investigation are considered to be zero, as the vessel is no longer operational and the persons on board are deceased.

Overall, as explained in section 6.1.1 the inclusion of the length of fishing vessels in the Directive as Length overall (LOA) in all three policy options, the definition of *"directly in connection with the operations of a ship"* and the extension of the scope of the directive to VSMCs involving fishing vessels below 15 meters in PO C would lead to additional investigations relative to the baseline, the highest number being estimated for PO C. Other measures clarifying definitions in the AI Directive (as regards delayed fatalities) are expected to have an impact on all shipowners as the number of safety investigations is expected to increase but their impact on costs for shipowners is expected to be small.

For the assessment of additional enforcement costs, a 'cooperation effort' of 8 hours per investigation is assumed. Such an investigation will be triggered by either the sinking of the vessel or a fatality. If the vessel has sunk the issue of the vessel being tied up and not able to operate does not arise. In the case of a fatality it is likely that such a case would have to be investigated by other competent authorities such as the police or judicial authorities under national law so the vessel will be immobilised for some period in any event. While safety investigations are separate to and distinct from other types of investigations, it should be possible for AIBs to avail of this window of opportunity when the vessel is not working, thereby limiting the negative economic impact on the enterprise. In 2018 (the latest year for which complete information is available), information from the Commission's Scientific, Technical and Economic Committee for Fisheries indicates that the (gross) value of landings was EUR 7,994 million in the fishing sector of EU27. The total number of hours worked by vessel crew is estimated at EUR 194 million in 2018. Thus, the gross value of landings per hour worked is estimated at EUR 41. The enforcement costs per investigation are estimated at EUR 328. The ***total enforcement costs for ship operators*** in PO A are estimated at EUR 3.3 thousand in 2030 and EUR 3.6 thousand in 2050 relative to the baseline, linked to the higher number of investigations due to the inclusion of the length of fishing vessels in the Directive as Length overall (LOA) and the interpretative guidelines on the definition of *"directly in connection with the operations of a ship"*. In PO B they are slightly higher than in PO A, estimated at EUR 4.6 thousand in 2030 relative to the baseline and EUR 4.9 thousand in 2050 due to the inclusion of the definition of *"directly in connection with the operations*

of a ship" in the Directive. In PO C enforcement costs are the highest, due to the inclusion of the VSMCs involving fishing vessels below 15 meters in the scope of the Directive, and estimated at EUR 16.7 to 40.7 thousand in 2030 and EUR 18 to 44 thousand in 2050 relative to the baseline at EU level.

On the basis of information from EMCIP, it is estimated that 67% of completed investigations give rise to at least one safety recommendation or define actions to prevent similar accidents from occurring in the future[74]. For PO A and PO B the ***costs savings for ship operators in terms of avoided vessels lost*** are estimated at EUR 0.9 million relative to the baseline, expressed as present value over 2022-2050. For PO C the costs savings are estimated at EUR 5.7 to 9.4 million relative to the baseline (corresponding to 18 to 31 vessels lost avoided). It should be noted however that there is high uncertainty regarding these estimates[75]. This is because the impacts of AI Directive on safety are indirect, through the safety recommendations and their follow-up. For this reason, a sensitivity analysis has been performed, assuming 10% and 20% lower value in absolute terms of the elasticity used to derive the impacts. Table 6 shows that even with lower value of the elasticity PO A, PO B and PO C are projected to result in costs savings for ship operators in terms of avoided vessels lost, although the positive impacts on safety would be more limited.

Table 6: Results of the sensitivity analysis on the costs savings for ship operators in terms of avoided vessels lost, expressed as present value over 2022-2050 (in million EUR) relative to the baseline

	Difference to the baseline		
	PO A	**PO B**	**PO C**
Cost savings for fishing vessels operators (in million EUR)			
Elasticity - central case	0.92	0.92	5.68 - 9.41
Elasticity - 10% lower	0.83	0.83	5.11 - 8.47
Elasticity - 20% lower	0.74	0.74	4.55 - 7.52

6.1.3. Impact on EMSA

The changes to the Directive related to reporting of VSMCs for fishing vessels below 15 meters and definitions are not expected to give rise to additional costs for EMSA.

Cost increases would however result from measures that increase the role of EMSA to facilitate the investigation of casualties in PO A and PO C (i.e. provide highly specialised analytical support during an individual investigation, provide analytical tools and equipment during an individual investigation and share knowledge or organise training on specific techniques/tools and new developments) including GDPR in all policy options. Although many AIBs mentioned during the stakeholders' consultation that they do not have sufficient resources to adequately conduct accident investigations, it often

[74] In the context of the impact assessment support study a log-log relationship between the number of investigations conducted in year t and the number of marine casualties in year t+2 has been estimated. The elasticity has been estimated at -0.0239 meaning that "a 1% increase in investigations in year t reduces the number of marine casualties in year 2 by 0.0239%". More details are provided in Annex 4.

[75] An average cost of EUR 2.1 million per vessel (in 2020 prices) has been considered for all vessels, except for small fishing vessels for which an average cost of EUR 0.5 million has been assumed drawing on information from the Scientific, Technical and Economic Committee for Fisheries (STECF), database of the 2021 Annual Economic Report on the EU Fishing Fleet, available at https://stecf.jrc.ec.europa.eu/reports/economic.

remains unclear what could be done on the EU level to address this issue. Many AIBs simply indicate that they would like to see their staff increased. As the AI Directive has no means to do so, policy measures are defined to increase assistance from EMSA in the conduct of investigations, while of course respecting the independence of AIBs. In practice, this would mean that any assistance provided by EMSA should be requested by the AIBs. The benefit of EMSA assistance would be that it could allow AIBs to investigate all the occurrences they would like to do so in a timely and efficient manner.

EMSA has considerable experience in providing operational support to national authorities in a number of areas. A pilot project involving remotely operated vehicles (remotely operated submersibles) began in 2020. Discussions with AIBs led to an expected need of 10 to 12 operations per year as well as the drawing up of business cases, draft rules of procedures, etc. With regard to the operational support from EMSA it is likely that the support will grow over time with 10-12 support actions in the first year growing to 30 actions per year over the successive years. The number of cases of support will also depend on demand by the AI bodies. This can be reviewed in function of demand.

The highly specialised analytical support during an individual investigation by EMSA in PO A and PO C is foreseen in terms of participation to VSMC investigations of 'standard' experts and 'high level' experts from EMSA. For 'standard' experts, 5 working days are assumed per VSMC at a rate of 1,500 EUR per day. 'Standard' experts would participate in around 10% of the VSMCs per year in PO A and PO C. For 'high level' experts, 4 working days are assumed per VSMC at a rate of 3,000 EUR per day. 'High level' experts would participate in around 2% of the VSMCs per year in PO A and PO C. In PO A the number of VSMCs are projected at 82 in 2030 and 97 in 2050. In PO C, due to the assumed extension of the AI Directive to VSMCs involving fishing vessels below 15 meters, the number of VSMCs are projected at 540 in 2030 and 595 in 2050. As a result, the additional costs for EMSA in PO A are estimated at around EUR 81 thousand in 2030 and EUR 96 thousand in 2050, equivalent to 0.7 full time equivalents (FTE) in 2030 and 0.8 FTEs in 2050 relative to the baseline.. In PO C the additional costs are estimated at around EUR 535 thousand in 2030 and EUR 589 thousand in 2050 equivalent to 4.5 full time equivalents (FTE) in 2030 and 5 full time equivalents in 2050 relative to the baseline. .

The analytical tools and equipment to be provided by EMSA during an individual investigation (hardware) can take various forms like for example:

- On scene tools such as ROV (remotely operator submersible), RPAS (aerial drones), Robots (e.g. small ones to access damaged areas, enclosed spaces, etc.);
- Specialised tools such as: VDR facilities, software such as MADAS (Marine Accident Data Analysis Suite)[76]; ad-hoc resources (scientific laboratories, tank testing); ad-hoc services (3D simulation for fire, loss of containers, etc.).

This support will build upon the existing services provided by EMSA in different areas (as seen above aerial drones, submersible drones, satellite imagery training etc.) and will be provided on a first come, first served basis. In the longer term, and depending on experience in implementation, the EMSA resources would be adapted accordingly.

[76] https://www.avenca.co.uk/marine-data-analysis/systems-software/madas/ (for example)

The additional cost estimates per year from 2025 onwards for analytical tools and equipment to be provided by EMSA in PO A and PO C are provided in Annex 4. They are estimated at EUR 1.1 million per year relative to the baseline for all years (EUR 0.9 million for on scene tools and EUR 0.2 million for specialised tools).

In relation to **knowledge sharing and organising training** on specific techniques/tools and new developments, EMSA currently organises training courses on core skills for accident investigators, advance courses for accident investigators and on use of electronic evidence (VDR/ECDIS). Additional training could be foreseen in all policy options in particular in relation to renewable and low carbon fuels (risks, use on board, ship protections, etc.), in support of the initiatives part of the "Fit for 55" package, but also on: human element, conduct of an automated ship, safety analysis (to encourage Member States to better use casualty data), forensic (photos, sampling, etc.), occurrences (fire, navigational accidents, damage to equipment, occupational activities, etc.) and GDPR rules. In all policy options, 6 additional training courses are foreseen at around EUR 36,000 each (EUR 6,000 estimated for the trainer and EUR 30,000 on average for reimbursement of participants). Thus, the total costs in all policy options are estimated at EUR 216,000 per year starting from 2025.

Total additional costs for EMSA are estimated at around EUR 1.42 million in 2030 and EUR 1.44 million in 2050 in PO A, and at around EUR 1.88 million in 2030 and EUR 1.93 million in 2050 in PO C. In PO B only the training costs to knowledge sharing and organising training are foreseen, estimated at EUR 216,000 per year (Table 7). These additional costs expected for EMSA are not covered by existing budgetary commitments. Part of the costs in PO A and PO C are projected for highly specialised analytical support provided by EMSA during individual investigations (for PO A, equivalent to 0.7 FTE in 2030 and 0.8 FTEs in 2050 relative to the baseline; for PO C, 4.5 FTE in 2030 and 5 FTEs in 2050 relative to the baseline). [77]

Table 7: Total additional cost estimates for EMSA relative to the baseline (in thousand EUR, 2020 prices)

	PO A		PO B		PO C	
	2030	2050	2030	2050	2030	2050
Costs for EMSA	1,423.2	1,438.0	216.0	216.0	1,876.6	1,931.1

Source: EMSA

6.1.4. Impacts on SMEs

The extension of the AI Directive to VSMCs involving fishing vessels below 15 meters in PO C is 'relevant' for SMEs. Due to the non-consolidated nature of this particular segment, it can be assumed that all fishing vessels below 15 meters would qualify as small enterprises or even as micro-businesses[78]. This may be also the case for operators of fishing vessels above 15 meters, for which the length of fishing vessels is to be defined in the Directive in all policy options. Fishermen's groups have been contacted, as part of the consultation process, and are in favour of the extension of scope.

The analysis in section 6.1.2 has shown that in PO A the *additional enforcement costs for fishing vessels operators* are estimated at around EUR 3,280 at EU level in 2030 and EUR 3,608 in 2050 relative to the baseline. PO B shows slightly higher costs than PO A (EUR 4,592 in 2030 and EUR 4,920 in 2050). For PO C the additional enforcement costs

[77] From those FTEs, 2 will be employed by EMSA.

[78] Small companies have less than 50 employees and either a net turnover or balance sheet of €10 million, while micros have less than 10 employees and either a net turnover or balance sheet of €2 million.

are estimated at EUR 16.7 to 40.7 thousand in 2030 and at EUR 18 to 44 thousand in 2050. Considering the projected number of fishing vessels in 2030 and 2050 at EU level, the additional enforcement costs relative to the baseline in all policy options are estimated at below 1 EUR per vessel[79].

In addition, the analysis in section 6.1.2 has shown that no additional administrative costs are expected in relation to the *reporting requirements for VSMCs*, included in PO A as a non-regulatory action and in PO B and PO C as an obligation. This is because operators of fishing vessels below 15 meters are already obliged under national law to notify the maritime authorities of a loss of the vessel or of a fatality on-board detailing the circumstances. Therefore, no area was identified in the analysis, where significant and disproportionate costs for SMEs, in comparison to all enterprises, would result from the changes under the three policy options.

On the other hand, all policy options will improve safety to different degrees, what will generally benefit all ship operators and in particular fishing vessels operators. PO C in particular will have positive impacts in terms of safety for operators of fishing vessels below 15 meters, which are mainly small enterprises or even micro-businesses. As explained in section 6.1.2, the *costs savings for ship operators in terms of avoided vessels lost* are estimated at EUR 0.9 million relative to the baseline in PO A and PO B, expressed as present value over 2022-2050, and at EUR 5.7 to 9.4 million relative to the baseline in PO C. These represent benefits for the fishing vessels operators that clearly outweigh the costs in all three policy options, with the highest impact expected in PO C.

6.1.5. Functioning of the internal market and competition

All policy options are expected to have a positive impact on the functioning of the internal market, both by improving overall maritime safety for the benefit of freight customers and passengers throughout the Union as well as by ensuring that the same safety level applies throughout the Union. The positive impacts of PO C are expected to be higher than those of PO A and PO B, because the VSMCs involving fishing vessels below 15 would be included in the scope of the AI Directive resulting into a higher degree of harmonisation between Member States. This is particularly the case as only 11 Member States currently investigate VSMCs involving fishing vessels below 15 metres.

All options provide for a level playing field as all policy options improve safety and the performance of AIBs in the performance of their functions.

[79] The estimation of the enforcement costs for the owners/operators of smaller fishing vessels is based on EMSA experience of the time necessary to establish the facts in case of fishing vessels above 15 metres and the gross value of landings per hour worked (i.e. drawing on information from the Commission's Scientific, Technical and Economic Committee for Fisheries), as explained in section 6.1.2. It should be noted that such an investigation will be triggered by either the sinking of the vessel or a fatality. If the vessel has sunk the issue of the vessel being tied up does not arise. In the case of a fatality it is likely that such a case would have to be investigated by other competent authorities such as the police or judicial authorities under national law so the vessel will be immobilised for some period in any event. While safety investigations are separate to and distinct from other types of investigations, it should be possible for AI bodies to avail of this window of opportunity when the vessel is not working.

6.1.6. Impacts on competitiveness

As explained in section 6.1.2 and in section 6.1.4, the additional enforcement costs for ship operators (i.e. fishing vessels operators) are expected to be very limited in all three policy options and estimated at below 1 EUR per vessel in 2030 and 2050 relative to the baseline. No other additional costs are expected for the industry (i.e. ship operators) in the three policy options. On the other hand all policy options are expected to lead to *costs savings for ship operators, in particular fishing vessels operators, in terms of avoided vessels lost.* Therefore, it can be concluded that all three policy options may improve the competitiveness of the fishing vessels operators, the impact being higher in PO C relative to PO A and PO B.

6.2. Social impacts

Social impacts are mainly assessed in terms of impacts of the policy options on maritime safety (in terms of lives saved and injuries avoided), working conditions and fundamental rights. Costs impacts for consumers from any of the policy options have not proved possible to be quantified but are expected to be negligible.

6.2.1. Maritime safety

As explained in section 6.1.2, not all investigations have an impact on the number of marine casualties. To estimate the benefits, a relationship between the number of finalised investigations and the number of marine casualties has been estimated, according to Annex 4[80]. The reduction in the number of casualties is subsequently translated into a reduction in the number of fatalities and injuries by using the ratios between the number of fatalities and injuries and the number of marine casualties projected in the baseline scenario. For PO A and PO B the impact on the number of lives saved and injuries avoided is expected to be limited by 2050 (2 lives saved and 10 injuries avoided relative to the baseline in PO A and 2 lives saved and 14 injuries avoided in PO B). However, PO C would result in higher number of lives saved (28 to 48) and injuries avoided (219 to 379)[81] for 2025-2050 relative to the baseline, mainly due to the assumed extension of the scope of AI Directive to the VSMCs involving fishing vessels below 15 meters. Thus, all policy options contribute towards Sustainable Development Goal 3 ("Ensure healthy lives and promote well-being for all at all ages"), although the positive impact of PO C is the highest.

All policy options are estimated to result in a reduction in the external costs of accidents relative to the baseline (Table 8) although the impact would be highest in PO C (EUR 132.6 to 229.3 million, expressed as present value over 2022-2050) relative to PO A (EUR 6.6 million) and PO B (EUR 9 million)[82].

---

[80] In the context of the impact assessment support study a log-log relationship between the number of safety investigations conducted in year t and the number of marine casualties in year t+2 has been estimated. The elasticity has been estimated at -0.0239 meaning that "a 1% increase in inspections in year t reduces the number of marine casualties in year 2 by 0.0239%". More explanations are provided in Annex 4.

[81] The possible impact of the policy measures on the number of fatality and injury avoided may be higher. A cautious approach is taken here due to the indirect nature of the impact of safety investigations on maritime safety.

[82] The 2019 Handbook on the external costs of transport has been used to monetise the costs. According to the Handbook, the external costs of a fatality in 2020 prices is estimated at around EUR 3.5 million and that of an injury at around EUR 0.5 million.

Table 8: Reduction in the external costs of accidents, present value over 2022-2050 (in million EUR)

	Baseline	Difference to the baseline		
		PO A	PO B	PO C
Fatalities	14,549	3.2	4.4	60.1 - 103.7
Injuries	17,827	3.4	4.7	72.5 - 125.6
Total fatalities and injuries	32,376	6.6	9.0	132.6 - 229.3

Source: Ecorys (2022), Impact assessment support study

It should be noted however that there is high uncertainty regarding these estimates. This is because the impacts of AI Directive on safety are indirect, through the safety recommendations and their follow-up. For this reason, a sensitivity analysis has been performed, assuming 10% and 20% lower value in absolute terms of the elasticity used to derive the impacts. Table 9 shows that even with lower value of the elasticity PO A, PO B and PO C are projected to result in lives saved and injuries avoided, although the positive impacts on safety would be more limited.

Table 9: Results of the sensitivity analysis on the reduction in the external costs of accidents, expressed as present value over 2022-2050 (in million EUR) relative to the baseline

	Difference to the baseline		
	PO A	PO B	PO C
Reduction in external costs of accidents (in million EUR)			
Elasticity - central case	6.6	9.0	132.6 - 229.3
Elasticity - 10% lower	5.9	8.1	119.3 - 206.3
Elasticity - 20% lower	5.3	7.2	106.1 - 183.4

It is important to note that while it is possible that police, judicial or administrative investigations might have dissuasive or deterrent effect as regards future accidents, this is not the primary function of such investigations. As these national investigations are carried out under a multiplicity of national procedures, neither they nor their results can easily be compared. Furthermore, the results of the investigations are not communicated or shared between Member States, to enable lessons to be learned. For these reasons, it is not possible to estimate their impact on maritime safety, although the impact on ship operators or AI bodies of Member States other than the investigating State is expected to be very limited.

6.2.2. Impacts on working conditions and skills

The impact of the policy options on working conditions is expected to be positive, although it has not been possible to quantify them. By improving safety, the policy options will result in saved lives (of passengers but in particular of crew), avoid injuries and improve the attractiveness of employment in the sector. The impact is expected to be higher in PO C, relative to PO A and PO B, resulting in the highest number of lives saved and injuries avoided. In addition, the knowledge sharing and training organised by EMSA included in PO A and PO C will improve the skills of investigators in light of new developments which may be relevant for accident investigation in the future, including but not limited to renewable and low carbon fuels, automation and autonomous shipping.

6.2.3. Impacts on fundamental rights

Given the global nature of the shipping industry and the different jurisdictions with which they may be brought into contact, seafarers need special protection, especially in

relation to contacts with public authorities, in line with the human rights protection standards enshrined in EU primary law. Therefore and in the interests of increased maritime safety, seafarers should be able to rely on fair treatment in the event of a maritime accident. The human rights and dignity of seafarers should be preserved at all times and all safety investigations should be conducted in a fair and expeditious manner.

The policy options were assessed to determine if they have an impact on the fundamental rights and/or equal treatment of EU citizens. The starting point of the assessment of the fundamental rights is the Charter of Fundamental Rights of the European Union[83]. The assessment identified two potentially relevant fundamental rights being Article 8 – Protection of personal data and Article 20 – Equality before the law.

Safety investigations and the reports emanating therefrom are not supposed to contain personal data so the question of protection thereof and the implications of the GDPR are somewhat limited. However, the majority of the AIBs noted that GDPR rules do play an important role that should be expressly mentioned in the Directive to guarantee the respect of the seafarers' rights. Several AIBs have raised the issue of when the AIB has to co-operate with an AIB in a third country when conducting a joint investigation as the GDPR forbids the transfer of the personal data of EU data subjects to non EEA countries — unless appropriate safeguards are imposed, or the third country's data protection regulations are formally considered adequate by the Commission. The EMSA training on GDPR, will address this issue in all policy options.

As regards "equality before the law", safety investigations are carried out to determine the cause of the accident and are not supposed to attribute blame or responsibility; they are separate from and distinct to police or judicial investigations. Similarly, safety investigation reports are not supposed to be written, in terms of content and style, with the intention of it being used in legal proceedings. All three of the POs were assessed having regard to the relevant EU instrument and the applicable IMO text[84] and it was concluded that they maintain full respect for human and fundamental rights referred to previously and none will have any negative impact thereon.

6.3. Environmental impacts

The impact of the policy options on the environment is also an indirect one, as it depends on the safety recommendations and their follow-up as explained in section 6.2.1. The environmental impact of maritime casualties derives from ships sinking, cargoes lost and oil spills (either as cargo or from bunkers - ship fuels). While there has not been a single significant oil spill similar to that of the Erika (1999) or Prestige (2002) oil spills in EU waters for almost 20 years, the possibility of such an incident is nonetheless present and has to be prepared for and mitigated against. Similarly and in the context of the European Green Deal and the "Fit for 55" package, it is likely that there will be a significant change in the way vessels are powered in the coming decades. This will have implications for the entire shipping and fishing industries including for the safety profile thereof and can be expected to have an impact on AIBs and the cases they investigate.

[83] OJ C 326 of 26.10.2012 p.2

[84] Resolution LEG.3(91) of 27 April 2009 Adoption of Guidelines on Fair Treatment of seafarers in the Event of a maritime Accident.

It is important to note the significance of the safety recommendations. A more recent example is the maritime safety issue related to containers lost overboard (falling off large containerships). Such an accident happened in 2019, where a large container vessel (MSC Zoe) lost a total of 342 containers whilst sailing in bad weather on the North Sea, in the Terschelling-German Bight Traffic Separation Scheme. This resulted in severe pollution of the Wadden Sea area and its islands (NL). The Wadden Sea is designated as a Particularly Sensitive Sea Area and is on the UNESCO World Heritage List.

The investigations by the flag State (Panama), together with affected States (NL and DE), identified safety issues related to various IMO instruments and requirements. Safety recommendations were made in the investigation reports regarding carriage requirements, such as, use of the improved use of the VDR to record such information for the purpose of safety investigations. The administrations involved have submitted proposals to the IMO various Maritime Safety Committees addressing recommendations included in the report for actions to be taken.

This case was also raised and discussed at the Transport, Telecommunications and Energy Council in summer 2021, under the Slovenian Presidency; where Ministers agreed to address the issue of containership safety, including containers lost at sea, fire safety etc., in a holistic manner following a root cause analysis. This work is ongoing, and a first Union submission to IMO has been agreed regarding the issue of container lost at sea and setting up an international mandatory reporting system, based on the legal requirements applicable in EU law already, requiring changes to the conventions (SOLAS and MARPOL).

Furthermore, 23 cases of pollution due to bunker fuel lost were recorded in 2019 for all vessels excluding fishing vessels below 15 meters. Assuming the same ratio of pollution to VSMCs for fishing vessels below 15 meters as for those above 15 meters, the overall number of pollution cases due to bunker fuel lost including for fishing vessels below 15 meters is estimated at 103 for 2019. The level of pollution per very serious accident (resulting in pollution) has been estimated as involving the loss of 30 tonnes of bunker fuel. For small fishing vessels, the level of pollution per very serious accident (resulting in pollution) implied the loss of 6.6 tonnes of bunker fuel while for larger fishing vessels a loss into the sea of 22 tonnes of bunker fuel was indicated.

In the baseline scenario the cumulative number of tonnes of bunker fuels lost between 2025 and 2050 is estimated at around 35.4 thousand. PO A and PO B would result in 7 tonnes of bunker fuel lost avoided during 2025-2050 relative to the baseline, while PO C is estimated to have a more significant impact (101 to 176 tonnes of bunker fuel lost avoided) due to the inclusion of the VSMCs involving fishing vessels below 15 meters in the scope of the Directive (see Table 10). This is expected to have a positive impact on the quality of marine water and biodiversity. It was not possible to quantify the environmental impact from avoided ships sinking and cargoes lost, but this is expected to be positive in all three policy options with the highest impact in PO C[85].

[85] In the context of the impact assessment support study a log-log relationship between the number of safety investigations conducted in year t and the number of marine casualties in year t+2 has been estimated. The elasticity has been estimated at -0.0239 meaning that “a 1% increase in inspections in year t reduces the number of marine casualties in year 2 by 0.0239%”. The reduction in the number of casualties is subsequently translated into a reduction in the number of tonnes of bunker fuel lost at sea by using the

Table 10: Bunker fuel lost cumulative for 2025-2050 (in tonnes)

	Baseline	Difference to the baseline		
		PO A	PO B	PO C
Bunker fuels lost	35,411	7	7	101 - 176

Source: Ecorys (2022), Impact assessment support study

It should be noted however that there is high uncertainty regarding these estimates. This is because the impacts of AI Directive on safety are indirect, through the safety recommendations and their follow-up. For this reason, a sensitivity analysis has been performed, assuming 10% and 20% lower value in absolute terms of the elasticity used to derive the impacts. Table 11 shows that even with lower value of the elasticity PO A, PO B and PO C are projected to result in bunker fuel lost at sea avoided, although the positive impacts would be more limited.

Table 11: Results of the sensitivity analysis on the bunker fuel lost at sea, cumulative for 2025-2050 (in tonnes) relative to the baseline

	Difference to the baseline		
	PO A	PO B	PO C
Bunker fuel lost at sea (in tonnes)			
Elasticity - central case	7	7	101 - 176
Elasticity - 10% lower	6	6	91 - 158
Elasticity - 20% lower	5	5	81 - 140

All policy options contribute towards Sustainable Development Goal 14 ("Conserve and sustainably use the oceans, seas and marine resources for sustainable development"), although the positive impact of PO C is the highest.

No significant harm is expected on the environment in any of the three policy options, in particular in the area of sustainable use and protection of water and marine resources to which the initiative relates. On the contrary, as explain above, all three policy options are expected to have small positive impacts on the quality of water and biodiversity – with the highest impact among the three projected in PO C.

7. HOW DO THE OPTIONS COMPARE?

7.1. Effectiveness

The assessment of effectiveness looks at the extent to which the general and specific objectives (SO) of the intervention, as previously described, are met. Table 12 provides the link between policy objectives and assessment criteria.

Table 12: Link between objectives and assessment criteria

General objective	Specific objective	Assessment criteria
Improve maritime safety and improve the protection of the marine environment	**SO1** - Protect fishing vessels, their crew and the environment.	Change in the number of very serious marine casualties reported and/or investigated Changes in the number of fatalities and injuries, and avoided vessels lost Changes in the number of tonnes of bunker fuel lost at sea

ratio between the number of tonnes of bunker fuel lost at sea and the number of marine casualties projected in the baseline scenario. More explanations are provided in Annex 4.

General objective	Specific objective	Assessment criteria
	SO2 - Member States AIBs to have clarity and precision regarding definitions to ensure that all accidents that need to be investigated are investigated in a timely and harmonised manner.	Expected improvement in clarity and functioning of the internal market Change in the number of investigations conducted
	SO3 - Enhance the capacity of AIBs to conduct (and report on) accident investigations in a timely, expert and independent manner- including as regards renewable and low carbon fuels and technologies	Change in quality of the investigation conducted

Concerning **SO1**, PO A and PO B should allow for more information to be gathered and thereby allow the AIBs, the Commission and EMSA to get a better appreciation and understanding of the safety picture of fishing vessels below 15 meters and the types of marine casualties they are affected by. However, neither PO A nor PO B requires investigations to be carried out for this type of fishing vessels. PO C aims to extend the scope of the Directive to all fishing vessels irrespective of their length in case they are involved in a VSMC. PO C is fully effective in addressing SO1 in that it requires both the reporting of and the investigation of VSMC involving fishing vessels below 15 meters, with positive effects on safety and protection of marine environment. PO A and PO B address SO1 to a more limited extent by requiring that the reporting of VSMCs is applied in different ways to the smaller fishing vessel segment.

Concerning **SO2**, as highlighted in the problem definition, some of the definitions used in the Directive are currently not always clear for the AIBs. As a result, AIBs do not always know whether or not an investigation should be started, which may also have negative impacts on the functioning of the internal market due to the different approaches by Member States. By making those definitions clearer, AIBs will better understand whether to investigate or not. Measures aiming to improve (some of) the definitions used are included in all three policy options. In PO A two elements are clarified, namely, how to measure the length of a fishing vessel and how to define the phrase 'in direct connection with the operations of the ship', by providing interpretive guidelines. As such, PO A contributes to some extent to achieve SO2. PO B and PO C, in addition to the clarification of how to measure the length of a fishing vessel, go further by including the definition of 'directly in connection with the operations of a ship' in the Directive and by including a specific deadline for accidents resulting in a fatality that does not directly occur after the accident took place. Therefore, PO B and PO C are more effective than PO A in achieving SO2. All three options include references to the most up-to-date versions of the IMO Casualty Code. Thus, it can be concluded that in relation to SO2, PO B and PO C are equally effective and more effective than PO A. All policy options contribute to improving the functioning of the internal market. In this respect, PO C is most effective, due to the inclusion of the VSMCs involving fishing vessels below 15 meters within the scope.

With regard to **SO3**, the problem definition highlighted that AIBs sometimes lack adequate resources (either in the number of staff or available budgets) to effectively conduct all investigations needed. To tackle this problem, several policy measures have been defined. PO B includes several specific policy measures. On the one hand, this option contains a measure on introducing a QMS system that ensures harmonisation of the investigation procedures throughout the EU. A key part of improvements in efficiency is to establish control conditions and a QMS supports this as it is supposed to indicate with more precision where there is a 'problem' or systematic 'fault' so that the

administration can take action. The better management of often scarce resources will identify system problems and allow these to be addressed either by seeking help from EMSA or by making the case for additional resources at the national level. It is to be noted that this includes availability of sufficient and adequate (technical) resources. If the AI function had not been separated from flag State administrations the EU AI bodies as part of the flag State administrations would have already been covered by the QMS requirement in Directive 2009/21/EC[86] and consequently would be audited in accordance with the III-code.

Since the IMO Code on the Implementation of International Instruments (the "III-code") became mandatory in 2017, it is acknowledged that a QMS ensures better adherence with the III-code requirements. Therefore, it is appropriate for the reasons previously explained as well as to ensure coherence between the different parts of the MS maritime administrations that this requirement is extended to the MS AI and port State control functions, and it is thus included in all policy options. On the other hand, PO B consists of a measure that broadens the group of competent authorities that could include information in EMCIP. At the same time, the role of EMSA is slightly enhanced by only providing sharing knowledge and organising training. By having these dedicated measures, PO B is somewhat effective in achieving SO3. PO A has a different approach in addressing SO3 and includes several measures on support from EMSA to the AIBs. This could either relate to soft skills (such as specific technical support) or hardware (such as specific analytical tools). In addition, EMSA could provide additional training. Besides support from EMSA, PO A also introduces a QMS. By the wider range of support offered, PO A is more effective in achieving SO3 than PO B. PO C is a mix of PO A and PO B and includes all measures proposed. More concretely, not only a QMS is introduced but both the support from EMSA as well as the broadening of the group of competent authorities are included. Thus, PO C and PO A are more effective than PO B in addressing SO3.

All policy options contribute to the general objective of improving maritime safety and the protection of the marine environment. PO C is however more effective than PO A and PO B due to the higher positive impact estimated in terms of lives saved, injuries avoided and pollution due to bunker fuels lost avoided. Annex 9 provides a more detailed overview on the effectiveness of the policy options in relation to the specific objectives.

7.2. Efficiency

Efficiency concerns "the extent to which objectives can be achieved for a given level of resource/at least cost". The combined measures under the three POs have economic, social and environmental impacts. The major costs of the policy options come in the form of investigation costs for AIBs and costs for EMSA related to soft skills (such as specific technical support) or hardware (such as specific analytical tools) and additional training. They are summarised in Table 13.

[86] Directive 2009/21/EC on flag State requirements (Article 8) imposes that EU Member State flag State administrations have a QMS.

Table 13: Summary of costs and benefits of policy options – present value for 2022-2050 compared to the baseline (in million EUR)

	PO A	PO B	PO C
Costs for AIBs			
Reporting costs	0.03	0.06	0.06
Investigation costs	4.3 - 13.96	5.03 - 18.33	11.97 - 141.53
Costs for EMSA	24.03	3.64	31.88
Costs for small fishing vessels operators (enforcement costs)	0.06	0.08	0.29 - 0.7
Total costs	28.42 - 38.08	8.81-22.11	44.2 - 174.17
Cost savings for vessels operators	0.92	0.92	5.68 - 9.41
Reduction in external costs of accidents	6.60	9.04	132.6 - 229.28
Total benefits	7.52	9.97	138.28 - 238.68
Net costs/benefits	(-30.55) - (-20.9)	(-12.14) – 1.15	64.51 - 94.09
Benefits to costs ratio	0.2 - 0.3	0.5 - 1.1	1.4 - 3.1

Source: Ecorys (2022), Impact assessment support study; Note: for the net costs/benefits, negative values indicated net costs and positive values net benefits.

PO C leads to the highest total costs among the three policy options, estimated at EUR 44.2 to 174.17 million in addition to the baseline costs, expressed as present value over 2022-2050. The highest total costs in PO C are linked to the assumed extension of the scope of the AI Directive to VSMCs involving fishing vessels below 15 meters and thus the increased number of investigations. PO A shows lower costs than PO C, estimated at EUR 28.42 to 38.08 million in addition to the baseline costs, expressed as present value over 2022-2050. The highest cost category in PO A is related to costs for EMSA for soft skills (such as specific technical support) or hardware (such as specific analytical tools) and additional training. Finally, PO B shows the lower total costs among the POs, estimated at EUR 8.81 – 22.11 million in addition to the baseline costs.

In terms of total benefits, PO C shows the highest benefits among the three policy options due to the reduction in the external costs of accidents and the avoided vessels lost linked to the extension of the scope to fishing vessels below 15 meters. These benefits are estimated at EUR 138.28 to 238.68 million relative to the baseline, expressed as present value over 2022-2050. PO A and PO B show much lower total benefits of EUR 7.52 million and EUR 9.97 million, respectively. The impact of the avoided pollution due to the tonnes of bunker fuel lost was not possible to be monetised but also in this case the highest benefits are projected in PO C, as shown in section 6.2.1.

Overall, PO A results in net costs relative to the baseline, expressed as present value over 2022-2050, while PO C shows net benefits. For PO B, the range provided shows that it could result either in net costs or net benefits although the possible net costs are lower than in PO A. The net benefits are largest in PO C, estimated at EUR 64.51 to 94.09 million relative to the baseline, expressed as present value over 2022-2050. PO C also shows higher benefits to costs ratio (1.4 to 3.1) relative to PO B and PO A (see Table 13).

Considering the sensitivity analysis on the impacts of the policy options on the costs savings for ship operators in terms of avoided vessels lost and on the external costs of accidents, provided in sections 6.1.2 and 6.2.1 respectively, the net benefits and the benefits to costs ratios have been calculated for each case and are provided in Table 14. The table shows that even with lower values of the elasticity, PO C would result in the highest benefit to cost ratio.

Table 14: Results of the sensitivity analysis on net benefits and benefit to cost ratio of policy options

	Difference to the Baseline		
	PO A	PO B	PO C
Net benefits (in million EUR)			
Elasticity - central case	(-30.55) - (-20.9)	(-12.14) - 1.15	64.51 - 94.09
Elasticity - 10% lower	(-31.31) - (-21.65)	(-13.14) - 0.16	40.64 - 80.26
Elasticity - 20% lower	(-32.06) - (-22.4)	(-14.14) - (-0.84)	16.78 - 66.43
Benefit to cost ratio			
Elasticity - central case	0.2 - 0.26	0.45 - 1.13	1.37 - 3.13
Elasticity - 10% lower	0.18 - 0.24	0.41 - 1.02	1.23 - 2.82
Elasticity - 20% lower	0.16 - 0.21	0.36 - 0.9	1.1 - 2.5

7.3. Coherence

Internal coherence. The internal coherence concentrates on how the different elements within the Directive itself work together to achieve the objectives. It should be noted that this does not only concern the Directive itself, but also its accompanying secondary legislation (delegated and/or implementing acts) and rules as well as interpretative guidelines. Although all three POs address the identified problems, they do so in different ways. PO A addresses the problems in such a way that room for flexibility remains, meaning that the majority of guidance would be laid down in interpretative guidelines, which are a supporting tool for AIBs. In addition, AIBs are encouraged to undertake certain activities, however, there is no obligation to do so. This notwithstanding, while coherence exists there is still room for improvement. PO B and PO C propose amendments to the Directive itself for all aspects that require further harmonisation and thus ensure a higher degree of internal coherence than PO A.

External coherence. The external coherence concentrates on the compliance of the Directive with key EU policy objectives and international legislation. Revising the Directive and deleting the references to outdated international law will ensure that the Directive and IMO legislation will be aligned. As such, both legal regimes will be consistent. As PO A, PO B and PO C all seek alignment with the current international legal regime, external coherence will be guaranteed in all three policy options.

7.4. Subsidiarity and proportionality

As highlighted in section 2 there is a clear need for EU action on all three problems identified, and their drivers. The current Directive does not apply to all vessel types involved in VSMCs, contains unclear definitions and refers to outdated legislation. In addition, AIBs are not able to effectively and consistently report and investigate marine casualties. Member States individually are not able to tackle all the problems identified. While it is possible to adopt national legislation to tackle some of the problems highlighted, if 27 Member States would do this and adapt their own legislation and/or rules this would lead to fragmentation of legislation and potential distortion of the internal market. To avoid such a fragmented legal framework, there is a need for EU action. As such, there is a right for the EU to act. As all policy options ensure harmonisation of the legal framework, the subsidiarity requirement is fulfilled. In any event, as stated in Section 3.2, the principle of subsidiarity does not apply to areas subject to EU exclusive competence pursuant to Article 3(2) TFEU.

In relation to proportionality, the proposed revision aims to improve maritime safety. This objective is achieved by investigating casualties and learning from them, to prevent similar accidents from happening in the future. PO A contributes to this objective by strongly focusing on improving the ability of AIBs to investigate accidents. Focus is put on providing more support through soft skills and hardware as well as knowledge sharing and training by EMSA. The additional support offered is considered proportional. PO B contributes to the objective by strongly focusing on clarifying several of the definitions used. As the Member States cannot easily tackle unclear definitions themselves it is important that it is done on an EU-level. During the stakeholder consultation, it became clear that clarifying the definitions is one of the most important aspects for AIBs in the revision of the Directive. The measures proposed under PO B are therefore considered to be proportionate. PO C combines elements of PO A and PO B and adds the scope extension to fishing vessels below 15 meters. The scope extension is considered to be proportionate. The additional costs necessary for AIBs to investigate VSMCs involving fishing vessels below 15 meters seem to be limited, especially, when compared to the potential positive safety impacts it can yield.

8. PREFERRED POLICY OPTION

8.1. Identification of the preferred policy option and stakeholders views

Although each of the options addresses the problems identified, their drivers and the specific objectives, some options are more effective in achieving the specific and general objectives. Based on the assessment done, **PO C is regarded as the most effective policy option**. With respect to **efficiency**, PO C has the highest additional costs, followed by PO A. However, when linking costs to benefits, PO C also yields the highest impact in terms of improving maritime safety and thus monetised benefits. As the additional benefits outweigh the additional costs, PO C is seen as the most efficient option proposed. Both the net benefits and the benefits to costs ratio are higher in PO C relative to PO B (when considering net benefits for PO B out of the range provided), while PO A results in net costs. Concerning **external coherence**, the policy options score more or less the same. PO C is slightly more coherent than PO A and PO B as besides coherence with international legislation, PO C also improves coherence by extending the scope of the Directive to fishing vessels below 15 meters. Concerning internal coherence, PO C is also the most coherent option. In terms of **subsidiarity**, all options fulfil this principle and there are no real differences among them. The three options are also **proportionate**. None of the options leads to excessive costs in achieving the objectives set even if PO A results in net costs relative to PO B and PO C.

Based on the analysis above it can be concluded that PO C is the preferred policy option. There is mixed opinion among AIBs as to whether the scope should be extended. AIBs already investigating casualties involving smaller fishing vessels are in favour of extending the scope. AIBs not yet investigating casualties involving smaller fishing vessels held mixed opinions. Some of them, especially the small ones, are against a scope extension as they fear that it will increase their workload substantially. The larger AIBs seem to be more in favour as they see advantages of investigating the accidents as in the long run it could improve safety. The sea-fisheries social partners (employers and employees representatives) have expressed support for this measure, underlining the importance of gathering solid, detailed information on the causes of accidents.

8.2. REFIT

This initiative is part of the Commission Work Programme 2021 under Annex II (REFIT initiatives), under the heading Promoting our European Way of Life[87].

The initiative has an important REFIT dimension in terms of alignment and simplification of safety legislation, of improving the safety profile in particular of the small fishing vessel segment and of assisting Member State AIBs to better discharge their reporting and investigative functions. Partially extending the Directive to the smaller fishing fleet while increasing the overall policy ambition, the review also includes some important simplification aspects. AIBs will face higher costs due to the scope extension as they will have to carry out at least a preliminary assessment of VSMCs involving smaller fishing vessels but this has to be seen against the simplification brought about by the removal of the requirement to mandatorily carry out such a preliminary assessment in the case of all serious casualties. It is however difficult to identify any cost savings stemming from this simplification as all casualties are subject to some form of assessment to establish the circumstances, to determine their seriousness and whether they need to be investigated.

In addition, the preferred policy option includes elements of simplification:

- It will increase the efficiency of the national AIBs by providing clarity on when they need to carry out investigations.
- The provision by EMSA of top-up assistance to those AIBs that request operational support in the form of analytical tools, hi-tech hardware such as drones or facilities to deal with VDRs will improve the quality and quantity of investigations carried out as well as increasing their harmonisation and standardisation across the EU.
- EMSA training to AIB staff on technological and regulatory developments as well as on safety issues arising from renewable and low carbon fuels and other developments arising from the European Green Deal as well as issues around autonomous shipping should also provide a boost to AIBs in tackling the significant coming changes in maritime transport.
- EU AIBs are, under the relevant IMO instruments (as is the case for all IMO States) obliged to report accident information data to the IMO Global Integrated Shipping Information System (GISIS)[88], however once the accident data is reported to EMCIP the possibility is included in EMCIP for this data to be transferred onwards to GISIS. Similarly if a Member State AIB wishes to make EMCIP its national database, EMSA as database manager can customise EMCIP with the required functionalities such that the AIB can report one time to EMCIP, thereby obviating the need for a national reporting as well as EU reporting. As such, the AI Directive already uses interoperable digital solutions and **could be considered digital-ready**.

8.3. Application of the 'one in, one out' approach

As explained in sections 6.1.2 and 6.2, the preferred policy option is not expected to result in additional administrative costs or adjustments costs for the private sector, or for the citizens. Additional enforcement costs for the private sector (i.e. ship operators) are estimated at EUR 0.29 to 0.7 million relative to the baseline, expressed as present value

[87] COM(2020) 690 final
[88] http://gisis.imo.org/Members

over 2022-2050. They would however be largely overcompensated by the benefits in terms of vessels lost avoided, which are estimated at EUR 5.68 to 9.41 million relative to the baseline, expressed as present value over 2022-2050.

9. HOW WILL ACTUAL IMPACTS BE MONITORED AND EVALUATED?

The Commission services will monitor the implementation and effectiveness of this initiative through a number of actions and a set of core indicators that will measure progress towards achieving the operational objectives. Five years after the end of the implementation date of the legislation, the Commission services should carry out an evaluation to verify to what extent the objectives of the initiative have been reached.

Actions foreseen for verifying implementation include:

- Commission/EMSA monitoring of EMCIP database to verify that investigations are being carried out in a timely and effective manner and that the reports are uploaded to the database, including for fishing vessels below 15 meters for which data and safety gaps are identified. The indicators that will be specifically monitored drawing on EMCIP database will be the number of fatalities and very serious injuries, the number of vessels lost and the number of cases of pollution at sea, and their evolution over time. All these indicators will be monitored by type of vessel involved. The number of safety recommendations published as a result of the investigations and their follow up will also be monitored.
- Visits to Member States to verify operations on the ground, these are carried out by EMSA on behalf of the Commission as part of EMSA's support role to the Commission[89]. To be translated into visits reports and if shortcomings are identified they are addressed either by means of EMSA training or through the EU pilot and infringement procedure.
- Member States will have to have a QMS to certify its organisation, policies, processes, resources and documentation are appropriate to achieve its objectives. This will have to be certified and subsequently subject to annual audit. AIBs will have to share with Commission/EMSA the results of the annual audits carried out by the accredited body such that the AIB can retain its QMS certification.
- Horizontal analysis required[90] to be carried out by EMSA (giving an indication of how the legislation is functioning and identifying gaps and what can be done to address them) and reported to the Commission and Member States (discussed in workshops).

[89] EMSA carries out such visits under Article 3 of Regulation (EC) No 1406/2002 establishing a European Maritime Safety Agency as part of its core tasks, as such no additional costs are expected to arise.
[90] Article 3(5) Regulation (EC) No 1406/2002 establishing a European Maritime Safety Agency

ANNEX 1: PROCEDURAL INFORMATION

1. LEAD DG, DECIDE PLANNING/CWP REFERENCES

The lead DG is DG MOVE, Unit D2: Maritime Safety

DECIDE reference number: PLAN/2019/5433

Item 35 in Annex II to Commission Work Programme 2021

2. ORGANISATION AND TIMING

The impact assessment follows the ex-post evaluation of the maritime accident investigation Directive performed as part of the overall maritime transport policy fitness check in 2018.

The impact assessment started in 2020, with inception impact assessment published on 9 October 2020[91].

The impact assessment on a possible review of the Accident Investigation Directive was coordinated by an Inter-Service Steering Group (ISSG). The Commission Services participating in the ISG were: Secretariat-General, DG Maritime Affairs and Fisheries, DG Climate Action, DG Migration and Home Affairs, DG for Employment, Social Affairs and Inclusion, DG Industry, Entrepreneurship and SMEs, DG Environment, DG Health and Food Safety and the European Maritime Safety Agency (EMSA).

The Inter-Service Steering Group met 4 times: on 22 January 2021, 3 March 2021, 15 October 2021 and 24 March 2022. It was consulted throughout the different steps of the impact assessment process: notably on all stakeholder consultation materials and deliverables from the external contractor and on the draft Staff Working Document.

3. CONSULTATION OF THE RSB

The draft report was discussed by the Regulatory Scrutiny Board on 27 April 2022, which issued a positive opinion. The Board also made several main recommendations for improvement which were addressed in the final impact assessment report as follows:

RSB recommendations	Modification of the IA report
(1) The report should better explain the effectiveness of the instrument and to what extent and through which mechanisms investigations lead to avoided accidents and pollution. It should discuss whether it is possible to counter the scarcity of investigative resources by better focussing investigations, instead of increasing their	In Sections 1 and 6.4 the description of how the Directive currently works has been improved; the linkage between safety investigations the safety recommendations that they give rise to and changes to international instruments, national laws and the operations of shipping companies are explained. With regard to very serious marine casualties Member States do not have discretion under the IMO instrument as to whether they will investigatre as

[91] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12642-Maritime-Accident-Investigation_en

number.	they are obliged to do so.
(2) The report should clarify how it grouped the measures into options. It should consider whether combining different levels of ambitions for the various objectives could lead to a better outcome. The report should clarify how measures on GDPR and the introduction of a quality management system link to problems that the initiative aims to tackle.	Section 5.3 has been reinforced to better explain and present the reasons for the groupings of measures into the three policy options. The linkage between the options and the problem descriptions has been better explained. The issue of training for GDPR and the misgiving of some Member states authorities about sharing of information with third country authorities is better explained. In section 6.1.1. the need for and expected benefits of the introduction of a quality management system for the Member States' accident investigation authorities is reinforced.
(3) The report should include more detailed explanations on how the estimates were calculated, including any sensitivity analysis carried out. The report should be explicit about the reasons for the limited quantified costs for SMEs. It should also underline uncertainties related to the benefits and acknowledge the risk that the benefits may not materialise as expected. It should further explain how efficiency in investigations is understood and used in the analysis.	More detailed explanations were added in sections 6.1.2, 6.2.1 and 6.3. In addition, a sensitivity analysis has been performed; its results are reported in sections 6.1.2, 6.2.1, 6.3 and 7.2. More explanations on the limited costs for SMEs have been added in section 6.1.4. The uncertainty of the benefits has been highlighted, together with the presentation of the results of the sensitivity analysis. More explanations on the quality management system and the link with the efficiency in investigations have been added in section 6.1.1.
(4) The report needs to justify better the proportionality of including smaller fishing vessels in the scope of the initiative. The report should clarify how this will work in the context of national authorities having the choice as to when to investigate beyond the very serious accidents. It should also set out how maritime accident investigations could be coordinated with police and other investigations in the most serious cases to minimise the potential loss of earnings for SME operators. It should clarify whether the additional costs expected for the European Maritime Safety Agency are covered by existing budgetary commitments.	In section 6.1.1 and 6.1.2. the proportionality of the partial extension of the scope of the Directive to cover fatalities and loss of the vessel in cases of fishing vessels of below 15 metres in length is better explained. The Directive is not being fully extended but rather Member States will be obliged to record and report the accident and to carry out a preliminary assessment to evaluate whether an investigation should take place. The current obligations of operators of fishing vessels below 15 meters to notify the maritime authorities of a loss of the vessel or of a fatality on-board detailing the circumstances is also noted. In section 6.1.4 the enforcement costs for a vessel operator of coopering with an investigation as well as the linkages between a safety investigation and other inquiries (police or administrative) is further developed. The impact on EMSA's budget and the additional resources that will be required as setr out in section 6.1.3.
(5) The report needs to be explicit about how success will be measured and which indicators will be monitored to this end.	Section 9 on monitoring reporting and evaluation of the results of the proposed policy measures and which indicators will be evaluated has been reinforced.

The draft report was submitted to the RSB on 30 March 2022 and was discussed by the Board on 27 April 2022.

4. EVIDENCE, SOURCES AND QUALITY

The impact assessment is based on several sources, using both quantitative and qualitative data. This includes:

- Ex-post evaluation of the maritime accident investigation Directive
- Maritime Fitness Check 2018
- Stakeholder consultation activities (see Annex 2)

- External support study carried out by an independent consortium (lead by Ecorys)
- Commission experience in monitoring and implementing the Directive
- Various databases managed by EMSA.

ANNEX 2: STAKEHOLDER CONSULTATION (SYNOPSIS REPORT)

This annex provides a summary of the outcomes of the consultation activities which have been carried out for the review of the Accident Investigation Directive, including in the context of the external support study. It notes the range of stakeholders consulted, describes the main consultation activities and provides a succinct analysis of their views and the main issues they raised.

The objective of the consultation activities were to collect information and opinions of stakeholders on the key problems and associated drivers, definition of relevant policy objectives linked to those problem areas and the identification, definition and screening of policy measures that could eventually be incorporated into policy options for this Impact Assessment, as well as gather information and opinions on their likely impacts.

1. Overview of consultation activities

A consultation strategy, covering the stakeholder consultation activities carried out, including as part of the support study, has been developed from the start and further fine-tuned throughout the different phases of the impact assessment. The consultation activities were aimed at a range of relevant stakeholders representing accident investigation bodies in EU and industry representatives (including relevant associations of shipowners, fishermen, port operators, recognised organisations seafarers and social partners).

Consultation activities have taken place since the publication of the Inception Impact Assessment in October 2020 and continued until early 2022, with the bulk of consultations taking place in 2021.

As part of the initial feedback mechanism, stakeholders had the opportunity to provide feedback on the Inception Impact Assessment[92] via the relevant website. The Commission received 5 responses, during 09 October to 20 November 2020. There was one response provided by one EU Member State, one from an EEA country and 3 provided by business associations, actors from shipping industry, including a trade association of seafarers and an NGO. A further response was received from a Member State which did not use the relevant website.

Afterwards, the following main consultation activities were carried out:

- Considering the highly technical nature of the file, it was agreed with the Secretariat General that there is **no added value in running an Open Public Consultation**. However, the general public was offered the opportunity to provide any views on this initiative, via an announcement on DG MOVE web page[93] and a dedicated functional mailbox. One contribution was received from a

[92] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12642-Maritime-Accident-Investigation_en
[93] https://transport.ec.europa.eu/news/maritime-safety-three-directives-under-review-2021-09-08_en

shipowner association relating to accident investigation which welcomed the administrative burden reduction and possible support to AIBs from EMSA.

- Three rounds of interviews with EU level representatives of key stakeholders organised by the consultant in charge of the external support study, running intermittently from February 2021 to November 2021, to fill specific information requests, particularly to support and refine the overall problem definition and possible policy options.
- Targeted stakeholder surveys organised by the consultant in charge of the external support study, running from June to November 2021, to gather specific information, particularly to support the refinement of the problem definition, the baseline and where possible the assessment of impacts of possible policy measures.
- Additional consultation activities organised by DG MOVE and the consultant in charge of the external support study in order to consult the Member States and key stakeholders by providing their views on the different policy measures but also to validate the emerging and final results of the support study to the Impact Assessment in terms of the quantification of the impacts. These activities took place in the context of meetings of the EU Sectoral Social Dialogue Committee on maritime transport (16 April 2021, 23 September 2021 and 16 December 2021), the EU Sectoral Social Dialogue Committee on Sea Fisheries (29 January 2021, 8 March 2021 and 16 November 2021), the EU Sector Social Dialogue Committee on ports (19 November 2021), meetings of the Permanent Cooperation Framework of AIBs (10 March 2021, 18 June 2021, 29 August 2021, 22 September 2021 and 7 October 2021), an informal meeting of the EU/EEA Maritime Transport Directors (30 November 2021), meetings of the of the EU Committee on Safe Seas and the Prevention of Pollution from Ships (17 May 2021 and 11 November 2021). A final validation workshop to validate the conclusions of the support study attended by Member State and industry representatives was also organised (20 January 2022).

The information collected from stakeholders was key in allowing the Commission to refine the design of the policy options as well as to assess their economic, social and environmental impacts, compare them and determine which policy option is likely to maximize the benefits/costs ratio for the society and fully contribute to achieving a more effective and efficient mechanism to investigate the maritime accidents across the EU. Findings from those processes complemented the desk research carried out in the context of the external support study.

Methods have been adapted to take account of the development of the COVID-19 pandemic. For this reason, interviews and meetings have been held by videoconference.

Table 15: Overview of responses to different stakeholder consultation activities

	Number of invitees	Number of responses	Impact Assessment elements
Exploratory interviews	5	5	Problem assessment
Targeted interviews 1st round	35	25	Problem assessment / possible measures
Targeted interviews 2nd round	5	4	Policy measures / options / impacts

	Number of invitees	Number of responses	Impact Assessment elements
Targeted AIB survey	28	16	Problem assessment /size of the problem / baseline
Targeted survey fisheries	305	71[94]	Problem assessment /size of the problem / baseline
Additional AIB survey	28	16	Data gaps /problem assessment

The full list of stakeholders who participated in the various consultation activities is included in the external support study.

2. Limitations of the Stakeholder consultation

Not all stakeholders were very responsive to the various targeted consultation activities, in particular fishermen representatives (slow responses or incomplete answers). However, since all relevant stakeholder groups have provided their views and positions to the various targeted consultations, a meaningful comparison and analysis of opinions gathered from all consultation activities was nevertheless possible.

It was particularly difficult to gather input from stakeholders on possible expected **costs** of implementing proposed measures, as well as estimations on the **number of accidents** because of the scarcity and incompleteness of existing data. In certain instances, the responses of the accident investigation bodies were not very consistent, which may be explained by their differing histories and stage of development (pre-2009 or post), structures (maritime only or multi-modal), size and resources, differing appreciations of issues such as definitions and whether there are problems with resources, concerns over additional, increased workload in the future, while ensuring that their full independence and responsibility in deciding the accidents they think are worth being investigating and the conduct of the investigations themselves.

3. Analysis of the key results of the stakeholder consultation

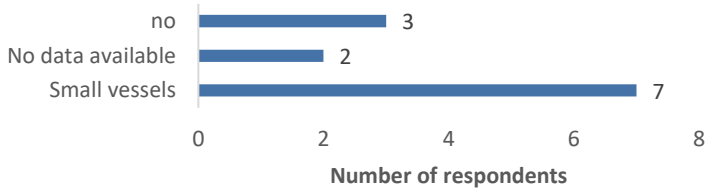
The remainder of the annex presents key findings from the analysis of stakeholder contributions to the consultation process. They are structured around the main elements of the intervention logic, including the problem areas and their drivers, the policy objectives as well as the key aspects of the design of possible policy measures. The technical support study for this Impact Assessment contains the detailed presentation of findings from the targeted consultation activities.

3.1. Problem areas and policy objectives

While AI Bodies are overall of the opinion that the fact that the fishing vessels below 15 meters are not covered by the Directive is not an issue *per se*, some rather pointing to difficulties in interpreting a number of the definitions provided in the Directive, they nevertheless acknowledge the high risks of accidents in this particular sector:

[94] The survey was distributed via the Commission's fisheries network and targeted a mix of individual fishermen, fishing companies (more than 1 employee), seafarer's and fisheries' organisations and 'other'. For each of the groups responses were received. 71 respondents started the survey. However, the majority of them did not complete the survey. Only 12 respondents filled answers to all questions asked.

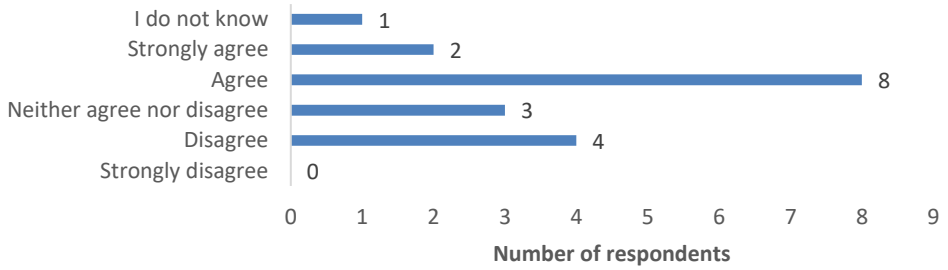
Figure 7: Are there certain types of fishing vessels that are more accident prone? (n = 12)



Almost half (seven out of eighteen) of the AIBs who participated in the consultation activities do not have information on the number of accidents involving small fishing vessels in their country. Of the eleven which have data available, three report no accident, three report a single-digit number of accidents and four report between 10 and 50 yearly accidents. One AIB reported a significantly higher number of yearly accidents involving small fishing vessels, namely 218, of which four were investigated. Out of these eighteen AIBs, five have stated that less than 10 such accidents are investigated on a yearly basis, and one AIB claiming to investigate between 10 and 20. According to the same AIBs, accidents are investigated if they lead to fatalities or a loss of ship.

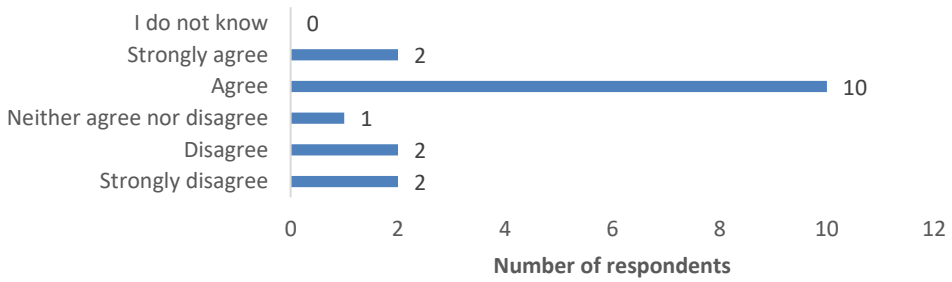
On the issue of the lack of some definitions in the Directive, ten AIBs agree and strongly agree that unclear definitions in the Directive may be the source of several problems. Four AIBs disagree with this claim, while three neither agree nor disagree. Ten AIBs consider that the problems are likely to stay the same, should no remedial action be taken, while three AIBs consider that these problems would increase in the future.

Figure 8: Do you agree that unclear definitions in the Directive are an issue? (n = 18)



Finally, regarding the question of adequate human or financial resources the AIBs provided the below replies. Out of the four AIBs stating that resource availability is not an issue, one indicated nevertheless that tasks linked to filling in the EMCIP database add stress on their resources.

Figure 9: Do you agree that a lack of resources available to AIBs is an issue? (n = 17)



With one exception, the average yearly number of investigations into maritime accidents did not fluctuate strongly across 2016 – 2020 period, in 16 Member States for which data was collected during this exercise. For nine AIBs, this number has been less than 10. For six AIBs, this number has been between 10 and mid-30. One AIB stands out in terms of both the absolute number of yearly investigations, as well as its sharp increase since 2018.

3.2. Potential policy measures

Scope of the Directive

On the policy measures regarding the investigation of accidents involving fishing vessels of less than 15 meters in length, there was no common view amongst the twenty AIBs who participated in the consultation. Sixteen AIBs have provided more detailed views, as presented in the figure below:

Figure 10: AIB survey - In your expert opinion, what grounds should justify the inclusion of smaller fishing vessels (under 15m) in the scope of the Directive? (multiple answers possible) (N=16)

	Count	% of responses	%
I am of the opinion that these smaller fishing vessels (under 15m) should not be included under the Directive	9		56%
Other, please specify	4		25%
These type of vessels are very accident-prone, and as such, should be included under the Directive	3		19%
These type of vessels present a large share of European Seafaring vessels, and as such, should be included under the Directive	3		19%
These type of vessels can cause severe accidents, and as such, should be included under the Directive	2		13%
I do not know	0		

N 16

Fourteen out of the sixteen AIBs who replied, believe that the inclusion of small fishing vessels in the scope of the Directive would require a higher number of staff. Ten AIBs consider that such an inclusion may lead to a reprioritisation of investigations and consequently to a higher number of accidents not being investigated. Six AIBs believe that new knowledge and skills would be required.

Fishermen representatives took the view that overall the benefits of investigating very serious accidents involving fishing vessels – irrespective of their size – are higher than the possible additional costs.

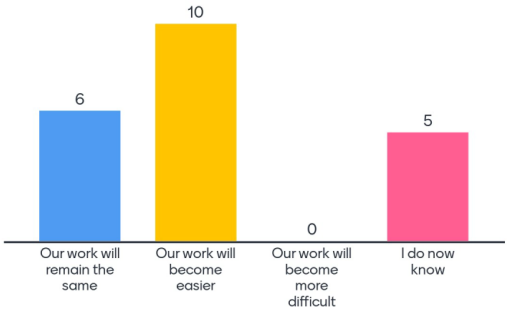
References to outdated legislation

The majority of the twenty AIBs expressing views, was of the opinion that the proposed measure, the Directive referring to the most up-to-date versions of the Code for the Investigation of Marine Casualties and Incidents and Code Casualty Investigation, is effective in addressing the identified problem. Also, the majority of them are of the opinion that the replacement of reference to Directive 95/46/EC by a reference to Regulation (EU) 2016/679 is at least to some extent effective, but they do not favour the Commission supporting the AIBs in order to comply with the new GDPR rules. This will contribute to a better protection of personal data of crew members, for example considering the processing of data after an interview with vessel crew is conducted by investigators.

EMSA providing highly specialised analytical support to AIBs

There is no common view amongst the AIBs regarding the effectiveness of this measure, with 9 out of 21 believing that there will be no change while 7 were of the opinion that it would be easier to do a high quality investigation. On the contrary the majority of the AIBs, 9 out of 20 replies, were of the opinion that EMSA providing analytical tools and equipment to AIBs would help them to do a high quality investigation against 7 who thought there will be no change while 1 respondent thought it would deteriorate the work of AIBs and 1 didn't know. The AIBs have also supported the added value that EMSA trainings and better dissemination of specialised information could bring. They were also supportive of the measure that the PCF could be given an advisory role to the EMSA with regard to the AID:

Figure 11: If the PCF is given an advisory role to EMSA with regard to the Directive, how will this affect your AIB's work on a daily basis? (n = 21)



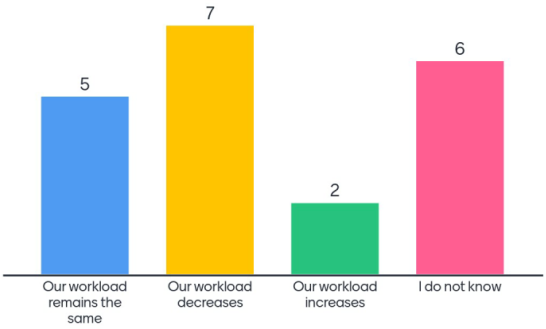
Introduce an obligation on Member States having a quality management system (QMS) for the accident investigation

The vast majority of the AIBs were not supportive of this measure, 13 out of 21, because of the cost increase.

Broaden the group to other competent authorities, EMSA and the Commission who can add accident data to the EMCIP database

Only 2 out of the 20 AIBs who provided views on this measure, considered that it would lead to increased workload for them.

Figure 12: How will this solution affect the workload of your AIB? (n = 20)



ANNEX 3: WHO IS AFFECTED AND HOW?

1. PRACTICAL IMPLICATIONS OF THE INITIATIVE

Summary of the preferred policy option implementation

The revision of the Maritime Accident Investigation Directive aims at maintaining and improving the level of maritime safety of EU registered ships operating worldwide and of ships operating in EU waters. The impacts of the preferred policy option are expected to fall on different stakeholder groups: national accident investigation bodies, EMSA, industry (i.e. ship owners/operators), crews of the vessels, port workers and passengers of maritime vessels.

Ensuring a high level of safety is important for the users of transport transporting goods as well as for passengers. It is also important for vessel crews as these persons make up the largest number of persons killed and/or injured in maritime accidents. It is important for consumer protection as well as for the integrity of the internal market that occurrences are systematically investigated in a coherent and harmonised manner across the European Union. There can be no gaps in the maritime safety net. Any and all lessons that can be learned should be taken advantage of to avoid future reoccurrence.

It is also important for the environment that accidents are avoided and when these do unfortunately occur that their effects are mitigated to the extent possible, this is why it is essential that accidents are investigated and that the results of the investigations are disseminated to the widest extent possible throughout the Union in a systemic manner.

The preferred policy option identified in the context of this Impact Assessment, policy option C, provides for a minimum requirement that any very serious marine casualty (in essence a fatality or the loss of a vessel) involving a fishing vessel of below 15 metres in length overall is subject to a preliminary assessment to determine if a full safety investigation should be carried out.

The preferred policy option also clarifies on a number of problematic or ambiguous definitions by amending the Directive. It aligns the Directive with the most up to date IMO provisions and also requires that AIBs have a certified quality management system in place to assure their operations.

Finally the preferred policy option envisages assistance to those AIBs that request it in terms of training as well as operational support whereby EMSA can assist AIBs to better discharge their obligations under the Directive.

Implications on consumers, market actors and public authorities

The following key target groups of this initiative have been identified:

- Accident investigation bodies in EU Member States
- European Maritime Safety Agency (EMSA)
- Owners/operators of fishing vessels of below 15 metres length overall

- Owners/operators of fishing vessels of above 15 metres length overall
- Owners/operators of maritime transport vessels
- Crews of the above-mentioned categories of vessel
- Port workers
- Passengers of maritime vessels

AIBs will be affected in three ways: firstly the partial extension of scope to smaller fishing vessels means that as a minimum they will have to carry out a preliminary assessment of very serious marine casualties involving these vessels. This is expected to increase the amount of work they have to do. AIBs will also face a slightly increased number of investigations because of changes and increased clarity in definitions. The increase is somewhat mitigated by the fact that the AI body can decide not to carry out a full investigation if it feels that there are no lessons to be learned. These investigations are expected to result in new findings as fishing vessels below 15 meters are currently not in the scope of the AI Directive.

AIBs will benefit from the technical and operational support that they will receive from EMSA which should allow them to better discharge their obligations in an efficient and timely fashion particularly when confronted with multiple investigations which have to be carried out at the same time.

The third aspect is that AIBs will have to put in place a quality management system (QMS). The AIBs internal systems will have to be certified and then the AIB will have to be audited each year to retain its certification. This implies one-off costs for putting in place the system and ongoing costs for the yearly audit.

EMSA will be impacted in that it will have to provide different forms of operational support as well as training to AIBs. This will take the form of support to the AIBs to carry out investigations either in terms of soft skills in the form of expertise or hardware such as drones or laboratory assistance to deal with technical aspects.

In **fisheries**, the owners/operators and crews of fishing vessels of below 15 metres in length overall are the stakeholder category mostly impacted by the proposed intervention. The extension of the scope of the Directive to this category of vessel should lead to an improvement in the safety profile of this vessel segment and at the very least to a better understanding of the safety problems faced by vessels within this category. Additional costs for the sector of participating in accident investigations (i.e. enforcement costs) are however limited.

Maritime transport operators and the **owners /operators of fishing vessels of above 15 metres** (both of which are currently within the scope of the Directive) will be impacted in that a limited number of additional investigations will be carried out as a result of increased clarity as regards definitions of when an investigation has to be carried out. The additional costs for the sector of participating in accident investigations (i.e. enforcement costs) are however limited.

On the other hand, benefits are expected in terms of avoided vessels lost, due to improved safety. These benefits overcompensate the costs for the industry (i.e. shipowners/operators).

Given that **crews** are systematically the most impacted category of people as regards injuries and death in maritime transport any improvement to safety will impact on them positively. Positive impacts in terms of safety improvements are also expected for the **port workers and the passengers of maritime vessels**.

2. SUMMARY OF COSTS AND BENEFITS

I. Overview of Benefits (total for all provisions) – Preferred Option (Policy option C)		
Description	***Amount***	***Comments***
Direct benefits		
Improvement in the functioning of the internal market		The initiative will ensure that Accident Investigation Bodies investigate similar accidents in the same way, to improve the functioning of the internal market and to ensure an appropriate safety net across the Union to protect life and the marine environment. EU action ensures a level playing field for shipowners, ports and between Member States.
Indirect benefits		
Reduction of external costs related to accidents relative to the baseline (i.e. present value over 2022-2050)	EUR 132.6 to 229.28 million	Indirect benefit to ships' crews, in particular those of small fishing vessels, port workers and passengers of maritime vessels, and to society at large, due to the lives saved and injuries avoided. Part of completed investigations give rise to recommendations or define actions to prevent similar accidents from occurring in the future. These are projected to result in 28 to 48 lives saved and 219 to 379 injuries avoided over 2025-2050 relative to the baseline. The reduction of external costs related to accidents, due to the lives saved and injuries avoided, is estimated at EUR 132.6 to 229.28 million relative to the baseline (i.e. present value over 2022-2050).
Cost savings for vessels operators relative to the baseline (i.e. present value over 2022-2050)	EUR 5.68 to 9.41 million	Indirect impacts for vessels' owners/ operators, in particular for small fishing vessels. Cost savings in terms of avoided vessels lost are estimated at EUR 5.68 to 9.41 million relative to the baseline (18-31 avoided vessels lost).
Reduction in the bunker fuel lost at sea, relative to the baseline over 2025-2050 (in tonnes)	101 to 176 tonnes	Indirect benefit to society at large. Preventing similar accidents from occurring in the future is projected to avoid 101 to 176 tonnes of bunker fuel lost at sea relative to the baseline. This is expected to have a positive impact on the quality of marine water and biodiversity.
Administrative cost savings related to the 'one in, one out' approach		
No costs savings related to the 'one in, one out'	-	-

approach have been identified		

II. Overview of costs – Preferred option (Policy option C)							
		Citizens/Consumers		Businesses		Administrations	
		One-off	Recurrent	One-off	Recurrent	One-off	Recurrent
Direct adjustment costs for Accident Investigation Bodies (AIBs) and EMSA, relative to the baseline (i.e. present value over 2022-2050)		-	-	-	-	**For AIBs**: one-off costs of EUR 0.3 million for setting up the quality management system (QMS)	**For AIBs**: EUR 11.66 to 141.23 million, of which EUR 9.59 to 139.16 million additional investigation costs and EUR 2.07 million for QMS **For EMSA**: EUR 31.88 million
Direct administrative costs for Accident Investigation Bodies (AIBs), relative to the baseline (i.e. present value over 2022-2050)		-	-	-	-	-	EUR 0.06 million
Direct enforcement costs for ship owners/operators, relative to the baseline (i.e. present value over 2022-2050)		-	-	-	EUR 0.29 to 0.7 million	-	-
Indirect costs							
Costs related to the 'one in, one out' approach							
Total	Direct adjustment costs	-	-	-	-		
	Indirect adjustment costs	-	-	-	-		
	Administrative costs (for offsetting)	-	-	-	-		

3. RELEVANT SUSTAINABLE DEVELOPMENT GOALS

III. Overview of relevant Sustainable Development Goals – Preferred Option(s)		
Relevant SDG	**Expected progress towards the Goal**	**Comments**

SDG 3 “Ensure healthy lives and promote well-being for all at all ages”	Changes to the Directive are expected to contribute to health and well-being benefits from the increased number of lessons learned which may prevent future injuries or fatalities.	The preferred policy option is projected to result in 28 to 48 lives saved and 219 to 379 injuries avoided over 2025-2050 relative to the baseline.
SDG 14 “Conserve and sustainably use the oceans, seas and marine resources for sustainable development”	Changes to the Directive are expected to contribute to preventing future damage to the marine environment through accidents of a similar nature.	Preventing similar accidents from occurring in the future is projected to result in 101 to 176 tonnes of bunker fuel lost avoided relative to the baseline. This is expected to have a positive impact on the quality of marine water and biodiversity.

ANNEX 4: ANALYTICAL METHODS

1. Description of the analytical methods used

The main model used for developing the baseline scenario for this initiative is the PRIMES-Maritime transport model by E3Modelling, a specific sub-module of the PRIMES and PRIMES-TREMOVE models. The model has a successful record of use in the Commission's energy, transport and climate policy assessments. In particular, it has been used for the impact assessments underpinning the "Fit for 55" package[95], the impact assessments accompanying the 2030 Climate Target Plan[96] and the Staff Working Document accompanying the Sustainable and Smart Mobility Strategy[97], the Commission's proposal for a Long Term Strategy[98] as well as for the 2020 and 2030 EU's climate and energy policy framework.

For the assessment of the impacts of the policy options an excel-based tool has been developed by Ecorys in the context of the impact assessment support study[99]. The tool draws on the Standard Cost Model for the assessment of the administrative costs and also includes an assessment of the impacts on the maritime safety. The excel-based tool builds extensively on data from EMCIP, provided by EMSA, and the analysis of stakeholders' feedback. The proposed measures which involve the amendment of the Directive are assumed to be implemented from 2025 onwards, so that the assessment has been undertaken for the 2025-2050 period and refers to EU27. Costs and benefits are expressed as present value over the 2022-2050 period, using a 3% discount rate.

PRIMES-Maritime model

The PRIMES-Maritime transport model is a specific sub-module of the PRIMES and PRIMES-TREMOVE models and aims to enhance the representation of the maritime sector within the energy-economy-environment modelling nexus. The model, which can run in stand-alone and/ or linked mode with PRIMES and PRIMES-TREMOVE, produces long-term transport activity, energy and emission projections, until 2070, separately for each EU Member State. The coverage of the model includes the European intra-EU maritime sector as well as the extra-EU maritime shipping. The model covers both freight and passenger international maritime. PRIMES-Maritime focuses only on the EU Member State, therefore trade activity between non-EU countries is outside the scope of the model. The model considers the transactions (bilateral trade by product type) of the EU-Member States with non-EU countries and aggregates these countries in regions. Several types and sizes of vessels are considered.

PRIMES-Maritime features a modular approach based on the demand and the supply modules. The demand module projects maritime activity for each EU Member State by

[95] Delivering the European Green Deal | European Commission (europa.eu)
[96] SWD(2020)176 final.
[97] EUR-Lex - 52020SC0331 - EN - EUR-Lex (europa.eu)
[98] Source: 2050 long-term strategy (europa.eu)
[99] Ecorys et al. (2022), Impact assessment support study concerning possible revision of Directive 2009/18/EC.

type of cargo and by corresponding partner. Econometric functions correlate demand for maritime transport services with economic indicators considered as demand drivers, including GDP, trade of energy commodities (oil, coal, LNG), trade of non-energy commodities, international fuel prices, etc. The supply module simulates a representative operator controlling the EU fleet, who offers the requested maritime transport services. The operator of the fleet decides the allocation of the vessels activity to the various markets (representing the different EU MS) where different regulatory regimes may apply (e.g. environmental zones). The fleet of vessels is disaggregated into several categories. PRIMES-Maritime utilises a stock-flow relationship to simulate the evolution of the fleet of vessels throughout the projection period and the purchasing of new vessels.

PRIMES-Maritime solves a virtual market equilibrium problem, where demand and supply interact dynamically in each consecutive time period, influenced by a variety of exogenous policy variables, notably fuel standards, pricing signals (e.g. Emission Trading Scheme), environmental and efficiency/operational regulations and others. The PRIMES-Maritime model projects energy consumption by fuel type and purpose as well as CO_2, methane and N_2O and other pollutant emissions. The model includes projections of costs, such as capital, fuel, operation costs, projections of investment expenditures in new vessels and negative externalities from air pollution.

The model serves to quantify policy scenarios supporting the transition towards carbon neutrality. It considers the handling of a variety of fuels such as fossil fuels, biofuels (bioheavy[100], biodiesel, bio-LNG), synthetic fuels (synthetic diesel, fuel oil and gas, e-ammonia and e-methanol) produced from renewable electricity, hydrogen produced from renewable electricity (for direct use and for use in fuel cell vessels) and electricity for electric vessels. Well-To-Wake emissions are calculated thanks to the linkage with the PRIMES energy systems model which derives ways of producing such fuels. The model also allows to explore synergies with Onshore Power Supply systems. Environmental regulation, fuel blending mandates, greenhouse gas emissions reduction targets, pricing signals and policies increasing the availability of fuel supply and supporting the alternative fuel infrastructure are identified as drivers, along fuel costs, for the penetration of new fuels. As the model is dynamic and handles vessel vintages, capital turnover is explicit in the model, influencing the pace of fuel and vessel substitution.

Data inputs

The main data sources for inputs to the PRIMES-Maritime model, such as for activity and energy consumption, comes from EUROSTAT database and from the Statistical Pocketbook "EU transport in figures"[101]. Other data comes from different sources such as research projects (e.g. TRACCS project) and reports. PRIMES-Maritime being part of the overall PRIMES and PRIMES-TREMOVE transport model is calibrated to the EUROSTAT energy balances and transport activity; hence the associated CO_2 emissions are assumed to derive from the combustion of these fuel quantities. The model has been adapted to reflect allocation of CO_2 emissions into intra-EU, extra-EU and berth, in line with data from the MRV database[102]. For air pollutants, the model draws on the EEA database. In the context of this exercise, the PRIMES-Maritime model is calibrated to 2005, 2010 and 2015 historical data.

[100] Bioheavy refers to bio heavy fuel oil.
[101] Publications (europa.eu)
[102] THETIS-MRV (europa.eu)

2. Baseline scenario

In order to reflect the fundamental socio-economic, technological and policy developments, the Commission prepares periodically an EU Reference Scenario on energy, transport and GHG emissions. The socio-economic and technological developments used for developing the baseline scenario for this impact assessment build on the latest "EU Reference 2020 scenario" (REF2020)[103]. The same assumptions have been used in the policy scenarios underpinning the impact assessments accompanying the "Fit for 55" package[104].

Main assumptions of the Baseline scenario

The main assumptions related to economic development, international energy prices and technologies are described below.

Economic assumptions

The modelling work is based on socio-economic assumptions describing the expected evolution of the European society. Long-term projections on population dynamics and economic activity form part of the input to the model and are used to estimate transport activity, particularly relevant for this impact assessment.

Population projections from Eurostat[105] are used to estimate the evolution of the European population, which is expected to change little in total number in the coming decades. The GDP growth projections are from the Ageing Report 2021[106] by the Directorate General for Economic and Financial Affairs, which are based on the same population growth assumptions.

Table 16: Projected population and GDP growth per Member State

	Population			GDP growth	
	2020	2025	2030	2020-'25	2026-'30
EU27	447.7	449.3	449.1	0.9%	1.1%
Austria	8.90	9.03	9.15	0.9%	1.2%
Belgium	11.51	11.66	11.76	0.8%	0.8%
Bulgaria	6.95	6.69	6.45	0.7%	1.3%
Croatia	4.06	3.94	3.83	0.2%	0.6%
Cyprus	0.89	0.93	0.96	0.7%	1.7%
Czechia	10.69	10.79	10.76	1.6%	2.0%
Denmark	5.81	5.88	5.96	2.0%	1.7%
Estonia	1.33	1.32	1.31	2.2%	2.6%
Finland	5.53	5.54	5.52	0.6%	1.2%
France	67.20	68.04	68.75	0.7%	1.0%
Germany	83.14	83.48	83.45	0.8%	0.7%
Greece	10.70	10.51	10.30	0.7%	0.6%

[103] EU Reference Scenario 2020 (europa.eu)
[104] Policy scenarios for delivering the European Green Deal (europa.eu)
[105] EUROPOP2019 population projections: Eurostat - Data Explorer (europa.eu)
[106] The 2021 Ageing Report : Underlying assumptions and projection methodologies The 2021 Ageing Report: Underlying Assumptions and Projection Methodologies | European Commission (europa.eu)

	Population			GDP growth	
	2020	2025	2030	2020-'25	2026-'30
Hungary	9.77	9.70	9.62	1.8%	2.6%
Ireland	4.97	5.27	5.50	2.0%	1.7%
Italy	60.29	60.09	59.94	0.3%	0.3%
Latvia	1.91	1.82	1.71	1.4%	1.9%
Lithuania	2.79	2.71	2.58	1.7%	1.5%
Luxembourg	0.63	0.66	0.69	1.7%	2.0%
Malta	0.51	0.56	0.59	2.7%	4.1%
Netherlands	17.40	17.75	17.97	0.7%	0.7%
Poland	37.94	37.57	37.02	2.1%	2.4%
Portugal	10.29	10.22	10.09	0.8%	0.8%
Romania	19.28	18.51	17.81	2.7%	3.0%
Slovakia	5.46	5.47	5.44	1.1%	1.7%
Slovenia	2.10	2.11	2.11	2.1%	2.4%
Spain	47.32	48.31	48.75	0.9%	1.6%
Sweden	10.32	10.75	11.10	1.4%	2.2%

Beyond the update of the population and growth assumptions, an update of the projections on the sectoral composition of GDP was also carried out using the GEM-E3 computable general equilibrium model. These projections take into account the potential medium- to long-term impacts of the COVID-19 crisis on the structure of the economy, even though there are inherent uncertainties related to its eventual impacts. Overall, conservative assumptions were made regarding the medium-term impacts of the pandemic on the re-localisation of global value chains, teleworking and teleconferencing and global tourism.

International energy prices assumptions

Alongside socio-economic projections, transport modelling requires projections of international fuel prices. The projections of the POLES-JRC model – elaborated by the Joint Research Centre and derived from the Global Energy and Climate Outlook (GECO[107]) – are used to obtain long-term estimates of the international fuel prices. The table below shows the oil prices assumptions of the baseline and policy options of this impact assessment.

Table 17: Oil prices assumptions

in $'15 per boe	2015	2020	2030	2040	2050
Oil	52.3	39.8	80.1	97.4	117.9
in €'15 per boe	2015	2020	2030	2040	2050
Oil	47.2	35.8	72.2	87.8	106.3

Source: Derived from JRC, POLES-JRC model, Global Energy and Climate Outlook (GECO)

Technology assumptions

Modelling scenarios is highly dependent on the assumptions on the development of technologies - both in terms of performance and costs. For the purpose of the impact

[107] https://ec.europa.eu/jrc/en/geco

assessments related to the "Climate Target Plan" and the "Fit for 55" policy package, these assumptions have been updated based on a rigorous literature review carried out by external consultants in collaboration with the JRC[108]. Continuing the approach adopted in the long-term strategy in 2018, the Commission consulted on the technology assumption with stakeholders in 2019. In particular, the technology database of the PRIMES and PRIMES-TREMOVE models (together with GAINS, GLOBIOM, and CAPRI) benefited from a dedicated consultation workshop held on 11th November 2019. EU Member States representatives also had the opportunity to comment on the costs elements during a workshop held on 25th November 2019. The updated technology assumptions are published together with the EU Reference Scenario 2020[109]. The same assumptions have been used in the context of this impact assessment.

Policies in the Baseline scenario

Building on the EU Reference scenario 2020, the baseline scenario for this impact assessment has been designed to include the initiatives of the 'Fit for 55' package[110].

The baseline scenario assumes no further EU level intervention beyond the current AI Directive and the continuation of the application of the IMO Casualty Code as it is. Smaller fishing vessels would continue to be outside the scope of the Directive and therefore Member States would adopt different approaches to similar accidents. Member States with inadequate financial, technical or operational resources to be able to report on and investigate accidents in a timely and efficient manner would have to make choices as to what accident to investigate and how.

As previously stated, the role of EMSA in the implementation of the Directive is central. EMSA operates the EMCIP database, provides training to investigators on the request of AIBs and assists in the management of the PCF. The Commission has launched an impact assessment on the possible review of EMSA founding Regulation.[111] However, the outcome of this impact assessment cannot be prejudged and thus the baseline scenario does not account for changes in the EMSA founding Regulation.

Baseline scenario results

The COVID-19 pandemic had a major impact on global shipping, affecting all its segments from passenger ships to container ships and oil tankers. In the baseline scenario, international maritime freight transport activity (intra and extra-EU) is projected to be 21% lower in 2020 relative to 2015. From 2021 onwards however it is projected to start recovering and grow strongly by 2025 and beyond (i.e. 19% growth for 2015-2030 and 48% for 2015-2050), due to the rising demand for primary resources and container shipping. Relative to 2019, this is equivalent to 8% increase in transport activity by 2030 and 33% growth by 2050.

[108] JRC118275
[109] EU Reference Scenario 2020 (europa.eu)
[110] Delivering the European Green Deal | European Commission (europa.eu)
[111] Regulation (EC) No 1406/2002/EC, the inception impact assessment at https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13049-European-Maritime-Safety-Agency-review-of-mandate_en

The number of port calls for 2025-2050 is projected to grow at a lower rate than transport activity, following similar evolution over the historical period[112]. This reflects the fact that transport activity is also driven by other factors such as the increase in the size of vessels over time, and of the distance travelled. In the baseline scenario the number of port calls is projected to go up by 14% by 2030 relative to 2015 and by 36% by 2050 (equivalent to 6% growth by 2030 relative to 2019 and 26% increase by 2050), following the recovery from the COVID-19 pandemic.

Driven by the increase in the transport activity and the number of vessels, the number of marine casualties is projected to increase over time in the baseline scenario. Considering *only the scope of the AI Directive (i.e. excluding fishing vessels below 15 meters)* the *number of casualties* is projected to increase by 14% by 2030 relative to 2019 and by 45% by 2050 without further EU level action. At the same time, the degree of severity of marine casualties is projected to decrease, leading to a decrease in the number of vessels lost (by 5% for 2019-2030 and for 2019-2050) and a relative stabilisation of the number of fatalities by 2050 (11% decrease for 2019-2030 and 3% increase for 2019-2050).

Table 18: Projected number of marine casualties, vessels lost, fatalities and injuries in the baseline scenario in EU27

	2019 (levels)	Cumulative growth rates		
		'19-'30	'19-'40	'19-'50
Total including fishing vessels below 15 meters				
Marine casualties	6,303	9%	16%	27%
Vessels lost	150	-6%	-11%	-14%
Fatalities	226	-7%	-9%	-10%
Injuries	1,667	0%	-1%	1%
Total excluding fishing vessels below 15 meters (current scope of the AI Directive)				
Marine casualties	2,502	14%	25%	45%
Vessels lost	20	-5%	-10%	-5%
Fatalities	66	-11%	-6%	3%
Injuries	540	10%	17%	34%
Fatalities and injuries where "other persons are involved"				
Total including estimated non reported fatalities and injuries				
Fatalities	12	0%	17%	25%
Injuries	84	2%	14%	23%

Source: Ecorys (2022), Impact assessment support study

Accounting also for the fishing vessels below 15 meters, which are currently outside the scope of AI Directive, the number of marine casualties is projected to increase by 9% by 2030 relative to 2019 and by 27% by 2050 in the baseline scenario.

The projected numbers of marine casualties, vessels lost, fatalities and injuries in the baseline scenario, by vessel type, are provided in Table 19. They are derived based on the projected growth in the number of vessels and the occurrence ratios. For all vessels types, except for fishing vessels, the occurrence ratios[113] are assumed to remain constant over time at their 2019 levels, drawing on information for the historical period from EMCIP. This is also the case for the ratios between vessels lost, fatalities, injuries and the vessel fleet.

[112] The same ratio between the growth in the number of port calls and the transport activity as for the historical period (2014-2019) has been assumed for the projection period.
[113] Ratio between the number of marine casualties and the number of vessels.

For fishing vessels the occurrence ratio is projected to slightly increase over time (from 5.6% in 2019 to 6.2% in 2030 and 7.5% in 2050), drawing on historical developments but assuming a slower pace than in the past. At the same time, the ratios between vessels lost, fatalities, injuries and the vessel fleet are assumed to remain constant over time, at their 2019 levels. This is acknowledging the past trends observed, showing that while the number of marine casualties involving fishing vessels is increasing over time the degree of severity of the casualties has been slightly decreasing[114]. The number of fishing vessels is projected to reduce over time (by 6% between 2019 and 2030 and by 16% during 2019-2050), in line with historical developments[115] and also taking into account the moderate increase in the number of catches projected in the future (0.4% per year)[116]. This is the reason why the number of vessels lost, fatalities and injuries involving fishing vessels is projected to decrease over time.

Thus, the lower growth in the number of marine casualties for fishing vessels below 15 meters (6% for 2019-2030 and 15% for 2019-2050) relative to other types of vessels is explained by the projected reduction in the number of fishing vessels by 2050, while the marine casualties' rate would still increase over time. The degree of severity of marine casualties including fishing vessels below 15 meters is projected to decrease over time but 210 fatalities are still projected in 2030 and 203 in 2050 in the baseline scenario, while 141 vessels are projected to be lost in 2030 and 129 in 2050. By 2050, the number of fatalities involving fishing vessels below 15 meters would be 135 out of total 203, representing 67% of the total number of fatalities while the vessels lost 85% of the total (110 lost fishing vessels below 15 meters out of 129 total).

Table 19: Projected numbers of marine casualties, vessels lost, fatalities and injuries in the baseline scenario by vessel type (EU27)

	Levels			
	2019	2030	2040	2050
Cargo vessels				
Marine casualties	1,233	1,452	1,623	1,969
Vessels lost	1	1	1	2
Fatalities	24	28	32	38
Injuries	204	240	268	326
Fishing vessels above 15 meters				
Marine casualties	381	386	388	386
Vessels lost	13	12	11	10
Fatalities	16	14	13	12
Injuries	113	102	93	85
Fishing vessels below 15 meters				
Marine casualties	3,801	4,011	4,204	4,366
Vessels lost	130	122	116	110
Fatalities	160	151	143	135
Injuries	1,127	1,064	1,009	957
Passenger vessels				
Marine casualties	616	733	821	994
Vessels lost	1	1	1	2

[114] For fishing vessels below 15 meters, the same occurrence rate as well as ratios between vessels lost, fatalities, injuries and the vessel fleet have been assumed as for fishing vessels above 15 meters. This is due to the lack of information in EMCIP, where only some Member States report the number of casualties, vessels lost, fatalities and injuries, on voluntary basis.
[115] European Commission (2020). Fishing fleet. Derived from: https://ec.europa.eu/oceans-and-fisheries/facts-and-figures/facts-and-figures-common-fisheries-policy/fishing-fleet_en
[116] OECD/FAO (2020), OECD-FAO Agricultural Outlook 2020-2029

	Levels			
	2019	2030	2040	2050
Fatalities	3	4	4	5
Injuries	145	173	193	234
Service vessels				
Marine casualties	193	201	204	206
Vessels lost	2	2	2	2
Fatalities	16	6	6	6
Injuries	39	41	41	42
Other vessels				
Marine casualties	79	79	79	79
Vessels lost	3	3	3	3
Fatalities	7	7	7	7
Injuries	39	39	39	39
Total including fishing vessels below 15 meters				
Marine casualties	6,303	6,862	7,319	8,000
Vessels lost	150	141	134	129
Fatalities	226	210	205	203
Injuries	1,667	1,659	1,643	1,683
Total excluding fishing vessels below 15 meters (current scope of the AI Directive)				
Marine casualties	2,502	2,851	3,115	3,634
Vessels lost	20	19	18	19
Fatalities	66	59	62	68
Injuries	540	595	634	726

Source: Ecorys (2022), Impact assessment support study

In addition, 18 Member States[117] currently report in EMCIP *casualties where "other persons are involved*". This is particularly relevant with regard to accidents on board ships in ports involving stevedores/dock workers. As explained in section 2.2 there is significant divergence of approach as regards what constitutes the “operations of a ship” and these differences in approach can have a considerable operational impact, particularly as regards what could be a joint investigation and as regards the gathering of meaningful accident and incident data. The matter has been extensively discussed between Member States AI Bodies in the context of PCF and there is agreement that the issue of what constitutes the operations of a ship particularly when that ship is in a port needs to be clarified.

During 2014-2019, a total number of 87 casualties where "other persons are involved" has been reported in EMCIP. For 2019, 11 casualties have been reported at EU27 level. Considering the significant divergence of approach as regards what constitutes the “operations of a ship” and the ratio between the number of casualties and the number of port calls[118] between Member States (ranging between 175 casualties per million of port calls for 2014-2019 in Slovenia and 132 in Portugal to 3 in the Netherlands and Spain), it is likely that the reporting in EMCIP under the AI Directive underestimates the number of casualties. It is possible that these casualties are reported to other authorities in the Member States that show lower ratios, but no information is available in relation to this and the investigations conducted. Assuming that the average ratio of the top 4 Member States (Slovenia, Portugal, Bulgaria and Malta) that report already in EMCIP applies to

[117] These Member States are: BG, DK, EE, FI, FR, DE, EL, IE, IT, LV, LT, MT, NL, PL, PT, SI, ES, SE.
[118] The number of port calls is considered to be more relevant for casualties where "other persons are involved", which is particularly relevant with regard to accidents on board ships in ports involving stevedores/dock workers.

the other Member States, 87 casualties where "other persons are involved" are estimated at EU level for 2019 (compared to a total of 11 casualties reported in EMCIP).

Table 20: Projected numbers of casualties where "other persons are involved" in the baseline scenario (EU27)

	2019	2030	2040	2050
BG	0	0	1	1
DK	3	3	3	4
EE	1	1	2	2
FI	4	5	5	5
FR	7	6	6	6
DE	7	6	7	8
EL	11	12	13	14
IE	2	2	2	2
IT	9	12	13	14
LV	1	1	1	1
LT	1	1	1	1
MT	1	2	2	2
NL	6	6	6	7
PL	2	3	4	4
PT	2	2	2	2
SI	0	0	1	1
ES	19	17	19	20
SE	6	5	5	6
BE	3	3	4	4
CY	0	0	0	1
HR	1	1	1	1
RO	1	1	1	1
Estimated total	87	89	99	107

Source: Ecorys (2022), Impact assessment support study

In addition, the estimated number of fatalities and injuries where "other persons are involved" (Table 20) is projected to remain stable up to 2030 relative to 2019 at EU level but increase by 25% and 23%, respectively, up to 2050 (15 fatalities and 103 injuries). As explained, this is particularly relevant with regard to accidents on board ships in ports involving stevedores/dock workers.

The projected developments in the number of fatalities in the baseline, presented above, are still far from the goal of the Sustainable and Smart Mobility Strategy of close to zero death toll for all modes of transport in the EU.

The tonnes of bunker fuel lost at sea due to very serious marine casualties involving all vessels, excluding fishing vessels below 15 meters, are estimated to go up from around 650 tonnes in 2019 to 740 tonnes in 2030 and 890 tonnes in 2050. When also considering fishing vessels below 15 meters the bunker fuels lost at sea are estimated to increase from 1,178 tonnes in 2019 to 1,301 tonnes in 2030 and 1,497 tonnes in 2050[119].

[119] An average level of 30 tonnes of bunker fuels lost per vessel (excluding fishing vessels) has been used for the estimations in the context of the impact assessment support study. For fishing vessels above 15 meters an average level of 22 tonnes of bunker fuels lost per vessel has been assumed, based on data from EMSA. Finally, for fishing vessels below 15 meters 21% of the bunker fuels lost per fishing vessels above 15 meters has been assumed (i.e. 6.6 tonnes), drawing on information from the Scientific, Technical and Economic Committee for Fisheries (STECF), database of the 2021 Annual Economic Report on the EU Fishing Fleet, available at https://stecf.jrc.ec.europa.eu/reports/economic.

Driven by the projected number of marine casualties, the number of safety investigations in the scope of the AI Directive is projected to increase from 95 in 2019 to 111 in 2030 and 138 in 2050 in the baseline scenario. The baseline projections also account for the impact of Brexit[120], which is likely to be felt more significantly by some Member States (e.g. Ireland, France, Belgium, Cyprus or the Netherlands) due to their links, either geographical or commercial, with the UK. The impact of the Russian invasion of Ukraine on maritime traffic, on maritime trade flows or safety and thereby indirectly on maritime accident investigation has not as yet been possible to quantify.

Table 21: Projected number of safety investigations finalised in the baseline scenario (EU27)

	Levels		
	2019	2030	2050
Number of investigations excluding fishing vessels below 15 meters but including investigations where "other persons are involved"			
Very serious	46	54	63
Serious	42	48	63
Less serious	7	9	12
Marine incident	0	0	0
Total	95	111	138
Of which, number of investigations where "other persons are involved"			
Very serious	0	1	2
Serious	0	0	0
Total	0	1	2
Range for the number of safety investigations for very serious casualties finalised for fishing vessels below 15 meters (outside the scope of AI Directive)			
Low	53	58	63
High	156	171	186

Source: Ecorys (2022), Impact assessment support study

As explained, safety investigations for fishing vessels below 15 meters are not in the scope of the AI Directive and Member States that perform them do so in line with national legislation. Based on data reported for 2014-2020 in EMCIP and stakeholders consultation, 11 Member States are currently conducting safety investigations for very serious casualties involving fishing vessels below 15 meters, but they are not necessarily conducted by the AIBs or in accordance with the EU Common Methodology or the IMO Casualty Code. These 11 Member States represented around 61% of fishing vessels below 15 meters in 2019 (41,579 of the total 68,272 fishing vessels below 15 meters)[121].

However, there is high uncertainty regarding the total number of very serious casualties investigated for fishing vessels below 15 meters because there is no obligation to report them[122]. Therefore, projections are presented in a range. Assuming the same ratio of investigations to very serious occurrences as for larger fishing vessels provides the upper bound of the range (high number of investigations) and the ratio of investigation as reported by France in EMCIP would provide the lower bound (low number of

[120] From the entry into force of the AI Directive till the end of 2020, the UK has conducted 187 safety investigations out of 1,482 investigations in total. Amongst them, 53 included an EU interest. As a result of Brexit, and assuming no agreement with the UK AIB, these would now have to be done by EU AIBs. On this basis, the number of investigations for all EU AIBs is estimated to increase by 3.5% each year relative to developments excluding Brexit.

[121] DE, DK, ES, FR, EL, HR, LT, MT, PL, PT, SE.

[122] The reporting in EMCIP is done on voluntary basis. Only 7 finalised investigations for very serious casualties have been reported in EMCIP for 2019 by Denmark, France, Malta, Poland and Portugal and even for these Member States it is not clear if all the investigations have been reported.

investigations)[123]. France was chosen for determining the lower bound because of the more complete time series reported in EMCIP. On these grounds, in the baseline scenario, the number of safety investigations for very serious casualties involving fishing vessels below 15 meters is projected to go up from a range between 53 and 156 investigations in 2019 to 58 to 171 investigations in 2030 and 63 to 186 investigations in 2050. These projections also take into account the effect of Brexit.

Given that there is no such thing as a standard investigation, the estimated costs per investigation differ substantially per AIB. Furthermore, a non-negligible share of the work of AIBs is spent on administrative activities. One AIB has indicated that it spends approximately 30% of its time and resources on administrative tasks. AIBs may also perform other activities (based on national law), that go beyond the requirements of the AI Directive. In order to separate the costs for AIBs investigations conducted according to AI Directive from other activities (based on national law), the time spent per investigation has been used for projecting the AIBs costs in the baseline scenario. Drawing on stakeholders' consultations, a range between 250 and 1,500 hours has been considered for an investigation[124]. The costs for all EU AIBs for conducting investigations (including administrative tasks) are thus projected to increase from a range between EUR 1.0 and 6.2 million in 2019 to EUR 1.2 to 7.2 million in 2030 and EUR 1.5 to 8.9 million in 2050 (Table 22).

Table 22: Projected costs for AIBs excluding fishing vessels below 15 meters in the baseline scenario (EU27)

Costs for AIBs excluding fishing vessels below 15 meters in the baseline scenario (in million EUR)	2019	2030	2050
Costs of investigations	0.7 - 4.3	0.8 - 5.0	1.0 - 6.3
Total costs, including administrative tasks	1.0 - 6.2	1.2 - 7.2	1.5 - 8.9

Source: Ecorys (2022), Impact assessment support study

The investigations of very serious casualties involving fishing vessels below 15 meters, performed by EU AIBs in line with the requirements of national law may add between EUR 0.6 to 10.1 million in 2019, to EUR 0.6 and 11.1 million in 2030 and to EUR 0.7 to 12.1 million in 2050.

3. Other assumptions used for quantifying the impacts of the policy options

Impacts on the number of investigations

As explained in section 6.1.1, the ***inclusion of the very serious casualties involving a fishing vessel below 15 meters*** in PO C is projected to result in 37 to 110 additional investigations relative to the baseline in 2030 and 40 to 119 additional investigations in 2050 at EU level.

It should be noted that for fishing vessels below 15 meters, as explained in section 5.1, the investigations in the baseline scenario are conducted in line with the requirements of national legislation in 11 Member States. These 11 Member States represented around

[123] As explained in Section 2.2, many AIBs report significant challenges for investigating accidents involving small fishing vessels (e.g. lack of witnesses for one-man vessels), this is why it was assumed that ratio of investigations to occurrence should be at most equal to the one for larger fishing vessels. For further details, see also Annex 4.

[124] The tariffs per hour draw on Eurostat Structure of earnings survey, Labour Force Survey data for Non-Wage Labour Costs.

61% of fishing vessels below 15 meters in 2019 (41,579 of the total 68,272 fishing vessels below 15 meters)[125].

To calculate the additional number of investigations in PO C, first the number of marine casualties that are currently not subject to investigations has been derived, drawing on the share of fishing vessels below 15 meters in the Member States that do not conduct investigations based on requirements of national legislation (i.e. 39%). In the second step, the share of very serious casualties in the total number of marine casualties involving a fishing vessel below 15 meters in the Member States that currently report such data has been used to estimate the very serious casualties involving a fishing vessel below 15 meters that are not reported. In the third step, to account for the high degree of uncertainty regarding the number of very serious casualties not investigated for fishing vessels below 15 meters the same assumptions as in the baseline scenario have been used. Assuming the same ratio of investigations to very serious marine casualties as for larger fishing vessels provides the upper bound of the range for the non investigated VSMCs (high number of investigations) and the ratio of investigation as reported by France in EMCIP would provide the lower bound (low number of investigations)[126]. As previously explained, France was chosen for determining the lower bound because of the more complete time series reported in EMCIP. Finally, the additional number of investigations relative to the baseline is derived.

The ***clarification of the length of fishing vessels definition***, defined as Length overall (LOA) in all three policy options, is projected to result in a limited increase in the number of investigations that are currently under the scope of the AI Directive (6 additional investigations in all three options relative to the baseline in 2030 and 2050).

For estimating these additional number of investigations, the Fishing Fleet Register[127] has been used to compare the number of fishing vessels that would fall into the scope of the Directive when the 'length between perpendiculars' (LBP) would be used as indicator. The LBP of fishing vessels is not always registered[128]. By only considering vessels for which both the LBP and LOA are registered, it is found that there are 4,321 fishing vessels with both the LOA and the LBP being larger than 15 meters. At the same time, there are 1,141 vessels for which the LOA is larger than 15 meters, but the LBP is smaller than 15 meters. Hence, by requiring the length of fishing vessels to be measured as LOA, the number of vessels included under the scope of the Directive would increase by 26%. Assuming the same occurrence ratio and the same ratio of investigations to marine casualties as in the baseline scenario, 6 additional investigations are estimated relative to the baseline in all three policy options.

As regards the definition of ***"directly in connection with the operations of a ship"*** and how this is interpreted having regard to port workers, the impact of a clearer definition explicitly extending the scope of the Directive to situations where there are casualties involving port workers which take place on board a ship in a port is expected to give rise

[125] DE, DK, ES, FR, EL, HR, LT, MT, PL, PT, SE.

[126] As explained in Section 2.2, many AIBs report significant challenges for investigating accidents involving small fishing vessels (e.g. lack of witnesses for one-man vessels), this is why it was assumed that ratio of investigations to occurrence should be at most equal to the one for larger fishing vessels.

[127] Fleet Register European Commission, consulted March 2022. Filters: "Present in the fleet on 31/12/2019"

[128] For 1,444 vessels with a LOA smaller than 15 meter, the LBP is not registered.

to a limited number of additional investigations per year in PO B and PO C (8 additional investigations relative to the baseline in 2030 and 9 in 2050). The impact would be smaller in PO A whereas only interpretative guidelines are foreseen (4 additional investigations relative to the baseline in 2030 and 5 in 2050).

The approach of estimating the total number of casualties where "other persons are involved" (including those not reported or possibly reported to other authorities in the Member States) in the baseline scenario is explained in section 2 of Annex 4 (Table 20). The split of the number of casualties by severity type is performed based on the average shares by severity type for 2014-2019 from EMCIP. In the next step the average ratio of investigations to very serious and serious casualties for 2014-2019 from EMCIP is used to derive the total number of investigations where "other persons are involved". Finally, the additional number of investigations is derived in relation to the baseline projections.

Overall, PO A would lead to 10 additional investigations at EU level in 2030 and 11 in 2050 relative to the baseline. PO B is projected to result in slightly higher number of additional investigations than PO A (14 in 2030 and 15 in 2050), while PO C would result in 51 to 124 additional investigations in 2030 and 55 to 134 additional investigations in 2050. As explained in section 6.1.1, the number of additional investigations may be slightly higher, in particular in PO B and PO C, which additionally *establish a time limit for fatal accidents.* However, due to the lack of data is was not possible to quantify this.

Detailed costs for EMSA for providing analytical tools and equipment during an individual investigation (hardware)

The analytical tools and equipment to be provided by EMSA during an individual investigation (hardware) can take various forms like for example:

- On scene tools such as ROV (remotely operator submersible), RPAS (aerial drones), Robots (e.g. small ones to access damaged areas, enclosed spaces, etc.);
- Specialised tools such as: VDR (Voyage Data Recorders) facilities, software such as MADAS (Marine Accident Data Analysis Suite)[129]; ad-hoc resources (scientific laboratories, tank testing); ad-hoc services (3D simulation for fire, loss of containers, etc.).

The additional costs estimates per year from 2025 onwards for analytical tools and equipment to be provided by EMSA in PO A and PO C are estimated at EUR 1.1 million per year relative to the baseline for all years (EUR 0.9 million for on scene tools and EUR 0.2 million for specialised tools). The breakdown of the costs is provided in the table below.

Table 23: Additional cost estimates per year for analytical tools and equipment to be provided by EMSA in PO A and PO C relative to the baseline (in EUR)

	Estimated cost and operations per year
On scene tools	
Remotely operated submersible (ROV)	
Cost per 'normal' operation in EUR	25,000

[129] https://www.avenca.co.uk/marine-data-analysis/systems-software/madas/ (for example)

	Estimated cost and operations per year
Number of 'normal' operations per year	12
Standby-by fees in EUR	50,000
Total cost per year for 'normal' operations in EUR	350,000
Cost per operation outside "coastal waters"	150,000
Number of operations outside "coastal waters" per year	3
Standby-by fees in EUR	50,000
Total cost per year for operations outside "coastal waters" in EUR	500,000
Total costs for ROV in EUR	**850,000**
Remotely piloted aircraft - aerial drone (RPA)	
Cost per operation in EUR	3,000
Number of operations per year	12
Total costs for RPA in EUR	**36,000**
Specialised tools (laboratories, testing, simulations)	
Average cost per operation in EUR	20,000
laboratories	10,000
simulations	20,000
tank testing	30,000
Number of operations per year	12
Total costs for specialised tools in EUR	**240,000**
Total costs for on scene and specialised tools (in EUR)	**1,126,000**

Source: EMSA

Benefits in terms of avoided number of fatalities, injuries, vessels lost and tonnes of bunker fuel lost at sea

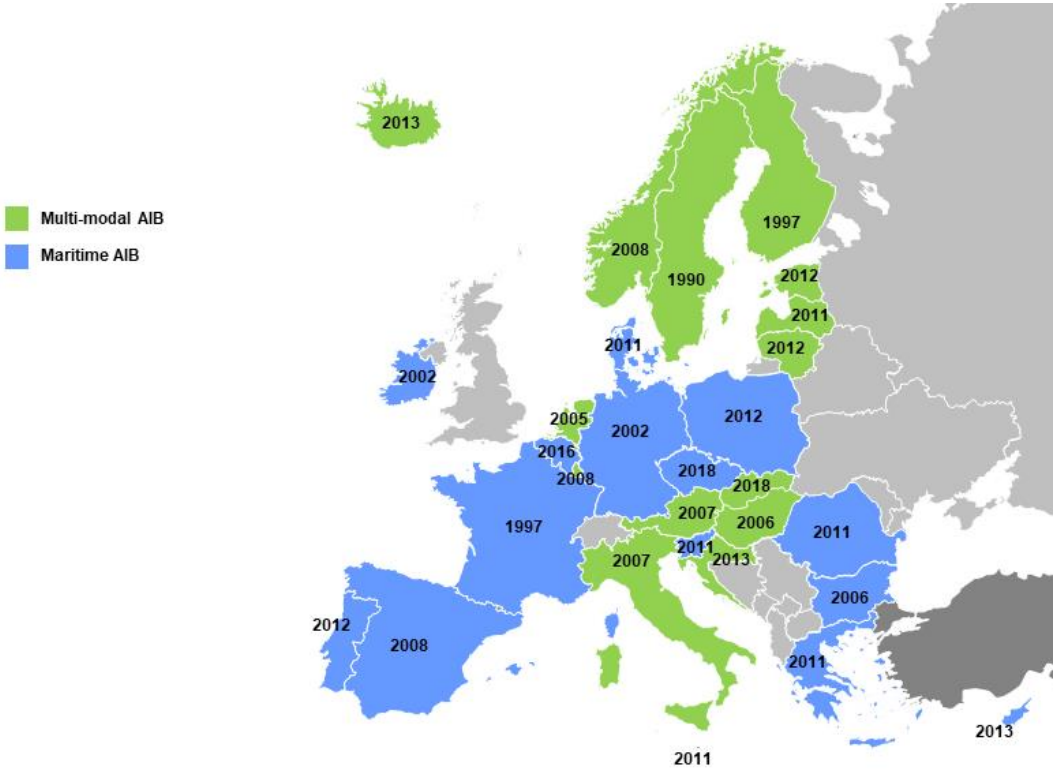
To estimate the benefits, a relationship between the number of finalised investigations and safety indicators has been estimated in the context of the impact assessment support study, by establishing an autoregressive log-log model. The effect of a safety investigation conducted in year 0 is estimated on the safety level 2 years later, as one might expect some delay between an accident occurring, the investigation being carried out and the safety recommendations being implemented. The hypothesis is thus that the safety impacts take two years to materialize; many investigation reports are only published one year after the accident having occurred.

A relationship between the (natural logarithm) of safety investigations conducted in the period 2012-2017 on the number of marine casualties in the period 2014-2019 has been estimated. It indicates that the negative effect of the number of safety investigations on the number of marine casualties two years later is statistically different from 0. Furthermore, the error term, indicated by the R2 (at 0.74) is fairly low, which suggests that much of the changes in year t+2 can be explained by changes in year t. The regression analysis is to be interpreted as "a 1% increase in investigations in year t reduces the number of marine casualties in year 2 by 0.102%". However, to provide a conservative estimate on the safety impacts, accounting for the high level of uncertainty, this elasticity is not used directly. Instead, a confidence interval is derived, indicating a 95% level of significance. The 95% confidence is calculated as: -0.102[130] + 2.571[131] × 0.030[132]. The confidence interval is calculated at -0.0239, which is used in the analysis. Thus, in the analysis "a 1% increase in investigations in year t reduces the number of marine casualties in year 2 by 0.0239%".

[130] Estimated coefficient.
[131] Which corresponds to the t-value for a significance level of 95%, using 5 degrees of freedom.
[132] The standard error.

The reduction in the number of casualties is subsequently translated into a reduction in the number of fatalities, injuries, vessels lost and tonnes of bunker fuel lost at sea by using the ratios between the number of fatalities, injuries, vessels lost and tonnes of bunker fuel lost at sea and the number of marine casualties projected in the baseline scenario.

ANNEX 5: EU/EEA ACCIDENT INVESTIGATION BODIES FALLING WITHIN THE SCOPE OF DIRECTIVE 2009/18/EC BY TYPE AND YEAR OF ESTABLISHMENT



ANNEX 6: IMO SUPERSEDED OR OUT OF DATE REFERENCES

Original instrument	Reference in AI Directive and date of change	Replacement/amendment
IMO code of International Standards and Recommended Practices for a Safety Investigation into a Marine Casualty or Marine Incident (Casualty Investigation Code) (Resolution A.849(20) of 27 November 1997 incorporated in Resolution MSC 255(84) of the IMO Maritime Safety Committee of 16 May 2008)	Article 3(1) of the Directive Revoked in December 2013	Guidelines to Assist Investigators in the Implementation of the Casualty Investigation Code (Resolution A.1075(28))
Circular MSC-MEPCS.3/Circ.3	Article 3(3) of the Directive Amended in November 2014, however, not yet implemented	MSC-MEPC.3/Circ.4/Rev.1
IMO resolution MSC A.861(20) of the IMO Assembly of 27 November 1997 shipborne voyage data recorders (VDRs). Resolution MSC.163(78) of the IMO Maritime Safety Committee on performance standards for VDRs	Article 3(6) of the Directive Revised in May 2006 and again revised in May 2012	Resolution MSC 214(81) (as adopted 12 May 2006), Revised through Resolution MSC (333 (90) as adopted on 22 May 2012.)
Recital 7 of the Directive refers to Code for the Implementation of Mandatory IMO Instruments annexed to Resolution A.996(25) of the IMO Assembly of 29 November 2007" recalling the obligation of flag States to ensure that marine safety investigations are conducted by suitably qualified investigators	Recital 7 of the Directive Revoked in November 2011	Resolution A.1054(27)

Original instrument	Reference in AI Directive and date of change	Replacement/amendment
Resolution A.1054(27)	Recital 7 of the Directive Revoked in December 2013	Resolution A.1070(28)

ANNEX 7: DISCARDED PROBLEM DRIVERS AND POLICY MEASURES

A number of possible problem drivers and policy measures were considered during the impact assessment process but were discarded either because the identified problem driver was not validated by the stakeholders consulted, because the problem was not susceptible to a solution by means of EU legislation or because proposing an action to address the issue at EU level will not yield additional results.

Discarded problem drivers

The Member State acting as Substantially Interested State (SIS)*:* the Directive obliges Member States to investigate VSMCs, including on a Member State which is neither the flag State nor the coastal State but whose substantial involvement has been established in the casualty. The purpose of the obligation is to guarantee that the investigation is conducted also when the coastal State and the flag State refuse to do so.

During 2014-2020, 20,899 ships flagged under an EU/EEA Member State have been involved in a marine casualty or incident. Considering the total number of marine casualties and incidents, a State different from the flag or the coastal State was involved in 23.3% of marine casualties and incidents during the same period. 28 EU/EEA Member States were involved as SIS 2,596 times, while the Czech Republic and Slovakia were not involved at all[133].

During the interviews with AIBs, it was observed that there is no problem with the comprehension and application of the aforementioned obligation. The provision is regarded as suitably open and clear both in IMO and EU law, adequately providing the standards for the launch of a procedure of investigations in collaboration with third countries.

Definition of pleasure yachts and pleasure craft. The Directive refers to “pleasure yachts and pleasure craft not engaged in trade, unless they are or will be crewed and carrying more than 12 passengers for commercial purposes.” However, the Directive does not define either "pleasure yacht" "pleasure craft" “commercial purposes” or “engaged in trade”. Furthermore, the exception "unless they are or will be crewed and carrying more than 12 passengers” is not defined. While there is some uncertainty, there is no agreement among the AIBs as to whether this is a problem, if it is what the size of the problem is and whether it is a problem which is susceptible to solution at EU level.

[133] European Maritime Safety Agency (2021), Annual overview of marine casualties and incidents 2021.

The ***COVID-19 pandemic*** impacted the work of investigators for a significant time and the question arose whether the procedures under the AI Directive offer sufficient flexibility for the AIBs to conduct their work in drastically changed circumstances. However, following discussions with the AIBs, it was concluded that nothing in the Directive contributed to the difficulties and that neither the COVID-19 pandemic nor emergencies in general could be considered as a sufficient problem or a driver to impede the correct functioning of the Directive.

Discarded policy measures

During the Impact Assessment process, a number of possible policy measures have been discussed with the key stakeholders and finally discarded, as explained below.

Policy measure	Relevant Driver	Short description	Reason for discarding
Formulate a definition of "serious casualty" in the Directive and thereby continue to oblige AIBs to conduct a preliminary assessment to determine if the investigation can lead to safety recommendations.	PD2	As the term 'serious casualty' no longer exists in the IMO Casualty Code, the obligation to perform an assessment has no legal basis in international law. The aim of this policy measure would be to assess whether an investigation could lead to safety requirements.	The AIBs consulted during the IA stated that that for each accident occurring AIBs already perform a preliminary assessment. Such an assessment is needed in order to assess the extent of the accident investigation. Introducing an explicit obligation to do so will not yield any additional results.
In relation to pleasure yachts and pleasure craft, the phrases 'for commercial purposes' and 'will be crewed and carrying' will be clarified in interpretive guidelines or explicitly defined in the Directive	PD2	During the IA process, a certain ambiguity and a risk of non-harmonised approach as to whether accidents involving this ship type are or have to be investigated was perceived.	Ten of the AIBs who participated in the stakeholder consultation find the definitions clear and unproblematic, while six other AIBs are of the view that this should be better elaborated. The European Boating Association further explained that accidents involving fatalities are investigated by AIBs if lessons can be drawn, and they do not see the need of additional clarifications.

Policy measure	Relevant Driver	Short description	Reason for discarding
Provide either in interpretative Guidelines or in detailed provisions in the Directive how the Member State should act as a Substantially Interested State	PD2	In cases where the Member State is neither the flag State or the coastal State it can have problems when it is obliged to investigate as a Substantially Interested State. This can be problematic as the Member state lacks jurisdiction but also when the member State AIB becomes aware of the accident long after it took place.	The AIBs consulted during the IA state that they do not have particular problems with this obligation, cooperation between EU Member States is excellent and any changes to the Directive will not address problems with third countries. Any changes to the Directive or interpretative guidelines in this regard are unlikely to yield any additional results.
Provide the possibility to produce a concise report for all accidents that are less complex	PD2	In this policy measure, the simplified report is replaced by a concise report. The phrase 'less complex' will be clearly defined in the Directive. Concise reports shall be produced irrespective whether a safety recommendation can be issued.	Defining whether an investigation is less complex is difficult. Neither international nor EU law define this concept. It seems extremely challenging to define less complex. In addition, it is also questionable whether an attempt to define less complex will ease the investigation procedures.
Ensure that EMSA provide open access to its data in order to increase the knowledge base of the AIB staff	PD4	EMCIP information based on open data is shared in order to disseminate findings on safety recommendations to a larger extent than is currently the case.	AIBs believe that other proposed measures already sufficiently ensured increasing the knowledge base of AIB staff. This measure has no added value.
Further ensure confidentiality of witness statements and the status of the safety investigation as regards other public bodies/judicial authorities in the Directive	PD4	The goal of this policy measure is to further strengthen the independence of the investigation authorities and to better define the role and responsibilities of AIBs particularly as regards their relations with judicial and prosecutorial authorities.	Safeguards to ensure the confidentiality of witness statements in national court cases need to be provided for in national law. The role and responsibilities of the AIBs as regards the status of safety investigations are already defined it the Directive which must be implemented having regards to the internal legal order in each Member State. No benefit of an additional EU measure in this regard were identified.

Policy measure	Relevant Driver	Short description	Reason for discarding
To support AIBs in meeting their objectives EC could stimulate the use of peer reviews on accident reports, in order to improve the quality of the written reports and PCF members could provide technical support to one another	PD4	In order to improve the quality and therefore usability of the reports, a quality review could be introduced. The review could be done via a peer review system (similar to aviation) where AIBs review each other's reports. In addition, the PCF could organise that staff is exchanged between AIBS if needed and possible.	AIBs believed that introducing the QMS itself will be sufficient to improve the quality of the accident investigation reports. In addition, EMSA could provide a quality assurance role. The added value of introducing peer reviews seems limited and it would increase the workload of AIBs without yielding clear benefits.
PCF to be given an advisory role to the EC/EMSA with regard to the AID	PD4	If the PCF has an advisory role towards the EC/EMSA, like the European Network of Civil Aviation Safety Investigation Authorities (ENCASIA) also has towards EC and European Union Aviation Safety Agency (EASA), it is expected that this will empower the PCF. Leading to improved cooperation and participation.	Political support for this measure seems to be missing, especially as the distinction between the Member States and their AI Bodies will become less clear once this measure is introduced. Instead of being fully independent the AIBs will move more to policy making, which is not their role.
The Directive is amended to provide additional flexibility for AIBs in emergency situations such as the COVID-19 pandemic	PD4	AIBs found it difficult to carry out their investigative functions during the COVID-19 pandemic, in particular they found travelling to the site of accidents difficult because of travel restrictions	AIBs stated that there was nothing intrinsically within the Directive that could be addressed by amending the directive to address this issue.

ANNEX 8: RETAINED POLICY MEASURES

Driver	Policy measure	Short description	Link to a specific objective
PD 1: The Directive does not apply to certain vessels	**PM 1a –** MSs will be **encouraged to report** all very serious marine casualties (crew fatalities or loss of vessel) involving fishing vessels of less than 15 metres in EMCIP	This measure aims to obtain more insight into the number of fatalities and/or vessel losses involving fishing vessels of less than 15 metres.	**SO1:** Protect fishing vessels, their crew and the environment
	PM 1b – MSs will be **obliged to report** all very serious marine casualties (crew fatalities or loss of vessel) involving fishing vessels of less than 15 metres in EMCIP	This measure aims to obtain more insight into the number of fatalities and/or vessel losses involving fishing vessels of less than 15 metres.	
	PM 2 - Member States will be **obliged to carry out a preliminary assessment** of very serious marine casualties involving fishing vessels of less than 15 metres to determine whether they will open a safety investigation	This measure requires AIBs to investigate (at least in the form of a preliminary assessment) accidents for small fishing vessels if the accident involved a loss of the vessel and/or a fatality. The measure applies to all fishing vessels of less than 15 metres LOA falling within the definition of Article 4(1)(4) of Regulation 1380/2013.	
PD2: Some definitions are not provided in the Directive or are not specific enough	**PM 3 –** Length of fishing vessels to be defined as **Length overall** (LOA)	The Directive will specify that the length overall (LOA) of a fishing vessel shall be used to determine the length. By defining that the length of a vessel is measured in LOA, the AID Directive will be in line with the length measures requirements laid down in Article 6a of Directive 2002/59.	**SO2:** Member States AIBs to have clarity and precision regarding definitions to ensure that all accidents that need to be are being investigated in a harmonised manner
	PM 4a - The phrase "directly in connection with the operations of a ship" will be clarified in **interpretive guidelines** (non-regulatory measure)	In order to be considered as falling within the scope of the Directive, the casualty has to be 'directly in connection with the operations of a ship'. The main issue seems to relate to the treatment of accidents involving	

Driver	Policy measure	Short description	Link to a specific objective
	as regards accidents which take place in ports	vessels in ports and involving port workers. There are differences in approach between Member States' AIBs and this measures will establish a common interpretation. Interpretative guidelines on what factors to take into consideration will provide AIBs with some practical guidance in understanding the Directive's provisions. Practical examples could be used for the sake of clarity.	
	PM 4b – The phrase 'directly in connection with the operations of a ship' will be **explicitly defined** in the Directive as regards accidents which take place in ports	In order to be considered as falling within the scope of the Directive, the casualty has to be 'directly in connection with the operations of a ship'. The main issue seems to relate to the treatment of accidents involving vessels in ports and involving port workers. There are differences in approach between Member States' AIBs and it is important to use a common definition on the phrase. In the Directive, an explicit definition will be included.	
	PM 5a – Interpretive guidelines will provide elements to support the AIB to decide when an accident classifies as **fatal** in case a person does not die immediately	This relates to situations where a person suffers serious injuries but does not die immediately. There are differences in approach between Member States' AIBs as to how a fatality which occurs some time after the incident is treated and a common interpretation must be established. Interpretative guidelines on what factors to take into consideration and how to decide if a fatality is linked to a specific incident and therefore has to be investigated. Practical examples could be used for the sake of clarity.	
	PM 5b - An explicit **deadline** will be included in the Directive stating when an **accident classifies as fatal** in case a person does not die immediately	This measure addresses the problem that a non-fatal injury can become a fatal injury some time after the marine occurrence which caused it. To provide clear guidance until when an investigation should be started, the Directive will include a clear deadline (i.e. 30 days after the accident occurred, as in other transport modes).	
PD3: The Directive contains references to outdated	**PM 6 -** The Directive will refer to the most up-to-date versions of the Code for the Investigation of Marine Casualties and Incidents (Casualty	In this policy measure, all references to specific IMO legislation and guidance, which might be outdated, will be deleted. Instead, the Directive will be re-phrased more openly by referring to the most up-to-	

Driver	Policy measure	Short description	Link to a specific objective
international rules	Investigation Code)	date version of the relevant IMO legislation and guidance. This is done with one reservation: that the latest version should be of the same clarity and protection as the previous version (non-regression clause meaning that it remains as good as it is now).	
PD4: Some AIBs lack sufficient resources or expertise to be able effectively and consistently report and investigate marine casualties	**PM 7 - EMSA** could **provide highly specialised analytical support** during an individual investigation (soft skills)	Many AIBs indicated that they do not have enough budget to have an expert on every specialised discipline. Therefore, it would be helpful if EMSA would provide a pool of experts of different disciplines who could be of service to any requesting AIB. A frequently given example is the need for a VDR expert.	**SO3:** Enhance the capacity of AIBs to conduct (and report on) accident investigations in a timely, expert and independent manner - including as regards renewable and low carbon fuels and technologies.
	PM 8 - EMSA could **provide analytical tools and equipment** during an individual investigation (hardware)	Specialised equipment can be very expensive and most AIBs do not have the budget to purchase such equipment. EMSA could provide specialised tools and equipment, which can be lent or provided to the AIBs. This way, the equipment only needs to be purchased once or twice instead of every AIB having to purchase it. Examples include a specialised data analysis programme in which all data can be combined and analysed at once or the use of RPAS (aerial drones) or ROVs (underwater vehicles).	
	PM 9 - EMSA could **share knowledge or organise training** on specific techniques/tools on new developments and technologies which may be relevant for accident investigation in the future including but not limited to renewable and low carbon fuels, which are particularly relevant in view of the “Fit for 55” package, and automation, , as well as the General Data Protection Regulation (GDPR) rules	EMSA could take a role in raising awareness of developments, disseminating information, and organising discussions and training courses on renewable and low carbon fuels, new digital technologies and relevant developments at the IMO level. In addition, EMSA could provide dedicated training on the use of investigative technologies, equipment and on new technologies relating to the developments in maritime transport. All of this would allow the AIBs to conduct their duties more effectively. The Commission and EMSA will provide guidance in the form of training and workshops on how AIBs can or have to deal with different aspects of the GDPR to ensure that during investigations the AIBs will comply with the GDPR legislation.	
	PM 10 - Introduce the obligation that each	This measure is introduced to improve the quality of the accident	

Driver	Policy measure	Short description	Link to a specific objective
	Member State establishes a **quality management system** (QMS) for the accident investigation body	investigations, the management of available resources having regard to the workload and especially the reports written. A similar system as under Article 8(1) of Directive 2009/21/EC could be adopted.	
	PM 11 – The list of **authorities** that can input / add accident data to the **EMCIP database is modified,** so that AIBs must report VSMCs but all other occurrences can be reported by other nominated competent national authorities, the Commission and EMSA	Currently, Article 17(3) of the Directive specifies that: "The investigative bodies of the Member States shall notify the Commission on marine casualties and incidents in accordance with the format in Annex II". Some of the AIBs consider that this should not be specifically their responsibility, as they do not handle this kind of data management, and the relevant statistics are collected, used and managed by other Member State authorities. Art. 17(3) will therefore be changed to "The investigative bodies of the Member States shall notify the Commission on very serious marine casualties. All other marine casualties and incidents can be notified by a duly designated competent authority of a Member State. Data is notified in accordance with the format in Annex II." In addition, EMSA and the Commission should be able to input data to the EMCIP database.	

ANNEX 9: EFFECTIVENESS OF THE DIFFERENT POLICY OPTIONS

Key: Impacts expected					
××	×	O	✓	✓✓	
Strongly negative	Negative	No or negligible impact	Positive	Strongly positive	Unclear
	PO A		PO B		PO C
Specific policy objective 1: Protect fishing vessels, their crew and the environment					
Change in the number of very serious marine casualties (VSMCs) reported and/or investigated	Positive effect on the number of very serious marine casualties (VSMCs) involving fishing vessels below 15 meters reported in EMCIP: 218 additional VSMCs in 2030 and 237 additional VSMCs in 2050 relative to the baseline. The increase in the amount of information available to national and EU authorities should help in the development of policy responses.		Positive effect on the number of very serious marine casualties involving fishing vessels below 15 meters reported in EMCIP: 436 additional VSMCs in 2030 and 474 additional VSMCs in 2050 relative to the baseline. This will lead to an accurate picture of the safety issues in this segment of the fishing vessel sector leading to better evidenced policy responses at national and EU level.		Positive effect on the number of very serious marine casualties involving fishing vessels below 15 meters reported in EMCIP: 436 additional VSMCs in 2030 and 474 additional VSMCs in 2050 relative to the baseline. This will lead to an accurate picture of the safety issues in this segment of the fishing vessel sector leading to better evidenced policy responses at national and EU level. In addition, 37 to 110 additional investigations of VSMCs involving fishing vessels below 15 meters are expected to be carried out in 2030 and 40 to 119 in 2050 relative to the baseline. The carrying out of systematic harmonised safety investigations leading to safety

Key: Impacts expected					
✗✗	✗	O	✓	✓✓	
Strongly negative	Negative	No or negligible impact	Positive	Strongly positive	Unclear
	PO A		PO B		PO C
					recommendations addressed to industry and authorities should improve the safety profile of this segment.
Changes in the number of fatalities and injuries and avoided vessels lost					Positive impact on the number of lives saved (28 to 48) and injuries avoided (219 to 379) for 2025-2050 relative to the baseline, mainly due to the assumed extension of the scope of the Directive to the VSMCs involving fishing vessels below 15 meters. Positive impact on ship operators in terms of avoided vessels lost estimated at EUR 5.7 to 9.4 million relative to the baseline (corresponding to 18 to 31 fewer vessels lost), mainly due to the assumed extension of the scope of the Directive to the VSMCs involving fishing vessels below 15 meters.
Changes in the number of tonnes of bunker fuel lost at sea					Positive impact on the environment: 101 to 176 tonnes of bunker fuel lost at sea avoided during 2025-2050, mostly due to

Key: Impacts expected					
××	×	O	✓	✓✓	
Strongly negative	Negative	No or negligible impact	Positive	Strongly positive	Unclear
	PO A		PO B		PO C
					the inclusion of the VSMCs involving fishing vessels below 15 meters in the scope of the Directive. This is expected to have a positive impact on the quality of marine water and biodiversity.
Specific policy objective 2 - Member States accident investigation bodies to have clarity and precision regarding definitions to ensure that all accidents that need to be investigated are investigated in a timely and harmonised manner					
Expected improvement in clarity and functioning of the internal market	Positive effect in removing any ambiguity for AIBs regarding the length of fishing vessels falling within the scope of the Directive. Improved clarity for AIBs regarding the accidents which take place in ports, through guidelines on 'directly in connection with the operations of a ship'. Improved clarity for AIBs regarding the decision on when an accident classifies as fatal in case a person does not die immediately. Positive effect by aligning the responsibilities of AIBs as regards their IMO responsibilities. This will remove any incoherence or difficulties due to different		Positive effect in removing any ambiguity for AIBs regarding the length of fishing vessels falling within the scope of the Directive. Positive effect, providing a harmonised approach for AIBs to accidents which take place in ports, though the inclusion of a definition of 'directly in connection with the operations of a ship' in the Directive. Positive effect, providing a harmonised approach for AIBs on when an accident classifies as fatal in case a person does not die immediately. Positive effect by aligning the responsibilities of AIBs as regards their IMO responsibilities.		Positive effect in removing any ambiguity for AIBs regarding the length of fishing vessels falling within the scope of the Directive. Positive effect, providing a harmonised approach for AIBs to accidents which take place in ports, though the inclusion of a definition of 'directly in connection with the operations of a ship' in the Directive. Positive effect, providing a harmonised approach for AIBs on when an accident classifies as fatal in case a person does not die immediately. Positive effect by removing the reference to serious casualty and

Key: Impacts expected					
××	×	O	✓	✓✓	
Strongly negative	Negative	No or negligible impact	Positive	Strongly positive	Unclear
	PO A		PO B		PO C
	or contradictory provisions. Positive effect on the functioning of the internal market through improved clarity.		This will remove any incoherence or difficulties due to different or contradictory provisions. Positive effect on the functioning of the internal market through improved clarity.		abolishing the requirement for a preliminary assessment. This will allow AI bodies to focus their work on the accidents where they consider that, a priori, some safety lessons can be learned. Positive effect by aligning the responsibilities of AIBs as regards their IMO responsibilities. This will remove any incoherence or difficulties due to different or contradictory provisions. Positive effect on the functioning of the internal market through improved clarity.
Change in number of investigations conducted	Small increase in the number of investigations due to improved clarity: 10 additional investigations in 2030 and 11 in 2050 relative to the baseline, with small positive impacts on the number of fatalities and injuries avoided, avoided vessels lost and number of tonnes of bunker fuel lost at sea.		Small increase in the number of investigations due to improved clarity: 14 additional investigations in 2030 and 15 in 2050 relative to the baseline, with small positive impacts on the number of fatalities and injuries avoided, avoided vessels lost and number of tonnes of bunker fuel lost at sea.		Small increase in the number of investigations due to improved clarity: 14 additional investigations in 2030 and 15 in 2050 relative to the baseline, with small positive impacts on the number of fatalities and injuries avoided, avoided vessels lost and number of tonnes of bunker fuel lost at sea.
Specific policy objective 3: Enhance the capacity of AIBs to conduct (and report on) accident investigations in a timely, expert and independent manner - including as					

Key: Impacts expected					
××	×	O	✓	✓✓	
Strongly negative	Negative	No or negligible impact	Positive	Strongly positive	Unclear
	PO A		PO B		PO C
regards renewable and low carbon fuels and technologies					
Change in quality of the investigation conducted	Positive effect on the quality of investigations and of the reports thanks to highly specialised analytical support by EMSA. The QMS should additionally ensure that each AIB can identify systemic problems and more effectively manage resources leading to better high quality safety investigations and reports. Positive effect through the better understanding of the General Data Protection Regulation (GDPR) rules. AIBs with limited resources should also benefit from shared technology, provided by EMSA. Improved awareness of renewable and low carbon fuels as well as new technologies, that are expected to lead to a radical change in the maritime transport sector over the coming decades and will inevitably have an impact on the types of accidents that occur as well as on		Positive effect as the QMS should ensure that each AIB can identify systemic problems and more effectively manage resources leading to better high quality safety investigations and reports. Positive effect through the better understanding of the General Data Protection Regulation (GDPR) rules. AIBs with limited resources should also benefit from shared technology, provided by EMSA. Improved awareness of renewable and low carbon fuels as well as new technologies, that are expected to lead to a radical change in the maritime transport sector over the coming decades and will inevitably have an impact on the types of accidents that occur as well as on the investigation thereof. More flexibility with regard to the nominated competent national authorities		Positive effect on the quality of investigations and of the reports thanks to highly specialised analytical support by EMSA. The QMS should additionally ensure that each AIB can identify systemic problems and more effectively manage resources leading to better high quality safety investigations and reports. Positive effect through the better understanding of the General Data Protection Regulation (GDPR) rules. AIBs with limited resources should also benefit from shared technology, provided by EMSA. Improved awareness of renewable and low carbon fuels as well as new technologies, that are expected to lead to a radical change in the maritime transport sector over the coming decades and will inevitably have an impact on the types of accidents that occur as well as on

Key: Impacts expected					
✖✖	✖	O	✓	✓✓	
Strongly negative	Negative	No or negligible impact	Positive	Strongly positive	Unclear
	PO A		PO B		PO C
	the investigation thereof.		in reporting incidents to EMCIP should allow AIBs to concentrate on their core activity of casualty investigation.		the investigation thereof. More flexibility with regard to the nominated competent national authorities in reporting incidents to EMCIP should allow AIBs to concentrate on their core activity of casualty investigation.