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Specific Training for Navigation in Areas with the Presence of Cetaceans

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ABSTRACT

The safety of maritime navigation depends not only on technological and procedural competence but also on understanding the living environment in which vessels operate—the ocean, the largest ecosystem on the planet. Despite major advances in maritime education and technology, current training programs overlook a fundamental aspect: awareness and knowledge of marine biodiversity, particularly cetaceans. This gap compromises both maritime safety and conservation efforts. The absence of specific training in cetacean conservation and ship strike prevention in current seafarer education programs at universities, academies, and vocational institutions represents a global shortcoming.

This study proposes a foundational training model for seafarers aimed at mitigating the risk of ship-cetacean collisions through education. It reviews regulatory recommendations, particularly from the International Maritime Organization (IMO) and the International Whaling Commission (IWC). Drawing from fieldwork in one of Europe's most biodiverse cetacean habitats, the research develops a practical and theoretical training model framework proposal. This proposal aims to redefine the seafarer's professional profile by integrating navigational competence with environmental awareness and responsibility. Education becomes the key driver to shift perspectives, empowering future seafarers to navigate responsibly and actively contribute to marine life conservation. This article charts the course for a new generation of maritime professionals—skilled, conscious, and committed to the protection of cetaceans.

1. Introduction.

Cetaceans need to surface regularly to breathe, so the risk of ship-cetacean collisions is high and therefore any ship should be considered a potential risk to navigation in the presence of cetaceans (Ritter, 2016). In 2007, the International Whaling Commission (IWC) established a long-term project to collect and analyse data on ship strikes.

The acceptance and use of specific training programmes for seafarers, especially those responsible for the execution of watchkeeping duties (bridge officers and masters), is key to preventing the risk of strikes on cetaceans. Hence the reason for this proposal, which is to further develop and include such training in the educational base, i.e. in nautical schools. A global shortcoming has been identified in this area: seafarers are not adequately trained to respond to the risk of ship-cetacean collisions and are not yet aware of the responsibility involved in navigating in areas where cetaceans are present. The IMO has already made a statement on education in this regard, but the parties involved have not provided the material resources to develop the training.

The International Whaling Commission (IWC) has been the main pioneer in raising this issue globally. In the 1990s, it began by setting up a working group dedicated to ship strikes. The commission has produced several guidelines and documents for shipping companies and has also collaborated with the WWF (Worldwide Fund for Nature) and the Volvo Ocean Race during the 2014/15 race. This is not enough, at least as far as seafarers and their training are concerned. Unless they are motivated to do so, seafarers are unlikely to have heard of the International Whaling Commission (IWC) and will certainly never have ac-

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cessed the content it produces (which is hardly focused on seafarers and their training).

Together with the IMO, the IWC will have the greatest regulatory and advisory capacity to implement the acceptance of a specific training programme for seafarers navigating in areas where cetaceans are present and to reach a consensus between the parties. The IWC currently emphasises the importance of seafarers in reporting ship-cetacean collisions and incidents. An important part of the work carried out in this regard is the creation of the largest global database of cetacean collisions in 2009. In 2016, the database recorded more than 1,200 incidents, and this number is steadily increasing.

The IWC's recommendations for preventing ship strikes are to keep ships away from cetaceans and reduce speed, add Marine Mammal Observers (MMO) on board whenever possible, and report any incidents or collisions to the IWC database.

2. Objectives.

This proposal is founded on a central premise: regardless of the training programmes that qualify them to perform their duties at sea, today's seafarers lack education in marine conservation and often operate without awareness of the risks involved in navigating areas inhabited by cetaceans. These are the same seafarers who are immersed in specific high-level training programmes, regulated in some cases at international level by the IMO through the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), and yet they do not have any specific training programme to prevent collisions with cetaceans at sea.

This shortcoming has not gone unnoticed, as the IMO, through consultative sessions with the International Whaling Commission, is aware of the issue and has issued a guidance document with recommendations to member states. What has gone unnoticed, however, is the response of member states to these recommendations, as there is no training plan created by the parties that assumes responsibility for providing this training to seafarers. This omission assumes particular significance considering Sustainable Development Goal 14 of the United Nations 2030 Agenda— "Conserve and sustainably use the oceans, seas and marine resources"—which underscores the imperative to intensify conservation measures. Conservation efforts must be intensified, as current efforts to protect the oceans do not yet respond to the urgent need to safeguard this environment.

Based on this basic premise, the overall objective is to create a training proposal that increases safety, minimises navigation risks and promotes a balanced and respectful coexistence between seafarers and cetaceans.

Interaction between ships and cetaceans, when not managed properly, can have negative consequences for cetaceans, ships and crews. Therefore, the essential objective is to develop specific training that enables seafarers to understand, anticipate and respond appropriately to situations that may arise at sea when navigating in the presence of cetaceans.

The ultimate goal is to develop this research further through a PhD.

3. Methodology.

This article presents a selection of key findings and proposals originally developed as part of a master's thesis completed in 2024 by the author. For the purposes of this publication in the *Journal of Maritime Research*, the content has been synthesised and structured to highlight the main topics in a concise and schematic manner.

The original research (master's thesis) was conducted using a practical, field-based methodology. The starting point involved direct observation of cetaceans and of the anthropogenic factors that affect them. Fieldwork took place in a high-populated cetacean area, specifically the Santiago-Valle Gran Rey marine strip, located on the southwest coast of La Gomera island. This zone spans 13,139.09 hectares and is considered the area with the highest cetacean diversity in the European Union relative to its size, with 22 out of the 28 cetacean species recorded in the Canary Islands present there. Accordingly, it has been designated a Special Area of Conservation (SAC) since 2011.

Since 2022, the author of this article has participated in whale watching activities within this SAC, in collaboration with the M.E.E.R.e.V. association, which is dedicated to cetacean research and scientific outreach in La Gomera. This onboard whale watching experience served as the preparatory phase of the research, followed by the systematic collection and analysis of relevant materials, including academic articles, publications, books, conferences, documentaries, and training programmes. The bibliography was compiled and reviewed according to a pre-established plan.

After defining the thematic sections and their interrelations, the writing phase began. This included a comprehensive introduction to the topic of navigation in the presence of cetaceans, analysing historical background, affected species, causes, and existing measures to prevent ship-cetacean collisions.

The results section presents topics related to the research's specific training objectives. It discusses cetacean behaviour and ecology to provide a foundational understanding, followed by criteria for cetacean identification, considered an essential skill for seafarers. The results highlight the importance of the International Maritime Organization (IMO) recommendations as a regulatory framework and present examples of best practices and responsible navigation in regions such as Canada and the United States.

Furthermore, the work of the International Whaling Commission's (IWC) Ship Strike Working Group (SSWG) is reviewed. Finally, the results include an analysis of existing curricula (university programmes, vocational training, and recreational courses) and propose a dedicated educational programme entitled '*Specific Training for Navigation in Areas with the Presence of Cetaceans'*.

4. Results.

4.1. The IMO recommendations.

In proposing specific training for navigation, it is essential to carefully examine the regulatory advances promoted by the

International Maritime Organization (IMO), the principal international regulatory body for maritime affairs. Establishing an objective basis for the development of such training presents a challenge; however, by following the IMO's recommendations the proposal can be supported by the document MEPC.1/Circ.674, issued on 31 July 2009 and entitled '*Guidance Document for Minimising the Risk of Ship Strikes with Cetaceans'*.

This document was issued by the Marine Environment Protection Committee (MEPC), which addresses environmental matters within the remit of the IMO, particularly those covered under the MARPOL Convention. The MEPC is also responsible for the identification of Special Areas and Particularly Sensitive Sea Areas (PSSAs).

The guidance document sets out key general principles to be considered and outlines a range of potential measures to reduce the risk of ship strikes with cetaceans. Among its key components, the document highlights the importance of education, outreach, and the development of training initiatives.

The IMO comprises an Assembly, a Council, and five main committees, including the MEPC, as well as several subcommittees that support the work of the principal technical bodies. In matters relating to training, the MEPC is supported by the Sub-Committee on Human Element, Training and Watchkeeping (HTW), which is responsible for the training and certification of personnel, as well as for providing information on the causes and consequences of fatigue and the risks this poses to the safety and wellbeing of seafarers.

Understanding this organisational structure clarifies that the IMO's *guidance document on the risk of ship strikes with cetaceans* — issued by the MEPC — may be complemented by training-related recommendations from the HTW Sub-Committee.

The issue of ship strikes was formally raised for the first time at MEPC 55 (2006). Subsequently, at MEPC 57, it was agreed to prioritise the development of guidance to minimise the risk of such collisions. Finally, at MEPC 59 (27 July 2009), the IMO formally recognised its role as the competent authority to address the issue of ship strikes involving cetaceans.

At the national level, the document outlines a range of possible measures to reduce the risk of ship strikes. It stresses the importance of prioritising actions that are both feasible and practical. It also recommends the collection of information on the species concerned, and the development of systems to report, record, and retrieve data on ship strikes with cetaceans. Education and outreach are treated as essential components, with suggestions including notices to seafarers, leaflets, posters, permanent signage, public service announcements, documentaries, and other educational and informative media. The document advocates for the development of curricula and training programmes for maritime academies, the inclusion of ship strike mitigation content in passage planning guidelines, and integration into qualification-oriented academic programmes. Consequently, this guidance will be considered in the design of a tailored training plan, as the IMO has explicitly supported the development of such educational measures

At the international level, the guidance highlights the need for coordination among states, as cetaceans are vulnerable to ship strikes throughout their range. The creation of educational and outreach materials, additional guidance, and joint management plans is encouraged. The document emphasises that any Member State identifying a ship strike problem within its waters should coordinate with other Member States through appropriate international forums, such as the IMO, the International Whaling Commission (IWC), and the Convention on Migratory Species (CMS).

The document concludes by stating that any adopted strategy to mitigate ship strikes should be widely disseminated within the maritime sector through appropriate communication channels. Information gathered through national mechanisms should be submitted to the IWC, which has developed a global ship strike database. Member States are urged to take the necessary steps to ensure compliance by vessels flying their flag with the measures adopted by the IMO to reduce and minimise ship strikes with cetaceans.

4.2. The IWC's Ship Strike Working Group.

The Ship Strike Working Group (SSWG), established by the International Whaling Commission (IWC) in 2005 to examine the issue of ship strikes involving cetaceans, is considered the leading international scientific authority on this matter. This section focuses on the 2010 workshop titled *"Reducing Risk of Collisions between Vessels and Cetaceans"*, organised by the SSWG.

The focus of the 2010 workshop was the Mediterranean Sea and the Canary Islands. Key recommendations included adopting and supporting IMO guidelines, preparing and submitting joint papers with IMO-MEPC, facilitating detailed necropsies using standardised protocols to determine cause of death, and allowing access to shipping data to correlate with cetacean presence areas to identify high collision risk areas. A particularly relevant outcome, was the recommendation to consider the inclusion of ship strikes in the training syllabi for watchkeeping crew, as outlined in the STCW Code.

The workshop also addressed an important point for seafarers: a large cetacean carcass may pose a navigational hazard. Under Chapter V of SOLAS (Regulations 31 and 32), vessels have a responsibility to report navigational hazards to other ships and relevant authorities. The workshop recommended that the dangers posed by floating whale carcasses be explicitly highlighted within the SOLAS framework to encourage reporting by seafarers.

It was also suggested that, under certain circumstances, reports of live cetacean groups may be appropriate, particularly when, in the judgement of the bridge team, they represent a significant collision risk—again in line with SOLAS reporting requirements.

To facilitate such communication, the 2010 workshop stressed the importance of establishing a ***"no-blame culture"***, so that seafarers who have unfortunately struck a whale do not fear negative repercussions for reporting the incident. On the contrary, such reporting should be seen as an act of environmental responsibility.

Another key aspect discussed was the need to provide appropriate and clear guidance to seafarers on what to look for

(e.g., species, visible injuries), other relevant details (e.g., vessel speed, propeller type), and how to report the incident (e.g., to national authorities and ultimately to the IWC's global ship strike database).

Additionally, the workshop reiterated the importance of following the IMO guidance document *MEPC.1/Circ.674* when identifying and progressing towards the most appropriate mitigation strategy in specific cases.

Awareness among seafarers was recognised as a critical factor. Beyond training seafarers, educational efforts should also target shipping companies and shore-based maritime personnel responsible for environmental compliance. Raising awareness was described as a long-term process, requiring educational actions to be repeated at regular intervals.

The workshop highlighted that incorporating ship strike prevention into the curriculum of nautical schools would enhance seafarers' awareness and contribute to improved data collection. The existence of a global network of maritime academies was identified as a promising avenue for implementing educational outreach programmes. Developing a standardised training programme for nautical schools was seen as a key step towards increasing seafarer awareness. Within the IMO, the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) is updated regularly, providing a viable opportunity to incorporate ship strike prevention into crew training modules.

Lastly, the workshop emphasised the importance of also informing sailing vessels and recreational craft, for example through the International Sailing Federation (ISAF) and the World Yacht Racing Forum network. It was also noted that ISAF holds consultative status within the IMO.

4.3. Shortcomings in seafarers' education.

The study programmes affecting the three largest groups of seafarers in Spain are analysed below. Within the three types of fleets (merchant, fishing and leisure), there are different training programmes for seafarers. Within university education, the bachelor's degree in Nautical Science and Maritime Transport qualifies graduates to hold positions of responsibility as merchant seafarers, such as deck officer or captain. In vocational training, the Higher Technical Certificate in Maritime Transport and Deep-Sea Fishing qualifies graduates to take on positions of responsibility as seafarers, such as deck officer or fishing vessel skipper. Finally, the leisure marine sector offers various regulated courses, with the yacht master certificate being the highest qualification in the field of pleasure boating.

There are common compulsory subjects and syllabuses in the three training pathways, such as celestial navigation, meteorology and maritime safety. However, a common educational shortcoming has also been identified: none of these programmes includes specific training for navigation in areas where cetaceans are present, which highlights the importance of this research.

4.3.1. The case of the bachelor's degree in Nautical Science and Maritime Transport.

According to the official plan, the distribution of credits (ECTS) by type of subject is as follows: 60 ECTS for the subjects of the basic training, 48 ECTS for the compulsory subjects of the general maritime training, 48 ECTS for the compulsory subjects of the specific training, 12 ECTS for the optional subjects (6 ECTS can be recognised for participation in culture, sport, student representation, solidarity and cooperation), 60 ECTS for the external work placement and 12 ECTS for the final degree project.

The areas of knowledge within the basic training module are applied physics, mathematical analysis, organic chemistry, graphical expression in engineering, business organisation, commercial law and English philology. The general maritime training module covers shipbuilding, preventive medicine and health, electrical engineering, nautical science and technology, and applied physics. The specific maritime training module focuses on three areas of knowledge: shipbuilding, navigation sciences and techniques, and fundamental and experimental physics. Finally, the optional training module covers three further fields of knowledge: shipbuilding, navigation sciences and techniques and private international law.

Therefore, if specific training for navigation in areas with the presence of cetaceans is to be created within the university system, it should be included in one of the areas of knowledge, with navigation sciences and techniques being the most appropriate (it is in this area that specific training modules such as coastal navigation, celestial navigation, radio-electronic navigation, ship handling, standard English, safety and marine pollution are taught). In order to facilitate the enhancement of students' competencies in cetacean conservation, it is recommended that the subject be incorporated within the optional training module.

4.3.2. The case of the vocational training certificate in Deep-Sea Fishing.

The modules of this training programme are as follows: manoeuvring and stowage; navigation, ship handling and communications; emergency control, English, organisation of healthcare on board; ship and fishing activity administration and management; bridge watch; deep-sea and high-seas fishing; training and career guidance; business and entrepreneurship; maritime transport route implementation project; workplace training.

After analysing the modules, it is worth mentioning the subject of Deep-sea and High-seas Fishing as an example of specific training in marine biology topics directly applied to fishing. However, unfortunately, specific training for navigation (and/or fishing) in areas with cetaceans is not covered, which presents an opportunity to include this training in the syllabus for this module.

4.3.3. The Case of the Yachtmaster certificate.

In this case, Order FOM/3200/2007, of 26 October, regulating the conditions for the operation of recreational craft in Spain, determines the theoretical knowledge required to obtain

the *Yachtmaster* certificate. The subjects included in the training programme may be listed as follows: astronomy and navigation; meteorology and oceanography, ship stability, English, and radio communications.

However, there is once again a notable absence of specific training related to cetacean conservation. In this context, the training programme could be enhanced through dedicated awareness campaigns within nautical academies and the development of an online training module.

4.4. Educational proposal: What is needed?.

A specific training programme for *Navigation in Areas with the Presence of Cetaceans* should be developed to consolidate common knowledge on the subject. This training needs to be made available to seafarers, allowing for the implementation of an online training module, and the support of organisations such as the IMO and the IWC should be sought to ensure continuous dissemination, periodic review and enrichment of the content. This is a dynamic subject that will need to evolve in line with regulatory developments and, of course, cetacean populations and their distribution.

This training proposal, structured according to university curricula and accompanied by a teaching guide, is presented below as a model for implementation in seafarer education.

4.4.1. Teaching plan.

Contribution to the professional profile:

This training contributes to the development of seafarers' skills in specialised navigation in areas densely populated by cetaceans. It qualifies students to work in more specific environments such as research vessels for environmental purposes, vessels operating in areas where cetaceans are present (expedition cruises), whale watching vessels, and vessels belonging to environmental control agencies. Environmental awareness is also developed regarding cetacean conservation, which contributes to the development of companies' environmental management policies.

Assigned skills:

Ability to analyse and summarise scientific articles on marine biology, ability to plan, execute and monitor a *passage plan* taking into account the presence of cetaceans; oral and written communication in English for writing reports and transmitting them in the event of sightings and/or collisions with cetaceans; basic database management skills (IWC collision database), ability to manage information (search for and analyse information from different sources), ability to learn through direct observation of cetaceans, ability to apply knowledge about cetaceans on board; knowledge and understanding of concepts, principles and theories of marine biology; knowledge of basic field identification and taxonomy techniques; development of skills in statistics, observation, planning and execution of field work; conduct research using *passive acoustic monitoring* (PAM), sounding and sonar equipment; record the number and type of cetacean species in an area; record oceanographic data, evaluate, process and interpret it to understand how it affects cetaceans; know how to use tools to plan, design and carry out research.

Objectives:

The main objective is to provide seafarers with a thorough understanding of cetacean behaviour, establish good navigation practices and define safety measures, all within the framework of environmental stewardship and maritime safety principles.

Contents:

Syllabus:

- *Collision history.*

Document and analyse accidents and collisions between ships and cetaceans, identifying causes and consequences, with the aim of establishing preventive measures.

- *Behaviour and ecology of cetaceans.*

Provide seafarers with essential knowledge to anticipate and manage interactions with cetaceans. Identification techniques.

- *Good practices and responsible navigation.*

Formulate guidelines based on empirical data and real experiences to guide safe and respectful interaction with cetaceans. Train seafarers in navigation techniques and practices that minimise the risk of collisions and other adverse impacts.

- *International regulatory framework.*

Analyse nautical practices in areas with cetacean presence at a global level, identifying regulations and interaction methodologies in different jurisdictions.

- *Regulatory impact.*

Promote regulatory changes that prioritise the safety and conservation of marine life.

Practical agenda:

- Case studies.

Situations that arise on board, sighting reports and ship strikes. Passage planning in areas where cetaceans are present. Navigation watch reinforced by the presence of cetaceans. Interpreting signs of cetacean presence.

Methodology:

The training will be delivered through a series of lectures and practical classes, including sea trips, seminars and tutorials (with members of the International Whaling Commission).

Assessment:

A series of practical cases will be provided in which students must be able to interpret and safely resolve risky situations. To this end, the student's ability to interpret the marine environment will be assessed. Regardless, the only valid answer will be the one chosen by the seafarer (student). This will promote the awareness of responsibility that seafarers must have when navigating in areas where cetaceans are present.

4.4.2. Learning plan.

Tasks and activities:

Study foundational topics in marine biology, analyse scientific articles, utilize specialized databases, participate in sea outings with Marine Mammal Observers (MMOs), attend group tutoring sessions with members of the IWC's Vessel Strike Working Group, design *passage plans* incorporating areas with presence of cetaceans, practice collision-avoidance manoeuvres and reporting protocols.

Resources to be used appropriately:

While the full list of recommended readings for this course is still in development, several foundational materials have already been identified to support the curriculum. Among these are educational tools such as the *Cetacean Curriculum* by the American Cetacean Society (2019) and the documentary *Collision* (Hamilton, 2023), which provides a visual exploration of the issue. Key technical and scientific references include the IMO's 2009 *Guidance on reducing ship strikes with cetaceans*, the 2010 joint IWC-ACCOBAMS workshop *report on vessel strike mitigation*, and *Marine Mammals of the World* by Jefferson et al. (2015), a comprehensive taxonomic reference. Additionally, research by Laist et al. (2001) offers critical insight into ship strikes with cetaceans, while the handbook by Todd et al. (2014) serves as a practical guide for *Marine mammal observation and acoustic monitoring*. Complementing these resources is the World Shipping Council's (WSC) *Whale Chart: A Global Voyage Planning Aid to Protect Whales*—a valuable navigational tool.

5. Discussion.

Following analysis of the data presented in the results, the current problem becomes clearer, particularly the striking contrast between the training provided to seafarers and their knowledge of marine life. This discrepancy can be attributed primarily to the prioritisation of other subjects within the fundamental training curriculum of nautical institutions, encompassing universities, vocational schools, and maritime academies. It is evident that this issue currently represents a substantial impediment to the promotion of awareness among seafarers regarding the conservation of cetaceans.

Regrettably, in this sector, change is often driven by the occurrence of major negative events, such as accidents. This reactionary dynamic typically triggers the chain of actions needed to implement regulation for the specific issue at hand. Such an "action–reaction" system is familiar to the maritime world; one need only recall the SOLAS Convention (International Convention for the Safety of Life at Sea), adopted by the IMO in response to the Titanic disaster—the first version of which was approved in 1914. This remains one of the clearest examples of how the current system tends to operate. Rather than anticipating and preventing disaster, the sector frequently waits until critical situations—such as ship strikes with cetaceans—reach their limits. Many of these issues could be avoided with appropriate educational preparation.

It is recommended that certain questions be posed to the reader to encourage further reflection: What would be the consequences of addressing the issue head-on, rather than ignoring it? Who is responsible for ship strikes involving cetaceans? How long will the culture of ignorance prevail? If the sea is our livelihood, should it not be understood as a living environment? Could incorporating knowledge about cetaceans help to prevent accidents?

Undoubtedly, this study raises further questions that merit discussion. Perhaps the final question to close this section should be: When should *Specific training for navigation in areas with the presence of cetaceans* begin*?* A definitive response to this issue can be provided, stating that the commencement of this process should be initiated at the earliest opportunity.

Although the IMO often functions according to a classic "action–reaction" model, this case reflects an exception. As demonstrated throughout this project, the *Guidance Document for Minimising the Risk of Ship Strikes with Cetaceans* (MEPC.1 / Circ.674) has been in circulation since 2009. That means over 15 years have passed during which these guidelines -intended to promote safer and more environmentally respectful navigation- have largely been overlooked.

This document is worth highlighting once more, as it explicitly allows Member States the freedom to establish a training programme that addresses not only the issue of ship strikes but also a broader review of the responsibilities that seafarers have in the field of cetacean conservation.

Conclusions.

Seafarers must assume responsibility and align their efforts with those of other cetacean conservation groups, such as the scientific committees referenced in this article (i.e. the International Whaling Commission). It is imperative that an honest appraisal of available capabilities is undertaken, and that the risks associated with cetacean encounters are recognised.

Based on this, a transition is needed in which knowledge acts as a catalyst for defining new values among seafarers. This includes not only scientific knowledge—since science alone is insufficient to ensure the conservation of marine life—but also a broader perspective that fosters understanding and respect for cetaceans. Recognizing the remarkable similarities between cetaceans and humans, and viewing them as unique individuals with specific ecological roles, is essential. In the author's view, this respect can only be cultivated through dedicated training in cetacean conservation. Such training should promote both individual and collective awareness among seafarers, ensuring that the knowledge acquired is integrated into their future work onboard and reflected in the ship's daily operations.

Recognizing the role and responsibility of seafarers in the conservation of cetaceans is essential for maintaining marine ecosystems that are vital to both maritime operations and broader societal well-being. As key actors at sea, seafarers must take the lead in implementing effective measures. Actions such as complying with voluntary recommendations, avoiding navigation through designated conservation areas, reducing vessel speed,

and maintaining awareness of cetacean distribution can significantly contribute to maritime safety and set a positive example for society.

Summary of Conclusions:

- The seafarer plays a central role in preventing ship strikes and must acknowledge this responsibility as a fundamental starting point.
- Specific training serves as a key driver for developing awareness among seafarers and represents a crucial step toward minimizing risk in navigation.
- The International Maritime Organization (IMO) has encouraged Member States to submit proposals for training programs focused on navigation in areas inhabited by cetaceans. Effective implementation should begin within academic institutions, particularly maritime universities.
- Such training should be extended across all seafaring sectors, including the merchant, fishing, and recreational fleets.
- Maritime training institutions are urged to adopt and integrate this specialized training into their curricula without delay.

The findings of the research faithfully reflect the initial concern that inspired the study: there is a notable lack of training related to navigation in areas with the presence of cetaceans, and this issue must be addressed. This represents a starting point for further development in both research and education on the subject. The outcome of the article reinforces the importance of continuing efforts to improve awareness and training in this field.

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