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Governance in marine protected areas of Macaronesia: challenges and opportunities for ecotourism

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The global decline of marine biodiversity has intensified the need for international efforts to expand and strengthen marine protected areas (MPAs). In Macaronesia, tourism represents a key driver of economic growth and social prosperity. However, a rapid increase in visitor numbers, combined with ecological sensitivity inherent to island systems, has heightened pressure on marine environments and highlighted the need for sustainable tourism models. Ecotourism represents a potential way to balance conservation, economic development, and community well-being, especially within MPAs. Meanwhile, the success of this balance depends heavily on effective governance; yet limited attention has been paid as to how governance structures in Macaronesia influence the integration of ecotourism into MPAs. This study analyses the role of institutional and legal governance in supporting ecotourism development in the MPAs of the four Macaronesian archipelagos (Azores, Madeira, the Canary Islands and Cabo Verde). A comparative qualitative analysis of institutional and legal governance frameworks was conducted for each archipelago, examining relevant legislation, institutional structures and maritime tourism regulations to identify strengths, limitations and administrative conditions affecting the integration of ecotourism in MPAs. The analysis reveals varying governance capacities across the archipelagos, all of which are characterised by complex legal systems and fragmented management of MPAs and maritime tourism. Despite these barriers, ecotourism remains a viable pathway within Macaronesia's MPAs, provided that the governing institutional and legal structures are refined to prioritise conservation outcomes.

KEYWORDS
ecotourism, governance framework, horrendogram, islands, legislation, MPA

1 Introduction

The accelerating loss of marine species, habitats and ecosystem functions has emerged as one of the environmental crises of our era – bringing together leaders, scientists and communities to act for the protection of the ocean (Weiskopf et al., 2020). Global targets have been established to protect 30% of oceans by 2030, under the Convention on Biological Diversity, specifically through the Kunming-Montreal Global Biodiversity Framework (GBF) – adopted in 2022 (COP 15, 2022). This further supported the adoption of the High Seas Treaty (BBNJ – Biodiversity beyond national jurisdiction) in 2023, which enables nations to establish large-scale marine protected areas (MPAs) in areas beyond national jurisdiction. This is a significant step toward achieving Target 3 of the GBF - "Conserve 30% of Land, Waters and Seas". At the regional level, these conservation targets are reinforced by European strategies, such as the Green Deal (European Commission, 2019), the EU Biodiversity Strategy for 2030 (European Commission, 2020) and the European Commission (2025), all of which emphasise the expansion, connectivity and effective management of MPAs. Collectively, these international and regional policies and strategies highlight the fundamental role that well-designed and effectively managed MPAs play in protecting the ocean and supporting ecosystem resilience and recovery.

MPAs are globally recognized as essential tools for marine conservation and the sustainable use of ocean resources (Sciberras et al., 2015; Gallacher et al., 2016; Gonçalves, 2023). An MPA is a "*clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values*" (Dudley, 2008; Day et al., 2019). MPAs can have a positive ecological effect such as the increase in the abundance of species and improvements in habitat quality (Edgar et al., 2014), as well as social and economic benefits for coastal communities (Rodríguez-Rodríguez et al., 2015). MPAs can fall into several categories of protection, ranging from totally protected areas (where visitation, use, and extraction are highly restricted) to multiple-use areas (where some activities and uses can take place) (Day et al., 2019). Their effectiveness depends not only on ecological design but also on their governance frameworks (Álvarez-Fernández et al., 2024). According to Dudley (2008), governance refers to "*who decides what are the objectives, what to do to pursue them, and with what means, how decisions are made, who holds the power, authority and responsibility and who is (or should be) accountable*" (Borrini-Feyerabend et al., 2013). Folke et al., 2005 defined it as "*the structures and processes in which people in societies make decisions and share power, create the conditions for ordered rule and collective power*" and Cormier et al., 2022 described it more specifically as "*the sum of the policies, politics, administration and legislation required in adaptive environmental management*". Governance is often confused with management, which, according to Dudley (2008), is defined by "*what is done in pursuit of given objectives and the means and actions to achieve the objectives*", so it is the application of governance decisions (Borrini-Feyerabend et al., 2013). Governance frameworks establish the parameters under which management systems will function to achieve the desired outcomes and who should be held accountable (Boyes and Elliott, 2023). The institutional and legal arrangements of governments and institutions are an important part of governance. Efforts to include international, regional, national and local policies have led several countries to develop complex system of departments, administrative agencies and competent authorities being involved (Boyes and Elliott, 2014; Guerreiro et al., 2021). This complex system can lead to overlapping jurisdictions, responsibilities, competencies and, in some cases, to gaps in management (Elliott et al., 2006; Boyes and Elliott, 2023).

Within this policy landscape, Macaronesia, comprising the archipelagos of the Azores, Madeira, the Canary Islands, and Cabo Verde, offers a uniquely relevant case study. While the region shares a unified biogeographic identity across the eastern North Atlantic (Figure 1), it spans three distinct nationalities (Portugal, Spain, and Cabo Verde) and operates under four primary local government authorities with significant jurisdictional autonomy: the Portuguese Autonomous Regions of the Azores and Madeira, the Spanish Autonomous Community of the Canary Islands, and the national government of the Republic of Cabo Verde. This diverse institutional framework, ranging from European outermost regions to a sovereign West African state, provides a fertile ground for examining the interface between marine governance, MPAs, and ecotourism (García-Sanabria et al., 2021; Borja et al., 2024). In Macaronesia, the tourism industry is highly significant for the economies of the archipelagos (FRCT Azores, 2017; Gonzáles-Mantilla et al., 2021), with growing pressure over the last years due to the rise in visitor numbers across all archipelagos (Cadima Ribeiro et al., 2025; Casimiro et al., 2025). Islands are inherently constrained by limited space, fragile ecosystems and limited natural resources, which makes them particularly vulnerable to the rapid expansion of tourism (Mazzola et al., 2022; UNCTAD, 2022; Liu et al., 2023). The increasing intensification of tourist activities and the use of natural areas can lead to environmental pressures such as habitat loss, waste accumulation and land-use conflicts (Fernandez-Abila et al., 2024). Promoting more sustainable tourism practices may help mitigate these impacts. Ecotourism, focused on smaller visitor numbers and learning-oriented experiences in nature, can help reduce tourism impacts while supporting conservation efforts, particularly within protected areas. Across the Macaronesian archipelagos, the development of ecotourism in MPAs may represent a viable pathway to balancing economic benefits, community well-being and marine conservation efforts (Casimiro et al., 2022, 2025).

Understanding the governance of Macaronesian MPAs is essential to identifying how decisions are made, who enforces regulations, and where coordination is lacking. Such an understanding reveals the enabling conditions necessary for ecotourism—a sector that relies on both ecological integrity and clear regulatory frameworks to balance visitor education with environmental protection. By integrating these perspectives, this study examines the institutional and legal characteristics of MPA governance across the Macaronesian archipelagos. Specifically, it aims to: 1) assess the degree of fragmentation and integration across administrative sectors; 2) identify the maritime tourism activities currently in place; and 3) describe the primary challenges and enabling

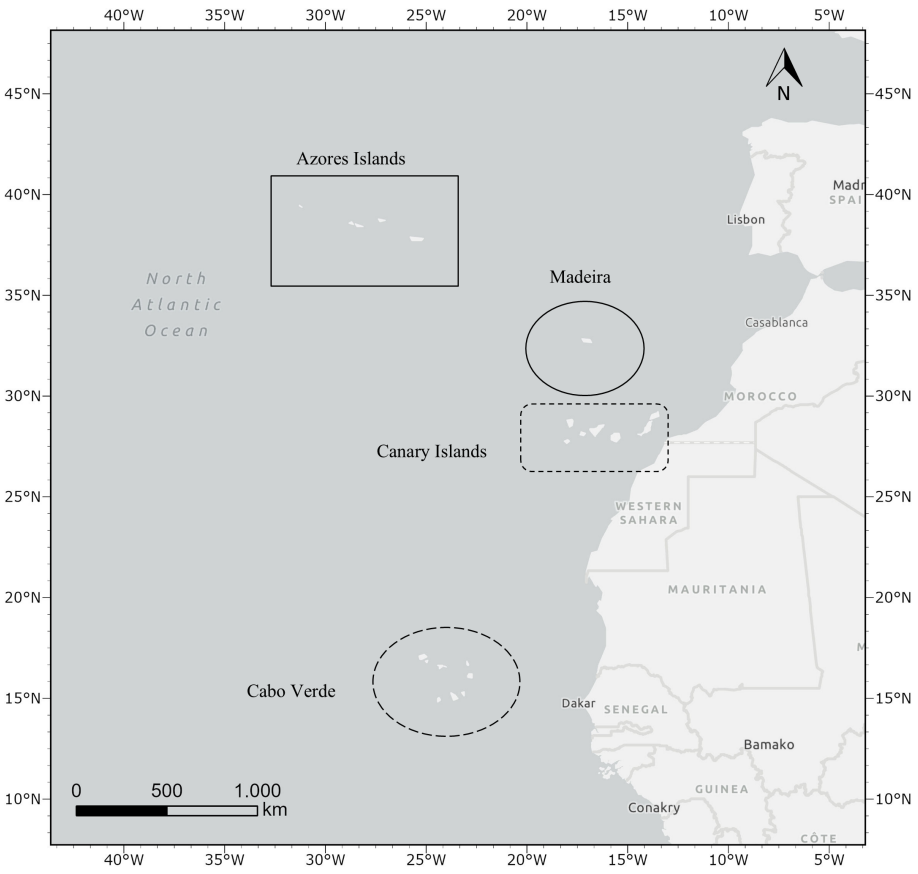

FIGURE 1
Geographic position of the archipelagos and islands of Macaronesia.

conditions for developing sustainable ecotourism within the region's MPAs.

2 Methods

This study used a qualitative approach to assess the institutional and policy framework that regulates the management of MPAs and maritime tourism activities in the Macaronesia archipelagos. Since these archipelagos include three autonomous regions from European Union (EU) countries (Azores and Madeira from Portugal, and the Canary Islands from Spain) and one non-EU country (Cabo Verde), we employed a multilevel institutional and policy analysis framework to assess the governance structures related to the management of MPAs and maritime tourism activities, within each archipelago. The drawing of the data and assessments were conducted from 2023 to 2025. A review of all the institutional framework and legal instruments (e.g. policies, legislation, and plans) was undertaken by consulting specialized data bases available online (official government sites and bulletins). This analysis focused mainly on marine management and existing maritime tourism activities, to assess the existence, or not, of enabling conditions for the development of ecotourism activities within the Macaronesia MPAs.

To understand the institutional relationships and distribution of competencies of managing maritime tourism activities and MPAs, an organogram was developed as an analytical tool (available in the Supplementary Material). The process involved identifying all relevant institutional governance actors (e.g. ministries, regional secretariats, departments, institutions) and mapping their formal roles, highlighting missions and competencies directly involved in the licensing of maritime tourism activities and the management of MPAs. We considered as maritime tourism activities: scuba diving, whale watching, and turtle watching as already ongoing in the archipelagos, with whale watching and scuba diving present in all four, while turtle watching occurs mainly in Cabo Verde (which is a significant nesting site for these marine reptiles).

To map the legal framework, information and data were sourced from official government channels (official websites, bulletins and through in person meeting with government officials) and relevant academic literature, such as scientific papers on marine governance. The data were summarized in the form of 'horrendograms', following the example of Boyes and Elliott (Boyes and Elliott, 2014). Policies were grouped into eleven key categories corresponding to major maritime activities, uses and sectors: 1) Fisheries and aquaculture, 2) Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA), 3) Flood and risk assessment, 4) Maritime Spatial Planning, 5) Nature conservation, 6) Maritime tourism activities, 7) Maritime cultural heritage, 8) Shipping and

pollution, 9) Water quality, 10) Marine Litter and 11) Energy. The developed 'horrendograms' illustrates the vertical integration of current legislation, policies and regulations in the Azores, Madeira, the Canary Islands and Cabo Verde, regarding the legal and policy frameworks for marine governance and maritime tourism activities.

A SWOT analysis was developed based on the analysis of the institutional and legal frameworks, to assess the Strengths (favourable conditions), Weaknesses (unfavourable conditions), Opportunities (driving forces) and Threats (jeopardizing conditions) for the development of ecotourism products within the MPAs of Macaronesia. The SWOT analysis was based specially in the existence or absence of four main factors: i) institutional support and framework of MPAs; ii) legal grounds of marine governance; iii) instruments for maritime tourism activities regulation; and iv) support for enforcement and monitoring of MPAs and maritime tourism activities. This SWOT methodology enabled the identification of constrains and opportunities within the Macaronesian archipelagos for the development of ecotourism products within their MPAs.

3 Results

3.1 Institutional framework

An overview of the institutional framework of each archipelago is summarized in Table 1, highlighting the departments and institutes directly involved in MPAs management and those holding the institutional and legal authority to issue licences for maritime tourism activities. Full details about institutional structure of each archipelago governments are provided in the Supplementary Material (See Supplementary schemes A–D).

3.1.1 Azores

Institutional governance in the Azores is characterised by a fragmented institutional framework, involving multiple entities with overlapping responsibilities in the management, licensing, and monitoring of MPAs and maritime tourism activities. The Regional Directorate for Maritime Policies (DRPM) is the key institution when it comes to MPA management and the licensing of most maritime tourism activities (e.g. whale watching and diving), operating under the Regional Secretariat for the Sea and Fisheries (SRMP). DRPM is responsible for contributing to the definition of regional policy for the economic and environmental valorisation of the Azores' maritime space, namely through spatial planning, the promotion of knowledge of the marine environment, the licensing of maritime tourism activities, as well as the implementation of measures to preserve good environmental status and existing resources (Azores Regional Government, 2024). The maritime tourism activities are subject to a licensing regime, with responsibility falling under the scope of the DRPM (Ressurreição et al., 2022; Azores Regional Government, 2024), which must coordinate the licensing process with other regional secretariats and directorates (e.g. Environment, Fisheries, etc.), where relevant. For instance, in the case of fishing tourism, the licensing process is managed by the Regional Directorate of Fisheries (Direção Regional das Pescas - DRP). Control, audit and inspection of maritime tourism activities fall under the jurisdiction of the Regional Inspectorate for Fisheries and Maritime Uses (Azores Regional Government, 2024). This multi-institutional arrangement indicates that responsibilities are distributed across several institutions, which may lead to administrative fragmentation and overlapping competences (Abecasis et al., 2013; Gomes et al., 2025).

3.1.2 Madeira

Madeira's institutional governance framework is based on the involvement of an authority responsible for the conservation and management of MPAs, and for the inclusion of the two sectors (tourism and conservation) under the same secretariat, in an attempt to facilitate synergistic cooperation (Castro et al., 2025). The Institute of Forests and Nature Conservation (Instituto das Florestas e Conservação da Natureza -IFCN) is responsible for the management of MPAs, while the Regional Directorate for the

TABLE 1 Summary of institutions regulating MPA management and maritime tourism licensing, within the Azores, Madeira, Canary islands and Cabo Verde.

Institutional competences	Azores	Madeira	Canary islands	Cabo Verde
Management of MPAs	Regional Directorate for Maritime Policies (DRPM)	Institute of Forests and Nature Conservation (IFCN)	Ministry for Ecological Transition and the Demographic Challenge (MITECO) (Central Government) and Regional Department of Ecological Transition and Energy (*Consejería de Transición Ecológica y Energía*)	National Directorate for the Environment (DNA)
Maritime tourism activities licencing	Regional Directorate for Maritime Policies (DRPM) or in the case of fishing tourism, the licence is issued by the Regional Directorate of Fisheries (DRP)	Regional Directorate for the Environment and the Sea (DRAM)	Depends on the activity (some are issued by the National Directorate of Fisheries; others by the General Directorate for Tourism Planning and Promotion)	Depends on the activity and might require several: National Directorate for the Environment (whale watching); others with Maritime Port Institute (IMP), and/or the Tourism Institute of Cabo Verde (ITCV)

The complete organogram can be consulted in the Supplementary Material of this article (Supplementary Schemes A–D).

Environment and the Sea (Direção Regional do Ambiente e Mar - DRAM) is responsible for the licensing of maritime tourism activities. Both entities are part of the Regional Secretariat for Tourism, Environment and Culture (Secretaria Regional de Turismo, Ambiente e Cultura - SRTAC), facilitating coordination between the conservation and tourism areas (Madeira Regional Government, 2025). IFCN oversees both terrestrial and marine conservation efforts. Maritime tourism activities such as whale watching, diving, coastal tours and others need a license to operate. The licensing process for recreation, sports and tourism activities is carried out through an application for a maritime space use permit (Título de Utilização Privativa do Espaço Marítimo - TUPEM), which grants the right to private use of maritime space for the development of an activity or use provided for in the National Maritime Spatial Planning Situation Plan for the Mainland, Madeira and Extended Continental Shelf subdivisions (PSOEM) (Government of Portugal, 2019) or in Annex I of Decree-Law No. 38/2015 (Government of Portugal, 2015). However, aquaculture activities require a specific authorisation procedure. Regarding the control, audit and inspection of maritime tourism activities, responsibility is divided between the Regional Directorate of Tourism (Direção Regional do Turismo - DRT) and the National Maritime Authority (Autoridade Marítima Nacional - AMN), acting through the Port Authority. The DRT is responsible for coordinating, promoting, executing and supervising tourism activities in Madeira, particularly in relation to licensing, registration, guarantees, insurance, advertising and compliance with general operational standards for tourism. The AMN is responsible for supervising navigation safety, safeguarding human life at sea and preventing pollution. Its supervision focuses on the safety of vessels, crews, safety equipment and compliance with navigation rules and authorised operating areas. The designation of IFCN as the authority responsible for both marine and terrestrial conservation contributes to administrative cohesion, further supported by the inclusion in one secretariat the areas of environment and tourism, showcasing a vision of Madeira's government for the necessity of cooperation and collaboration between these two areas.

3.1.3 Canary islands

Marine governance in the Canary Islands is characterised by a multi-level and fragmented institutional framework, in which responsibilities are shared between the Government of Spain and the Government of the Canary Islands. The exclusive economic zone (EEZ) of Spain (up to 200 nautical miles) and the territorial waters (up to 12 nautical miles) surrounding the Canary Islands are under the jurisdiction of the central government of Spain, although the Autonomous Community exercises relevant sectoral competences affecting the marine environment. As a result, responsibilities for the management and governance of certain MPAs are shared between the Government of Spain and the Government of the Canary Islands, depending on their legal designation and spatial scope. The Ministry for Ecological Transition and the Demographic Challenge (Ministerio para la Transición Ecológica y el Reto Demográfico - MITECO), through the General Directorate of the Coast and the Sea (La Dirección General de la Costa y el Mar - DGCM) is responsible for the development and implementation of maritime spatial planning instruments (Planes de Ordenación del Espacio Marítimo - POEM) for the five Spanish marine demarcations, including the Canary Islands. MITECO is also responsible for the designation of MPAs under state jurisdiction and for the implementation of the Natura 2000 Network in marine waters. Some marine reserves designated in the Canary Islands require coordination with the Ministry of Agriculture, Fisheries and Food, as they are classified as marine reserves of fishing interest, including the La Palma Marine Reserve, whose management falls under the competence of the General State Administration with coordination mechanisms involving the Regional Government. In these cases, MPA management responsibilities must be articulated between the central administration and the Government of the Canary Islands, through the Regional Departments of Agriculture, Livestock, Fisheries and Food Sovereignty, and Ecological Transition and Energy. Maritime tourism activities, such as diving, recreational fishing, whale watching are subject to a licensing regime. The government of the Canary Islands is responsible for issuing licenses, although the competent authority varies according on the type of activity. For instance, a whale watching company requires authorisation under regional tourism regulations and must comply with national environmental standards, in accordance with Royal Decree 1727/2007, currently overseen by the MITECO (Government of Spain, 2008). In the case of diving activities, a company must obtain a license from the Regional Department of Fisheries. Regarding the control, audit, and inspection of maritime tourism activities, responsibilities are distributed among several administrative bodies according to the licensing authority, with the Maritime Authority also involved. The Maritime Authority holds competences related to inspections for compliance with maritime safety standards. Overall, the Canary Islands present a fragmented institutional governance structure, with responsibilities distributed between the Government of Spain and the Government of the Canary Islands. The jurisdiction of the central government within the limits of the territorial sea and the EEZ requires greater cooperation between the two governments (central and Canarian). On the one hand, this approach allows for greater interconnection between the international and European policies adopted by the country in its autonomous territories. However, it also adds complexity regarding the number of entities involved in managing MPAs and licensing activities, leading to increased bureaucracy (Quero García et al., 2021; Galparsoro et al., 2025).

3.1.4 Cabo Verde

Responsibilities for marine management, MPAs, and maritime tourism activities are distributed across multiple ministries and agencies in Cabo Verde, an independent state classified as a SIDS (Small Island Developing State). The Ministry of the Sea has the responsibility to manage the maritime economy, which is crucial to the development of the country as an island nation (OECD, 2022). It also has authority over a wide array of ocean-related policies (OECD, 2022; Macpherson et al., 2023; Fudge et al., 2025). The National Directorate for the Environment (Direção Nacional de Ambiente - DNA) is the entity responsible for the planning,

management and monitoring of MPAs. Within the Ministry of Agriculture and Environment, DNA must cooperate directly with the National Directorate for Maritime Policy (Direção Nacional de Políticas do Mar - DNPM), which is part of the Ministry of the Sea, on matters concerning the management and implementation of MPAs. Maritime tourism activities require authorisation and licenses to operate in Cabo Verde, and the entity to issue the license varies according to the type of activity, with some activities requiring more than one license. For instance, whale watching activities require a license from the National Environmental Authority (DNA), another from the Maritime Port Institute (Instituto Marítimo e Portuário-IMP) for vessels, and other from the Tourism Institute of Cabo Verde (Instituto do Turismo de Cabo Verde - ITCV) (Government of Cabo Verde, 2015; Ministry of Agriculture and Environment of Cape Verde, 2024) Since 2024, the General Inspectorate of Economic Activities (Inspecção-Geral das Actividades Económicas - IGAE), part of the Ministry of Industry, Trade and Energy, has been the entity responsible for inspecting all maritime tourism activities (Government of Cabo Verde, 2024). With fragmented institutional competences there is a strong need for cooperation and collaboration among state entities. Additionally, there are difficulties in implementing defined policies on the ground, with many MPAs lacking management plans and some being susceptible to illegal activities, such as illegal fishing (Merceron et al., 2024).

3.2 Legal framework

The current legal framework in place concerning marine protection, MPAs and maritime tourism activities was mapped for the archipelagos of the Azores, Madeira, Canary Islands and Cabo Verde (Figures 2–5, respectively). At the centre of each figure, are the international conventions, treaties and protocols signed by each archipelago (yellow boxes for global law and agreements, blue boxes for international organizations, and purple boxes for climate change). For the European archipelagos (Azores, Madeira and Canary Islands), moving from the centre, the red boxes represent the European Union (EU) directives and policies, with the blue circles highlighting the primary objectives of those instruments. In the case of Cabo Verde, red boxes represent regional African laws and commitments that were signed by the country, followed by blue circles highlighting the primary objectives of the instruments. The figures also show, in the green boxes, national legislation implemented to support the directives, international and regional agreements. The legislative protection afforded is stated in the light blue boxes, at the end of each scheme.

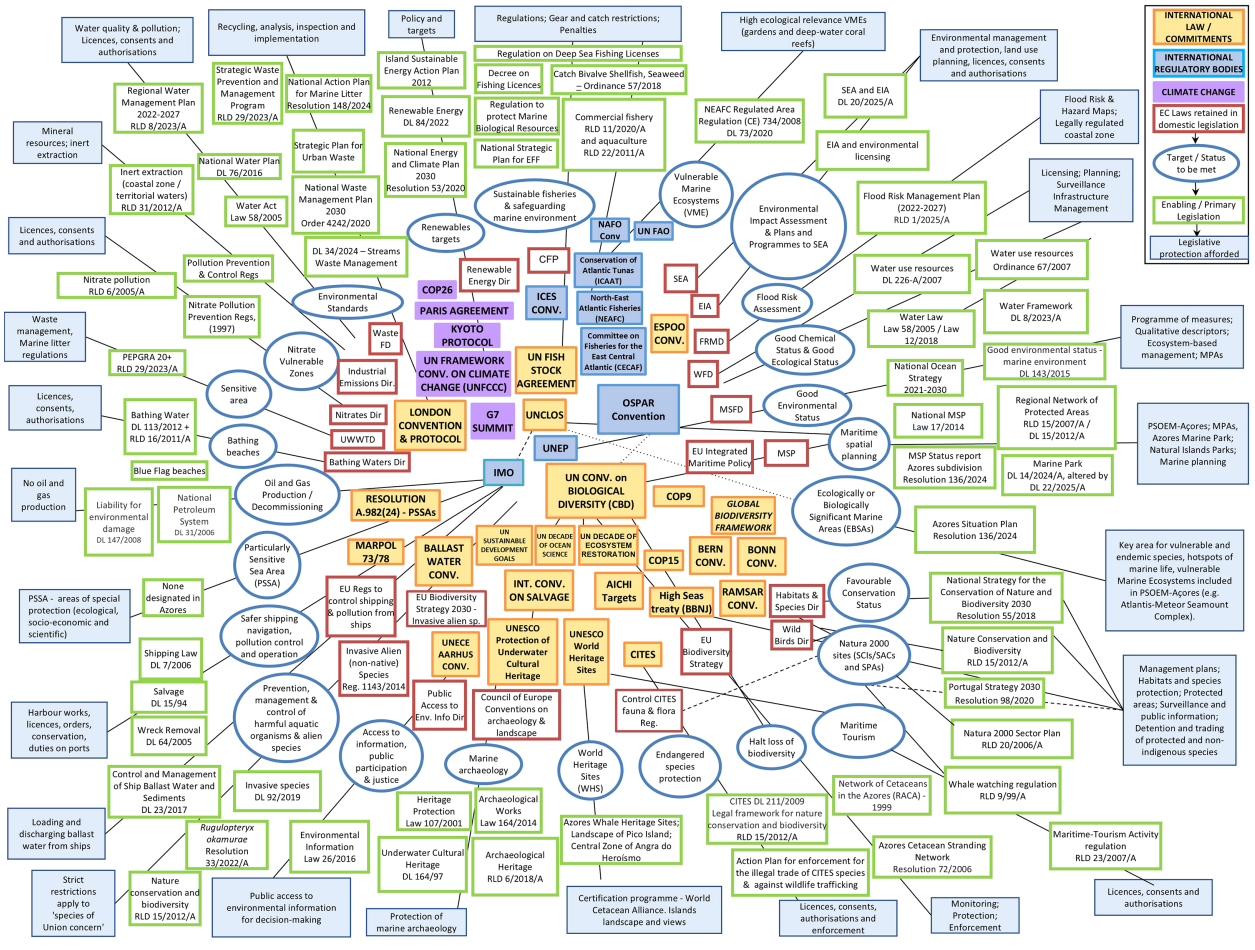

FIGURE 2
International, regional and national legislation regarding marine management and maritime tourism activities in the Azores, Portugal. Adapted from Boyes and Elliott, 2014.

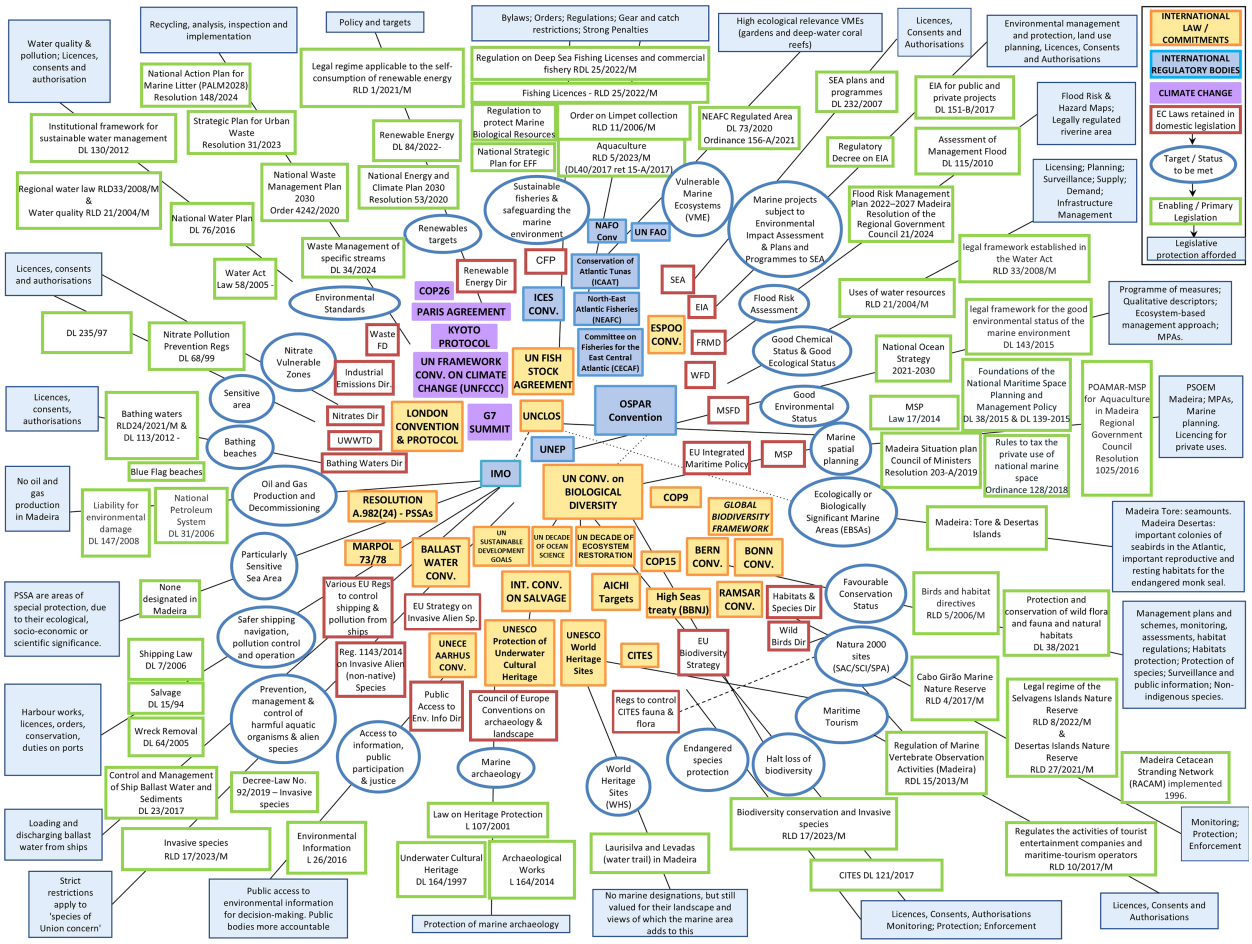

FIGURE 3
International, regional and national legislation regarding marine management and maritime tourism activities in Madeira, Portugal. Adapted from Boyes and Elliott, 2014.

3.3 SWOT analysis

To answer the question "*Can the existent framework of marine governance support the inclusion of ecotourism in the MPAs of Macaronesia?*", the analysis of the institutional and legal frameworks of the four archipelagos allows the identification of strengths, weaknesses, opportunities and threats (SWOT) for each of the archipelagos (Tables 2–5).

The SWOT analysis of each archipelago indicates the presence of the four key criteria: i) institutional support and framework of MPAs), as well as criteria ii) legal grounds of marine governance; iii) instruments for maritime tourism activities; and iv) support for enforcement and monitoring of MPAs and maritime tourism activities. Across the European archipelagos (Azores, Madeira and the Canary Islands) the complexity of a multi-layered policy and regulatory system spanning global, European, national, and regional levels, are common threats. As for the Portuguese archipelagos (Azores and Madeira) the highly technical nature of legal language and limitations in enforcement and monitoring capacity are also a shared concern, particularly given the extensive EEZ under Azorean jurisdiction and the challenges posed by remote areas in Madeira, such as the Selvagens, and the growing number of tourists, represents an increasing source of ecological pressure in both. In Madeira, monitoring and auditing responsibilities are more dispersed across institutions, and political instability is identified as a potential risk factor that may affect policy continuity and governance effectiveness. In the Canary Islands, concerns arise regarding the highest influx of tourists in Macaronesia, placing an increasing pressure on the archipelago's marine ecosystems. This growing demand amplifies existing governance challenges, particularly in contexts of national-regional articulation of the Canary Islands. At the same time, limitations in enforcement and monitoring capacity are also identified. As for Cabo Verde, threats are mainly regarding a reduce number of management plans in MPAs and a lack of resources for enforcement and monitoring. Some illegal activities still occurring in the islands (as fishing and turtle hunting), also create challenges.

4 Discussion

Although they are all Atlantic islands, the Macaronesia region is diverse, comprising three autonomous regions (the Azores, Madeira and the Canary Islands) belonging to countries in the European Union (EU), and one SIDS, Cabo Verde. As a result, they operate

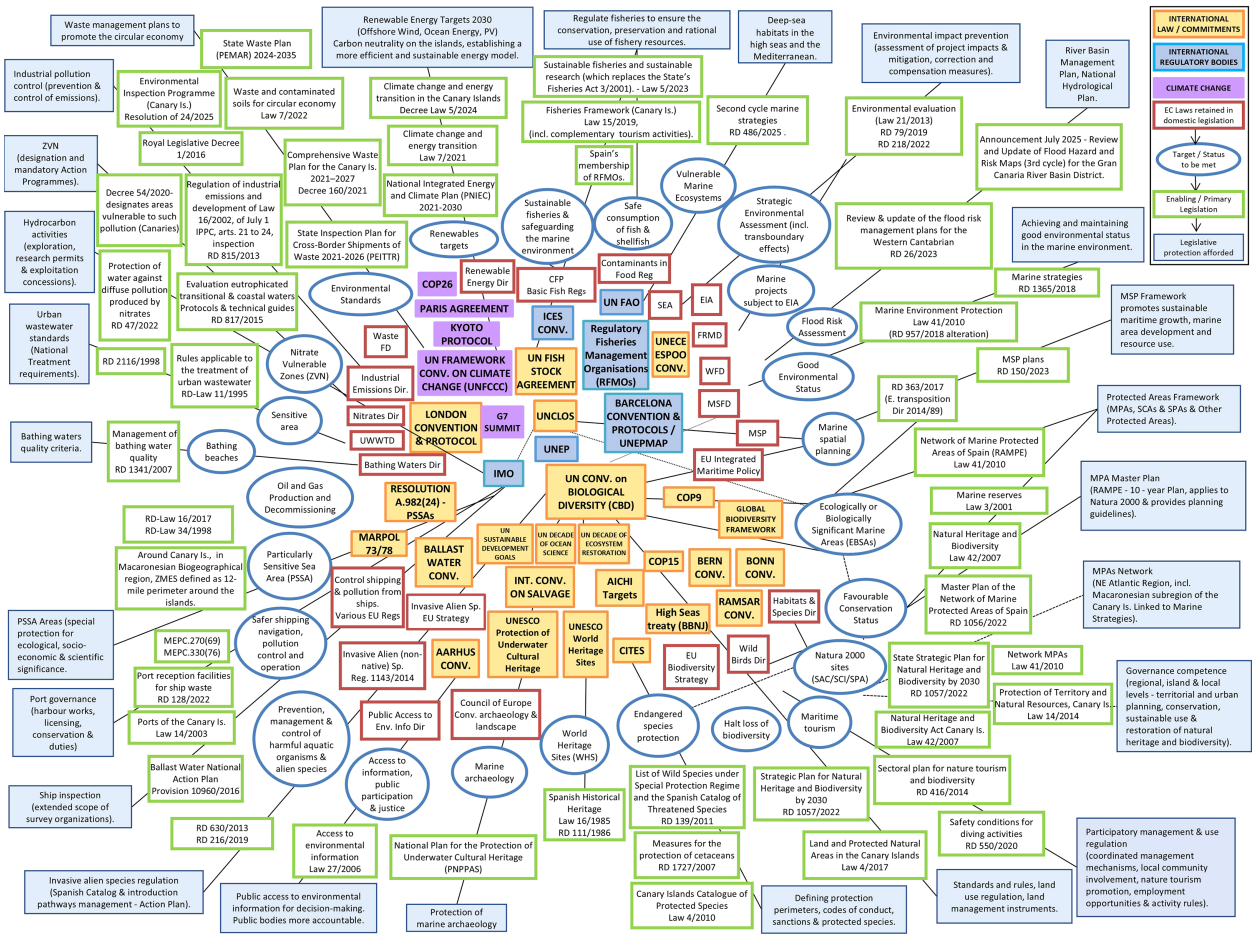

FIGURE 4
International, regional and national legislation regarding marine management and maritime tourism activities in the Canary islands, Spain. Adapted from Boyes and Elliott, 2014.

under different institutional arrangements for marine management. This distinct continental jurisdictions translate into heterogeneous governance capacities and uneven implementation outcomes across archipelagos (Adewumi, 2021). Institutional governance fragmentation increases administrative complexity by requiring coordination across multiple entities with overlapping or unclear mandates.

Monitoring and auditing for the Portuguese archipelagos is dispersed, with some responsibilities shared and overlapping between authorities, resulting in delays in decision-making, unclear accountability, and reduced enforcement of effectiveness in MPAs and on sustainable performance of the maritime tourism activities (Guerreiro et al., 2021). Despite policy ambitions for multisectoral integration (e.g. Maritime Spatial Planning) empirical assessments and national case studies show that in Macaronesia, implementation remains heavily shaped by pre-existing sectoral policies (e.g. fisheries, environment, energy, defence) (Calado et al., 2024), which can lead to an inconsistent enforcement and duplication of licensing procedures. Institutional governance fragmentation undermines the effectiveness of MPAs, since inconsistent monitoring and enforcement reduce ecological integrity (Mackelworth et al., 2013; Dehens and Fanning, 2018; Álvarez-Fernández et al., 2024), which may cause some constraints for the development of ecotourism products within the Macaronesian MPAs (Drumm et al., 2016; Forje and Tchamba, 2022). Strengthening institutional governance frameworks could therefore act as a catalyst for the development of ecotourism in the region's MPAs. By fostering transnational cooperation, Macaronesia could position itself as a unified ecotourism destination for MPAs, however it's effectiveness depends on reducing asymmetries in governance capacity across archipelagos (Gutierrez et al., 2023; Mast et al., 2025). This aligns with previous works suggesting a participatory, cross-border approach aimed at strengthening marine governance and enhancing coordination among the Macaronesian archipelagos (García-Sanabria et al., 2021).Regarding legal instruments, the four "horrendograms" (Figures 2–5) illustrate the multi-level and multi-sectoral nature of the marine governance legislation currently in force. All archipelagos share a complex legal framework with local, regional, national and international initiatives that need to be considered and harmonized (Mahon and Fanning, 2019). The four regions are aligned on most major international instruments such as the United Nations Convention on the Law of the Sea (UNCLOS), the Convention on Biological Diversity, the 2030 Agenda, the Paris Agreement, the High Seas treaty, among other international policies and agreements, that were signed and implemented in the four Macaronesian archipelagos, demonstrating their interest in international cooperation, sustainable development, and ocean

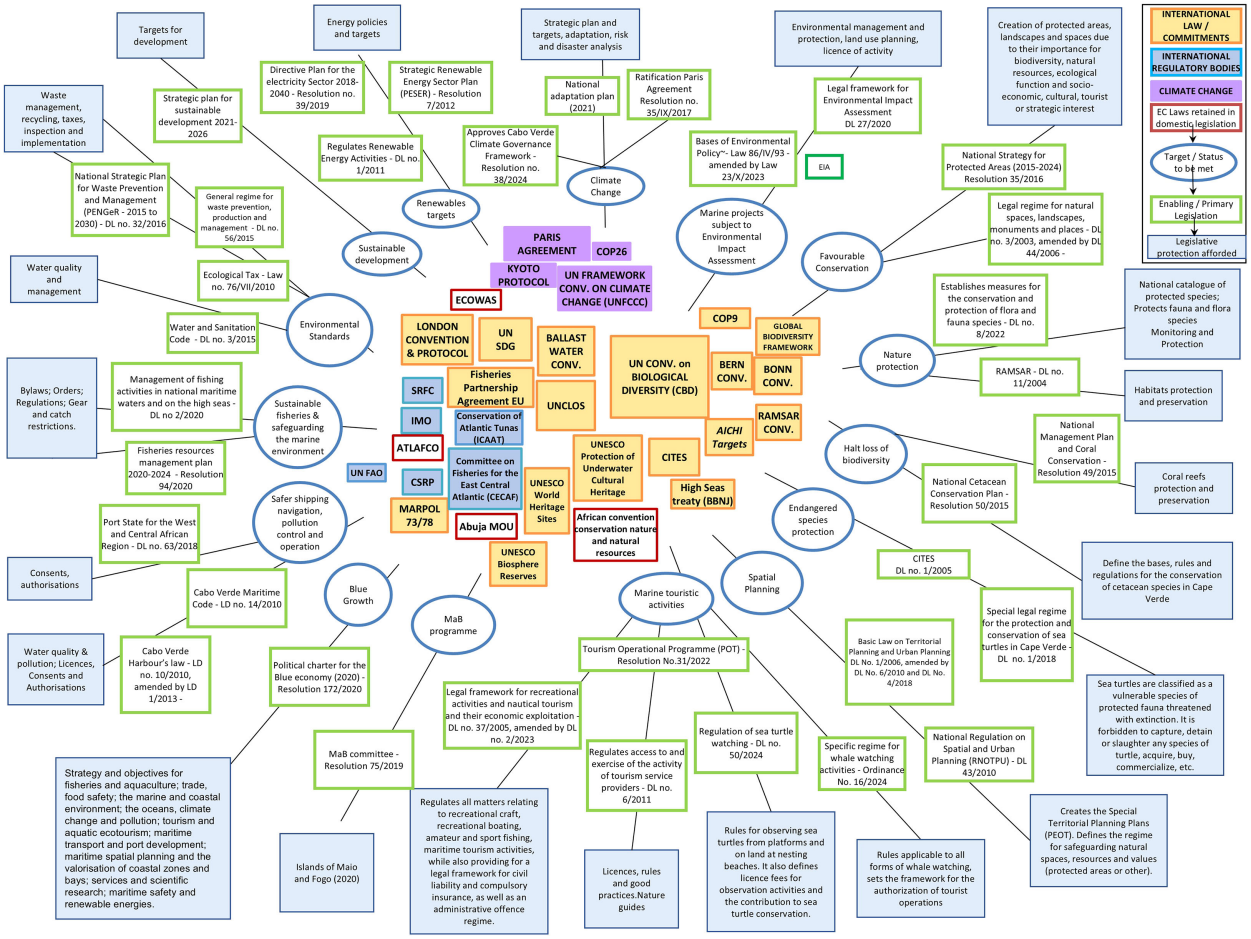

FIGURE 5
International, regional and national legislation regarding marine management and maritime tourism activities in Cabo Verde. Adapted from Boyes and Elliott, 2014.

management. However, while alignment with international agreements demonstrates political commitment, it does not guarantee effective implementation at regional or local levels. In the case of the Azores, Madeira and the Canary Islands, European directives and strategies for nature and habitats have been incorporated into national and regional legal frameworks, adding layers of protection to biodiversity and ecosystems (Birds and Habitats Directives, EU Biodiversity Strategy, Water Framework Directive, among others). Studies demonstrate how this implementation results in a cascade of regional plans, monitoring programmes and site protections (Sanderson et al., 2016; Abramic et al., 2020; Ferraro and Failler, 2022). In EU regions, this vertical integration strengthens legal safeguards but also increase the regulatory instruments and responsible entities, contributing to institutional and legal complexity, and often resulting in overlapping or fragmented competences across administrative levels (Boyes and Elliott, 2014; van Tatenhove, 2017; Tocco et al., 2024). Cabo Verde has a higher regulatory and procedural flexibility; nevertheless, at the implementation level, the country faces some challenges. Studies have shown that the implementation of MPAs encounters obstacles such as the absence of MPA management plans and insufficient financial resources (Sena et al., 2023; Cosme De Esteban et al., 2025). At the national level, each of the four archipelagos has specific legislative instruments (decree-laws) to support the creation of MPAs, and management plans are indicated as essential tools to provide a management framework (Calado et al., 2011). All archipelagos have legislation regulating maritime tourism activities highlighting the importance and growth of this sector in Macaronesia (Silva, 2015; Torres et al., 2017; Gonzáles-Mantilla et al., 2021; de la Cruz-Modino et al., 2024; Martins et al., 2025).

The robust institutional and legal foundation that enables and regulates both marine conservation and maritime tourism in the Azores has the potential to support the development of ecotourism activities in the Azorean MPAs, even if the legal and institutional governance architecture remains complex and fragmented (Table 2). Several authors argue that this fragmentation limits operational effectiveness, especially in an outermost region such as the Azores, where enforcement and long-term monitoring are resource-intensive (Abecasis et al., 2015; Moura et al., 2026). The size and scale of the Azorean maritime territory places pressure to maintain scientific, administrative, and enforcement capacity. The recently proposed reform for the Azores MPAs' network (RAMPA - Rede de Áreas Marinhas Protegidas dos Açores) is an opportunity for the region with the creation of a specific MPA Management Authority, which might enhance coherence, but its effectiveness will depend on staff, funding, and political stability (Blue Azores, 2024).

TABLE 2 SWOT analysis of the Azores (key differences between the archipelagos are highlighted in bold).

Strengths	Weaknesses
• Robust regional autonomy with clear legal competences for MPAs creation, management and monitoring. • A centralized institution for management of MPAs and licensing of maritime tourism activities (DRPM). • Structured legal framework for marine conservation and MPAs, including defined rules, competent authorities and regulatory instruments. • Existence of rules and regulations for maritime tour operators (whale watching, diving, etc). • Legal instruments are public and available to all in the official bulletins (online).	• Complex legal system with multi-level layers (European, National, Regional), creating coordination and implementation challenges. • Legal language reduces the accessibility (comprehensibility) and understanding of the rules and norms. • Fragmented sectoral rules, with the necessity of the involvement of several entities for licencing and monitoring of MPAs and maritime activities.
Opportunities	**Threats**
• Maritime tourism activities have been growing and play an important role for the economy of the Azores ((Torres et al., 2017; Gonzáles-Mantilla et al., 2022; Ressurreição et al., 2022). • Political interest in developing a more sustainable tourism model (Azores Regional Government, 2023). • Proposed reform for the MPAs network-RAMPA (Blue Azores, 2024) • Existing legislation of MPAs allows the development of some activities in specific zones of the MPA. • EU-funded projects facilitate cooperation among stakeholders in the Azores and the Macaronesia region. • **Revision of coastal MPAs management policies.**	• **Lack of enforcement and monitoring of activities in MPAs due to the size of the maritime territory of the Azores EEZ** (Moura et al., 2026) • Significant increase in the number of tourists in the Azores – ecological pressure (SREA - Azores Regional Statistical Service, 2025). • **Political instability and limited political will.** • Lack of funding for management capacity.

The legislation of RAMPA was recently approved (Azorean Regional Government, 2024), however, it was rapidly amended in 2025, due to a proposal to declassify some MPAs, postponing the implementation of fishing restrictions in fully protected areas until january 2026 (Azorean Regional Government, 2025). Despite resulting from a long participatory process, this revision highlights the fragility of conservation measures and their dependence on political will (Blue Azores, 2024). RAMPA is aimed at oceanic MPAs, while the revision of legislation and policies for coastal MPAs is still ongoing. Land-sea interactions are particularly sensitive on islands, given the high intensity and diversity of uses and activities that take place in coastal areas (Innocenti and Attombri, 2024; Tocco et al., 2024). A new MPA management authority, established in 2025, represents a key step towards improving coordination and governance effectiveness across both oceanic and coastal MPAs (Azores Regional Government, 2025). It is expected to enhance coherence and connectivity in coastal areas, where, under the current legal framework, coastal MPAs remain under the jurisdiction of the Island Natural Parks (Abecasis et al., 2015). This institutional arrangement requires greater coordination among multiple entities, and the new authority provides an opportunity to improve integration and management effectiveness across the land–sea interface. The opportunity window for ecotourism in the Azorean MPAs is broad, with the documented economic value of maritime tourism in the Azores – including some activities that may be classified as ecotourism, highlighting the sector's potential to support local communities and diversify the regional economy (Casimiro et al., 2022; Ressurreição et al., 2022).

A relatively cohesive institutional arrangement in Madeira, with a unified secretariat for tourism and the environment, can be advantageous in the archipelago by facilitating cross-sector collaboration, especially regarding the development of ecotourism

TABLE 3 SWOT analysis of Madeira (key differences between the archipelagos are highlighted in bold).

Strengths	Weaknesses
• Administrative cohesion for the management of MPAs (marine and coastal MPAs) through one entity, IFCN. • Structured legal framework for marine conservation and MPAs, including defined rules, competent authorities and regulatory instruments. • **Environment and tourism portfolios consolidated under the same regional secretariat (Regional Secretariat for Tourism, Environment and Culture).** • Existence of rules and regulations for maritime tour operators (whale watching, diving, etc). • Legal instruments are public and available to all in the official bulletins (online).	• Complex legal system with multi-level layers (European, National, Regional), creating coordination and implementation challenges. • Legal language reduces the accessibility (comprehensibility) and understanding of the rules and norms. • **Monitoring and auditing are dispersed, with some responsibilities being shared and overlapping between several authorities.**
Opportunities	**Threats**
• Existing legislation of MPAs allows the development of some activities in certain areas of the MPA. • Maritime tourism activities play an important role in the economy of Madeira – 184 maritime tourism companies registered in 2025 (Madeira Regional Directorate of Statistics, 2025). • EU-funded projects facilitate cooperation among stakeholders in Madeira and the Macaronesia region.	• Significant increase in the number of tourists in Madeira – ecological pressure. • Lack of enforcement and monitoring of activities in more remote areas (e.g. Selvagens). • **Political instability.**

TABLE 4 SWOT analysis of the Canary islands (key differences between the archipelagos are highlighted in bold).

Strengths	Weaknesses
• Strong vertical integration of international and European policies in the Canarian legislation. • Legal instruments are public and accessible to all in the official bulletins. • **Jurisdiction of the central government within the limits of the territorial sea and the EEZ requires strong cooperation between the two governments (central and Canarian).** • Existence of rules and regulations for maritime tour operators (whale watching, diving, etc).	• Complex legal system with multi-level layers (European, National, Regional), creating coordination and implementation challenges. • **Number of entities (National and Canarian) involved in the processes of management of MPAs and licensing of maritime tourism activities.** • Legal language reduces the accessibility (comprehensibility) and understanding of the rules and norms. • Licensing and authorisations for maritime tourism activities are dispersed across multiple administrative bodies within the regional government.
Opportunities	**Threats**
• Recent constrains in the number of tourists can lead to a will change in the business of tourism for more sustainability. • Existing legislation of MPAs allows the development of some activities in certain areas of the MPA (de la Cruz-Modino et al., 2024). • EU-funded projects facilitate cooperation among stakeholders in Canary Islands and the Macaronesia region.	• **Canary Islands have the highest influx of tourists in Macaronesia.** • Lack of enforcement and monitoring of activities in the maritime area.

products in MPAs (Table 3). The autonomous region of Madeira held three elections in consecutive years (2023, 2024 and 2025) for the regional legislative assembly (Regional Government). This political instability affects the regular management and implementation of public policies, including those related to nature conservation. In the Canary Islands, the high degree of vertical integration of European directives and policies strengthens their legal framework (Table 4), creating a comprehensive legal basis for marine conservation, and MPAs management complemented by regulations for maritime tourism activities (Rodríguez-Rodríguez et al., 2019). Some challenges arise from the complex multi-layered institutional structure, especially regarding licensing procedures. As for Cabo Verde, the institutional governance reflects a system that is politically committed to ocean management but still in the process of institutional consolidation (Table 5). Competences for MPAs and coastal management are shared among several ministries and institutes, resulting in overlapping responsibilities and administrative fragmentation. Implementation gaps concerning MPAs are also significant; although Cabo Verde has legally designated MPAs, few management plans are operational, limiting the ability to define zoning, visitor rules or monitoring protocols. At the same time, Cabo Verde holds important opportunities to embed ecotourism within its emerging governance framework, since some maritime tourism activities are not yet fully regulated, offering a window to adopt international best practices. Across Macaronesia, the governance frameworks reveal a complex but promising landscape for integrating ecotourism within MPAs. Recommendations emerging from this study highlight the need for the development of simplified regulatory guidelines and operational manuals for stakeholders can mitigate the effects of institutional fragmentation. Strengthening enforcement and monitoring capacity can be supported by technological tools and the active involvement of regulated maritime tourism operators in compliance and reporting mechanisms (Jones et al., 2013; Di Cintio et al., 2023). In parallel, spatial planning within MPAs can be employed to minimize ecological pressure, ensuring that permitted activities remain compatible with conservation objectives (Horta e Costa et al., 2022).

Even though horrendograms are useful comparative tools across governance scales and to visualize how integrated or fragmented the legal system is, they also have limitations, since they do not include every single legal instrument, and as such the mapping is not exhaustive (Monwar et al., 2018). The choice of which policies to map is based on their relevance to marine environment governance; however, some subjective judgement is inevitably required when selecting instruments. Also, this study focuses on governance from the perspective of institutional and legal frameworks and could benefit from including an analysis of stakeholders' involvement in marine governance in Macaronesia, so further research can address

TABLE 5 SWOT analysis of Cabo Verde (key differences between the archipelagos are highlighted in bold).

Strengths	Weaknesses
• The existence of a Ministry of the Sea. • IGAE acts as the central inspection entity for matters concerning environment, economic activities, health and tourism. • Legal instruments are public and available to all in the official bulletins (online).	• Shared competencies regarding marine protected areas between two ministries and institutes • Legal language reduces the accessibility (comprehensibility) and understanding of the rules and norms. • **Low rate of implemented MPA management plans.**
Opportunities	**Threats**
• **Some activities are not yet regulated, which enables the implementation of tried and tested best practices.** • **Maritime tourism activities exist, with some important expression in islands with more tourism, such as Sal and Boavista** (Martins et al., 2025). • Cooperation agreements with EU countries (e.g. Portugal, Spain).	• **Illegal fishing and hunting of turtles** (Ribeiro et al., 2022). • Rapid and unregulated coastal tourism development. • Lack of enforcement and monitoring of activities in the maritime area (Aquino, 2023).

this aspect (Pomeroy and Douvere, 2008; Cárcamo et al., 2014; Karlsson, 2019; Sena et al., 2023). The characterization of governance frameworks through institutional and legal analysis provides a valuable base for identifying formal structures, regulatory scopes and complexity. However, this approach remains limited, as it does not capture an assessment of governance effectiveness and management outcomes. As recognized in the literature, a persistent gap often exists between formal governance arrangements and actual implementation or performance (Bennett and Dearden, 2014a, 2014b; Álvarez-Fernández et al., 2024). A more comprehensive assessment of governance performance would require the integration of complementary lines of evidence, including stakeholder perceptions, levels of compliance and enforcement, as well as ecological and socio-economic indicators (Gill et al., 2017), so further research can be developed to enable a more robust understanding of governance arrangements in the MPAs of Macaronesia.

5 Conclusion

In island nations, the ocean affects the everyday lives and livelihoods of citizens, playing a central role in their economy, well-being and sustainability. This study set out to assess if existing institutional and legal governance frameworks in Macaronesia support the integration of ecotourism within MPAs. The results show that, while all four archipelagos possess formal legal and institutional structures, some challenges still exist. In the European archipelagos (the Azores, Madeira, and the Canary Islands) dense regulatory architectures shaped by EU directives and national legislation, provide clear legal bases for MPA designation, spatial planning and the licensing of maritime tourism activities. Cabo Verde, while operating outside the EU framework, has a political commitment to marine governance and an increasing engagement in regional and international cooperation. Institutional fragmentation, overlapping competences, and gaps in monitoring and implementation of management plans generate challenges for an effective implementation of ecotourism products, centred in conservation. However, the region's institutional and legal governance framework may support the integration of ecotourism into MPAs. The maritime tourism sector in Macaronesia has been reported in the literatureto generate economic and social benefits. Some maritime tourism activities currently operating in Macaronesia appear to align with ecotourism principles and definitions (e.g. environmental interpretation, low-impact use of natural resources, contributions to local economies). These activities can be considered as potential starting points for developing ecotourism initiatives within Macaronesian MPAs. The findings further indicate that Macaronesia may offer scope for the development of transarchipelagic ecotourism initiatives linking MPAs across the four archipelagos. Despite differences in regulatory and institutional contexts, shared ecological characteristics and conservation challenges provide a basis for complementary approaches to ecotourism. Exploring such possibilities could contribute to strengthening regional cooperation. There are clear opportunities to explore, such as strengthening cross-archipelago collaboration, building adaptive governance capacity, and promoting more inclusive decision-making processes. Progress will depend on clarifying competences to increase cross-sectoral collaboration and enable joint action across the region.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary Material. Further inquiries can be directed to the corresponding author.

Author contributions

DC: Conceptualization, Writing – review & editing, Writing – original draft, Investigation, Formal analysis, Methodology, Data curation. MV: Methodology, Validation, Conceptualization, Supervision, Formal analysis, Writing – original draft, Writing – review & editing. AB: Methodology, Validation, Investigation, Writing – review & editing, Formal analysis. CC-R: Investigation, Validation, Methodology, Writing – review & editing, Formal analysis. PP: Formal analysis, Writing – review & editing, Methodology, Validation, Investigation. JG: Validation, Formal analysis, Methodology, Supervision, Conceptualization, Writing – original draft, Writing – review & editing.

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Conflict of interest

The author(s) declared that this work was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fmars.2026.1776136/full#supplementary-material

References

Abecasis, R. C., Afonso, P., Colaço, A., Longnecker, N., Clifton, J., Schmidt, L., et al. (2015). Marine conservation in the Azores: Evaluating marine protected area development in a remote island context. *Front. Mar. Sci.* 2. doi: 10.3389/fmars.2015.00104

Abecasis, R. C., Longnecker, N., Schmidt, L., and Clifton, J. (2013). Marine conservation in remote small island settings: Factors influencing marine protected area establishment in the Azores. *Mar. Policy* 40, 1–9. doi: 10.1016/j.marpol.2012.12.032

Abramic, A., Nogueira, N., Sepulveda, P., Cavallo, M., Fernández-Palacios, Y., Andrade, C., et al. (2020). Implementation of the Marine Strategy Framework Directive in Macaronesia and synergies with the Maritime Spatial Planning process. *Mar. Policy* 122, 104273. doi: 10.1016/j.marpol.2020.104273

Adewumi, I. J. (2021). Exploring the nexus and utilities between regional and global ocean governance architecture. *Front. Mar. Sci.* 8. doi: 10.3389/fmars.2021.645557

Álvarez-Fernández, I., Sánchez-Carnero, N., and Freire, J. (2024). Governance, not design, rules European Atlantic MPA performance. *Reg. Stud. Mar. Sci.* 71, 103419. doi: 10.1016/j.rsma.2024.103419

Aquino, M. L. (2023). The limits of the European Union's fisheries agreements as sustainable development instruments: The case of Cape Verde. *Mar. Policy* 148, 105455. doi: 10.1016/j.marpol.2022.105455

Azorean Regional Government (2024). *Decreto legislativo regional n°14/2024/A* (Parque Marinho dos Açores: Diário da República). Available online at: https://files.diariodarepublica.pt/1s/2024/12/24900/0003100289.pdf (Accessed December 11, 2025).

Azorean Regional Government (2025). *Decreto Legislativo Regional n.° 22–2025 A* (Portugal: Di´rio da República). Available online at: https://diariodarepublica.pt/dr/detalhe/decreto-legislativo-regional/22-2025-938923407 (Accessed December 11, 2025).

Azores Regional Government (2023). *Strategic and Marketing Plan for Azores Tourism-Horizon 2030* Secretaria Regional do Turismo, Mobilidade e Infraestruturas, Summary Version.

Azores Regional Government (2024). *Decreto Regulamentar Regional n.° 21/2024/A* (Portugal: Região Autónoma dos Açores). Available online at: https://diariodarepublica.pt/dr/detalhe/decreto-regulamentar-regional/21-2024-897816391 (Accessed November 11, 2025).

Azores Regional Government (2025). *Decreto Regulamentar Regional n.° 27/2025/A* (Portugal).

Bennett, N. J., and Dearden, P. (2014a). From measuring outcomes to providing inputs: Governance, management, and local development for more effective marine protected areas. *Mar. Policy* 50, 96–110. doi: 10.1016/j.marpol.2014.05.005

Bennett, N. J., and Dearden, P. (2014b). Why local people do not support conservation: Community perceptions of marine protected area livelihood impacts, governance and management in Thailand. *Mar. Policy* 44, 107–116. doi: 10.1016/j.marpol.2013.08.017

Blue Azores (2024). *Revisão da Rede de Áreas Marinhas Protegidas dos Açores -Ponto de Situação, (2019-2024) e próximos passos.* Available online at: https://588b85c5-60f3-440c-80c6-3b3cbe03d01b.usrfiles.com/ugd/588b85_f3e435d6e8a14e19a152ae5c3e486751.pdf (Accessed November 11, 2025).

Borja, A., Oliveira, B., Pouso, S., Matos, A. C., Costa, A. C., Botelho, A. Z., et al (2024b). Baseline assessment of Social-Ecological System models. *Marine SABRES Deliverable* 4.1, 23–26.

Borrini-Feyerabend, G., Dudley, N., Jaeger, T., Lassen, B., Pathak Broome, N., Phillips, A., et al. (2013). "Governance of Protected Areas: From understanding to action," in *Developing capacity for a protected planet* (Gland, Switzerland: IUCN). Available online at: www.iucn.org/pa_guidelines (Accessed October 15, 2025).

Boyes, S. J., and Elliott, M. (2014). Marine legislation - The ultimate "horrendogram": International law, European directives & national implementation. *Mar. pollut. Bull.* 86, 39–47. doi: 10.1016/j.marpolbul.2014.06.055

Boyes, S. J., and Elliott, M. (2023). *Marine Governance Briefing Paper - Deliverable 3.2* (Marine SABRES European Union's Horizon Europe research and innovation programme under grant agreement no. 101058956. and the UKRI Project Number 10050525).

Cadima Ribeiro, J. A., Vareiro, L., Remoaldo, P., and Monjardino, I. C. (2025). Residents' perceptions of the impacts of tourism in the Azores archipelago (Portugal): A cluster analysis. *Tourism Hospitality Res.* 25, 274–288. doi: 10.1177/14673584231205217

Calado, H., Frazão Santos, C., Quintela, A., Fonseca, C., and Gutierrez, D. (2024). The ups and downs of maritime spatial planning in Portugal. *Mar. Policy* 160, 105984. doi: 10.1016/j.marpol.2023.105984

Calado, H., Ng, K., Lopes, C., and Paramio, L. (2011). Introducing a legal management instrument for offshore marine protected areas in the Azores—The Azores Marine Park. *Environ. Sci. Policy* 14, 1175–1187. doi: 10.1016/j.envsci.2011.09.001

Cárcamo, P. F., Garay-Flühmann, R., Squeo, F. A., and Gaymer, C. F. (2014). Using stakeholders' perspective of ecosystem services and biodiversity features to plan a marine protected area. *Environ. Sci. Policy* 40, 116–131. doi: 10.1016/j.envsci.2014.03.003

Casimiro, D., Escudero, M. D., Guerreiro, J.Â., and Ventura, M. A. (2025). Assessing ecotourism opportunities in Macaronesian marine protected areas (MPAs): An adapted MEET indicator-based methodology. *Sustainability (Switzerland)* 17. doi: 10.3390/su17115190

Casimiro, D., Ventura, M. A., Botelho, A. Z., and Guerreiro, J. (2022). Ecotourism in marine protected areas as a tool to valuate natural capital and enhance good marine governance: A review. *Front. Mar. Sci.* 9. doi: 10.3389/fmars.2022.1002677

Castro, N., Monteiro, J. G., Gouveia, M. M., Parretti, P., Schäfer, S., Álvarez, S., et al. (2025). Refining management strategies in marine protected areas in oceanic islands: a non-indigenous species risk index for strategic prioritization. *Biol. Invasions* 27, 89. doi: 10.1007/s10530-025-03536-1

COP 15 (2022). *Decision 15/4 - Kunming-Montreal Global Biodiversity Framework* (Montreal). Available online at: https://www.cbd.int/conferences/post20202CBD/WG8J/11/7,CBD/SBSTTA/23/9,CBD/SBSTTA/24/12andCBD/SBI/3/21,respectively. Agenda item 9A. (Accessed October 11, 2025).

Cormier, R., Elliott, M., and Borja, Á. (2022). Managing marine resources sustainably – The 'Management Response-Footprint Pyramid' covering policy, plans and technical measures. *Front. Mar. Sci.* 9. doi: 10.3389/fmars.2022.869992

Cosme De Esteban, M., Tuya, F., Haroun, R., and Otero-Ferrer, F. (2025). A systematic review of marine habitat mapping in the Central-Eastern Atlantic Archipelagos: Methodologies, current trends, and knowledge gaps. *Remote Sens. (Basel).* 17, 2331. doi: 10.3390/rs17132331

Day, J., Dudley, N., Hockings, M., Holmes, G., Laffoley, D., Stolton, S., et al. (2019). *Guidelines for applying the IUCN protected area management categories to marine protected areas Second edition* (Gland, Switzerland: IUCN). Available online at: www.iucn.org/pa_guidelines (Accessed October 11, 2025).

Dehens, L. A., and Fanning, L. M. (2018). What counts in making marine protected areas (MPAs) count? The role of legitimacy in MPA success in Canada. *Ecol. Indic.* 86, 45–57. doi: 10.1016/j.ecolind.2017.12.026

de la Cruz-Modino, R., Pascual-Fernández, J. J., Domínguez-González, D., Pérez-Amores, G., González-Cruz, C., Santana-Talavera, A., et al. (2024). Sharing the ocean: Fostering blue synergies for sustainable whale-watching. *Reg. Stud. Mar. Sci.* 80, 103905. doi: 10.1016/j.rsma.2024.103905

Di Cintio, A., Niccolini, F., Scipioni, S., and Bulleri, F. (2023). Avoiding "Paper Parks": A global literature review on socioeconomic factors underpinning the effectiveness of marine protected areas. *Sustainability* 15, 4464. doi: 10.3390/su15054464

Drumm, A., Rodríguez, A., Danelutti, C., and Santarossa, L. (2016). *Mediterranean Experience of Ecotourism Manual. A guide to discover the MEET approach*. Marseille, France: MedPAN.

Dudley, N. (2008). *Guidelines for Applying Protected Area Management Categories* (Gland, Switzerland: IUCN). Available online at: https://portals.iucn.org/library/sites/library/files/documents/PAPS-016.pdf (Accessed October 10, 2025).

Edgar, G. J., Stuart-Smith, R. D., Willis, T. J., Kininmonth, S., Baker, S. C., Banks, S., et al. (2014). Global conservation outcomes depend on marine protected areas with five key features. *Nature* 506, 216–220. doi: 10.1038/nature13022

Elliott, M., Boyes, S. J., and Burdon, D. (2006). Integrated marine management and administration for an island state—the case for a new Marine Agency for the UK. *Mar. pollut. Bull.* 52, 469–474. doi: 10.1016/j.marpolbul.2006.03.017

European Commission (2019). *The European Green Deal* (Brussels: European Commission). Available online at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52019DC0640 (Accessed October 11, 2025).

European Commission (2020). *EU Biodiversity Strategy for 2030* (Brussels: European Commission). Available online at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0380 (Accessed October 11, 2025).

European Commission (2025). *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: The European Ocean Pact (COM(2025) 281 final)*. Available online at: https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=comnat:COM_2025_0281_FIN.

Fernandez-Abila, C. J., Tan, R., Dumpit, D. Z., Gelvezon, R. P., Arcala Hall, R., Lizada, J., et al. (2024). Characterizing the sustainable tourism development of small islands in the Visayas, Philippines. *Land Use Policy* 137. doi: 10.1016/j.landusepol.2023.106996

Ferraro, G., and Failler, P. (2022). Bringing nature into decision-making and policy design: Experiences from overseas Europe. *Policy Design Pract.* 5, 226–244. doi: 10.1080/25741292.2021.1885797

Folke, C., Hahn, T., Olsson, P., and Norberg, J. (2005). Adaptive governance of social-ecological systems. *Annu. Rev. Environ. Resour.* 30, 441–473. doi: 10.1146/annurev.energy.30.050504.144511

Forje, G. W., and Tchamba, M. N. (2022). Ecotourism governance and protected areas sustainability in Cameroon: The case of Campo Ma'an National Park. *Curr. Res. Environ. Sustainability* 4, 100172. doi: 10.1016/j.crsust.2022.100172

FRCT Azores (2017).Regional Investment strategy Macaronesia. Available online at: https://www.azores.gov.pt/NR/rdonlyres/F25135CF-528F-45BC-AC04-75532410BDE5/1051238/RISMacaronesia_14Dec2016vJA.pdf (Accessed November 21, 2025).

Fudge, M., Fullbrook, L., and Vince, J. (2025). Integrative capacity enabling integrated oceans management: Insights from Australia. *Ocean Coast. Manage.* 267, 107730. doi: 10.1016/j.ocecoaman.2025.107730

Gallacher, J., Simmonds, N., Fellowes, H., Brown, N., Gill, N., Clark, W., et al. (2016). Evaluating the success of a marine protected area: A systematic review approach. *J. Environ. Manage.* 183, 280–293. doi: 10.1016/j.jenvman.2016.08.029

Galparsoro, I., Montero, N., Mandiola, G., Menchaca, I., Borja, Á., Flannery, W., et al. (2025). Assessment tool addresses implementation challenges of ecosystem-based management principles in marine spatial planning processes. *Commun. Earth Environ.* 6, 55. doi: 10.1038/s43247-024-01975-7

García-Sanabria, J., García-Onetti, J., Cordero Penín, V., de Andrés, M., Caravaca, C. M., Verón, E., et al. (2021). Marine Spatial Planning cross-border cooperation in the 'European Macaronesia Ocean': A participatory approach. *Mar. Policy* 132. doi: 10.1016/j.marpol.2021.104671

Gill, D. A., Mascia, M. B., Ahmadia, G. N., Glew, L., Lester, S. E., Barnes, M., et al. (2017). Capacity shortfalls hinder the performance of marine protected areas globally. *Nature* 543, 665–669. doi: 10.1038/nature21708

Gomes, I., Serrano, D., Pham, C., and Afonso, P. (2025). Remote but not isolated; an integrated ecosystem assessment across the marine ecosystem of the Azores. *Ecol. Indic.* 181, 114409. doi: 10.1016/j.ecolind.2025.114409

Gonçalves, E. J. (2023). Marine protected areas as tools for ocean sustainability 131–141. doi: 10.1007/978-3-031-24888-7_11

Gonzáles-Mantilla, P. G., Gallagher, A. J., León, C. J., and Vianna, G. M. S. (2021). Challenges and conservation potential of shark-diving tourism in the Macaronesian archipelagos. *Mar. Policy* 131, 104632. doi: 10.1016/j.marpol.2021.104632

Gonzáles-Mantilla, P. G., Gallagher, A. J., León, C. J., and Vianna, G. M. S. (2022). Economic impact and conservation potential of shark-diving tourism in the Azores Islands. *Mar. Policy* 135, 104869. doi: 10.1016/j.marpol.2021.104869

Government of Cabo Verde (2015). *Decreto-lei n.º 37/2015* (Cabo Verde: Boletim Oficial). Available online at: https://kiosk.incv.cv (Accessed December 11, 2025).

Government of Cabo Verde (2024). *Decreto-Lei n.º18/2024* (Cabo Verde: Boletim Oficial). Available online at: https://boe.incv.cv/Bulletins/Details/A2024/S1/BO33/5711 (Accessed December 11, 2025).

Government of Portugal (2015). *Decreto-Lei n.º38/2015, que desenvolve a Lei n.º17/2014*. Diário da República.

Government of Portugal (2019). *Resolução do Conselho de Ministros nº203-A* (PSOEM).

Government of Spain (2008). *Real Decreto 1727/2007, de 21 de diciembre, por el que se establecen medidas de protección de los cetáceos* (Spain: Boletín Oficial del Estado). Available online at: https://www.boe.es/buscar/doc.php?id=BOE-A-2008-516 (Accessed October 17, 2025).

Guerreiro, J., Carvalho, A., Casimiro, D., Bonnin, M., Calado, H., Toonen, H., et al. (2021). Governance prospects for maritime spatial planning in the tropical atlantic compared to EU case studies. *Mar. Policy* 123, 104294. doi: 10.1016/j.marpol.2020.104294

Gutierrez, D., Calado, H., and García-Sanabria, J. (2023). A proposal for engagement in MPAs in areas beyond national jurisdiction: The case of Macaronesia. *Sci. Total Environ.* 854, 158711. doi: 10.1016/j.scitotenv.2022.158711

Horta e Costa, B., Guimarães, M. H., Rangel, M., Ressurreição, A., Monteiro, P., Oliveira, F., et al. (2022). Co-design of a marine protected area zoning and the lessons learned from it. *Front. Mar. Sci.* 9. doi: 10.3389/fmars.2022.969234

Innocenti, A., and Attombri, C. (2024). The current policyscape affecting land-sea interactions in the European Union. *Ocean Coast. Manage.* 251, 107093. doi: 10.1016/j.ocecoaman.2024.107093

Jones, P. J. S., Qiu, W., and De Santo, E. M. (2013). Governing marine protected areas: Social–ecological resilience through institutional diversity. *Mar. Policy* 41, 5–13. doi: 10.1016/j.marpol.2012.12.026

Karlsson, M. (2019). Closing marine governance gaps? Sweden's marine spatial planning, the ecosystem approach to management and stakeholders' views. *Ocean Coast. Manage.* 179, 104833. doi: 10.1016/j.ocecoaman.2019.104833

Liu, Y. L., Chiang, J., and Ko, P. F. (2023). The benefits of tourism for rural community development. *Humanit. Soc Sci. Commun.* 10. doi: 10.1057/s41599-023-01610-4

Mackelworth, P., Holcer, D., and Fortuna, C. M. (2013). Unbalanced governance: The Cres-Lošinj special marine reserve, a missed conservation opportunity. *Mar. Policy* 41, 126–133. doi: 10.1016/j.marpol.2012.12.017

Macpherson, E., Jorgensen, E., Paul, A., Rennie, H., Fisher, K., Talbot-Jones, J., et al. (2023). Designing law and policy for the health and resilience of marine and coastal ecosystems—Lessons from (and for) Aotearoa New Zealand. *Ocean Dev. Int. Law* 54, 200–252. doi: 10.1080/00908320.2023.2224116

Madeira Regional Directorate of Statistics (2025). *Maritime Statistics 2024*. Available online at: https://estatistica.madeira.gov.pt/en/download-now-3/territorio-gb/maritime-statistics/maritime-statistics-in-focus.html (Accessed December 8, 2025).

Madeira Regional Government (2025). *Decreto Regulamentar Regional n.º 9/2025/M* (Portugal: Diário da República). Available online at: https://diariodarepublica.pt/dr/detalhe/decreto-regulamentar-regional/9-2025-927416006 (Accessed November 25, 2025)

Mahon, R., and Fanning, L. (2019). Regional ocean governance: Polycentric arrangements and their role in global ocean governance. *Mar. Policy* 107, 103590. doi: 10.1016/j.marpol.2019.103590

Martins, S., Marco, A., and Clarke, L. J. (2025). Conservation and ecotourism increase natural capital asset value: An economic assessment of sea turtles on Boa Vista Island, Cabo Verde. *Ocean Coast. Manage.* 268, 107764. doi: 10.1016/j.ocecoaman.2025.107764

Mast, A., Gill, D., Ahmadia, G. N., Darling, E. S., Andradi-Brown, D. A., Geldman, J., et al. (2025). Shared governance increases marine protected area effectiveness. *PloS One* 20, e0315896. doi: 10.1371/journal.pone.0315896

Mazzola, F., Pizzuto, P., and Ruggieri, G. (2022). Tourism and territorial growth determinants in insular regions: A comparison with mainland regions for some European countries, (2008–2019). *Papers Regional Sci.* 101, 1331–1382. doi: 10.1111/pirs.12701

Merceron, T., Clément, T., Gabrié, C., Staub, F., Ba, T., and Traore, M. S. (2024). *State of West African marine protected areas 2022*. Eds. T. Merceron, T. Clément, C. Gabrié and F. Staub (Gland: IUCN, International Union for Conservation of Nature). doi: 10.2305/BXRM8651

Ministry of Agriculture and Environment of Cape Verde (2024). *Portaria n.º 16/2024* (Cabo Verde: Boletim Oficial). Available online at: https://boe.incv.cv/Bulletins/Details/A2024/S1/BO43/5752 (Accessed October 17, 2025).

Monwar, M., Tzika, E., Magalhães, A. V., Grimmel, H., Moniz, F., Bonnin, M., et al. (2018). GPSAzores: analysis and comparison of the legal frameworks of the north atlantic countries. 41.

Moura, R., Pessanha Santos, N., and Catarino, M. E. (2026). Fishing effort and enforcement in the Azores Marine Protected Areas: How prevalent is illegal fishing? *Aquac. Fish.* 11, 193–208. doi: 10.1016/j.aaf.2025.05.002

OECD (2022). *Sustainable Ocean Economy Country Diagnostics of Cabo Verde* (Paris: Organisation for Economic Co-operation and Development (OECD)). Available online at: https://www.oecd.org/en/publications/sustainable-ocean-economy-country-diagnostics-of-cabo-verde_e3cdc345-en.html (Accessed October 17, 2025).

Pomeroy, R., and Douvere, F. (2008). The engagement of stakeholders in the marine spatial planning process. *Mar. Policy* 32, 816–822. doi: 10.1016/j.marpol.2008.03.017

Quero García, P., García Sanabria, J., and Chica Ruiz, J. A. (2021). Marine renewable energy and maritime spatial planning in Spain: Main challenges and recommendations. *Mar. Policy* 127, 104444. doi: 10.1016/J.MARPOL.2021.104444

Ressurreição, A., Cardigos, F., Giacomello, E., Leite, N., Oliveira, F., Kaiser, M. J., et al. (2022). The value of marine ecotourism for an European outermost region. *Ocean Coast. Manage.* 222. doi: 10.1016/j.ocecoaman.2022.106129

Ribeiro, M. C., Patino-Martinez, J., Agues, J., Marçal-Correia, A., and Nuno, A. (2022). Exploring a comprehensive behavioural model to investigate illegal sea turtle trade in Cabo Verde. *Conserv. Soc.* 20, 325–335. doi: 10.4103/cs.cs_98_21

Rodríguez-Rodríguez, D., Merkohasanaj, M., and López, I. (2019). Social and economic sustainability of multiple-use marine protected areas in Spain: A mixed methods, multi-scale study. *Ocean Coast. Manage.* 171, 47–55. doi: 10.1016/j.ocecoaman.2019.01.013

Rodríguez-Rodríguez, D., Rees, S. E., Rodwell, L. D., and Attrill, M. J. (2015). Assessing the socioeconomic effects of multiple-use MPAs in a European setting: A national stakeholders' perspective. *Environ. Sci. Policy* 48, 115–127. doi: 10.1016/j.envsci.2014.12.020

Sanderson, F. J., Pople, R. G., Ieronymidou, C., Burfield, I. J., Gregory, R. D., Willis, S. G., et al. (2016). Assessing the performance of EU nature legislation in protecting target bird species in an era of climate change. *Conserv. Lett.* 9, 172–180. doi: 10.1111/conl.12196

Sciberras, M., Jenkins, S. R., Mant, R., Kaiser, M. J., Hawkins, S. J., and Pullin, A. S. (2015). Evaluating the relative conservation value of fully and partially protected marine areas. *Fish Fish.* 16, 58–77. doi: 10.1111/faf.12044

Sena, N., Veiga, A., Semedo, A., Abu-Raya, M., Semedo, R., Fujii, I., et al. (2023). Co-designing protected areas management with small island developing states' local stakeholders: A case from coastal communities of Cabo Verde. *Sustainability* 15, 15178. doi: 10.3390/su152015178

Silva, L. (2015). How ecotourism works at the community-level: The case of whale-watching in the Azores. *Curr. Issues Tourism* 18, 196–211. doi: 10.1080/13683500.2013.786027

SREA - Azores Regional Statistical Service (2025). *Estatísticas do Turismo - Região Autónoma dos Açores 2024*. Azores Regional Statistical Service.

Tocco, C. L., Frehen, L., Forse, A., Ferraro, G., and Failler, P. (2024). Land-sea interactions in European marine governance: State of the art, challenges and recommendations. *Environ. Sci. Policy* 158. doi: 10.1016/j.envsci.2024.103763

Torres, P., Bolhão, N., Tristão da Cunha, R., Vieira, J. A. C., and Rodrigues, A. S. (2017). Dead or alive: The growing importance of shark diving in the Mid-Atlantic region. *J. Nat. Conserv.* 36, 20–28. doi: 10.1016/j.jnc.2017.01.005

UNCTAD (2022).Building resilience in Small Island developing States. Available online at: https://unctad.org/system/files/official-document/aldcinf2022d2_en.pdf (Accessed November 13, 2025).

van Tatenhove, J. P. M. (2017). Transboundary marine spatial planning: A reflexive marine governance experiment? *J. Environ. Policy Plann.* 19, 783–794. doi: 10.1080/1523908X.2017.1292120

Weiskopf, S. R., Rubenstein, M. A., Crozier, L. G., Gaichas, S., Griffis, R., Halofsky, J. E., et al. (2020). Climate change effects on biodiversity, ecosystems, ecosystem services, and natural resource management in the United States. *Sci. Total Environ.* 733. doi: 10.1016/j.scitotenv.2020.137782