sustainability

MDPI

Systematic Review

Marine Zoning: A Two-Decade Bibliographic Analysis—A Systematic Review

Yael Shaked Mandelberg [1,2], Ziv Zemah-Shamir [3,4], Inbar Schwartz Belkin [1], Steve Brenner [2] and Shiri Zemah-Shamir [1,*]

[1] School of Sustainability, Reichman University (IDC Herzliya), P.O. Box 167, Herzliya 4610101, Israel; yaelmandelberg@gmail.com (Y.S.M.); inbarsch@gmail.com (I.S.B.)
[2] Department of Environment, Planning and Sustainability, Bar Ilan University, Ramat Gan 5290002, Israel; steve.brenner@biu.ac.il
[3] Department of Marine Biology, Leon H. Charney School of Marine Sciences, University of Haifa, Haifa 3498838, Israel; zzemah@univ.haifa.ac.il
[4] Morris Kahn Marine Research Station, University of Haifa, Haifa 3498838, Israel
* Correspondence: shiri.zemahshamir@runi.ac.il

Abstract: Marine zoning is a widely used spatial tool for managing ocean spaces, minimizing conflicts between uses, and maintaining ecosystem services. This review examines and profiles the use of marine zoning and its potential to support climate resilience and ecosystem services through a systematic PRISMA analysis of 121 articles. The findings highlight the importance of balancing sustainable resource use and human well-being with nature protection through well-tailored zoning objectives. The review underscores the need to expand research on underrepresented marine habitats such as seagrass and algae, which play a critical role in climate change mitigation. Additionally, it highlights the necessity of broadening the scope to consider human activities beyond fisheries, which are often the primary focus. Stakeholder engagement and public awareness are identified as crucial for effective marine zoning planning. A significant gap is noted in the integration of ecosystem services and natural capital into marine zoning research. Furthermore, despite marine zoning's potential to address climate change challenges, the reviewed articles reveal limited attention to this topic, indicating an urgent need for further research. This review advocates for the incorporation of ecosystem service valuation and climate change considerations into marine zoning to ensure sustainable management that balances ecological preservation with human well-being.

Keywords: climate change; ecosystem services; marine spatial planning; marine zoning; natural capital; PRISMA

check for updates

Academic Editors: Chen-Tung Arthur Chen, Neculaí Patriche, Victor Niţă and Elena Sîrbu

Received: 11 December 2024
Revised: 9 February 2025
Accepted: 11 February 2025
Published: 19 February 2025

Citation: Shaked Mandelberg, Y.; Zemah-Shamir, Z.; Schwartz Belkin, I.; Brenner, S.; Zemah-Shamir, S. Marine Zoning: A Two-Decade Bibliographic Analysis—A Systematic Review. *Sustainability* **2025**, *17*, 1724. https://doi.org/10.3390/su17041724

Copyright: © 2025 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

1. Introduction

Marine ecosystems are vital for human well-being, offering essential services such as providing food, carbon sequestration, and storm protection, along with cultural benefits such as recreation and aesthetic appreciation [1–10]. Recognizing these benefits, the concept of ecosystem services (ESs) underscores the significance of these natural systems for human survival and livelihoods [1,11,12]. Coastal marine areas, in particular, provide numerous ecosystem services that are essential to supporting local communities [13]. Protecting ESs requires a thorough understanding of the value of natural capital (NC), which encompasses the resources, biodiversity, and functions of ecosystems that are critical for human well-being. However, human activities, including overfishing, pollution, and coastal development, pose significant threats to marine ecosystems worldwide [14–16]. These threats

compromise the resilience and stability of marine ecosystems, highlighting the urgent need for effective management strategies to safeguard NC [17–19].

Anthropogenic threats, coupled with climate change (CC), affect marine ecosystems through ocean warming, acidification, rising sea levels, increased storm intensity, altered circulation patterns, and the shifting distribution and abundance of marine species [20–24]. These effects can exacerbate existing human-induced pressures on ecosystem structure and function and adversely impact the benefits provided by marine ecosystems, necessitating updated and adaptive marine management approaches [25–28].

Over the past two decades, coastal countries have been promoting marine spatial planning (MSP) initiatives to balance multiple human demands and impacts with ocean health, marine conservation, and the preservation of ESs. Many marine spatial plans designate areas that prohibit certain human activities to protect biotic and abiotic resources. Designated marine protected areas (MPAs) are a key conservation strategy for safeguarding and managing marine biodiversity [29]. Zones within MPAs can be designed to focus on ecological, social, and economic objectives [30]. The past decade has seen a significant increase in the establishment of MPAs with the level of protection from human activities varying significantly across the various management categories of MPAs as defined by the International Union for Conservation of Nature (IUCN).

Marine spatial planning does not rely solely on MPAs for managing human uses; it incorporates various other zones representing diverse interests, each strategically designed for specific objectives. These zones serve as a spatial tool that specifies when and where human activities are permitted, thereby isolating human uses that are thought to be incompatible [31,32]. This zoning approach optimizes resource use while minimizing conflicts and balancing economic development with environmental conservation. Such a balancing approach is vital for sustainable marine management as it facilitates coordinated efforts among stakeholders and actively promotes the preservation of ecosystem integrity and resilience. By maintaining the overall provision of ESs within the zoned area, MSP aims to enhance conservation efforts, support sustainable development, and foster economic growth, all ultimately benefiting human well-being [33–36].

Since marine zoning is a widely used spatial tool in marine spatial plans [31,32], it holds significant potential to address the pressing challenges faced by marine ecosystems, including the sustainable use of ESs, CC resilience, and the preservation of natural capital NC. However, despite its widespread application, the degree to which marine zoning effectively integrates these critical aspects remains insufficiently explored. This gap underscores the need for a comprehensive review to evaluate how zoning design and implementation can support these objectives and contribute to more sustainable marine management practices.

In this review, we aim to address this need by evaluating key aspects of marine zoning utilization in spatial plans. Specifically, we analyze parameters such as the number, size, and type of zones; conservation objectives; stakeholder engagement; and the explicit inclusion of ES, NC, and CC considerations in zoning strategies. Furthermore, we identify gaps in existing research and practical applications as a critical foundation for improving the integration of these elements into marine spatial planning. By focusing on these aspects, this study provides essential insights to enhance marine zoning approaches, particularly in the context of developing climate readiness and fostering resilience in marine ecosystems.

2. Materials and Methods

The current study's systematic literature review follows the protocol developed by the Preferred Reporting Items for Systematic Review Recommendations (PRISMA) (as per Page et al. [37]). The PRISMA protocol is a set of guidelines designed to improve

the transparency and quality of systematic reviews by providing a structured framework for reporting research findings. This ensures that all critical components of the review process are systematically documented, thereby making the review more comprehensive and reliable. While PRISMA was initially developed for medical research, its structured approach enhances rigor and transparency across various academic fields. In disciplines such as marine zoning, PRISMA helps standardize the review process, making it easier for researchers to identify research gaps, assess the trustworthiness of findings, and ensure that the review is replicable and transparent [37]. PRISMA includes three stages: first, systematic article selection applying a search engine; second, screening; and third, a review of selected articles with information extraction (Figure 1). A bibliographic search was conducted using the Scopus database. Scopus is recognized for its comprehensive coverage and high-quality bibliometric data, making it a reliable choice for systematic reviews and offering advantages over other citation databases. Compared to Web of Science, Scopus offers broader journal coverage, including a wider representation of regional publications, which is essential for capturing diverse perspectives in multidisciplinary research [38,39]. Furthermore, unlike Google Scholar, which includes non-peer-reviewed sources such as theses and conference papers, Scopus provides a curated collection of scholarly works, ensuring higher data quality [38]. Scopus has been selected as the primary database for this research because of its broad multidisciplinary coverage, including key areas such as environmental sciences and ecology. With access to an extensive range of peer-reviewed articles, Scopus ensures that the literature review is thorough and captures many relevant studies on marine zoning. This broad, reliable source base strengthens the research findings, making them more robust and applicable to real-world marine management and climate-resilience strategies [40–42].

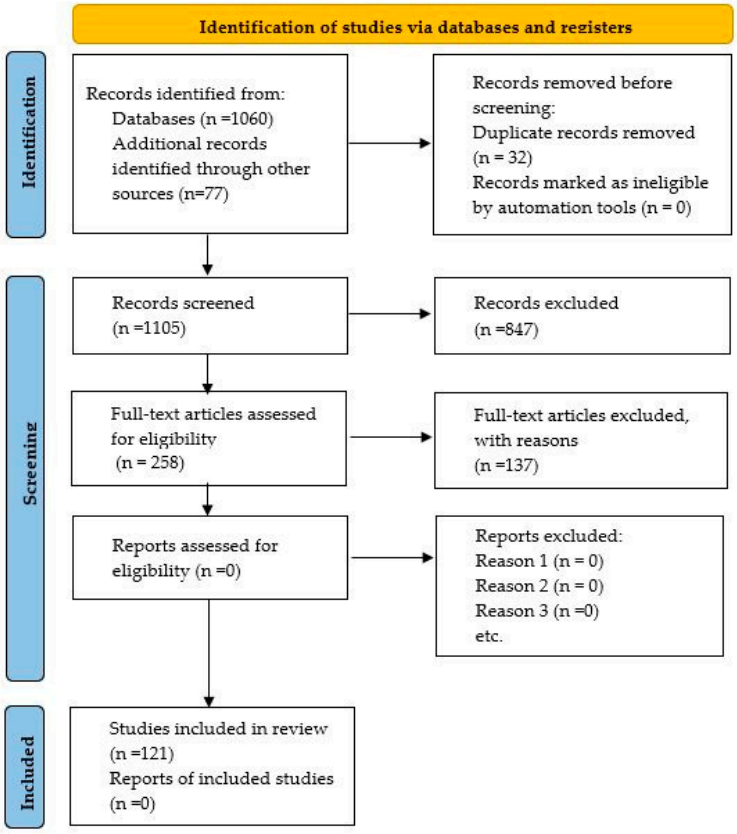


Figure 1. Current review screening flowchart following PRISMA protocol (Source [37]). This work is licensed under CC BY 4.0. To view a copy of this license, visit https://creativecommons.org/licenses/by/4.0/ (accessed on 4 May 2022).

The following search terms in the title, abstract, or keywords were used:

1. "marine" AND "zoning" OR "marine" AND "zonation" OR "marine" AND zoning AND design AND
2. "marine" AND "protected" AND "area" OR "mpa" AND
3. "marine" AND "spatial" AND "planning" OR "msp" AND
4. "marine" AND "coast" OR "marine" AND "coastal" AND "area" AND
5. "marine" AND "coastal" AND "management" OR "marine" AND "management" OR
6. "multi" AND "use" AND "mpa" OR "multi" AND "use" AND "marine" AND "protected" AND "area" OR "multiuse" AND "mpa" OR "multiple" AND "use" AND "mpa" OR "multiple" AND "use" AND "marine" AND "protected" AND "area" OR "multiple-use" AND "mpa" OR "multiple-use" AND "marine" AND "protected" AND "area"

The search, conducted on 4 May 2022, initially returned a total of 1060 publications. To focus specifically on research cases involving the use of marine zoning, the search was limited to research and review articles, excluding grey literature and book chapters. Following the PRISMA protocol, additional relevant papers were identified through other sources, such as snowball sampling. These were manually added to the dataset, bringing the total number of articles to 1137. After duplicates were removed, 1105 articles were screened on two levels. The first level of screening included the title and abstract, and the second level considered the full article. At the first level, articles were eliminated if they did not address a marine-related subject, if they were not in the English language, and if they did not have relevance to spatial marine management, planning, or evaluation (n (= number of articles) = 847). The second level of screening eliminated articles if they did not contain the zoning aspect, i.e., articles that did not contain references to area, site, evaluation, or planning of zoning or zone types. Moreover, review articles that only mentioned zoning or zones in general but not as part of the research were also eliminated (n = 137). The screening resulted in 121 articles for review and analysis (10.6% of the original collection) (Figure 1).

Information was manually extracted from each of the 121 selected articles. Data relevant to addressing the objectives of this study were systematically compiled into Excel tables, and a database was created to organize the extracted information (see Supplementary Materials). The main categories of data included study area location, zone types, human activity and threat types, study subjects, and stakeholder engagement. Additionally, the inclusion of ES, marine NC, and CC topics in the reviewed articles was examined to assess the presence of marine ES and NC topics in marine zoning research and determine whether CC and its effects are being cited and studied in marine zoning planning and research.

3. Results

3.1. Marine Zoning: A Two-Decade Bibliographic Analysis

A bibliographic search using the Scopus search engine identified articles published from 1 January 2002 to 30 March 2022, representing two decades of research. The number of articles on marine zoning and marine conservation fluctuated year by year (Figure 2). There was a notable increase in publications from 2009 to 2010, with a peak of 14 articles in 2010. After 2010, there was a decline; however, the number of articles remained relatively high and stable (average 7.2 articles), reaching a second peak of 11 articles in 2017. The years 2003, 2004, and 2011 were exceptionally sparse, with no articles published. It should be noted that the marine zoning articles search focused on articles related to conservation (e.g., MPA). Using different search keywords might encompass additional aspects of marine zoning; however, it would not achieve the current search purpose.

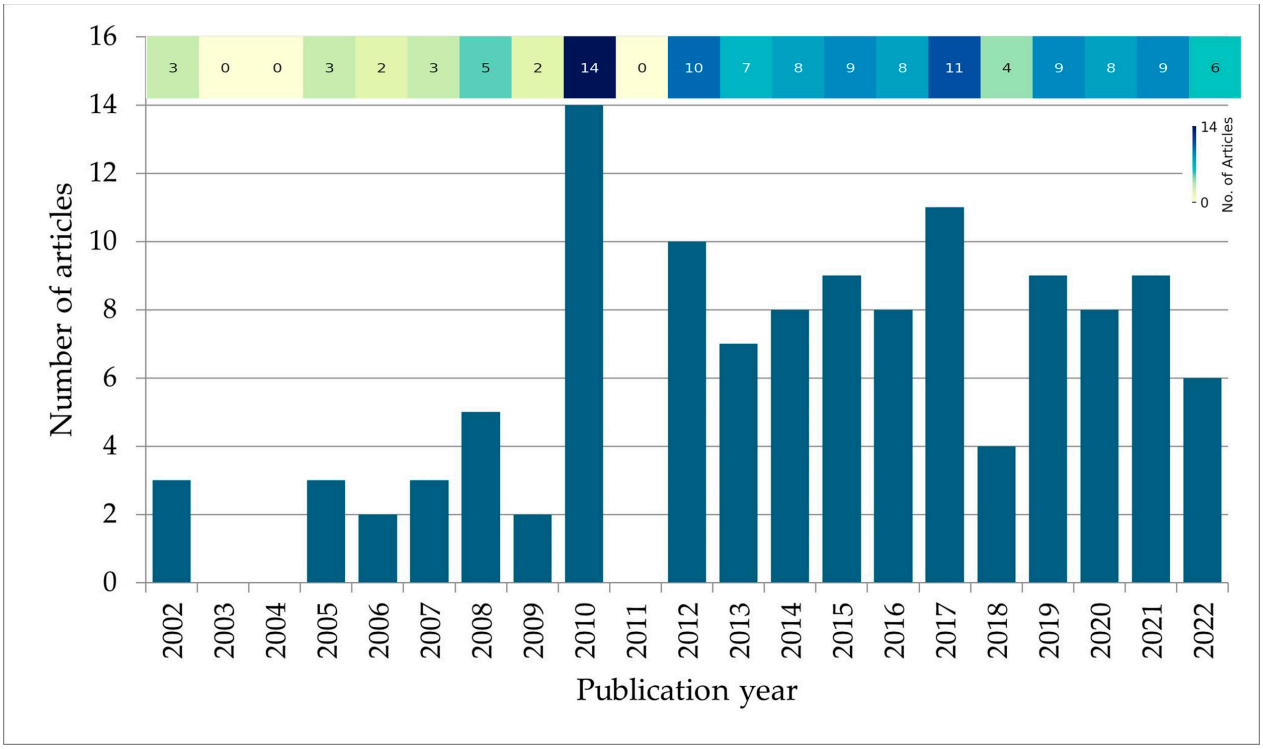


Figure 2. Distribution and visualization of the number of marine zoning scientific articles related to conservation by publication year (2002–2022) based on results from a Scopus literature review. Heatmap visualization—darker shades indicating years of higher publication activity.

3.2. Number, Size, and Type of Zones

In a marine spatial plan, distinct uses and their intensities are selected based on the area's attributes and suitability for those purposes, as well as the currently existing use in the area. Thus, zone definitions and their management aim to minimize conflicts between incompatible uses, thereby sustaining the health of marine ecosystems [33]. Consequently, the marine spatial plan defines the number and types of designated zones based on its aim, ensuring they align with the area's ecological and usage requirements. To examine the common marine zoning plane structure in the review papers, we retrieved the number of zones and categories, as well as the MPA or research area size data.

To evaluate the use of zone types, those having similar purposes were grouped together (see Table 1) [43]. The literature review search focuses on zoning for marine conservation with the level of protection or restoration. Here, we study the different definitions and uses of zone types. Out of one hundred and twenty-one articles, ninety-six include a description or definition of the zone types used as well as the number of zones. Of these, seventy-six mention a no-take zone (fully protected zone, sanctuary zone, or core zone), which is the most protected and the most common zone used as part of a zoning plan. Sixty-three mention a special-use zone, which includes the specific planning need described in the study, i.e., shore-based activities and oil exploration [44]. Thirty articles mentioned a general-use zone, and twenty-six mentioned a conservation zone/park (see Table 1). Out of the no-take zone articles, 33% also include a general-use zone and 30% include a special-use zone. These results align with the goal of a marine management plan that uses zoning to balance both marine conservation and sustainable marine use. When the primary objective is marine conservation, the plan will also designate zones for human activities, and vice versa. This approach ensures that both human activities and ES usage are integrated alongside marine conservation efforts.

Table 1. The number of articles including the different zone types in the zoning plan, classified according to zone type in relevant articles.

Zone Type	In Relevant Articles (n = 96)
No take/fully protected/sanctuary zones	76
Special use	63
Unprotected/open/general use	30
Conservation zone/park	26
Buffer	18
Scientific research zone	16
Habitat protection	15
Mariculture and fishery	13
Tourism-related zone	10
Partially protected area	9
Multi-use zone	9
Aquaculture zone	8
Specific management	6
Reserve	6

Considering the number of zones, we found that ninety-six articles (79%) present the zone types and the number of zones of the zoning plan. The number of zones presented in the articles ranges from one to nine, with the most common division into three zones (27 articles) (Figure 3). We used the Marine Conservation Institute's marine protection atlas (MPAtlas) for the size estimation of MPAs included in the review articles. These MPAs were classified into four classes by size. The classification examined the size of the study area and the number of zones defined in terms of size as follows: (1) very small <10 km^2, (2) small 10–100 km^2, (3) large 100–100,000 km^2, and (4) very large >100,000 km^2. The large size area is the most common regardless of the number of zones in the study. Furthermore, there appears to be no correlation between the area size and the number of zones planned (Figure 4).

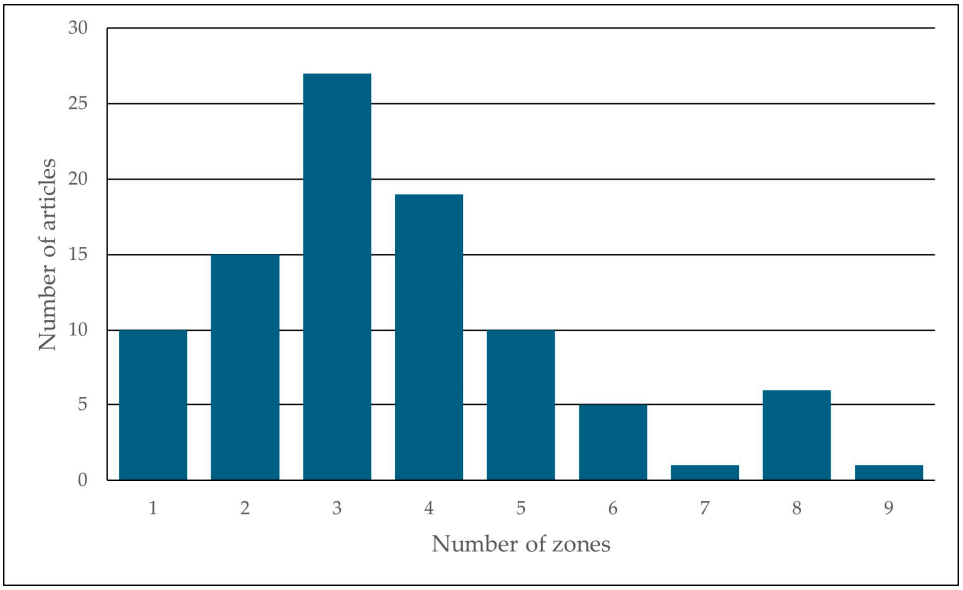


Figure 3. The number of articles according to the number of zones included in the zoning plan.

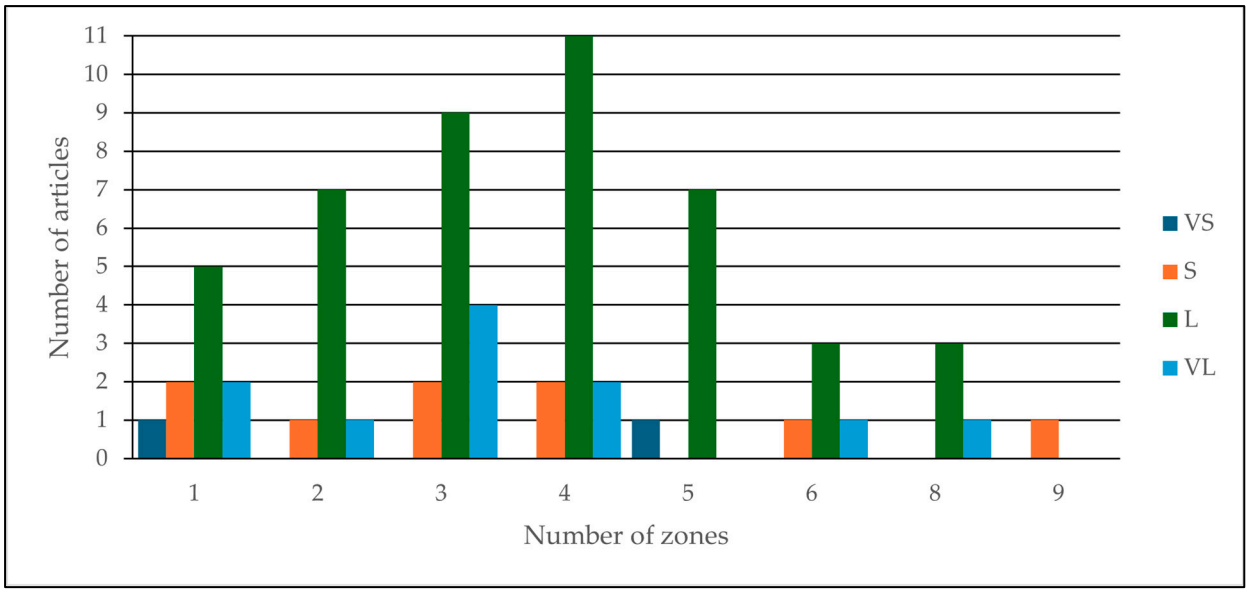


Figure 4. The number of articles according to the number of zones included in the zoning plan broken down by study area size (VS = very small, S = small, L = large, and VL = very large).

3.3. Study Area Location

Zoning research study areas refer to regions presented as case studies or involved in the planning processes of specific locales. These study areas were defined by the country or federation in which they are located. Eight primary locations are highlighted in Figure 5, while the other locations studied were only mentioned in one or two articles.



Figure 5. The eight countries most frequently studied in reviewed articles, along with the corresponding number of articles that include each country.

The number of articles focusing on Australia is significantly higher than the other regions studied. Of the 36 articles mentioning Australian study sites, 14 focus on the Great

Barrier Reef (GBR, which was rezoned in 2004), 5 on New South Wales, 5 on Port Stephen Moreton Bay region, and 1 each on Ngari Capes Marine Park, Jurien Bay Marine Park, and Eyre Peninsula. The second-most-studied area is Indonesia with six articles. Three of the articles studied different separate and specific areas; however, the other three articles focus on a marine protected area network in Raja Ampat, where a zoning plan was implemented in 2012 [45–47]. Both MPA Raja Ampat and the GBR are marine zoning areas that have been managed for a relatively long period.

3.4. Human Activities and Threat Types

Here, we analyze the conflicts between human activity and marine environment sustainability discussed in the articles in order to understand how current zoning approaches are used to protect, sustain, and support the marine environment and ecosystem. The types of human threats addressed in the reviewed articles are presented in Table 2.

Table 2. Number of articles according to the human activity or threat presented in the articles reviewed.

Threat Type	Number of Articles (*n* = 121)
Fishing as the main threat, along with other human activities in general	38
Only fishing	32
Human activity in general	26
Did not mention a threat	12
Human activities in general and fishing as an example	8
Tourism as the main human activity with an emphasis on recreational fishing	5

Clearly fishing is the predominant human threat cited in the marine zoning articles reviewed. Fishing is a human activity that, without management or regulation, can easily become a threat. Grouping together the articles that identified fishing as a primary threat reveals that 68.6% of the reviewed articles cited fishing as a human threat (Figure 6). In some cases, fishing is mentioned as the main threat, while in others, it is listed together with several other human threats. Meanwhile, 21.49% of the articles referred to human threats in general, excluding fishing, and the remaining 9.92% did not mention human threats at all (Figure 6).

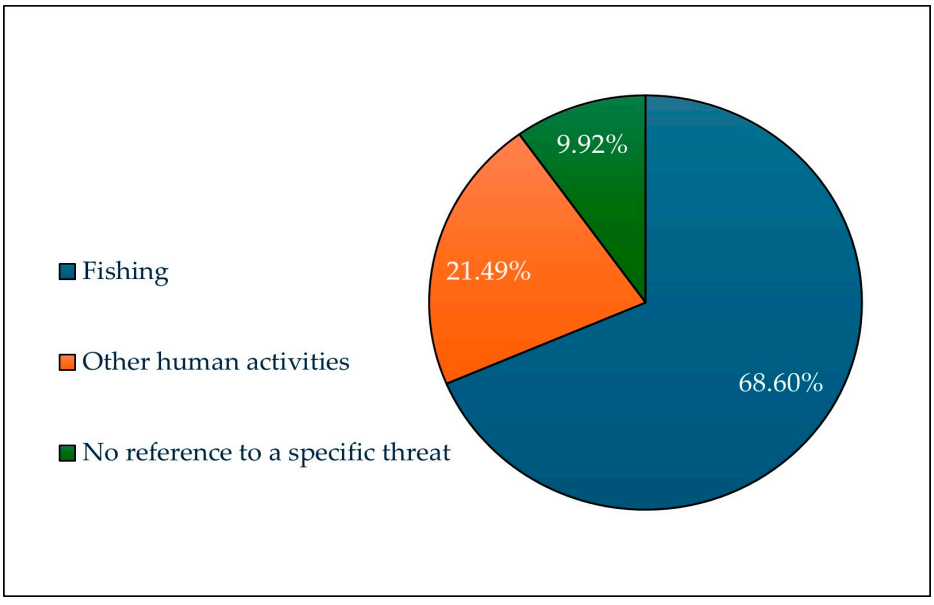


Figure 6. Distribution of the human activities referred to as "threats" in the review papers.

Fishing is identified as the most prevalent human threat for which zoning provides effective solutions through management and spatial planning. For example, zoning contributes to the conservation of fish species in estuaries by designating specific areas as no-take or partially protected zones. This approach optimizes the conservation of fish habitats by integrating temporal and spatial variation across marine life stages, from eggs to adults. De Paula Costa et al. [48] demonstrated that defining small no-take areas can be a more advantageous approach than other spatial and non-spatial fishing management strategies. This advantage is partially attributed to better compliance with the marine protected area strategy and, consequently, the more efficient management of exploited resources. Furthermore, implementing a zoning scheme to protect fish habitats facilitates the accommodation of multiple objectives, reduces conflicts between activities, and minimizes adverse effects on coastal ecosystems. There is a recognized need and urgency to address declining resource conditions and ongoing natural and anthropogenic threats. In response, marine zoning offers varying levels of protection and enables different levels of use based on the goals of the specific marine zone [49].

3.5. Primary Subjects of Protection and Management

In the current review (see Figure 7), most articles (44.63%) identified fish as the primary or one of the primary subjects of protection and management (fish only, 27.27%; fish with coral or algae, etc., 7.44%; marine habitat with an emphasis on fish, 9.92%). Another 28.1% of the articles focused on more general topics, such as marine habitats and the overall marine ecosystem in the study area that require management and/or protection (e.g., [50]). Some articles (8.26%) concentrated on a specific organism as a case study to evaluate an existing marine zoning plan or to develop a new one (e.g., whales in [51] and marine turtles in [52]). Less common study subjects included coral reefs (including sponges), represented in only 3.31% of the articles, and algae, in just 1.65% of the articles.

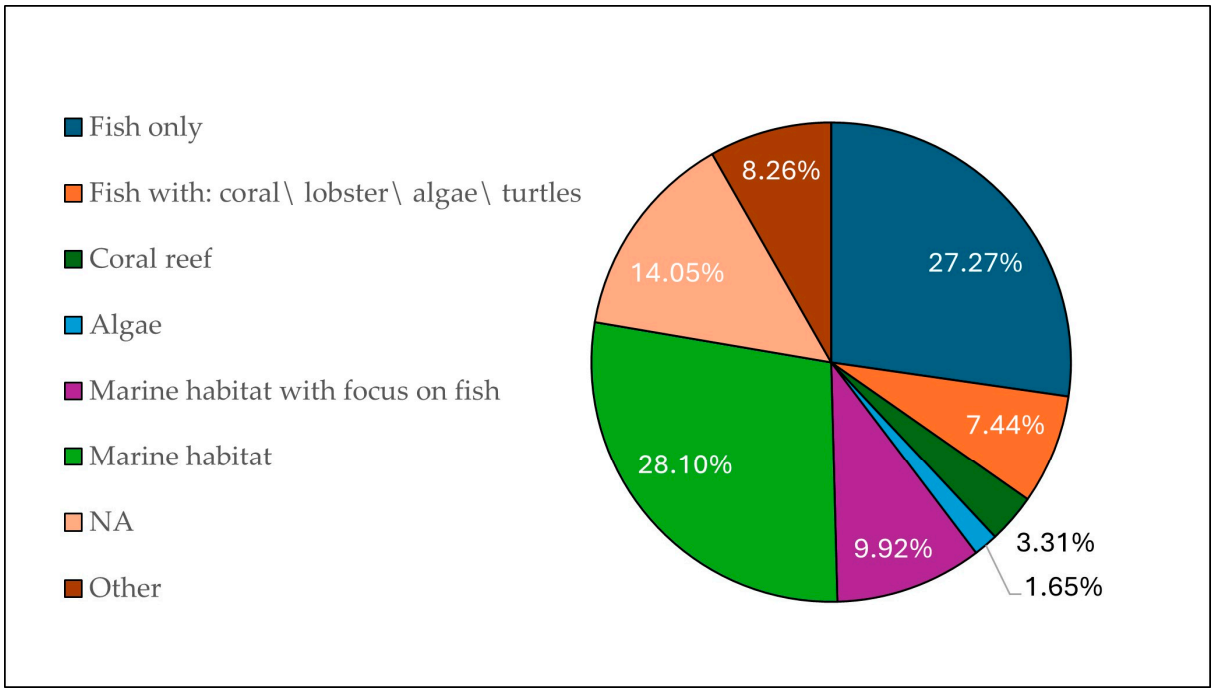


Figure 7. Distribution of articles' main subjects for protection and management.

3.6. Stakeholder Engagement

Stakeholder engagement is a crucial part of the marine zoning planning process [53–56]. Of the Appendix A 121 reviewed articles, 38 (31.4%) mentioned stakeholder involvement

in the planning and evaluation process. The reviewed articles present two main methods for stakeholder consultations. The first involves interviews with selected stakeholders (e.g., [45,57–61]), while the second method is to hold workshops with stakeholder participation (e.g., [50,61]).

Stakeholder engagement in most case studies includes various types of stakeholders. The most common stakeholder type in the review articles is the policy or decision-making echelon (Political—17 articles, Figure 8), representing members of local government, government agencies, and relevant government departments (e.g., fisheries, planning, tourism department, maritime affairs, and environmental agencies). The next most common stakeholder is the public sector (Public—16 articles, Figure 8), which includes several entities such as indigenous groups, local communities, residents and property owners, community leaders, and local users. This stakeholder type is followed by scientists and the fishing sector, i.e., fishery representatives (12 articles each). The category "Other" refers to unique stakeholders that participate due to the specific study aim and area, such as boating organizations, business owners, nature reserve employees, architects, engineers, NGOs, farmers, livestock growers, and manufacturers.

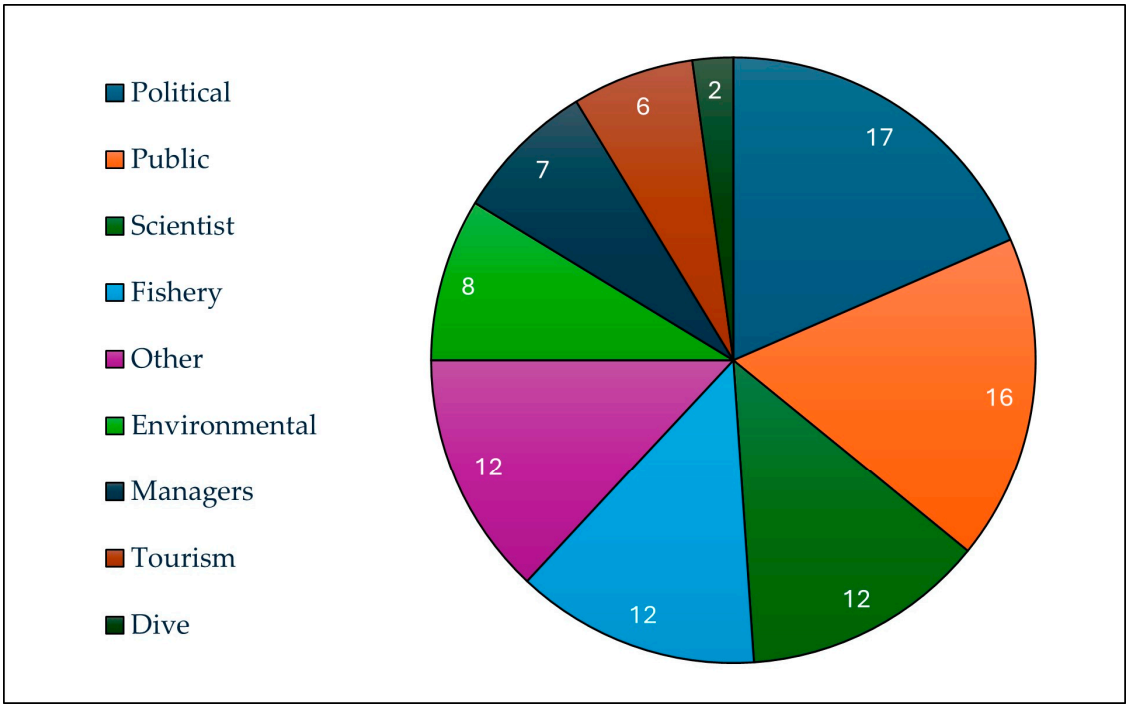


Figure 8. Stakeholder group types were identified in the review papers (n = 38). Each segment of the pie chart, labeled with a corresponding number, represents the frequency with which each stakeholder group was mentioned.

3.7. Inclusion of Ecosystem Services (ESs), Marine Natural Capital (NC), and Climate Change (CC) Topics

Examining mentions of ESs in the articles reviewed reveals that thirty-three articles contain the term "ecosystem services" and describe it in the introduction or as part of the research contribution. However, only three articles directly addressed ESs as part of the research. Barbosa et al. [62] proposed a novel approach for the systematic spatial planning of multi-zoning, selecting cost-effective areas for restoration based on biodiversity, ES, and ecosystem conditions to achieve an optimal spatial design of Green and Blue Infrastructure (GBI). Verutes et al. [63] identified an optimal zoning scheme that evaluates the risk to three coastal marine habitats posed by eight human uses and quantified the current and

future delivery of three ESs: protection from storms, catch and revenue from lobster fishing, and tourism expenditures. Halpern et al. [64] developed a framework for evaluating the effects of multiple human activities on the marine environment and their interactive and cumulative impacts. The authors argue that management decisions require a consideration of ESs and trade-offs among all ESs. Furthermore, they concluded that comprehensive marine zoning provides a powerful tool to collectively address these key concepts.

Marine ESs is the output generated by marine NC [12]. Accordingly, NC is considered essential to human welfare [1]. Due to its importance, evaluating marine NC can be valuable in marine zoning spatial planning and management. However, in the current review, of the 121 articles, only two mentioned marine NC. Rovere et al. [65] presented an application of a methodology that produces a set of maps for MPA management. They proposed an environmental quality map of the marine territory that provides information on the value of the marine environment and finds application in cases where a comparison between natural and human or financial capital is required. The higher the NC, the higher the environmental quality. These maps were created as a tool for MPA managers to identify areas subject to various susceptibilities and to direct conservation efforts or plans for the sustainable development of the territory.

The second study, by Verutes et al. [63], mentioned earlier, used the term "NC" when presenting the Natural Capital Project (NatCap), which works to integrate the value that nature provides to society into all major decisions (https://naturalcapitalproject.stanford.edu/ (accessed on 8 November 2024)). The study did not refer to NC as a subject of the research.

CC may affect marine ESs and NC; therefore, MSP can be used to manage and protect these resources [66]. The current review articles included three studies that presented a CC assessment. Brodie and Waterhouse [67] reported on the history and status of human effects on the GBR, assessed the success of the regime management, and suggested future forecasts. They determined that effective action on CC has yet to begin, either nationally or globally. Magris et al. [68] devised objectives for biodiversity, connectivity, and resilience to global warming, determined the extent to which existing MPAs achieved these, and designed complementary zoning to achieve all objectives combined in expanded MPA systems. Their approach recognizes that MPA expansion and zoning are among several tools that might be used by managers to realize conservation objectives and reduce potential conflict. Nonetheless, more research is needed to investigate various management tools, as well as additional guidance to integrate potentially significant interactions of CC with connectivity and biodiversity, and to adapt more informed conservation plans accordingly. Noble et al. [69] developed a fuzzy-set multi-criteria evaluation. Their analysis includes a prediction of how CC may affect sensitive habitats and demonstrates the increased vulnerability of both habitats and marine species when allowing fishing pressure across the entire MPA and in spatial zoning scenarios. They showed that current and predicted social-ecological spatial information about an MPA can provide decision-makers and the local community with tools to make informed decisions toward better designing an MPA that supports long-term social–ecological resilience.

Table 3 presents only the seven articles that address one or more of the three subjects (ESs, NC, and CC). Each article covers one subject, except for Verutes et al. [63], which addresses both ESs and NC. However, note that the NC in these articles is referred to as part of a collaboration with the Natural Capital Project (NatCap) and not as an independent NC evaluation. While ESs, NC, and CC are overlapping subject areas that play an essential part in marine habitat management, they have low representation in articles studying marine zoning.

Table 3. Articles addressing ecosystem services, natural capital, and climate change topics.

Article	Parameters	Comments
Barbosa et al. [62]	ES	Proposed a novel approach to selecting cost-effective areas for restoration in Green and Blue Infrastructure designs based on the provision of ESs
Halpern et al. [64]	ES	Maintained the provision of an overall set of ESs provided by the overall zoned area
Verutes et al. [63]	EC; NC	[EC] Used an ecosystem service approach to inform coastal and ocean planning decisions [NC] The Natural Capital Project (NatCap)
Rovere et al. [65]	NC	Discussed the use of maps to represent the value of NC contained in each cell of a marine protected area, including natural, economic, esthetic, and rarity values.
Brodie and Waterhouse [67]	CC	Discussed CC as one of the stressors responsible for the decline in coral cover and general reef health of the Great Barrier Reef
Magris et al. [68]	CC	Cited the need to consider resilience to global warming as one of the broad conservation objectives when designing marine protected area (MPA) systems
Noble et al. [69]	CC	Referred to CC and its potential impact on sensitive habitats and marine species within a marine protected area

4. Discussion

This review synthesizes findings on marine zoning to support and inform researchers and managers in marine spatial planning and decision-making. By characterizing and examining relevant criteria, this review provides insights into important considerations for effective marine planning and management. It identifies less-studied topics and emerging focus areas as priorities for future research to advance marine zoning and support marine ecosystem conservation and human well-being.

Over the two-decade period considered, marine zoning research exhibited fluctuation that can be explained by several factors. The lack of articles on marine zoning in 2003 and 2004 may be attributed to limited case studies or practical implementations and limited data available for researchers to analyze since zoning projects were still in the early phases of planning and implementation. The increase in publications between 2008 and 2010 aligns with the growing global awareness of marine conservation and the integration of MSP into national and international policies. This surge coincided with key policy developments, such as the Convention on Biological Diversity's Aichi Biodiversity Targets, which aimed to conserve 10% of coastal and marine areas by 2020 [70]. These global initiatives likely prompted researchers to focus on the role of zoning in balancing ecological preservation with economic activities such as fisheries, tourism, and energy production.

The article numbers peak in 2010 may be attributed to heightened attention on sustainable marine resource management and the establishment of marine zoning areas, which provided opportunities for case studies that can be evaluated for their effectiveness. The decline in publications in 2011 may reflect a shift in research priorities or the completion of foundational studies. However, the stable publication rate in subsequent years indicates the continued relevance of marine zoning as a research topic. The second peak in 2017 likely corresponds with the increasing urgency to meet global conservation goals, particularly those outlined in the Sustainable Development Goals (SDGs), specifically Goal 14, which emphasizes the protection of marine ecosystems [71].

In recent years, the number of articles on marine zoning has remained relatively stable, indicating that it remains a pertinent research topic. Despite its significance and evolving

nature, it was expected that the literature search would yield a higher volume of research articles. This current search is centered on marine zoning articles related to conservation and protection. A broader search might yield more results. Additionally, this highlights the necessity for further studies on marine zoning, with the expectation that the number of articles will grow as marine zoning management continues to develop and generate more data.

When researching, managing, or planning marine zoning, it is imperative to understand its fundamental components, which include the definition, objectives, management strategies, and spatial planning of the designated zones. No-take zones, fully protected zones, and sanctuary zones were found to be the most common zones in the review of marine zoning plans (Table 1). These zones are defined as highly protected and are essential for conserving marine biodiversity and ecosystems [72]. However, as shown in the current results, to achieve a balanced approach that meets the specific needs of an area and the communities that rely on it, complementary zones such as partially protected zones, general-use zones, and special-use zones should also be included in zoning planning.

No correlation was found between the size of the study site and the number of zones contained in the zoning plan (Figure 3), suggesting that the number of zones in the zoning plan does not depend on the size of the site area. The number and size of zones in a marine spatial plan can be influenced by several factors, including conservation targets, species mobility, marine habitat distribution, or infrastructure development needs. When implementing marine spatial planning with zoning, the focus should prioritize the specific objectives and environmental conditions of the area rather than the size of the site. This is significant given that the current review demonstrates variation in marine zoning study sites worldwide.

For instance, the prominence of the GBR as a study site (Figure 5) reflects the area's research appeal due to its importance of marine conservation and its relatively long history of management since it was declared in 1975 and, in 1981, was listed as a UNESCO World Heritage Area. In 2004, a re-zoning process was undertaken, and, in 2015, the Australian and Queensland governments released the Reef 2050 Long-Term Sustainability Plan [73]. The GBR's features, long-term monitoring, and extensive data availability provide a reliable and informative case study for research and serve as an example of marine management in general and, specifically, in marine zoning. The GBR's integrated management approach serves as an example of a zoning plan that has been updated over time [32]. These factors explain the high level of research interest and the large number of articles focusing on the GBR. The process of planning, managing, monitoring, and analysis provides valuable lessons on how to improve zoning based on field results. This underscores the importance of long-term monitoring and continuous research to enhance marine conservation alongside human activities in zoning management. Considering evolving research data, increasing human pressures, and dynamic environmental conditions, future marine zoning management strategies must be continuously updated.

Fisheries, for instance, are recognized as a significant supply service within the broader framework of ESs [4]. Accordingly, the primary objective of fish conservation research is to develop effective management strategies that mitigate the impact of fishing activities on ecosystems. Based on the articles reviewed, marine spatial planning is identified as a key solution for achieving this goal (e.g., [42,48]). However, the level of trust between fishermen and marine spatial planners can vary due to ambiguous policies and inconsistent implementation practices [74]. Despite these challenges, fostering trust and collaboration is essential for the successful implementation of marine spatial plans. Fishing emerged as the dominant human activity on which marine zoning research is focused. Moreover, most of the articles reviewed cited fishing as a significant threat to marine habitats and species

(Table 2). Fisheries, fish, and their derivatives are the most frequently researched subjects in relation to zoning planning in the articles reviewed. While fishing is vital for food security and holds traditional cultural significance for indigenous and local communities, it can also pose threats such as overfishing, harm to marine biodiversity, and marine litter [75–80]. Effective fishing management is crucial for environmental and economic stability and human well-being. It is also the oldest sector, which explains its prominence in the articles reviewed (Figure 6) and the widespread use of zoning as a tool for fishery management worldwide.

Research emphasizes the importance of appropriate policy and regulatory guidelines in developing integrated strategies for sustainable fisheries [81,82]. Moreover, the emergence of the blue economy and clean energy initiatives has had a significant impact on fishery management, particularly in the context of marine zoning. The implementation of blue economy concepts, such as resource efficiency and social equity, plays a crucial role in ensuring the sustainability of fish resources in conflict zones. Furthermore, the extraction of energy from waves and tides as renewable sources must consider the balance between the needs of traditional marine users and the development of marine renewable energy projects, especially in inshore fisheries where interactions are more locally significant [83]. Effective marine spatial planning is highlighted as a key factor in managing the spatial occupancy of fishing areas by energy developments and ensuring the sustainable coexistence of marine renewable energy and fishing industries [84]. However, marine conservation should be integrated into each MSP and fishery management plan to ensure the feasibility and continued health of the marine ecosystem. It is essential to evaluate all parameters and to formulate informed zone-based uses to prevent negative economic impacts [49] and to achieve zoning aims for conservation and protection [85].

The predominance of fishing as the major human threat in marine zoning research, as evidenced by its citation in 68.6% of the reviewed articles, highlights a critical focus area for marine conservation efforts. This contrasts with the limited representation of other human activities such as tourism, coastal development, and industrialization in the reviewed literature. Tourism, particularly in coastal and reef areas, often contributes to habitat degradation, pollution, and physical damage to ecosystems through activities such as boating, diving, and anchoring. Furthermore, coastal development and industrial activities, such as port expansions, natural gas and oil extraction, and urban development, also pose significant risks to marine habitats, particularly through pollution and habitat fragmentation. These activities can lead to the loss of critical marine environments such as mangroves, coral reefs, and seagrass beds, all of which serve as vital buffers against CC.

The current review underscores a research gap in the assessment of marine zoning's capacity as a comprehensive spatial management tool. While much attention has been paid to fishery management, there is limited research on how marine zoning can address other human impacts such as tourism, coastal development, and industrial activities, highlighting the need for a broader, multi-sectoral approach in future studies.

Combining human activity with marine conservation, where society must balance biodiversity, aquaculture, and marine industries, necessitates the inclusion of other important study subjects in zoning plans [68]. Marine habitats are the second-most-studied subject in the articles reviewed (Figure 7). "Marine habitat" is a broad term encompassing a variety of habitats and definitions [86], one of which is coral reefs, a widely researched subject. However, in the current review, coral reefs are the main subject in only 4% of the reviewed articles. Nonetheless, the term "coral reef" appeared in the bibliographic analysis of authors' keywords. Hence, it can be assumed that when citing "marine habitat" as the subject, most reviewed articles include coral reefs under this description of "marine habitat". Coral reefs are a critical marine habitat supporting the marine ecosystem [87].

They are the most biodiverse of marine ecosystems, with ecological and socioeconomic importance through providing food and employment worldwide [88–90]. Therefore, coral reef as a significant ESs should be a greater focus of research rather than just part of the marine habitat definition in only 4% of the articles.

In addition to coral reef habitats, seagrass and algae were also found to be underrepresented as main study subjects for preservation and protection (Figure 7). Less than 2% of the articles reviewed presented algae as a research objective, and none presented seagrass as the main subject. Both algae and seagrass have high ecological and socioeconomic significance and provide valuable ESs. Marine algae and seagrass provide habitats for various species and have high carbon sequestration potential. Moreover, both are used as food extracts in pharmaceuticals, cosmetics, and industrial applications, and some species can be used in agriculture [91–93].

To support marine ESs and maximize the effectiveness of marine zoning and planning, it is essential to ensure that diverse interests and knowledge are integrated into decision-making. Robust stakeholder engagement is thus a critical component of effective marine management. This engagement is essential for the successful implementation of MSP [94,95]. Despite its importance, less than a third of the articles reviewed mentioned stakeholders' engagement. Various stakeholder types were mentioned, including government representatives, municipalities, local community leaders, researchers, recreational users, indigenous groups, and other relevant individuals (e.g., [48,50,96]). The most common stakeholder types cited were from the policy or decision-making and public sectors (Figure 8). This indicates the importance of government agencies and local communities in the zoning processes as they influence community life. Other significant stakeholders are scientists and the fishery sector; their high occurrence in the articles underscores the importance of incorporating specific experts into marine zoning plans. However, the engagement of stakeholders from the environmental protection, mainly NGOs, and tourism (e.g., diving, beach recreationalists, or other marine recreation) sectors should receive more focus to analyze the interaction/conflict between the preserved areas and the tourists. CC's effects on the marine environment are another important and major concern. Considering CC threats, researchers and managers should include a diverse range of stakeholder types to ensure a comprehensive and effective marine spatial zoning plan. These stakeholders have a major role in preserving ecosystems' sustainability and the flow of ESs.

The limited inclusion of ESs and NC in marine zoning research highlights a crucial gap that needs to be addressed to enhance the efficacy of marine spatial planning (Table 3). As this review shows, only a few articles integrate ES and NC evaluations in their zoning frameworks, and even fewer examine these factors in a way that can influence stakeholders and policymakers. This absence is concerning, given the growing recognition of ESs and NC as critical elements for sustainable marine management [12]. Marine ES assessments, including mapping and valuation, are essential for identifying priority areas and conveying the importance of natural resources. Such evaluations could help to balance ecological conservation with socio-economic needs, guiding management strategies for fisheries, tourism, and coastal protection.

To address this gap, practical methodologies are proposed for operationalizing; Frameworks such as InVEST® (Integrated Valuation of Ecosystem Services and Trade-offs) [97] and GIS-based spatial analysis can be utilized to map and quantify ecosystem services, including fishery productivity, carbon sequestration, and coastal protection. These tools provide a spatially explicit foundation for identifying priority areas that balance ecological conservation with socio-economic benefits. Additionally, participatory approaches, such as stakeholder workshops, scenario planning, and participatory mapping, can ensure the

inclusion of locally valued ESs, such as fisheries, tourism, and cultural ESs, into zoning frameworks [98,99].

Expanding on these observations, the current review found that while many articles address fishery management within the context of marine zoning, the focus tends to lean heavily toward the ecological aspects of fisheries. These assessments primarily consider species population dynamics, and the impacts of fishing on marine habitats, rather than evaluating fishing as an ES or considering the habitat as a form of NC.

Moreover, fisheries represent only one aspect of the broader range of ESs and NC that marine ecosystems provide. There are numerous additional ESs, such as those related to tourism, coastal protection, and urban development, that should be better characterized and integrated into marine zoning research. Expanding the marine zoning scope of research to include these services will provide a more comprehensive understanding of the multiple ways in which marine ecosystems support human well-being and socio-economic benefits. This expansion is crucial for developing more holistic and effective marine zoning planning and management strategies that consider the full range of services and values that these ecosystems provide.

Adding marine NC and ES evaluation to marine spatial zoning planning and management provides a more comprehensive approach that can foster greater collaboration between stakeholders and policymakers while promoting marine conservation, especially under CC effects.

CC significantly affects marine ecosystems as it is associated with ocean acidification and a wide range of current and potential biological effects, such as shifts in marine circulation, temperature, and nutrient input [100]. Future impacts of CC on marine ecosystems are expected to have major consequences, including changes in species' life histories and distributions, biogeochemical cycles, and seasonality [101,102]. These changes in marine ecosystems affect humans and societies that depend on ecosystem functioning and will continue to affect us even more in the future [103]. To cope with CC influences, an effective integration of its effects should be part of marine spatial planning [27].

Marine zoning should play a critical role in supporting marine conservation in the context of CC by designating areas for protection and sustainable use, which enhances biodiversity and protects habitats vulnerable to climate stressors, such as coastal nursery habitats [104] and important feeding grounds [105]. Zoning frameworks can balance conservation and economic activities [106], while robust zoning models enhance resilience by integrating fisheries and renewable energy [107]. Despite the clear potential of marine zoning within MSP to address CC challenges, the articles reviewed revealed a low reference rate to CC issues, indicating a gap in research (Table 3). There is a need to promote research on marine zoning's role in mitigating CC impacts, to explore its efficiency, and to define suitable zoning processes for long-term marine ecosystem conservation and the support of ESs [108].

While this review defines and profiles the use of marine zoning planning and management and highlights significant gaps, it is not without its limitations. Firstly, the literature search, based on PRISMA guidelines for systematic review, was conducted in one major electronic database—Scopus—without searching other official databases. Therefore, despite the advantages of Scopus, some studies might have been missed. Secondly, using the specific search terms selected (see Materials and Methods) to identify zoning-related articles may cause the search results to focus on the use of MPA in marine zoning, which can create a bias towards that specific management type. Thirdly, due to language limitations, the search was limited to English-language studies, so studies in other languages were not included in the review. This, too, could introduce a bias. Nonetheless, as part of the PRISMA protocol, searches for additional studies were conducted to address part of the

potential limitation. Furthermore, while Scopus was the sole database used, its widespread use in review articles demonstrates its reliability in providing a comprehensive overview of literature. To address these limitations in future research, we suggest performing a comparison to another database. Furthermore, using general search terms may reveal additional extensive findings that can be suitable in border issue research.

5. Conclusions

Marine zoning is a critical tool for balancing marine ecosystem preservation with socio-economic needs by designating zones for conservation, sustainable use, and economic activities. This review underscores the essential role of sustainable fisheries in zoning plans and emphasizes the need to consider other human activities, such as tourism, coastal development, and renewable energy projects, for more comprehensive marine spatial plans.

Significant research gaps remain in underrepresented habitats, such as algae and seagrass, which play critical roles in carbon sequestration and ecosystem health. Conserving and sustainably managing these habitats are imperative, particularly to mitigate CC impacts and support ecosystem resilience, alongside increasing public awareness, stakeholder engagement, and policy support.

Future research should integrate comprehensive ES assessments, including economic valuation, into zoning frameworks to provide tools for balancing ecological and socio-economic objectives. Anticipatory zoning approaches, addressing CC impacts, are essential for adapting to dynamic environmental conditions. These approaches should include evaluating renewable energy projects alongside traditional marine activities, such as fisheries and tourism.

Additionally, collaborative and adaptive management strategies that engage local communities and policymakers must be prioritize. Advancing tools for mapping and valuing ESs and NC will enhance decision-making and stakeholder collaboration. By addressing these gaps, marine spatial planning can better align with long-term conservation goals and ensure the continued provision of critical ESs, even under changing environmental conditions.

Supplementary Materials: The following supporting information can be downloaded at https://www.mdpi.com/article/10.3390/su17041724/s1, Table S1: Papers' review analysis.

Author Contributions: Conceptualization, S.Z.-S.; methodology, Y.S.M. and S.Z.-S.; formal analysis, Y.S.M.; investigation, Y.S.M.; resources, S.B. and S.Z.-S.; data curation, Y.S.M. and Z.Z.-S.; writing—original draft preparation, Y.S.M.; writing—review and editing, Y.S.M., S.Z.-S., Z.Z.-S. and I.S.B.; visualization, Y.S.M.; supervision, S.B. and S.Z.-S.; funding acquisition, S.B. and S.Z.-S. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by THE SCIENCE AND TECHNOLOGY MINISTRY THROUGH ESHKOL SCHOLARSHIP grant number 3-14159 and MINISTRY OF ENVIRONMENTAL PROTECTION, ISRAEL, grant number 3-19045.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The raw data supporting the conclusions of this article will be made available by the authors on request.

Conflicts of Interest: The authors declare no conflicts of interest.

Appendix A. 121 Reviewed Articles

1. Agostini, V.N.; Margles, S.W.; Knowles, J.K.; Schill, S.R.; Bovino, R.J.; Blyther, R.J. Marine Zoning in St. Kitts and Nevis: A Design for Sustainable Management in

the Caribbean. *Ocean Coast. Manag.* **2015**, *104*, 1–10. https://doi.org/10.1016/j.ocecoaman.2014.11.003.

2. Allnutt, T.F.; McClanahan, T.R.; Andréfouët, S.; Baker, M.; Lagabrielle, E.; McClennen, C.; Rakotomanjaka, J.M.; Tianarisoa, T.F.; Watson, R.; Kremen, C. Comparison of Marine Spatial Planning Methods in Madagascar Demonstrates Value of Alternative Approaches. *PLoS ONE* **2012**, *7*, e28969. https://doi.org/10.1371/journal.pone.0028969.
3. Alvarez-Berastegui, D.; Amengual, J.; Coll, J.; Reñones, O.; Moreno-Navas, J.; Agardy, T. Multidisciplinary Rapid Assessment of Coastal Areas as a Tool for the Design and Management of Marine Protected Areas. *J. Nat. Conserv.* **2014**, *22*, 1–14. https://doi.org/10.1016/j.jnc.2013.07.003.
4. Babcock, E.A.; Pikitch, E.K.; McAllister, M.K.; Apostolaki, P.; Santora, C. A Perspective on the Use of Spatialized Indicators for Ecosystem-Based Fishery Management through Spatial Zoning. *ICES J. Mar. Sci.* **2005**, *62*, 469–476. https://doi.org/10.1016/j.icesjms.2005.01.010.
5. Barbosa, A.; Martín, B.; Hermoso, V.; Arévalo-Torres, J.; Barbière, J.; Martínez-López, J.; Domisch, S.; Langhans, S.D.; Balbi, S.; Villa, F.; Delacámara, G.; Teixeira, H.; Nogueira, A.J.A.; Lillebø, A.I.; Gil-Jiménez, Y.; McDonald, H.; Iglesias-Campos, A. Cost-Effective Restoration and Conservation Planning in Green and Blue Infrastructure Designs. A Case Study on the Intercontinental Biosphere Reserve of the Mediterranean: Andalusia (Spain)–Morocco. *Sci. Total Environ.* **2019**, *652*, 1463–1473. https://doi.org/10.1016/j.scitotenv.2018.10.416.
6. Basirati, M.; Billot, R.; Meyer, P.; Bocher, E. Exact Zoning Optimization Model for Marine Spatial Planning (MSP). *Front. Mar. Sci.* **2021**, *8*. https://doi.org/10.3389/fmars.2021.726187.
7. Brodie, J.; Waterhouse, J. A Critical Review of Environmental Management of the 'Not So Great' Barrier Reef. *Estuar. Coast. Shelf Sci.* **2012**, *104–105*, 1–22. https://doi.org/10.1016/j.ecss.2012.03.012.
8. Burbano, D.V.; Meredith, T.C. Conservation Strategies Through the Lens of Small-Scale Fishers in the Galapagos Islands, Ecuador: Perceptions Underlying Local Resistance to Marine Planning. *Soc. Nat. Resour.* **2020**, *33*, 1194–1212. https://doi.org/10.1080/08941920.2020.1765058.
9. Burbano, D.V.; Meredith, T.C.; Mulrennan, M.E. Exclusionary Decision-Making Processes in Marine Governance: The Rezoning Plan for the Protected Areas of the 'Iconic' Galapagos Islands, Ecuador. *Ocean Coast. Manag.* **2020**, *185*. https://doi.org/10.1016/j.ocecoaman.2019.105066.
10. Chalastani, V.I.; Manetos, P.; Al-Suwailem, A.M.; Hale, J.A.; Vijayan, A.P.; Pagano, J.; Williamson, I.; Henshaw, S.D.; Albaseet, R.; Butt, F.; Brainard, R.E.; Coccossis, H.; Tsoukala, V.K.; Duarte, C.M. Reconciling Tourism Development and Conservation Outcomes Through Marine Spatial Planning for a Saudi Giga-Project in the Red Sea (The Red Sea Project, Vision 2030). *Front. Mar. Sci.* **2020**, *7*. https://doi.org/10.3389/fmars.2020.00168.
11. Cheng, H.C.; Château, P.A.; Chang, Y.C. Spatial Zoning Design for Marine Protected Areas through Multi-Objective Decision-Making. *Ocean Coast. Manag.* **2015**, *108*, 158–165. https://doi.org/10.1016/j.ocecoaman.2014.08.018.
12. Chung, H.S.E.; Gullett, W.; Rose, G. Development of a Model for Enhancing Justice in MPA Designation and Zoning and Its Application to Taiwan's South Penghu Marine National Park. *Coast. Manag.* **2019**, *47*, 570–593. https://doi.org/10.1080/08920753.2019.1669101.

13. Chunye, W.; Delu, P. Zoning of Hangzhou Bay Ecological Red Line Using GIS-Based Multi-Criteria Decision Analysis. *Ocean Coast. Manag.* **2017**, *139*, 42–50. https://doi.org/10.1016/j.ocecoaman.2017.01.013.
14. Cockerell, B.; Pressey, R.L.; Grech, A.; Álvarez-Romero, J.G.; Ward, T.; Devillers, R. Representation Does Not Necessarily Reduce Threats to Biodiversity: Australia's Commonwealth Marine Protected Area System, 2012–2018. *Biol. Conserv.* **2020**, *252*. https://doi.org/10.1016/j.biocon.2020.108813.
15. Corrales, X.; Vilas, D.; Piroddi, C.; Steenbeek, J.; Claudet, J.; Lloret, J.; Calò, A.; Di Franco, A.; Font, T.; Ligas, A.; Prato, G.; Sahyoun, R.; Sartor, P.; Guidetti, P.; Coll, M. Multi-Zone Marine Protected Areas: Assessment of Ecosystem and Fisheries Benefits Using Multiple Ecosystem Models. *Ocean Coast. Manag.* **2020**, *193*. https://doi.org/10.1016/j.ocecoaman.2020.105232.
16. Crossman, N.D.; Ostendorf, B.; Bryan, B.A.; Nefiodovas, A.; Wright, A.; Model. Simul. Soc. Australia New Zealand (MSSANZ); Catchment Modelling Toolkit; CSIRO Sustainable Ecosystems; The University of Melbourne. OSS: A Spatial Decision Support System for Optimal Zoning of Marine Protected Areas. In *Int. Congr. Model. Simul.* **2005**, *1525–1531*.
17. Davis, K.; Kragt, S.; Gelcich, S.; Schilizzi, S.; Pannell, D. Accounting for Enforcement Costs in the Spatial Allocation of Marine Zones. *Conserv. Biol.* **2015**, *29*, 226–237. https://doi.org/10.1111/cobi.12358.
18. Day, J.C. Zoning - Lessons from the Great Barrier Reef Marine Park. *Ocean Coast. Manag.* **2002**, *45*, 139–156. https://doi.org/10.1016/S0964-5691(02)00052-2.
19. Day, J.C. Effective Public Participation Is Fundamental for Marine Conservation—Lessons from a Large-Scale MPA. *Coast. Manag.* **2017**, *45*, 470–486. https://doi.org/10.1080/08920753.2017.1373452.
20. Day, J.C.; Dobbs, K. Effective Governance of a Large and Complex Cross-Jurisdictional Marine Protected Area: Australia's Great Barrier Reef. *Mar. Policy* **2013**, *41*, 14–24. https://doi.org/10.1016/j.marpol.2012.12.020.
21. De Souza Rêgo, I.; Aguiar, M.C.; Oliveira Soares, M. Environmental Zoning and Coastal Zone Conservation: The Case of a Protected Area in Northeastern Brazil. *J. Integr. Coast. Zone Manag.* **2016**, *16*, 35–43. https://doi.org/10.5894/rgci603.
22. Delavenne, J.; Metcalfe, K.; Smith, R.J.; Vaz, S.; Martin, C.S.; Dupuis, L.; Coppin, F.; Carpentier, A. Systematic Conservation Planning in the Eastern English Channel: Comparing the Marxan and Zonation Decision-Support Tools. *ICES J. Mar. Sci.* **2012**, *69*, 75–83. https://doi.org/10.1093/icesjms/fsr180.
23. Dickinson, M.; Rutherford, M.; Gunton, T. Principles for Integrated Marine Planning: A Review of International Experience. *Environments* **2010**, *37*, 21–46.
24. Diggon, S.J.; Bones, C.J.; Short, J.L.; Smith, J.; Dickinson, M.; Wozniak, K.; Topelko, K.; Pawluk, K.A. The Marine Plan Partnership for the North Pacific Coast – MaPP: A Collaborative and Co-Led Marine Planning Process in British Columbia. *Mar. Policy* **2022**, *142*. https://doi.org/10.1016/j.marpol.2020.104065.
25. Dobbs, K.L.; Fernandes, S.; Slegers, B.; Jago, L.; Thompson, J.; Hall, J.; Day, J.; Cameron, D.; Tanzer, J.; MacDonald, F.; Lumpus, C. Incorporating Marine Turtle Habitats into the Marine Protected Area Design for the Great Barrier Reef Marine Park, Queensland, Australia. *Pac. Conserv. Biol.* **2007**, *13*, 293–302. https://doi.org/10.1071/PC070293.
26. Dobbs, K.L.; Fernandes, S.; Slegers, B.; Jago, L.; Thompson, J.; Hall, J.; Day, J.; Cameron, D.; Tanzer, F.; Marsh, H.; Coles, R. Incorporating Dugong Habitats into the Marine Protected Area Design for the Great Barrier Reef Marine Park, Queensland, Australia. *Ocean Coast. Manag.* **2008**, *51*, 368–375. https://doi.org/10.1016/j.ocecoaman.2007.08.001.

27. Duarte de Paula Costa, M.; Magris, R.A.; Muelbert, J.H.; Vieira, J.P.; Castello, J.P.; Copertino, M.S.; Possingham, H.P. Spatial Zoning to Conserve Fish Species with Complex Life Cycles in Estuaries. *Ocean Coast. Manag.* **2022**, *221*. https://doi.org/10.1016/j.ocecoaman.2022.106115.
28. Duarte, F.; Doherty, G.; Nakazawa, P. Redrawing the Boundaries: Planning and Governance of a Marine Protected Area—the Case of the Exuma Cays Land and Sea Park. *J. Coast. Conserv.* **2017**, *21*, 265–271. https://doi.org/10.1007/s11852-017-0498-4.
29. Edwards, H.J.; Elliott, I.A.; Pressey, R.L.; Mumby, P.J. Incorporating Ontogenetic Dispersal, Ecological Processes and Conservation Zoning into Reserve Design. *Biol. Conserv.* **2010**, *143*, 457–470. https://doi.org/10.1016/j.biocon.2009.11.013.
30. Escandón-Panchana, J.; Vallejo, E.; Panchana, P.; Velastegui-Montoya, A.; Herrera-Franco, G. Spatial Planning of the Coastal Marine Socioecological System—Case Study: Punta Carnero, Ecuador. *Resources* **2022**, *11*, 74. https://doi.org/10.3390/resources11080074.
31. Fernandes, L.; Day, J.; Lewis, A.; Slegers, S.; Kerrigan, B.; Breen, D.; Cameron, D.; Jago, B.; Hall, J.; Lowe, D.; Innes, J.; Tanzer, J.; Chadwick, V.; Thompson, L.; Gorman, K.; Simmons, M.; Barnett, B.; Sampson, K.; De'ath, G.; Mapstone, B.; Marsh, H.; Possingham, H.; Ball, I.; Ward, T.; Dobbs, K.; Aumend, J.; Slater, D.; Stapleton, K. Establishing Representative No-Take Areas in the Great Barrier Reef: Large-Scale Implementation of Theory on Marine Protected Areas. *Conserv. Biol.* **2005**, *19*, 1733–1744. https://doi.org/10.1111/j.1523-1739.2005.00302.x.
32. Fernandes, L.; Dobbs, K.; Day, J.; Slegers, S. Identifying Biologically and Physically Special or Unique Sites for Inclusion in the Protected Area Design for the Great Barrier Reef Marine Park. *Ocean Coast. Manag.* **2010**, *53*, 80–88. https://doi.org/10.1016/j.ocecoaman.2009.12.003.
33. Fidler, R.Y.; Andradi-Brown, D.A.; Awaludinnoer, D.; Pada, D.; Purwanto; Hidayat, N.I.; Ahmadia, G.N.; Harborne, A.R. The Importance of Biophysical Context in Understanding Marine Protected Area Outcomes for Coral Reef Fish Populations. *Coral Reefs* **2021**, *40*, 791–805. https://doi.org/10.1007/s00338-021-02085-y.
34. Fraschetti, S.; D'Ambrosio, P.; Micheli, F.; Pizzolante, F.; Bussotti, S.; Terlizzi, A. Design of Marine Protected Areas in a Human-Dominated Seascape. *Mar. Ecol. Prog. Ser.* **2009**, *375*, 13–24. https://doi.org/10.3354/meps07781.
35. Fraser, K.A.; Adams, V.M.; Pressey, R.L.; Pandolfi, J.M. Impact Evaluation and Conservation Outcomes in Marine Protected Areas: A Case Study of the Great Barrier Reef Marine Park. *Biol. Conserv.* **2019**, *238*. https://doi.org/10.1016/j.biocon.2019.07.030.
36. García-Charton, J.A.; Pérez-Ruzafa, A.; Marcos, C.; Claudet, J.; Badalamenti, F.; Benedetti-Cecchi, L.; Falcón, J.M.; Milazzo, M.; Schembri, P.J.; Stobart, B.; Vandeperre, F.; Brito, A.; Chemello, R.; Dimech, M.; Domenici, P.; Guala, I.; Le Diréach, L.; Maggi, E.; Planes, S. Effectiveness of European Atlanto-Mediterranean MPAs: Do They Accomplish the Expected Effects on Populations, Communities, and Ecosystems? *J. Nat. Conserv.* **2008**, *16*, 193–221. https://doi.org/10.1016/j.jnc.2008.09.007.
37. Gonzalez-Mirelis, G.; Lindegarth, M.; Sköld, M. Using Vessel Monitoring System Data to Improve Systematic Conservation Planning of a Multiple-Use Marine Protected Area, the Kosterhavet National Park (Sweden). *Ambio* **2014**, *43*, 162–174. https://doi.org/10.1007/s13280-013-0413-7.
38. Grantham, H.S.; Agostini, V.N.; Wilson, J.; Mangubhai, S.; Hidayat, N.; Muljadi, A.; Muhajir; Rotinsulu, C.; Mongdong, M.; Beck, M.W.; Possingham, H.P. A Comparison of Zoning Analyses to Inform the Planning of a Marine Protected Area Network in Raja Ampat, Indonesia. *Mar. Policy* **2013**, *38*, 184–194. https://doi.org/10.1016/j.marpol.2012.05.035.

39. Gray, D.L.; Canessa, R.; Rollins, R.; Keller, C.P.; Dearden, P. Incorporating Recreational Users into Marine Protected Area Planning: A Study of Recreational Boating in British Columbia, Canada. *Environ. Manag.* **2010**, *46*, 167–180. https://doi.org/10.1007/s00267-010-9479-1.
40. Gray, D.L.; Canessa, R.R.; Rollins, R.B.; Dearden, P.; Keller, C.P. Understanding Recreational Boater Attitudes to Zoning in a Proposed Marine Protected Area. *Coast. Manag.* **2010**, *38*, 575–597. https://doi.org/10.1080/08920753.2010.523413.
41. Grorud-Colvert, K.; Claudet, J.; Carr, M.; Caselle, J.; Day, J.; Friedlander, A.; Lester, S.E.; Lison De Loma, T.; Tissot, B.; Malone, D. Networks - The Assessment of Marine Reserve Networks: Guidelines for Ecological Evaluation. In *Marine Protected Areas: A Multidisciplinary Approach*; Cambridge University Press, **2011**; pp. 293–321.
42. Guzman, H.M.; Benfield, S.; Breedy, O.; Mair, J.M. Broadening Reef Protection across the Marine Conservation Corridor of the Eastern Tropical Pacific: Distribution and Diversity of Reefs in Las Perlas Archipelago, Panama. *Environ. Conserv.* **2008**, *35*, 46–54. https://doi.org/10.1017/S0376892908004542.
43. Habtemariam, B.T.; Fang, Q. Zoning for a Multiple-Use Marine Protected Area Using Spatial Multi-Criteria Analysis: The Case of the Sheik Seid Marine National Park in Eritrea. *Mar. Policy* **2016**, *63*, 135–14. https://doi: 10.1016/j.marpol.2015.10.011.
44. Hall, A.E.; Cameron, D.S.; Kingsford, M.J. Partially Protected Areas as a Management Tool on Inshore Reefs. *Rev. Fish Biol. Fish.* **2021**, *31*, 631–651. https://doi.org/10.1007/s11160-021-09654-y.
45. Halpern, B.S.; McLeod, K.L.; Rosenberg, A.A.; Crowder, L.B. Managing for Cumulative Impacts in Ecosystem-Based Management through Ocean Zoning. *Ocean Coast. Manag.* **2008**, *51*, 203–211. https://doi.org/10.1016/j.ocecoaman.2007.08.002.
46. Harasti, D.; Davis, T.R.; Mitchell, E.; Lindfield, S.; Smith, S.D. A Tale of Two Islands: Decadal Changes in Rocky Reef Fish Assemblages Following Implementation of No-Take Marine Protected Areas in New South Wales, Australia. *Reg. Stud. Mar. Sci.* **2018**, *18*, 229–236. https://doi.org/10.1016/j.rsma.2017.10.011.
47. Hastings, K.; Ryan, K.L. Differences in Perception of a Newly Created Marine Park in South-West Western Australia by Boat-Based Recreational Fishers and the Broader Community. *Mar. Policy* **2017**, *77*, 65–77. https://doi.org/10.1016/j.marpol.2016.12.012.
48. Henriques, N.S.; Monteiro, P.; Bentes, L.; Oliveira, F.; Afonso, C.M.L.; Gonçalves, J.M.S. Marxan as a Zoning Tool for Development and Economic Purposed Areas - Aquaculture Management Areas (AMAs). *Ocean Coast. Manag.* **2017**, *141*, 90–97. https://doi.org/10.1016/j.ocecoaman.2017.03.016.
49. Hobday, A.J.; Hartog, J.R.; Timmiss, T.; Fielding, J. Dynamic Spatial Zoning to Manage Southern Bluefin Tuna (Thunnus Maccoyii) Capture in a Multi-Species Longline Fishery. *Fish. Oceanogr.* **2010**, *19*, 243–253. https://doi.org/10.1111/j.1365-2419.2010.00540.x.
50. Johnson, A.E.; McClintock, W.J.; Burton, O.; Burton, W.; Estep, A.; Mengerink, K.; Porter, R.; Tate, S. Marine Spatial Planning in Barbuda: A Social, Ecological, Geographic, and Legal Case Study. *Mar. Policy* **2020**, *113*. https://doi.org/10.1016/j.marpol.2019.103793.
51. Jones, K.R.; Maina, J.M.; Kark, S.; McClanahan, T.R.; Klein, C.J.; Beger, M. Incorporating Feasibility and Collaboration into Large-Scale Planning for Regional Recovery of Coral Reef Fisheries. *Mar. Ecol. Prog. Ser.* **2018**, *604*, 211–222. https://doi.org/10.3354/meps12743.

52. Jumin, R.; Binson, A.; McGowan, J.; Magupin, S.; Beger, M.; Brown, C.J.; Possingham, H.P.; Klein, C. From Marxan to Management: Ocean Zoning with Stakeholders for Tun Mustapha Park in Sabah, Malaysia. *ORYX* **2018**, *52*, 775–786. https://doi.org/10.1017/S0030605316001514.
53. Kapourchal, S.A.; Dargahi, M.D.; Karimzadegan, H. Zoning Coastal Marine Boujagh National Park and Sustainable Management by Geographic Information System. *Indian J. Sci. Technol.* **2014**, *7*, 1933–1938.
54. Kenyon, R.A.; Babcock, R.C.; Dell, Q.; Lawrence, E.; Moeseneder, C.; Tonks, M.L. Business as Usual for the Human Use of Moreton Bay Following Marine Park Zoning. *Mar. Freshw. Res.* **2018**, *69*, 277–279. https://doi.org/10.1071/MF16400.
55. Klein, C.J.; Steinback, C.; Watts, M.; Scholz, A.J.; Possingham, H.P. Spatial Marine Zoning for Fisheries and Conservation. *Front. Ecol. Environ.* **2010**, *8*, 349–353. https://doi.org/10.1890/090047.
56. Knott, N.A.; Williams, J.; Harasti, D.; Malcolm, H.A.; Coleman, M.A.; Kelaher, B.P.; Rees, M.J.; Schultz, A.; Jordan, A. A Coherent, Representative, and Bioregional Marine Reserve Network Shows Consistent Change in Rocky Reef Fish Assemblages. *Ecosphere* **2021**, *12*. https://doi.org/10.1002/ecs2.3447.
57. la Mesa, G.; Molinari, A.; Tunesi, L. Coastal Fish Assemblage Characterisation to Support the Zoning of a New Marine Protected Area in North-Western Mediterranean. *Ital. J. Zool.* **2010**, *77*, 197–210. https://doi.org/10.1080/11250000903413668.
58. la Mesa, G.; Salvati, E.; Agnesi, S.; Tunesi, L. Assessment of Coastal Fish Assemblages before the Establishment of a New Marine Protected Area in the Central Mediterranean: Its Role in Formulating a Zoning Proposal. *Mediterr. Mar. Sci.* **2017**, *18*, 11–21. https://doi.org/10.12681/mms.1788.
59. Lauer, P.; López, L.; Sloan, E.; Sloan, S.; Doroudi, M. Learning from the Systematic Approach to Aquaculture Zoning in South Australia: A Case Study of Aquaculture (Zones - Lower Eyre Peninsula) Policy 2013. *Mar. Policy* **2015**, *59*, 77–84. https://doi.org/10.1016/j.marpol.2015.04.019.
60. Li, F.; Xu, M.; Liu, Q.; Wang, Z.; Xu, W. Ecological Restoration Zoning for a Marine Protected Area: A Case Study of Haizhouwan National Marine Park, China. *Ocean Coast. Manag.* **2014**, *98*, 158–166. https://doi.org/10.1016/j.ocecoaman.2014.06.013.
61. Lozano-Montes, H.M.; Babcock, R.; Loneragan, N.R. Exploring the Effects of Spatial Closures in a Temperate Marine Ecosystem in Western Australia: A Case Study of the Western Rock Lobster (Panulirus Cygnus) Fishery. *Ecol. Model.* **2012**, *245*, 31–40. https://doi.org/10.1016/j.ecolmodel.2012.05.015.
62. Lu, S.Y.; Shen, C.H.; Chiau, W.Y. Zoning Strategies for Marine Protected Areas in Taiwan: Case Study of Gueishan Island in Yilan County, Taiwan. *Mar. Policy* **2014**, *48*, 21–29. https://doi.org/10.1016/j.marpol.2014.03.001.
63. Lunn, K.E.; Dearden, P. Fishers' Needs in Marine Protected Area Zoning: A Case Study from Thailand. *Coast. Manag.* **2006**, *34*, 183–198. https://doi.org/10.1080/08920750600567234.
64. Lynch, T.P. Incorporation of Recreational Fishing Effort into Design of Marine Protected Areas. *Conserv. Biol.* **2006**, *20*, 1466–1476. https://doi.org/10.1111/j.1523-1739.2006.00509.x.
65. Lynch, T.P. A Decadal Time-Series of Recreational Fishing Effort Collected during and after Implementation of a Multiple Use Marine Park Shows High Inter-Annual but Low Spatial Variability. *Fish. Res.* **2014**, *151*, 85–90. https://doi.org/10.1016/j.fishres.2013.09.014.

66. Ma, C.; Zhang, X.; Chen, W.; Zhang, G.; Duan, H.; Ju, M.; Li, H.; Yang, Z. China's Special Marine Protected Area Policy: Trade-off between Economic Development and Marine Conservation. *Ocean Coast. Manag.* **2013**, *76*, 1–11. https://doi.org/10.1016/j.ocecoaman.2013.02.007.
67. Magris, R.A.; Pressey, R.L.; Mills, M.; Vila-Nova, D.A.; Floeter, S. Integrated Conservation Planning for Coral Reefs: Designing Conservation Zones for Multiple Conservation Objectives in Spatial Prioritisation. *Glob. Ecol. Conserv.* **2017**, *11*, 53–68. https://doi.org/10.1016/j.gecco.2017.05.002.
68. Makino, A.; Klein, C.J.; Beger, M.; Jupiter, S.D.; Possingham, H.P. Incorporating Conservation Zone Effectiveness for Protecting Biodiversity in Marine Planning. *PLoS ONE* **2013**, *8*, e78986. https://doi.org/10.1371/journal.pone.0078986.
69. Malcolm, H.A.; Foulsham, E.; Pressey, R.L.; Jordan, A.; Davies, P.L.; Ingleton, T.; Johnstone, N.; Hessey, S. Selecting Zones in a Marine Park: Early Systematic Planning Improves Cost-Efficiency; Combining Habitat and Biotic Data Improves Effectiveness. *Ocean Coast. Manag.* **2012**, *59*, 1–12. https://doi.org/10.1016/j.ocecoaman.2011.12.001.
70. Malcolm, H.A.; Smith, S.D.A.; Jordan, A. Using Patterns of Reef Fish Assemblages to Refine a Habitat Classification System for Marine Parks in NSW, Australia. *Aquat. Conserv. Mar. Freshw. Ecosyst.* **2010**, *20*, 83–92. https://doi.org/10.1002/aqc.1055.
71. Mangi, S.C.; Austen, M.C. Perceptions of Stakeholders towards Objectives and Zoning of Marine-Protected Areas in Southern Europe. *J. Nat. Conserv.* **2008**, *16*, 271–280. https://doi.org/10.1016/j.jnc.2008.09.002.
72. Mangubhai, S.; Wilson, J.R.; Rumetna, L.; Maturbongs, Y.; Purwanto. Explicitly Incorporating Socioeconomic Criteria and Data into Marine Protected Area Zoning. *Ocean Coast. Manag.* **2015**, *116*, 523–529. https://doi.org/10.1016/j.ocecoaman.2015.08.018.
73. Mann, B.Q.; Cowley, P.D.; Kyle, R. Estimating the Optimum Size for Inshore No-Take Areas Based on Movement Patterns of Surf-Zone Fishes and Recommendations for Rezoning of a World Heritage Site in South Africa. *Ocean Coast. Manag.* **2016**, *125*, 8–19. https://doi.org/10.1016/j.ocecoaman.2016.03.006.
74. Markantonatou, V.; Giakoumi, S.; Koukourouvli, N.; Maina, I.; Gonzalez-Mirelis, G.; Sini, M.; Maistrelis, K.; Stithou, M.; Gadolou, E.; Petza, D.; Kavadas, S.; Vassilopoulou, V.; Buhl-Mortensen, L.; Katsanevakis, S. Marine Spatial Plans Focusing on Biodiversity Conservation: The Case of the Aegean Sea. *Aquat. Conserv. Mar. Freshw. Ecosyst.* **2021**, *31*, 2278–2292. https://doi.org/10.1002/aqc.3610.
75. Martin, C.L.; Momtaz, S.; Jordan, A.; Moltschaniwskyj, N.A. Exploring Recreational Fishers' Perceptions, Attitudes, and Support towards a Multiple-Use Marine Protected Area Six Years after Implementation. *Mar. Policy* **2016**, *73*, 138–145. https://doi.org/10.1016/j.marpol.2016.08.002.
76. Martín-García, L.; Sangil, C.; Brito, A.; Barquín-Diez, J. Identification of Conservation Gaps and Redesign of Island Marine Protected Areas. *Biodivers. Conserv.* **2015**, *24*, 511–529. https://doi.org/10.1007/s10531-014-0833-0.
77. Maynard, J.A.; Beeden, R.; Puotinen, M.; Johnson, J.E.; Marshall, P.; van Hooidonk, R.; Heron, S.F.; Devlin, M.; Lawrey, E.; Dryden, J.; Ban, N.; Wachenfeld, D.; Planes, S. Great Barrier Reef No-Take Areas Include a Range of Disturbance Regimes. *Conserv. Lett.* **2016**, *9*, 191–199. https://doi.org/10.1111/conl.12198.
78. Mazor, T.; Possingham, H.P.; Edelist, D.; Brokovich, E.; Kark, S. The Crowded Sea: Incorporating Multiple Marine Activities in Conservation Plans Can Significantly Alter Spatial Priorities. *PLoS ONE* **2014**, *9*, e104489. https://doi.org/10.1371/journal.pone.0104489.

79. McCook, L.J.; Ayling, T.; Cappo, M.; Choat, J.H.; Evans, R.D.; De Freitas, D.M.; Heupel, M.; Hughes, T.P.; Jones, G.P.; Mapstone, B.; Marsh, H.; Mills, M.; Molloy, F.J.; Pitcher, C.R.; Pressey, R.L.; Russ, G.R.; Sutton, S.; Sweatman, H.; Tobin, R.; Wachenfeld, D.R.; Williamson, D.H. Adaptive Management of the Great Barrier Reef: A Globally Significant Demonstration of the Benefits of Networks of Marine Reserves. *Proc. Natl. Acad. Sci. USA* **2010**, *107*, 18278–18285. https://doi.org/10.1073/pnas.0909335107.
80. McGowan, J.; Bode, M.; Holden, M.H.; Davis, K.; Krueck, N.C.; Beger, M.; Yates, K.L.; Possingham, H.P. Ocean Zoning within a Sparing versus Sharing Framework. *Theor. Ecol.* **2018**, *11*, 245–254. https://doi.org/10.1007/s12080-017-0364-x.
81. McWhinnie, L.; Briers, R.A.; Fernandes, T.F. The Development and Testing of a Multiple-Use Zoning Scheme for Scottish Waters. *Ocean Coast. Manag.* **2015**, *103*, 34–41. https://doi.org/10.1016/j.ocecoaman.2014.11.004.
82. Moore, C.H.; Radford, B.T.; Possingham, H.P.; Heyward, A.J.; Stewart, R.R.; Watts, M.E.; Prescott, J.; Newman, S.J.; Harvey, E.S.; Fisher, R.; Bryce, C.W.; Lowe, R.J.; Berry, O.; Espinosa-Gayosso, A.; Sporer, E.; Saunders, T. Improving Spatial Prioritisation for Remote Marine Regions: Optimising Biodiversity Conservation and Sustainable Development Trade-Offs. *Sci. Rep.* **2016**, *6*. https://doi.org/10.1038/srep32029.
83. Muhl, E.K.; Esteves Dias, A.C.; Armitage, D. Experiences with Governance in Three Marine Conservation Zoning Initiatives: Parameters for Assessment and Pathways Forward. *Front. Mar. Sci.* **2020**, *7*. https://doi.org/10.3389/fmars.2020.00629.
84. Noble, M.M.; Harasti, D.; Pittock, J.; Doran, B. Understanding the Spatial Diversity of Social Uses, Dynamics, and Conflicts in Marine Spatial Planning. *J. Environ. Manag.* **2019**, *246*, 929–940. https://doi.org/10.1016/j.jenvman.2019.06.048.
85. Noble, M.M.; Harasti, D.; Pittock, J.; Doran, B. Using GIS Fuzzy-Set Modelling to Integrate Social-Ecological Data to Support Overall Resilience in Marine Protected Area Spatial Planning: A Case Study. *Ocean Coast. Manag.* **2021**, *212*. https://doi.org/10.1016/j.ocecoaman.2021.105745.
86. Ortiz-Lozano, L.; Granados-Barba, A.; Espejel, I. Ecosystemic Zonification as a Management Tool for Marine Protected Areas in the Coastal Zone: Applications for the Sistema Arrecifal Veracruzano National Park, Mexico. *Ocean Coast. Manag.* **2009**, *52*, 317–323. https://doi.org/10.1016/j.ocecoaman.2009.03.004.
87. Osmond, M.; Airame, S.; Caldwell, M.; Day, J. Lessons for Marine Conservation Planning: A Comparison of Three Marine Protected Area Planning Processes. *Ocean Coast. Manag.* **2010**, *53*, 41–51. https://doi.org/10.1016/j.ocecoaman.2010.01.002.
88. Parnell, P.E.; Dayton, P.K.; Fisher, R.A.; Loarie, C.C.; Darrow, R.D. Spatial Patterns of Fishing Effort off San Diego: Implications for Zonal Management and Ecosystem Function. *Ecol. Appl.* **2010**, *20*, 2203–2222. https://doi.org/10.1890/09-1543.1.
89. Pérez-Ruzafa, A.; García-Charton, J.A.; Marcos, C. North East Atlantic vs. Mediterranean Marine Protected Areas as Fisheries Management Tool. *Front. Mar. Sci.* **2017**, *4*. https://doi.org/10.3389/fmars.2017.00245.
90. Portman, M.E. Zoning Design for Cross-Border Marine Protected Areas: The Red Sea Marine Peace Park Case Study. *Ocean Coast. Manag.* **2007**, *50*, 499–522. https://doi.org/10.1016/j.ocecoaman.2007.02.008.
91. Portman, M.E.; Shabtay-Yanai, A.; Zanzuri, A. Incorporation of Socio-Economic Features' Ranking in Multicriteria Analysis Based on Ecosystem Services for Marine Protected Area Planning. *PLoS ONE* **2016**, *11*, e0154473. https://doi.org/10.1371/journal.pone.0154473.
92. Raycraft, J. Circumscribing Communities: Marine Conservation and Territorialization in Southeastern Tanzania. *Geoforum* **2019**, *100*, 128–143. https://doi.org/10.1016/j.geoforum.2018.12.011.

93. Read, A.D.; West, R.J. Qualitative Risk Assessment of Multiple-Use Marine Park Effectiveness - A Case Study from NSW, Australia. *Ocean Coast. Manag.* **2010**, *53*, 636–644. https://doi.org/10.1016/j.ocecoaman.2010.08.003.
94. Rodríguez-Basalo, A.; Sánchez, F.; Punzón, A.; Gómez-Ballesteros, M. Updating the Master Management Plan for El Cachucho MPA (Cantabrian Sea) Using a Spatial Planning Approach. *Cont. Shelf Res.* **2019**, *184*, 54–65. https://doi.org/10.1016/j.csr.2019.06.010.
95. Rojas-Nazar, Ú.; Gaymer, C.F.; Squeo, F.A.; Garay-Flühmann, R.; López, D. Combining Information from Benthic Community Analysis and Social Studies to Establish No-Take Zones within a Multiple Uses Marine Protected Area. *Aquat. Conserv. Mar. Freshw. Ecosyst.* **2012**, *22*, 74–86. https://doi.org/10.1002/aqc.1239.
96. Roman, G.S.J.; Dearden, P.; Rollins, R. Application of Zoning and 'Limits of Acceptable Change' to Manage Snorkelling Tourism. *Environ. Manag.* **2007**, *39*, 819–830. https://doi.org/10.1007/s00267-006-0145-6.
97. Rovere, A.; Ferraris, F.; Parravicini, V.; Navone, A.; Morri, C.; Bianchi, C.N. Characterization and Evaluation of a Marine Protected Area: 'Tavolara - Punta Coda Cavallo' (Sardinia, NW Mediterranean). *J. Maps* **2013**, *9*, 279–288. https://doi.org/10.1080/17445647.2013.778081.
98. Rowell, D.A.; Arafeh-Dalmau, N.; Fuller, R.A.; Possingham, H.P.; Hereu, B. Efficient Small-Scale Marine Reserve Design Requires High-Resolution Biodiversity and Stakeholder Data. *Ocean Coast. Manag.* **2022**, *223*. https://doi.org/10.1016/j.ocecoaman.2022.106152.
99. Ruiz-Frau, A.; Kaiser, M.J.; Edwards-Jones, G.; Klein, C.J.; Segan, D.; Possingham, H.P. Balancing Extractive and Non-Extractive Uses in Marine Conservation Plans. *Mar. Policy* **2015**, *52*, 11–18. https://doi.org/10.1016/j.marpol.2014.10.017.
100. Salomon, A.K.; Waller, N.P.; McIlhagga, C.; Yung, R.L.; Walters, C. Modeling the Trophic Effects of Marine Protected Area Zoning Policies: A Case Study. *Aquat. Ecol.* **2002**, *36*, 85–95. https://doi.org/10.1023/A:1013346622536.
101. Sarker, S.; Rahman, M.M.; Yadav, A.K.; Islam, M.M. Zoning of Marine Protected Areas for Biodiversity Conservation in Bangladesh through Socio-Spatial Data. *Ocean Coast. Manag.* **2019**, *173*, 114–122. https://doi.org/10.1016/j.ocecoaman.2019.03.002.
102. Schwarzmann, D.; Freitag, A.; Dorfman, D.; Records, D.; Walz, M. Updating the Florida Keys National Marine Sanctuary Management Plan: Estimating the Impact to Commercial Fishing in Monroe County, Florida. *Water* **2022**, *14*, 30290. https://doi.org/10.3390/w14030290.
103. Shimada, T.; Limpus, C.; Jones, R.; Hamann, M. Aligning Habitat Use with Management Zoning to Reduce Vessel Strike of Sea Turtles. *Ocean Coast. Manag.* **2017**, *142*, 163–172. https://doi.org/10.1016/j.ocecoaman.2017.03.028.
104. Sibert, J.; Senina, I.; Lehodey, P.; Hampton, J. Shifting from Marine Reserves to Maritime Zoning for Conservation of Pacific Bigeye Tuna (Thunnus Obesus). *Proc. Natl. Acad. Sci. USA* **2012**, *109*, 18221–18225. https://doi.org/10.1073/pnas.1209468109.
105. Smallwood, C.B.; Beckley, L.E. Spatial Distribution and Zoning Compliance of Recreational Fishing in Ningaloo Marine Park, North-Western Australia. *Fish. Res.* **2012**, *125–126*, 40–50. https://doi.org/10.1016/j.fishres.2012.01.019.
106. Smallwood, C.B.; Beckley, L.E.; Moore, S.A. Influence of Zoning and Habitats on the Spatial Distribution of Recreational Activities in a Multiple-Use Marine Park. *Coast. Manag.* **2012**, *40*, 381–400. https://doi.org/10.1080/08920753.2012.692312.

107. Teh, L.C.L.; Teh, L.S.L.; Pitcher, T.J. A Tool for Site Prioritisation of Marine Protected Areas under Data Poor Conditions. *Mar. Policy* **2012**, *36*, 1290–1300. https://doi.org/10.1016/j.marpol.2012.04.010.
108. Tien, H.V.; Nguyen, T.P. Marine Algal Species and Marine Protected Area Management: A Case Study in Phu Quoc, Kien Giang, Vietnam. *Ocean Coast. Manag.* **2019**, *178*. https://doi.org/10.1016/j.ocecoaman.2019.104816.
109. Tsilimigkas, G.; Rempis, N. Spatial Planning Framework, a Challenge for Marine Tourism Development: Location of Diving Parks on Rhodes Island, Greece. *Environ. Dev. Sustain.* **2021**, *23*, 15240–15265. https://doi.org/10.1007/s10668-021-01296-1.
110. Tsilimigkas, G.; Rempis, N.; Derdemezi, E.T. Marine Zoning and Landscape Management on Crete Island, Greece. *J. Coast. Conserv.* **2020**, *24*. https://doi.org/10.1007/s11852-020-00757-5.
111. Ulloa, R.; Vargas, A.; Hudson, C.; Rivadeneira, M.M. Zoning of the Mejillones Peninsula Marine Protected Coastal Area of Multiple Uses. *Estuar. Coast. Shelf Sci.* **2013**, *41*.
112. van de Geer, C.; Mills, M.; Adams, V.M.; Pressey, R.L.; McPhee, D. Impacts of the Moreton Bay Marine Park Rezoning on Commercial Fishermen. *Mar. Policy* **2013**, *39*, 248–256. https://doi.org/10.1016/j.marpol.2012.11.006.
113. Venier, C.; Menegon, S.; Possingham, H.P.; Gissi, E.; Zanella, A.; Depellegrin, D.; Sarretta, A.; Barbanti, A.; McGowan, J. Multi-Objective Zoning for Aquaculture and Biodiversity. *Sci. Total Environ.* **2021**, *785*. https://doi.org/10.1016/j.scitotenv.2021.146997.
114. Verutes, G.M.; Arkema, K.K.; Clarke-Samuels, C.; Wood, S.A.; Rosenthal, A.; Rosado, S.; Canto, M.; Bood, N.; Ruckelshaus, M. Integrated Planning That Safeguards Ecosystems and Balances Multiple Objectives in Coastal Belize. *Int. J. Biodivers. Sci. Ecosyst. Serv. Manag.* **2017**, *13*, 1–17. https://doi.org/10.1080/21513732.2017.1345979.
115. Villa, F.; Tunesi, L.; Agardy, T. Zoning Marine Protected Areas through Spatial Multiple-Criteria Analysis: The Case of the Asinara Island National Marine Reserve of Italy. *Conserv. Biol.* **2002**, *16*, 515–526. https://doi.org/10.1046/j.1523-1739.2002.00425.x.
116. Weeks, R.; Russ, G.R.; Bucol, A.A.; Alcala, A.C. Incorporating Local Tenure in the Systematic Design of Marine Protected Area Networks. *Conserv. Lett.* **2010**, *3*, 445–453. https://doi.org/10.1111/j.1755-263X.2010.00131.x.
117. Weeks, R.; Aliño, P.M.; Atkinson, S.; Beldia, P., II; Binson, A.; Campos, W.L.; Djohani, R.; Green, A.L.; Hamilton, R.; Horigue, V.; Jumin, R.; Kalim, K.; Kasasiah, A.; Kereseka, J.; Klein, C.; Laroya, L.; Magupin, S.; Masike, B.; Mohan, C.; Da Silva Pinto, R.M.; Vave-Karamui, A.; Villanoy, C.; Welly, M.; White, A.T. Developing Marine Protected Area Networks in the Coral Triangle: Good Practices for Expanding the Coral Triangle Marine Protected Area System. *Coast. Manag.* **2014**, *42*, 183–205. https://doi.org/10.1080/08920753.2014.877768.
118. Wendt, H.K.; Weeks, R.; Comley, J.; Aalbersberg, W. Systematic Conservation Planning within a Fijian Customary Governance Context. *Pac. Conserv. Biol.* **2016**, *22*, 173–181. https://doi.org/10.1071/PC16001.
119. Wijayanto, C.; Yulianda, F.; Imran, Z. The Core Zone Decisive of Marine Conservation Area in Southeast Sulawesi Using Marxan. In *Proceedings of the 3rd International Conference on Integrated Coastal Management and Marine Biotechnology 2021, ICMMBT 2021*; IOP Publishing Ltd.: **2022**; Volume 967.
120. Yates, K.L.; Schoeman, D.S.; Klein, C.J. Ocean Zoning for Conservation, Fisheries and Marine Renewable Energy: Assessing Trade-Offs and Co-Location Opportunities. *J. Environ. Manag.* **2015**, *152*, 201–209. https://doi.org/10.1016/j.jenvman.2015.01.045.

121. Ye, G.; Fei, J.; Wang, Z.; Jiang, Q.; Gaines, S.D.; Ming, C.L. A Novel Marine Spatial Management Tool for Multiple Conflicts Recognition and Optimization of Marine Functional Zoning in the East China Sea. *J. Environ. Manag.* **2021**, *298*. https://doi.org/10.1016/j.jenvman.2021.113506.

References

1. Costanza, R.; d'Arge, R.; De Groot, R.; Farber, S.; Grasso, M.; Hannon, B.; Limburg, K.; Naeem, S.; O'Neill, R.V.; Paruelo, J.; et al. The Value of the World's Ecosystem Services and Natural Capital. *Nature* **1997**, *387*, 253–260. [CrossRef]
2. Costanza, R.; De Groot, R.; Sutton, P.; Van der Ploeg, S.; Anderson, S.J.; Kubiszewski, I.; Farber, S.; Turner, R.K. Changes in the Global Value of Ecosystem Services. *Glob. Environ. Change* **2014**, *26*, 152–158. [CrossRef]
3. Böhnke-Henrichs, A.; Baulcomb, C.; Koss, R.; Hussain, S.S.; de Groot, R.S. Typology and Indicators of Ecosystem Services for Marine Spatial Planning and Management. *J. Environ. Manag.* **2013**, *130*, 135–145. [CrossRef] [PubMed]
4. Liquete, C.; Piroddi, C.; Drakou, E.G.; Gurney, L.; Katsanevakis, S.; Charef, A.; Egoh, B. Current Status and Future Prospects for the Assessment of Marine and Coastal Ecosystem Services: A Systematic Review. *PLoS ONE* **2013**, *8*, e67737. [CrossRef] [PubMed]
5. Barbier, E.B. Marine Ecosystem Services. *Curr. Biol.* **2017**, *27*, R507–R510. [CrossRef]
6. Himes-Cornell, A.; Pendleton, L.; Atiyah, P. Valuing Ecosystem Services from Blue Forests: A Systematic Review of the Valuation of Salt Marshes, Seagrass Beds, and Mangrove Forests. *Ecosyst. Serv.* **2018**, *30*, 36–48. [CrossRef]
7. Yu, B.; Cai, Y.; Jin, L.; Du, B. Effects on Willingness to Pay for Marine Conservation: Evidence from Zhejiang Province, China. *Sustainability* **2018**, *10*, 2298. [CrossRef]
8. Russo, G.F.; Franzese, P.P. Marine Natural Capital and Ecosystem Services: An Environmental Accounting Model. *Ecol. Model.* **2020**, *424*, 109029. [CrossRef]
9. Chakraborty, S.; Gasparatos, A.; Blasiak, R. Multiple Values for the Management and Sustainable Use of Coastal and Marine Ecosystem Services. *Ecosyst. Serv.* **2020**, *41*, 101047. [CrossRef]
10. Gaylard, S.; Waycott, M.; Lavery, P. Review of Coast and Marine Ecosystems in Temperate Australia Demonstrates a Wealth of Ecosystem Services. *Front. Mar. Sci.* **2020**, *7*, 453. [CrossRef]
11. Millennium Ecosystem Assessment (MEA). *Ecosystems and Human Well-Being: Wetlands and Water Synthesis*; World Resources Institute: Washington, DC, USA, 2005.
12. Buonocore, E.; Grande, U.; Franzese, P.P.; Russo, G.F. Trends and Evolution in the Concept of Marine Ecosystem Services: An Overview. *Water* **2021**, *13*, 2060. [CrossRef]
13. Mehvar, S.; Filatova, T.; Dastgheib, A.; De Ruyter van Steveninck, E.; Ranasinghe, R. Quantifying Economic Value of Coastal Ecosystem Services: A Review. *J. Mar. Sci. Eng.* **2018**, *6*, 5. [CrossRef]
14. Costanza, R.; Alperovitz, G.; Daly, H.; Farley, J.; Franco, C.; Jackson, T.; Kubiszewski, I.; Schor, J.; Victor, P. *Building a Sustainable and Desirable Economy-in-Society-in-Nature: Report to the United Nations for the 2012 Rio+ 20 Conference*; ANU Press: Canberra, Australia, 2013.
15. Rasheed, A.R. Marine Protected Areas and Human Well-being–A Systematic Review and Recommendations. *Ecosyst. Serv.* **2020**, *41*, 101048. [CrossRef]
16. Smith, A.C.; Harrison, P.A.; Soba, M.P.; Archaux, F.; Blicharska, M.; Egoh, B.N.; Erős, T.; Domenech, N.F.; György, Á.I.; Haines-Young, R.; et al. How Natural Capital Delivers Ecosystem Services: A Typology Derived from a Systematic Review. *Ecosyst. Serv.* **2017**, *26*, 111–126. [CrossRef]
17. Burke, L.; Reytar, K.; Spalding, M.; Perry, A. *Reefs at Risk Revisited*; World Resources Institute: Washington, DC, USA, 2011.
18. Halpern, B.S.; Frazier, M.; Potapenko, J.; Casey, K.S.; Koenig, K.; Longo, C.; Lowndes, J.S.; Rockwood, R.C.; Selig, E.R.; Selkoe, K.A.; et al. Spatial and Temporal Changes in Cumulative Human Impacts on the World's Ocean. *Nat. Commun.* **2015**, *6*, 7615. [CrossRef] [PubMed]
19. Shucksmith, R.J.; Kelly, C. Data Collection and Mapping–Principles, Processes, and Application in Marine Spatial Planning. *Mar. Policy* **2014**, *50*, 27–33. [CrossRef]
20. Frölicher, T.L.; Fischer, E.M.; Gruber, N. Marine Heatwaves under Global Warming. *Nature* **2018**, *560*, 360–364. [CrossRef]
21. Lotze, H.K.; Tittensor, D.P.; Bryndum-Buchholz, A.; Eddy, T.D.; Cheung, W.W.; Galbraith, E.D.; Barange, M.; Barrier, N.; Bianchi, D.; Blanchard, J.L.; et al. Global Ensemble Projections Reveal Trophic Amplification of Ocean Biomass Declines with Climate Change. *Proc. Natl. Acad. Sci. USA* **2019**, *116*, 12907–12912. [CrossRef] [PubMed]
22. Worm, B.; Lotze, H.K. Marine Biodiversity and Climate Change. In *Climate Change: Observed Impacts on Planet Earth*; Letcher, T.M., Ed.; Elsevier: Amsterdam, The Netherlands, 2016; pp. 195–212.
23. Oliver, E.C.; Benthuysen, J.A.; Darmaraki, S.; Donat, M.G.; Hobday, A.J.; Holbrook, N.J.; Schlegel, R.W.; Sen Gupta, A. Marine Heatwaves. *Annu. Rev. Mar. Sci.* **2021**, *13*, 313–342. [CrossRef] [PubMed]

24. Kouhi, S.; Hashemi, M.R.; Spaulding, M.; Hara, T. Modeling the Impact of Sea Level Rise on Maximum Water Elevation During Storm Surge Events: A Closer Look at Coastal Embayments. *Clim. Chang.* **2022**, *171*, 31. [CrossRef]
25. Blanchard, J.L.; Watson, R.A.; Fulton, E.A.; Cottrell, R.S.; Nash, K.L.; Bryndum-Buchholz, A.; Büchner, M.; Carozza, D.A.; Cheung, W.W.; Elliott, J.; et al. Linked Sustainability Challenges and Trade-offs Among Fisheries, Aquaculture, and Agriculture. *Nat. Ecol. Evol.* **2017**, *1*, 1240–1249. [CrossRef]
26. Stock, C.A.; John, J.G.; Rykaczewski, R.R.; Asch, R.G.; Cheung, W.W.; Dunne, J.P.; Friedland, K.D.; Lam, V.W.; Sarmiento, J.L.; Watson, R.A. Reconciling Fisheries Catch and Ocean Productivity. *Proc. Natl. Acad. Sci. USA* **2017**, *114*, E1441–E1449. [CrossRef] [PubMed]
27. Frazão Santos, C.; Agardy, T.; Andrade, F.; Calado, H.; Crowder, L.B.; Ehler, C.N.; García-Morales, S.; Gissi, E.; Halpern, B.S.; Orbach, M.K.; et al. Integrating Climate Change in Ocean Planning. *Nat. Sustain.* **2020**, *3*, 505–516. [CrossRef]
28. Wang, Y.S.; Gu, J.D. Ecological Responses, Adaptation, and Mechanisms of Mangrove Wetland Ecosystem to Global Climate Change and Anthropogenic Activities. *Int. Biodeterior. Biodegrad.* **2021**, *162*, 105248. [CrossRef]
29. Roberts, K.E.; Hill, O.; Cook, C.N. Evaluating Perceptions of Marine Protection in Australia: Does Policy Match Public Expectation? *Mar. Policy* **2020**, *112*, 103766. [CrossRef]
30. D'Aloia, C.C.; Daigle, R.M.; Côté, I.M.; Curtis, J.M.; Guichard, F.; Fortin, M.J. A Multiple-Species Framework for Integrating Movement Processes Across Life Stages into the Design of Marine Protected Areas. *Biol. Conserv.* **2017**, *216*, 93–100. [CrossRef]
31. Ehler, C.; Douvere, F. *Marine Spatial Planning: A Step-by-Step Approach Toward Ecosystem-Based Management*; UNESCO, Intergovernmental Oceanographic Commission and Man and the Biosphere Programme: Paris, France, 2009. [CrossRef]
32. UNESCO-IOC; European Commission. *MSPglobal International Guide on Marine/Maritime Spatial Planning*; IOC Manuals and Guides No. 89; UNESCO: Paris, France, 2021.
33. Agardy, T. *Ocean Zoning: Making Marine Management More Effective*; Earthscan: London, UK, 2010.
34. Day, J.C.; Kenchington, R.A.; Tanzer, J.M.; Cameron, D.S. Marine Zoning Revisited: How Decades of Zoning the Great Barrier Reef Has Evolved as an Effective Spatial Planning Approach for Marine Ecosystem-Based Management. *Aquat. Conserv.* **2019**, *29*, 9–32. [CrossRef]
35. Basirati, M.; Billot, R.; Meyer, P.; Bocher, E. Exact Zoning Optimization Model for Marine Spatial Planning (MSP). *Front. Mar. Sci.* **2021**, *8*, 629. [CrossRef]
36. Escandón-Panchana, J.; Elao Vallejo, R.; Escandón-Panchana, P.; Velastegui-Montoya, A.; Herrera-Franco, G. Spatial Planning of the Coastal Marine Socioecological System—Case Study: Punta Carnero, Ecuador. *Resources* **2022**, *11*, 74. [CrossRef]
37. Page, M.J.; Moher, D.; Bossuyt, P.M.; Boutron, I.; Hoffmann, T.C.; Mulrow, C.D.; Shamseer, L.; Tetzlaff, J.M.; Akl, E.A.; Brennan, S.E.; et al. PRISMA 2020 Explanation and Elaboration: Updated Guidance and Exemplars for Reporting Systematic Reviews. *BMJ* **2021**, *372*, n160. [CrossRef]
38. Martín-Martín, A.; Orduna-Malea, E.; Thelwall, M.; López-Cózar, E.D. Google Scholar, Web of Science, and Scopus: A Systematic Comparison of Citations in 252 Subject Categories. *J. Informetr.* **2018**, *12*, 1160–1177. [CrossRef]
39. Singh, V.K.; Singh, P.; Karmakar, M.; Leta, J.; Mayr, P. The Journal Coverage of Web of Science, Scopus, and Dimensions: A Comparative Analysis. *Scientometrics* **2021**, *126*, 5113–5142. [CrossRef]
40. Baas, J.; Schotten, M.; Plume, A.; Côté, G.; Karimi, R. Scopus as a Curated, High-Quality Bibliometric Data Source for Academic Research in Quantitative Science Studies. *Quant. Sci. Stud.* **2020**, *1*, 377–386. [CrossRef]
41. Bin Ali, N.; Tanveer, B. A Comparison of Citation Sources for Reference and Citation-Based Search in Systematic Literature Reviews. *e-Inform. Softw. Eng. J.* **2022**, *16*, 220106. [CrossRef]
42. Solé Figueras, L.; Zandt, E.I.; Buschbaum, C.; Meunier, C.L. How Are the Impacts of Multiple Anthropogenic Drivers Considered in Marine Ecosystem Service Research? A Systematic Literature Review. *J. Appl. Ecol.* **2024**, *61*, 1212–1226. [CrossRef]
43. Cockerell, B.; Pressey, R.L.; Grech, A.; Ward, T.; Devillers, R. Representation Does Not Necessarily Reduce Threats to Biodiversity: Australia's Commonwealth Marine Protected Area System 2012–2018. *Biol. Conserv.* **2020**, *252*, 108813. [CrossRef]
44. Hastings, K.; Ryan, K.L. Differences in Perception of a Newly Created Marine Park in South-West Western Australia by Boat-Based Recreational Fishers and the Broader Community. *Mar. Policy* **2017**, *77*, 65–77. [CrossRef]
45. Grantham, H.S.; Agostini, V.N.; Wilson, J.; Mangubhai, S.; Hidayat, N.; Muljadi, A.; Rotinsulu, C.; Mongdong, M.; Beck, M.W.; Possingham, H.P. A Comparison of Zoning Analyses to Inform the Planning of a Marine Protected Area Network in Raja Ampat, Indonesia. *Mar. Policy* **2013**, *38*, 184–194. [CrossRef]
46. Mangubhai, S.; Wilson, J.R.; Rumetna, L.; Maturbongs, Y.; Purwanto. Explicitly Incorporating Socioeconomic Criteria and Data into Marine Protected Area Zoning. *Ocean Coast. Manag.* **2015**, *116*, 523–529. [CrossRef]
47. Fidler, R.Y.; Andradi-Brown, D.A.; Awaludinnoer, D.; Pada, D.; Purwanto; Hidayat, N.I.; Ahmadia, G.N.; Harborne, A.R. The Importance of Biophysical Context in Understanding Marine Protected Area Outcomes for Coral Reef Fish Populations. *Coral Reefs* **2021**, *40*, 791–805. [CrossRef]
48. de Paula Costa, M.D.; Magris, R.A.; Muelbert, J.H.; Vieira, J.P.; Castello, J.P.; Copertino, M.S.; Possingham, H.P. Spatial Zoning to Conserve Fish Species with Complex Life Cycles in Estuaries. *Ocean Coast. Manag.* **2022**, *221*, 106115. [CrossRef]

49. Schwarzmann, D.; Eynon, J.; Shea, R.; Dongarra, L. *Florida Keys National Marine Sanctuary Restoration Blueprint: Updated Socioeconomic Supporting Documentation for the 2019 Draft Environmental Impact Statement and 2022 Proposed Rule*; National Oceanic and Atmospheric Administration (NOAA): Silver Spring, MD, USA, 2022.
50. Chalastani, V.I.; Manetos, P.; Al-Suwailem, A.M.; Hale, J.A.; Vijayan, A.P.; Pagano, J.; Williamson, I.; Henshaw, S.D.; Albaseet, R.; Butt, F.; et al. Reconciling Tourism Development and Conservation Outcomes Through Marine Spatial Planning for a Saudi Giga-Project in the Red Sea (The Red Sea Project Vision 2030). *Front. Mar. Sci.* **2020**, *7*, 168. [CrossRef]
51. Lu, S.Y.; Shen, C.H.; Chiau, W.Y. Zoning Strategies for Marine Protected Areas in Taiwan: Case Study of Gueishan Island in Yilan County, Taiwan. *Mar. Policy* **2014**, *48*, 21–29. [CrossRef]
52. Dobbs, K.; Fernandes, L.; Slegers, S.; Jago, B.; Thompson, L.; Hall, J.; Day, J.; Cameron, D.; Tanzer, J.; MacDonald, F.; et al. Incorporating Marine Turtle Habitats into the Marine Protected Area Design for the Great Barrier Reef Marine Park, Queensland, Australia. *Pac. Conserv. Biol.* **2007**, *13*, 293–302. [CrossRef]
53. Ritchie, H.; Ellis, G. 'A System that Works for the Sea'? Exploring Stakeholder Engagement in Marine Spatial Planning. *J. Environ. Plan. Manag.* **2010**, *53*, 701–723. [CrossRef]
54. Nutters, H.M.; da Silva, P.P. Fishery Stakeholder Engagement and Marine Spatial Planning: Lessons from the Rhode Island Ocean SAMP and the Massachusetts Ocean Management Plan. *Ocean Coast. Manag.* **2012**, *67*, 9–18. [CrossRef]
55. Ruiz-Frau, A.; Edwards-Jones, G.; Kaiser, M.J. Mapping Stakeholder Values for Coastal Zone Management. *Mar. Ecol. Prog. Ser.* **2011**, *434*, 239–249. [CrossRef]
56. Ruiz-Frau, A.; Possingham, H.P.; Edwards-Jones, G.; Klein, C.J.; Segan, D.; Kaiser, M.J. A Multidisciplinary Approach in the Design of Marine Protected Areas: Integration of Science and Stakeholder-Based Methods. *Ocean Coast. Manag.* **2015**, *103*, 86–93. [CrossRef]
57. Villa, F.; Tunesi, L.; Agardy, T. Zoning Marine Protected Areas through Spatial Multiple-Criteria Analysis: The Case of the Asinara Island National Marine Reserve of Italy. *Conserv. Biol.* **2002**, *16*, 515–526. [CrossRef]
58. Lunn, K.E.; Dearden, P. Fishers' Needs in Marine Protected Area Zoning: A Case Study from Thailand. *Coast. Manag.* **2006**, *34*, 183–198. [CrossRef]
59. Mangi, S.C.; Austen, M.C. Perceptions of Stakeholders Towards Objectives and Zoning of Marine-Protected Areas in Southern Europe. *J. Nat. Conserv.* **2008**, *16*, 271–280. [CrossRef]
60. Álvarez-Berastegui, D.; Amengual, J.; Coll, J.; Renones, O.; Moreno-Navas, J.; Agardy, T. Multidisciplinary Rapid Assessment of Coastal Areas as a Tool for the Design and Management of Marine Protected Areas. *J. Nat. Conserv.* **2014**, *22*, 23–34. [CrossRef]
61. Muhl, E.K.; Esteves Dias, A.C.; Armitage, D. Experiences with Governance in Three Marine Conservation Zoning Initiatives: Parameters for Assessment and Pathways Forward. *Front. Mar. Sci.* **2020**, *7*, 629. [CrossRef]
62. Barbosa, A.; Martín, B.; Hermoso, V.; Arévalo-Torres, J.; Barbière, J.; Martínez-López, J.; Domisch, S.; Langhans, S.D.; Balbi, S.; Villa, F.; et al. Cost-Effective Restoration and Conservation Planning in Green and Blue Infrastructure Designs. A Case Study on the Intercontinental Biosphere Reserve of the Mediterranean: Andalusia (Spain)–Morocco. *Sci. Total Environ.* **2019**, *652*, 1463–1473. [CrossRef]
63. Verutes, G.M.; Arkema, K.K.; Clarke-Samuels, C.; Wood, S.A.; Rosenthal, A.; Rosado, S.; Canto, M.; Bood, N.; Ruckelshaus, M. Integrated Planning that Safeguards Ecosystems and Balances Multiple Objectives in Coastal Belize. *Int. J. Biodivers. Sci. Ecosyst. Serv. Manag.* **2017**, *13*, 1–17. [CrossRef]
64. Halpern, B.S.; McLeod, K.L.; Rosenberg, A.A.; Crowder, L.B. Managing for Cumulative Impacts in Ecosystem-Based Management through Ocean Zoning. *Ocean Coast. Manag.* **2008**, *51*, 203–211. [CrossRef]
65. Rovere, A.; Ferraris, F.; Parravicini, V.; Navone, A.; Morri, C.; Bianchi, C.N. Characterization and Evaluation of a Marine Protected Area: 'Tavolara–Punta Coda Cavallo' (Sardinia NW Mediterranean). *J. Maps* **2013**, *9*, 279–288. [CrossRef]
66. Cavanagh, R.D.; Melbourne-Thomas, J.; Grant, S.M.; Barnes, D.K.A.; Hughes, K.A.; Halfter, S.; Meredith, M.P.; Murphy, E.J.; Trebilco, R.; Hill, S.L. Future Risk for Southern Ocean Ecosystem Services Under Climate Change. *Front. Mar. Sci.* **2021**, *7*, 615214. [CrossRef]
67. Brodie, J.; Waterhouse, J. A Critical Review of Environmental Management of the 'Not So Great' Barrier Reef. *Estuar. Coast. Shelf Sci.* **2012**, *104*, 1–22. [CrossRef]
68. Magris, R.A.; Pressey, R.L.; Mills, M.; Vila-Nova, D.A.; Floeter, S. Integrated Conservation Planning for Coral Reefs: Designing Conservation Zones for Multiple Conservation Objectives in Spatial Prioritisation. *Glob. Ecol. Conserv.* **2017**, *11*, 53–68. [CrossRef]
69. Noble, M.M.; Harasti, D.; Pittock, J.; Doran, B. Using GIS Fuzzy-Set Modelling to Integrate Social-Ecological Data to Support Overall Resilience in Marine Protected Area Spatial Planning: A Case Study. *Ocean Coast. Manag.* **2021**, *212*, 105745. [CrossRef]
70. Convention on Biological Diversity. Aichi Biodiversity Targets. 2010. Available online: https://www.cbd.int/sp/targets/ (accessed on 9 September 2024).
71. United Nations. Transforming Our World: The 2030 Agenda for Sustainable Development. 2015. Available online: https://sdgs.un.org/2030agenda (accessed on 9 September 2024).

72. Medrano, A.; Linares, C.; Aspillaga, E.; Capdevila, P.; Montero-Serra, I.; Pages-Escola, M.; Hereu, B. No-Take Marine Reserves Control the Recovery of Sea Urchin Populations after Mass Mortality Events. *Mar. Environ. Res.* **2019**, *145*, 147–154. [CrossRef]
73. Roth, C.H.; Addison, J.; Anthony, K.; Dale, A.; Eberhard, R.; Hobday, A.; Horner, N.J.; Jarvis, D.; Kroon, K.; Stone-Jovicich, S.; et al. *Reef 2050 Plan Review Options*; CSIRO: Canberra, Australia, 2017.
74. Chollett, I.; Perruso, L.; O'Farrell, S. Toward a Better Use of Fisheries Data in Spatial Planning. *Fish Fish.* **2022**, *23*, 1136–1149. [CrossRef]
75. de Mitcheson, Y.J.S.; Linardich, C.; Barreiros, J.P.; Ralph, G.M.; Aguilar-Perera, A.; Afonso, P.; Erisman, B.E.; Pollard, D.A.; Fennessy, S.T.; Bertoncini, A.A.; et al. Valuable but Vulnerable: Over-Fishing and Under-Management Continue to Threaten Groupers, so What Now? *Mar. Policy* **2020**, *116*, 103909. [CrossRef]
76. Kyvelou, S.S.I.; Ierapetritis, D.G. Fisheries Sustainability through Soft Multi-Use Maritime Spatial Planning and Local Development Co-Management: Potentials and Challenges in Greece. *Sustainability* **2020**, *12*, 2026. [CrossRef]
77. Vázquez-Rowe, I. A Fine Kettle of Fish: The Fishing Industry and Environmental Impacts. *Curr. Opin. Environ. Sci. Health* **2020**, *13*, 1–5. [CrossRef]
78. Vianna, G.M.; Zeller, D.; Pauly, D. Fisheries and Policy Implications for Human Nutrition. *Curr. Environ. Health Rep.* **2020**, *7*, 161–169. [CrossRef]
79. O'Hara, C.C.; Frazier, M.; Halpern, B.S. At-Risk Marine Biodiversity Faces Extensive, Expanding, and Intensifying Human Impacts. *Science* **2021**, *372*, 84–87. [CrossRef] [PubMed]
80. Parsons, M.; Taylor, L.; Crease, R. Indigenous Environmental Justice within Marine Ecosystems: A Systematic Review of the Literature on Indigenous Peoples' Involvement in Marine Governance and Management. *Sustainability* **2021**, *13*, 4217. [CrossRef]
81. Kyvelou, S.S.; Ierapetritis, D.G.; Chiotinis, M. The Future of Fisheries Co-Management in the Context of the Sustainable Blue Economy and the Green Deal: There Is No Green without Blue. *Sustainability* **2023**, *15*, 7784. [CrossRef]
82. Bidayani, E.; Reniati, R.; Priyambada, A. Implementation of the Blue Economy Concept of Traditional Fisheries Management in the Conflict Zone on the Coast of the Kebintik Village, Pangkalan Baru District, Central Bangka Regency. *ECSOFiM* **2023**, *10*, 147–155. [CrossRef]
83. Stelzenmüller, V.; Letschert, J.; Gimpel, A.; Kraan, C.; Probst, W.N.; Degraer, S.; Döring, R. From Plate to Plug: The Impact of Offshore Renewables on European Fisheries and the Role of Marine Spatial Planning. *Renew. Sustain. Energy Rev.* **2022**, *158*, 112108. [CrossRef]
84. Jones, K.R.; Venter, O.; Fuller, R.A.; Allan, J.R.; Maxwell, S.L.; Negret, P.J.; Watson, J.E. One-Third of Global Protected Land Is Under Intense Human Pressure. *Science* **2018**, *360*, 788–791. [CrossRef] [PubMed]
85. Costello, M.J. Distinguishing Marine Habitat Classification Concepts for Ecological Data Management. *Mar. Ecol. Prog. Ser.* **2009**, *397*, 253–268. [CrossRef]
86. Knowlton, N.; Brainard, R.E.; Fisher, R.; Moews, M.; Plaisance, L.; Caley, M.J. Coral Reef Biodiversity. *Life World's Ocean. Divers. Distrib. Abundance* **2010**, *65*, 65–74. [CrossRef]
87. Cinner, J. Coral Reef Livelihoods. *Curr. Opin. Environ. Sustain.* **2014**, *7*, 65–71. [CrossRef]
88. Woodhead, A.J.; Hicks, C.C.; Norström, A.V.; Williams, G.J.; Graham, N.A. Coral Reef Ecosystem Services in the Anthropocene. *Funct. Ecol.* **2019**, *33*, 1023–1034. [CrossRef]
89. Spalding, M.D.; Ravilious, C.; Green, E.P. *World Atlas of Coral Reefs*; University of California Press: Berkeley, CA, USA, 2001.
90. Eddy, T.D.; Lam, V.W.; Reygondeau, G.; Cisneros-Montemayor, A.M.; Greer, K.; Palomares, M.L.D.; Bruno, J.F.; Ota, Y.; Cheung, W.W. Global Decline in Capacity of Coral Reefs to Provide Ecosystem Services. *One Earth* **2021**, *4*, 1278–1285. [CrossRef]
91. Raja, A.; Vipin, C.; Aiyappan, A. Biological Importance of Marine Algae-An Overview. *Int. J. Curr. Microbiol. Appl. Sci.* **2013**, *2*, 222–227.
92. de los Santos, C.B.; Scott, A.; Arias-Ortiz, A.; Jones, B.; Kennedy, H.; Mazarrasa, I.; McKenzie, L.; Nordlund, L.M.; de la Torre-Castro, M.D.L.T.; Unsworth, R.K.; et al. Seagrass Ecosystem Services: Assessment and Scale of Benefits. In *Out of the Blue: The Value of Seagrasses to the Environment and to People*; de la Torre-Castro, M.D.L.T., Ed.; Academic Press: London, UK, 2020; pp. 19–21.
93. Piwowar, A.; Harasym, J. The Importance and Prospects of the Use of Algae in Agribusiness. *Sustainability* **2020**, *12*, 5669. [CrossRef]
94. Ison, S.; Pecl, G.; Hobday, A.J.; Cvitanovic, C.; Van Putten, I. Stakeholder Influence and Relationships Inform Engagement Strategies in Marine Conservation. *Ecosyst. People* **2021**, *17*, 320–341. [CrossRef]
95. Maguire, B.; Potts, J.; Fletcher, S. The Role of Stakeholders in the Marine Planning Process—Stakeholder Analysis within the Solent, United Kingdom. *Mar. Policy* **2012**, *36*, 246–257. [CrossRef]
96. Fernandes, L.; Day, J.O.; Lewis, A.; Slegers, S.; Kerrigan, B.; Breen, D.A.N.; Cameron, D.; Jago, B.; Hall, J.; Lowe, D.; et al. Establishing Representative No-Take Areas in the Great Barrier Reef: Large-Scale Implementation of Theory on Marine Protected Areas. *Conserv. Biol.* **2005**, *19*, 1733–1744. [CrossRef]

97. Natural Capital Project. InVEST 0.0. *Stanford University, University of Minnesota, Chinese Academy of Sciences, The Nature Conservancy, World Wildlife Fund, Stockholm Resilience Centre, and the Royal Swedish Academy of Sciences*. 2025. Available online: https://naturalcapitalproject.stanford.edu/software/invest (accessed on 10 February 2025).
98. Slater, A.M.; Irvine, K.N.; Byg, A.A.; Davies, I.M.; Gubbins, M.; Kafas, A.; Kenter, J.; MacDonald, A.; Murray, R.O.H.; Potts, T.; et al. Integrating stakeholder knowledge through modular cooperative participatory processes for marine spatial planning outcomes (CORPORATES). *Ecosyst. Serv.* **2020**, *44*, 101126. [CrossRef]
99. Banela, M.; Kyvelou, S.S.; Kitsiou, D. Mapping and Assessing Cultural Ecosystem Services to Inform Maritime Spatial Planning: A Systematic Review. *Heritage* **2024**, *7*, 697–736. [CrossRef]
100. Doney, S.C.; Ruckelshaus, M.; Emmett Duffy, J.; Barry, J.P.; Chan, F.; English, C.A.; Galindo, H.M.; Grebmeier, J.M.; Hollowed, A.B.; Knowlton, N.; et al. Climate Change Impacts on Marine Ecosystems. *Annu. Rev. Mar. Sci.* **2012**, *4*, 11–37. [CrossRef] [PubMed]
101. Gattuso, J.P.; Magnan, A.; Billé, R.; Cheung, W.W.; Howes, E.L.; Joos, F.; Allemand, D.; Bopp, L.; Cooley, S.R.; Eakin, C.M.; et al. Contrasting Futures for Ocean and Society from Different Anthropogenic CO2 Emissions Scenarios. *Science* **2015**, *349*, aac4722. [CrossRef] [PubMed]
102. IPCC. *Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II, and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*; Lee, H., Romero, J., Eds.; IPCC: Geneva, Switzerland, 2023.
103. Payne, M.R.; Barange, M.; Cheung, W.W.; MacKenzie, B.R.; Batchelder, H.P.; Cormon, X.; Eddy, T.D.; Fernandes, J.A.; Hollowed, A.B.; Jones, M.C.; et al. Uncertainties in Projecting Climate-Change Impacts in Marine Ecosystems. *ICES J. Mar. Sci.* **2016**, *73*, 1272–1282. [CrossRef]
104. Cabral, H. Climate Change Impacts on the Nursery Function for Fish of Coastal Zones. In *Treatise on Estuarine and Coastal Science*; Elsevier: Amsterdam, The Netherlands, 2024; Chapter 4.8.
105. Gutiérrez, E.; Letelier, L.; Santos-Carvallo, M.; Barilari, F.; Gutiérrez, L.; Pérez-Álvarez, M.J.; Sepúlveda, M. Zoning Proposal for a Marine Protected Area in Chile: A Conservation Tool for Large Cetaceans. *Ocean Coast. Manag.* **2024**, *248*, 106975. [CrossRef]
106. Short, C.; Smith, J.L.; Bones, J.; Diggon, S.; Heidt, A.; Mcdougall, C.; Pawluk, K.A. Marine Zoning for the Marine Plan Partnership (MaPP) in British Columbia, Canada. *Mar. Policy* **2023**, *152*, 105524. [CrossRef]
107. Jia, R.; Gao, J.; Gao, F. Robust Ocean Zoning for Conservation, Fishery and Marine Renewable Energy with Co-Location Strategy. *Appl. Energy* **2022**, *328*, 120166. [CrossRef]
108. Horta e Costa, B.; Guimarães, M.H.; Rangel, M.; Ressurreicão, A.; Monteiro, P.; Oliveira, F.; Bentes, L.; Sales Henriques, N.; Sousa, I.; Alexandre, S.; et al. Co-Design of a Marine Protected Area Zoning and the Lessons Learned from It. *Front. Mar. Sci.* **2022**, *9*, 969234. [CrossRef]

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.