



Creating a common ground for the implementation of a community-based Marine Protected Area – a case study in Algarve, Portugal

M. Helena Guimarães^{a,*}, Mafalda Rangel^{b,1}, Barbara Horta e Costa^{b,1}, Adriana Ressurreição^{b,1}, Frederico Oliveira^b, Jorge M.S. Gonçalves^b

^a MED - Mediterranean Institute for Agriculture, Environment and Development & CHANGE – Global Change and Sustainability Institute, Institute for Advanced Studies and Research, Universidade de Évora, Évora, Portugal

^b CCMAR – Centro de Ciências do Mar, Universidade do Algarve, Campus Gambelas, 8005-139, Faro, Portugal

ABSTRACT

Marine Protected Areas (MPAs) are a key tool for the worldwide strategy to halt the decline of biodiversity, yet they can also escalate conflicts between different human activities, conservation and other societal interests. Enabling conditions to secure MPAs effectiveness and the ability to deliver the desired socio-ecological outcomes often include the application of participatory approaches. One example of these approaches are collective visioning exercises where stakeholders can work together, projecting into the future their expectations and goals for MPAs. Our study presents a visioning exercise, using an adaptation of the Territory Game technique, as a starting point of a long and comprehensive participatory process to implement a community-based MPA in the southern part of Portugal. This particular MPA aims at protecting one of the largest rocky reefs of the Portuguese coast, an important biodiversity and human activities' hotspot, stressing the need to accommodate different interests into its design and planning. To the best of our knowledge, and in the context of an MPA, this is one of the few studies in the literature where the process of creating a stakeholders' shared vision is described. Stakeholder mapping and raising interest activities were used to motivate their participation. A total of 7 visions were co-created by 50 stakeholders of 30 different institutions. From this set we were able to congregate a shared vision that became the flag of the subsequent participatory process. The visioning exercise made explicit that the MPA is a long-term investment, that includes immediate costs and benefits, some that will only arrive later. Considering the immediate costs, the desire to identify compensatory measures was also made explicit. Our results show that using visioning exercises in the early stages of an MPA design broadens the discussions and paves the way for less consensual tasks such as MPA zoning and regulation.

1. Introduction

Marine Protected Areas (MPAs) are areas for which protective, conservation, restorative or precautionary measures are instituted for the purpose of protecting and conserving species, habitats, ecosystems or ecological processes of the marine environment' (OSPAR Commission, 2003). These area-based tools have been increasingly used as a worldwide strategy to halt the decline of biodiversity (Rice et al., 2012; Lubchenco and Grorud-Colvert, 2015; Hermoso et al., 2022). MPAs that are considered successful frequently include ecological and socio-economic outcomes (Bennett and Dearden, 2014; Ban et al., 2017; Ulate et al., 2018; Di Franco et al., 2016, 2020; Jacquemont et al., 2022). Yet, to reach such outcomes, they need sound social-ecological planning in tandem with local users' legitimacy and inclusive approaches that promote equity and justice (Giakoumi et al., 2018; Pendleton et al., 2017; Grorud-Colvert et al., 2021). Inclusive approaches imply that stakeholders and interests are identified, future options envisioned, and that

compromises attempting to maximize the benefits and reduce the burdens of an MPA implementation are reached (Day et al., 2019). If stakeholder's engagement and participation in the planning phase of an MPA is secured, then there is a higher probability of success (Dehens and Fanning, 2018; Giakoumi et al., 2018; Humphreys and Herbert, 2018).

Securing stakeholder participation is not a straightforward achievement. There are several aspects influencing stakeholder participation (Manzungu, 2002; Wester et al., 2003; Fletcher 2007; McGee et al., 2022). Head counts and representativeness should be critically reviewed and are not sufficient to overcome the limitations of a participation processes (Manzungu, 2002; Wester et al., 2003; Fletcher, 2007; McGee et al., 2022). Tools for stakeholder's analysis can contribute to effectively identified, categorize and understand inter-relationships between stakeholders (Reed 2008; Reed et al., 2009). Yet, many other contextual aspects can influence a participatory process. Understanding the external and internal factors in place is a step forward while tackling such obstacles (Fletcher, 2007; 2007). Mixed-mode methodologies

* Corresponding author.

E-mail address: mhguimaraes@uevora.pt (M.H. Guimarães).

¹ these authors contributed equally to this paper.

which means that participatory tools are used in combination with consultation ones (i.e. questionnaires, interviews) can help bringing into a deliberative process unvoiced needs, interests and values (Reed 2008, Reed et al., 2019; Rangel et al., 2019). Further, activities that motivate a wider engagement can be democratically important and work in parallel with a formal participatory process which can narrow the power within a tight network of “stakeholders” (Bremer and Glavovic, 2013).

Nonetheless, drivers and root causes of inequitable and unjust conditions can decrease the efficiency of participatory processes, even when well designed and implemented (Heron et al., 2021). Participatory initiatives do not always guarantee that all knowledge-holders are “empowered” and they can actually become an arena for one knowledge-holder to exert power and manipulate others (Bremer and Glavovic, 2013). Indeed, participatory process should not be understood as a panacea but as an important framework while dealing with natural resource management such as MPA planning and implementation (Dehens and Fanning, 2018; Giakoumi et al., 2018; Humphreys and Herbert, 2018).

Planning implies looking at the future, hence visioning tools can be useful. The collective development of a vision allows the identification of clear objectives before moving into less consensual tasks, such as the co-design of zoning and regulation instruments for the MPA (Gilliland and Laffoley, 2008; Ehler and Douvere, 2009; Gopnik et al., 2012; Agostini et al., 2015; Tafon et al., 2021). With a visioning exercise, stakeholders can initiate the dialogue by sharing interests, values and wishes for the future, in a creative and unrestricted environment. The creation of a vision is an activity that defines a purpose and allows the identification of a pathway to reach the desirable state in the future (Kessler, 2004; Agostini et al., 2015). Thus, when co-created at an early stage, a vision is a strong basis for the successful development of management tools such as zoning and regulations (Agostini et al., 2015). As Scianna et al. (2019) study shows, having a clearly stated vision for a MPA is an important element of effective management.

Visions are distinct from the process of scenario creation (McGowan et al., 2019; Aguiar et al., 2020; Calado et al., 2021) since they do not aim at predicting or forecasting (Pinto-Correia et al., 2014; Wilson, 2020). The intention behind this process is grounded in the conceptualization of systems innovation and transition processes, where social learning is a process of reframing that leads to a change in perspectives among stakeholders, who jointly seek a shared view of problems and directions for sustainable solutions (Kemp and Loorbach, 2006; Pohl, 2011; Guimarães et al., 2019). Visions are stories about the future, which can be told either qualitatively (in words or pictures), quantitatively (as numerical estimates) or by combining both (Pinto-Correia et al., 2014). A collective visioning approach implies the participation of as many stakeholders as possible. Through a well-structured participatory process, it is possible to jointly construct visions which are enriched by the perspectives of different participants. This process leads to greater awareness of the current situation, challenges ahead, and the roles of the different actors and institutions (Wiek and Iwaniec, 2013).

This study presents the starting point of the design stage of an MPA located in the southern region of Portugal, the Algarve. The idea and concept of this MPA started to germinate almost 15 years ago, among several stakeholders (i.e., fishers, researchers, public administration), after a major habitat and biodiversity mapping of the entire region (Gonçalves et al., 2004, 2007, 2008, 2010). In 2017, the conditions were set to start the process of designing and implementing such MPA. The location of this MPA coincides not only with a hotspot of biodiversity but also with a hotspot for several economic activities such as tourism and fisheries, highly dependent on the ecosystem services provided by this region (Gonçalves et al., 2015; Henriques et al., 2018; Horta e Costa et al., 2022., Ressurreição et al., 2020, 2021). Therefore, from the start, it was clear that the success of this MPA was dependent on an effective integration of existing interests. Furthermore, the implementation of several MPAs with similar characteristics in the past, assuming a top-down approach, had led to conflicts and inefficiencies on achieving

their conservation goals (Vasconcelos et al., 2013). Thus, a compromise between the multiplicity of activities/stakeholders was needed, in addition to the development of a marine spatial planning instrument capable of safeguarding biodiversity. A participatory process for the co-design of this future community-based MPA (CbMPA) was put in place (all details in Rangel et al., *in prep.*).

This MPA has been designated as community-based because it was proposed by local stakeholders. The promoters of the initiative included a local fishing organization, one municipality, one parish and one research centre. Funding for the implementation of the participatory process was attained from Ocean Azul foundation dedicated to ocean conservation. The process started with the mapping of stakeholders and raising interest activities. Later, we opted to develop a collective vision for the future of this CbMPA. In the present study, the main objectives are 1) presenting and discussing the methodological approach used for the visioning exercise and 2) discussing the content of this CbMPA vision, considering the goals that such policy instrument should reach. We recognize that a visioning process might not be generalize to every context due to the diversity of coastal governance across regions. Nonetheless, we aim to motivate others to consider visioning as an important tool for planning future MPAs and also to review the achievements of already implemented ones.

2. The case study

The future CbMPA is located in the southern region of Portugal, the Algarve, from the Marina of Albufeira (east limit) to the lighthouse of Alfanzina (west limit), spanning across the municipalities of Albufeira, Lagoa, and Silves (Fig. 1). The area (156.6 km² in total) is composed by a central rocky reef ranging between 13 and 25 m depth, and ~31 km² of sandy substrate and 63 km² of intricate rock/mixed habitats. The relevance of this area is explained by the natural rocky reef, a priority habitat under the European Union habitats directive (code: Reefs 1070), and by the fact that 70% of all species found in the Algarve have been reported for this area: 703 invertebrates, 111 fish and 75 algae (Henriques et al., 2018). A total of 19 species with conservation status were also identified, including seahorses (*Hippocampus* spp.) and the dusky grouper (*Epinephelus marginatus*). Finally, 45 new species recorded for Portugal and 12 new species for science were also found in this area (Henriques et al., 2018). In addition to its ecological relevance, the area is also highly relevant in socio-economic terms as it supports relevant tourism and fisheries industries (Ressurreição et al., 2020, 2021).

3. Methods

A vision can be developed using several techniques (Wiek and Iwaniec, 2013). The visioning approach used in the present case was inspired by the Territory Game method (Angeon and Lardon, 2008; Lardon, 2013; Littaye et al., 2016; Esgalhado et al., 2020). We selected this method because of its territorial nature, i.e., the vision is developed taking into consideration the territory. Plus, facts and figures are used to trigger discussion between participants. As such it allows for ‘out of the box’ ideas, and promotes the debate regarding the feasibility of all suggestions; while being a springboard for discussions based on the characteristics and potentialities of the area. In a CbMPA design, conflicting interests are expected; hence the game nature of the method is also beneficial because it promotes an ‘at ease’ atmosphere. The Territory Game technique can be ‘played’ by everyone. In our particular case, players were the stakeholders involved in the different activities occurring in the future CbMPA and with an explicit role in the territorial development (Table 1). Stakeholders were mapped during field work and survey applications to develop a baseline report on the socio-economic importance of the region (Ressurreição et al., 2021). In addition, the research team that promoted this process is well rooted in the region and working with most of these stakeholders in several topics and for a long time.

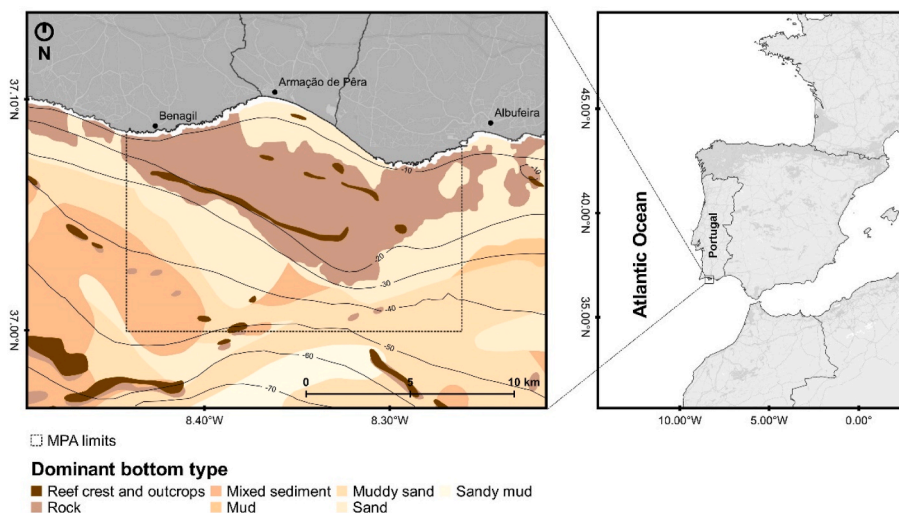


Fig. 1. Location and dominant bottom typologies of the area proposed to become a CbMPA (dominant bottom type data is based on “Broad-scale seabed substrate map of the European sea areas: EUSeaMap” (EMODnet Seabed habitats- <https://www.emodnet-seabedhabitats.eu>).

Table 1

Overview of the stakeholder mapping and the type and number of participants in the visioning exercise.

Typology of Stakeholders	Sub-Typology	Institutions (N)	Participants
Public administration	local development enterprises, businesses and tourism	6	3
	management of natural resources	1	0
	education	5	2
	ports and navigation	2	2
	local administration	2	1
	research focusing on marine systems	15	7
		2	2
Non-Governmental representatives & associations	local development and sustainable use of natural resources	6	1
	commercial fishing sector	12	3
	underwater activities and recreational fishing	6	2
	businesses & tourism	8	0
	Non-Governmental Organizations (NGOs)	12	3
	research focusing on marine systems	1	1
		1	1
Private companies	hospitality/tourism sector	6	1
	marinas	2	1
	thematic parks and aquatic activities	1	0
	environment & science communication	2	1
		2	1
Total of institutions		89 (30)	50

Note: 89 institutions were identified and invited, in brackets is the number of institutions that were present in the workshop.

The game is structured and guided by an overarching question/s. In the present case, the questions posed at the beginning of the visioning exercise were:

“What type of CbMPA can exist in 15 years?” and “How can the CbMPA contribute to the territorial development?”

The idea of the first question was to project the discussion to a medium-long term period, where future options are less limited by current or short-terms conditions. The main idea of the second question

was to highlight that the goal of this CbMPA was to contribute to the territorial development and not to hamper it. The goal was not to discuss whether or not the MPA would contribute to territorial development but to collectively discuss how the MPA could be design to fulfil that purpose.

The game is meant to be spatially explicit; that means that participants need to draw on a map how the future could look like, considering their visions. In this specific case, we used the map of the region with the limits of the proposed CbMPA and the rocky reef justifying the CbMPA proposal (Fig. 2). The adjacent land territory was also included in the map, with the municipalities and well-known landmarks such as local beaches, the lighthouse, the marina, and one lagoon system.

The visioning exercise occurred on the May 7, 2019 with the participation of 50 representatives of 30 institutions with a stake in the area (Table 1). Participants were divided in 7 distinct working groups and the distribution was predefined so that, in each table, a representative of the different human activities operating in the area was present. The number of playing tables (working groups) was based on the number of participants, so each table included ~7 participants. Participants were distributed between tables to secure that each member represented a different sub-typology (see Table 1). The heterogeneous groups played in parallel and independently for 2 h. In the final hour of the workshop a spokesperson of each group presented the group vision for all the participants. In this plenary format, the contrasts or similarities between visions were highlighted. This exercise did not force consensus, since every stakeholder was invited to express their perspective, and, in the end, we focused on shared features that appeared as the visions were explained.

The original format of the Territory Game follows a set of rules and is played in three steps.

1) **Diagnosis:** The participants have to identify and draw the diagnosis of the current situation of the territory. For that, each player is given two cards (Fig. 3) with succinct information on a topic relevant to the overarching question(s).

In their turn, players must choose one of the cards they were given to, and share the information it contains, adding their own knowledge. Within each throw, it is only allowed to debate the topic of the thrown card. All the other players are encouraged to add to the topic. In the map of the territory, and in a given location which players agree as most relevant, they should draw or add symbols related to the topic discussed. Once the selected information has been drawn on the map, it is the turn

What type of MPA can exist in 15 years?
How can the MPA contribute to the territorial development?

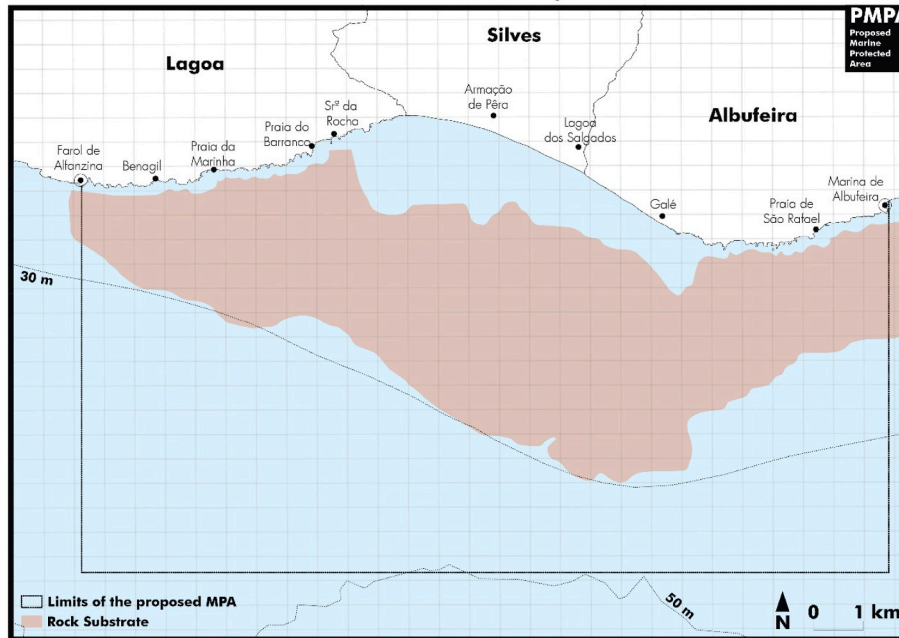


Fig. 2. The board of the game including the location and limits of the future CbMPA.



Fig. 3. Examples of playing cards. A – informs about the number of marine species identified in the area and shows their conservation status. B – provides an overview of the cultural heritage in the region. C – Examples of the marine based tourism activities in the area.

of the next player to throw a card.

- 2) **Vision:** This step is based on the results of the previous one; and players must imagine and draw a possible future development for the territory. The vision ought to be spatially explicit, and only consensual ideas can be drawn. At this stage, players are not limited to specific cards, therefore the discussion has the potential to be more open and broader.
- 3) **Action:** The aim of this step is to define a series of actions to be taken at the present time in order to meet the desired vision or prevent an undesired one. Actions should be achievable by the participants in the group and possible to be implemented at present time. Actions can suggest stakeholders not present in the game, but with whom would be possible to create a partnership (Lardon, 2013).

To secure that the visioning exercise was developed by the majority of the stakeholders identified for the area, the workshop was planned to last for 3 h. Considering the number of participants, their heterogeneity and the time allocated, the following adaptations to the original format of the Territorial Game were considered (Lardon, 2013): i) Step 1 and 2 were merged and each group played two rounds before advancing to step 3; ii) The rules were maintained but, in each player turn, the participant had to select between the 2 cards available, explain the card

and his/her reaction to it, and finalize by expressing a wish for the future CbMPA. This meant that the player would simultaneous express his/her diagnosis of the current situation and specify how it should be in the future. Before the following play, the idea was drawn on the map (Fig. 1), including the number of participants in the group that supported the wish; iii) In the 3rd step of the process, the actions were defined, as well as a title for each vision. Hence another important adaptation to the original Territory Game approach was the fact that all perspectives were included and not just the consensual ones. An indication of the number of participants that supported the wish was included.

A total of 12 game cards were made available. The game cards were created to trigger and guide the discussions towards existing interests in the context of a CbMPA implementation. The goal of such discussions was to consider topics with ecological, social and economic relevance in the area. We took into consideration the available data and examples of previous studies that use the territory game methodology (Angeon and Lardon, 2008; Lardon, 2013; Littaye et al., 2016; Esgalhado et al., 2020). For that reason, the game cards included snapshots of facts in the following dimensions (Fig. 3).

- 1) Distribution of marine habitats with ecological importance;

- 2) Presence and abundance of marine species with conservation concern. This card highlighted species with a protection status by the International Union for Conservation of Nature (IUCN), priority habitats for conservation by OSPAR convention and a new species identified in the area (Fig. 3a);
- 3) Spatial distribution of biodiversity hotspots;
- 4) Sources of pollution and human activities with potential to hamper natural assets;
- 5) Important habitats in the marine-terrestrial interface (i.e., permanent and temporary wetlands and ponds);
- 6) Current climatic conditions and future scenarios;
- 7) Existing education institutions and population education levels;
- 8) Cultural and socioeconomic development institutions;
- 9) Figures and numbers quantifying fishing activity in the area (i.e., number and types of fishing boats and landing statistics);
- 10) Commercial species with high economic importance to the fishing sector.
- 11) Types of touristic activities;
- 12) Marine species of importance to the recreational and touristic activities;

The cards were the same in all 7 tables, meaning that the player 1 in Group A had the same set of cards as player 1 in Group B, and so on. Although all playing tables had the same cards, the order of the discussed topics varied according to the prioritized cards, and the information added by the players.

In summary, we adapted the Territory Game to the current context by.

- 1) Using this methodology in a marine environment;

To the best of our knowledge this adaptation is rare. In fact, we only found one study by Littaye et al. (2016), that described such adaptation. Most work developed using this methodology was focused on terrestrial systems (e.g., Lardon, 2013; Esgalhado et al., 2020).

- 2) Merging two steps of the original methodology to accommodate time constraints as well as the large number of players in our real-world context.

With this adapted version of the Territory Game, we were able to: a) promote a constant discussion at the territory level, and b) secure that relevant information (present in the game cards) triggered the discussion between participants.

In each table, a moderator guided the discussion and a note-taker followed the game and recorded the main discussion topics. The workshop was guided by a skilled facilitator.

The result of this exercise was the co-creation of 7 visions (one per group), that were presented in the final part of the workshop in a plenary format (Fig. 4). The visions were then discussed to understand the level of similarities between them. During the discussions, when particular aspects of a vision were identified, the facilitator questioned the overall group about their agreement with such a feature.

After the workshop, the comparison of the 7 visions was deepened, and a vision that congregated all the common features was created. This work was based on content analysis and thematic coding in line with the systematization presented in Table 2.

The shared vision was later commented and revised by all stakeholders. In the subsequent workshop, the shared vision was presented to the stakeholders for their validation. As such, and for the remaining steps of the participatory process aiming at co-designing of the CbMPA (details in Horta e Costa et al., 2022; and Rangel et al., *in prep.*), the shared vision was used as a flag remembering stakeholders of what they set to achieve with this CbMPA.

4. Results

In this section we provide: i) an overview of the visions produced during the workshop, ii) the description of the shared vision, and iii) the evaluation and comments made by the participants of the workshop.

4.1. The visions developed during the workshop

The 57 participants in the workshop were divided in 7 heterogeneous groups which created one vision (A-G). A total of 26 actions were suggested. In this particular case, participants expressed their vision by identifying wishes, but also actions that need to be taken so that the CbMPA can be implemented to reach its proposed goals. Hence, the actions help to describe each vision. The following descriptions summarise the main features of each vision but, to avoid repetitions, each description focuses on the distinctive features of each vision. Table 2 systematizes the similarities.

Vision A: A sea that educates

In this vision a strong emphasis was given to the perception that natural assets are declining in quality and quantity. One main feature in Vision A is the development of actions that can halt the decline and, at least, maintain the current levels of marine biodiversity, mainly to.

1. Increase knowledge about pollution sources and carrying capacity of the system,
2. Use of renewable energies by converting fuel boats to electric or solar vessels,
3. Forbid dredging,
4. Forbid industrial fisheries and aquaculture,
5. Define navigation channels.
6. Regulate and enforce of marine-tourism activities

Spatial explicit features: In this vision, participants draw the terrestrial sources of pollution on the map.

In the future: Achieve sustainability for local and certified fisheries, with the possibility of selling fish directly to consumers, enabling the increase in earnings for local fishers while allowing optimal product quality to costumers. The development of an environmental educational program linked to a physical space, including a museum or observatory promoting the existing marine cultural heritage, traditions and history.

Vision B: A sea with future

This vision has several similarities with the other visions (see Table 2). In Vision B, more emphasis is given to the potential certification of marine economic activities by developing a trademark for the CbMPA. This certification should ensure that businesses undertaking their activity in the MPA area comply with a set of good practice guidelines. In addition, concerns about climatic changes are also referred. The main feature of vision B is the assertion that existing natural capital can be improved and valued through the implementation of the CbMPA. It was considered that the CbMPA also favours the sustainable use of current natural resources while allowing their recovery in the future.

Spatial explicit features: As in Vision A, the spatial explicit feature identified on the map is a source of terrestrial pollution.

In the future: A CbMPA with a trademark benefiting all activities that occur in the area, encouraging compliance with good practices. As such, the main wish is that the CbMPA promotes a different and more sustainable use of this part of the Algarve, attracting responsible visitors and users, and raising awareness for the importance of marine conservation within the community.

Vision C: progressing while protecting tradition

Many of the wishes described before were also identified in vision C (see Table 2). Yet, in this vision the need for a no-take area within the CbMPA was mentioned, although no specific location is suggested. Regarding the recreational activities, a training program, aiming to enhance knowledge among marine tourism operators about natural



Fig. 4. Moments of the workshop where visions for the future CbMPA were created and shared. A – explaining the game, B – playing the game, C – adding agreed elements to the vision, D – using the cards to trigger discussions, E – adding the title to the vision, F – presenting the vision in plenary.

assets in the area, and on a set of good practices, are recognized as priorities. In Vision C, the group suggested that the fishing activities in the area should be limited to vessels up to 7 m maximum length. Further, the group identified the need to create a governance model based on co-management between the users of the area and the public administration.

Spatial explicit features: No spatial explicit element was drawn on the map.

In the future: In this vision, the most distinctive feature is the wish to have a co-management governance model in which stakeholders have responsibilities in the decision-making process. In addition, emphasis is given to the identity, cultural heritage and need to preserve and value the sea traditions rooted in the community.

Vision D: protecting to grow

In this vision, several aspects already mentioned were also detailed (see Table 2). One distinctive feature is the suggestion to develop a CbMPA monitoring program, including both natural values and human activities. Using underwater noise as a monitoring indicator is suggested by this group.

Spatial explicit features: No spatial explicit element was drawn on the map.

In the future: The CbMPA is an opportunity to regulate and control human activities in the area, so that the natural assets that currently exist are maintained and enhanced in the future.

Vision E: the future of the algarve is in the sea

Wishes regarding vision E are similar to the ones already detailed (see Table 2) but concrete actions are specified.

1. Include the characterization of CbMPA natural and socio-economic values within the curriculum of local schools,
2. Define partnerships between fishers' associations and local restaurants, to value and promote CbMPA fishing products, caught in a sustainable manner,
3. Establish compensation measures to fishers negatively affected by the CbMPA,
4. Involve and develop comprehensive communications strategies targeting the local communities to enhance CbMPA social acceptance,
5. Define underwater interpretation routes for divers,
6. Allow fishing activities for vessels between 7 and 9 m long,
7. Create temporary no-take areas that rotate in time.

Spatial explicit features: No spatial explicit element was drawn but a reference to the need of conserving the existing lagoon was indicated.

In the future: This group specify actions that must be implemented to decrease the present pressure on the natural assets of the area. The group also suggests the need to decrease or eliminate conflicts that will emerge if regulations are implemented. To secure that such conflicts do not scale up, the group discussed the need for compensatory measures so that negotiations can be successful and allow a collaborative and collective CbMPA implementation.

Vision F: balance and sustainability in the relation between humankind and the ecosystem

In this vision, the participants highlight the need of considering the existing human activities when CbMPA zoning and regulations are discussed. Further, the group agreed that a no-take area is key to achieve marine conservation, although a possible location is not indicated or drawn. The need for enforcement is consistently identified in all visions,

Table 2
Systematization of the elements (ecological, socioeconomic and governance) defined in the visioning exercise.

Elements of the visions		Visions						
		A	B	C	D	E	F	G
Ecological	Halt the decline, maintain and, if possible, increase biodiversity levels							
	Reduce pollution sources							
	Create an environmental educational program linked to physical space where contents can be developed, adjusted and updated							
	Need to adapt to climate change							
	Potentiate and capitalize the existing natural capital							
	Create a no-take area							
	Recognize and control underwater pollution							
	Protect existing wetlands							
	Protect of the Valado Reef							
	Increase knowledge about pollution sources							
	Calculate a carrying capacity threshold for each human activity							
Socio-economic	Regulate and control of human activities							
	Promote sustainable local fisheries that are properly valued							
	On-going training strategies on best practices for marine-tourism activities							
	Properly enforce regulation for marine-tourism activities							
	Limit fishing to vessels up to 7 m length							
	Create compensation measures to fishers who lost fishing grounds							
	Develop underwater interpretation routes for divers							
	Allow fishing for vessels up to 9m long							
	Properly regulate recreational fishing							
	Develop zoning and regulations considering existing human activities							
	Promote the conversion to solar/electric powered boats							
	Exclude dredging in the whole CbMPA							
	Ban industrial fisheries and aquaculture							
	Create navigation channels to order marine traffic							
	Create a certification program, based on good practices, for different activities							
	Allow direct sale of fishing products							
	Develop an CbMPA trademark							
Implement environmentally friendly moorings								
Build a museum or observatory to promote cultural marine heritage								
Governance	Create a co-management entity including the users and the public administration.							
	Monitor the marine species and habitats as well as economic activities							
	Develop comprehensive communications to involve local communities							
	Create compensation measures to reduce conflicts							
	Create a dedicated enforcement entity for this CbMPA							

yet, in this vision, the group suggests the definition of a specific and financially independent entity for this CbMPA.

Spatial explicit feature: The lagoon (Lagoa dos Salgados) was identified in the map. A large area in the map was identified as the most important for fisheries.

In the future: The most differentiating feature of this vision is the wish that enforcement inside the CbMPA should be done by a specific entity.

Vision G: create, protect and value

In this vision, the need for a strategy promoting the CbMPA fishing products is also highlighted, including the wish to value and benefit local sustainable fisheries. Further, the group expressed the need to have an educational program focusing on the MPA natural values. The most distinctive feature of vision G is the definition of spatial elements by identifying a specific area that, in their perspective, must be strictly protected – the reef crest, locally known as the Valado reef. In addition,

participants consider that the boundary between the reef and the surrounding sandy bottom must also be considered for further protection. On top of limiting sand extraction and aquaculture, this group considers that recreational fishing should be prohibited in some areas, and the marine tourism businesses must be properly regulated.

Spatial explicit feature: Participants identified the Valado reef as an area to be strictly protected.

In the future: The distinctive feature of this vision is the wish to protect a specific element of the planned CbMPA, the Valado reef. Hence this vision explicitly identifies what needs to be protected in addition to the need to regulate and value existing human activities, also referred in the remaining visions.

Fig. 5 show examples of the visions drawn during the workshop. Table 2 summarizes the key elements of each vision and explains the comparative effort developed to arrive at the shared vision detailed in

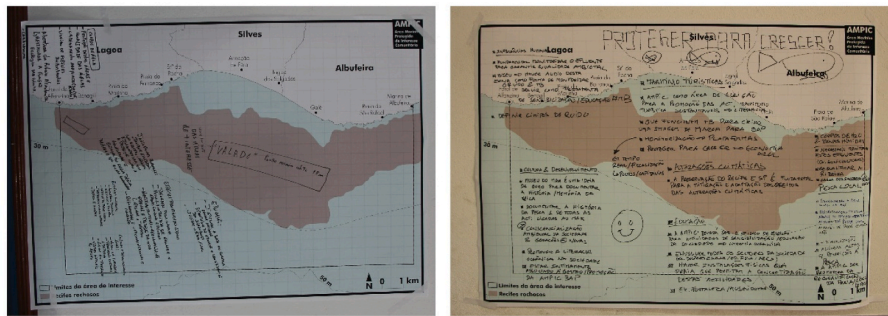


Fig. 5. Two examples of the seven visions created.

the following section.

The shared vision

Based in these 7 visions a shared vision (Fig. 6) was created and validated by the stakeholders taking part in the participatory process. Table 2 contributed to the development of the shared vision, but also considered the discussions in the plenary format. A printed version of this vision accompanied all the following workshops as a reminder of the common achievements aimed by the group with the creation of this CbMPA. The description of the shared vision starts with the wish that the CbMPA maintains and increases the existent natural capital, while safeguarding the cultural heritage and economic activities in the area. The definition of a zoning scheme with several protection levels was

agreed to be a common wish, but it was evidenced that such step and others (i.e., regulation, monitoring and enforcement) should be closely developed with the stakeholders. The main wish is to create a sense of ownership so that the MPA is fully accepted by the community.

Participants evaluation of the workshop

Before ending the workshop where the 7 visions were created and compared, participants (40 out of 57) replied to an anonymous questionnaire to evaluate the workshop. The questionnaire included closed and open-ended question. The closed-ended questions included a 5-point Likert-scale from very low to very high.

The results provide information on how participants understood the visioning exercise, and its clarity and utility to the overall process

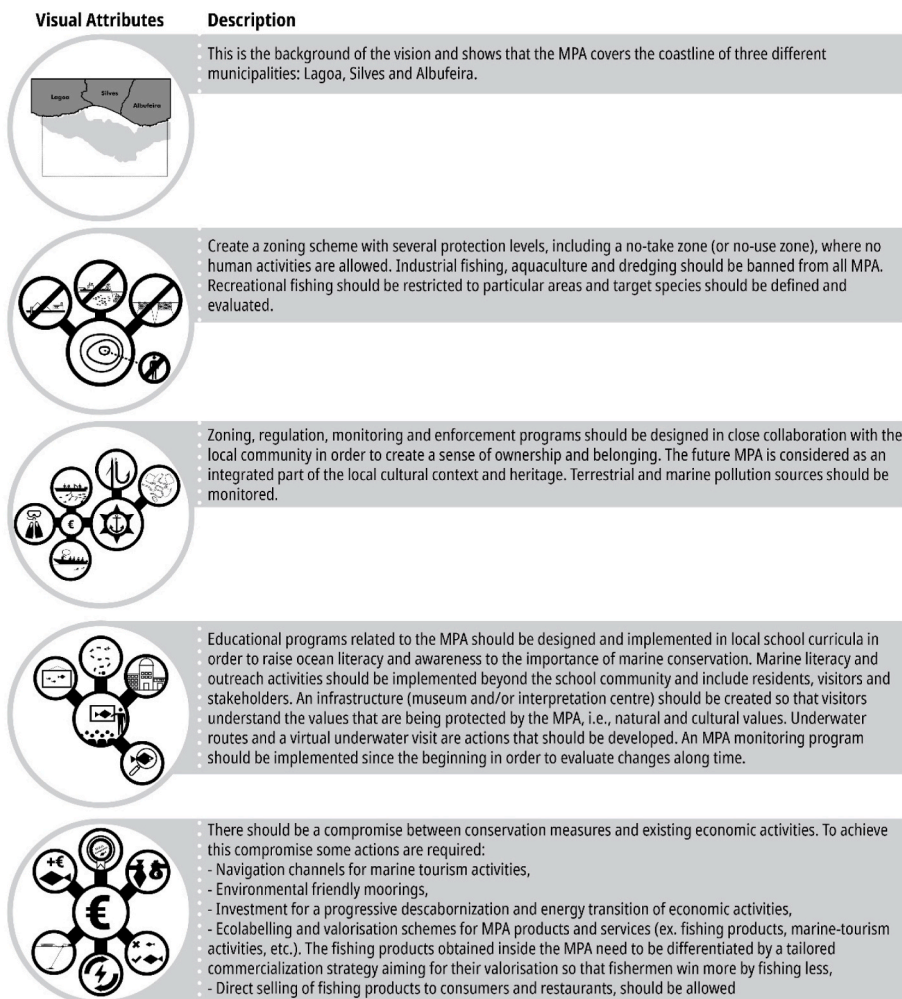


Fig. 6. Visual attributes and key elements of the shared vision.

towards the MPA implementation. Fig. 7A shows the satisfaction score regarding the sequence of topics addressed in the workshop, the organization and the techniques used. Overall, the satisfaction level was high. The innovation level in terms of activities developed in the workshop was also considered high (Fig. 7B).

In some questionnaires, comments were made to explain the satisfaction and innovation scores attributed. These are summarized in the following topics.

- Instructions for the exercise could be clearer and could have been provided before the workshop so that participants could start working faster (2 out of 40 replies),
- The workshop was too long. Workshops should not take more than 2h30 (2 out of 40 replies),
- More time was needed for the plenary discussion and for the overall exercise (3 out of 40 replies),
- The detail of the discussion should be increased, perhaps by playing with less cards (2 out of 40 replies),
- The acoustics of the room could be better (2 out of 40 replies),
- The results achieved considering the number of institutions and different interests were impressive (1 out of 40 replies)
- Interesting, creative and efficient method (9 out of 40 replies)
- Not everyone feels comfortable in this type of working format (1 out of 40 replies)
- The combination of participants within each group brought very rich discussions (3 out of 40 replies)

5. Discussion and conclusions

Having a vision of what the future can look like supports the definition of objectives, pathways to achieve them and, more importantly, allows for the establishment of trade-offs between conflicting interests and uses (Agostini et al., 2015; Littaye et al., 2016; Restrepo-Gómez et al., 2022). In the present case study, the promoters of the CbMPA opted to co-create the vision together with the stakeholders.² As such, the promoters highlighted, since the beginning of the process, that the CbMPA needed to be a collective initiative, integrating both ecological and socio-economic goals. The present study describes the process towards the development of this shared vision. The visions co-created suggest that stakeholders value the natural assets of the region, identify the risk they face and, more importantly, consider that the implementation of such CbMPA can contribute to the protection and added value of the region.

5.1. Visions for MPAs

MPAs are management and conservation instruments with medium to long term objectives (Reed et al., 2010). What can be understood as a short-term disadvantage can become an advantage in the medium/long term. Although some authors express the need of including, at an early stage of MPA planning, a visioning exercise with stakeholders (Agostini et al., 2015), very few do so, and detail the content of these visions (McGowan et al., 2019). In fact, to the best of our knowledge, not many MPAs were established based on shared visions. Here, we contribute to address such gap by starting the co-design of a CbMPA with visions for its future. Further, to address the lack of literature in this topic, we detail, on top of the results achieved, the methods used in such process. As such we call for a comparative effort about the goals and visions of MPAs across case studies. These comparisons can bring important insights regarding the perception about MPAs and their potential.

A cross-cutting element to all the created visions was the perception

² The design and facilitation of the workshop was done by specialized team members that never participated in the process and were responsible for its scientific coordination.

that ecological values in the area are in decline. This was an important outcome since it shows that the community is aware of the problem. As Ostrom (1990) concludes, a key condition for the development of collective actions towards sustainability is the common understanding of a problem and the urgency of finding solutions. The vision exercise made it clear that stakeholders see the MPA implementation as a pathway to halt the decline of marine resources, recognized as a pressing threat by the majority. Moreover, the MPA is considered an opportunity to regulate the current activities. In fact, in several visions, a call for regulation and enforcement was evidenced, suggesting that the MPA definition should also be guided by information on the carrying capacity of the proposed area. As Ressurreição et al. (2020, 2021) show, the area is intensively explored by several marine tourism and fisheries activities. Despite the facts and figures provided in the Territory Game to encourage discussions, stakeholders were already well aware of the existing pressures and of the need for changing the *status quo*. The analysis of the similarities and differences between visions allowed us to predict points of concern where negotiations would be challenging. That was the case for the maximum length of the vessels to be allowed to operate within the MPA, with different thresholds being suggested by distinct groups (more details in Horta e Costa et al., 2022). Another key issue that was evident from this visioning exercise was the immediate need of negotiations for compromises, since trade-offs and potential losses in the short-term are expected. Compensation measures could unlock the negotiations and act as a solution for a CbMPA implementation with most stakeholders on board.

In an MPA, the spatial planning plays a key role, and creating spatially rooted visions can be highly relevant. As McGowan et al. (2019) highlights, the marine spaces are geographically vast, so the possibilities for human interactions are diverse and priorities for action are far from settled. Successful MPAs typically legitimate local users and engage them in the planning, design and management (Dehens and Fanning, 2018; Giakoumi et al., 2018; Humphreys and Herbert, 2018). A first step encouraging engagement should be the development of a shared vision. Visioning supported this CbMPA design by i) highlighting the current situation and recognition that conservation measures are needed, ii) raising the first questions about the role and impacts of the MPA, iii) guiding the needed discussions about future compromises. Finally, the exercise was also important to build trust among the stakeholders before advancing to more challenging steps.

5.2. The adequacy of the methodological approach used

In the context of an MPA design, starting with a visioning exercise broadens the discussion and prevents the narrow focus on meeting the immediate spatial needs of existing human activities. An MPA needs to be assumed as a long-term investment, where objectives and opportunities become more important with time (e.g., as fishing stocks increase and recover because of little to no fishing pressure) (McGowan et al., 2019; Balata and Williams, 2020).

MPA implementation can be a reason for conflict since conservation and social objectives can be difficult to match (Reed et al., 2010; Hermoso et al., 2022; Restrepo-Gómez et al., 2022). For this reason, we suggest a step-by-step approach that clearly demonstrates that stakeholders with different interests are capable of collectively achieving outcomes. This is highlighted by the feedback received after the visioning exercise:

Considering the number of institutions and different interests, the results achieved were impressive. The combination of participants within each group brought very rich discussions. [anonymous replies to the evaluation questionnaire]

Visioning, particularly developed through the Territory Game technique, can also be a form of achieving what Restrepo-Gómez et al. (2022) considered to be urgent in fisheries science: the use of social-ecological approaches so that fisheries scientists overcome

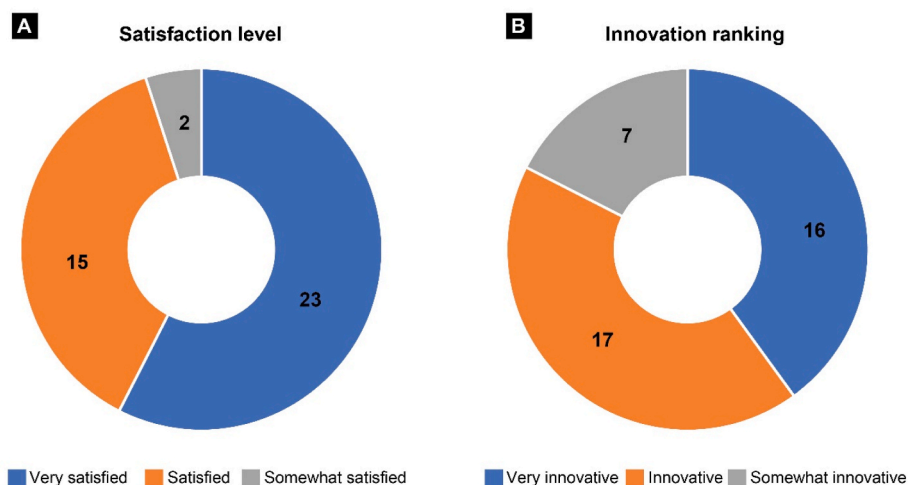


Fig. 7. Satisfaction level regarding the structure, organization and techniques used during the workshop (A) and how new was the approach used in the workshop for the participants (B). In both cases the scale included 2 other levels (very low and low), yet no replies were register on those levels.

methodological barriers and learn new ways of communicating their findings and allow knowledge appropriation. The game cards developed for the visioning exercise signal the social-ecological dimension of the issues at stake, and are an important feature of this work. Further, the game cards were also a different way of science communication.

Another point worth exploring here is the adaptation of the Territorial Game to the marine environment where no boundaries or physical limits exist. This can be a challenge but also an opportunity. Our results indicate that the territorial potential, provided by the adaptation of the Territorial Game, was not fully explored. Participants were reluctant to draw on the map what the future may look like. Since one important role of MPAs is regulating activities through different protection zones, a lack of territorial identification may have been a way to avoid spatial commitments by stakeholders. There are no immediate win-win situations in MPAs, space for conservation implies less space for other activities such as fishing. This lack of spatial definition was also described in other contexts (e.g. Reed et al., 2010). This is probably related to the difficulty in creating space for conservation in an area where previously human activities could occur everywhere.

The timing of the visioning process might also explain the lack of spatial expression. This exercise was developed at the starting point of a long-term interaction process between these stakeholders (started in 2019 and continued until 2021, see Rangel et al., *in prep.*). The identification of an area where a wish was expressed could conflict with the desire of others for the same space. Having this in mind, perhaps stakeholders were careful not to provide such level of detail about their desires. Further, the lack of routines of collaboration among participants can also explain such result. A multi-stakeholder context as the one existing in this real-world context implies time for stakeholders to trust each other and to learn how to share knowledge and experiences among them, to ultimately develop collective actions (i.e., the process of social learning, as suggested by Reed et al., 2010). Further, as social learning evolves, vision for the future can also change or be enlarged (Guimarães et al., 2019). In addition, stakeholder participation should not be taken for granted (Manzungu, 2002; Wester et al., 2003; Fletcher 2007; McGee et al., 2022), and the visions can also be challenged by the arrival of new stakeholders to the process. Hence, the revalidation of the vision for this CbMPA is recommended after a few years of its implementation.

The Territory Game was a useful technique to inspire and operationalize the visioning step of the broad participatory process that supported the design of this CbMPA (detailed in Rangel et al., *in prep.*). We agree with Brennan's (2018) argument that art-science approaches also play a key role in visioning for the marine space. Such approaches speak to the heart and to the mind, and can bring into the policy arena

the 'emotional energy' that planning and conservation processes for the marine environment need (Brennan 2018). MPAs are not just a tool for nature conservation, and urgently need to be perceived as a collective effort towards a sustainable use of the marine space for current and future generations. Using the proper tools and competences to act as such is fundamental.

Funding

This study received funding from the Portuguese FCT – Foundation for Science and Technology to CCMAR through the strategic projects UIDB/04326/2020, UIDP/04326/2020 and LA/P/0101/2020. This study was also partially funded by National Funds through FCT - Foundation for Science and Technology under the Project UIDB/05183/2020 (MED). This work was also supported by the Oceano Azul Foundation, namely the review study, socioeconomic evaluation (AMPIC VALUE) and participatory process. B.H.C. was supported by national funds through FCT - Foundation for Science and Technology, I.P. (Portugal), in agreement with the University of Algarve, in the scope of Norma Transitória with the research contract DL57/2016/CP1361/CT0038. M.R. and A.R. were supported by FCT through the postdoctoral fellowships SFRH/BPD/116307/2016 and SFRH/BPD/102494/2014, respectively.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Acknowledgements

We would like to greatly thank the three municipalities (Albufeira, Lagoa and Silves) and parish councils included in the MPA territory as well as all the participants in this process. Without their commitment and interest, this initiative would have never been possible. We also want to acknowledge all the researchers and students involved in the scientific studies and participatory process. We also want to thank the anonymous reviewers for their very interesting and useful suggestions that contributed to substantially improve the manuscript.

References

- Aguiar, A.P.D., Collste, D., Harmácková, Z.V., Pereira, L., Selomane, O., Galafassi, D., Vuuren, D.V., Leeuw, S.V.D., 2020. Co-designing global target-seeking scenarios: a cross-scale participatory process for capturing multiple perspectives on pathways to sustainability. *Global Environ. Change* 65, 102–198. <https://doi.org/10.1016/j.gloenvcha.2020.102198>.
- Agostini, V.N., Margles, S.W., Knowles, J.K., Schill, S.R., Bovino, R.J., Blyther, R.K., 2015. Marine zoning in St. Kitts and Nevis: a design for sustainable management in the Caribbean. *Ocean Coast Manag.* 104, 1–10. <https://doi.org/10.1016/j.ocecoaman.2014.11.003>.
- Angeon, V.V., Lardon, S., 2008. Participation and governance in territorial development projects: the “territory game” as a local project leadership system. *Int. J. Sustain. Dev.* 11 (2–4), 262–281. <https://doi.org/10.1504/ijisd.2008.026505>.
- Balata, F., Williams, C., 2020. The role of coastal communities in the sustainable management of marine protected areas. In: *Marine Protected Areas*. Elsevier, pp. 113–129. <https://doi.org/10.1016/B978-0-08-102698-4.00006-X>.
- Ban, N.C., Davies, T.E., Aguilera, S.E., Brooks, C., Cox, M., Epstein, G., Evans, L.S., Maxwell, S.M., Nenadovic, M., 2017. Social and ecological effectiveness of large marine protected areas. *Global Environ. Change* 43, 82–91. <https://doi.org/10.1016/j.gloenvcha.2017.01.003>.
- Bremer, S., Glavovic, B., 2013. Exploring the science-policy interface for Integrated Coastal Management in New Zealand. *Ocean & Coastal Manage.* 84, 107–118. <https://doi.org/10.1016/j.ocecoaman.2013.08.008>.
- Brennan, R.E., 2018. Re-storying marine conservation: integrating art and science to explore and articulate ideas, visions and expressions of marine space. *Ocean Coast Manag.* 162, 110–126. <https://doi.org/10.1016/j.ocecoaman.2018.01.036>.
- Bennett, N.J., Dearden, P., 2014. From measuring outcomes to providing inputs: governance, management, and local development for more effective marine protected areas. *Mar. Pol.* 50, 96–110. <https://doi.org/10.1016/j.marpol.2014.05.005>.
- Calado, H., Pegorelli, Vergílio, C.M., Hipólito, C., Campos, A., Moniz, F., Costa, A.C., Pereira da Silva, C., Fonseca, C., Frazão Santos, C., Gabriel, D., Guerreiro, J., Gil, A.J., Johnson, D., Ng, K., Monwar, M.M., Ventura, M.A., Suárez-de Vivero, J.L., Pinho, M., Borges, P., Caña-Varona, M., Papaioannou, E.A., 2021. Expert knowledge-based co-development of scenarios for maritime spatial planning in the Northeast Atlantic. *Mar. Pol.* 133, 104741 <https://doi.org/10.1016/j.marpol.2021.104741>.
- Day, J.C., Kenchington, R.A., Tanzer, J.M., Cameron, D.S., 2019. 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. Mar. Freshw. Ecosyst.* 29 (S2), 9–32. <https://doi.org/10.1002/aqc.3115>.
- Dehens, L.A., Fanning, L.M., 2018. What counts in making marine protected areas (MPAs) count? The role of legitimacy in MPA success in Canada. *Ecol. Indic.* 86, 45–57. <https://doi.org/10.1016/j.ecolind.2017.12.026>.
- Di Franco, A., Hogg, K.E., Calò, A., Bennett, N.J., Sévin-Allouet, M., Alaminos, O.E., Lang, M., Koutsoubas, D., Prvan, M., Santarossa, L., Nicolini, F., Milazzo, M., Guidetti, P., 2020. Improving marine protected area governance through collaboration and co-production. *J. Environ. Manag.* 269, 110757 <https://doi.org/10.1016/j.jenvman.2020.110757>.
- Di Franco, A., Thiriet, P., Di Carlo, G., Dimitriadis, C., Francour, P., Gutiérrez, N.L., Grissac, A.J., Koutsoubas, D., Milazzo, M., Otero, M.M., Piante, C., Plass-Johnson, J., Sainz-Trapaga, S., Santarossa, L., Tudela, S., Guidetti, P., 2016. Five key attributes can increase marine protected areas performance for small-scale fisheries management. *Sci. Rep.* 6, 38135 <https://doi.org/10.1038/srep38135>.
- Esgalhado, C., Guimarães, M.H., Debolini, M., Guimomar, N., Lardon, S., Ferraz de Oliveira, I., 2020. A holistic approach to land system dynamics – the Monfurado case in Alentejo. *Portugal Land Use Policy* 95, 104607.
- Ehler, C., Douvère, F., 2009. *Marine Spatial Planning a Step-by-step Approach toward Ecosystem-Based Management*. Intergovernmental Oceanographic Commission, Paris.
- Fletcher, S., 2007. Influences on stakeholder representation in participatory coastal management programmes. *Ocean Coast Manag.* 50 (5–6), 314–328.
- Giakoumi, S., McGowan, J., Mills, M., Beger, M., Bustamante, R.H., Charles, A., Christie, P., Fox, M., Garcia-Borboroglu, P., Gelcich, S., Guidetti, P., Mackelworth, P., Maina, J.M., McCook, L., Micheli, F., Morgan, L.E., Mumby, P.J., Reyes, L.M., White, A., Grorud-Colvert, K., Possingham, H.P., 2018. Revisiting “success” and “failure” of marine protected areas: a conservation scientist perspective. *Front. Mar. Sci.* 5, 223. <https://doi.org/10.3389/fmars.2018.00223>.
- Gilliland, P.M., Laffoley, D., 2008. Key elements and steps in the process of developing ecosystem-based marine spatial planning. *Mar. Pol.* 32, 787–796. <https://doi.org/10.1016/j.marpol.2008.03.022>.
- Gonçalves, J.M.S., Monteiro, P., Coelho, R., Afonso, C., Ribeiro, J., Almeida, C., Veiga, P., Machado, D., Berecibar, E., Oliveira, F., e Bentes, L., 2004. Mapeamento de biocenoses marinhas da Reserva Ecológica Nacional Submarina entre Albufeira e Vale do Lobo. Relatório Final CCDR Algarve. Universidade do Algarve, CCMAR, Faro, p. 182 (pp + Anexos).
- Gonçalves, J.M.S., Monteiro, P., Coelho, R., Afonso, C., Almeida, C., Veiga, P., Machado, M., Machado, D., Oliveira, F., Ribeiro, J., Abecasis, D., Primo, L., Tavares, D., Fernández-Carvalho, J., Abreu, S., Fonseca, L., Erzini, K., e Bentes, L., 2007. Cartografia e caracterização das biocenoses marinhas da Reserva Ecológica Nacional Submarina entre a Galé e a barra Nova do Ancão. Relatório Final CCDR Algarve. Universidade do Algarve, CCMAR, Faro, p. 250 (pp + Anexos).
- Gonçalves, J.M.S., Monteiro, P., Afonso, C., Almeida, C., Oliveira, F., Rangel, M., Ribeiro, J., Machado, M., Veiga, P., Abecasis, D., Pires, F., Fonseca, L., Erzini, K., e Bentes, L., 2008. Cartografia e caracterização das biocenoses marinhas da Reserva Ecológica Nacional Submarina entre a Galé e a foz do rio Arade. Relatório Final CCDR Algarve. Universidade do Algarve, CCMAR, Faro, p. 144 (pp + Anexos).
- Gonçalves, J.M.S., Monteiro, P., Afonso, C., Oliveira, F., Rangel, M., Machado, M., Veiga, P., Leite, L., Sousa, I., Bentes, L., Fonseca, L., Erzini, K., 2010. Cartografia e caracterização das biocenoses marinhas da Reserva Ecológica Nacional Submarina entre a foz do Rio Arade e a Ponta da Piedade. Relatório Final. ARH Algarve. CCMAR, Faro, p. 122 (+ Anexos).
- Gonçalves, J.M.S., Monteiro, P., Oliveira, F., Costa, E., Bentes, L., 2015. Bancos de pesca do Cerco e da Pequena Pesca Costeira do Barlavento algarvio. Relatório Técnico No. 1/2015 – PescaMap/Promar Eixo 4 GAC Barlavento. CCMAR, Universidade do Algarve, Faro, p. 104 (pp + Anexos).
- Gopnik, M., Fieseler, C., Cantral, L., McClellan, K., Pendleton, L., Crowder, L., 2012. Coming to the table: early stakeholder engagement in marine spatial planning. *Mar. Pol.* 36 (5), 1139–1149. <https://doi.org/10.1016/j.marpol.2012.02.012>.
- Grorud-Colvert, K., Sullivan-Stack, J., Roberts, C., Constant, V., Horta e Costa, B., Pike, E., Kingston, N., Laffoley, D., Sala, E., Claudet, J., Friedlander, A.M., Gill, D.A., Lester, S.E., Day, J.C., Gonçalves, E.J., Ahmadi, G.N., Rand, M., Villagomez, A., Ban, N.C., Gurney, G.G., Spalding, A.K., Bennett, N.J., Briggs, J., Morgan, L.E., Moffitt, R., Deguignet, M., Pikitch, E.K., Darling, E.S., Jensen, S., Hameed, S.O., Carl, G., Guidetti, P., Harris, J.M., Torre, J., Kizilkaya, Z., Agardy, T., Cury, P., Shah, N.J., Sack, K., Cao, L., Fernandez, M., Lubchenko, J., 2021. The MPA Guide: a framework to achieve global goals for the ocean. *Science, American Association for the Advancement of Science* 373 (6560). <https://doi.org/10.1126/science.abf0861>. hal-03340433.
- Guimarães, M.H., Esgalhado, C., Ferraz-de-Oliveira, I., Pinto-Correia, T., 2019. When does innovation become custom? A case study of the montado, southern Portugal. *Open Agriculture* 4 (1), 144–158. <https://doi.org/10.1515/opag-2019-0014>.
- Henriques, N.S., Ressurreição, A., Oliveira, F., Monteiro, P., Rangel, M., Bentes, L., Lino, P., Jacob, J., Afonso, C.M.L., Moura, D., Berecibar, E., Horta e Costa, B., Gonçalves, J.M.S., 2018. Baía de Armação de Pêra: Informação de base dos valores naturais e dos usos do espaço marinho. CCMAR, Universidade do Algarve, Fundação Oceano Azul, Faro, Portugal, p. 84.
- Hermoso, V., Carvalho, S.B., Giakoumi, S., Goldsborough, D., Katsanevakis, S., Leontiou, S., Markantonatou, V., Rumes, B., Vogiatzakis, I.N., Yates, K.L., 2022. The EU Biodiversity Strategy for 2030: opportunities and challenges on the path towards biodiversity recovery. *Environ. Sci. Pol.* 127, 263–271. <https://doi.org/10.1016/j.envsci.2021.10.028>.
- Heron, L.E., Allen, W., Le Heron, R., Logie, M.J., Glavovic, B., Greenaway, A., Hikuroa, D., Davies, K.K., 2021. What does success look like? An indicative rubric to assess and guide the performance of marine participatory processes. *Ecol. Soc.* 26 (1), 29. <https://doi.org/10.5751/ES-12211-26012>.
- Horta e Costa, B., Guimarães, M.H., Rangel, M., Ressurreição, A., Monteiro, P., Oliveira, F., Bentes, L., Sales Henriques, N., Sousa, I., Alexandre, S., Pontes, J., Afonso, C.M.L., Belackova, A., Marçalo, A., Cardoso-Andrade, M., Correia, A.J., Lobo, V., Gonçalves, E.J., Pitta e Cunha, T., Gonçalves, J.M.S., 2022. Co-design of a marine protected area zoning and the lessons learned from it. *Front. Mar. Sci.* 9, 969234 <https://doi.org/10.3389/fmars.2022.969234>.
- Humphreys, J., Herbert, R.J.H., 2018. Marine protected areas: science, policy & management. *Estuar. Coast Shelf Sci.* 215, 215–218. <https://doi.org/10.1016/j.ecss.2018.10.014>.
- Jacquemont, J., Blasiak, J.R., Le Cam, C., Le Gouellec, M., Claudet, J., 2022. Ocean conservation boosts climate change mitigation and adaptation. *One Earth* 5 (10), 1126–1138. <https://doi.org/10.1016/j.oneear.2022.09.002>.
- Kessler, B.L., 2004. Stakeholder participation: a synthesis of current literature. <https://repository.library.noaa.gov/view/noaa/10701>.
- Kemp, R., Loorbach, D., 2006. *Transition Management: a reflexive governance approach*. In: Voß, J.P., Bauknecht, D., Kemp, R. (Eds.), *Reflexive Governance for Sustainable Development*. Edward Elgar Publishing, Cheltenham, UK, pp. 103–130.
- Lardon, S., 2013. *Developing a Territorial Project. The “territory Game”, a Coordination Tool for Local Stakeholders*. Research Results FaçSAde (38). Sciences for Action and Development, INRA.
- Littaye, A., Lardon, S., Alloncle, N., 2016. Stakeholders’ collective drawing reveals significant differences in the vision of marine spatial planning of the western tropical Pacific. *Ocean & Coastal Manage.* 130, 260–276. <https://doi.org/10.1016/j.ocecoaman.2016.06.017>.
- Lubchenko, J., Grorud-Colvert, K., 2015. Making waves: the science and politics of ocean protection. *Science*. <https://doi.org/10.1126/science.aad5443>.
- Manzungu, E., 2002. More than a headcount: towards strategic stakeholder representation in catchment management in South Africa and Zimbabwe. *Phys. Chem. Earth* 27, 927–933. [https://doi.org/10.1016/S1474-7065\(02\)00095-5](https://doi.org/10.1016/S1474-7065(02)00095-5).
- McGee, G., Byington, J., Bones, J., Cargill, S., Dickinson, M., Wozniak, K., Pawluk, K.A., 2022. Marine plan partnership for the north pacific coast: engagement and communication with stakeholders and the public. *Mar. Pol.* 142, 104613 <https://doi.org/10.1016/j.marpol.2021.104613>.
- McGowan, L., Jay, S., Kidd, S., 2019. Scenario-building for marine spatial planning. In: Zaucha, J., Gee, K. (Eds.), *Maritime Spatial Planning*. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-319-98696-8_14.
- OSPAR Commission, 2003. *OSPAR Recommendation 2003/3 on a Network of Marine Protected Areas*.
- Ostrom, Elinor, 1990. *Governing the Commons: the Evolution of Institutions for Collective Action*. Cambridge University Press, Cambridge, UK, 978-0-521-40599-7.
- Pendleton, L.H., Ahmadi, G.N., Browman, H.I., Thurstan, R.H., Kaplan, D.M., Bartolino, V., 2017. Debating the effectiveness of marine protected areas. *ICES (Int. Counc. Explor. Sea) J. Mar. Sci.* 75, 1156–1159. <https://doi.org/10.1093/icesjms/lsx154>.

- Pinto-Correia, T., Mckeen, A., Guimarães, M.H., 2014. Transdisciplinarity in deriving sustainability pathways for agriculture. In: Sutherland, L., Darnhofer, I., Wilson, G., Zagata, L. (Eds.), *Transition Pathways towards Sustainability in European Agriculture*. ©CAB International, 2014.
- Pohl, C., 2011. What is progress in transdisciplinary research? *Futures* 43 (6), 618–626.
- Rangel, M., Pita, C., Oliveira, M.M., Guimarães, M.H., Rainha, R., Sonderblohm, C., Monteiro, P., Oliveira, F., Ballesteros, M., Gonçalves, J.M.S., Pierce, G., Erzini, K., 2019. Do fisher associations really represent their members' needs and opinions? The case study of the octopus fishery in the Algarve (south Portugal). *Marine Pol.* 101, 276–284. <https://doi.org/10.1016/j.marpol.2018.04.011>.
- Reed, M.S., 2008. Stakeholder participation for environmental management: a literature review. *Biol. Conserv.* 141, 2417–2431. <https://doi.org/10.1016/j.biocon.2008.07.014>.
- Reed, M.S., Graves, A., Dandy, N., Posthumus, H., Hubacek, K., Morris, J., Prell, C., Quinn, C.H., Stringer, L.C., 2009. Who's in and why? A typology of stakeholder analysis methods for natural resource management. *J. Environ. Manag.* 90, 1933–1949. <https://doi.org/10.1016/j.jenvman.2009.01.001>.
- Reed, M.S., Evelyn, A.C., Cundill, G., Fazey, I., Glass, J., Laing, A., Newig, J., Parrish, B., Prell, C., Raymond, C., Stringer, L.C., 2010. What is social learning? *Ecol. Soc.* 15 (4), r1 [online] URL: <http://www.ecologyandsociety.org/vol15/iss4/resp1/>.
- Ressurreição, A., Rangel, M., Oliveira, F., Monteiro, P., Bentes, L., Pontes, J., Henriques, N.S., Afonso, C.M.L., Sousa, I., Guimarães, M.H., Horta e Costa, B., Gonçalves, J.M.S., 2020. Mapeamento e valorização das atividades suportadas pela costa de Lagoa, Silves e Albufeira e desenvolvimento de um processo participativo com vista ao estabelecimento de uma Área Marinha Protegida de Interesse Comunitário (AMPIC). CCMAR, Universidade do Algarve. Fundação Oceano Azul, Faro, Portugal, p. 162p.
- Ressurreição, A., Rangel, M., Oliveira, F., Monteiro, P., Bentes, L., Pontes, J., Henriques, N.S., Andrade, M., Afonso, C.M.L., Sousa, I., Guimarães, M.H., Andrade, M., Horta e Costa, B., Gonçalves, J.M.S., 2021. Resumo Alargado: AMPICvalue - Mapeamento e valorização das atividades suportadas pela costa de Lagoa, Silves e Albufeira e desenvolvimento de um processo participativo com vista ao estabelecimento de uma Área Marinha Protegida de Interesse Comunitário (AMPIC). CCMAR, Universidade do Algarve, Fundação Oceano Azul, Faro, Portugal, p. 15.
- Restrepo-Gómez, D.C., Zetina-Rejón, M.J., Zepeda-Domínguez, J.A., 2022. Trends in marine fisheries social-ecological systems studies. *Ocean Coast Manag.* 220 (2022), 106076 <https://doi.org/10.1016/j.ocecoaman.2022.106076>.
- Rice, J., Moksness, E., Attwood, C., Brown, S.K., Dahle, G., Gjerde, K.M., Grefsrud, E.S., Kenchington, R., Kleiven, A.R., McConney, P., Ngoile, M.A.K., Næsje, T.F., Olsen, E., Olsen, E.M., Sanders, J., Sharma, C., Vestergaard, O., Westlund, L., 2012. The role of MPAs in reconciling fisheries management with conservation of biological diversity. *Ocean Coast Manag.* 29, 217–230. <https://doi.org/10.1016/j.ocecoaman.2012.08.001>.
- Scianna, C., Niccolini, F., Giakoumi, S., Di Franco, A., Gaines, S.D., Bianchi, C.N., Scaccia, L., Bava, S., Cappanera, V., Charbonnel, E., Culioli, J.M., Di Carlo, G., De Franco, F., Dimitriadis, C., Panzalis, P., Santoro, P., Guidetti, P., 2019. Organization science improves management effectiveness of marine protected areas. *J. Environ. Manag.* 15 (240), 285–292. <https://doi.org/10.1016/j.jenvman.2019.03.052>.
- Tafon, R., Glavovic, B., Saunders, F., Gilek, M., 2021. Oceans of Conflict: Pathways to an Ocean Sustainability PACT. *Planning Pract. Res.* <https://doi.org/10.1080/02697459.2021.1918880>.
- Ulate, K., Alcoverro, T., Arthur, R., Aburto-Oropeza, O., Sánchez, C., Huato-Soberanis, L., 2018. Conventional MPAs are not as effective as community co-managed areas in conserving top-down control in the Gulf of California. *Biol. Conserv.* 228, 100–109. <https://doi.org/10.1016/j.biocon.2018.09.033>.
- Vasconcelos, L., Pereira, M.J., R, Caser, U., Gonçalves, G., Silva, F., Sá, R., 2013. MARGov – setting the ground for the governance of marine protected areas. *Ocean Coast Manag.* 72, 46–53. <https://doi.org/10.1016/j.ocecoaman.2011.07.006>.
- Wester, P., Merrey, D.J., de Lange, M., 2003. Boundaries of consent: stakeholder representation in river basin management in Mexico and South Africa. *World Dev.* 31 (5), 797–812. [https://doi.org/10.1016/S0305-750X\(03\)00017-2](https://doi.org/10.1016/S0305-750X(03)00017-2).
- Wiek, A., Iwaniec, D., 2013. Quality criteria for visions and visioning in sustainability science. *Sustain. Sci.* <https://doi.org/10.1007/s11625-013-0208-6>.
- Wilson, K., 2020. Governing the salish sea. *Hastings Environmental Law Journal* 26, 169–182.