

**Determining the Feasibility of Establishing New Multiple Use Marine Protected Areas
in Chile.**

Felipe Vásquez-Lavín^a, Jeanne Simon^b, Ximena Paz-Lerdón^c.

^a School of Business and Economics, Universidad del Desarrollo and Department of Economics, Universidad de Concepción. Chile. Corresponding author: fvlavin@gmail.com.
Research Nucleus on Environmental and Resource Economics-MSI. Address: Ainavillo 456, Concepción, Chile. Telephone: 56-41- 2268406

^b Department of Public Administration and Political Science, Universidad de Concepción, Chile. jsimon@udec.cl.

^c Department of Finance and Economics, Universidad Católica de la Santísima Concepción. Chile. ximenapazl@gmail.com.

Determining the Feasibility of Establishing New Multiple Use Marine Protected Areas in Chile.

ABSTRACT.

This paper evaluates the feasibility of establishing a Multiple Use Marine Protected Area. The methodology was applied to evaluate three proposed sites in Chile with diverse conservation needs, social stress and poverty levels, and different economic activities (small-scale fishing, heavy industry and mining activities). We use two broad categories for the evaluation: Socio-economic and political-institutional. The methodology uses a combination of secondary data with personal interviews, workshops and focus groups with fishermen, unions, politicians, social organizations, etc., from different political, social and economic background to characterize current and potential natural and social resources and to evaluate in an ordinal scale the feasibility of establishing the protected area. The methodology allows us to correctly identify the challenges faced in each site and can be used to develop appropriate strategies for balancing economic, social and environmental objectives. This methodology can be replicated to evaluate the feasibility of other marine or terrestrial protected areas.

Keywords: Protected Coastal Marine Areas, feasibility, sustainable development, governance.

Determining the Feasibility of Establishing New Multiple Use Marine Protected Areas in Chile.

Introduction

We propose and apply a methodology to evaluate the feasibility of establishing a sustainable Multiple-Use Marine Protected Area (MU-MPA) in three sites in Chile, considering economic, social, political and institutional factors.

Worldwide interest in the establishment of Marine Protected Areas (MPA) can be situated in two international conferences: the Special Symposium on Marine Parks (11th Pacific Science Congress, September, Tokyo, Japan, 1966) and the First International Conference on Parks and Marine Protected Areas (Tokyo, Japan, 1975) (Castilla, 1986). In response, the annual rate of MPA growth is near 5% at the global level, indicating the relevance of this mechanism in the conservation of biodiversity and marine resources (Sale et al. 2005; Stefansson and Rosenberg, 2005; Pauly et al. 2002). In recent years, several countries have evaluated the cost and benefits of establishing a MPA (McCrea-Strub et al. 2011) and have introduced diverse mechanisms to assure their endurance and sustainability. In Latin America, there are at least 21 countries that have established marine reserves (MR) including the Dutch Antilles, Bahamas, Barbados, Belize, Brazil, Chile, Colombia and Cuba (PISCO, 2007).

In Chile, the national government can legally protect marine natural resources by declaring them a nature sanctuary, wetlands, marine park or marine reserve, and most recently MU-MPA (LGPA, General Law of Fisheries and Aquiculture). These legal statuses have different implications in terms of the property rights and economic activity limitations. For example, in a MR, the extraction of any resource for commercial purposes is completely forbidden, although small amounts can be extracted for research objectives resulting in a high monitoring and enforcement costs.

In contrast, the Chilean MU-MPA seeks to establish a governance structure that allows sustainable economic activities provided they are compatible with the conservation of marine resources. Additionally, the MU-MPA integrates terrestrial and marine zones, considering them a single ecosystem (GEF-UNDP, 2005). Consequently, the creation and management of a MU-MPA involves coordination between several public institutions (Ministries of Economy, Defense, and the Environment). They also contemplate active involvement of diverse private associations, including those that have social, economic, conservation and/or research relevance in the area. The MU-MPA can be considered an important advance in integrated coastal management due to the integration of human development and conservation goals (Moreno-Bonilla et al. 2009), and ideally it should promote conservation, local development and governability. As can be seen, the MU-MPA governance approach not only contrasts with top-down decision-making but also with market solutions based on formal neoclassical models.

Between 2003 and 2005, under the framework of the National Strategy for Biodiversity, the Chilean Environmental Protection Agency (CONAMA, 2005) with the support of the Marine Global Environment Facility (GEF) identified three MU-MPA based on their biological representativeness at global, regional and local levels as well as a demonstrated interest of local political authorities and stakeholders in the area.

In 2009, the government began to consider the establishment of MU-MPA in three additional sites in Chile. The three areas selected are: Hualpén Peninsula (Site 1) located in southern Chile, Mejillones Peninsula (Site 2) located in northern Chile, and Punta Patache (Site 3) located in northern Chile (see Figure 1).

Insert Figure 1

This process is not unique, like Chile, other countries are also exploring similar mechanisms to promote sustainable use of marine resources. Therefore, field-tested methodologies that provide greater understanding of the complex processes involved in the public-private management and conservation of marine resources is required to select sites and develop strategies prior to MPA establishment. This paper fills this gap using a governance and co-management model that is characterized by consensual regulation based in user participation in decision-making (Ostrom, 1990) and that considers the increasing questioning of top-down

models for natural resource management and the recognition that sustainable solutions need to be socially constructed.

Background

In most cases, the site selection for a MU-MPA is determined by an identified need for conservation. However, there is growing recognition that the scientific understanding of the ecosystem or species to be protected is insufficient (Kelleher, 1999; Salm et al.2000) and that the sustainability also depends on economic, social, political and institutional factors and therefore a useful evaluation requires a multidisciplinary approach to consider the diverse aspects that should be weighted in the decision making process. Further, several empirical evaluations of MPA feasibility using ecological, socioeconomic and political criteria found that their consideration contributes to better conservation strategies (Klein et al. 2008; Green et al. 2009; Ramírez et al. 2009).

The evaluation of the performance of MPA regarding the optimal use of resources has been gaining interest in the international literature (Pomeroy et al. 2005), although the evaluation of the economic and social feasibility of establishing a MPA is not a clear cut. Furthermore, given the fact that a perfect monitoring and control system for protecting natural resources is expensive, and then the question of aligning interests of several actors involved in the MPA is crucial for the success of these conservation initiatives.

Economic and Social Feasibility

Vásquez et al. (2008) and Sierralta et al. (2011) showed that the implementation of a MPA in a location where there is no obvious sustainable economic development path will probably produce significant social costs and result in high burden to some stakeholders due to the total or partial restrictions of their economic activities or historical rights, negatively affecting the proposed conservation goals.

Some MPA had considered incorporating environmentally economic activities in the area, but these new activities have negatively impacted conservation goals. The fetish example of such activities is tourism that has become the most important economic activity included after the implementation of a MPA (Gaymer et al.2007). But this activity may not be innocuous for environmental goals, for example, a World Resources Institute report (Burke and Maidens, 2005) on the Marine Park *Bonaire* in the Dutch Antilles found that the coral reef has significantly decreased after 10 years in areas of high scuba diving activities, surpassing the ecosystem's load capacity after the threshold of 5000 dives.

Pomeroy et al. (2005) suggest several indicators to evaluate the feasibility of implementing a protected area. These indicators combine economic and social aspects, such as knowledge on human impacts, perceptions of seafood availability, perceptions about resource extraction and nonmarket values, style of life, family income distribution, occupational structure of the families, user knowledge of natural history, community access to scientific knowledge, number (or percentage) of people with leadership capacities, and cultural and historical values.

In addition to the economic aspects described above, an evaluation of the social costs and benefits generated by area establishment also needs to be evaluated. For example, the establishment of a MU-MPA could help to reduce contamination and other pathogenic agents that negatively impact public health. Thus, a MU-MPA site can also be established in order to establish greater control over contaminating activities in protected areas or it could be important for scientific investigation and environmental education.

A cost-benefit analysis considering all economic and social impacts of the proposed MU-MPA needs to evaluate the desirability from economic and conservation perspectives with a clear identification of winners and losers. In the case that losses are generated for stakeholders, then compensation should be considered, minimizing the social impacts of these measures.

Political and Institutional Feasibility

Biodiversity conservation can also be politically threatened when users or inhabitants perceive that limitations on resource extraction are unjust or are not effectively monitored, resulting in ineffective or conflictive environmental protection. Indeed, even when it is clear that the specific ecosystem or species is environmentally very important, the surrounding community may not value this environmental service. For example, in Sandy West End Bay, Honduras (Forest, 1998) the non-governmental organization that managed the MR independently organized beach cleaning, offered environmental education activities and participated in the review process of coastal zoning permits. Fishing activities were especially controlled and penalized, while other activities such as dredging and construction were neither controlled nor penalized. As a result, the local fishing community felt excluded from an area they traditionally used and actively opposed the MR. The ex-post conflict diagnostic identified a series of problems: poorly trained marine reserve staff, lack of coordination between the NGO, the local community and the marine reserve staff, a private sector uninterested in working with the community, and top-down decision making.

In general, there are multiple actors that will be positively or negatively affected by MPA establishment and the potential conflicts and solutions are closely related to their perception of MU-MPA goals and functioning. Thus, it is important to analyze the compatibility between the objective of sustainable development of the MPA and actors' interests and agendas, especially those that can jeopardize sustainable resource use.

Still, even when there is an intention to involve the community and other stakeholders, most public actors interested in promoting environmental conservation face important challenges to define sustainable management rules based on the voluntary participation of multiple organizations, social groups and individuals with different time constraints, needs, resources and interests. Nevertheless, and despite these challenges, governance structures (formal and informal networks between public and private actors and structure resource management) have spontaneously emerged to sustainably manage commonly pooled resources (Ostrom, 1990). A governance structure is essentially the “action arena” where exogenous variables such as rules, biophysical conditions and social contexts, and participants interact to produce outcomes (Ostrom, 2005).

According to both policy and academic literature, the feasibility of any governance structure depends on its collaborative nature and shared understandings because the regulation structure (management model) is socially constructed, where interactions can be collaborative and/or conflictive due to competing objectives, diverse interests and varying levels of trust between the different participants. In other words, so that all stakeholders come together and work collectively, they must perceive that sustainable resource use is beneficial. Consequently, during the negotiation of the management model, all stakeholders should understand the costs and benefits of both present and future actions. Ideally, there will be complementarity between each stakeholder’s objective and the objective of the Area.

However, even when actors have certain conflicting interests, they may form alliances when their previous collaborative relations were successful (Evans, 2001).

Based on the analysis of successful cases of natural resource management, Ostrom (1990) concludes that sustainable governance structures are based in local knowledge as well as in traditional practices that informally structure relations between the participants. Furthermore, since the social and environmental contexts are intricately related, both should be analyzed from users' perspectives prior to establishing new or additional rules on resource use. Even when we look for general institutional rules, governance solutions are context dependent (Ostrom, 2005).

Additionally, since the co-management model involves both public organisms and private actors, clarity about roles, responsibilities and financing is essential although agreement on an initial set of rules is rarely sufficient to assure its viability (Ostrom and Ahn, 2003). Considering that the conditions under which rules can have exceptions need to be discovered and discussed, all actors should clearly understand and agree to the basic principles of area establishment. A consistent finding in the social science literature is that communication among participants greatly increases commitment to collective goals and affects the functioning of the relationships within those partnerships (Ostrom, 1998). Further, since conflicts over rule interpretation and adjustments will surely occur, conflict resolution mechanisms should also exist. Finally, to assure viability of the governance structure, a

minimal level of resources (time, money, and/or human resources) need to be available to mitigate costs for some stakeholders as well as to facilitate network formation.

Finally, MU-MPA establishment requires the creation of a public-private non-profit partnership, an inter-organizational network, which requires specific leadership skills due to the lack of formal authority and hierarchy. Indeed, leadership needs to assure that rules are respected and to establish / strengthen relations of trust and collaboration between the stakeholders, to lead as peer problem solver, to build broad-based involvement, and to sustain hope and participation (Chrislip and Larsson, 1994). A recognized leader who is respected by all the stakeholders will favor a sustainable model, while its absence will surely result in coordination problems and distrust.

Materials and methods

The methodology combines economic and social analysis with stakeholder analysis (SA) to determine the feasibility of a sustainable MU-MPA. Since several criteria depend on people's perception, we based our analysis on field work through interviews, focus groups, discussion and presentation of the initiatives with stakeholders (see appendix for a list of stakeholders, guidelines for interviews to different types of actors). The economic analysis focuses on the feasibility of maintaining the current economic activities and the identification

of new activities that are compatible with conservation objectives. This analysis also considered possible social benefits that could be generated with the establishment of the area. We analyzed whether the establishment of the MPA would have negative or positive economic impact on the community, based on the main resources that will be protected and the restrictions impose to the agents. Based on secondary information on current economic activities and the identified new possible activities in the government proposal for the new MU-MPA, we identified whether declaring the new protection status for the area would affect the current extractive activities, the income generation and whether there are enough evidence that the new proposed economic activities will really contribute to the sustainability of the MPA.

To evaluate political and institutional characteristics, we used stakeholder analysis to determine commitment, trust, shared goals, leadership, and financial support for the project as well as associated conflicts. Stakeholder analysis (SA) is a tool commonly used to identify possible conflicts and determine the feasibility of public projects and programs, especially in planning instruments, collaborative policy making and strategic decision-making. Further, Grimble and Wellard (1996) argue that SA is a powerful analytical tool with incredible potential for sustainable development natural resource management strategies, including when there are multiple uses or users of a resource, as in the case of protected marine areas. In the case of coastal land administration, SA has been used to understand the conflicts that emerged over competing resource use (Rockloff and Lockie, 2004; Foell et al.1999).

Even though SA establishes several assumptions based on a cost-benefit analysis and bounded rationality of the actors, the characterization of actors is complex and requires understanding of the context. First, each actor seeks to maximize his/her interests at minimal cost. Secondly, each actor uses an implicit or explicit framework to analyze the situation (i.e., define interests, determine costs and benefits). Additionally, each stakeholder is assumed to possess different capacities to influence public decisions based on their resources. Although there are diverse types of resources, typical organizational resources include legally recognized authority, economic resources, leadership, popular support, networks, and ability to form alliances. Implicit in SA is the assumption that the most powerful actors will achieve their objectives.

Figure 2 presents the step to accomplish our objective. The established rubrics used to estimate the level (low, medium and high) for each criterion are presented in Table 1. We then combined the individual evaluation of each criterion in an overall evaluation of the feasibility of developing a MU-MPA in each study area. For each area, critical points were identified and improvement strategies were proposed.

Insert Figure 2

Insert Table 1

The minimum required for a sustainable governance structure is the evaluation of Medium in all the evaluated elements. The evaluation of “Low” is considered to be an important

weakness that needs to be addressed prior to the establishment of a MPA. The typical stakeholder analysis matrix was adapted to the context of MU-MPA, characterizing each actor according to type of actor (public, private for profit, private non-profit), resources (institutional authority, financial resources, social legitimacy), capacity to influence the final result (including veto capacity), capacity to lead or oppose change, immediate interests, long-term objectives, orienting logic, opinion of the protected marine area and its possible impact, and past and present conflicts with other stakeholders. The stakeholder matrix is completed based on the interview responses with respect to actors and the potential for conflict and/or collaboration. An example of this matrix is given in table 2 below for one of the interviewed institutions.

Results

Site Characterization

The site of Hualpén Peninsula (Site 1) is located in southern Chile near to the third largest city and industrial port of Concepción. At present, according to the Law of National Monuments, the Hualpén Peninsula is a nature sanctuary. In the adjacent woody coastal area, there are three small fishing villages, a beach, and a private park. Hualpén Peninsula is considered to be a biodiversity conservation object because it is the only conservation space in the Biogeographic Mediterranean District (Camus, 2001) and for the estuarine ecosystem formed by the Biobío River and coastal upwelling (EULA, 2009).

Site 2 is the Mejillones Peninsula, is located in the Marine Humboldt Ecoregion, in northern Chile. Described by Sullivan-Sealey and Bustamante (1999), it is characterized by a uniform desert coast with limited rivers (poor runoff) and general lack of geographical features. Further, it is characterized by an oceanic regime of salty, cold water with local upwelling events. The conservation objects include the reproduction zones of the green (*Chelonia mydas*) and olive (*Lepidochelys olivacea*) tortoises and the habitat of the Humboldt Penguin (*Spheniscus humboldti*) and the endemic species *Pyura preaputialis*. This site is not located near urban areas, although there is a fishing village nearby. It is also located near a legally recognized benthonic resource hatchery (Promar, 2009).

The third site (Punta Patache) contains a good part of the marine coastal biodiversity of Chile's Norte and like the Mejillones site is located in a Humboldt Marine Ecoregion. There are two conservation objects: 1) macro alga forests "huirales" (*Macrocystis* spp.), due to their structural role in the ecosystem, and 2) the habitat of vulnerable migratory birds. There are no fishing villages or social organizations with presence in the proposed area (Promar, 2009a), although there are important mining and energy activities located nearby.

Stakeholder Identification and Characterization

In each study area, we identified 8 stakeholders: 5 public actors and 3 private actors. Four of the public actors represented government interests: two were from the Ministry of Economy and are responsible for marine resources (SERNAPESCA and SUBPESCA), one from the Ministry of Environment (MMA), and the regional government. The role of the representative from the Ministry of Mining (SERNAGEOMIN) and/or the private research center was principally technical although s/he could play a more political role. The three remaining actors represented private economic interests in the area: artisanal fishing, industry, and/or mining.

In each selected site, the regional office of the Ministry of the Environment had already established a MU-MPA commission with the majority of the stakeholders in order to socialize MU-MPA objectives and to collaboratively define a MPA management model. The commission meetings were considered the “action arena” where the stakeholders can negotiate their participation in the management model. The MMA considered the private actors to be potential administrators of each area.

Semi-structured interviews were held with the stakeholders participating in the MU-MPA Commission. The majority of the stakeholders demonstrated in the interviews that they clearly understood the objectives of the MU-MPA as well as how their organization could contribute to MU-MPA management. Documents and official web pages of different public organizations were also analyzed to complement the interviews.

A stakeholder matrix was elaborated to characterize each stakeholder interviewed based on official information on each organization and the interview responses. Table 2 presents the characterization of the National Fishing Service for Site 2.

Insert Table 2

Once all the stakeholders were characterized in a similar way, a comparative table was prepared for each site. Table 3 shows this analysis for each of the criteria in stakeholder matrix. In general, all the stakeholders had a significant capacity to influence the results of the management model, and thus their participation and approval of the decisions is important. The actors with more influence did not exercise a leadership role, except for the representative from the Environmental Ministry.

Insert Table 3

Most of the actors perceived the impact of the area as favorable, except for the economic actors (fishers and firms), who tended to emphasize the negative aspects. This response is common due to the restrictions on economic activity that will be generated by MU-MPA implementation. It could also be due to their limited knowledge about the purpose, functioning, costs and benefits of the MU-MPA. The commitment of the stakeholders and the identification of potential obstacles and problems were also evaluated as low.

Economic Costs and Benefits of Area Establishment

We identified the costs and benefits of area establishment on economic activities, considering their environmental impact, that is, whether this new protection status would reduce income availability or generate new flows of revenues associated to the already identified new activities implicit in the government justification for the proposal. The sources of information were previous studies and official documents. Most of the gathered information was merely descriptive, environmental impact studies of current economic activities on the marine resources were practically non-existent, which limited the accuracy of the assessment regarding the feasibility of the establishment of a MU-MPA. Even more dramatic is the lack of any evidence of the potential of the suggested new economic activities. This fact is yet another example in which the proposal of MPA and the making decision process lack of the necessary information regarding impacts of economic activities and its sustainability and the real contribution of the new suggested activities.

In Site 1, the principal economic activities are artisanal fishing and gastronomic tourism. The proposed MU-MPA will affect three artisanal fishing villages and close to 100 fishers and their families (SERNAPESCA, 2006). The estimated average monthly income for fishers is US\$300 (EULA, 2009). Unfortunately the government proposal did not identify whether or not extraction activities would be reduced in the area and did not specify the main

environmental goals for the establishment of the MPA. It expected however, that some limitations in the extraction and access to the area would occur, reducing the revenues. Similarly, even when stakeholders in the interviews suggested several activities related to tourism (whale watching), no cost-benefit study has been performed regarding this activity. The only references found was an earlier study for another completely different Chilean area (Gaymer et al.2007), which estimated the annual benefits of US\$260,000 for artisanal fishermen for the Chilean Marine Reserve of Choros-Damas. Nevertheless, we cannot assume that these revenues would be capture in this area, since the climatic conditions are completely different. Following the criteria in table 1 we found that there is not any current or future sustainable economic activity in the area. Thus for Site 1, we classified economic feasibility as **medium**.

In Site 2, the principal economic activities are artisanal fishing (pelagic fish) and aquiculture concessions (benthonic resources). The proposed MU-MPA will affect three artisanal fishing villages and 200 fishers and alga collectors (SERNAPESCA, 2006). There was insufficient information available on the economic and social costs associated to the fishing limits that area establishment would produce. In this case the new proposed economic activity was the introduction of scuba diving for tourism, one again, this suggestion lack of any objective demand or supply analysis. Due to the geographical isolation of the area and the lack of cost-benefit studies for the new economic activities, we also classified the economic feasibility as **low**.

In contrast with Sites 1 and 2, the establishment of a Site 3 will not affect artisanal fishers. However, two important industries are located nearby and there are three mining concessions that are partially present in the proposed site. As in the other sites, biodiversity conservation could become an important tourist attraction, especially for the Humboldt penguins. However, Site 3 does not have access to potable water or electricity, and thus the implementation of tourist activities would be costly.

Area establishment would require environmental control of nearby industrial activity, although the specific costs involved have not been calculated. In the interviews, the industrial companies expressed their interest to financially support the area as part of corporate social responsibility, but they are not actually working with the rest of stakeholders in the task force.

Site 3 presents a contradictory results since the industries surrounding the area have a positive attitude towards the establishment of the MPA. Nevertheless, these industries themselves are the most significant environmental threat to the area. A MU-MPA tries to combine economic activities and environmental protection, therefore, in principle, in this there is potential for both conservation and significant economic activity, because there are empowered private actors who are interested in the establishment of the MPA, in contrast to the conflicts with the artisanal fishers in Sites 1 and 2. Consequently, economic feasibility was estimated as **medium**.

Social and educational activities compatible with conservation goals

In site 1, due to the large number of universities in the surrounding area, this site also has great (yet underdeveloped) potential for scientific research and environmental education. Additionally, there is a private Museum and Park that receives visitor's year around and one local university expressed its interest in developing research associated with fisheries resources of the area. One study (CONAMA, 2005) indicates that Site 1 offers important archeological potential. Considering that area establishment could trigger use of this potential, we classified social availability as **medium**.

At the same time, preliminary information suggests that Site 2 offers a potential for educational purposes. There are reports of archeological remains in the area although no studies were found. Additionally, the nearby university presently develops research and community outreach activities related to the area's biodiversity. Further, there is an environmental organization and a nearby neighborhood council that has also developed similar outreach projects. Considering that area establishment will favor present-day activities as well as coordination with diverse public institutions, we classified social feasibility as **high**.

In site 3, there is a research center interested in area establishment and there are also unconfirmed reports of archeological remains. Several academics from nearby universities

have carried out research in the area, but there is no presently declared interest. There is also a vague plan to develop an environmental education program. Due to the absence of active organizations and the vague proposals, the social feasibility was estimated as **low**.

Compatibility of stakeholder interests and agendas

We present a more detailed analysis for Site 2 as an example, and a brief description for the other two sites. In site 2, although the Commission includes both public and private actors, only the public actors regularly attended the meetings and have played the principal roles in the design of the MU-MPA management model. The most committed public actor is MMA (a characteristic of all the sites). The nearby local government expressed interest in the area, but they legally cannot provide the needed resources. The other actors expressed ambivalence with respect to area establishment.

In this site, the MU-MPA has been included in the parallel coastal zoning process being led by the Regional Government and the Fishing Service of the Ministry of Economy (SERNAPESCA). Further, there is complementarity between the objectives of the public actors, who express optimism with respect to obtaining financing, although active coordination to achieve this goal is limited.

In contrast with the active participation of public stakeholders, private actors have played a limited role in public-private coordination. The fishing communities with presence in the area have not participated in the discussion, principally because they lack clear leadership and do not have sufficient preparation to understand the technical issues. As a result, they present a generalized opposition to area establishment, principally due to their distrust of government actors. The only private actor who regularly participates in the commission is a scientist from a nearby university, but he has not exercised a mediation role.

At present, the industries located nearby do not participate in the Commission, even when the three mining concessions that overlap with the proposed site emerge as possible points of conflict. Further, in the interviews, the private actors expressed interest in financially contributing to conservation processes, favoring the site's economic feasibility. Since there are no human settlements nearby, social conflict levels are low and there is no need to develop social mitigation strategies.

Despite the adequate levels of public coordination and low level of social conflict, the public actors expressed distrust of private actors (fishers and mining interests) and weakly value their participation. Consequently, the political feasibility for Site 2 was evaluated as **low**.

Site 1 shares many similarities with Site 2. In this site, private stakeholders expressed little interest and weak commitment to the establishment of a MU-MPA. The principal conflict

present in the action arena was the resistance of the artisanal fishers, who expressed a generalized distrust of government actors and competing artisanal fishermen. In short, although whale watching has a potential to become an important economic activity, the fishers do not believe that there will be sufficient support to convert to this new activity.

At the same time, there is good communication between the public stakeholders, and consequently a great potential for agreements and coordination between public actors, especially with respect to coastal zoning. But at the same time, they also expressed their distrust of the artisanal fishermen, especially with respect to conservation goals. Thus, the potential benefits of public coordination are threatened by the distrust existing between public and private actors, principally due to unresolved conflicts over previously established marine reserves. This conflictive situation is even more complex due to the vulnerable economic and social situation of the artisanal fishing villages. Still, the local government has played an important role in conflict mediation between public and private actors, although they do not have the financial resources necessary to contribute to area management. Consequently, the political feasibility in Site 1 was evaluated as **low**.

Site 3 presents important differences with the other two sites. First, a potential conflict could develop because the MU-MPA is not included in the parallel zoning process. Second, mining companies and not artisanal fishers are the principal private actors involved, which results in an important financing potential (through corporate social responsibility) but also are potential contamination sources. Consequently, the National Mining Services is a relevant public actor in this site due to its administration and regulation of mining concessions,

constituting an important veto capacity. Principally because of the expressed private interest in area establishment, the political feasibility in Site 3 was evaluated as **Medium**.

Leadership and financial support

In all the proposed sites, the MMA has played a leadership role in the Commission, although they will not be responsible for managing the area and do not show any interest in doing so. No other actor has accepted the responsibility for area, although most of them declared the support to the creation of the area. Consequently, no area has a socially accepted management model that can be evaluated.

At all sites, regional governments were open to provide financial support through the Regional Development Fund, although this funding is short-term and would require constant renewal. Additionally, the Ministry of the Environment, research centers, and artisanal fishers also indicated the possibility to provide resources through planning, research and vigilance, respectively. The remaining actors indicated they could not contribute resources. All three sites thus received the same evaluation of **Medium** for institutional feasibility because 4 actors indicated low or medium complementarity with MU-MPA objectives yet only two confirmed financing.

Table 4 summarizes the results obtained for the three proposed sites. As can be seen, each site presented a distinct configuration even when they have certain characteristics in common. Considering the importance of all the criteria, an area should be considered to be feasible when all present a medium evaluation.

In the three proposed sites in Chile, Sites 1 and 3 were considered to present a medium level of global feasibility because they presented medium feasibility in three of the four criteria, which indicates that they need to address the weaknesses identified in order to favor a sustainable MU-MPA. Our analysis suggests that Site 3 has a greater opportunity to establish a sustainable MU-MPA, although it will generate less social benefits.

In contrast, Site 2 presented the only high level (environmental education and research) found in the study. At the same time, two criteria were evaluated as low feasibility (economic and political feasibility), presenting important weaknesses that need to be addressed.

Insert Table 4

The Ministry of Environment and other public actors demonstrated high levels of participation and interest in the establishment of MU-MPA, probably due to their favorable perception of its impact. A second strength observed in all sites is that all the actors understood the purpose, and functioning of the proposed MPA, although the artisanal fishers did not have a clear understanding of the costs and benefits.

At the same time, the principal weakness was associated with the limited participation of private actors, who also expressed a negative perception of area establishment. In all the sites, the artisanal fishers and private companies with presence in the area were skeptical that the area could produce favorable impacts. Due to the non-exclusive nature of commonly pooled resources, the tragedy of the commons is the most likely outcome if economic agents only assume the private costs and ignore the social costs of their actions (Hardin, 1968; Gordon, 1954). In order to avoid this tragedy, all economic agents with presence in the area need to accept as legitimate the management rules in order to avoid their over-exploitation (Ostrom, 1990; Feeny et al. 1990). Considering that the artisanal fishers demonstrated high levels of distrust of public actors in general, this weakness must be effectively addressed to establish a sustainable MPA in Sites 1 and 2.

Despite the many similarities observed between the proposed sites, our general results reveal a certain degree of spatial variability in all the criteria used to characterize the feasibility of establishing a MU-MPA in each site, confirming the importance of the local context and the fact that there is no recipe on how to design a sustainable management model for environmental resources. The more favorable situation found in Sites 1 and 3 was associated to 1) the presence of economic agents whose objectives are compatible with the conservation objects and 2) the existence of legal instruments (zoning plans) that included the MPA. In conclusion, the greater degree of global feasibility found in Sites 1 and 3 indicates that these

specific configurations are more favorable for the establishment of a sustainable Multi Use Marine Protected Area and could imply a lower social cost in the short term.

Discussion

We identify several policy suggestions to increase the feasibility of each area and to assure the support from the government, the community and the private sector. First, it is necessary to disseminate the importance of these natural areas to the community and the productive sectors through environmental education programs emphasizing the development of social responsibility of the State and the private sector. Second, the proposal of new areas for protection should be accompanied by a set of technical reports about current and potential economic activities and its impact on the conservations goals. Third, those environmental goals should be defined more precisely in order to orientate the evaluation of different course of action. So far, the declaration and proposal of these three MPA are too vague in terms of its environmental goals, reducing the effectiveness of the feasibility analysis.

More specifically, in site 1, the government needs to incorporate the artisanal fishermen in the process of economic development in order to increase the feasibility of the creation of a MU-MPA in Hualpén. In the case of site 2, it is necessary to implement strategies to approach the various coastal communities to resolve the conflict of interest among them while in the

case of site 3 private companies should be incorporated in the task force since they declared to be willing to participate but they have not been involved in the efforts so far.

As can be seen, our results reflect the argument of Vásquez et al. (2008) who argue that the actors associated with Chilean Marine Reserves do not have complete knowledge on the conservation mechanisms. Indeed, at times, the economic activities of stakeholders do not respect the conservation mechanisms and produce errors in the evaluation of property rights, benefits and costs. Additionally, even when many (industrial) fishers will accept conservation mechanisms that do not negatively impact their economic activity, smaller fishing communities tend to be reticent and distrusting as found by Bess and Rallapudi (2007) in Maōri fishing communities, similar to the reaction of artisanal fishers in the present study.

Conclusions

Drawing on academic literature and lessons learned in case studies, we propose and apply a methodology to characterize the economic, social, political and institutional factors considered to influence the effective and efficient functioning of a MPA. Our methodology has tried to be comprehensive within the limitations imposed by the lack of information on some of the subjects evaluated. However, it is enough to raise minimum requirements necessary for both the establishment of a MU-MPA to identify conditions for achieving

success in them and to suggest course of actions to improve the feasibility of the establishment of a MPA.

We think that same critical issues that need to be addressed in future research are the following: 1) we should, when data is available, combine our qualitative analysis with a quantitative and statistical analysis. This is difficult especially because the declaration of intentions associated with the declaration of a MPA generally is not accompanied by a set of studies with quantitative analysis. But it should be part of the future evaluation of feasibility analysis. Second, we have not used any weighting mechanism of the opinion or commitments of different actors. This is a delicate matter, it might be the case that the commitment of the artisanal fishers is more crucial than the commitment of other actors and therefore their opinion should be more relevant in the overall assessment. We have not robust criteria to decide one way or another; therefore, we have not weights different opinions. Nevertheless, this should be part of future research about the feasibility of new MPA. Probably an ex poste evaluation of the success of different MPA might shed some light about this issue.

In conclusion, we think that the proposed methodology provides a first attempt to identify an effective and efficient manner to comprehend the multiple interactions involved in the establishment of a MPA. Based on these results, strategies can be developed to strengthen the possibilities of success for these conservation strategies. Furthermore, our method has the potential to be applied to other protected areas, not only MPA, and it can be enriched with the development of quantitative information in the future.

- *Acknowledgments:* We gratefully acknowledge partial financial support from the Scientific Millennium Initiative of the Chilean Ministry of Economics, Promotion and Tourism under Project NS 100007.

References

- Bess R. and R. Rallapudi. 2007. Spatial conflicts in New Zealand fisheries: The rights of fishers and protection of the marine environment. *Marine Policy* doi:10.1016/j.marpol.2006.12.009.
- Burke, L., Maidens, J., and World Resources Institute, Washington, DC (EUA). (2005). *Arrecifes en peligro en el Caribe. Reef at risk in the Caribbean.*
- Camus P. A. 2001. Biogeografía marina de Chile continental. *Revista Chilena de Historia Natural* 74: 587-617.
- Castilla, J.C. 1986. ¿Sigue existiendo la necesidad de establecer parques y reservas marítimas en Chile? *Revista Ambiente y Desarrollo* ,VOL. II, N° 2, pp. 53-63.
- Centro de Estudios Ambientales de la Universidad de Concepción (EULA). 2009. Informe Final Expediente Técnico para la Solicitud del AMCP-MU Sitio Prioritario Península de Hualpén. Ministerio del Medio Ambiente, Santiago.
- Chrislip, David D, and Carl E Larson. 1994. *Collaborative Leadership How Citizens and Civic Leaders Can Make A Difference.* San Francisco, CA: Jossey-Bass.
- Comisión Nacional del Medio Ambiente- Gobierno de Chile (CONAMA). 2005. *Política Nacional De Áreas Protegidas.*

Comisión Nacional del Medio Ambiente- Gobierno de Chile, Región del Biobío. (CONAMA BIO BIO) 2008a. Planificación Estratégica para la conservación del Área Marina de Hualpén. Diciembre 2008.

Comisión Nacional del Medio Ambiente- Gobierno de Chile, Región del Biobío. (CONAMA BIO BIO) 2008b. Informe Técnico Área Marina Hualpén. Sitio Prioritario de la Estrategia para la conservación de la Biodiversidad. Diciembre 2008.

Comisión Nacional del Medio Ambiente- Gobierno de Chile, Región del Biobío. (CONAMA BIO BIO) 2008c. Diagnóstico Social, Económico y Cultural. Península de Hualpén: El aspecto social y convivencia con el entorno. Diciembre 2008.

Evans, Peter. 1996. "Government action, social capital and development: Reviewing the evidence on synergy." *World Development* 24: 1119-1132.

Feeny D., Berkes F., McCay B. and J. M. Acheson. 1990. The Tragedy of the Commons Twenty-Two Years Later. *Human Ecology* 18: 1-19.

Foell J., Harrison E, and Stirrat RL.1999. Participatory approaches to natural resource management – the case of coastal zone management in the Puttalam District, Sri Lanka. Summary findings of DFID-funded research project No. R6977. University of Sussex, United Kingdom, 1999.

Forest, N. B. 1998. "Assessment of Coastal Regulations and Implementation: Case Study of Roatán, Bay Island Honduras". *Coastal Management Journal*, 26:125-155.

Gaymer C., Dumont C., and Stotz W. U. 2007. Evaluación de línea base de las reservas marinas “Isla Chañaral” e “Isla Choros-Damas. Proyecto Fondo de Investigación Pesquera (FIP) N°2006-56.

Global Environmental Facility (GEF)-United Nations Development Programme (UNDP). 2005. Conservación de la Biodiversidad de Importancia Mundial a lo Largo de la Costa Chilena. Documento Proyecto número 40493, UNDP.

Gordon, H. S. 1954. The Economic Theory of a Common-Property Resource: The Fishery. *Journal of Political Economy* 62: 124-142.

Grimble R. and Wellard K. 1996. Stakeholder methodologies in natural resource management: A review of principles, contexts, experiences and opportunities. *Agricultural Systems*, 55(2): 173-193.

Green A., Smith S. E., Lipsett-Moore G., Groves C., Peterson N., Sheppard S., Lokani P., Hamilton R., Almany J., Aitsi J. and L. Bualia. 2009. Designing a resilient network of marine protected areas for Kimbe Bay, Papua New Guinea. *Oryx* 43: 488-498.

Hardin, G. 1968. The Tragedy of the Commons. *Science* 162: 1243-1248.

Klein C. J., Chain A., Kircher L., Cundiff A. J., Gardner N., Hrovat Y., Scholz A., Kendall B. E. and S. Airamé. 2008. Striking a Balance between Biodiversity Conservation and Socioeconomic Viability in the Design of Marine Protected Areas. *Conservation Biology* 22: 691-700.

Kelleher G. 1999. Guidelines for Marine Protected Areas. IUCN, Gland, Switzerland and Cambridge, UK.

McCrea-Strub A., Zeller D., Sumaila U. R., Nelson J., Balmford A. and D. Pauly. 2011.

Understanding the cost of establishing marine protected areas. *Marine Policy* 35: 1–9.

Moreno-Bonilla M., De Andrade R. and A. Cabezas. 2009. Proyecto Conservación de la Biodiversidad de Importancia Mundial a lo Largo de la Costa Chilena: Logros, lecciones y desafíos para la conformación del Subsistema de Áreas Marinas Protegidas en Chile. *Memorias I Congreso Nacional de Áreas Protegidas*, Bogotá.

Ostrom, Elinor. 2005. *Understanding Institutional Diversity*. Princeton, NJ: Princeton University Press.

Ostrom, E. and T.K. Ahn. 2003. *Foundations of Social Capital*. Cheltenham, UK: Edward Elgar.

Ostrom, E. 1998. A Behavioral Approach to the Rational Choice Theory of Collective Action: Presidential Address, American Political Science Association, 1997. *American Political Science Review*. 92(1): 1-22.

Ostrom, E. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. New York: Cambridge University Press.

Pauly D., Christensen V., Guenette S., Pitcher T. J., Sumaila R., Walters C., Watson R. and D. Zeller. 2002. Towards sustainability in world fisheries. *Nature* 418: 689–95.

PISCO (Partnership for Interdisciplinary Studies of Coastal Oceans). 2007. *La Ciencia de las Reservas Marinas (2da Edición, Versión para Latinoamérica y el Caribe)*. www.piscoweb.org. 22 pp.

- Pomeroy R. S., Watson L. M., Parks J. E. and G. A. Cid. 2005. How is your MPA doing? A methodology for evaluating the management effectiveness of marine protected areas. *Ocean & Coastal Management* 48: 485–502.
- Promar Pacífico Ltda. 2009. Informe Técnico de Sustentabilidad AMCP- MU Península de Mejillones: Elaboración de plan de gestión para el sitio marino costero Península de Mejillones. Ministerio del Medio Ambiente, Santiago.
- Promar Pacífico Ltda. 2009a. Informe Técnico AMCP- MU Punta Patache. Ministerio del Medio Ambiente, Santiago.
- Rockloff S. F. and S. Lockie 2004. Participatory tools for coastal zone management: Use of stakeholder analysis and social mapping in *Australian Journal of Coastal Conservation* 10.12: 81-92.
- Ramírez L. F., Alonso D., Segura-Quintero C., Moreno R., Mendoza S., Maldonado J., Castro A. P., Calero L. A., Zamora A., Bohórquez E. and R. Franke. 2009. Viabilidad de una red de áreas marinas protegidas, Caribe colombiano. Instituto de Investigaciones Marinas y Costeras(INVEMAR), Santa Marta.
- Salm, R.V., John Clark, and Erkki Siirila (2000). *Marine and Coastal Protected Areas: A guide for planners and managers*. IUCN. Washington DC. xxi + 371pp.
- Sale, P.F., R.K. Cowen, B.S. Danilowicz, G.P. Jones, J.P. Kritzer, K.C. Lindeman, S. Planes, N.V.C. Polunin, G.R. Russ, Y.J. Sadovy, and R.S. Steneck. 2005. Critical science gaps impede use of no-take fishery.

Sierralta L., Serrano R., Rovira J. and C. Cortés. 2011. Las áreas protegidas de Chile. Ministerio del Medio Ambiente, Santiago.

Stefansson G. and A. A. Rosenberg. 2005. Combining control measures for more effective management of fisheries under uncertainty: quotas, effort limitation and protected areas. *Philosophical Transactions of the Royal Society of London B* 360:133-146.

Sullivan K. and G. Bustamante. 1999. Setting Geographic Priorities for Marine Conservation in Latin America and the Caribbean. The Nature Conservancy, Arlington.

Vásquez F., Castilla J. C., Gelcich S., Quiroga M. A., Carrasco P., Paz X. and J. Riquelme. 2008. Evaluación económica de los activos ambientales presentes en la red de reservas marinas decretadas en el país bajo la Ley General de Pesca y Acuicultura. Proyecto Fondo de Investigación Pesquera (FIP) N°2008-56.

Figures and Tables

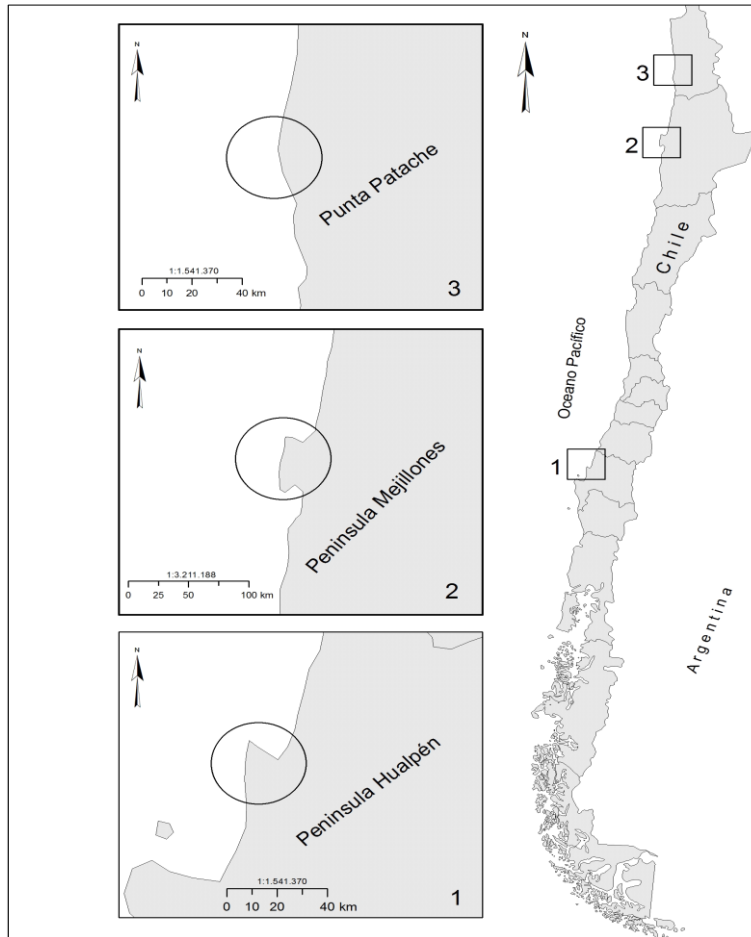


Figure 1. Map of the three possible sites for MU-MPA establishment: Hualpén Peninsula (Site 1), Mejillones Peninsula (Site 2), and Punta Patache (Site 3)

Source: Author elaboration

Figure 2. Methodological Steps.

Source: Author elaboration

Table 1: Rubric to Evaluate Feasibility

	Evaluation Criteria	High	Medium	Low
Social and Economic Feasibility	Potential to develop economic activities	Sustainable economic activities that are compatible with the conservation goals are being implemented	Sustainable economic activities that are compatible with the conservation goals have been identified and can be easily implemented.	Conservation goals require limitation on actual economic activities and alternative activities have not been identified
	Potential for scientific research and environmental education	Area establishment will open up new opportunities for scientific research or environmental education; there are actors interested in pursuing these activities	Area establishment will open up new opportunities for scientific research or environmental education, but there are not actors interested in pursuing these activities	The possibilities for scientific research and environmental education is limited
	Knowledge and understanding of the objectives and agreements achieved in establishment of the area.	All the actors indicate the same objectives and agreements.	The most important actors indicate the same objectives and agreements.	There are distinct visions with respect to the objectives and agreements; lack of consensus
	Complementarity between stakeholder objectives and Area objectives	The proposed model allows the majority of actors to achieve their goals.	The proposed model allows several actors to achieve their goals.	Several actors have goals that conflict with the model's or other actor's goals
Political and Institutional Feasibility	Commitments accepted by the actor in the management model	All the actors accept the roles and responsibilities present in the proposed model.	Almost all the actors accept the roles and responsibilities present in the proposed model.	Several key actors do not support the establishment of the MPA.
	Perception of costs and benefits associated with the establishment of the MC Area; identification of possible problems.	Most of the actors express a clear and shared understanding of costs and benefits associated with the establishment of the Area; shared understanding of possible problems	Although the majority of the actors present a general understanding the costs, benefits and problems involved, many cannot identify all the costs and benefits.	The majority of the actors present a unrealistic vision of the problems that will be generated by the Area; many beneficiaries do not perceive that they are beneficiaries.

	Leadership	Clear leadership that motivates team work	Coordination between the different stakeholders but without clear leadership	Limited coordination and no clear leadership
	Rules and Responsibilities	Management model is perceived as clearly defined and coherent with the objectives of the MPA and national jurisprudence	Management model is perceived as clearly defined and coherent with the objectives of MPA, but several points could produce conflicts with the national jurisprudence.	Management Model is perceived as confusing and/or incoherent with the objectives of the MPA and/or national jurisprudence
	Financing	Clearly defined funding sources and supported by institutional commitment	Funding sources are identified but without institutional commitment	Funding sources have not been identified

Source: Author elaboration

Table 2: Stakeholder Matrix for National Fishing Service in Site 2 (Mejillones Peninsula)

Actor	National Fishing Service (SERNAPESCA)
Type of Actor	Governmental
Resources, institutional power, leadership, economic power, authority, popular support, networks, etc.	Formal power: responsible for the implementing national fishing policy and monitoring and controlling fishing activity. Indicates that they will not contribute financial resources Capacity to articulate private and public interests The relation with the local fishers is formal.
Capacity to promote or oppose MPA establishment	LOW CAPACITY TO PROMOTE OR OPPOSE Its principal role is to ensure the health quality of fished products for international markets, propose plans for recreational fishing, supervise marine parks and reserves and provide official fishing statistics. Responsible for monitoring and controlling managed areas in collaboration with the Port's Capitan.
Capacity to lead MPA	LOW CAPACITY TO LEAD MPA
Short-term interests	SERNAPESCA is responsible for monitoring and controlling managed areas and supervising marine parks and reserves. It does not have the responsibility to lead or implement any of these areas. Conservation of marine resources in the area. Establish new economic activities that are compatible with sustainable resource management. Obtain additional resources to improve vigilance in the managed fishing areas.
Long-term objectives	Obtain and assure the human and material resources required to effectively supervise and monitor MU-MPA.
Orienting Logic	Efficiently fulfill the national fishing policy
Perception of MU-MPA and its impact	FAVORABLE. Favors adequate zoning and a sustainable resource management plan, which requires the participation of all stakeholders and recognition of their interests, especially artisanal fishers
Past and present Conflicts with other actors	Certain overlapping of functions with the Navy. The principal conflict is that they question the artisanal fishers who are reticent with respect to the area
Knowledge of MU-MPA	Clearly understands the administrative process involved in the MU-MPA, but is unclear with respect to the functions that correspond to the National Fishing Service.
Complementarity	The principal motivation is to protect natural resources and encourage sustainable social-economic development by introducing new activities. The objectives are complementary with other public actors in the commission.
Commitment	Protagonist of the commission. Seeks to generate agreements between the stakeholders although expressed distrust in the fishers.
Perception of Costs and Benefits	The benefits highlighted are protection of ecosystems and the sustainable use of natural resources. Clearly understands the financial resources needed for the area, and his principal concern is how to achieve efficient supervision.
Leadership	Protagonist in the declaration of MU-MPA.
Financing	His organization can only contribute economic resources for partial financing of the area.
Other comments	Demonstrates distrust in the fishers and their capacity for sustainable resource management.

Source: Author Elaboration

Table 3: Stakeholder Matrix for the proposed sites in Chile.

	National Fishing Service	Sub-secretary of fishing	Environmental Ministry	Regional Government	Ministry of Mining	Research Center	Artisanal Fishers	Firms
Leadership Influence	High	Medium	High	Medium	Medium	High	High	High
Interest in Area	Low	High	High	High	High	Medium	High	Low
Perception of Impact	High	High	High	High	Low	High	Medium	Medium
Conflict with other actors	Favorable	Favorable	Favorable	Favorable	Favorable	Favorable	Distrust	Undefined
Knowledge of Area	Artisanal Fishers	No	Artisanal Fishers	Artisanal Fishers	No	No	Governmental actors, other Artisanal Fishers	Ministry of Environment
Goals complementary with the area	High	High	High	Medium	Medium	High	Medium	Low
Commitment	High	High	High	Medium	Low	High	Medium	Medium
Perception of Costs-Benefits	Yes	Yes	Yes	Yes	Low	High	Medium	Low
Contribute financing	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
	No	No	Yes	Yes	No	Yes	Yes	No

Source: Author elaboration

Table 4: Economic, Social, Political and Institutional Viability

	<i>Site 1</i>	<i>Site 2</i>	<i>Site 3</i>
Economic Feasibility	Medium	Low	Medium
Feasibility for Scientific Research and Environmental Education	Medium	High	Low
Political Feasibility: Potential for Collaboration between stakeholders	Low	Low	Medium
Institutional Feasibility: Potential for Sustainable Governance Structure	Medium	Medium	Medium
Global Feasibility	Medium	Low	Medium

Source: Author Elaboration

Appendix.

A1: Actors Interviewed and Workshop Participants per Site

Site	INSTITUTION	NAME	Clasification
1	EULA-UDEC Comité Nacional Pro Defensa de la Flora y la Fauna (CODEFF)	Mauricio Aguayo Rodrigo López	Independent consultant Actor private non-profit
	Particular	Familia Macaya	Actor private non-profit
	Parque Pedro del Río Zañartu	Martín Domínguez	Actor private non-profit
	FEREPA BIO BIO	Hugo Arancibia	Actor private non-profit
	GORE BIO BIO-Borde Costero	Jorge Urrea/ Loredana Díaz	Actor public
	Municipio de Hualpén	Claudia Sanhueza	Actor public
	DIRECTEMAR	Javier Monsalves	Actor public
	SERNAPESCA	Jorge Torres	Actor public
	SUBPESCA	Herman Muñoz	Actor public
	MMA-BIOBIO REGION	Patricia Carrasco	Actor public
2	CREA-Universidad de Antofagasta	Carlos Guerra	Actor private non-profit
	Promar Pacifico Ltda.	Cristian Hudson	Independent consultant
	STI Mejillones	Juan González	Actor private non-profit
	STI/AG/Federación de Pescadores Artesanales	Orivindo Delgado	Actor private non-profit
	GORE Antofagasta-Borde Costero	Sebastián Arce	Actor public
	Municipio de Antofagasta	Jorge Honores	Actor public

3	Gobernación Marítima de Antofagasta	César Ceballos R.	Actor public
	SERNAPESCA	Patricio Araya/ Mauricio Bringas	Actor public
	SUBPESCA-CONSEJO ZONAL	Marcos Soto	Actor public
	CONAF	Nelson Amado/ Felipe González	Actor public
	MINVU	Rodolfo Gómez/ Carlos Díaz	Actor public
	MMA-ANTOFAGASTA REGION	Roberto Villablanca	Actor public
	MMA	Beatriz Ramirez Miguel Stutzin	Actor public
	UNAP Promar Pacifico Ltda.	Walter Sielfeld Cristian Hudson	Actor private non-profit Independent consultant
	STI/Federación de Pescadores Artesanales	Héctor Molina	Actor private non-profit
	GORE BIO BIO-Borde Costero	Billy Morales P	Actor public
	Gobernación Marítima de Iquique SERNAGEOMIN	Alvaro Vicencio Fanny Torres Rojas	Actor public Actor public
	Bienes Nacionales	Egon Grünewald	Actor public
SERNAPESCA	Patricio Rivas Devillé	Actor public	
MMA- TARAPACA REGION	Roxana Galleguillos	Actor public	
MMA	Beatriz Ramirez Miguel Stutzin	Actor public	
SUBPESCA-CONSEJO ZONAL	Juan Carlos Villaroel	Actor public	

Source: Author Elaboration

A2: Interview Guidelines Public Sector / Private / Group Pressure.

1. What is your perception of the fact that you want to establish a marine protected area in the sector?
2. In your opinion, what should be the main objective of the Marine Protected Area? (Conservation? Tourism? Sustainable fishing? .. Etc..)
3. How long have you participated in the Working Committee for MU-MPA?
4. What perception do you have in relation to the agreements reached at the Working Committee for MU-MPA?
5. Do you think the Sustainable Development of the area is possible? What are the main obstacles? (Target: see their perception of the possibilities of development and / or protection)
6. I can tell what kind of economic activities are linked directly and indirectly in the area?
7. Identifies you some group or social sector, which should be consulted on MU-MPA project so far not part of the MU-MPA?
8. Considering that its establishment will limit certain activities of some companies and individuals you identify who will be affected agents positively and negatively.
9. For negatively affected agents which institution or organization should have the responsibility to fund compensation programs or mitigation? (Thinking about the economic effects).
10. What public or private organization would be the most suitable to control the MU-MPA?
11. In your opinion, Who (is) benefits (n) plus the establishment of the MU-MPA?
12. What (s) organization (s) to contribute funds MU-MPA?

13. Do you think a public-private alliance would be a good way to ensure financing, management and monitoring of the MU-MPA? Or is it better be a public organization?

14. What kind of responsibility accept the organization you represent if established MU-MPA?

15. Can you mention if there are outstanding cultural elements associated with this MU-MPA project? (Please mention activities and / or agents involved and degree of involvement)

Source: Author Elaboration

A3: Guidelines Social Organizations Affected.

1. Did you think you want to set a MU-MPA in the area?

2. Do you think it is necessary to establish one? What perception do you have of that? Do you have all the information you need to respond? If it is not, what questions do you have in relation to the establishment and management? What are the main benefits or opportunities you expect as a result?

3. Do you participate you or your organization in committee work?

4. Are you aware of the conclusions of the last meetings of the Working Committee for MU-MPA? Do you feel represented (a) by this committee?

5. What do you expect the project to establish a MU-MPA? You will have a impact in your life? in your family? And your income?

6. From the information he knows the MU-MPA project, consider yourself that there is some cultural aspect and / or social that has not been considered to date? (Please develop)

7. Do you think it is possible to reconcile the protection of marine life and activity

economic (state) that you develop? Do you think it is important to protect the environment?

8. Do you believe that the government will work with your organization for the project does not deteriorate the quality of life of his family and neighborhood?

9. What kind of responsibility you would accept the organization represents whether the establishment of the MU-MPA?

Source: Author Elaboration