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The integration of nature conservation into the marine spatial planning process

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ABSTRACT

The understanding of the role of nature conservation (NC) is used to illustrate how an integrated and sustainable approach to decision-making could be developed for planning and managing activities in the marine environment. The need for NC to be integrated in the marine spatial planning (MSP) decision-making process is highlighted in various initiatives around the world. However none of these initiatives describes a commonly applicable framework to achieve this goal. The plethora of interpretations regarding the meaning, role and position of NC in planning, makes such an attempt more complex. A good starting point in order to develop such a process is to answer the question: how NC can contribute to the achievement of sustainability in the context of MSP? In the present study the different ways that NC has been interpreted over time are explored and several definitions are analyzed, concluding that there is currently no common approach to NC in MSP initiatives. Therefore it is indicated that NC should be treated as a means to achieve good environmental status of the ecosystem, based on its spatial, economic and conflict resolution dimensions, characteristics that are common among all marine uses. Consequently, it is proposed that NC at sea should be put in a central position during the MSP processes. A schematic presentation of the concept is provided in this paper.

1. Introduction

Marine spatial planning (MSP) deals with presenting an integrated vision of the spatial aspects of sectoral policies in the areas of, e.g. maritime transport, environmental protection, energy, fisheries and tourism [1]. One of the concerns of MSP hence is the need to integrate economic and environmental decision-making and to support the development of a sustainable management regime through an ecosystem approach to marine management. Ecosystem-based management focuses on the diverse benefits provided by marine systems, rather than on single ecosystem services. Such benefits or services include vibrant commercial and recreational fisheries, biodiversity conservation, renewable energy from wind or waves and coastal protection [2]. On the other hand, a sustainability oriented marine spatial plan must provide: (a) a clear vision of the desired future for the area based on the major site values; (b) a set of strategies and actions for achieving this objective; and (c) clear guidance to assist managers in dealing with opportunities and eventualities that arise during the life of the plan [3]. Hence the decision-making process for developing plans needs to ensure that environmental, economic and social factors are considered in a holistic and integrated manner.

Efforts to reduce the impacts of human use of the marine environment by legislation, policy and management tools are generally directed at particular activities, species and locations, or a combination of all three [4]. The main strategy for implementing NC is the establishment and appropriate management of protected areas (in situ conservation) [5]. The importance of protecting nature, biodiversity and resources at sea is reflected in various attempts to create marine protected areas (MPAs) around the world for well over 100 years [6,7,8]. The term MPA is often used as an umbrella term for a range of marine spatial designations with the aim of conserving nature. The need to designate MPAs as a contribution to preserve and improve the quality of marine biodiversity has been put forward in several international policy instruments and legislation [9].

The need to integrate NC in the MSP process is expressed in various texts. The Irish Sea Pilot Project had among other the aim

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to test ways of integrating NC into key sectors (e.g. fisheries, energy, transport, minerals, tourism, etc.) in order to make an effective contribution to sustainable development on a regional basis [10] and does so by comparing the conservation goals with other sectors' objectives. The "Technical and Legal NC Requirements for New Spatial Planning Instruments in the German Exclusive Economic Zone" (EEZ) [11] stresses the need for the interests of marine conservation to be incorporated into the process for spatial planning via planning input from conservationist sources. This need is covered through the description of certain criteria and objectives that spatial areas should fulfill in order to secure NC at sea. Also in the EEZs of the North Sea and the Baltic Sea NC planning is strongly embedded into the regional marine spatial plans [12] and the requirements to this direction are described. However none of these examples describes a conceptual framework on how to commonly handle NC in the MSP process. A common handling of NC is even more complicated by the often problematic implementation of policies and laws and the opposition against these policies.

NC as a human action is rooted in diverse, evolving cultures and world views [13]. As a result, people define NC in different case-tailored ways, often without explicit mentioning its exact meaning. The same problem applies when spatial management decisions must be taken. It is often not clear what exactly NC is: one of the spatial uses, one of the strategic goals within the planning process or just a means to reach ecological objectives? For example, answering the question whether or not conservation should be considered a "use", different respondents provided widely ranging answers, i.e. from a pure "yes" over a "maybe" to "not at all" [14] (Table 1).

A controversy of views of how marine NC should be handled is also found for example in three EU texts, i.e. the Marine Strategy Framework Directive (MSFD, 2008) [15], the Blue Paper on Integrated Maritime Policy (IMP, 2007) [16] and the Communication from the Commission on MSP in the EU—Achievements and Future Development (2010) [17]. In the MSFD, NC is at the core of its implementation and can be translated to an overall goal, however, in the two aforementioned texts conservation is presented as one of the competing uses for space.

The fact that all participants in decision-making for MSP should preferably have the same understanding of the role and the position of NC before and after the design and application of the corresponding plan, stresses the need for convergence in the existing diversity of concepts and values of nature and NC. Therefore the urgency to find ways to incorporate understandings of the human relationship with the natural world, and hence to increase efforts for NC emerges. The purpose is not only to reach a common concept in the planning process, but also to be able to be presented in official (legislative) texts. As decision-making processes in MSP demand for the participation of all interested parties from early steps onwards, they should at least share common perceptions of acceptability of alternative uses, a common awareness of value of marine ecosystems, a common recognition of NC as a legitimate use, as well as a common understanding that conservation may lead to direct benefits.

As there is a clear need for a common concept on how to position NC in the MSP process, this paper analyses the commonalities and differences between NC and human uses of the marine space to arrive to a commonly applicable concept for integrating NC in the MSP process ensuring sustainability. The commonalities and differences between NC and human uses of the marine space are first analyzed by literature review, focusing on: (1) the various schools of thought regarding the interpretation of NC over time; (2) the identification of interested parties linked to NC and how they interpret it; and (3) a valuation of the different views on whether or not NC at sea can be considered a marine use. The lessons learned from literature are finally summarized in a commonly applicable concept for integrating NC in the MSP process ensuring sustainability. For a better understanding a schematic presentation of the concept is provided and analyzed.

Table 1
Diversity of opinions on whether or not NC can be considered a "use" of the marine environment [14].

Elliott Norse: Conservation is an overarching policy goal because publicly owned resources are a public trust to be managed for the benefit of society.
Nici Gibbs: The term conservation often refers to, or is used to justify, the protection or preservation of an area or characteristic of the marine environment irrespective of any risks or adverse effects arising from other uses. In these cases Conservation should be considered as a separate use of the marine environment.
Barry Gold: By considering conservation as a use within a marine spatial process, we provide stakeholders with a proactive approach that considers trade-offs between levels of conservation and other uses within an ecosystem goods and services framework.
Fanny Douvere and Charles Ehler: Conservation must be able to compete with traditional uses of the sea (including fishing and marine transport) and new uses (offshore wind farms, mariculture) in government processes such as MSP that are being used increasingly to plan and allocate space in marine areas.
Ian Ball: The specific effect of considering a separate use will depend entirely on the context of the management process being used. There are unique aspects to conservation that cannot be ignored. A one-year moratorium on fishing or tourism, for example, makes more sense than a one-year moratorium on conservation.
Carl Safina: Conservation is not a use. It is a restraint that facilitates many kinds of use in perpetuity.
Cora Seip-Markensteijn: If uses conflict heavily with intended NC and no mutually beneficial solution can be found, then considering conservation as a separate use can be a solution.

2. Interpreting nature conservation

IUCN (2009) [13] refers to the diverse concepts of nature that exist around the world, with a tremendous consequent diversity of conservation values, ranging from intrinsic values related to sacred species, sites, landscapes, etc., to use values for livelihood, and functional values. The same way NC as a concept can be defined in many different ways, according to many parameters one of those being what will be and how it will be protected and or restored. As a term, NC refers to the protection and preservation of biomes (ecosystems). Biodiversity conservation, which involves everything from conserving genetic variability within a population, to different populations within a species, to assemblages of species within ecosystems, to ecosystem processes, and a diverse array of ecosystems, is a closely related term [18]. Moreover, the World Conservation Strategy (WCS) defines conservation as the 'management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations' [19]. Furthermore, IUCN does not restrict NC only to the most valuable, representative and vulnerable biotic aspects, but also to the abiotic ones and points out an important difference: biotic elements (habitats, ecosystems and species) display certain resilience and may be able to recover from partial destruction, whereas geological heritage is non-renewable and, once destroyed, it is absolutely unrecoverable [20]. There is a long history regarding the different interpretations of NC. Formalized different philosophies developed into two branches as early as the late 19th century and early 20th century. The preservationists advocated pure wilderness based on a spiritual appreciation for nature (termed the preservationist or

romantic—transcendental ethic school), while the conservationists advocated a resource-based approach to the management of natural resources (termed the resource conservation ethics) [21]. While the ultimate objective of both philosophies clearly is different, they both focused on rare and threatened species. More recently however, conservation has shifted away from the more traditional focus on rare and threatened species, to encompass all ecological components of the ecosystem, including more commonly occurring features and the functional processes that support them [10]. A more recent and more innovative idea in conservation is however the functionalist ideal, which conceives human economies as embedded in the larger and more enduring economy of nature [22]. Its goal is to adapt human economies to ecological exigencies, thus achieving a mutually sustaining relationship between social systems and the ecosystems in which they are situated and on which they depend. Important to this end is: (1) the shifting of the focus from biodiversity conservation in reserves to biodiversity-friendly policy measures in anthropogenic landscapes; (2) the shifting of the focus from the ecological benefits of conservation to societal preferences for biological diversity; and (3) the attention that should be given to the social dilemma in biodiversity conservation which needs to be counteracted by sophisticated management design [23]. As a result of this, the benefits of conservation can be seen as social constructs determined by individual and societal perceptions of nature according to the definition that the Millennium Ecosystem Assessment gives for ecosystem services [24]. Close to the ecosystem services concept is the ecological economists' term of natural capital, which covers biodiversity, ecosystems, natural landscapes and the renewable and non-renewable natural resources they contain and refers to the fundamental assets on which all human societies and economies depend [25,26]. The flows of natural goods and services that accrue from these stocks of natural capital are equivalent to the interest that accumulates from financial capital, and these stocks should be managed conservatively. Thus the full wealth of a nation can be evaluated only with due consideration of all forms of capital: manufactured, human, social and natural [27].

Except for the focus on which values should be first protected and who should first benefit from conservation, there is another categorization according to how various experts and other interested parties interpret NC. The construction of NC as a process has evolved from expert driven to a network co-ordinated setting in which experts have become a stakeholder among other stakeholders [28]. It should be added, stakeholders are those who have an interest in a particular decision, either as individuals or representatives of a group [29], including people who (can) influence a decision as well as those (possibly) affected by it [30]. Furthermore, the complexity and diversity of ecosystems and ecosystem management give rise to the need for transdisciplinarity, the effort to integrate different kinds of knowledge on ecosystem assets [31]. Transdisciplinarity is built on the dialog and cross-boundary issues between scientists from different knowledge areas, i.e. interdisciplinarity [32], plus some other intervenients, such as planners, decision-makers and stakeholders in general [33]. This transdisciplinarity again stresses the need for a common interpretation of NC, which is not at all that obvious as it may seem. Policy makers, for example, usually deal with how NC affects the creation or the resolution of conflicts. Sociologists rather take care of how NC contributes to social welfare and social learning. Planners see NC as one of the spatially competing interests. Economists are concerned with the monetary or non-monetary valuation of the benefits of NC. Natural scientists deal with which values and at which scale have a priority to be conserved, while finally, end users see NC as an objective to fight for or fight against depending on their respective interests.

3. The spatio-temporal, conflict and economic dimensions of human and natural uses.

Human uses are spread across the spatial scales from the whole sea to the local scale. It is obvious that in a large area several uses exist, with the potential to coexist. Human uses require activities which in turn demand energy (e.g. manpower, technology and traveling) in order to generate an income. For example fisheries is an activity that leads to consumption of the caught fish (the product), which in turn leads to an income for fishermen. Human capital assets, including boats and fishing equipment as well as the knowledge and skills of the fishermen, comprise additional stocks. Low et al. [34] argue that in the human system, human made capital (typically renewable) is the monetary stock upon which actors can draw. However marine ecosystems and their relevant space are not only used by humans. They are also used by the natural living and non-living part of the ecosystem (i.e. natural use). Each type of use (human and natural) that takes place in the marine environment: (1) has spatial and temporal dimensions; (2) may overlap with other types of use (conflict dimension); and (3) has an economic dimension, namely is linked to costs, benefits and externalities (positive or negative). These can serve as criteria when spatial decisions must be taken, e.g. in cases where one or more of these uses must be evaluated as possible "spatial investments". In the broader sense these characteristics are fundamental to allow decision makers to evaluate alternative policy scenarios.

3.1. The spatial and temporal dimension

In the case of landscape planning, some authors argue that the spatial dimension of landscapes is the appropriate platform for the integration of different areas of knowledge and of science as well as planning [34]. The same could also apply to MSP. All sectors (private and public) use or claim part of the three dimensioned marine space, i.e. they have or intend to have a spatial reference at different spatial scales. Next to these sectors also the MPA asset of NC has or should have a spatial reference. Spatial referencing of the agreed targets for all the marine uses, including those for NC, and of the actions necessary to deliver these targets, is facilitated through zoning activities into use-priority areas. In Europe, for example, the EC Habitats Directive [35] and EC Birds Directive [36] promote the explicit spatial character of NC, both at land and sea.

Except for the spatial dimension, as with all other uses, NC has a temporal dimension. For example, conservation zones can be designated as a permanent or temporal arrangement. Temporary marine protected areas change over time and area. This feature coincides with the temporal/spatial scales at which ecological systems operate [37].

3.2. The conflict dimension

Depending on how marine uses are spatially allocated and managed, conflicts between them inevitably arise. Conservation can be applied not only to areas whose naturalness has been maintained to a high level, e.g. where there is no human intervention, but also to areas already used by humans, where there is the need to control the rate of degradation that results from this intervention. This study is referred to the latter case since there are few or no marine areas that are not affected by human activities [38]. Nevertheless, in both cases competition might evolve when the area has a potential to be used for more than one activity and hence there is a need to decide which is the best use for this particular area. All the uses of the sea are represented by their relevant sectors and each sector is responsible for

managing its relevant use. Some of these sectors are more willing to cooperate between each other or have best potential to coexist than others. There is not a single approach when it comes to zoning of uses. Some believe that coexistence is preferable than single use per zone. Others believe that each zone should be occupied by a single use. None of the above zoning approaches can ensure success, unless there is a strategy for achieving an overall goal of a broader area that includes all these uses and zones which recognizes the need for space for the natural living and non living users as mentioned before. NC at sea might be the only spatial use, that can coexist with others without necessarily leading to conflicts. This is possible through the establishment of multiple-use MPAs, with a core area ringed by different degrees of protection thus buffer zones and transition zones [40].

3.3. The economic dimension

Like the rest of the marine uses, NC is linked to costs, benefits and externalities. The use of an area for conservation, instead of other uses corresponds to the production of costs and benefits. To conserve means opportunity costs for humans by not using the area for other activities. Opportunity costs are foregone revenues, e.g., the value to fisheries and other marine uses [39]. The costs of conserving reduce human utility in the short term, but in the long term to conserve means profit production, for both ecosystems and human needs. This profit automatically gives a corresponding value to the conserved area, which can be translated to a price. NC is also connected with positive externalities as the benefits which it produces or ensures are used by humans and others without these users to bare any costs.

However caution must be exercised when dealing with the valuation of the benefits produced from conservation. Some of them can be translated into monetary terms, others cannot. At the end the total benefit produced has to be strong enough in order NC as an option to be competitive. It is noted in MEA 2003 [27], if the aggregate utility of the services provided by an ecosystem (as measured by its utilitarian value) outweighs the value of converting it to another use, its intrinsic value may then be complementary and provide an additional impetus for conserving the ecosystem. If, however, economic valuation indicates that the value of converting the ecosystem outweighs the aggregate value of its services, its ascribed intrinsic value may be deemed great enough to warrant a social decision to conserve it anyway.

4. NC as a human use of the marine environment?

Although in the past, planning legislations have tended to make only incidental reference to conservation and environmental matters and conservation as a use in its own right was not well recognized in plans [41], nowadays it is increasingly the main driver for large-scale sea use/MSP initiatives [42].

NC at sea when applied in the form of MPAs also has the abovementioned three characteristics. In most of the MSP initiatives NC is perceived as one of the different marine uses or interests. The advantage of being perceived as one of the possible uses of a certain area is that it can be compared and evaluated as one of them, on the basis of the abovementioned common characteristics. A comprehensive reasoning about why NC should be considered a use is given in the Practitioner's Toolkit for Marine Conservation Agreements [43] which provides information for local, national, and international organizations regarding a promising strategy to protect ocean and coastal biodiversity from degradation and depletion. In its context, a number of "Myths" about the management of ocean and coastal environments are described and disproved. In one of them, Myth 4, it is believed that conservation is an unproductive use of ocean and coastal lands and resources. One of the arguments that is provided to the contrary is that although productive uses of ocean and coastal areas often means there are requirements to harvest, cultivate, or extract resources, to take resources to the market, or to create direct financial returns. More recently, these traditional concepts of productive uses have been challenged and examined to allow for broader interpretations that include conservation and provision of ecosystem services. In sum, specific laws, regulations, and policies that address activities in the marine environment must be carefully assessed to determine "real" versus "perceived use" requirements. For example, aquaculture laws frequently require cultivation of shellfish, but upon reading the definitions of cultivation, also restoration and protection activities (without subsequent harvest) may easily qualify.

In "MSP: A Step-by-Step Approach toward Ecosystem-Based Management" [1], MSP is presented as a way to achieve multiple goals and objectives, including sustainable economic development and biodiversity conservation. Here it is shown that NC is one of the objectives of the marine spatial plan. There are cases where NC is the most important driver for the establishment of a marine spatial plan, and thus not only one of the objectives but the overall goal of relevant areas' management. According to the literature a number of marine spatial plans that have been developed, primarily relate to the establishment of marine protected areas and marine reserves. They therefore tend to place conservation objectives above use related objectives and seek to place additional controls on existing human activities to support achievement of the conservation goals [44]. One example where NC serves as the overall objective for the whole area is "The Natural Sea" described as one of the proposed scenarios by the project GAUFRE [45]. There are other examples such as the Great Australian Bight Marine Park plan, the Great Barrier Reef Marine Park Zoning Plan, the Trilateral Wadden Sea Plan and the Florida Keys National Marine Sanctuary plan. NC can also be seen as one of the objectives of other marine users. This might be part of their economic development strategies or just part of their obligations to the restrictions imposed from local or national nature protection strategies. An example of this aspect of conservation is when fishermen must comply with measures like rejection of undersized fish when captured alive, restriction of the amount of specific fishing effort and discouraging of destructive fishing methods. Another example is the speed reduction of ships in order to prevent mortal impacts of whale collision. In these examples conservation is not explicitly allocated in a certain zone, and thus does not necessarily need to be considered as one of the marine uses.

5. How to strategically position NC within the marine spatial planning process?

Taking account of the previous analysis, NC at sea may be considered as having three main dimensions (i.e. spatio-temporal, conflict and economic dimension) which make it behave as a marine use. However, other features clearly distinguish marine NC from other (more classic) uses and thus highlight the need for a special treatment in the MSP process:

(1) NC is applied as a need to control negative impacts onto the natural marine environment of already existing traditional uses, e.g. fishing and shipping, and thus as a protective measure against sectoral threats.
(2) It does not put press on the marine ecosystems. On the contrary it promotes resilience.
(3) The types of benefits derived from NC are more diverse than those from other human uses. They are the benefits derived

from the utilitarian value of ecosystems (use and non-use values), but also the benefits from the non-utilitarian value of ecosystems (intrinsic value) [27].

(4) NC ensures and promotes the production of public goods and services, which in turn support economic activities and the production of economic benefits. In fact, NC as an "investment" produces public goods and services and supports other forms of marine usage.
(5) Even if competition for space between private and public use exists, the benefits produced from NC are reaped by both user types.
(6) Its implementation does not necessarily exclude other uses. Thus the possibility of coexistence with other uses is more tangible. As such, NC could be considered one of the strategic local, national or individual objectives, instead of a use that inevitably demands space.
(7) Even when NC would be a spatially referenced use of the marine ecosystems, it would still contribute to the avoidance of conflicts, when it takes the form of a multi-objective MPA.

An unambiguous positioning of NC is hence difficult since NC can be a spatial use, which has a positive contribution to the health of the marine ecosystems. However, at the same time it is also a vehicle to achieve a good environmental status of the seas and helps fulfilling the requirements of environmental sustainability, without necessarily occupying space. On the other hand, other (more classic) anthropogenic uses usually have negative effects on the marine ecosystem (or at least alter the natural ecosystem) and serve as a vehicle for economic development and thus contribute to the economic sustainability. All types of uses hence contribute to sustainability. It would however be dangerous to only highlight the use aspect of NC as this would increase the risk of conflict. Therefore an additional step must be taken that the engagement of NC should be a prerequisite for the success of economic development strategies. This way sustainability is ensured and secured in a more integrated manner. All interpretations of NC can and should hence be applied together without one excluding the other.

Consequently, NC demands a special treatment in order to take a strong position in the MSP process. Due to the fact that the different sectors use the marine environment with an antagonistic behavior and that most of the local or national decisions are economic profit driven, NC needs to be able to participate in different parts of the decision-making process and requires to have the flexibility to play different roles. Although the possibility to promote competition or cooperation among uses is a matter of policy making, the choice between these two directions can be influenced by the way NC will be handled by people who represent the NC domain. It is hence a major challenge to find the best strategy for integrating NC in economic development. Therefore the coordination of this integration should be an explicit part of the MSP process.

Some examples of MSP initiatives, demonstrating the need for an appropriate integration of NC into MSP, were presented earlier in the introduction. However none of these examples provides us with details on how to actually integrate NC within the MSP process, ensuring full transparency of NC within the process and acknowledging the special position of NC. Here it is an attempt to schematically present a conceptual and generic MSP framework, capable of fully integrating (the special position of) NC, as a key issue in and/or step towards achieving sustainability (Fig. 1).

This conceptual scheme is divided into five interrelated levels. The first level represents the domains that participate in planning, i.e. the social, the economic and the ecological domain. These domains correspond to the three pillars of sustainability, which need to be balanced as visualized by the interaction arrows of the same length, symbolizing equality between them. The second level shows the extra prerequisites or the extra effort expected from each domain to enhance and ensure an appropriate level of NC. The social domain should give extra effort to the understanding of the benefits gained from NC to the public at large. For the economic domain this extra effort is translated into investments in NC. Finally, the ecological domain should ensure extra effort for or "consciousness of" the demand of space. The fulfillment of these prerequisites and the simultaneous positive impact of previous steps lead to the third level, symbolizing the enhancement of NC. Within this concept, NC is at the center, i.e. in the middle of the five leveled scheme. By going through this level we end up at the top of the scheme, symbolizing the achievement of the overall goal (sustainability) not only of the process presented and described here, but also of the respective marine spatial plan. Finally, there is the five level namely the arrows connecting the goal achievement with the three domains of sustainability. This level symbolizes the completion of the process, but simultaneously also its feedback because achieving sustainability also means that each domain is in a position to maintain the second level efforts and thus to continuously support the process. The following advantages of the concept justify its application during plan making processes:

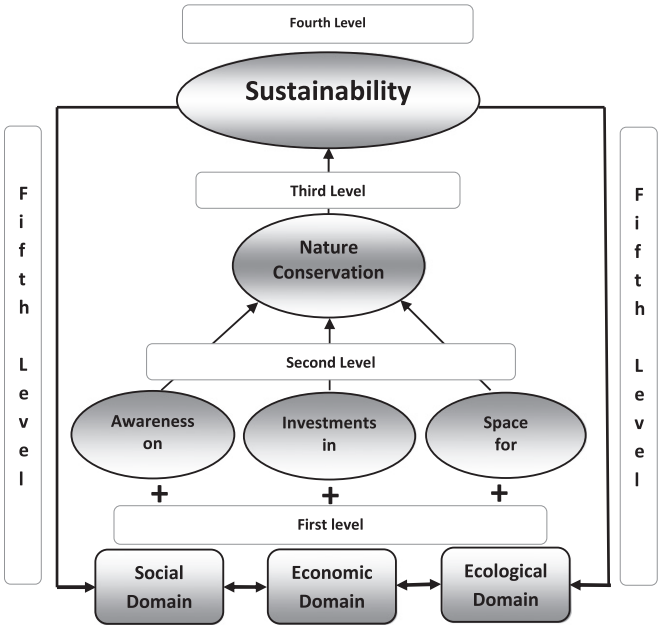

Fig. 1. Schematic presentation of a generic MSP process, capable of fully integrating the special position of NC.

- The concept is a mental guide that should be followed during the plan making stage of MSP and especially during the steps where the goals are set for each domain of sustainability.
- The concept focuses separately on sea use sectors/activities through sector based zoning, with NC being one of them.
- It ensures the integrative and cross-sectoral perspective of the plan making process.
- It considers NC as one of each sector's targets, while
- acknowledging NC as the core of marine management and
- supporting the achievement of sustainability.

The process proposed is a guide for plan makers. It is compatible not only with the broader plan making process followed usually for MSP, but also precisely with the ecosystem approach to management, the later linked to some critical elements which include: the consideration of multiple sectors;

consideration of crossscale interactions; integrated priorities, plans, and actions; ecosystem health indicators; and linkages between the ecosystem and society. Additionally an ecosystem based plan ideally contains elements of longterm sustainability, ecosystem health and resilience, recognition of ecosystem services, and human wellbeing [46]. Here the participation of sectors in decision-making and implementation of the plan plays a key role. Kenchington has noted that cross-sectoral management generally becomes necessary as the intensity and range of uses increase [42]. In addition, multiple-use management requires a decision-making framework that meaningfully includes and considers all sectoral and community interests, where management objectives and decision-making processes are not dominated or determined by particular sectors or interest groups [47]. In a sector-by-sector approach, every proposed MPA becomes a battleground in which conservation interests appear to be pitted against other users. Integrated MSP instead puts conservation interests at the table with others as equal (or sometimes dominant) players [48]. Thus the challenge is to detect, visualize and manage the interactions between sectors and their relevant interests found in the form of claims for marine space, and conclude on the position for nature conservation not only in a theoretical but also in empirical analysis. It is fair to say that further research on analyzing this scheme and its components is required, particularly in a learning-by-doing context.

A similar approach is needed in terms of governance structures. Problems arise from fragmentation in the governance systems which is used to manage specific human uses of marine resources, together with spatial and temporal mismatches between biophysical systems and the rights, rules, and decision-making procedures created to manage human interactions with these systems [46]. By focusing on the integrated management of spatial areas rather than "a-spatial" regulation of particular activities, MSP requires a reconfiguration of management institutions [49]. An "Integrated Agency" is a good option to delegate administrative responsibility for all zones in a region, or to designate the government's jurisdictional waters to one agency [27].

6. Conclusions

Literature review shows that there is no single interpretation of NC. On the contrary a variety of definition exist from perceiving it as the overall MSP objective, to understanding it as the one of the potential uses of marine space along with other human uses. This fact is further complicated by the historical context, in which there is a clear evolution of NC from species protection to the protection of whole ecosystems, where humans are part of and interact with each other, underpinning our hypothesis that there is currently no common approach of handling NC within a MSP process.

The spatial, economic and conflict resolution dimensions of NC contribute to the conclusion that NC is – and should be handled as – one of the rest of the marine uses. This assumption gives the advantage to NC to be considered as one of the players participating in spatial decision-making and zoning of activities at sea. However this characteristic of NC is not enough. On the other hand there is the aspect that NC is often perceived as the overall objective of marine spatial plans. Again however this approach sometimes questions the balance among the rest of the marine uses/interests/sectors and thus questions the achievement of sustainability. Somewhere in between there is a third view – supported also from the present study – where NC should be treated as a means to achieve good environmental status of the ecosystem. Therefore encompassing all possible dimensions and behaviors that are linked to NC at sea, the latter should be put at the center of the MSP process, acting simultaneously as a sectoral interest and also as a multi-sectoral objective. A conceptual scheme developed here, gives a clear description of the essential position of NC when it comes to achieving sustainability as an overall objective of MSP. The scheme referring to a five level sequential process, assists during the plan making process when the need for transectoral integration is already inevitable.

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