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## From identification of compatibilities and conflicts to reaching marine spatial allocation agreements. Review of actions required and relevant tools and processes

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### A B S T R A C T

Conflicts related to the use of marine space may emerge both at the spatial and the decision making level, prior to and/or after the adoption of a marine spatial plan. Marine conflict management is inherent in marine spatial planning (MSP) and should include three stages: a) identification of compatibilities and conflicts, b) avoidance of conflicts, and if required c) resolution of conflicts. Various decision support tools and processes tested so far that aim to address marine conflict management have proved successful in providing identification and visualization of spatial conflicts and compatibilities and their relevant trade-offs and thus in assisting in conflict avoidance efforts. However, in case conflict resolution is required, they fail to provide a final solution (e.g. allocation of space) acceptable by all parties involved. This happens because the (spatial) allocation rules that these processes adopt usually focus only on ensuring efficiency that is not enough to guarantee a (single) mutually acceptable solution. In the present paper, it is suggested that apart from ensuring efficiency, a solution should also ensure fairness, equity, transparency, sustainability and consideration of synergies that may emerge, both at the spatial and at the decision making level. In conclusion, there is no single tool or process that can satisfactorily address all conflict management stages, and thus a careful selection and combination of decision support tools and processes is required to facilitate the production of an integrated mutually acceptable marine spatial plan.

### 1. The marine conflict management sequence and its connection to the MSP steps

As the ocean is becoming more industrialized particularly because developing sectors such as aquaculture and renewable energy grow in significance, the potential for conflicts between different marine sectors is increasing over time (Ehler and Douvère, 2006). Rising conflicts between ocean users may lead to tensions that spill over to include other stakeholders and the general public (McGrath, 2004). Therefore multi-sector planning is required to optimize the use of marine space while facilitating the management of various types of conflicts that may arise. Towards this goal the concept of Marine Spatial Planning (MSP) has been developed. MSP refers to an adaptive, science-based approach that analyses current and future uses of marine and coastal areas, assesses trade-offs between these uses, and allocates space to them in a way that maximizes societal benefits (Ehler, 2008). Hence, MSP should not be restricted in defining where and what types of conflicts are occurring or might occur, but it should also be comprehensive and adaptive, and promote the resolution of such conflicts (Ehler and

Douvère, 2006). Accordingly, in the framework of MSP, marine conflict management should follow a sequence of three stages: a) Detection of compatibilities and conflicts between activities at sea as well as between stakeholders during the decision making process: This means to determine which uses and activities could or could not coexist spatially. It also means to determine what and how interests, perspectives and positions of various stakeholders affect the interdependent relationships among them that may lead either to cooperative or to non-cooperative behaviors; b) Prevention of conflict: This can happen by emphasizing and fostering the compatibilities, and minimizing and avoiding spatial conflicts, in order to prevent conflicts to escalate and; c) Resolution of conflicts: When prevention is not possible, a conflict resolution process should be followed. This process implies that an agreement can be reached to maximize joint gains.

Conflict itself should be embedded as a dimension of governance where, as part of the MSP process, the conflict landscape can be mapped and identified up front. This makes the conflicts explicit in the planning process, rather than waiting for conflicts to arise as responses to management decisions (Nurse-Bray, 2013). Hence, marine conflict

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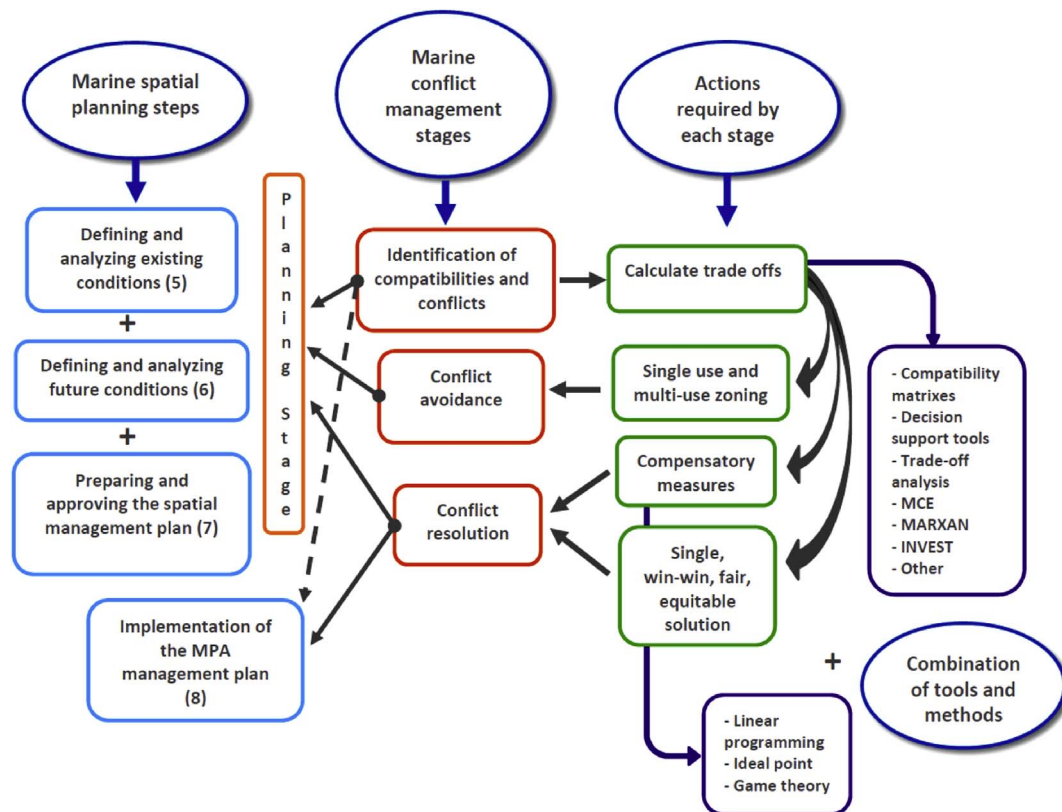


Fig. 1. Marine spatial planning steps, corresponding conflict management actions required and examples of tools and processes. Solid arrows show direct link. Dashed arrows show indirect link. Numbers in parentheses refer to MSP steps as described by Ehler and Douvère (2009).

management may be required either at the planning stage or the implementation stage of an MSP or during both (Secretariat of the Convention on Biological Diversity and the Scientific and Technical Advisory Panel GEF, 2012; ICES, 2014). According to the “MSP Guide, A step by step approach” (Ehler and Douvère, 2009) these planning stages refer to steps 5 to 7 and the implementation stage refers to step 8 of the MSP process (Fig. 1).

However, while all three stages of the marine conflict management sequence may happen at the planning stage, at the implementation stage prevention seems less possible and the need for conflict resolution seems more necessary (Harte et al., 2010).

Starting from the link between the marine conflict management sequence and the specific MSP steps as shown in Fig. 1, a number of challenging questions arise that are transformed into the following objectives of this paper: a) To define and briefly present a checklist of specific actions that are required to ensure successful conflict management; b) to review existing tools and processes developed and tested so far that contribute to conflict management and to categorize them based on which stages of the marine conflict management sequence they can address; c) to assess these tools and processes based on how many of the conflict management actions from (a) they can address and their potential to be adapted and combined with one another in order to offer an integrated manner of addressing the marine conflict management sequence.

## 2. Actions required for successful marine conflict management

### 2.1. Identification and avoidance stages

#### 2.1.1. Consideration of all of compatibilities and conflicts at both the spatial and the decision making level

One of the objectives of MSP is to make compatibilities and conflicts among human uses visible and therefore identifiable (Ehler and

Douvère, 2006). Identification and understanding of the type of compatibilities and conflicts that occur already or may occur in the future, assists to the selection of conflict avoidance or conflict resolution approaches and/or mechanisms (ICES, 2014). In various studies, a number of types of conflicts and compatibilities related to marine planning are presented. Those types are either derived from literature on conflict and peace, on natural resources management, on land use planning and management or they have been detected from the observation of specific case studies related to MSP. In the present study we categorize them according to the following types:

A) Compatibilities and conflicts among activities at sea that may result from:

1. Spatial and temporal overlap between human activities at sea (Douvère and Ehler, 2009). Spatial compatibility describes the ability of different sea uses to coexist within the same physical space without incurring a disadvantage to either. It can support for multifunctional areas as targeted forms of co-use or seasonal variations in the use of space (Kannen et al., 2010; Kannen, 2014). On the other hand spatial conflict occurs when the co-use of an area is impossible due to negative effects from one use to another.
2. Positive or negative environmental externalities (ICES, 2014; Douvère and Ehler, 2009). Externalities arise when the welfare or well-being of one individual or group is negatively (or positively) affected by the decision of another group or individual that does not explicitly take these impacts into account (Sanchez et al., 2010).
3. The ease or difficulty of access to an area by a user due to established use rights. Compatibility or conflict depends on whether a user already occupies an area and whether a user applies any property, user, management, exclusion and access rights to exclude other users from co-using that area (Eagle et al., 2008;

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