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Analysis of the Algerian maritime spatial planning framework applied to the eastern sector

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Introduction

Oceans provide vital services to people, and the planet. They not only provide jobs and food but also support economic growth, regulate the climate, and contribute to the well-being of coastal communities. At a global scale, the capacity of coastal and marine ecosystems to provide these services is increasingly hampered by the lack of preservation of natural capital and the unbalanced use of coastal and marine space (Santoro, 2014). With the unprecedented growth in ocean economy-related activities worldwide, the need for a sustainable concept where socioeconomic development can occur with minimal environmental degradation is widely recognised.

The Mediterranean Sea is the second-largest biodiversity hotspot, and one of the major climate change hotspots in the world. Indeed, climate change is already significantly altering the ability of marine fisheries to provide food, and income in the region. As a semi-enclosed sea, it is more sensitive to human impacts than more open waters and is one of the world's biomes that shows strong negative responses to land use, and climate change pressures (Newbold, 2020). By hosting 87% of the Mediterranean's well-documented forms of life, the Western part of the Mediterranean Sea basin presents the highest rates of endemism (UNEP, 2010). On the other hand, the Mediterranean is one of the most economically important seas in the world, generating an estimated annual economic value of 450 billion US dollars from ocean related activities (Randone et al., 2017).

Over recent decades Mediterranean cities have witnessed important growth due to increasing population, and socio-economic change, notably on the coasts of southern countries leading to a rapidly increasing demand for maritime, and coastal space, generally ending in spatial use conflicts. The Western Mediterranean, in particular, is under intense pressures deriving from increasing coastal urban development, and intensive human activities such as fisheries, extraction of natural resources, maritime traffic, and pollution (Plan Bleu, 2014). Following sustainability trends, this calls for knowledge-based ecosystem-based integrated management, and planning approaches.

Compared to the north shore of the western Mediterranean Sea basin, the Algerian maritime space, which occupies the largest area of the western shore, is not that overcrowded in terms of marine, and coastal activities, but it is subject to the same environmental threats. Therefore, it requires conservation measures, and a planning framework. According to (Issad, 2016) the implementation of Marine spatial planning (MSP) in Algeria is one of the main means to achieve an integrated maritime policy based on the idea that there is a link between the various objectives related to maritime activities, and uses, and environmental protection. Indeed, MSP is progressively regarded as attaining sustainable maritime use by managing, and resolving conflicts between competing uses, thus enhancing natural environment fortification. (Moore et al., 2017).

MSP is a practical tool to create, and establish a more rational use of marine resources, and spaces, improve synergies, and reduce conflicts of use in order to balance the demands of development with the need to protect the environment, and achieve social, and economic

outcomes in an open, and planned framework (COI/UNESCO, 2018). The use of MSP could thereby help achieve SDG 14 aiming to "Conserve, and sustainably use the oceans, seas, and marine resources for sustainable development", which is essential to meet human nutritional needs, and to address the challenge of food security in the future (MSPglobal, 2021).

Within this context, the present work studies the combination of MSP, and the establishment of a Marine, and Coastal Protected Area (MCPA) to meet the challenge of conserving marine biodiversity, and preserving the processes, and functions that are essential for achieving a good ecological status in the eastern coast of Algeria with a focus on the Edough Mounts planned MCPA in Annaba, according to the following hypotheses:

A- Algerian waters are subject to regulatory maritime spatial planning.
B- MSP in Algeria is driven by activities, strategies, and sectorial plans.

The aim of this graduation project is therefore to perform a diagnosis on Algerian MSP, to analyse the framework of MSP in the eastern sector of the country, and to explore the links, and relationships between MSP, and the Edough Mounts future MCPA, so as to optimise the effectiveness of marine protected areas in the context of sustainable development. The ultimate objective is to reduce current and potential conflicts over marine resources, which are becoming more, and more coveted for the goods, and services they provide. To this end, this work is structured in 7 chapters:

- Elements and concepts related to MSP
- Methodological approach and study area
- State of the art on MSP
- Actor mapping
- Algerian MSP diagnosis
- Mapping the eastern maritime space in Algeria
- Conclusion and perspectives.

Chapter 01: Elements and concepts related to MSP

The integrated nature of MSP implies that it is connected to many other concepts. This chapter aims to define, and clarify the main elements, and concepts that are related to MSP based on multiple up-to-date literature. However, it is mostly inspired from the latest international guide on marine/maritime spatial planning developed in 2021 by MSPglobal[1].

1. Planning

Planning is the process of envisioning, and organising the activities required to achieve a desired goal. In this work, we mention:

- Spatial planning: a key instrument for establishing long-term, sustainable frameworks for social, territorial, and economic development both within, and between countries.
- Strategic planning: planning by organisations or sectors aimed at improving the long-term effectiveness of operations.
- Operational planning: a method that turns strategic plans into detailed maps broken up into various components.

2. Maritime space

2.1. Maritime boundaries

Maritime space is subject to regulations, and laws at different levels. Maritime boundaries are the legal definitions of waters under national, and international law. Coastal states' ability to exercise control over a strip of sea adjacent to their territory has always been recognised as a right. However, the nature, and extent of this right was not codified (Van Lauwe et al., 2016).

Maritime areas under the sovereignty or jurisdiction of coastal States are governed the "Law of the Sea", which includes all the rules relating to the delimitation, and use of maritime areas. This right is based on the United Nations Convention on the Law of the Sea (UNCLOS), signed on 10 December 1982 in Montego Bay, Jamaica, which, in order to structure, and rationalise the maritime space, defines the various maritime zones bordering the coastal States, islands, and archipelago states. UNCLOS stipulates the general jurisdictional arrangements concerning the right of governance, and regulation of sea areas, and specifies the different categories of spaces over which states can assert their sovereignty or jurisdiction (figure 1), including:

1. Spaces of sovereignty:
- Inland waters
- Territorial Sea (12NM)
2. Spaces under international jurisdiction:
- Contiguous area (24NM)
- Exclusive Economic Zone (200NM)
- High Seas
- Continental Shelf

[1] UNESCO-IOC/European Commission. 2021. *MSPglobal International Guide on Marine/Maritime Spatial Planning*. Paris, UNESCO. (IOC Manuals, and Guides no 89)

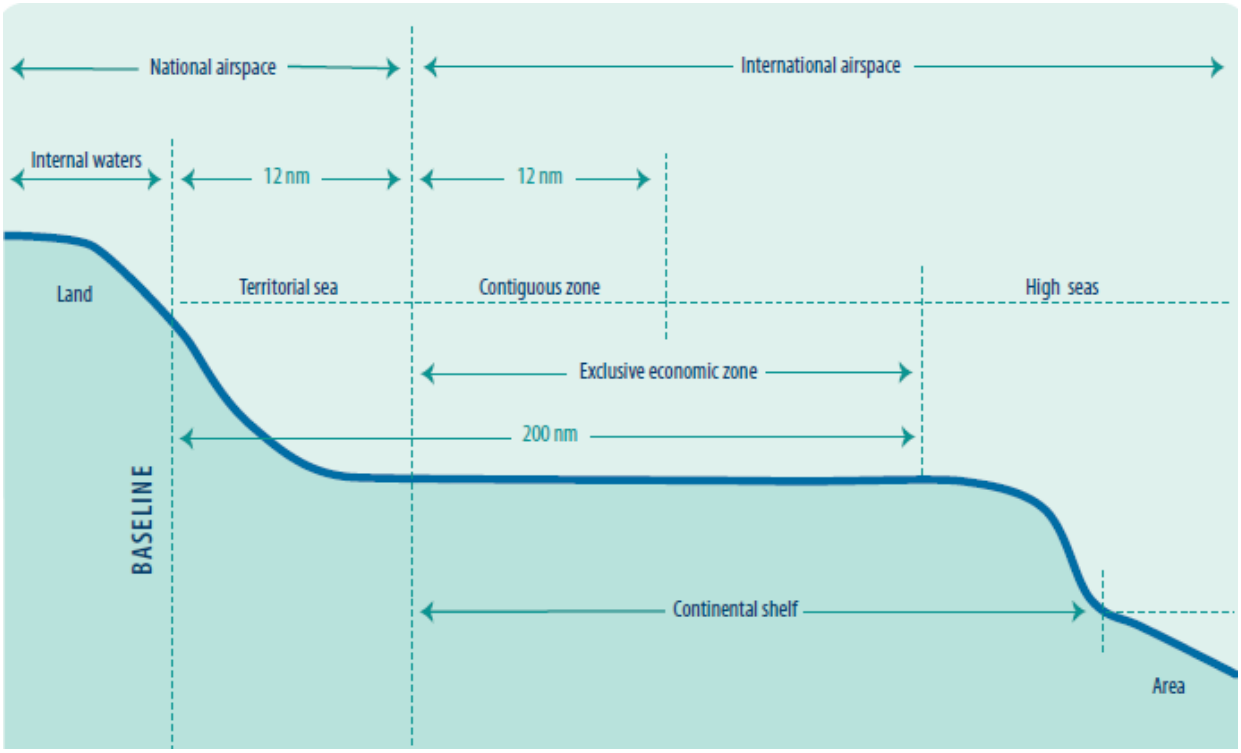


Figure 1 : Legal boundaries of maritime space according to the UNCLOS (MSP global, 2021)

2.2. Use of the maritime space

Since maritime space belongs to everyone, and therefore to no one, it is shared by its users in all its dimensions, counting: the surface, the bottom (ground), and the subsoil (underground) of the sea, the water column, and even the airspace. In addition to these three dimensions, there is also a fourth dimension: time, since the use of this space can be punctual, regular, temporary, or permanent from one activity to another as shown in figure 2.

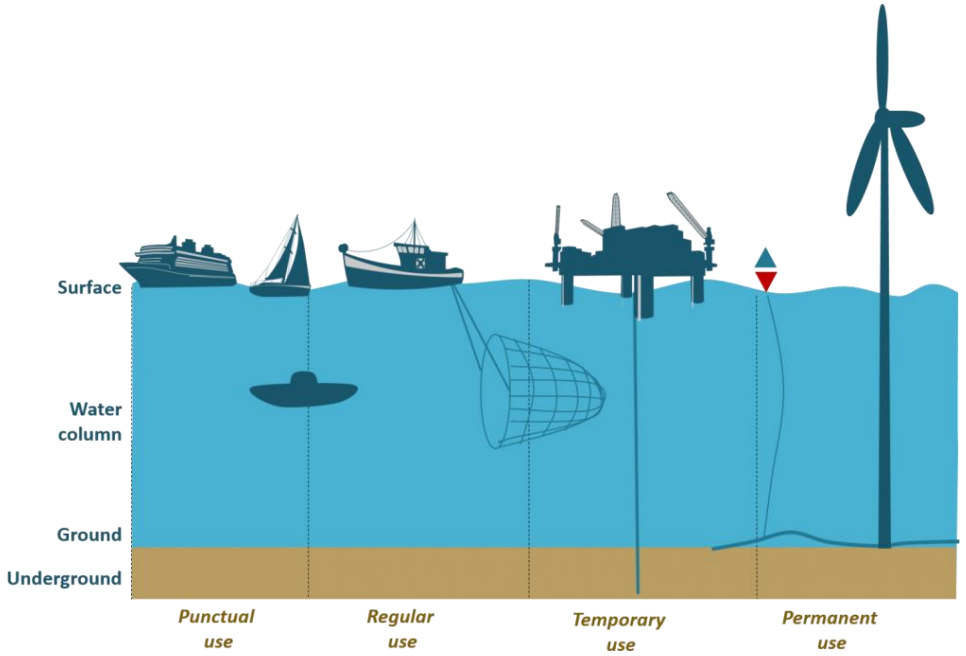


Figure 2:Dimentions of the maritime space (Stratégies Mer et Littorales)

2.2.1. Maritime sectors and activities:

Maritime and coastal spaces are shared by multiple sectors, and activities. "Multi-use" refers to the intentional joint use of the same maritime space and/or of resources in close geographic proximity by either a single user or multiple users. Indeed, the term covers different situations in which maritime uses are (or may be) combined in at least one of the temporal, and spatial dimensions explained earlier. The following table presents the different types of established and emerging maritime uses:

Table 1 : Types, and examples of maritime space uses (MSP global, 2021)

Uses	Mobile	Fixed	Others
Established	- *Coastal, and maritime tourism, and recreation* - *Fisheries* - *Shipping*	- *Coastal aquaculture* - *Marine Protected Areas (MPAs)* - *Oil, and gas* - *Pipelines, and cables* - *Ports* - *Sand, and gravel mining*	- *Coastal communities* - *Military defence, and security* - *Maritime, and underwater cultural heritage* - *Scientific research*
Emerging	- *Dynamic marine protected areas (DMPAs)*	- *Carbon sequestration through carbon capture storage* - *Deep sea mining* - *Desalination plants* - *Offshore aquaculture* - *Offshore renewable energy (wind, tidal, solar, and wave energy)*	- *Marine bioprospecting*

2.2.2. Conflicts of use

When considering spatial compatibilities, it is important to differentiate between the sectors per se (such as offshore wind), and their activities in maritime space (such as constructing and operating an offshore wind farm). Spatially speaking, it is the activities that come into conflict with each other, although the conflicts themselves are often described as sectoral conflicts.

According to recent studies, most maritime sectors are forecast to grow, which places increasing pressure on the maritime, and coastal space. While all sectors look for ideal locations for their activities, some are more constrained in their choices than others. Sectors also differ with respect to their political, and socio-economic importance, with nearshore conflicts often involving local communities, and different stakeholders than offshore conflicts.

Spatial conflicts arise from direct competition over limited space (two sectors interested in the same location or one sector negatively impacting on the other, which may or may not be in the same location).

The spatial conflict potential of sectors can vary significantly, depending on the activities involved, and which sector or activity is at the receiving end. The impacts of sectors on each other are not symmetrical: One may significantly affect the other but not vice versa; the issues may be different for the two sides (e.g., safety issues for one, access issues for the other), and the impacts may be considered more or less severe.

This means there are different levels of risk, and urgencies associated with conflicting issues (e.g. one sector requiring immediate action). Suitable means must then be found to successfully address each conflicting issue. These will also depend on the spatial scale of the conflict (local, regional, national, or international) (EU, 2019).

3. Maritime spatial planning

Mostly called marine spatial planning, there are other designations to define the process, such as: "maritime spatial planning"; "Ocean planning", "maritime planning", "marine spatial management (Ehler & Douvere, 2009), "Marine function zoning" (in China) …. etc.

3.1. Definitions

The fact that there is no internationally agreed definition of MSP, reflects the different contexts under which it could be developed, the scope it can take, and the diverse ranging of purposes it can be used for. The table below compiles a non-exhaustive list of MSP definitions:

Table 2 : Definitions of Maritime Spatial Plannning.

Organisme	MSP definition
United Kingdom Department for Environment, Food, and Rural Affairs, (2008).	*A practical way to create, and establish a more rational organization of the use of marine space, and the interactions between its uses, to balance demands for development with the need to protect marine ecosystems, and to achieve social, and economic objectives in an open, and planned way.* *A strategic, forward-looking, planning tool for regulating, managing, and protecting the marine environment including through the allocation of space, that addresses the multiple, cumulative, and potentially conflicting uses of the sea.*
The Intergovernmental Oceanographic Commission (IOC) of UNESCO (2009)	*A public process of analysing, and allocating the spatial, and temporal distribution of human activities in marine areas to achieve ecological, economic, and social objectives that have been specified through a political process.*
The National Ocean Council of the United States of America (2013)	*Marine planning is a science-, and information-based tool that can help advance local, and regional interests, such as management challenges associated with the multiple uses of the ocean, economic, and energy development priorities, and conservation objectives.*
The European Union (EU) Directive 2014/89/EU establishing a framework for MSP (EULEX, 2014)	*A process by which the relevant Member State's authorities analyse, and organise human activities in marine areas to achieve ecological, economic, and social objectives. Through their maritime spatial plans, Member States shall aim to contribute to the sustainable development of energy sectors at sea, of maritime transport, and of the fisheries, and aquaculture sectors, and to the preservation, protection, and improvement of the environment, including resilience to climate change impacts. In addition, Member States may pursue other objectives such as the promotion of sustainable tourism, and the sustainable extraction of raw materials.*
UNEP/Convention on Biological Diversity (CBD, 2O12)	*An area-based management framework that provides a means for improving decision-making as it relates to the use of marine resources, and space.*
National Framework on Marine Spatial Planning in South Africa ***Ministry of environmental affairs, 2017***	*The governance process of collaboratively assessing, and managing the spatial, and temporal distribution of human activities to achieve economic, social, and ecological objectives.*

Note:

As an area-based management framework, MSP can often be mistaken as a mapping exercise as it does use maps to create a more comprehensive picture of a marine area, identifying where, and how an ocean area is being used, what natural resources, and habitats exist, and how these resources could be used in the future avoiding conflicts among users. All MSP exercises rely on spatial (area-based) management processes that can vary in scale, but also on social context. Social context could include cultural, and other intrinsic value that are time invariant. MSP also accounts for temporal trends, conducting retrospective analysis, and utilizing forecasting methods, and fully taking into account seasonal, annual, and longer time trends, such as oceanographic phenomena. (LME, 2020).

3.2. Benefits of MSP

As often a public and political process, MSP can be seen as an important tool to provide transparency to a complicated decision-making process, using spatial, and temporal data to balance trade-offs, and back important policy decisions. Much more than a series of maps, the intended result of MSP is a holistic, well-coordinated, and sustainable approach towards the effective use of marine areas, ensuring that marine resources, and services are utilized within clear environmental limits that prioritize marine ecosystem health.
MSP should be seen as a planning framework to bring together the multitude of information, views, and needs, with dynamic spatial planning requirements, for a sustainably consumption of goods, and services from the marine environment indefinitely (LME, 2020).

As a practical management instrument to rationalise the use of marine, and coastal space, and resources, MSP can have significant economic, social, administrative, and environmental benefits. The following table identifies some of the most important benefits of marine spatial planning:

Table 3 :Examples of benefits of marine spatial planning (Ehler & Douvere 2009)

Economic	Environmental	Social	Administrative
- *Increased certainty of access to desirable areas for new private sector investments, where infrastructure is frequently amortized over 20-30 years* - *Identification, and early resolution of conflicts among incompatible uses through planning instead of litigation* - *Streamlined, and more transparent permit, and licensing procedures* - *Improved capacity to plan for new, and changing human activities, including emerging technologies, and their associated effects*	- *Identification of ecologically, and biologically significant areas as a basis for space allocation* - *Establish context for planning a network of marine protected areas* - *Identification, and reduction of the cumulative effects of human activities on marine ecosystems*	- *Improved opportunities for local community, and citizen participation in planning* - *Identification of effects of decisions on the allocation of ocean space (e.g., closure areas for certain uses, protected areas) on communities* - *Identification, and preservation of social, cultural, and spiritual values related to use of ocean space*	- *Improve speed, quality, accountability, and transparency of decision making, and reduction of regulatory costs* - *Improve consistency, and compatibility of regulatory decisions* - *Improve information collection, storage, and retrieval, access, and sharing*

3.3. MSP Steps

While there is no single model for MSP, there is a common planning process that involves establishing a vision, setting goals, and determining measurable objectives, from which allocation of space, and resources within that space can flow, as well as the area-specific management needed to sustain the ecosystems that stakeholders collectively value (UNEP/CBD). Ehler, and Douvere, (2009) define the main steps involved in the development, and implementation of an MSP as follows:

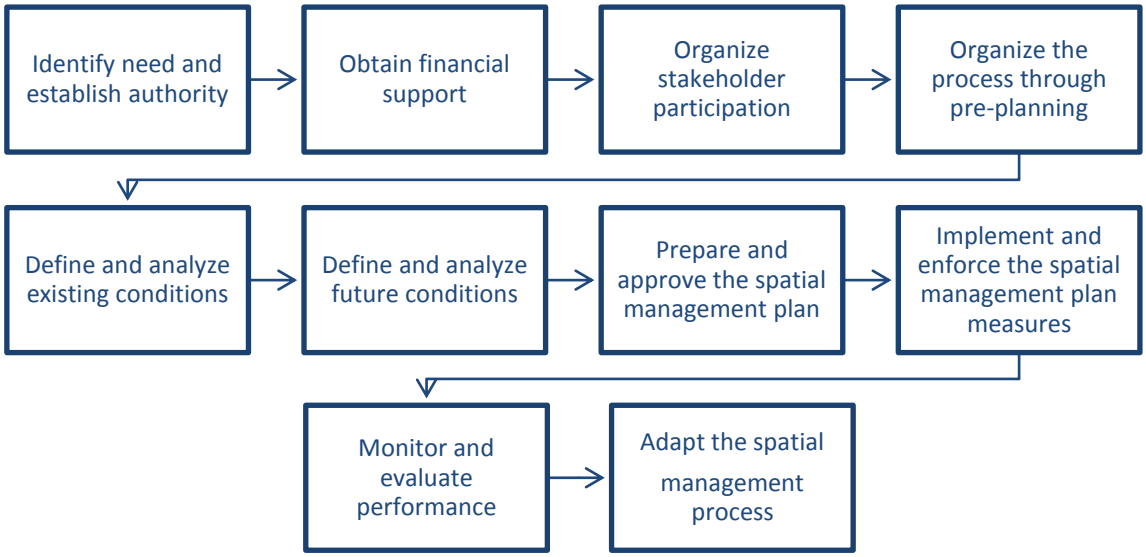


Figure 3:Main steps of MSP.

3.4. Characteristics of an effective MSP

According to Ehler, and Douvere (2009), an effective MSP should have the following characteristics, and be:

- Ecosystem-based, balancing ecological, economic, and social goals, and objectives toward sustainable development
- Integrated, across sectors, and agencies, and among levels of government
- Place-based or area-based
- Adaptive, capable of learning from experience
- Strategic, and anticipatory, focused on the long-term
- Participatory, stakeholders actively involved in the process

3.5. MSP-type measures

A spatial management measure is a means of producing desired goods, and services from a marine area. It specifies how, where, and when human activities should occur. The table below provides a non-exhaustive list of how MSP measures influence the spatial distribution of human activities in different sectors.

Table 4 : Examples of MSP- type measures by sector (Ehler 2009)

Sector	Management measures
Marine transportation	*Mandatory vessel traffic routes*
	Ship routes/ fairways
	Vessel traffic separation schemes
	Areas to be avoided (by vessels)
	Precautionary or prohibited areas
	Lightering areas
	Moving safety (buffer) & security zones around tankers
	Pilot boarding areas
	Safety zones around oil spill response operations
Ports	*Safety zones around vessels, and terminals*
	Anchoring, and no-anchoring grounds or areas
	Security zones in ports, and waterways
	Offshore port zones for oil transfers
Fishing	*Fishery closure areas, including seasonal closures*
	No trawl areas
	Critical habitat designations
	Artificial reef areas
Offshore aquaculture	*Offshore areas designated for aquaculture*
Oil & Gas	*Oil & Gas lease or concession areas*
	Safety zones around offshore installations
	Areas withdrawn from leasing
Renewable energy	*Wind farms, wave parks, & tidal energy lease or concession areas*
	Safety zones around wind farms, wave parks, and tidal facilities
Pipelines & cables	*Pipeline rights-of-way or areas*
	Communication cable rights-of-way
	Energy transmission cable rights-of-way
	Cable lines (not always in rights-of-way)
Sewage	*Sewer lines, and diffusers*
Dredging	*Dredging sites or areas*
	Dredged material disposal areas or sites (active & inactive)
Sand & gravel mining	*Sand, and gravel (aggregate) extraction areas*
Military	*Military operations of exercise/training areas ("hot zones")*
	Danger, restricted, or security areas
	Submarine operating areas
	Sonar operating zones
	Security, and safety around naval ships
Recreation	*Wildlife viewing areas*
	Personal watercraft areas
Marine protected areas	*Marine nature reserves or ecological reserves (no take, no access, no impact zones)*
	Marine wilderness areas
	Marine parks
	Habitats/species management areas
Nature conservation	*Coral reefs*
	Wetlands
	Marine mammal breeding routes
Research	*Scientific reference sites*
History, and culture	*Protected archaeological areas e.g., shipwrecks* *Submerged archaeological sites*

3.6. Scales of MSP

Whether the approach is ecological, socio-economic or governmental, there are important factors to consider in the definition of 'scale' in general (table 5).

The definition of an MSP scale is critical as it shapes the rest of the process. It is an aspect that directly influences or even predetermines the subprocesses, activities, and features of the MSP process, such as data collection. To consider all these implications, we could define a scale at a jurisdictional (International, national, provincial, local), ecological or socio-economic level of the MSP process, and its components, in space, and time.

The *geographical* scale of an MSP plan is generally determined by the scope of action i.e., the management regimes that flow from MSP initiatives, such as coastal management, and zonings. Thus, the cartographic documents of a plan of national scale will have variable sub-scales, adapted to the territory.

Table 5 : Different factors related to planning geographical scales (Suarez de Vivero 2001, MSPglobal, 2021)

Denomination	Description	Political instruments	Maritime jurisdiction	Morphology	Ecosystems
International scale	*Geographical scope of treaties*	*International treaties*	*EEZ / High seas*	*Ocean /Sea basins (sub-global)*	*Large marine ecosystems*
International-regional scale (Macro-region)	*Specific geographical areas subscribed to regional maritime management conventions*	*Regional Convention (UNEP / Regional Seas)*	*EEZ / High seas*	*Ocean / Sea basins*	*Ecoregions*
National scale (Meso-region)	*State's juris-dictional waters as a whole*	*State*	*EEZ* *Territorial sea* *Internal waters*	*Ocean / Sea sub-basin*	*Bio-geographical regions*
National-regional scale	*Marine subdivisions established for State's jurisdictional waters as a whole*	*Federation States / Autonomous regions*	*Territorial sea* *Internal waters*	*Gulfs, estuaries, bays, inlets*	*Continental shelf, and slope* *Seamounts* *Submarine canyons* *Marine phanerogam prairies*
Subregional scale	*Marine subregions, and subzones established in each of the national-regional scale subdivisions*	*Provinces* *Municipalities* *Counties*	*Territorial sea* *Internal waters*	*Gulfs, estuaries, bays, inlets*	*Continental shelf, and slope* *Seamounts* *Submarine canyons* *Marine phanerogam prairies*
Local scale	*Special marine planning areas, and* *scope of port spaces*	*Municipalities* *Port authorities*	-------	--------	-------

4. The complex relationship between MSP and MCPAs

As an area-based management tool, a marine, and coastal protected area is a 'clearly defined geographical space, recognized, dedicated, and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services, and cultural values' (IUCN 2019) Likewise, in the Algerian law (Act 11-02), an MPA is a geographically delimited portion of land, sea, river and/or lagoon that is defined, regulated, and managed for the protection, and maintenance of the natural, and cultural heritage, as one of the following categories:

- National park
- Natural park
- Integral natural reserve
- Natural reserve
- Management reserve for habitats, and species
- Natural site
- Biological corridor

Marine and coastal protected areas are managed to achieve specific (long-term biodiversity) conservation, and sustainable use objectives, and afford higher protection than the surrounding areas ranging from small, local, and community-based networks to national networks to regional multistate initiatives.

If managed in isolation, coastal, and marine protected areas are vulnerable to the impacts of resource development, and exploitation occurring outside these areas, particularly overfishing, alteration, and destruction of habitats, climate change, and marine pollution. Thus, protecting coastal and marine areas, including species, habitats, landscapes, and seascapes should be integrated into spatial development strategies (Winther et al., 2020). Furthermore, stressing the need for MSP in MCPAs, Ehler and Douvre (2009) state that the future of marine biodiversity, associated ecosystem service benefits, and of MCPAs, is heavily dependent on the management of human activities in their surrounding environment. Indeed, even an effectively managed network of MCPAs will have limited effect on marine resources without help from MSP.

The wide variety of MSP approaches suggests that there is no single way to do MSP effectively, and that biodiversity conservation is not necessarily a major goal of MSP, nor is it always a consequence of its implementation. Nonetheless, there are elements of successful MSP that contribute to positive conservation and development outcomes (UNEP/CBD 2012). Such positive biodiversity outcomes occur through MSP when interconnected ecosystems are treated systematically, and all impacting uses/pressures are addressed, as warranted by the problems that management must consider (Agardy et al. 2011).

Basically, the combination of MSP and MCPAs is a win-win situation. For example, MSP could enhance the performance of a marine protected area network through zoning synergistic marine-use areas close to MPAs or buffer zones around vulnerable ones. It could provide a broader perspective on the way in which MPAs are nested within a marine spatial plan, and increase ecological representativeness through protection of important areas, including those not selected as sites for MPAs, where conservation measures could be proposed, and implemented. Also,

marine protected areas are considered as effective means, and pilot sites for MSP with real experience on improved marine planning, and governance, zoning, sustainable small-scale fisheries, stakeholder participation, and long-term research, and monitoring (COP meeting, 2021).

5. Concepts related to MSP

Most MSP approaches that address goals, such as marine and coastal biodiversity conservation (following the Aichi Biodiversity Target of the CBD), need to consider additional themes like blue economy, climate change, and sustainable development goals (SDGs) of the United Nations 2030 Agenda.

5.1. MSP and Sustainable development goals

Sustainable development is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs. The United Nations 2030 Agenda for Sustainable Development, and its 17 interconnected SDGs, adopted in 2015, is a global framework for international, national, and local initiatives that can be led by any group of stakeholders – but especially through partnerships – towards a more sustainable, and just world. Moreover, it is a long-term roadmap that sets the scene for public policies.

Several SDGs are relevant to the ocean, and comprise specific targets, and timetables for achieving them. Goal 14, 'Life below water', addresses marine issues specifically. It provides opportunities to facilitate concrete actions for ocean sustainability, and to foster greater integration among the sectors of ocean governance.

The sustainable use of the ocean cannot be achieved unless the management of all sectors of human activities affecting the ocean is coherent. Human impacts on the sea are no longer minor compared to the overall scale of oceans. A coherent overall approach is needed. This requires considerations of the effects on ecosystems of each of the many pressures, what is being done in other sectors, and the way that they interact. (UN, 2015)

Therefore, MSP should embrace all SDGs, and contribute to achieving them. As the 2030 Agenda can only be achieved by 'transforming global aspirations to local realities' MSP can become a vehicle contributing to this aim and involving different spatial scales of intervention. Indeed, there is room for such a process to tackle the challenges of the present decade.

It is important to highlight that the achievement of a specific SDG should not jeopardise, but foster, the others whenever possible especially since there are many close synergies between them such as SDG 14, SDG 2 (zero hunger), and 12 (responsible production, and consumption). Indeed, the achievement of SDG 14 has the potential to support sustainable consumption, and production patterns in ocean-based industries.

5.2. MSP and blue economy

Marine spatial planning (MSP) is used to create geospatial plans that identify what spaces of the ocean are appropriate for different uses, and activities. These plans have similarities with sustainable ocean economy plans, which describe how to sustainably use the ocean, and its resources to advance economic, and social development (Winther et al., 2020).

On a global scale, economy linked to maritime sectors is considered to be the new gate of economic development (Planbleu, 2018). Although it has many definitions (table 6), it is safe to say that an ocean or "maritime" economy is said to be "blue" to indicate sustainable growth (Patil et al., 2018) aiming to ensure a continuous supply of goods, and services for present, and future generations while preserving the health of marine, and coastal ecosystems. In practice, one of the enablers of blue economy is marine spatial planning.

Table 6 : A non exaustive list of blue economy definitions

Organisme	Blue economy definitions
MSPglobal, 2021	*Ocean' or 'maritime' economy is the sum of ocean-based economic activities, assets, goods, and services. It covers a wide range of established sectors, such as fisheries, maritime transport, and tourism, as well as emerging sectors, such as offshore renewable energy, aquaculture, and marine biotechnology.*
PlanBleu, 2018	*The blue economy is a low-polluting, resource-efficient circular economy based on sustainable consumption, and production patterns, promoting human well-being, and social equality, generating economic value, and jobs, significantly reducing environmental risks, and ecological shortages.*
Union for the Mediterranean (2015) A definition adapted to the Mediterranean context	*The Blue Economy is the set of human activities depending on the sea and/or underpinned by land-sea interactions in the context of sustainable development, and notably including industrial, and service sectors such as aquaculture, fisheries, blue biotechnologies, coastal, and maritime tourism, shipping, ship-building/repair, ports, ocean energy, and marine renewable energy, including offshore wind, which are among the main traditional, and emerging economic maritime sectors in the Mediterranean Sea basin http://ufmsecretariat.org/wp)*
The European Union (EU) Directive 2014/89/EU establishing a framework for MSP (EULEX, 2014)	*A process by which the relevant Member State's authorities analyse and organise human activities in marine areas to achieve ecological, economic, and social objectives. Through their maritime spatial plans, Member States shall aim to contribute to the sustainable development of energy sectors at sea, of maritime transport, and of the fisheries, and aquaculture sectors, and to the preservation, protection, and improvement of the environment, including resilience to climate change impacts. In addition, Member States may pursue other objectives such as the promotion of sustainable tourism, and the sustainable extraction of raw materials.*
UN Environment	*Blue Economy is defined as a "green economy in a blue world", since "a global transition to a low-carbon, resource-efficient Green Economy will not be possible unless the seas, and oceans are a key part of these urgently needed transformations"*

5.3. MSP and ICZM

Integrated coastal zone management (ICZM), also called 'integrated coastal management', is the process of managing the coast, and nearshore waters in an integrated, and comprehensive manner with the goal of achieving conservation, and sustainable use (Katona et al., 2017). ICZM covers the full cycle, including information collection, planning, decision-making, management, and implementation. The approach seeks informed participation, and cooperation from all relevant stakeholders. It seeks integration of the goals, and instruments needed to meet these objectives; of different policy areas, sectors, and levels of administration; and of the land, and sea components of the target area. The distinction between coast, and ocean becomes more complex when considering the possibility of including 'land-sea interactions' in MSP. On one hand, MSP is sometimes considered as the main tool for the implementation of ICZM in the marine area of coastal zones (Barcelona Convention COP, 2021), on the other hand, ICZM is referred to as a parallel, and distinct design process, which should ensure 'consistency'. So, it's safe to say that MSP is the extension of TSP (territorial spatial planning) through ICZM further out to the sea.

5.4. MSP and the Ecosystem-based Approach

The CBD (2000) defines the ecosystem approach as a strategy for the integrated management of land, water, and living resources that promotes conservation, and sustainable use in an equitable way. This principle implies a primary focus on maintaining and, when possible, restoring ecosystem structure, and functioning within a marine area. It includes the recognition that ecosystems are dynamic, changing, and sometimes poorly understood.

MSP is expected to apply an ecosystem-based approach (EBA) by ensuring that spatial distribution, and related decision-making considers the principles, and elements of EBA. The coupling of MSP, and EBA ensures that planning looks beyond jurisdictional boundaries, cumulative impacts are considered, a precautionary approach is applied, and planning is adaptive (Ansong et al., 2017). In other words, MSP is intended to inform the spatial distribution of maritime uses, and activities in a sustainable manner that recognises, and operationalizes the following EBA elements (UNEP, 2011):

- Aligning with ecosystem boundaries
- Managing for multiple objectives/benefits
- Considering cumulative impacts
- Using best-available science, and information
- Applying the precautionary approach to deal with uncertainty
- Managing adaptively.

Through the use of the ecosystem approach, Marine Spatial Planning benefits from a series of sustainability assessments, and generates an integrated plan, contributing to the achievement of Good Environmental Status (GES). Thus, it ensures that the capacity of marine ecosystems to respond to human-induced changes is not compromised (ADRIATIC Project).

5.5. MSP and climate change

Oceans and seas have a two-way relationship with weather, and climate. The oceans influence the weather on local and global scales, while changes in climate can fundamentally alter many properties of the oceans. (Oceans US EPA, 2022) With the on-going climate change trends not only environmental components, but also maritime activities will be affected by changes in the ocean (decrease, increase or relocation).

Based on ‘adaptive, and anticipative’ principles, MSP is meant to be ‘climate-smart’, and build up scenarios taking in consideration long term impacts of climate change (MSP Step 6, defining, and analysing future conditions). Examples of MSP objectives related to climate change responses may include:

- Promotion of offshore renewable energy
- Promotion of blue infrastructure, and nature-based solutions for carbon sequestration or coastal vulnerability reduction
- Conservation of potential areas for climate refugees

Moreover, a climate-smart MSP could also propose the emerging concept of dynamic marine protected areas (DMPAs), which means MPAs that are planned to shift across latitudinal gradients as species distribution are expected to shift according to climate change models.

Chapter 02: Methodological approach and study area

This chapter provides an overview of the methodological approach explaining the study's logical framework, problematic, and scales. The study area is also presented here. Details of the methodologies used to collect data, analyse, and interpret information will be separately illustrated in each of the 4 following chapters with their respective appendices.

1. Logical framework:

To properly conduct this study, we organised our reflexion on the subject starting from concrete problems that are observed in the Algerian marine and coastal environment. According to recent studies, this environment witnesses a widespread degradation of marine habitats, depletion of resources, and loss of biodiversity due to pressures caused by the unbalanced, and increasing human use of maritime space, and its resources, marine pollution, impacts of climate change, in addition to the fact that maritime literacy in the country is not highly regarded. These said "problems" are directly linked to two major issues: marine biodiversity conservation and achieving a good ecological status in this distinctive environment along with other socio-economic issues.

In a sustainable development context, the challenge to deal with these issues would be met by moving towards the achievement of sustainable development goals such as SDG 14: life below water, and 12: responsible consumption, and production.

The present study suggests the combination of an MSP concept, and the establishment of an MCPA as a one of many solutions to deal with the current situation as illustrated in figure 4. MSP is seen here as a tool to optimally create, and eventually manage an MCPA.

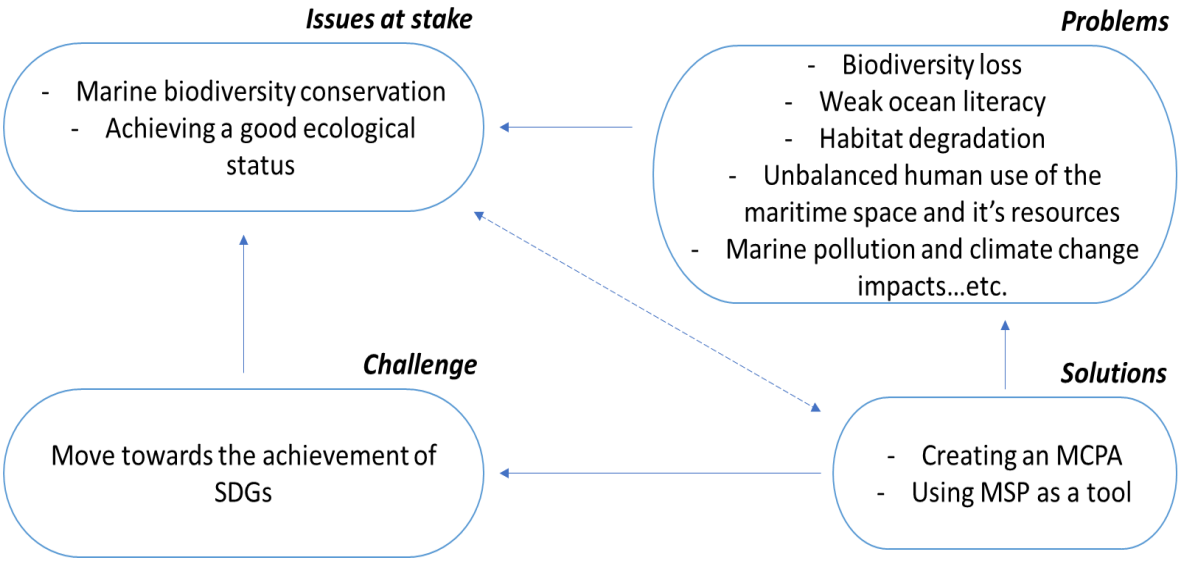


Figure 4: How we see it.

Having chosen an actual ongoing establishment of the future MCPA of the Edough Mounts as an example we'll explore the links, and relationships between these two processes as a case-study. However, we first need to carry out a diagnosis, and analyse the MSP framework in Algeria. The two addressed problematic are briefly explained in the table below.

Table 1: Problematics

Problematic	Objectives	Major outcomes	Methods
1- ***MSP in Algeria***	Analyse the MSP framework in Algeria	*Algerian MSP's alignment with international standards, and recommendations* Institutional, and regulatory components, MSP potential, gaps, strengths & weaknesses	Literature search + Survey
2- ***MSP, and biodiversity conservation***	Analyse MSP regarding the Edough Mounts future MCPA	*MSP as a conflict management tool around the MCPA* Stakeholders, activities & conflicts	MACTOR mapping + QGIS mapping + Survey

A mixed methodological approach is adopted in this study. In a prior step, basic questions needed to be answered: defining the study area, and analysis scales, which activities to consider, and choosing the most relevant actors in the case-study. Due to the uncertainty of information on potential, and future activities, and limitations of some aspects of the chosen methods, we only considered the established activities.

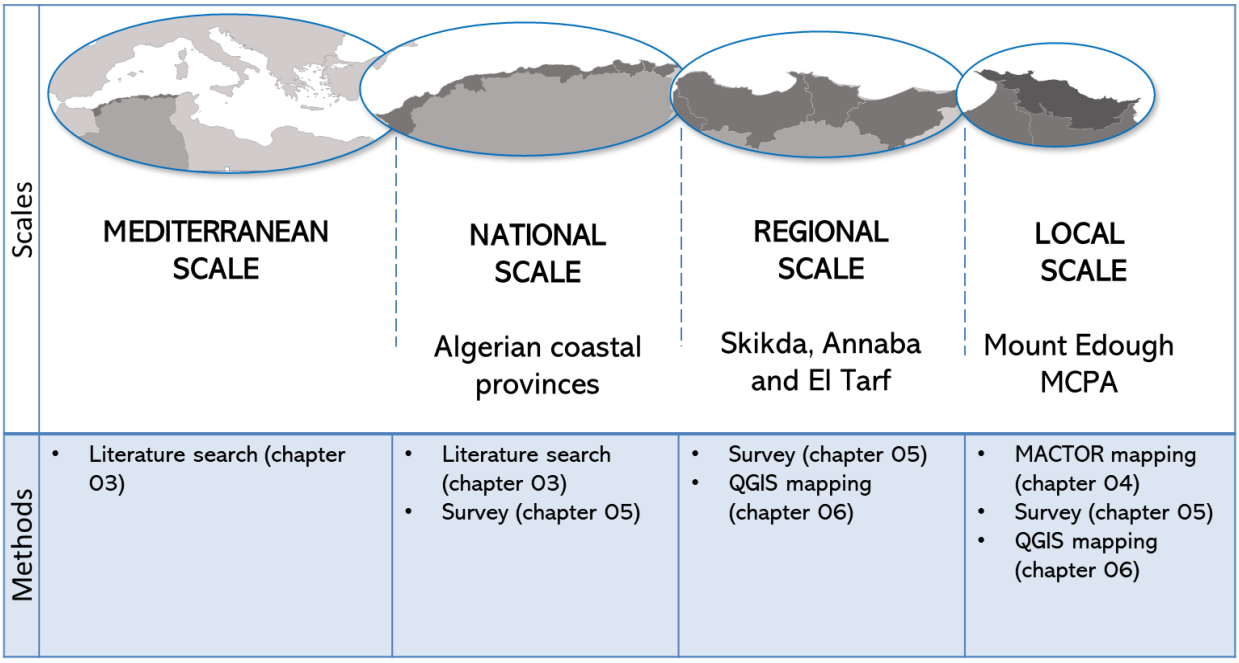


Figure 5: Methodology scales (inspired by SML)

As mentioned in table 04, several methods are used to address the studied problematics. Each method concerns one or multiple scales as illustrated in figure 5. The 04 methods are explained afterward in the manuscript in 04 distinct chapters. Furthermore, figure 6 simplifies the whole methodological approach.

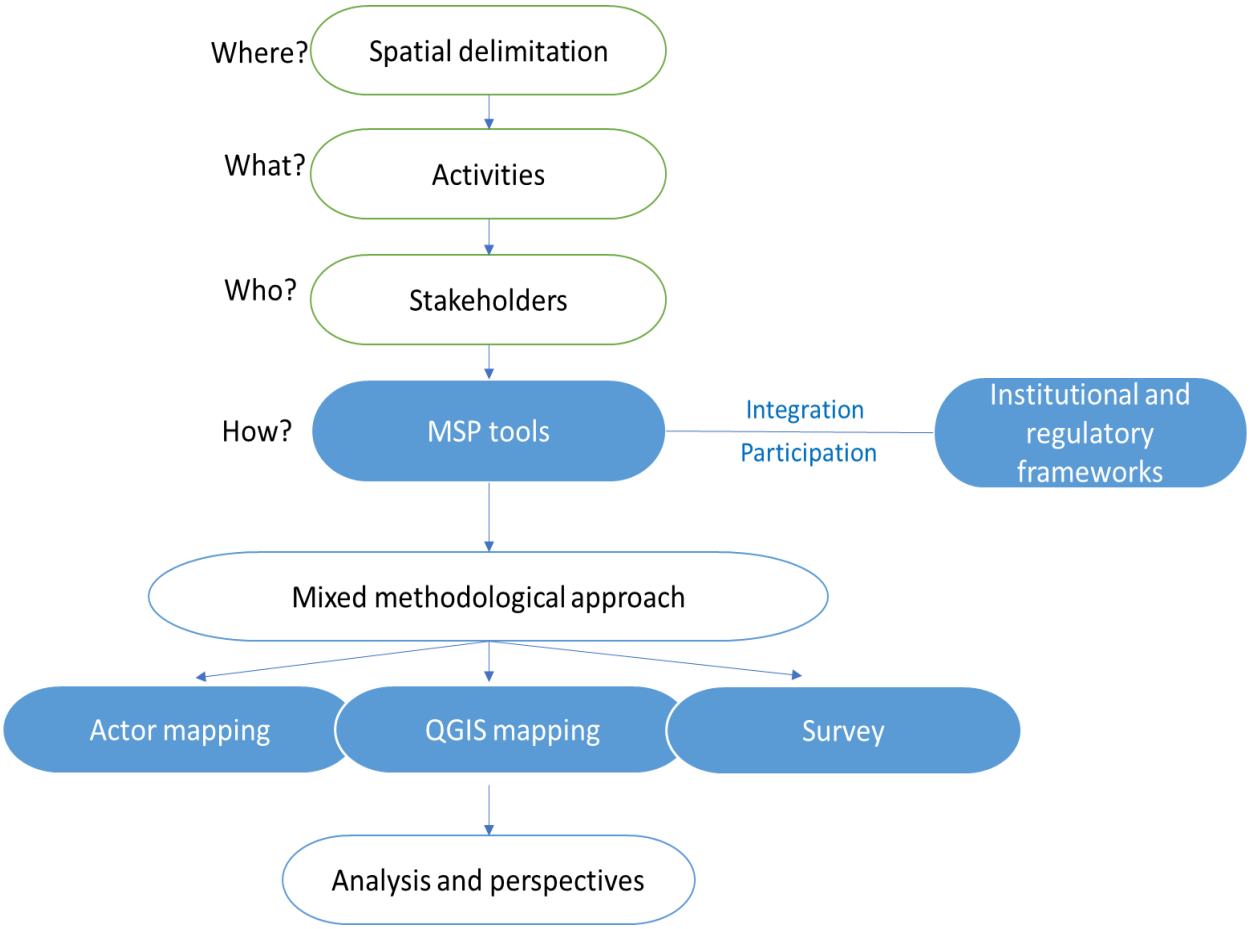


Figure 6: Logical framework

2. Study area

Our study focuses on the coastal, and maritime areas of the eastern Algerian coast, more precisely, the easternmost provinces (wilayas) of Skikda, Annaba, and El Tarf. Zooming into this area, the Edough Mounts future MCPA is located in between Annaba and Skikda as shown in figure 7.

Given MSP's "space based" principle, and the different components it is built on, we've established a technical datasheet for the three provinces (table 7), and a second one for the Edough Mounts (table 8). These datasheets contain detailed information about the exact locations, marine, and land areas according to regulated delimitations, coastline lengths, population… etc. along with a brief counting of the most important maritime and coastal space uses (activities) of each area.

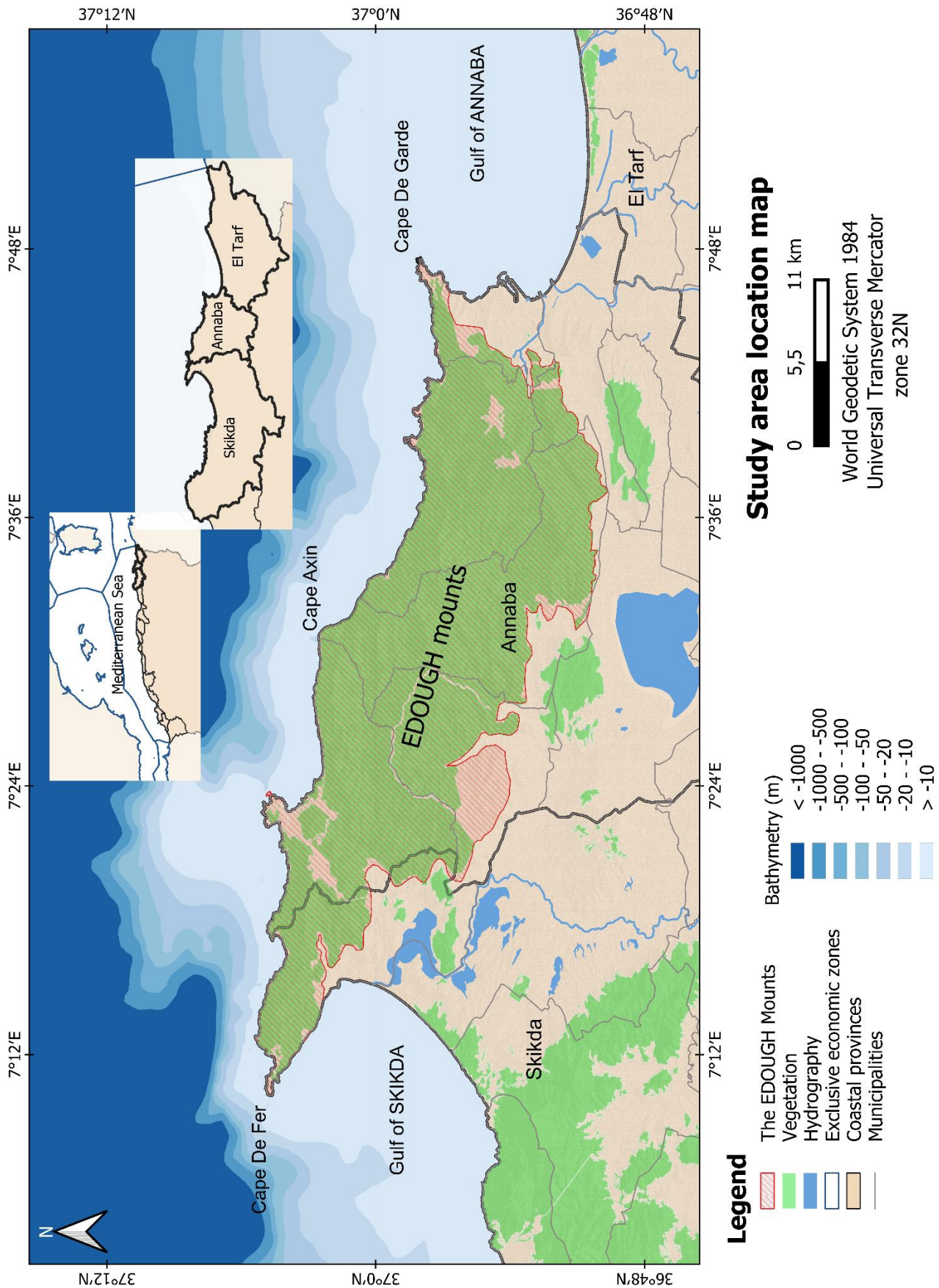


Figure 7: Study area location map.

Table 7 : Datasheets of Skikda, Annaba, and El Tarf.

Province		Skikda	Annaba	El Tarf
Geographic location		Located between latitudes 36°26' N, and 37°40'N, and longitudes 6°15' E, and 7°24''E It is limited by: • The Mediterranean to the North. • Wilayas of Constantine, Mila, and Guelma to the South. • Wilaya of Jijel to the West. • Wilaya of Annaba to the East	Located between latitudes 37°5' N, and 36°36'N, and longitudes 7°15'E, and 7°50'E It is limited by: • The Mediterranean to the North. • Wilaya of Guelma to the South. • Wilaya of Skikda to the West. • Wilaya of El Tarf to the East	Located between latitudes 36°5'N, and 36°57'N, and longitudes 7°40'E, and 8°40'E It is limited by: • The Mediterranean to the North. • Wilaya of Guelma, and Souk Ahras to the South. • Wilaya of Annaba to the West. • Tunisia to the East
Seafront (km)		130	80	40
Fronting marine areas (km^2)	***6NM***	1555,5	724,5	917,8
	12NM	1259	604,7	841,5
	24NM	2736,8	1192,3	1483,8
Coastal length (km)		250,19	122,5	90
Total Area (in land) (km^2)		4137,68	1393,20	3339
Land areas (km^2)	***100m***	19,9	10,2	9,6
	300m	53,3	26,8	27
	800m	128,6	62,9	68,5
	3km	431,3	199,1	242,8
Population		964 045 inhabitants (2012)	637 567 inhabitants (2012)	430 000 inhabitants (2008)
Coastal Municipalities		Oued Zehour - Kheneg Mayoum -Ouled Attia-Kanoua – Cheraia - Collo - Kerkera - Tamalous - Ain Zouit - Skikda - Filfila - Djendel Saadi Mohamed - Benazzouz -EL Marsa	Chetaibi - Oued El Aneb – Seraidi – Annaba - El Bouni	Souarekh – El Kala – Berrihane – Ben M'Hidi - Echatt
Hydrographic network		Oued El-Kebir Oued Saf-Saf Oued Guebli Oued Z'hour	Oued Seybouse Fetzara lake	Tonga lake Oubeira lake El Melah lake Oued Bou Namoussa Birds' lake
Main activities		Fisheries Industry Tourism Port activity Agriculture	Fisheries Industry Tourism Port activity Agriculture	Fisheries Agriculture Tourism

Table 8 : Datasheet of the Edough Mounts.

Case study area		**The Edough Mounts**
Geographic location		Located in the north of Annaba, and a small part of Skikda between Cape de Garde 36°49'N, and 37°5' N, and Cape de Fer 7°10'E, and 7°45' E
Coastline length		≈ 139
Fronting marine areas ***(km^2)***	**6NM**	745.8
	12NM	683.7
	24NM	1343.2
Total Area ***(in land) (km^2)***		609.4
Land areas ***(km^2)***	**100m**	2.4
	300m	4.2
	800m	8.5
	3km	178.2
Altitude		1008m mount Bouzizi (Kef Esbâa)
Coastal municipalities		**Main features, and activities**
Annaba (Ramdani, 2013)		- 18 small islands - 1539,94ha of forests - 10 beaches - Urbanisation (98% wilaya population) - Agriculture - Industry (59units) - Port activity - Tourism (ZET of Annaba corniche 356ha)
Seraidi (Ramdani, 2013)		- 11 small islands - 5 beaches - 22km wide continental shelf - 6995,45ha of forests - Agriculture (1161ha) - Tourism (ZET of Oued Begrat 1375ha)
Oued El Aneb (Ramdani, 2013)		- Landuse: mostly vegetation - 1 Agglomeration
Chetaibi (Ramdani, 2013)		- About 58 small islands - 3169,8 ha of forests - 5 beaches - Agriculture (1261ha) - Tourism (ZET of Chetaibi 293ha, and the western Bay 328ha)
El Marsa (Yakhlef, 2013)		- 2686ha of forests - Fisheries - Agriculture - Tourism - 4 beaches - Tourism (ZET of La Marsa 112ha, and Sidi Akkacha 110ha)

Chapter 03: State of the art on Marine Spatial Planning

This chapter briefly presents a state of the art on the progress of maritime spatial planning worldwide, at a regional level in the Western Mediterranean along with information on potential MSP components in Algeria based on literature research.

1. MSP Worldwide

On a global scale, the UN Convention on the Law of the Sea, UNCLOS provides an overarching framework for allocating marine space to national states, through codifying concepts such as the Territorial Sea, EEZ, Contiguous Zone, and the Continental Shelf. The preamble to the convention already notes that "the problems of ocean space are closely interrelated and need to be considered as a whole". Nevertheless, maritime policies often correspond to the competencies of national governments. Whilst the vision of 'maritime affairs' (uses, activities, and utilisation of the maritime space in the strategic sense) is that of a 'matter of state', a current trend is transboundary MSP mainly seen in the EU region with few examples in practice. (IOC/UNESCO 2020)

Over the past decades, various countries have started to use MSP to achieve sustainable development, including the goal of developing a "blue economy" or "blue growth", and biodiversity conservation in ocean, and coastal areas. One of the earliest examples of MSP was the plan developed for the Great Barrier Reef Marine Park in Australia (Vince 2014). According to Merrie, and Olsson (2014), much of the increase in interest in MSP seems to have derived from the first international workshop on MSP that was organized by UNESCO's Intergovernmental Oceanographic Commission (IOC) in 2006. Since then, about half of the 150 countries with marine waters started some form of MSP initiative, and the interest in MSP continues to grow. For example, MSP is mandatory throughout an entire region (Europe) where 22 countries must have their marine spatial plans in place by 2021 according to binding EU legislation (figure 8).

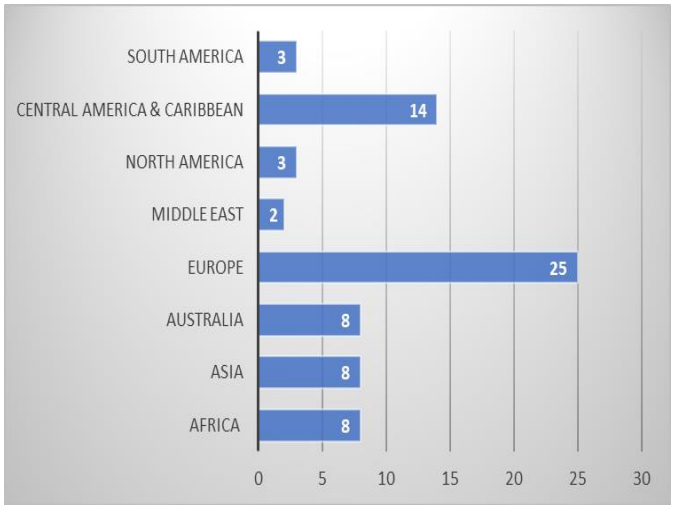


Figure 9: Number of countries by region with MSP initiatives in 2018 (according to Ehler, 2021).

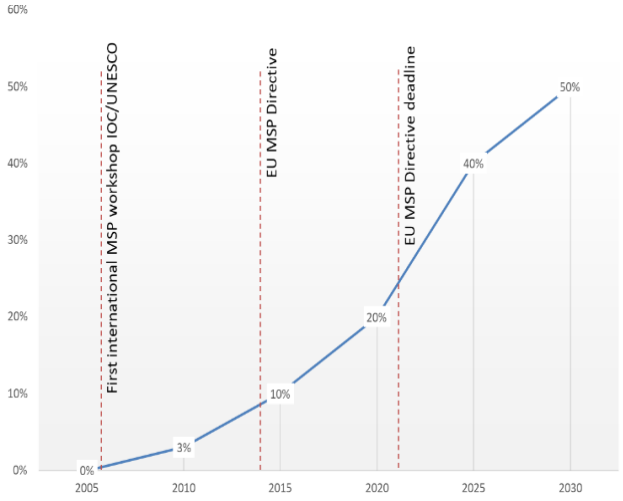


Figure 8: Estimated areas of world EEZs covered by approved MSP plans (according to Ehler, 2021)

Although MSP is currently underway in more than 60 countries worldwide (figure 9), not all MSP initiatives have been successful as most of them face challenges like stakeholder engagement, political framework, human dimension, environment sustainability, monitoring, and

evaluation, trans-boundary issues, and global climate change. Only 22 countries have government-approved marine spatial plans (Santos et al. 2019).

While some countries have specific legislation for MSP (e.g., the UK has the Marine, and Coastal Access Act), most do not, and some countries use existing laws including environmental legislation (like Belgium) or biodiversity legislation (like Australia) or existing land-use planning legislation that is extended to the sea (The Netherlands, and Germany) as a basis of authority for MSP (Ehler, 2009).

Moreover, the need for MSP is widely recognized, and it has shown promising results when combined with other management protocols such as Integrated Coastal Zone Management (ICZM), building upon these management approaches as well as all policies that underlie them, for instance establishing marine protected areas (MPAs) (LME, 2020).

2. MSP in the Mediterranean

In the Mediterranean region, the UNCLOS remains the main legal basis for regulating marine ecosystems, and the blue economy/blue growth, as it authorises the introduction of legal, and policy tools for coastal planning, thus, facilitating the establishment of MSP in the countries that have ratified the convention including the EU and North African countries.

The total EEZ for this basin is 3307,035 km^2, with 16% of the area less than 100m deep, and 5% covered by MPAs (Van Den Burg et al., 2019). However, maritime boundaries definition in the Mediterranean is complex, mainly due to geographical, geopolitical, and economic reasons, which requires complex agreements among neighbouring states. This results in several yet unsolved issues even with respect to territorial sea borders. Most Mediterranean states have established a 12-mile territorial sea, while declaration of EEZs, and "EEZ derived zones", such as fisheries zones, fisheries protection zones, ecological protection zones, and ecological, and fishery protection zones, have been declared through national legislation by several states (Ramieri et al. 2019). More than 20% of the marine waters in the Mediterranean fall under a high seas regime governed by international norms (Cinnirella et al. 2014) which limits the interventions of coastal states in economic, and environmental maritime affairs, and calls for strong cooperation at the regional level.

In addition to the current human-caused pressures in the Mediterranean, according to (Piante, and Ody 2015), almost all Mediterranean maritime sectors (tourism, shipping, aquaculture, offshore oil, and gas…etc.), except professional fisheries (because of fish stock depletion), are expected to grow during the next 15 years. Emerging sectors, such as renewable energy, seabed mining, and biotechnology, are expected to grow even faster. Such growing development can increase existing conflicts between sectors, and generate new ones, and will represent additional pressure on already stressed Mediterranean ecosystems.

Although continuously gaining ground, MSP is a fairly new, and emerging process in the Mediterranean region compared to land planning, but several regional policies, and legislative instruments establishing a framework for integrated coastal management, and supporting the implementation of MSP in the Western Mediterranean exist such as: the Mediterranean Action

Plan, and the Barcelona Convention protocols (Dumping, Prevention, and Emergency, Land-Based Sources, Specially Protected Areas, and Biological Diversity, Offshore, Hazardous Wastes, and ICZM), the Mediterranean Strategy for Sustainable Development focusing on the implementation of Barcelona Convention while establishing regulatory mechanisms, including MSP, the Union for the Mediterranean aiming to enhance dialogue among the northern, and southern Mediterranean countries, the Ecosystem Approach initiative meant to achieve an ecosystem-based management, and good environmental status of the Mediterranean Sea, the European Union Directive on MSP, and the Western Mediterranean Initiative established to foster a resilient Blue Economy, and a secure, and better-governed Mediterranean (IOC/UNESCO, 2021).

At a national scale, progress among Mediterranean countries is uneven, as some countries are at advanced stages of maritime spatial planning, mostly those who have adopted the EU directive, while others are still working on the early stages of their maritime policies mostly in the southern shore.

3. Algerian context

As many Southern Mediterranean countries, Algeria has undergone sustained economic, and population growth over recent decades (MedECC, 2020). It is the most populated country in the Maghreb region with 65% of the population living in coastal areas representing only 1.9% of the Algerian territory (European Commission, 2020).

The coastal region is attractive for the development of various economic activities including industrial ones (ONS). With a 1622km coastline, the coastal environment of Algeria has therefor suffered great disturbances such as pollution, coastal erosion, extensive urbanisation, resources depletion …etc.

Unlike inland areas, the Algerian maritime space remains one of the least explored spaces of the Western Mediterranean basin, as the development of mainly maritime activities in the country is only recent apart from a few basic activities such as Maritime transport. However, in 2018, Algeria established its Exclusive Economic Zone (EEZ), which implies a need for maritime spatial planning of several activities.

Despite this urging need to organize, and synergize maritime space use in Algeria, there is no Maritime Spatial Planning policy or strategy in the country so far. Nonetheless, in a long-term perspective, it is necessary to have a good understanding of the existing legal, and institutional frameworks, on which to anchor a potential MSP strategy. As a starting point, the following tables present non-exhaustive lists of MSP related programmes, strategies, regulations, and institutions that could potentially support the establishment of an MSP policy in Algeria.

Table 9: Most relevant MSP related plans and strategies by sector. (Adapted from Issad, 2016)

Sector	MSP related strategies, and plans
Territorial management	- National spatial planning masterplan (SNAT) - National coastal planning masterplan (SDAL) - Regional spatial planning masterplans (SRAT)

	- Territorial programming space masterplan (SEPT) - Provincial spatial planning plans (PAW) - Metropolitan areas planning masterplans (SDAAM) - Coastal planning plans (PAC)
Environment (UNESCO-IOC, 2021)	- The National Strategy for Integrated Coastal Management (2015): Aiming to ensure sustainability of coastal areas, and the goods, and services they provide while preventing environment degradation through ICZM (on-going updating with a section on MSP). - National Biodiversity Strategy, and Action Plan (SPANB) 2016-2030: With the objective of conserving at least 5% of marine, and coastal areas by 2030.
Fisheries, and Aquaculture	- National Strategy for the Blue Economy 2030: Ongoing establishment (CPMR, and MedWaves, 2022)

Table 10: A non-exhaustive list of MSP related legislative elements by sector in Algeria. (Based on Issad 2016, and Zerrouki 2020)

Sector	MSP related legislative elements
Environment	- Coastal Act 02-02 relative to coastal protection, and valorisation: Articles 3 (coordination between actors), 7 (Coastal zone delimitation), 8 (Terms of offshore extraction). - Act 11-02 relative to protected areas within the framework of sustainable development: Articles 4 (Categories of protected areas), 15 (Zonation within protected areas), 26 (Protected areas classification study), 32 (Protection of marshes, mudflats, and wetlands). - Act 03-10 relative to the protection of the environment in the framework of sustainable development: Article 52 (Prohibition of the immersion, dumping, and incineration of suspect substances in waters under national jurisdiction). - Presidential decree n°06-405 of November 14th 2006 relating to the ratification of the protocol on specially protected areas, and Mediterranean biodiversity: Article 17 (Planning, and monitoring of specially protected areas)
Fisheries, and aquaculture	- Act 2001-11 relative to fishing, and aquaculture: Articles 18 (no-fishing areas), 41 (Aquaculture exercise conditions). - Executive decree n° 03- 481 defining terms, and conditions to exercise fishing activities: Articles 32 (Delimitation of fishing areas), 69 (Underwater fishing). - Act 15-08 of April 2nd 2015 completing act 01-11: Articles 2, and 3 (responsible fishing), 16 (Planning, and management of fishing, and aquaculture areas).
Maritime transport, and port activities	- Act n°98-05 of Juin 25th 1998 relating to the maritime code: Articles 5 (Maritime districts), 7 (Natural, and artificial Public maritime domain), 8 (Delimitations terms of the Public Maritime Domain), 898 (Port Public Domain), 117 (Hydrocarbons transport risks), 163 (Commercial navigation), 775(Terms of merchandise transport), 889 (Port categories).
Tourism, and recreation activities	- Act n° 03-03 relative to expansion zones, and touristic sites: Articles 8 (Definition of ZETs), 15 (Touristic management plan). - Act n° 03-02 defining general rules for the use, and touristic exploitation of beaches:

	Articles 36 (Prohibition of boat navigation within swimming areas), 37(prohibition of underwater fishing during summer season). - Act n° 04-111 of April 13th 2004 setting the conditions for opening, and banning beaches for bathing: Articles 5 (prohibition of wastewater discharge), 6 (prohibition of access to military areas).
Coastal management	- Executive decree n° 09-114 of April 7th 2009 defining conditions to elaborate Coastal Management Plans (PAC), it's content, and implementation: Article 2 (Content of the PAC's technical report).
Industry, and mines	- Act n° 05-07 relative to hydrocarbons: Article 7 (exploitation, and exploration in the maritime domain). - Act n° 04-20 relative to the prevention of major risks, and to the management of hazards in the framework of sustainable development: Article 61 (Emergency intervention plans). - Act n° 01-10 of July 3rd 2001, relating to mines: Articles 2 (Fossils, and mineral substances are property of the state), 3 (terms of exercising mining, and extraction activities).

Table 11 : Institutional framework for MSP (non-exhaustive list adapted from Issad, 2016, and Zerrouki, 2020)

Category	Potential MSP actors
Ministries	- Prime Ministry - Ministry of Interior, of Local Authorities, and of Territorial Planning - Ministry of Environment, and Renewable Energies - Ministry of Fisheries, and Fishery Products - Ministry of Defence - Ministry of Industry, and Mines - Ministry of Public Works, and Transport - Ministry of Agriculture - Ministry of Tourism, and Handicraft - Ministry of Finances - Ministry of Higher Education, and Scientific Research - Ministry of Water Resources
Interdepartmental Boards, and Committees	- Higher Board of the Sea (HCM) - National Coastal Commission (CNL) - Higher Board of Environment, and Sustainable Development (HCEDD) - MarPol national committee (Tel Bahr) - National Board of Territorial Management, and Sustainable Development - Coastal Coordination Council - National Commission of Protected Areas
Technical institutes	- National Agency for Tourism Development (ANDT) - National Coast Guard Service (SNGC) - National Centre for Maritime Surveillance, and Rescue Operations (CNOSS) - National Agency for Spatial Planning (ANAT) - National Water Resources Agency (ANRH) - National Observatory of the Territory (ONT)
Research institutes, and data providers	- Higher National School of Marine Sciences, and Coastal Management (ENSSMAL) and other universities - Higher National Maritime School (ENSM) - Fisheries, and aquaculture institutes, and training centres

	- Laboratory Network for Environmental Monitoring (LRSE) - National Research, and Development Centre of Fisheries, and Aquaculture (CNRDPA) - National Mapping, and Remote Sensing Institute (INCT) - Algerian Spatial Agency (ASAL) - National Office of Meteorology (ONM) - National Office of Statistics (ONS) - Maritime Studies Laboratory (LEM) - National Centre for the Development of Biological Resources (CNDRB) - Environment, and Sustainable Development Observatory (ONEDD) - National Laboratory for the Control, and Analysis of Fishery, and Aquaculture Products, and Environmental Health (LNCAPPASM) - National Agency for Land Intermediation, and Regulation (ANIREF)
International organisms, commitments, and projects	- European Union (EU) - Intergovernmental Oceanographic Commission (IOC/UNESCO) - The Barcelona Convention, and it's protocols - Union for the Mediterranean (UfM) - United Nations Environment Programme (UNEP) - United Nations Development Programme (UNDP) - Action Plan for the Mediterranean (MAP) - Food, and Agriculture Organization (FAO) - International Union for Conservation of Nature (IUCN) - The International Maritime Organization (IMO) - The Convention on Biological Diversity (CBD, 1992) - The 2002 World Summit on Sustainable Development, - World Wildlife Fund (WWF) - German cooperation bureau (GIZ) - The International Commission for the Conservation of Atlantic Tuna (ICCAT) - Agreement on the conservation of cetaceans in the adjacent Atlantic area (legal tools for biodiversity conservation based on cooperation) (Accobams) - WestMed initiative - PIM initiative - SPA/RAC - MEDPAN - MSPGlobal…etc.

Table 12: A non-exhaustive list of regional initiatives in the Mediterranean Sea-basin supporting the implementation of MSP in which Algeria participates (adapted form UNESCO-IOC. 2021.)

Initiative (Date)	**Regional Sea/ Large Marine Ecosystem (LME)**	**Participating Countries**	**Issues addressed**
Determination of Priority Actions for the Further Elaboration, and Implementation of the Strategic Action Programme for the Mediterranean Sea (2000-2006)	Mediterranean Sea	Albania, Algeria, Bosnia, and Herzegovina, Croatia, Egypt, Lebanon, Morocco, Slovenia, Syria, Tunisia, Turkey	Pollution
MED Integration of Climatic Variability, and Change int National Strategies to Implement the ICZM	Mediterranean Sea	Albania, Algeria, Bosnia, and Herzegovina, Egypt, Lebanon, Libya,	ICZM

Protocol in the Mediterranean (2012-2013)		Montenegro, Morocco, Syria, Tunisia	
MED Mediterranean Environmental Sustainable Development Program (Sustainable MED) (2009-2014)	Mediterranean Sea	Albania, Algeria, Bosnia, and Herzegovina, Bulgaria, Egypt, Lebanon, Libya, North Macedonia, Montenegro, Morocco, Serbia	/
MED: Sustainable Governance, and Knowledge Generation (2011- 2015)	Mediterranean Sea	Albania, Algeria, Bosnia, and Herzegovina, Egypt, Lebanon, Libya, North Macedonia, Montenegro, Morocco, Syria, Tunisia, Turkey	Capacity building
Oil Pollution Management Project for the Southwest Mediterranean Sea (1994-2000)	Mediterranean Sea (West)	Algeria, Morocco, Tunisia	Pollution, oil, and gas
MArine Protected Areas in the MEDiterranean (MAPAMED)	Mediterranean Sea	All Mediterranean countries	MPA establishment
MedPAN South Project (2009-2012)	Mediterranean Sea (South, and East)	Albania, Algeria, Croatia, Egypt, Lebanon, Libya, Montenegro, Morocco, Syria, Tunisia, Turkey	MPA establishment, improving the management of existing MPAs
People for Ecosystem Based Governance I Assessing Sustainable Development of Ocean, and Coast (PEGASO) project (2010- 2014)	Mediterranean Sea and Black Sea	Algeria, Belgium, Croatia, Egypt, France, Greece, Italy, Lebanon, Morocco, Romania, Spain, Switzerland, Tunisia, Turkey, United Kingdom, Ukraine	ICZM

Chapter 04: Actor mapping

1. Materials and Methods

1.1. MACTOR concept

It is only natural to have conflicts of use of maritime and coastal space as long as the actors, and their respective objectives, and attributions overlap. In this matter, studies have shown that the strategic analysis of an actor's game is a crucial step to the foresight of resolving conflicts between groups who have different projects, and visions of maritime space, and its resources, which strongly conditions the evolution of the studied system. In this context, we have used an open-source software called MACTOR 5.1.2 which was designed to conduct a mapping of actors regarding a specific issue according to their objectives, level of power, influence…etc. The MACTOR method (Méthode ACTeurs, Objectifs, Rapports de force) offers an analysis of the game of actors as well as tools that can grasp the power, and complexity of information to use, all of this providing the analyst with intermediary results which shed light on specific dimensions of the problem (MACTOR help). Although MACTOR was originally developed for enterprise management issues, multiple studies on other topics were conducted, where the software was found to be very useful. In our case, we projected this method on environmental issues, more precisely, the analysis of the Algerian MSP process regarding the future MCPA of the Edough Mounts. The aim of this chapter is to highlight, and understand conflicts of use of the maritime and coastal space in this area, especially those related to the establishment of this MCPA.

The applied methodology is structured around several components, which are described here as five distinct stages. The first stage seeks to identify the different dimensions of the problematic, such as the actors involved, and their objectives as they engage in the issue. The second stage involves analysing, and describing the strategies identified in two ways:

- Identifying the direct influences exerted by the actors on each other ("actors/actors" matrix),
- Describing, and measuring the position of each actor in relation to each objective ("actors/objectives" matrix).

This second stage is conducted according to experts' opinion on the matter. In the third stage, the two matrices are input into the MACTOR software for processing. The result helps us provide a more detailed picture of the relative positions of all the actors (dominant or dominated by others), to identify the objectives for which they feel the most concern, those which are controversial or not, and to highlight the diverging, and converging interests reflected in the various positions. The fourth stage is the interpretation of results generated by the software in the form of complex reports. These reports contain multiple statistical analysis parameters. However, the ones we found to be most expressive and informant regarding our problem are:

Influence & dependence (I_i & D_i)	Net scale of influence (NS)	Competitiveness (R_i)	Ambivalence (EQ_3)	Implication
Convergence & divergence	1MAO 2MAO 3MAO	Net distance between actors	Net distance between objectives	Actor/ objective relationship

In the fifth stage, additional analysis on the chosen parameters was conducted in order to rank the actors using two parameters R_i, and NS, to profile each one, define the key actors, and to help interpret the influence/dependence map as well as the rest of the results.

In order to highlight the difference between the actors' actions and the activities' hypothetical frame, we chose to conduct **two parallel studies** on MACTOR with the same sets of actors, and objectives, yet with different input matrices. Therefore, from this point on, we'll be talking about "*MSP in theory*", "*Real MSP*", and the "*comparison"* between these two which is calculated by subtraction (for better illustration of the differences) at various stages of the methodology, and the discussion. Furthermore, figure 10 summarizes the whole actor mapping methodology.

1.2. Input data

1.2.1. Common data

1.2.1.1. List of Actors:

A list of 40 actors was defined. Actors were selected combining stakeholders at the National, regional, and local level. The selection of these actors was based on their implication in the studied problematic, their level of power, scope of action, and their backgrounds. These actors were grouped into 05 categories: **administration**, **local authorities**, **scientists**, **economic operators**, and **socio-professional organisations.**

The choice of categories was based on experts' opinion, and literature search. We tried covering every type of actors that usually affects the studied system at different levels, and backgrounds, so that the final list is representative of the system. Although 40 is quite a big number for the MACTOR standards, efforts were made to reach this number. We limited the number of actors according to their relative weight regarding the problematic, so the 3 or 4 most influent actors of each category were included in the final list in order not to put any category at disadvantage over the others. The final list consists of the following stakeholders:

1. **Ministry in charge of Environment (ME)**
2. **Ministry of fishing, and fishery products (MFFP)**
3. **Ministry of the interior, local authorities, and territorial planning (MICLAT or MILGA)**
4. **Ministry of tourism, and handicraft (MTH)**
5. **Ministry of industry, and mines (MIM)**
6. **Ministry of finance (MF)**
7. **Environment department of Annaba (EDA)**
8. **Environment department of Skikda (EDS)**
9. **Department of fishing, and aquaculture of Annaba (DFAA)**
10. **Department of fishing, and aquaculture of Skikda (DFAS)**
11. **Department of tourism, and handicraft of Annaba (DTHA)**
12. **Department of training, and vocational education (DTVE)**
13. **National coastal commission of Annaba (NCCA)**
14. **National coast guard service (NCGS)**
15. **Wilaya of Annaba (WA)**
16. **Wilaya of Skikda (WS)**
17. **Municipalities of the Edough region (MER)**
18. **Fishermen (F)**
19. **Small trades (ST)**
20. **Trawler fleets owners (TFO)**
21. **Sardine fleets owners (SFO)**
22. **Proxies (P)**
23. **Aquaculture farms (AF)**
24. **Fishing port of Chetaibi (FPC)**
25. **Mixed use port of Annaba (MUPA)**
26. **Fishing port of El Marsa (FPE)**
27. **Fishing port of Seraidi (FPS)**
28. **Fishing shelter of Ain Barbar (FSA)**
29. **Tourism operators (TO)**
30. **Industrial operators (IO)**
31. **Hydrocarbon transportation company (HTC)**
32. **Badji Mokhtar University of Annaba (BMUA)**
33. **Other universities, and the higher national school of marine sciences, and coastal management (OU)**
34. **Fisheries, and aquaculture training centre (FATC)**
35. **National chamber of fisheries, and aquaculture (NCFA)**
36. **Fishermen associations (FA)**
37. **Environmental protection associations (EPA)**
38. **Nautical activities (NA)**
39. **Medias (M or Me)**
40. **Recreational fishermen (RF)**

- **Missions of actors:**

The table below details the different actors' missions, roles, or attributions associated with the maritime, and coastal space, and its resources. This information will be helpful to explain their standpoints which are illustrated in the MACTOR results reports.

Table 13 : Actors' missions, roles, or attributions regarding maritime, and coastal space and/or its resources in the studied system.

Category	Actors	Missions / Roles / Attributions
Administrations	ME	Develop, deliver, and ensure the conception, implementation, monitoring, and control of national policies, and strategies in the environmental fields (climate change, protection of biodiversity, waste management, etc.), and renewable energies. Initiate, and enforce the development of legislation, and regulations governing their area of jurisdiction.
	MFFP	Deliver elements of national policy in the fields of fisheries, and aquaculture, and to ensure its implementation in accordance with the laws, and regulations. Exercises its powers over activities related to the exploitation, promotion, enhancement, preservation, and development of the national fisheries, and aquaculture heritage.
	MICLAT	Responsible for internal security, administration, territorial spatial planning, and civil liberties.
	MTH	Its mission is to develop and implement the government's tourism policy through various programmes for the development of tourism, and for the protection, and safeguarding of the artisanal heritage.
	MIM	Develops, and monitors elements of growth, and development policy in the industrial sector.
	MF	Its main tasks are to propose, after arbitration, the draft budgets; to participate in the definition, implementation, and monitoring of the budgetary policies of the sectors; to monitor the implementation of the budget, and to evaluate it (Issad, 2016)
	EDA	Carry out the sector's activities at a local scale, and ensure the implementation, and monitoring of the Ministry of the environment's strategy development programs
	EDS	
	DFAA	Carry out the sector's activities at a local scale, and ensure the implementation, and monitoring of the Ministry of fishing, and fishery products' strategy development programs
	DFAS	
	DTHA	Carry out the sector's activities at a local scale, and ensures the implementation, and monitoring of the Ministry of tourism, and handicraft's strategy development programs
	DTVE	Ensures the implementation, and monitoring of the training development strategy programs' execution at the local vocational training institutions
	NCCA	Ensure the implementation of the national policy for the protection, and development of the coastal zone. Establish a complete inventory of coastal areas, and island regions (human settlements, and natural areas). Mapping of coastal areas, and permanent monitoring of their evolution.
	NCGS	Responsible for all matters relating to the police of navigation, and fisheries, to the people of the sea, to the ships, and to the exploitation of the resources of the sea. Carries out its missions in the maritime public domain, and in the various areas of the maritime space under national sovereignty, jurisdiction, and responsibility. Contributes to coastal surveillance, national defence, maritime security, and maritime intelligence gathering.
Local authorities	WA	Represents the space for joint implementation of public policies, and consultation between local, and regional authorities, and the State. Contributes with the State to the administration, and planning of the territory, to the economic, social, and cultural development, to the protection of the environment, and to the protection, promotion, and improvement of the living environment of the citizens.
	WS	
	MER	Represents the framework for citizen participation in the management of public affairs (place of exercise of citizenship). Contributes with the State to the

		administration, and planning of the territory, to the economic, social, and cultural development, to the security, as well as to the protection, and improvement of the living environment of the citizens.
Economic operators	**F**	Exploitation of fishery resources by working for fleets owners.
	ST	Exploitation of fishery resources on small fishing boats employing traditional methods
	TFO	Use one or more trawlers for benthic fishery resource exploitation
	SFO	Use one or more seine boats for surface fishery resource exploitation
	P	Fisheries production sale (marketing hubs)
	AF	Production of farmed fishery products
	FPC	Provides shelter for fishing vessels, and fishery products' landings along with first hand marketing operations. Provides shelter for recreational boats, and activities.
	MUPA	Provides shelter for commercial vessels, and tankers, and import/export operations. Provides shelter for fishing vessels, and fishery products landings along with first hand marketing operations. Provides shelter for recreational boats, and activities.
	FPE	Provides shelter for fishing vessels, and fishery products' landings along with first hand marketing operations. Provides shelter for recreational boats, and activities.
	FPS	Provides shelter for fishing vessels, and fishery products' landings along with first hand marketing operations. Provides shelter for recreational boats, and activities.
	FSA	Provides shelter for fishing vessels, and fishery products' landings along with first hand marketing operations.
	TO	Exploitation of coastal, and maritime space for tourism activities
	IO	Space occupation for industrial installations (mostly coastal space)
	HTC	Use of maritime space for hydrocarbons transportation through vessels or underwater pipelines
Scientists	**BMUA**	Data, and knowledge providers Education, and awareness raising on the opportunities offered by the sea
	OU	
	FATC	Capacity building in maritime sectors
Socio-Professional organisation, and civil society	**NCFA**	Represent fisheries operators in an administrative way Responsibilize fishermen about sustainable fishing practices
	FA	Representing fishermen, and defending their rights
	EPA	Protection, and preservation of the maritime space, and its resources through awareness raising activities
	NA	Small scale exploitation of maritime, and coastal space
	M	Inform, sensibilize, and keep maritime, and coastal space users up to date regarding conflicts, opportunities, sustainable practices, worldwide experiences…etc.
	RF	Non-profit pleasure fishing

1.2.1.2. List of Objectives

Basically, the objectives should be inspired from the actors themselves. However, in our case, we used objectives that are specific to the MSP concept, and that could also be related to the different activities at the same time, in order to get our results closer to our problematic. A list of 9 objectives related to MSP was determined. The phrasing of these objectives had to be as formal as possible because the method involves positioning each actor according to whether they are very much in favour, in favour, indifferent, not in favour or very much against, the objective. So, they have to be formalized as specifically as possible to allow the position of each actor to be assessed correctly. Furthermore, each objective is explained in the table below.

Table 14 : List of MSP objectives in the studied system (details inspired from MSP international guide 2021)

Objective	Explanation
1. **Management, control, regulation, and surveillance (MCRS)**	Regular review, and observations required to ensure proper functioning of regulations, and compliance with provisions governing the use of marine, and coastal space to achieve sustainable management objectives.
2. **Conservation, and protection of marine, and coastal biodiversity (CPMCB)**	Preservation, restoration, and improvement of the state of marine, and coastal fauna, and flora against the impacts of human activities, and the rational exploitation of living resources through sustainable management measures such as the creation of protected areas offering different levels of protection in well-defined zones.
3. **Data, and knowledge providing (DKP)**	Provision, communication, and sharing of maritime space, and activities-relevant expertise, knowledge, data, and information from different sectors, on current, and future conditions to bridge the gap between science, and policy, and ensure an effective use of resources.
4. **Development, and valorisation (DV)**	Exploitation, and use of the maritime, and coastal space, in all its dimensions, and of its living, and non-living resources through different economic sectors' development activities.
5. **Observation, and monitoring (OM)**	Data collection, assessment, and analysis of the different uses of the sea, and coastal areas as well as the conflicts, and compatibilities between these uses, and between them, and the environment's carrying capacity.
6. **Outreach, and awareness raising (OAR)**	Popularization among decision-makers, and different actors of the maritime, and coastal space, and awareness raising about the possibilities offered by the sea.
7. **Training, and capacity building (TCB)**	Development, and capacity building of marine actors in MSP, and commitment of stakeholders to training through internships, workshops...etc.
8. **Cooperation, and collaboration (CC)**	Strengthening partnerships, and mediation mechanisms between the different sectors, and fostering coordination, at all levels to promote harmonization, and improve coherence, and synergies in the uses of the maritime, and coastal space.
9. **Combatting pollution, and environmental degradation (CPED)**	Preservation of the marine, and coastal environment against alterations caused by various types of marine, and terrestrial pollution, leading to a risk of habitats deterioration, and threatening ecosystem services, with the aim of achieving a good environmental quality.

1.2.2. Real and in theory MSP matrices

How actors build their strategies regarding the use of maritime space, and its resources depends not only on the positions each one adopts for or against the various objectives defined previously, but also on the strengths of each actor, on the influence they have on each other, and on the pressure, they are capable of exerting on this system. Two types of relationships therefore need to be documented: the position of each actor regarding the objectives, and the influence exerted by the actors on each other. For this, the MACTOR method proposes a numerical representation. For each analysis (Real or in theory) two MACTOR input data tables were informed to obtain:

1.2.2.1. Matrix of Direct Influences (MDI)

The Matrix of Direct Influences (MDI) “Actor X Actor” showing the direct influences each actor is capable of exerting on one another. Influences are graded from 0 to 4 according to the importance of the actor's possible jeopardy:

0 No influence	1 Operating procedures	2 Projects	3 Missions	4 Existence

1.2.2.2. Valued position matrix (2MAO)

The matrix of valued positions “Actor X Objective” (2MAO) provides information on the actor's stance on each objective (pro, against, neutral or indifferent), and the hierarchy of its objectives. The sign (valence) indicates whether the actor is likely to reach the objective or not with five levels of intensity characterising the degree of priority of the objective for the actor as followed:

0 Objective has a bleak outcome	1 Objective jeopardises the actor's operating procedures (management, etc...) / is vital for its operating procedures	2 Objective jeopardises the success of the actor's projects / is vital for the success of its projects	3 Objective jeopardises the accomplishment of the actor's mission / is indispensable for its missions	4 Objective jeopardises the actor's existence / is indispensable for its existence

It is to be noted that a prior step to the 2MAO consisted in filling up the 1MAO which is a simple position matrix showing the valence of each actor with respect to every objective (likely, unlikely, neutral, or indifferent) according to the following scale:

+1 Actor i is pro-objective j	-1 Actor i is against objective j	0 Actor i is neutral or indifferent to objective j

This was more like a safety step in order to simplify the procedure and avoid making mistakes. Although it is not separately input into the software with the initial data, it is recalculated later on in the processing phase from the 2MAO.

Choosing the data that fills the tables must be performed cautiously, as this stage determines the quality of subsequent results. At this level of our analysis, it is already possible to sort some information such as the global implication of each actor, and the most conflicting objectives.

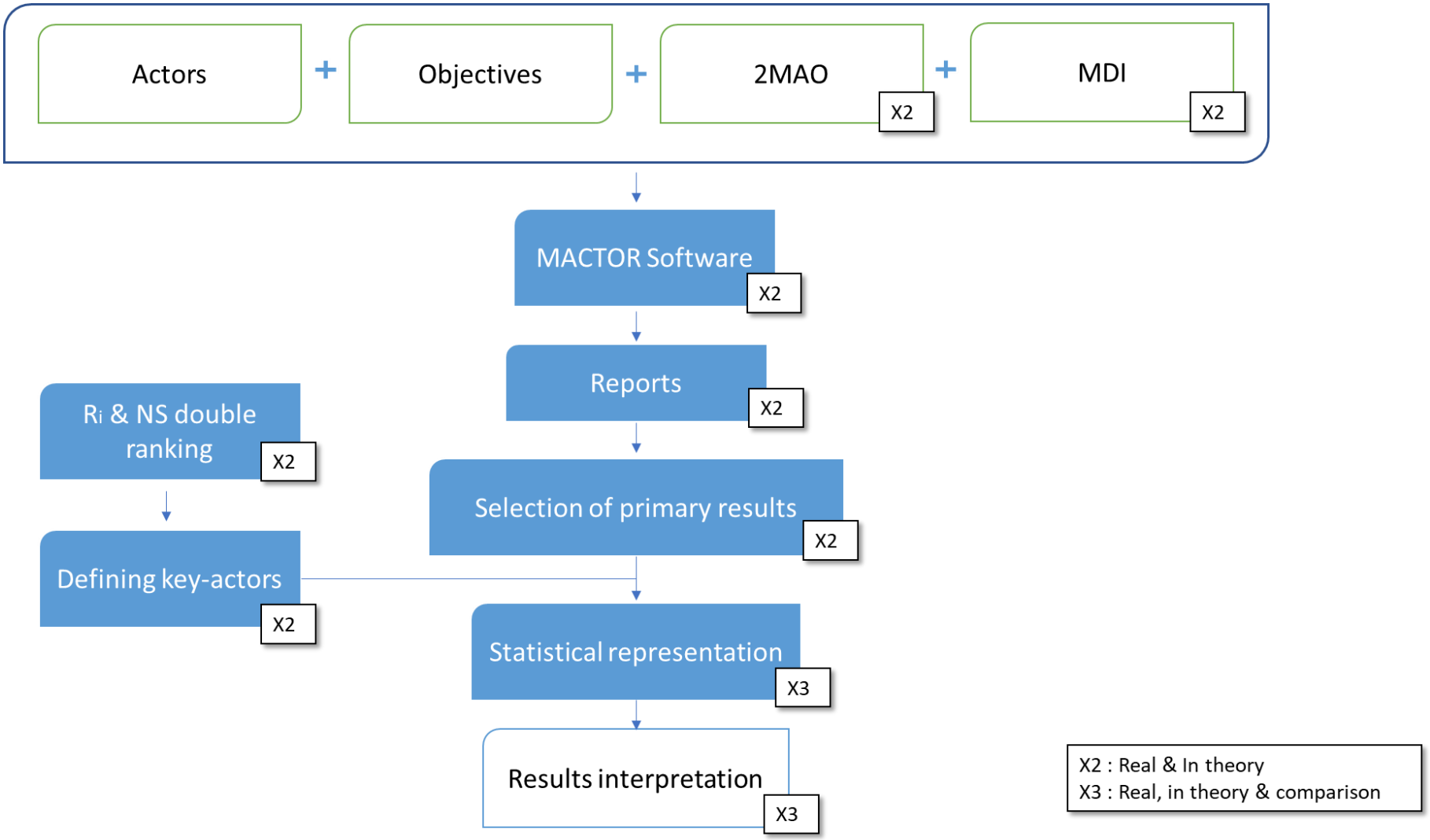


Figure 10: Actor mapping methodology.

2. Results and Discussion

As mentioned before, when all the data is input into the software, it generates a report of all the estimated results. This part of the manuscript details each of the chosen parameters in our study:

I_i D_i	NS	R_i	Ambivalence	Implication	Convergence	Divergence	1MAO	2MAO

2.1. Direct, and indirect influences MDII

2.1.1. Matrix of Direct, and Indirect Influences (MDII)

The influence actor A has on actor B is called a *direct* influence. If it influences actor C, who influences actor B, it will be called *indirect* influence. The MDII matrix determines the direct, and indirect influences of order 2 between actors. The utility of this matrix is its more complete vision of the games of competitiveness (an actor can reduce the number of choices of another by influencing it through an intermediary actor).

The "sum" operation is used to calculate the MDII. It does not produce (in this new matrix) the same scale of intensities adopted to evaluate direct influences in MDI. Despite this, values in MDII are a good indicator of the importance of direct, and indirect influences actors have on each other. Two indicators are calculated from the MDII:

- The degree of direct, and indirect influence of each actor (Ii, by summing rows).
- The degree of direct, and indirect dependence of each actor (Di, by summing columns).

Table 15 : MDII calculating, and interpretation details.

	Calculating elements	Elements of interpretation
MDII	The Matrix of Direct, and Indirect Influences (MDII) is calculated in the following way: $(\mathbf{MDII})_{ij} = (\mathbf{MDI})_{ij} + \Sigma k\ \mathbf{Min}\ (\ (\mathbf{MDI})_{ij}\ ,\ (\mathbf{MDI})_{ik}\ )$ With: "$(\mathbf{MDI})_{ij}$" : the direct influence actor i has on actor j; "$\Sigma k\ \mathbf{Min}\ (\ (\mathbf{MDI})_{ij}\ ,\ (\mathbf{MDI})_{ik}\ )$" : the sum of all indirect influences actor i exerts on actor j, and which flow through an intermediary actor k. For this last value we only take into account indirect influences of order 2, in other words influences flowing only with one intermediary actor at a time. Indirect influences of order 3, and then 4, etc… (being transmitted by 2 then 3 intermediary actors, etc. before attaining actor j) are not taken into account. We justify this choice by assuming that an actor i wanting to influence indirectly actor j in its calculations cannot take into consideration tens or hundreds of indirect influences relayed by many actors forming a chain. This is far too complicated. However, this actor can indeed exert many indirect influences of order 2, each being transmitted by one intermediary actor at a time. The net direct, and indirect influence of actor i (I_i) is calculated by adding the influences this actor receives from other actors, in other words not taking into account its auto indirect influence: $\mathbf{Di} = \Sigma k \neq \mathbf{I}\ (\mathbf{MDII})_{ki}$ N.B.: the indirect influence an actor has on itself is equal (by construction) to the indirect influence it receives from itself. This influence is called retroaction and is represented by the diagonal of the MDII matrix.	Values represent direct, and indirect influences between actors: The higher the value, the more influence the actor has on the other. The Ii ('Net direct, and indirect influence of actor I'), and Di ('Net direct, and indirect dependence of actor I') indicators are used to classify actors by their degree of indirect influences, and dependences.

2.1.1.1. Influence/dependence histograms:

Figures 11, and 12 are histograms representing the degree of direct, and indirect influence, and dependence of each actor (I_i, and D_i), and figure 13 shows the difference between the first two.

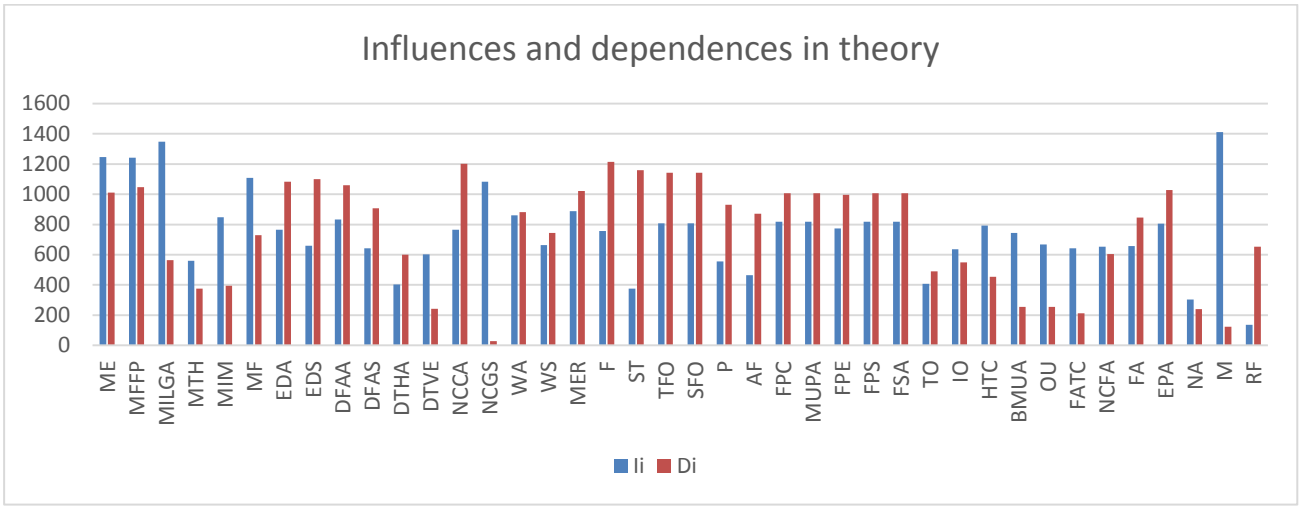


Figure 11: Degree of direct, and indirect influence, and dependence of actors in theory

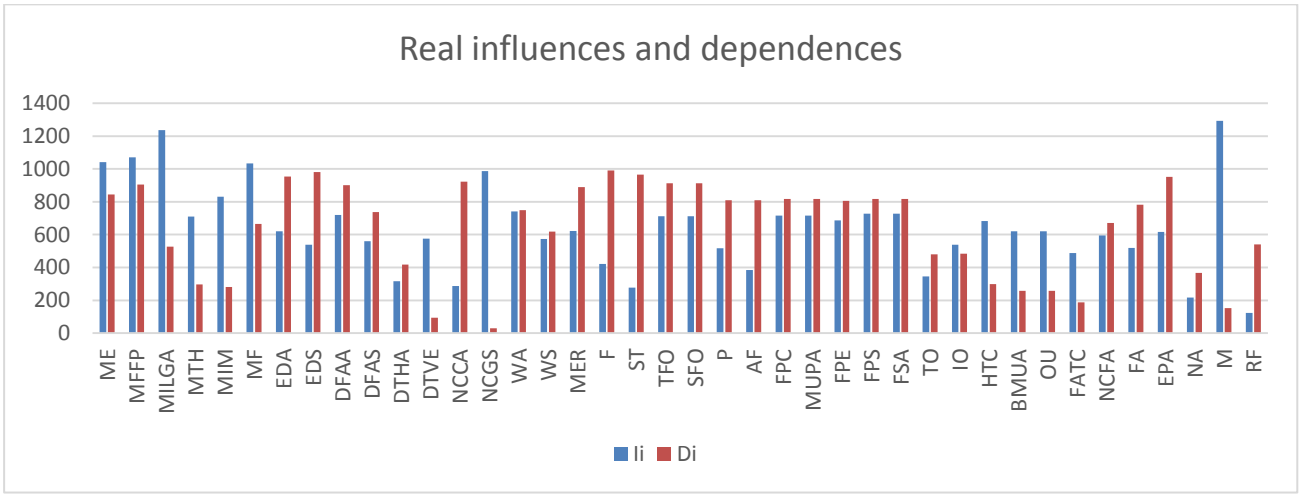


Figure 12: Real degree of direct, and indirect influence, and dependence of actors.

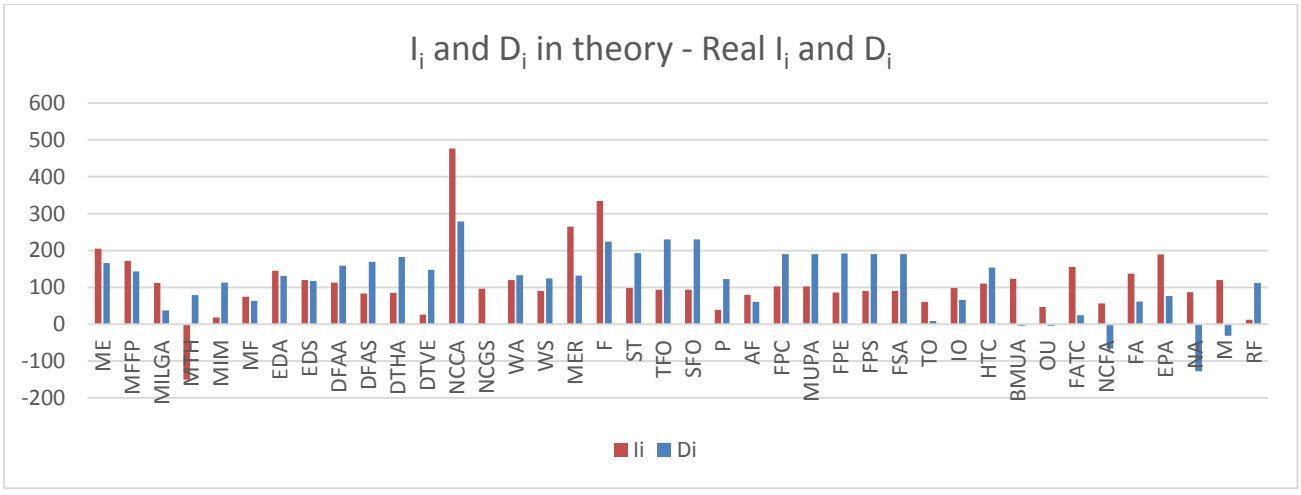


Figure 13: Difference between the real, and theoretical degree of direct, and indirect influence, and dependence

The actors who have the highest influence on the rest of the system are the same in theory, and on the field (real MSP), counting Medias (M), Ministries in charge of territorial planning (MICLAT) fisheries, and aquaculture (MFPP), environment (ME), and the coastguard service (NCGS). The ministry of finances (MF) also appears to be highly influent in real MSP. Two actors are the least influent in real, and theoretical MSP: recreational fishermen (RF), and nautical activities (NA) while two others have very low influences in real MSP: the national coastal commission of Annaba (NCCA), and small trades (ST).

Seventeen actors are very dependent on others in both theoretical and real MSP studies but in different orders. With the most dependent ones being commonly fishermen (F), and NCAA followed by fishery operators (ST, TFO, and SFO) port facilities (FPC, MUPA, FPE, FPS, FSA), administrative actors (MFPP, ME, EDA, EDS, DFAA), municipalities of the Edough region (MER), and environment protection associations (EPA). The least dependent actors are NCGS, M, fisheries, and aquaculture training centres (FATC), department of training, and vocational education (DTVE), and NA in both systems but NA's dependence increases in real MSP. Most differences are positive meaning that the majority of actors (34) are more dependent, and influent in theory than in real MSP except the ministry of tourism, and handicrafts (MTH) who's influence is bigger in reality, and NA, NCFA, M who are more dependent in real MSP than in theory, in that order. Also, two actors: universities (OU), and NCGS have the same dependences in theory, and real MSP. The most relevant differences are NCAA, F, and MER's influences along with NCAA, fishery operators, and port facilities' dependences which are higher in theory than in reality.

2.1.2. MDII competitiveness

2.1.2.1. MDII competitiveness vector

The MACTOR software uses a scalar to represent the competitiveness of each actor taking into account its direct influence, and dependence. Ri is the competitiveness of actor i considering its max: influences; direct, and indirect dependence;, and feedback or retroaction.

Table 16 : R_i calculating, and interpretation details.

	Calculating elements	Elements of interpretation
R_i	Competitiveness is calculated using Ii, Di, and the Matrix of Direct, and Indirect Influences (MDII)ij: $\mathbf{Ri = [(I_i - (MDII)_{ii}) / S] x [I_i / (I_i + D_i)]}$ Where: $\mathbf{S = \Sigma_i I_i = \Sigma_i D_i}$ Ri takes into account actor i's manoeuvre range $\mathbf{(I_i - (MDII)_{ii})}$, in other words its net direct, and indirect influence (Ii) minus its retroaction (MDII)ii. The relative manoeuvre range $\mathbf{[(I_i - (MDII)_{ii}) / S]}$ of actor i is then deflated by the coefficient $\mathbf{I_i / (I_i + D_i)}$ which is between 0, and 1, and allows to integrate the actors dependence in the equation. The R_i value is compared to 1: if an actor has a competitiveness value of more than 1, it is more competitive than the average: $\mathbf{R_i^* = n x (R_i / kR_k)}$ where **n** = number of actors.	The bigger the scalar, the more competitive an actor is. When an actor is more competitive so will be its influence, but its dependence, and retroaction will be quite weak. It is foolish to think that only the actor's influence measures its competitiveness. An actor can be very influential, be also very dependent, and at the same time be very retroactive: this would result in a weak competitiveness. However, an actor being moderately influential, and having no dependence or retroaction will be very competitive.

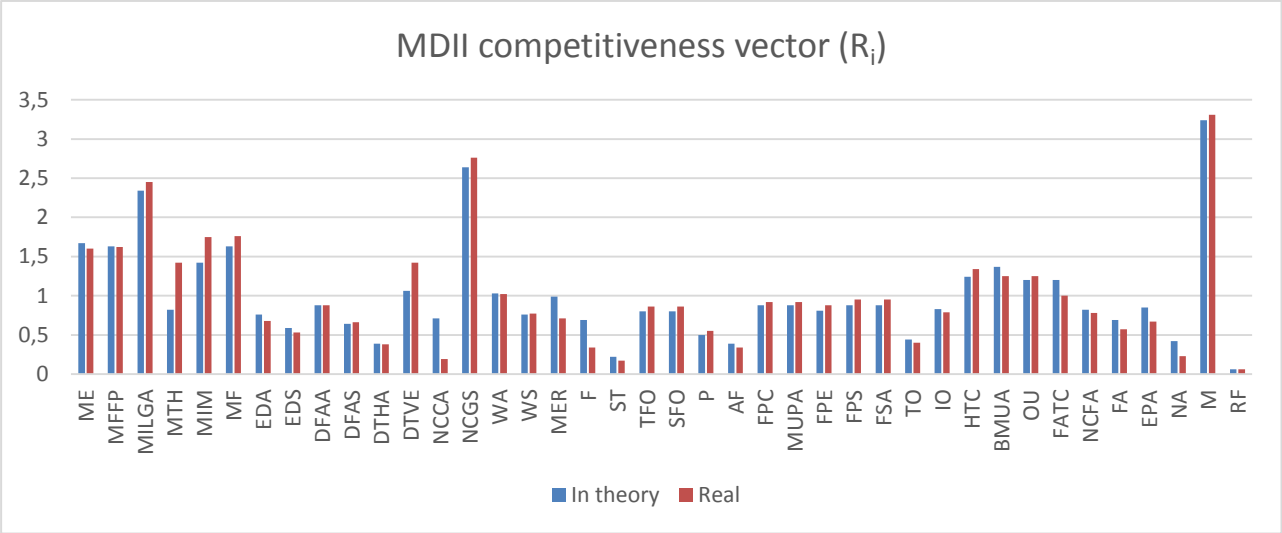


Figure 14: Real and theoretical competitiveness vector of actors

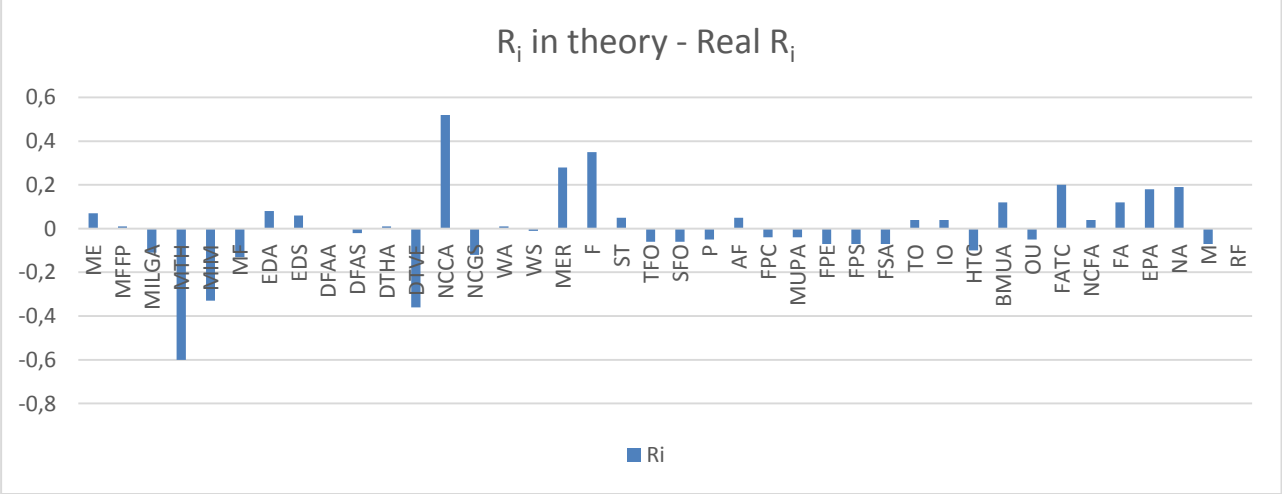


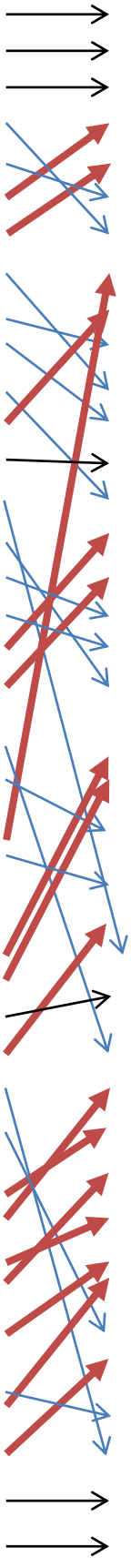
Figure 15: Difference between the real, and theoretical competitiveness vector of actors.

Actor's competitiveness ranges from 0.06 (RF) to 3.24 (M) in theory, and from 0.06 (RF) to 3.31 (M) in real MSP. The most competitive actors in both systems are M, NCGS, and MICLAT meaning that their dependences, and retroactions are insignificant compared to their influences. While the least competitive actors are recreational fishermen (RF), and small trades (ST) in both systems along with the national coastal commission (NCAA), and nautical activities (NA) in real MSP, which means that not only are they very influent, and dependent, but they also have high retroaction on themselves.

As for the rest of the actors, we notice a lot of shifts in their R_i rank as illustrated in figure 15. Of the 40 actors, 19 are more competitive in real MSP than in theory, 19 others are more competitive in theory than in real MSP, and the two remaining actors: department of fisheries, and aquaculture of Annaba (DFAA), and RF show no difference of competitiveness. The most relevant differences in competitiveness correspond to the ministry of tourism, and handicrafts (MTH), the department of training, and vocational education (DTVE), and the ministry of industry, and mines (MIM) who are more competitive in real MSP than in theory, and NCAA, F, and MER who on the contrary are more competitive in theory than in real MSP.

2.1.2.2. R_i ranking

	Category	In theory
1	Socio-professionnal organisations, and civil society	M
2	Administrations	NCGS
3	Administrations	MICLAT
4	Administrations	ME
5	Administrations	MFFP
6	Administrations	MF
7	Administrations	MIM
8	Scientists	BMUA
9	Economic operators	HTC
10	Scientists	OU
11	Scientists	FATC
12	Administrations	DTVE
13	Local authorities	WA
14	Local authorities	MER
15	Administrations	DFAA
16	Economic operators	FPC
17	Economic operators	MUPA
18	Economic operators	FPS
19	Economic operators	FSA
20	Socio-professionnal organisations, and civil society	EPA
21	Economic operators	IO
22	Administrations	MTA
23	Socio-professionnal organisations, and civil society	NCFA
24	Economic operators	FPE
25	Economic operators	TFO
26	Economic operators	SFO
27	Administrations	EDA
28	Local authorities	WS
29	Administrations	NCCA
30	Economic operators	F
31	Socio-professionnal organisations, and civil society	FA
32	Administrations	DFAS
33	Administrations	EDS
34	Economic operators	P
35	Economic operators	TO
36	Socio-professionnal organisations, and civil society	NA
37	Administrations	DTHA
38	Economic operators	AF
39	Economic operators	ST
40	Socio-professionnal organisations, and civil society	RF



	Category	Real
1	Socio-professionnal organisations, and civil society	M
2	Administrations	NCGS
3	Administrations	MICLAT
4	Administrations	MF
5	Administrations	MIM
6	Administrations	MFFP
7	Administrations	ME
8	Administrations	MTA
9	Administrations	DTVE
10	Economic operators	HTC
11	Scientists	BMUA
12	Scientists	OU
13	Local authorities	WA
14	Scientists	FATC
15	Economic operators	FPS
16	Economic operators	FSA
17	Economic operators	FPC
18	Economic operators	MUPA
19	Administrations	DFAA
20	Economic operators	FPE
21	Economic operators	TFO
22	Economic operators	SFO
23	Economic operators	IO
24	Socio-professionnal organisations, and civil society	NCFA
25	Local authorities	WS
26	Local authorities	MER
27	Administrations	EDA
28	Socio-professionnal organisations, and civil society	EPA
29	Administrations	DFAS
30	Socio-professionnal organisations, and civil society	AF
31	Economic operators	P
32	Administrations	EDS
33	Economic operators	TO
34	Administrations	DTHA
35	Economic operators	F
36	Economic operators	AF
37	Socio-professionnal organisations, and civil society	NA
38	Administrations	NCAA
39	Economic operators	ST
40	Socio-professionnal organisations, and civil society	RF

Figure 16: Top-down ranking of the 40 actors according to their competitiveness

2.1.3. Net scale of influences (NS)

The net scale of direct and indirect influences measures, for every couple of actors, the distance between the direct, and indirect influence. Each actor exerts (receives) direct, and indirect influences of order 2 (from) each actor. The net influence scale will indicate for each couple of actors the surplus influence either exerted or received (Appendix 2). The next step is to calculate for each actor the total difference of direct, and indirect influences by adding up the net influence scales on the rest of the actors. These results are illustrated in the histogram below (figure 18).

Table 17 : NS calculating, and interpretation elements.

	Calculating elements	Elements of interpretation
NS	The direct, and indirect influence net scale is calculated in the following way: $(NS)_{ij} = (MDII)_{ij} - (MDII)_{ji}$	Values are relative whole numbers: The (+) sign indicates the actor exerts more influence than it receives; The (-) sign indicates the actor exerts less influence than it receives.

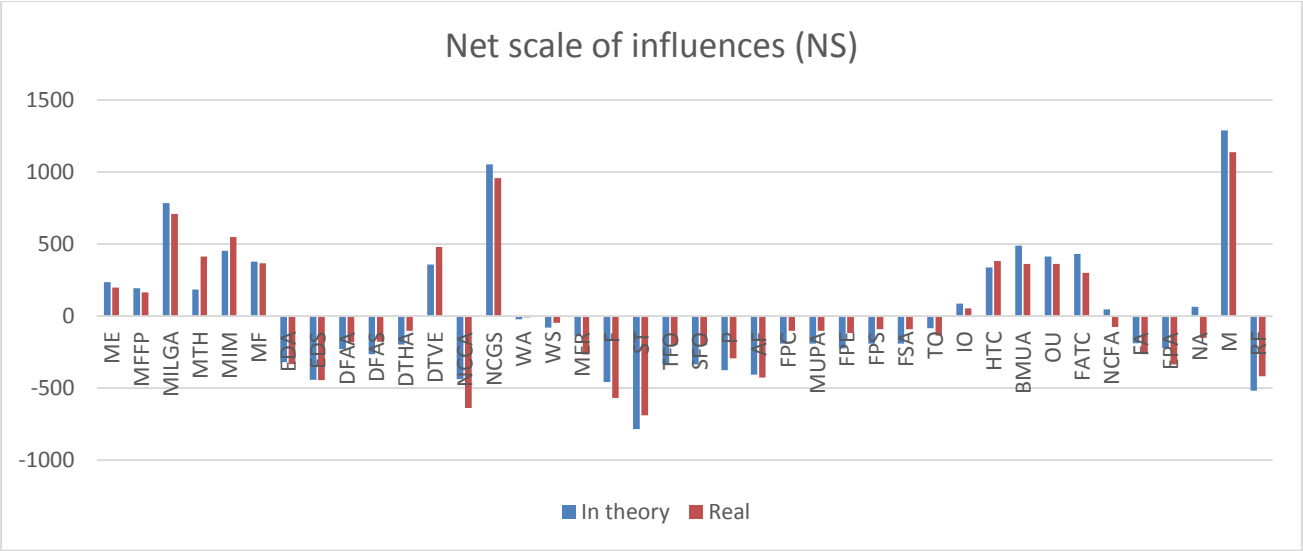


Figure 17: Real and theoretical net scale of direct and indirect influences of actors

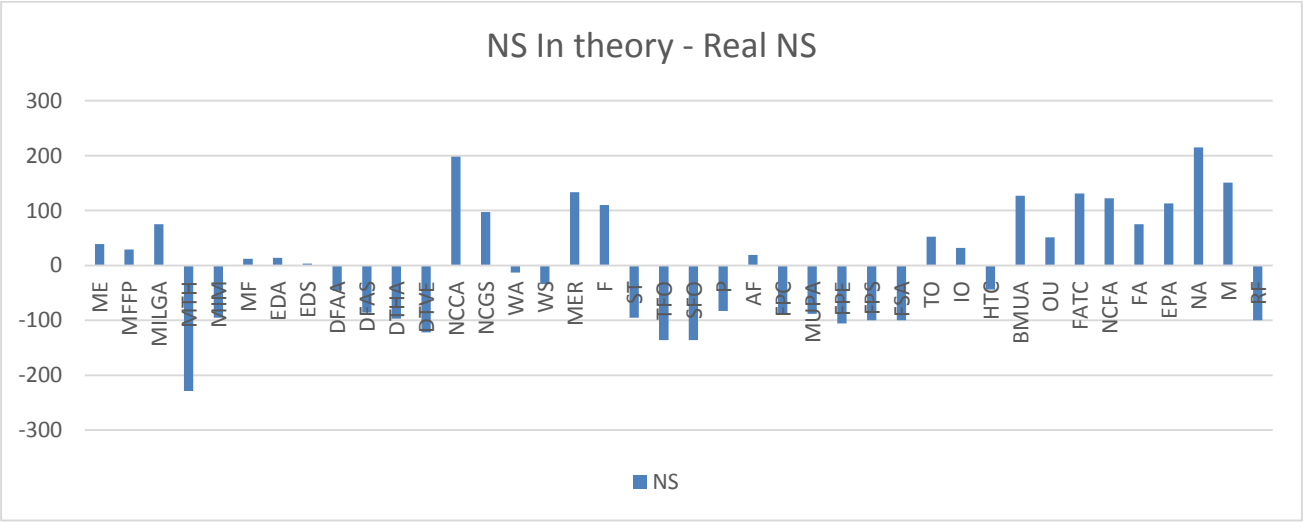


Figure 18: Difference between the net scale of direct, and indirect influences of actors.

Fourteen actors have positive net scales of influence with the highest corresponding to M, NCGS, and MICLAT (who are also the systems' most competitive actors). These actors exert more influence than they receive from the others combined. 23 actors have negative net scales of influence with the lowest corresponding to ST, NCCA, F, and RF. On the contrary, these actors receive more influence than they exert on the others.

The national chamber of fisheries, and aquaculture (NCFA), and NA have a negative real NS, and a positive theoretical NS meaning that they exert more influence than they receive in theory, but they receive more influence than they exert in reality. The wilaya of Annaba (WA) has the smallest NS, which is almost non-existent in both systems, so this actor exerts as much influence as it receives.

The biggest differences correspond to NA, and NCAA who seem to have a higher net scale of influence in theory than in real MSP (the national coastal commission of Annaba receives more influence than it exerts in both systems, but real MSP's NS is lower than theoretical MSP's NS), and to MTH with the opposite case. Also, the smallest differences correspond to environment departments of Annaba, and Skikda (EDA, EDS), MF, and aquaculture farms' (AF) net scales which are higher in theory than in real MSP.

2.2. Map of influences and dependences between actors

The map of influence, and dependence between actors is a graphic representation of actors' positions with respect to influences, and dependences (direct or indirect: D_i, and I_i) between each other. Positions are calculated automatically by the MACTOR software. This map is created from the MDII matrix, more specifically the I_i, and D_i. The x-axis represents the dependence, and y-axis the influence actors have between each other.

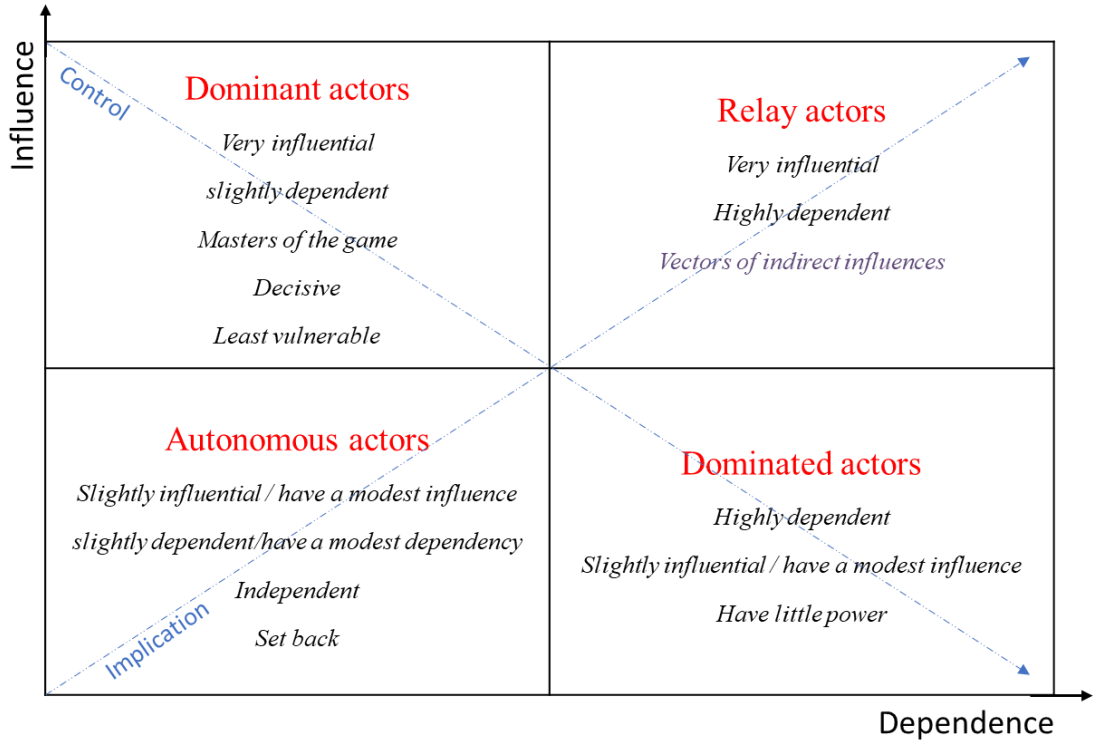


Figure 19: Key to reading the influence dependence maps. (Based on Zerrouki 2020, Bassaler 2004)

22.1. Actor profiling:

As mentioned earlier in this chapter, in the fifth stage we perform a bivariate ranking of actors using R_i, and NS with a two parameters filter on Microsoft EXCEL software to define the systems' key actors. The superposition of this result on the influence dependence maps (figure 20) makes it possible to add an element of interpretation to these maps, not only do we define the type of actors (figure 19) but we also profile, and arrange them into 4 groups according to this top-down double ranking. The different sections enumerated from 1 to 4 on the maps refer to the actors' rank of power. These were delimited according to noticeable profile shifts represented in appendix 3.

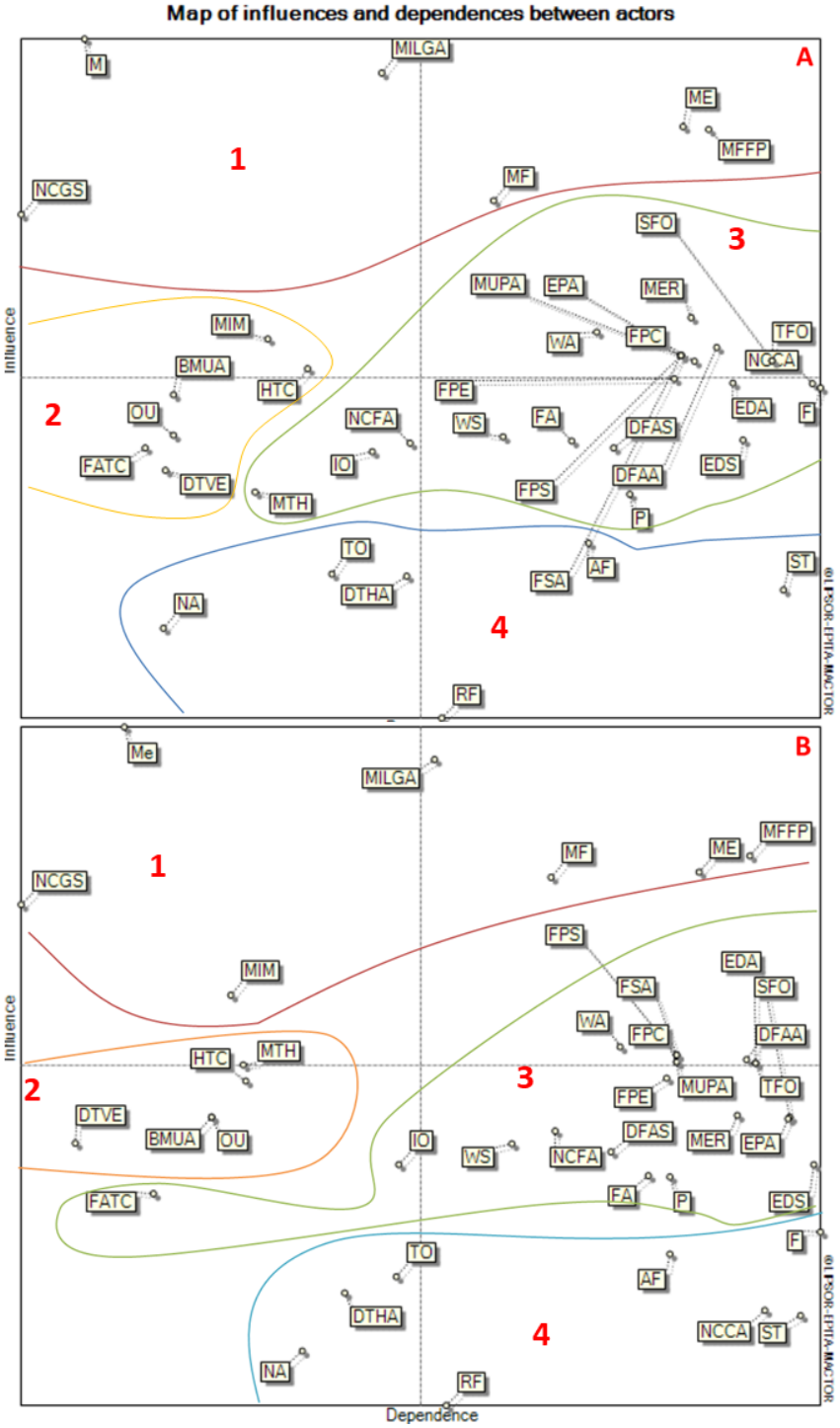


Figure 20: Maps of influences, and dependences, A: MSP in theory, and B: real MSP.

The most implicated actors in both systems are ministries in charge of fisheries, and the environment (MFPP, and ME) which is only normal, since they have the most to gain from the achievement of MSP objectives, being two of the key actors in the creation of the Edough Mounts future MCPA. Even though they are both relay actors who are very influent, and very dependent at the same time, they also belong to the 1st rank of power, therefore they have the means to trigger conflicts and/ alliances in both systems.

Medias (M), and the coastguard service (NCGS) are the most dominant, and controlling in the game of actors of both systems, for different reasons. They are both in the 1st rank of power. NCGS has regulatory missions over maritime, and coastal space, and therefore, over its users (the rest of the actors). As for M, it has the least to lose whatever the consequences of the system's evolution although it has the potential to influence most of the actors. In the same rank of power, we find the ministry of finance (MF) (relay actor in A, and B), and MICLAT (dominant in A, and relay in B because its dependence increases in real MSP).

Hydrocarbon transport companies (HTC), universities (OU, BMUA), and the department of training, and vocational education (DTVE) are ranked second according to their power profiles in both systems. They are autonomous actors.

The common 4th rank actors of both systems are autonomous: nautical activities (NA), tourism operators (TO), department of tourism, and handicraft of Annaba (DTHA); and dominated: recreational fishermen (RF), aquaculture farms (AF), and small trades (ST). These last three actors are the systems' least controlling actors, they relatively have no means of action over the game of actors. Note that NA is the least implicated actor in theory MSP but not so much in real MSP, and that ST is the least controlling actor in real MSP.

The rest of the actors belong to the 3rd rank of power meaning that they have average influence, relatively considerable dependence, and average control, and implication. These actors include local authorities, port facilities, decentralized administrations…etc. They are either relay, dominated or autonomous actors.

Some actors change status between the two systems such as:

- NCAA and F whose influences drops down enough in real MSP to be one of the least controlling actors.
- The ministry of industry, and mines (MIM) whose power increases in real MSP to go from the 2nd to the 1st rank.
- The ministry of tourism and handicrafts (MTH) who goes from being a 3rd rank autonomous actor in theory to a 2nd rank actor in between dominance, and autonomy in real MSP.
- Fisheries and aquaculture training centres (FATC), who's involvement in the decision-making processes, and institution accompaniment in developing blue economy, and MSP is not systematic.

Key actors appear to have different rates of power over the evolution of both in theory, and real MSP systems. It wouldn't be logical to consider only the most powerful actors as others are central to the discussed problematic, such as fishermen (in B) who are the first actors concerned by the establishment of the MCPA through MSP at a local scale, or the coastal commission (in A) who has the legal attributions, and prerogatives to be implicated in the process, or even local authorities (in A, and B) who may be the most suitable actors to gather

the rest of the stakeholders to discuss the problematic in a participatory integrated vision. Not having power over the systems does not exclude actors from having a key role, if not considered, these actors could slow down the achievement of goals, and form obstacles to the evolution of the systems.

2.3. Order 02 Analysis

2.3.1. Valued position matrix (2MAO)

The 'Data/Matrix of Actors, and Objectives (2MAO)' gives access to the 2MAO matrix. The rows, and columns of this matrix contain the name of those actors taking part in the study at hand. This matrix is the initial information input into the software, and it is equally presented as a result of the MACTOR study, to identify marginalities. As explained earlier, the 2MAO matrix specifies the actor's position on each objective (pro, against, neutral or indifferent).

2.3.2. Convergence:

The valued convergence matrix or Valued Convergence Actors X Actors (2CAA) is related to the Matrix of valued positions Actors X Objectives (2MAO). This calculates the average convergence intensity between two actors, when these have the same degree (pro or against the objective). The values in this matrix do not measure the number of potential alliances (as in 1CAA), but the alliance intensity with the objectives hierarchy (preferences) of the couple of actors. This is a symmetrical matrix.

2.3.2.1. Graph of order 2 convergences between actors

The graph of convergences between actors maps the actors with respect to their convergences (data in matrices 2CAA). The nodes in the graph represent the defined actors, and the links the relationships expressed in the mentioned matrices.

2.3.3. Divrgence

The Matrix of valued divergences or valued Divergences Actors X Actors (2DAA) is related to the Matrix of valued positions Actors X Objectives (2MAO). It identifies for each couple of actors the number of objectives for which these actors do not hold the same position (one actor is pro the objective, and the other is against it). The values in this matrix do not measure the number of potential conflicts, but rather the conflict intensity with the objectives hierarchy (preferences) of the couple of actors. This is a symmetrical matrix.

2.3.3.1. Graph of order 2 divergences between actors

The graph of divergences between actors, maps the actors of order 2 with respect to their divergences (data in matrices 2DAA). It helps to identify potential alliances, and conflicts. These graphs represent the extent, or intensity, of the divergence of actors with respect to objectives. The nodes in the graph represent the defined actors, and the links the relationships expressed in the mentioned matrices.

Table 18 : 2 CAA, and 2DAA calculating, and interpretation details.

	Calculating elements	Elements of interpretation
2CAA	The valued convergence matrix is calculated in the following way: If $\mathbf{((2MAO)_{ik} \times (2MAO)_{jk}) > 0}$, Then $\mathbf{(2CAA)_{ij} + ½ \times (|(2MAO)_{ik}| + |(2MAO)_{jk}|)}$ Otherwise $\mathbf{(2CAA)_{ij} = 0}$	The values represent the degree of convergence: the higher the intensity, the more actors have common interests.
2DAA	The valued divergence matrix is calculated in the following way: If $\mathbf{((2MAO)_{ik} \times (2MAO)_{jk}) < 0}$, Then $\mathbf{(2DAA)_{ij} + ½ \times (|(2MAO)_{ik}| + |(2MAO)_{jk}|)}$ Otherwise $\mathbf{(2DAA)_{ij} = 0}$	The values represent the degree of divergence: the higher the intensity, the more actors have diverging interests.

2.3.4. Degree of convergence & divergence (2CAA & 2DAA):

Also calculated in the order 02 analysis are the degree of convergence, and divergence associated to the valued positions (2C, and 2D respectively) which are global indicators of the convergence, and divergence percentages of the set of actors with the set of objectives.

Table 19 : 2C, 2D, and calculating elements.

	Calculating elements	In theory	Real
2C	The degree of convergence is related to the valued positions: $\mathbf{2C = (\Sigma_{ij} (2CAA)_{ij}) / (\Sigma_{ij} (2CAA)_{ij} + \Sigma_{ij} (2DAA)_{ij})) \times 100}$	94.8%	74.9%
2D	The degree of divergence is related to the valued positions: $\mathbf{2D = (\Sigma_{ij} (2DAA)_{ij}) / (\Sigma_{ij} (2CAA)_{ij} + \Sigma_{ij} (2DAA)_{ij})) \times 100}$	5.2%	25.1%

Order 02 analysis is done taking into consideration only the objective hierarchy, and the degree of opinion.

In theory MSP, the overall intensity of convergences is high while divergences are less intense with the strongest divergence between industry operators (IO), and environment protection associations (EPA). In real MSP, a significant number of weak convergences appears and the number of strong ones decreases. However, we also notice a lot of strong divergences in actor's interests.

Some actors can have very weak convergences, and divergences at the same time, which implies that they often have neutral or indifferent positions such as recreational fishermen (RF) in real MSP. Medias do not appear on the divergence graphs (figure 21), probably because of their weak interactions with the other actors, and particularly with keys actors. The convergence of this actor is not necessarily regular, and may appear only during certain situations.

The degree of convergence and divergence percentages of the set of actors with the set of objectives (table 19) show a difference of about 20% between real, and theoretical MSP. The fact that there are 20% more convergences and 20% less divergences in theory than in in real MSP sheds light on the gaps of potential alliances when considering the real aspects of the game of actors.

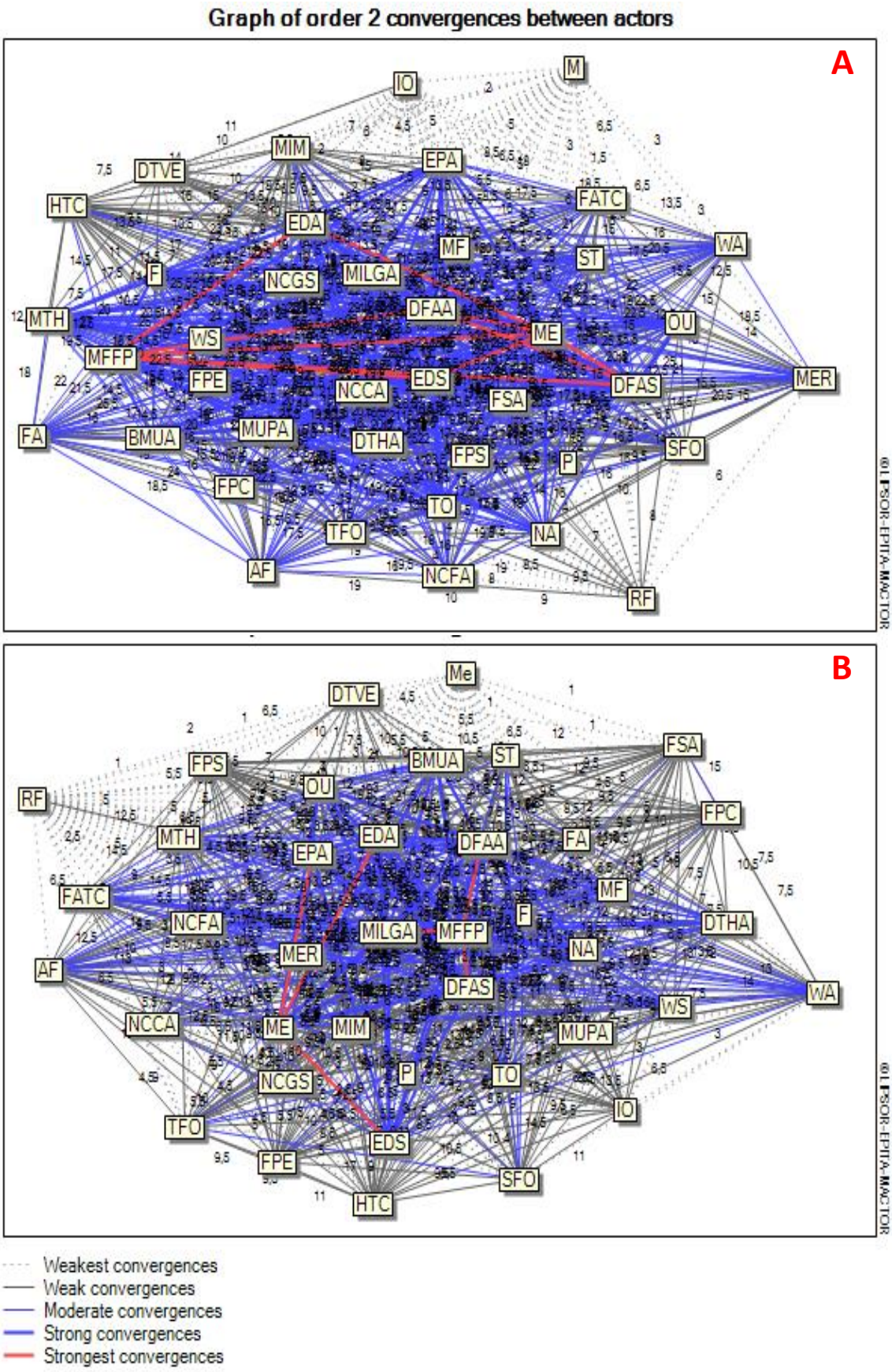


Figure 21: Graphs of order 02 convergence between actors, A: MSP in theory, and B: real MSP.

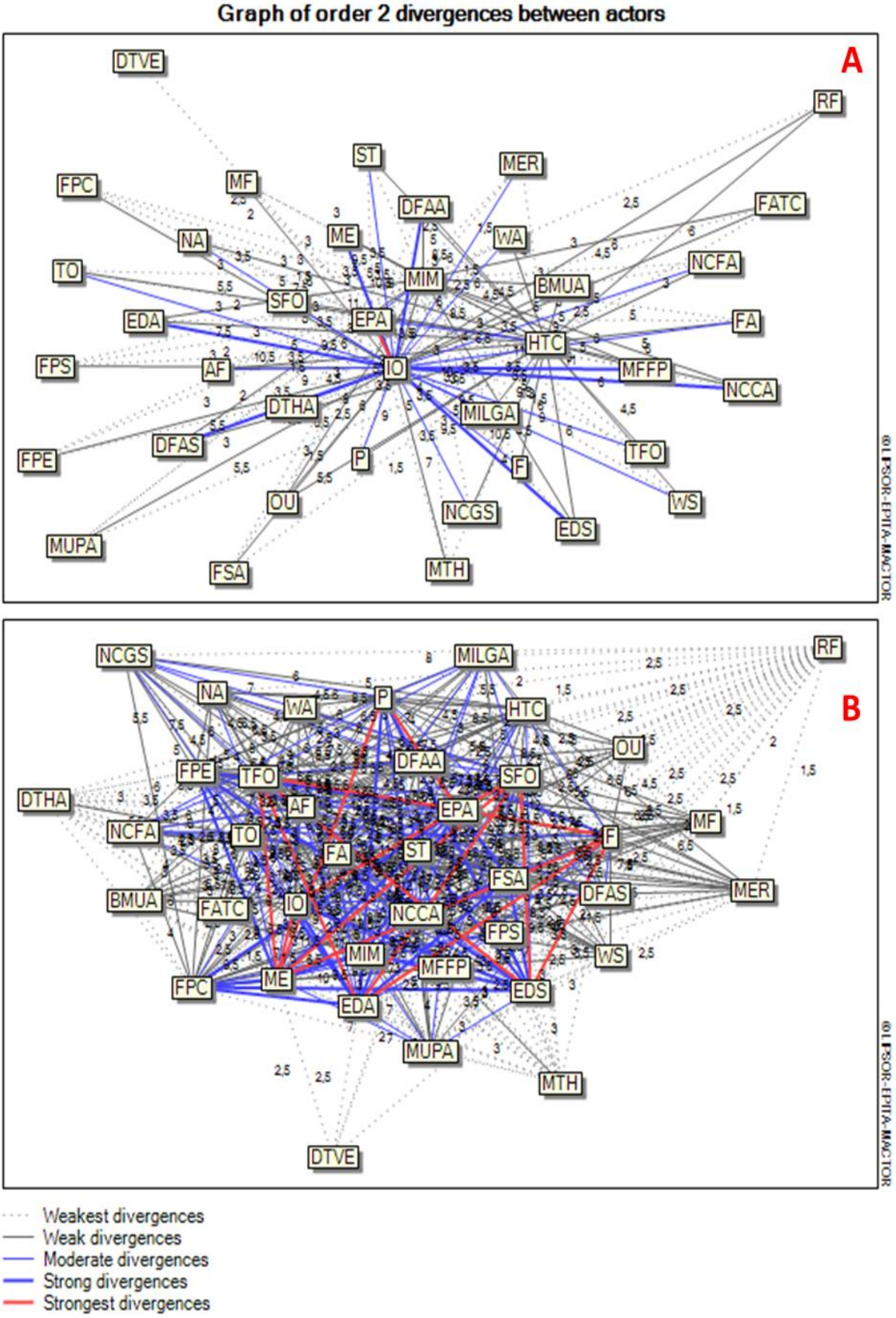


Figure 22: Graphs of order 02 divergence between actors, A: MSP in theory, and B: real MSP.

2.4. Order 03 analysis:

2.4.1. Weighted valued position matrix (3MAO)

The weighted (with respect to competitiveness) valued position matrix (3MAO) describes each actor's position on every objective. This is taking into account its degree of opinion on every objective, its objective hierarchy, and competitiveness between actors.

Table 20 : 3MAO calculating, and interpretation elements.

	Calculating elements	Elements of interpretation
3MAO	The weighted valued position matrix (3MAO) is calculated automatically by multiplying the Matrix of valued position (2MAO) by the vector of actor competitiveness (resulting from their indirect influences ($\mathbf{R_i}$)): $\mathbf{(3MAO)_{ij} = R_i^* \times (2MAO)_{ij}}$	Positive values represent the actor's mobilisation towards its objectives. Negative values represent the rate of opposition.

2.4.2. Actor's mobilisation towards objectives

Figure 23 presents a histogram that is produced from the valued relationship matrix (order 3) between actors, and objectives, 3MAO. This histogram is used to identify for each actor, the extent of its position with respect to the defined objectives, e.g., pro or against since it shows the actions taken by actors towards objectives.

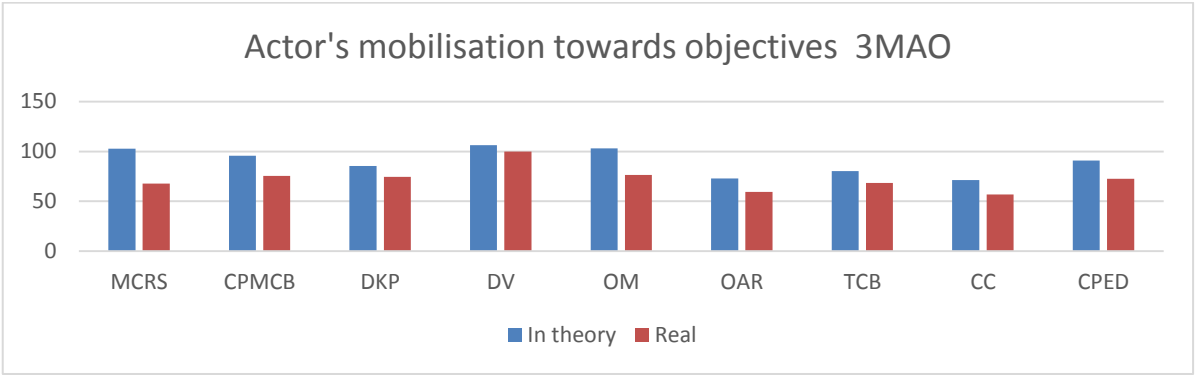


Figure 23: Real and theoretical mobilisation of actors towards their objectives.

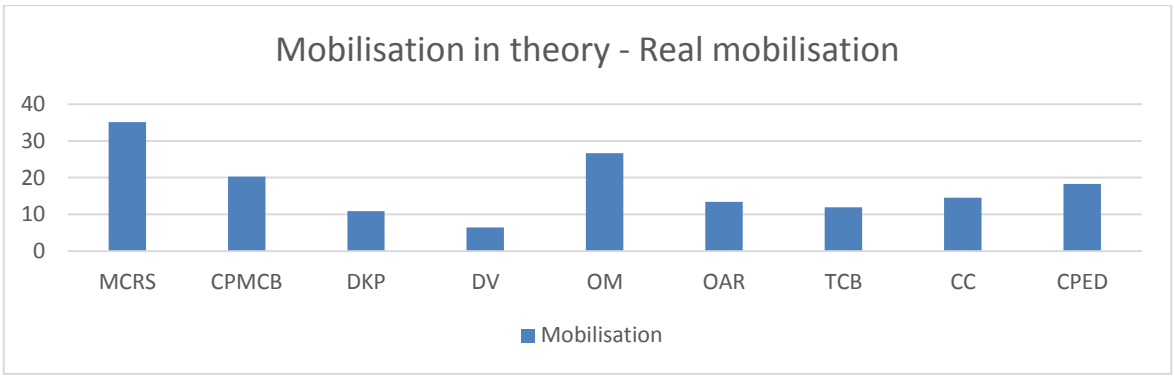


Figure 24: Difference between real, and theoretical mobilisation of actors towards their objectives

2.4.3. Convergence

The weighted valued matrix of convergences or weighted valued Convergences Actors X Actors (3CAA) is related to the weighted valued position matrix Actors X Objectives (3MAO). It identifies for a couple of actors the number of common positions they have on objectives (pro or against). This would identify the number of possible alliances also taking into account the actors' preferences in terms of objectives, and their competitiveness. This is a symmetrical matrix.

2.4.3.1. Graph of order 3 convergences between actors

The graphs of convergences between actors are produced from the symmetrical matrices 1CAA, 2CAA, 3CAA. This graph maps the actors with respect to their convergences (data in matrices 1CAA, 2CAA, 3CAA). That is, the closer actors are to each other, the more their convergence is intense. The nodes in the graph represent the defined actors, and the links the relationships expressed in the mentioned matrices.

2.4.4. Divergence

The weighted valued matrix of divergences or weighted valued Divergences Actors X Actors (3DAA) is related to the weighted valued position matrix Actors X Objectives (3MAO). It identifies for each couple the average divergence intensity for those two actors who do not hold the same position (one actor is pro the objective, and the other is against it). The values of this Matrix measure the conflict intensity with, for every couple, their objectives hierarchies (preferences), and their competitiveness. This is a symmetrical matrix.

2.4.4.1. Graph of order 3 divergences between actors

The graphs of divergences between actors are produced from the symmetrical matrices 1DAA, 2DAA, 3DAA. The graph of divergences between actors, maps the actors of order 3 with respect to their divergences (data in matrices 3DAA). It helps to identify potential alliances, and conflicts. The nodes in the graph represent the defined actors, and the links the relationships expressed in the mentioned matrices.

Table 21 : 3CAA, and 3DAA calculating, and interpretation details.

	Calculating elements	Elements of interpretation
3CAA	Weighted valued Matrix of convergences is calculated in the following manner: If $\mathbf{((3MAO)_{ik} \times (3MAO)_{jk}) > 0,}$ Then $\mathbf{(3CAA)_{ij} = 1/2 \times (|(3MAO)_{ik}| + |(3MAO)_{jk}|)}$ Otherwise: $\mathbf{(3CAA)_{ij} = 0}$	The values represent the degree of convergence: the higher the intensity, the more actors have common interests
3DAA	Weighted valued Matrix of convergences is calculated in the following manner: If $\mathbf{((3MAO)_{ik} \times (3MAO)_{jk}) < 0,}$ Then $\mathbf{(3DAA)_{ij} = 1/2 \times (|(3MAO)_{ik}| + |(3MAO)_{jk}|)}$ Otherwise: $\mathbf{(3DAA)_{ij} = 0}$	The values represent the degree of convergence: the higher the intensity, the more actors have diverging interests

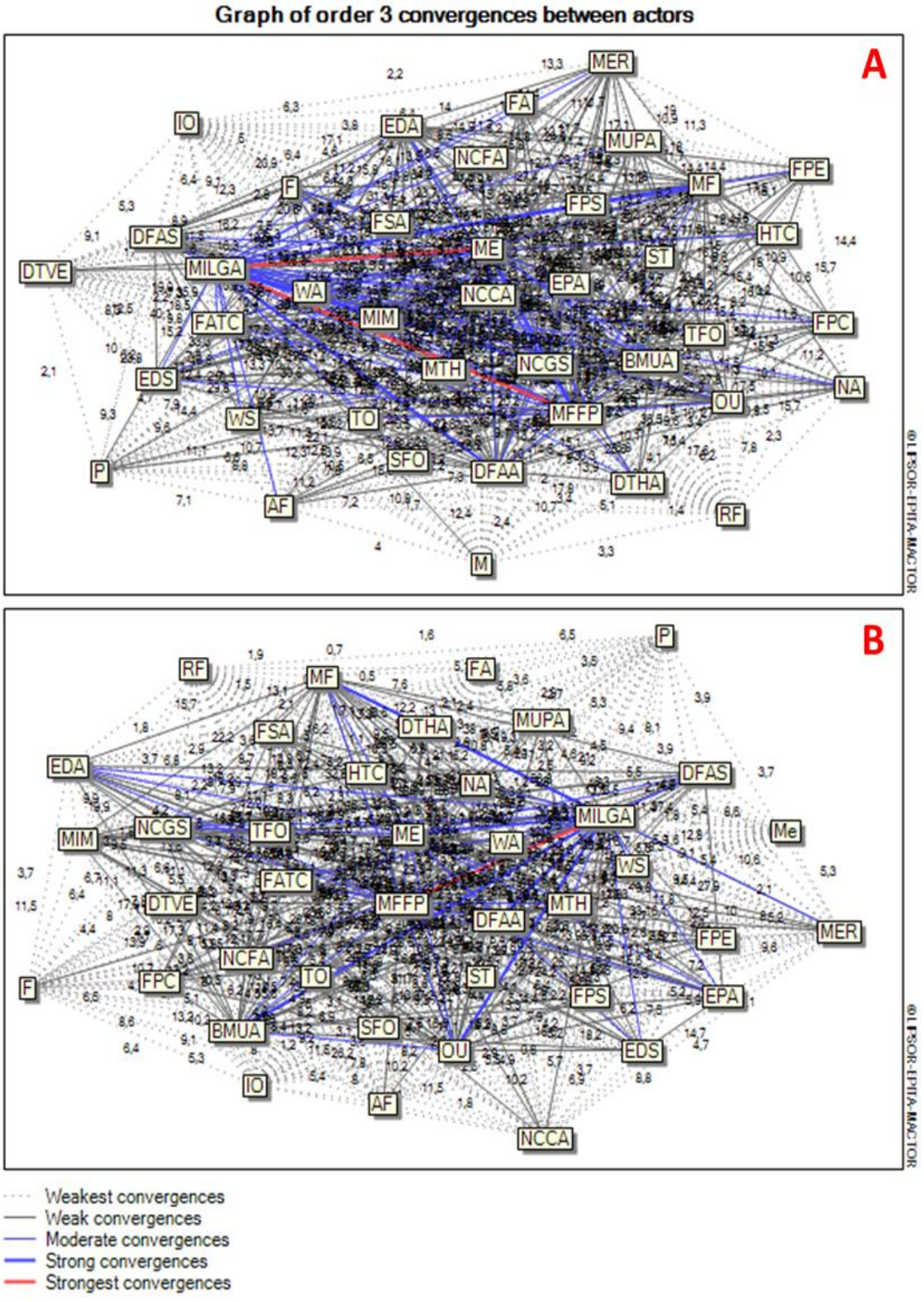


Figure 25: Graphs of order 03 convergence between actors, A: MSP in theory and B: real MSP.

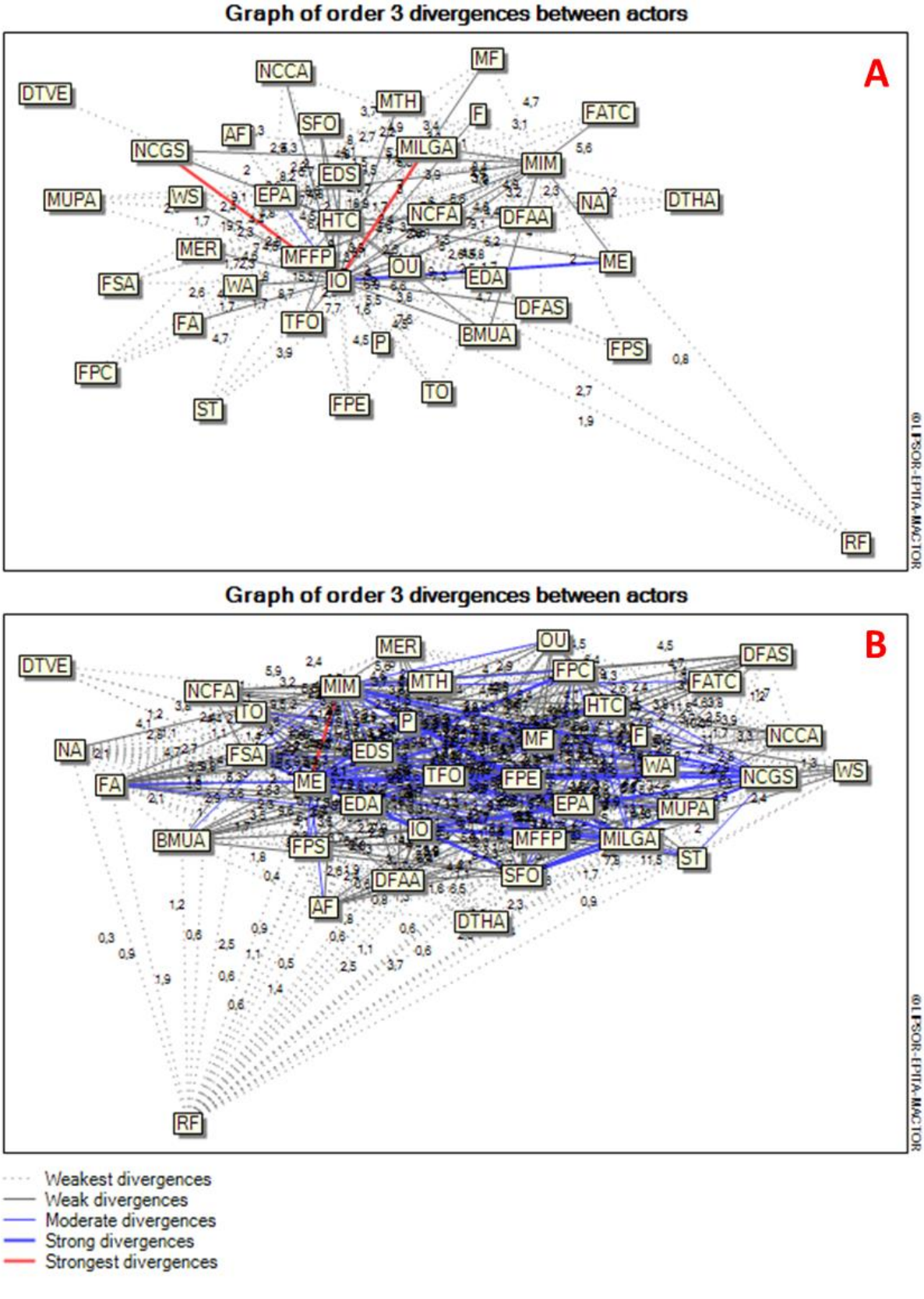


Figure 26: Graphs of order 03 divergence between actors, A: MSP in theory and B: real MSP.

If two actors have common interests their potential alliance is very much probable. If their interests are diverging, they are more likely to be in conflict.

However, it is not enough to be in conflict with an actor in order to oppose him; one must also have the direct or indirect means of action to do so. This conditions the alliances or conflicts. Furthermore, it is the existence of a favourable competitiveness that triggers a conflict (Gombleu, 2018).

Order 03 analysis clarifies the impact of considering actors' competitiveness in the evaluation of their convergences, and divergences. This not only affects the intensities of these indicators as shown in the graphs but also allows us to assess actors' mobilisations, and rates of opposition towards objectives in both systems.

The rate of opposition on all 9 objectives is non-existent since all mobilisation values are positive. Meaning that not only are the actors involved in the 9 objectives, but they also have means of action on them considering their competitiveness.

We notice a significant decrease in the overall intensity of convergences, and divergences in both systems when considering the actor's competitiveness. Implying that actors have less means of actions to trigger conflicts or form alliances in real MSP than in theory.

The strongest link of convergence in theory is between ministries: ME, MICLAT, and MFPP but the ministry in charge of the environment diverges away in real MSP. The weakest convergences in both systems are noticed with industry operators (IO), proxies (P), medias (M), and recreational fishermen (RF) in addition to fishermen (F), and the national coastal commission of Annaba (NCAA) in real MSP.

The strongest link of divergence in interests is between the coastguard service (NCGS), and MFPP, and between MICLAT, and IO in theory MSP. While in real MSP, the strongest link is between the ministry of industry, and mines (MIM), and ME. A lot of weak divergences appear in theory which is not the case of real MSP where most links are of moderate intensity. RF's order 02 analysis status is maintained, it has indeed a neutral or indifferent position.

Medias do not appear on the divergence graphs, probably because of their main topics of interest which are not necessarily in line with the priorities of key players in costal and marine zones. On the other hand, the temporal horizon for medias is not consistent with the temporal horizon of administrative, and economic actors, and of coastal, and maritime planning.

2.5. Ambivalence EQ3 :

Two actors can share both converging and diverging positions on different objectives. Hence, we call this couple of actors *ambivalent.* If they wish to become allies, they have to work only on those common objectives, and put aside their diverging objectives. Actor ambivalence is calculated with three equilibrium indicators using their simple, valued, then valued, and weighted positions. We're only considering the third indicator EQ3 to produce a histogram representing the ambivalence of actors on objectives (Figure 27).

Table 22 : 3EQi calculating, and interpretation elements.

	Calculating elements	Elements of interpretation
$3EQ_i$	The weighted valued ambivalences is calculated in the following way: **$3EQ_i = 1 - (|k|(3CAA)_{ik}| - |3DAA)_{ik}|) / (|k|(3CAA)_{ik}| + |(3DAA)_{ik}|)$**	This indicator varies from 1 (very ambivalent actors) to 0 (not ambivalent actors).

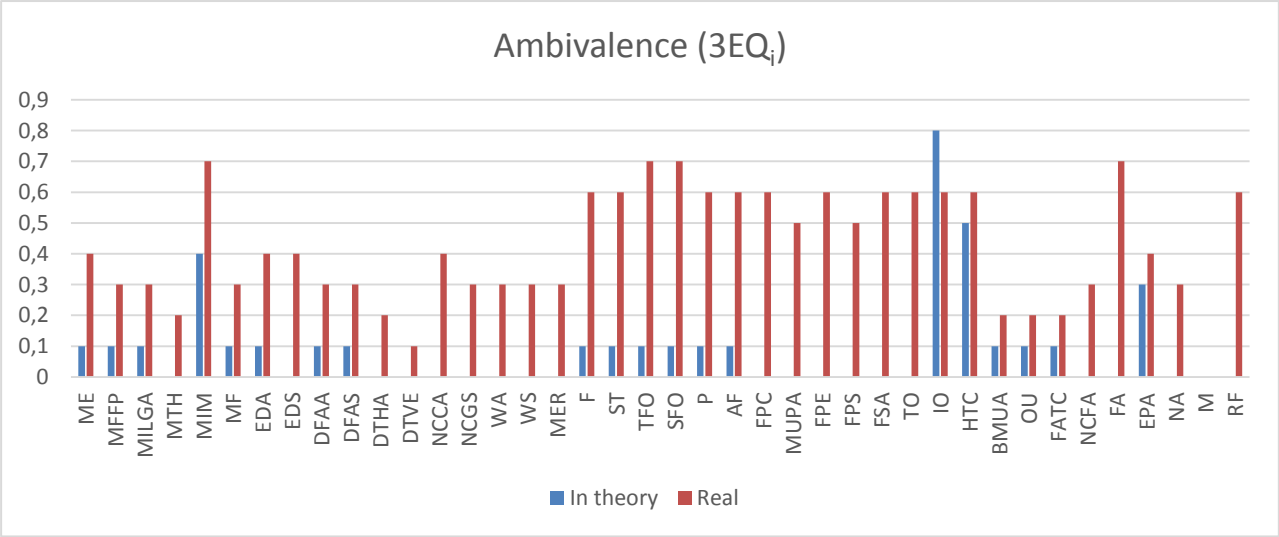


Figure 27: Actors' weighed valued ambivalence.

To understand this parameter, we'll discuss two examples:

- In theoretical MSP, industry operators (IO) are an autonomous actor with modest influence, and dependence, have average competitiveness, and very low net scale of influence, and belong to the 3rd power rank., and yet, IO's weighed valued ambivalence is the highest in the game of actors. This means that IO is the actor that shares the same positions (diverging or converging) with the actors it interacts with (influences or depends on) on their different objectives the most. This result depends on the number of actors the said actor interacts with, and on their similarities in positions, hence it is safe to say that since IO is an independent or set back actor, it is the most ambivalent one because its interactions are limited, and because most of them are similar.
- In both systems, M is the most dominant actor being the first in the 1st power rank. Accordingly, the number of interactions M has in the game of actors is the highest. Therefore, having a non-existent ambivalence both real, and in theory, means that it shares no similar positions with the actors it influences on the objectives.

The most ambivalent actors in theory are IO, HTC, and MIM. Conversely, MIM, port facilities, fishery operators, AF, FA, RF, IO, TO are the most ambivalent actors in real MSP. The least ambivalent actor in both systems is M along with RF, NA, FA, NCFA, TO, port facilities, local authorities, NCGS, NCCA, DTVE, DTHA, EDS, and MTH.

Most ambivalences in theory are non-existent. Thus, there is no need to represent the difference between the two systems in another histogram. Overall, except IO there is less ambivalence in theory than in real MSP.

2.6. Net distance between objectives:

The map of net distance between objectives (figure 28) is used to identify objectives on which actors take the same position (either pro or against). It hence enables to isolate groups of objectives where there is a strong convergence (when objectives are close together) or divergence (when objectives are far apart) on the part of actors' opinion. It also maps objectives with respect to the net scale (the difference between the valued convergence matrix, and the valued divergence matrix, respectively 2COO, and 2DOO).

Figure 28: Maps of net distance between objectives, A: MSP in theory and B: real MSP

There seems to be less proximities between objectives in B than in A meaning that the rate of divergence on objectives is higher in real MSP which is a potentially negative element in the analysis.

In theory MSP, we notice three pairs of objectives on which actors take the same positions on Management Control Regulation and Surveillance, and Observation and Monitoring; Data and Knowledge Providing, and Cooperation and Collaboration; along with Combatting Pollution and Environmental Degradations, and Conservation and Protection of Marine and Coastal Biodiversity. In real MSP, only one pair is observed: CPMCB, and MCRS. The difference emphasises the gap between actors' reality, and theoretical positions on the objectives, and hierarchy.

2.7. Net distance between actors

The map of net distances between actors (figure 29) is produced from the 2CAA, and 2DAA symmetrical matrices. It is used to recognise potential alliances.

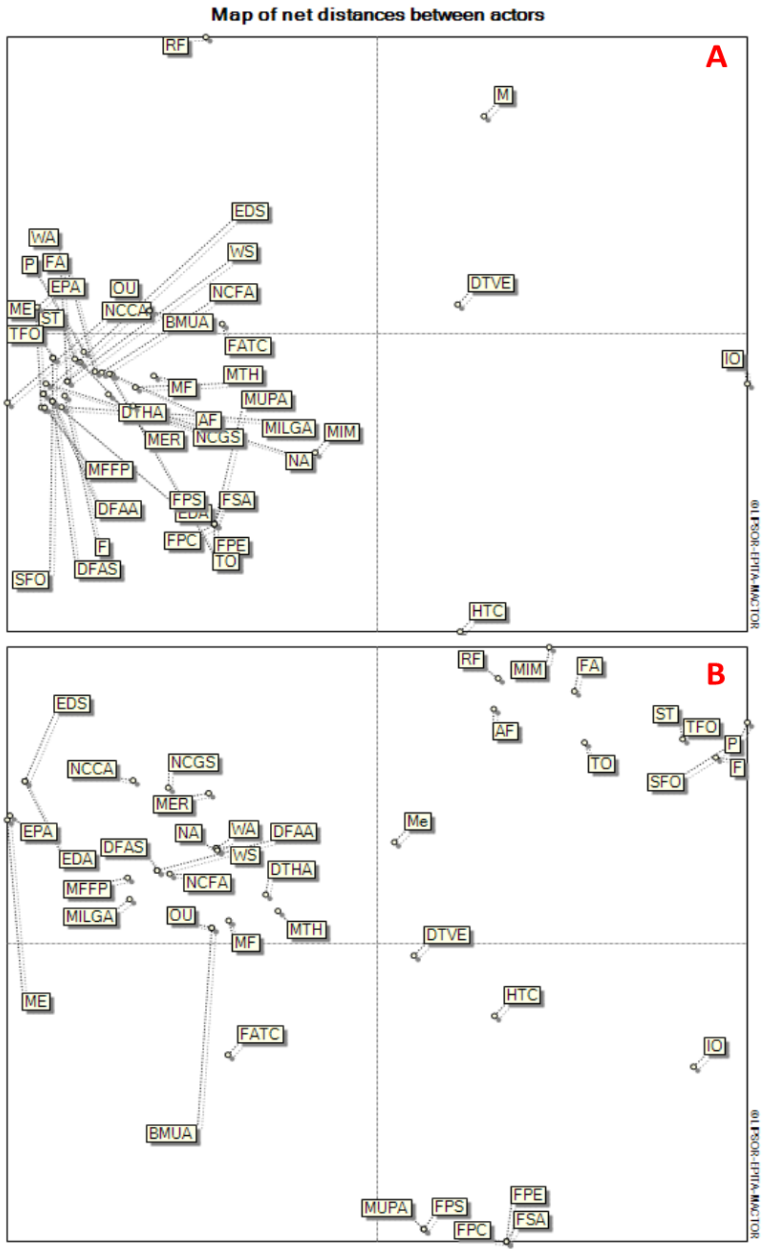


Figure 29: Graphs of net distance between actors, A: MSP in theory and B: real MSP.

The shortest the distance between actors the more they are likely to form alliances with each other over one or more objectives. The number of potential alliances decreases from in theory to real MSP.

In theory MSP we notice one group of 35 actors all close to each other. The 5 remaining actors: recreational fishermen (RF), medias (M), Industry operators (OI), hydrocarbon transport companies (HTC), and the department of training, and vocational education (DTVE) are far from the first group, and from each other. These actors have very low alliance potential in the system. However, in real MSP, DTVE, OI, HTC, and M remain separated along with tourism operators (TO), but we notice 4 separate groups: port facilities; fishery operators; administrations, scientists, and local authorities; and finally, RF, MIM, AF, and FA. These groups are more likely to work together on one or more objectives.

2.8. Map of Actors/Objectives relationship

A factorial analysis method of relationship is applied to the 3MAO matrix. It produces a map emphasising convergences between actors with respect to objectives, which are also shown on the map in figure 30. This map gathers actors whose position towards an objective is relatively similar.

- **Keys to reading:**

Identifying the axes is fundamental to analysing the correspondences between actors, and objectives. This map places great emphasis on proximity structures. Nevertheless, one must be careful about false proximity due to perspective effects: the graph being a projection, apparent proximities on the graph may not reflect a real proximity. The map of actor/objective relationship can be interpreted intuitively, using a few simple reading keys:

- The centre of the graph corresponds to the average values, the closer the points are to the centre of gravity, the more their profiles are identical to the average. The further the points are from the centre, the more original their profiles are.
- The proximity between two points of the same category (actors or objectives) means that they have similar profiles.
- The proximity between two points of different categories (actors and objectives) is a sign of attraction; conversely, two opposite points on the graph indicate repulsion.

Most points (actors and objectives) are not gathered around the centre which means there are a lot of original profiles in theory, and real MSP systems. We can observe some attractions in the maps. Although it is quite difficult to distinguish which actors are included in these proximities, some attractions are readable, for example port facilities are close to each other especially around the Development, and Valorisation objective in theory MSP meaning that their position on the objective is relatively similar.

Compared to the first map (A), points are more dispersed in real MSP (B) meaning that there are more repulsions than attractions in reality, although some similarities appear between A, and B like the proximity of environment protection associations to Conservation, and Protection of Marine Biodiversity objective.

In “theory MSP”, two objectives are close from each other: Cooperation, and Collaboration, and Data, and Knowledge Providing, while no considerable proximity between any of the objectives is observed in real MSP. This could be justified by the fact that of all the cooperation, and collaboration processes require a reliable base of data, and knowledge, and this base also depends on the decisions, and processes of cooperation, and collaboration that may facilitate the production of data, and knowledge.

We notice one difference in particular between A, and B which is that ME, and MFPP are close in theory, but they are very far apart in real MSP. Probably because the legal framework dictates strong functional links between these two sectors; to the contrary, this situation in the field is completely different. Indeed, this theoretical proximity is constrained by the gaps of operational coordination and sharing data. In addition, the lack of common planning is one of the main factors causing this distance between “theoretical”, and “real” MSP

The most isolated objectives in the scatterplot are Outreach and Awareness Raising, Training, and Capacity Building in theory MSP; and OAR, Development, and Valorisation, Observation, and Monitoring in real MSP. These objectives have the most different profiles. They are also the ones actors have the least convergences on in each system. The most isolated actors in the scatterplot are HTC, IO, M, and NCGS in theory MSP; and M, ME, NCGS, and MIM in real MSP. Indeed, they each have distinct profiles, so it is perfectly normal.

Figure 30: Maps of actor/objectives relationships, A: MSP in theory and B: real MSP.

Chapter 05: Algerian MSP diagnosis

1. Materials and Methods

MSP is an integrated participatory process; therefore, the use of surveys, and interviews is common in evaluating stakeholder's knowledge, and standpoints on MSP whether prior to developing the plan, during its adoption or afterwards for evaluation purposes.

In our case, we adopted this method to diagnose the state of MSP at a national, regional, and local scale, in order to support the MACTOR mapping results, and to eventually give suggestions, orientations, and recommendations on MSP in Algeria with a focus on the Eastern sector (wilayas of Annaba, El Tarf, and Skikda), and the Edough Mounts future MCPA case-study. Aiming to be as broad as possible, and include most aspects of the diagnosis, the interviews targeted information about:

- Already existing MSP elements in Algeria
- MSP reflexion in different sectors
- Legal, and institutional framework
- Objectives of actors, and their implication in the MSP process
- Gaps, and needs i.e., distance between the current state, and MSP good practices around the world
- Suggestions and recommendations.

1.1. Interview guide:

1.1.1. Definition:

An interview guide is a document that gathers a series of questions to ask or the topics to discuss during an interview. It is structured according to the type of interview to be conducted. More than just a list of questions, it is intended to provide an orderly general framework for the interview, It generally consists of three parts (scribbr.fr):

- Introduction and presentation of the research work, and its theme, explanation of what the interview should contribute to this work.
- Contact information of the interviewee
- List of questions to be asked, and the themes they refer to.

1.1.2. MSP interview guide

After a thorough literature search an interview guide (appendix 4) was developed to reference the main themes to be addressed, and the questions to be asked of the actors. In a semi-directive approach, the guide was proved very useful to orient, and pace the discussions and interactions during the interviews.

It offered the opportunity to target some actors, and to stress specific points according to their answers. Moreover, it allowed us to orientate the sequence of questions depending on the interviewee, and to correct off-topic issues, and misunderstandings. It also optimized time

because answers to multiple questions may come up when asking only one. Interviews were adapted to each actor according to their interaction, and their knowledge of the concept.

An introductory note explains the context, and objectives of the survey, and what is expected from interviewees. The interview guide consisted of 4 parts: the identity of the actor, their comprehension of MSP, their activity, and their opinion, in that order.

Questions were ordered according to the funnel technique: from the most general to the most specific question. Both closed and open-ended questions are used to get specific answers when needed or to obtain more precise information giving the respondent freedom to answer a factual or an opinion question. The combination of these two types made it possible to reach just the needed number of questions to ask during the interview, and not waste time and attention on certain aspects that could have been dedicated to answering other questions of equivalent importance.

A couple of interview trials were useful to validate the content of the guide and make the necessary adjustments before starting the interviews with actors.

1.2. Interview process:

The survey targeted actors with a national, regional, and local influence, mostly in the case-study area, so they are representative of the list of actors implicated in the problems. They were chosen because of their implication in the Algerian MSP process with regard to the Edough Mounts future MCPA.

Interviews were carried out between April, and July 2022 in Algiers, Annaba, and Oran. An MSP fact sheet (appendix **5**) was emailed to interviewees in advance to give them an idea about the process and the aim of the interview, and so they could develop a background knowledge on MSP.

A total of 38 anonymized interviews were held with each one lasting from 40min to 2h30min during which participants were encouraged to speak freely in Arabic or French. About half of the interviews were conducted in person, and the other half over the phone. Either way, notes were taken, and later-on transcribed, and organized into a database in order to statistically represent the results which were synthesized into figures. The database contains all the questions, and sub-questions asked in the interviews with drop down menus for each one listing all the answers given by the interviewees, although these answers had to be reformulated, and summarized to be statistically represented. Furthermore, figure 31 illustrates the MSP diagnosis methodology.

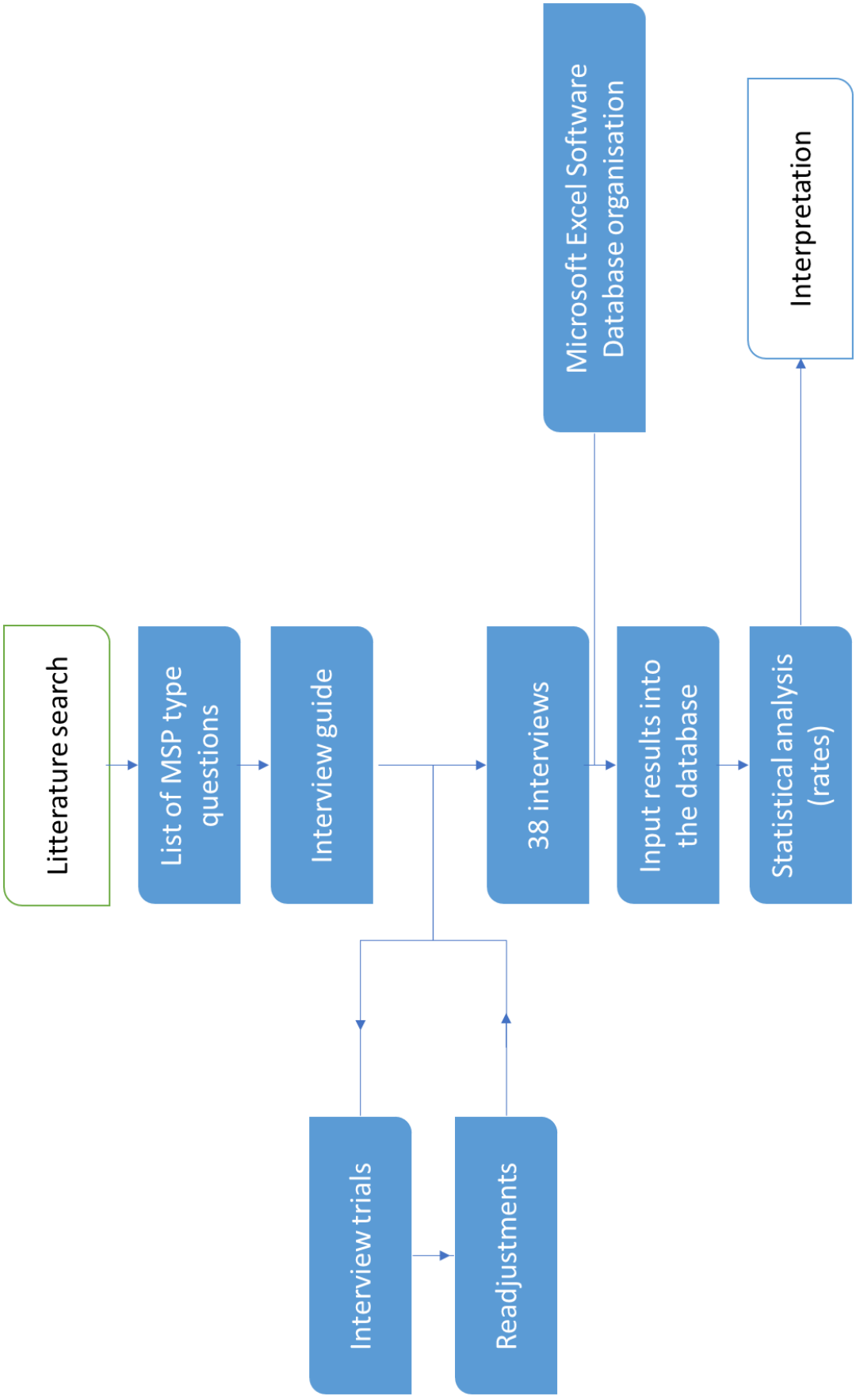


Figure 31: Algerian MSP diagnosis methodology

2. Results and Discussion

2.1. Interviewee sample:

The interviewee list included actors from the categories mentioned in the previous chapter except local authorities. The biggest portion (48%) of the interviewee sample was administrative actors at different levels. Members of environmental association and national fisheries chambers represent socio-professional organisations, and civil society with 10%. Another category representing 7% of the sample, the PEBLA project leading the creation of the Edough Mounts future MCPA, is worth mentioning although they're considered to work with the ministry of the environment (a central administration). Most of the interviewees belong to the environmental, and fisheries, and aquaculture sectors. Others include:

- Territorial, and coastal management
- Tourism, and recreational activities
- Defence

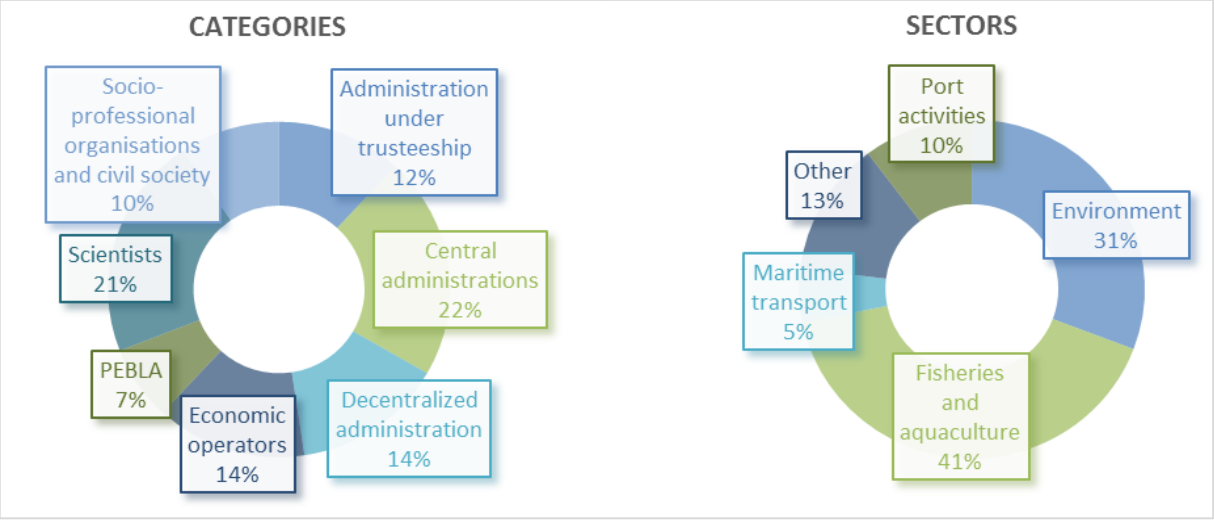


Figure 32: Categories and sectors of interviewees.

2.2. Comprehension of MSP

- *Have you ever heard of MSP before today? If so, in what circumstances?*

Most interviewees already knew of the concept from different circumstances as shown in figure 34. Projects that were mentioned included:

- PEBLA
- NS ICZM
- DIVECO
- SNEB
- WestMed
- MSPglobal

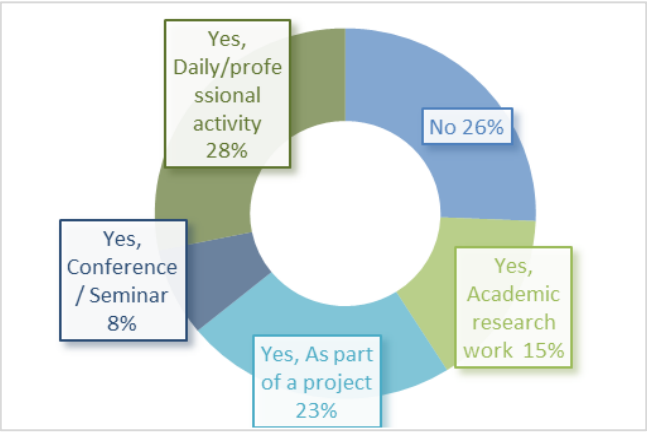


Figure 33: Interviewees' knowledge of MSP

- *According to you, what activities are covered by MSP?*

Fisheries (33), maritime transport (29), tourism, and recreation (29), and aquaculture (25) were mentioned the most when listing activities covered by MSP. Environment protection came 23 times although some interviewees did not consider it as an activity but more as a transversal process. Other sectors are listed in the figure below:

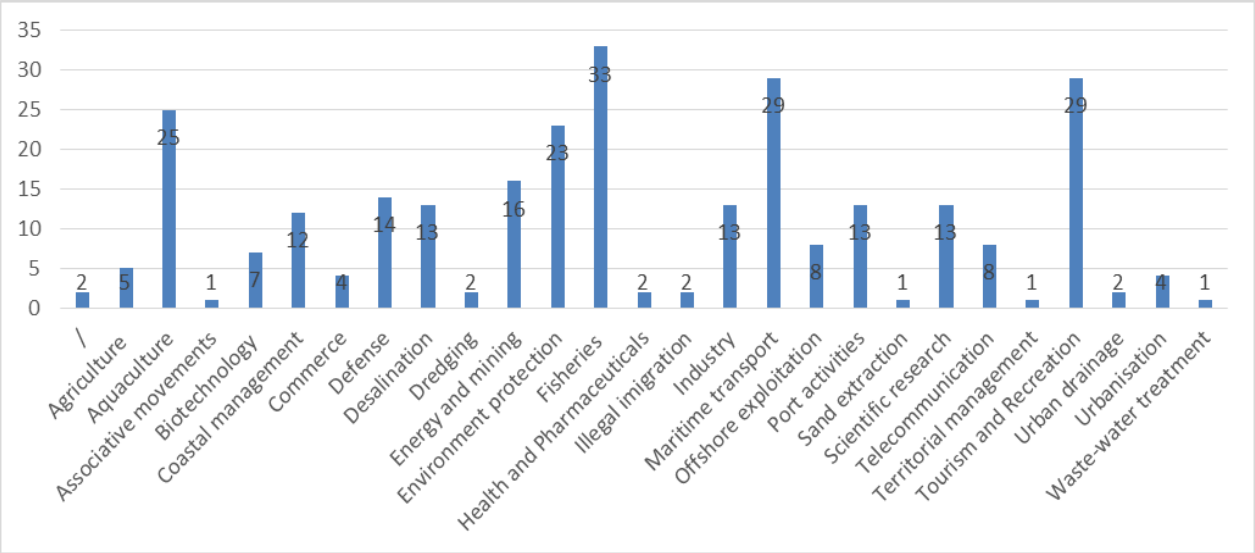


Figure 34: Sectors covered by MSP

- *Which sectors according to you use the MSP concept the most in Algeria?*

Fifteen percent of interviewees did not answer this question while 15% others stated that none of the sectors use MSP at the time being.

Sectors that are thought to use it the most are Environment, and Fisheries, and aquaculture (16%). Other suggestions included:

- Port activities
- public works
- Scientific research
- Tourism, and Recreation
- Industry
- Local authorities

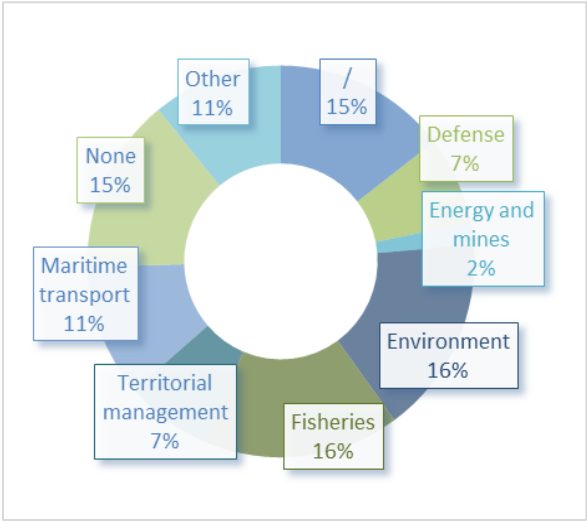


Figure 35: Sectors who use MSP the most in Algeria.

- *MSP is used to … ?*

For most interviewees, MSP is used to protect the environment, reduce conflicts between activities, encourage investments in the maritime domain, strengthen coordination between actors, and increase cross-border cooperation. Other uses of MSP include:

- To level with international standards
- Management, and anticipation of activity overlaps
- To organize, delimit, and orient maritime activities
- Promote cohabitation
- Identify priorities, and allocate sufficient space to each activity
- Coherent use of resources

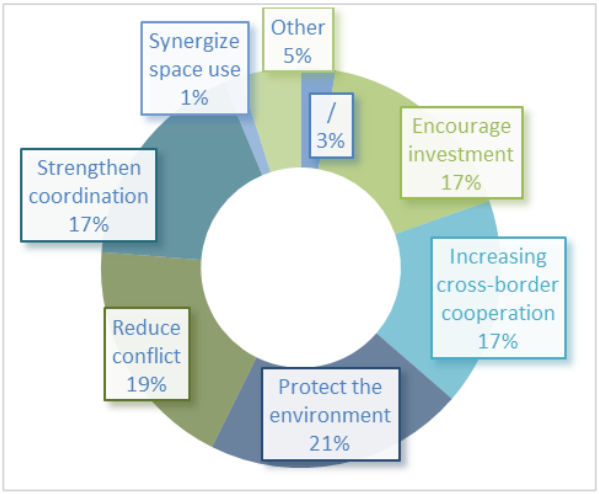


Figure 36: Use of MSP.

- Do you think that TSP, ICZM, and MSP are...?

Most interviewees (58%) think that the three concepts are complementary, 27% think they are dependent on one another. Those who found them to be conflictual (2%) from a management point of view stated that the difference between MSP, and ICZM is not clear, and that the connection between the maritime, and terrestrial domain has not been made in Algeria. As for the contradiction (4%), it lays in the objectives of the concepts as TSP, and ICZM have development goals, and MSP is meant to protect the environment according to the interviewee's understanding.

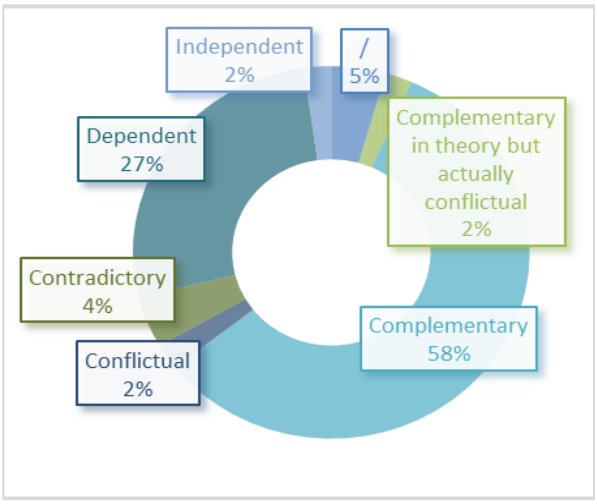


Figure 37: Relationship between MSP, TSP, and ICZM.

- *MSP in Algeria is …?*

For 31% of the interviewees, MSP doesn't exist in any form, for 24% others, it is driven by marine activities, sectoral plans, and strategies. As for the rest of the sample, it exists without calling it "MSP" but it's either not organized or not implemented, except 2% who think it is regulated, and fully implemented in Algeria.

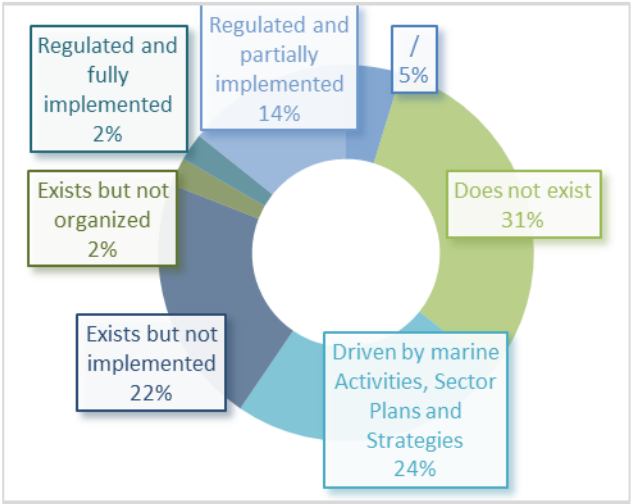


Figure 38: State of Algerian MSP.

2.3. Conduct / Activity:

- *What is the spatial scope of your activity? At what Scales?*

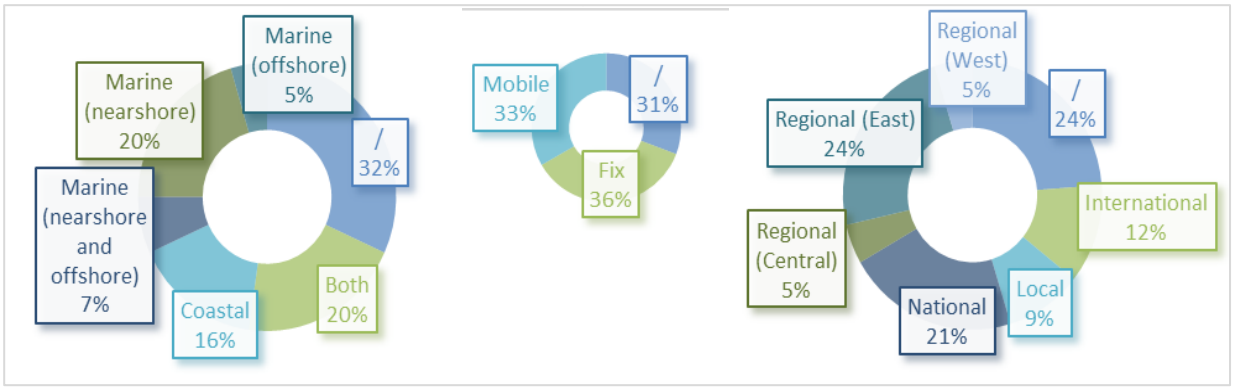


Figure 39: Spatial scope, and scales of the interviewees' activities

- *What is the temporal scope of your activity? At what frequency?*

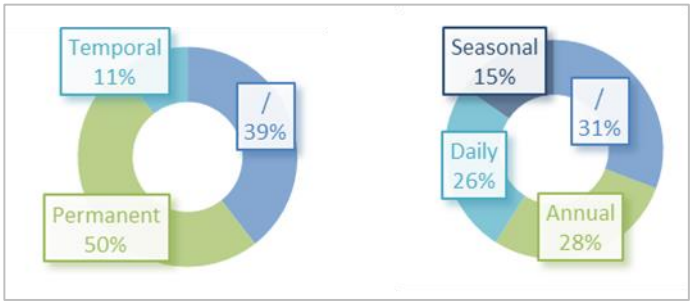


Figure 40: Temporal scope, and frequency of the interviewees' activities.

A good number of interviewees had trouble answering the last two questions and skipped it most of the time. The spatial, and temporal distribution of activities is varied which incinerates the diverse types of use of these spaces, and their complexity.

- *What are your main objectives regarding the marine spatial space, and its resources?*

Depending on the actors' profiles, and categories, they claim working for the protection, and preservation 34% (mostly administrative actors from the sectors of environment, and fisheries), exploitation 22 %, rational, and sustainable exploitation 10%, development, and valorisation 8%, raising awareness 8% (socio-professional organisations, and civil society), management 6%, and providing knowledge, and data 4% (scientists) of marine space, and resources. Other objectives include:

- Secure maritime navigation
- Law enforcement (defence)
- Achieve food security
- Enhance planning, ecologic, and economic bases of ICZM (PEBLA)

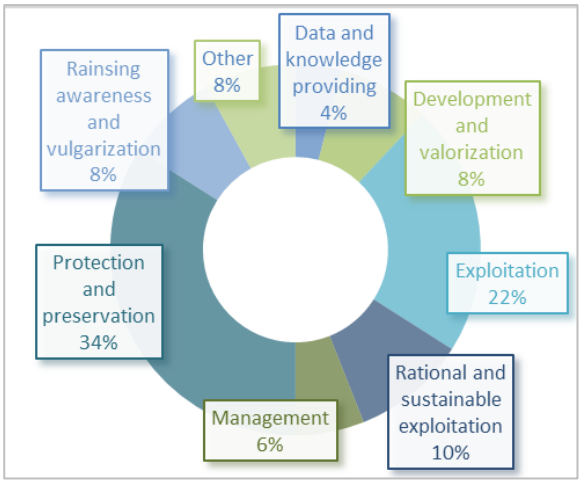


Figure 41: Interviewees' main objectives.

- *What is your position on the following objectives concerning the Algerian maritime, and coastal space, and its resources?*

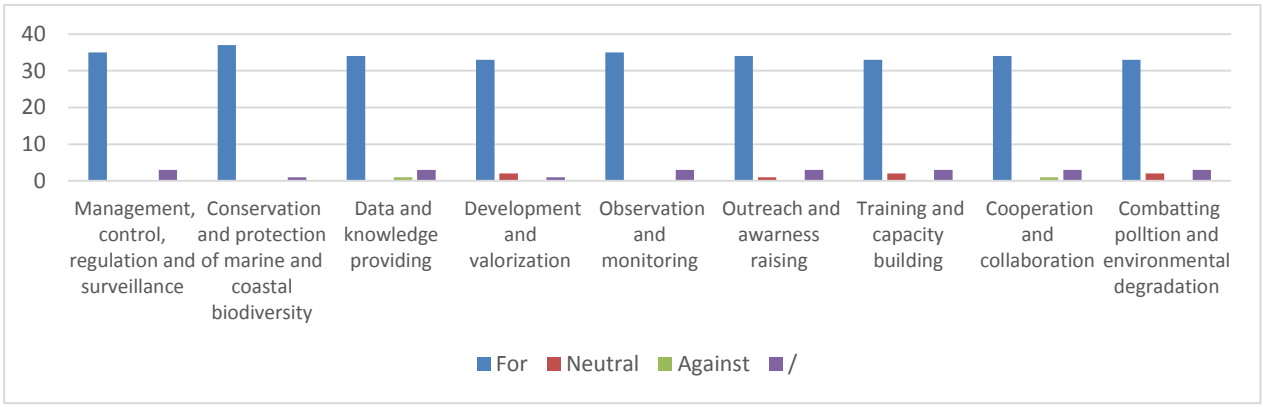


Figure 42: Interviewee's positions on MSP objectives.

The majority of the interviewees' sample is favourable for the 9 MSP objectives theoretically as they are objectives of general interest. But they don't necessarily act to move towards them.

- *What marine activities or sectors are in conflict with yours? What types of problems do you usually encounter?*

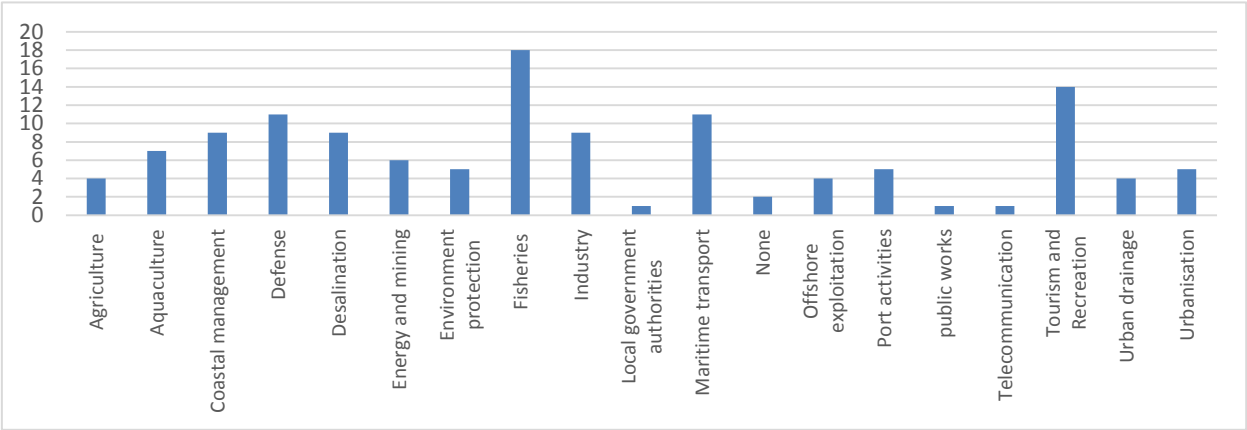


Figure 43: Conflictual sectors, and activities.

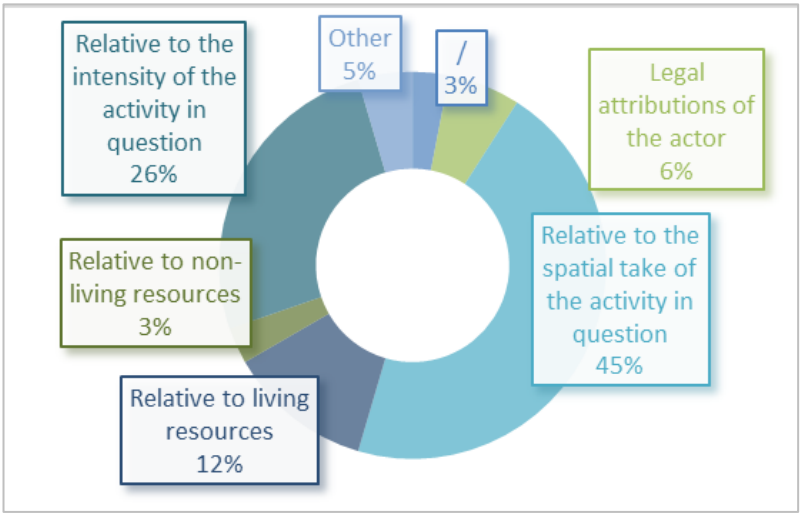


Figure 44: Nature of the conflicts.

The most conflictual sectors are fisheries, tourism, maritime transport, and defence. The conflicts are generally related to the spatial take, and the intensity of these activities. Other conflicts were mentioned such as:

- Relative to the temporal take of the activity
- relative to the means, and methods of the activity
- Relative to communication, and cooperation

Note that a considerable conflict was reported multiple times inside the fisheries sector between the different categories of fishermen, with most of them having problems with recreational, and illegal fishing.

- *How do you usually manage these conflicts?*

Thirty percent of the actors encountering conflicts with others try finding middle grounds, and solutions which generally are temporary. Thirteen percent find permanent solutions through concertation, and communication, while 28% don't try to solve the conflicts, and 11% withdraw generally being the weaker actors. Others (8%) mentioned relying on political arbitration, anticipation when possible, and for some with limited power, all they do is report to their hierarchical superiors.

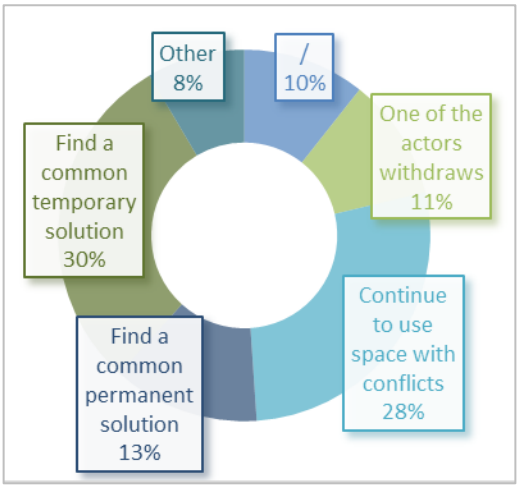


Figure 45: Management of conflicts.

- *Elements of MSP already exist in your sector?*

Most interviewees are aware of the existence of some MSP elements in their respective sectors although they don't call them that. These elements are mostly legislative, and regulatory (laws, and sectoral plans) such as the National Scheme of territorial management (SNAT). Institutional arrangements include conventions, and data exchange protocols, and technical elements vary for each sector such as MPA zonings for the Environment or regulated fishing areas for Fisheries (ZPR).

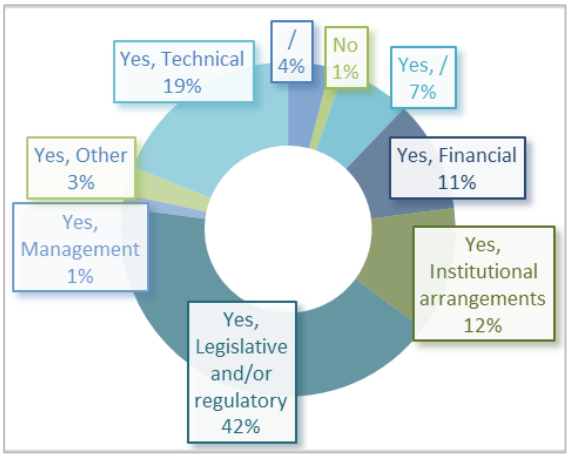


Figure 46: Sectoral MSP elements in Algeria.

- *Are they being applied …?*

Seventeen interviewees did not answer this question. Forty-three percent of the interviewees said that their respective sectoral MSP-type elements were partially applied, and 32% said they were fully applied. Others (8%) said that they were not applied at all. However, 16 interviewees did not justify their answers. Those who said they were fully applied either felt obliged to say so because of their position (mostly administrative actors) or were convinced that because the elements are legislative, and regulatory that they had

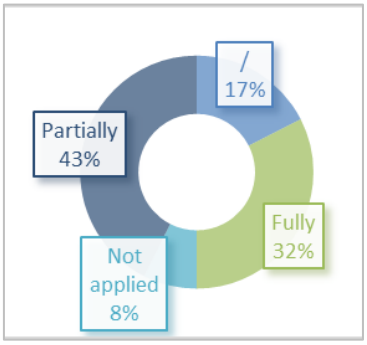


Figure 47: Application of MSP elements.

to be respected, and fully implemented. As for partial application, many reasons were mentioned such as:

- Lack of control, and supervision
- Application texts not detailed
- CMPs (PACs) not elaborated yet
- Corruption, and fraud
- Lack of financial means, and competences
- No concertation
- No real appropriation of processes by the institutions
- Personal motivations
- Sectoral interests
- High dependence of some sectors

2.4. Opinion:

- *What do you think of MSP in Algeria?*

The high need for MSP in Algeria is confirmed by this result. Half of the interviewee sample find it to be indispensable, 40% think it's necessary, and some even said it's mandatory for all the benefits it will provide, and because it's high time to catch up on international standards and start working on the impacts of cumulated bad decisions, and management of these last decades.

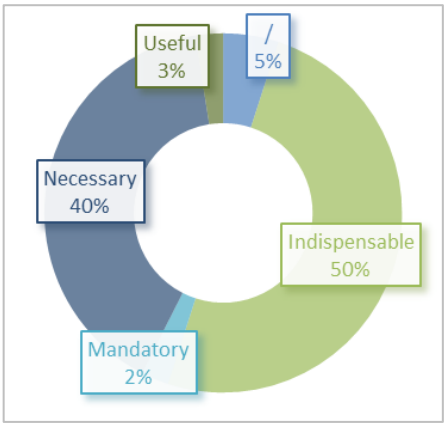


Figure 48: The need for MSP in Algeria

- *How do you think a maritime spatial planning policy could be developed in Algeria?*

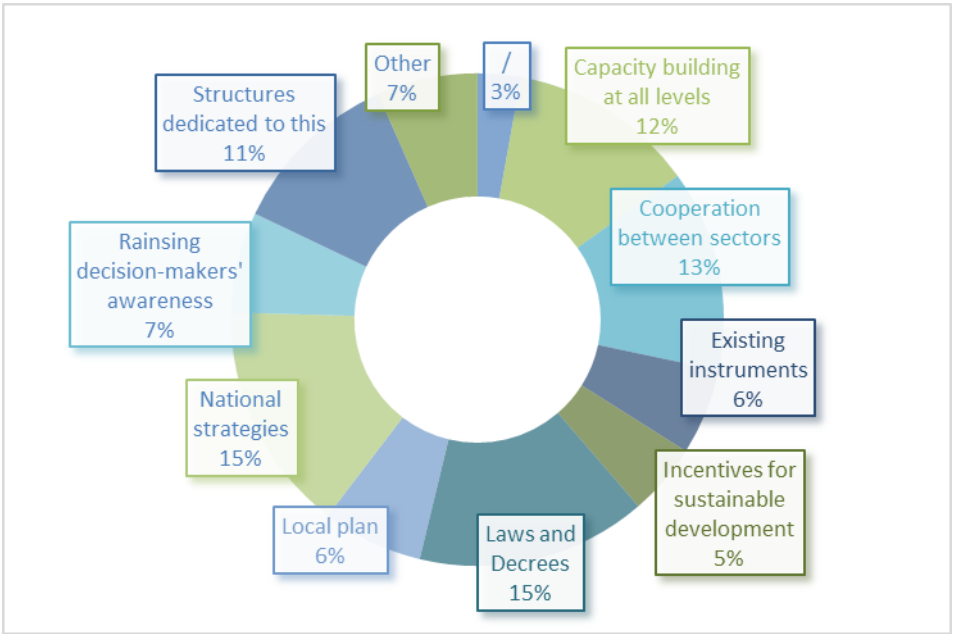


Figure 49: Ways to develop MSP in Algeria

According to the interviewee's an MSP policy could be developed through the legal anchorage of MSP, national strategies, Cooperation between sectors, the creation of a structure dedicated to planning maritime, and coastal spaces along with raising political actors, and decision makers'

awareness on the concept, and the necessity to adopt its principle, and through local plans, and existing instruments. Seven percent of the interviewee sample suggested other measures to develop MSP such as:

- Bottom-up organization
- Regeneration of the ministry of Planning
- Including universities, and civil society
- Implement trade-off tools
- Coordination, communication, and integration
- Decentralised decision-making

- *In your opinion, should MSP be implemented in a sectoral or integrated manner?*

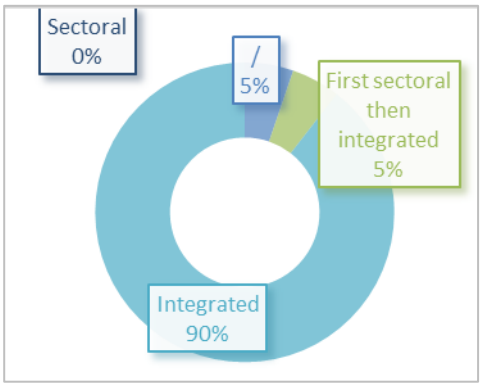


Figure 50: MSP, sectoral or integrated implementation?

All interviewees agree on the fact that MSP's implementation must be integrated and not sectoral although some argued that in order to integrate it the MSP reflexion should start sectorally first. However, 14 interviewees did not justify their answers. Reasons for the choice of Integration include:

- Common space, all sectors concerned.
- Compromises are found after considering all ideas.
- MSP is a global inclusive approach.
- Integrate all means, and competences to optimize time, and efforts.
- Sectoral interdependency.
- Participatory process to avoid sectoral appropriation of maritime space.

- *What will the implementation of an MSP policy bring to your sector of activity?*

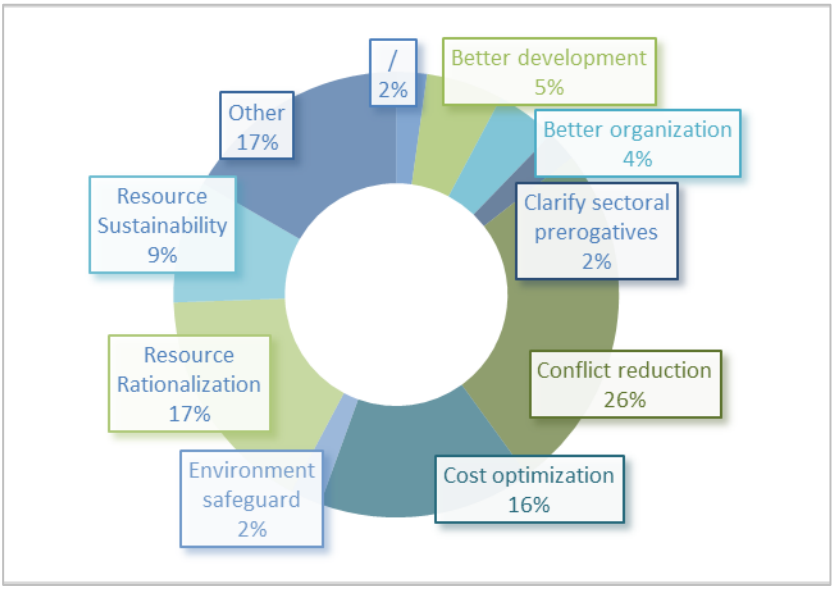


Figure 51: Impact of MSP on sectors, and activities

According to interviewees, MSP will help reduce conflicts for their respective sectors (26%), rationalize the exploitation of maritime resources (17%), optimise costs, and expenses (16%), contribute to resource sustainability (9%), offer better development (5%), and organization (4%) of activities, and clarify the prerogatives, and missions of each sector, and actor, to avoid attribution overlaps. Other benefits of MSP include:

- More respect of regulations
- Better management of overcrowded spaces
- Alignment to international standards, and demonstrate the respect of international obligations
- Eliminate intersectoral barriers
- Reduce risks, and threats (Stability)
- Standardise actors' collaboration
- Sustainably increase economic values, and job availability
- Implementation, and monitoring of sectoral strategies
- Meet the challenge of food security
- Mutualise costs
- Power recognition for associations

- *Do you think that the establishment of MSP in Algeria will have a negative impact on your activity?*

Thirteen percent of interviewees did not answer this question (mostly those who first heard of existence of MSP on the interviews). Only 11 % of think MSP will indeed affect their activities negatively at first (in the short term). Most of them are fisheries actors thinking that MSP will limit fishing area especially small trades, and that operators of the sector will be the first impacted.

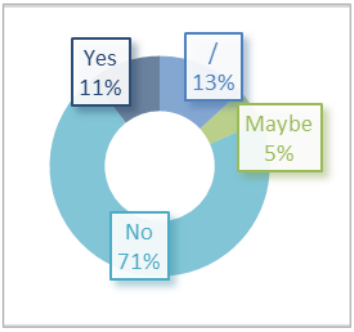


Figure 52: Negative impacts of MSP.

- *In your opinion, who should be in charge of setting up, and monitoring MSP in Algeria?*

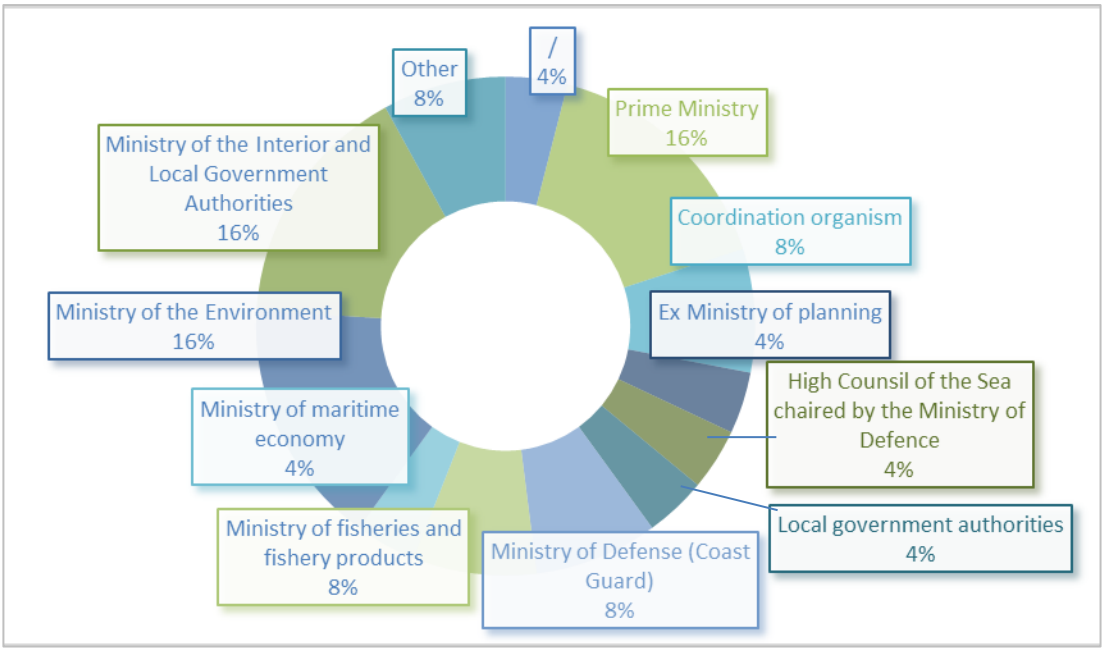


Figure 53: Who should be in charge of implementing MSP in Algeria?

The majority of suggested institutions are ministries including existing ones: MICLAT (16%) because they're already in charge of TSP, the Prime ministry (16%) because of its high influence over national strategies, ME (16%), and MFFP (8%) because they concerned the most by MSP, and the Ministry of Defence (8%) to make sure MSP elements are respected ; a potential Ministry of the sea or of maritime economy (4%), and the Ex-ministry of planning (4%). The creation of an independent coordinating organism with high influence, and power of decision was suggested to avoid sectoral subjectivity. Four percent think that a good option would be if the High Council of the Sea (HCM) was chaired by the Ministry of Defence to give it more credibility, and strict implementation. Local authorities (4%) were also suggested to be in charge of MSP because they have the power, and attributions to gather all implicated actors, and work on solutions together at a local level. Other suggestions include:

- Universities
- Ministry of Transport (Maritime)
- Directorate-general of forestry

- *What do you think needs to be done to promote the establishment of an MSP strategy in Algeria?*

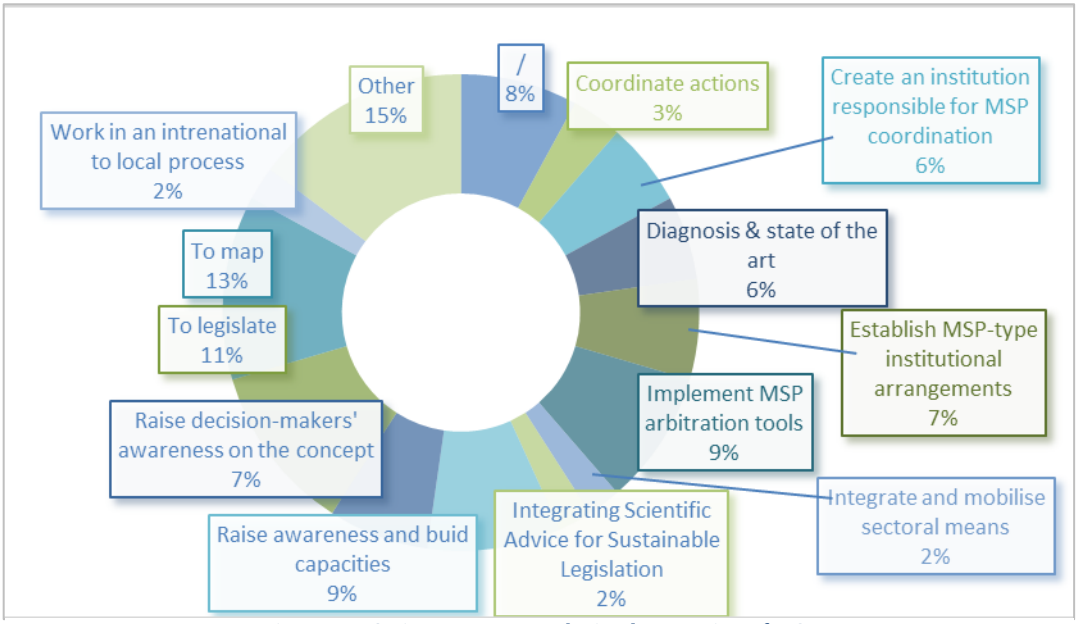


Figure 54: Actions to promote the implementation of MSP

To promote the establishment of an MSP policy in Algeria, interviewees suggested many elements as shown in the upper figure. Other elements include:

- Define strategic activities
- Achieve consistency of existing instruments
- Adopt sectoral organisation mechanisms (indicators)
- Avoid radical changes, and create real compromises
- Communication, and information
- Define maritime territories
- Develop MSP-type pleas
- Set long term objectives
- Simplify, and contextualize instruments
- Start planning inland then in maritime space
- Study intersectoral relations
- Target legislative gaps, and work on them.

- *What are you doing to move towards MSP at your scale?*

Fifteen percent of interviewees did not answer this question. Depending on their respective sectors, actors move towards MSP in their own ways, and with the available means through communication, and concertation (11%), Raising awareness, and vulgarisation (9%) not on the concept of MSP but on other related aspects such as responsible fishing, and the importance of certain ecosystems like Posidonia meadows. Other interviewees contribute by scientific research, and production (11%). As for the rest, 7% stated that they do nothing yet, 6% will join, and be favourable of the implementation of MSP although they claim they're not the first actors to be concerned by it, and 37% move towards MSP through other means such as:

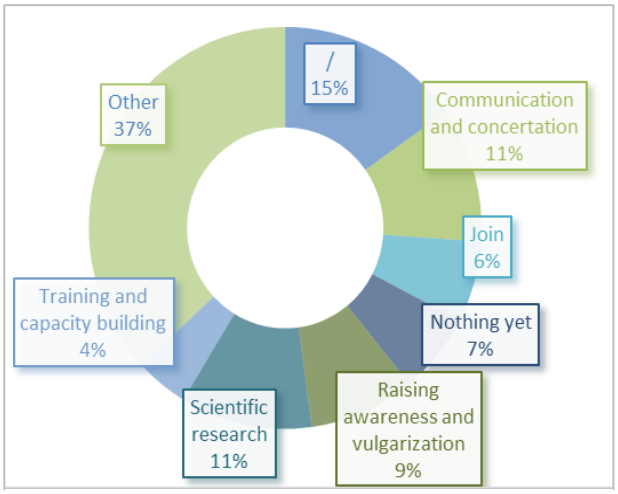


Figure 55: Actions to move towards MSP

- Conservation projects (MPAs)
- Contribution to capacity building
- Integrating MSP in the NS ICZM
- Monitoring, preservation, and valorisation actions
- Organization, and participation in regional, and international manifestations
- Teaching, and introducing the concept of MSP in universities
- Work within an integrated approach on national, and international projects with other stakeholders
- Ensuring the application of the law
- Capacity building of key operators

- *In your opinion, what separates the Algerian MSP from good maritime spatial planning practices?*

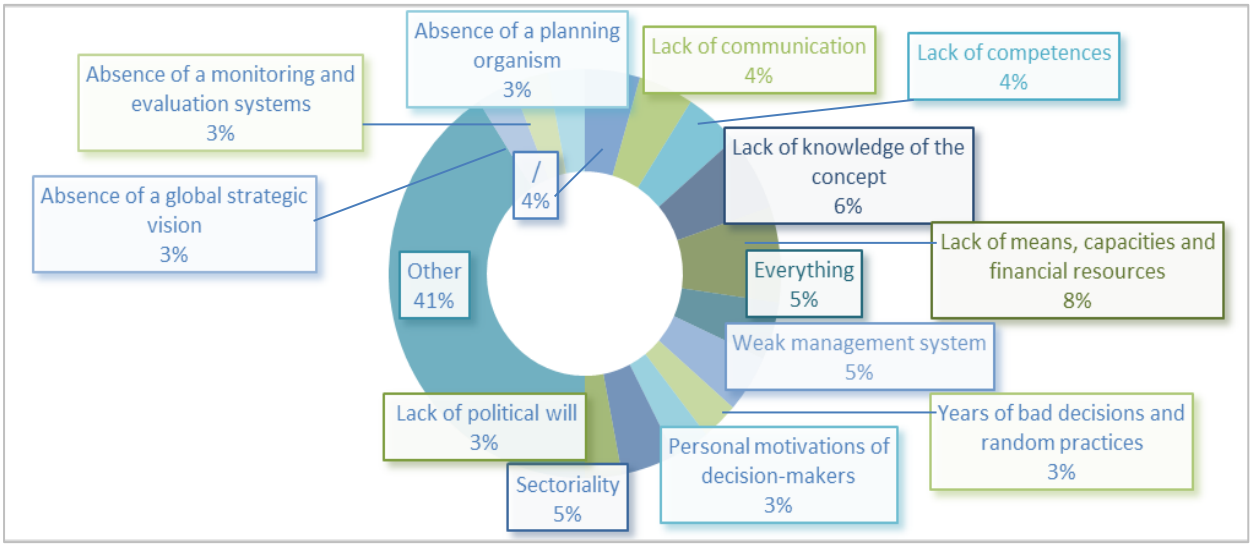


Figure 56: Gap between Algerian MSP, and international good practices.

This is one of the questions interviewees were most reactive on. The issue that came up the most was the lack of means, capacities, and financial resources (8%), followed by the lack of

knowledge on the MSP concept (6%), the current sectoral management (5%), the lack of communication (4%), and competences (4%) along with other issues as shown in the upper figure. Other (41%) problems were reported such as:

- Absence of a state of reference
- Absence of application texts in legislation
- Adaptation to the social aspect of the country
- The current flow of decisions
- Algeria's unclear weight in the Mediterranean basin
- First users' lack of trust in foreign concepts
- Heavy, and not sufficient laws, and regulations (not flexible)
- Lack of ambition, and political will, and interest in maritime space (MSP is not currently a strategic priority)
- Lack of coordination, and short-term planning
- Lack of respect for decentralized decisions, and sectoral monopole of spaces.
- Slow reactions to spatial use emergencies
- Time gap (we're far behind international standards because we turned our back to the sea)

- *In your opinion, would a database on the use of maritime space in Algeria be useful for managing conflicts between activities? If so, where do you think it would be located? Who would administer/manage it? Could you participate in its data feed in the perspective of collaboration, and cooperation?*

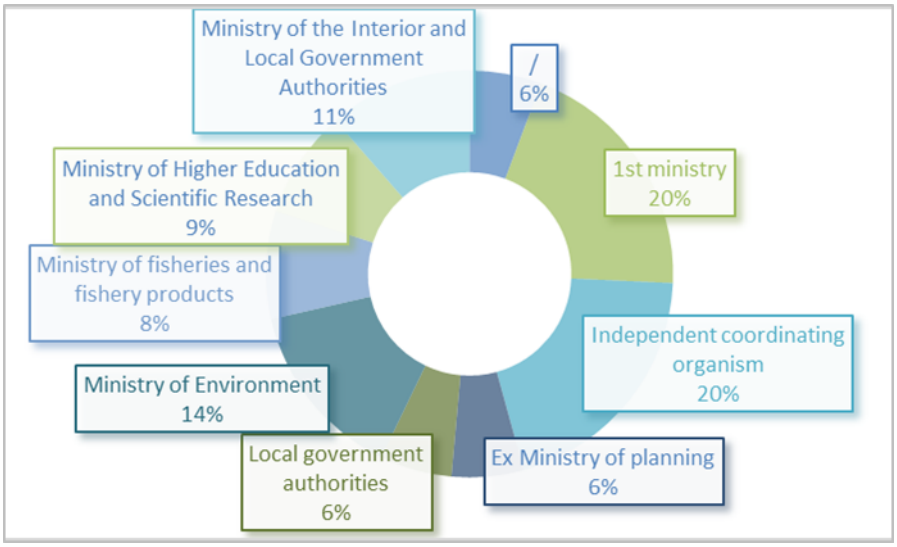


Figure 57: Who should be in charge of the MSP database

All interviewees agree on the need for a spatial use database. Although suggestions of its administrator were diverse, most of them think that whoever oversees implementing MSP should manage the database. Some think that the Prime ministry (20%) or an independent coordinating organism (20%) are the most suitable to do so, others suggested MICLAT (11%), MFFP (8%), ME (14%), local authorities (6%), and the Ex-Ministry of planning (6%). Nine percent of interviewees think that the database should be shared with whoever is in charge of MSP but that its piloting, and administration should be overseen by scientists, and universities suggesting the Ministry of Higher Education, and Scientific Research to host the database.

Most interviewees (89%) are willing to share maritime space related data once the database is created. Some even went on to suggest preliminary structures of the database, and ways of administrating it (categorizing data according to sources, who should have access to what information…etc.) which emphasizes actor's mobilisation towards providing knowledge, and data but also cooperation, and collaboration between each other, and their awareness of the necessity of starting such a global process as MSP with a science-based approach.

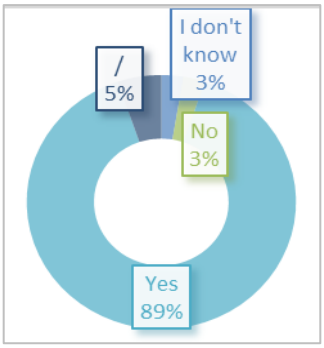


Figure 58: Data feed.

Note that the existance of two sectoral spatial use databases was reported in the sectors of Fisheries, and aquaculture, and Maritime Transport, along with the on-going creation of one in the Environment Ministry (PEBLA's Coastal Geographic Information System). Even actors belogoing to these said sectors ignored their existence which highlights a lack of communication, and information even within sectoral management approaches.

- *Do you think that the creation of the future EDOUGH Mounts MCPA will affect your activity?*

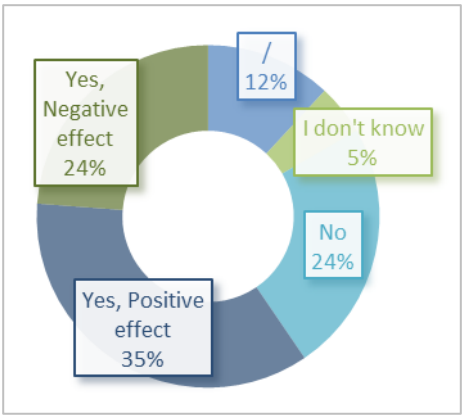


Figure 59: Impact of the EDOUGH Mounts future MCPA.

Interviewees (24%) who said that the future MCPA wouldn't affect their activity are administrative actors from the fisheries sector. They justify their answer by the fact that the area to be protected is rocky, and not frequented by fishermen (other than small trades). Thirty-five percent stated that the impact would be positive providing:

- A development opportunity for conchyliculture (Aquaculture, and MPAs are complementary)
- Small scale capacity building
- Resources protection, and fisheries stock conservation
- A sustainability focused investment in the area
- An increase of the area's attractiveness A spawning area, and reference area for scientific research
- A role to play in the management of this said MCPA (for associations, and civil society)

As for negative impacts (24%), they are the opposite of what has been said earlier, meaning that the future MCPA would:

- Limit the fishing activities (areas, engines, and methods), unless alternatives are offered to fishermen.
- Create a conflict with artisanal fishing
- Limit investments
- Overlap with aquaculture projects, and navigation routes

Conversely, some think that the negative effect would be on the MCPA, and not on activities such as pollution.

- *How do you plan to deal with this use conflict?*

More than half interviewees chose not to answer this question, 19% said that the most suitable sway to solve conflicts is through communication to find middle-grounds, and 23% suggested:

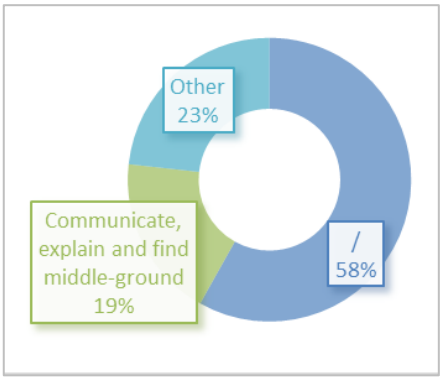


Figure 60: Ways to deal with the conflicts.

- Creating emergency antipollution units
- Fishermen guidance, and awareness raising to accept, and co-manage the MPA
- Implementing regulation measures
- Intensifying monitoring
- Moving the aquaculture farms
- Indemnifying fishermen in case of low production
- Make sure fishermen respect their dedicated areas
- Search for new fishing areas through activity mapping

- *In this case, will the use of MSP facilitate trade-offs between the different uses of space, and maritime, and coastal resources?*

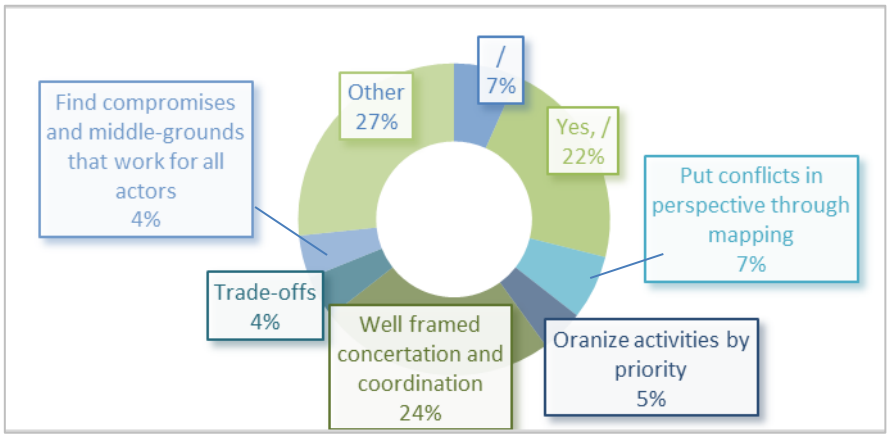


Figure 61:Use of MSP to solve conflicts.

Ninety-three percent of interviewees agree that MSP would help find solutions to the potential conflicts arising from the creation of the MCPA, 22% had no idea how but the rest stated that MSP would organize the concertation, and coordination processes between actors (24%), put conflicts in perspective through mapping tools (7%), organize activities by strategic priorities of the country (5%), guide, and orient trade-offs (4%), and find compromises that suit everyone (4%). Other ways MSP would facilitate trade-offs include:

- Following international standards
- Targeting objectives with national interests
- Regulating maritime space
- Relocating activities
- Keeping all sectors informed
- Sharing good practices of management, planning, and governance.
- Suggesting alternatives for impacted actors
- Helping to protect biodiversity when knowing their vulnerabilities
- Predicting conflict, and preventing them from happening
- Precising clear sectoral limits
- Introducing the co-management option of the MCPA

- *Do you think that MSP would help develop a blue economy in Algeria?*

Most interviewees (87%) think that the implementation of an MSP policy would contribute to the development of a Blue Economy in the country, because it would: create a clear investment framework, and opportunities providing information for start-ups, increase ecosystems, and biodiversity's health, and ensure regulated, secure, and sustainable management. Also, because MSP is a tool in the heart of BE gathering the same stakeholder, and their simultaneous evolution will develop blue skills, and accelerate the achievement of SDGs.

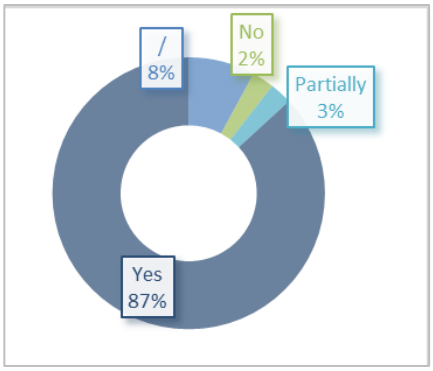


Figure 62: MSP to help develop Blue Economy

However, some think that BE is not MSP's main objective. It is the other way around meaning it is a BE strategy that will make it possible to plan maritime space.

- *Do you think we should have a law on MSP in Algeria?*

Opinions were diverging for this question. Most interviewees (76%) think that a law would help anchor the process legislatively giving it more power, and making its measures mandatory with a long-term vision, it would also clarify roles, and attributions to avoid overlaps, and make sure the MSP strategy is accepted, and well-respected by actors. Then again, others stated that we have enough laws in each sector that could be used for MSP, they only lack complementary application text to reinforce their implementation.

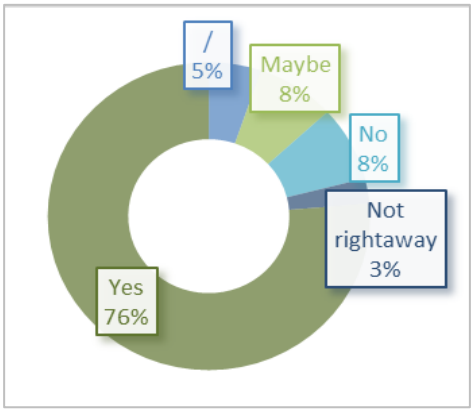


Figure 63: Necessity of a law on MSP

- *Do you think that civil society should be involved in MSP?*

A striking majority of 95% of interviewees think that the implication of civil society before, during, and after the development of a planning strategy is necessary, including socio-professional organisations, because they are the first users of the space to be planned, they only need to be included, sensibilized, and trained on the different aspects they could contribute in, so that their ideas, and opinions would be beneficial to the process providing a different point of view from administrators', and politicians'. Including them would follow international trends, and the participatory nature of MSP ensuring its sustainability. Nevertheless, 5% think that MSP is a strictly strategic and political process.

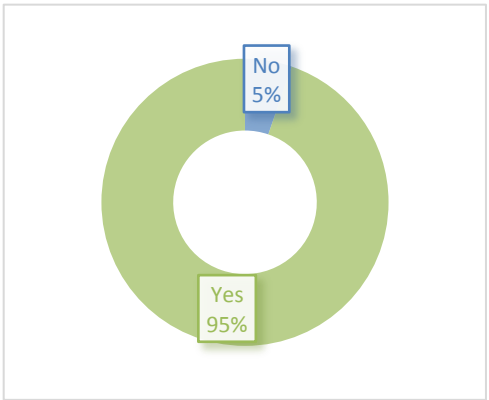


Figure 64: Implication of civil society in the MSP process.

Chapter 06: Mapping the eastern maritime space in Algeria

1. Materials and Methods

Mapping is central to MSP. Regardless of the geographic scope, mapping all current uses and conditions is the starting point of an MSP process although it is not the only intended end-product.

Mapping the studied area is meant to validate the interviews, and MACTOR results, and to better illustrate the layout of different activities, zonings, and the local conflicts of use, also providing reference thematic maritime spatial use maps of the Algerian eastern sector.

There are activities for whom the area makes sense to characterize overlapping uses (e.g., conservation areas), and those for whom we consider the capacity or the intensity of the activity to impact others (e.g., seawater desalination plant). Therefore, we either speak of:

➔Activity's spatial hold (What perimeter does it occupy?); or
➔Activity's intensity (What perimeter does it impact?)

We thereby, delimited approximate impact zones for the main activities whose impact depends on their intensity, considering the area's features (bathymetry, courants, and configuration of the coast…etc.).

QGIS or Quantum GIS is an opensource Geographic Information System software which is an IT system for creation, storage, organization, manipulation, analysis, and display of spatially referenced information. In this study we used QGIS version 3.22.3 for mapping, and processing.

As detailed in figure 65, data was collected from different sources in both shapefile, and raster formats along with qualitative information.

After digitizing information extracted from rasters, and literature research, the data was assembled, and sorted, then validated first through QGIS geometry validation tools then by overlaying them with base-maps such as Google-maps or OpenStreetMap. Basic geospatial treatments were conducted on some layers (e.g., buffers to produce regulated delimitations layers), and the data was then organized into thematic MSP maps. Three tools were found useful for data collection:

- QuickOSM plugin in QGIS allowing to download OpenStreetMap data in shapefile formats.
- QuickMapServices in QGIS providing a multitude of base-maps in raster format mostly for inland areas.
- Navionics Marine chart in SAS.Planet software[2] providing maritime data generally used for navigation purposes in raster formats.

[2] SAS.Planet is a free application used to view, and download satellite maps submitted by such services as Google Earth, Google Maps, Bing Maps.

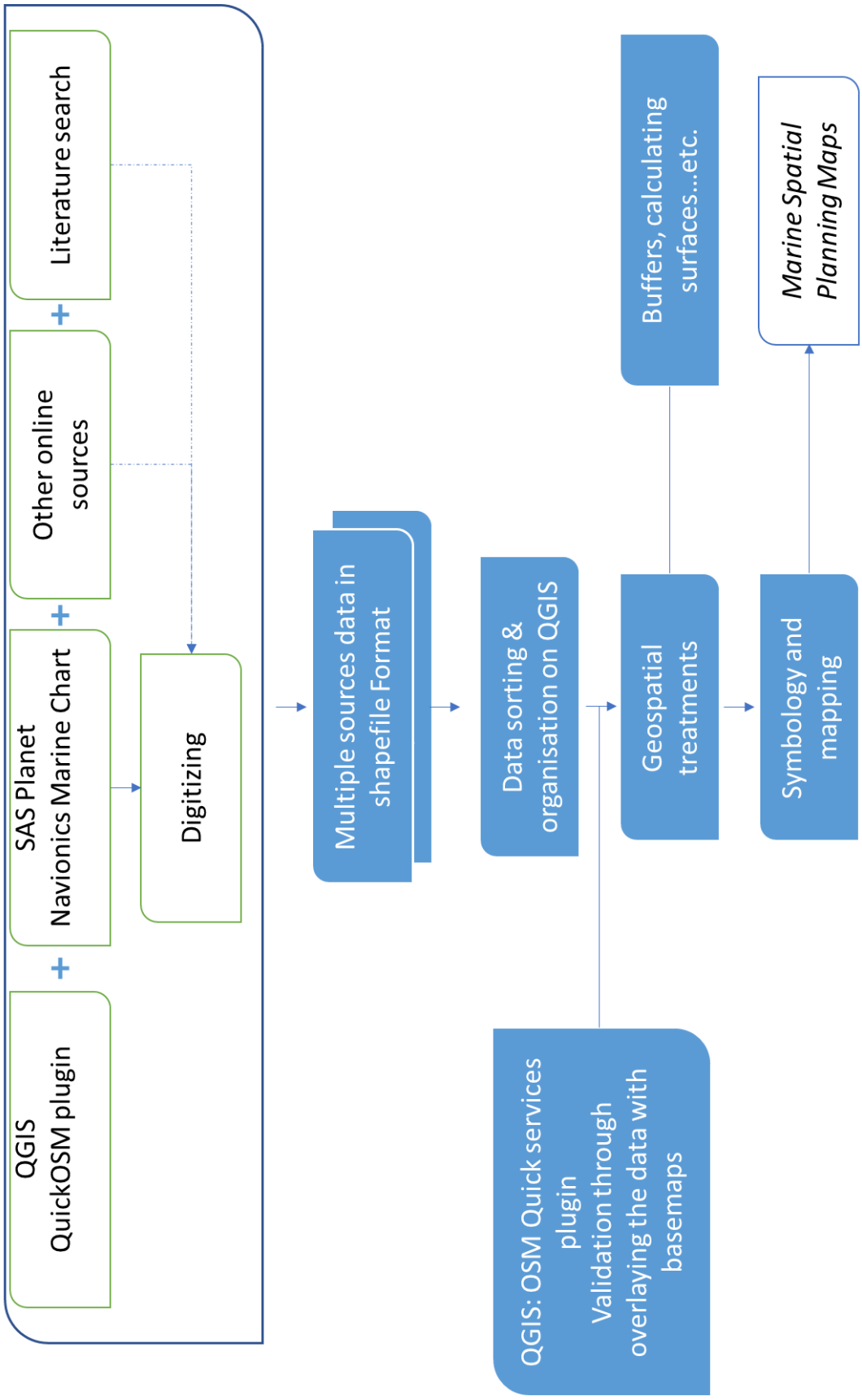


Figure 65: Mapping process methodology

2. Results and Discussion

As mentioned in figure 65, results of this chapter are thematic marine spatial planning maps. For more clarity, and better display, the study area was divided into 6 maps focusing on the most occupied areas counting: Easternmost waters (figure 66), Gulf of Annaba (figure 67), Edough marine area (figure 68), Gulf of Skikda (figure 69), Bay of Stora (figure 70), and Bay of Collo (figure 71). Areas that are not included in the maps are mostly empty, and undisturbed.

The data availability in the different wilayas is very imbalanced as we struggled to harmonize activity representation. For instance, delimitation of touristic expansion zones is missing in the wilaya of Skikda although we know of the existence of at least two in El Marsa because of the lack of data. Another example worth mentioning is the lack of data on regulated fishing areas, and offshore exploration zones in all the study area which will have an impact on the proper representation of important use conflicts.

The congestion of the maps is totally normal, otherwise there wouldn't be a need for planning. Many overlaps between activities are brought to light such as:

- Gulf of Annaba:

  The mixed-use port of Annaba's anchoring zone overlaps with a potential conchyliculture area.

- Edough marine area:
  - The future MCPA's area of interest is cluttered with activities, and potentially crossed by a maritime highway. Note that the zoning presented in the maps is not final as the creation of the MCPA is still underway.
  - Fishing shelter of Ain Barbar nearly inside the core (central) zone of the future MCPA.
  - Conchyliculture, and aquaculture zone interfering with MCPA zonation (the three levels of protection).
  - Touristic sites and expansion zones (ZEST) within the 800m, 300m, and 100m coastal strips.
  - ZEST of Oued Bougrat interfering with both buffer, and transition zones of the future MCPA.
- Bay of Stora:

  The combined potential impact zone of an energy plant, the discharges of a wastewater treatment plant, a desalination plant, and a petrochemical industrial zone, on fisheries, and on the environment although deprived of a protection initiative so far.

- Bay of Collo:

  An intensive agriculture area surrounding beaches, and potentially disturbing recreational activities.

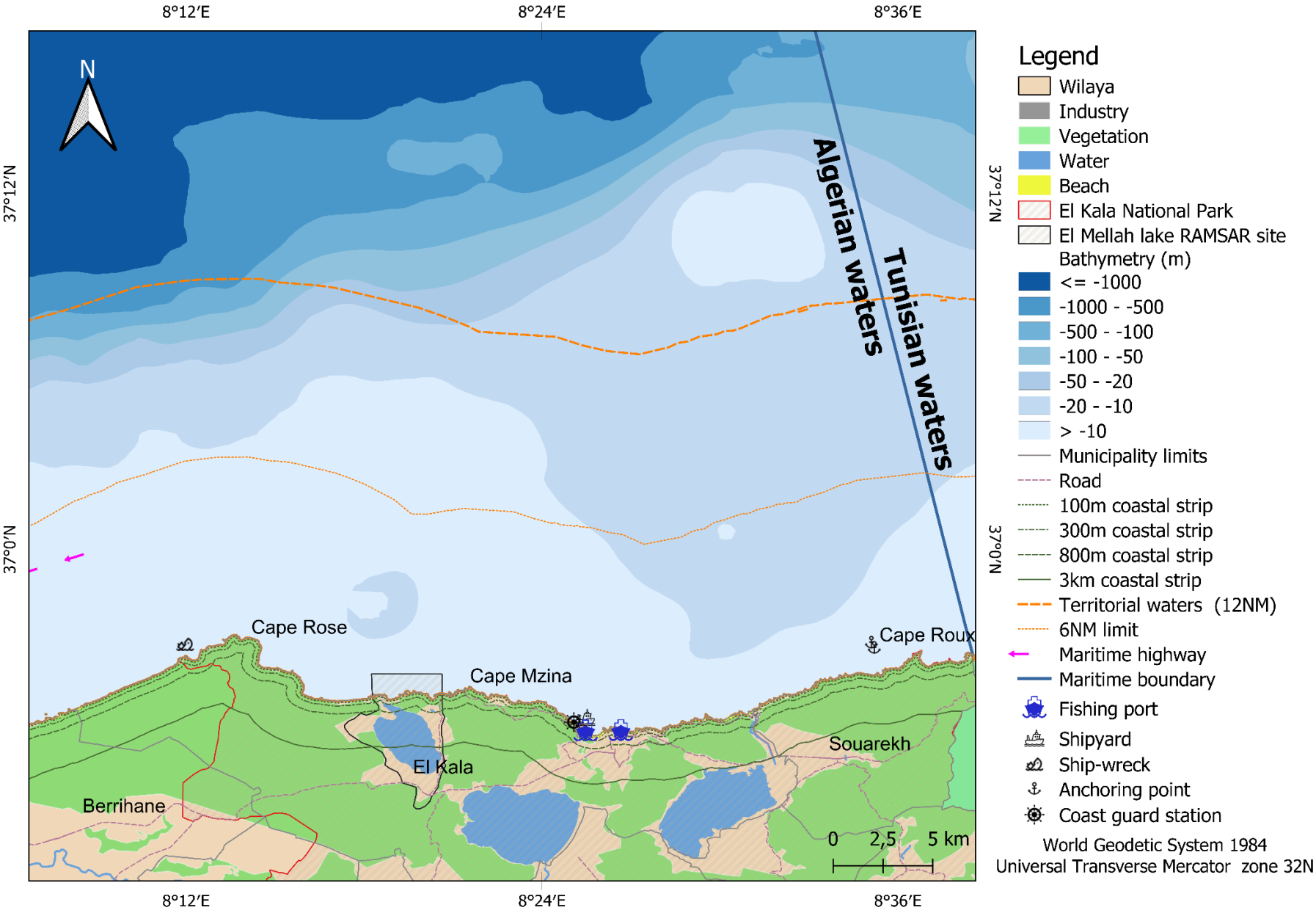


Figure 66: Thematic MSP map of Algeria's easternmost waters (Tunisian border, wilaya of El Tarf)

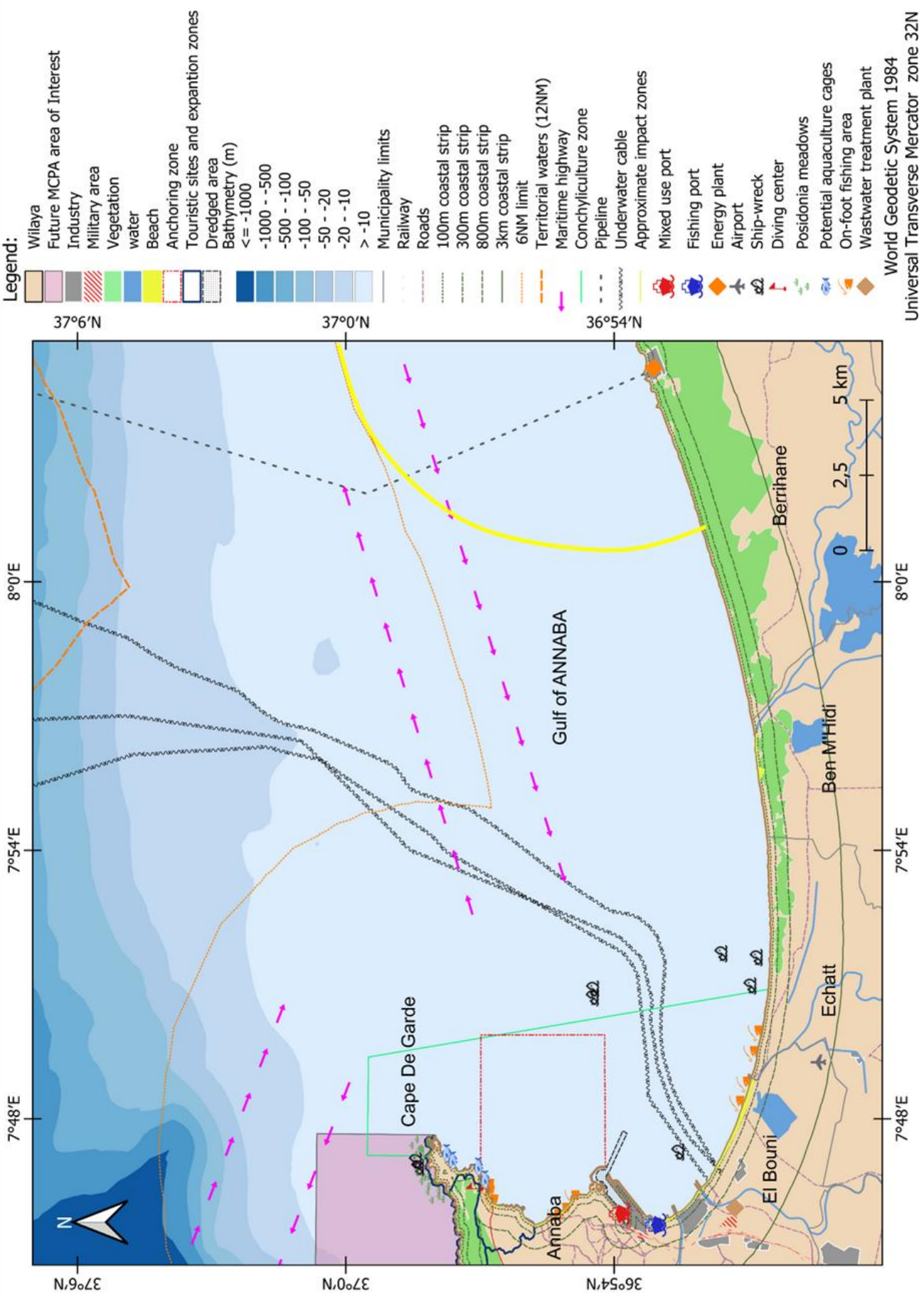


Figure 67: Thematic MSP map of the Gulf of Annaba. (Wilaya of Annaba)

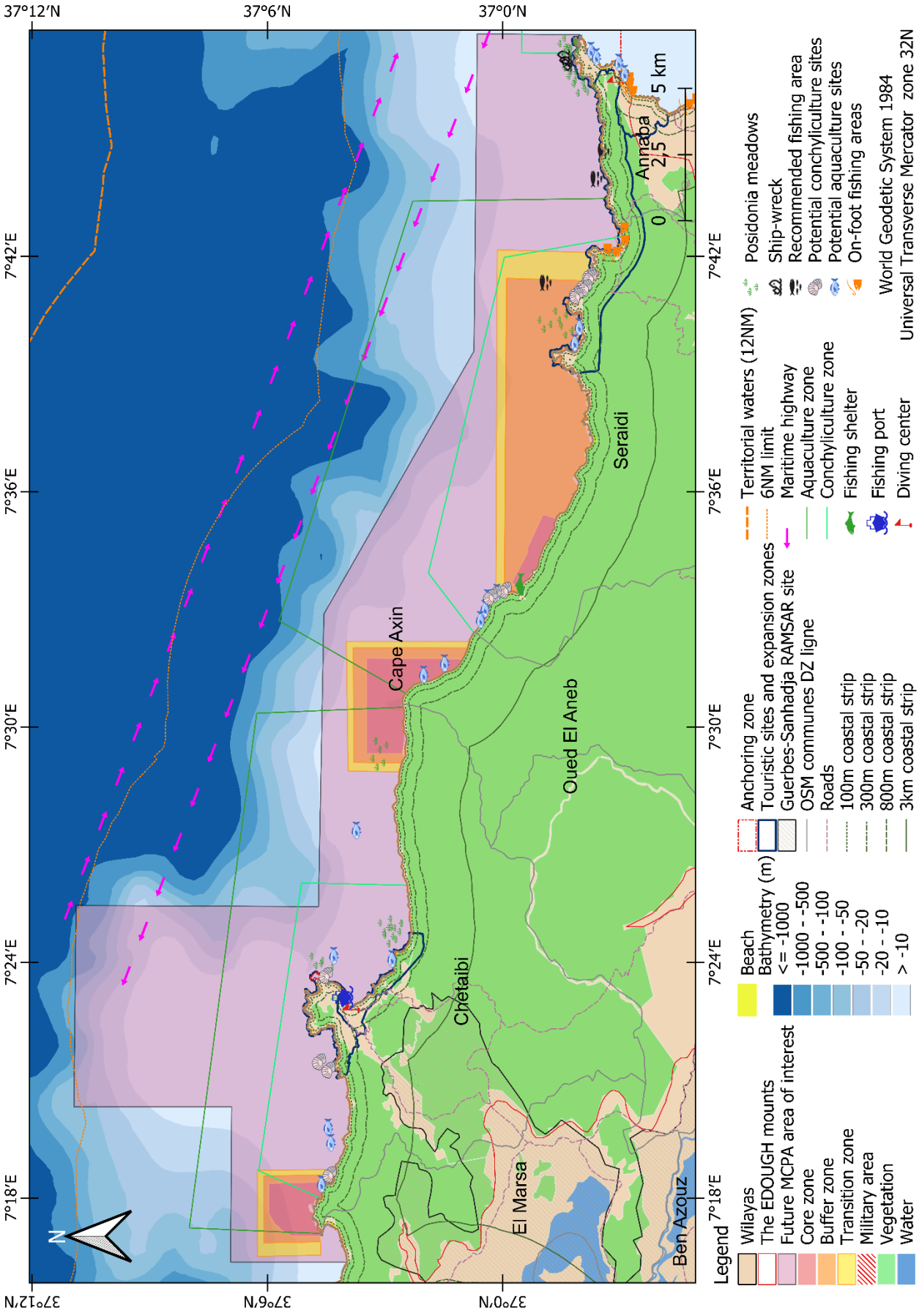


Figure 68: Thematic MSP map of the Edough marine area (Wilayas of Annaba, and Skikda)

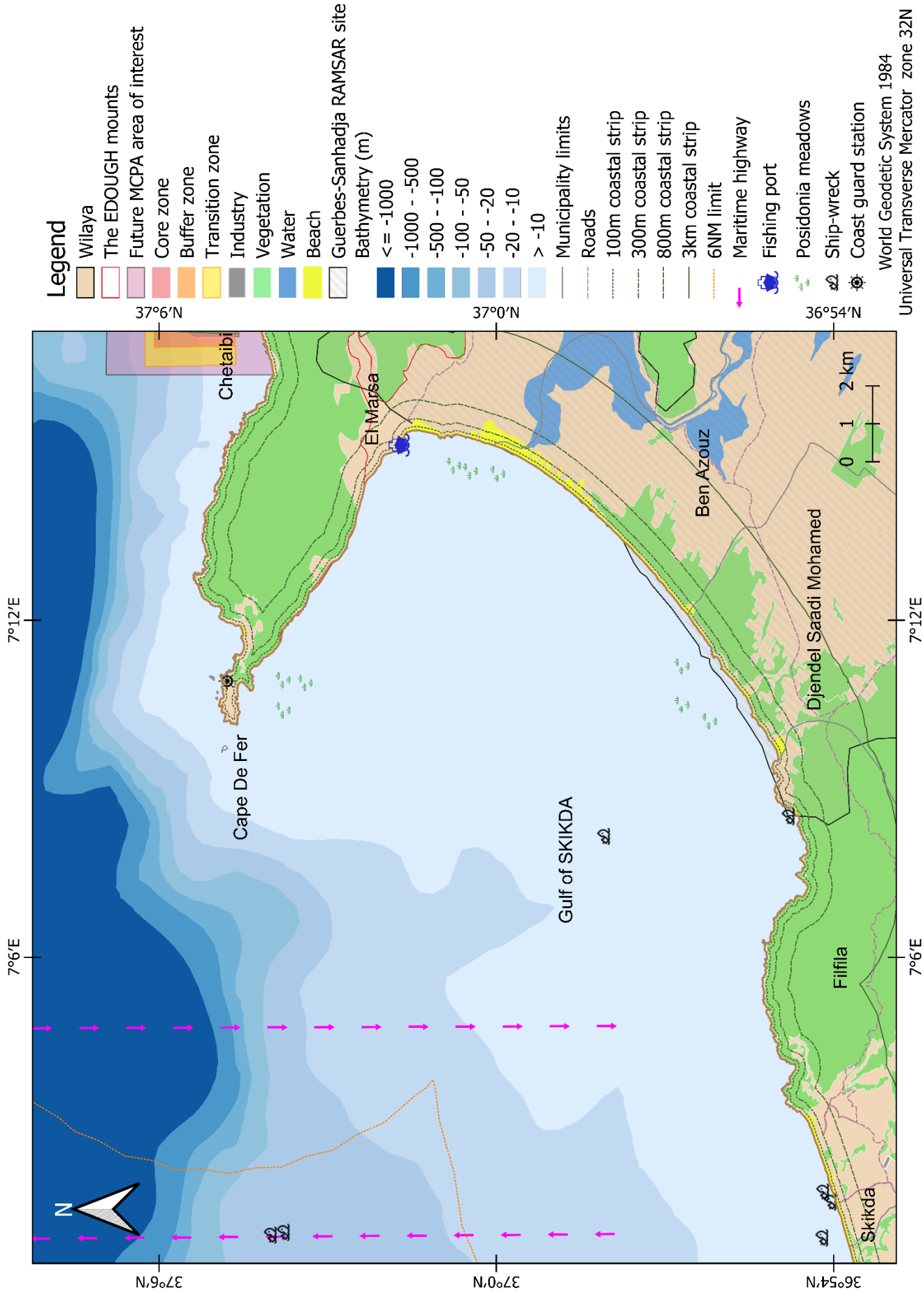


Figure 69: Thematic MSP map of The Gulf of Skikda (Wilaya of Skikda).

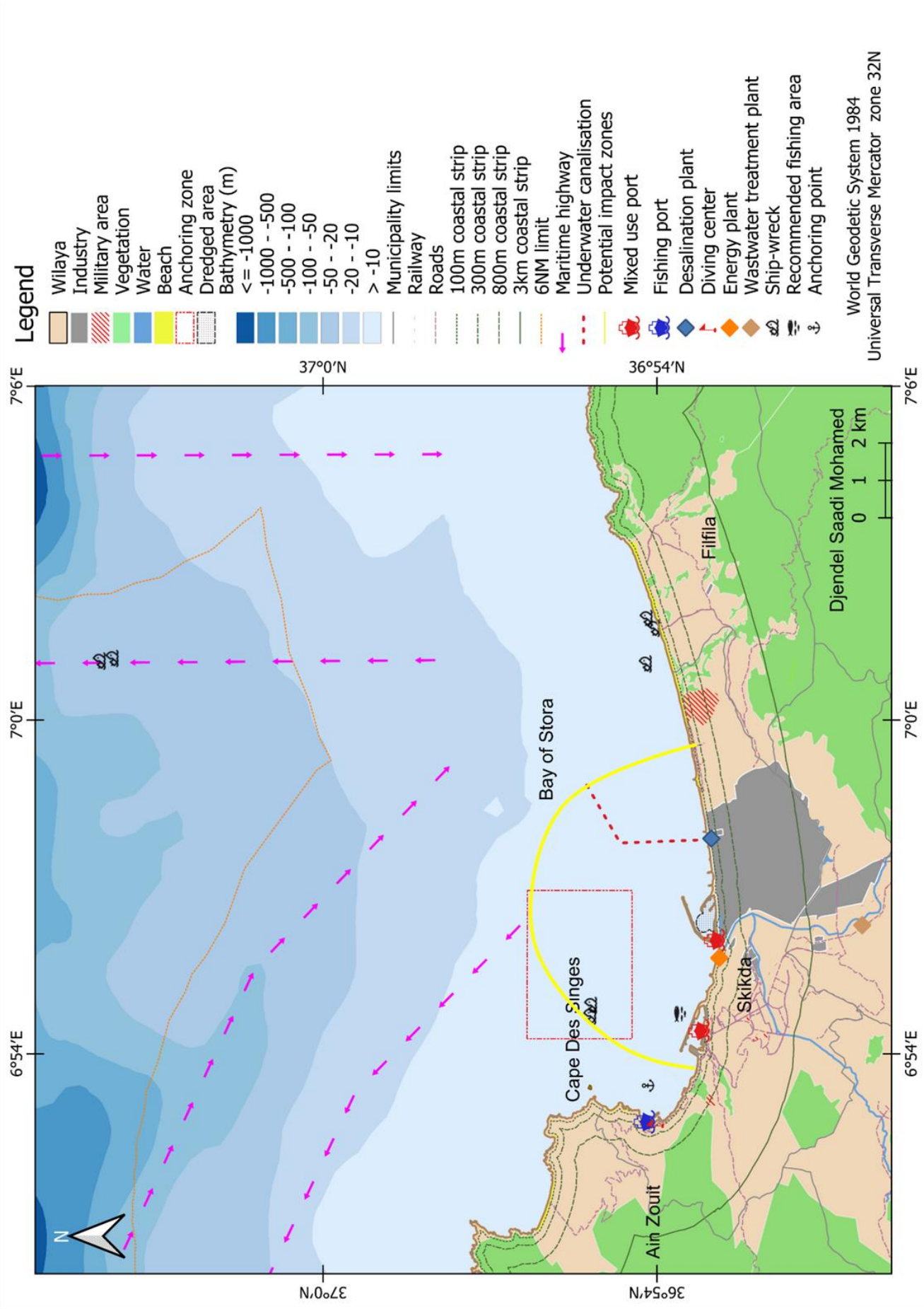


Figure 70: Thematic MSP map of the bay o Stora (wilaya of Skikda).

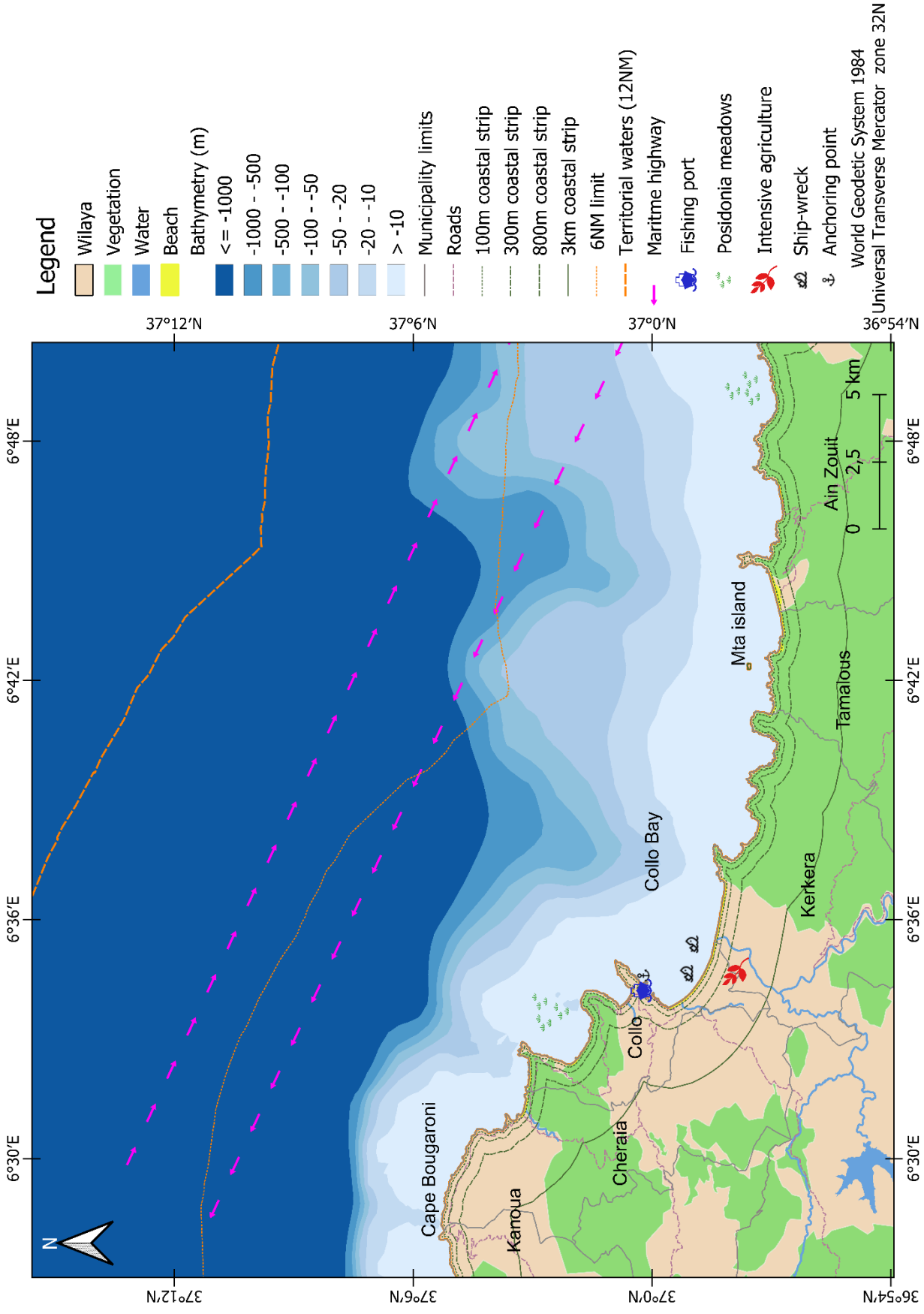


Figure 71: Thematic MSP map of the bay of Collo.

Chapter 07: Conclusion and perspectives

Multiple approaches for planning human activities, resource use, and ecosystem integrity in marine areas are gaining traction around the world, including, marine spatial planning which is a concept that provides means for improving decision-making using scientific, and geospatial information, among other tools, to address conflicts, and synergize human activities, while maintaining ecosystem health, function, and services (Centre for Ocean Solutions, 2011).

In the Mediterranean region however, the concept is still emerging, and many countries have yet to develop their MSP plans to line up with international trends in a context of climate change, food security, and resources scarcity challenges. Among these countries, Algeria is especially in need of an MSP framework, and processes both from a sectoral point of view, and as a transversal process given it's 1622 km long littoral hosting some of the region's most important resources. MSP should be also seen through the multi-use management of spatial maritime conflicts.

This study aims to analyse the MSP framework in Algeria, focusing on the eastern sector, and the links between this framework, and biodiversity conservation tools through the case study of an ongoing creation of an MCPA. Using a mixed methodological approach, the study points out the available elements that could form an MSP starter-pack along with gaps and weaknesses standing in the way of the current maritime space governance's alignment with international standards, thereby providing a reference state on MSP in the country. It also provides reference thematic MSP maps of the three easternmost wilayas, and studies the use of MSP as a tool for biodiversity conservation, and protection by analysing the spatial uses around the future MCPA of the Edough mounts in-between Annaba, and Skikda. As a follow up for table 1, the table below consolidates, and provides a global overview of the different chapter's main results.

Table 23: Main results of the study by chapter.

Literature research	Actor mapping	MSP diagnosis	QGIS mapping
Absence of an actual integrated MSP strategy in the country but rather sectoral management plans, and strategies partially addressing MSP issues	Assessment of actor's standpoints on MSP objectives	Assessment of actor's knowledge on MSP (principles use, etc.) And of their activities' compatibility with MSP objectives	Geospatial representation of the future MCPA's proposed zoning, and surrounding activities
Legislative, and institutional framework relating to the concept	Identification of key actors in the process of creating the Edough Mounts future MCPA	Evaluation of the state of MSP in Algeria (necessity, application, basic elements, etc.) from different actors' point of views	Highlighting of maritime, and coastal activity overlaps
Engagement in regional initiatives supporting MSP	Profiling of actors according to their influence, and dependence, and evaluation of their weight in the game of actors	Identification of gaps, and problems standing in-between the alignment of Algeria's maritime management measures with international standards	Production of Maritime spatial planning maps of the three easternmost wilayas of the country

	Estimation of actor's conflict potential through divergences, and convergences	Identification of types of conflicts between maritime, and coastal space users, and categories of actors, along with specific conflicts between stakeholders around the Edough Mounts future MCPA, and initiation of the reflexion on the use of MSP a tool to manage these conflicts	Suggestion of the use of mapping, as an MSP tool, to synergize the creation of the future MCPA with other activities, and potentially manage it
	Estimation of distances between actors, and objectives to recognise potential alliances around common objectives	Assessment of actors' willingness to work together on the conflicts (through the database for example)	
	Highlighting of the gap between actors' interactions in theory, and in reality	Raising interviewed actors' awareness on the potential benefits of the use of MSP to solve their conflicts	

Overall, the planning of maritime space in the country is at its earliest stages but the existence of some planning measures, and elements it can be based on, although sectorally, is promising. Indeed, MSP in Algeria can be built on already existing territorial planning strategies such as the National Strategy on Integrated Coastal Zone Management, and the National Territorial management Strategy in a governance perspective. An important challenge lies in the lack of political awareness on marine issues so far, nonetheless, decision-makers' attention is being drawn to the upcoming National Strategy on Blue Economy (SNEB 2030), a much more attractive investment, which will eventually facilitate the introduction of MSP principles into national strategies in a development-oriented framework. Based on the survey results, there is still little doubt that it would be developed mainly for environment conservation objectives given the country's strategic priorities.

However, several shortcomings are currently observed such as attribution overlaps or the non-effectiveness of some planning coastal tools like Coastal Planning Plans, which is a real obstacle for the implementation of MSP at the local level (territory of coastal wilayas). PACs are supposed to allocate spaces for different uses, considering Act 02-02, and its provisions regarding the legal meaning of costal domain which includes maritime waters.

Also, potential MSP actors' knowledge on the concept is fragmented and uneven across sectors, and categories. A considerable hierarchical lack of communication is one of the main problems magnifying the country's top-down marine and coastal space management weaknesses. Recognizing the need for planning, and organization is crucial for the development of an issue-driven MSP, but some administrative barriers may stand in the way, for example most administrative interviewees had trouble using the word 'conflict' mainly because the conflicting aspects of the activities are regulated, and therefor respected according to them.

Another barrier to MSP is the lack, and fragmentation of data on marine spatial uses which could slow down the planning process, as MSP maps are necessary, and very data demanding, a detailed diagnosis, and collection of data is essential. Despite the difficulties faced to collect spatial data on the study area, mapping (both of actors, and spatial) as an MSP tool is proven to be very useful to highlight maritime space conflicts as a first step to work on them, and also to support the establishment of MCPAs through a holistic vision including all concerned actors, as it helps to define ones with key roles, evaluate their objectives, conflict, and alliance potentials, and also to visualise the user-user, and user-environment links in the area.

The participatory principle is very important to the success, and the sustainability of an MSP policy; thus, the involvement of economic operators and civil society is essential despite the fact that they're used to only undergoing planning strategies although they could be beneficial stakeholders.

At a local scale, the Edough mounts future MCPA is a good example stressing the need of spatial planning of marine and coastal areas in Algeria. Indeed, using MSP principles and tools such as information, and concertation mechanisms, or spatial mapping could support the MCPA's establishment process through targeting existing conflict, and dealing with them in an integrated participatory approach, or even predicting potential ones around the area to be protected. Also, analysis, and mapping of the game of actors involved in the process provides useful information about actors' profiles, key actors, conflict potentials, and highlights potential alliances that could optimize means, and efforts to achieve common objectives.

A considerable gap exists between theoretical actors' relationships, and the way they exercise their power in the field. This could be explained by the lack of means, and competencies in practice or by the lack of consideration of social variants, and the standardized objectives, which are not adapted to the Algerian context, in theory. Hence, it would be interesting to get inspired from MSP good practices and successful examples both at the regional, and international scale such as the Adriatic MSP initiative, but it is not advisable to duplicate or strictly follow them, as the planning process needs to be adapted to the country' institutional, and social aspects. Moreover, MSP could also play a key role in the management of the protected area once officially created.

Finally, results of this work confirm that the current state of MSP in Algeria is summarized in hypothesis B (MSP in Algeria is driven by activities, strategies, and sectorial plans), and that an MSP policy must be developed in this context with the aim to move towards hypothesis A (Algerian waters are subject to regulatory maritime spatial planning) in the medium-, and long-term perspectives. In order to do so, the necessary conditions need to be provided including adequate institutional, and legislative frameworks along with adapted skills, technical requirements, awareness raising at all levels, in particular at the level of planners, decision makers, local authorities, and economic operators, and a complete diagnosis of the country's maritime, and coastal space uses.

In conclusion, political will remains the main trigger of planning policies in the country because only when decision-makers are convinced of the need for such a concept, will they deploy means to develop it. No matter which driver will initiate MSP in Algeria, the policy must be led by an

organism with very high power, and influence over integrated sectors, it must be well framed from the beginning, and efforts need to be made at all levels to optimise its effectiveness.

Moreover, it is recommended to replicate the present study on the rest of the littoral and, if ever there is the political will to engage in an MSP process, further studies need to be conducted to:

- Develop a database of the country's maritime and coastal space conditions, and use
- Specifically determine how far Algerian policies and management system are from the regional, and in the long-term international requirements of MSP guidelines in order to efficiently address the gaps, and optimize time, and effort
- Evaluate the financial aspect of a potential MSP framework
- Find solutions to overcome legislative, regulatory, and institutional weaknesses
- Adapt the MSP concept to the administrative, and social regimes of the country
- Integrate MSP in the management of MCPAs in practice
- Identify other benefits of MSP than those related to biodiversity conservation
- Study the need for a bottom-up approach to manage maritime and coastal space
- Evaluate the transboundary considerations regarding the role of Algeria in the Mediterranean MSP framework

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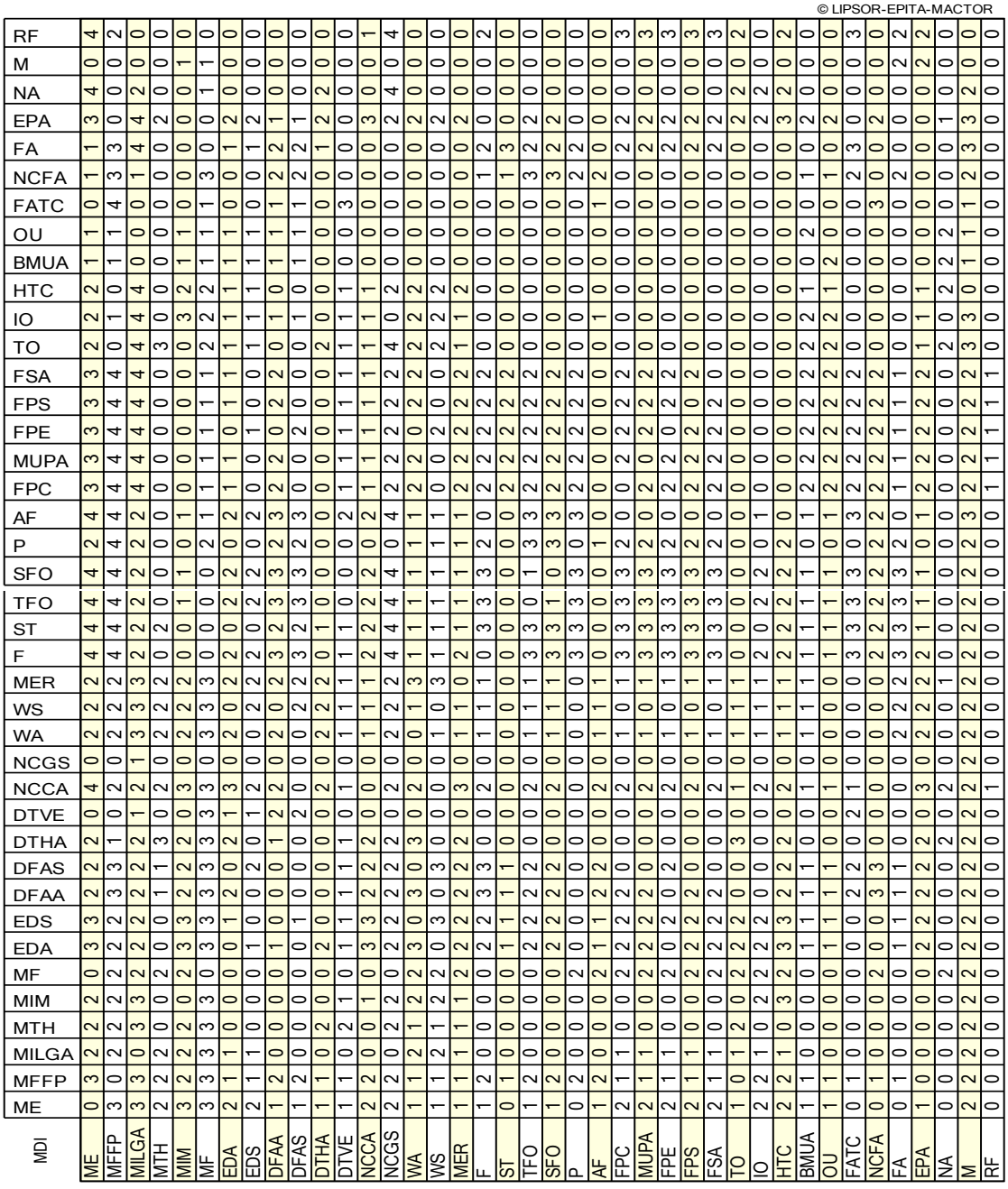
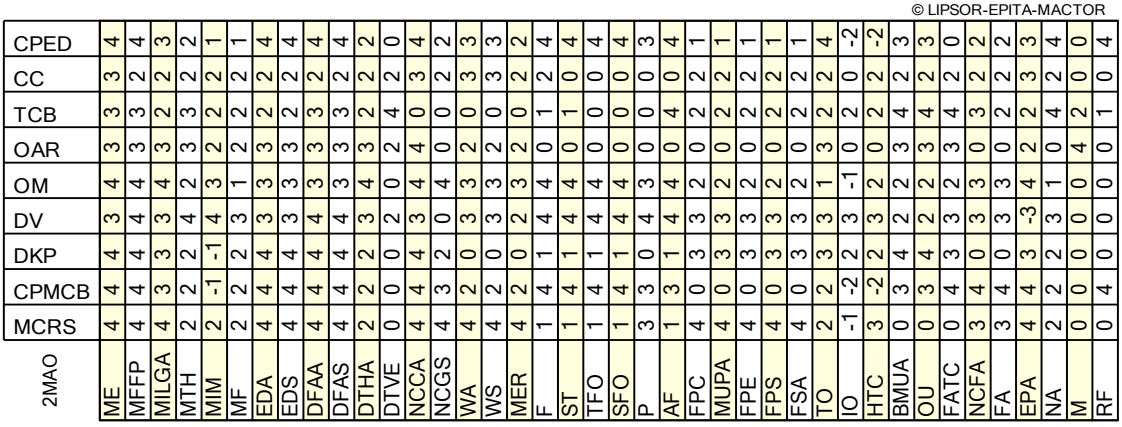
Appendices

Appendix 1: MACTOR input matrices

- **In theory MSP**





- **Real MSP**

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MDI	ME	MFFP	MILGA	MTH	MIM	MF	EDA	EDS	DFAA	DFAS	DTHA	DTVE	NCCA	NCGS	WA	WS	MER	F	ST	TFO	SFO	P	AF	FPC	MUPA	FPE	FPS	FSA	TO	IO	HTC	BMUA	OU	FATC	NCFA	FA	EPA	NA	Me	RF
RF	2	2	0	0	0	0	0	0	1	0	0	0	1	4	0	0	0	0	0	0	0	0	0	3	3	3	3	3	2	0	0	0	0	1	0	2	2	0	0	0
Me	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0
NA	4	1	2	2	0	1	1	1	1	0	2	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	0	0	0	0	0	0	0	1	0
EPA	3	2	4	1	2	0	2	2	1	1	0	0	2	2	2	2	2	0	0	2	2	0	0	2	2	2	2	2	0	2	3	2	2	0	2	0	0	1	3	0
FA	0	2	4	1	0	0	2	2	2	2	1	0	0	0	0	0	0	2	2	2	2	2	0	2	2	2	2	2	0	0	0	0	0	2	0	0	0	0	3	0
NCFA	1	3	2	1	1	3	2	2	2	2	0	0	0	0	0	0	0	1	1	3	3	2	2	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	2	0
FATC	0	4	0	1	0	1	0	0	1	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0
OU	1	1	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	1	0
BMUA	1	1	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	1	0
HTC	2	0	2	0	2	2	1	1	0	0	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0
IO	2	2	2	0	3	2	1	1	1	1	0	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	1	0	3	0
TO	2	2	2	3	0	2	1	1	0	0	2	1	1	4	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	1	1	3	0
FSA	2	4	4	0	0	1	1	0	2	0	0	1	0	2	2	0	1	0	1	2	2	2	0	2	2	2	2	0	0	0	0	2	2	2	2	1	2	0	2	1
FPS	2	4	4	0	0	1	1	0	2	0	0	1	0	2	2	0	1	0	1	2	2	2	0	2	2	2	0	2	0	0	0	2	2	2	2	1	2	0	2	1
FPE	2	4	4	0	0	1	0	1	0	2	0	1	0	2	0	2	1	0	1	2	2	2	0	2	2	0	2	2	0	0	0	2	2	2	2	1	2	0	2	1
MUPA	2	4	4	0	0	1	1	0	2	0	0	1	0	2	2	0	1	0	1	2	2	2	0	2	0	2	2	2	0	0	0	2	2	2	2	1	2	0	2	1
FPC	2	4	4	0	0	1	1	0	2	0	0	1	0	2	2	0	1	0	1	2	2	2	0	0	2	2	2	2	0	0	0	2	2	2	2	1	2	0	2	1
AF	2	4	2	2	1	1	1	1	3	3	0	2	0	4	1	1	1	0	0	3	3	3	0	0	0	1	1	1	0	1	0	1	1	2	2	0	1	0	1	0
P	1	4	2	0	0	2	0	0	2	2	0	0	0	0	1	1	1	2	0	3	3	0	1	2	2	2	2	2	0	0	2	0	0	0	2	0	0	0	2	0
SFO	1	4	2	0	1	0	1	1	3	3	0	0	0	4	1	1	1	3	0	1	0	3	0	3	3	3	3	3	0	2	2	1	1	1	2	3	0	0	2	0
TFO	1	4	2	0	1	0	1	1	3	3	0	0	0	4	1	1	1	3	0	0	1	3	0	3	3	3	3	3	0	2	2	1	1	1	2	3	0	0	2	0
ST	2	4	2	1	0	0	0	0	2	2	1	1	0	4	1	1	1	3	0	3	3	3	0	3	3	3	3	3	0	0	2	1	1	3	2	3	0	0	2	0
F	2	4	2	1	0	0	1	1	3	3	0	1	0	4	1	1	2	0	0	3	3	3	0	3	3	3	3	3	0	2	2	1	1	3	2	3	0	0	2	0
MER	2	2	3	2	2	3	2	2	2	2	2	1	1	2	3	3	0	0	0	1	1	0	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	2	0
WS	2	2	3	2	2	3	0	2	0	2	2	1	1	2	1	0	1	0	0	1	1	0	1	0	0	0	0	0	1	1	1	0	0	0	0	1	1	0	2	0
WA	2	2	3	2	2	3	2	0	2	0	2	1	1	2	0	1	1	0	0	1	1	0	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	0	2	0
NCGS	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
NCCA	4	2	2	1	3	3	3	2	2	0	2	1	0	2	2	0	1	1	0	0	0	0	0	2	2	2	2	2	1	2	2	1	1	0	0	0	2	1	1	1
DTVE	0	0	1	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0
DTHA	2	1	2	3	2	3	0	0	0	0	0	1	0	2	3	0	1	0	0	0	0	0	0	0	0	0	0	0	3	0	2	0	0	0	0	0	2	2	2	0
DFAS	2	3	2	0	2	3	0	1	0	0	0	1	0	2	0	3	1	3	1	2	2	0	2	0	0	2	0	0	0	0	2	1	1	1	3	1	2	0	2	0
DFAA	2	3	2	2	2	3	1	0	0	0	0	1	0	2	3	0	1	3	1	2	2	0	2	2	2	0	2	2	0	0	2	1	1	1	3	1	2	0	2	0
EDS	3	0	2	2	3	3	1	0	0	2	0	1	2	2	0	3	1	2	1	2	2	0	1	2	2	2	2	2	2	2	3	1	1	0	0	1	2	0	2	0
EDA	3	0	2	2	3	3	0	1	1	0	2	1	2	2	3	0	1	2	1	2	2	0	1	2	2	0	2	2	2	2	3	1	1	0	0	1	2	0	2	0
MF	0	2	2	2	2	0	0	0	0	0	0	0	0	0	2	2	1	0	0	0	0	2	2	2	2	2	2	2	2	2	2	0	0	0	2	0	0	2	2	0
MIM	2	0	3	0	0	3	0	0	0	0	0	1	0	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0	0	0	0	2	0
MTH	2	0	3	0	2	3	0	0	0	0	2	2	0	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0
MILGA	2	2	0	2	2	3	1	1	0	0	0	0	0	0	2	2	1	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	2	0
MFFP	2	0	3	2	2	3	1	1	2	2	1	1	0	2	1	1	1	2	1	2	2	2	2	1	1	1	1	1	0	1	1	1	1	1	1	1	0	0	2	0
ME	0	3	3	2	3	3	2	2	1	1	1	1	2	2	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	2	2	1	1	0	0	0	1	0	2	0

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2MAO	ME	MFFP	MILGA	MTH	MIM	MF	EDA	EDS	DFAA	DFAS	DTHA	DTVE	NCCA	NCGS	WA	WS	MER	F	ST	TFO	SFO	P	AF	FPC	MUPA	FPE	FPS	FSA	TO	IO	HTC	BMUA	OU	FATC	NCFA	FA	EPA	NA	Me	RF
CPED	3	3	2	2	1	1	3	3	3	3	2	0	2	2	2	2	3	4	4	4	4	3	4	-1	-1	-1	-1	-1	4	-1	-1	2	2	0	2	2	3	4	0	4
CC	3	2	2	2	0	2	2	2	2	2	2	2	1	0	3	3	2	0	0	0	0	0	0	2	2	2	2	2	0	0	1	2	2	2	2	0	3	2	0	0
TCB	3	3	2	3	2	1	2	2	3	3	2	3	0	0	0	0	0	1	1	0	0	0	4	1	1	1	1	1	1	1	2	4	4	4	3	0	2	4	1	1
OAR	3	3	3	1	2	0	3	3	3	3	3	2	2	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	3	3	3	0	0	2	0	3	0
OM	3	3	3	1	-3	1	2	2	2	2	1	0	1	2	2	2	2	-3	-3	-3	-3	-3	-3	2	2	2	2	2	-1	-1	-1	2	2	2	3	-3	3	1	0	0
DV	-3	3	3	3	3	3	-3	-3	3	3	3	2	-2	0	3	3	2	4	4	4	4	4	4	3	3	3	3	3	3	3	3	2	2	3	3	3	-3	3	0	0
DKP	3	3	3	2	-1	2	3	3	3	3	2	0	2	2	0	0	0	1	1	1	1	0	1	3	3	3	3	3	2	2	2	3	3	3	0	0	3	2	0	0
CPMCB	3	3	3	0	-1	2	3	3	3	3	0	0	1	2	1	1	1	-4	-2	-4	-4	-2	3	-2	0	-2	0	-2	-1	-2	-1	3	3	3	3	3	3	2	0	-2
MCRS	3	3	3	2	2	2	3	3	2	2	2	0	1	3	2	2	2	-1	-1	-1	-1	-2	-1	-1	-1	-1	-1	-1	-1	-1	3	0	0	0	3	-3	3	2	0	0

Appendix 2: MDII competitiveness NS, and ambivalence data

Category	Actors	R_i In theory	Real Ri	NS in theory	Real NS	Ambivalence in theory	Real ambivalence
Administrations	ME	1,67	1,6	237	198	0,1	0,4
	MFFP	1,63	1,62	194	165	0,1	0,3
	MICLAT	2,34	2,45	785	710	0,1	0,3
	MTH	0,82	1,42	185	414	0	0,2
	MIM	1,42	1,75	454	549	0,4	0,7
	MF	1,63	1,76	379	367	0,1	0,3
	EDA	0,76	0,68	-319	-333	0,1	0,4
	EDS	0,59	0,53	-441	-444	0	0,4
	DFAA	0,88	0,88	-228	-182	0,1	0,3
	DFAS	0,64	0,66	-264	-178	0,1	0,3
	DTHA	0,39	0,38	-198	-101	0	0,2
	DTVE	1,06	1,42	359	481	0	0,1
	NCCA	0,71	0,19	-438	-636	0	4
	NCGS	2,64	2,76	1054	957	0	0,3
Local authorities	WA	1,03	1,02	-21	-8	0	0,3
	WS	0,76	0,77	-79	-45	0	3
	MER	0,99	0,71	-134	-267	0	0,3
Economic operators	F	0,69	0,34	-458	-568	0,1	0,6
	ST	0,22	0,17	-783	-688	0,1	6
	TFO	0,8	0,86	-335	-199	0,1	0,7
	SFO	0,8	0,86	-335	-199	0,1	0,7
	P	0,5	0,55	-375	-292	0,1	0,6
	AF	0,39	0,34	-406	-425	0,1	0,6
	FPC	0,88	0,92	-190	-102	0	0,6
	MUPA	0,88	0,92	-190	-102	0	0,5
	FPE	0,81	0,88	-224	-118	0	0,6
	FPS	0,88	0,95	-190	-90	0	0,5
	FSA	0,88	0,95	-190	-90	0	0,6
	TO	0,44	0,4	-83	-135	0	0,6
	IO	0,83	0,79	87	55	0,8	0,6
	HTC	1,24	1,34	339	383	0,5	0,6
Scientists	BMUA	1,37	1,25	489	362	0,1	0,2
	OU	1,2	1,25	413	362	0,1	0,2
	FATC	1,2	1	431	300	0,1	0,2
Socio-professional organisation, and civil society	NCFA	0,82	0,78	47	-75	0	0,3
	FA	0,69	0,57	-189	-264	0	0,7
	EPA	0,85	0,67	-221	-334	0,3	0,4
	NA	0,42	0,23	65	-150	0	0,3
	M	3,24	3,31	1290	1139	0	0
	RF	0,06	0,06	-517	-417	0	0,6

Appendix 3: Actors' profiles in theory and in real MSP systems

Actors		Profile in theory
M	category	Socio-professional organisations, and civil society
	Influence/Dependence	The most influential - least dependent after NCGS
	Competitiveness vector	3,24
	Net Scale of influence	1290
NCGS	category	Administrations
	Influence/Dependence	The least dependent - very influential
	Competitiveness vector	2,64
	Net Scale of influence	1054
MICLAT	category	Administrations
	Influence/Dependence	The most influential after Me - Average dependency (before axis)
	Competitiveness vector	2,34
	Net Scale of influence	785
ME	category	Administrations
	Influence/Dependence	The most influential after Me, and MICLAT -Very dependent
	Competitiveness vector	1,67
	Net Scale of influence	237
MF	category	Administrations
	Influence/Dependence	As dependent as NCGS - very influential
	Competitiveness vector	1,63
	Net Scale of influence	379
MFFP	category	Administrations
	Influence/Dependence	Same level of influence as ME - More dependent than ME
	Competitiveness vector	1,63
	Net Scale of influence	194
MIM	category	Administrations
	Influence/Dependence	Low dependence - Medium influence
	Competitiveness vector	1,42
	Net Scale of influence	454
BMUA	category	Scientists
	Influence/Dependence	Low dependency - Medium influence (less than MIM, and ETH)
	Competitiveness vector	1,37
	Net Scale of influence	489
HTC	category	Economic operators
	Influence/Dependence	Low dependency - Moderately influential (less than MIM)
	Competitiveness vector	1,24
	Net Scale of influence	339
FATC	category	Scientists
	Influence/Dependence	Low dependency - low influence
	Competitiveness vector	1,2
	Net Scale of influence	431
OU	category	Scientists
	Influence/Dependence	Low dependency - low influence
	Competitiveness vector	1,2
	Net Scale of influence	413
DTVE	category	Administrations
	Influence/Dependence	Very low dependency - low influence
	Competitiveness vector	1,06
	Net Scale of influence	359
WA	category	Local authorities
	Influence/Dependence	Very dependent - moderately influential
	Competitiveness vector	1,03
	Net Scale of influence	-21
MER	category	Local authorities
	Influence/Dependence	Very dependent (more than WA) - moderately influential (slightly more than WA)
	Competitiveness vector	0,99
	Net Scale of influence	-134
FPC	category	Economic operators
	Influence/Dependence	Very dependent - moderately influential (same position as PPM PPS, and PPA)
	Competitiveness vector	0,88
	Net Scale of influence	-190
MUPA	category	Economic operators
	Influence/Dependence	Very dependent - moderately influential (same position as PPC PPS, and PPA)
	Competitiveness vector	0,88
	Net Scale of influence	-190
FPS	category	Economic operators
	Influence/Dependence	Very dependent - moderately influential (same position as PPC PPM, and PPA)
	Competitiveness vector	0,88
	Net Scale of influence	-190
FSA	category	Economic operators
	Influence/Dependence	Very dependent - moderately influential (same position as PPC PPM, and PPS)
	Competitiveness vector	0,88
	Net Scale of influence	-190
DFAA	category	Administrations
	Influence/Dependence	Very dependent - moderately influential
	Competitiveness vector	0,88
	Net Scale of influence	-228
EPA	category	Socio-professional organisations, and civil society

	Influence/Dependence	Very dependent - moderately influential (slightly off axis)
	Competitiveness vector	0,85
	Net Scale of influence	-221
IO	category	Economic operators
	Influence/Dependence	Moderately dependent - moderately influential
	Competitiveness vector	0,83
	Net Scale of influence	87
MTA	category	Administrations
	Influence/Dependence	Low dependency - low influence
	Competitiveness vector	0,82
	Net Scale of influence	185
NCFA	category	Socio-professional organisations, and civil society
	Influence/Dependence	moderately dependent - moderately influential (relatively more dependent than influential)
	Competitiveness vector	0,82
	Net Scale of influence	47
FPE	category	Economic operators
	Influence/Dependence	Very dependent - moderately influential (on axis)
	Competitiveness vector	0,81
	Net Scale of influence	-224
TFO	category	Economic operators
	Influence/Dependence	Very dependent - moderately influential (almost on axis) (Same as AS)
	Competitiveness vector	0,8
	Net Scale of influence	-335
SFO	category	Economic operators
	Influence/Dependence	Very dependent - moderately influential (almost on axis) (Same as AC)
	Competitiveness vector	0,8
	Net Scale of influence	-335
WS	category	Local authorities
	Influence/Dependence	Moderately dependent - Not very influential
	Competitiveness vector	0,76
	Net Scale of influence	-79
EDA	category	Administrations
	Influence/Dependence	Very dependent - moderately influential (on axis)
	Competitiveness vector	0,76
	Net Scale of influence	-319
NCCA	category	Administrations
	Influence/Dependence	The most dependent after P - moderately influential
	Competitiveness vector	0,71
	Net Scale of influence	-438
FA	category	Socio-professional organisations, and civil society
	Influence/Dependence	Moderately dependent - not very influential
	Competitiveness vector	0,69
	Net Scale of influence	-189
F	category	Economic operators
	Influence/Dependence	The most dependent - as influential as CNLA
	Competitiveness vector	0,69
	Net Scale of influence	-458
DFAS	category	Administrations
	Influence/Dependence	Very dependent - low influence
	Competitiveness vector	0,64
	Net Scale of influence	-264
EDS	category	Administrations
	Influence/Dependence	Very dependent - low influence
	Competitiveness vector	0,59
	Net Scale of influence	-441
P	category	Economic operators
	Influence/Dependence	Very dependent (less than DES) - low influence (less than DGPAS)
	Competitiveness vector	0,5
	Net Scale of influence	-375
TO	category	Economic operators
	Influence/Dependence	Moderately dependent - very little influence
	Competitiveness vector	0,44
	Net Scale of influence	-83
NA	category	Socio-professional organisations, and civil society
	Influence/Dependence	The east influential after PP - low dependency
	Competitiveness vector	0,42
	Net Scale of influence	65
DTHA	category	Administrations
	Influence/Dependence	Moderately dependent (axis) - very little Influential
	Competitiveness vector	0,39
	Net Scale of influence	-198
AF	category	Economic operators
	Influence/Dependence	Very dependent - very low influence
	Competitiveness vector	0,39
	Net Scale of influence	-406
ST	category	Economic operators
	Influence/Dependence	The least influential after PP, and AN - the most dependent after P, and CNLA
	Competitiveness vector	0,22
	Net Scale of influence	-783

RF	category	Socio-professional organisations, and civil society
	Influence/Dependence	The least influential (max) - Medium dependency
	Competitiveness vector	0,06
	Net Scale of influence	-517

Actors		Real profile
M	category	Socio-professional organisations, and civil society
	Influence/Dependence	The most influential - the least dependent after NCGS
	Competitiveness vector	3,31
	Net Scale of influence	1139
NCGS	category	Administrations
	Influence/Dependence	Very influential - the least dependent
	Competitiveness vector	2,76
	Net Scale of influence	957
MICLAT	category	Administrations
	Influence/Dependence	The most influential after M - Average dependency (after the axis)
	Competitiveness vector	2,45
	Net Scale of influence	710
MF	category	Administrations
	Influence/Dependence	As dependent as NCGS - very influential
	Competitiveness vector	1,76
	Net Scale of influence	367
MIM	category	Administrations
	Influence/Dependence	Low dependency - Influential
	Competitiveness vector	1,75
	Net Scale of influence	549
MFFP	category	Administrations
	Influence/Dependence	Very dependent - Very influential (3rd place)
	Competitiveness vector	1,62
	Net Scale of influence	165
ME	category	Administrations
	Influence/Dependence	Very dependent - Very influential (4th place)
	Competitiveness vector	1,6
	Net Scale of influence	198
DTVE	category	Administrations
	Influence/Dependence	The least dependent after NCGS - low influence
	Competitiveness vector	1,42
	Net Scale of influence	481
MTA	category	Administrations
	Influence/Dependence	low dependency - medium influence (on axis)
	Competitiveness vector	1,42
	Net Scale of influence	414
HTC	category	Economic operators
	Influence/Dependence	Low dependency - medium influence
	Competitiveness vector	1,34
	Net Scale of influence	383
BMUA	category	Scientists
	Influence/Dependence	Low dependency - medium influence
	Competitiveness vector	1,25
	Net Scale of influence	362
OU	category	Scientists
	Influence/Dependence	Low dependency - medium influence (same position as UBMA)
	Competitiveness vector	1,25
	Net Scale of influence	362
WA	category	Local authorities
	Influence/Dependence	Very dependent - moderately influential
	Competitiveness vector	1,02
	Net Scale of influence	-8
FATC	category	Scientists
	Influence/Dependence	Low dependency - low influence
	Competitiveness vector	1
	Net Scale of influence	300
FPS	category	Economic operators
	Influence/Dependence	Very dependent - moderately influential (on axis) (same position as FSA)
	Competitiveness vector	0,95
	Net Scale of influence	-90

FSA	category	Economic operators
	Influence/Dependence	Very dependent - moderately influential (on axis) (same position as FPS)
	Competitiveness vector	0,95
	Net Scale of influence	-90
FPC	category	Economic operators
	Influence/Dependence	Very dependent - moderately influential (near the axis) (same position as MUPA)
	Competitiveness vector	0,92
	Net Scale of influence	-102
MUPA	category	Economic operators
	Influence/Dependence	Very dependent - moderately influential (near the axis) (same position as FPC)
	Competitiveness vector	0,92
	Net Scale of influence	-102
FPE	category	Economic operators
	Influence/Dependence	Very dependent - moderately influential (less than other ports)
	Competitiveness vector	0,88
	Net Scale of influence	-118
DFAA	category	Administrations
	Influence/Dependence	Very dependent - moderately influential (on axis)
	Competitiveness vector	0,88
	Net Scale of influence	-182
TFO	category	Economic operators
	Influence/Dependence	Very dependent - moderately influential (on axis)
	Competitiveness vector	0,86
	Net Scale of influence	-199
SFO	category	Economic operators
	Influence/Dependence	Very dependent - moderately influential (on axis)
	Competitiveness vector	0,86
	Net Scale of influence	-199
IO	category	Economic operators
	Influence/Dependence	Moderately dependent - Not very influential
	Competitiveness vector	0,79
	Net Scale of influence	55
NCFA	category	Socio-professional organisations, and civil society
	Influence/Dependence	Dependent - not very influential
	Competitiveness vector	0,78
	Net Scale of influence	-75
WS	category	Local authorities
	Influence/Dependence	Dependent - not very influential
	Competitiveness vector	0,77
	Net Scale of influence	-45
MER	category	Local authorities
	Influence/Dependence	Very dependent - low influence
	Competitiveness vector	0,71
	Net Scale of influence	-267
EDA	category	Administrations
	Influence/Dependence	Very dependent (4th place) - not very influential (same position as EPA)
	Competitiveness vector	0,68
	Net Scale of influence	-333
EPA	category	Socio-professional organisations, and civil society
	Influence/Dependence	Very dependent (4th place) - not very influential (same position as EDA)
	Competitiveness vector	0,67
	Net Scale of influence	-334
DFAS	category	Administrations
	Influence/Dependence	Very dependent - low influence
	Competitiveness vector	0,66
	Net Scale of influence	-178
FA	category	Socio-professional organisations, and civil society
	Influence/Dependence	Very dependent - low influence
	Competitiveness vector	0,57
	Net Scale of influence	-264
P	category	Economic operators
	Influence/Dependence	Very dependent - low influence
	Competitiveness vector	0,55
	Net Scale of influence	-292
EDS	category	Administrations
	Influence/Dependence	Most dependent after F - Not very influential
	Competitiveness vector	0,53
	Net Scale of influence	-444

TO	category	Economic operators
	Influence/Dependence	Moderately dependent - Not very influential
	Competitiveness vector	0,4
	Net Scale of influence	-135
DTHA	category	Administrations
	Influence/Dependence	Low dependency - low influence
	Competitiveness vector	0,38
	Net Scale of influence	-101
AF	category	Economic operators
	Influence/Dependence	Very dependent - low influence
	Competitiveness vector	0,34
	Net Scale of influence	-425
F	category	Economic operators
	Influence/Dependence	The most dependent - low influence
	Competitiveness vector	0,34
	Net Scale of influence	-568
NA	category	Socio-professional organisations, and civil society
	Influence/Dependence	Low dependency - Very low influence
	Competitiveness vector	0,23
	Net Scale of influence	-150
NCCA	category	Administrations
	Influence/Dependence	Very dependent - Very low influence
	Competitiveness vector	0,19
	Net Scale of influence	-636
ST	category	Economic operators
	Influence/Dependence	The most dependent after F, and EDS - Very low influence
	Competitiveness vector	0,17
	Net Scale of influence	-688
RF	category	Socio-professional organisations, and civil society
	Influence/Dependence	Medium dependency - the least influential
	Competitiveness vector	0,06
	Net Scale of influence	-417

Appendix 4: Interview guide (in French)

Guide d'entretien

- Note conceptuelle :

La planification de l'espace maritime (PEM) est un concept d'organisation de l'utilisation des mers de manière synergique pour gérer et réduire les conflits d'usage de l'espace maritime par les activités existantes et potentielles. Le présent questionnaire est mené dans le cadre d'un projet de fin d'études de Master en Ingénierie de l'environnement marine côtier à l'Ecole Nationale Supérieure de Sciences de le Mer et de l'Aménagement du Littoral. Il a pour objectif de faire un diagnostic complet sur la PEM sur lequel s'appuie la constitution d'une base afin de donner des propositions, orientations et recommandations sur son application et sa mise en œuvre en Algérie avec un zoom sur le secteur Est (wilayas de Jijel, Annaba, Skikda et El Tarf).

- Questions :

Partie 01 :

1) Nom : (facultatif)
2) Prénom : (facultatif)
3) Catégories d'acteurs :
   - Administrations (centrale / décentralisée / sous tutelle)
   - Collectivités locales (Wilaya / Daïra/ municipalité)
   - Opérateurs économiques
   - Scientifiques
   - Organisation socio-professionnelles et société civile.
   - Autres

4) Secteur :
5) Institution :
6) Qualité :

Partie 02 :

1) Avez-vous déjà entendu parler de la PEM ?
   Si oui, dans quelles circonstances ?
   - Activité quotidienne / professionnelle
   - Réseaux sociaux
   - Travail de recherche universitaire
   - Conférence / séminaire
   - Dans le cadre d'un projet, lequel ?
   - Autres

2) D'après vous, quelles sont les activités concernées par la PEM ?
   - Activités portuaires
   - Recherche scientifique

- Transport maritime
- Energies et mines
- Pêche et aquaculture
- Télécommunication
- Biotechnologie
- Protection de l'environnement
- Défense
- Aménagement des côtes
- Tourisme et activités récréatives
- Dessalement
- Toutes
- Autres

3) La PEM sert à :

- Réduire les conflits entre les secteurs et les acteurs
- Encourager les investissements en instaurant la prévisibilité, la transparence et des règles plus claires
- Renforcer la coordination pour équilibrer le développement des activités maritimes
- Accroître la coopération transfrontalière entre les pays et les secteurs
- Protéger l'environnement

4) Pensez-vous que l'aménagement du territoire, la gestion intégrée des zones côtières et la planification de l'espace maritime sont :
   - Dépendant
   - Indépendants
   - Contradictoires
   - Conflictuelles
   - Complémentaires
   - Autres
5) La PEM en Algérie:

- N'existe pas
- Existe mais non mise en œuvre
- Règlementée et mise en œuvre partiellement
- Règlementée et mise en œuvre totalement
- Portée par les activités maritimes, des stratégies et des plans sectoriels

6) Quel est le secteur d'après vous qui applique la PEM le plus en Algérie?

Partie 03 :

1) Quelle est l'emprise spatiale de votre activité
   - Fixe/mobile

- Locale/régional (est /centre /ouest)/National
- Zone côtière/zone maritime (côtière/au large/les deux)/les deux

2) Votre activité est :
- Permanente/ temporelle/ occasionnelle
- Journalière/ hebdomadaire/mensuelle/ saisonnière/ annuelle.

3) Quels sont vos principaux objectifs en relation avec l'espace maritime et ses ressources ?

4) Quel est votre position par rapport aux objectifs ci-dessous concernant l'espace maritime et côtier algérien et ses ressources : (favorable/neutre/défavorable)

- Gestion, contrôle, régulation et surveillance
- Conservation et protection de la biodiversité marine
- Production de connaissances et de données
- Développement et valorisation
- Observation et suivi
- Vulgarisation et sensibilisation
- Formation et construction de capacités
- Coopérations et collaborations
- Lutte contre la pollution et la dégradation du milieu

5) Quelles sont les activités maritimes qui sont conflictuelles avec la votre ou avec votre secteur?
- Activités portuaires
- Recherche scientifique
- Transport maritime
- Energies et mines
- Pêche et aquaculture
- Biotechnologie
- Protection de l'environnement
- Exploration
- Défense
- Tourisme et activités récréatives
- Dessalement
- Aménagement des côtes
- Télécommunication
- Autres :

6) Quels types de problèmes avez-vous l'habitude de rencontrer?
- Par rapport à l'emprise spatiale de l'activité en question
- Par rapport à l'intensité de l'activité en question
- Par rapport aux ressources vivantes
- Par rapport aux ressources non vivantes
- Autre :

Précisez :

7) Comment vous gérez ces conflits habituellement ?
   - En trouvant une solution temporaire en commun
   - En trouvant une solution permanente en commun
   - Un des acteurs se retire
   - Continuer à utiliser l'espace avec les conflits
   - Autre

8) Des éléments de la PEM existent déjà dans votre secteur ?
   Si oui, sont-ils des mesures :
   - Législatives et/ou réglementaires
   - Arrangements institutionnels
   - Techniques
   - Financières
   - Autres

Sont-elles appliquées :

- Totalement
- Partiellement
- Autre

Pourquoi ?

Partie 04 :

1) Que pensez-vous de la PEM en Algérie ?
   - Indispensable
   - Nécessaire
   - Peu utile
   - Autre

2) Comment d'après vous pourrait-on développer une politique de planification de l'espace maritime en Algérie ?
   - Lois et décrets
   - Stratégies nationales
   - Plan locaux
   - Structures dédiées à cela
   - Renforcement des capacités à tous les niveaux
   - Coopération entre les secteurs
   - Mesures incitatives au développement durable
   - A travers les instruments existants

   Expliquez :

3) Selon vous, est ce que la PEM doit être mise en œuvre de manière sectorielle ou intégrée ?

Pourquoi ?

4) Qu'apportera la mise en œuvre d'une politique PEM à votre secteur d'activité ?
   - Rationalisation des ressources
   - Durabilisation des ressources
   - Optimisation des ressources
   - Optimisation des coûts
   - Réduction des conflits
   - Autre

5) Pensez-vous que la mise en place d'une PEM en Algérie aura des effets négatifs sur votre activité ?
   Si oui, lesquels ?

6) Selon vous, qui devrait être chargé de la mise en place et du suivi de la PEM en Algérie ?

   - Ministère de transport (maritime)
   - Ministère de l'intérieure et des collectivités locales
   - Ministère de l'enseignement supérieur et recherche scientifique
   - Ministère des ressources en eau et de l'environnement
   - Ministère de l'énergie
   - Ministère de l'industrie et des mines
   - Ministère de la pêche et des ressources halieutiques
   - Ministère des travaux publics
   - Ministère de la défense (gardes côtes)
   - Autre

Pourquoi ?

7) Que doit-on faire à votre avis pour promouvoir l'instauration d'une stratégie PEM en Algérie ?
   - Légiférer
   - Mettre en place une institution chargée de la coordination PEM
   - Mettre en place des arrangements institutionnels type PEM
   - Cartographier
   - Mettre en place des outils d'arbitrage de la PEM
   - Autres

8) Que faites-vous pour aller vers la PEM à votre échelle ?

9) Une PEM efficace est fondée sur les écosystèmes, intégrée et multi-objectifs, basée sur le lieu ou basée sur la zone, continu et adaptative, stratégique et anticipative et enfin participative.

   Selon vous qu'est ce qui sépare la PEM algérienne actuellement des bonnes pratiques de planification de l'espace maritime ?

10) Selon vous, une base de données sur l'utilisation de l'espace maritime en Algérie serait utile pour la gestion des conflits entre les activités ?

Si oui, elle serait domiciliée où à votre avis ? Elle serait administrée/pilotée par qui ?

11) Pourriez-vous participer à son alimentation en données dans une perspective de collaboration et de coopération entre les différents secteurs d'activités maritimes et côtières.

12) Dans le cadre du projet Protection de l'environnent et de la Biodiversité du Littoral Algérien (PEBLA), la mise en place d'une aire marine et côtière protégée est prévue dans la zone de l'Edough, wilayas de Annaba et Skikda.

Pensez-vous que sa création affectera votre activité ?

Si oui, comment/pourquoi ?

13) Comment comptez-vous agir face à ce conflit d'usage ?

14) Dans ce cas, l'utilisation de la PEM facilitera- elle les arbitrages entre les différents usages de l'espace et des ressources maritimes et côtières ? Comment ?

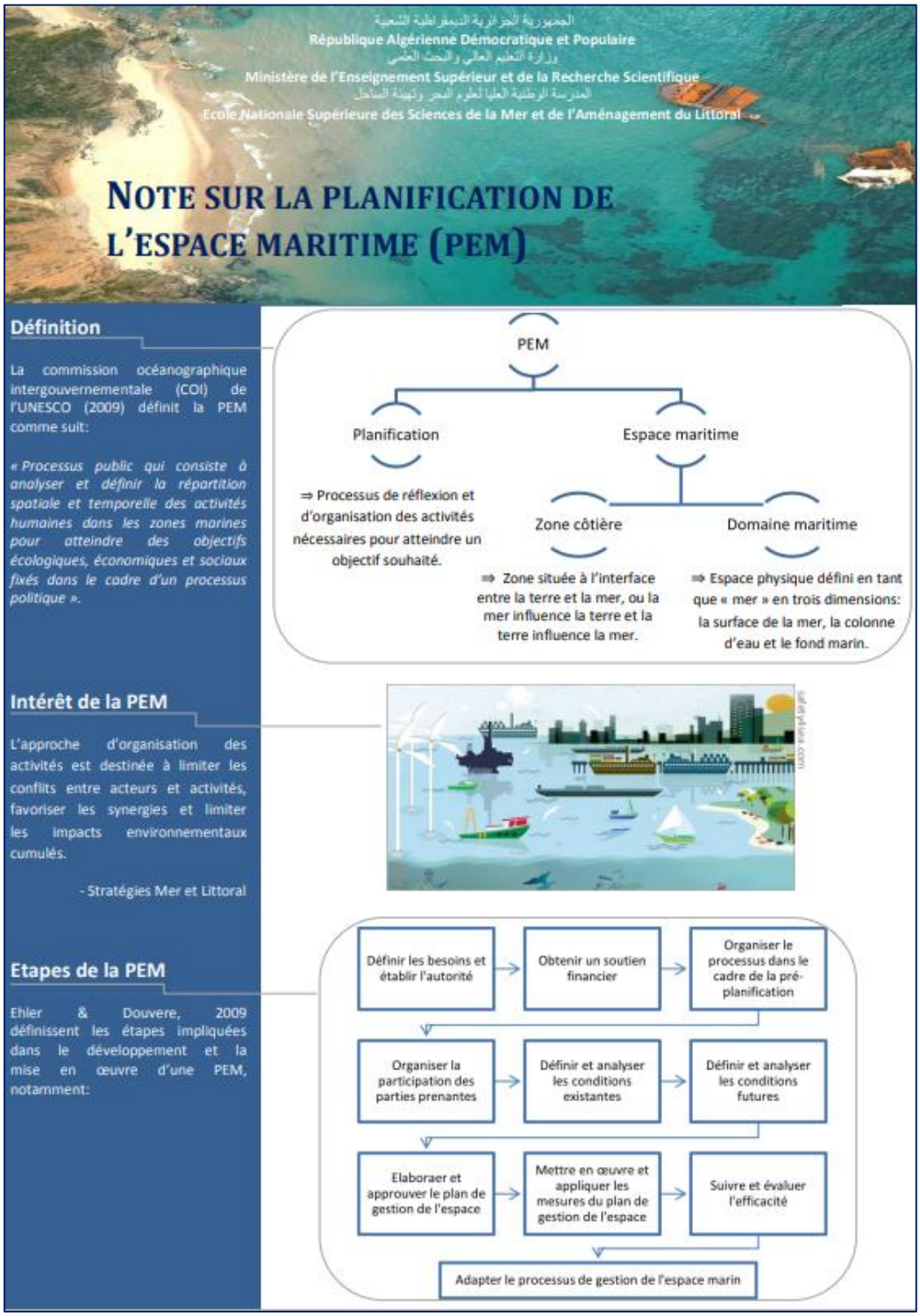
15) Pensez-vous que la PEM permettrait de développer une économie bleue en Algérie ?

16) Pensez-vous qu'on doit avoir une loi sur la PEM en Algérie ?

17) Est-ce que vous pensez que la société civile doit être impliquée dans la PEM ?

- **Merci** -

Appendix 5: MSP factsheet (in French)



Abstract

In order to analyse the general framework of maritime spatial planning in Algeria, and to study the use of MSP as a tool for biodiversity conservation and protection through the case-study of the Edough Mounts future marine and coastal protected area, a mixed methodological approach was used combining actor mapping on MACTOR software, mapping on QGIS software, and an MSP diagnosis conducted through a series of interviews with the stakeholders involved in the thematic. In addition, a scan of the state of the art on the concept in an international, regional, and national context was conducted. Results indicate that marine spatial planning in the country is driven by activities, strategies, and sectorial plans, and more generally by uses of marine space and its natural resources. The sectorial organization of maritime use causes many spatial use conflicts. Therefore, the integrated development of an MSP policy is needed, although it faces multiple gaps. These gaps could be overcome if more attention is given to the country's maritime space and resources. MSP synergises marine uses in a sustainable development framework, thus aiming to safeguard the health of ecosystems, and the services they provide. Indeed, the use of MSP contributes to the well-framed establishment of MCPAs not only by mapping the activities around these areas but also by highlighting and predicting user-user, and user-environment conflicts. The concept is still at an embryo state in Algeria compared to progress made at an international scale, but it can be considered that a preliminary legislative and institutional basis, with relevant tools, could provide a starting point for the development of an integrated MSP policy.

Keywords: MSP, biodiversity conservation, Algerian coast, Edough mounts, QGIS, MACTOR, interview guide.

Résumé:

Afin d'analyser le cadre général de la planification de l'espace maritime en Algérie et d'étudier l'utilisation de la PEM comme outil de conservation et de protection de la biodiversité à travers l'étude de cas de la future aire marine et côtière protégée des monts de l'Edough, une approche méthodologique mixte a été utilisée combinant la cartographie des acteurs sur le logiciel MACTOR, la cartographie sur le logiciel QGIS et un diagnostic PEM réalisé à travers une série d'entretiens avec les parties prenantes impliquées dans la thématique. De plus une analyse de l'état de l'art sur le concept dans un contexte international, régional et national a été menée. Les résultats indiquent que la planification de l'espace maritime dans le pays est portée par les activités, les stratégies et les plans sectoriels et en général par les usages de l'espace maritime et de ses ressources naturelles. L'organisation sectorielle de l'utilisation de cet espace provoque de nombreux conflits d'usage. Par conséquent, l'élaboration intégrée d'une politique PEM est nécessaire, bien qu'elle soit confrontée à de multiples lacunes. Ces lacunes pourraient être comblées si l'on accordait plus d'attention à l'espace et aux ressources maritimes du pays. La PEM met en synergie les différents usages de la mer dans un cadre de développement durable, visant ainsi à sauvegarder la santé des écosystèmes et les services qu'ils fournissent. En effet, l'utilisation de la PEM contribue à la mise en place bien encadrée des AMCPs non seulement en cartographiant les activités autour de ces zones, mais aussi en mettant en évidence et en prédisant les conflits utilisateur-utilisateur et environnement-utilisateur. Le concept est encore à l'état embryonnaire en Algérie par rapport aux progrès à l'échelle internationales, mais on peut considérer qu'une base législative et institutionnelle préliminaire avec des outils pertinents pourraient servir de base à l'élaboration d'une politique PEM intégrée dans le pays.

Mots-clés : PEM, conservation de la biodiversité, littoral Algérien, monts de l'Edough, QGIS, MACTOR, guide d'entretien.

ملخص

من أجل تحليل إطار تخطيط الحيز البحري في الجزائر، ودراسة استخدامه كأداة لحفظ التنوع البيولوجي من خلال دراسة حالة المحمية البحرية والساحلية المستقبلية لجبال إيدوغ، تم استخدام منهجية مركبة تجمع بين وضع خرائط الجهات الفاعلة على برنامج MACTOR، رسم خرائط على برنامج QGIS وتشخيص تخطيط الحيز البحري الذي تم من خلال سلسلة من المقابلات مع الجهات الفاعلة المعنية بالموضوع، بالإضافة إلى تقييم التطور الحاصل بشأن هذا المفهوم في سياق دولي وإقليمي ووطني. تشير النتائج إلى أن تخطيط الحيز البحري في البلد يتركز على الأنشطة والاستراتيجيات والخطط القطاعية. يسبب التنظيم القطاعي للاستخدام البحري العديد من نزاعات الاستخدام المكاني. ولذلك، لا بد من وضع سياسة متكاملة لتخطيط الحيز البحري، رغم أنه يواجه ثغرات متعددة. يمكن تجاوز هذه الثغرات إذا أولي مزيد من الاهتمام للمجال البحري للبلد وموارده. يقوم تخطيط الحيز البحري بتحقيق التآزر بين الاستخدامات البحرية في إطار التنمية المستدامة، ويهدف بالتالي إلى حماية صحة النظم الإيكولوجية والخدمات التي تقدمها. والواقع أن استخدام تخطيط الحيز البحري يساهم في التأطير الجيد للمحميات البحرية والساحلية ليس عن طريق رسم خرائط للأنشطة المحيطة بهذه المجالات فحسب، بل أيضا عن طريق تسليط الضوء والتنبؤ بالنزاعات بين المستعملين وبينهم وبين البيئة. لا يزال هذا المفهوم في مراحله الأولى في الجزائر مقارنة بالتقدم المحرز على المستوى الدولي، ولكن عددًا كبيرًا من العناصر التشريعية والمؤسساتية يمكن أن يوفر أساسًا لتطوير سياسة مدمجة لتخطيط الحيز البحري في البلاد .

الكلمات الرئيسية : تخطيط الحيز البحري, الحفاض على التنوع البيولوجي , الساحل الجزائري, جبال إيدوغ, MACTOR,QGIS , دليل المقابلة.