Chapter 7. Legal tools for coastal zone management in Brazil

A basis for national marine spatial planning?

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1 Marine spatial planning (MSP) is a recent process in Brazil. The administrative management of spaces at the intersection of the continental territory and the ocean has historically been addressed from two angles. The federal government has made use of (1) the international law of the sea for the largest maritime environments located away from the coast, and (2) environmental law, or "coastal law", which focuses on spaces restricted to a strip of land adjacent to the shoreline termed *costeira* (coastal) in the legislation. This strip penetrates inland to varying distances (up to 50 km) following the administrative boundaries of the coastal municipalities. A third space – which is not treated as a continuum or as a whole – would be the geographic coastal zone located between this strip of land and the marine areas distant from the coast. Only a portion of the marine waters of this coastal zone is of interest to public authorities: that which is legally known as the "maritime strip", with a width that does not exceed "territorial sea".

2 Since 2013, there has been a willingness on the part of government policymakers and agencies to move towards MSP for the area from the shoreline to the outer limit of the waters under jurisdiction (i.e. the boundary of the exclusive economic zone, EEZ). But MSP is not yet legislatively approved, and the text that mentions it is therefore not applicable. If it does become applicable, questions regarding the technical, scientific and legal modalities of MSP will arise; it will also be necessary to determine whether the legal instruments of current coastal zone management in Brazil can serve as a basis for MSP.

3 This chapter outlines the existing legal framework that gives rise to the predominance of land and shoreline planning. In Brazil, legal governance of the coast focuses on the land rather than coastal waters. The current system of coastal management is relatively cumbersome due to the multiple institutions involved at different scales, the complex distribution of responsibilities (at least tripartite), and the entrenched practice of land-based planning. Even the zoning of marine protected areas – the

premise of MSP – has not managed to counterbalance this tendency. To take into account the importance of Brazilian waters and the seabed, what they contain, and the ecological and economic services they provide, spatial planning on a much wider, non-partial, more systemic "maritime zone" would be required.[1] As for its feasibility, linking this MSP to coastal land management is possible. The second part of the chapter presents the conditions necessary for this, keeping in mind that (1) a shift towards the maritime area also means a change in the agencies overseeing that area and (2) if MSP takes an ecological orientation – in order to maintain the tropical ecosystems present and their ecological functions – this inevitably must compete with other options for national maritime planning. It should be noted that the territorial planning system described is not set in stone and can evolve. This chapter aims to offer practical insights to the administrators of future MSP.

Legal management of the coast: a focus on coastal land

4 Brazil's global importance is often linked to its forest cover, but it also has an equally impressive coastal strip of about 10,800 km (this estimate may vary depending on the calculation method)[2]. While 40% of Brazil's land area is below 200 m in elevation, coastal development and artificialisation are increasing as a result of soaring demography: the country's population has grown from 60 to 200 million in sixty years.

5 The coastal zone (*costeira*) represents less than 4.1% of the national land area (8,5 millions km^2), but an estimated 24.6% of the population[3] (190,732,694 inhabitants according to the last census in 2010) is concentrated there, with urbanisation increasing from 45% to 85% between 1960 and 2010[4]. Although the coastal zone has received much public attention, can we identify any real public policy concerning this space in decision-making, accompanied by a legislative and regulatory arsenal capable of planning how it is used by humans and for which activities?

6 The demarcation between maritime and coastal land areas was enacted as early as the country's independence. Planning policy has focused more on the shoreline and inland strip more than on marine waters, with the former subject to a succession of different coastal planning tools. However, legislative planning is constrained by the complex division of coastal authority between institutions.

7 Nevertheless, lessons can be learned from the experiences of managing vulnerable or protected ecosystems and species in the coastal zone, in particular through the consolidation of environmental law and legal regulations for ecosystems present on the coast or in shallow or nearshore waters. This management has been oriented primarily towards natural resources, and offers guidelines and tools that may benefit future MSP.

8 The scale of governance is considerable: Brazil's *zona costeira* encompasses one of the longest coastal strips on the continent. It contains diverse tropical ecosystems (coastal mangroves, sandbanks, dunes, estuaries and coral reefs, among others) with 92% of the area in the intertropical zone. It is made up of 17 coastal states, from Amapá in the north to Rio Grande Do Sul in the south, is the location of 13 of Brazil's 27 capitals, and includes more than 400 municipalities. A large part of the population resides there annually or periodically, working in both formal and informal activities considered to support national or local development (commercial ports, coastal and offshore

industries, artisanal and industrial fisheries, beach tourism, coastal real estate). To protect the coastal and marine environment from overexploitation of natural resources and risks of degradation, since the 1980s the Brazilian Federal Constitution, in Chapter VI (Art. 225), has provided that "all have the right to an ecologically balanced environment", the corollary being the duty to protect the environment; paragraph 4 of Article 225 also cites the *zona costeira* as a "national heritage" (5 October 1988)[5]. Brazilian legislation has been modified several times by laws, decrees and policies to regulate the coastal space.

A series of coastal planning measures

9 The administration of the coastline (territorial space) is enshrined in Law No. 7661 of 16 May 1988[6], which established the National Plan for Coastal Management (PNGC), which is an integral part of two long-standing policies: the National Environmental Policy (PNMA) enshrined in Law No. 6938 of 1981[7], and the National Policy for Marine Resources (PNRM)[8] enshrined in a decree of 12 May 1980. The law of 16 May 1988 specifies that the PNGC must be set out in detail in a specific document under the aegis of the Interministerial Commission on Sea Resources (CIRM) and must guide (1) the methods of managing resources in the coastal zone in a rational manner, (2) the means of protecting the environment and (3) authority over the management of this zone which is no longer considered as an ordinary space. The PNGC concerns inshore coastal areas much more than offshore.

10 A first version of the PNGC (PNGC I) was presented in November 1990, and the second (PNGC II) was approved in 1997, in the form of CIRM Resolution 005 of 3 December 1997, following approval at the 48th ordinary meeting of the National Environmental Council (CONAMA). This new version, PNGC II, which is still in force, was published in Decree No. 5300 of 7 December 2004[9] which, according to the official terminology used in Brazil, "regulates" Law No. 7661 of 16 May 1988 on coastal management. This important 2004 decree establishes rules for the use and occupation of the coastal zone and sets criteria for coastal management. It has provided the country with nine types of policy instruments, four of which are termed "plans":

- The National Plan for Coastal Management (PNGC) encompasses the set of guidelines applicable to different levels of government and scales of action, guiding the implementation of policies for the sustainable development of the coastal zone.
- The Federal Action Plan for the Coastal Zone (PAF) integrates public policies affecting the coastal zone and identifies shared responsibilities for action.
- The State Plan for Coastal Management (PEGC) implements state policy for coastal zone management, defining the responsibilities and institutional procedures for its implementation based on the PNGC.
- The Municipal Plan for Coastal Management (PMGC) implements municipal coastal zone management, defining the responsibilities and institutional procedures for its implementation based on the PNGC and the PEGC, and also takes into account other land use and occupancy plans at municipal level.

11 With regard to the planning process (in the sense of drafting planned actions), a decision by the Coastal Management Integration Group (GI-Gerco) resulted in a Federal Action Plan for the Coastal Zone (PAF-ZC). This is periodically revised and is one of the instruments in the PNGC.

12 The 4th Federal Action Plan for the Coastal Zone (PAF-ZC, 2017–2019)[10] is currently underway; it was approved by CIRM Resolution No. 02/2017, at the 58th session of the GI-Gerco on 18 October 2017. It includes 17 concrete actions, which have been under discussion since 2017 (Box 1).

Box 1. The 17 actions of the Federal Action Plan for the Coastal Zone

- A1. Brazilian action plan to combat marine litter
- A2. Macro-diagnosis of the Brazilian coastal zone
- A3. Development of a methodology for the integration of land and sea altimetry – Action: national coastal management meeting
- A4. National coastal conservation programme: design, formalisation and dissemination
- A5. Socio-environmental monitoring of Brazilian ports
- A6. Development of a methodology for evaluating the integrated management plans of the Secretária de Patrimônio da União
- A7. Promotion of training courses focusing on the coastal area
- A8. Integration of the *Orla* project with municipal master plans
- A9. Increase in the number of states with PEGCs
-A10. Identification and dissemination of good practices developed by the G17 (sub-group on the integration of coastal states) and municipalities related to the management of river, coastal, marine and estuarine zones
- A11. Identification of states that have not established coastal ecological and economic zoning, and monitoring of the preparation and implementation of this, aimed at strengthening the PNGC
- A12. Evaluation of effective actions of waterfront committees and integrated management plans, taking into account the recent changes in Law 13 240/2015
- A13. Regulation of motorised vehicle and vessel traffic on beaches
- A14. Contribution to the implementation of the UN Sustainable Development Goal "Life Below Water" (SDG 14) in Brazil
- A15. Contribution to the approval and implementation of the actions contained in draft law 6 969/2013
- A16. Development of a regional case study on integrated coastal–marine governance for the Babitonga ecosystem (Santa Catarina state)
- A17. Promotion of dissemination actions and implementation of Law 12 340/15 and its regulation on the transfer of beach management to cities and municipalities

13 These 17 actions include both frameworks and methodological instruments. Some actions are more advanced than others; all are subject to multiple divisions of authority.

A complex planning exercise

14 There are three levels of jurisdictions overseeing policymaking in Brazil, which is a federal state with a tripartite system. At the very least, authority is shared between the federal government (national level), the states and the municipalities. Article 21 of the Federal Constitution gives the federal government the legislative authority to draw up

national and regional plans for the national territory. The planning instruments available may thus have different origins:

- federal (the PNGC)
- state (the PEGC)
- municipal (the PMGC).

15 Another example is the Integrated Coastal Management Plan (PGI). For the specific territorial space known as the "*orla*" (equivalent to the shoreline or even the foreshore), the drafting of this plan involves officials from all three levels of governance, assisted by representatives of civil society. The PGIs, which aim to improve beach management, cover the territory of the municipality and are a strategic plan for the local level.

16 For a given topic, material authority for planning is assigned either exclusively to one institution or to several. Thus, the federal government may have exclusive authority, joint or suppletive authority, or concurrent authority (articles 22, 23 and 24 of the Federal Constitution of 1988[11]). The drafting of acts such as the PGI is an illustration of the interaction of these authorities.

17 Because of this complex division of authority and capabilities, Brazil's legal framework is sometimes considered an institutional and normative limitation to effective planning for the *zona costeira* or the maritime strip. The challenge linked to this is perhaps smaller during the design phase of measures. It is much larger during the phase of identifying damage to ecosystems, or identifying urban constructions causing partial or total degradation of the coast. Proof of degradation of biological and physical environments gives rise to conflicts between authorities that are so intertwined or numerous that the regulations created to sanction the degradation can no longer be applied by these same authorities[12] and it is no longer possible to identify which authorities have been harmed by these actions, nor how to enable them to take legal action to combat them. This results in a problem of recognition of the "interest to act" of the injured institution (victim of environmental destruction). Law 9605 of 1998[13] is clear on criminal and administrative sanctions, but it is difficult to apply if the institution is itself involved in the decision to authorise the activities and land uses that cause the degradation of the coastline[14]. Sometimes authorities are involved in environmentally damaging developments, such as those required to host the 2016 Olympic Games.

18 In the maritime area, the division of authority is unambiguous. This is under the jurisdiction of federal maritime authorities, which are concerned with defence, navigation and exploitation. In legal terms, in Brazil, the maritime zone is almost opposed to the coastal zone. While the continuity of these marine areas, from rivers and deltas to the high seas, can be demonstrated by the natural sciences, it is not, or very poorly, considered in law. According to Article 22 of the Constitution, it is exclusively up to the federal government to legislate on maritime law and criminal law: two aspects that are essential for the legal management and future of a geographic coastal area whose ecological integrity is threatened.

Management of coastal environments: lessons learned

19 The heritage status of the coastal zone is accompanied by a legal arsenal intended to prevent the degradation of the coastal and marine biome. The federal government is a

signatory to international conventions – universal or specialised – relating to the law of the sea, the protection of coastal and marine environments, or marine or migratory species.

20 In addition to management directed solely at the coastal space, there is also public policy that takes into consideration the species and ecosystems present in this zone. Even when it deals solely with protected natural environments, this policy reveals three trends that we will develop below: (1) the fragmentation of the management of coastal and maritime areas, (2) the desire to restore certain very attractive natural sites with a high economic value, including by technical and artificial means, and (3) the use of "zoning within zoning": for example, for the management of coastal mangroves.

Fragmented management of coastal and marine environments

21 The management of coastal and marine environments and natural sites suffers from the fragmentation of institutional and normative resources dedicated to protected natural environments. The PNGC must be implemented with the participation of the federal government, the states, the municipalities and the districts. The institutional and territorial organisation of environmental issues must be respected, as well as the National Environmental Policy, which was created in 1981 and supplemented by a decree in 1990 and by the creation of the Ministry of the Environment (MMA) in 1992 (with attributions established in 2003). The application of the PNGC is carried out through entities that integrate the National Environment System (SISNAMA). The National Environment Council (CONAMA) also coordinates the different public agencies.

22 According to OLIVEIRA and COELHO (2015), "coastal zone management issues, whose impact is hardly limited to the local scope, and which take on regional or national proportions, are of interest to the Brazilian Institute of the Environment and Renewable Natural Resources (IBAMA), in the federal autarkic mode, as it implements the National Environment System (SISNAMA)". According to Law 6938 of 31 August 1981 on the National Environmental Policy, which since 2003 has been centred on the tasks of the Ministry of the Environment, there are, in addition to the administrative policymaking bodies, several recognised implementing institutions – IBAMA and the Chico Mendes Institute for Biodiversity Conservation (ICMBio) – which are enlisted according to the action to be carried out[15]. One of ICMBio's missions is to organise and manage the protected areas established by the federal government (DELELIS *et al.*, 2010). The term "protected areas" is used here in a general sense (the different types of protected areas in Brazil are detailed later in this chapter). Specific implementation bodies dedicated to environmental protection also exist, from state level (State Environmental Agency, *Agência estadual de meio ambiente*) to municipal councils. This mainly concerns land and coastal areas, and more rarely extends to marine areas.

23 As for the maritime area of the *zona costeira,* and other national marine waters (territorial sea and all waters under the national jurisdiction), they are managed by the Maritime Authority in charge of constructions that may be carried out in these areas and their impacts. Its main objective among other provisions is to ensure safety according to Law No. 9966 of 28 April 2000 on the prevention, monitoring and surveillance of pollution caused by the discharge of hydrocarbons and other dangerous or harmful substances in waters under national jurisdiction. Jurisdiction is exercised

directly by the Commander of the Navy (*Marinha do Brasil*)[16]. Often, in a form of zoning, so-called "provisional prevention of gas and hydrocarbon exploitation" zones are drawn along the coast.

24 OLIVEIRA and COELHO (2015) highlight that this fragmentation of institutional authority is a limitation to the planned management of impacts on the natural environment: "Because of the joint authority of the central government, the states and the municipalities, potential conflicts arise in determining the relevant body for the environmental authorisation of an activity in coastal areas. These conflicts have arisen due to a lack of clarity on the delimitation of the authority of each federal entity, a point partially clarified by a complementary law (no. 140 of 8 December 2011), mainly on the random use of criteria to define the authority of each entity."

25 The authorisation to occupy and exploit the coastal zone (in its maritime space) is an instructive example. Law No. 140 of 8 December 2011[17] provides for three situations:

- Article 7 provides that the federal government has the exclusive authority to grant permits for constructions and activities located or developed concurrently in the land and sea areas of the coastal zone. Thus, if the location of the enterprise concerns both, a land and a sea strip, the authorisation falls within the jurisdiction of the federal government, but only in cases corresponding to a typology established by an act of executive power. This typology is established by a proposal from the National Tripartite Commission, with the participation of a member of the National Environmental Council (CONAMA), considering the criteria of size, the possible pollution generated and the nature of the activity.
- Article 8 states that the states may "issue environmental permits for activities or constructions that use natural resources, that are actually or potentially polluting, or that are in any way likely to cause environmental degradation, except in the cases provided for in Articles 7 and 9".
- Article 9 deals with municipal authority for "the administrative acts of the municipalities, which, observing the attributions of the other federated entities provided for in this law, aim to issue environmental permits for activities or constructions that have or could have a local impact on the environment, according to a typology defined by the environmental council of the different states, taking into account the size, the potential pollution generated and the nature of the activity".

26 Two points should be noted here: (1) this separation between administrative bodies for the land on one hand and for the sea and maritime and river navigation on the other undermines the ecological continuity between coastal and maritime areas and ecosystems in its day-to-day application; and (2) it is no simpler to identify the relevant institution and environmental authorisations for protected coastal areas than for ordinary coastal areas.

The role of public institutions concerning beaches

27 Seafront constructions and their impacts on beaches are often described by the term *orla marítima* (DE FREITAS, 2011); these constructions must obtain authorisation from the municipality and are used as residences or commercial premises. The result of this development is the replacement of open beach systems and a natural coastal landscape with lines of concrete. In this case, municipalities play a dual role, both in causing degradation and in restoration efforts (DA SILVA LOUREIRO FILHO, 2014). This transformation is often backed by law: according to DE FREITAS (2011), "among the most

frequently encountered problems in the coastal zone, one of the most worrying is the invasion of the beach and even of the dunes and *restingas* [coastal sand forests] with the construction of diverse structures or activities without clear rules governing them. These are irregular occupations, mainly due to the fact that these lands are public and, therefore, their use by individuals is subject to authorisation by the public authority. Buildings on Brazilian beaches are increasingly common, where bars, kiosks and hotels disfigure the natural beauty. As a rule, these constructions are irregular or authorised by the municipalities based on Article 30-subparagraph of the Federal Constitution, i.e. the subject is treated as being of local interest, although in some cases it is understood that the federal government has the authority if the beach is a property of its domain." In this context, measures dedicated to beach management have multiplied, including those of coastal management, such as the 'Orla project' (SILVA and FARIAS FILHO, 2015), incentives to sign the maritime beach management adherence clause (TAGP[18]), and the dissemination of technical manuals by laboratories specialised in coastal studies, regularly revised according to new standards (SPU *et al*., 2018; LAGECI *et al.*, 2020, etc.)

"Zoning within zoning": development and conservation of coastal mangroves

28 Legislation concerning the *zona costeira* deals with the planning, institutional authority and management of this area. It includes the National System of Protected Areas (SNUC) arising from the environmental law, which is based on Law 9985/00 on SNUC and Federal Decree 4 340/2002, which regulates it. The protected areas under SNUC apply to the national territory, including coastal areas, so also coastal mangrove areas, and waters under national jurisdiction further afield. Brazil's coastal mangrove areas are considerable (BRADAO, 2011). They are part of the legally protected "Atlantic Forest" biome and have irreplaceable importance for the flora and fauna of this land–sea interface as ecological corridors, and are also sources of food, revenue and enrichment for formal and informal mangrove farmers. This ecosystem extends from Oiapoque (Amapá state) in the north to the city of Laguna (Santa Catarina state) in the south.

29 The legal treatment of mangroves and the management of the coastal zone are carried out in different ways (DA SILVA LEITE NOURY, 2014; DA SILVA LEITE NOURY and GALLETTI, 2022). Mangrove law is part of an evolution of Brazilian environmental law, influenced by international law on wetlands and forests. In this context, SNUC aims not only to conserve biodiversity, but also to protect watersheds, water resources and landscapes, as well as recreational uses (including ecotourism), historical, archaeological and cultural sites, etc. (CABRAL and DE SOUZA, 2005).

30 This system of zoning, to create "permanent conservation zones" in rural or urban areas – protected spaces in the public or private domain that have been given a special character by the Constitution – is of particular importance for the protection of coastal mangrove areas (DA SILVA LEITE NOURY and GALLETTI, 2022). The legal status of this zoning (in particular Chapter II, Section 2, of Law No. 12,651 of 25 May 2012 and No. 12,727 of 17 October 2012 revising the Forestry Code) sometimes applies to coastal mangroves and other areas essential to them, such as dune-fixing or mangrove-stabilising sandbanks. The owner, possessor or occupier of a SNUC area has obligations to maintain the vegetation and restore it if it has been destroyed, except for exceptional uses or clearings authorised by law.

31 In addition, SNUC provides two kinds of legal protection for mangroves: full conservation or sustainable use conservation. These two types of protected areas have different levels of protection and can themselves be divided into different categories; they are administered by federal, state and municipal bodies. Each protected area should have a management structure and a management plan to monitor zoning and protection.

32 While the law allows for legal protection of mangroves, paradoxically it also allows for their clearance. The destruction of mangroves in a permanent urban conservation zone is possible, but only in cases of public utility or social interest, or if it has a low impact on the environment. It must then be explained and described in an administrative procedure (CONAMA resolution 369/2006). Any clearance requires the authorisation of the relevant environmental council, provided that the municipality concerned has a decision-making (authorised to decide) and advisory (authorised to issue an opinion) environmental council and a master plan: "They must be published in the Official Gazette and be available in a place of easy access from the public list and the list containing the data related to applications and permits for vegetation removal, as provided for in Law 10 650/2003" (MEDEIROS and ROCHA, 2011). Some planning instruments thus provide legal justification for mangrove degradation.

33 In addition to the law on protected species, mangrove areas are subject to many other legal areas such as water law or forestry law; mangroves are covered by the 2012 Forestry Code. Coastal management plans must therefore integrate and harmonise many sectoral topics (in this case forestry or health) that are *a priori* distinct, even though Article 3 of Law No. 7661 of 16 May 1988 on the National Plan for Coastal Management states that priority must be given to the conservation of certain natural elements, including mangroves.

MSP in Brazil: some unresolved questions

34 The bill PL 6969-2013[19], instituting the National Policy for the Conservation and Sustainable Use of the Brazilian Marine Biome (PNCMar), known as the "Law of the Sea", has the objective of promoting the equitable, efficient, shared and sustainable use of marine resources and ecosystems and ensuring the conservation of marine diversity and marine protected areas for sustainable development. Article 3 § 14, PL 6969-2013 cites the use of marine spatial planning to this end.

35 However, the bill PL 6969-2013 was still not approved in 2022, preventing its implementation. Indeed, this initiative is not unanimously supported and has been criticised, likely due to the changes the law would necessitate if approved. At the heart of the debate are which methods to use to conduct relevant, effective MSP. How to engage in planning of the marine space itself, beyond the small strip of shoreline and the foreshore?

36 This section explores two possible options: (1) MSP based on public policy inspired by scientific expertise, and (2) MSP that could cover the entire national maritime area.

MSP inspired by scientific expertise

37 The use of scientific expertise in national, regional and local sustainable development planning is part of the discourse accompanying MSP projects. The inclusion of ecological and toxicological expertise – which would play a leading role and guide proposals by decision-makers – in such new planning for natural areas is desirable, but it can only be achieved within a well-defined framework. Moreover, any such initiative must be carried out in the understanding that there are knowledge gaps, heterogeneous data and uncertainty, as illustrated by the case of marine protected areas.

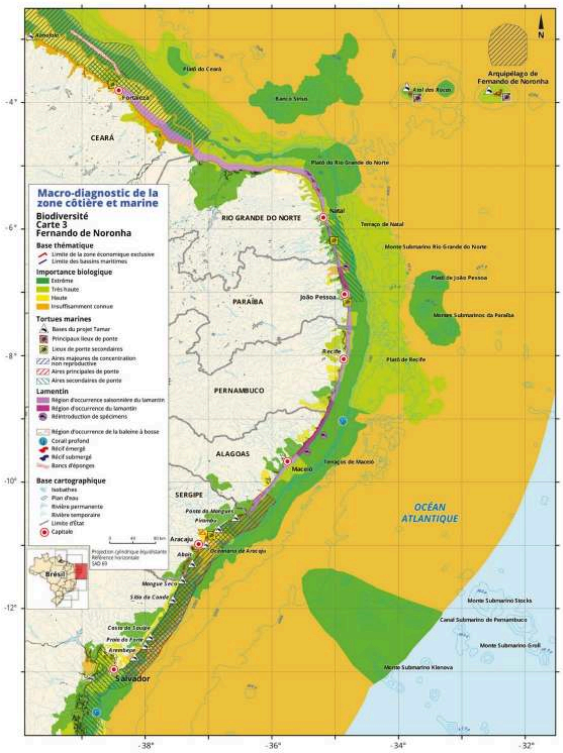
Frameworks for MSP based on scientific expertise

38 The role of scientific expertise is important in Brazilian environmental law. Public decision-making is supposed to be able to rely on the appropriate scientific council. Article 3 of Law No. 7661 of 16 May 1988 on the PNGC specifies that coastal management must provide for the zoning of uses by "prioritising" the conservation and protection of, among other things, natural resources, both renewable and non-renewable, reefs, seaweed beds, coastal and oceanic islands, marine caves, other natural permanent conservation areas and monuments that make up natural and landscape heritage. The law thus presupposes a scientific apparatus to document these elements of the marine and estuarine ecosystem.

39 Since 2004, Decree No. 5300/2004, Article 7, has provided tools for the management of the coastal zone, including:

- the Coastal Zone Management Information System (SIGERCO), a component of the National Environmental Information System, which integrates geo-referenced information on the coastal zone. It goes beyond GIS and brings together literary and technical information.
- the Coastal Zone Environmental Monitoring System (SMA), an operational structure for the continuous collection of data to monitor the dynamics of the use and occupation of the coastal zone and the assessment of socio-environmental quality objectives
- the Report on the Environmental Quality of Coastal Areas (RQA-ZC), which periodically consolidates the results obtained by environmental monitoring and evaluates the efficiency and effectiveness of management measures
- Coastal Economic Ecological Zoning (CEEZ), which guides the spatial planning process to achieve the conditions for the sustainable development of the coastal zone in accordance with the guidelines for economic ecological zoning of the national territory, as a support mechanism for monitoring, licensing, and management programmes
- the macro-diagnosis of the coastal zone to gather information on a national scale on the physical–natural and socio-economic characteristics of the coastal zone, in order to guide actions for the protection, conservation, regulation and monitoring of natural and cultural heritage (fig. 1).

Figure 1. Macro-diagnosis of the coastal zone in Northeast Brazil: example of a biodiversity map



Source: Ministério do Meio Ambiente (2008)

40 An MSP exercise applied in the open marine environment (characterised by the free circulation of biological and physical elements in the water) will be useful, better than what has been done inland by administrators who have not taken environmental continuity into account. However, such an exercise does not guarantee the perennial installation of research structures, or the improvement of the ecological governance of the mapped areas even if these objectives are made explicit in draft texts.

41 The emphasis on conservation and sustainability concerns in MSP, rather than other concerns (economic, cultural, security, etc.) is made explicit in the draft law PL 6969 of 2013 (PNCMar). While this bill was still in the evaluation phase at the time of writing, the intent of the legislation is clear. Article 3 proposes a very ambitious definition, stating that "marine spatial planning is the process of comprehensive, adaptive, integrated and ecosystem-based spatial planning, transparent, participatory and based on scientific knowledge aimed at assessing and distributing human activities in space and time in the marine biome, in order to identify the most appropriate areas for the different types of activities, to reduce environmental impacts and conflicts between uses, to promote compatible uses and to preserve ecosystem services, achieving environmental, economic and social objectives".

Planning in a context of uncertainty: the example of marine protected areas

42 It is prudent to consider MSP as an exercise that takes into account what already exists, and therefore knowledge gaps, the heterogeneity of data usable by decision-makers and uncertainty. Among the range of possible topics – from the port sector to marine pollution – we focus here on marine protected areas.

Coastal protected areas

43 Protected areas in Brazil exist up to the limits of territorial sea, but may cover marine areas up to waters under jurisdiction, according to Law No. 985 of 18 July 2000 on the SNUC. There are different kinds of protected areas.

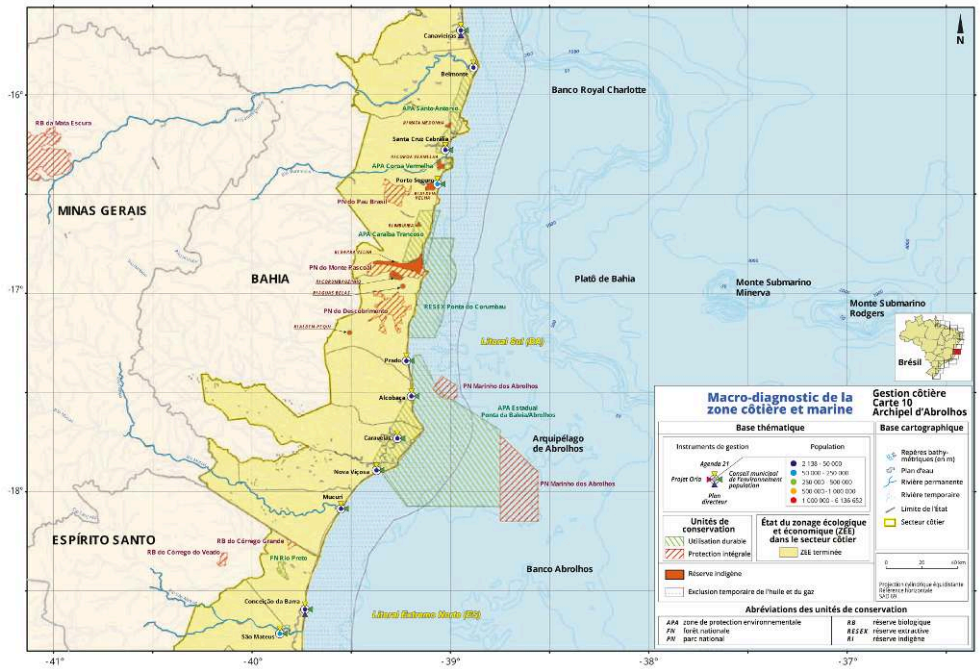
44 In areas with integral protection *(proteçao integral),* only the indirect use of natural resources is allowed; included in this category are ecological stations, biological reserves, national parks, natural monuments and refuges of forest life.

45 In areas of sustainable use (*uso sustentável*), the conservation of environmental goods is reconciled with the sustainable use and valorisation of part of the natural resource. The names and modalities of this conservation allowing for controlled use are environmental protection zones/areas, zones/areas of ecological interest, national forests, extractive reserves, wildlife reserves, sustainable development reserves and private natural heritage reserves. Areas defined on land or in a liquid environment fall either under the public domain or the private domain. Examples of public protected areas include ecological stations, biological reserves and national parks, and private protected areas include wildlife refuges, etc.

46 The ICMBio website showed, as of August 2021, an estimated 364,651,400 ha of marine biome and 851,600,000 ha of terrestrial biome in Brazil, within which there are 171,424,192 ha of ICMBio protected areas, of which 92,660,914 ha are marine protected areas.

47 Apart from an often-jagged coastline, with islets and shallows, Brazil has few remote oceanic islands, except for the Fernando de Noronha Archipelago, 350 km off the northeast coast, opposite the city of Nata, and a few famous islets, including the Abrolhos Archipelago (Bahia state, fig. 2*)*. Legally, the Abrolhos Archipelago is a marine national park (*Parque Nacional Marinho dos Abrolhos*, Decree No. 88,218 of 6 April 1983) and covers 913 km^2. Atoll das Rocas (7.5 km^2), part of the state of Rio Grande Do Norte, is a biological reserve that was the first marine conservation unit created by the Brazilian government in 1979. This atoll was declared a UNESCO World Heritage Site in 2001. The São Pedro e São Paulo archipelago has been put forward for consideration as an Environmental Protection Area (APA) and a Marine Natural Monument (MONA) with the request under review in 2018 (FRANCINI-FILHO *et al.,* 2018). Other protected areas include Rebes do Parazihno off the state of Amapá, the Marine Park do Parcel de Manuel Luis opposite the state of Maranhão, the Marinha do Arvoredo Biological Reserve off the state of Santa Catarina, etc. This non-exhaustive list is difficult to establish because of the succession of different statutes applied to micro-portions of the protected area over time.

Figure 2. Macro-diagnosis of the coastal zone (Bahia): coastal management map of the Abrolhos archipelago



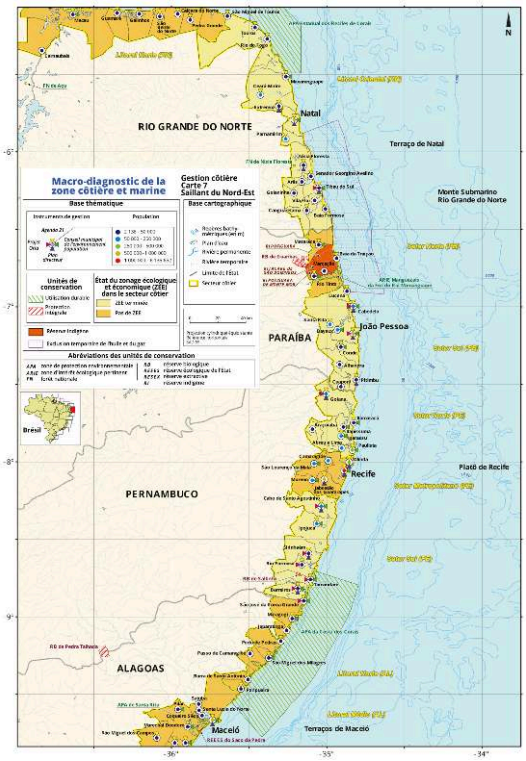
Source: Ministério Do Meio Ambiente (2008)

The case of the state of Pernambuco

48 The Pernambuco coast is long (187 km), attractive (white sands), and strategic for development. It extends from the municipality of Goiana in the northeast to Sao José da Coroa Grande in the south, and includes 21 municipalities. The high concentration of anthropisation, visible in industrial, commercial and residential buildings, etc., generates coastal pollution, especially from wastewater. The state seeks to manage the coastal zone, as it has been given this authority by law. To this end, it has established the State Policy for Coastal Management in Pernambuco through State Law No. 14,258/2010. This state law takes into account: (1) problems arising in its estuaries, which, although protected by Law No. 9931/86, are not free from uses related to public or private activities, (2) the *orla,* and the legal protection of its coastal mangroves.

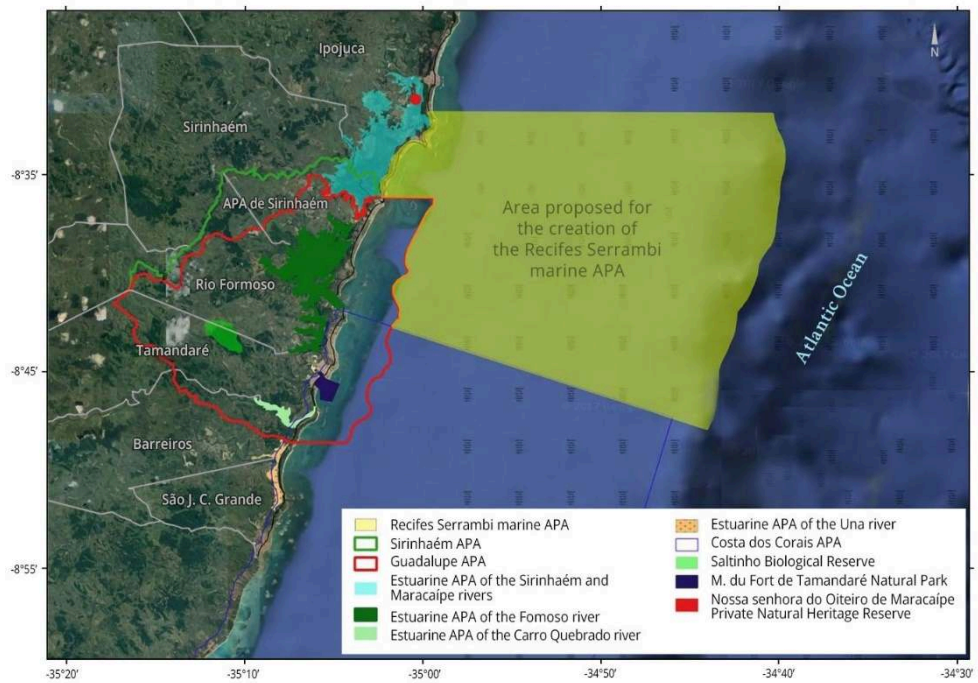
49 Concerned about the use of natural resources and the depletion of productive environments, Pernambuco's State Department of the Environment and Sustainability (SEMAS) and the State Environmental Agency (CPRH) presented, through a public consultation, the proposal to create the state's first exclusively marine environmental protection area (*area de proteçao ambiental*, APA) Marinha Recife Serrambi (fig. 4 and 5). This is adjacent to the ten other existing zoned areas (fig. 4) and is added to the landscape map previously represented in 2008 (fig. 3).

Figure 3. Macro-diagnosis of the coastal zone (2008): coastal management map



EEZ: ecological and economic zoning
Source: Ministério Do Meio Ambiente (2008)

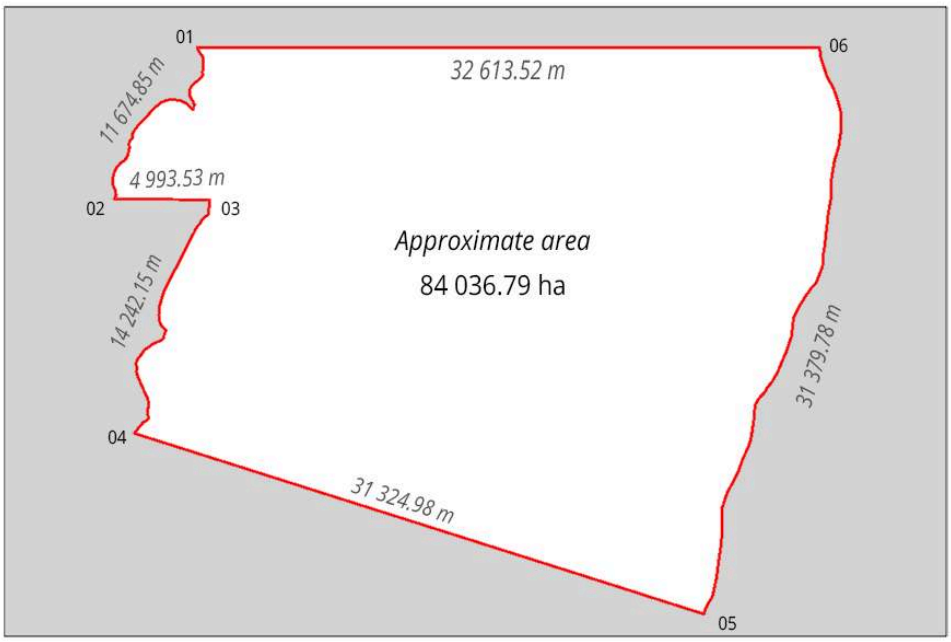
Figure 4. Map of the Recife Serrambi Marine Environmental Protection Area (APA)



Source: CPRH (2017)

50 This APA proposed by the SEMAS/CPRH technical group (2017, p. 11) aims "to integrate and organise the multiple marine uses on 84,036.79 ha of the southern coastline of the state of Pernambuco, involving the municipalities of Ipojuca, Sirinhaém, Rio Formoso and Tamandaré, and in harmony with the conservation of coastal ecosystems" (see Box 2). The APA defined in 2018[20] starts south of Ipojuca (fig. 5).

Figure 5. Recife Serrambi Marine Environmental Protection Area (APA) perimeter



Source: Map and Decree No. 46,052 published on 23 May 2018

Box 2. The objectives of the Recife Serrambi Marine Environmental Protection Area

As stated in Decree No. 46,052 of 23 May 2018 (art. 2), the objectives of the Recife Serrambi Marine Environmental Protection Area are to:

(1) Protect biodiversity in coastal and marine environments, focusing on endemic, rare and threatened species, considering their characteristics and ecosystem dynamics.
(2) Ensure the conservation of the reef environment, with its fauna, flora, geological formation and ecosystem functions.
(3) Ensure connectivity between different environments for the conservation of biodiversity, the recovery of fish stocks and the maintenance of environmental and ecosystem services.
(4) Reconcile and organise the various uses of coastal and marine environments, taking into account fishing, nautical activities, area management, tourism and other socio-economic activities, making them compatible with environmental conservation.
(5) Strengthen artisanal fisheries, encouraging sustainable management of natural resources.

(6) Strengthen sustainable tourism by promoting good practice in the implementation of tourism activities and community tourism.
(7) Support research, production and systematisation of knowledge on biodiversity, socio-environmental aspects, management of the area, etc. by capitalising on scientific and empirical knowledge.
(8) Encourage social participation through environmental education, sustainable practices and the development of conservation and protection strategies.
(9) Ensure the maintenance of the landscape of the coastal and marine environment.

51 The nine objectives for this APA are primarily ecological, but also include planning for the socio-economic future of the populations living near or from it. This is not always the case with marine protected areas and the functions assigned to them by decision-makers in emerging or developing countries (GALLETTI and CHABOUD, 2015). The creation phase of the marine protected area was collaborative and participatory, involving individual fishermen, presidents of fishermen's associations, lawyers, restaurant owners, agencies from all three spheres of governance, public officials, residents, etc. In 2020, this marine protected area still did not have a management plan, but negotiations were underway.

52 The decision to create an exclusively marine protected area (which adjoins another) is a step forward. It is interesting to note that this area allows for sustainable use rather than full protection. This could be used as an incentive for other states, some of which have begun the process of creating or have already created marine protected areas, such as the state of São Paulo's Laje de Santos Marine State Park (created in 1993).

53 Another interesting development is the emergence of joint protection efforts between Brazilian states. This is particularly the case along the Coral Coast (região da Costa dos Corais), which is making efforts to protect the marine manatee *Trichechus manatus* (the local name is *peixe-boi marinho*). Fifteen municipalities on the southern coast of the state of Pernambuco and the northern coast of the state of Alagoas are involved in this protection effort.

54 Another initiative is "mosaics of protected areas" (*mosaicos de áreas protegidas)*, initially envisaged in a forest context, but now used in coastal sites. This is the case for the maritime area of the northern coast of São Paulo (Ilhas do Litoral Norte de São Paulo) created by the São Paulo state Decree No. 53-525 of 8 October 2008. The creation of mosaics of protected areas has been tested since 2010 (DELELIS *et al.*, 2010). It is a tool for establishing a "mosaic" of protected areas recognised by an order of the Ministry of the Environment or by the states. It operates with an essentially consultative council which, in addition to representatives of the protected areas, includes members of civil society and other public institutions or figures. This council defines the area of the mosaic, with the ambitious aim of developing reconnections between individual protected sites, action plans and strategic planning, to form a kind of marine ecological corridor or network (GALLETTI, 2014) capable of enhancing biological and landscape diversity for regional sustainable development.

55 In 2018, the launch year of the Brazilian Blue Initiative and its financial extension (MARETTI *et al.,* 2019; ICMBIO, 2018; VILLELA MARRONI, 2014), the sites of São Pedro and São Paulo, and Trindade and Martim Vaz, integrated two ocean mosaics: (1) the Arquipélago mosaic of Trindade e Martim Vaz and Monte Columbia (APA of 471,532 km^2

with a surrounding EEZ of 402,377 km^2 and a natural monument of 69,155 km^2) and (2) the Arquipélago São Pedro–São Paulo mosaic (APA of 454,315 km^2 with a surrounding EEZ of 407,052 km^2 and a natural monument of 47,263 km^2). These could serve as examples to study questions around the establishment of management plans and their effectiveness. These collaborations around conservation actions allow hope for the harmonisation of provisions in future MSP approaches.

Towards MSP for the whole maritime area?

56 Spatial planning seeks modernised, informed and responsible planning of land space, now extended to the marine space. Another goal of MSP is to contribute to SDG 14 "Life Below Water: conserving and sustainably using the oceans, seas and marine resources", a goal that is not, or poorly, articulated, either in the law of the sea or with estuarine and marine natural sciences alone (GALLETTI and DA SILVA LEITE NOURY, 2022). While MSP is certainly an additional tool to public policy put in place by coastal and marine agencies, beyond the method, MSP ultimately leads to decisions concerning national marine use planning. This remains a question of marine public policy, which is situated high in the hierarchy in Brazil and has particular features. The maritime territory concerned is sizeable. In addition to the risks generated by development projects carried out, there may be other risks, real or feared, resulting from future MSP.

The "lead" institution of an MSP

57 At the institutional level, since 2019, MSP in Brazil has been promoted by the CIRM (coordinator at the federal level), which is composed of 15 parties: the Presidency of the Republic; Brazilian Navy; Ministry of Foreign Affairs; Ministry of Economy; Ministry of Regional Development; Ministry of Tourism; Ministry of Mines and Energy; Ministry of Citizenship; Ministry of Environment; Ministry of Science, Technology, Innovations and Communications; Ministry of Defence; Ministry of Agriculture, Livestock and Food Supply; Ministry of Education; Ministry of Infrastructure; and the Ministry of Health. The consideration of marine spaces to support development, coupled with the tradition of precedence of the Brazilian Navy in decision-making and control of these spaces, results in authoritarian and unilateral public decision-making and federal-level MSP that remains a strong expression of central and military power at sea.

58 The remit of the Brazilian Navy is reviewed quite regularly; for example, the recent short Decree No. 10,607 of 22 January 2021 aims to create a working group to review maritime policy. The Navy's activities and operational programmes, include – in addition to the National Coastal Management Plan[21] and the Survey of the Brazilian Continental Shelf[22] – the Sectoral Plan for Marine Resources [23], which includes 11 programmes that it sponsors or is associated with, such as the Brazilian Ocean Observation System[24] and the *Revizee* programme, among others, inspired by models for monitoring oceanic changes in the global ocean initiated by the Intergovernmental Oceanographic Commission (IOC). This institutional and legal structure that MSP can take does not exclude the involvement of naturalist scientific expertise in the process. There are necessarily cases of cooperation between the Ministry of Defence with the support of the Navy, ICMBio (for its technical expertise) and the National Council for Scientific and Technological Development[25] of the Ministry of Science, Technology, Innovation and Communication.

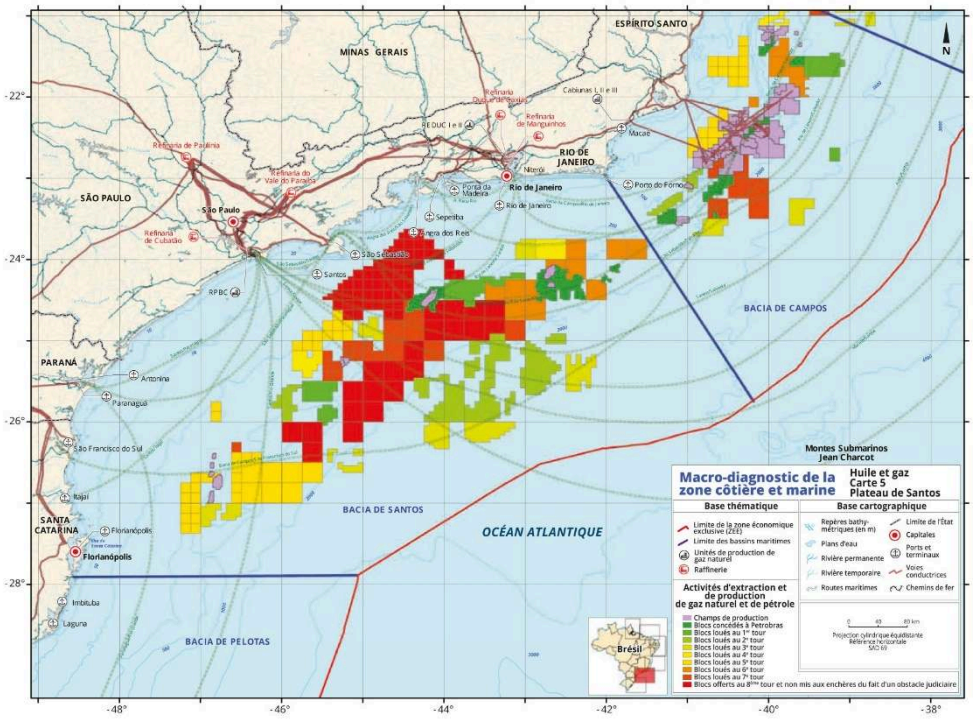
The maritime territory for MSP

59 In a maritime territory of 4.5 million km^2, expectations regarding MSP are high: it must bring about "better coordination of the actions of public authorities and private stakeholders in the marine sector", "in order to guarantee the best possible use of marine spaces and the economic development of the sector". There must be evidence of the public exercise, with maps, resources, allocated personnel and a dedicated budget, and go beyond the experience of managing only enclaves or the coastal strip.

60 The territory potentially concerned includes:

- Marine waters: Law 81617/93 recognises a territorial sea of 12 nautical miles in width along the entire coastline, a contiguous zone, and an EEZ of 200 nautical miles from the baseline. This baseline is drawn in the vicinity of the rather irregular coastline (low water line) and around the three island complexes that it encircles. This has the legal effect of extending the maritime zone eastwards, and in turn the following delineation of the EEZ.
- National continental shelf: Brazil has gradually increased (in 2004, 2006, 2015, 2017 and 2018) its definition of the outer limits of its extended continental shelf, which the Interministerial Commission on Marine Resources (CIRM) has termed the "*Amazônia Azul*" zone. This currently has a surface area of 4,451,766 km^2 if the EEZ and extended continental shelf are included, and 4,476,000 km^2 if territorial sea are included. This maritime area represents 52% of the national land territory. The marine spaces and uses have been identified politically and historically by the federal government. Its interventionism can be seen in the distribution of access to non-living resources (as in the case of opening up offshore areas to conventional and non-conventional oil and gas exploration) and the desire to control these. The same is true for living resources. For example, Brazil remains in control of its growing commercial fishing activities (exclusive fishing zone), despite the lack of continuity in catch and monitoring datasets and its membership in the Regional Tuna Fisheries Management Organisation since 1969 (Inter-American Tropical Tuna Commission, Northern Temperate Tuna Commission, Southern Temperate Tuna Commission, as well as commissions on other species).

Figure 6. Macro-diagnosis of the coastal zone: gas and hydrocarbon exploration/exploitation map



Source: Ministério Do Meio Ambiente (2008)

MSP and the risk of legal inconsistency

61 There are general risks if MSP is reduced to the mere mapping of areas and uses, or to the preferential allocation of use rights for particular activities. Marine planning that leads to the appropriation of ocean wealth ("ocean grabbing") is described in the scientific literature, either through privatisation of the ocean (ROS, 2019) or nationalisation; yet this is rarely mentioned in the conferences, public presentations and debates conducted by the public authorities mandated to initiate the process. The risk is reserving a particular volume of water and its contents, seabed or marine geological structures for the exclusive use of a single operator, or conversely, a natural resource conservation agency, with other activities being moved elsewhere. The other risk is granting majority use to one type of activity, with other activities being reduced without the possibility of challenging the decision. This is the case with the public policy supporting solid, liquid or gas mineral resource extraction (fig. 6), which makes other activities – fisheries or beach tourism, for example – residual, of lower quality, or risky.

62 In the case of productivist MSP, the risk of ecological impacts on the environment due to increased anthropic pressures (discharge, disturbance, extraction, overdensity, etc.) is proven, and ultimately leads to the degradation of these environments, the impoverishment of natural resources, or even to reaching a threshold of irreversibility in terms of ecological damage. Indeed, the risks of such MSP may be even greater in Brazil, a tropical zone, than elsewhere (QUEFFELEC *et al.*, 2021; FOTSO, 2018). For marine ecologists, this is due to the higher ecological stakes in these latitudes (Brazil lies between the latitudes of 5° North and 33° South, and between the longitudes of 34° and

73° West). For lawyers, the latitude (tropical or temperate) matters little, despite being reminded by environmental lawyers to be more open to the sciences (TELES DA SILVA, 2016). From a legal point of view, the risk is rather the quantitative importance of the area and resources affected and potentially degraded, and the size of national territory to be administered. The extent of any degradation that occurs in a marine area of this size would result in disproportionate public and private restoration efforts that would need to be carried out and financed.

63 Beyond MSP, the weakness of the legal rules enacted to regulate the increased activities of individuals or companies extracting resources from coastal and offshore sites needs to be given more attention, as does the lack of knowledge of the authorities of marine spaces regarding these spaces' productivity, vulnerability, interactions and monetary/non-monetary value. This lack of knowledge can lead to the allocation of exploitation rights in a process that is too rapid, uninformed or imprudent.

64 There are three key situations in which inadequate regulations have been problematic, and which MSP should try to remediate.

- Cases in which administrative authorities refrain from destroying structures (legal or illegal) that damage estuarine or coastal ecosystems, even though they have the ability to. For example, if the exploitation of mangroves for shrimp farming persists in a sustainable use zone, despite the proximity of mangroves located in a permanent conservation area that should be very strictly protected, without monitoring the consequences of the buildings or equipment, or without the appropriate collection, treatment and disposal of effluents and waste, or without ensuring the quality of the water and soil (these degradations can be exported to the permanent protected area without reaction by public authorities).
- Cases in which authorities fail to comply with jurisprudence recommendations or insufficiently take these into account: a recent example is the Foz do Amazonas area in the state of Amapá. The Federal Public Prosecutor's Office issued a recommendation on 19 April 2018 against the granting of an environmental authorisation to the French oil company Total, a permit that would have allowed oil exploration activities to begin on certain areas acquired in 2013 off the mouth of the Amazon. The prosecutor's recommendation was based on the recent discovery of the "Amazon coral reef" (about 56,000 km^2) and the inadequacy of the environmental impact assessment provided. The Brazilian Institute of the Environment and Renewable Natural Resources (IBAMA), to whom this recommendation was addressed, had to make a decision, and in 2019, new concession areas were made available for drilling under the sea on or near the reef.
- The case of the Brazilian paradox: although the country legally controls 3,661,000 km^2 of marine waters, these are less productive than those of other Latin American countries. The result is that Brazil is facing overfishing, overexploitation of stocks and species collapse, and has not managed to establish sufficient marine protected areas in its EEZ, despite the fact that these would ultimately support fishing (only 1.5% of the EEZ is reported to contain marine protected areas compared to 23.4% in territorial sea [FRANCINI-FILHO *et al.*, 2018]).

Conclusion

65 In Brazil, coastal planning law mainly concerns the land bordering the ocean, with a division of environmental assets and authority between the federal, state and municipal spheres. The *zona costeira*, delimited according to various plans, includes the coastal strip, merges with the boundaries of coastal municipalities, and makes some

incursions into territorial sea. Territorial management deals with the issues of land use and proximity to natural areas according to certain priorities (e.g. health).

66 Mapping of the shore, estuaries, seafloors and subsoils of territorial sea (maps that were not made in the framework of planning) show considerable areas currently under use – uses granted by the public authorities – in the Atlantic. In addition to the few perimeters of reef and coastal protected areas (within 12 nautical miles or beyond), there are many areas reserved for uses such as oil, gas and mineral exploration or exploitation. These areas are clearly visible off the states of Paraná (south) and Espirito Santo (north), allocated in the basins of Santos (*bacia de Santos*), Campos (*bacia de Campos*), and Espirito Santo (*bacia de Espirito Santo*), for example (fig. 6).

67 In a perspective of MSP, solutions must be identified for the over-anthropisation of space by activities, mainly with fixed or moveable rights of way. Such zoning is based on industrial – not natural – planning or development to multiply or intensify activities, such as aquaculture or hydrocarbons in offshore pre-salt hydrocarbon deposits. As a result, safety and public health issues will arise in territorial sea as well as in waters under jurisdiction (MUXAGATO and LE PRIOUX, 2011).

68 Shifting the focus of planners from simply the shoreline strip to coastal sites and beyond will be facilitated if coastal and ocean sciences can show why actions in remote marine areas help to maintain coastal benefits and services.

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NOTES

1. The coastal zone is included in the territorial sea according to Law No. 7661 of 6 May 1988.

2. This estimate is taken from studies on the representativeness of coastal ecosystems conducted by the National System of Protected Areas (SNUC) and includes the natural contours of the Brazilian coast (PRATES *et al.*, 2012, p. 11.).

3. According to Brazil's National Institute of Geography and Statistics, http://www.mma.gov.Br/gestao-territorial/gerenciamento-costeiro (consulted in 2021), and based on the demographic census (*Censo Demográfico*) it conducted in 2010–2011.

4. From the Brazilian Ministry of the Environment website: http://www.mma.gov.br/gestao-territorial/gerenciamento-costeiro%20consulté%20le%2010/07/2019

5. Art. 225 § 4: "The Brazilian Amazon Forest, the Atlantic Coastal Forest, the Serra do Mar, the Pantanal of Mato Grosso and the Coastal Zone constitute a national heritage; their use shall be in accordance with the law and under conditions guaranteeing the preservation of the environment, including the use of natural resources." Brazilian Federal Constitution (5 October 1988). https://wipolex.wipo.int/fr/text/218254

6. Lei nº 7.661, de 16 de Maio de 1988 institui o Plano Nacional de Gerenciamento Costeiro e dá outras providências. http://www.planalto.gov.br/ccivil_03/leis/L7661.htm

7. Lei nº 6.938/81 Politica Nacional do Meio Ambiente: http://www.planalto.gov.br/ccivil_03/leis/l6938.htm

8. https://www.mma.gov.br/gestao-territoral/gerenciamento-costeiro, see base-legal-gerco

9. Decreto nº 5.300 de 7 de dezembro de 2004, Regulamenta a Lei no 7.661, de 16 de maio de 1988, que institui o Plano Nacional de Gerenciamento Costeiro - PNGC, dispõe sobre regras de uso e ocupação da zona costeira e estabelece critérios de gestão da orla marítima, e dá outras providências.

10. IV Plano de Ação Federal para a Zona Costeira 2017–2019 (PAF-ZC).

11. In the Federal Constitution of 1988, according to Article 21, the federal government has the authority to: IX - draw up and implement national and regional plans for regional planning and economic and social development. According to Article 22, the federal government has exclusive authority to legislate on: I - civil, commercial, criminal, procedural, electoral, agrarian, maritime, aeronautical, space and labour law. However, according to Article 23, the federal government, states, districts and municipalities have joint authority: VI - to protect the environment and to

combat pollution in all its forms; VII - to preserve forests, fauna and flora. According to Article 24, the federal government, states and districts have the authority to legislate concurrently on: VI - forests, hunting, fishing, wildlife, nature conservation, defence of the soil and natural resources, environmental protection and pollution control; VII - liability for damage to the environment, consumers, property and rights of artistic, aesthetic, historical, tourist or landscape value. Constitution available at: https://wipolex.wipo.int/fr/text/218254

12. In the Federal Constitution of 1988, for example, it is stated in Article 24:
(1) "In the field of concurrent legislation, the federal government's authority is limited to enacting general standards."
(2) "The authority of the federal government to legislate on general standards does not exclude the suppletive authority of the states."
(3) "In the absence of a federal law on general standards, the states exercise full legislative authority in accordance with their specific features."
(4) "When a federal law on general standards arises, it suspends the effect of the sub-federal law insofar as the latter is contrary to the former."

13. Lei nº 9.605, de 12 de fevereiro de 1998 dispõe sobre as sanções penais e administrativas derivadas de condutas e atividades lesivas ao meio ambiente, e dá outras providências.

14. See next section on mangrove degradation.

15. Lei 6.938 de 31 de agosto de 1981, Art. 6, IV-Ógãos executores: o Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis - IBAMA e o Instituto Chico Mendes de Conservação da Biodiversidade - Instituto Chico Mendes http://www.planalto.gov.br/ccivil_03/leis/L6938.htm (accessed on 10/07/2019)

16. Lei 9.966/2000 de 28 de Abril de 2000 dispõe sobre a prevenção, o controle e a fiscalização da poluição causada por lançamento de óleo e outras substâncias nocivas ou perigosas em águas sob jurisdição nacional e dá outras providências, Art. 2, XXII-XXII - autoridade marítima http://www.planalto.gov.br/ccivil_03/Leis/L9966.htm

17. Lei Complementar 140, de 8 de Dezembro de 2011. http://www.planalto.gov.br/ccivil_03/leis/lcp/lcp140.htm

18. *Termo de Adesão à Gestão de Praias* (TAGP) or 'Beach Management Agreement'.

19. Draft law 6 969/2013 establishing the National Policy for the Conservation and Sustainable Use of the Brazilian Marine Biome (PNCMar) and other provisions, https://www.camara.leg.br/proposicoesweb/ficha de tra mitacao?IdProposicao=604557

20. Legislative Assembly of Pernambuco, 2018 (http://www2.cprh.pe.gov.br/wp-content/uploads/2021/01/lei_apa_mar_recife.pdf).

21. *Plano Nacional de Gerenciamento Costeiro.*

22. *Plano de levantamento da plataforma continental brasileira.*

23. *Plano setorial para os recursos do mar* (PSRM).

24. *Sistema brasileiro de observação dos oceanos.*

25. *Conselho nacional de desenvolvimento científico e tecnológico.*

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