ITALIAN MARITIME SPATIAL PLAN

ADRIATIC MARITIME AREA

STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA)

(Article 13 of Legislative Decree 152/2006 and amendments, Annex VI to Part II)

NON-TECHNICAL SUMMARY

AUTORITÀ PROCEDENTE	MINISTERO DELLE INFRASTRUTTURE E DELLA MOBILITÀ SOSTENIBILE *DIPARTIMENTO PER LA MOBILITÀ SOSTENIBILE DIREZIONE GENERALE PER LA VIGILANZA SULLE AUTORITÀ DI SISTEMA PORTUALE, IL TRASPORTO MARITTIMO E PER VIE D'ACQUA INTERNE*
SOGGETTO RESPONSABILE	TERESA DI MATTEO
TECNICI	SOGESID S.P.A.
DATA STESURA	SETTEMBRE 2022

Index

1. The strategic and regulatory context of the MSP

1.1 Directive 2014/89/EU and its Transposition into National Law

Directive 2014/89/EU has been transposed in Italy through Legislative Decree No. 201/2016 that:

- Establishes that the Ministry of Infrastructure and Transport (now the Ministry of Infrastructure and Sustainable Mobility) is the Competent Authority (art. 8), to which specific activities are assigned (art. 8, 9, 10, 11);
- Establishes the Inter-Ministerial Coordination Table (TIC) at the Presidency of the Council of Ministers Department for European Policies (DPE), which includes all the central Administrations involved in marine maritime issues (art. 6);
- Establishes the Technical Committee at the Ministry of Infrastructures and Transport (now the Ministry of Infrastructures and Sustainable Mobility), as the Competent Authority, which includes five central Administrations and the Maritime Regions (art. 7);
- Provides that the management plans of the maritime space are drawn up by the Technical Committee mentioned in article 7 and, before approval, are transmitted to the Interministerial Coordination Table mentioned in article 6, which certifies the correspondence with the planning process defined in the guidelines mentioned in article 6, paragraph 2. The maritime space management plans are approved by decree of the Minister of Infrastructures and Transport (now Ministry of Infrastructures and Sustainable Mobility), subject to the opinion of the Permanent. Conference for the relations between the State, the Regions and the autonomous Provinces of Trento and Bolzano;
- Provides that the existing plans and programs that take into consideration the marine waters and the economic and social activities carried out therein, as well as those concerning land activities relevant to the consideration of land-sea interactions, developed and implemented under the European and national provisions in force at the date of entry into force of the decree, are included and harmonized with the provisions of the management plans of the maritime space. Ministerial Decree of 13/11/2017, No. 529, as amended by Ministerial Decree of 11 March 2019, No. 89 and Ministerial Decree of 27 June 2019, No. 263, regulates the organization and functioning of the Technical Committee.

In line with the provisions of art. 6, paragraph 2, of Decree no. 201/2016, with the Decree of the President of the Council of Ministers of 1 December 2017, the "*guidelines containing the guidelines and criteria for the preparation of maritime space management plans*" were approved. The Guidelines have identified three maritime reference areas, for the drafting of three inter-coordinated Plans, referable to the three sub-regions of the Marine Strategy (art. 4 of Directive 2008/56/EU):

- The western Mediterranean Sea;
- The Adriatic Sea;
- The Ionian Sea and the central Mediterranean Sea.

This solution makes it possible to pool the work already carried out under the Marine Strategy with regard to the identification of indicators and the acquisition of environmental data.

The Plans will have a duration of 10 years, with the possibility of a mid-term review, or if deemed necessary following the monitoring of the implementation of the Plan or events that require revision.

2. Principles, objectives and, objectives and contents of the MSP

2.1 Characteristics of the Plan and its Legal Effectiveness

The Plan provides strategic level indications and guidelines for each Maritime Area and their sub-areas, to be used as a reference for other planning actions (sector or local level) and for the granting of concessions or authorizations. Depending on the characteristics of the sub-areas and planning needs, the Plan provides more or less detailed indications, both in terms of spatial resolution and in terms of defining measures and recommendations. The reference time horizon of the Plan is 2032, the year in which, at the latest, an initial update of the Plan will be due, taking into account, where possible and necessary, a longer time horizon (year 2050). The superordinate character of the Plan and its prevalence with respect to other planning and programming acts, does not imply that the latter will cease to exist, but that they must be "*incorporated*" in the new Plan during its first application and, if necessary, modified to guarantee harmonization with its forecasts; following approval of the Plan, they must be consistent with the objectives, addresses, recommendations and forecasts contained therein. Therefore, the Plan will not be derogated from plans or programs or administrative measures, thus being able to guarantee clarity and legal certainty of the use of the maritime space for economic operators, through the coordination of different administrative acts concerning activities taking place at sea or which may have an impact on the maritime space. The Plan has, therefore, the nature of a "first-level instrument", i.e. superordinate to the further and prevalent acts of planning of the management of the "*marine territory", whose content must necessarily flow into it*" (Council of State, section IV, 2 March 2020, no. 1486), and falls into the type of "*super-plans*" (together with the Basin Plan, as per art. 65 of legislative decree no. 152/2006, and the Landscape Plan, as per art. 145 of legislative decree no. 42/2004).

Specifically, the relationship between the Maritime Spatial Management Plan and plans and programs concerning land-based activities, the scope of application of the Maritime Spatial Management Plan is different, but the Maritime Spatial Management Plan must take this into account and may affect it in relation to those aspects which may have an effect on the marine space, i.e. in the presence of land-sea interactions.

In particular, the national legislator clarifies that the scope of application of the Maritime Spatial Management Plan is different from that of the urban plan (to which the port master plan, approved after the entry into force of law no. 84/1994, can be assimilated): in these terms should be interpreted the provisions contained both in d.lgs. n. 201/2016 as well as in the relevant supplementary guidelines, which have the care to clarify that the planning of the maritime space does not apply to urban (and rural: the terminology used textually takes up the content of the Directive, which leaves the "urban and rurar planning" of the Member State unaffected).

2.2 Area of interest of the Plan and its spatial articulation

The drafting of the Italian Maritime Spatial Plans is implemented in three parallel and coordinated processes in the three Maritime Areas identified by the Guidelines (Adriatic, Ionian-Central Mediterranean, and Western Tyrrhenian-Mediterranean).

In each area, the Plan covers all waters and/or seabed beyond the coastline over which Italy has jurisdiction, with the exception of areas with "*urban and rural planning governed by existing legislation"*. The delimitation of the three Maritime Areas covered by the Plan has therefore considered the following criteria:

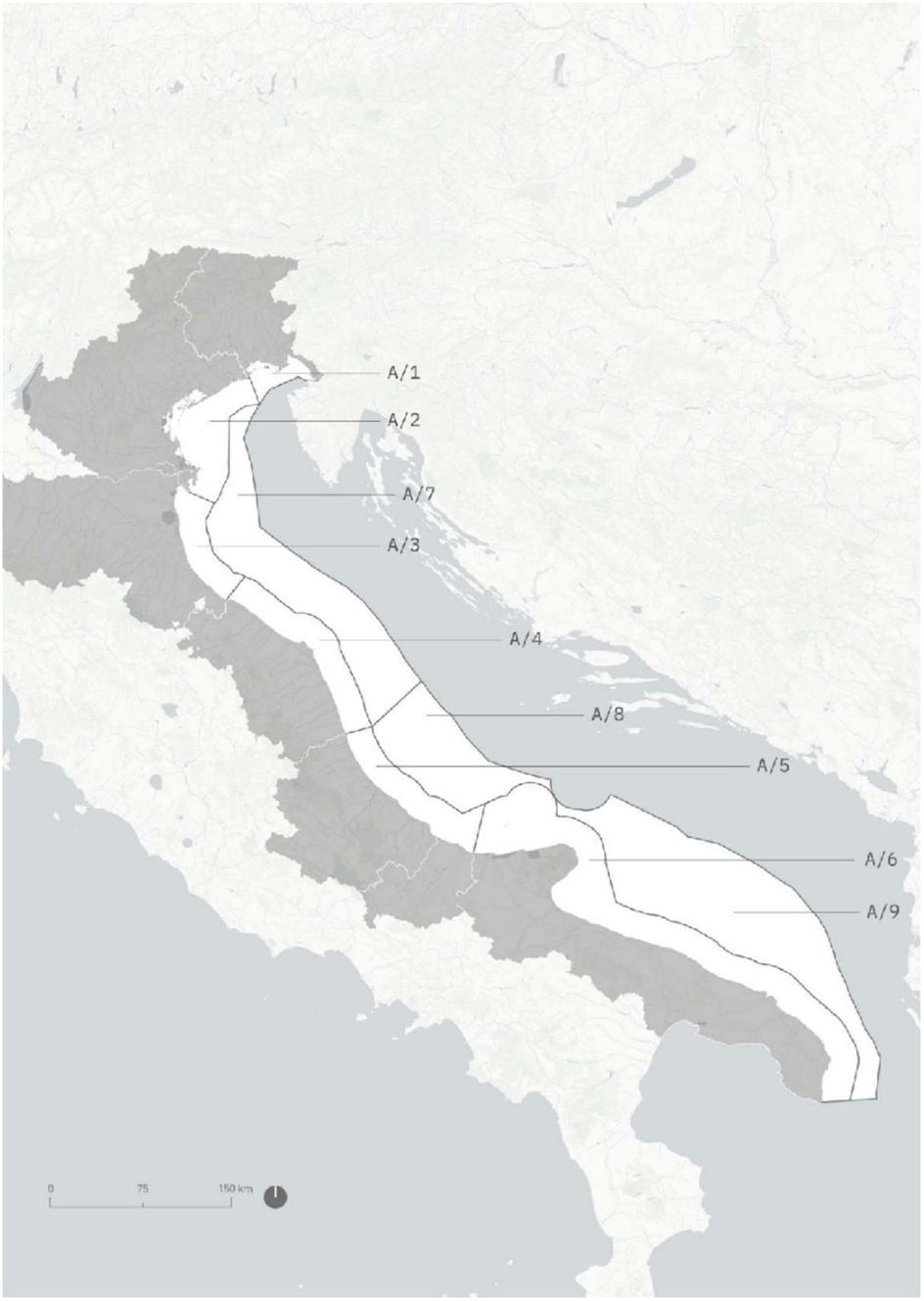
- jurisdictional boundaries where defined, also following specific agreements with neighboring countries, made available by the Istituto Idrografico della Marina - IIM (e.g. 12mn limits, continental shelf limits);
- delimitations between marine sub-regions of the Marine Strategy Directive;
- boundaries of marine areas open to hydrocarbon exploration and production as identified by the MISE;
- virtual equidistance lines.

The delimitations reported in the following do not prejudice in any way the outcome of future negotiations with neighboring Countries for the settlement of existing disputes and the drafting of future agreements on maritime areas and rights of use, also according to the provisions of Law no. 91.

2.2.1 Maritime Area "*Adriatic*"

The "*Adriatic*" Maritime Area has an extension of about 62,930 km2 and is delimited in the East by the limits of the continental shelf already formally agreed with the neighboring countries (Yugoslavia, 1969; Albania, 1992; Greece, 1977 and 2020) and in the South by the delimitation line between the marine sub-regions "*Adriatic Sea*" and "*Ionian Sea - Central Mediterranean*" of the Marine Strategy Directive, as also indicated in the Legislative Decree 201/2016.

Within it, the area is divided into 9 sub-areas, of which 6 within the territorial waters.



Delimitation and internal zoning of the "Adriatic" Area

2.3 The Ecosystem-Based Approach in the Plan

The Convention on Biological Diversity (CBD) (COP 5/ Decision V/6) established in May 2000 the following definition of the ecosystem approach: "*the ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable manner. Therefore, the application of the ecosystem approach will help to achieve a balance of the three objectives of the Convention: conservation, sustainable use and the fair and equitable sharing of the benefits arising from the use of genetic resources. An ecosystem approach is based on the application of appropriate scientific methodologies focusing on the levels of biological organization, including the structure, processes, functions and essential interactions between organisms and their environment. It recognizes that humans, with their cultural diversity, are an integral part of many ecosystems*."

The need for management approaches based on an ecosystem perspective, which fully incorporate ecosystem considerations, into marine planning has become increasingly urgent (Douvere and Ehler 2008, Ansong et al. 2017). The Ecosystem-Based Approach (EBA) considers humans as an integral part of the natural ecosystem and, if applied, can show the exchange and interactions between the goods and services provided by natural ecosystems and different management objectives (Levin et al., 2009). Although the MSP Directive does not directly provide a definition of EBA, the requirement to implement EBA is set out in Preambles (3), (14), (22) and directly in Article 5 on MSP objectives.

The key principles for the application of the EBA in MSP can be summarized as follows:

- Take the long view;
- Integrate ecological, social, economic, and institutional perspectives and recognize their interdependencies;
- Make the protection and restoration of marine ecosystems a priority;
- Consider anthropogenic pressures and cumulative impacts;
- Consider connections and connectivity between and across ecosystems;
- Take a perspective that considers ecosystem services;
- Promote adaptive management;
- Plan at the appropriate scales;
- Take a precautionary approach;
- Use the best knowledge available;
- Involve stakeholders.

2.4 Strategic objectives

The definition of strategic objectives is one of the fundamental steps in the process of constructing the Maritime Spatial Plans (MSP) of the three Maritime Areas. The objectives identified in this chapter are high level objectives, referring to the national and supranational dimension, and are common to the three maritime areas covered by the Plans. These specific objectives have been developed in coherence with the strategic objectives identified in this chapter and are preparatory to the definition of the Planning Units in each sub-area and the related vocations and measures of the Plan. The identification of the strategic objectives for the three maritime areas was carried out first of all on the basis of the existing strategies, plans and regulations at an international, European and national level, concerning both environmental, landscape and cultural heritage aspects and socio-economic aspects linked to the needs of the various sectors. In this sense, the objectives indicated by the Marine Strategy to achieve GES ("*Good Environmental Status*") are central.

In fact, the Guidelines for the management of the Maritime Space (DPCM 1 December 2017) indicate the ecosystem approach as a fundamental tool for the proper development of Maritime Spatial Planning. The ecosystem approach plays in this sense a bridging role between MSP and the implementation of Marine Strategies. Moreover, the paradigm of sustainable development, declined in the "*Agenda 2030 on Sustainable Development*" of the United Nations (2015) and in the 17 Sustainable Development Goals - SDGs to be

achieved by 2030, is considered superordinate and transversal to all the objectives of the Plan, in line with the principles and objectives of the National Strategy for Sustainable Development.

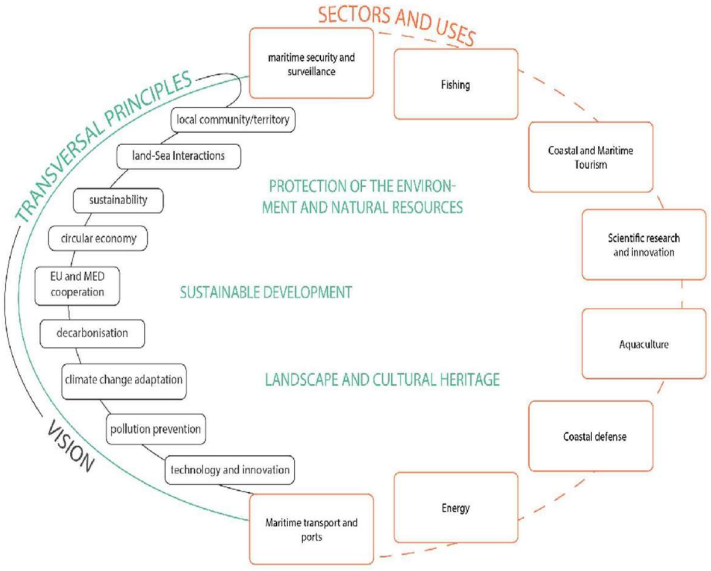
For the systematic collection of planning objectives by macro-theme or macro-sector deriving from the instruments in force at a transnational (EU and non-EU) and national level, Annex 4 of the National Guidelines on Maritime Spatial Planning was used as the main reference. Consequently, the collection is structured in the following 11 themes/sectors:

- Sustainable development
- Environmental protection and natural resources
- Landscape and cultural heritage
- Maritime safety, navigation and surveillance
- Fishing
- Aquaculture
- Maritime transport and ports
- Energy
- Coastal defence, flood protection, seabed morphology restoration
- Coastal and maritime tourism
- Scientific research and innovation

The themes of "*Sustainable Development*", "*Environmental Protection and Natural Resources*" and "Landscape and Cultural Heritage" are transversal and superordinate principles to all the objectives of the Plan.

The themes "*Environmental protection and natural resources*" and "*Landscape and cultural heritage*" are also considered as specific uses of the sea and in this sense used in Phase 4 of planning. The 42 identified strategic objectives are summarized in next Table and constitute a unitary and integrated corpus that contributes to form a Vision for the development of the three maritime areas and, specifically, of the "Adriatic" maritime area.

Sustainable Development and the objectives into which it is declined, represents the paradigm of the development strategy of the maritime areas identified in the Plan. With reference to this paradigm, the objectives of the individual sectors are identified, considering the transversal nature of environmental protection and cultural heritage. The objectives identified are as a whole referable to a series of transversal principles that constitute the elements of reference for the Vision. These principles are identified in purple in the next Figure which also includes the various themes/sectors/uses considered.



	THEMES/SECTORS/USES	Code	OBJECTIVES
Transversal principles	**Sustainable development**	OS_SS|01	Developing a sustainable marine economy, multiplying growth opportunities for marine and maritime sectors
		OS_SS|02	Contribute to the National Strategy for Sustainable Development
		OS_SS|03	Contributing to the European Green Deal
		OS_SS|04	Fully grasp the economic and environmental sustainability opportunities arising from the circular economy
	Environmental protection and natural resources	OS_N|01	Apply a consistent *Ecosystem Based Approach (*EBA) at all stages of drafting Maritime Spatial Plans
		OS_N|02	Supporting the extension of EU marine protection to 30% by 2030
		OS_N|03	Transpose and promote the implementation of the main space measures foreseen in the MSFD Program of Measures
		OS_N|04	Integration of land-sea interaction aspects and integrated management of the coastal strip, with particular reference to environmental aspects
		OS_N|05	Take into account in the medium - long term the process and objectives of marine ecosystem restoration as outlined in the proposed European Law on Environmental Restoration
	Landscape and cultural heritage	OS_PPC|01	Support the landscape value of the coastal strip
		OS_PPC|02	Promoting the recovery and redevelopment of buildings and areas subject to protection
		OS_PPC|03	Promote and support the conservation of underwater archaeological heritage
		OS_PPC|04	Promoting regional and international cooperation in the field
		OS_PPC|05	Promoting and creating awareness on intangible cultural heritage
		OS_PPC|06	Combating unauthorized building in coastal areas
Sectors/Uses	**Maritime safety, navigation and surveillance**	OS_S|01	Preventing pollution from ships and contributing to the implementation of the measures of the Marpol Convention
		OS_S|02	Help promote maritime safety, the implementation of UNCLOS standards and the EU Maritime Safety Strategy
	Fishing	OS_P|01	Sustainable development of the fisheries sector
		OS_P|02	Implementation of European and National Multiannual Management Plans in Geographical Sub-Areas (GSA)
		OS_P|03	Promotion, development and spatial management of small-scale coastal fishing using sustainable techniques
		OS_P|04	Promote the creation of areas for the recovery and protection of fish stocks and protection of *Essential Fish Habitats* (EFH)
		OS_P|05	To encourage cooperation among States in order to achieve concerted measures for the sustainable management of the activities of their national fisheries sectors.
		OS_P|06	Monitoring and combating illegal fishing
	Aquaculture	OS_A|01	Promoting the sustainable growth of the aquaculture sector

		OS_A|02	Promoting quality aquaculture and supporting the process of establishing AZAs (*Allocated* Zones for Aquaculture)
	Maritime transport and ports	OS_TM|01	Promoting sustainable development of maritime transport and reducing its negative impacts
		OS_TM|02	Promoting the use of alternative fuels, reducing discharges into the sea, improving port facilities for the collection of waste and cargo residues and/or encouraging the use of such facilities, improving the management of dredged sediments
		OS_TM|03	Promoting European and regional cooperation on maritime transport and multimodality
		OS_TM|04	Contribute to increasing the competitiveness of Italian ports, the sharing of "best practices" and the implementation of the National Strategic Plan for Ports and Logistics (PSNPL)
		OS_TM|05	Promote the integration and dialogue between existing planning systems in particular regarding the integration of port strategic planning, land planning and sea plans
	Energy	OS_E|01	To contribute to the energy transition towards renewable and low-emission sources through the development of offshore renewable energy production
		OS_E|02	Pursue the environmental, social and economic sustainability of offshore hydrocarbon prospection, exploration and production activities
		OS_E|03	Promote the conversion of platforms and infrastructure associated with depleted fields and synergies between compatible maritime activities
		OS_E|04	Promoting European and regional energy cooperation
		OS_E|05	Promoting the planning of suitable areas for CO capture and geological storage [2]
	Coastal defence	OS_DC|01	Promote the development, harmonization and implementation of strategies and measures to protect the coastline and combat erosion foreseen in the Flood Risk Management Plans drawn up at the scale of the Hydrographic District in compliance with the provisions of the Floods Directive (2007/60/EC) and in the Coastal Plans / Integrated Coastal Zone Management Plans prepared by many regions
		OS_DC|02	Ensure the best coherence between the uses and vocations of sea use foreseen in the MSP Plans and coastal uses, with reference to their safeguard in a scenario of necessary adaptation to ongoing climate change
		OS_DC|03	Consider and adequately address the issue of the use and protection of underwater sand for beach nourishment, to be considered as a strategic resource for coastal defense and adaptation plans
	Coastal and maritime tourism	OS_T|01	Promoting sustainable forms of coastal and maritime tourism
		OS_T|02	Promoting coherent planning actions on land and sea, also for tourism purposes
		OS_T|03	To contribute to the diversification of tourist products and services and to counter the seasonality of demand for inland, coastal and maritime tourism
	Scientific research and innovation	OS_RI|01	Target marine research activities on the knowledge needs of the Plan, to strengthen and support the planning process and itssustainable growth objectives
		OS_RI|02	To encourage the development of technologies and innovative solutions to be used to improve the effectiveness of the Plan and to promote their dissemination in the various sectors of the marine economy and in the various marine areas
		OS_RI|03	Support the maintenance and consolidation of the observation network and specific needs for experimentation and research,also in order to evaluate the effects and effectiveness of the Plan and support its updating

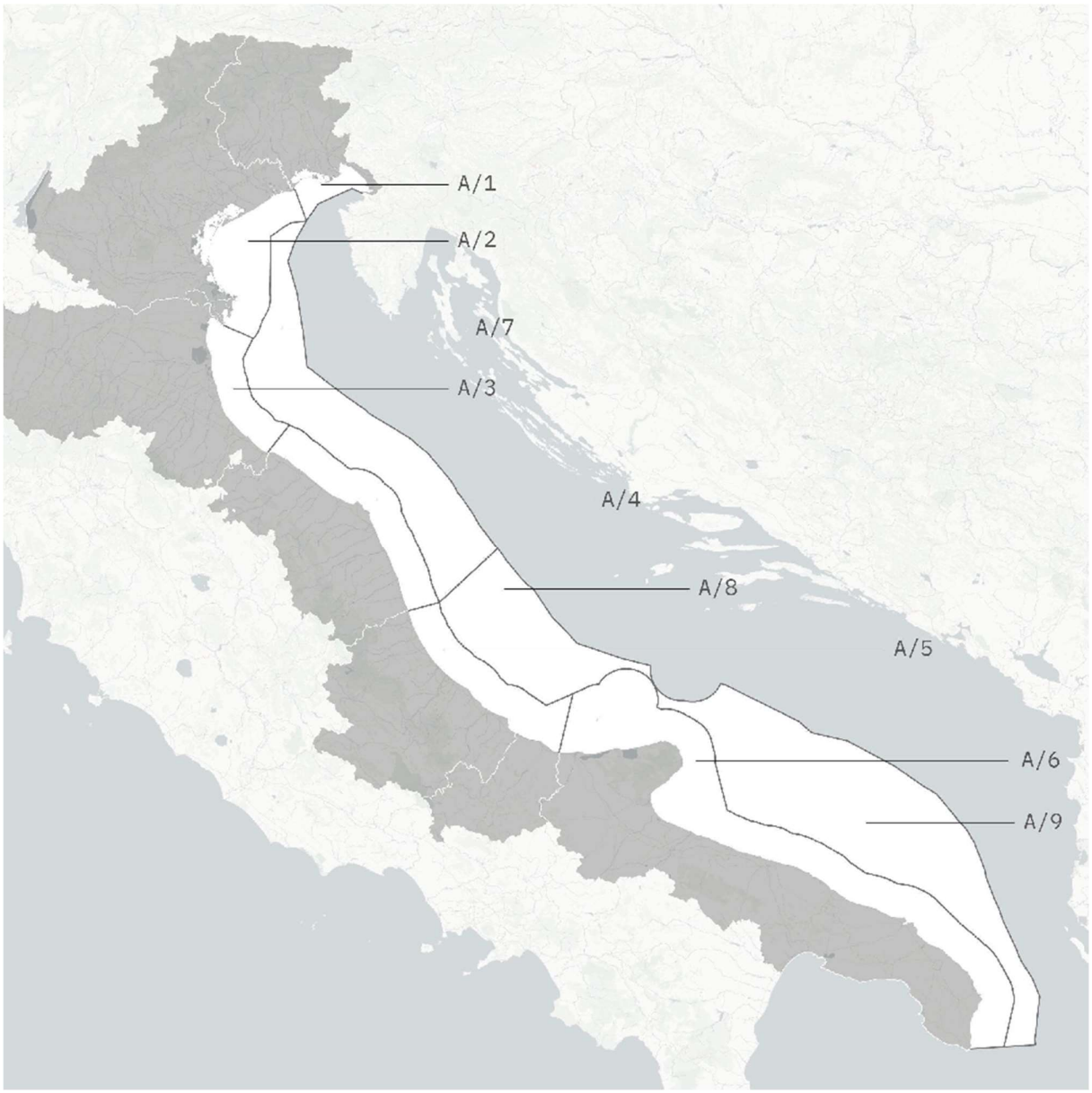
2.5 Definition of sub-areas

The "*Adriatic*" area is influenced by the complex morpho-bathymetric characteristics and hydrological, geographical and environmental as well as social and economic dynamics of the Adriatic Sea. The interregional and international context in which the area insists, moreover, influences in a substantial way the planning needs of strategic level and address for the Maritime Area. Such characteristics have been taken into consideration in the definition of the sub-areas (next Figure), according to the planning needs and the definition, for each sub-area, of an appropriate medium-long term vision and coherent specific planning objectives.

The limits of the sub-areas must be considered as permeable limits, from the point of view of uses, from the environmental/ecosystem point of view and from the point of view of the *governance* system, so as to ensure maximum coherence with respect to the planning of the vast area and neighboring sub-areas, as well as to meet the needs of a unified ecological and functional vision. Taking into account these objectives, the criteria and elements to be considered for the definition of the sub-areas, through their optimal combination and expert judgment, were as follows:

– National and international legal and administrative boundaries: The first distinction in determining the sub-areas was determined by the boundary between territorial waters (from the coastline to the 12 NM line) and continental shelf (from the 12 NM to the median line). The boundaries of the sub-areas along the coastline were defined taking into account the boundaries of the maritime areas and the regions Friuli Venezia Giulia (sub-area A/1), Veneto (A/2), Emilia-Romagna (A/3), Marche (A/4), Abruzzo and Molise (A/5) and Puglia up to Capo di Leuca, the boundary established by the Marine Reporting Unit MSFD (A/6). These boundaries have been extended up to the demarcation of the 12 NM by following boundaries demarcated by existing zones used for sectoral planning and management activities (e.g. between A/2 and A/3 along the separation line between the Natura 2000 Sites being established in the marine waters off the Po Delta) or by following the boundaries of the Maritime Directorates (zones);
– Morphological and oceanographic features: the proposed division into "off-shore" sub-areas (off the 12 NM) mainly took into account the geomorphological, oceanographic and hydrological features of the Adriatic Sea, which vary markedly along the north-south gradient. The northern portion of the Adriatic Sea, which constitutes the largest continental shelf area in the entire Mediterranean Sea, has been enclosed in sub-area A/7, delimited by the boundary of the escarpment that reaches the deep water up to about 270 m of the complex depression of the Fossa di Pomo. The boundary between sub-areas A/7 and A/8 has been drawn in continuity with the boundary between A/4 and A/5 to ensure consistency with planning in territorial waters. Considering instead that below the Gargano Promontory the southern Adriatic Sea shows a deep depression, up to -1225 m, enclosing platform areas of variable surface and a relatively large bathyal area, the boundary between sub-areas A/8 and A/9 has been identified at the point of coincidence between the 12 NM line and the median line, at the agreed boundary between the archipelago of the Tremiti Islands (Italy) and that of Pelagosa (Croatia). This subdivision coincides with the demarcation line between Geographical Subareas (GSAs) 17 and 18, except for a limited northern portion of sub-area A/9 (about 70000 ha).

In addition, in delimiting the subareas, additional specific criteria were taken into account, such as: the distribution of peculiar or prevailing existing uses of the sea, existing areas used for planning and management activities, and the boundaries of marine areas open to hydrocarbon exploration and production identified by the MISE. For general use and to support public consultation, the cartographic layers of the Plan (Areas, Subareas, Planning Units) with the relative attributes and the thematism assigned according to the priority uses of each PU are published on the SID platform - Portal of the Sea[2] and can be consulted together with all the cartographic layers used in the maps of the cognitive framework (Phase1).



2.6 Coexistence and synergy between uses.

Phase 2 of the planning process has highlighted how the Adriatic Sea, similarly to other marine areas of relatively limited extension, is characterized by a high density of uses, particularly in the areas closest to the coast, and therefore by potential and real conflicts between some activities. At the same time, however, different uses can coexist in the same area and develop synergies leading to the effective sharing of the maritime space and its resources (multi-use), with advantages for all the sectors involved. Coastal and marine tourism certainly represents an economic activity of central importance for the Adriatic coastal communities.

The Maritime Space Plan for the Adriatic Area proposes to support through spatial and other measures (e.g. involvement, training, administrative aspects, etc.) the evolution of the sector towards more sustainable activities, including the strengthening or development of synergies with other sectors, such as in particular artisanal fishing (fishing tourism and ichthyic tourism) and aquaculture (aquaculture). The Plan also underlines the need to develop tourist offers (e.g. ecotourism) that are synergic with the objectives of environmental protection and protection of landscape and cultural heritage, also considering the key role that these elements play in supporting the tourist economy of the Adriatic region. In the central area of the Adriatic basin there is

a historical coexistence of tourism and offshore mining activities, locally characterized by direct or indirect conflicts.

The process of discharging platforms that are no longer active offers the opportunity for synergic developments between the two sectors. These structures can in fact be potentially reused for various tourism-recreational purposes, such as support for boating, diving activities, recreational fishing or environmental education.

The issue of the potential reuse of decommissioned platforms also concerns other sectors, such as the production of energy from renewable sources at sea, the creation of biological protection areas (as in the case of the SCI-SPA "Relitto Piattaforma del Paguro"), aquaculture and scientific research, thus also looking at the multi-use logic of these infrastructures. The analysis of the planning indications described in the following sections of this chapter of the Plan, highlight possible synergies also between the objectives of fishing and those of environmental protection and natural resources. The Biological Protection Zones (ZTB), established by the Ministry of Agricultural, Food and Forestry Policies with the aim of protecting fishery resources, have positive effects on environmental protection in general. In the same way, well-managed marine protected areas can represent a useful tool for the reconstitution of ichthyic stocks and therefore bring benefits to local fishing.

In the ZTB and marine protected areas can also be promoted forms of sustainable tourism, as for example experimented in the AMP of Miramare and in the SCI-SPA of Paguro.

2.7 Elements of land-sea interaction

The Plan for the Adriatic Sea Maritime Area takes into account characteristics and dynamics, both natural and anthropic, which determine important land-sea interactions relevant to the basin scale, as analysed and described in Phase 1. The Adriatic maritime area is characterized by land-sea interactions of natural origin, strongly linked to the presence of river deltas, lagoons and wetlands, which characterize the dominant landscape of the Italian Adriatic coastal area, especially in its northern strip. Among the natural factors considered in the analysis of land-sea interactions, the erosive processes of the coast, determined by the combination of natural and anthropic factors. The specific suitability of coastal areas has also taken into account the potential influences on the marine areas facing the coastal areas where human activities on land are located. In particular, relevant interactions at basin scale have been identified, determined by urbanized areas, also for tourism use, industrial areas, port areas (including cruise ports), and areas of primary interest for the tourism system (including marinas and pleasure ports). Furthermore, land-sea connections that characterize numerous maritime activities, such as marine areas for hydrocarbon exploitation (including cables and supporting pipelines), the presence of fishing ports and national military activities have also been taken into consideration.

In particular, in order to promote and support the development of tourism in the area, it is necessary to protect the Adriatic beaches with appropriate measures to combat erosion and emissions of pollutants of land-based origin. Furthermore, in consideration of the expected increase in maritime traffic, in line with the Maritime Spatial Plan it will be necessary to verify the robustness and the appropriate integration of land transport systems interconnected with the marine one, as well as the related needs for new infrastructures.

The whole Adriatic coastal area is also characterized by the presence of sites of important environmental value and by areas relevant for the protection and enhancement of landscape and cultural heritage (e.g. Natura 2000 network areas, Regional Parks, UNESCO sites, etc.). In many cases these areas extend between the land and the sea or at least include numerous land-sea interactions that are a constituent part of their natural and/or landscape value. The elements of land-sea interaction highlighted at the scale of the maritime area have been considered for the definition of the Plan elements described below; in particular, with regard to the determination of the suitability and mode of use of the Planning Units closest to the coast or to the hot-spots of land-sea interaction, as well as with regard to the measures of the Plan at national and sub-area level.

With regard to the measures, in fact, in the extended document of the Plan of the "Adriatic" maritime area, it is highlighted the possible relevance for the management of land-sea interactions, for example, in relation to the withdrawal of relict sands for coastal defense, the realization of shore connections of offshore plants or the improvement of environmental and energy sustainability of ports (hot-spot of land-sea interactions).

2.8 Relevant elements for transnational cooperation

Italy plays a central role in the transnational cooperation of the Adriatic Sea, also in consideration of its geographical position that extends along the axis of the entire basin. Italy's commitment concerns both strategic and multi-sectoral cooperation initiatives, such as the EU strategy for the Adriatic and Ionian Region (EUSAIR), and sectoral cooperation mechanisms, such as those of the Regional Fisheries Organisations (RFOs, including the General Fisheries Commission for the Mediterranean (GFCM) of the FAO).

The Maritime Spatial Plan represents a fundamental instrument useful to enhance the role of Italy in the framework of the cooperation in the Adriatic basin and therefore to contribute to solve some of the problems of transnational nature. The Plan contributes to the transboundary management of environment and natural resources, through the systematization of the network of environmental protection tools (MPAs, Natura 2000 network, EBSAs - CBD, SPAMI, etc.), and through planning choices consistent with the measures agreed at transnational level for the protection of fishery resources (e.g. FRAs - GFCM) and through choices consistent with the common European objectives defined in terms of quality of the marine environment (MSFD).

The Plan contributes to the recognition of the importance of underwater cultural heritage as an integral part of the cultural heritage of mankind, supporting international cooperation on the subject and implementing the indications and measures established under the UNESCO Convention on the Protection of Underwater Cultural Heritage, adopted in Paris on 2 November 2001, ratified and entered into force in Italy through Law 157/2009, which integrates and expands the protection provisions inherent in the underwater cultural heritage already in the UNESCO Convention on the Law of the Sea. The MSP Plan also promotes a systemic, European and regional vision of maritime transport and the theme of multimodality.

This vision is reflected in the Plan's objectives, which foresee the sustainable growth of Adriatic port systems also on the basis of the strengthening and extension of existing cooperation networks between ports, the further development of Motorways of the Sea as a complementary solution to road transport, the integration of maritime transport with the land transport network in the trans-European perspective of TNT-T multimodal networks, the harmonisation of the Plan's choices with existing international planning tools (first and foremost those defined by the IMO such as shipping corridors). The sustainable management of energy resources and the transition towards renewable ones are a further relevant element for the transnational cooperation, both to promote consistent choices between the two sides of the Adriatic Sea and to strengthen the energy distribution networks, consistently with the EUSAIR Pillar 2.

2.9 Measures (at National and Regional level)

The management plan of the Maritime Area "Adriatic" is elaborated by integrating the existing discipline contained in sectoral regulations and in plans and programs in force (as provided by the guidelines of the D.P.C.M. 1 December 2017, par. 14), which remain fully in force. To complement and supplement the sectoral measures in force, the plan identifies a series of measures to achieve the vocations indicated in the plan itself, to improve the coexistence between uses (resolving any conflicts and developing reciprocal synergies), to contribute to the maintenance and achievement of good environmental status and to ensure the compatibility of uses with the requirements of landscape and cultural heritage protection. Therefore, unless the contents of the maritime spatial management plan make it necessary to modify them (art. 5, co. 3, legislative decree no. 201/2016), the forecasts contained in other plans and programs (integrated and sectoral) are intended to be confirmed and are not reported as measures within this document. The measures of the maritime spatial management plans, therefore, are not reproductive of the existing regulatory framework, but, complement it and where necessary amend its existing planning and programmatic forecasts.

The Maritime Spatial Management Plan considers national level measures and relevant measures at the scale of the individual sub-area. The national level measures apply to the entire Italian marine space and are therefore valid for all three maritime areas. For some sub-areas within the territorial waters of coastal regions, more

detailed and specific measures have been defined for these sub-areas. In the case of the offshore sub-areas, no specific measures have been identified, since the national level measures are valid in these sub-areas.

As provided by the guidelines containing the guidelines and criteria for the preparation of MSP plans (D.P.C.M. 1 December 2017, par. 20), the national level measures contribute to the achievement of strategic objectives, while those of regional level contribute to the achievement of the specific objectives declined for the different sub-areas. The measures of the management plan of the "Adriatic" Maritime Area, elaborated at the national and sub-area scale, will be subjected to the implementation, when the available economic-financial resources will result sufficient, without any budgetary consequences. In next Table the national level measures are shown, while please refer to Section 2 of the SEA for consultation on sub-area specific measures.

National level measures. **Measure Category**: S - Spatial measures; are related to the definition of spatial aspects and areas in which activities can take place; T - Temporal measures; are related to the definition of limits or conditions that regulate or define the performance of activities over time; TE - Technical and technological measures; are related to the use or adoption of specific technologies or techniques; M - Monitoring, control and surveillance measures; these relate to the acquisition of data concerning the performance of maritime activities, compliance with rules or regulations, effects on the marine environment, effects in terms of interaction with other uses; G - Governance measures (G); these relate to procedural and organizational mechanisms, including multilevel; E - Economic and financial measures (E); identify actions related to financial resources to support maritime activities (also in the framework of existing programming, such as regional POR-FESR and/or EMFF); A - Other measures (A); such as training, education, communication activities.

Typology of the measure: I - addresses, mainly addressed to public administrations or planning instruments; P - prescriptions that the plan provides to regulate the uses of the maritime space (e.g. in terms of modalities, also spatial and temporal - in which the uses can be exercised); I - incentives; A - actions, i.e. concrete initiatives (e.g. consultations, studies, analyses) carried out by or on behalf of competent administrations, possibly in partnership with private subjects.

Code	Strategic objective	Reference use for measurement	Measure	Category(S, T, TE, M, G, EC,A)	Type (I/P/i/A)	Mainactors
NAZ_MIS|01	Transverse measurements		Develop and implement a long-term strategy for the participation and involvement of stakeholders in the process of implementation, monitoring and evaluation of the Maritime Plans, with a view to their updating. Particular attention will be paid to the most socially embedded sectors, local administrations and the general public.	A	A	MIMS
NAZ_MIS|02	Transverse measurements		Consolidate, develop and update the National Portal of the Sea, in terms of content, functions and interface with different types of users.	TE, M	A	MIMS
NAZ_MIS|03	Transverse measurements		Develop methodologies and tools for the quantitative assessment of the socio-economic effects of plan choices, to support the adaptive management phases of the MSP.	M	A	MIMS
NAZ_MIS|04	OS_SS|01 - Developing a sustainable maritimeeconomy, multiplyinggrowth opportunitiesfor the marine and maritime sectors	**nt** Sustainable development	To carry out a study on the socio-economic characterization and evolutionary trends of the different sectors of the Italian sea economy. The study will consider the three maritime areas of reference of the Management Plans, in order to allow the identification of actions that support the sustainable development of the Italian sea economy, to be conveyed in particular through the Maritime Area Management Plans. The study is configured as preparatory to the definition of a National Strategy for the sustainable development of the sea economy.	**A)** A	A	MISE
NAZ_MIS|05	Contributing to the National Strategy forSustainable Development	Sustainable development	Elaborate a Maritime Strategy (National Strategy for the Sustainable Development of the Sea Economy) at a national level, to be implemented in synergy with the implementation of the Maritime Spatial Management Plans, in order to provide astructured impulse to the sustainable development of the Italian sea economy, inthe short, medium and long term. The Maritime Strategy is also developed on thebasis of the results of the study on the socio-economic characterization and evolutionary trends of the sea economy.	A	A	MISE
NAZ_MIS|06	OS_SS|03 -		Taking into account the forecasts and implementation of the NIPEC, as well as the indications of the Report of the "Climate Change, Infrastructure and Sustainable Mobility Commission" (MIMS, 2022), develop a study on the			

	Contributing to the European Green Deal	Sustainable development	impact of climate change on National Maritime Plans and related adaptation measures to be considered in a mid-term assessment of MSP Plans. The study will consider a multi-scale approach, assessing in the analysis and solutions also the dimensions of maritime area, sub-area, local area.	A	A	MITE
NAZ_MIS|07		Sustainable development	Prepare a study on the contribution of MSP Plans to the achievement of national climate change reduction and carbon neutrality targets.	A	A	MITE
NAZ_MIS|08		**nt** Sustainable development	To set up a Working Group of coastal Regions aimed at identifying common needs and strategies to fully exploit the opportunities that the objectives of the European Green Deal offer for the development of maritime territories and areas. The Working Group will also see the possibility to work in subgroups, one for each maritime area, to focus on the necessary specificities.	**A)** A	A	MISE,MITE, Regions
NAZ_MIS|09	OS_SS|04 - Fully grasp the economic and environmental sustainability opportunities arising from the circular economy	Sustainable development	Strengthen the role of the maritime economy within the National Strategy for the Circular Economy, for example: enhancing the link and synergies between the Maritime Spatial Plans and the Strategy for the Circular Economy; specifying more detailed actions with reference to the "Blue Economy" Area of intervention, contemplating the efficient use of the maritime space among the tools envisaged to support the transition towards a circular economy, envisaging proposals for specific actions for the sectors of the maritime economy.	A	I	MITE
NAZ_MIS|10		Sustainable development	To support the structuring, strengthening, development and valorisation of shipbuilding and ship repair, maintenance, overhaul and restructuring, dismantling and component collection activities, structuring a circular naval economy supply chain, wherever possible in synergy with the actions aimed at reconverting the use of coastal industrial areas in crisis/decommissioning and environmental reclamation.	A	I	MIMS, Port Authority
NAZ_MIS|11		Sustainable development	To support the structuring of a recovery, re-use and recycling chain of the by-products of the aquaculture and professional fishery activities (also in line with the relevant Measures of the MSFD PoM Descriptor 10), to be realized also at a wide area level including more sub-areas and wherever possible in synergy with the actions aimed at the reconversion of the use of the industrial coastal areas in crisis/decommission and at the environmental reclamation.	A	I	MISE, MIPAAF, Regions
NAZ_MIS|12		Sust **nt** able ain development	Support the structuring of a national supply chain for the recovery, disassembly, reuse/recycling of end-of-life pleasure, sport and fishing boats, wherever possible in synergy with actions aimed at the conversion of use of coastal industrial areas in crisis/decommissioning and environmental reclamation.	**A)** A	I	MISE
	OS_N|01 - Applying acoherent Ecosystem based approach (EBA) in the overall approach and guidance of MaritimeSpatial Plans	Environmental protection and naturalresources	In order to enable full integration between the implementation processes between MSFD Measure Programs and MSP Plans, establish an "MSFD-MSP" working grouplinked to the activities of the Technical Committee for MSP, aimed at: 1.1 Ensure the integration in the MSP Plans of the spatially explicit information related to species and habitats as well as their environmental status			

NAZ_MIS|13			and expected trends, and their integrated assessment, contributing to fill the current knowledge gaps and reinforcing the activities foreseen within the MSFD Directives (with particular reference to the measures MADIT -M032-NEW3; MICIT -M032-NEW3; MWEIT -M035-NEW3 and Measure 3 of the PoM MSFD 20/12/2021 Update) and Natura 2000. 1.2 Adopt analytical tools for analysis and continuous monitoring of potential cumulative impacts of anthropogenic activities on environmental components (in synergy with MSFD and Natura 2000 Directives) as well as of conflicts/synergies between anthropogenic uses.	M, G	A, I	MITE,ISPRA
NAZ_MIS|14	SO_N|02 - Support the extension of EU marine protection to30%, of which 10% ina stringent manner, by 2030	**nt** Environmental protection and naturalresources	In order to enable full integration between the implementation processes between MSFD Measure Programs and MSP Plans, establish an "MSFD-MSP" working grouplinked to the activities of the Technical Committee for MSP, aimed at: 2.1 Identify priority areas for environmental conservation and/or marine resources for the purpose of expanding the network of Marine Protected Areas (MPAs) and/or Natura 2000 Network sites, in line with the forecasts and tools provided bythe MSFD Directives (with particular reference to Measure 1 of Descriptor 1 of theMSFD 20/12/2021 PoM Update), Natura 2000 and the 2030 Biodiversity Strategy. 2.2 Promote studies and assessments of connectivity, ecological status, ecosystem functions and ecosystem services derived from them.	**A)** S, M, EC	A, I	MITE, ISPRA, Regions
NAZ_MIS|15	OS_N|03 - Transposeand promote the implementation of the main space measures foreseen inthe MSFD Program ofMeasures	Environmental protection and naturalresources	In order to enable full integration between the implementation processes between MSFD Measure Programs and MSP Plans, establish an "MSFD-MSP" working grouplinked to the activities of the Technical Committee for MSP, aimed at: 3. establish procedures aimed at the spatial definition, prioritization and application of the measures foreseen by PoM MSFD with an appropriate multi-scalar approach that also takes into account specific objectives (sub-areas) and suitability (U.P.).	S, TE, M	A, I	MITE,ISPRA
NAZ_MIS|16	OS_N|04 - Integrating aspects ofland-sea interaction and integrated management of the coastal strip, with particular reference to environmental aspects	**nt** Environmental protection and naturalresources	To support study and research activities aimed at improving the spatial knowledge of land-sea interactions, with particular reference to the areas identified as interaction hot spots and/or suitable for "environmental protection and natural resources" and landscape protection. These activities should support the integrated management of the protection instruments in force and/or planned.	**A)** TE, M, G	I, A	MITE, ISPRA, Regions
NAZ_MIS|17	OS_N|05 - Take intoaccount in the medium - long termthe process and objectives of marine ecosystem restoration as outlined in the proposed European Law on Environmental Restoration	Environmental protection and natural resources	Prepare the National Environmental Restoration Plan, identifying the priority areas to be restored and the restoration measures and methods to be adopted, in synergic and subsidiary relation with the implementation and monitoring process of the Maritime Space Plans.	S, T	I, A	MITE, Regions
NAZ_MIS|18		Environmental protection and	Improve the knowledge on the distribution of habitats and species indicated in theproposal for an EU Regulation on Environmental Restoration (COM(2022)304 final), capitalizing also on the results of European research			Research Institutions

		naturalresources	projects and of the National Centre for Biodiversity (PNRR-MUR) being set up, and ensuring their effective and direct transfer to the National Plan for Environmental Restoration and, from there,to the Maritime Spatial Plans.	M	A	, Universities, ISPRA
NAZ_MIS|19	OS_PPC|01 - Supporting the landscape value ofthe coastal strip	Landscape and culturalheritage	Initiate analysis to identify and prescribe in appropriate guidelines, principles, criteria and standards to minimize the visual impact on the coastal landscape of seawater facilities and structures (for energy, aquaculture, etc.).	S, TE	A	MIC, MITE
NAZ_MIS|20		Landsnctape and cultural heritage	Provide facilities or incentives for current holders of aquaculture concessions, in the case of activities to improve the characteristics (spatial distribution and color of thenfloats) of the facilities already under concession.	**A)** TE	i	Regions
NAZ_MIS|21		Landscape and culturalheritage	Integrate the Guidelines for the identification of AZAs with a methodology that allows to take into account also the visual perception of aquaculture facilities from the ground. Promote specific studies at a sub-area scale aimed at valorising and capitalising on the experiences already made in the field of compatibility betweenaquaculture facilities and landscape protection requirements, as well as at identifying further practices.	S, TE	I	ISPRA, Regions
NAZ_MIS|22	OS_PPC|02 - Promoting the recovery and redevelopment of buildings and areas subject to protection	Landscape and culturalheritage	Through the analysis of the landscape plans, carry out a reconnaissance of the systems of immovable assets characterising the coastal landscape (e.g. lighthouses, towers), also insisting on non-bound areas, in order to identify and plan enhancement interventions on a sub-area scale.	A	A	MIC, Regions
NAZ_MIS|23	OS_PPC|03 - Promoting and supporting the conservation of theunderwater archaeological heritage	Landscape and culturalheritage	By systematizing the available knowledge and what has already been regulated, define a unitary picture (at the scale of the maritime area), accompanied by mapping, of the areas with the presence of submerged archaeological assets subject to protection or to be protected, of the anthropic activities in such areas prohibited or to be prohibited (including trawling), of the interventions carried out for this purpose or of those to be implemented (including through mechanical and technological means) and of the necessary monitoring activities.	S, M	A	MIC, Regions
NAZ_MIS|24	OS_PPC|05 - Promoting and creating awareness on intangible culturalheritage	**nt** Landscape and culturalheritage	Provide incentives and facilitations for the management, valorisation, conservationand/or restoration of tangible assets representing the intangible heritage linked to the uses of the sea (e.g. trabucchi, historical fishing tools, etc.). Providing incentivesand facilitations for the valorisation of activities that constitute the intangible heritage linked to the uses of the sea, such as techniques and traditions of historical artisanal fishing, traditional shellfish farming activities or ephemeral events that are part of the intangible heritage of the sea (e.g. festivals and religious processions at sea).	**A)** A	i	MIC, Regions
NAZ_MIS|25		Landscape and culturalheritage	Provide for the historical boats, special forms of evaluation of their cultural value, in order to catalogue them, to carry out the necessary restoration works and to preserve them in suitable structures (e.g. Sea Museum).	A	I	MIC
NAZ_MIS|26	OS_PPC|06 - Combating unauthorised building in coastalareas	Landscape and culturalheritage	Systematize the information available in the national database on unauthorized building and from other sources, in order to develop a study on the extent of the phenomenon of unauthorized building in the coastal strip (300 meters deep) at	M	A	Mi, Regions

			the scale of the maritime area, to be used in the planning of interventions to combat it.			
NAZ_MIS|27	OS_S|02 Help promote maritime safety, the implementation of UNCLOS standards and the EU MaritimeSafety Strategy	Maritime safety, navigation and surveillance	With particular reference to the area of the Strait of Sicily, strengthen the dialogue and international coordination for the management of emergency situations involving the safeguard of human life at sea.	A	I	Coastguard / NationalMaritime Rescue Coordination Centre
NAZ_MIS|28	SO_P|01 - Encouraging the sustainable development of thefisheries sector	**nt** Fishing	To guarantee the adequate spatial coverage of the fleet modernization actions (also regarding the energy efficiency of the vessels) for all fishing segments, in particularfor the small artisanal fishery, and to incentivize adequate conditions for the fishing sector in the ports, in order to ensure safe and decent working conditions for the operators and to improve the competitiveness of the sector. In this context, foresee also the appropriate actions aimed at the training of the fishery operators on the sustainability aspects of the professional fishery as per Measure 8 (Descriptors 1 and 3) of the PoM MSFD 20/12/2021 Update.	**A)** TE	I	MIPAAF,ISPRA, Regions
NAZ_MIS|29		Fishing	To encourage the application of solutions aimed at increasing energy efficiency (in particular as regards the energy efficiency of vessels) and the use of renewable energies in the fisheries sector with a view to the supply chain, including the processing and marketing of the product, considering the land-sea interactions offishing activities.	TE	I	MIPAAF,ISPRA
NAZ_MIS|30	OS_P|02 - Support the implementation of the forecasts of the European and National MultiannualManagement Plans in the Geographical Sub-Areas (GSA)	Fishing	Support the appropriate spatial distribution of investments to align fishing capacity with fishing opportunities as indicated by the European and National multi-annual plans for the Management of Sub-Geographical Areas (GSA), in order to contribute to the reduction of fishing pressure, also through studies aimed at assessing the balance between the capacity of fleet segments and the availability of resources, promoting their conservation and sustainable exploitation.	S,EC	A	MIPAAF
NAZ_MIS|31	OS_P|03 - Promotion, development and spatial management of small-scale coastalfishing using sustainable techniques	**nt** Fishing	Stimulate projects, studies and research aimed at promoting an adequate spatial presence of small-scale fisheries, their sustainability and direct actions to strengthen the related skills and develop human capital.	**A)** TE,G	I	MIPAAF, Regions
NAZ_MIS|32		Fishing	Promote agreements between fishermen practising small-scale fishing and the bodies/bodies responsible for the management of coastal and marine areas subjectto protection (MPAs, coastal and marine sites of the Natura 2000 Network, national or regional parks that include coastal and marine areas, etc.) in order to enhance the role of these areas in sustainable development and in the recognition of the quality, also environmental, of the products and services offered by small-scale artisanal fishing. This objective is aligned with the goal of supporting the extension of the protection of EU seas to 30% by 2030, generating positive effects for small-scale artisanal fishing, in synergy with the aims of nature protection.	S, T, G	A	MIPAAF, Regions,MPA managers
NAZ_MIS|33		Fishing	Develop local small-scale fisheries plans that also contain spatial forecasts and measures.	S, A	A	Regions

NAZ_MIS|34	OS_P|04 - Encouragethe creation of areas for the recovery and protection of fish stocks and protectionof Essential Fish Habitats (EFH)	Fishing	Launching an integrated evaluation of the knowledge on the Essential Fish Habitats (EFH) of the main alieutic species, aimed at the determination of the areas to be subjected to protection constraints as a priority, thus supporting the institution of spatial measures of resources management (e.g. ZTB) and related actions of joint spatial planning of fishing activities. This survey activity and related periodic monitoring will have to be carried out as a priority within the 0-6 nautical miles from the coast, as well as capitalizing on the activities foreseen in Measure 3 (Descriptors 1, 3, 6) to support the implementation of the environmental target 6.3 of the PoM MSFD 20/12/2021 Update.	TE, EC, M,G	A, I	MIPAAF
NAZ_MIS|35	SO_P|05 - Encouragecooperation betweenStates in order to achieve concerted measures for the sustainable management of activities of their national fisheries sectors	Fishing	In the context of national, EU and international cooperation initiatives (e.g. FAO-GFCM, CBD), identify, propose and/or strengthen multi-level governance systems (from transnational, to national, inter-regional and compartmental scales) that identify and promote concerted measures for monitoring, sustainable management of shared fishery resources, management of interactions between different fisheries systems, and protection of protected species at a broad range.	**A)** G	I	MIPAAF
NAZ_MIS|36		Fishing	Strengthen international dialogue and coordination for the management of fishing activities in international waters, in order to prevent disputes and ensure the safeoperation of Italian fishing fleets	A	I	MIPAAF,MAECI
NAZ_MIS|37	OS_P|06 - Monitoring and combating illegalfishing	Fishing	Support and strengthen the fight against illegal fishing through co-management schemes as well as through technological adaptation of control networks in all maritime areas.	M, G	A, I	MIPAAF, Captaincies
NAZ_MIS|38		Fishing	Carry out studies and pilot projects for the registration and geo-referencing of fishing activities, in collaboration with the Harbour Offices, which evaluate the extension of the use of VMS and/or AIS systems also for non-compulsory segments (small boats) and possibly the development and adoption of low-cost systems, also using economic incentives (e.g. in the context of FEAMPA).	TE, M, G	A, I, i	MIPAAF, Regions
NAZ_MIS|39	SO_A|01 - Promotingthe sustainable growth of the aquaculture sector	Aquaculture	To encourage the adoption of solutions aimed at increasing energy efficiency and the use of renewable energy in the aquaculture sector from a supply chain perspective that includes the processing and marketing aspects of the product, considering the land-sea interactions of the activities themselves.	TE	I	MIPAAF, Regions
NAZ_MIS|40		Aquaculture	Promote coexistence between aquaculture growth and environmental conservation, through targeted studies and pilot projects for the integration of aquaculture activities and Natura 2000 sites.	**A)** TE	I	MIPAAF,ISPRA, Regions
NAZ_MIS|41	OS_A|02 - Promotequality aquacultureand support the process of establishing AZAs (Allocated Zones forAquaculture)	Aquaculturee	Develop, adopt and implement AZA Plans at the regional scale, in line with the MSP Plans and with the support of the AZA Technical Guide (ISPRA /HIPAA).	S, G	A	Regions
NAZ_MIS|42		Aquaculturee	Establish a permanent working table aimed at supporting the integration and progressive harmonization between regional AZA plans and MSPs in the different maritime areas, strengthening the already existing tools (e.g. ITAQUA).	G	A	MIPAAF,ISPRA, Regions
NAZ_MIS|43			Address through targeted studies an adequate spatial distribution of			MIPAAF,

		Aquaculturee	investments for the technological development and diversification of productions, and monitoring and support systems for the same.	A	A	Regions
NAZ_MIS|44	SO_TM|01 - Promoting the sustainable development of maritime transportand reducing its negative impacts	Maritime transportand ports	Produce a study aimed at identifying the areas of highest concentration ("hot spot"areas) of pressures generated in the marine environment by maritime traffic: air emissions, water pollution, waste dispersion, underwater noise emissions, collisions with marine megafauna. The study will also include the definition of specific measures that will ensure, starting from what is indicated in the MSP Plans and with reference to the LSI analysis, the reduction of these pressures and the mitigation of negative impacts on the environment.	TE, M	A	MIMS, ISPRA, PortAuthority
NAZ_MIS|45		Maritime transportand ports	Produce an analysis aimed at identifying new areas of spatial management of maritime traffic (PSSAs, ATBAs, TTSs) and strengthening existing ones, with the aim of improving the regulation of shipping lanes and reinforcing conservation actions for marine ecosystems and biodiversity.	TE, M	A	MIMS, MITE, PortSystem Authority
NAZ_MIS|46		Maritime transport and ports	Encourage the identification and adoption within the MSP of specific spatial, behavioral, and technological measures to reduce the impacts of underwater noise on biota, including in line with MSFD Descriptor 11 objectives and measures.	**A)** S, TE	A	MIMS,MITE
NAZ_MIS|47	OS_TM|02 - Promotethe use of alternativefuels, reduce discharges into the sea, improve port facilities for the collection of waste and cargo residues and/or encourage the use of such facilities, improve themanagement of dredged sediments	Maritime transportand ports	Prepare the mapping at the scale of the maritime area of the sites suitable for the delivery of dredged materials, also through the connection with the databases available at regional level; strengthen the harmonization and coordination of management practices of dredged sediments in the maritime area and at national level.	S, TE, G	A, I	MITE, MIMS, Regions, Port System Authorities
NAZ_MIS|48		Maritime transportand ports	Actively contribute to European and Mediterranean-wide harmonization initiatives of solid waste collection methods on ships and their delivery to ports, in order to optimize procedures (from the planning phase to the service assignment phase), maximize recyclable fractions and contribute to the development of circular economy supply chains. Particular attention must be paid to plastic waste, to activities to combat the abandonment of this waste at sea and on beaches, to the related collection and recovery activities and to environmental education and information activities.	TE, EC, M	I	Port System Authorities , Regions
NAZ_MIS|49	OS_TM|03 - Promoting Europeanand regional cooperation on maritime transport and multimodality	Maritime transportand ports	Adapting multimodal transport networks, integrating the local scale with international and European traffic networks.	G, TE, M	A	MIMS, PortSystem Authority
NAZ_MIS|50	OS_TM|04 - Contributing to increase the competitiveness ofItalian ports, the sharing of best practices and the implementation ofthe National Strategic Plan for Ports and Logistics	**nt** Maritime transportand	Adapt the performance and functionality of Italian ports to the standards required to obtain the different existing certifications such as European Clean Ports, Environmental Management System (EMS), PERS (Port Environmental Review System) and Environmental Port Index.	**A)** G	A, I	Port System Authority

	(PSNPL)	ports				
NAZ_MIS|51	OS_TM|05 - Promotethe integration and dialogue between the planning systemsin force in particular regarding the integration of port strategic planning, land planning and sea plans	Maritime transportand ports	Ensure the integration in the MSP Plans of the updates and adjustments of the Port Master Plans, as far as they are concerned and in particular as regards the needs interms of new water spaces in the areas in front of the ports with the aim of ensuring the development of port activities.	G	A	MIMS, PortSystem Authority
NAZ_MIS|52	OS_E01 - Contributing to the energy transition towards renewable and low-emission sources through the development of offshore renewableenergy production	**nt** Energy	Develop national Guidelines for the identification of suitable sites for offshore renewables (wind, solar, wave and current) and the assessment of single and cumulative environmental and landscape impacts, considering the elements of potential impact, during the construction, operation and decommissioning phases, and also considering the elements for the transport of the energy produced onshore. These Guidelines will allow to: i) refine the spatial planning (e.g. in termsof robustness and spatial resolution); ii) address the design of the plants; iii) facilitate the permitting phases (e.g. EIA and VINCA).	**A)** S	A,I	MITE, MIC
NAZ_MIS|53		Energy	To develop a Decision Support System (DST), dynamically linked to the National Portal of the Sea and also fed by the data deriving from the pre-operational and post-operational monitoring and investigation activities (pre-operational phases, including EIA, operation and decommissioning) for offshore renewable energy production plants. This DST aims to support - from an energy, environmental, technological and socio-economic point of view - the phases of feasibility analysis, preliminary design, assessment of environmental impacts, identification of solutions and mitigation measures and assessment of the social acceptability of offshore infrastructure for the production of energy from renewable sources, for the benefit of operators, administrations, local communities.	S, M	A	MITE
NAZ_MIS|54		Energy	Establish an observatory on the monitoring of the impacts of offshore wind farms on the environment and other uses of marine space and the coast, considering thedefinition, implementation and evaluation phases of the monitoring plans required for the installation and operation of wind farms. The assessments of this observatory will need to be taken into account in the implementation of the monitoring plans of the MSP plans, and therefore in the eventual revision of these plans.	M	A	MITE, MIC, Regions
		nt	Initiate and support research and innovation activities, also through pilot projects, on various issues related to offshore renewable energy production, such as in particular: (i) energy production from sources other than wind (wave, tides and currents, solar, combination of different sources), (ii) plants and technologies in areas with clear added value (for synergy with other sectors and issues, for the self-sufficiency of marginalized areas, for the management of energy demand peaks in particular areas, etc.) such as ports, remote areas and minor islands,	**A)**		

NAZ_MIS|55		Energy	(iii) combination of offshore renewable energy production with other uses (multi-use) such as aquaculture, tourism, recreation, fishing, protection, (iv) innovative technologies, such as the use of renewable energy sources in the environment, in the tourism sector, in the tourism industry, in fishing, in the protection of the environment, etc.) such as ports, remote areas and small islands, (iii) combination of offshore renewable energy production with other (multi-use) uses such as aquaculture, tourism, boating, fishing, environmental protection, (iv) innovative technologies, also aimed at minimizing impacts on the environment and landscape; (v) experimental assessment of the environmental effects on specific habitats or target species of the solutions adopted.	TE, S	A	MUR, MITE
NAZ_MIS|56		Energy	Create a working group to improve authorization procedures, speeding up processes while respecting the principles of transparency and efficiency.	G	A	MITE, MIC, Regions
NAZ_MIS|57		Energy	Offshore renewable energy installations should adopt solutions to reduce conflicts and promote wherever possible and safe coexistence with other uses of the sea (e.g. permeability for shipping, fishing with gears, sand extraction for coastal defense works, offshore aquaculture facilities, managed tourism, scientific research).	S, T, TE	P	MITE
NAZ_MIS|58		**nt** Energy	Within Marine Protected Areas and marine areas included in National or RegionalParks, the installation of offshore wind power plants is forbidden, with the exception of micro-wind power plants possibly used for self-consumption, also for the supply of energy to activities allowed in the protected area.	**A)** TE	P	MITE
NAZ_MIS|59	OS_E02 - Pursue the environmental, socialand economic sustainability of offshore hydrocarbonprospection, exploration and production activities	Energy	Create an MSP-PiTESAI working group, linked to the activities of the Technical Committee for the MSP, to align the two plans reciprocally and progressively in the implementation and possible revision phases of the plans themselves, supporting the energy transition objectives of the PiTESAI as far as the MSP is concerned, also through the sharing of data and portals.	S, M	A, I	MITE,MIMS
NAZ_MIS|60	OS_E03 - Promote the reconversion of platforms and infrastructures associated with depleted fields and synergies between compatible maritime activities	Energy	Promote, within the scope of the MSP and in compliance with current regulations and the "National Guidelines for the decommissioning of offshore hydrocarbon production platforms and related infrastructures", experiments and projects for the reconversion of decommissioned platforms and related infrastructures (e.g. sealines).	TE	A	MITE
	OS_DC|01 - Promotethe development, harmonization and implementation of strategies and measures to protect the coastline and to combat erosion, as foreseen in the FloodRisk Management	**nt**	Relaunch the mandate of the National Coastal Erosion Table (TNEC - Memorandumof Understanding MATTM-Regions signed 6.4.2016) in order to: (i) address in a coordinated manner Integrated Coastal Zone Management (ICZM) at the national scale; (ii) systematize existing strategies and plans (ICZM strategies and plans, coastal plans, flood risk management plans pursuant to Legislative Decree 49/2010, etc.(iii) to promote measures and actions for	**A)**	A, I	MITE, Regions

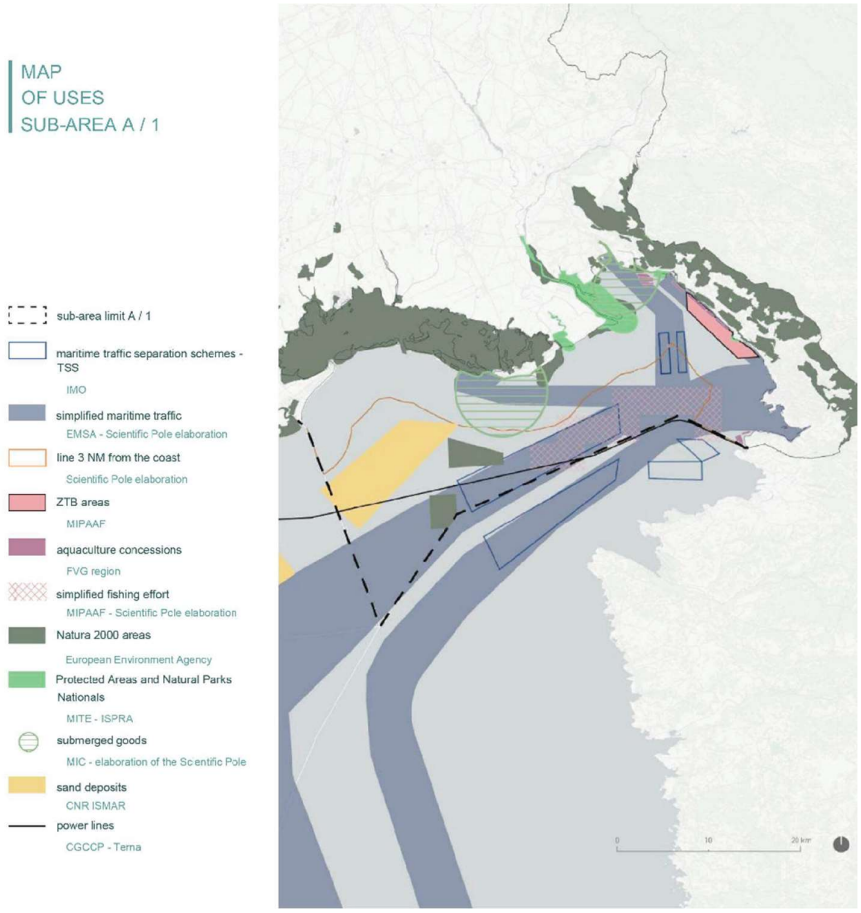
NAZ_MIS|61	Plans prepared at thelevel of the Hydrographic Districtin compliance with the provisions of the Floods Directive (2007/60/EC) and in the Coastal Plans / Integrated Coastal Zone Management Plans prepared by many regions	Coastal defence	research and experimentation of climate change adaptation interventions (also in synergy with mitigation objectives) that are conceptually, environmentally and technologically advanced (e.g.nature-based solutions) implemented at the right spatial scales and on the basis ofappropriate scenarios; (iv) to census and monitor these interventions at the national and regional scales; (v) to foster interregional cooperation on these issues. Within its mandate, the TNEC should regularly coordinate with the Technical Committee for MSP.	S, TE, G		
NAZ_MIS|62	OS_DC|02 - To guarantee the best coherence between the uses and vocations of sea use foreseen in the MSP Plans and the coastaluses, with reference to their safeguard in a scenario of necessary adaptationto the ongoing climate change	**nt** Coastal defence	Analyze the coherence between the existing coastal strategies and plans/GIZC, theprojects that intervene on the coastal morphology (for conservation, restoration or modification) and the forecasts of the MSP plan; propose possible corrective actions, also taking into account the most recent climate scenarios, possibly elaborated at regional and/or local scale.	**A)** S, G	A, I	MITE, Regions
NAZ_MIS|63	OS_DC|03 - Adequately consider and address the issueof the use and protection of underwater sand for beach nourishment, to be considered as a strategic resource forcoastal defense and adaptation plans	Coastal defence	To complete the mapping, qualitative assessment and quantification of the volumes of underwater sand deposits available in the seabed, through dedicated funds, in order to plan the use of this (non-renewable) resource on the basis of current and future (erosion and flooding) risk mitigation needs (arising from climate change adaptation needs) in particular considering the increasing demand for sediment forthe implementation of 'nature-based solutions'. Promote the systematic organization and sharing of information acquired at different management scales (regional and national).	S, M	A	MITE, Regions
NAZ_MIS|64		**nt** Coastal defence	Reduce conflicts and impacts related to the use of marine sands for defense worksby: i) prioritizing the use of deposits outside protected areas or with nature priority established by the MSP; ii) reducing conflicts with other uses (e.g. fishing and aquaculture) through the choice of the most suitable deposits and appropriate extraction methods and timing; iii) adopting impact mitigation measures to be assessed in a site-specific way.	**A)** S, T, TE	A, P	MITE, Regions
NAZ_MIS|65		Coastal defence	Create a working group to improve regulations and authorization procedures related to concessions and coastal nourishment interventions with underwater sand in order to clarify and speed up the authorization procedures in compliance with the principles of transparency and efficiency.	G	A	MITE, MIC, Regions
NAZ_MIS|66	SO_T|01 - Promotingsustainable forms of coastal and maritime tourism OS_T|02 - Promotingcoherent planning actions on land and sea, also for tourism purposes	Coastal and maritime tourism	Facilitate the development of coastal and maritime eco-tourism initiatives also in amulti-use perspective and therefore promoting opportunities for co-planning between the tourism sector and other sectors of the sea economy (such as. fishingand aquaculture). In this sense, promote the spatial application of the awareness and information measures provided by Measure 2 (Descriptors 1 and 6) of the PoM MSFD 20/12/2021 Update.	S, G	A, I	Ministry of Tourism, ISPRA

NAZ_MIS|67	OS_T|02 - Promotingcoherent planning actions on land and sea, also for tourism purposes	Coastal and maritime tourism	Designing and developing monitoring activities for pleasure boating, also on the basis of the systemisation of any existing initiatives, through collaboration between Regions and operators/local bodies, in order to acquire adequate knowledge of traffic flows and define management measures for the sustainable development of the sector.	A	A	Regions
NAZ_MIS|68		**nt** Coastal and maritime tourism	At the sub-area scale, assess the establishment of areas for the regulation of recreational traffic and the creation of structures to ensure eco-friendly moorings, in order to preserve the most vulnerable benthic ecosystems and minimize conflicts with other activities. As far as this measure is concerned, the subjects responsible for the implementation and management of the various areas and structures will have to be identified.	A	A	Regions, municipal authorities
NAZ_MIS|69	SO_T|03 - Contributing to the diversification of tourism products andservices and to countering the seasonality of demand for inland, coastal and maritimetourism	Coastal and maritime tourism	Identifying assets or coastal areas subject to strong tourism pressure, also by monitoring the number of accesses, in order to define, where necessary, specific actions for the development of sustainable tourism and the regulation of tourist flows at all or certain times of the year, such as: limiting the number of daily accesses, requiring the purchase of a special ticket whose proceeds are destined to finance interventions for the protection and enhancement of the environmental and cultural heritage, the creation of equipment and initiatives for sustainable tourism (e.g. buoy fields, sea and land visit routes, initiatives for sustainable tourism education, etc.). equipment and initiatives for sustainable tourism (e.g. buoy fields, sea and land visit routes, environmental education initiatives, etc.).	T, G, S	A, I	MIC, Ministry of Tourism, Regions
NAZ_MIS|70		Coastal and maritime tourism	To initiate a study, at the scale of the maritime area, aimed at identifying and promoting sustainable technologies and practices in the sector of navigation for tourism purposes (passenger transport and boating), orienting it spatially and temporally on areas that are particularly vulnerable and congested due to high tourist pressure.	T, TE, S	A, I	MIMS, Regions
NAZ_MIS|71	OS_RI|01 - Target marine research activities on the knowledge needs of the Plan, to strengthen and support the planningprocess and its sustainable growth objectives	**nt** Scientific research and innovation	Design and establish a science-to-policy interface structure aimed at supporting the concrete and timely transfer and application of scientific research results in the MSP process, targeting marine research on the priority needs of the MSP process and disseminating this research to society	A	A	MUR,MIMS

2.10 Summary of planning for each Sub-area

2.10.1 Sub-area A/1 - Territorial waters of Friuli Venezia Giulia

The main uses of the sea and coast present in the sub-area are represented in the Figure. The figure in question shows a synthetic and simplified representation of the maritime activities existing in the area, aimed at providing an overall framework and understanding the planning choices made in the area. In the maritime area in question, the main uses of the sea are: coastal and maritime tourism, maritime transport and related port activities, fishing, aquaculture, protection of the environment and natural resources, protection of the landscape and cultural heritage. The sources of the spatial data used are given in next Figure and represent information available at the national level through the contribution of the Ministries involved in the MSP process.

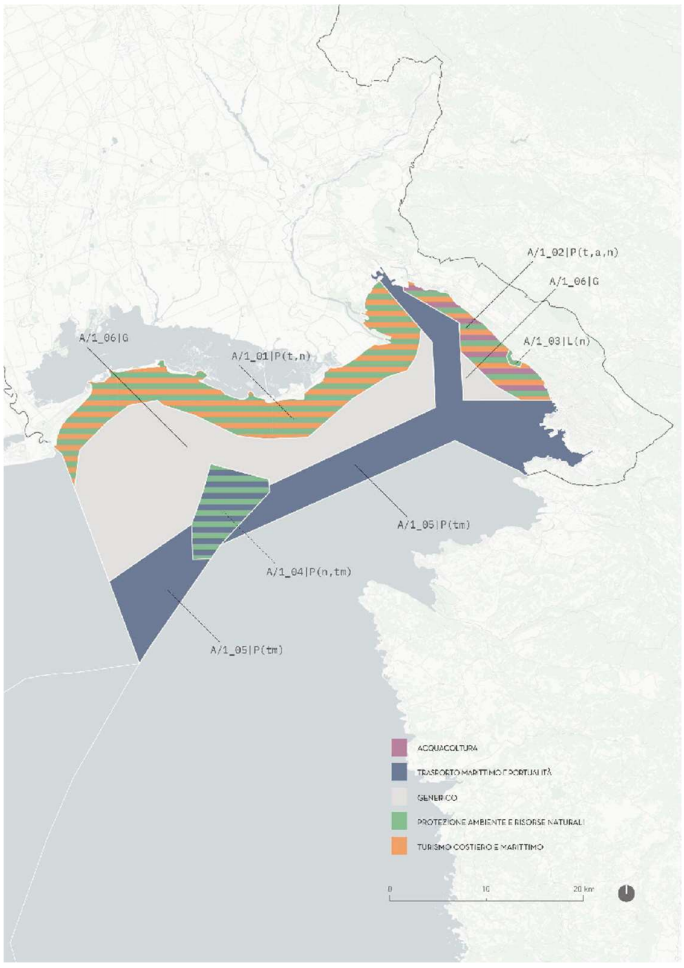


The specific objectives for sub-area A/1 are reported in the following table

Sectors concerned	Code	Specific objectives
Maritime transport and ports *with particular reference to commercial ports and shipbuilding*	(A/1)OSP_TM|01	Ensure the development of commercial maritime traffic involving the regional commercial port system, in the context of TEN-T networks and international and global traffic scenarios, with a view to sustainable development.
	(A/1)OSP_TM|02	Ensure the periodicity of maintenance work on the seabed functional to the activities of the regional commercial port system.
	(A/1)OSP_TM|03	Enable the development of shipbuilding activities in line with sector production trends.
Maritime transport and ports		

with particular reference to dredging and maintenance of the seabed and related sediment management	(A/1)OSP_TM|04	Provide, through a specific planning, maintenance interventions of the seabed, waterways and marinas for a periodic management of sediments at sea and within the lagoon, also in function of the protection of fishing and aquaculture activities
Dredged sediment sea-diving	(A/1)OSP_ISD|01	Identify sea areas and bounded areas compatible with the management and transfer of sediments deriving from dredging activities and maintenance of the seabed and lagoon and port waterways, in line with what is allowed by the regulations in force and with regard to fishing activities.
Environmental protection and natural resources	(A/1)OSP_N|01	Enhance the system of protected areas within a framework of overall ecological coherence, considering existing conservation measures, including reducing pollution in ports and taking into account interactions with the coast and lagoon environments, in synergy with other present uses
Including protection of Special Areas of Conservation	(A/1)OSP_N|02	Highlight marine environments and habitats of relevant environmental value and monitor their conservation over time.
	(A/1)OSP_N|03	Achieve and maintain the environmental objectives stemming from the Marine Strategy Framework Directive (MSFD) and the Water Framework Directive (WFD) (Dir. 2000/60/EC).
Fishing	(A/1)OSP_P|01	Promoting the sustainable management of small-scale fisheries, through the regulated management of fishing grounds.
	(A/1)OSP_P|02	To favour the sustainable management of fishery, through specific local regulation of the use of gears, different from the artisanal ones, within the national management plans for target species (small pelagics, demersal and bivalve mollusks).
Aquaculture	(A/1)OSP_A|01	To encourage the maintenance of marine and lagoon aquaculture activities.
Coastal and maritime tourism *with particular reference to seaside tourism, nautical tourism and cruise tourism*	(A/1)OSP_T|01	Safeguarding the tourist use of the coasts by improving and/or maintaining the quality of bathing water (Directive 2006/7/EC), protection against flooding and a strategy to combat coastal erosion
	(A/1)OSP_T|02	Developing pleasure boating, with a view to diversifying the tourist offer, while ensuring accessibility to waterways and environmental sustainability
	(A/1)OSP_T|03	To favour the activities functional to the development of the cruise sector
Landscape and cultural heritage	(A/1)OSP_PPC|01	Encourage the protection and enhancement of coastal scenic beauty, while respecting the uses already permitted, also identifying maritime stretches of water as additional contexts for the protection of the landscape of coastal areas, enhancing the *skyline*, visual cones, intervisibility of places.
	(A/1)OSP_PPC|02	Promote interventions that support the restoration and conservative recovery of coastal real estate assets of high historical-architectural and archaeological value in coherence with the objectives and guidelines of the Regional Landscape Plan (coastal fortifications, lighthouses and markers).
	(A/1)OSP_PPC|03	To support conservation interventions and the promotion of assets and places that constitute the historical testimony of the environmental culture of the sea and navigation.

The Planning Units identified for Sub-area A/1:



2.10.2 Sub-area A/2 - Territorial waters Veneto

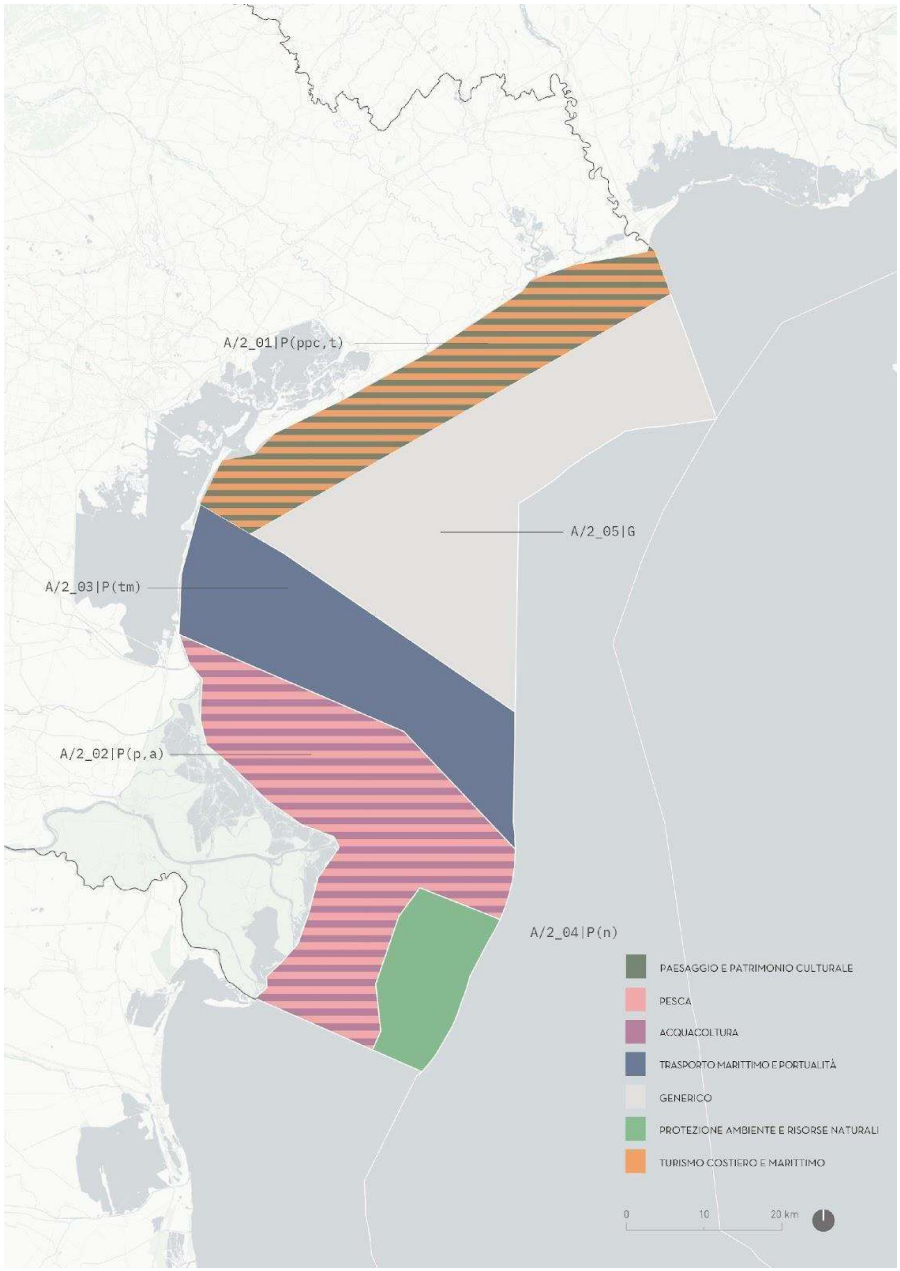
The main uses of the sea and coast present in the sub-area are depicted in the Figure. The figure in question shows a synthetic and simplified representation of the maritime activities existing in the area, aimed at providing an overall framework and understanding the planning choices made in the area. In the maritime area in question the main uses of the sea are: coastal and maritime tourism, maritime transport and related port activities, management of the Porto Viro offshore regasification plant, fishing, aquaculture, protection of the environment and natural resources, protection of the landscape and cultural heritage, aquaculture.

The specific objectives for sub-area A/2 are reported in the following table

Reference sector	**Code**	**Specific objective**
Maritime transport and ports *with particular reference to port infrastructure and the development of commercial and passenger traffic*	(A/2)OSP_TM|01	Guarantee the infrastructural conditions of nautical accessibility for the strengthening of commercial maritime traffic involving the Veneto Port System in support of the regional economy.
	(A/2)OSP_TM|02	To support the competitiveness of Veneto ports in relation to their specificity of "regulated ports".
	(A/2)OSP_TM|03	Relaunch the Veneto cruise economy through the resumption of traffic with O/D Venice by solving the terminal problem.
Maritime transport and ports *with particular reference to*	(A/2)OSP_TM|04	Activate a program of dredging of waterways and lagoons, protecting habitats and through careful consultation with fishermen

dredging activities		
Dredged sediment sea-diving	(A/2)OSP_ISD|01	Identify, in agreement with the fishermen's categories, areas in the sea for the transfer of sediments deriving from the dredging and maintenance activities of the seabed and of the lagoon and port waterways
Environmental protection and natural resources	(A/2)OSP_N|01	Promote uses of the sea that are compatible with conservation areas.
	(A/2)OSP_N|02	Protect marine habitats and species of Community interest by monitoring their presence and conservation status.
	(A/2)OSP_N|03	Achieve and maintain the environmental objectives stemming from the Marine Strategy Framework Directive (MSFD) and the Water Framework Directive (WFD) (Dir. 2000/60/EC).
Fishing	(A/2)OSP_P|01	Promote sustainable fisheries management within the framework of national management plans for target species (in particular small pelagics, demersal and bivalve molluscs).
	(A/2)OSP_P|02	Promote the sustainable management of small-scale coastal artisanal fisheries through regulated management of fishing grounds.
	(A/2)OSP_P|03	Promoting the adaptation of structures and processes that enable the development of economic activities in the fisheries and aquaculture sector, including complementary activities such as fishing tourism and ichthyic tourism
Aquaculture	(A/2)OSP_A|01	Promoting the development of aquaculture activities in the territorial sea areas
Coastal and maritime tourism *with particular reference to sustainable tourism and the identity of places*	(A/2)OSP_T|01	Promote a quality tourism that sees in the achievement of high quality standards (such as the maintenance of the state of quality of bathing water) the elements for its promotion
	(A/2)OSP_T|02	Developing slow and experiential tourism on the coastal strip in synergy with inland and endolittoral navigation and yachting, supporting the redevelopment of small ports, integrating the land and sea planning system, protecting the landscape characteristics of the coastal system and the architectural features of seaside towns
Coastal defense	(A/2)OSP_DC|01	Programming integrated actions for coastal defense that combine sea defense works and planned beach nourishment with naturalistic interventions for the recovery of dune systems.
	(A/2)OSP_DC|02	Reduce fluid and gas extraction in coastal areas generating accelerated subsidence and increased flood risk areas
Landscape and cultural heritage	(A/2)OSP_PPC|0 1	Promote land-sea interactions in the new landscape planning of the coastal strip. Identify actions for the knowledge and enhancement of the underwater archaeological heritage

The Planning Units identified for Sub-area A/2:

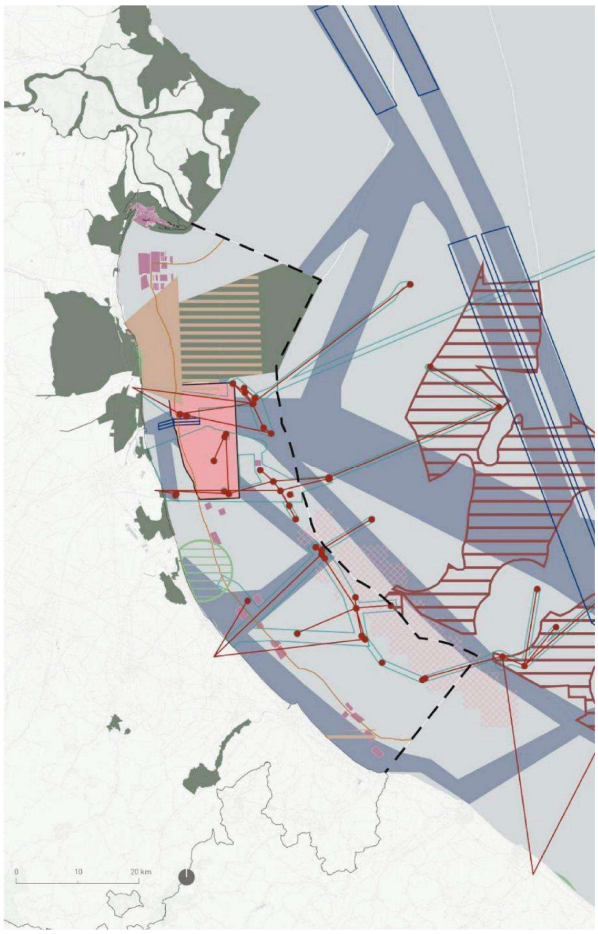


2.10.3 Sub-area A/3 - Territorial waters of Emilia-Romagna

The main uses of the sea and coast present in the sub-area are depicted in the Figure. The figure in question shows a synthetic and simplified representation of the maritime activities existing in the area, aimed at providing an overall framework and understanding the planning choices made in the area. In the maritime area in question, the main uses of the sea are: coastal and maritime tourism, maritime transport and connected port activities, fishing, aquaculture, protection of the environment and natural resources, protection of the landscape and cultural heritage, hydrocarbon research and cultivation, and activities connected to military defense. The sources of the spatial data used are reported in Figure and represent information available at national level through the contribution of the Ministries involved in the MSP process.

MAP
OF USES
SUB-AREA A / 3

- sub-area limit A / 3
- maritime traffic separation schemes - TSS
  IMO
- simplified maritime traffic
  EMSA - Scientific Pole elaboration
- line 3 NM from the coast
  Scientific Pole elaboration
- ZTB areas
  MIPAAF
- aquaculture concessions
  Emilia Romagna region
- simplified fishing effort
  MIPAAF - Scientific Pole elaboration
- Natura 2000 areas
  European Environment Agency
- submerged goods
  MIC - elaboration of the Scientific Pole
- defense - temporary areas "Echo 346"
  IIM
- defense - permanent area "Echo 346"
  IIM
- platforms
  UNMIG - Mild
- hydrocarbon pipelines
  UNMIG - Mild
- suitable areas PITESAI
  MILD
- safety areas
  CGCCP

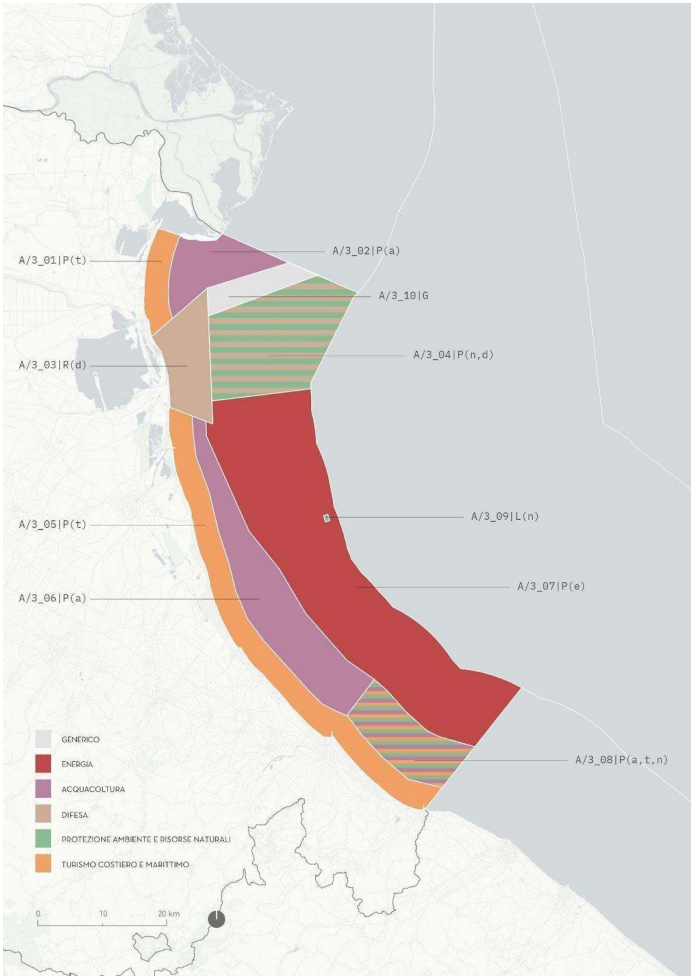


The specific objectives for sub-area A/3 are reported in the following table

Reference sector	Code	Specific objective
Coastal and maritime tourism *also relevant for coastal defense*	(A/3)OSP_T|01	Safeguard the tourist use of the coasts (seaside tourism) by protecting them from flooding, combating erosion, maintaining and restoring the beach system
Coastal defense	(A/3)OSP_DC|01	Allowing the exploitation of underwater sand deposits, indispensable for beach nourishment; reducing conflicts with other uses; ensuring the prudent management of this non-renewable resource and minimizing and impact on the environment
Energy	(A/3)OSP_E|01	Manage the exploitation over time of the methane fields already authorized in a way that is safe for man and the environment, in line with the guidelines and forecasts of PiTESAI. reducing conflicts and increasing synergies with other sectors of the marine economy (tourism, aquaculture, environmental protection)
	(A/3)OSP_E|02	Promote the generation of energy from renewable sources at sea, also promoting, where possible, the conversion of decommissioned platforms for multi-purpose projects that include the storage of energy produced from renewable sources (hydrogen), the creation of areas of 'biological protection' and/or sites of interest for tourism and underwater fishing and aquaculture
Fishing	(A/3)OSP_P|01	Promoting the sustainable and regulated expansion of small-scale fishing with particular attention to the development of income-generating activities such as fishing tourism and ichthyic tourism
	(A/3)OSP_P|02	To review the regulation of trawling, taking into account the effects on the seabed, the areas with EFH, the sustainability of the exploitation of stocks, with particular attention to the development of income-generating activities such as fishing tourism and fishing tourism
Aquaculture	(A/3)OSP_A|01	To support the sustainable development of the aquaculture activities in synergy with the other uses present in the area, with particular attention to the development of income-generating activities such as Acqui-tourism and through the identification of Aquaculture Areas (AZA), as per European indications.
Environmental protection and natural resources	(A/3)OSP_N|01	Consolidate the existing system of protected areas and conservation measures, within a framework of overall ecological coherence and in synergy with other present uses.
	(A/3)OSP_N|02	Maintain/achieve WFD, MSFD and H&BD environmental objectives.
Maritime transport and ports	(A/3)OSP_TM|01	To support the development of maritime (and/or tourist/fishing) commercial traffic involving the regional commercial port system, in the context of TEN-T networks and international and global traffic scenarios, with a view to sustainable development
	(A/3)OSP_TM|02	Manage the periodicity of maintenance of the seabed functional to the activities of the commercial and tourist port system by promoting the sustainable management of sediments (from port dredging, excavations, hydraulic systems, etc.), with the aim of coastal nourishment for emerged and submerged beaches.
	(A/3)OSP_TM|03	Developing recreational boating, with a view to diversifying the tourist offer, promoting environmental sustainability and at the same time ensuring accessibility to waterways
Defense	(A/3)OSP_D|01	Allowing the maintenance of the military functions of certain areas,

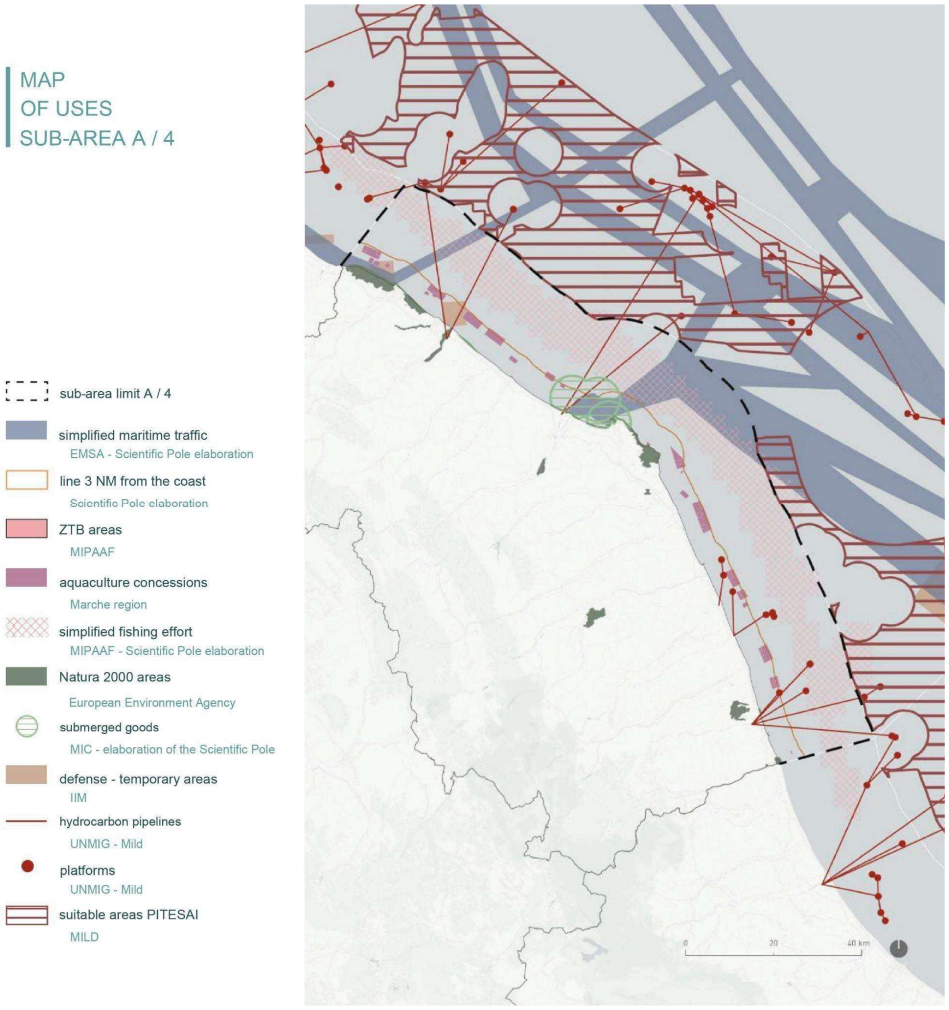
		reducing conflicts with other present uses
Landscape and cultural heritage	(A/3)OSP_PPC|01	Promoting the coordination of Maritime Spatial Planning with the Landscape Planning of the regional territory and with the needs of conservation, recovery and enhancement of historical, architectural and archaeological heritage

The Planning Units identified for Sub-area A/3:



2.10.4 Sub-area A/4 - Marche territorial waters

The main sea and shoreline uses present in the sub-area are depicted in the Figure. The figure in question shows a synthetic and simplified representation of the maritime activities existing in the area, aimed at providing an overall framework and understanding the planning choices made in the area. In the maritime area in question, the main uses of the sea are: coastal and maritime tourism, maritime transport and connected port activities, fishing, aquaculture, protection of the environment and natural resources, protection of the landscape and cultural heritage, hydrocarbon research and cultivation, and activities connected to military defense. The sources of the spatial data used are reported in Figure and represent information available at national level through the contribution of the Ministries involved in the MSP process.

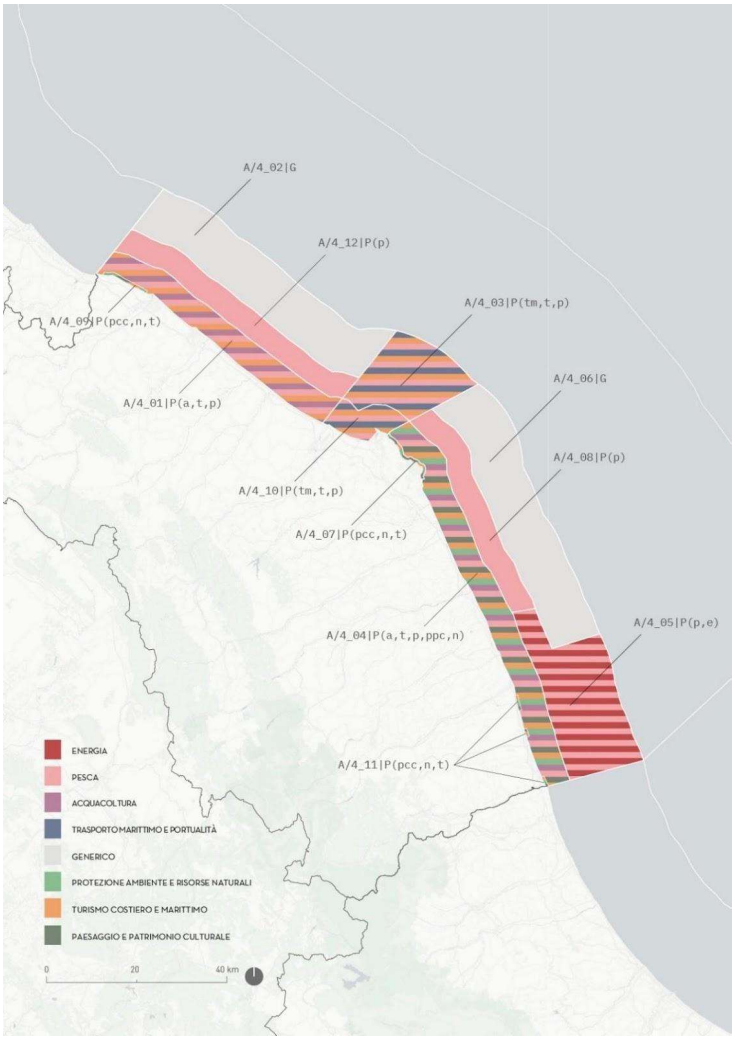


The specific objectives for sub-area A/4 are reported in the following table

Reference sector	Code	Specific objective
Coastal and maritime tourism	(A/4)OSP_T|01	Improving the services available to tourists, whether seaside, yachtsmen or cruise passengers, and integrating the tourist offer with the cultural attractions present on the coasts and, above all, in the inland areas
	(A/4)OSP_T|02	Improving the network of tourist ports through the modernization of existing ports
	(A/4)OSP_T|03	Encourage the modernization of tourist port facilities and related services, in the logic of a new vision of the port and waterfront as a tourist destination and, as such, the hub of the tourism system
	(A/4)OSP_T|04	Developing pleasure boating, with a view to diversifying the tourist offer, while ensuring environmental sustainability
	(A/4)OSP_T|05	Supporting activities functional to the development of the cruise sector, enhancing the value of the ports of call as tourist infrastructures, not just transport infrastructures
Coastal defense *including flood*	(A/4)OSP_DC|01	Implementing the measures related to the "buffer zone" connected to the regulations (NTA ICZM Plan/Title III), in terms of seasonality of the bathing establishments, minimization of the interference with the hydrodynamic balance and limitation of soil consumption also in implementation of the

protection, and restoration of seabed morphology		Floods Directive (2007/60/CE)
	(A/4)OSP_DC|02	Reduce vulnerability in support of increased resilience of the coastal strip in implementation of the ICZM Plan including through actions to reactivate solid river transport feeding the coastal strip
	(A/4)OSP_DC|03	Pursue the objectives and principles of the Mediterranean Protocol (art. 28 NTA ICZM Plan) through specific actions including the renaturalisation of the coastal strip (art. 24 NTA ICZM Plan) and the harmonisation between public use and the tourist and recreational development of the coastal area
Aquaculture	(A/4)OSP_A|01	Sustainable development of aquaculture, with increased production and use of farming systems that minimise the use of plastics
Fishing	(A/4)OSP_P|01	Maintain current fishing capacity in a sustainable manner.
	(A/4)OSP_P|02	Promote sustainable fisheries also through the development of dedicated port infrastructure.
Environmental protection and natural resources	(A/4)OSP_N|01	Implementation of policies to ensure conservation of habitats and species and restoration of the most threatened habitats.
	(A/4)OSP_N|02	Protect and preserve the quality of the marine environment (Directive 2008/56/EC and Directive 2000/60/EC) and increase the effectiveness of control actions also through sea monitoring.
Landscape and cultural heritage	(A/4)OSP_PPC|01	Promote interventions that promote the restoration and conservation of coastal real estate of high historical and architectural value (coastal fortifications, lighthouses and signals)
	(A/4)OSP_PPC|02	To encourage the conservation and promotion of the assets that constitute the historical testimony of the environmental culture of the sea and navigation.
	(A/4)OSP_PPC|03	Encourage the preservation of coastal scenic beauty.
Maritime transport and ports	(A/4)OSP_TM|01	Ensuring a major freight flow for the "traditional" ferry lines, "crucial" to maintaining the line and remaining sustainable.
	(A/4)OSP_TM|02	Encourage the reconversion of activities in crisis in or near commercial ports into activities related to shipbuilding or the circular economy.
	(A/4)OSP_TM|03	Encourage logistical innovation and the modernisation of port infrastructure in order to boost maritime transport of both goods and people and cruise passengers.
Energy *with particular reference to renewable energies*	(A/4)OSP_E|01	Contribute to decarbonisation by promoting the use of marine renewable energies, provided they are compatible with landscape protection and environmental sustainability.
	(A/4)OSP_E|02	Promote the creation of a global value chain in the region based on marine renewable energies by protecting the marine environment and coastal landscape.

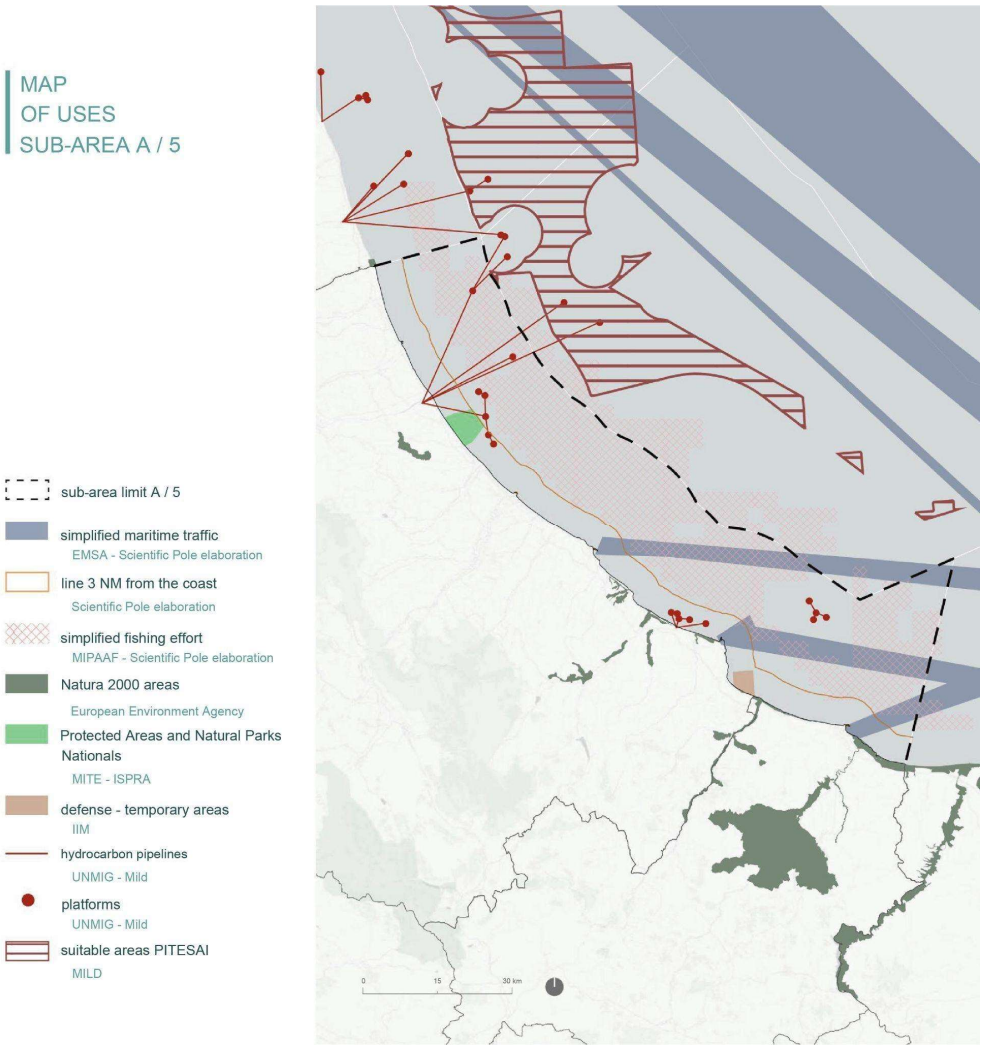
The Planning Units identified for Sub-area A/4:



2.10.5 Sub-area A/5 - Abruzzo and Molise territorial waters

The main uses of the sea and coast present in the sub-area are depicted in the Figure. The figure in question shows a synthetic and simplified representation of the maritime activities existing in the area, aimed at providing an overall framework and understanding the planning choices made in the area. In the maritime area in question, the main uses of the sea are: coastal and maritime tourism, maritime transport and connected port activities, fishing, protection of the environment and natural resources, protection of the landscape and cultural heritage, hydrocarbon exploration and production, and activities connected to military defense.

The sources of the spatial data used are reported in Figure and represent information available at national level through the contribution of the Ministries involved in the MSP process.



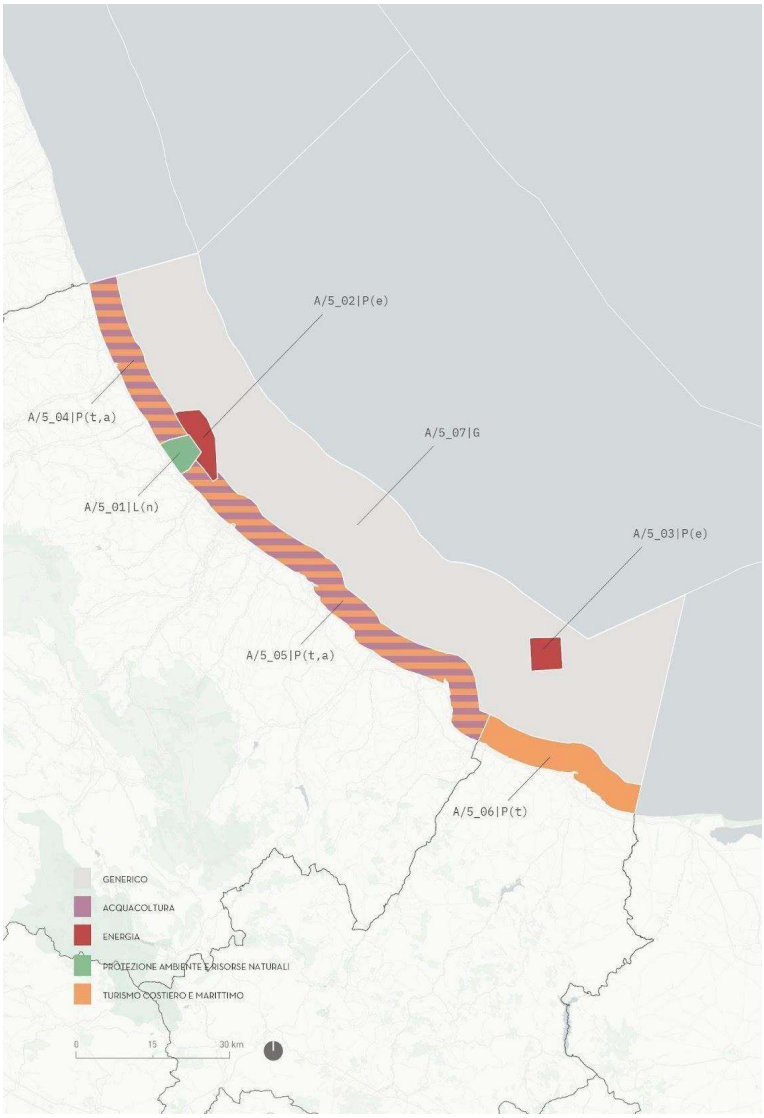
The specific objectives for sub-area A/5 are reported in the following table

Reference sector	Code	Specific objective
Maritime transport and port activities with particular reference to commercial ports and shipbuilding	(A/5)OSP_TM|01	To ensure the development of commercial maritime traffic involving the regional commercial port system, in the context of TEN-T Networks and international and global traffic scenarios, with a view to sustainable development. To promote cross-border cooperation by establishing an active and long-term partnership through the improvement of multimodal connections and maritime transport.
	(A/5)OSP_TM|02	Enhancing the port areas through a process of urban requalification and integration.
	(A/5)OSP_TM|03	Guaranteeing the periodicity of maintenance interventions on the seabed functional to the activities of the regional commercial and tourist port system. Supporting the implementation of a monitoring and management system of silting in the ports that allows a dynamic collection of data necessary to develop a planning and

		forecasting system for ordinary and extraordinary maintenance of the seabed.
	(A/5)OSP_TM|04	Enable the development of shipbuilding activities in line with sector production trends.
	(A/5)OSP_TM|05	Providing for a planning of maintenance interventions of the seabed, waterways and marinas also in function of the protection of fishing and aquaculture activities.
Maritime transport and ports With particular reference to dredging and seabed maintenance Dredged sediment sea-diving	(A/5)OSP_ISD|01	Identify sea areas and defined coastal areas compatible with the management and delivery of sediments deriving from dredging activities and maintenance of the seabed and port waterways, in line with what is allowed by the regulations in force and having regard to fishing activities. Propose strategies for the re-use of sediments deriving from the dredging of port areas aimed at the nourishment of eroding stretches of coastline.
Environmental protection natural resources	(A/5)OSP_N|01	Enhancing the protected area system within a framework of overall ecological coherence, considering the existing conservation measures and defining a valorization strategy capable of virtuously combining conservation and valorization aims, adopting a unitary view of promoting sustainable development. Safeguard relict dune areas and backdune areas for the maintenance of biodiversity with the proposal of actions aimed at their restoration and conservation. Promote the exchange of experiences and best practices for the management and conservation of coastal and natural heritage through the participatory involvement of stakeholders.
	(A/5)OSP_N|02	Highlight marine environments and habitats of relevant environmental value and monitor their conservation over time, also with reference to the expansion of the Natura 2000 network of sites at sea.
	(A/5)OSP_N|03	Achieve and maintain the environmental objectives stemming from the Marine Strategy Framework Directive (MSFD) and the Water Framework Directive (WFD) (Dir 2000/60/EC)
Coastal defense	(A/5)OSP_DC|01	Implement actions aimed at protecting the coast from erosion phenomena, storm surges and the critical issues resulting from climate change. Identify structural and non-structural coastal hazard mitigation interventions based on exposed assets. Provide for monitoring activities of structural interventions with particular attention to water and sediment quality aspects.
		To allow the exploitation over time of the methane fields already authorised in a safe

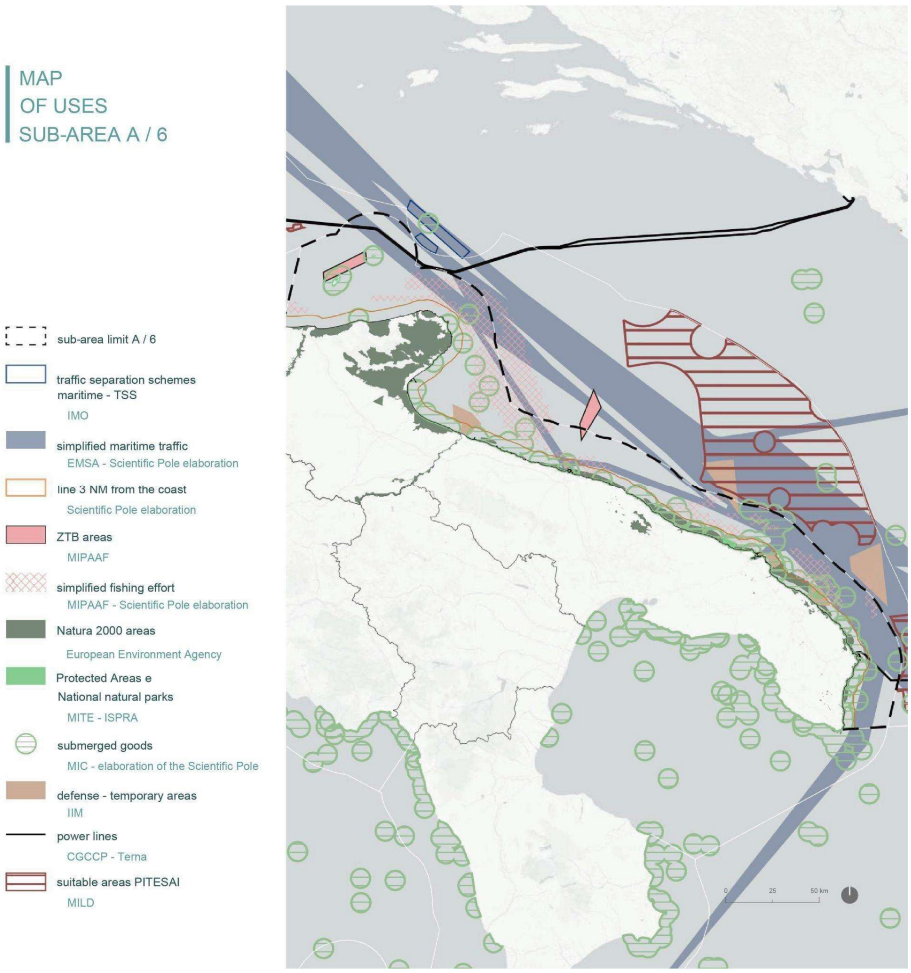
Energy	(A/5)OSP_E|01	manner for man and the environment, reducing conflicts and increasing synergies with other sectors of the marine economy, in accordance with the guidelines and forecasts of PiTESAI.
	(A/5)OSP_E|02	To support the experimentation and the use of technologies for the generation of energy from renewable sources at sea, with particular reference to wind power, compatibly with the policies in force for the protection of the environment and the landscape.
Fishing	(A/5)OSP_P|01	To support the sustainable management of artisanal fishing, through the regulated management of fishing areas, and the increase of the income of the sector's operators with particular attention to the development of income-generating activities such as fishing tourism and ichthyic tourism, promoting fishing traditions, maritime culture and respect for the environment
	(A/5)OSP_P|02	To support the sustainable management of fishery, through specific local regulations on the use of gears, different from those of artisanal fishing, within the national management plans for target species (small pelagics, demersal and bivalve molluscs)
Aquaculture	(A/5)OSP_A|01	Identify the most suitable areas (AZA) in order to defuse possible conflicts with other uses of the sea and ensure the protection of the marine environment. Promote the maintenance and sustainable development of aquaculture activities in synergy with other uses in the area
Coastal and maritime tourism *with particular reference to seaside tourism, nautical tourism and cruise tourism*	(A/5)OSP_T|01	Safeguard the tourist use of the coasts through the improvement and/or maintenance of the quality status of bathing waters (Directive 2006/7/EC) and a strategy to combat coastal erosion.
	(A/5)OSP_T|02	Developing pleasure boating, with a view to diversifying the tourism offer, while ensuring accessibility to waterways and environmental sustainability
	(A/5)OSP_T|03	To support the activities functional to the development of the cruise sector
	(A/5)OSP_T|04	Promote the recovery and enhancement of the archaeological heritage of the coast and the emergencies of historical and architectural value of considerable interest. Enhance the historical and cultural heritage of the coast by promoting the recovery of trabucchi respecting their natural destination and compliance with their traditional value.
	(A/5)OSP_T|05	Promote sustainable mobility linking coastal and marine fruition also through the development of cycle tourism in an overall context of diversification of the tourist offer.

The Planning Units identified for Sub-area A/5:



2.10.6 Sub-area A/6 - Territorial waters of eastern Apulia

The main uses of the sea and coast present in the sub-area are depicted in the Figure. The figure in question shows a synthetic and simplified representation of the maritime activities existing in the area, aimed at providing an overall framework and understanding the planning choices made in the area. In the maritime area in question, the main uses of the sea are: coastal and maritime tourism, maritime transport and related port activities, fishing, protection of the environment and natural resources, protection of the landscape and cultural heritage, and activities related to military defense. The sources of the spatial data used are reported in Figure and represent information available at national level through the contribution of the Ministries involved in the MSP process.



The specific objectives for sub-area A/6 are reported in the following table

Reference sector	Code	Specific objective
Environmental protection and natural resources	(A/6)OSP_N|01	Contribute to the achievement and maintenance of the environmental objectives deriving from the Marine Strategy Framework Directive (MSFD) and the Water Framework Directive (WFD) (Dir. 2000/60/EC), also by filling the knowledge gaps in the descriptors and providing structural interventions for the modernization and proper management of urban and industrial discharges
	(A/6)OSP_N|02	Conserving, restoring and monitoring marine biodiversity (e.g. *Posidonia oceanica* meadows, coralligenous and deep biocoenosis, marine mammals) in line with the objectives of the Biodiversity Strategy and with the provisions of the FAP, enhancing, expanding and strengthening the system of protected areas and the Regional Ecological Network within a framework of overall ecological coherence
	(A/6)OSP_N|03	To improve the environmental quality of the coastal system by raising its ecological gradient; to integrate the aspects of land-sea interaction and integrated management of the coastal strip, with particular reference to environmental and naturalistic aspects, also with regard to terrestrial habitats and species
	(A/6)OSP_N|04	Protecting the marine environment from the impacts of human activity

	(A/6)OSP_N|05	Promote measures to manage waste that can be found in the sea and on beaches, through policies to combat "Marine Litter", including better waste management, reducing packaging waste, increasing recycling rates (of plastics in particular), improving the treatment of waste water, promoting the recovery of waste already dispersed
Landscape and cultural heritage	(A/6)OSP_PPC|01	Increasing the degree of naturalness of the coastal system, redesigning and redeveloping rural coastal landscapes and historic urban *waterfronts*, restoring natural and historic-cultural coastal places of scenic value when degraded by uncontrolled human development
	(A/6)OSP_PPC|02	Enhance the aesthetic-perceptual structure of the landscape and promote reciprocal and complementary relationships between inland and coastal landscapes in order to develop land-sea interaction and the fruition of cultural heritage, with particular regard to coastal sites and cultural heritage related to the defense system (historical centres, castles, fortified palaces, towers, city walls), often inserted in valuable urban and environmental contexts; prevent transformations that alter or compromise the functional, historical, visual, cultural, symbolic and ecological components and relations that characterise and identify the structure of the regional coastal landscape
	(A/6)OSP_PPC|03	Recovering dune systems, cliffs, wetlands, water basins and canals, as well as marginal areas close to the coast that are severely degraded and reinforcing ecological connections, also through the relocation of existing infrastructures lacking in landscape and identity value
	(A/6)OSP_PPC|04	Strengthen the interventions aimed at promoting slow mobility systems also for the connections between the coast and the hinterland
	(A/6)OSP_PPC|05	Safeguard the great sceneries characterizing the regional image: safeguard the panoramic views of relevant landscape value, characterized by particular environmental, naturalistic and historical-cultural values
	(A/6)OSP_PPC|06	Encourage the protection and enhancement of coastal scenic beauty, in compliance with the uses already permitted, preserving the horizon line as a valuable element of the coastal seascape, also by identifying maritime stretches of water as additional contexts for the protection of the coastal landscape, enhancing the *skyline*, visual cones, intervisibility of places. panoramic points and natural and anthropic visual landmarks, main settlements, castles, towers, lighthouses and any other architectural and cultural asset, located in a privileged orographic position, from which it is possible to get panoramic views of the landscapes characterizing the regional identity
	(A/6)OSP_PPC|07	Protecting the submerged archaeological heritage also through the strengthening and adjustment of the knowledge base, the deepening of impact assessments and the strengthening of seabed monitoring actions related to the implementation of interventions (e.g. beach nourishment, dredging, small movements) that may have an impact on known and potential sites
	(A/6)OSP_PPC|08	Strengthening interventions to promote and conserve *in situ* the underwater cultural heritage and archaeological, monumental and cultural heritage values through the protection of context values and conserving the seascape and coastal landscape to integrate the landscape and cultural dimensions of heritage assets

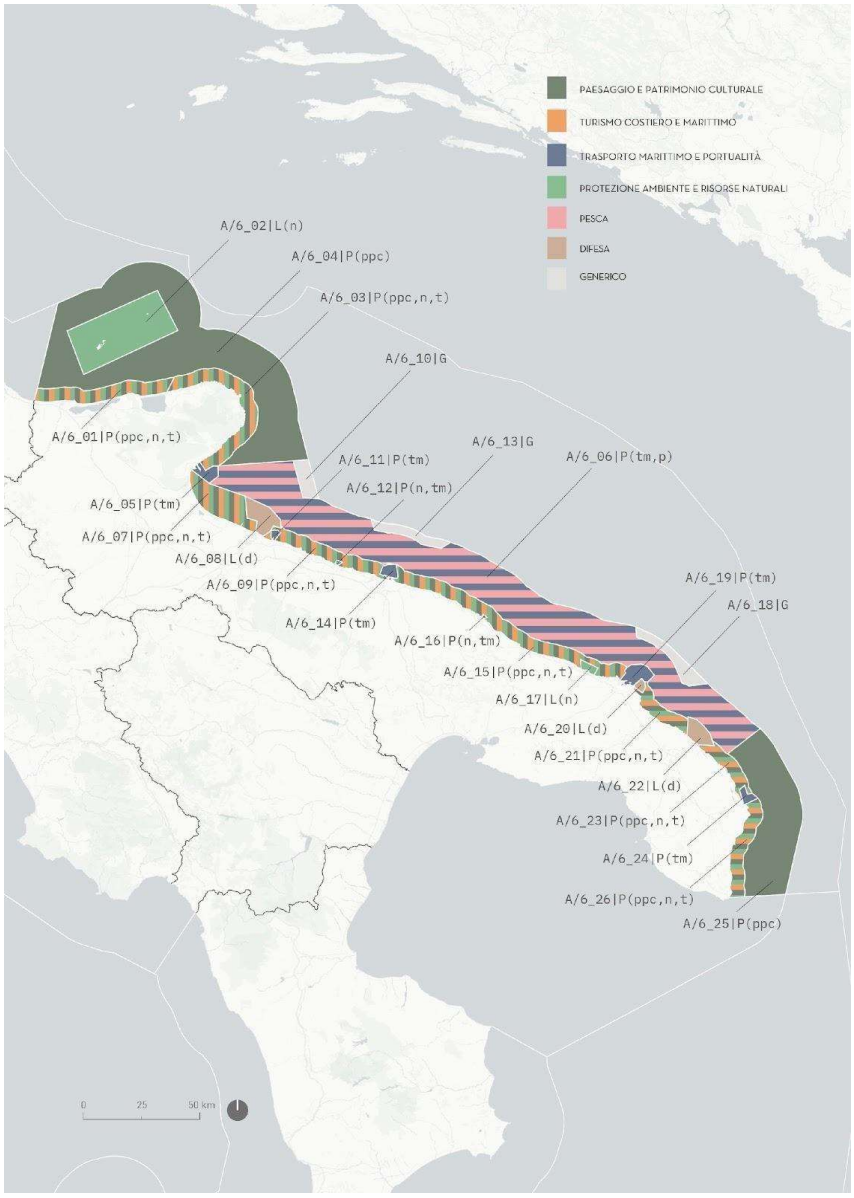
Maritime safety, navigation and surveillance	(A/6)OSP_S|01	Increasing legality and safety in sea areas and within port activities and infrastructures, also by supporting a widespread presence of Coast Guard and other Law Enforcement Agencies.
Coastal and maritime tourism	(A/6)OSP_T|01	Promote a quality tourism focused on innovative products and on products characterized by a strong territorial imprint and that sees in the achievement of high quality standards (such as the maintenance of the state of quality of bathing water, the maintenance and respect for nature) the elements for its promotion
	(A/6)OSP_T|02	Promoting the seasonal adjustment of tourist flows through the enhancement of the hinterland and the reduction of *hotspots* of high concentration of tourist flows and establishing criteria based on an ecosystem approach for the use of state-owned areas for tourism and recreational purposes
	(A/6)OSP_T|03	Promoting pleasure boating through the networking of dedicated sustainable infrastructures, the promotion of innovation in the shipbuilding sector and the promotion of an experiential tourism on the coastal strip by protecting the landscape characteristics of the coastal system and the architectural features of the seaside towns
	(A/6)OSP_T|04	Supporting the integrated development of sustainable tourist-sport activities (e.g. cycling tourism, rowing, sailing, *kite-surfing*, *windsurfing*, recreational diving) through appropriate spatial planning of the same, providing adequate infrastructural support on land (landing places, support structures, etc.) and enhancing the use of new technologies
	(A/6)OSP_T|05	Promote the panoramic viewpoints as a resource for the tourist fruition of the territory, as points from which it is possible to catch panoramic views of the whole regional landscape
	(A/6)OSP_T|06	Strengthen interventions to promote the experiential tourism of the sea "from the sea", enhancing the perception of the coastal landscape from the sea with appropriate transport systems (environmentally friendly propulsion systems), and through the protection of intervisibility
	(A/6)OSP_T|07	Strengthen the actions to promote underwater tourism by enhancing the use of new technologies
Fishing *some aspects also relevant to aquaculture*	(A/6)OSP_P|01	To promote the conservation and rational management of the biological resources of the sea and inland waters in respect of the protection of the environment and marine ecosystems, also through the planning of the fishing effort, the adoption of selective fishing systems and the study and control of the interrelationships between the marine, lagoon, lake and river environment and fishing and aquaculture
	(A/6)OSP_P|02	To support and apply the integrated management approach of the coastal strip through effective governance tools (including local ones) of coastal resources and territories, supporting generational change and the adaptation of related infrastructures and services
	(A/6)OSP_P|03	Combating illegal fishing in line with EU regulations, in particular for the protection of fish stocks during the spawning and growth phases, including through the establishment of biological rest areas and *nursery* and restocking areas
	(A/6)OSP_P|04	Encouraging a reduction in the use of plastics, tackling ghost fishing and the spread of microplastics

	(A/6)OSP_P|05	Reinforce efforts to promote the recycling of waste products and the proper disposal of waste from fisheries, recreational boating, etc.
	(A/6)OSP_P|06	To guarantee in all the area to the fishing sector the necessary aids for the maintenance and transmissibility of the traditional fishing systems and of the equipments linked to them (traditional reed pots, fishing with the "lampara", etc.).
Aquaculture	(A/6)OSP_A|01	Identify suitable areas for aquaculture (AZA) to be used for breeding purposes, as well as the service areas necessary to carry out this activity
Coastal defense *considered within the framework of Integrated Coastal Zone Management*	(A/6)OSP_DC|01	To protect the morpho-dynamic equilibrium of coastal environments from erosive phenomena through the predisposition of a cognitive framework that frames the phenomenon of coastal erosion in its complexity, areal and temporal dimension, identification of areas at risk and predisposing/incident factors (subsidence, solid transport, etc.), determination of the interference of the phenomenon with other processes (e.g. loss of habitat) at the scale of the coastal physiographic unit
	(A/6)OSP_DC|02	Elaborate at the scale of the physiographic unit methodologies and strategies of intervention to contrast coastal erosion, subsidence of coastal plains and defense against flooding of coastal areas generated by meteo-sea events, according to the population and the exposed elements as well as the constraints present, ensuring the connection with the management plan of the flood risk and with the planning of civil protection
	(A/6)OSP_DC|03	The sea as a great public park: to regulate the use of the areas of the maritime domain, preserving them from incongruous uses and from illegal activities, promoting free use and the development of eco-compatible tourist and recreational activities, guaranteeing the safeguard of the environmental, naturalistic and landscape aspects of the Apulian coastline
	(A/6)OSP_DC|04	Guaranteeing an 'active protection' of the coast in order to contrast the ever-increasing demand for coastal land transformation through: (i) Rewarding systems to support the adaptation of the existing built environment to weather and climate changes; (ii) Modification of the seabed system of existing structures in order to reduce interference with wave motion and coastal dynamics; (iii) Identification of areas with elements at risk (buildings, structures, etc.) within or close to the maritime state property; (iv) Identification of buffer strips; (v) Adoption of mechanisms for the acquisition of public property areas and the relocation of the public domain.(iv) Identification of buffer strips; (v) Adoption of mechanisms for the acquisition of areas of public property and the delocalisation/retreat of elements at risk; (vi) Activation of pilot projects on stretches of coastline (even limited stretches), through economic/urban incentives aimed at restoring the natural capacity of the coast to adapt to climate change, including those caused by the rise in sea level; (vii) Regulation of interventions on existing or new structures within the buffer strips; (viii) Restoration and creation of green infrastructures with strategic objectives for the fight against coastal hydrogeological instability such as coastal cordons and coastal wetlands
	(A/6)OSP_DC|05	Promote the natural nourishment of the coast and the management and artificial nourishment of the coastal strip by enhancing the sediments as a strategic resource and developing

		appropriate management programs for sediments from dredging activities
	(A/6)OSP_DC|06	Promote coastal contracts as voluntary planning tools to pursue, through integrated actions, both the protection and enhancement of the territories and local development
	(A/6)OSP_DC|07	Promoting the implementation of programs for the reclamation of large industrial areas, the reconversion of areas in crisis/decommissioning and the carrying out of emergency response exercises for the defense of the sea and coasts from pollution by hydrocarbons and other harmful substances
	(A/6)OSP_DC|08	Raising the urban quality of coastal areas, through redevelopment of *waterfronts* and *waterfront areas*
	(A/6)OSP_DC|09	Ensuring the preservation of the coastline, also ensuring the protection of the visibility of the coastline both from inland and from the sea and limiting the possibility of providing for new settlement loads on the coastal front outside the consolidated margins of urban settlements
	(A/6)OSP_DC|10	To support the decrease of terrigenous inputs in the sea area
	(A/6)OSP_DC|11	Encourage the transformation of fixed structures used as bathing establishments into easy-to-remove structures, in order to allow the pursuit of the objectives of protecting the significant landscape value and restoring the balance during the winter season
Maritime transport and ports	(A/6)OSP_TM|01	Guaranteeing, by seizing all the opportunities given by the establishment of interregional EPZs, the development of commercial maritime traffic involving the regional commercial port system, in the context of TEN-T networks and international and global traffic scenarios, with a view to sustainable development
	(A/6)OSP_TM|02	Enable the development of shipbuilding activities in line with the sector's production trends
	(A/6)OSP_TM|03	Manage the periodicity of maintenance of the seabed functional to the activities of the commercial and tourist port system ensuring the sustainable management of sediments
	(A/6)OSP_TM|04	Promoting cross-border cooperation by establishing an active and long-term partnership through the improvement of multimodal connections and maritime transport
	(A/6)OSP_TM|05	Enhancement of the port areas through a redevelopment process, with development of passenger and cruise ports and urban integration and application of the standards defined by MITE for *green ports* adapted to the different regional port realities
	(A/6)OSP_TM|06	To promote the recycling of obsolete nautical and naval units through the definition and research of new standards for the execution of activities adopting the principles of circular economy
	(A/6)OSP_TM|07	Promote the reduction of CO_2 and noise emissions from vessels (decrease in speed, use of non-traditional energy sources and fuels, etc.).
	(A/6)OSP_TM|08	Combating the introduction of non-indigenous species through shipping (biofouling and ballast water)
	(A/6)OSP_E|01	Promoting research in the field of sustainable exploitation of wave energy, compatible with the protection of the landscape and biodiversity
		Promoting the transformation of ports into facilities with a positive energy balance, including through the production of

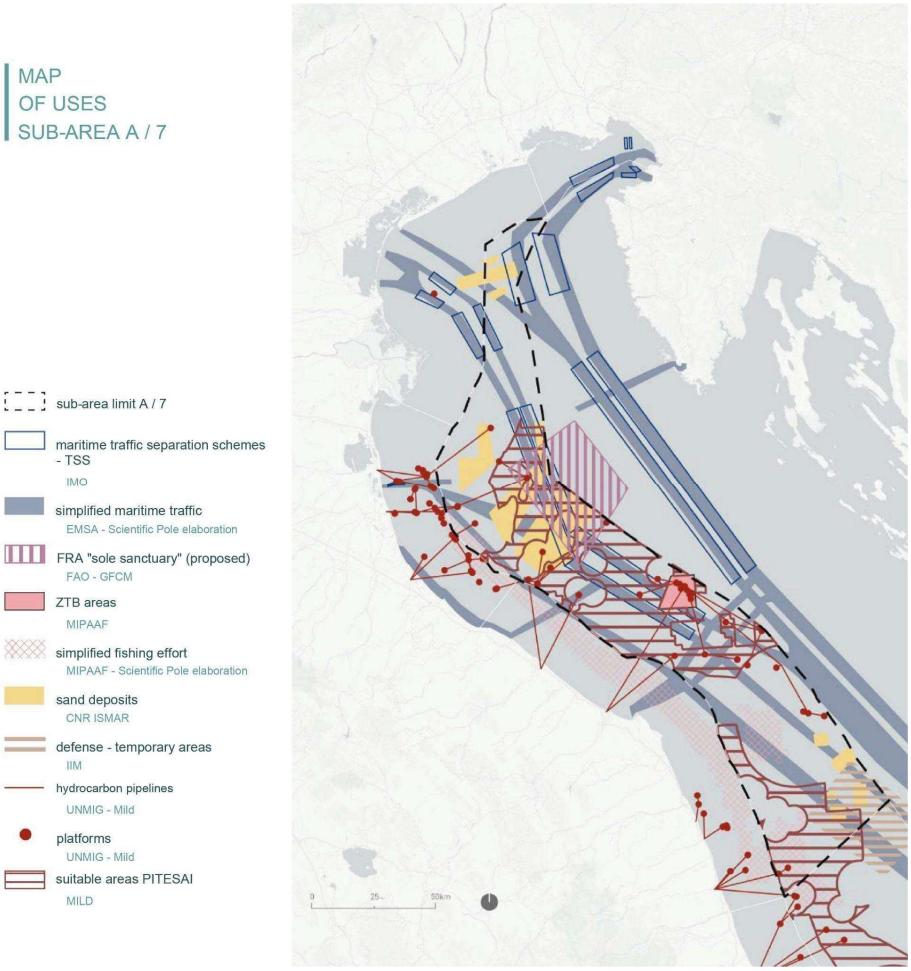
Energy	(A/6)OSP_E|02	energy from wave motion, encouraging the reduction of CO2 emissions and other pollutants related to the combustion of fossil fuels linked to port activities
	(A/6)OSP_E|03	Reconcile the protection of the marine-coastal habitat, landscape and visual integrity with innovative forms of energy production from renewable sources (e.g. *offshore* wind on existing and disused platforms integrated with the production of green hydrogen and similar).
Defense	(A/6)OSP_D|01	Allow certain areas to maintain their military functions, reducing conflicts with other present uses
	(A/6)OSP_D|02	Compatibly with institutional use, promote the representative redevelopment and usability of fortifications and military sites of cultural value (e.g. Taranto Castle)

The Planning Units identified for Sub-area A/6:



2.10.7 Sub-area A/7 - Northern Central Adriatic Continental Shelf

The main uses of the sea and coast present in the sub-area are depicted in the Figure. The figure in question shows a synthetic and simplified representation of the maritime activities existing in the area, aimed at providing an overall framework and understanding the planning choices made in the area. In the maritime area in question, the main uses of the sea are: maritime transport, fishing, protection of the environment and natural resources, protection of the landscape and cultural heritage, hydrocarbon exploration and production, and activities connected to military defense. The sources of the spatial data used are reported in Figure and represent information available at national level through the contribution of the Ministries involved in the MSP process.

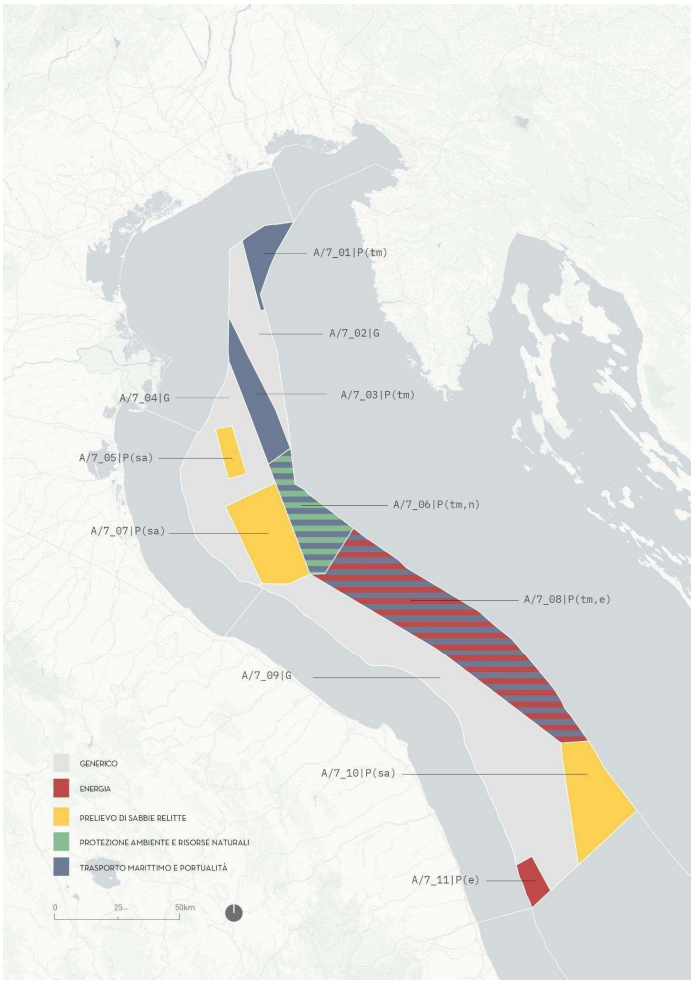


The specific objectives for sub-area A/7 are reported in the following table

Reference sector	Code	Specific objective
Maritime transport and ports	(A/7)OSP_TM|01	Promote sustainable development of maritime transport and reduce its negative impacts, with specific rules to reduce risks and impacts in sensitive areas using, in particular, IMO guidelines
Energy	(A/7)OSP_E|01	Enable the exploitation over time of the already licensed methane fields in a manner safe for human health and the environment, reducing conflicts and increasing synergies with other sectors of the marine economy, in accordance with the PiTESAI guidelines and forecasts.
	(A/7)OSP_E|02	Supporting the experimentation and use of technologies for the generation of energy from renewable sources at sea, with particular reference to wind power, compatibly with the policies in force for

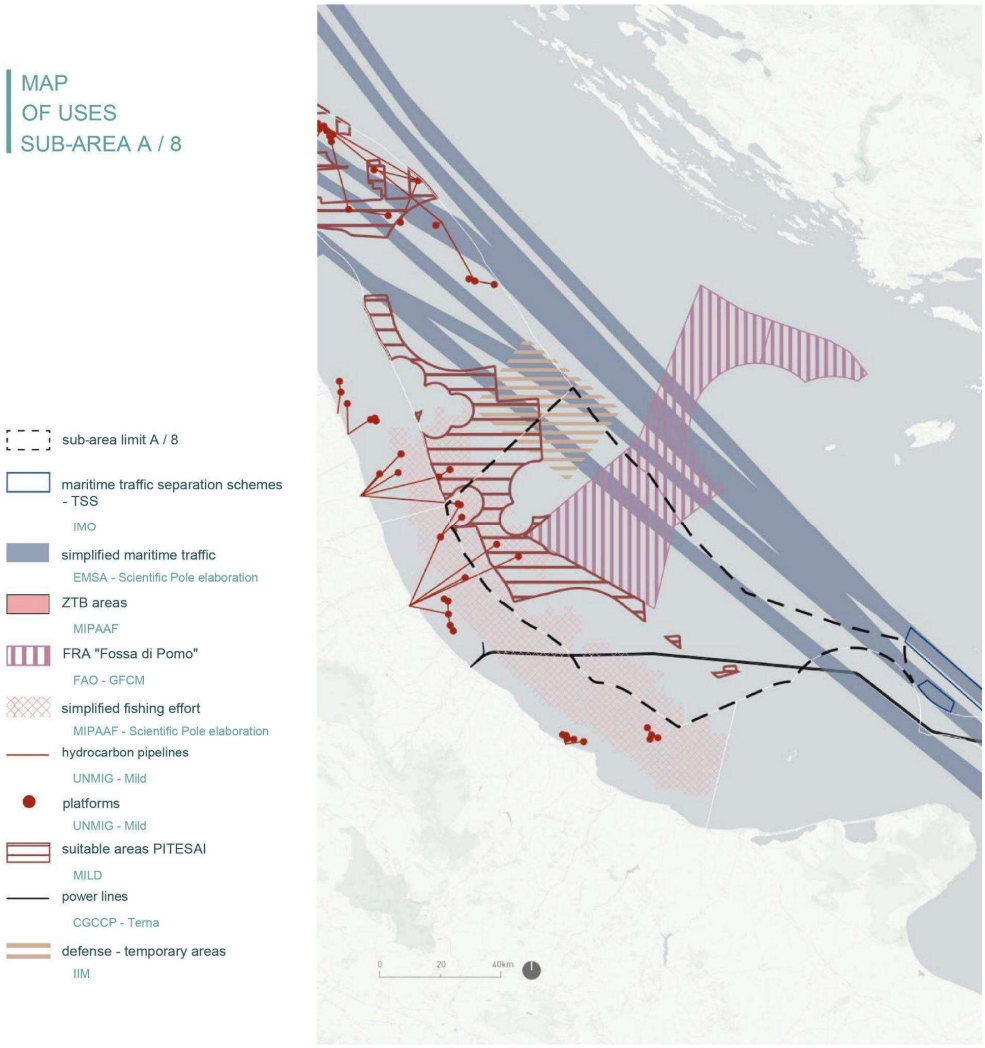
		the protection of the environment and the landscape
Fishing	(A/7)OSP_P|01	Promote the pursuit of the sustainable use of fishery resources, taking into account the sustainability of stock exploitation, the presence of Essential Fish Habitats (EFH), potential effects on the seabed, non-fished species (bycatch) and ecosystems, as well as existing and planned protected areas and BZs.
	(A/7)OSP_P|01	Promoting transnational action for concerted measures for the protection of resources and the sustainability of fisheries
Environmental protection and natural resources	(A/7)OSP_N|01	Consolidate the existing system of protected areas and conservation measures, within a framework of overall ecological coherence and by promoting the implementation of the main spatial measures foreseen in the MSFD Program of Measures
Withdrawal of relict sands	(A/7)OSP_SA|01	Properly address the use and protection of underwater sand for beach nourishment, to be considered as a strategic resource for coastal defense and adaptation plans
Landscape and cultural heritage	(A/7)OSP_PPC|0 1	Promote the conservation, recovery and enhancement of the landscape and underwater archaeological heritage, as well as the emergencies of historical and cultural value of considerable interest.

The Planning Units identified for Sub-area A/7:



2.10.8 Sub-area A/8 - Central-Southern Adriatic Continental Shelf

The main uses of the sea and coast present in the sub-area are depicted in the Figure. The figure in question shows a synthetic and simplified representation of the maritime activities existing in the area, aimed at providing an overall framework and understanding the planning choices made in the area. In the maritime area in question, the main uses of the sea are: maritime transport, fishing, protection of the environment and natural resources, protection of the landscape and cultural heritage, hydrocarbon exploration and production, and activities connected to military defense. The sources of the spatial data used are reported in Figure and represent information available at the national level through the contribution of the Ministries involved in the MSP process.

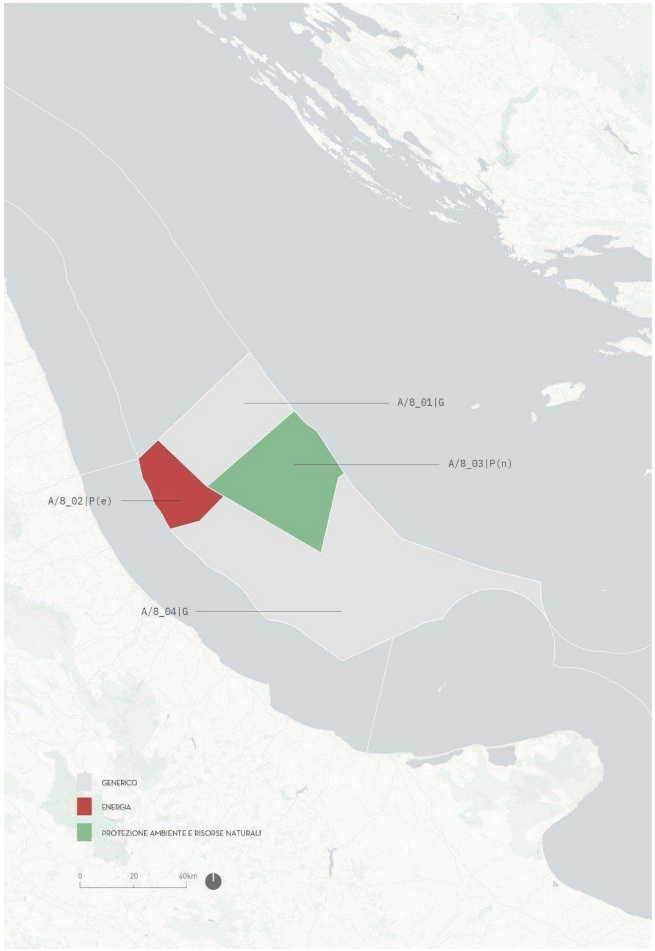


The specific objectives for sub-area A/8 are reported in the following table

Reference sector	Code	Specific objective
Maritime transport and ports	(A/8)OSP_TM|01	Promote sustainable development of maritime transport and reduce its negative impacts, with specific rules to reduce risks and impacts in sensitive areas using, in particular, IMO guidelines
	(A/8)OSP_E|01	Enable the exploitation over time of the already licensed methane fields in a manner safe for human health and the environment, reducing conflicts and increasing synergies with other sectors of the marine economy, in accordance with the PiTESAI guidelines and forecasts.

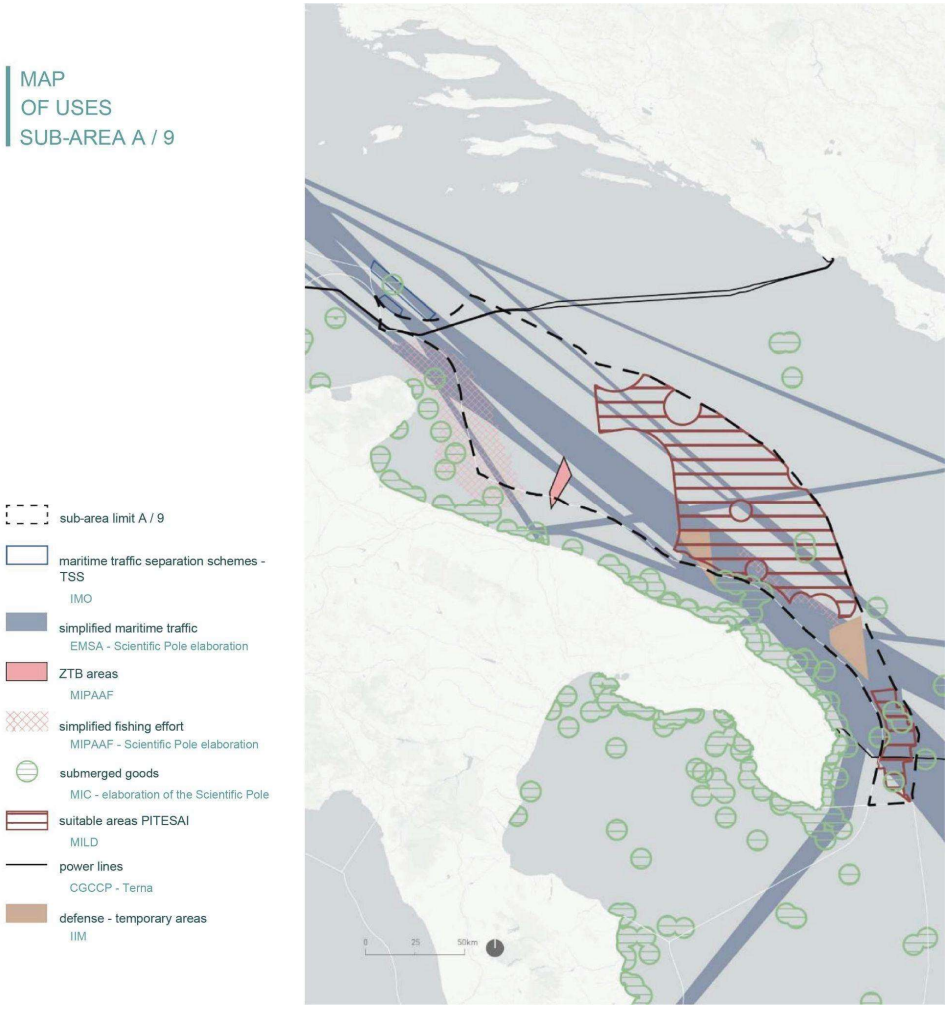
Energy	(A/8)OSP_E|02	To support the experimentation and use of technologies for the generation of energy from renewable sources in the sea, with particular reference to wind power, compatibly with the policies in force for the protection of the environment and the landscape
Fishing	(A/8)OSP_P|01	Promote the pursuit of sustainable use of fishery resources, taking into account the sustainability of stock exploitation, the presence of Essential Fish Habitats (EFH), the potential effects on the seabed, non-fished species (bycatch) and ecosystems, as well as protected areas and existing FRAs (Pomo Pit).
	(A/8)OSP_P|02	Promoting transnational action for concerted measures for the protection of resources and the sustainability of fisheries
Environmental protection and natural resources	(A/8)OSP_N|01	Consolidate the existing system of protected areas and conservation measures, within a framework of overall ecological coherence and by promoting the implementation of the main spatial measures foreseen in the MSFD Program of Measures
Landscape and cultural heritage	(A/8)OSP_PPC|01	SO 5.a To support the conservation, recovery and valorisation of the underwater landscape and archaeological heritage, as well as of the emergencies of historical and cultural value of remarkable interest.

The Planning Units identified for Sub-area A/8:



2.10.9 Sub-area A/9 - Southern Adriatic Continental Shelf

The main uses of the sea and coast present in the sub-area are depicted in the Figure. The figure in question shows a synthetic and simplified representation of the maritime activities existing in the area, aimed at providing an overall framework and understanding the planning choices made in the area. In the maritime area in question, the main uses of the sea are: maritime transport, fishing, protection of the environment and natural resources, protection of the landscape and cultural heritage, hydrocarbon exploration and production, and activities connected to military defense. The sources of the spatial data used are reported in Figure and represent information available at the national level through the contribution of the Ministries involved in the MSP process.

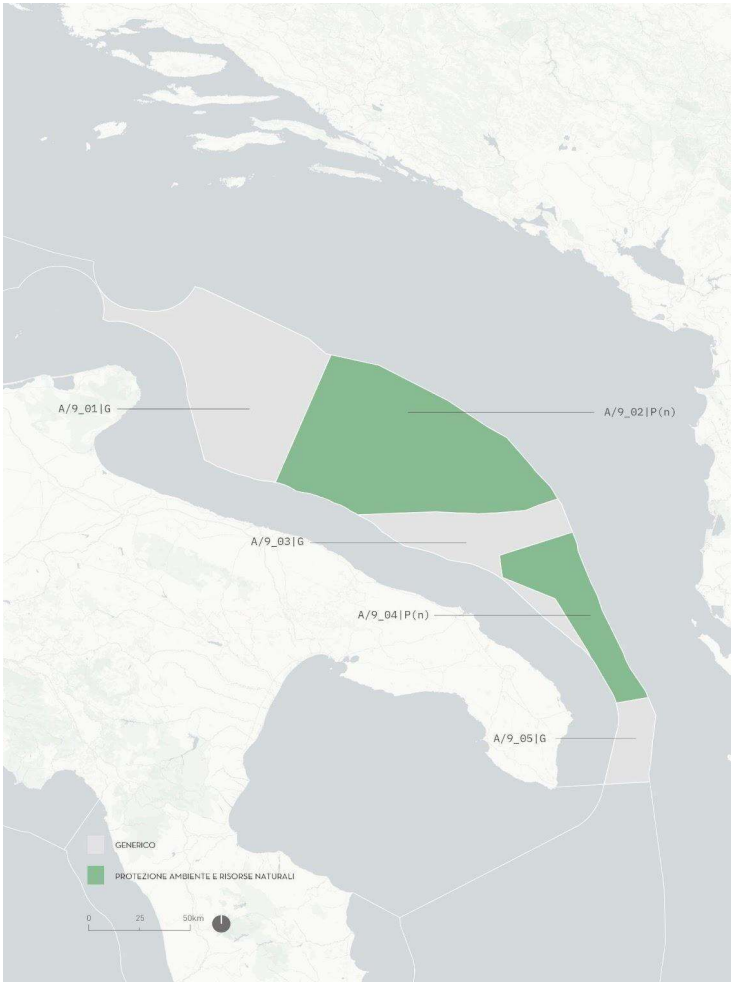


The specific objectives for sub-area A/9 are reported in the following table

Reference sector	Code	Specific objective
Maritime transport and ports	(A/9)OSP_TM|01	Promote sustainable development of maritime transport and reduce its negative impacts, with specific rules to reduce risks and impacts in sensitive areas using, in particular, IMO guidelines
Energy	(A/9)OSP_E|01	Supporting the experimentation and use of technologies for the generation of energy from renewable sources at sea, with particular reference to wind power, compatibly with the policies in force for the protection of the environment and the landscape
	(A/9)OSP_P|01	Promote the pursuit of the sustainable use of fishery resources, taking into account the sustainability of stock exploitation, the

Fishing		presence of Essential Fish Habitats (EFH), potential effects on the seabed, non-fished species (bycatch) and ecosystems, as well as existing and planned protected areas and BZs.
	(A/9)OSP_P|02	Promoting transnational actions for concerted measures for the protection of resources and the sustainability of fisheries
Environmental protection and natural resources	(A/9)OSP_N|01	Consolidate the system of existing protected areas and conservation measures, within a framework of overall ecological coherence and promoting the implementation of the main spatial measures foreseen in the MSFD Program of Measures, with particular reference to the deep sea
Withdrawal of relict sands	(A/9)OSP_SA|01	Properly address the use and protection of underwater sand for beach nourishment, to be considered as a strategic resource for coastal defense and adaptation plans
Landscape and cultural heritage	(A/9)OSP_PPC|01	To promote the conservation, recovery and enhancement of the underwater landscape and archaeological heritage, as well as emergencies of historical and cultural value of considerable interest.

The Planning Units identified for Sub-area A/9



3. The environmental sustainability objectives of the MSP

3.1 The Environmental Sustainability Objectives of the MSP (Maritime Spatial Plan)

Environmental sustainability in the context of maritime spatial planning is assessed through the verification of the capacity to contribute to the pursuit of the environmental and sustainable development objectives of a general level, relevant to the Plans themselves, deduced from the policies, strategies, etc., and from the references on environmental sustainability established at the different levels, international, EU and national (as defined in Chapter 1 of the RA), considering all the environmental aspects on which the implementation of the Plan could generate effects. Considering the important role played by the Marine Strategy Framework Directive (MSFD, 2008/56/EC) and by the 11 strategies determined by it for achieving Good Marine Environmental Status (GES), which Maritime Spatial Planning must contemplate and observe, for the purposes of determining the spaces and uses of the sea in order to favour social and economic development while guaranteeing the achievement of environmental sustainability objectives, the 11 environmental objectives, related to the 11 qualitative descriptors, and the respective environmental targets of the Marine Strategy have been considered as the main reference for defining the environmental sustainability objectives of the MSP:

Qualitative descriptors	**Environmental Objective of the Marine Strategy**	**Environmental targets (*ex* Min. Decree 15 February 2019)**
Biodiversity (D1)	Biodiversity must be preserved	○ Increasing the number of protected marine species and habitats with a satisfactory conservation status ○ Improving the condition of populations of fish and cephalopod species, including those of commercial interest ○ Improving coastal fish stocks
Non-indigenous species (D2)	The presence of non-native species must be limited	○ Implementing a system for early detection and reporting of non-native species in port areas and aquaculture zones ○ Implementing traceability systems for imports, translocations and movements of non-invasive species
Fish and molluscs of commercial interest (D3)	Fish stock must be preserved	○ Reducing fishing mortality of target species exploited by commercial fishing ○ Containing the impact on fish resources and biodiversity of illegal fishing ○ Regulating recreational fishing ○ Regulating the minimum landing size of commercial selachii
Trophic networks (D4)	Elements of trophic networks must be preserved	○ Improving the status of trophic components in order not to alter the structural and functional conditions of marine ecosystems
Eutrophication (D5)	Minimising anthropogenic eutrophication	○ Treating wastewater properly ○ Reducing nutrient loads into the sea from diffuse sources
Integrity of seabed (D6)	The integrity of the seabed must be preserved	○ Limiting physical loss on biogenic substrates ○ Limiting abrasion from biogenic bottoms fishing
Hydrographic conditions (D7)	Hydrographical conditions must be preserved	○ Limiting the impacts of new infrastructure at sea resulting from permanent changes in hydrological and physiographic conditions
Contaminants (D8)	Contaminant concentrations must be contained	○ Reducing contaminant concentrations with values above Biological Quality Standards

Contaminants in products for human use (D9)	The concentrations of contaminants in fish and other fishery products intended for human consumption must be contained	○ Limiting the concentration of contaminants in fishery products
Marine Wastes (D10)	The presence of marine waste must be reduced	○ Reducing the presence of marine waste on shorelines, in the surface layer of the water column, on the seabed, in the water column as micro-waste and in marine animals
Underwater noise (D11)	Underwater noise levels must be contained	○ Implementing the National Register of Impulsive Sounds ○ Defining the base level for continuous low-frequency sounds

Considering the transversality with other environmental policies and planning issues that affect environmental factors on land and in any case in relation to the sea, such as mainly water issues, flooding, coastal erosion, atmospheric emissions from maritime traffic, underwater archaeological assets, natural hazards, it is deemed necessary to identify additional environmental components to be taken into account for the context analysis and for the identification of general environmental sustainability objectives, such as: water, soil, air and climate change, human health, landscape and cultural heritage, including underwater archaeological assets.

Thus, on the basis of the above definition, the Environmental Sustainability Objectives

[1] (O.A) of the MSP presented below are essentially the result of the following process:

- analysis of regulations, strategies, conventions on environmental sustainability established at different levels, international, EU and national (Chapter 1 of the RA) and in particular Environmental Objectives and Targets (ex Min. Decree 15 February 2019) of the Marine Strategy;
- indications formulated in the scoping phase by the SCAs[2] ;
- comparison with cross-cutting principles (and related sectoral objectives) identified in the Plan.

The environmental sustainability objectives, therefore, were obtained from the analysis and development of the environmental components described above. During the preliminary consultation with the relevant authorities in environmental matters, which led to the drafting of this document, the environmental aspects and themes/components identified and the related objectives were integrated in order to identify the specific environmental sustainability objectives for the Plan, against which a set of indicators for monitoring and criteria for prioritising and selecting operations are proposed in the following chapters.

	Environmental Sustainability Objectives (ESOs)		**Target**	**Policy and/or regulatory reference**
Marine and		**OA 1.a**	Sustainably manage and protect marine and coastal ecosystems to avoid significant negative impacts, including by enhancing their resilience and acting to restore them, in order to achieve healthy and productive oceans.	Agenda 2030 (Objective 14), Directive 2008/56/EC (Marine Strategy), Regulation EU

[1] In the ISPRA Guidelines reference is made to "*environmental protection objectives*" pertinent to the Plan, "*deduced from the regulations, from the references on the subject of sustainability established at the various levels and from the programmatic and planning framework pertinent to the P/P, taking into account what has already been developed in the preliminary report and the consultations of the preliminary phase*" (ref. letter e - Annex VI Legislative Decree 152/2006).

[2] Following the preliminary consultation with the relevant authorities in environmental matters (SCA), the environmental aspects and identified themes/components and their objectives were integrated in order to identify the specific environmental sustainability objectives for the Plan, against which a set of indicators for monitoring and criteria for prioritising and selecting operations are proposed in the following chapters.

	Preserving and sustainably using the oceans, seas and marine resources for sustainable development	**OA 1.b**	Effectively regulate fishing and put an end to overfishing, illegal, unreported and unregulated fishing and destructive fishing methods.	no. 1380/2013 (Common Fisheries Policy) SNSvS - OSN II.1 Maintaining the vitality of the seas and preventing impacts on the marine and coastal environment
		OA 1.c	Implement science-based management plans to restore fish stocks in the shortest possible time, at least to levels that produce the maximum sustainable yield, as determined by their biological characteristics	
	Protecting and preserving the marine environment, preventing its degradation or, where possible, restoring marine ecosystems in areas where they have suffered damage	**OA 1.d**	Take effective and immediate action to reduce the degradation of natural environments, halt the destruction of biodiversity and protect endangered species	Agenda 2030 (Objective 14), Directive 2008/56/EC (Marine Strategy) European Biodiversity Strategy (COM(2020) 380 SNSvS - OSN II.1
	Preventing and reducing inputs to the marine environment, with a view to progressively eliminating pollution, to ensure that there are no significant impacts or risks to marine biodiversity, marine ecosystems, human health or uses of the sea	**OA 1.e**	Prevent and significantly reduce marine pollution of all kinds, particularly from land-based activities, including marine litter and nutrient pollution of waters	Agenda 2030 (Objective 14), Directive 2008/56/EC (Marine Strategy) Directive 2000/60/EEC (Water)
Biodiversity and natural areas	Protecting marine habitats, species and ecosystems as a whole	**OA 2.a**	Preserve and possibly improve the quality of marine ecosystems as a whole (ecosystem approach) and, in particular, preserve and possibly improve the conservation status of habitats and species, including through the adoption of specific conservation objectives and measures	Directive 92/43/EEC (Habitats), Directive 2009/147/EC (Birds), International Conventions (Bonn, Berne, Barcelona), (Objective 14), Directive 2008/56/EC (Marine Strategy) SNSvS - OSN I.1 Maintaining and improving the conservation status of species and habitats for ecosystems, both terrestrial and aquatic

	Increasing the area of MPAs and ensuring management effectiveness	**OA 2.b**	Creating new Marine Protected Areas and completing the Natura 2000 Network at sea to protect 30% of Italy's seas by 2030 with strict protection of 10%.	European Biodiversity Strategy (COM(2020) 380 Directive 92/43/EEC (Habitats) SNSvS - OSN I.3 Increasing the protected land and marine area and ensuring effective management
	Halting the spread of invasive exotic species	**OA 2.c**	Strengthening marine pollution prevention measures and improving the quality of marine ecosystems	Legislative Decree No. 230 of 15/12/2017 SNSvS - OSN I.2 Halting the spread of invasive exotic species
	Promoting sustainable fishing activities by encouraging the recovery and protection of fish stocks	**OA 2.d**	Establishing additional no-take areas for professional fishing with the greatest impact on marine habitats and species, particularly in the EFH (*Essential Fish Habitats*) of commercially important fish stocks. Adopt measures to minimise *by-catch* of rare species (e.g. sharks, turtles, small cetaceans and seabirds)	Three-year National Programme for Fisheries and Aquaculture, PO FEAMPA 21-27, Council Regulation No. 1967/2006 concerning management measures for the sustainable exploitation of fishery resources in the Mediterranean Sea SNSvS - OSN I.4 Protect and restore genetic resources and natural ecosystems related to agriculture, forestry and aquaculture
Waters	Preventing and reducing pollution and achieving improvements in water status	**OA 3.a**	Protecting and restoring water-related ecosystems by 2030. Water quality is to be improved and water pollution reduced, especially that generated by hazardous chemicals. Cross-border cooperation will be promoted in order to achieve integrated water management at all levels	Agenda 2030 (Goal 6); Directive 2000/60/EC SNSvS - II.4 Implementing integrated water resources management at all planning levels
	Reduction of potential negative consequences of flood events for human health, land, property, environment and cultural heritage	**OA 3.b**	Enhanced protection and improvement of the aquatic environment, including through specific measures for the gradual reduction of discharges, emissions and losses of priority substances and halting or phasing out of discharges, emissions and losses of priority hazardous substances	Framework Directive 2000/60/EEC (Water), Directive 2007/60/EC (Flood Risk), Directive 2014/101/EU (Framework for Community action in the field of water policy)
Soil	Preserving coastal zones for the benefit of present and future generations	**OA 4.a**	Achieving neutrality in soil degradation on a global scale. Soil management, therefore, can only be defined as sustainable if human activities are able to support, enhance and regulate the ecosystem services provided by soil, without compromising soil functionality and biodiversity.	Agenda 2030 (Goal 15), COM(2006)231 SNSvS - OSN II.2 Halting soil consumption and combating desertification

		OA 4.b	Preventing the impacts of coastal erosion through new works, including maritime works and coastal defence works, integrated management of activities and the adoption of specific measures for coastal sediments and coastal works, and the sharing of scientific data to improve knowledge on the status, evolution and impacts of coastal erosion.	Barcelona Convention - ICZM Protocol (2008)
Air and climate change	Total decarbonisation by 2050 and net reduction of greenhouse gas emissions of at least 55% by 2030	**OA 5.a**	Integrating climate change measures into national policies, strategies and plans.	Climate and Energy Framework 2030 New EU climate change adaptation strategy, Strategy for a climate-neutral economy by 2050 European Green Deal PNRR EU strategies for energy system integration and hydrogen SNSvS - OSN II.6 Minimising emissions and reducing air pollutant concentrations SNSvS - OSN IV.1 Increasing energy efficiency and energy production from renewable sources while avoiding or reducing impacts on BBCC and landscape SNSvS - OSN II.6 Minimising Emissions and Reducing Pollutants
	Climate neutrality by 2050	**OA 5.b**	Increasing energy efficiency and energy production from renewable sources while avoiding or reducing impacts on cultural heritage and landscape	
Human health	Decrease population exposure to environmental and anthropogenic risk factors	**OA 6.a**	Reduction of premature mortality from environmental causes by one third through studies and research on environmental risk factors for primary prevention, with a view to environmental sustainability and circular economy.	Agenda 2030 (Goal 3), Legislative Decree no. 116 of 30 May 2008 (Bathing Waters) SNSvS - OSN IV.2 Increasing the sustainable mobility of people and goods SNSvS - OSN III.1 Decrease population exposure to environmental and anthropogenic risk factors SNSvS - OSN III.3 Regenerating cities, ensuring accessibility and ensuring sustainable connections
		OA 6.b	Protect human health from the risks of poor bathing water quality also through environmental protection and improvement.	

Landscape and Cultural Heritage	Ensuring the potential development, sustainable management and custodianship of territories, landscapes and cultural heritage and promoting the development of culture by fostering its public enjoyment and valorisation.	**OA 7.a**	Adopting a general policy to assign a function to cultural and natural heritage in collective life and to integrate protection into general planning programmes.	Unesco Convention concerning the protection of the world cultural and natural heritage (Paris, 16 November 1972); Legislative Decree no. 42 of 22 January 2004 (Cultural Heritage and Landscape Code); European Landscape Convention (Florence, 2000) Valletta Convention; SNSvS - OSN III.5 Ensuring the development of the potential, sustainable management and custodianship of territories, landscapes and cultural heritage Convention for the protection of the architectural heritage of Europe (Granada, 1985), Cultural heritage and landscape code (Legislative Decree 42/2004)
		OA 7.b	Developing scientific and technical studies and research and perfecting intervention methods to deal with dangers threatening the cultural or natural heritage.	
	Strengthening efforts to protect and safeguard the world's cultural and natural heritage	**OA 7.c**	Promoting the recovery and strengthening the protection of the cultural heritage of the coastal strip.	
		OA 7.d	Ensuring and strengthening the protection of underwater cultural heritage.	Convention on the protection of the underwater cultural heritage (2001 – Law 157/2009) Valletta Convention

For the purposes of checking the Plan's consistency with the guidelines on the environment and sustainable development, a matrix has been drawn up in which the respective potential synergy - inconsistency - indifference is briefly reported for each environmental sustainability objective identified for each environmental component potentially affected by the Plan's implementation and for each type of strategic objective of the Plan. It represents, in actual fact, an internal consistency check between the planning and SEA environmental assessment paths where possible conflicts between the environmental sustainability objectives and the strategic objectives are highlighted, the possible criticalities of which are found in the matrix in **Annex IV.** The criteria adopted, shown below, not only provide a specific definition but also use a colour scale to facilitate the reading of the matrix:

Direct consistency	indicates that the objectives of the Maritime Spatial Plan pursue goals and/or dictate provisions that contribute to the realisation of the goals and provisions of the environmental objectives.
Indirect consistency	indicates that the objectives of the Maritime Spatial Plan pursue goals and/or dictate provisions that are compatible or have strong elements of integration with those of the environmental objectives.
Indifference	indicates that the objectives of the Maritime Spatial Plan pursue goals and/or dictate provisions unrelated to those of the environmental objectives.
Inconsistency	indicates that the objectives of the Maritime Spatial Plan pursue aims and/or dictate provisions that conflict with those of the environmental objectives.

From the analysis of the matrix it is easy to deduce how the elaboration of plan objectives and environmental objectives was conducted in an integrated manner, converging, in most cases, plan requirements with environmental protection requirements. The process of integration has led to a convergence of the objectives as

evidenced by the numerous direct and indirect consistencies that can be summarised in the matrix. Thus, the environmental goals relating not only to the conservation of nature and biodiversity, but also to the promotion of the quality of the marine environment, are integrated with the development needs of the economic - social system that revolves around the uses that characterise the marine space. It is highlighted how Maritime Spatial Planning, developed through the ecosystem approach, is indispensable to ensure in the long term a sustainable balance between nature and human activities such as fishing, aquaculture, maritime transport together with those activities that are growing rapidly such as offshore wind energy and that therefore need to be evaluated in a perspective of increasing dedicated space. The analytical exercise allowed to detect many potential synergies and consistencies and some potential inconsistencies related to punctual elements that fail to perfectly integrate environmental objectives and plan objectives. With respect to these potential inconsistencies, further moments of evaluation of the effects and consistency with the Do No Significant Harm principle (DNSH), will be able to provide guidelines to maximise the Plan's contribution to sustainability objectives. A deeper and more punctual reading of the matrix tells us that, as previously stated, consistencies (452), direct and indirect, are numerically much more consistent than inconsistencies (44), and indifferences (428) appear rather relevant, a number that is easily justifiable if we consider that many environmental objectives deal with quite specific and defined themes that in many cases do not find valid correlations with the plan objectives.

Regarding the environmental sustainability objectives, the elaboration of the data obtained from the matrix shows us that the reference objectives of the environmental component "**Marine and coastal environment**" and in particular the objectives **OA_1a** "*Sustainably manage and protect marine and coastal ecosystems to avoid significant negative impacts, including by enhancing their resilience and acting to restore them, in order to achieve healthy and productive oceans"* and **OA_1d** "*Take effective and immediate action to reduce the degradation of natural environments, halt the destruction of biodiversity and protect endangered species*" have the highest number of consistencies (30 and 31), highlighting how the objectives related to the conservation, protection and restoration of marine ecosystems represent one of the Plan's fundamental goals; in fact, among the other environmental sustainability objectives with a high number of consistencies, we find not only those related to the conservation of habitats and ecosystems, such as those mentioned above, but also the objectives whose main goals are related to both the reduction and containment of pollutants, **OA_1e** (25) "*Prevent and significantly reduce marine pollution of all kinds, particularly from land-based activities, including marine litter and nutrient pollution of waters*" and **OA_3a** (24) "*Protecting and restoring water-related ecosystems by 2030. Water quality is to be improved and water pollution reduced, especially that generated by hazardous chemicals. Cross-border cooperation will be promoted in order to achieve integrated water management at all levels*", as well as the integration of policies related to combating climate change and increasing energy efficiency through renewables, **OA_5a** "*Integrating climate change measures into national policies, strategies and plans. Increasing energy efficiency and energy production from renewable sources while avoiding or reducing impacts on cultural heritage and landscape*" and finally to the preservation and protection of cultural heritage and landscape, **OA_7b** (30) "*Developing scientific and technical studies and research and perfecting intervention methods to deal with dangers threatening the cultural or natural heritage*".

On the whole, it can be seen that most of the environmental sustainability objectives present a fairly high number of consistencies with the plan objectives, ranging from 17 to 23; the remaining objectives, on the other hand, present a lower number of consistencies (from 12 to 15), these values, in fact, must necessarily be contextualised with the values of the relative inconsistencies, which have a rather low incidence of between 0 and 8. This clarifies how even the lowest levels of consistencies do not necessarily imply high levels of inconsistency, since, as described above, it is the "indifferences" that are predominant.

On the basis of the above, in contrast to the more easily pursued objectives described above, we should find the negatively influenced environmental sustainability objectives represented by objective **OA_7d** "*Ensuring and strengthening the protection of underwater cultural heritage*" with a low number of consistencies (12) and objectives **OA_2b** "*Creating new Marine Protected Areas and completing the Natura 2000 Network at sea to protect 30% of Italy's seas by 2030 with strict protection of 10%*" and **OA_2a** "*Preserve and possibly improve the quality of marine ecosystems as a whole (ecosystem approach) and, in particular, preserve and possibly improve the conservation status of habitats and species, including through the adoption of specific conservation objectives and measures*" with the highest number of inconsistencies (8 and 5 respectively), but the numerical

analysis shows that there are no conditions to consider them as negatively affected by the plan, testifying to what was previously described on the synergy of the elaboration of the different types of objectives and the convergence of the objectives' aims. In general, the sector that seems to present the most potential inconsistencies with the environmental sustainability objectives is the energy sector/use with a total of 21 potential inconsistencies. In spite of guidelines aimed at moving away from fossil fuels, these activities risk interfering negatively with the environment and landscape, both directly and indirectly.

Most of the potential inconsistencies (13) are due to the poor integration of the environmental/target objectives with the objective "OS.E2 - *Pursue the environmental, social and economic sustainability of hydrocarbon surveying, exploration and production activities at sea",* which is in potential conflict with the objectives of environmental and landscape-cultural protection and enhancement, highlighting how, maintaining or increasing hydrocarbon surveying, exploration and production activities at sea is in contrast both to the objectives of protecting and defending the environment and the landscape and cultural heritage and to the objectives relating to their development, pushing, conversely, towards an increase in energy production through renewable and lower-impact sources (e.g. floating wind power).

Similarly, an increase in tourism activities or an increase in port activities that foresee an increase in large ship passages or an increase in tourism activities that foresee an increase in the number of presences risk clashing with the objectives whose aim is to restore and recover marine ecosystems and preserve their quality. Therefore, the objective of the Tourism sector/use **OS.T2** - "*Promoting coherent planning actions on land and sea, also for tourism purposes*", the aim of which is to promote actions aimed at increasing the attractiveness of ports near cities of art, is in contrast with the environmental objectives aimed at containing and reducing marine pollution **OA_2c** "*Strengthen measures to prevent marine pollution and improve the quality of marine ecosystems*". The potential inconsistencies summarised in the annexed matrix may guide the definition of specific objectives and uses in relation to the different contexts.

In conclusion, it is clear that the development of the Plan's objectives took place in an integrated manner with the consideration of the environmental sustainability objectives, highlighting how in most cases there is a clear convergence, witnessed by the presence of numerous direct but also indirect consistencies, between the OS.PPC objectives "Landscape and Cultural Heritage" and the OA_7 - environmental component "Landscape and cultural heritage", OS.P "Fisheries" and the OA_1 - environmental component "Marine and coastal environment" and OA_2 - environmental component "Biodiversity and natural areas subject to protection regimes", OS.DC "Coastal Defence" and the OA_7 - environmental component "Landscape and Cultural Heritage", while the objectives OS.N "Environmental Protection and Natural Resources", OS.SS "Sustainable Development" and OS.RI "Research and Innovation", due to their transversal nature, present a convergence with practically all the groups of environmental sustainability objectives, where the consistencies, both direct and indirect, show that both groups of objectives work in synergy to achieve the same goals.

Potential inconsistencies are limited to those objectives whose aims, although set in the context of safeguarding natural resources, do not have environmental protection as their primary purpose, leading to potential conflicts between objectives. In the following chapters, possible impacts and mitigation measures necessary to mitigate and make acceptable such potential inconsistencies will be defined.

3.2 Evaluation and Verification of External Consistency of the MSP

The external consistency verification analysis, in the RA, assumes a fundamental role in defining any potential synergies and/or conflicts between the Maritime Spatial Plan and other relevant plans or programmes. The external consistency verification activity is fundamental in outlining and defining the overall congruity of the Plan with respect to the planning, programmatic and regulatory context in which it is developed. Specifically, horizontal external consistency is verified, i.e. the consistency of the plan objectives with the objectives/principles of environmental sustainability inferred from plans/programmes drawn up for the same territorial area is assessed. Through this tool, the existing relations and the level of synergy/conflictuality of the Plan, and in particular of its objectives, with the objectives of other relevant plans/programmes of the same level will be verified, i.e. in all those plans whose area of influence is the national surface and that concern the maritime sector and those sectors interconnected to it on the basis of land-sea interactions, with the aim of identifying potential synergic factors

and possible critical or conflicting aspects. It is therefore evident that the interrelationships between the MSP and detailed level planning deriving from general regulations of a national nature will not be found in the matrix of external consistency, but the superordinate objectives/goals of the national regulations will be included.

In the following paragraphs, the context analysis and the consequent definition of the interferences between the plan and the environment will analyse and highlight those that are regional and/or provincial constraints and regulations, thus defining, no longer mere consistency, but the actual site-specific interaction. The aforementioned analysis can be readily found in the thematic cartography attached to the Environmental Report.

As previously described, the objectives considered are of two types, strategic and of environmental sustainability that derive from the superordinate acts of mandate from which the Plan derives; specifically, the consistency between the strategic objectives of the Plan and the strategic objectives of the other Plans/Programmes was assessed. Given the large and articulated planning, for a faster and more efficient reading, two types of analysis were carried out through two matrices:

- External consistency with respect to Plans/Programmes directly related to the marine sector, where the congruity of the Plan's strategic objectives with the objectives/goals of Plans whose programming is carried out in marine areas is analysed:
    - National Operational Programme (NOP) of the European Maritime, Fisheries and Aquaculture Fund (EMFAF),
    - The National Strategic Plan for Ports and Logistics;
    - National cold ironing plan;
    - Coastal Erosion Master Plan;
    - Plan for the collection and management of ship-generated waste and cargo residues from ports;
    - Plans to protect the sea and coastal areas from accidental pollution by hydrocarbons and other harmful substances;
    - Three-year national fisheries and aquaculture programme 2022-2024;
    - Coastal management plans;
    - Strategic Plan for Italian Aquaculture 2014-2020;
    - Interreg maritime cross-border cooperation programme Italy France 2021-2027;
    - Interreg cross-border cooperation programme Italy Croatia 2021-2027;
    - Pharos4MPAs Interreg Mediterranean Programme;
    - Interreg next med programme
    - Interreg ADRION Programme.
- External consistency with respect to sectors not directly related to the marine sector, where the consistency of the strategic objectives of the Plan with the objectives/goals of the Plans whose programming is mainly carried out in inland areas of the coast is analysed:
    - National Integrated Energy and Climate Plan;
    - National Recovery and Resilience Plan (NRRP) under the Next Generation EU;
    - National Operational Programmes (NOPs) of the European Regional Development Fund (ERDF);
    - National Operational Programmes (NOPs) of the European Social Fund Plus (ESF+);
    - Rural Development Programme (RDP) of the European Agricultural Fund for Rural Development (EAFRD);
    - PTE (Plan for Ecological Transition);
    - Plan for the Sustainable Energy Transition of Eligible Areas (PiTESAI);
    - Infrastructure Annex to the Economic and Financial Document (DEF) 2021 "Ten years to transform Italy";
    - National Strategic Plan for Sustainable Mobility (PNSMS);
    - Strategic Programme to Combat Climate Change and Improve Air Quality;
    - National Climate Change Adaptation Plan (PNACC);
    - Hydrographic District Flood Risk Management Plan;

- Water Management Plan of the Hydrographic District;
- District Basin Plan;
- Hydrogeological Structure district plans (Art. 67 Legislative Decree 152/2006);
- Water Protection Plan;
- Regional Landscape Plan (PPR);
- Planning of Protected Natural Areas;
- Conservation measures Natura 2000 Network;
- Management plans for Natura 2000 sites;
- PON "Infrastructure and Networks" 2014-2020;
- Extraordinary tourist mobility plan 2017-2022;
- Tourism Strategic Plan 2017-2022;
- National Air Pollution Control Programme;
- Regional Transport Plan.

The verification of external consistency was conducted through the construction and use of double-entry matrices through which the priorities and objectives of the Plan are compared with the objectives of the relevant Plans/Programmes in order to assess their consistency, possible irrelevance or potential conflict:

- **Direct consistency**, indicates that the Maritime Spatial Plan pursues objectives and/or dictates provisions that contribute to the realisation of the goals and provisions of the instrument examined.
- **Indirect consistency** indicates that the Maritime Spatial Plan pursues objectives and/or dictates provisions that are compatible or have strong elements of integration with those of the instrument examined.
- **Indifference**, indicates that the Maritime Spatial Plan pursues objectives and/or dictates provisions unrelated to those of the instrument examined.
- **Inconsistency**, indicates that the Maritime Spatial Plan pursues objectives and/or dictates provisions contrary to those of the instrument examined.

Assessments are expressed graphically using the following symbols and colours:

Direct consistency	indicates that the Maritime Spatial Plan pursues objectives and/or dictates provisions that contribute to the realisation of the goals and provisions of the instrument examined.
Indirect consistency	indicates that the Maritime Spatial Plan pursues objectives and/or dictates provisions that are compatible or have strong elements of integration with those of the instrument examined.
Indifference	indicates that the Maritime Spatial Plan pursues objectives and/or dictates provisions unrelated to those of the instrument examined.
Inconsistency	indicates that the Maritime Spatial Plan pursues objectives and/or dictates provisions contrary to those of the instrument examined.

3.2.1 External Consistency of Plans not directly related to the marine sector

The MSP is part of a context now characterised by the presence of numerous plans that define and determine policies and interventions on territories more or less connected to the marine environment. Therefore, it is evident that some of the objectives of the plans under consideration may potentially conflict with the objectives of the MSP. The EU policies of the last decades, in synergy with the growing awareness of the importance of environmental balances, have been developed by acquiring the concepts of environmental sustainability, directing the development and orientation of all sector plans towards energy sustainability, respect for natural resources, the reduction of pollution, and emissions in general, with a view to a circular economy whose aim is the progressive reduction of impacts on the environment while promoting the evolution of the economy and its various sectors. Thus, we can easily understand how the evolution of these policies over time has led to the

definition of increasingly specific objectives, which in some cases are not reflected in the objectives of already approved plans, generating inconsistencies. Therefore, the MSP, through the tool of the ecosystem approach, must ensure a balanced integration between the sustainability of the environment and the economic sustainability of human activities that characterise the marine environment (fishing, aquaculture, tourism, etc.); it is therefore the indispensable tool to achieve the social and economic sustainability of the aforementioned activities while respecting the marine ecosystem.

From a reading of the external consistency matrix in **Annex III** to the RA, it appears that the consistencies, direct and indirect, between the objectives of the main plans considered are the absolute majority compared to the inconsistencies found. On the basis of what has been defined above, it is easy to understand that these inconsistencies are exclusively linked to certain matrix crossings involving specific areas and uses. In fact, based on the objectives of EU policies on atmospheric emissions and energy transition, from the matrix analysis, inconsistencies are found between the objectives of the plans considered and the objective "OS.E2 - *Pursue the environmental, social and economic sustainability of hydrocarbon surveying, exploration and production activities at sea*", the achievement of which clashes with the principles/objectives of all those plans that are aimed at protecting and preserving the environment and ecosystems, restoring habitats and promoting the energy transition from fossil fuels to renewable energy sources.

In particular, there is inconsistency between the goal and the main national energy plan, the National Integrated Energy and Climate Plan (PNIEC) and the Plan for Ecological Transition, whose goals promote sustainable energy sources. Similarly, there is a constant inconsistency in almost all of the Plan's objectives with respect to one of the main goals of the Plan for the Sustainable Energy Transition of Eligible Areas (PiTESAI), namely to "*Identify a defined reference framework of areas where hydrocarbon surveying, exploration and cultivation activities are permitted on national territory, aimed at enhancing the environmental, social and economic sustainability of the same*", putting it in contrast with the EU and national lines of abandoning the search and extraction of hydrocarbons in favour of sustainable development and, in particular, the promotion of plants from renewable sources, decarbonisation, and the protection of habitats, species and the coastal strip, taken up and defined in the objectives of the plan. Potential inconsistencies were also highlighted in relation to tourism development plans. In fact, the increase in the flow of tourists, including through the enhancement of tourist mobility, and dedicated infrastructures may not fit in with the prospects of safeguarding the coastal landscape and protecting the coastline from erosion as envisaged by the objectives of the MSP.

3.2.2 External Consistency of Plans directly related to the marine sector

On the other hand, with regard to the plans directly related to the marine sector, from the analysis of the consistency matrix, it clearly emerges that there are no particular inconsistencies, but the plans integrate or, at most, do not cause interference of any kind between the implementation of the objectives of the MSP and the implementation of the plans considered. Thus, from the point of view of the general planning context, both EU and national, the Plan objectives are consistent with what is already provided for by the existing plans, highlighting the interest in achieving common goals by directly or indirectly integrating, or even simply not hindering, the achievement of the same. As in the previous case, the structured inconsistencies are found with the objective OS - EN2 "*Pursue the environmental, social and economic sustainability of hydrocarbon surveying, exploration and production activities at sea*", the achievement of which leads to an inconsistency with the principles/objectives of the plans whose goals are innovation, sustainability, environmental protection and landscape enhancement.

3.3 Assessment and Verification of internal consistency of the MSP

The purpose of the verification and assessment of internal consistency is to establish all possible correlations between the environmental sustainability objectives and the specific objectives of the various sub-areas and

the respective measures, both national and regional, that the Plan envisages applying, so as to verify the actual correspondence between the planned measures and the environmental sustainability objectives set.

The verification process, being particularly complex, is developed from the earliest stages of drafting the Plan and represents a structural phase in its origin. In fact, during the planning process, the verification is carried out as the planning activity is developed, so that both the objectives and the proposed measures are adjusted in real time, simultaneously with the development of planning. In this way, the verification and evaluation of internal consistency guides the construction of the Plan, leading to the definition of measures that are consistent with environmental sustainability objectives.

At the conclusion of the aforementioned operations to verify consistency and construct the Plan, the result obtained, which stems from the information obtained from the context analysis, highlights not only the actual correspondence but also the cause/effect relationship between all the phases that have characterised the planning process, thus confirming the validity of the planning strategy through the direct correlation between measures and proposed objectives. All of the above is visually represented through the elaboration of matrices that allow for a quicker reading of all the relationships existing between the environmental sustainability objectives and the specific objectives of the sub-areas first and, on a more detailed level, between the environmental sustainability objectives and the measures/actions, national and regional, then.

Through the matrices, the links and relations between the objectives assumed by the Plan for the specific maritime space and sub-area and the planned measures have been reconstructed, thus making the decision-making process accompanying its elaboration more transparent. This analysis also makes it possible to verify the existence of possible contradictions within the Programme, synergies or elements to be taken into account during implementation.

The relationship between the specific objectives by sub-area and the environmental sustainability objectives/targets is defined in the matrix in **Annex IV** to the RA, where the construction of the matrix has taken into consideration the genesis of the specific objectives, highlighting not only the maritime area and the sub-area of reference but also the theme/sector/use referred to the general objectives of the Plan and the specific uses referred to the planning unit, thus making explicit the path through which the specific objectives were defined; finally, eleven columns have been inserted, highlighting the cases where the objective is expected to have effects on other uses/sectors.

Similarly, on the basis of the Plan, the matrices in Annexes IV and V, concerning both national and regional measures, highlight not only the strategic objective (for national level measures) or specific objective (for sub-area level measures) to which the measure in question intends to contribute, the main reference use of the measure and the possible interaction with other uses that the measure will regulate, but also identify the category of the measure among the following:

- **Spatial measures/actions (S),** related to the definition of the spatial areas in which activities can take place;
- **Temporal measures/actions (T),** related to the definition of limits or conditions governing the performance of activities over time;
- **Technical and technological (TE) measures/actions,** related to the use or adoption of specific technological equipment or techniques;
- **Monitoring, control and surveillance (M) measures/actions,** related to the acquisition of data on the conduct of maritime activities, compliance with rules or regulations, the acquisition of data on the state of the marine environment, and how to monitor activities in marine waters;
- **Multi-level governance measures/actions (G),** which concern procedural and organisational procedures;
- **Economic and financial measures/actions (E),** which identify financial resources to support maritime activities (including within existing programming, such as regional POR-FESR and/or FEAMP)
- **Other types of measures (A)** (e.g. training, education, communication).

The next column indicates the type of measure from among the following:

- I - addresses, mainly addressed to public administrations or planning instruments
- P - requirements that the plan provides for regulating the uses of maritime space (e.g. in terms of the manner - including spatial and temporal - in which uses may be exercised)

- I - incentives
- A - actions, i.e. concrete initiatives (e.g. consultations, studies, analyses) carried out by or on behalf of competent administrations, possibly in partnership with private entities;

and the main implementers of the measure, i.e. the party responsible for implementing the measure; finally, for national measures, the reference measures/descriptors of the Marine Strategy updated to the new implementation cycle are specified and eleven columns are inserted, where it is highlighted where the target is expected to have effects on other uses/sectors.

For the purpose of verifying internal consistency through the matrices described above (specific objectives and measures of the Plan/environmental sustainability objectives) the analysis will be developed by highlighting potential positive or negative, direct or indirect influences, specifying any synergic effects or potential conflicts and whether there are objectives or measures/actions envisaged by the Plan that are not fully in line with one or more of the environmental sustainability objectives defined in the VAS, according to the criteria below:

EVALUATION CRITERIA FOR THE ACTIONS MATRIX - ENVIRONMENTAL OBJECTIVES

Legend of criteria	
Potential negative direct influence	**ND**
Potential negative indirect influence	**NI**
Potential insignificant or nil influence	**I**
Potential positive indirect influence	**PI**
Potential positive direct influence	**PD**

Thus, it is evident how consistencies between objectives and/or measures and environmental sustainability objectives/Targets are defined through their potential influence, both positive and negative, and not through an absolute value judgement that unequivocally defines their weight in achieving the result. Thus, the attribution of a potentially direct negative influence implies two opposing principles whose realisation could conflict when they are applied in the same Planning Unit at the same time, thus incentivising maritime and cruise transport as through the pursuit of the specific objective **(A/2)OSP_TM|03** "*To re-launch the Veneto cruise economy through the resumption of traffic with O/D Venice by solving the terminal problem*" or the pursuit of the specific objective **(A/6)OSP_D|01** "*To allow the maintenance of the military functions of some areas, reducing conflicts with other present uses",* determine a clear contrast with almost all the environmental objectives, as found in the matrix in Annex V; in particular, these objectives cannot coexist with, among others, the presence or new establishment of Marine Protected Areas which are the objective of sustainability OA_2b, or with those environmental sustainability objectives that pursue the reduction of marine pollution, OA_1e.

Nevertheless, the objective/measure of the Plan retains its strategic validity, and its implementation shall be carried out in a way that does not conflict with what is defined by the Environmental Sustainability Objectives/Targets. Similarly, the indirect potential negative influence represents the potential negative interference between the specific objective/measure and the environmental sustainability objective/Target, the coexistence of which could be possible if certain measures are taken that could make it possible for them to be implemented at the same time while minimising the potential negative effect. Therefore, favouring pleasure boating for tourism purposes, specific objective (A/1)OSP_T|02 "*To develop pleasure boating, with a view to diversifying the tourism offer, while ensuring accessibility to waterways and environmental sustainability*", could be in conflict with the management and protection of marine ecosystems, environmental sustainability objective OA_1d "*Undertake effective and immediate action to reduce the degradation of natural environments, halt the destruction of biodiversity and protect endangered species*", but if the specific objective/measure is achieved by promoting the principles of environmental sustainability then the two objectives could co-exist, both achieving their goals. With regard to potential positive influences, both direct and indirect, it is evident that the definition of one or the other depends on the urgency of the result and the goals to be achieved, i.e. whether these coincide directly or are more or less complementary. Thus, whether a specific objective/measure directly implements the

environmental sustainability objective, e.g. implementing policies aimed at the conservation of habitats and species with the sustainable management and protection of marine and coastal ecosystems, or whether the objective/measure assists and complements the environmental sustainability objective (contributing to decarbonisation with marine renewable energy compatible with environmental sustainability/Reducing the degradation of natural environments and the destruction of biodiversity).

Through the above analysis, therefore, both the efficiency of the choices made at the planning stage aimed at pursuing the environmental sustainability objectives, the definition process of which has been outlined above, and the potential conflicts are highlighted, the analysis of which will be necessary in the subsequent evaluation phases, especially with reference to the evaluation of the negative impacts on the environmental components; therefore, the correspondences, whether positive or negative, will later be verified and explored in more detail in the chapters dedicated to the evaluation of impacts..

More specifically, the assessment criteria with respect to the environmental objectives have been set starting from the principles from which the MSP was born and evolves in Directive 2014/89/EU (Maritime Spatial Planning) starting with the definition of "Integrated Maritime Policy" (IMP) which refers to "(...) *a Union policy whose aim is to foster coordinated and coherent decision-making to maximise the sustainable development, economic growth and social cohesion of Member States, and notably the coastal, insular and outermost regions in the Union, as well as maritime sectors, through coherent maritime-related policies and relevant international cooperation* (...)" and the ecosystem approach, which considers humans as an integral part of ecosystems and promotes the exchange and sustainable integration between ecosystem and resource management. In particular, the aforementioned directive states that "(...) *The application of an ecosystem-based approach will contribute to promoting the sustainable development and growth of the maritime and coastal economies and the sustainable use of marine and coastal resources"*. Thus, if we consider, as later described in the chapters on impacts, that anthropic activities (aquaculture, fishing, removal and/or deposition of marine sediments, etc.) entail, in any case, the generation of impacts on the surrounding environment, on the basis of the IMP that envisages a sustainable development of the marine economy and of the ecosystem approach that considers a reciprocity between man, his activities and the ecosystem in which he lives, all those objectives/measures/actions that entail or envisage a decrease, improvement or containment, including through planning and sustainable management tools, of the pressures caused by the uses in question have been assessed with a positive consistency.

On the other hand, those objectives/measures/actions that envisage an increase in anthropic activities *tout court* without envisaging environmental sustainability actions or policies, such as the increase in port infrastructures or the promotion of cruise tourism by increasing the number of ships and landings, or that in addition to increasing activity are in clear conflict with current environmental policies, such as the increase in hydrocarbon prospecting, research and cultivation activities at sea, are assessed with a potentially negative influence.

Finally, it should be emphasised that the possible negative influence of a specific objective may also correspond to a positive influence in the corresponding measure/action, as the objective may conflict with the principles of environmental sustainability but its implementation may include justifications, arrangements or specifications that put it in line with the environmental sustainability objectives.

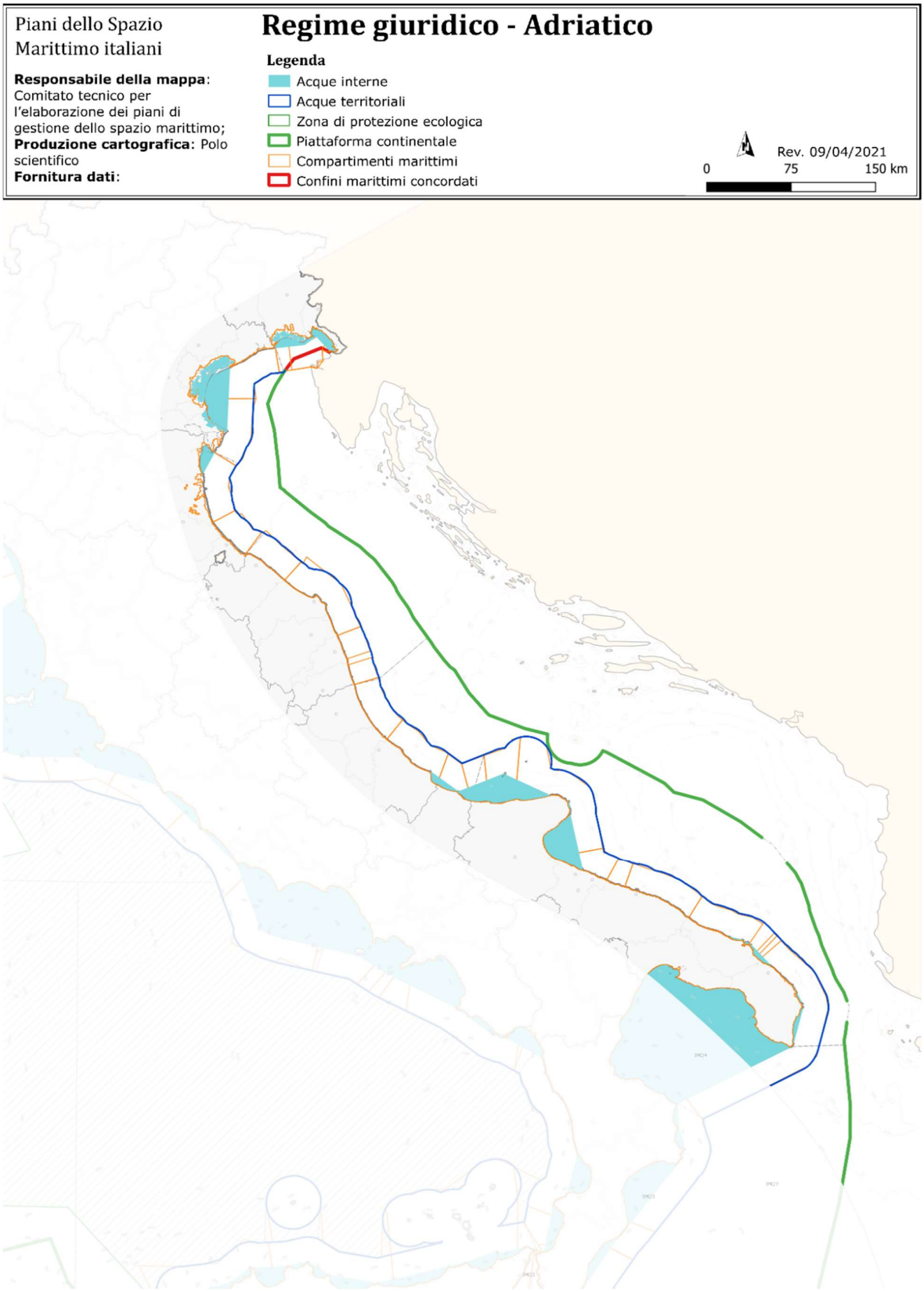
4. Environmental context of reference of the MSP

4.1 Geographical and territorial overview

The "Adriatic" area (Figure below) is delimited in the East by the limits of the continental shelf already formally agreed upon with neighboring countries (Yugoslavia, 1969; Albania, 1992; Greece, 1977 and 2020) and in the South by the boundary line between the marine sub-regions "Adriatic Sea" and "Ionian Sea-Central Mediterranean" of the Marine Strategy Directive, as also indicated in Legislative Decree 201/2016.

The Maritime Area affects the administrative boundaries represented by the following:

- boundaries of the maritime area covered by the Plan (Adriatic), as defined under the Marine Strategy Directive (Framework Directive 2008/56/EC);
- boundaries of coastal regions overlooking the maritime area under consideration: Friuli-Venezia Giulia, Veneto, Emilia-Romagna, Marche, Abruzzo, Molise, and Puglia (up to Capo d'Otranto).
- Boundaries of coastal municipalities in the former provinces of Trieste and Udine, Metropolitan City of Venice, Rovigo, Ferrara, Ravenna, Forlì-Cesena, Rimini, Pesaro-Urbino, Ancona, Macerata, Fermo, Ascoli Piceno, Teramo, Pescara, Chieti, Campobasso, Foggia, Barletta-Andria-Trani, Metropolitan City of Bari, Brindisi, and Lecce (up to Capo d'Otranto).
- boundaries of the Maritime Directorates of Trieste (Maritime Compartments of Trieste and Monfalcone), Venice (M.C. of Venice and of Chioggia), Ravenna (M.C. of Ravenna and of Rimini), Ancona (M.C. of Ancona, of Pesaro and of San Benedetto del Tronto), Pescara (M.C. of Pescara, of Ortona and of Termoli) and Bari (M.C. of Manfredonia, of Molfetta, of Bari, of Brindisi and of Gallipoli, up to Capo d'Otranto).



Legal boundaries of the "Adriatico" area

4.2 The current status of the environment in the territory of reference of the MSP

4.2.1 Indicators for the characterization of the state of the environment

In order to ensure the characterization of the context of reference, descriptive indicators of the state of the environment will be used at the sub-area and planning unit level. Therefore, starting from the table presented in Section 4.9 of the RP, from a comparison with the Environmental Sustainability Objectives (see Chapter 3 of the ER) and with the set of indicators for monitoring[3] the MSP (Chapter 7 of the Plan), a number of indicators have been selected to describe the characteristics of the ecological system, measure the presence or rather the concentration of elements of particular environmental importance or sensitivity (protected natural areas or areas of biological/naturalistic interest, cultural assets, specific and areal, etc.) without yet referring to uses and forecasts of the Plan.

Environmental component	Environmental indicator	Parameters to be assessed	Source	Context of reference considered
Biodiversity	*Posidonia oceanica*	Surface in ha	---	Sub-Area
	Protected areas (Rete Natura2000, MPA, ZTB...)	Surface in ha	MITE	Planning Unit
	Marine waste	Beached marine waste	ISPRA	Sub-Area
Water	Trophic state of the system	Nitrate/Phosphate concentrations	ISPRA	Sub-Area
	Quality of water	Concentration of contaminants	ISPRA	Sub-Area
Air	Air quality	Concentration of atmospheric pollutants	ISPRA	Sub-Area
Soil	Coastal dynamics	Assessment of coastal erosion	ISPRA	Sub-Area
	Coastal profile	Presence of coastal works	ISPRA	Sub-Area
	Subsidence	Seaside towns with subsidence	ISPRA	Sub-Area
Landscape and Cultural heritage	Soil consumption	Soil consumed (2020) and soil consumption (2019-2020) in landscape protection areas[4]	ISPRA	Region
	Presence of assets and restricted and/or protected areas	Number of (specific) assets restricted under Leg.D. 42/2004	MiC	Strip of reference (300 m from the shoreline)
		Surface in ha of (areal) assets restricted under Leg.D. 42/2004	MiC	Strip of reference (300 m from the shoreline)
		Number of submerged assets	MiC	Planning Unit

4.2.2 Marine and Coastal Environment

The Marine Strategy Framework Directive requires member states to develop a program based on an initial assessment of the environmental status of the marine ecosystem and the definition of good environmental status. Good environmental status of the marine environment is defined on the basis of 11 qualitative descriptors that refer to multiple aspects, including biodiversity, pollution, and the impact of productive activities. For each descriptor there are also, available environmental targets to be achieved, defined by Decree of the Ministry of Ecological Transition in 2019, and related operational monitoring forms.

[3] The Monitoring Plan is "*a tool aimed at tracking in space and time the efficiency of MSP implementation and suggesting improvement measures if these are deemed necessary through mid-term reviews*." It must "*embrace possible variations in space and time of environmental, social, economic and management priorities, should these emerge during the first cycle of its implementation. Thus, the role of monitoring played in informing and communicating changes in the status of implementation of management measures and their objectives, as well as boundary conditions that may affect them and require revision, is once again emphasized*."

[4] https://annuario.isprambiente.it/sys_ind/696 e https://annuario.isprambiente.it/sys_ind/697

For **Descriptor 1**, the Marine Environment Strategy requires that biodiversity is maintained and that "the quality and presence of habitats as well as the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions." In addition, for the achievement of Good Environmental Status, Italy in application of the Marine Strategy Directive has defined that the following environmental targets must be set:

- increase the number of marine species and marine habitats of interest as regards conservation and maintenance (Habitats Directive, Birds Directive, SPA/BD Protocol of the Barcelona Convention);
- achieve an improvement in the condition of populations of representative species of fish and cephalopods, including those that are vulnerable or commercially exploited (also in relation to the relevant environmental goal of Descriptor 3 - Fish and Molluscs/Crustaceans of commercial interest);
- achieve an improvement in the demographic characteristics of coastal fish species' populations compared to their conditions in Marine Protected Areas.

The description of the “Biodiversity D1” of the “Adriatic” marine area is based on solely marine species and habitats and of greater management value, also according to the MSFD, present in the Annexes in the Habitats Directives 92/43/EEC and “Uccelli” 79/409/EEC.As regards fish, coastal, pelagic, demersal and deep-sea species are considered. As regards cephalopods, coastal and continental shelf species are considered.

As regards the biodiversity of the "Adriatic" marine area, the focus was on marine species and benthic habitats referred to in Directive 92/43/EEC and Directive 2009/147 "Birds".

The information and data are derived from the monitoring programs referred to in Art. 11 of Leg. Decree 190/2010, as amended, collected by ISPRA, the Regional Agencies for the Protection of the Environment, the CNR, and then supplemented with those from other Plans, research projects and cognitive surveys at the national and international level, taking into account that for bird species, mammals, reptiles, fish species and cephalopods not exploited for commercial purposes but susceptible to incidental catch.

The entire Central Mediterranean Sea area was identified by COP 12 (Korea 2015) of the Convention on Biological Diversity as an "Ecologically or Biologically Significant marine Area" (EBSA) , a definition that does not yet set direct limits, as it does not imply an economic or legally protected status, but recommends that states pay special attention to management practices for biodiversity conservation. The EBSA of the Adriatic Sea is defined as an area relevant to the support of services provided by the sea, based on criteria, including biodiversity. It was chosen to carry out the description of the main environmental components in the "Adriatic" maritime area through the priority areas with environmental protection value. These areas were identified through management tools related to the Natura 2000 Network (e.g. SCI, SPAs), sea protection (Marine Protected Areas) and fisheries management (such as Biological Protection Zones (ZTBs) and Fisheries Restricted Areas (FRAs)).

Priority areas that fall outside the EBSAs are described by taking sub-areas as reference. The "Adriatic" maritime area due to its very high ecological, landscape and cultural value, is affected by numerous environmental protection instruments and is divided into 9 SUB-AREAS, 7 of which within territorial waters.

Priority environmental SETTINGS are:

- 3 EBSAs.
- 4 Marine Protected Areas
- 7 Biological Protection Zones (Min. Decree 22 January 2009 of MIPAAF-O.J. General Series No. 37 of 14-02-2009).
- 1 FRA (Recommendation: GFCM/41/2017/3)

L'EBSA "Ecologically or Biologically Significant Marine Areas" North Adriatic[5]

It includes:

- the **SUB-AREAS A/1-A/2-A/3-** and the northern parts of **A/4 e A/7 (**territorial waters). The EBSA is an area located in the northern section of the "Adriatic" marine area and supports important endemic species and communities.
  The priority environmental **SETTINGS** are**:**
  - MPA/ZTB "Miramare".
  - ZTB/ZSC Tegnùe "Porto Falconera-Caorle".
  - ZTB/ZSC "Tegnùe di Chioggia".
  - ZTB "Fuori Ravenna e aree limitrofe" (Outside Ravenna and neighbouring areas).
  - ZTB "Le Barbare".

The North Adriatic EBSA is defined as a special area for the support of services provided by the sea based on criteria of uniqueness or rarity, importance for species' life stages, importance for threatened or endangered species/habitats, vulnerability, fragility, sensitivity or slow recovery, biological productivity, biodiversity and naturalness. It is characterized by the presence of areas of high environmental value such as 'trezze' or 'tegnùe', (rocky outcrops), meadows of *Posidonia oceanica*., subpopulations of bottlenose dolphin, breeding colonies of European shag, nesting sites of common tern, resting and feeding areas for sea turtles, nursery areas of blue, common thresher shark and sandbar shark. The area is characterized by the presence of fish spawning and growth areas (Essential fish habitats) are particularly sensitive to pressures such as seafloor abrasion and selective mining, particularly due to fishing activities, but also from pressures such as changing sedimentary rates, introduction of non-synthetic substances and compounds, and underwater noise. Therefore, 5 biological protection zones have been established in this area: (ZTB) "Miramare" which is also a Marine Protected Area (MPA), the Tegnùe of "Porto Falconera-Caorle", the "Tegnùe di Chioggia", the "Outside Ravenna and neighbouring areas" and the "Le Barbare".The north-central Adriatic is a supportable habitat for *Caretta caretta* sea turtles, which find abundant food and shallow waters there. Foraging areas for this species cover about 9% of the entire Mediterranean basin.

L'EBSA "*Ecologically or Biologically Significant Marine Areas*" – Central Adriatic[6]

The EBSA is an area located in the central section of the "Adriatic" marine area and supports important endemic species and communities.
It includes **SUB-AREA A/8 (territorial waters)** and the priority environmentaletting**:**

- ZTB/FRA Jabuka/Pomo Pit.

The central Adriatic zone includes the Pomo Pit EBSA that extends in front of the Torre del Cerrano Marine Protected Area. The Jabuka/Pomo Pit is the largest Fishery Restricted Area established in agreement with the Croatian government in the seas bordering our peninsula where fishing is regulated.

It is a sensitive and critical spawning and nursery area for the demersal resources of the Adriatic Sea, particularly for hake; for the large population of Norway lobster, especially important for juveniles in depths of more than 200 m; for the nursery area for blackbellied angler and horned octopus.

Environmental priority areas that fall outside of Ecologically or Biologically Significant Marine Areas include the Priority Area of Sites of Community Interest (SCI) such as "Litorale di Porto D'Ascoli" and "Costa del Piceno-San Nicola a mare" (SCI IT5340022), which mainly feature the presence of habitat 1110 (Sandbanks which are slightly covered by sea water all the time).

[5] See EBSA Area Map Ecologically or Biologically Significant Marine Areas" North Adriatic PGSM_ADR_AMBD004_EBSA A4

[6] See EBSA Area Map Ecologically or Biologically Significant Marine Areas" Central Adriatic PGSM_ADR_AMBD004_EBSA_A4

The SCI "Costa del Piceno-San Nicola a mare", which falls within SUB-AREA A/4, is also characterized by habitat 1170 "Reefs" and the presence of the Twait shad, a vulnerable species, which is on the IUCN red list.It is a 100% marine area and has a surface area of about 43 ha.

L'**EBSA "*Ecologically or Biologically Significant Marine Areas*" - Southern Adriatic**[7]

The EBSA is an area located in the southern section of the Adriatic Sea and supports important species and endemic communities. It includes **SUB-AREE A/6** (territorial waters) and **A/9** (international waters).

The priority environmental setting consists of the:

- Biological Protection Zone "Off the coast of Puglia"

The EBSA is located laterally to the Tremiti Islands MPA and opposite the Torre Guaceto Mpa. It borders part of the Biological Protection Area "Off the coast of Puglia." The southern area of the Adriatic as opposed to the northern part features extensive seagrass beds of *Posidonia oceanica*, a species endemic to the Mediterranean Sea under Annex I of the Habitats Directive 92/43/EEC and Annex IV of the Bern Convention, recognized by the Mediterranean Regulation as a protected habitat, and by UNEP as a highly endangered ecosystem in the Mediterranean basin.

Recent exploration of the deep sea in the EBSA between the southern Adriatic and Ionian Seas has led to the discovery of important white coral beds, one between Italy and Albania (Bari Canyon), and one south of Capo Santa Maria di Leuca. The Special Area of Protection (ZPS) "Scoglio dell'Eremita" ITA9120012 is a seabird nesting area

The ZTB "Off the coast of Puglia" has a restocking function for numerous fish species of commercial interest.

Environmental priority areas that fall outside of Ecologically or Biologically Significant Marine Areas include the Priority Maine Protected Area **"**Torre del Cerrano" MPA which falls within SUB-AREA A/5.

The area is home to a good number of marine animal species, both pelagic and benthic, and a small but large contingent of plant species, and the priority environmental "Tremiti Islands" Marine Nature Reserve, which is also a Marine Protected Area, Special Protection Area, Biological Protection Area and Site of Community Importance, and the Marine Protected Area "Torre Guaceto which both fall within SUB-AREA A/6.

The European Union, in the Marine Strategy Framework Directive 2008/56/EC, lists alien species among the descriptors of good environmental status of the sea (see **Descriptor 2**: Non-indigenous species. "Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystems"), just as the Mediterranean EcAp (Ecosystem Approach) strategy, promoted by UNEP/MAP, considers alien species among the ecological targets. Biological invasions are among the main threats to biodiversity worldwide, impacting native species, the economy and health to such an extent that they are present in numerous international directives and conventions. The list of NIS present in the Italian seas in 2012 compiled by Italy for the initial assessment was updated following comparison with that produced by the Joint Research Centre (JRC) based on data from the literature in collaboration with ISPRA. The monitoring data obtained for the first time in areas with the highest risk of introduction (mainly port areas), cannot be compared with those in 2012, so no trend can be established.

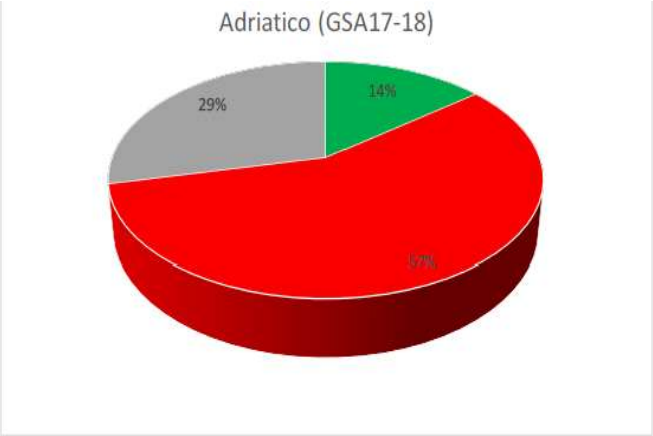
For the purpose of 2018 reporting, it would not allow a proper assessment of Good Environmental Status to be made based on monitoring data alone. In the Marine Strategy Framework Directive (EC/2008/56 - Cycle II 2018-2024), species exploited by commercial fisheries are considered within the Qualitative **Descriptor 3**, which states "*populations of all commercially exploited fish and shellfish/crustaceans are within biologically safe limits, exhibiting a population age and size distribution indicative of good stock health*." In accordance with the MSFD, the new Common Fisheries Policy - CFP (Regulation (EU) No. 1380/2013) has maximum sustainable yield (MSY) among its objectives for all fisheries.

The "Adriatic" marine area includes the Geographical Sub Areas (GSA) 17 and 18 (FAO-GFCM) and has been divided into 9 sub-areas (MSP) of which 6 are within territorial waters. In line with the total number of fishing units in GSA 17, this area has a percentage incidence of 24.5 percent of all fisheries in Italy. The distribution of

[7] See EBSA Area Map Ecologically or Biologically Significant Marine Areas" Southern Adriatic PGSM_ADR_AMBD005_EBSA_A6

fishing effort is higher in the northern portion of the basin and all the way to the Gargano coast of Puglia. There are 7 Biological Protection Zones in the area distributed from north to south of the basin, in addition to Fisheries Restricted Areas (FRAs), present in national and international waters. The latest assessment of good environmental status under the Marine Strategy was conducted by ISPRA in the 2018 Report.

The results obtained for the Adriatic Sea region are shown in the following graphs.



Percentage of stocks in the "Adriatic" subregion within biologically safe limits (green), outside biologically safe limits (red) or not assessed (grey) Source: ISPRA, Summary report MSFD 2018 – D3

As is already known for the Mediterranean context, it is noteworthy that a large proportion of the stocks assessed in the subregions exhibit unsustainable exploitation status. In general, this condition is related to excessive fishing pressure and. The Marine Strategy Framework Directive (MSFD) requires for **Descriptor 4** that "all elements of the marine food webs, to the extent that they are known, occur at normal abundance and diversity and levels capable of ensuring the long-term abundance of the species and the retention of their full reproductive capacity."

Descriptor 4 has undergone a major revision as part of the recent MSFD updates and in particular the methodological documentation. The methodological criteria have been changed and simplified. Indicators associated with the trophic network are now used as Surveillance Indicators

The Marine Strategy Framework Directive (MSFD) requires for **Descriptor 5** that human-induced eutrophication be minimized, especially it adverse effects, such as loss of biodiversity, ecosystem degradation, harmful algal blooms and oxygen deficiency in bottom waters.

Eutrophication is among the most widespread and deleterious anthropogenic impacts on marine ecosystems. Ecosystem restoration has become a key action for the 2050 vision of Europe's biodiversity strategy (*European Green Deal).w*All models for Italy's seas indicate a reduction in N and P loads. Only a small area in the south-western Ionian Sea shows an increase in nitrate. All models showed that there is a decrease in Chl-a only in the central/northern Adriatic, while the changes are zero for the other Italian seas.

Results from all models indicate that dissolved inorganic nutrients responded most rapidly to changing nutrient loads. Although improvements occurred in all MSFD regions for almost all eutrophication indicators, the relative intensities and response times to changes showed strong variations among regions. This shows that the response times to nutrient management strategies depend on the characteristics of the seas. Therefore, the timescales used for simulations must be long enough to assess the full offshore impact of load reductions away from coastal and marginal areas such as the Adriatic.

Between 2016 and 2018, nutrient input from fish farming increased by 14 percent, while nutrient subtraction carried out by mussel farming decreased by about 2.3 percent.

This variation is to be considered insignificant in a marine environmental balance (Descriptor 5, Marine Strategy), also considering the low nutrient input from aquaculture sources compared to other anthropogenic sources.

Descriptor 6 (Sea-floor integrity) requires, for the achievement of the GES, that sea-floor integrity be at a level that ensures that the structure and functions of the ecosystems are safeguarded and benthic ecosystems, in particular, are not adversely affected. This descriptor is intended to ensure that pressures generated by

anthropogenic activities on the sea-floor do not adversely affect marine ecosystem components, particularly benthic communities and their associated habitats.

From the initial assessment conducted as part of the first phase of the MSFD, with regard to Descriptor 6 (Physical Disturbance and Physical Loss) it was found that the pressure that most interacts on the sea-floor is Abrasion due to fishing activities that actively interact with the bottom (trawling, beam trawling and hydraulic dredges). With regard to Sealing pressure, in all three subregions, this was found to be concentrated mainly along the coast where, moreover, many protecte.

The 2018 Summary Report clarifies that the available data from the Monitoring Programmes do not allow a value to be established constituting a threshold above which a significant impact can be found. d and/or sensitive habitats are present. **Descriptor D7** "Hydrographical conditions" envisages that, to achieve Good Environmental Status (GES), a "*permanent alteration of hydrographical conditions does not adversely affect marine ecosystems*".Permanent alterations of hydrographic conditions due to coastal and marine infrastructure works under construction or planned as of 2012 were considered for this descriptor. To this end, Italy, through the EcAp-ICZM project, has identified two assessment areas affected by infrastructures subject to national Environmental Impact Assessments (EIAs) that have the potential to permanently alter hydrographic conditions, and such as to potentially produce significant impacts on benthic habitats: the new port of Fiumicino and the LNG Terminal in Monfalcone. With regard to this qualitative descriptor, the methodological approach involved the analysis of significant and permanent alterations to the oceanographic background characteristics of the hydrological processes and the physiographic conditions produced by new infrastructure built (or planned) since 2012 and subject to national Environmental Impact Assessment (EIA). In assessing the level of significance of the alterations produced by the engineering works, the analysis was restricted to coastal and marine infrastructure subject to a national EIA procedure. This made it possible to exclude all coastal defence works, the construction of small ports or marinas, and extensions of existing port infrastructures that do not require a national EIA and which are deemed not to produce any significant impact on both the spatial and temporal scales of marine ecosystems, as a specific consequence of altered hydrographical conditions.

Specifically, the assessment of the engineering works did not concern impacts on the ecosystems but focused mainly on benthic habitats, with a regression to the limits of the Habitats Directive.

This descriptor seems to disregard the impact of coastal defences, both as a modification of the seafloor and as a hydrodynamic alteration. In the Adriatic, Ionian and Tyrrhenian maritime areas, numerous coastal defence works have led to modifications of the seabed, completely transforming coastal dynamics. These works, even if small in size and affecting only the coastal strip, are nevertheless widely present along all the country's coasts and interfere with the hydrodynamics and transportation of sediments, considerably altering the natural balances of the beach system and the marine ecosystem

The concentration of pollutants, **Descriptor 8,** in the marine environment and their effects are assessed taking into consideration the provisions of the Marine Strategy Directive, as also required by the legal framework.

Substances or groups of substances were considered that: (1) are included in the list of priority substances in Annex X of Directive 2000/60/EC and further regulated in Directive 2013/39/EC; (2) are discharged into the affected marine region, subregion, or subdivision; (3) are contaminants and their release into the environment poses significant risks to the marine environment due to past and present pollution in the affected region, subregion, or subdivision.

As regards the targets, a comparison with the elaborations carried out in the previous assessment in 2012, although the assessment areas are different, shows the following:

- Biota

The investigated parameters were grouped into specific categories of contaminants (Metals, Polycyclic Aromatic Hydrocarbons (PAHs), Fluoranthene, Hexachlorobenzene (HCB), Hexachlorobutadiene (HCBD), pesticides/biocides and organochlorine compounds). It should be noted that due to the resident and physiological characteristics of bivalve mollusks, the assessment of concentration data for this species was defined over an area that covers the range of existence of these organisms, i.e., up to the 20 m bathymetry in the Adriatic Sea subregion.

The available data, integrated and indexed, showed no exceedances of the threshold value of the different parameters, except for the parameter mercury.

- Sediments

The investigated parameters were grouped into specific contaminant categories (Metals, PAHs, organochlorine compounds, HCB and TBT). The evaluation of concentration data was carried out by distinguishing the coastal zone under the jurisdiction of the WFD from the offshore zone up to the limit of territorial waters for the maritime area in question. In this area, the data provided show a qualitatively good status. Specifically, metals and PAHs are the categories with the highest percentages of exceedances.

- Water

As with other matrices, the investigated parameters were grouped into specific contaminant categories (Metals, PAHs, organochlorine compounds, pesticides, BTEX, phenols, HCBDs, and organotin compounds). Concentration data were evaluated by distinguishing between the coastal WFD area and the offshore area up to the limit of territorial waters for the "Adriatic" marine area. In general, as regards the offshore area, the data provided allow for a qualitative assessment of the status, as the percentages of exceedances of threshold values are less than 8%. The exceedances found were recorded for several categories of contaminants, mainly in the WFD area. For the "Adriatic" marine area, the recorded exceedances concern metals.

In the Marine Strategy Framework Directive (EC/2008/56 - Cycle II 2018-2024), contaminants in fish and other seafood are considered within the Qualitative **Descriptor 9** for the determination of good environmental status, which States "*Contaminants in fish and other seafood for human consumption do not exceed levels established by Community legislation or other relevant standards"*. The parameters considered, listed in Regulation (EC) No 1881/2006 *et seq.* are: Heavy Metals (Lead, Cadmium and Mercury); Dioxins and PCBs; and Polycyclic Aromatic Hydrocarbons (PAHs).The latest assessment of the GES under Art. 8 of the MSFD was carried out by ISPRA in the MSFD Report 2018. The data used for the quality status assessment are drawn from specific monitoring activities carried out for the purposes of the Marine Strategy Directive by CNR, according to WP 5.1 (Decree 11 February 2015). In general, the percentage of data coverage is not extensive enough to provide a meaningful representation of the quality of maritime areas nor to allow a judgement on the environmental status as set out in the GES definitions of Ministerial Decree No. 36 of 15 February 2019. The Adriatic Sea sub-region, however, features a higher percentage of coverage than the other two sub-regions. Despite the lack of information, it can be observed that the available data on the concentrations of contaminants detected in the samples of fishery products do not show exceedances of the threshold values for metals (Cd; Pb; Hg), nor for polycyclic aromatic hydrocarbons (PAH: benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene and chrysene), nor for organochlorines. Thus, a qualitative improvement can be seen, in general, compared to the data processed in the past Initial Assessment (IA), in which exceedances were found for metals in all three sub-regions, although, as already mentioned, the current coverage percentages are lower than in the past assessment (ISPRA, 2018).

In the Marine Strategy Framework Directive (EC/2008/56 - Cycle II 2018-2024), marine litter is considered within quality **descriptor 10**. Waste enters marine ecosystems from terrestrial (land-based) and marine (sea-based) sources. The former category includes coastal infrastructure, tourism and recreation, industrial activities and agriculture; the latter category includes tourism and recreation near the coast, fishing, aquaculture, shipping, oil and gas refineries, military activities and submarine communication cables.

It is estimated that about five trillion pieces of plastic, weighing 250,000 tons, currently float in the seas, while estimates of the total amount of plastic waste in the oceans (floating and deposited on the sea floor) put the figure at about 150 million tons, with an increase each year of about 8 million tons.

Data regarding beached marine litter are the result of monitoring campaigns conducted from October 2015 to March 2017 (one campaign per season for a total of eight campaigns).

As for the Adriatic, the sampling effort was 8 km. In this area, a percentage close to 80 percent of this beach litter consists of plastics.

The data regarding floating litter are the result of the monitoring campaign conducted over three years, from October 2013 to September 2016. The values of floating litter density, again, are higher for the Adriatic Sea, with a value almost double that of the other monitored sea segments. Also in the Adriatic Sea, the share of litter of natural origin is very low, and equal to 8 percent, higher only than in the segment related to the channel between

Sardinia and Sicily (SSCC) where, compared to a density value of 2.82, the portion of litter of natural origin is only 3 percent. As regards the litter found on the seabed, the most common types found, especially in the Mediterranean and Northeast Atlantic, are soft plastics (e.g., shoppers and bags), hard plastics (e.g., bottles, sundry containers), glass and metal (cans). Additional wastes accumulated on the sea-floor also include oil drums and radioactive waste containers that remain lying, stranded or silted, on underwater slopes and rocky outcrops. Data regarding the sea bottom litter component are derived from the MATTM-CNR Monitoring Program for the year 2016. No sampling area under Italian jurisdiction was chosen for the "Adriatic" Marine Area.

It is reported that monitoring of litter on the sea bottom should also be carried for the "Adriatic" Marine Area. At the local level in 2018 the project Fishing for Litter experimental project by Legambiente with the aim of collecting waste accidentally recovered at sea by fishermen during trawling. In about 90 days, more than 3,300 kilograms of waste found on the seabed were collected.

Of this litter, about 97 percent was plastic waste, followed by 1.4 percent metal waste and less than 1 percent textile or rubber waste. More than 80 percent of the waste came from fishing and aquaculture activities: among the plastic materials it was found that more than 80 percent were socks used for mussel farming.

The preliminary analysis covered 20 km² of coastline off the Venetian coast and found the presence of 362 objects referable to ALDFGs (abandoned, lost or otherwise discarded fishing gear), with a total weight of more than 500 kg. One-third of these consisted of trawl nets and about one-quarter of trammel nets. The type of gear found is indicative of the type of local activity, e.g., the lower occurrence of mussel socks indicates that the area has little involvement in this activity.

Waste pollution, including plastic waste, causes deep and lasting damage to the marine ecosystem. Litter promotes the worsening of invasions of non-indigenous species.

In the Marine Strategy Framework Directive (EC/2008/56 - Cycle II 2018-2024), marine noise is considered within quality **descriptor 11**. The Marine Strategy Framework Directive (MSFD) distinguishes two main types of marine noise:

- impulsive sound, i.e., loud, intermittent or infrequent noise, such as that generated by piling, seismic surveys and military sonar;
- continuous sound, constant lower-level noise (e.g., generated by ships and wind turbines).

To improve the quality of the environmental status of EU marine waters, the MFSD aims to avoid or limit the negative influence of noise on marine life, which is particularly complex because sound travels rapidly through water, four times faster than through air. Thus underwater noise can be perceived by marine organisms even dozens of kilometers away.

The Mediterranean Sea area is particularly exposed to continuous noise: an estimated 9 percent of Europe's marine area is exposed to very high-density ship traffic. Indeed, the largest area of such traffic is the Mediterranean Sea (27 percent). Impulsive sound, i.e., noise produced by pile driving for onshore and offshore construction, seismic surveys to inspect underwater oil and gas deposits, explosions and some sonar sources, affects the Mediterranean Sea to a lesser extent (18%).

With a view to initiating constant monitoring of marine noise and monitoring noise pollution in the sea, the Cetacea Foundation installed eight self-regulating buoys with hydrophones in the Adriatic Sea in 2020 as part of the Soundscape Project carried out with funding from Interreg Italy-Croatia.

4.2.3 Biodiversity and natural areas under protection

Marine Protected Areas[8] are a management tool for achieving sustainability goals in social-ecological systems. Together with the Natura2000 network and the OECMs (Other Effective Area-based Conservation Measures - CBD) they cover 19.1 percent of the national marine area (Sixth National CBD Report, presented in April 2019). They are, in addition, key tools for the conservation of coastal ecosystems.

The establishment of new MPAs involving the application of specific conservation measures makes it possible to contribute to the strengthening of the protection of Natural Capital stocks consisting, for example, of *Posidonia*

[8] Carta delle Aree Marine Protette - PGSM_ADR_AMBD001_AMP

oceanica seagrass beds and seabed characterized by the presence of coralligenous species and at the same time to encourage sustainable economic activities that are important for local communities.

In recent decades, *Posidonia oceanica* meadows have been severely threatened by direct anthropogenic pressures, such as physical removal and eutrophication, and by climate change (Badalamenti et al., 2011). It has been estimated that these seagrass beds in the last 50 years have regressed by 34 percent in the Mediterranean and 25 percent along the Italian coast in particular (Telesca et al., 2015).

Posidonia oceanica meadows are not as widespread along the "Adriatic" marine area except along the Apulian coast of the southern Adriatic where, however, they are subject to regression as is the case in much of the Italian coast. In the Mediterranean Sea, the Gulf of Trieste represents the northern distributional boundary of *Posidonia oceanica.* The most extensive seagrass meadow is located near Koper, on the Slovenian coast of the Gulf of Trieste. It is currently limited to a narrow area in front of the Grado lagoon, with isolated small-sized patches. The trend in habitat extent is stable, although moderate signs of regression are found along coastal waters characterized by urban, industrial and agricultural pressures. Much greater, however, is the total extent of habitat in the southern Adriatic, particularly along the Apulian coast. The nature and structure of the substrate, as well as the presence of urban, industrial and agricultural settlements, greatly influence the establishment and development of this habitat.

Regarding habitat "Reefs", the northern Adriatic is characterized by coralligenous formations, subject to specific protection measures, called "trezze" or "tegnùe". These unique hard-bottom bioconstructions in a predominantly sandy/muddy context are mainly concentrated between the Po Delta and the Gulf of Trieste, at a distance from the coast varying between 0.5 to 21 km and at depths between 7 to 25 m. Coralligenous formations extend almost uninterruptedly along the coasts of Marche, Abruzzo, and Molise. Along the north-south gradient, coralligenous formations thin out to the Gargano promontory. Past the Gulf of Manfredonia, coralligenous formations occur in the form of a few sparse patches. The bathymetric range of the southern Adriatic coralligenous habitat is between 10 and 140 m.

The data available for coralligenous formations, white coral and maërl habitats from monitoring activities conducted by ARPA and the CNR do not allow for an assessment of any loss or maintenance of these habitats, but they have brought more knowledge about the distribution and condition of these habitats in the Italian seas, going to form a baseline for the current implementation cycle of the Marine Strategy, for which improved and updated monitoring protocols have been prepared. Both coralligenous and maërl formations are being studied, and will be the subject of the CNN Report 2023.

A step forward in aligning marine protected areas with the Environmental Economic Zones (EEZs), established in 2019 and coinciding with the territory of National Parks, was achieved through the September 2020 "Simplification and Digital Innovation" Law.

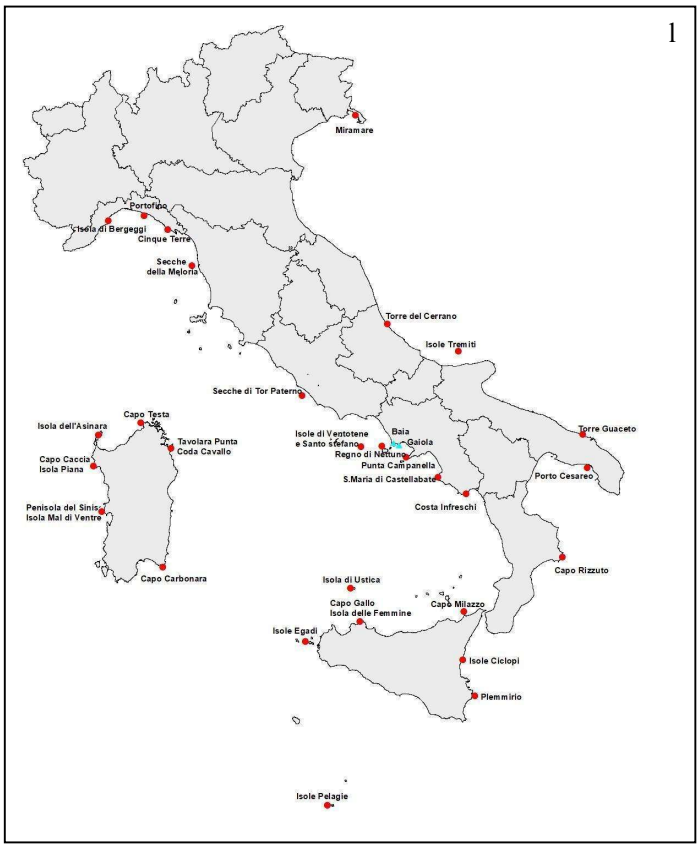
This intervention aligns the importance of marine protected areas with that already recognized for national parks in supporting the development of sustainability policies. There are two major consequences, first to move Italy forward toward building a comprehensive system of national protected areas, and second to strengthen and enhance the environmental, social and economic functions performed by national protected areas for the protection of Natural Capital. The total value of ecosystem services was calculated for 12 MPAs, distributed along the Italian coasts. The economic value of ecosystem services generated in each of the 12 MPAs investigated to date varies between 7 and 113 million euros per year, also depending on their extension. In the following tables (a, b, c, d), for each MPA, both flow indicators and benefit-relevant indicators expressed in economic terms are shown for each ecosystem service (Source IV CNN 2021).

The total value of ecosystem services calculated for the 12 MPAs investigated to date, constituting slightly more than 1/3 of Italy's 32 MPAs, is about 570 million euros per year. In the "Adriatic" marine area, the economic value of ecosystem services was calculated only for the Tremiti Islands MPA (IV CNN Report 2021). This value highlights the important role played by this MPA in the conservation of marine resources and, at the same time, in the generation of important human benefit flows.

A recent study published by National Geographic (2022) assessed the protection levels of the Mediterranean's 1,062 MPAs. While 6.01 percent of the Mediterranean is covered by some form of protection, 95 percent of this area shows no difference between the regulations imposed within MPAs versus outside MPAs. Comprehensive

and high levels of protection, the most effective for biodiversity conservation, represent only 0.23% of the basin and are unevenly distributed across political boundaries and eco-regions. With this in mind, marine protected areas (MPAs) are an important deterrent to such phenomena as illegal fishing, for example, as well as a particularly effective tool for restoring marine biodiversity and ecosystem services, but currently only 2.7 percent of the ocean is adequately protected. This low level of ocean protection is also due to conflicts with fishing and other extractive uses, as well as, in some cases, resistance to their establishment by local governments.

The protection of ecosystems and biodiversity plays a key role in the implementation of the European sustainable growth policy in the context of the *Green Deal.*



1

Studies and scientific research show that it is crucial to conserve and restore, where necessary, the ecosystem services of our natural systems to a healthy state, and to increase the number and quality of protection programs and measures targeting the most vulnerable terrestrial and aquatic ecosystems, the establishment of biological corridors, the implementation of native species protection and conservation programs, the study and countering of the spread of invasive alien species, the fight against illegal trade and poaching, and public awareness.

Currently designated MPAs cover 9.68 percent of the Mediterranean Sea, but those effectively managed are only 1.27 percent. To date, 29 MPAs have been established covering an area of about 222 thousand hectares and to these one needs to add two underwater archaeological parks and the International Marine Mammal Sanctuary, adding another 2.5 million hectares protected, for a total of 32 MPAs (data from the 6th update of the Ufficiale List of Protected Areas).

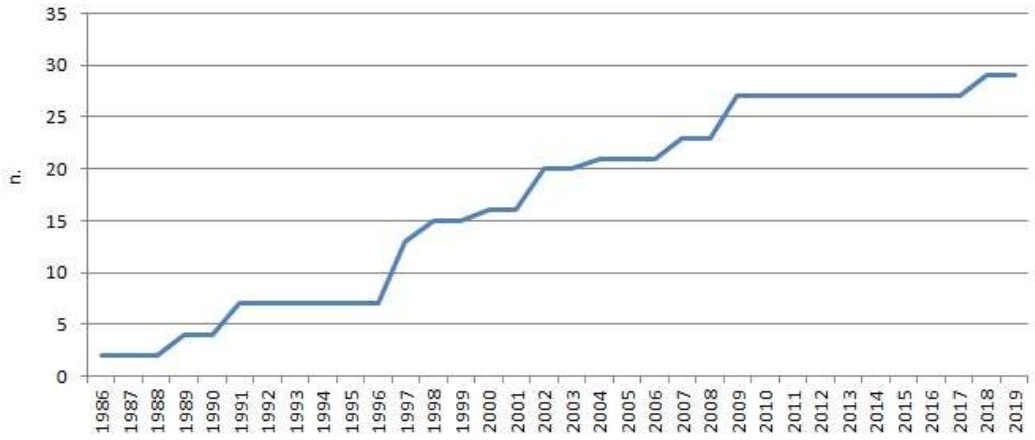
Sicily with 79.895 ha and Sardinia with 89.983 ha including the marine area of the Maddalena Archipelago NP, are the regions with the most MPAs, both in terms of number (7 in Sicily and 6 in Sardinia) and of marine protected areas (Source Ispra 2021). Campania has 4 MPAs, plus the underwater archaeological parks of Baia and Gaiola, covering a total area of 22,441 ha. Liguria has 3 established MPAs but a much smaller total protected area of about 5,100 ha compared to the situations described above.

The surface area figure alone, however, does not allow us to trace the actual degree of protection, which is closely related to the distribution in the different zoning levels:

- **Zone A,** with Total Protection, interdicted to all activities that may cause damage or disturbance to the marine environment. Only scientific research and service activities are generally allowed in this zone.
- **Zone B,** with General Protection: where a range of activities are permitted, often regulated and authorized by the management body, while granting sustainable enjoyment and use of the environment, resulting in minimal impact.
- **Zone C,** with Partial Protection, which represents the buffer strip between the areas of greatest naturalistic value and the sectors outside the marine protected area, where activities of sustainable enjoyment and use of the sea of modest environmental impact are allowed and regulated by the management body, in addition to what is already allowed in the other zones.

- **Zona D**, present only in rare cases, provides for less restrictive regulation than the other zoning levels. For special territorial characteristics in some marine protected areas, special subzones Bs of total reserve are established, forbidden to all activities that may cause damage or disturbance to the environment and marine species. In such a zone, access is allowed but all forms of harvesting are prohibited.

Only 2.8% of the total area is under full protection restrictions (Zone A), while in the remaining area human activities are regulated consistently with protection objectives (Zones B, C and D). Protection level D, in which restrictive measures are minimal, is present only in the MPAs "Isole Egadi", "Regno di Nettuno," and "Torre del Cerrano", affecting 17.7 percent of the area protected by the MPAs. As shown in Figure, the number of MPAs established only grew modestly until the mid-1990s, gaining momentum thereafter. Since 2009 there has been a stabilization, up until the establishment in 2018 of two new MPAs.



Trend in Marine Protected Areas in the years 1986-2019 (Source Ispra 20221)

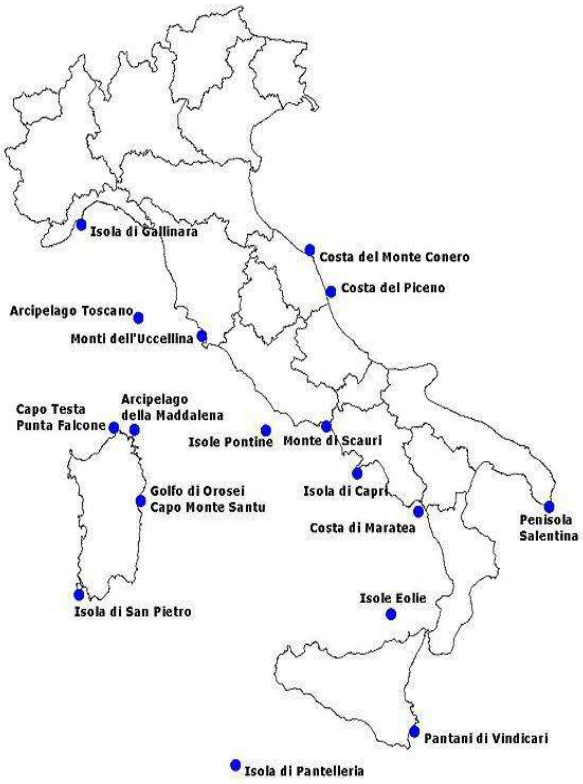
Designated marine areas

The 52 designated marine areas in the Adriatic Sea have been identified according to the provisions of Laws 979/82 art. 31, 394/91 art. 36, as amended. Of these, 29 have already been established, as well as 2 underwater parks in Baia and Gaiola. The marine protected areas that are soon to be established are the designated areas for which the preliminary process is underway. This process is provided for the areas included in the list of 46 Designated Areas indicated by Laws 979/82 Art. 31 and 394/91 Art. 36.

At present, in addition to the Capo Spartivento MPA, which is in the process of being established, there are ongoing preliminary investigations for the establishment of twelve new marine protected areas (designated marine areas Laws 394/91, Art. 36, and 979/82, Art. 31, as amended), whose administrative procedures can be considered to be in the final or very advanced stage:

1. Isola di Capri,
2. Capo d'Otranto-Grotte Zinzulusa and Romanelli-Capo di Leuca,
3. Costa di Maratea,
4. Costa del Monte Conero,
5. Isole Eolie,
6. Banchi Graham-Terribile- Pantelleria-Avventura,
7. Isola Gallinara,
8. Golfo di Orosei – Capo Monte, Santu
9. Isola di San Pietro
10. Isole Cheradi.
11. Arcipelago toscano

12. Monti dell'Uccellina -Formiche di Grosseto- Foce dell'Ombrane - Talamone



Le 17 aree marine protette di prossima istituzione, qualunque sia lo stato di avanzamento del previsto iter amministrativo. (Fonte MITE)

The following is the list of marine protected areas established in the Maritime area "ADRIATIC:

1. Marine Protected Area "MIRAMARE"
2. Marine Protected Area "TORRE DEL CERRANO"
3. Marine Protected Area "TREMITI ISLANDS"
4. Marine protected area "TORRE GUACETO"

The Framework Law on Protected Areas stipulates that the management of the marine protected area shall be entrusted as a priority to a management consortium formed among local authorities, public agencies, scientific institutions or recognized environmental protection associations. In Marine Protected Areas, regulations govern prohibitions and possible exemptions according to the degree of protection required.

4.2.4 Land and Soil

Like water and the air, land is a limited resource, and is one of the essential pre-requisites for lifee implementato

Waterproofing is one of the main causes of degradation of the land in Europe, as it leads to a heightened risk of flooding, contributes to climate change, threatens biodiversity, results in the loss of fertile farmland as well as natural and semi-natural areas, and, along with urban spread, contributes to the progressive, systematic destruction of the countryside, especially the rural landscape.

One important tool for studying and monitoring land as a resource is the European Corine Land Cover Programme (Copernicus,) lanciato nel 1990 and implemented to provide the European Union, the associated countries, and countries adjacent to the Mediterranean and Baltic Seas with homogeneous territorial information within the countries involved, facilitating contact between the operators. Using GUS techniques, this geographical data is

used to characterise the land component of the coastal belts included in the Adriatic MSP Sub-areas using. The table below shows the percentage area for each class / type of land cover of the extent of the entire sector, for each coastal belt sector that corresponds to the specific sub-area.

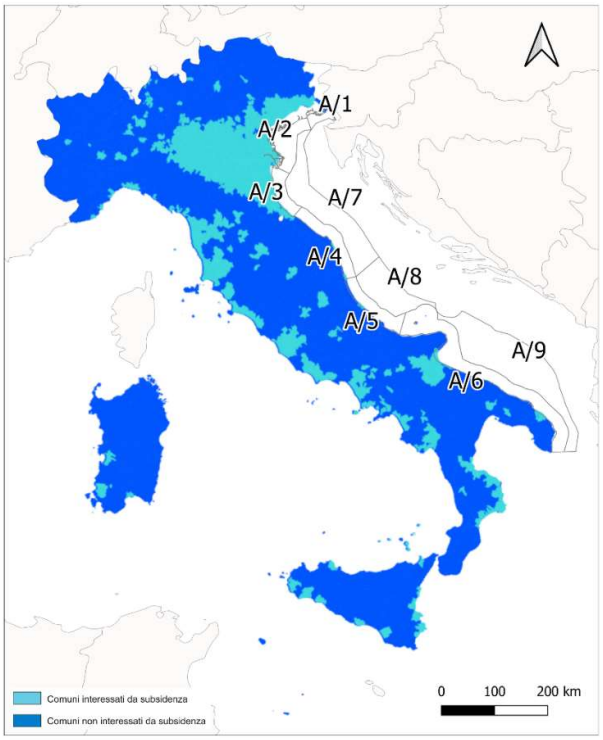
Coastal belt in the sub-area	Type of land cover - Level 1	Percentage of the area of the entire sector
A/1	Croplands	47.0%
A/1	Bush, forest	20.3%
A/1	Anthropised	15.0%
A/1	Sea, river, lake	13.1%
A/1	Grasslands	2.0%
A/1	Wetlands, transition water	1.4%
A/1	Plains, scrubland	0.7%
A/1	Areas with little or no vegetation	0.5%
A/2	Croplands	53.1%
A/2	Sea, river, lake	22.6%
A/2	Anthropised	12.4%
A/2	Wetlands, transition water	6.0%
A/2	Grasslands	3.3%
A/2	Bush, forest	2.2%
A/2	Areas with little or no vegetation	0.3%
A/3	Croplands	62.9%
A/3	Anthropised	16.1%
A/3	Sea, river, lake	12.1%
A/3	Bush, forest	4.7%
A/3	Wetlands, transition water	1.8%
A/3	Grasslands	1.8%
A/3	Areas with little or no vegetation	0.5%
A/3	Plains, scrubland	0.1%
A/4	Croplands	64.1%
A/4	Anthropised	19.6%
A/4	Bush, forest	10.8%
A/4	Grasslands	4.4%
A/4	Areas with little or no vegetation	0.7%
A/4	Sea, river, lake	0.5%
A/4	Plains, scrubland	0.1%
A/4	Wetlands, transition water	0.0%
A/5	Croplands	71.1%
A/5	Anthropised	15.2%
A/5	Bush, forest	8.8%
A/5	Grasslands	2.6%
A/5	Areas with little or no vegetation	0.9%
A/5	Plains, scrubland	0.8%
A/5	Sea, river, lake	0.5%

Coastal belt in the sub-area	Type of land cover - Level 1	Percentage of the area of the entire sector
A/5	Wetlands, transition water	0.0%
A/6	Croplands	65.0%
A/6	Anthropised	10.9%
A/6	Bush, forest	9.3%
A/6	Grasslands	6.5%
A/6	Plains, scrubland	3.4%
A/6	Sea, river, lake	2.6%
A/6	Wetlands, transition water	1.7%
A/6	Areas with little or no vegetation	0.6%

A lot of the coastal belt area in sub-area A/1 is cultivated land (47%, while about 20% is covered by bush. The anthropised areas account for 15%, which is the same percentage as the Marano Lagoon, along with the transition waters. The percentage the Venetian Lagoon occupies of the coastal belt that corresponds to sub-area A/2 is almost 23%, added to by the 6% of wetlands and transition waters. The anthropised area is about 12% whereas more than half the entire area is allocated for agricultural use. This latter cover class also prevails in the coastal belt in sub-area A/3, in which croplands account for almost 63% of the total area calculated. The Comacchio Valleys in the Po Delta Park, along with the other lagoons, rivers, and transition waters, amount to about 14% of the cover, while the zones changed by man account for 16%. Almost all the land cover in the coastal belt in sub-area A/4 can be broken down as being in four classes: croplands at 64%, anthropised areas at almost 20%, bush and forests at 11% and 4% grasslands. For the coastal sector in sub-area A/5, administered therefore by the regions of Abruzzo and Molise, one finds a large expanse of croplands at more than 71% of the entire area analysed. The anthropised areas make up about 15% and about 11% is occupied by bush and grasslands. Then poorly vegetated areas, transition waters, and lakes and rivers each account for less than 1%.

In the entire "Adriatic" M.A. [maritime area] the lowest anthropised zone percentage within the entire extent of the coastal belt is that measured on the coast of Puglia, which is in sub-area A/6 and reaches almost 11%. Croplands account for 65% of the total area, along with 9% of bush / forests, 6% of grasslands, and the remaining part made up of plains with more or less vegetation, and coastal and transition waters. Subsidence is a well-known, slow process of the land getting lower. It mainly affects coastal areas and plains Subsidence is generally caused by geological factors, but in recent decades it has been aggravated by the actions of man, reaching a greater scale that those that would have been attained naturally. Generally, natural subsidence is at a rate of a few millimetres per year. The case of subsidence induced and/or accelerated by anthropic causes (extracting fluids from the sub-soil or water remediation) is different. It reaches values from ten to more than a hundred times greater, and its effects manifest themselves within a shorter time, in some cases resulting in compromising human works and activities. Especially drawing fluids from the sub-soil results in the reduction in the volume of sediment it contains (especially if clays or limes are involved) which, as a result, compacts, and its topographical surface is lowered significantly. Therefore, subsidence is an important environmental risk factor, especially in areas that are highly urbanised or recently urbanised, and in coastal areas, especially when these are below sea level, also as regards climate fluctuations in the Mediterranean context (Annuario dei Dati Ambientali, ISPRA Ed. 2019).

This interaction of natural and anthropic processes makes studying the subsidence phenomenon complex, and so also its mitigation. In some zones, such as in Emilia-Romagna or the Venetian Lagoon, for example, where drawing fluids from the sub-soil is significant, the legislative actions taken to protect the territory have slowed down or even stopped subsidence locally. This phenomenon involves about 14% of Italian municipalities. The regions most exposed are Veneto and Emilia-Romagna, in which about 50% of municipalities are affected, followed by Tuscany, Campania), Lombardy, and Friuli-Venezia-Giulia (Annuario dei Dati Ambientali, ISPRA. Ed. 2019).



Modified - Italian municipalities with phenomena of subsidence and Sub-areas of the Adriatc Sea

Sub-area	Municipalities with subsidence phenomena that fall within the regions in the Adriatic Sea sub-areas
A/1	24
A/2	307
A/3	179
A/4	5
A/5	5
A/6	11

The Sub-Areas for the regions most affected by the subsidence phenomena are A/2 and A/3, which correspond to the regions of Veneto and Emilia-Romagna. As shown in Figure besides the zones in the Po Valley Plains and Venetian Lagoon, mainly the coastal municipalities are affected by this phenomenon and, especially, those characterised by low and sandy coastlines.

The Italian coastline along the Adriatic Sea is about 1,400 km long and about 86% of that is natural coastline (Table below) The longest stretch of coastline is in area A/6 and is about 680 km long, whereas the shortest is in sub-area A/1 at about 100 km long (ISPRA 2022 Data - processed by SOGESID).

SUB-AREA	Overall length (km)	Natural coastline (km - % of total sub-area)		Anthropised coastline (km - % of total sub-area)	
A/1	104	68	66%	36	34%
A/2	149	128	86%	21	14%
A/3	123	106	86%	17	14%
A/4	181	147	82%	33	18%
A/5	166	139	84%	27	16%
A/6	681	623	91%	58	9%

An initial indication of the coastline set-up can be obtained by computing the sections of natural coastline in relation to those subjected to coastal works by man for various purposes

Another indication of the coastal set-up is the data that, albeit speditiously, distinguishes high from low coastline. The latter is the most common morphology at about 87%, whereas the high coastline is found mainly on the Puglia coast (sub-area A/6) and marginally on sub-areas A/1, A/4, and A/5. As is known, the Veneto and Emilia-Romagna coasts (sub-areas A/2 and A/3) are exclusively in the form of beaches.

SUB-AREA	Overall length (km)	Low coast (km - % of total sub-area)		High coast (km - % of total sub-area)	
A/1	104	99	96%	4	4%
A/2	149	149	100%	0	0%
A/3	123	123	100%	0	0%
A/4	181	171	94%	10	6%
A/5	166	164	99%	2	1%
A/6	681	513	75%	169	25%

The retraction of the coastlines is perhaps the most monitored coastal risk factor, especially due to its impact on the tourism economy. In fact, erosion of the coastlines results in a reduction in spaces used for swimming and recreation activities which, is some areas like the Romagna coastline, are an important part of the Region's GDP.

This criticality affects both sections of active crags (or high coasts), where the phenomenon is often associated with collapses and/or undercutting at the base due to wave motion, and especially sandy and gravel beaches, where the loss of sediment due to the effect of coastline dynamics, results in lowering the level and the beach and retraction of the coastline. A recent piece of data on the evolutionary trend of the Adriatic coastline is found in the ISPRA 2020 processing for the Coastline, which provides information on retraction - stability - advancement of each segment of the coastline.

SUB-AREA	Retracting coastline (km - % of total sub-area)		Stable coastline (km - % of total sub-area)		Advancing coastline (km - % of total sub-area)	
A/1	8	7%	85	82%	11	11%
A/2	36	24%	48	32%	65	44%
A/3	34	28%	51	41%	38	31%
A/4	22	12%	98	54%	61	34%
A/5	33	20%	77	47%	56	33%
A/6	70	10%	549	81%	62	9%

The most frequent sections for which advancing coastlines are found are in sub-area A/2, where 44% of the coast is advancing, followed by those in sub-areas A/4 and A/5. The overview that emerges from this study therefore clearly differentiates sections of coastline characterised by a high degree of dynamism of the coastline (sub-areas A/2 and A/3 for example), with alternating erosion and prograding phenomena and sections of coastline with limited evolutionary phenomena (sub-areas A/1 and A/6), where the coast appears to be stable over the years.

SUB-AREA	Erosion in sq.m.	Growth in sq.m.
A/1	394,723	1,286,625
A/2	1,926,402	2,932,461
A/3	882,289	1,134,455
A/4	570,131	682,390
A/5	1,014,268	1,044,051
A/6	710,572	853,845

The coastline sections that are most stable are confirmed to be in sub-areas A/6 and A/1 for the reasons laid out before. Those that are most dynamic are in sub-areas A/2 and A/5, marked by changes in the areas of beaches of

the order of millions of square metres. Especially for sub-area A/2 an overall growth from 1994 to 2012 of almost 3 million square metres calculated, and erosion of about 2 million square metres of beach area.

Of the Adriatic regions, those with the largest percentage length of coastal sections exposed to a potential risk in 2012, were: Abruzzo, Emilia -Romagna and Marche, that had undergone particularly intense urbanisation over the last 50 years that had resulted in occupying more than half the territory within 300 metres of the coastline (Abruzzo: 62%, Marche: 59%, Emilia-Romagna: 55%). However, on analysing the data provided by the regions (TNEC - MATTM-Regions, 2018) related to monitoring phenomena by individual bodies in different periods and using different methods, the situation appears to be even more alarming. In fact, the Adriatic Regions that provided the data are all affected by erosion phenomena covering more than 30% of the length of their coastlines.

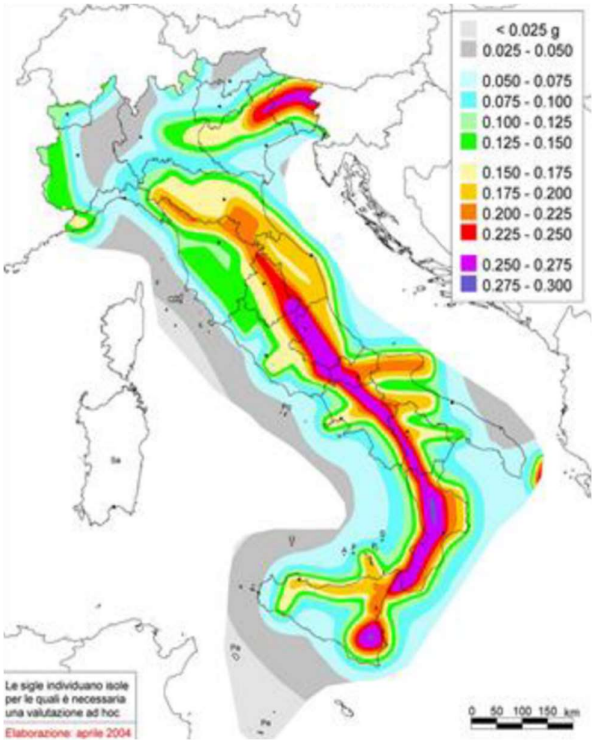
The most impactful effects of erosion phenomena are seen after storm surges that often result in a significant transfer of sediments away from the beach system, which is not counteracted by subsequent additions. In all of this, the artificial contribution of replenishing beaches becomes fundamental, especially taking advantage of stockpiles of sand under the sea, which are an important source of sand with characteristics that are compatible with those of the current beaches.The works involve moving boulders, making the seabed safe, as this has often been altered by the presence of the works themselves. One problem connected with the presence of rigid works in the sea is the deepening of the seabed at openings in or the edges of the structure that, in addition to altering the environmental conditions, can pose risks for swimming in the sea. Of the environmental aspects connected with detached works one must stress degradation of the quality of the waters behind the reef, as well as a loss of habitats, resulting in non-insignificant effects on the composition of the benthic communities present in terms of diversity, abundance, and biomass. On the other hand, submerged detached defences, similar to rocky sub-strata, facilitate the presence of epibiotic communities.

In relation to the matters and criticalities described above, one must point out the importance of careful evaluation of the criticalities induced by anthropic activities in the sea, on the dynamics of the coastal belt, while also taking into account the evolving scenarios associated with current climate changes. In fact, it was found that, especially in the North Adriatic Regions, already greatly afflicted with problems of marine flooding, the degree of vulnerability will increase in the coming decades, and they will have to come up with “adaptation plans” for climate changes that involve new ways of managing and using the coastline.

Sub-area	Mean of the seismic classifications for coastal towns and cities in each sub-area
A/1	2.96
A/2	3.00
A/3	2.28
A/4	2.19
A/5	2.74
A/6	3.31

Italy is largely a country that is tectonically and seismically active, which brings about seismic dangerousness that is particularly relevant along the entire Chain of the Appenines, Western Alps, Southern Sicily, and the Gargano Promontory in Puglia. The seismic dangerousness is determined by two elements; seismic shaking, which generally causes most of the damage, and surface faults.

The coastal belt with the highest mean seismicity value (3,31), is that located off sub-area A/6 administered territorially by the Puglia Region. Values below 3 are obtained for coastal belts for Sub-areas A/5 (Abruzzo and Molise), A/4 (Marche), and A/3 (Emilia-Romagna). Finally, for coastal municipalities in sub-area A/2 the mean seismic classification value was equal to 3.



Seismic dangerousness map (approved by means of OPCM 3519/2006), drawn up by the National Institute of Geology and Vulcanology, used as a reference to identify the ag values (ag is the acceleration of the land expressed as a fraction of acceleration due to gravity g) and the seismic zones. The maximum ag values are provided for the points on a reference grid, the node points is which are not more than 10 km apart (0.05° grid) and for various probabilities of exceeding in 50 years. There are various maps for different return periods.

Volcanic phenomena are connected with the particularly intense geodynamics of the entire Mediterranean area, characterised and determined by the presence / cohabitation of three tectonic plates: the Tyrrhenian, Adriatic, and African. The collision of the Tyrrhenian with the Adriatic plate formed (and is still forming) the Appenines, and both these plates, which in turn constitute the Euro-Asian plate, collide with the African plate. It is specifically this collision that, over million years, has formed most of the Italian volcanoes, and especially those in Southern Italy. The paroxysmal manifestations of the volcanic phenomena are eruptions, which occur when magma from inside the Earth rises to the crust due to the lower density than the surrounding rocks, passes through the crust and comes out on the surface in the form of lava, releasing the gases trapped while it is rising to the surface.

There are no volcanoes in the Adriatic Maritime Area. Nor are there volcanoes in the Adriatic coastal belt and the areas to the east of the Appenines.The coastal belt is also subject to hydrogeological instability such as, for example, retraction of the crags or coastal flooding. Flooding is the most frequent type of instability associated with hydraulic dangerousness. For this reason, knowledge of these phenomena in both normative and scientific terms, is both abundant and continuously updated. From a normative point of view there are two important tools: the Hydrogeological System Plans (PAI) and the Flood Risk Management Plan (PGRA).

For the entire coastal belt of the Adriatic Maritime Area, the calculation of the areas marked out as being in danger of flooding is about 2,800 sq.km out of an area of about 14,000 sq.km. Therefore, about 20% of the coastal belt in question is subject to the danger of flooding. In detail, and as indicated in the table below, the coastal belts most exposed to the danger of flooding are those in sub-areas A/3 (57,3% of the area at risk of flooding), A/2 (36.17%) and A/1 (23.52%). Morphologically, these areas are characterised by very extensive coastal plains, at altitudes near mean sea level, and they are crossed by important water courses.

The coastal belts in sub-areas A/4, A/5 and A/6, on the other hand, have a more irregular morphology, with steeper slopes and frequent high, rocky coasts, where flooding is normally less in extent, but greater in terms of intensity and force. In fact, the areas subject to danger of flooding in relation to the overall areas of the coastal belts calculated, are all small in extent. In fact, in the coastal belt in sub-area A/4, only 4,22% is classified as

being in danger of flooding, while in the coastal belts in sub-areas A/5 and A/6 only 6% of the total extent is classified as being in danger of flooding.

Sub-area	Percentage of the area subject to dangerousness due to flooding, compared to the 10 km coastal belt
A/1	23.52
A/2	36.17
A/3	57.30
A/4	4.22
A/5	5.95
A/6	6.18

The table below shows the results of this analysis, which shows that the coastal sectors in maritime sub-areas A/2 and A/3 to be those with territories most subject to the risk of flooding. These measure 1750 sq.km for sector A/2 and more than 1100 sq.km for sector A/3. In addition, one sees that the sector in sub-area A/6 (Adriatic Puglia) is where the areas classified as being high and very high risk are the most extensive.

SUB-AREA	PGRA – Risk of flooding (sq.km.)				
	R1 - moderate	R2 - medium	R3 - high	R4 - very high	Total risk
A/1	250	266	34	63	612
A/2	1060	561	36	94	1750
A/3	697	365	77	4	1142
A/4	25	56	7	27	114
A/5	27	48	12	35	123
A/6	63	114	93	183	453

Looking at the percentages for the areas at very high risk, the highest values are recorded for sectors that correspond to sub-areas A/1 (4,83 %) and A/6 (3,7%), whereas the sector in sub-area A/3 has the highest percentage for areas at high risk (4,5%).

SUB-AREA	PGRA – Risk of flooding (percentage of 10 km coastal belt)				
	R1 - moderate	R2 - medium	R3 - high	R4 - very high	Total risk
A/1	19.13	20.40	2.60	4.83	46.95
A/2	38.11	20.16	1.29	3.37	62.93
A/3	40.91	21.41	4.50	0.21	67.04
A/4	1.55	3.48	0.40	1.64	7.07
A/5	1.70	2.97	0.76	2.20	7.63
A/6	1.26	2.30	1.88	3.70	9.14

The dangerousness of landslides lies in the probability of occurrence of a potentially destructive phenomenon, of a certain intensity, and a certain time and in a given area. About 470 sq.km are in danger of landslide in the entire coastal belt that falls within the Adriatic Maritime Area. Therefore, with less than 4% of the area in danger of landslide for the entire 10 km wide coastal belt, this type of instability is decidedly less common than flooding.

Sub-area	Percentage of the area subject to dangerousness due to landslides, compared to the 10 km coastal belt
A/1	0
A/2	0
A/3	0.49

A/4	14.48
A/5	14.48
A/6	1.93

.

The areas most subject to flooding are spacious and without steep slopes, and so are obviously not subject to landslides, which are recorded in more steep zones with a rocky sub-strate. In fact, for the coastal belts in sub-areas A/1 and A/2 there are no areas in danger of landslides, and less than 10 sq.km is classified in terms of danger of landslides in the coastal belt in sub-area A/3 (0.49%).

The most extensive areas within the perimeters of danger of landslides fall within the coastal zones in sub-areas A/4 and A/5, where they occupy more than 14% and are connected with a more irregular morphology and particular lithological conditions and land coverage. Finally, almost 2% of the areas at danger or landslides is found for the coastal belt in sub-area A/6.

4.2.5 Waters (marine-coastal, swimming, transition)

The main aim of the national water policy is to guarantee sufficient "good quality" water to meet the needs of the people and the natural environment. The risks to human health linked to the consumption of water, relate mainly to their pollutant and contaminant contents, which also pose a threat to aquatic ecosystems, such as a scarcity of water and drought, which have serious consequences for many economic sectors.

In 2015 the six-year monitoring period, in terms of the Draft Directive on Waters (Directive 2000/60/CE), which calls for attaining "good" condition of all bodies or water. This goal was not achieved fully not only in Italy, but in other countries in the European Union as well. Marine-coastal waters

The "Benthic Macroinvertebrates M-AMBI-CW" indicator relates to the quality of the marine-coastal waters, and especially to classification of the Biological Quality Elements (EQB) of the marine bodies of water.

The M-AMBI (Multivariate-Azti Marine Biotic Index) is a multimetric index is used to provide a brief ecological classification of the ecosystem, using structural parameters (diversity, specific richness, and ratio between tolerant / sensitive species) of the mobile seabed macrozoobenthic community.

The species are broken down into five ecological groups opportunists (I order), opportunists (II order), tolerant, sensitive/tolerant, and sensitive), based on sensitivity to the environmental stress gradients. This indicator is relevant because it is laid down by the national norm and provides a significant response to pressures of anthropic origin. For the Adriatic Maritime Area the data refers to the Italian coastal stations monitored between 2016 and 2017 for the Benthic Macroinvertebrates EQB. For the 2016-2017 period of the 98 monitoring stations for 5 coastal regions of the 7 in the Adriatic Maritime Area (Veneto, Emilia Romagna, Marche, Abruzzo, and Puglia), 50,52% were in a high ecological state, 44,33 % in a good state, and 5,15% in a sufficient state (Source ISPRA 2021 yearbook). In the Sub-areas of the Adriatic Maritime Area, the greater percentage of stations fell in the high and good state. In terms of the "Benthic Macroinvertebrates" biological quality element, for the coastal regions for which data is available, no critical situations were found for the years 2016 and 2017. The trend for the 2016-2017 period was positive compared to previous years, and overall the environmental quality according ti the "Benthic Macroinvertebrates" EQB improved (Source Ispra 2021 yearbook).

Regarding the Adriatic Maritime Area, in 2019 4 of the 7 Regions were monitored (Emilia Romagna, Marche, Abruzzo, and Puglia). At an individual Region level, a comparison of the data fir the various years in some Regions showed a stationary trend, with most of the stations classified in the high and good state categories. The comparison done for 3 Regions (Emilia-Romagna, Abruzzo, and Puglia) and 24 stations, for the years 2015-2016, 2017-2018, and 2019 showed a stationary trend, with the greater percentage of stations that fall into the high and good state categories for all the years. (Source Ispra 2021 yearbook).

"A" chlorophyll is a primary indicator of phytoplankton biomass and is particularly sensitive to changes in the trophic levels, brought about by the addition of nutrient (N and P) loads, coming from basins in the coastal belt. An analysis of its spatial trends makes it possible to establish the relationships between the loads of nutrients weighing on the coastal systems, and the response of the latter in terms of producing phytoplanktonic biomass.

It also makes it possible to monitor the efficacy of any strategies and actions applied in order to control and remove the nutrients. (Source Ispra 2021 yearbook).

For each Region the seasons were classified by the Phytoplankton EQB on a scale of "high - good - sufficient - poor - bad), based on the value of the "chlorophyll a" index, evaluated in relation to the macro type of the body of water to which the stations belong (Source Ispra 2021 yearbook).

Overall, nationwide one finds that in 2018, of the coastal stations 72% were in the high state, whereas in 2019 this percentage went up considerably (80%).

In 2019 of the 160 monitoring stations for 6 of the 7 coastal Regions in the Adriatic Maritime Area (Friuli Venezia Giulia, Veneto, Emilia Romagna, Marche, Abruzzo and Puglia), 81% were in a high ecological state, 13,13% were in a good ecological state, and 5% were in a sufficient ecological state.

There were 131 stations in a high class, 21 in the good class, and 8 in the sufficient class (Source Ispra 2021 yearbook). Compared to 2018 there was an increase in the high class and a reduction in the good and sufficient classes respectively. In the Sub-areas in the Adriatic Maritime Area, the biological quality classification in terms of the phytoplankton EQB of the coastal waters is high). Overall the environmental quality in terms of the Phytoplankton EQB compared to the data available for 2018 improved, excepting for Sub-area A/3.

In fact, in sub-area A/3 of the 15 Chlorophyll "a" sampling stations, none were excellent, 9 were in a good state, and 6 were in a sufficient state (Source Ispra 2021 yearbook).

The Clean Coast Index can be used to classify the beaches in 5 categories, based on the density of the waste found in the sections of beach monitored:

- Very clean beach
- Clean beach
- Moderately clean beach
- Dirty beach
- Extremely dirty beach.

In 2020 the CCI was calculated nationwide for 57 beaches in spring and 67 in autumn because, due to the COVID-19 restrictions or other cases of force majeure, not all the beaches envisaged for the monitoring plan were sampled.

In spring 89% of the beaches monitored were clean or very clean, compared to 7% of beaches that were dirty or extremely dirty. In autumn 76% of the beaches were clean or very clean, compared to 9%+that were dirty or extremely dirty. The other beaches were found to be moderately clean. The percentage of clean or very clean beaches was clearly higher than previous years: 52% of the beaches were found to be clean or very clean in 2018, whereas in 2019 this figure was 58% (Ispra, 2021). In spring, on the Adriatic 79% of the beaches monitored were found to be clean or very clean, while 16% were dirty or extremely dirty. In autumn, however, 62% of the beaches were clean or very clean, and 21% were dirty or extremely dirty (Ispra, 2021).

The swimming waters are classified based on two microbiological parameters (escherichia coli and intestinal enterococchi), defined in the Directive on Swimming Waters. The aim of the Directive is to evaluate the degree of "swimmability" of water associated with a health and hygiene risk, and to provide indications as to the presence of microbiological contamination. In fact, on the one hand it provides environmental indications of the degree of microbiological pollution (faecal pathogens), and on the other expresses the probability of contracting a pathology associated with said pollution during a recreational activity (from excellent to poor class, the probability increases). In addition, it allows an indirect estimation of the efficacy of the waste water treatment systems, and evaluation of the efficacy time of any remediation measures adopted. Of all the swimming waters, 97,3% are in line with the Directive's minimum quality standards, classified as "sufficient" or excellent (Sources: European Environment Agency 2021). During During the 2020 swimming season, 5,520 swimming waters were monitored, 4,848 coastal and transition, and 672 inland, for a total of 32,636 samples taken and analysed

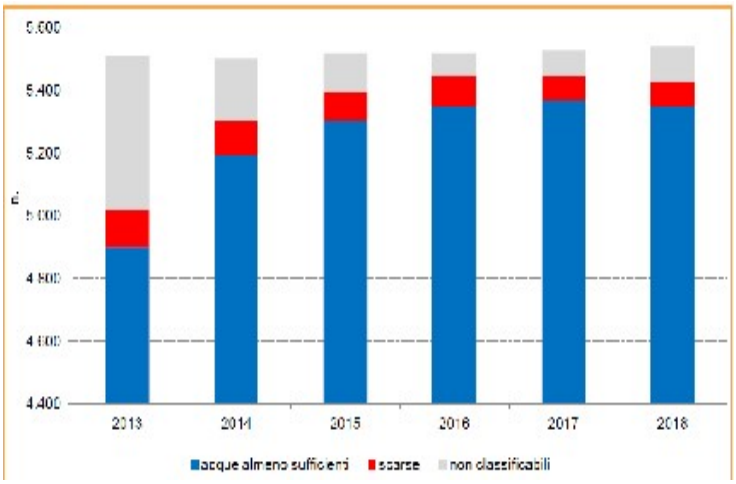
Of the 5,520 swimming waters monitored, 4,891 were in the excellent class, 337 in the good class, 143 in the sufficient class, and 93 in the poor class. 56 waters were not classified and so cannot be evaluated.

The classification was done using the results of monitoring done during the 2020 swimming season, and those from the three previous seasons (2019-2018-2017) (Source Ispra 2021 yearbook).

Nationwide, the percentage of excellent and good quality waters is high and near the European average (88.6% compared to 93% for the EU). As can be seen from most of the waters were in the excellent class (89%), 6% were classified as good, and 2% as sufficient. However, there are still criticalities, due to the presence of poor class (2%) and non classifiable (1%) waters, for which a quality judgement cannot be expressed, due to changes or anomalies found in the frequency of sampling and so they do not offer a useful number of samples for classification purposes. Both at a regional level and in general one can state that the number of waters in the excellent and good classes is very high. Overall, the number of excellent class waters prevails, although there are only three regions / autonomous provinces (Trento, Bolzano, and Umbria) in which all the water are in the excellent class. In 13 Regions (Piedmont, Lombardy, Veneto, Friuli Venezia Giulia, Liguria, Marche, Lazio, Abruzzo, Molise, Campania, Calabria, Sicily and Sardinia) there are poor waters. This result pushes us away from attaining the goal set in the Draft Directive on Waters 2000/60/CE. Of these Regions, 11 have unclassified waters, not subjected to evaluation, as they did not reach the minimum number of samplings (Source Ispra 2021 yearbook). Both at a regional level and in general one can state that the number of waters in the excellent and good classes is very high. Overall, the number of excellent class waters prevails, although there are only three regions / autonomous provinces (Trento, Bolzano, and Umbria) in which all the water are in the excellent class.

In 13 Regions (Piedmont, Lombardy, Veneto, Friuli Venezia Giulia, Liguria, Marche, Lazio, Abruzzo, Molise, Campania, Calabria, Sicily and Sardinia) there are poor waters. This result pushes us away from attaining the goal set in the Draft Directive on Waters 2000/60/CE. Of these Regions, 11 have unclassified waters, not subjected to evaluation, as they did not reach the minimum number of samplings (Source Ispra 2021 yearbook).

The trend analysis shows gradual attainment of the goals, even though in 2018 there was a slight drop off, due to worsening, with a slight reduction in the percentage of swimming waters classified as excellent, and a minimal increase in those of poor quality. This result led to slowing down in attaining the goals set by the norm (Figure below)



During the 2021 swimming season 2,663 swimming waters were monitored. In the Adriatic Maritime Area the excellent quality along with good quality of swimming waters almost reached 100% in all the Sub-areas excepting for Sub-area A/5 where poor water was encountered. This is why the goals set in the Directive on Waters has not been reached.As part of the swimming checks, algae that are potentially toxic present in aquatic environments are monitored, to also understand any correlations with global warming. The *Ostreopsis cf. ovata* indicator assesses the presence of the micro-alga, trends in its blooming, and possible damage to the benthic marine environment, while contributing to the environmental assessment of swimming waters in terms of DM 19/4/2018.

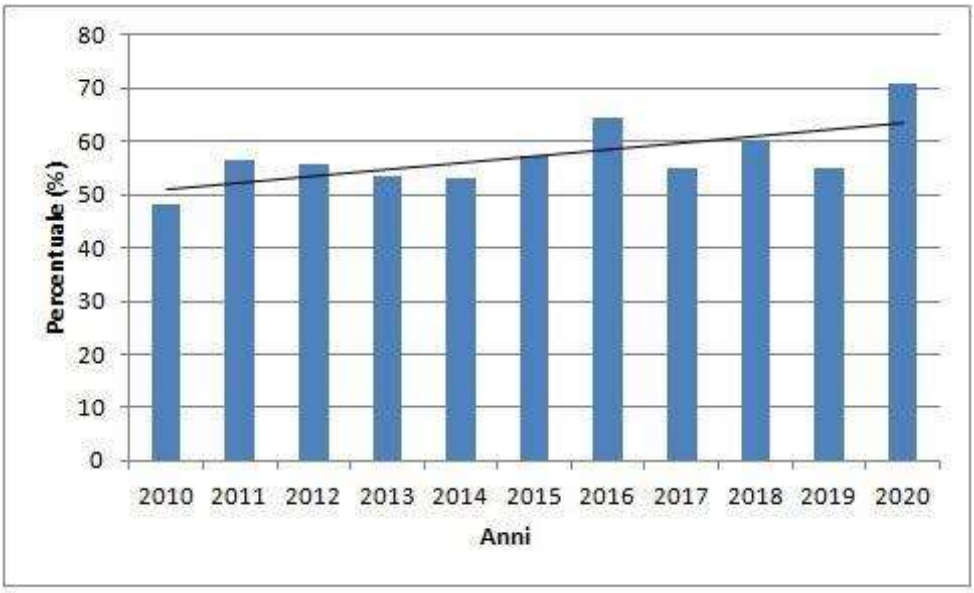
The blooming trend is also monitored for the purposes of safeguarding the health of bathers.

Nationwide, in 2020 monitoring was done in 13 coastal regions out of 15, excepting for Molise and Basilicata. The 200 stations identified and monitored have ideal hydromorphological characteristics for the development of the micro-alga (presence of macro-algae, rocky sub-strata, shallow water with moderate hydrodynamism, natural reefs and flow barriers, or piers).

In 6 regions exceeding of 30,000 cells/l was exceeded, which is deemed to be an alert value in terms of the Health Ministry's Guidelines. In 5 Regions a value of 100,000 cells/l was exceeded, which is deemed to be an emergency value. In 2020 there was an increase in sites with the presence of the micro-alga 71% (142 sites) compared to 54,8% (114 sites) in 2019, which describe the spatial distribution of the indicator.

Figure below shows that the trend is negative, since the trend over the eleven years taken into account, does not show a clear change in direction. In fact, since 2010 there is an increase over time of about 20 percentage points of sites with the presence of *Ostreopsis ovata* with 48 % in 2010 and 71 % in 2020.

In addition, minimal variations in the number of sites with the presence of micro-alga were found for the 2010-2015 period and large variations for the period 2016 to 2020 (Source Ispra 2021 yearbook) (Figure below).



Percentage of positive sites from 2010- 2020 (Source Ispra 2021 yearbook)

For the Adriatic Maritime Area monitoring in 2020 was done in 6 of the 7 coastal Regions (Friuli-Venezia-Giulia, Veneto, Emilia-Romagna, Marche, Abruzzo, and Puglia). The *Ostreopsis cf. ovata* was found in 3 coastal Regions (Friuli, Marche and Puglia), whereas it was not found in any of the samples taken on the coasts of Veneto, Emilia-Romagna, and Abruzzo. Two hotspots were found in the Adriatic Maritime Area, one in Friuli-Venezia-Giulia, that is, Sub-Area A/1, where cases of suffering were observed in marine organisms like limpets, crabs, and gasteropods, and the other in Puglia, that is, Sub-Area A/6, with a 100% presence of this toxic alga and a concentration in the column of water exceeding 30,000 cells per litre (Fig.4.79). This is the alert threshold, for which safeguarding measures must be adopted.

The ecological classification index for the Macroinvertebrate Biological Quality Element M-AMBI (Multivariate-Azti Marine Biotic Index), is applied to the coastal lagoons in the Mediterranean (TW) and is based on an analysis of the structure of the macrozoobenthic community on the mobile sea bed. This index takes into account the tolerance / sensitivity of the species, the diversity of the community, and the specific richness, and it is based on extensive bibliographical backing that is able to summarise the complexity of the mobile sea bed communities, making it possible to read the ecosystem in question ecologically.

The M_AMBI responds to pressures of anthropic origin, which affect the transition areas, and describes the ecological quality state in 5 classes: High, Good, Sufficient, Poor, Bad.

Of the 84 transition bodies of water in Italy, to which the M-AMBI index was applied during the three-year 2017-2019 monitoring period, 7.1% were in a "high" ecological state, 35.7% in a "good" state, 28.6% "sufficient", 3.1% in a "poor" state, and 15.5% in a "bad" ecological state (Source Ispra 2021 yearbook).

Nationwide, 42,9% of the transition bodies of water attained the quality objective ("good" or "high").

In the Adriatic Maritime Area, during the 2017-2019 three-year period, the ecological quality goal was achieved in 76.9% of the bodies of water in SUB-AREA A/1 and 26.3% in SUB-AREA A/2, whereas in SUB-AREA A/3 no body of water achieved the quality goal.

The MaQI (Macrophyte Quality Index) (Sfriso et al., 2014) formally adopted by Italy to classify the ecological state of the transition settings within the realm of Directive 2000/60/CE, adds the two macro-algae and aquatic seagrasses biological quality elements.

The MaQI responds to pressures of anthropic origin, which affect the transition areas, and describes the ecological quality state in 5 classes: : High, Good, Sufficient, Poor, Bad.

Applying the MaQI index to the transition waters in Italy provides a general assessment of the macrophyte components(macro-algae and seagrass) for the Friuli-Venezia-Giulia, Veneto, Emilia Romagna, Campania, Puglia, Sicily and Sardinia Regions, for which data is available, taking in a total of 86 bodies of water. In the count and in processing transition waters of a "river mouth" type were not considered, as currently this indicator does not apply to them (Source Ispra 2021 yearbook).

Of the 86 bodies of water monitored in the 2017-2019 three-year period in the Italian Regions that have transition waters, 25.6% were in a "high" ecological state, 23.3% in a "good" state, 12.8% in a "sufficient" state, 32.6% in a "poor" state, and the remaining 5.7% in a "bad" state. At a national level, therefore, 48.9% of the transition bodies of water attained the quality objective ("good" or "high").

For the Adriatic Maritime Area, in the 2017-2019 three-year period 90.9% of the bodies of water in SUB-AREA A/6 achieved the quality goal. Lower percentages were reached in SUB-AREA A/1 with 38.5% and SUB-REA A/2 with 22.2%, whereas in SUB-AREA A/3 no body of water was found to be in a "high" or "good" state.

4.2.6 Air and climate changes

As indicated in the National Strategy for Adapting to Climate Changes (SNACC) first, and then the National Plan for Adapting to Climate Changes (PNACC), the effects of climate changes on the marine ecosystems are able to profoundly alter their integrity in terms of both diversity and functioning. In fact, climate changes affect all levels of the ecological organisation, and changes in individuals, populations, and communities have been observed, as well as in the structure and functioning of ecosystems. The increase in the temperature of the seas, acidification, and the introduction of alien species reduce the resilience of marine ecosystems. As regards the Mediterranean basin in particular, global warming has led towards tropicalisation, which seems to point towards a reduction in indigenous species with an affinity for the cold.

Also, in the Mediterranean, due to its modest size the characteristic of being semi-closed, the changes induced by global warming can give rise to responses at a biological level that are faster than is found in other systems on a global scale. Two primary variables were considered in particular, to describe the evolution of the climate on Italian seas: the water surface temperature (SST) and the sea level (SSH).

This also made it possible to analyse the climatic anomalies expected, based on future climatic projections (2021-2050). By zoning the future climatic anomalies based on the forecast climate changes over the period 2021-2050, it was possible to identify the "homogeneous climatic areas", by superimposing the homogeneous climatic macro-regions and the anomalies zoning, in order to define areas with the same current climatic condition, and the same projection for future climatic anomaly.

For each climate macro-region in the Central Mediterranean, data analysis highlighted the following main climatic characteristics:

- **Homogeneous marine climatic macro-region 1M**: includes the Adriatic Sea, Ligurian Sea, and the northern part of the Sea of Sardinia. This macro-region is characterised by the lowest surface temperature and sea level values.
- **Homogeneous marine climatic macro-region 2M**: includes mainly the Ionian and Tyrrhenian Seas. This macro-region is characterised by surface temperatures of around 20°C and sea level values of around -3 cm.

Homogeneous marine climatic macro-region 3M:mainly includes the southern part of the Central Mediterranean. This macro-region is characterised by the highest values for surface temperature and sea level.

The indicators for the surface temperature of the Italian seas are calculated based on data processed by the National Oceanic and Atmospheric Administration (NOAA). These represent the estimated monthly mean values on a regular grid with a spatial resolution of 1° x 1°, obtained by stable spatial reconstruction of the sea surface temperature on a global scale. The estimates were based in integrating satellite measurements and data from the International Comprehensive Ocean-Atmosphere Data Set SST (ICOADS, http://icoads.noaa.gov/), which refer to measurements taken by ships, buoys, and other types of platforms.

Six groups of points were selected from the grid, each of which represents one of the Italian seas.

The average annual values for the mean sea water surface temperatures in Italy in 2020 obtained in this way are between 18.5°C (Adriatic) and 20.4°C (Ionian and Strait of Sicily).

The lowest monthly values are recorded in February for the Adriatic Sea, Sea of Sardinia, and the Strait of Sardinia, and in March for the other seas, that is, the Tyrrhenian, Ionian, and Strait of Sicily. The highest monthly values are recorded in August for all the seas. The lowest value was recorded in the Adriatic Sea (12.0°C) and the maximum in the Tyrrhenian (28.0°C).

Similar to the air temperature, the sea surface temperature in Italy in 2020 was higher than the 1961-1990 climatological average. The mean anomalies were positive i8n all months and intensified during the year up to August. The positive differences from the normal values with at their maximum in August (+1.7°C) and May (+1.4°C), whereas the smallest difference occurred in October (+0.3°C). On examining the series of mean annual anomalies compared to the 1961-1990 thirty-year reference climatology, with a mean anomaly of +0.95°C 2020 took fourth place in the entire series. Nine of the last ten years have recorded positive anomalies that were higher than the entire series. Over the last twenty-two years the mean anomaly has always been positive. As party to the "Convention on Long Range Transboundary Air Pollution" of the United Nations Economic Commission for Europe, each year Italy submits data on the emission of pollution into the atmosphere, in order to fulfil the obligations laid down by the Protocols implementing the Convention. The same data is also transmitted in terms of the Directive on the reduction of national emissions of certain pollutants of the atmosphere.

In the 1990-2019 period, the emissions of almost all the pollutants analysed, show a downward trend. The reductions are particularly significant for the main pollutants: SOx (-94%), NOx (-71%), CO (-70%), COVNM (-55%), BC (-62%), cadmium (-60%), mercury (-57%), lead (-95%) and hexachlorobenzene (-93%). The main driving factors behind these trends are the reductions in the transport, industrial, and road sectors, due to the implementation of various European Directives that have introduced new technologies, limits to plant emissions, limitation of lead content in liquid fuels, and the change to cleaner fuels. In addition, emissions were also down due to improved energy efficiency and the promotion of renewable energy.

The energy sector is the main source of emissions in Italy, with a quota of more than 80%, including escaped emissions, for many pollutants (SOx 88%; NOx 91%; CO 94%; PM2,5 88%; BC 94%; PAH 84%). The industrial process sector is an important source of emissions, linked specifically with the engineering sector, at least for particulate, heavy metals, and POP, whereas significant SOx emissions result from the production of cement and from the production of carbon black and sulphuric acid. The solvents and other products production sector is characterised by COVNM emissions. The farming sector is the main source of NH3 emissions in Italy, with a quota of 94% of the national total. Finally, the waste sector, and especially waste incineration, is a significant source for Cd.

In 2019, overall emissions of greenhouse gases in Italy came to about 376 million tonnes of CO2 equivalent. The total emissions of greenhouse gases, in CO2 equivalent terms, reduced by 19.4% between 1990 and 2019, going from 519 to 418 million CO2 equivalent tonnes.The most important greenhouse gas, CO2, accounts for 81.2% of all greenhouse gas emissions, and recorded a reduction of 22.7% between 1990 and 2019. In the energy sector in particular, the emissions of CO2 in 2019 went down by 20.7% compared to 1990.

Respectively, CH4 and N2O emissions account for 10.3% and 4.1% of all greenhouse gas emissions in Italy. Emissions of CH4, in particular, reduced by 12.9% from 1990 to 2019, while N2O reduced by 33.9%.

Specifically, for the year 2019, most of the overall greenhouse gas emissions can be attributed to the energy sector, followed by industrial processes and the use of products and agriculture. As has been said, the energy sector is the largest contributor to the emission of total greenhouse gas emissions for the country. Emissions by this sector went down by 20.9% from 1990 to 2019. For the industrial processes sector, emissions went down by 16.0% from 1990 to 2019. Specifically, in terms of compounds, emissions of CO2 represent 44.0% and showed a reduction of 49.1%, CH4 went down by 67.9% but only represents 0.1%, whereas N2O the levels of which represent 1.9% of total industrial emissions, went down by 91.1%. The reduction in emissions is mainly due to a reduction in the chemical industry (due to fully operational technology for damping down in the adipic acid industry) and emissions from the production of minerals and metals. There was a considerable increase in emissions of fluorinated gases (about 400%), the level of which, of total emissions in the sector, is 54.0% For agriculture, the emissions relate mainly to the levels of CH_4 and N_2O that account for 64.3% and 34.3% of the sector's total respectively. CO_2, on the other hand, only accounts for 1.5% of the total. The reduction observed in the total level of emissions (-17.3%) is due mainly to the reduction in CH_4 emissions from enteric fermentation (-14.6%), which accounts for 44.9% of the sector's emissions, and a reduction in N_2O in farming land (-20.6%), which represents 27.2% of the emissions from this sector.

As regards land use, the change in land use and forestry, from 1990 to 2019 total absorption increased significantly. CO_2 represents almost all the emissions and absorptions for this sector (98.4%).

Finally, emissions from the waste sector increased by 5.1% from 1990 to 2019, mainly due to an increase in the emissions from disposal of solid waste in the land (11.9%), which accounts for 75.1% of waste emissions. The most important greenhouse gas in this sector is CH_4 that accounts for 89.5% of emissions from the sector, and increased by 5.2% from 1990 to 2019. The N_2O emission levels went up by 40.1%, whereas CO_2 went down by 89.2%. These gases represent 10.2% and 0.3% for the sector respectively.

.In table provides an overview of the greenhouse gas emission trends by sector in Italy from 1990 to 2019.

Category	1990	1995	2000	2005	2010	2015	2017	2018	2019
				kt CO_2 equivalent					
A. Energy: fuel combustion	**412,204**	**425,568**	**448,477**	**477,889**	**420,035**	**350,910**	**342,747**	**338,568**	**329,135**
CO_2: 1. Energy Industries	136,941	139,941	144,273	159,227	136,885	105,486	104,529	95,545	91,312
CO_2: 2. Manufacturing Industries and Construction	90,772	88,969	94,893	90,786	68,900	54,552	52,136	53,221	48,838
CO_2: 3. Transport	100,319	111,531	121,443	126,616	114,172	105,039	99,741	103,133	104,283
CO_2: 4. Other Sectors	76,042	75,580	79,175	92,328	90,907	77,658	78,243	78,741	76,703
CO_2: 5. Other	1,071	1,496	837	1,233	652	459	326	341	453
CH_4	2,444	2,701	2,468	2,301	3,159	3,005	3,105	2,922	2,939
N_2O	4,615	5,349	5,388	5,398	5,361	4,710	4,667	4,665	4,607
1B2. Energy: fugitives from oil & gas	**13,117**	**12,374**	**11,147**	**9,755**	**9,014**	**8,115**	**7,731**	**7,395**	**7,507**
CO_2	4,048	4,002	3,262	2,557	2,377	2,574	2,351	2,295	2,757
CH_4	9,058	8,360	7,873	7,185	6,625	5,531	5,370	5,090	4,741
N_2O	12	12	12	13	12	10	10	9	9
2. Industrial processes	**40,422**	**38,316**	**39,123**	**47,209**	**37,000**	**33,232**	**33,817**	**34,570**	**33,937**
CO_2	29,335	27,281	25,832	28,718	21,703	14,976	14,976	15,248	14,941
CH_4	129	134	73	74	60	42	44	44	41
N_2O	7,199	7,701	8,599	8,251	1,224	613	697	684	641
HFCs	444	927	2,489	7,617	12,054	15,387	16,321	16,445	16,801
PFCs	2,907	1,492	1,488	1,940	1,520	1,688	1,314	1,657	1,028
Unspecified mix of HFCs and PFCs	NO	25	25	25	25	25	25	23	24
SF_6	408	680	604	550	394	472	417	446	444
NF_3	NO	77	13	33	20	28	23	22	18
3. Agriculture	**35,672**	**35,751**	**34,829**	**32,335**	**30,020**	**29,563**	**30,109**	**29,686**	**29,517**
CO_2: Liming	1	1	2	14	18	14	17	15	16
CO_2: Urea application	465	512	525	507	335	425	418	405	396
CO_2: Other carbon-containing fertilizers	44	54	44	42	28	20	20	22	17
CH_4: Enteric fermentation	15,497	15,319	15,048	13,179	12,761	12,912	13,301	13,257	13,241
CH_4: Manure management	4,843	4,606	4,571	4,685	4,539	4,253	4,211	4,142	4,132
CH_4: Rice Cultivation	1,876	1,989	1,656	1,752	1,822	1,668	1,646	1,601	1,583
CH_4: Field Burning of Agricultural Residues	15	15	15	16	15	16	15	15	15
N_2O: Manure management	2,817	2,688	2,601	2,399	2,320	2,126	2,150	2,117	2,082
N_2O: Agriculture soils	10,111	10,563	10,363	9,737	8,178	8,125	8,325	8,107	8,031
N_2O: Field Burning of Agricultural Residues	4	4	4	4	4	4	4	4	4
4A. Land-use change and forestry	**-3,491**	**-23,673**	**-20,916**	**-35,037**	**-41,923**	**-43,682**	**-20,339**	**-36,003**	**-41,561**
CO_2	-5,702	-24,905	-22,366	-35,995	-42,702	-44,274	-22,411	-36,608	-42,235
CH_4	1,286	303	714	299	350	264	1,511	153	181
N_2O	925	929	735	658	430	328	561	453	493
6. Waste	**17,304**	**19,996**	**21,890**	**21,883**	**20,404**	**18,617**	**18,309**	**18,332**	**18,184**
CO_2	512	458	208	230	177	99	92	54	55
CH_4	15,470	18,223	20,144	19,907	18,358	16,633	16,330	16,402	16,275
N_2O	1,323	1,315	1,538	1,746	1,869	1,885	1,887	1,876	1,853
Total emissions (with LULUCF)	***515,229***	***508,331***	***534,550***	***554,034***	***474,551***	***396,754***	***412,374***	***392,547***	***376,719***
Total emissions (without LULUCF)	***518,720***	***532,004***	***555,466***	***589,072***	***516,474***	***440,437***	***432,714***	***428,549***	***418,281***

As regards the shipping sector, this category of the national inventory of emissions includes all emissions resulting from the fuels used for this purpose. Overall, emissions for this sector went down from 1990 to 2019, due to a reduction in furl consumption for port activities and shipping. The number of movements, up since 1990, has inverted the trend in recent years. In 2019 shipping was a significant category in terms of emissions of SOx, NOx, PM10, PM2.5 and BC. As regards the fishing sector, unlike the shipping sector, this falls into the ENERGY sector. For this sector too, data related to emissions is derived from the extent of fuel consumption for fishing, and this data is rather reliable thanks to the different taxation regime applied to the fishing sector, which makes separate accounting of this type of consumption possible.

4.2.7 Food safety: fishing-related aspects

The quality of the environment and food products is one of the main aspects responsible for the health and wellbeing of the human population. Fishing and aquaculture are an important source of food with high value in terms of nutrition, income, and employment. The awareness of the importance of including ichthyic products in a varied nutritional regime has increased in recent decades in Italy and in Europe.

Pollutants in ichthyic products can pose a human health risk. While its chemical composition makes the ichthyic products peculiar compared to other protein foods, at the same time there are risks connected with consuming ichthyic products, in the form of biological contaminants (bacteria, viruses, algae toxins for bivalve molluscs, parasites, etc.), or chemicals (heavy metals, mercury, lead, cadmium, polychlorobyphenyls, PCB, dioxin, etc.). The presence of harmful substances is mainly due to the influence of the aquatic environment. The degree of contamination also depends on the age of the animal, its type of food, the species' lipid content (e.g. dioxin and PCB build up in the fats).

Food safety for all products including ichthyic products, is still one of the priority objectives of European Community policies. As indicated in the preceding paragraphs, the concentration of contaminants in ichthyic products intended for human consumption (D9) is estimated taking into account the provisions of Directive 2008/56/CE or the threshold values laid down by Regulation 1881/2006 and s.m.i. The main environmental milestone for descriptor 9, by means of specific action and monitoring programmes, consists of diminishing the concentration of contaminants in samples of fishing products from national waters, that do not conform to the limits laid down by current legislation.

The risks to human health associated with consuming ichthyic products relate mainly to the heavy metal content in fish and biological contamination in bivalve molluscs. Specifically, there are three types dangers that the consumer can face when consuming ichthyic products:

- Biological (especially viruses, bacteria, and parasites).
- Chemical (mainly environmental pollutants).
- Physical (presence of foreign bodies in the ichthyic product, such as fragments of plastic).

The data below covers all the maritime areas, as it is not available by individual areas or sub-areas. As can be seen from the Annual Report to the PNI 2019 of the Health Ministry, in 2019 there were 7,119 checks carried out on bivalve molluscs, 3% of which did not conform due to the presence of *Escherichia coli*, in 0.3% of the cases Salmonella was present and in 0.4% of the cases algae toxins were present. Most of the non conformities were found in natural managed banks, whereas the lowest number (with the exception of the algae mycotoxins) in hatcheries.

	Controlli effettuati	Non conformità *Coli*	Non conformità' *Salmonella*	Non conformità biotossine algali	% non conformità *Coli*	% non conformità *Salmonella*	% non conformità biotossine algali
ALLEVAMENTI	2.891	32	5	50	1,11%	0,17%	1,73%
BANCHI NATURALI GESTITI	1.707	78	4	0	4,57%	0,23%	0,00%
LIBERA RACCOLTA	637	10	0	1	1,57%	0,00%	0,16%

In the 680 checks carried out on ichthyic hatcheries in 2017, no irregularities were found for the presence of forbidden anabolic substances or residue from medicines or other contaminants.

In ichthyic products the highest concentration of microplastics is found in the gastrointestinal tract. In fish the average number of particles found is between 1 and 7, in shrimps an average of 0.75 particles / g was found, whereas in bivalve molluscs the average number of particles is 0.2-4/g.

Since in most cases the stomach and intestine of fish are fish are eliminated, the risk of exposure of man to microplastics as a result of consuming fish, is low.

On the other hand, the risk may be greater for bivalve molluscs, as they are consumed whole.

In Conclusion, EFSA recommends further implementation and standardisation of analytical methods for detecting micro and nano plastics, in order to evaluate their presence and quantify the levels at which they are present in foods. Further studies are also necessary, in order to find out more about the toxicokinetics and toxicity of these compounds, both in marine organisms and in man.

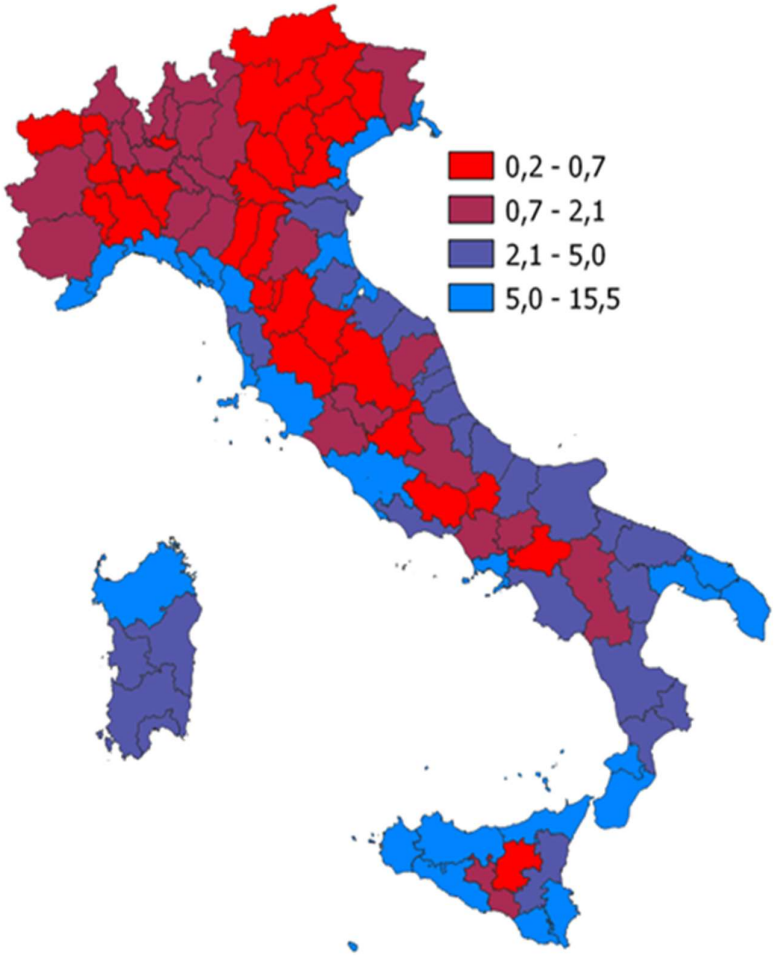
The sea economy includes all the types of production in which companies and people work, with the production process based on the "sea" resource. This means transporting cargo and passengers via waterways, the ichthyic chain (which includes fishing and aquaculture), coastal tourism, shipyards, water sports and recreation activities, the sea-derived energy industry, research activities, regulation and environmental safeguarding of the waters. These activities do not only involve companies located on the coast, but also those who work in order parts of the Country, but that are functionally part of these sectors. In 2017 the European Commission identified the Blue Economy as “A well-managed, sustainable marine and maritime economy that aims to reconcile sustainable economic growth associated with the sea with the best means of subsistence and social fairness for current and future generations and reinforcing of transparent food systems that are reliable and safer, based on conservation of the marine ecosystems and biodiversity, and on sustainable use of the resources. Promoting sustainable growth of maritime economies is one of the priority goals of the PSM and MSFD Directives. This context is part of that for sustainable development, dealt with in the “2030 Sustainable Development Agenda". The Primary objective is to improve the socio-economic wellbeing conditions that characterise our Country, while the individual objectives are:

- To reduce poverty, inequality, discrimination, and unemployment (especially among females and the youth).
- To ensure environmental sustainability.
- To regain trust in the institutions.
- To increase opportunities for professional growth, study, and training.
- To restore competitiveness to Countries, by means of a fourth industrial revolution based on innovative, sustainable technologies.

Italy accounts for 6% of the European Coastline, and the Italian coasts are in 7 of the 30 Geographical Sub-Areas (GSA) into which the General Fishing Commission for the Mediterranean.

The most important sector in terms of added value and employment is tourism, while mining and recreational activities are the most marginal sectors. The ichthyic chain, which includes fishing and aquaculture, generates more than 7% of the added value, and employs almost 12% of the people.

At a territorial level, the sea economy's contribution to the provincial GDP is particularly significant in Liguria, Southern Tuscany, Sicily (especially Trapani and Messina), the Rimini Province, Veneto and the Province of Trieste, where it reaches its highest value of 15.4%. This sector is characterised by a positive evolutionary dynamic. In 2019 there were 208,606 companies in business, and the number increased by 14.7% in 2014-2019, compared to an overall growth in the number of companies in Italy over the same period of 0.6%. The level of sea economy companies nationwide stands at 3%, but approaches 12% in Liguria, and stands at between 4.5 and 5.6% in Sardinia, Friuli-Venezia-Giulia, Lazio, and Sicily.



Quota in % of the sea economy's added value compared to the province's total economy

Most of the companies work in the tourism sector, followed by the ichthyic sector, and sporting and recreation activities. In total, these companies account for almost 77% of companies, but only generate 44% of the added value. However, substantial differences are found in the various segments: companies run by youth are more numerous in tourism and the ichthyic chain, whereas there are few of them in research, environmental regulation and protection, and the transport segment. Italy plays its part in the effort to contain the impact of fishing on fishery resources and the marine ecosystems, pursued by the EU, acting in reducing the number of fishing vessels and engaging in fishing.

Production by Italy aquaculture sector remains stable, while one would hope for growth to reduce dependence on importation of ichthyic products, and limit pressure applied by fishing on the ichthyic stock.

The goal aimed for in Italy for 2025 in terms of growth and development of the sector seems to be unattainable, given the unchanging number of plants and substantially stable production trend.

Employment in the sector follows a positive trend in the leading segment (mussel farming), but is negative when it comes to fresh water production.

The added value generated by fishing and aquaculture accounts for a marginal quota of the national GDP, and has been stable in terms of value and quota of the national total since 2013. In 2020, fishing and aquaculture contributed € 843 billion to the Italian GDP, which relates to a percentage quota of 0,045%. The sector's contribution to the national GDP reduced constantly from 2010 to 2020 in terms of both absolute value and percentage.

4.2.8 Landscape and cultural heritage

The landscape and cultural heritage are structural elements of the living setting for the population and the identity of a territory. They represent a key element in individual and social wellbeing, as recognised in the European Landscape Given the elements of physical and anthropic characterisation of the landscape and its components, it would be difficult to represent the Adriatic coastal belt system in a few pages. Therefore, in the pages that follow, an analysis is laid out that will make it possible to arrive at:

1. A definition of the particular characteristics of the Landscape Settings as these are identified in the Regional Landscape Plans, based on elements of the hydrogeomorphological set-up, the environmental and ecosystemic characters, the types of settlements .
2. Evaluation of the Concentration of historical-architectural assets and landscape areas of interest protected in terms of the Cultural Heritage and Landscape Code on the coast or immediately adjacent to it (a belt within 300 m of the shoreline was taken as a reference).

Characteristics of the Adriatic Coastal Belt's Landscape System

- **Sub Area A/1 – (Territorial waters) Friuli-Venezia-Giulia**[9]

The region's territory was classified in 12 Landscape Settings (AP) beginning, among other things, from the following identification criteria:

Of the 12 **Landscape Settings** identified by FVG's Landscape Plan, those affected by the MSP are:

- **AP 11** - Karst Region and Western Coastline.
- **AP 12** – Lagoon and coast.

In A/1 a total of 159 assets of historical / architectural interest were censused. The highest concentration is in A/1_05 with 85 units and in A/1_01 with 54 assets censused. The greatest density of areas subject to landscape protection in A/1 lies in A/1_03 in which 100% of this reference belt has assets of landscape / architectural interest . That usage of this UP is laid down as being for "Protection of the environment and natural resources". It is followed by A/1_02 at 80,69% . To a lesser extent there's A/1_01 at 23.14%. However, in combining the specific and areal index values the highest sensitivity indices in A/1 are assigned to A/1_01 (value: 12), A/1_02 (value: 10) and A/1_05 (value: 10).

- **Sub-Area A/2 – (Territorial Waters) Veneto**[10]

Of the 14 APs identified in Annex B3 to DGR 427 of 10/04/2013, those affected by the MSP are settings 11) Eastern Remediations - Piave to Tagliamento, and 14) Adriatic coastal arc, Venice Lagoon, and Po Delta.

- **AP 11** Eastern remediations Piave to Tagliamento ".
- **AP 14** Adriatic Coastal Arc, Venice Lagoon, and Po Delta.

In **A/2** (within the reference belt) a total of 30 assets of historical / architectural interest were censused. The highest concentration is in A/2_01 with 17 units (which puts it in class 2 in terms of the specific asset proportion index) and in A/2_03 with 13 assets censused (index value: 2). The greatest density of areas subject to landscape protection in **A/2** lies in A/2_03 in which 100% of this reference belt has assets of landscape / architectural interest (which puts the PU in class 5 in terms of the areal proportion index). It is followed by A/2_02 at 94,42% (class 5 in the areal proportion index). To a lesser extent there's A/2_01 at 68.82% (areal proportion index, class 4). However, in combining the specific and areal index values the **highest sensitivity indices** in **A/2** are assigned to **A/2_03** (value: 10), A/2_01 (value: 8) and A/2_02 (value: 5).

- **Sub-Area A/3- (Territorial Waters) Emilia-Romagna**[11]

[9] Carta dei beni culturali e paesaggistici nella Sub-Area A/1 - PGSM_ADR_AMBD009_BeniCulturali_A1
[10] Carta dei beni culturali e paesaggistici nella Sub-Area A/2 - PGSM_ADR_AMBD010_ BeniCulturali _A2
[11] Carta dei beni culturali e paesaggistici nella Sub-Area A/3 - PGSM_ADR_AMBD011_ BeniCulturali _A3

The
Region is currently engaged together with MiBAC in the process of adapting the current Landscape Plan to the Cultural Heritage and Landscape Code.

In **A/3** (within the reference belt) 18 assets of historical / architectural interest were censused overall, all concentrated in A/3_05 (A/3 is a sub-area that lies mainly in territorial waters). The highest concentration is, as stated, A/3_05 with 18 units (putting it in class 2 in terms of its specific assets proportion index). The greatest density of areas subject to landscape protection in **A/3** lies in A/3_03 in which 94.26% of the area is subject to areal restrictions within the reference area (which puts the PU in class 5 in terms of the areal proportion index). It is followed by A/3_05 at 18.41% (class 2 in the areal proportion index).

However, in combining the specific and areal index values the **highest sensitivity indices** in **A/3** are assigned to **A/3_03** (value: 5), and A/3_05 (value: 4).

- **Sub-Area A/4- (Territorial Waters) Marche**[12]

The PPAR Report highlights the fact that the Region is divided into three sub-areas:

- Coastal sub-area. Made of the territories of the municipalities on the Adriatic coast.
- Mountain sub-area. Made up of territories of municipalities that are part of the Mountain Communities.
- Hill sub-area. Made up of territories of municipalities not included in either of the previous sub-areas.

In **A/4** (within the reference belt) a total of 84 assets of historical / architectural interest and 27 archaeological assets, giving a total of 111 units were censused (besides the 3 under water). The highest concentration is in A/4_10 with 60 units overall (which puts it in class 4 in terms of the specific asset proportion index) and in A/4_04 with 33 assets censused (index value: 3). The greatest density of areas subject to landscape protection in **A/4** lies in A/4_07 in which 97.43% of the area involves is covered by landscape / architectural assets within the reference area (which puts the PU in class 5 in terms of the areal proportion index). It is followed by A/4_04 at 23.91% (class 3 in the areal proportion index). However, combining the specific and areal index values the **highest sensitivity indices** in **A/4** are assigned to **A/4_04** (value: 9), A/4_10 (value: 8) and A/4_07 (value: 5).

- **Sub-Area A/5- (Territorial Waters) Abruzzo and Molise**[13]

The Regional Landscape Plan identified the following landscape settings:

Mountain Settings

- Monti della Laga
- Salinello River
- Gran Sasso Maiella – Morrone Monti Simbruini, Velino Sirente, Abruzzo National Park.

Coastal Settings

- Teramo Coast
- Pescara Coast
- Testino Coast.

River Settings

- Vomano - Tordino Rivers
- Tavo - Fino Rivers
- Pescara - Tirino – Sagittario Rivers
- Sangro - Aventino Rivers.

[12] Carta dei beni culturali e paesaggistici nella Sub-Area A/4 - PGSM_ADR_AMBD012_ BeniCulturali _A4
[13] Carta dei beni culturali e paesaggistici nella Sub-Area A/5 - PGSM_ADR_AMBD013_ BeniCulturali _A5

In **A5**
(within the reference belt) a total of 50 assets of cultural / architectural interest were censused in the 300 m coastal belt. The highest concentration is in A/5_05 with 27 units (which puts it in class 3 in terms of the specific asset proportion index) and in A/5_06 with 11 assets censused (index value: 2).

The greatest density of areas subject to landscape protection in **A/5** lies in A/5_06 in which 10.00% of the area is subject to areal restrictions within the reference area (which puts the PU in class 5 in terms of the areal proportion index). It is followed by A/5_05 at 52.06% (class 4 in the areal proportion index), and A/5_01 at 51,21% (class 4). Combining the specific and areal index values the **highest sensitivity indices** in **A/5** are assigned to **A/5_05** (value: 12), A/5_06 (value: 10) and A/5_01 (value: 8).

No underwater assets were surveyed.

- **Sub-Area A/6- (Territorial Waters) Puglia**[14]

As indicated in the General Report, the Plan identifies 11 landscape settings.

- **AP 1** Gargano
- **AP 3** Tavoliere *Schedule: Setting A3.4 I Coastal landscapes*.
- **AP 4 Ofanto**.
- **AP 5** Central Puglia.
- **AP 7** Murgia Dei Trulli
- **AP 9** The Brindisi Plain
- **AP 10** Tavoliere Salentino
- **AP 11** Salento Delle Serre

A/6 is the area with the greatest richness and sensibility of landscape on the Adriatic Coast.

In **A/6**, within the reference belt, 457 assets of historical and architectural interest were censused. The greatest concentration is in A/6_15 with 274 units (256 specific cultural / architectural assets, 18 archaeological assets, and 5 underwater assets), putting it in class 5 in terms of the specific asset proportion index. In A/6_09 there were 103 assets (98 cultural / architectural assets and 5 archaeological assets) with an index value of 5. The greatest density of areas subject to landscape protection in **A/6** lie in A/6_01, A/6_14, A/6_16, A/6_22, A/6_24 and A/6_26 with 100% of their area covered by landscape / architectural assets in the reference belt (which puts this UP in class 5 in terms of areal proportion), followed by A/6_23 with 99.95%. Combining the specific and areal index values the **highest sensitivity indices** in **A/6** are assigned to **A/6_15** (value: 25), A/6_09 (value: 15) and A/6_12 (value: 12).

Land use in the belt subject to landscape protection

Reference is made to the indicator developed by ISPRA to monitor land used in the coastal belt and annual land use (2019-2020) in areas bound by landscape protection (ex D.Lgs. 42/2004 - art. 136). In the first case the table below shows how of the Adriatic regions setting, Marche is the region with the highest value for land use in the 300 m coastal belt, with an upward trend for 2018-2020, followed by Abruzzo and Emilia-Romagna. In the second case the table shows how of the Adriatic regions setting, Veneto is the territory that has seem land use in absolute terms more than any other, even though Puglia is the region with the largest percentage of land used.

Region	**Annual land use within 300 m of the coastline (2019-2020)**		**Annual land use within 300 m of the coastline (2018-2019)**	
	%	*Var % 2019/2020*	*%*	*Var % 2018/2019*
Veneto	10.8	-0.1	10.8	0.2
Friuli-Venezia-Giulia	12.6	0.1	12.6	0.3

[14] Carta dei beni culturali e paesaggistici nella Sub-Area A/6 - PGSM_ADR_AMBD014_ BeniCulturali _A6

Emilia-Romagna	35.6	0.1	35.5	0.0
Marche	46.1	0.2	46.0	0.2
Abruzzo	36.8	0.2	36.7	0.3
Molise	20.2	0.3	20.0	0.0
Puglia	29.5	0.0	29.4	0.2
Italy	**22.8**	**0.1**	**22.7**	**0.1**

Region	**Land use in areas bound by landscape protection (2019-2020)**			**Land used (%)**
	Increase (hectares)	*Increase %*	*Density m²/ha*	
Veneto	122	0.2	1.8	8.4
Friuli-Venezia-Giulia	11	0.1	0.5	8.2
Emilia-Romagna	64	0.2	1.2	7.4
Marche	46	0.2	1.3	5.8
Abruzzo	86	0.5	1.4	2.9
Molise	34	0.4	1.4	3.7
Puglia	65	0.3	2.2	8.7
Italy	**1037**	**0.2**	**1**	**5.4**

5. Evaluation of the possible significant effects of the MSP

5.1 Correlation matrix between anthropic uses of the sea, pressures, effects and environmental components

Consistently with paragraph 5.2.2 of the Preliminary Environmental Report, in order to assess the potential effects of the Plan and its impacts on the relevant environmental context, qualitative estimates were used, focusing on the description of the cause-effect interrelationships, supplemented by quantitative elements from the available physical and environmental information.

The evaluation exercise at this stage was aimed to:

- describe and estimate the potential pressures resulting from current and future sea conditions and uses, as a result of the Plan measures;
- identify the environmental issues/components potentially affected by the measures in the Plan;
- estimate the intensity and possible duration of the effects, cumulative or otherwise, on the environmental components;
- suggest possible alternatives and mitigation/compensation measures to be integrated into the Plan.

The analysis of the potential environmental effects of the Plan took into account the main interactions between the uses of the maritime space and the state of the environmental components described in the previous chapters. In order to ensure that the activities are compatible and ecologically sustainable in the medium to long term, the Preliminary Environmental Report provides an initial analysis of the interactions between sea uses and environmental components, which aimed to highlight the potential negative effects on environmental components, marine and terrestrial, from the anthropic uses of the sea, as well as to highlight the benefits from maintaining the marine environment in good condition, in order to support the achievement of good environmental status under the Marine Strategy (Framework Directive 2008/56/EC), as well as the benefits from the presence of areas of environmental protection value. This analysis of the interactions between uses and environmental components, carried out according to a risk-based approach (Stelzenmuller et al. 2020), comprising identification, analysis, evaluation phases of the interactions between uses and the environment and definition of the potential risks for the environment and for the benefits and services from ecosystems in good environmental status within the proposed Plan, has been deepened in this Environmental Report, through a more detailed identification of the potential causal factors and pressures from the anthropic uses of the sea envisaged by the Plan on a national scale. Once the factors were determined, the possible effects were outlined, i.e., the changes, both positive and negative, direct and/or indirect, potentially determined.

As a further development of section 5.2.2 of the Preliminary Environmental Report, it was deemed appropriate to provide for the structuring of the matrix designed for the purpose of assessing the interactions between anthropic uses of the sea, causal factors/pressures, potential effects and environmental themes/components not envisaging the grouping of different plan uses in a single row but maintaining only one use on each row; in order to allow a more distinctive identification of the impacts determined by each type of use, and to be able to give clear evidence of the potential effects correlated to each single use, also in accordance with the opinion expressed by the MITE, Technical Commission for Environmental Impact Assessment – EIA and SEA, SEA Subcommission. The analysis also took into account the values assigned to each effect in paragraph 5.2.2 of the Preliminary Environmental Report, to establish *a priori* whether the pressure generated by the use could give rise to positive or negative changes to the environment, in relation to whether or not the relevant environmental sustainability objectives were achieved.

This preliminary analysis made it possible to outline the implementation criteria and/or conditions capable of defining the Plan's actions in terms of their environmental sustainability, fostering the integration of environmental sustainability objectives in the implementation phase as well, even though, in some cases, it was not possible to establish *a priori* the specific value, since it strictly depends on the implementation methods and technical and territorial characteristics of the area of interest. In fact, the adaptation of the methodology to

the various reference contexts makes it possible to estimate *ex-ante* the probable generation or otherwise of the identified effects and to comparatively appreciate their relative dimensions; in the implementation phase, the initial estimates can be verified through monitoring and any correction measures put into place.

On the basis of these premises, the analytical considerations regarding the assessment of the interactions between anthropic uses of the sea, causal factors/pressures, potential effects and environmental issues/components have been summed up and transformed into mutually comparable value judgments, through the assignment of scores commensurate with the intensity of the expected potential impact, according to the criteria and scale of values below:

Criteria and scores legend	
Very negative potential impact	**-2**
Negative potential impact	**-1**
Irrelevant or no potential impact	**0**
Positive potential impact	**1**
Very positive potential impact	**2**

The proposed method allows for a representation of the intensity with which a given environmental component is likely to be stressed, also as a function of an analysis of the (potential) cumulative impacts.

The matrix produces an **Environmental Compatibility Index** (**ECI**) that summarily indicates the intensity, on all the environmental components considered in aggregate, of the impact generated by each of the planned interventions or by a set of them (horizontal reading of the matrix). This index allows an integration of the cognitive framework with respect to information of a physical and/or environmental nature relative to the various contexts of analysis, in order to parameterise potential intensity (surface area of protected natural areas, species or habitats at risk, contamination, etc.). The analysis makes it possible not only to qualify the potential effects but also to establish a hierarchy of the potential impacts (negative and positive), with respect to the environmental components considered in the context analysis. This activity therefore makes it possible to identify any critical areas and/or particularly sensitive thematic components that need to be further investigated and to introduce compensation and/or mitigation measures to reduce and/or minimise potential negative impacts and enhance positive impacts, thus fostering the pursuit of sustainability objectives. The above correlation matrix constitutes **Annex VI** to the RA.

The following are some of the results of the matrix processing, including:

1. a table listing the Environmental Compatibility Index (ECI) values for the sectors/uses envisaged by the Plan; this makes it possible to visualise which environmental components are most likely to be affected by the effects (negative and positive) associated with the various uses/sectors envisaged by the Plan;
2. a table detailing the ECI values, on the basis of the main pressure factors and the possible environmental effects (negative and positive) associated with the different uses/sectors envisaged in the Plan;
3. a table that associates the main pressure factors and possible environmental effects (negative and positive) with the Plan's (national) measures and related Objectives; it can be seen that the MSP provides for measures which, to a certain extent, contain possibly negative effects and include those identified as positive, within a strategic and synergetic framework;
4. a map of the ECI values assigned to the PUs in the Adriatic Area;
5. a table that identifies the 3 Planning Units (PUs) for the Adriatic Maritime Area, to which a value of ECI < -50[15] is assigned; the expected uses/sectors for these PUs are identified, the reasons for the typological assignments adopted by the planners are highlighted, any relevant elements for the environment, landscape

[15] According to the adopted methodological approach, it is estimated that the accumulation of pressures/effects on the various environmental components may determine a potentially critical situation for the UPs as indicated

and cultural heritage are identified, the measures adopted at the Sub-Area level and the pressures/effects associated with the (priority) uses foreseen by the Plan for these PUs are summarised.

Environmental Compatibility Index (ECI) associated with the different uses/sectors foreseen by the Plan; the index is obtained on the basis of pressure/effect correlation values on environmental components

uses provided for in the MSP	Water	Marine and coastal environment	Air and climate change	Biodiversity and natural areas subject to protection regimes	Landscape and Cultural Heritage	Human health and the socio-economic context	Soil	Environmental Compatibility Index
Maritime transport and ports	-4	-10	-2	-10	-1	-5	-2	**-34**
Coastal defence	-4	-5	-1	-3	-5	-1	1	**-18**
Fishing	-3	-7	1	-4	0	-5	1	**-17**
Aquaculture	-4	-5	1	-5	0	-1	0	**-14**
Energy	0	-4	3	-2	-4	0	-4	**-11**
Telecommunications	-1	-2	1	-2	0	-1	-3	**-8**
Coastal and Maritime Tourism	-3	-4	2	-4	1	1	0	**-7**
Dredged sediment immersion at sea	-1	-2	0	-1	0	0	0	**-4**
Withdrawal of relict sands	-1	-2	1	-2	2	2	3	**3**
Defence	1	0	1	0	1	0	1	**4**
Maritime Security	2	2	0	2	0	2	0	**8**
Landscape and Cultural Heritage	2	1	1	2	10	6	2	**24**
Research and Innovation	6	6	6	6	3	6	6	**39**
Environmental protection and natural resources	10	10	10	10	2	10	6	**58**

ECI values on the basis of the main pressure factors and possible environmental effects (negative and positive) associated with the different uses/sectors in the Plan			
Sector and intended use of the Plan	**Environmental Compatibility Index**	**Potential causal factor/pressure**	**Potential effect**
Aquaculture	-8	Production of waste (from effluents, sanitary treatment of organisms and treatment of underwater nets and installations	Problems of various kinds such as reduction of dissolved oxygen, alteration of organism development, intoxication; alteration of water and sediment quality; bioaccumulation of contaminants in organisms
	-7	Nitrogen and phosphorous inputs from point sources (e.g. discharges from wastewater treatment, industrial processes and aquaculture and mariculture facilities) and diffuse sources (e.g. agricultural runoff and transport emissions)	Distressed States of benthic communities and fish die-offs
	-6	Alteration of the trophic network	Inter- and intra-specific competition for food resources - Loss of biodiversity
		Voluntary and involuntary introduction of invasive species (alien and non-indigenous species)	Competition with native species, introduction of pathogenic organisms, alteration of ecosystem balances, loss of biodiversity, expansion of invasive non-indigenous species (NIS)
	-1	Alteration of the visual perception of the landscape	Visual perception of implants
	4	Effective measures and adequate funding to counter illegal activities	Sustainable use of the environment and resources
	10	Regulating the uses of maritime space	Sustainable use of the environment and resources
Defence (military uses)	-3	use of sonar for military exercises	Disturbance of fauna, removal and disorientation of fauna
	-2	Noise emissions and vibrations; variation of noise levels	Disturbance of fauna, removal and disorientation of fauna
	9	Regulating the uses of maritime space	Sustainable use of the environment and resources
Coastal defence	-8	Restoration and protection of dunes	Heavy vehicles and machines used to transport materials, in the absence of suitable access routes, can cause: direct destruction of plant communities, mobilisation of stabilised sands and soil compaction
	-5	Implementation of rigid defence systems	Changes and/or loss of habitat, resulting in non-negligible effects on the composition of benthic communities present in terms of diversity, abundance and biomass, and on trophic structure
	-3	Construction of new works visible from the coast	Impact on visual perception of the landscape
		By-pass systems	Increased resuspension and thus turbidity of water in the vicinity of the intervention area
	-2	Beach nourishment	Temporary increase in suspended particulate matter, smothering and burial phenomena, alteration of the beds on which the populations are settled, alteration of population and decrease in trophic resources
	-1	Implementation of rigid defence systems	Impact on visual perception of the landscape
	4	Implementation of rigid defence systems	Ability to facilitate the aggregation of mobile fauna, mainly fish, by providing food availability, shelter from predators and suitable sites for reproduction and recruitment

Energy	-9	Pollutant releases, accidental or otherwise	Problems of various kinds such as altered development of organisms, intoxication; altered water and sediment quality; bioaccumulation of contaminants in organisms
	-6	Seabed alteration (abrasion, sealing, dredging)	Loss of seafloor, loss of biodiversity
	-5	Altered sedimentary rates, sedimentological imbalances of various kinds; changing hydrodynamic conditions	Benthic species and habitats smothering, alteration of species life cycles
	-4	Altered sedimentary rates, sedimentological imbalances of various kinds; changing hydrodynamic conditions	Benthic species and habitats smothering, alteration of species life cycles
	-3	Noise emissions and vibrations; variation of noise levels	Disturbance of fauna, removal and disorientation of fauna
		Construction of offshore wind farms	Impact on visual perception of the landscape
	-2	Construction of wind power plants	Disruption of migratory routes, impairment of the bird population
	-1	Construction of wind/photovoltaic systems	interference with cultural heritage
	1	Construction of wind/photovoltaic systems	Renewable energy production
	5	Construction of offshore wind farms	Creation of fish restocking areas
	11	Regulating the uses of maritime space	Sustainable use of the environment and resources
Dredged sediment immersion at sea	-4	Generation and development of turbidity plumes (surface and bottom) during spillage	Benthic species and habitats smothering, alteration of species life cycles
Landscape and Cultural Heritage	3	Promoting the networking of coastal maritime heritage assets	Efficient use of coastal maritime heritage assets
		Restoration of assets of high historical and architectural value	Enhancement of the historical and architectural value of assets
	4	Interventions aimed at the protection and enhancement of coastal areas of high landscape value	Enhancing the landscape value of high-value coastal areas
	6	Promoting the culture of the sea and shipping	Increasing the degree of awareness on the part of users
	8	Regulating the uses of maritime space	Sustainable use of the environment and resources
Fishing	-6	Abrasion and/or alteration of the seafloor with fishing gear (trawl nets, dredges, turbo blowers)	Loss of biodiversity, damage to benthic habitats, removal of benthic species
		By-catch, overfishing	Loss of biodiversity, reduction of fish stocks
		Ingestion of waste and/or entrapment, intoxication; increased presence of waste	Mortality of or damage to fauna
		Fishing pressure and overfishing	Inter- and intra-specific competition for food resources - Loss of biodiversity
	-5	Alteration of the trophic network	Inter- and intra-specific competition for food resources - Loss of biodiversity
		Waste production	Problems of various kinds such as altered development of organisms, intoxication; altered water and sediment quality; bioaccumulation of contaminants in organisms
	8	Regulating the uses of maritime space	Sustainable use of the environment and resources
	9	Effective measures and adequate funding to counter illegal activities	Sustainable use of the environment and resources

Withdrawal of relict sands	-7	Seabed alteration (abrasion, sealing, dredging)	Loss of seafloor, loss of biodiversity
	-5	Altered sedimentary rates, sedimentological imbalances of various kinds; changing hydrodynamic conditions	Benthic species and habitats smothering, alteration of species life cycles
	-3	Noise emissions and vibrations; variation of noise levels	Disturbance of fauna, removal and disorientation of fauna
	8	Extraction of material to combat coastal erosion (beach nourishment)	Beach Profile Reconstruction
	10	Regulating the uses of maritime space	Sustainable use of the environment and resources
Environmental protection and natural resources	11	Increased protection of ecosystems (including deep sea ecosystems), habitats and species	Preserving biodiversity, ecosystem processes and functions
		Effective measures and adequate funding to counter illegal activities	Sustainable use of the environment and resources
	12	Management measures	Preserving biodiversity, ecosystem processes and functions
		Regulating the uses of maritime space	Sustainable use of the environment and resources
		Restoration and restoration of ecosystems	Preserving biodiversity, ecosystem processes and functions
Research and Innovation	13	Analyses aimed at the acquisition of environmental data (e.g. biocenotic maps, species distribution, hotspots)	Increased knowledge of and effects on the environment
		Funds for scientific research	Increased knowledge of and effects on the environment
		Regulating the uses of maritime space	Sustainable use of the environment and resources
Maritime Security	8	Surveillance of maritime traffic	Increasing safety conditions in maritime navigation
Telecommunications	-9	Seabed alteration (abrasion, sealing, dredging)	Loss of seafloor, loss of biodiversity
	-7	Altered sedimentary rates, sedimentological imbalances of various kinds; changing hydrodynamic conditions	Benthic species and habitats smothering, alteration of species life cycles
	8	Regulating the uses of maritime space	Sustainable use of the environment and resources
Maritime transport and ports	-9	Ship strikes	Mortality of or damage to fauna
		Pollutant releases, accidental or otherwise	Problems of various kinds such as altered development of organisms, intoxication; altered water and sediment quality; bioaccumulation of contaminants in organisms
	-8	Seabed alteration (abrasion, sealing, dredging)	Loss of seafloor, loss of biodiversity
	-6	Habitat degradation also linked to climate change (e.g. ocean acidification, rising temperatures)	Habitat transformations and food availability
	-4	Noise emissions and vibrations; variation of noise levels	Disturbance of fauna, removal and disorientation of fauna
	-3	Construction of new works visible from the coast	Impact on visual perception of the landscape
		Voluntary and involuntary introduction of invasive species	biodiversity loss and ecosystem services
	-2	Voluntary and involuntary introduction of invasive species (alien and non-indigenous species)	Introduction of pathogenic organisms, alteration of ecosystem balances, loss of biodiversity

	10	Regulating the uses of maritime space	Sustainable use of the environment and resources
Coastal and Maritime Tourism	-10	Population increase	Altered water quality
	-6	Ingestion of waste and/or entrapment, intoxication; increased presence of waste	Mortality of or damage to fauna
		Removal of organisms and organic material, including for ornamental purposes; damage to organisms during diving activities	Loss of biodiversity and damage to organisms/communities
	-3	Increased anthropic visitation of sites of cultural interest	Damage to cultural heritage through over-exploitation
	-2	Anthropic nocturnal beach attendance and artificial lighting; bathing activities; recreational boating and anchoring; morphological alteration of beaches	Disturbance of coastal nesting sites
	10	Regulating the uses of maritime space	Sustainable use of the environment and resources
		Aesthetic/cultural services, linked to education and sustainable tourism activities (e.g. whale watching); diving activities	Enhancing the territory and raising public awareness of environmental issues

Comparison of the main pressure factors, possible environmental effects (negative and positive) and (national) measures of the Plan and its Objectives

Sector	Most significant pressure factors	(Possible) significant environmental effects (negative and positive)	Planned Measures (national)	Plan Objectives
AQUACULTURE	• Production of waste (including waste from sewage, sanitary treatment of organisms and treatment of underwater nets and installations	• Problems of various kinds, such as reduction of dissolved oxygen, alteration of organism development, intoxication; alteration of water and sediment quality; bioaccumulation of contaminants in organisms	NAZ_MIS|40-41	SO_A|01 - Promoting the sustainable growth of the aquaculture sector
	• Nitrogen and phosphorous inputs from point sources (such as discharges from wastewater treatment, industrial processes and aquaculture and mariculture facilities) and diffuse sources (e.g. agricultural runoff and emissions	• Distressed States of benthic communities and fish die-offs		
	• Alteration of the trophic network	• Inter- and intra-specific competition for food resources - Loss of biodiversity		

Sector	Most significant pressure factors	(Possible) significant environmental effects (negative and positive)	Planned Measures (national)	Plan Objectives
	• Voluntary and involuntary introduction of invasive species (alien and non-indigenous species)	• Competition with native species, introduction of pathogenic organisms, alteration of ecosystem balances, loss of biodiversity, expansion of invasive non-native species (NIS)		
	• Altered visual perception of the landscape	• Visual perception of implants	NAZ_MIS|19 - NAZ_MIS|20 - NAZ_MIS|21	OS_PPC|01 - Supporting the landscape value of the coastal strip
			In smaller measures: NAZ_MIS|11	OS_SS|04 - Fully grasping the economic and environmental sustainability opportunities arising from the circular economy
			NAZ_MIS|39	SO_A|01 - Promoting the sustainable growth of the aquaculture sector
			NAZ_MIS|41-42-43	OS_A|02 - Promoting quality aquaculture and supporting the process of establishing AZAs (Allocated Zones for Aquaculture)
	• Effective measures and adequate funding to counter illegal activities	• Sustainable use of the environment and resources	NAZ_MIS|37-38	OS_P|06 - Monitoring and combating illegal fishing
	• Regulating the uses of maritime space		NAZ_MIS|04	OS_SS|01 - Developing a sustainable marine economy, multiplying growth opportunities for marine and maritime sectors
			NAZ_MIS|11	OS_SS|04 - Fully grasping the economic and environmental sustainability opportunities arising from the circular economy
			NAZ_MIS|40	SO_A|01 - Promoting the sustainable growth of the aquaculture sector
			NAZ_MIS|41-43	OS_A|02 - Promoting quality aquaculture and supporting the process of establishing AZAs (Allocated Zones for Aquaculture)
COASTAL DEFENCE	• Restoration and protection of dunes	• heavy vehicles and machines used to transport materials, in the absence of suitable access routes, can cause: direct destruction of plant	NAZ_MIS|63 - NAZ_MIS|64 - NAZ_MIS|65	OS_DC|03 - Considering and adequately addressing the issue of the use and

Sector	Most significant pressure factors	(Possible) significant environmental effects (negative and positive)	Planned Measures (national)	Plan Objectives
		communities, mobilisation of stabilised sands and soil compaction		protection of underwater sand for beach nourishment, to be considered as a strategic resource for coastal defence and adaptation plans
	• Beach nourishment	• Temporary increase in suspended particulate matter, smothering and burial phenomena, alteration of the population dynamics and decrease in trophic resources		
	• Implementation of rigid defence systems	• changes and/or loss of habitat, resulting in non-negligible effects on the composition of benthic communities present in terms of diversity, abundance and biomass, and on trophic structure		
	• Construction of new works visible from the coast	• Impact on visual perception of the landscape	NAZ_MIS|19	OS_PPC|01 - Supporting the landscape value of the coastal strip
	• By-pass systems	• increased resuspension and thus turbidity of water in the vicinity of the intervention area		
	• Regulating the uses of maritime space	• Sustainable use of the environment and resources	NAZ_MIS|61	OS_DC|01 - Promoting the development, harmonization and implementation of strategies and measures to protect the coastline and combat erosion foreseen in the Flood Risk Management Plans drawn up at the scale of the Hydrographic District in compliance with the provisions of the Floods Directive (2007/60/EC) and in the Coastal Plans / Integrated Coastal Zone Management Plans prepared by many regions
			NAZ_MIS|62	OS_DC|02 - Ensuring the best coherence between the uses and vocations of sea use foreseen in the MSP Plans, and coastal uses, with reference to their safeguard in a scenario of necessary adaptation to ongoing climate change
			In smaller measures: NAZ_MIS|62	OS_DC|02 - Ensuring the best coherence between the uses and vocations of sea use foreseen in the MSP Plans, and coastal

Sector	Most significant pressure factors	(Possible) significant environmental effects (negative and positive)	Planned Measures (national)	Plan Objectives
				uses, with reference to their safeguard in a scenario of necessary adaptation to ongoing climate change
MARITIME TRANSPORT AND PORTS	• Ship strikes	• Mortality of or damage to fauna	NAZ_MIS|45	OS_TM|01 - Promoting sustainable development of maritime transport and reducing its negative impacts
	• Pollutant releases, accidental or otherwise	• Problems of various kinds such as altered development of organisms, intoxication; altered water and sediment quality; bioaccumulation of contaminants in organisms	NAZ_MIS|44	
	• Seabed alteration (abrasion, sealing, dredging)	• Loss of seafloor, loss of biodiversity		
	• Habitat degradation also linked to climate change (e.g. ocean acidification, rising temperatures)	• Habitat transformations and food availability		
	• Noise emissions and vibrations; variation of noise levels	• Disturbance of fauna, removal and disorientation of fauna	NAZ_MIS|46	
	• Ingestion of waste and/or entrapment, intoxication; increased presence of waste	• Mortality of or damage to fauna	NAZ_MIS|48	OS_TM|02 - Promoting the use of alternative fuels, reducing discharges into the sea, improving port facilities for the collection of waste and cargo residues and/or encouraging the use of such facilities, improving the management of dredged sediments
	• Construction of new works visible from the coast	• Impact on visual perception of the landscape	NAZ_MIS|19	OS_PPC|01 - Supporting the landscape value of the coastal strip
	• Regulating the uses of maritime space	• Sustainable use of the environment and resources	NAZ_MIS|44-45	OS_TM|01 - Promoting sustainable development of maritime transport and reducing its negative impacts
FISHING	• Abrasion and/or alteration of the seafloor with fishing gear (trawl nets, dredges, turbo blowers)	• Loss of biodiversity, damage to benthic habitats, removal of benthic species		
	• By-catch, overfishing	• Loss of biodiversity, reduction of fish stocks	NAZ_MIS|34	OS_P|04 - Promoting the creation of areas for the recovery and protection of fish

Sector	Most significant pressure factors	(Possible) significant environmental effects (negative and positive)	Planned Measures (national)	Plan Objectives
				stocks and protecting Essential Fish Habitats (EFH)
			NAZ_MIS|37-38	OS_P|06 - Monitoring and combating illegal fishing
	• Ingestion of waste and/or entrapment, intoxication; increased presence of waste	• Mortality of or damage to fauna	NAZ_MIS|44 NAZ_MIS|48	OS_TM|01 - Promoting sustainable development of maritime transport and reducing its negative impacts OS_TM|02 - Promoting the use of alternative fuels, reducing discharges into the sea, improving port facilities for the collection of waste and cargo residues and/or encouraging the use of such facilities, improving the management of dredged sediments
	• Fishing pressure and overfishing	• Inter- and intra-specific competition for food resources - Loss of biodiversity	NAZ_MIS|30	SO_P|02 - Supporting the implementation of the forecasts of the European and National Multiannual Management Plans in the Geographical Sub-Areas (GSA)
			NAZ_MIS|32	OS_P|03 - Promoting, developing and spatially managing small-scale coastal fishing using sustainable techniques
	• Waste production	• Problems of various kinds such as altered development of organisms, intoxication; altered water and sediment quality; bioaccumulation of contaminants in organisms	NAZ_MIS|44 NAZ_MIS|48	OS_TM|01 - Promoting sustainable development of maritime transport and reducing its negative impacts OS_TM|02 - Promoting the use of alternative fuels, reducing discharges into the sea, improving port facilities for the collection of waste and cargo residues and/or encouraging the use of such facilities, improving the management of dredged sediments
			In smaller measures: NAZ_MIS|11-12	OS_SS|04 - Fully grasping the economic and environmental sustainability opportunities arising from the circular economy

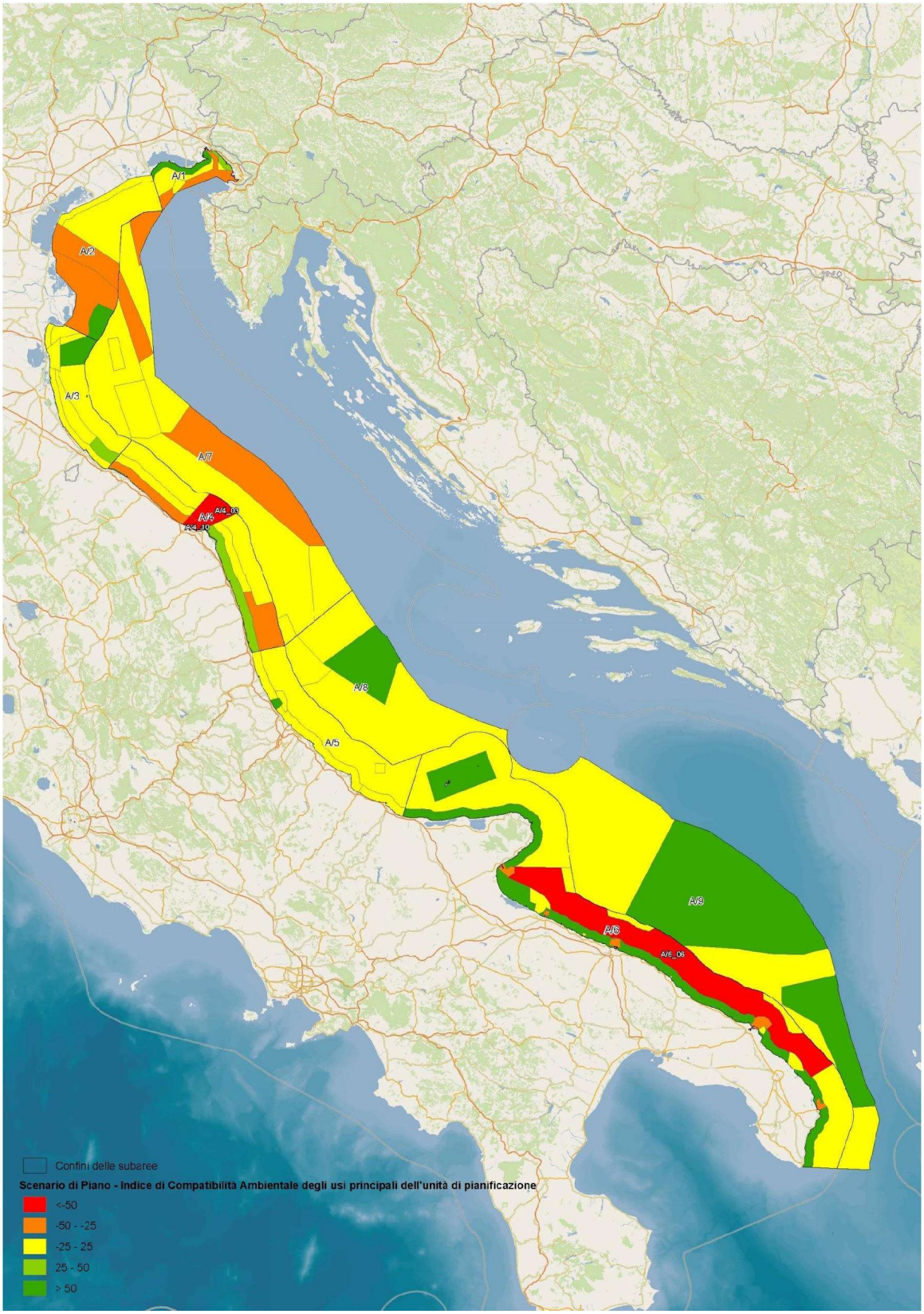
Sector	Most significant pressure factors	(Possible) significant environmental effects (negative and positive)	Planned Measures (national)	Plan Objectives
			NAZ_MIS|28	SO_P|01 - Promoting the sustainable development of the fisheries sector
			NAZ_MIS|29	
			NAZ_MIS|31	OS_P|03 - Promoting, developing and spatially managing small-scale coastal fishing using sustainable techniques
	• Regulating the uses of maritime space	• Sustainable use of the environment and resources	NAZ_MIS|33	OS_P|03 - Promoting, developing and spatially managing small-scale coastal fishing using sustainable techniques
			NAZ_MIS|34	OS_P|04 - Promoting the creation of areas for the recovery and protection of fish stocks and protecting Essential Fish Habitats (EFH)
			NAZ_MIS|35-36	SO_P|05 - Encouraging cooperation among States in order to achieve concerted measures for the sustainable management of the activities of their national fisheries sectors
	• Effective measures and adequate funding to counter illegal activities		NAZ_MIS|37-38	OS_P|06 - Monitoring and combating illegal fishing
COASTAL AND MARITIME TOURISM	• Ingestion of waste and/or entrapment, intoxication; increased presence of waste	• Mortality of or damage to fauna		
	• Removal of organisms and organic material, including for ornamental purposes; damage to organisms during diving activities	• Loss of biodiversity and damage to organisms/communities		
	• Increasing anthropic attendance of sites of cultural interest	• Damage to cultural heritage through over-exploitation	NAZ_MIS|69	SO_T|03 - Contributing to the diversification of tourist products and services and countering the seasonality of demand for inland, coastal and maritime tourism
	• Anthropic night-time beach attendance and artificial lighting; bathing activities;	• Disturbance of coastal nesting sites		

Sector	Most significant pressure factors	(Possible) significant environmental effects (negative and positive)	Planned Measures (national)	Plan Objectives
	recreational boating and anchoring; morphological alteration of beaches			
	• Regulating the use of maritime space	• Sustainable use of the environment and resources	NAZ_MIS|67-68	SO_T|02 - Promoting coherent planning actions on land and sea, also for tourism purposes
			NAZ_MIS|69-70	SO_T|03 - Contributing to the diversification of tourist products and services and countering the seasonality of demand for inland, coastal and maritime tourism
	• Aesthetic/cultural services, linked to education and sustainable tourism activities (e.g. whale watching); diving activities	• Enhancing the territory and raising public awareness of environmental issues	NAZ_MIS|66	SO_T|01 - Promoting sustainable forms of coastal and maritime tourism SO_T|02 - Promoting coherent planning actions on land and sea, also for tourism purposes
ENERGY	• Hydrocarbon extraction	• Pollutant releases, accidental or otherwise	NAZ_MIS|54	OS_E01 - Contributing to the energy transition towards renewable and low-emission sources through the development of offshore renewable energy production OS_E03 - Promoting the conversion of platforms and infrastructure associated with depleted fields and synergies between compatible maritime activities
		• Seabed alteration (abrasion, sealing, dredging)		
		• Altered sedimentary rates, sedimentological imbalances of various kinds; changing hydrodynamic conditions		
		• Benthic species and habitats smothering, alteration of species life cycles	NAZ_MIS|60	
		• Noise emissions and vibrations; variation of noise levels: Disturbance of fauna, removal and disorientation of fauna		
	• Construction of wind power plants	• Impact on visual perception of the landscape	NAZ_MIS|52	OS_E01 - Contributing to the energy transition towards renewable and low-emission sources through the development of offshore renewable energy production
			NAZ_MIS|19	OS_PPC|01 - Supporting the landscape value of the coastal strip
		• Disruption of migratory routes, impairment of the bird population	NAZ_MIS|54	OS_E01 - Contributing to the energy transition towards renewable and low-

Sector	Most significant pressure factors	(Possible) significant environmental effects (negative and positive)	Planned Measures (national)	Plan Objectives
				emission sources through the development of offshore renewable energy production
		• Creation of fish restocking areas		
	• Construction of wind/photovoltaic systems	• interference with cultural heritage	NAZ_MIS|52 NAZ_MIS|57	OS_E01 - Contributing to the energy transition towards renewable and low-emission sources through the development of offshore renewable energy production
		• Renewable energy production		
	• Regulating the uses of maritime space	• Sustainable use of the environment and resources	NAZ_MIS|53 NAZ_MIS|55 NAZ_MIS|57 NAZ_MIS|58	OS_E01 - Contributing to the energy transition towards renewable and low-emission sources through the development of offshore renewable energy production
LANDSCAPE AND CULTURAL HERITAGE	• Promoting the networking of coastal maritime heritage assets	• Efficient use of coastal maritime heritage assets	NAZ_MIS|22	OS_PPC|02 - Promoting the recovery and redevelopment of buildings and areas subject to protection
			NAZ_MIS|23	OS_PPC|03 - Promoting and supporting the conservation of underwater archaeological heritage
			NAZ_MIS|24	OS_PPC|05 - Promoting and creating awareness on intangible cultural heritage
	• Restoration of assets of high historical and architectural value	• Enhancing the historical and architectural value of assets	NAZ_MIS|22	OS_PPC|02 - Promoting the recovery and redevelopment of buildings and areas subject to protection
	• Interventions aimed at the protection and enhancement of coastal areas of high landscape value	• Enhancing the landscape value of high-value coastal areas	NAZ_MIS|26	OS_PPC|06 - Combating unauthorised building in coastal areas
	• Promoting the culture of the sea and shipping	• Increasing the degree of awareness on the part of users	NAZ_MIS|24-25	OS_PPC|05 - Promoting and creating awareness on intangible cultural heritage
	• Regulating the uses of maritime space	• Sustainable use of the environment and resources	All precedents	

Sector	Most significant pressure factors	(Possible) significant environmental effects (negative and positive)	Planned Measures (national)	Plan Objectives
MARITIME SAFETY	• Surveillance of maritime traffic	• Increasing safety conditions in maritime navigation	NAZ_MIS|27	OS_S|02 Helping promote maritime safety, the implementation of UNCLOS standards and the EU Maritime Safety Strategy
ENVIRONMENTAL PROTECTION AND NATURAL RESOURCES	• Increased protection of ecosystems (including deep sea ecosystems), habitats and species	• Preserving biodiversity, ecosystem processes and functions	NAZ_MIS|13	OS_N|01 - Applying a consistent Ecosystem based approach (EBA) at all stages of drafting of Maritime Spatial Plans
	• Effective measures and adequate funding to counter illegal activities	• Sustainable use of the environment and resources	NAZ_MIS|37-38	OS_P|06 - Monitoring and combating illegal fishing
	• Management measures	• Preserving biodiversity, ecosystem processes and functions	NAZ_MIS|15	OS_N|03 - Transposing and promoting the implementation of the main spatial measures foreseen in the MSFD Programme of Measures
	• Regulating the uses of maritime space	• Sustainable use of the environment and resources	NAZ_MIS|16	OS_N|04 - Integrating aspects of land-sea interaction and integrated coastal zone management, with particular reference to environmental aspects
	• Restoration and restoration of ecosystems	• Preserving biodiversity, ecosystem processes and functions	NAZ_MIS|17-18	OS_N|05 - Taking into account in the medium to long term the process and objectives of marine ecosystem restoration as outlined in the proposed European Law on Environmental Restoration
			NAZ_MIS|14	OS_N|02 - Supporting the extension of EU marine protection to 30%, of which 10% in a stringent manner, by 2030
RESEARCH AND INNOVATION	• Analyses aimed at the acquisition of environmental data (e.g. biocenotic maps, species distribution, hotspots)	• Increased knowledge of and effects on the environment	NAZ_MIS|18	OS_N|05 - Taking into account in the medium to long term the process and objectives of marine ecosystem restoration as outlined in the proposed European Law on Environmental Restoration
			NAZ_MIS|13	OS_N|01 - Applying a consistent Ecosystem based approach (EBA) in the overall design and guidance of Maritime Spatial Plans

Sector	Most significant pressure factors	(Possible) significant environmental effects (negative and positive)	Planned Measures (national)	Plan Objectives
			NAZ_MIS|14	OS_N|02 - Supporting the extension of EU marine protection to 30%, of which 10% in a stringent manner, by 2030
			NAZ_MIS|18	OS_N|05 - Taking into account in the medium to long term the process and objectives of marine ecosystem restoration as set out in the proposed European Law on Environmental Restoration
	• Funds for scientific research	• Increased knowledge of and effects on the environment	NAZ_MIS|03-04	OS_SS|01 - Developing a sustainable marine economy, multiplying growth opportunities for marine and maritime sectors
	• Regulating the uses of maritime space	• Sustainable use of the environment and resources	NAZ_MIS|05	OS_SS|02 - Contributing to the National Strategy for Sustainable Development
			NAZ_MIS|06 NAZ_MIS|07	OS_SS|03 - Contributing to the European Green Deal
			NAZ_MIS|09	OS_SS|04 - Fully grasping the economic and environmental sustainability opportunities arising from the circular economy
			NAZ_MIS|15	OS_N|03 - Transposing and promoting the implementation of the main spatial measures foreseen in the MSFD Programme of Measures



Map of ECI values attributed to UPs in the Adriatic Area

Planning Units (PUs) assigned an ECI value < -50

PU with ECI < -50	ECI	Priority uses/sectors associated with UPs	Other Uses	Justification for typological attribution	Environmentally significant PU elements	"% of protected marine space in relation to PU[16]	Sub-area measures
A/4_03	-58	Fishing, Maritime transport and ports, Coastal and maritime tourism	Nautical tourism Dredged sediment immersion at sea Other uses compatible with priority uses	Between 3- and 12-miles Ancona/Falconara Marittima. Area affected by the traffic routes pertaining to the ports of Ancona and Falconara Marittima. Pleasure boating represents an important component of tourism. Dredged sediment dumping sites are identified in the area. Prohibition of new hydrocarbon exploration and production applications with the PiTESAI.	-	0.00%	NO
A/4_10	-58		Other uses compatible with priority uses	Within 3 miles Ancona/Falconara Marittima. Area affected by the traffic routes pertaining to the ports of Ancona and Falconara Marittima. Small-scale coastal fishing and hydraulic dredges represent important productive activities in the Marche region (fishing does not take place outside 3 nm from the coast due to spatial conflicts with towed gears, while hydraulic dredges limit their fishing grounds to sandy bottoms, therefore generally within 2 nm). Tourism is an important seasonal socio-economic component	The area is of relevance for underwater archaeology, given the presence of the city of Ancona, an important destination for shipping routes in antiquity. The PU encompasses the Falconara Marittima Contaminated Site of National Interest, which includes a marine portion covering approximately 1,200 hectares."	0.00%	NO
				Most relevant pressure factors	**(Possible) significant environmental effects (negative and positive)**		
			-10	Population increase	Altered water quality		

[16] Ref. Map of sensitivities of the Protected Areas System, Biological Protection Zones and of the Fisheries Restricted Areas"

	-9	Ship strikes	Mortality of or damage to fauna	
		Pollutant releases, accidental or otherwise	Problems of various kinds such as altered development of organisms, intoxication; altered water and sediment quality; bioaccumulation of contaminants in organisms	
	-8	Seabed alteration (abrasion, sealing, dredging)	Loss of seafloor, loss of biodiversity	
	-6	Abrasion and/or alteration of the seafloor with fishing gear (trawl nets, dredges, turbo blowers)	Loss of biodiversity, damage to benthic habitats, removal of benthic species	
		Bycatch, overfishing	Loss of biodiversity, reduction of fish stocks	
		Habitat degradation also linked to climate change (e.g. ocean acidification, rising temperatures)	Habitat transformations and food availability	
		Ingestion of waste and/or entrapment, intoxication; increased presence of waste	Mortality of or damage to fauna	
		Removal of organisms and organic material, including for ornamental purposes; damage to organisms during diving activities	Loss of biodiversity and damage to organisms/communities	
		Fishing pressure and overfishing	Inter- and intra-specific competition for food resources - Loss of biodiversity	
	-5	Alteration of the trophic network	Inter- and intra-specific competition for food resources - Loss of biodiversity	
		Waste production	Problems of various kinds such as altered development of organisms, intoxication; altered water and sediment quality; bioaccumulation of contaminants in organisms	
	-4	Noise emissions and vibrations; variation of noise levels	Disturbance of fauna, removal and disorientation of fauna	
	-3	Increased anthropic attendance of sites of cultural interest	Damage to cultural heritage through over-exploitation	
		Construction of new works visible from the coast	Impact on visual perception of the landscape	
		Voluntary and involuntary introduction of invasive species (alien and non-indigenous species)	biodiversity loss and ecosystem services	

	-2	Anthropic night-time beach attendance and artificial lighting; bathing activities; recreational boating and anchoring; morphological alteration of beaches	Disturbance of coastal nesting sites	
		Voluntary and involuntary introduction of invasive species (alien and non-indigenous species)	Introduction of pathogenic organisms, alteration of ecosystem balances, loss of biodiversity	
	8	Regulating the uses of maritime space	Sustainable use of the environment and resources	
		Effective measures and adequate funding to counter illegal activities	Sustainable use of the environment and resources	
	9	Regulating the uses of maritime space	Sustainable use of the environment and resources	
	10	Aesthetic/cultural services, linked to education and sustainable tourism activities (e.g. whale watching); diving activities	Enhancing the territory and raising public awareness of environmental issues	

PU with ECI < -50	**ECI**	**Priority uses/sectors associated with UPs**	**Other Uses**	**Justification for typological attribution**	**Environmentally significant PU elements**	**"% of protected marine space in relation to PU[17]**	**Sub-area measures**
A/6_06	-51	Fishing, Maritime transport and ports	Aquaculture Nautical tourism other uses if compatible with priority uses	Area with heavy shipping traffic (merchant, oil and passenger). Permitted fishing activities in compliance with current regulations Prohibition of new hydrocarbon exploration and production applications (see PiTESAI).	Presence of submerged archaeological assets (ARCHEOMAR data). High natural value due to high density of species and habitats (protected by the Natura 2000 Directives (Habitats and Birds). Part of the area is included in the EBSA "South Adriatic Ionian Strait".	0.64%	NO
				Most relevant pressure factors	**(Possible) significant environmental effects (negative and positive)**		
			-9	Ship strikes	Mortality of or damage to fauna		

[17] Ref. Map of sensitivities of the Protected Areas System, Biological Protection Zones and of the Fisheries Restricted Areas"

		Pollutant releases, including accidental releases	Problems of various kinds such as altered development of organisms, intoxication; altered water and sediment quality; bioaccumulation of contaminants in organisms	
	-8	Seabed alteration (abrasion, sealing, dredging)	Loss of seafloor, loss of biodiversity	
	-6	Abrasion and/or alteration of the seafloor by fishing gear (trawl nets, dredges, turbo blowers)	Loss of biodiversity, damage to benthic habitats, removal of benthic species	
		Bycatch, overfishing	Loss of biodiversity, reduction of fish stocks	
		Habitat degradation also linked to climate change (e.g. ocean acidification, rising temperatures)	Habitat transformations and food availability	
		Ingestion of waste and/or entrapment, intoxication; increased presence of waste	Mortality of or damage to fauna	
		Fishing pressure and overfishing	Inter- and intra-specific competition for food resources - Loss of biodiversity	
	-5	Alteration of the trophic network	Inter- and intra-specific competition for food resources - Loss of biodiversity	
		Waste production	Problems of various kinds such as altered development of organisms, intoxication; altered water and sediment quality; bioaccumulation of contaminants in organisms	
	-4	Noise emissions and vibrations; variation of noise levels	Disturbance of fauna, removal and disorientation of fauna	
	-3	Construction of new works visible from the coast	Impact on visual perception of the landscape	
		Voluntary and involuntary introduction of invasive species	biodiversity loss and ecosystem services	
	-2	Voluntary and involuntary introduction of invasive species	Introduction of pathogenic organisms, alteration of ecosystem balances, loss of biodiversity	
	8	Regulating the use of maritime space	Sustainable use of the environment and resources	
	9	Effective measures and adequate funding to counter illegal activities		
	10	Regulating the use of maritime space		

5.2 Elements related to potential negative effects of human activities on descriptors D1-D2-D3-D5-D6-D7-D9 of the Marine Strategy and MPAs

At this stage, the Plan considers the results of the monitoring as of 2018 (MATTM and ISPRA, 2019) of the state of the environment, according to the Descriptors of the Marine Strategy Framework Directive 2008/56/EC, in order to assess the potential causes and actions needed to reduce and control the potential negative effects of pressures generated by anthropic uses for each descriptor. The following description, by descriptor, includes the analysis of aspects relating to the biodiversity and water components.

➢ **Descriptor 1: Biodiversity (D1)**

Qualitative descriptor 1 (Biodiversity) collects information on the distribution and status of habitats and priority conservation species, information and knowledge from monitoring by the Habitats and Birds Directives, ACCOBAMS and the Natural Capital Committee. The elements related to any potential negative effects of anthropic activities on the descriptor Biodiversity (D1) are reported below.

- ***Caretta caretta***

As La Mesa et al. (2019) explain in their report on the monitoring of species and habitats of community interest (Directive 92/43/EEC and Directive 09/147/EC) in Italy for the marine environment throughout its life cycle, *Caretta caretta* is subject to pressures from multiple human activities.

After more than 30 years of conservation efforts, in 2015 the Mediterranean subpopulation of Loggerhead was listed as Least Concern by the International Union for Conservation of Nature (IUCN) and on the Red List of Threatened Species (Casale & Tucker, 2015). Foraging areas for this species cover approximately 31.75% of the foraging area of the Mediterranean basin. The assessment of the risk produced by the use of different types of fishing gear showed that more than 40% of the foraging areas were exposed to medium to very high levels of threat, with variations found throughout the Mediterranean Sea (V. Almpanidou, A. Chatzimentor. 2021). In particular, the foraging area enclosed in the Adriatic Sea was the most severely affected by fishing, with 73.47% of its area subject to high and very high risk, compared to the Ionian and Tyrrhenian Sea areas (V. Almpanidou, A. Chatzimentor. 2021). A further potential threat is posed by marine pollution, as suggested by several trials showing the presence of high levels of diffuse contaminants in their tissues (Bucchia et al., 2015; Cocci et al., 2018, 2019, 2020). In particular, the sea turtle *Caretta caretta* is a 'flagship species', useful as an indicator of the general level of pollution in marine ecosystems.

A high number of plastic particles was detected in the faeces of wild-caught *Caretta caretta* turtles *and Chelonia mydas* living in the north-western Adriatic Sea, collected after their arrival at a local rescue centre for their rehabilitation. This is a number of microparticles varying between 10 and 15 per 100 ml; a fairly high number compared to data generally reported for the gastrointestinal contents of dead stranded turtles (Duncan et al., 2018). Entanglement in abandoned nets, traps, ties or plastic bags are regularly reported and can cause severe injuries leading to mutilation, amputation, impaired buoyancy and restricted movements that prevent the turtle from behaving normally and can lead to the death of the individual (Duncan et al., 2017). The Adriatic basin is in fact, one of the most polluted marine sites on the globe, due to its high productivity and anthropic impact, with an average concentration of > 400,000 plastic particles up to 5mm per km (MSFD Technical Subgroup on Marine Litter Group et al., 2013; Alessi and Di Carlo, 2018; Liorca et al., 2020). Therefore, the presence of a high level of plastic pollution in the faeces of turtles in the Adriatic Sea, and the acknowledged importance of the sea turtle as a flagship species for the health status of the marine environment, indicate and confirm the high level of plastic pollution in the Adriatic Sea systems. Other factors that negatively affect nesting and, consequently, the reproductive success of the species are:

- nocturnal anthropic frequentation of beaches, which can disturb nesting females;
- artificial lighting on beaches, which can cause disorientation of newborn turtles and disturb the females themselves;

- bathing activities (recreational facilities, mechanical cleaning of beaches, physical presence of equipment) that reduce the space available for nest selection, exposing the nests to storm surges and flooding, and physically damaging nests and embryo development;
- the geomorphological alteration of beaches as a result of sedimentological imbalances of various kinds can interfere with both spawning and embryonic development in the nest;
- bycatching at sea with fishing gear, especially in major aggregation areas, such as bottom trawls in neritic aggregation areas, drift longlines in pelagic feeding areas and fixed nets near spawning areas and coastal migration corridors. Other disturbing factors are maritime traffic, which is linked to the risk of collisions near spawning areas and coastal migration corridors;
- smothering by waste (plastic).

- ***Marine mammals***

The Regional Assessment of the Mediterranean Marine and Coastal Environment ('2017 Mediterranean Quality Status Report', UNEP/MAP 2017) provides information on the state of the environment and the distance to the achievement of ecological objectives and Good Environmental Status (GES), according to the Ecosystem Approach in the Mediterranean (EcAp). The Quality Status Report (QSR) on biodiversity provides information on marine mammals. Data on the distribution of marine mammals are usually collected during dedicated naval and aerial surveys, acoustic surveys or opportunistically by whale watching operators, ferries, cruise ships, military vessels. Twelve species of marine mammals – seals and 11 cetaceans – can be regularly found in the Mediterranean Sea; all 12 species belong to populations (or subpopulations, *sensu* IUCN) that are genetically distinct from their North Atlantic conspecifics.

The Mediterranean monk seal (*Monachus monachus*) and the 11 species of cetaceans (minke whale, *Balaenoptera physalus*; sperm whale, *Physeter macrocephalus*; zephyrus, *Ziphius cavirostris*; common dolphin, *Delphinus delphis*; long-finned pilot whale, *Globicephala melas*; Risso's dolphin, *Grampus griseus* orca, *Orcinus orca*; stenella or striped dolphin, *Stenella coeruleoalba*; rough-toothed dolphin, *Steno bredanensis*; common bottlenose dolphin, *Tursiops truncatus*; porpoise, *Phocoena phocoena relicta*) face numerous threats, due to strong anthropic pressures in the entire Mediterranean basin. Of the 12 marine mammal species listed above, seven are listed in a threatened category on the IUCN Red List, three are listed as data deficient and two need to be assessed.

Maritime traffic interacts with a variety of uses of the marine environment, ranging from interactions with coastal fishing to the emergence of large offshore energy infrastructure.

From an environmental point of view, the resulting pressures are:

- emission of substances;
- chemical pollution;
- marine litter;
- underwater noise;
- introduction of invasive non-indigenous species;
- accidental mortality due to fishing gear (bycatch);
- collision between vessels.

Such phenomena can seriously affect marine and coastal biodiversity and possible protection targets even at high distances from the sources of impact. More than 200 cetaceans die stranded each year due to anthropic activities (S. Lo Brutto, A. Calascibetta, G. Pavan et al. 2021).

The conservation status of cetaceans has been a concern for many years because various threats such as, accidental mortality in fishing gear (bycatch**),** vessel collisions, chemical pollution, noise pollution, offshore wind farms and general habitat degradation affect different species to varying degrees (Avila et al., 2018, Marsili et al., 2018). The risks to marine mammals are mainly determined by the nets used by multipurpose fishing vessels. Larger vessels, which generally use bottom trawls or pelagic longlines, are likely to be responsible for more accidental or intentional deaths.

Gillnets, trammel nets, longlines and bottom trawls pose a serious threat to the survival of elasmobranch (shark and ray) populations in the Mediterranean Sea (GFCM, 2014). Overfishing has an indirect effect on cetacean populations in the Mediterranean and, as such, its impact is difficult to measure. The Mediterranean Sea is the most overexploited sea in the world; some 63% of its fish stocks are exploited at biologically unsustainable levels and its demersal resources at serious and real risk of depletion (FAO, 2022).

Many of the exploited species are important prey for cetaceans and, as cetacean resource utilisation options decrease in the future, the effect of overexploitation is likely to impact intra- and interspecific competition for food resources. Furthermore, many of the species mentioned above have similar distributions and share common food resources.

- ***Posidonia oceanica, Reefs***

Marine phanerogams also play an important role in the sedimentary processes of Mediterranean coastal environments. (Coppa *et al.* , 2019). *Posidonia oceanica* is an essential component of beach morphodynamics, also through the deposition of leaves that form plant mounds, known as 'banquettes' (Simeone *et al.,* 2013), with which it contributes to determining the geomorphological variability of beaches throughout the year, constituting a significant component of the volume of coastal barriers, dunes and the material exchanged between the emerged and submerged beach during storm surges. In recent decades, the seagrass beds of *Posidonia oceanica* have been severely threatened by direct anthropic pressures, such as physical removal and eutrophication, and by climate change (Badalamenti *et al.* , 2011). It has been estimated that these meadows have regressed by 34% in the last 50 years at the Mediterranean scale and by 25% along the Italian coasts (Telesca *et al.* , 2015).

The most significant impacts are represented by:

- Beach management and removal of beached posidonia. The beaching of *Posidonia oceanica* leaves is a natural phenomenon that occurs annually along the coasts of the Mediterranean Sea. The use of beaches for tourism requires the removal of these deposits, which are considered a negative externality by beach managers and bathers. This phenomenon, which is increasing, can have a different intensity in relation to the distance from the mouths of watercourses, the regime of tides and currents, and the extension of the Posidonia meadows present near the shorelines or the relevant littoral unit (physiographic unit), with consequences that can compromise the vitality of coastal marine habitats. Approximately 83% of municipalities remove Posidonia deposits from beaches each year using heavy machinery such as excavators, which are the number one choice in about 40% of cases (Med POSBEMED - 2017). These phenomena involve the modification of the beach system with the consequent retreat of the shoreline, and the use of heavy machinery (mechanical shovels and excavators) to remove the banquette, have effects that negatively affect the nesting and thus the reproductive success of the species *Caretta caretta.*
- Works carried out on the marine state property (*demanio marittima*). Maritime works such as breakwaters and groynes, lagoon inlets, jetties and soft barriers, built between the emerged and submerged beach, have entailed, and still entail, effects ranging from the total obliteration of the beach to the triggering of irreversible erosive processes. These coastal defence works have entailed both modifications of the seafloor and hydrodynamic alterations, completely transforming coastal dynamics, as have ports. The construction of maritime works and port structures can act negatively both directly, because they are built directly on stretches of seafloor characterised by the presence of coralligenous formations (covering of the substrate), and indirectly, as in the case of beach nourishment activities with unsuitable material, with the consequent increase in turbidity.
    - Anchoring and mooring activities. Mechanical activities such as anchoring are one of the causes of destruction of the Posidonia meadows. Anchoring is today one of the major causes of degradation of the seagrass beds, as a result of the considerable increase in recreational boating and the presence of vessels in the protected marine areas of great natural interest and not just in summer. *The anchors embedded in the sediment when removed rip out the roots of the Posidonia with considerable damage to the habitat. This damage could easily be avoided through the good management of maritime spaces that includes the rules for protecting priority marine habitats in the planning processes.* With regard to moorings, berths in harbours and bays mostly use individual, traditional moorings

consisting of a block, chain and a large radius of 60 to 80 m^2 on average. One of the aspects that will have to be considered will be the reduction of deadweight and anchoring gear in general, which are harmful to the Posidonia, which in the past were sunk as ballast on the seagrass beds, and the removal and replacement of the most impactful ones with more sustainable technologies. Very often, 'classic' moorings involve a deadweight, usually made of concrete, lying on the seafloor, equipped with an eyelet to attach the chain or ropes, to the opposite end of which a mooring buoy is attached to moor the boat.

With regard to habitat 1170 'Reefs', the most significant impacts are caused by:

- eutrophication, due to the presence of urban, agricultural and industrial pollutants, increased water turbidity, climate change, (*Cystoseira* with the exception of *Cystoseira compressa*, which is considered more tolerant- Relini & Giaccone, 2009, Thibaut, 2014; Mancuso *et al.*, 2018);
- trawling activities, which damage the biocoenosis both directly, by destroying colonies, and indirectly, by causing the suspension of fine sediments whose redeposition then causes the smothering of the benthic species present. Other fishing activities such as deep-sea fishing and deep trammel netting for lobsters also cause further damage to these delicate and sensitive biocoenoses by interacting with benthic species (Bo *et al*., 2014).
- direct and indirect anthropic activities that contribute to the degradation and destruction of the coralligenous formations. Some, such as anomalies in the summer thermocline linked to ongoing climate change, may act on a large scale, while others affect more or less limited areas. In this regard, we can point out:
    - the construction of maritime works and harbour structures that can have a negative effect either directly, because they are built directly on stretches of seafloor characterised by the presence of coralligenous formations (covering of the substrate), or indirectly, as in the case of beach nourishment activities with unsuitable material, with the consequent increase in turbidity;
    - pollution and eutrophication; anchoring and excavation works for laying cables and pipes;
    - use of small dredges and anchors that destroy or damage vulnerable habitats;
    - fishing activities with a negative mechanical impact in the case of interaction by towed gears, such as trawls (bottom trawls), dredges and lines;
    - smothering caused by abandoned or lost fishing gear (ghost nets);
    - the expansion of invasive non-indigenous species (NIS).

- ***Marine Protected Areas***

MPAs play an important role in protecting and fostering the growth of fish communities and stocks within their boundaries; these benefits attract recreational fishermen both to the MPAs and the neighbouring areas. The interest of fishermen and tourists can create conflicts between sectors, e.g. between recreational and professional fishermen, divers and tourist boats, as well as damaging habitats.

Recreational fishing is regulated in the majority of MPAs in the Mediterranean; however, since this activity, however exercised, is considered productive it is not always compatible with the protection of ecosystems.

Since recreational fishing removes a significant amount of fish stocks, failure to include these catches in surveys can compromise the accuracy of the figures and lead to erroneous fisheries management recommendations. In the coastal waters of the western Mediterranean, including MPAs, vulnerable species make up almost 20 per cent of recreational fishing catches.

Some methods (such as freediving and trolling with lures) catch species that are also exploited by artisanal fisheries, especially large specimens of high economic value.

Further environmental impacts of recreational fishing are:

- The alteration of trophic nets: some species caught by recreational fishermen help regulate marine ecosystems and control the proliferation of other species, such as seahorses.
- Stress: which sometimes results in the death of specimens (as in catch-and-release fishing).

- The possible introduction of exotic species: in the Mediterranean, live exotic animals used as bait can survive and replace endemic species, changing the structure of trophic chains.
- Ghost fishing due to the loss or abandonment at sea of gear such as lines and nets, which may remain as waste on the seafloor or in the water column: this gear continues to catch fish for years, especially in rocky habitats, and damages them by exerting an abrasive action.
- Damage to sensitive habitats, mainly through:
    - the trampling of the fragile Cystoseira forests by shell collectors and shore fishermen;
    - accidental contact with sessile organisms, such as coralligenous formations by divers, especially inexperienced ones;
    - anchoring on Posidonia meadows, where lines and chains can damage the seafloor and the surrounding environment through mechanical action. In established MPAs, anchoring and mooring activities are regulated.

Small-scale fishing if fully or strictly regulated within MPAs can produce ecological benefits, e.g. an increase in stock abundance, biomass, density and fecundity.

This so-called 'reserve effect' transfers biomass to the fishing grounds and can produce economic benefits for artisanal fisheries in adjacent areas.

The potentially harmful effects of artisanal fishing include:

- Alterations in biodiversity and ecosystem functioning through the removal of key species (such as large predators) or individuals of specific size classes.
- Catching of species considered vulnerable (IUCN Red List). According to a study conducted in France, Italy and Spain, about 50 per cent of the total catch of artisanal fisheries in coastal waters, and 100 per cent of offshore fisheries, concerns vulnerable species.
- Damage to hermaphrodite species, induced by size-selective trapping.
- Deterioration of habitats through direct or indirect actions. Some techniques, such as small dredges and anchors destroy or damage vulnerable habitats, such as seagrass beds (*Posidonia oceanica*), coralligenous formations and deep rocky habitats, which host sessile and fragile organisms such as gorgonians, sponges and corals.
- Loss/abandonment of fishing gear (nets, hooks and lines). So-called ghost nets continue to catch fish and damage sessile organisms such as corals and gorgonians and constitute marine litter.
- Damage is caused by oil pollution and antifouling agents.

Small offshore wind farms, if managed sustainably, could also benefit biodiversity in ways beyond carbon-neutral power generation. Many marine scientists are convinced that the coexistence of wind and nature is possible and, indeed, desirable and that wind farms are a protected place for fish, crustaceans and other species. In 2014, a group of Scottish, Dutch and US marine scientists led by the University of St. Andrews (Scotland) demonstrated, for the first time, that marine mammals preferentially used an artificial structure in the open sea to search for food. Subsequently, similar research by German, Dutch, Belgian and Danish scientists revealed that wind farms can protect and even feed a wide range of marine life, including European lobsters (*Homarus gammarus*), brown crabs (*Cancer pagurus*) and common harbour porpoises (*Phocoena phocoena*) as well as threatened species such as North Sea cod (*Gadus morhua*) and seals. Up to a tonne of mussels can grow on the foundation of a single wind turbine and marine scientists have found that these North Sea renewable energy sites, some of which span an area of 80 km^2, can be considered a network of marine life sanctuaries and a nursery/Kinderstube for underwater species (B. A.-Schenkemeyer 2018).

Even the European flat oyster (*Ostrea edulis*), another species that has been overexploited to the point of extinction, is now being cultivated under turbines in the North Sea off the coast of the Netherlands, thanks to the EU-funded Multi-Use offshore platforms demoNstrators for boostIng cost-effecTive and Eco-friendly proDuction in sustainable marine activities UNITED project, which examines possible alternative uses of wind farms. Further impacts are due to illegal activities that may jeopardise the protection of the characteristics of the relevant environment and the institutional purpose of the marine protected area.

➢ **Descriptor 2: Non-indigenous species (D2)**

The European Union, in the Marine Strategy Framework Directive 2008/56/EC, lists alien species among the descriptors of good environmental status of the sea (see Descriptor 2: Non-indigenous species. "Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystems"), just as the Mediterranean EcAp (Ecosystem Approach) strategy, promoted by UNEP/MAP, considers alien species among the ecological targets. Biological invasions are among the main threats to biodiversity worldwide, impacting native species, the economy and health to such an extent that they are present in numerous international directives and conventions: Rio de Janeiro Convention on Biodiversity, Protocol on Protected Areas and Biological Diversity (follow-up to the Barcelona Convention), CBD (Convention of Biological Diversity), Habitats Directive and numerous others. Although the environmental problems caused by IAS are recognised worldwide, knowledge of their current and future impacts on native biodiversity is still largely unknown (Downey and Richardson 2016; Essl et al. 2020).

Alien species have entered the Mediterranean as a result of:

- voluntary introduction by humans (import of species for aquaculture or aquaristics, import of live bait).
- Involuntary introduction (maritime traffic, organisms associated with imported species for aquaculture) and through migration (through the Suez Canal or from the Strait of Gibraltar 1).
- Escape from aquaculture facilities and the spread of alien species. Accidental releases can lead to the introduction of alien species into the marine environment, with consequences such as competition with native species for resources and territory, transfer of pathogens or parasites, disturbance of wildlife and disruption of ecosystem functions.
- Excess nutrients in the food web Several studies have pointed out that overfeeding of reared individuals can alter the structure of benthic communities, as unconsumed feed can affect surrounding food webs, fostering some organisms over others.
- Discharge of effluent from aquaculture facilities that may contain residues from sanitary treatments, antifouling agents and leftover feed. Inappropriate management may induce eutrophication and reduction of dissolved oxygen.

Maritime traffic through ballast water and fouling (organisms attached to the hull) is now a major vector for the introduction of alien species. Some alien species can be invasive, capable of colonising large areas in a short time. Their introduction and spread has been found to threaten biodiversity and related ecosystem services. The IMO (International Maritime Organisation) Convention on the Management of Ballast Water provides for the development of an early warning system to ensure the rapid identification of introduced undesirable species and associated risk assessment, followed by prompt alerting of the relevant authorities.

➢ **Descriptor 3: Commercial fish and shellfish (D3)**

In the Marine Strategy Framework Directive (EC/2008/56 - Cycle II 2018-2024) species exploited for commercial fishing purposes are considered within the Qualitative Descriptor 3 for the determination of good environmental status. The MSFD, as reported by ISPRA in the 2018 MSFD Summary Report, observes that a large part of the stocks assessed in the sub-regions presents unsustainable exploitation status, which was already known in the case of the Mediterranean.

Generally speaking, this condition is linked to excessive fishery pressure and, only sometimes, to inadequate biomass. In addition, no formal analytical stock assessment is conducted for an important percentage of the stocks (particularly in the Western Mediterranean and Central Mediterranean-Ionian Sea sub-regions). The Adriatic is the sub-region with the highest proportion of stocks within biologically safe limits (14%), but at the same time the one with the highest prevalence of stocks in inadequate condition (over 50%). A comparison between the latest assessment and the previous one shows a slight improvement in the state of fish stocks, with a trend for some stocks towards reduced fishing mortality, but still in most cases as unsustainable (ISPRA, 2018). According to the 2021 Ispra Yearbook of Environmental Data, the Adriatic Sea in 2019 had 87.5 per cent of overfished stocks. The main environmental criticalities from anthropic uses and related pressures are linked to an excessive fishing pressure, determined by the size of the activity and, in particular, by the fishing

effort (E), calculated by multiplying the tonnage (expressed in GT "Gross Tonnage") by the average fishing days (as per EC Regulation 2091/1998) and by the Catch Per Unit Effort (CPUE), which indicates the amount of catch obtained for a unit of effort.

According to the 2021 Ispra Yearbook of Environmental Data, in 2018, compared to 2017, the capacity of the national fishing fleet decreased slightly (-1%) in terms of number of vessels and -4.3% in terms of capacity expressed in GT (gross tonnage). The decrease in fishing activity in Italy, especially since the early 2000s, is also evidenced by a net change in average fishing days, which, for example, from 2007 to 2018 decreased by 17.5 fewer fishing days per vessel. Fishing effort, which has been steadily decreasing since 2004, increased between 2008 and 2009, from 25.2 to 26.5, then started to drop once more to 16.4 in 2018. Catch per unit effort (CPUE) continued to increase compared to previous years, standing at 11.7 kg/day for 2018. From 2009 to 2014, a steady decline in both indicators (effort and CPUE) was observed, probably pointing to the fact that, as the intensity of exploitation decreased there was no overall recovery of exploited resources; subsequently, however, a trend reversal was observed with a slight increase in CPUE against the continued decline in effort. Over the 'long' period (1996-2018), the number of vessels making up the national fleet decreased by 24.5%, in accordance with the trend in overall power (-35.9%) and tonnage (-36.1%) (Ispra, 2021).

Fishing pressure is undoubtedly the most significant impact on stocks, but not the only one; other factors may pose threats such as the following:

- illegal, unreported and unregulated (IUU) fishing;
- unfair competition to EU fisheries from other Mediterranean countries that are not bound by the rules, undermining efforts to rebuild stocks;
- warming of the Mediterranean Sea, at a rate 20 % faster than in the rest of the world (according to MedECC data, climate change could lead to the local extinction of commercial fish and marine invertebrates by up to 50 % by 2050);
- plastic pollution;
- fuel leakages;
- loss of habitat;
- maritime traffic;
- the proliferation of invasive exotic species.

A problematic issue, which is raising growing concern in several areas of the Mediterranean, particularly in the Adriatic and Ionian seas, is the use and disposal of mussel nets ('socks'). According to recent data, plastic socks are the seventh most common waste category on beaches and the third most common on the seafloor (Interreg-PHAROS4MPAs-2019). Compared to other sea farming methods, cage farming poses potentially higher risks to different habitats, communities and sensitive species. In the Mediterranean, this system is mainly used for breeding sea bream, sea bass, shi drum (*Umbrina cirrosa*) and tuna.

➢ **Descriptor 5: Eutrophication (D5)**

Eutrophication is one of the 11 qualitative descriptors of the EU Marine Strategy (Directive 2008/56/EC), for which Italy conducted an initial assessment, in 2012, under Article 8 of the said Directive, and is among the most widespread and deleterious anthropic impacts on marine ecosystems. The northern Adriatic Sea represents the most significant area, at national level, for the eutrophication phenomenon and is divided into *'coastal waters'* and '*offshore waters'*, in accordance with the criteria of the new EU Decision 2017/48 of the European Commission. It receives important nutrient inputs from rivers and is therefore subject to eutrophic processes in coastal areas south of the Po. Eutrophication is a process driven by the enrichment of water by nutrients, especially compounds of nitrogen and/or phosphorous compounds, leading to increased growth, primary production and biomass of algae, resulting in an accumulation of organic matter, hypoxia/anoxia of the bottom waters, possible suffering of the benthic communities and fish die-offs. The causes of eutrophication are mainly due to nutrient inputs into the sea from rivers or coastal settlements, which cause serious negative impacts on the health of marine ecosystems, particularly on *Posidonia oceanica* meadows and surface algal populations in the microtidal environment, to which most species belonging to the genus *Cystoseira* (with the exception of *Cystoseira compressa*, considered to be more tolerant) is sensitive, and to a

wide range of environmental stresses, related in particular to eutrophication, the presence of urban, agricultural and industrial pollutants, increased water turbidity, climate change (Relini & Giaccone, 2009, Thibaut, 2014; Mancuso *et al*., 2018). Regarding the effects of farming activities, aquaculture of euryhaline and marine species, in transitional environments and at sea, produces the input or subtraction of nutrients, compounds of nitrogen and phosphorus. Marine aquaculture influences the trophic status of its environment through two processes: nitrogen and phosphorous input by farmed fish, in the form of uneaten feed, faeces and excretions; nitrogen and phosphorous subtraction by mussels that use their compounds as a trophic resource. The balance is given by how much nitrogen and phosphorous is introduced by intensive fish farming and how much is subtracted by filtration from farmed mussels. The discharge of effluents from aquaculture facilities may contain residues from sanitary treatments, antifouling agents and leftover feed.

Inappropriate management can induce eutrophication and reduction of dissolved oxygen. Further impacts relate to the sustainable use of goods and services; the main sources of nutrients are from the crop and livestock farming and civil sectors (urban settlements). In the near future, any approach to assessing changes in eutrophication indicators will have to take into account changes related to atmospheric precipitation, warming and acidification of the seas, which will have an increasing impact on trophic processes and will most likely result in reduced amounts of dissolved oxygen in the marine environment (Wakelin et al., 2020).

- **Descriptor 6: Sea-floor integrity (D6)**

The pressures interacting with the seafloor are mainly those reported by European documents and in the Reporting Sheets prepared for the 2012 Initial Assessment (Phase I MSFD) "Physical Loss" and "Physical Damage", the latter being replaced in the New Decision by "Physical Disturbance", meaning the temporary and reversible disturbances. With regard to "Physical Damage", the EC identified as pressures capable of producing effects/impacts on the seafloor, abrasion, especially caused by fishing activities that actively interact with the seafloor (trawling, fishing with otter trawls and hydraulic or turbo-blowing dredges). Specifically, this pressure affects most of all mobile seabeds located beyond 3NM from the coast (or at depths greater than 50m) up to a maximum depth of 1000m. In addition, the EC has identified extraction and change in siltation (related to river inputs, shipping, etc.). With regard to the Reporting Sheet "Physical Loss", the two pressures indicated by the EC are sealing and smothering. The biogenic substrates potentially subject to significant pressure (from abrasion and/or sealing) are mainly maërl beds and *Posidonia oceanica* meadows, the latter habitat already protected by current regulations. The 2018 Summary Report clarifies that the available data from the Monitoring Programmes do not allow a value to be established constituting a threshold above which a significant impact can be found. In particular, no data are available on the extent of the biogenic substrates of mobile seabeds (maërl beds); therefore, it is neither possible to establish whether these substrates are subject to pressures producing physical disturbance/physical loss, nor is it possible to establish a significant pressure threshold. However, this information represents a serious limitation in maritime spatial planning.

- **Descriptor 7: Hydrographical conditions (D7)**

With regard to this qualitative descriptor, the methodological approach involved the analysis of significant and permanent alterations to the oceanographic background characteristics of the hydrological processes and the physiographic conditions produced by new infrastructure built (or planned) since 2012 and subject to national Environmental Impact Assessment (EIA). In assessing the level of significance of the alterations produced by the engineering works, the analysis was restricted to coastal and marine infrastructure subject to a national EIA procedure. This made it possible to exclude all coastal defence works, the construction of small ports or marinas, and extensions of existing port infrastructures that do not require a national EIA and which are deemed not to produce any significant impact on both the spatial and temporal scales of marine ecosystems, as a specific consequence of altered hydrographical conditions.

Specifically, the assessment of the engineering works did not concern impacts on the ecosystems but focused mainly on benthic habitats, with a regression to the limits of the Habitats Directive.

This descriptor seems to disregard the impact of coastal defences, both as a modification of the seafloor and as a hydrodynamic alteration. In the Adriatic, Ionian and Tyrrhenian maritime areas, numerous coastal defence

works have led to modifications of the seabed, completely transforming coastal dynamics. These works, even if small in size and affecting only the coastal strip, are nevertheless widely present along all the country's coasts and interfere with the hydrodynamics and transportation of sediments, considerably altering the natural balances of the beach system and the marine ecosystem. Changes in hydrographical conditions have produced corridors for alien species, changed sedimentation regimes and created substrates for planktonic species with benthic stages, such as jellyfish. The construction of maritime engineering works (dykes, protective groynes, lagoon inlets, jetties and soft barriers) and harbour structures can have a negative effect both directly, because they are built onto stretches of seafloor characterised by the presence of coralligenous formations (covering the substrate), and indirectly, as in the case of beach nourishment activities with unsuitable materials and consequent increased turbidity. Moreover, these works built between the emerged and submerged beach, have entailed – and indeed still entail – effects ranging from the total cancellation of the body of the beach to the triggering of irreversible erosion processes. Therefore, the impacts produced on a local scale by coastal defence works and small harbours should also be taken into account.

- **Descriptor 9: Contaminants in seafood (D9)**

In the Marine Strategy Framework Directive (EC/2008/56 - Cycle II 2018-2024), contaminants in fish and other seafood are considered within the Qualitative Descriptor for the determination of good environmental status No. 9, which States "*Contaminants in fish and other seafood for human consumption do not exceed levels established by Community legislation or other relevant standards"*. The parameters considered, listed in Regulation (EC) No 1881/2006 *et seq.* are: Heavy Metals (Lead, Cadmium and Mercury); Dioxins and PCBs; and Polycyclic Aromatic Hydrocarbons (PAHs).

The latest assessment of the GES under Art. 8 of the MSFD was carried out by ISPRA in the MSFD Report 2018. The data used for the quality status assessment are drawn from specific monitoring activities carried out for the purposes of the Marine Strategy Directive by CNR, according to WP 5.1 (Decree 11 February 2015).

In general, the percentage of data coverage is not extensive enough to provide a meaningful representation of the quality of maritime areas nor to allow a judgement on the environmental status as set out in the GES definitions of Ministerial Decree No. 36 of 15 February 2019. The Adriatic Sea sub-region, however, features a higher percentage of coverage than the other two sub-regions. Despite the lack of information, it can be observed that the available data on the concentrations of contaminants detected in the samples of fishery products do not show exceedances of the threshold values for metals (Cd; Pb; Hg), nor for polycyclic aromatic hydrocarbons (PAH: benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene and chrysene), nor for organochlorines. Thus, a qualitative improvement can be seen, in general, compared to the data processed in the past Initial Assessment (IA), in which exceedances were found for metals in all three sub-regions, although, as already mentioned, the current coverage percentages are lower than in the past assessment (ISPRA, 2018).

Fishery products are exposed to contaminants in the environment due to both natural causes (e.g. natural geological factors including geothermal activity) and anthropic causes (industry, e.g. sewage discharge, agriculture, aquaculture, etc.). In the earth's crust, heavy metals are found in crystalline form and are naturally present in soils and, therefore, in sediments and in marine and transitional waters, and are then found as "natural" contaminants in food. However, human activities have led to an increase and progressive dispersion of these metals into the environment. Mining, metallurgical and metal-processing activities have led to their dispersion into the living environment and are also a risk factor for the general population.

Trophic chains represent the eco-biological target for the set of contaminants present in the environment, which, by penetrating food chains, can be transferred (and often bio-magnified) in prey-predator sequences, all the way to humans. From a strictly sanitary point of view, "heavy metals" s.s., such as lead, cadmium and mercury, represent chemical elements known to be capable of residing and/or concentrating in fishery products (Jaworski JF et al., 1987), with a significant variability, also linked to the different characteristics and trophic level occupied in the food chains by the species (Wang WX., 2002) and zoological groups included in the heterogeneous commodity category. In the past, environmental contamination by heavy metals was generally associated with real "accidents", but with the exponential growth and spread of industrialisation, the phenomenon has turned from an "accidental" to an infrastructure and production problem of increasing

intensity, which has become even more difficult to assess. In addition, the growing use of fertilisers and plant protection products has also been added to a widespread state of environmental impairment caused by industrial releases, contamination due to (active or decommissioned) mining activities and improper waste disposal. Pollution of marine waters is mainly due to the development of anthropic activities resulting in the direct or indirect introduction into the aquatic environment of substances capable of producing harmful effects on living organisms and, consequently, on human health; in particular, it depends on the contaminants transported into the sea by rivers and inland catchment basins, which feature large-scale industrial and crop and livestock farming activities and/or intense urbanisation phenomena, while a significant share is due to the direct input, into coastal waters, of urban landfills and industrial discharges (Focardi *et al.* , 2001).

In addition, the presence of contaminated sites (both national SNI and regional SRI) has undoubtedly become one of the most relevant issues for land management: on the one hand, for their environmental and health implications and, on the other, for the socio-economic repercussions from the possible closure of factories and/or the impairment of residential and agricultural settlements in the vicinity of the "contaminated sites", which can be defined as areas in which the contribution of one or more pollutants determines the effective alteration of the natural characteristics of the soil and water tables.

5.3 Possible interactions between the MSP (Sector, Uses, Measures) and the Marine and Coastal Environment

The coastal marine environment component, which includes aspects related to water, biodiversity and areas subject to protection regimes, suffers direct negative effects mainly due to infrastructure engineering projects that lead to the fragmentation of habitats, environments and ecological networks, especially in non-man-made contexts. Eutrophication, a phenomenon mainly due to nutrient enrichment leading to an increase in primary production and algal biomass and consequent alteration of benthic communities, is of great concern in some marine areas. The contamination of sediments, flora and fauna by man-made chemicals is a phenomenon that negatively affects biodiversity. Coastal and maritime activities, such as fishing, shipping, tourism, aquaculture, pollution and oil and gas extraction, place multiple pressures on the coastal marine environment. Waste dispersed in the marine environment is present in all marine ecosystems: plastics, metals, cardboard and other waste products accumulate on the coastlines and seafloor and in surface waters.

Offshore activities and ships also cause underwater noise pollution that can negatively affect the coastal marine environment. As noted in the European Environment Agency's (EEA) 2021 report on the state of Europe's seas, concentrations of contaminants in pieces (such as microplastics) can be thousands of times higher than the seawater, which exposes marine species and habitats to harmful chemicals. This is due to a number of problems such as the lack of effective regulation, adequate control measures and river basin management; deterioration of the coastal areas caused by pollution, urbanisation and the destruction of natural habitats; land-use conflicts, over-exploitation of resources, loss of biodiversity and the possible effects of climate change.

However, efforts to move towards zero pollution will require a focus on water resources as part of the European Green Deal's Zero Pollution Action Plan, which includes restoring the natural functions of aquifers, surface, marine and coastal waters, combating pollution caused by urban surface runoff, and responding to new issues such as microplastics and chemicals. One of the key components of the European Green Deal, the producer-to-consumer strategy, aims to significantly reduce agricultural use and the risk of chemical pesticides, antibiotic use and fertiliser leakage into the environment, e.g. through integrated pest management and an integrated nutrient management plan. The EU Biodiversity Strategy 2030 also pursues similar objectives.

Maritime transport currently plays, and will continue to play, an essential role in world and European trade and economy. In recent years, the maritime sector has taken significant steps to alleviate its environmental impact on marine life. In view of an expected increase in maritime transport globally, as far as the EU is concerned, a new report reveals for the first time the full extent of the sector's impact on the coastal marine environment and identifies issues that need to be resolved with a view to sustainable development (European Environment Agency-2021). Despite the actions taken at the European level to protect marine biodiversity, the overall problems persist.

The coastal marine environment continues to be over-exploited for fishing, leading to particularly serious problems for biodiversity. The fishing fleet is greatly oversized and a reduction in capacity would be required to adapt it to the available fish resources.

According to the MSP forecasts, as shown by the matrix in Section 5.1.1, the most important pressure factors are related to maritime transport, the construction of new port infrastructure, coastal defence works, energy production facilities, both onshore and offshore, aquaculture facilities, fishing, and coastal and maritime tourism. Effects related to pressure factors have been extensively discussed in section 5.1.2 Elements related to potential negative effects from human activities on descriptors D1-D2-D3-D5-D6-D7-D9 of the Marine Strategy and in the following sub-sections. With regard to infrastructure engineering works, however, it must be considered that they are subject to EIA procedures and it is at this stage, in which the typological, dimensional, and locational aspects are clarified, that the possible extent of the impact must be assessed. The environmental context in which the engineering works are located, and the relevant protection regime must be taken into account during the project drafting and EIA phases.

For all other coastal defence works not subject to an EIA that may adversely affect them. either directly or indirectly, the relevant impacts should be taken into account as reported in section 5.1.2.

A number of (national) measures of the MSP (NAZ_MIS|61, NAZ_MIS|62, NAZ_MIS|63, NAZ_MIS|64, NAZ_MIS|65), consistent with the DNSH principle, are of fundamental importance to support the development, harmonisation and implementation of strategies and measures for coastal defence and erosion control (OS_DC|01), to guarantee the best coherence between the sea uses and its vocations of use, as per the MSP Plans and coastal uses (OS_DC|02), and to adequately consider and address the issue of the use and safeguarding of underwater sand for beach nourishment, to be considered as a strategic resource for coastal defence and adaptation plans (OS_DC|03). A number of (national) measures of the MSP, in accordance with the DNSH principle, will be fundamental for the assessment processes concerning aquaculture uses, including the NAZ_MIS|39 and the NAZ_MIS|40 functional to the achievement of the goal of the OS_A|01 Plan aimed at promoting the sustainable growth of the aquaculture sector and the NAZ_MIS|41 measures, NAZ_MIS|42, NAZ_MIS|43, functional to the achievement of the goal of the OS_A|02 Plan, aimed at promoting quality aquaculture and supporting the process of defining AZA (Allocated Zones for Aquaculture).

With regard to fisheries, several of the (national) measures of the FMP (NAZ_MIS|28, NAZ_MIS|29, NAZ_MIS|30, NAZ_MIS|31, NAZ_MIS|32, NAZ_MIS|33, NAZ_MIS|34, NAZ_MIS|35, NAZ_MIS|36, NAZ_MIS|37, NAZ_MIS|38) aim at fostering the sustainable development of the fishery chains (OS_P|01), at fostering the implementation of the forecasts of the European and National Multiannual Management Plans in the Geographical Sub-Areas (GSA) (OS_P|02), at promoting, developing and managing small-scale coastal fishing through sustainable techniques (OS_P|03), at fostering the creation of areas aimed at the recovery and protection of fish stocks and the protection of Essential Fish Habitats (EFH) (OS_P|04), to encourage cooperation between States in order to achieve concerted measures for the sustainable management of their respective national fishing sectors (OS_P|05) and to control and combat illegal fishing (OS_P|06), in accordance with the DNSH principle.

The measures related to the protection of the environment and natural resources (NAZ_MIS|13, NAZ_MIS|14, NAZ_MIS|15, NAZ_MIS|16, NAZ_MIS|17, NAZ_MIS|18) aim at the Ecosystem based approach (EBA) in the general approach and indications of the Maritime Spatial Plans (OS_N|01), to foster the extension of the protection of the EU seas to 30% by 2030 (OS_N|02), to transpose and promote the implementation of the main spatial measures provided in the MSFD Programme of Measures (OS_N|03), to integrate the aspects of land-sea interaction and integrated coastal zone management, with particular reference to environmental aspects (OS_N|04) and to the goals of marine ecosystem restoration, as indicated in the proposed European Nature Restoration Law (OS_N|05). The uses envisaged in the MSP also envisages the NAZ_MIS|71 measure, aimed at directing marine research activities based on the fact-finding needs of the Plan, to strengthen and support the planning process and its sustainable growth objectives (OS_RI|01). Scientific research plays a key role in verifying the effects on coastal marine species and habitats. Monitoring and control of environmental, socio-economic and institutional components are essential for proper management of a marine area. Furthermore, biocenotic mapping has proven a fundamental tool for assessing environmental conditions and planning possible protection and resource management actions in marine areas.

The world of research is therefore called on to play a fundamental role, both in ensuring the development of new methodologies and monitoring tools, and in contributing to the training of professionals capable of supporting public decision-makers and businesses. Even in marine areas subject to protection regimes, scientific research plays a primary role as it must support the managing entity in its strategic decision-making process, providing data on the abundance of focal species, the population structure of focal species, the distribution and complexity of habitats, the composition and structure of communities, the degree of recruitment within communities, the integrity of the trophic network, the type, level and profitability of fishing effort, water quality, analysis of signs of "recovery", assessment of anthropic impacts, all potential biophysical indicators of effective management of a Marine Protected Area. Governments, management entities, NGOs and others are increasingly interested in developing and applying management assessment systems to adapt future management operations; scientific research should support this mechanism by providing more and more innovative tools, accurate, updated data and comparisons with other international situations.

The "National Recovery and Resilience Plan" must also be seen as an opportunity to rethink the world of research, to overcome the chronic shortage of resources, compared to the European average, by investing in human resources and equipment in tackling environmental emergencies, also fostering coordination and cooperative interaction between public bodies, but also with the private sector.

When defining the envisaged measures, the assessment should be based on a coherent ecosystem approach, also taking into account the protection needs of marine and coastal areas, particularly for the high sensitivity areas identified in Chapter 4, Section 4.3.1.1.

For the definition of the areas of greatest environmental sensitivity within the "Adriatic" area of the MSP, reference was made to waters (in terms of percentage of the surface area) falling within Marine Protected Areas (established under Laws 979/1982 and 394/1991, as amended) and in the other types of protected areas referred to in the Official List of Protected Areas (EUAP), in the Biological Protection Zones referred to in the Decree of 22 January 2009 of the MIPAAF (Ministry of Agricultural, Food and Forestry Policies) (OJ General Series no. 37 of 14-02-2009) and in the Fisheries Restricted Area referred to in the recommendations of the GFCM-FAO (*General Fisheries Commission for the Mediterranean-Recommendation*: GFCM/41/2017/3). The analysis conducted revealed the following situation for the Adriatic MA:

Sub-area A/3 features the highest percentage of protection of the marine space equal to 22.2%, compared to the other Sub-areas, due to the presence of the Biological Protection Zone (BPZ) "Outside Ravenna and neighbouring areas" and of Natura2000 Network sites, while Sub-area A/4 features a marine space protection percentage of 0.3%, due to the absence of both MPAs and BPZs. The percentages of 19.7% of Sub-Area A/8 for the presence of the FRA Jabuka/Pomo Pit Fisheries Restriction Zone, and 19.6% of Sub-Area A/6 for the presence of the MPA "Tremiti Islands" and the MPA "Torre Guaceto", the BPZ "Tremiti Area", the BPZ "Off the Apulia Coast" and Natura2000 Network sites are worth highlighting. Overall, the most sensitive areas are represented by Sub-Areas A/3, A/8 and A/6. The provisions of the MSP are to guarantee the goals of species and ecosystem protection and the permitted uses should not lead to pressure factors for habitats. For these areas, the MSP measures, such as NAZ_MIS|05, will be important, i.e. to develop a Maritime Strategy (National Strategy for the Sustainable Development of the Sea Economy) at national level, implemented in synergy with the implementation of the Maritime Spatial Plans, in order to provide a structured impulse to the sustainable development of the Italian sea economy, in the short, medium and long term, aimed at contributing to the National Strategy for Sustainable Development (OS_SS|02). On the other hand, it will be necessary to verify the possible critical issues linked to the uses in the areas for which Maritime Transport and Ports (e.g. A/1_04) are included among the priority uses (P), an area mainly affected by important commercial traffic routes, but also coinciding with a sea SAC and a connecting area in which there are seagrass beds and rocky outcrops (*trezze* or *tegnue*) with coralligenous and rhodolite biocoenoses.

In addition, the area also acts as a protection area for target species such as *Caretta caretta* and *Tursiops truncatus*, which can be found throughout the Upper Adriatic Sea, and is also a breeding and growth area for fish species of commercial interest. Contributing to this will be such measures in the MSP as NAZ_MIS|69, which aims to define tools to control tourism pressure from a perspective of sustainability, and NAZ_MIS|70, which aims to identify and promote sustainable technologies and practices in tourism navigation.

Furthermore, certain engineering works, such as coastal defence works, are instrumental in safeguarding the coastline, which continues to recede also as a result of climate change.

➢ **The effects of renewable energy production on the marine and coastal environment**

The potential impacts of offshore renewable energy facilities, and in particular wind turbines, on marine and coastal environments may affect habitats, fish, birds, marine mammals and other species (e.g. plants, algae, invertebrates and bats).

The main impacts on **habitats** can be summarised as follows:

- loss of existing habitats and replacement with other habitats (e.g. by adding concrete, steel or rock structures);
- creation of new marine habitats;
- disturbance and degradation of habitats (including penetration, abrasion and compression of sediments and cable laying);
- asphyxiation due to falling sediment in suspension;
- alteration of physical processes due to the presence of new structures;
- release of contaminants or mobilisation of pre-existing contaminants.

In most cases, these impacts envisage a potentially complex range of impacts. For example, damage and habitat disturbance can be caused by any activity that interacts with the seabed. Such activities could include (i) the use of sampling equipment for sampling and coring, (ii) the wake of thrusters, or (iii) the preparation of the seafloor prior to laying foundations and cables. These impacts may have potentially wide-ranging spatial effects and may occur at any time during and after the life cycle of the project. Habitats listed in Annex I of the Habitats Directive that are potentially vulnerable to impacts from offshore wind farms include "sandbanks which are slightly covered by sea water all the time" [1110], "reefs" [1170] and "Posidonia beds" [1120]. Posidonia beds are at risk due to direct physical destruction and sedimentation alterations in hydrographical regimes. Depending on the location of the wind farm and the associated power transmission infrastructure, other habitats or habitat complexes could also be affected. Such habitats and habitat complexes include "estuaries" [1130], "mudflats and sandflats not covered by sea water at low tide" [1140] and "large shallow inlets and bays" [1160]. Some marine habitats, particularly "submerged or partially submerged caves" [8330], are unlikely to be affected by offshore wind farms.

Although activities such as geophysical and geotechnical surveys are unlikely to result in significant impacts on habitats, the potential for geotechnical coring or other activities to result in direct loss of/disturbance to protected habitats should be considered. Attention should also be paid to repowering activities, as they may involve activities with similar effects to other phases. Potentially, repowering activities may even extend the duration of existing impacts beyond the period initially assessed. Installations may affect intertidal and subtidal habitats through (i) loss of habitat in the footprint area of turbines and related infrastructure, (ii) disturbance due to sediment dispersal/sedimentation caused by different activities, which may lead to seafloor asphyxiation, alteration of the physical structure of habitats or remobilisation of pollutants, and iii) temporary disturbances due to the interaction of operations with the seabed, including the use of anchoring legs of self-lifting platforms[18], ship anchors, etc.. Long-term effects on habitats include the introduction of new artificial substrates that may attract benthic and other organisms. Finally, the habitats listed in Annex I of the Habitats Directive may be affected by the exclusion of other activities previously present, such as fishing, thus allowing the restoration of benthic habitats that have been severely damaged by trawling.

Most of the wind farms, and their associated cable systems, are currently located in areas with relatively soft sediments (e.g. sandy bottoms with varying percentages of finer sediments, larger gravel, boulders, etc.): recent studies have shown that the introduction of hard surfaces in areas where sandy sediments prevail has often resulted in significant alteration of benthic communities. Although this alteration can be assessed positively, the marked change in conditions could lead to significant impacts if existing habitats are protected within a

[18] Type of mobile platform anchored to the seabed by means of a system of piles known as "anchoring legs".

Natura 2000 site. Engineered structures or other artificial hard substrates lead to (i) permanent changes in sediment structure, (ii) the sealing of marine sediments, and (iii) the consequent loss of typical soft-bottom habitats. The artificial introduction of hard substrates therefore does not necessarily lead to an ecological improvement of marine habitats. The condition and conservation goals of Natura 2000 sites should be taken into account in assessments, and caution should be exercised when there is limited information available on the actual historical background conditions. Another aspect that needs to be emphasised is the difference between fixed and floating wind turbine technology, also in relation to the nature of the seafloor on which these structures are placed. Some types of fixed foundations, such as air foundations, do not require piling or drilling of the seabed. This means that the probability of significant impacts is low compared to monopile foundations or foundations that otherwise require the use of anchor piles.

The energy produced by floating wind turbines has a much smaller footprint in terms of habitat destruction. With regard to the potential impacts of the infrastructure on **fish species,** reference is made to those whose effects propagate over a wide distance, e.g. disturbance due to underwater noise and alteration of water quality (e.g. due to suspended sediments). Electromagnetic fields generated by cable systems used to transport electricity from a wind farm to the mainland are also a potential type of impact. In this regard, the sturgeon's ability to detect electromagnetic fields has been observed, although the probability and significance of any impact is not yet well understood. However, there is considerable uncertainty as to whether magnetic fields or induced electric fields may have detrimental effects or whether such effects may be ecologically significant. Underwater noise may need to be taken into account if a wind farm is sufficiently close to a designated site in coastal or estuarine waters, which could be affected by the noisiest wind farm construction activities (e.g. driving of foundation piles and/or detonation of unexploded ordnance). In order to take into account the effects of underwater noise on fish species, it would be possible to classify species according to their sensitivity to underwater noise, based on the presence or absence of a swim bladder: it is understood that fish with a swim bladder are sensitive to acoustic pressure. However, estimates of the distances at which disturbance effects occur are still very uncertain. The interaction between **birds** and offshore power plants, especially wind power plants, has been extensively studied in Europe and worldwide. As a result, numerous national guidance documents are available on birds and such infrastructure (especially wind[19]).

The types of impacts of offshore wind turbines on birds are largely similar to those identified in relation to onshore wind farms, although the cumulative effects may be more significant for offshore structures. These types of impacts have been examined extensively and are summarised below:

- habitat loss and degradation: the elimination or fragmentation of supporting habitats that birds would otherwise use;
- disturbance and displacement: the tendency of birds to move away can lead to habitat loss;
- collision: fatal interaction between flying birds and wind turbine structures;
- Barrier effect: wind farms constitute an impenetrable area for birds in flight, requiring them to cover additional distances resulting in a greater expenditure of energy;
- alteration (e.g. possibility of finding support).

Each type of impact can potentially affect the survival and reproductive capacity of individual specimens. This may lead to alterations in the demographic parameters of a population, which may result in a measurable change in its size. **Marine mammals** (porpoises and cetaceans) can be affected in various ways by offshore wind farms. So far, within the context of offshore wind projects, the focus has primarily been on the effects of underwater noise, due in particular to the construction of wind turbine foundation piles, e.g. monopile foundations and lattice structures. These types of foundations can produce high levels of impulsive noise that can adversely affect the activity level of marine mammals. These effects are progressively reduced the further away we move from the site. In addition to the effects caused by noise, there are a variety of additional potential

[19] In Italy, one example is the Ministerial Decree of 10 September 2010, whose Attachment 4 "Wind farms: elements for their proper inclusion in the landscape" contains "*aspects relating to their potential environmental and landscape impacts and construction criteria and mitigation measures to be taken into account, both in the design phase and in the compatibility assessment phase of the projects"*.

effects of wind farms on marine mammals, the importance of which may increase as our understanding of their significance for these species improves. A few examples are given below:

- acoustic perturbation and displacement
- hearing impairment (injuries caused by underwater noise)
- interference in communication
- loss of habitat
- collision with vessels
- barrier effect
- reduction of fishing pressure
- alteration of water quality (contaminants)
- effects of electromagnetic fields on navigation
- cliff effect

With regard to noise, in addition to the noise generated by pile driving operations, the noise produced during the pre-construction and operating phase of the plant may also affect marine fauna. For the construction of an offshore wind farm, geophysical and geotechnical surveys are often carried out in combination with surveys. Such surveys involve high levels of noise, which can generate permanent and temporary damage to the hearing apparatus, escape/avoidance tendencies and other behavioural incidences. Some echosounders use frequencies in the hearing range of harbour porpoises and may disturb the species, which is highly dependent on acoustic communication for its survival. The continuous noise produced by the vessels involved in periodic maintenance can also cause disturbance. While the noise generated by pile driving can cause serious physical harm to some animals but only lasts for a few months (during the construction phase of the wind farm) and then stops, in contrast, the noise caused by the operation of a wind farm is much less but lasts for many years and could affect the behaviour of some species, possibly altering the balance of the site's ecosystem. Neither the initial nor the long-term noise impacts of offshore wind farms on marine fauna are yet fully understood. The noise generated by pile driving can also potentially cover the loud vocalisations emitted by truncate bottlenose dolphins at a distance of 10-15 km and weak vocalisations even at a distance of 40 km.

The displacement effect of dolphins (i.e. their moving away from the pile-driving site) may outweigh interference in communication during the construction phase. Less intense levels of noise, e.g. during the operation of the wind farm, could, however, have significant consequences over a longer period of time if normal behaviour is impaired. A possible further repercussion concerns, as mentioned above, the potential loss of habitat: theoretically, the construction of an offshore wind farm can be assumed to result in a loss of habitat at least equivalent to the footprint area of the new infrastructure (including wind turbine or substation foundations, corrosion protection and cable protection). The increased vessel traffic associated with wind farms also increases the risk of marine mammals colliding with them. Most analyses of marine mammal collisions with vessels, however, are not related to wind turbines, but mostly focus on shipping traffic along offshore shipping lanes and involve large species such as sperm whales and whales. It has been found that most fatal collisions occur with vessels of 80 m or more travelling at speeds of 14 knots or more.

In any case, the intensification of vessel traffic caused by wind farm activities is an important cumulative effect, which is particularly significant in seas that already feature a high degree of shipping pressure, such as the Mediterranean Sea. Another potential negative effect relates to the concept of the so-called “barrier effect”, which is based on the assumption that the presence of wind turbines and their associated activities could be an obstacle to the movement of certain species of marine mammals. The duration of this effect would be longer than temporary disturbances during the construction and decommissioning phases or single events during the operation phase, e.g. maintenance work. With regard to species commonly found in the vicinity of existing offshore wind farms (e.g. harbour porpoises, common seals or grey seals), however, there appears to be no evidence of a possible barrier effect. Some evaluations have also ruled out the possibility that multiple simultaneous pile-driving activities may collectively constitute a barrier to movement from one area to another. For other species (e.g. fin whales, *Balaenoptera physalus*, sperm whales, *Physeter macrocephalus*, and Cuvier’s beaked whales, *Ziphius cavirostris*), potentially present in new wind farm development areas, such as the Mediterranean, no information on the potential barrier effect is however available.

Marine mammals are vulnerable to toxic contaminants, which can bioaccumulate and be transmitted from mothers to their offspring through lactation. Most of the relevant pollutants that can bioaccumulate are no longer used and the current effects are largely the result of past discharges. However, fat-soluble chlorinated organic compounds, such as industrial polychlorinated biphenyls (PCBs), can be ingested through food and potentially lead to reduced reproductive capacity and a weakened immune system. From this point of view, it should be remembered that any offshore installation requires the use of various chemicals, such as lubricating oils, engine oils, hydraulic fluids and antifouling compounds (compounds that prevent the formation of algae on marine infrastructure). The alteration of water quality may also depend on the mobilisation of suspended sediments. The rather low sensitivity of marine mammals to suspended sediment, together with the generally limited spatial and temporal extent of any effects, usually results in low impacts. A further repercussion may concern the electromagnetic fields created during the operation of the plant, from normal alternating current (AC) and high voltage direct current (HVDC) electricity transmission cables. These fields can in turn induce electric fields in the marine environment, which are assumed to potentially affect the orientation ability of cetaceans. There is no known evidence that this effect occurs in practice, and it is not currently considered to have a significant effect on cetaceans. Finally, reference is also made to the so-called "reef effect", which can occur when new structures are built in marine waters. Colonisation (settlement of species on structures) of artificial "reefs" by algae and other organisms ("reef effect") may result in the alteration of the surrounding natural habitats, including prey and their behaviour. This alteration may include beneficial effects from reduced fishing activity and increased aggregations of (prey) fish. Wind farms can therefore potentially have a positive impact on marine mammals and fish through the creation of habitats following the introduction of new hard substrates (foundations and corrosion protection) and/or the reduction/exclusion of fishing activities. When decommissioning, it is therefore necessary to weigh the pros and cons of not removing certain structures, such as wind turbine foundations or rock armour, as this could be beneficial for marine mammals. These pros should be weighed against the cons of removing the structures, which could arise from other conservation interests (e.g. if the pre-existing habitats were of a different nature) and advantages for the users of the sea, e.g. fishing interests and navigation safety.

The potential impacts on **plants**, **algae** and **invertebrates** are generally considered in relation to their habitats. In turn, the sensitivity of marine habitats is often partly described in relation to factors such as the resistance and resilience of typical and associated species. However, the effects on the receptors examined may have consequences for groups such as marine mammals or seabirds if, for example, the search for food is affected. The only plant species specifically associated with the habitat types listed in Annex I of the Habitats Directive are *Zostera marina*, *Zostera noltii*, *Cymodocea nodosa* and *Posidonia oceanica* (Posidonia meadows, *Posidonion oceanicae*). Other aquatic plants are also potentially vulnerable to the effects of habitat loss and disturbance if they are located in the vicinity of offshore wind farms. Due to the need for aquatic plants to live in shallow water exposed to sunlight, interactions with offshore wind farms are more likely to occur at the level of power transmission cables rather than in the areas where turbines are located. However, at the site of the Middelgrunden offshore wind farm, in the shallow waters of the Öresund Strait in Denmark, aquatic plant meadows (*Zostera marina*) were present prior to the construction of the wind farm.

Monitoring of these seagrass meadows has revealed that, three years after the construction of the turbines the level of plant cover had not been affected, meaning that there was no negative impact due to the construction of the wind farm (including dredging and laying of the gravity foundations). It was observed that seaweed generally colonises the new surfaces provided by wind turbine foundations. Equivalent habitats are provided by the offshore oil and gas extraction sector; however, wind turbine foundations are more numerous. This colonisation contributes to an increase in structural and biological diversity, potentially resulting in a reef effect, which leads to further effects in relation to the colonisation of invertebrates.

As far as marine invertebrates are concerned, wind farm infrastructure introduces new hard substrates, above and below the water surface, to which they may adhere. In some cases, this reef effect may increase diversity, although some studies have also suggested that it risks contributing to the spread of invasive exotic species. Regardless of the net increase in biodiversity, an alteration of habitats or species communities may, however, have negative effects on the conservation goals of the Natura 2000 site in question.

Offshore wind installations must therefore always be subject to appropriate assessment.

Attention was also paid to the increase in temperature around the cables in relation to the effects on the benthos. The operation of submarine power cables, in fact, generates heat, warming the local sediments.

The degree of heating depends on the characteristics of the cables, the electricity transported, the depth to which the cables are buried and the characteristics of the sediments. Heat dissipates rapidly in seawater. Consequently, the effects on sediments at shallow depths are negligible, where cables are buried 1 m or more and there is efficient heat exchange with the body of water above.

This means that the surface epifauna and infauna, which dwell in the top centimetres of the sediments, will not be exposed to a significant temperature change. Most benthic animals inhabit the upper 5-10 cm of the seafloor in the open sea and the upper 15 cm of the seafloor in the intertidal zones, where the temperature increase will be modest, provided the cables are buried deep enough. Some animals, such as langoustines, dig deeper into the seafloor, although the overall habitat area subject to warming is likely to be very limited.

Finally, with regard to the effects on **bats** due to offshore wind farms, the risk of mortality due to a direct collision or barotrauma has a cross-border dimension, as bats may dwell hundreds of kilometres from the offshore infrastructure in question. In order to assess the incidences of possible increased mortality at sea, it is necessary to know or be able to estimate the size of the bat population, including the part of the population that crosses the sea. Potentially relevant species are the Nathusius' pipistrelle (*Pipistrellus nathusii*), the common noctule (*Nyctalus noctula*) and the parti-coloured bat (*Vespertilio murinus*).

- **The effects on the marine and coastal environment of hydrocarbon prospection, exploration and production activities**

Hydrocarbon prospection, exploration and production activities and the subsequent decommissioning of plants determines specific pressures that must be taken into account to identify possible environmental impacts at sea. During the **exploration** phase, surveys (of a geographical, geological, geophysical and geochemical nature) are carried out to ascertain the geo-mineral characteristics of the site and to locate the presence of hydrocarbon accumulations below the surface of the explored seabed. In particular, geophysical surveys exploit the properties of elastic waves that propagate in the seabed and are reflected differently according to its geological and mineralogical characteristics. The acoustic waves used in this type of investigation constitute a pressure (noise) that produces effects on marine organisms with high risks for biodiversity. Collection vehicles emit noise and light in an environment that is normally in complete darkness. Dredging the seafloor also raises clouds of sediment. One of the main open questions still to be defined is how far deep-sea currents would spread these clouds. By settling back on the seafloor, the sediments could smother living species even if they live far away from the area where the operations take place.

Each mining operation would remove a "biologically active" surface layer from the seafloor, each year, from an area of approximately 200-300 square kilometres (National Geographic 2022).
Also to be considered at this stage are the other sources of environmental pressure related to the operation of the vessels used for geophysical surveys, which produce underwater noise (although vessels suitable for carrying out seismic surveys must be equipped with particularly "silent" propulsion systems to avoid interference with acoustic acquisition systems), emit fumes that fall back into the sea, release effluents and may impact with charismatic marine megafauna.

Another effect due to the extraction of raw materials and hydrocarbons is the control of environmental risks due to the management of extractive waste by the mining industry.

Waste from the extraction industries represents a quantitatively significant waste stream in the EU. According to the European Environment Agency, it is estimated that this type of waste accounts for about 29% of the total waste generated each year in the EU and that its annual volume exceeds 400 million tonnes.

The **research** phase, for verifying the validity of the stratigraphic-structural results collected in the previous phase, envisages the drilling of exploratory wells, an activity that requires the use of a drilling rig mounted, depending on the depth of the seabed, on a platform resting on the seafloor, on a semi-submersible platform or on an anchored vessel. The discharge of civil effluents, leakage of drilling fluids and/or drilling debris may constitute specific pressures associated with the execution of exploratory wells, in addition to the noise induced by the drilling operations (pumps, motors, jacking and rotary rigs, etc.). Additional pressures associated with

this phase are related to the area of marine surface occupied by the drilling rig (the extent of the area depends on the type of platform on which the rig is mounted), with limitations to navigation and fishing and a punctual increase in maritime traffic for the use of support and service vehicles. The subtraction of space from other uses of the sea, e.g. fishing activities, can also have environmental consequences in marine areas far from the research (and possibly, cultivation) site, as in the case of the concentration of the fishing effort in areas not affected by restrictions and prohibitions. The usability of the landscape, however temporary, may also be affected by the presence of the facility and its means of service.

The **production** phase includes the actual drilling of wells to exploit the reservoir, the installation of the relevant structure and finally production (extraction of the oil or natural gas from the subsoil and possible first treatment on the offshore platform). For the exploitation of hydrocarbon deposits at sea, different types of platforms are used, either fixed or floating. The drilling and installation of the platforms, the operation of the rig and the presence itself constitute pressures with possible impacts on marine environments.

Compared to the pressures mentioned for the exploration phase, those relating to the liquid or gaseous hydrocarbon production phase are more or less the same, with pressures on habitats and the landscape, the production of underwater noise, the subtraction of maritime space, environmental pressures dependent on the movement of service vehicles and the combustion of propellants, and the possible alteration/obstruction of migratory routes as well. Among the pressures that hydrocarbon activities may exert on the marine environment, the interaction of the offshore structure with the migratory routes of birds should also be mentioned. In particular, the artificial lighting that oil platforms generate in the offshore marine environment, although this phenomenon is still poorly understood, may affect both migratory and resident birds.

During the production phase, generally speaking, we may also add the discharge of civil effluents into the sea and the discharge, into the sea or into certain geological formations, of effluents from the extraction and treatment of hydrocarbons, so-called “production waters”. These, after being treated to remove the hydrocarbons, in accordance with the Ministerial Decree of 28 July 1994 and the Ministerial Decree of 3 March 1998 (mineral oil concentration of less than 40 mg/l - Art.104, paragraph 5, of Legislative Decree 152/2006 as amended) and subject to authorisation by the Ministry of the Environment and Protection of Land and Sea, may be discharged into the sea. The production phase also involves the installation of submerged structures extending for miles from the wellheads to the coast. This is the case with gas and oil pipelines, which can cause environmental damage to the habitats and populations they cross.

The offshore structure **decommissioning** phase begins with the end of the mining operations and the closing of the deposit and ends with the removal of the casing column, the intermediate columns and the production column beneath the seabed, through cutting and recovery, or, alternatively, with the authorisation of an alternative reuse or partial removal of the platforms or related infrastructure, in accordance with a specific project prepared and approved pursuant to the "National Guidelines for the Decommissioning of Extraction Platforms for the Production of Hydrocarbons at Sea and Related Infrastructures", approved by D.M. of 15 February 2019. The platform decommissioning operations require certain preliminary offshore activities to be carried out, such as surveys and inspections, cleaning the marine concretions, securing the safety and rehabilitating the related facilities (which involves pipe emptying and remediation operations, by means of washing with water and/or steam and the possible use of chemical additives) and the preparatory work for decommissioning. This preliminary phase is then followed by the cutting and removal of the platform, transportation of the removed materials to the mainland and dismantling of the removed materials, and finally the disposal of the said materials. The pressures that may generate significant impacts on the environment are therefore mainly noise and vibrations, the to and fro of ships, emissions of pollutants into the atmosphere, discharges of water, production of sewage and waste, pollutant leakage, night lighting, and the movement of marine sediments. A positive effect of such operations could be the removal of materials useful for combating coastal erosion (beach nourishment). Coastal erosion is a generalised and continuous process taking place along sandy coasts. The construction of harbours on sandy coasts or emergency defence works built to protect built-up areas or communication infrastructures have also locally aggravated the phenomenon.

For this reason, the need to plan and design coastal defence works in accordance with Integrated Coastal Zone Management (ICZM) criteria has increased over the years, taking into account not only the effectiveness of a work in counteracting erosion, but also how the alterations produced in the environmental matrices can affect

the economic and social resources, landscape component, and conservation of ecological resources and biodiversity. All maritime engineering works modify the coastal morphology and interfere with the littoral transportation of sediments. Therefore, the choice of the best solutions to contrast erosion must be supported by a careful analysis of the whole set of (marine, continental and anthropic) factors that most influence coastal dynamics, on the scale of both the hydrographical basin and the underlying coastal areas (physiographical units).

5.4 Possible interactions between the MSP (Sector, Uses, Measures) and the environmental component Soil

A study by Marino and Tomassetti (ISPRA2018) notes that the intensive aquaculture of fish species can result in the release of waste, both organic, in solid and/or dissolved form, and inorganic, composed largely of carbon, nitrogen and phosphorous.

When they exceed the natural assimilation capacity of an ecosystem, alterations can occur in the water column and sediments with phenomena that are usually localised and rather modest in size. However, in some cases, and under particular environmental conditions and types of farming, eutrophication phenomena, dissolved oxygen depletion and changes in biodiversity on a local scale may occur.

Aquaculture in cages with increased sedimentation of particulate organic waste may lead to increased oxygen demand of the sediment community and may affect sediment chemistry, which, in turn, may cause changes in species diversity, abundance and biomass of benthic fauna and flora. The latter can also be affected by smothering, due to the sediment generated by waste products or shellfish harvesting, especially if hydraulic or mechanical dredges are used. Where smothering occurs only periodically, the level of recoverability is generally reasonable, especially if bivalve fields are percolated by currents (ISPRA 2018). An improvement in productivity and an increase in quality and environmental sustainability of aquaculture could be achieved through appropriate spatial planning for the development of new sites shared with other activities, and facilitate the licensing procedures (SHAPE Project, 2014; Adriplan, 2015).

As argued by national and international researchers, the impact of trawling on sediment structure, benthic biodiversity and all the basic nutritional resources in these deep-sea sedimentary ecosystems is often severe, and there is no information available on the recovery time of benthic ecosystems below 500 m depth. A group of researchers have compared sediment samples from “ploughed” and “unploughed” areas off the Spanish coast and found that trawling has drastically reduced the total amount of small animals living in marine sediments, such as nematodes, small worms that are the dominant group in these environments and are really important in ecosystem processes (www.mongabay.com). Another effect of trawling is the loss or abandonment of nets, traps and longlines (lines several kilometres long), which remain in the sea as waste (Ghost Gear Report), damaging the underwater habitats because fishing nets are made of nylon, polypropylene, polyethylene, polyester and other materials, which are cheap and strong but cause a serious environmental problem if abandoned in the sea. Another consequence of trawling is the release of carbon dioxide (CO2), due to the mechanical action on the carbon-containing sediments that are mobilised from the bottom. The release of CO2 from the bottom increases the acidity of the oceans and reduces their ability to absorb it from the atmosphere (www.lifegate.it). The construction of infrastructures at sea can determine two different effects on the Soil component: the first is due to the infrastructure itself, which could constitute an obstacle to the free propagation of waves and, by interacting with it, give rise to various kinds of effects that can be felt even at great distances, and the second is due to the execution of the works, which could lead to the mobilisation of materials by rolling or suspension during the infrastructure laying operations. These phenomena, varying in intensity through time and space, could interfere with the natural dynamics of coastal sediments.

Coastal protection works built along Italian coastlines over the years belong to different types, adopted according to the geological and sedimentological context or according to design purposes; the most common, as reported in ISPRA's research on the coastline in Italy (2022), are attached breakwaters, detached breakwaters and transverse groynes. Attached breakwaters, generally consisting of natural or man-made boulders, are attached to the coastline, as the name suggests, to strengthen it, however entailing changes in the profile of the

emerged and submerged beach, as the sediments at the foot of the structure tend to be resuspended and transported offshore by the reflected waves and permanently removed from the solid transport balance, with the possible occurrence of scouring at the foot of the breakwater.

To this can be added the failure to form a new shoreline at the back of the breakwater, the alteration of currents and littoral solid transport, and the disappearance of the beach and dune habitat (ISPRA 2014). Detached breakwaters are also made of natural or artificial materials placed on medium shallow seabeds; they may consist of single or series of structures, with openings at intervals to facilitate water circulation and exchange.

The formation of rip currents between the breakwaters, the displacement of the littoral current towards the open sea, the formation of a sandy bar at a certain distance from the shoreline, deposition in the protected area and erosion in the sectors adjacent to and in front of the breakwaters, and the growth of the beach behind with thin material are the most common effects produced by these works (ISPRA 2014).

The function of groynes is to intercept littoral currents, so as to redistribute sediments along the shore, allowing the formation of a protective beach or slowing down ongoing erosion. These defence works can lead to the upstream shoreline advancing, the strengthening of the beach profile and changes in the grain size of the sediments of the downstream beach. Moreover, they usually trigger erosion in the under-billow areas, altering the layout of the shoreline, changing the over-billow and under-billow beach profile and forming rip currents (ISPRA 2014). A very common “soft engineering” approach to coastal protection along sandy shores in Italy is beach nourishment, which is a process by which suitable sediment, usually sand, lost through drift or erosion is replaced from other sources, of marine or terrestrial origin, to replenish the (emerged and/or submerged) beach. The results of this type of intervention are immediate and the sandy beaches, therefore, become accessible to the public instantaneously, which is one of the main advantages of beach nourishment, together with the fact that, by adopting grain sizes compatible with the pre-existing sand, the originality of the site is preserved and enhanced. With regard to the physical effects associated with beach nourishment, replenishing the shoreline with sand can produce morphological and granulometric variations attributable to the advancement towards the sea of the beach’s equilibrium profile and the increased width of the emerged beach.

There may also be a temporary increase in suspended particulate and increases in turbidity levels resulting from the use of materials with mineralogical characteristics that are too different from those present on the native beach (ISPRA 2014). Depending on the degree to which a coastal dune cordon is compromised, it may be possible to restore and protect the dune system by means of the morphological reconstruction of coastal dunes (conventional engineering) or to the construction of windbreaks and restoration with plant species (naturalistic engineering). For the morphological reconstruction of the dunes, sediments that are compatible, in terms of their granulometry and mineral composition, with the pre-existing sediments are used, possibly protecting them from erosion with windbreaks and/or semi-rigid elements placed at the foot of the dune and shaping the dune profile so as to minimise wind deflection. In these cases, the impacts on the environment are limited to the sand removal and relocation from neighbouring shorelines. Naturalistic engineering aims to foster and accelerate the stabilisation mechanisms of wind deposits and revegetation.

The replanting of vegetation follows the preparation of a substrate, with the aim of fertilising the soil and, through the use of geotextiles, counteracting wind erosion (ISPRA 2014).

By-pass systems are set up to protect adjacent shores and seabeds in order to restore sediment transport from one side to the other of maritime engineering works, such as harbours or transverse groynes.

The potential physical effects associated with these systems are mainly due to the mechanism of sediment suction and reflow, which can produce an increase in resuspension and therefore water turbidity in the vicinity of the intervention area (APAT 2007, ISPRA 2014).

The relict sand deposits correspond to ancient beaches, also known as “fossil beaches”, formed during the Ice Ages, when the sea level had dropped about 120 m below the present day, and which today are sometimes covered by recent pelitic sediments. These natural submerged deposits can provide suitable sediments for replenishing eroding shorelines through dredging operations. The effects on the marine environment generated by dredging relict sands are observed both on the seafloor and in the water column. In fact, dredging operations can lead to alterations in morphology, granulometric and chemical variations (dissolved oxygen) and changes

in the compaction of surface sediments on the seabed and resuspension of the fine fraction of the sediment removed, with the possible generation of surface and deep turbidity plumes in the water column (ISPRA 2018).

The physical-mechanical effects of dredging operations depend on the type of dredge used: stationary dredges, used when the deposit is predominantly vertical, produce a series of sub-circular depressions and/or pits of varying size (diameter from 20 to over 100 m, depth from 2 to 20 m), while self-propelled dredges produce a series of sub-parallel furrows of varying size (from 1-2 m up to 4-5 m wide, 0.5 to 2 m deep). Other factors contribute to determining the nature and extent of the physical alteration of the seafloor, such as the geometry and method of production of the deposit: deposits of wide spatial extent are produced for a limited thickness over large areas, while less extensive deposits are produced at depth for a maximum useful thickness (ISPRA 2018). Numerous studies report great variability in the time required for seabed recovery, understood as the restoration of the seafloor to its morphological and sedimentological conditions prior to dredging.

These times can vary from 1 month to more than 15 years, with faster recovery if the dredging is carried out with a self-propelled dredge, in a very dynamic environment, while after the use of stationary dredges, especially in low energy environments, restoration can be extremely slow and may not even be completed in the case of very deep cavities. The construction of offshore wind farms involves significant effects on the seafloor due to the laying of the foundations, which can be either monopile, tripod or four-leg (or pillar) foundations. Monopile foundations can be built up to a depth of 30 m and consist of a pipe that is driven into the seafloor. More stable three- or four-legged foundations can be used for greater depths but involve a greater impact on the seafloor. The laying of the foundations can lead to a load of suspended sediment in the water column, increasing its turbidity with a negative impact on the fauna, in particular on corals, sponges and anemones, and with probable negative influences on algae photosynthesis as well.

To reduce this negative effect, self-propelled anti-turbidity structures can be used, the use of which, recently monitored in the Venice lagoon, has provided encouraging results.

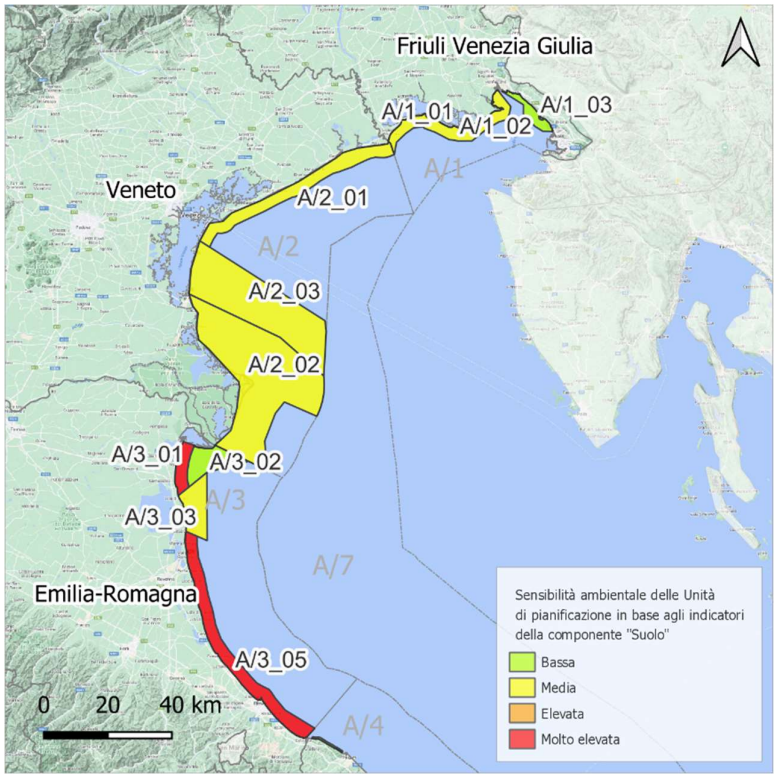
A quantitative (incomplete and rather speedy) indication of environmental sensitivity, in relation to the soil component, can be achieved by way of a series of indicators that are particularly significant in the coastal context, with both constant updating and national geographical coverage. These indicators consist of: coastal erosion, urbanisation of the coastal strip, shoreline naturalness, coastal subsidence, flood risk (based on the flood risk management plan or PRGA). For each planning unit, using GIS techniques, the contribution of each indicator on the sensitivity of the soil component was assessed and, subsequently, a relative sensitivity index was calculated from their geographical overlap and summation. The results of this procedure made it possible to identify, for the maritime area in question, 35 planning units with an environmental sensitivity index of the soil component. Of these, 3 have a “very high” index, 1 a “high” index, 12 a “medium” index and, finally, 19 a “low” index as shown in the table below.

Sub-area	Planning Unit	Soil Component Sensitivity Index
A/3	**A/3_01**	Very high
A/3	**A/3_05**	Very high
A/4	**A/4_11**	Very high
A/5	**A/5_04**	High
A/3	**A/3_03**	Medium
A/2	**A/2_03**	Medium
A/2	**A/2_02**	Medium
A/2	**A/2_01**	Medium
A/4	**A/4_07**	Medium
A/6	**A/6_01**	Medium
A/6	**A/6_07**	Medium
A/6	**A/6_08**	Medium
A/6	**A/6_12**	Medium
A/6	**A/6_17**	Medium

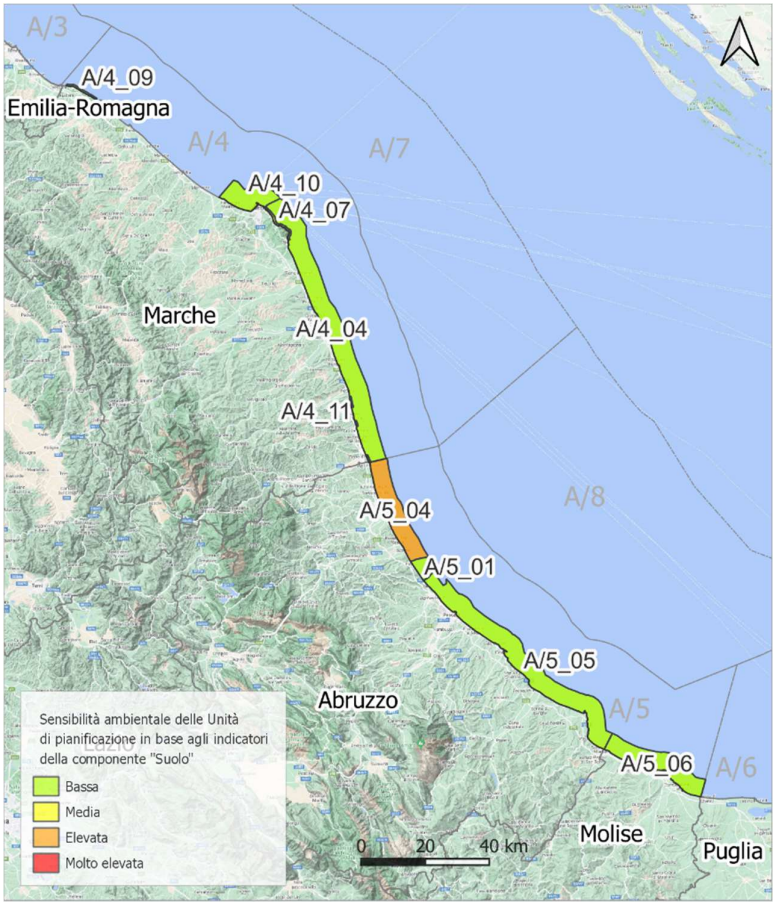
Sub-area	Planning Unit	Soil Component Sensitivity Index
A/6	**A/6_22**	Medium
A/1	**A/1_01**	Medium
A/3	**A/3_02**	Low
A/1	**A/1_03**	Low
A/5	**A/5_01**	Low
A/5	**A/5_06**	Low
A/5	**A/5_05**	Low
A/4	**A/4_04**	Low
A/4	**A/4_10**	Low
A/4	**A/4_09**	Low
A/6	**A/6_03**	Low
A/6	**A/6_02**	Low
A/6	**A/6_05**	Low
A/6	**A/6_09**	Low
A/6	**A/6_11**	Low
A/6	**A/6_14**	Low
A/6	**A/6_19**	Low
A/6	**A/6_21**	Low
A/6	**A/6_23**	Low
A/6	**A/6_26**	Low
A/1	**A/1_02**	Low

Classification of the Planning Units of the "Adriatic" Maritime Area, according to the Soil sensitivity index. Data from ISPRA, National Civil Protection, Copernicus Corine Land Cover, PCN National Geoportal MITE – processed in 2022 by SOGESID.

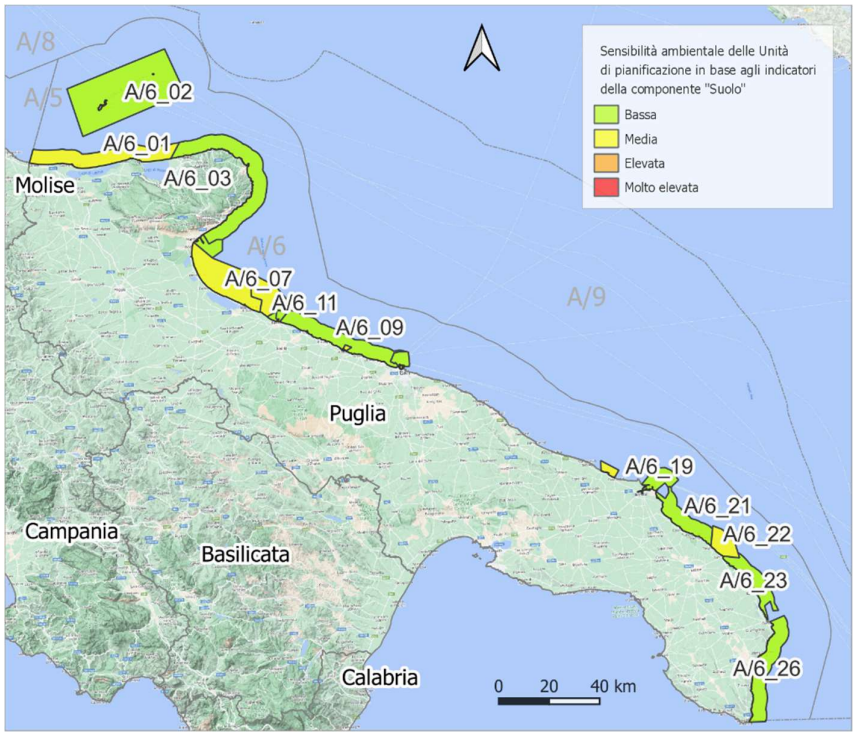
In particular, for planning units A/3_01 (Comacchio coastline in the province of Ferrara), A/3_05 (coastline from Marina di Ravenna to Cattolica, in the provinces of Ravenna, Forlì-Cesena and Rimini) and A/4_11 (Rio Canale beach, beach between the Acquarossa ditch and the S. Lucia and the littoral on the left mouth of the F. Tronto (in the provinces of Fermo and Ascoli Piceno) as well as for the Planning Unit A/5_04 (Teramo littoral) the most significant effects of the MSP on the Soil component are expected. Figures represent the Planning Units listed above and all the others reported in Table 5.1.3 in their geographical and administrative context of belonging.



Mapping of the Planning Units falling within the Adriatic Sea Sub-areas A1, A/2 and A/3 according to the sensitivity index of the Soil component. Data from ISPRA, National Civil Protection, Copernicus Corine Land Cover, PCN National Geoportal MITE – processed in 2022 by SOGESID.



Mapping of the Planning Units falling within the Adriatic Sub-areas A/4 and A/5 according to the sensitivity index of the Soil component. Data from ISPRA, National Civil Protection, Copernicus Corine Land Cover, PCN National Geoportal MITE – processed in 2022 by SOGESID.



Mapping of the Planning Units falling within the Adriatic Maritime Sub-area A/6 according to the sensitivity index of the Soil component. Data from ISPRA, National Civil Protection, Copernicus Corine Land Cover, PCN National Geoportal MITE – processed in 2022 by SOGESID.

➢ **The effects on the Soil of renewable energy production**

No further particular issues are reported beyond what has already been noted with regard to potential impacts on marine environments.

➢ **The effects on the Soil of hydrocarbon prospecting, exploration and production activities**

With regard to the soil component, the greatest impacts are caused by possible hydrocarbon spills from pipelines or well structures and other chemicals from tank ruptures. The disposal of stratum water and drilling sludge may be another possible source of contamination for this environmental component. Other impacts are due to the physical occupation of soil by extraction facilities and pipelines and interference with soil due to construction and engineering works in relation to oil extraction projects. Moreover, hydrocarbon extraction produces localised subsidence above the deposit, whether on land or at sea; therefore, this activity, if conducted at sea, cannot cause effects on the ground level along the coastal strip.

5.5 Possible significant effects of the MSP measures on air and climate change

➢ **Air and climate change effects of renewable energy production**

The construction of energy production facilities powered by offshore renewable sources, especially wind power, will have a typically positive impact on air and climate change. On the other hand, the development of renewable energy installations is one of the pillars underpinning the EU's environmental policies in the fight against climate change, as well as for issues related to, for example, the security and affordability of energy supplies. The production of energy from renewable sources, in fact, saves emissions of pollutants and climate-altering compounds that would occur in the case of energy production using traditional fossil fuels (as well as considering the average national energy production mix). Achieving the PNIEC's (National Integrated Plan for Energy and the Climate) 2030 target for offshore wind power (900 MW) would allow emission savings of about 450 thousand tonnes per year of CO_2, 370 tonnes per year of NOx and 4 tonnes per year of dust.

Therefore, the positive effects of these projects on this environmental component should be noted.

- **The effects on air and climate change of hydrocarbon prospection, exploration and production activities**

The repercussions of hydrocarbon extraction activities (prospection, exploration, production and decommissioning) on the environmental air component primarily arise from ducted (boiler smokestacks, turbochargers, generators) and non-ducted (fugitive emissions) atmospheric emissions. Particular attention must be paid to the presence of flares. In order to prevent any fugitive emissions that may occur, an appropriate periodic maintenance programme is adopted by the Proponent/Plant Operator, to identify any leaks and their repair. During gas flaring and gas venting, in connection with well operations, the gases emitted may include Volatile Organic Compounds (VOCs), nitrogen oxides (NOx), sulphur dioxide (SO_2), hydrogen sulphide (H_2S), carbon monoxide (CO) and carbon dioxide (CO_2). Some of these gas emissions can be very toxic and in some cases fatal to humans and other animals, depending on the concentrations and time of exposure.

5.6 Possible significant effects of MSP measures on human health and the socio-economic context

The MSP, through the NAZ_MIS|05 (national) measure, aims at implementing a nationwide Maritime Strategy (National Strategy for the Sustainable Development of the Sea Economy), to be implemented in synergy with the implementation of the Maritime Spatial Plans, capable of ensuring a structured impulse to the sustainable development of the Italian marine economy, in the short, medium and long term. In order to define the reference context and assess the potential (positive) impacts on the socio-economic system, related to a sustainable development of the sea economy, the MSP has provided for a specific measure, namely the NAZ_MIS|04 and NAZ_MIS|03 (aimed at "*Developing methods and tools for the quantitative assessment of the socio-economic effects of the planned decisions, to support the adaptive management phases of the MSP*".

As shown by the matrix in Section 5.1.1, most of the expected effects on the socio-economic system are of a positive nature; this is also explained by the fact that the MSP has among its objectives that of "*Developing a sustainable economy of the sea multiplying growth opportunities for marine and maritime sectors*" (SO_SS|01) and to "*Contributing to the National Strategy for Sustainable Development*" (SO_SS|02 through NAZ_MIS|05) and "*Contributing to the European Green Deal*" (SO_SS|03 through NAZ_MIS|06) and "*Fully grasping the economic and environmental sustainability opportunities arising from the circular economy*" (SO_SS|04 through NAZ_MIS|09). The support in the MSP for sectors such as fisheries (NAZ_MIS|28-29 and NAZ_MIS|31-38), aquaculture (NAZ_MIS|20 and NAZ_MIS|39-43), the strengthening, development and valorisation of shipbuilding (NAZ_MIS|10-12), traditional maritime activities (NAZ_MIS|24), maritime transport (NAZ_MIS|44-51), coastal tourism (NAZ_MIS|66-70) is framed within a rationale of sustainable development; this means, first of all, reducing environmental pressure factors (atmospheric emissions, water pollution, production and risk of waste dispersion at sea, underwater noise emissions, risk of accidents, disturbance of marine fauna, reduction of biodiversity, etc.), improving production processes and the competitiveness of production sectors (reducing costs by increasing energy efficiency, creating better working conditions for operators, creating balanced conditions in tourist flows, etc.), carrying out environmental remediation and redevelopment of coastal areas, promoting/creating awareness of the value of the economic activities that make up the intangible heritage linked to the uses of the sea (OS_PPC|05).

The current geopolitical framework has also highlighted the necessity of several goals of the European Green Deal, especially those aiming at achieving the energy independence of the EU countries and at fostering the energy transition towards renewable and low-emission sources through the development of offshore renewable energy production (OS_E01; to this end, the MSP contains measures, such as NAZ_MIS|52, NAZ_MIS|55-58). Some aspects related to the topic of energy will be analysed in more detail below.

The potential negative effects on human health from the sectors envisaged in the MSP are mainly related to "Maritime transport and ports" (increase of pollutants in the atmosphere, release of pollutants, including accidental releases and risk of accidents, disturbance of marine fauna), Fishing (presence of contaminants in the catch, increase of waste, etc.), Aquaculture (nitrogen and phosphorous inputs from point sources and

increase of waste, etc.), Coastal and maritime tourism (increase of population and need for waste water management, waste production), and the production of hydrocarbons at sea and related infrastructure.

- **The effects on the socio-economic context of energy production from renewable sources**

Installations powered by renewable sources, including wind farms, ensure a significant contribution to the achievement of national, EU and international energy and environmental goals and commitments. In addition, the installation of such plants favours the use of local resources, promoting economic growth and contributing to job creation by boosting the development, also at local level, of innovation potential through the promotion of research and development projects.

- **The effects on human health and socio-economic context of hydrocarbon prospection, exploration and production activities**

Hydrocarbon exploration and exploitation can be responsible for the release of various chemicals, the substances present in the oil and gas mixtures and their deposits, as well as the additives used in extraction procedures, in particular chemical additives used in fracking, and their subsequent release into the environment. The physico-chemical properties and environmental behaviour of these chemicals can differ widely. Most of these chemicals, including hydrocarbon mixtures, are volatile and can be dispersed in the air. Many others are water-soluble and can pollute groundwater. Possible health impacts related to hydrocarbon exploration and cultivation result from possible exposure:

- direct inhalation of air pollutants and/or dermal absorption;
- indirectly through ingestion of food or contaminated water.

Many pollutants are released into the atmosphere as a result of this type of operations, namely, nitrogen oxides (NOx) and sulphur oxides (SOx), volatile organic compounds (VOCs), BTEX (total benzene, toluene, ethylbenzene and xylenes), PM (Particulate Matter), polycyclic aromatic hydrocarbons (PAHs such as phenanthrene, naphthalene), phenols, biocides.

Exposure via inhalation can cause short-term damage to human health (irritation of the eyes, nose and throat, respiratory tract infections, headaches, nausea, allergic reactions, worsening of health conditions in individuals with asthma and emphysema, etc.) and long-term damage (tumours, leukaemia, cardiovascular diseases, liver and kidney diseases, reduction of red and white blood cells, chromosomal aberrations, genetic malformations, etc.). Groundwater and surface water can be contaminated due to:

- spills and leaks during transport, storage and use;
- migration of hydrocarbons and other fluids that can penetrate into the groundwater through rock fractures, faults and abandoned wells;
- failure of wells, if improperly designed, constructed or maintained.

Water contaminated by petroleum products often contains arsenic, cadmium, mercury, lead, zinc and copper; these heavy metals are toxic to humans and animals, even in small concentrations, because they are persistent substances that bioaccumulate in organisms. Mercury, for example, accumulates in tissues faster than it is excreted. The indirect exposure route includes contamination of food and drinking water. Unfortunately, limited quantitative information is available on both direct (air and water) and indirect (diet) pathways.

Other possible impacts are from noise and radiation exposure, due to the presence of Naturally Occurring Radioactive Material (NORM) in the excavated spoils.

As with any mining activity, oil and gas extraction can produce emissions of Naturally Occurring Radioactive Materials (NORM), such as uranium, thorium and their radioisotopes, as well as iodine, potassium and others. Among these NORMs (Naturally Occurring Radioactive Materials), the most common are radium-226 and radium-228, which result from the decay of uranium and thorium, respectively. The severity or type of their effects on health depends on the amount and duration of exposure to this radiation. Cancer is considered the primary effect, followed by changes in DNA or mutations. Radon and its decay products, if inhaled at certain doses and for prolonged periods, can cause DNA damage and lung cancer. The IARC has classified radon in Group 1, which includes substances with sufficient evidence of carcinogenicity.

5.7 Possible significant effects of the MSP measures on landscape and the cultural heritage

Generally speaking, infrastructure construction has a direct negative effect on the landscape and cultural heritage component, consisting in the fragmentation of habitats, environments and ecological networks, especially in non-man-made contexts (i.e. outside urban or port areas), the alteration of morphological/ settlement systems, the alteration/impairment of the view and of the qualifying and defining elements of the landscape (man-made and natural), as well as of the possibility of perception/use of the historical heritage.

According to the MSP forecasts, as shown in the matrix in section 5.1.1, the most important pressure factors are related to the construction of new port infrastructure, coastal defence engineering works, energy production facilities, both onshore and offshore, and aquaculture facilities.

In all these cases, it is above all the alteration of the landscape perception values that makes the new infrastructure potentially critical. However, it must be considered that these works are subject to an EIA and it is in this phase, in which the type, dimensions and location of the project are clarified, that the possible extent of its impact will be assessed. When designing the projects and during the EIA phase, the historical and urban context, the relationship with the cultural and landscape heritage into which the engineering work is introduced and the relative legal safeguards (as set out in the Regional Landscape Plans, analysed in Chapter 4) should be taken into account; in order to rule out any interference with the archaeological heritage preserved underground, preventive archaeological surveys and investigations will be required, in compliance with the rest of the Regulations). A number of (national) measures of the MSP, including NAZ_MIS|22 ("*Recognition of the property assets characterising the coastal landscape (e.g. lighthouses, towers), also built on non-heritage-listed areas, in order to identify and plan enhancement actions at the sub-area scale*") may contribute to support the EIA processes. Specific Objective OS_PPC|03 of the Plan ("*Promoting and supporting the conservation of the underwater archaeological heritage*") is expressly linked to underwater heritage, according to which "*the Plan, in accordance with the UNESCO Convention on the Protection of the Underwater Cultural Heritage, aims to ensure and strengthen the protection of the underwater cultural heritage, encouraging international cooperation, promoting in situ conservation of artefacts and sites, and promoting actions for raising public awareness, appreciation and protection of the heritage. In accordance with the European Convention on the Protection of the Archaeological Heritage (Valletta Convention), the Plan aims to foster cooperation between archaeologists, urban planners and affiliated professionals to ensure optimal conservation of the archaeological heritage, facilitating public access where possible*." It is precisely for this reason that the MSP has envisaged Measure NAZ_MIS|23 aimed at "*fostering and supporting the conservation of the underwater archaeological heritage*" and at "*defining a unitary framework (at the maritime area scale), accompanied by mapping, of the areas where underwater archaeological assets subject to protection are located, of the anthropic activities in such areas that are currently banned, or which may be banned in the future (including trawling), of the interventions implemented to this end or of any future interventions that may be implemented (also by means of mechanical and technological instruments), and of the necessary monitoring activities*." Some of the (national) measures of the MSP (e.g. NAZ_MIS|09, NAZ_MIS|13 and NAZ_MIS|16) aim at enhancing the role of the sea economy and furthering the aspects of land-sea interaction and integrated coastal zone management. In the definition phase of these measures, therefore, opportunities for development, including infrastructure development, based on a coherent ecosystem approach, should be assessed, taking into account the need to protect the cultural and landscape heritage, especially in highly sensitive areas, within the meaning of Chapter 4, paragraph 4.3.1.3. The analysis carried out through the definition of a (relative) index that measures the density of cultural heritage (both punctual and areal) in the 300m strip and the surface area subject to landscape constraints, has revealed the following situation for the **Adriatic** M.A.:

Subarea	PU code	Uses and Principles	Total sensitivity weight
A/6	**A/6_15**	Tourism, Landscape and Cultural Heritage	25
A/6	**A/6_09**	Tourism, Landscape and Cultural Heritage	15

Based on the above table, with regard to most of the areas recognised as "most sensitive", the forecasts of the MSP are to guarantee the goals of environmental and landscape protection, and the permitted uses should not lead to pressure factors for the landscape. For such areas, the measures of the MSP will be significant, such as NAZ_MIS|24 aimed at achieving the goal of the OS_PPC Plan|05 ("*Promoting and creating awareness on the intangible cultural heritage*") and NAZ_MIS|26 aimed at drawing up a study on the extent of illegal building in the coastal strip. Finally, it should be considered that some of the MSP measures (NAZ_MIS|19, NAZ_MIS|20 and NAZ_MIS|21) are functional to the achievement of the goal of the OS_PPC|01 Plan ("*Supporting the landscape value of the coastal strip*") and may contribute to minimise the visual impact on the coastal landscape of facilities and structures built on the coastal strip, through the definition of guidelines, principles, criteria and standards integrating the specific indications relative to the levels of protection of the Regional Landscape Plans and other planning tools in force. Generally speaking, the improved infrastructural planning of the coastal strip also has positive effects, contributing to improve the conditions of access and use of the cultural heritage, which, as seen in Chapter 4, is very often concentrated in the immediate vicinity of the coastal strip. Since the MSP aims to support the goals of the European Green Deal (OS_SS|03), the infrastructure planning and design process should also take into account the possibility of providing for sustainable mobility corridors. This may be achieved through other MSP measures, such as NAZ_MIS|69, which aims at defining tools to control tourism pressure in a sustainable way, NAZ_MIS|25, which aims at preserving the naval heritage of historical interest, and NAZ_MIS|70, which aims at identifying and promoting sustainable technologies and practices in the field of navigation for tourism purposes.

Moreover, some engineering works, such as coastal defence works, are instrumental in safeguarding the landscape and the coastline, which continues to recede also as a result of climate change.

In the current planning phase of the MSP, also taking into account some of the comments made by the Environmental Authorities (SCA) in the scoping phase, an attempt was made to verify the visual interference potential of offshore wind farms. This is a sensitive and controversial issue, which is why NAZ_MIS|52[20] and NAZ_MIS|54[21] were included in the MSP measures. In the framework of this ER, following an approach used in the EIA phase for offshore wind farm projects, a graphic elaboration has been prepared (see Annex MSP_ADR_AMBD018) that assesses the risk of visual intrusion as a function of the distance from the coast of the perimeter of the PUs to which the MSP assigns energy use as a priority.

The above is in accordance with the evaluation approach set out in the PNIEC (National Energy and Climate Plan), PiTESAI (Plan for the Sustainable Energy Transition of Relevant Areas) and PONIR (National Operational Programme for Infrastructure and Networks).

- **The effects on the landscape and cultural heritage related to the production of energy from renewable sources**

Visual impact is considered one of the most relevant impacts relating to offshore wind farms. Wind turbines, in fact, are visible from very far away, in different ways, depending on the characteristics and layout of the facilities, the lay of the land, population density and atmospheric conditions. The visual alteration of an offshore wind installation is mainly due to the wind turbines (poles, nacelles, rotors, propellers). The impact analysis, in this case, should refer to all the works planned in relation to the facility as a whole, considering

[20] Through this measure, the MSP proposes to "*develop national guidelines for the identification of suitable sites for offshore renewable energy facilities (wind, solar, onshore and offshore currents) and the assessment of single and cumulative environmental and landscape impacts, considering potential impact elements, during the construction, operation and decommissioning phases, and also taking into account the elements for the onshore transport of the produced energy. These Guidelines will allow to: i) improve the spatial planning process (e.g. in terms of spatial robustness and resolution); ii) guide the plant design process; iii) facilitate the permit-granting phases (e.g. EIA and VINCA – Environmental Incidence Assessment)*".

[21] Through this measure, the MSP proposes to "*establish an observatory for monitoring the impacts of offshore wind farms on the environment and other uses of marine space and the coast, considering the definition, implementation and evaluation phases of the monitoring plans required for the installation and operation of wind farms. The evaluations produced by this observatory shall be taken into account when implementing the monitoring plans of the MSP, and therefore in the possible revision of any similar plans*."

that a large part of the impact also depends on the location and arrangement of the machines. Regarding the location of large-scale offshore wind farms, the inevitable alteration of the appearance of the site and the perception of the associated values, considering the ineffectiveness of any masking measures, the choice of location and design configuration, where possible, should be aimed, as a matter of priority, at areas that are already impaired (e.g. coastal port areas), where compatible with the wind of course, and at the creation of new values consistent with the landscape context. Wind farms should become a feature of the landscape, contributing to the recognition of its specificity through a coherent relationship with the surrounding context. In this sense, wind farms will determine the design of a new landscape.

- **The effects on the landscape and cultural heritage of hydrocarbon prospection, exploration and production activities**

With specific reference to cultural and landscape assets, the potential impacts of the different phases of offshore hydrocarbon exploration and exploitation activities are, in general:

- linked directly or indirectly to the material and perceptive alteration/modification of a landscape, due to engineering work and the transformations of land use, temporary or otherwise, required for hydrocarbon prospection, exploration and cultivation operations;
- linked directly or indirectly, in the short or long term, individually or cumulatively and synergetically, either permanently or temporarily, to the alteration/modification/destruction of other components such as habitats, ecosystems, biodiversity, soil and water, as well as air (in the construction and decommissioning phase);
- due to any decrease/loss of the identity and/or intangible values linked to the established uses of marine areas.

5.8 Verification of compliance with the DNSH principle

The Recovery and Resilience Facility (RRF) regulation stipulates that no measure included in the Recovery and Resilience Plan (RRP) shall result in significant harm to environmental goals, within the meaning of Article 17 of EU Reg. 2020/852 (Taxonomy regulation).

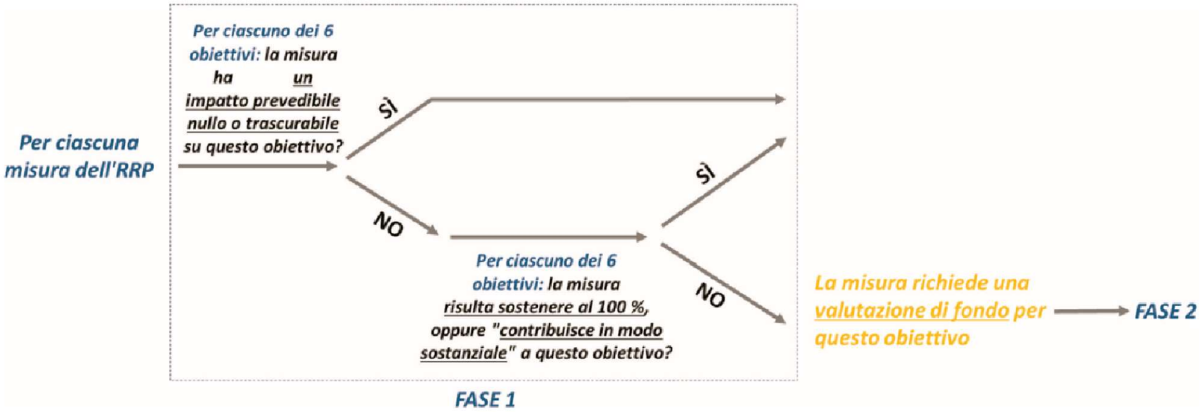
In addition, the RRP assessment must ensure that every single measure, i.e. every reform and investment, envisaged by the plan complies with the "do-no-significant-harm" (DNSH) principle.

It identifies the following criteria to determine how each economic activity contributes substantially to the protection of the ecosystem, without harming any of the environmental goals:

1. **Climate change mitigation**: an economic activity must not lead to significant emissions of greenhouse gases (GHG).
2. **Climate change adaptation**: an economic activity must not have an increased negative impact on the current and future climate, on the activity itself or on people, nature or property.
3. **Sustainable use and protection of water and marine resources:** an economic activity must not be **detrimental** to the good health of water bodies (surface, groundwater or marine) or harm its quality or reduce its ecological potential.
4. **Transition to the circular economy, including waste prevention and recycling**: an economic activity must not result in significant inefficiencies in the use of recovered or recycled materials, increase the direct or indirect use of natural resources, or significantly increase waste or the burning or disposal thereof, causing significant long-term environmental damage.
5. **Prevention and reduction of air, water and soil pollution**: an economic activity must not cause increased emissions of pollutants in the air, water or soil.
6. **Protection and restoration of biodiversity and health of ecosystems**: an economic activity must not harm the good condition and resilience of ecosystems or the conservation status of habitats and species, including those of interest to the Union.

The Commission has provided technical guidance on how to apply the DNSH principle in the context of the RRF through the guide, published on 18 February 2021, and its annexes available also in Italian at the following link: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021XC0218(01)

In particular, the Commission has prepared a checklist (see Annex I) to support the compliance analysis. The checklist is based on the following decision tree (p. 8 of the Technical Guide):



Consistent with the text of the regulation and the Commission's operational guidelines, a single template was prepared to collect the information necessary for evaluating the 72 national measures of the Plan in the light of the DNSH principle, divided into the two steps described below.

Phase 1

The effects generated on the six environmental goals by each of the Plan's measures were traced to four distinct scenarios:

a) The measure has no or negligible impact on the achievement of this goal.
b) The measure appears to fully support the achievement of this goal (100%).
c) The measure substantially contributes to this goal.
d) None of the above options: the measure requires a background assessment for this goal.

If, with regard to an individual goal, the measure is classified in one of the first three scenarios, a brief justification is provided to highlight the reasons why the intervention is associated with a limited risk of environmental damage, regardless of its potential contribution to the green transition, and the verification of compliance with the DNSH principle is therefore completed.

In the event that the measure is not classified in any of the first three scenarios, with regard to at least one of the objectives, a background assessment of compliance with the DNSH principle has to be carried out for the corresponding environmental goals (Step 2).

Phase 2

Stage 2 of the checklist includes, for each of the six objectives, questions corresponding to the legal requirements of the DNSH assessment.

1. **Climate change mitigation** - Is the measure expected to result in significant greenhouse gas emissions?
2. **Climate change adaptation** - Is the measure expected to worsen the negative effects of the current and expected future climate on itself or on people, nature or assets?
3. **Sustainable use and protection of water and marine resources** - Is the measure expected to harm: (i) the good ecological status or potential of water bodies, including surface and groundwater; or (ii) the good ecological status of marine waters?
4. **Transition to the circular economy, including waste prevention and recycling** - Is the measure expected to: (i) result in a significant increase in waste generation, incineration or disposal, with the exception of the incineration of non-recyclable hazardous waste; or (ii) result in significant inefficiencies, not minimised by appropriate measures, in the direct or indirect use of natural resources at any stage of

their life cycle; or (iii) cause significant and long-term environmental damage from a circular economy perspective?

5. **Prevention and reduction of air, water and soil pollution** - Is the measure expected to result in a significant increase in pollutant emissions in the air, water or soil?
6. **Protection and restoration of biodiversity and health of ecosystems** - Is the measure expected to: (i) significantly harm the good condition and resilience of ecosystems; or (ii) harm the conservation status of habitats and species, including those of interest to the Union?

For a measure to be included in the Plan, the answers to these questions in the checklist must be "no", to indicate that no significant harm is being done to the specific environmental goal.

Here, too, it is necessary to provide a background assessment of compliance with the DNSH principle, through the possible selection from a range of options based on the support list provided in Annex II to the Technical Guidance by the Commission.

5.8.1 Verification of compliance with the DNSH principle of the national measures of the Plan

See Annex VII of the ER for details of the verification of the national measures.

With reference to the environmental goal DNSH "**1. Climate change mitigation**", phase 1 of the verification of compliance with the DNSH principle resulted in all 71 national measures of the Plan being classified in one of the first three scenarios, namely

A. 42 measures have no or negligible impact on the achievement of this goal, for one of the following reasons:
   - they do not entail any foreseeable negative and significant effects with respect to the climate change mitigation goal;
   - they promote sustainable development and thus indirectly also climate change mitigation;
   - they foster the development of the circular economy and thus indirectly also climate change mitigation;
   - they represent an information opportunity to the climate change mitigation goal.

B. 8 measures appear to fully support the achievement of this goal, for one of the following reasons:
   - they converge towards the achievement of climate change mitigation goals;
   - they specifically refer to climate change mitigation and adaptation objectives;
   - they make it possible to analyse the impacts of climate change on MSPs and identify relevant climate change mitigation and adaptation actions.

C. 21 measures substantially contribute to the achievement of this goal, as they enable convergence towards climate change mitigation goals.

With regard to the environmental goal "*1. Climate Change Mitigation*", none of the 71 national measures of the Plan therefore required a background assessment of compliance with the DNSH principle (Step 2).

With regard to the environmental goal DNSH "**2. Climate change adaptation"**, phase 1 of the verification of compliance with the DNSH principle resulted in all 71 national measures of the Plan being classified in one of the first three scenarios, namely

A. 49 measures have no or negligible impact on the achievement of this goal, for one of the following reasons:
   - they do not entail significant negative foreseeable effects with respect to the climate change adaptation goal;
   - they promote sustainable development and thus indirectly also climate change adaptation;
   - they foster the development of the circular economy and thus indirectly also climate change adaptation;
   - they represent an information opportunity to the goal of climate change adaptation.

B. 22 measures substantially contribute to the achievement of this goal, for one of the following reasons:
   - they converge towards the achievement of climate change adaptation goals;
   - they promote sustainable development and thus indirectly also climate change adaptation;
   - they specifically refer to climate change mitigation and adaptation goals;

- they make it possible to analyse the impacts of climate change on MSPs and identify related climate change mitigation and adaptation actions.

Similarly to the previous goal, with regard to the environmental goal "*2. Climate change adaptation"*, none of the 71 national measures of the Plan therefore required a background assessment of compliance with the DNSH principle (Stage 2).

With regard to the DNSH environmental goal "**3. Sustainable use and protection of water and marine resources**", phase 1 of the verification of compliance with the DNSH principle resulted in 70 national measures of the Plan being classified in one of the first three scenarios, namely

A. 8 measures have no or negligible impact on the achievement of this goal, because, in view of the direct effects and primary indirect effects over the life cycle, these measures will not pose any risk of environmental degradation related to the protection of water quality and marine resources, since they are implemented in accordance with the applicable national and international regulations;
B. 31 measures fully support the achievement of this goal, because they fully contribute to the achievement of the good ecological potential of water bodies, waters and marine resources in accordance with the applicable national and international regulations;
C. 31 measures substantially contribute to the achievement of this goal, since in view of the direct effects and primary indirect effects over the life cycle, these measures substantially contribute to the achievement of the good ecological potential of water bodies, waters and marine resources, since they are implemented in a sustainable manner and in accordance with the applicable national and international regulations.

With regard to the environmental goal "*3. Sustainable use and protection of water and marine resources*", measure NAZ_MIS|41 of the Plan, which provides for the development, adoption and implementation of AZA Plans at a regional scale, in accordance with the MSP Plans and with the support of the AZA Technical Guide (ISPRA /HIPAA), required a background assessment of compliance with the DNSH principle (Phase 2). This assessment has made it possible to verify that the measure in question does not harm the good ecological status or potential of water bodies, including surface and groundwater, or the good ecological status of marine waters, as it relates to the implementation of best environmental practices in accordance with current national and international regulations.

With regard to the DNSH environmental goal "**4. Transition to the circular economy, including waste prevention and recycling",** phase 1 of the verification of compliance with the DNSH principle resulted in all 71 national measures of the Plan being classified in one of the first three scenarios, namely

A. 35 measures have no or negligible impact on the achievement of this goal, for one of the following reasons:
   - they do not interact with the aims of the goal, as they are not relevant;
   - they reduce or do not foresee the determination of significant negative effects with respect to the target, despite the foreseeable increase in anthropic pressure.
B. 14 measures were found to fully support the achievement of this goal, for one of the following reasons:
   - the proposal of the measure aims at structuring a supply chain based on the circular economy, thus directly contributing to its dissemination, affirmation and implementation (*NAZ_MIS|10*, *NAZ_MIS|11*, *NAZ_MIS|12);*
   - the activities envisaged by the measure are fundamental and necessary for the development of the circular economy, including waste prevention and recycling *(NAZ_MIS|48, NAZ_MIS|50);*
   - waste prevention and recycling and the development of the circular economy can be increased through targeted studies and pilot projects for the integration of aquaculture activities and environmental conservation *(NAZ_MIS|40);*
   - the definition of the National Strategy for Sustainable Development of the Marine Economy directly promotes the introduction of circular economy principles, including waste prevention and recycling *(NAZ_MIS|05);*

- the measure, through the establishment of the planned GDL, can increase and enhance the stock of knowledge needed to achieve the expected results of waste prevention and recycling in the perspective of the circular economy *(NAZ_MIS|08);*
- a study aimed at identifying the areas with the highest concentration of water pollution, waste dispersion, underwater noise emissions, and collisions with marine megafauna allows for the implementation of actions aimed at the transition to the circular economy *(NAZ_MIS|44)* through the planned mitigations;
- the strengthening of the marine economy within the framework of the National Strategy for the Circular Economy, through the actions envisaged in the measure, directly promotes the increase and development of the principles of the circular economy including waste prevention and recycling *(NAZ_MIS|09);*
- experimentation and reconversion projects of platforms and related infrastructures are fully in accordance with the production and consumption model of the circular economy *(NAZ_MIS|60);*
- the mapping and planning of the use of submarine sands favours the implementation of actions aimed at developing the circular economy *(NAZ_MIS|63);*
- a study on the socio-economic characterisation and evolutionary trends of the different sectors of the Italian marine economy contributes to the dissemination of waste prevention and recycling issues in the perspective of the circular economy *(NAZ_MIS|04);*
- the measure is based on the circular economy production and consumption model *(NAZ_MIS|25).*

C. 22 measures substantially contribute to the achievement of this goal, for one of the following reasons:

- certain activities envisaged in the measure, including in particular the energy efficiency of vessels, can contribute to the development of waste prevention and recycling with a view to the circular economy (*NAZ_MIS|28*, *NAZ_MIS|29*);
- the development of a plan for the identification of AZAs in accordance with the plan contributes to the development of the circular economy and waste prevention and recycling (*NAZ_MIS|41*, *NAZ_MIS|42*);
- the regulation of recreational traffic and the creation of facilities to ensure environmentally friendly moorings can facilitate the implementation of actions aimed at developing the circular economy (*NAZ_MIS|68*);
- the activities envisaged by the measure may foster the implementation of actions aimed at developing the circular economy (*NAZ_MIS|54*);
- the activities envisaged in the measure, such as the mapping of suitable sites for the delivery of dredged materials, the updating of available databases and the management practices of dredged sediments, may foster the implementation of actions aimed at developing the circular economy (*NAZ_MIS|47*);
- the introduction and affirmation of the circular economy is significantly promoted by the activities envisaged in the measure through deepening and sharing environmental knowledge (*NAZ_MIS|14*);
- the creation of an MSP - PiTESAI working group is essential for achieving the goal of developing and establishing the circular economy. (*NAZ_MIS|59*);
- the activities envisaged in the measure can facilitate the acquisition of data and contribute to implementing waste prevention and recycling actions (*NAZ_MIS|15*);
- improved regulation of shipping lanes and the strengthening of actions to conserve marine ecosystems and biodiversity can facilitate the implementation of actions aimed at developing the circular economy (*NAZ_MIS|45*);
- a unified framework, accompanied by mapping of areas with submerged archaeological assets already protected or to be protected, can contribute to the development of waste prevention and recycling with a view to the circular economy (*NAZ_MIS|23*);
- the activities envisaged by the measure, through the consideration of environmental impacts and potential impacts during construction, operation and decommissioning, can foster the implementation of actions aimed at developing the circular economy (*NAZ_MIS|52*);

- the measure, through the planned study, can increase and enhance the body of knowledge required for implementing circular economy strategies (*NAZ_MIS|07*);
- the activities envisaged by the measure may foster the implementation of actions aimed at developing the circular economy (*NAZ_MIS|55*);
- increasing projects, surveys and research aimed at sustainable fisheries can contribute to activities aimed at developing the circular economy (*NAZ_MIS|31*);
- the measure, through monitoring and the subsequent definition of measures aimed at sustainable development, can contribute to implementing the circular economy (*NAZ_MIS|67*);
- the measure can increase and enhance the knowledge base on the coastal marine environment by making it functional to the goals of waste prevention and recycling and the circular economy (*NAZ_MIS|70*);
- the activities envisaged in the measure, through monitoring and analysis, can foster the acquisition of data and contribute to implementing waste prevention and recycling actions (*NAZ_MIS|13*);
- the transfer and application of the results of scientific research in the MSP process, the targeting of marine research on the priority needs of the MSP process, and the dissemination of this research to society can facilitate the implementation of actions aimed at developing the circular economy (*NAZ_MIS|71*);
- the measure can increase and enhance the knowledge base on the coastal marine environment by making it functional to the goals of waste prevention and recycling with a view to developing the circular economy (*NAZ_MIS|02*);

- the activities envisaged in the measure, through technological development and monitoring systems, can directly influence the prevention and recycling of waste and the development of the circular economy (*NAZ_MIS|43*).

With regard to the environmental goal "**4. Transition to the circular economy, including waste prevention and recycling",** none of the 71 national measures of the Plan therefore required a background assessment of compliance with the DNSH principle (Stage 2).

With regard to the DNSH environmental goal "**5. Prevention and reduction of air, water and soil pollution**", phase 1 of the verification of compliance with the DNSH principle resulted in all the 71 national measures of the Plan being classified in one of the first three scenarios, namely:

A. 16 measures have no or negligible impact on the achievement of this goal, since the prevention and reduction of air, water and soil pollution appear to be only marginally affected;
B. 33 measures appear to fully support the achievement of this goal, for one of the following reasons:
   - the activities envisaged by the measures can positively influence the prevention and reduction of air, water and soil pollution (*NAZ_MIS|10, NAZ_MIS|13, NAZ_MIS|15, NAZ_MIS|18, NAZ_MIS|19, NAZ_MIS|21, NAZ_MIS|26, NAZ_MIS|38, NAZ_MIS|39, NAZ_MIS|41, NAZ_MIS|42, NAZ_MIS|43, NAZ_MIS|49, NAZ_MIS|50, NAZ_MIS|51, NAZ_MIS|56*);
   - the restriction of the number of daily accesses, the financing of measures to protect and enhance the environmental and cultural heritage, and the construction of facilities and implementation of initiatives for sustainable tourism can significantly promote the goals of preventing and reducing air, water and soil pollution (*NAZ_MIS|69*);
   - an assessment of the socio-economic effects of plan choices can facilitate the prevention and reduction of air, water and soil pollution (*NAZ_MIS|03*);
   - targeted studies and pilot projects for the integration of aquaculture activities and environmental conservation can improve the prevention and reduction of air, water and soil pollution (*NAZ_MIS|40*);
   - studies on the socio-economic characterisation and evolutionary trends of the different sectors of the Italian sea economy can foster the prevention and reduction of air, water and soil pollution (*NAZ_MIS|04*);

- coastal and maritime eco-tourism initiatives and awareness-raising and information activities under Measure 2 (Descriptors 1 and 6) of the PoM MSFD 20/12/2021 Update can significantly support the prevention and reduction of air, water and soil pollution (*NAZ_MIS|66*);
- the prevention and reduction of air, water and soil pollution can be facilitated through the definition of the National Strategy for the Sustainable Development of the Marine Economy (*NAZ_MIS|05*);
- a unitary framework with the mapping of areas with submerged archaeological assets already subject to protection or to be protected can contribute to preventing and reducing air, water and soil pollution (*NAZ_MIS|23*);
- the study foreseen in the measure can contribute to preventing and reducing air, water and soil pollution (*NAZ_MIS|06*);
- improving the regulation of shipping lanes and strengthening the conservation of marine ecosystems and biodiversity can increase the prevention and reduction of air, water and soil pollution (*NAZ_MIS|45*);
- the coexistence of offshore renewable energy installations with maritime transport, fishing with gears, sand extraction for coastal defence works, offshore aquaculture facilities, managed tourism, scientific research can ensure the goals of prevention and reduction of air, water and soil pollution (*NAZ_MIS|57*);
- experiments and projects for the reconversion of platforms and related infrastructures can help prevent and reduce air, water and soil pollution (*NAZ_MIS|60*);
- the goals of preventing and reducing air, water and soil pollution can benefit from the establishment of GDL on administrative procedures for beach nourishment (*NAZ_MIS|65*);
- a recovery, re-use and recycling chain for by-products of aquaculture and professional fishing activities can contribute to preventing and reducing air, water and soil pollution (*NAZ_MIS|11*);
- the regulation of recreational traffic and the creation of facilities to ensure environmentally friendly moorings can help prevent and reduce air, water and soil pollution (*NAZ_MIS|68*);
- a national recovery, dismantling, reuse/recycling chain of end-of-life recreational, sport and fishing boats can contribute to preventing and reducing air, water and soil pollution (*NAZ_MIS|12*);
- a long-term strategy for securing the participation and involvement of stakeholders in the implementation, monitoring and evaluation process of maritime plans can contribute to preventing and reducing air, water and soil pollution (*NAZ_MIS|01*);
- the identification of priority areas to be restored and the restoration measures and methods to be adopted can significantly promote the prevention and reduction of air, water and soil pollution (*NAZ_MIS|17*).

C. 22 measures substantially contribute to the achievement of this goal, for one of the following reasons:

- the activities under the measures are essential for the goals of preventing and reducing air, water and soil pollution (*NAZ_MIS|52*, *NAZ_MIS|53*, *NAZ_MIS|54*, *NAZ_MIS|55*, *NAZ_MIS|58*, *NAZ_MIS|59*);
- the prevention and reduction of air, water and soil pollution are significantly increased by the activities in the measure, through deepening and sharing environmental knowledge (*NAZ_MIS|14*, *NAZ_MIS|16*);
- the achievement of air, water and soil pollution prevention and reduction objectives requires coherence between existing coastal/GIZC strategies and plans, projects affecting coastal morphology and MSP plan forecasts (*NAZ_MIS|62*);
- the transfer and application of the results of scientific research in the MSP process, the targeting of marine research on the priority needs of the MSP process and the dissemination of this research to society can ensure the achievement of the goals of preventing and reducing air, water and soil pollution (*NAZ_MIS|71*);
- the reduction of conflicts and impacts related to the use of marine sands for defence works is fundamental for the goals of preventing and reducing air, water and soil pollution (*NAZ_MIS|64*);
- the activities envisaged in the measure are essential in the prevention and reduction of air, water and soil pollution (*NAZ_MIS|48*);

- the measure, through the establishment of the envisaged GDL, can increase and enhance the stock of knowledge necessary to achieve the expected results of preventing and reducing air, water and soil pollution (*NAZ_MIS|08*);
- the measure, through the planned study, can increase and enhance the stock of knowledge needed to achieve the expected results of preventing and reducing air, water and soil pollution (*NAZ_MIS|07*);
- all the activities envisaged in the measure can contribute significantly to achieving the goals of preventing and reducing air, water and soil pollution (*NAZ_MIS|61*);
- certain activities envisaged in the measure, including, in particular, improving the energy efficiency of vessels, can contribute significantly to preventing and reducing air, water and soil pollution (*NAZ_MIS|28*);
- the activities envisaged in the measure are fundamental to the goals of preventing and reducing air, water and soil pollution (*NAZ_MIS|63*);
- certain activities envisaged in the measure, including in particular improving the energy efficiency of vessels and the use of renewable energy in the fishing sector can contribute significantly to preventing and reducing air, water and soil pollution (*NAZ_MIS|29*);
- the measure can increase and enhance the wealth of knowledge on the coastal marine environment by making this wealth functional to the goals of preventing and reducing air, water and soil pollution (*NAZ_MIS|70*);

- a study aimed at identifying the areas with the highest concentration of air emissions, water pollution, waste dispersion, underwater noise emissions, and collisions with marine megafauna can reduce air, water and soil pollution (*NAZ_MIS|44*);
- the measure can increase and enhance the knowledge of the coastal marine environment by making this knowledge functional to the goals of preventing and reducing air, water and soil pollution (*NAZ_MIS|02*);
- the activities envisaged in the measure, such as the mapping of suitable sites for the delivery of dredged materials, the updating of available databases and the management practices of dredged sediments, are essential to achieve the goals of preventing and reducing air, water and soil pollution (*NAZ_MIS|47*).

Therefore, with regard to the environmental goal "**5. Prevention and reduction of air, water and soil pollution",** none of the 71 national measures of the Plan required a background assessment of compliance with the DNSH principle (Stage 2).

With reference to the DNSH environmental goal "**6. Protection and restoration of biodiversity and health of ecosystems',** phase 1 of the verification of compliance with the DNSH principle resulted in 70 national measures of the Plan being classified in one of the first three scenarios, namely

A. 8 measures have no or negligible impact on the achievement of this goal, because, in view of the direct effects and primary indirect effects over the life cycle, these measures will not pose any risk of environmental degradation related to protecting and restoring biodiversity and ecosystems, since they are implemented in accordance with the applicable national and international regulations;
B. 31 measures fully support the achievement of this goal, since they fully contribute to protecting and restoring biodiversity and ecosystems, in accordance with the applicable national and international regulations;
C. 31 measures substantially contribute to the achievement of this goal, because, in view of their direct effects and primary indirect effects over the life cycle, they substantially contribute to protecting and restoring biodiversity and ecosystems, since they are implemented in a sustainable manner and in accordance with the applicable national and international regulations.

With regard to the environmental goal "*6. Protection and restoration of biodiversity and health of ecosystems*" the NAZ_MIS|41 measure of the Plan, which envisages the development, adoption and implementation of AZA Plans at the regional scale, in accordance with the MSP Plans and with the support of the AZA Technical

Guide (ISPRA /HIPAA), required a background assessment of compliance with the DNSH principle (Phase 2).

This assessment verified that the measure in question does not significantly harm the good condition and resilience of ecosystems or the conservation status of habitats and species, including those of interest to the Union, as it relates to the implementation of best environmental practices in accordance with the applicable national and international regulations.

5.8.2 Verification of compliance with the DNSH principle of the Plan measures at the sub-area level

Likewise to the activities conducted with regard to the 71 national measures, verification of compliance with the DNSH principle was also carried out for the 53 measures at the sub-area level of the "Adriatic" maritime area. With regard to the DNSH environmental goal "**1. Climate change mitigation**", the stage 1 verification of compliance with the DNSH principle resulted in 51 measures of the Plan at the sub-area level being classified in one of the first three scenarios, namely:

A. 45 measures have no or negligible impact on the achievement of this goal, for one of the following reasons:
   - they promote the development of the circular economy and thus indirectly also climate change mitigation;
   - they do not entail any foreseeable negative and significant effects with respect to the climate change mitigation goal;
   - they promote the development of port efficiency and thus indirectly also climate change mitigation;
   - they promote the development of environmental management systems for marinas and thus indirectly also climate change mitigation.

B. Four measures appear to fully support the achievement of this goal, as they specifically address climate change mitigation goals;

C. 2 measures substantially contribute to the achievement of this goal, for one of the following reasons:
   - they contribute, among others, to climate change mitigation and adaptation objectives;
   - they specifically foster the environmental and energy sustainability of ports and thus indirectly also climate change mitigation.

With regard to the environmental goal "**1. Climate change mitigation**", the following two measures of the Plan at the sub-area level required a background assessment of compliance with the DNSH principle (Stage 2), namely:

- ***(A/1)_MIS\|23*** *Measures for exploiting opportunities offered by cruise tourism: systematisation of proposals aimed at directing cruise tourism flows to the inland areas, by valorising the local resources and professional skills.*
- ***(A/2)_MIS\|2*** *Identifying how to support the actions and activities to be pursued by the Extraordinary Commissioner, within the meaning and for the purposes of Law 125/2021, with regard to cruise tourism. Assessing how the maritime spatial plan should be updated, based on the actions implemented by the said Commissioner.*

The assessment process verified that these two measures comply with the DNSH principle for Goal 1, albeit subject to the condition, respectively, that cruise tourism flows to the inland areas are managed in a sustainable manner and without leading to an increase in GHG emissions (e.g. by using electric vehicles, cycling, etc.) and that sustainable actions and activities are planned and do not lead to an increase in GHG emissions.

With regard to the environmental goal DNSH "**2. Climate change adaptation"**, phase 1 of the verification of compliance with the DNSH principle resulted in 51 measures of the Plan at sub-area level being classified in one of the first three scenarios, namely

A. 39 measures have no or negligible impact on the achievement of this goal, since they do not entail any foreseeable negative and significant effects on the climate change adaptation goal;
B. 2 measures appear to fully support the achievement of this goal, since they specifically address climate change adaptation goals;

C. 10 measures substantially contribute to the achievement of this goal, for one of the following reasons:
   - they converge towards the achievement of climate change adaptation goals;
   - they represent an information opportunity on the topic of the goal in question.

With regard to the environmental goal "**2. Climate change adaptation"**, the following two measures of the Plan at the sub-area level required a background assessment of compliance with the DNSH principle (Phase 2), namely:

- ***(A/2)_MIS|1*** *In consideration of the important interactions between the Venice Lagoon and the Adriatic Sea (land-sea interactions), with regard to ports and maritime transport, and of the consequent repercussions for the Maritime Spatial Plan, promoting (i) the approval of the Morphological Plan of the Venice Lagoon, (ii) the definition of the new Protocol for the management of lagoon sediments, (iii) the excavation and adaptation of navigation channels in the lagoon system, (iv) the definition of a management regulation for interactions between the regulated port and the MOSE flood barrier system.*
- ***(A/2)_MIS|2*** *Identifying how to support the actions and activities to be pursued by the Extraordinary Commissioner, within the meaning and for the purposes of Law 125/2021, with regard to cruise tourism. Assessing how the maritime spatial plan should be updated, based on the actions implemented by the said Commissioner.*

The two measures in question do not worsen the negative effects of the current climate and the expected future climate, on itself or on people, nature or assets, provided that the manner of implementation of these measures takes into due account the effects of climate change on the areas concerned and that solutions are proposed to meet the goals of climate change adaptation.

With regard to the DNSH environmental goal "**3. Sustainable use and protection of water and marine resources**", the phase 1 verification of compliance with the DNSH principle resulted in 48 measures at the sub-area level of the "Adriatic" maritime area being classified in one of the first three scenarios, namely:

A. 2 measures have no or negligible impact on the achievement of this goal, since in view of the direct effects and the primary indirect effects over the life cycle, the interventions envisaged by the measures will not entail any risk of environmental degradation, with respect to protecting water quality and marine resources, since they are implemented in accordance with the applicable national and international regulations;
B. 25 measures are found to fully support the achievement of this goal, because they contribute to the conservation and improvement of the environmental quality of the sub-area, fully contributing to the achievement of the good ecological potential of water bodies, waters and marine resources in accordance with the applicable national and international regulations;
C. 21 measures substantially contribute to the achievement of this goal, because these activities contribute to the conservation and improvement of the environmental quality of the sub-area, as well as to the achievement of the good ecological potential of water bodies, waters and marine resources in accordance with the applicable national and international regulations.

With regard to the environmental goal "**3. Sustainable use and protection of water and marine resources**", the following five measures of the Plan at the sub-area level required a background assessment of compliance with the DNSH principle (Stage 2):

- ***(A/1)_MIS|1*** *Supporting and fostering the use of fossil fuels capable, in any case, of contributing to the decarbonisation of the sector in a transitional phase (liquefied natural gas and oil, methanol), of second-generation biodiesel and zero-emission fuels from renewable sources (ammonia, hydrogen and electricity).*
- ***(A/1)_MIS|23*** *Measures for exploiting opportunities offered by cruise tourism: systematisation of proposals aimed at directing cruise tourism flows to the inland areas, by valorising the local resources and professional skills.*
- ***(A/1)_MIS|24*** *In order to guarantee the navigability of the lagoon waterways, in the context of land-sea interaction, supporting the ordinary maintenance management works on the lagoon floor by applying special guidelines for the management of dredging operations (Guidelines for the Technical Management*

of Dredging in the Lagoon Area). These are aimed at verifying the existence of the necessary environmental criteria for handling sediments in the lagoon, in application of Art. 185 c. 3 of Legislative Decree no. 152/2006.

- ***(A/1)_MIS|27** Identifying areas of sea immersion of sediments beyond 3 NM from the coastline, as provided in par. 3.1.1 of the Technical Annex to DM 173/2016, subject to site characterisation.*
- ***(A/2)_MIS|8** Adopting the measure of the Regional Council for defining the AZAs (Allocated Zones for Aquaculture) at sea, as macro-areas eligible for aquaculture concessions.*

The assessment has verified that the 5 measures in question do not harm the good status or good ecological potential of water bodies, including surface and groundwater, or the good ecological status of marine waters, because the proposed measures, of high socio-economic value, will be implemented according to the best sustainable management practices and in accordance with the applicable national and international regulations, contributing to decarbonisation and the transition to zero emissions from renewable sources and in accordance with the Marine Strategy goals. With regard to the DNSH environmental goal "**4. Transition to the circular economy, including waste prevention and recycling**", the stage 1 verification of compliance with the DNSH principle resulted in all 53 measures of the Plan at the sub-area level being classified in one of the first three scenarios, namely:

A. 21 measures have no or negligible impact on the achievement of this goal, for one of the following reasons:
   - the envisaged activities do not interact with, or have a marginal and indirect impact on, the goals of waste prevention and recycling and on the transition to the circular economy, because they are developed with regard to issues that differ substantially from those that may significantly affect these goals;
   - they are to be implemented according to the best environmental, energy and operational standards, and, therefore, have no, or at most a negligible, negative effects on the goal.

B. 10 measures were found to fully support the achievement of this goal, for one of the following reasons:
   - they promote sustainable development and environmental protection strategies;
   - they promote prevention in waste management through the implementation of EMSs;
   - they provide for the development of studies, research and experimentation aimed at promoting the conversion of platforms.

C. 22 measures substantially contribute to the achievement of this goal, for one of the following reasons:
   - the activities envisaged by the measure concern issues closely related to the mitigation of environmental impacts, the protection of habitats and sustainable development, being synergic with the pursuit of the goals of waste prevention and recycling and the transition to the circular economy;
   - they promote forms of sustainable management of port and port-related facilities, being synergetic with the pursuit of the goals of waste prevention and recycling and the transition to the circular economy;
   - they promote environmental monitoring, education and awareness-raising activities on issues fully consistent with the goal pursued;
   - they include studies and monitoring activities aimed at improving, *inter alia*, the management of coastal marine sediments, fully in accordance with the transition to the circular economy principles.

This assessment made it possible to verify that for the environmental goal "*4. Transition to the circular economy, including waste prevention and recycling*" none of the 53 measures of the Plan at the sub-area level therefore required a background assessment of compliance with the DNSH principle (Stage 2).

With regard to the environmental goal DNSH "**5. Prevention and reduction of air, water and soil pollution**", the stage 1 verification of compliance with the DNSH principle resulted in 47 measures of the Plan at the sub-area level being classified in one of the first three scenarios, namely:

A. 16 measures have no or negligible impact on the achievement of this goal, because the planned activities have a marginal and indirect impact on the goals of preventing and reducing air, water and soil pollution,

since they are developed on issues that are substantially different from those that most influence these goals;

B. 10 measures are found to fully support the achievement of this goal, because they fully contribute to achieving the goals of preventing and reducing air, water and soil pollution through sustainable development and environmental protection strategies;

C. 21 measures substantially contribute to the achievement of this goal, because the goals of preventing and reducing air, water and soil pollution are pursued to a significant extent by the activities envisaged in the measure, since these activities concern issues closely related to environmental impacts, habitat protection and sustainable development.

With regard to the environmental goal **"5. Prevention and reduction of air, water and soil pollution",** the following 6 measures of the Plan at the sub-area level required a background assessment of compliance with the DNSH principle (Stage 2):

- ***(A/1)_MIS|28*** *Sharing with the competent Authorities reference uses for the sea water bodies that are compatible or consistent with the protection and safeguard requirements of coastal landscapes, as identified through the processes for conforming the urban planning tools to the PPR (Regional Landscape Plan), within the framework of which surveys are conducted and landscape maps produced for identifying significant aspects of scenic perception.*
- ***(A/1)_MIS|29*** *As part of the activities for conforming urban planning tools to the PPR (Regional Landscape Plan), promoting the recognition of local landscape systems as structuring elements of coastal landscapes, in order to valorise them within the strategic networks of cultural heritage, ecology and slow mobility, also through the implementation of landscape projects.*
- ***(A/2)_MIS|1*** *In consideration of the important interactions between the Venice Lagoon and the Adriatic Sea (land-sea interactions), with regard to ports and maritime transport, and of the consequent repercussions for the Maritime Spatial Plan, promoting (i) the approval of the Morphological Plan of the Venice Lagoon, (ii) the definition of the new Protocol for the management of lagoon sediments, (iii) the excavation and adaptation of navigation channels in the lagoon system, (iv) the definition of a management regulation for interactions between the regulated port and the MOSE flood barrier system.*
- ***(A/2)_MIS|4*** *Measures to be implemented through the LIFE CARE Project (DGR no. 389/2022), for the purpose of (i) establishing a veterinary hospital in the Po Delta Regional Natural Park to take care of turtles stranded alive or found by fishermen accidentally in their fishing gear. This facility will take care of the first aid and rehabilitation of turtles in Veneto and will network with similar facilities in Emilia-Romagna. Measures to be implemented through the LIFE Transfer Project: (ii) improving the priority habitat 1150 * Coastal lagoons. The measure aims first and foremost at solving the drastic regression of submerged marine phanerogams – which are fundamental for the conservation status of the lagoons and for the maintenance of important nursery functions, for example – in this habitat, also considering the slow speed at which this vegetation is able to colonise the lagoon areas. The interested lagoon habitats include Caleri, Barbamarco, Canarin and Vallona.*
- ***(A/2)_MIS|5*** *(i) Development of common management proposals by the Northern Adriatic Fishery District (established by Ministerial Decree of 23 February 2010 between MIPAAF (Ministry of Agriculture and Fisheries) and the regions of Emilia Romagna, Friuli Venezia Giulia and Veneto), (ii) implementing the "Guidelines for environmental and productive reactivation of fishery resources in connection with seafloor dredging", approved with DGR No 1009 of 20 July 2021, (iii) implementing the project for repopulating marine ecosystems, approved with DGR No 976 of 13 July 2021, (iv) supporting sustainable management projects proposed by professional maritime fishing enterprises, under the EMFAF (European Maritime, Fisheries and Aquaculture Fund).*
- ***(A/2)_MIS|9*** *(i) Promoting the approval process of the New Morphological Plan of the Venice Lagoon and the New Protocol for sediment management in the Venice Lagoon, (ii) classifying the ports and maritime outlets under regional jurisdiction and identifying the relative management authority or entity, for the purpose of implementing the delegation processes under Law Decree No 112/1998, art. 105 paragraph 2, letter e), (iii) defining a spending item for financing dredging interventions of the maritime*

passes subject to regional jurisdiction and including them in the Three-Year Programme of Public Works, (iv) including in the Economic Frameworks relative to the Projects the expenses required for archaeological surveys, pursuant to art. 25 of the Legislative Decree 50/2016, and for implementing the so-called "Environmental Rearrangement Plan", provided by Regional Decree 1009/2021 and agreed on with the competent CO.GE.VO. (Clam Management Consortia).

This assessment verified that these 6 measures comply with the DNSH principle for Goal 5, because they contribute to the sharing of environmental, urban and landscape knowledge and needs.

With regard to the DNSH environmental goal "**6. Protection and restoration of biodiversity and health of ecosystems",** phase 1 of the verification of compliance with the DNSH principle resulted in 48 measures of the Plan at the sub-area level being classified in one of the first three scenarios, namely:

A. 2 measures have no or negligible impact on the achievement of this goal, because, in view of the direct effects and primary indirect effects over the life cycle, the measures will not pose any risk of environmental degradation related to protecting and restoring biodiversity and ecosystems, since they are implemented in accordance with the applicable national and international regulations;
B. 25 measures are found to fully support this goal, because they contribute to the conservation and improvement of the environmental quality of the sub-area, fully contributing to protecting and restoring biodiversity and ecosystems, in accordance with the applicable national and international regulations;
C. 21 measures substantially contribute to the achievement of this goal, because these activities contribute to the conservation and improvement of the environmental quality of the sub-area, as well as to protecting and restoring biodiversity and ecosystems, in accordance with the applicable national and international regulations.

Also with regard to the environmental goal "*6. Protection and restoration of biodiversity and health of ecosystems*", the following 5 measures of the Plan at the sub-area level required a background assessment of compliance with the DNSH principle (Stage 2):

- ***(A/1)_MIS\|1*** *Supporting and fostering the use of fossil fuels capable, in any case, of contributing to the decarbonisation of the sector in a transitional phase (liquefied natural gas and oil, methanol), of second-generation biodiesel and zero-emission fuels from renewable sources (ammonia, hydrogen and electricity).*
- ***(A/1)_MIS\|23*** *Measures for exploiting opportunities offered by cruise tourism: systematisation of proposals aimed at directing cruise tourism flows to the inland areas, by valorising the local resources and professional skills.*
- ***(A/1)_MIS\|24*** *In order to guarantee the navigability of the lagoon waterways, in the context of land-sea interaction, supporting the ordinary maintenance management works on the lagoon floor by applying special guidelines for the management of dredging operations (Guidelines for the Technical Management of Dredging in the Lagoon Area). These are aimed at verifying the existence of the necessary environmental criteria for handling sediments in the lagoon, in application of Art. 185 c. 3 of Legislative Decree no. 152/2006.*
- ***(A/1)_MIS\|27*** *Identifying areas of sea immersion of sediments beyond 3 NM from the coastline, as provided in par. 3.1.1 of the Technical Annex to DM 173/2016, subject to site characterisation.*
- ***(A/2)_MIS\|8*** *Adopting the measure of the Regional Council for defining the AZAs (Allocated Zones for Aquaculture) at sea, as macro-areas eligible for aquaculture concessions.*

This assessment verified that the 5 measures in question do not significantly harm the good condition and resilience of ecosystems or the conservation status of habitats and species, including those of interest to the Union, because the proposed measures, of high socio-economic value, will be implemented according to the best sustainable management practices and in accordance with the applicable national and international regulations, contributing to decarbonisation and the transition to zero emissions from renewable sources and in accordance with the Marine Strategy goals.

5.9 Outcomes of the Impact Assessments on the Natura 2000 network

The study attached to this report (Annex IX) is part of the Integrated Assessment of Plans in relation to Natura 2000 sites and Strategic Environmental Assessment and is aimed at providing useful technical elements for the screening and "*appropriate assessment*" phase of the Habitat procedure. In particular, they serve the purpose of identifying any elements capable of producing significant negative impacts on the habitats and species of Community interest, for which the Natura 2000 sites potentially affected by the Plan have been designated, i.e. the ones indicated in Annexes I and II of Directive 92/43/EC and Annex I of Directive 2009/147/EC, as well as the species of habitual migratory birds, both in isolation and in combination with other plans, projects or interventions, with a special focus on priority habitats and species. When carrying out this analysis, within the framework of the direvtive, it shall be necessary to adopt the precautionary principle: "*In the Impact Assessment procedure, the precautionary principle should be applied whenever it is not possible to exclude, with reasonable scientific certainty, the occurrence of significant interferences generated by a plan/programme/project/intervention/activity on the Natura 2000 network sites*". The study applies the provisions set out in Annex G to Presidential Decree 357/97, as supplemented, and in the National Guidelines for Impact Assessment (VIncA), as defined in the MoU of 28/11/2019, pursuant to Article 8, paragraph 6, of Law 5 June 2003, No 131, between the central Government, the regional governments and the Autonomous Provinces of Trento and Bolzano, published in the Official Journal of 28/12/2019 (GOV 2019).

The Study provides a fact-finding and regulatory framework, should the conditions occur, for subjecting to the VINCA the individual implementation plans/projects relative to the different sectors/uses mapped and classified within the Plan. Given the strategic level of planning, consistent with the technical and regulatory guidelines, the analysis reported in the Study, based on the Plan forecasts, was aimed at identifying the potential direct and indirect impacts, cumulative or otherwise, on the habitats and species of the Natura 2000 Sites.

The potential impacts linked to the implementation of the Plan provisions have been identified and analysed by reconstructing the Threats, as outlined in the Management Plans of the individual Natura 2000 Sites.

Even though the sea planning process has positive effects on the Natura 2000 Network, according to the objectives set out in Directive No 2014/89/EU establishing a framework for maritime spatial planning, aimed at promoting the sustainable development of marine areas and the sustainable use of marine resources (art. 1), the implementation of certain measures set out in the Plan or the cumulative effect due to the implementation of certain uses provided by the Plan may lead to potential impacts on the SCIs, SACs and SPAs. For all these reasons, an analysis of potential threats was carried out, which identified the Natura 2000 Network Sites potentially exposed to greater impact risks, due to overlapping uses, number of species and number of habitats.

In parallel, the conservation measures envisaged in the various Natura 2000 Sites were verified to assess whether they were sufficient to minimise the risks or should be supplemented, at a later stage, with additional measures. In fact, the National VINCA Guidelines clearly provide that "*it is reasonable to assume that the conservation goals are relatively stable over time, and in fact, in most cases they must be long-term goals, although it is likely that the conservation measures required to achieve these goals will change in response to changes in the types of pressures to which the sites are exposed and, of course, to the hopefully positive effects of the conservation measures already undertaken*". The fact that, to date, no procedures have yet been defined for carrying out the various permitted activities has prevented a more detailed understanding of the possible interferences with the habitats and species, on the basis of differentiations for the various sub-areas or on a site-specific scale. Therefore, in some cases, it seemed unnecessary and, indeed, too simplistic, at this stage, to conduct an analysis of the impacts, considering it more appropriate to postpone any further inquiry into the matter in connection with the definition of the implementation tools provided by the Plan. In other words, the MSP does not identify the specific locations of the interventions and, therefore, the Environmental Impact Assessment, in terms of both the screening activities and appropriate assessments, has made it possible to identify, through risk assessment, the areas of high and medium environmental sensitivity to pressure/threats, as a result of which the subsequent sector plans/projects – which shall be implemented in relation to the uses envisaged by the MSP – will require punctual verification subject to the VINCA.

Therefore, consistently with the Guidelines, "*in the event that the planning level subject to SEA fails to identify the location of the planned projects, it shall be necessary to require the impact assessments of the individual interventions, which must however also be verified in consideration of the cumulative effect produced by them*", the completed VINCA has provided a framework of requirements for the submission to the VINCA procedures of individual implementation plans/projects, for the issuing of authorisations, of concessions of maritime spaces, and for the implementation of all the measures envisaged by the Plan that might have potential direct, indirect and/or cumulative effects on habitats and species of interest for conservation purposes. This having been said, insofar as the conservation measures set out in the various Management Plans of the Natura 2000 sites examined either provide for bans on certain activities arising from the distribution of the maritime space, or no measures are envisaged for limiting the potential risk of certain uses. Another key aspect is the implementation of the Plan measures, which, in the specific cases of the Natura 2000 Sites, should be aimed primarily at limiting the potential threats identified in the introductory chapters of this Impact Assessment. On the basis of the risk assessment of the pressures/threats, carried out in relation to the uses envisaged by the Plan, the impact assessment highlighted potential direct and/or indirect impacts on habitats and species of interest for conservation purposes that are likely to be minimised through the adoption of specific mitigation measures *"aimed at minimising or even eliminating the negative impact of a plan during or after its implementation*". In relation to the intended uses and depending on the potential threats identified, the main minimisation (or mitigation) measures that could be adopted are listed in the conclusion.

5.10 Overview of the possible critical environmental issues identified

During the definition phase of the Plan (see Chapter 4 of the Plan), a number of areas of particular attention and issues of environmental importance were identified[22], to be considered in the plan according to the pressures linked to the main uses[23] , in order to "*support the process of defining the vocations of the sub-areas and relative planning units at the strategic level, as well as defining the measures of the plan itself".*

The methodology adopted within the ER, as seen in the previous sections, requires a matrix-based comparison between the anthropic uses of the sea, pressures, effects and environmental components (see **Annex VI** of the ER), with the aim of defining an **Environmental Compatibility Index** (ECI); according to this index, which also takes into account the potential cumulative impacts linked to the coexistence between uses envisaged by the Plan, situations of potential criticality were identified, depending on the (main) uses attributed to the different PUs. The most relevant environmental pressures/impacts are linked to those areas where Fishing, Maritime Transport and Port Activities, and Coastal Tourism overlap as uses envisaged by the MSP.

With regard to the **Adriatic** Maritime Area, the sub-areas recognised as potentially critical in this sense are **A/4_03** and **A/4_10**, and **A/6_06.** In these scenarios, the potential (negative) critical issues are mainly related to (potential) pressures on the marine environment and biodiversity (altered water quality, increased mortality or damage to marine fauna, issues of various kinds such as altered development of organisms, intoxication,

[22] Reference should be made to section 6.2.5 of the Plan "*Attention items relating to single and multiple impacts on biodiversity and coastal marine habitats"*, which, in tabular form, "*provides a summary overview of the main attention items relating to single and multiple impacts on biodiversity and coastal marine habitats, to be considered in the development of the vocations and definition of the plan measures described below*".

[23] These include, for example: Identification and adoption of behavioral and technological practices to reduce the impacts of underwater noise on biota; identification of areas with the highest incidence of collisions with marine megafauna; increase knowledge of the areas of highest incidence of air emissions and water pollution related to maritime transport; strengthening maritime traffic management, through existing spatial measures (transit corridors and traffic separation schemes); Identify the areas with the greatest impact on coastal and maritime tourism, with particular reference to pleasure boating; Strengthen multi-level governance systems that identify and promote concerted measures for the monitoring and sustainable management of fisheries, also with a view to international cooperation; to promote actions aimed at the training of the operators of the ichthyic sector about the sustainability aspects of the professional fishing; systematise and strengthen knowledge on Essential Fish Habitats of key fish species; identify priority areas for environmental and/or marine resource conservation, using an ecosystem-based approach that therefore considers connections at the whole sphere scale; systematise available information on habitats and species and fill knowledge gaps.

bioaccumulation of contaminants in organisms, loss of seabed, damage to benthic habitats, etc.), and the potential for damage to the marine environment and biodiversity.), especially as a result of population growth, the risk of collision between vessels and the release of pollutants, alteration of the seafloor (abrasion, sealing, dredging) also as a result of fishing gear (trawl nets, dredges, turbo-blowers), accidental catches and overfishing, habitat degradation also linked to climate change (e.g. ocean acidification, rising temperatures).

These situations of potential criticality were then verified against the Plan's national measures (for the PUs identified as potentially critical for the Adriatic Area there are in fact no measures defined at the Sub-Area level available to date) and it was found that the MSP provides for regulatory measures that should help reduce the pressure factors and thus the potential (negative) effects on the environment.

However, mitigation measures are envisaged to reduce the effects related to certain pressures and will be explained in Chapter 6 below. Finally, an assessment of the (national) measures of the MSP was conducted against the "do-no-significant-harm" (DNSH) principle, using the checklist prepared by the European Commission[24] . Substantial consistency was found for all DNSH objectives. A small number of measures in the MSP have no or negligible impact on the DNSH objectives, while most of them are fully in accordance with the environmental protection and climate change adaptation/mitigation goals.

No background assessment of compliance with the DNSH principle (Stage 2) was found to be necessary for none of the 71 national measures of the Plan. Reference should be made to **Annex VII** and **Annex VIII** of the ER for a more detailed understanding of the assessments.

5.11 Issues related to cross-border environmental aspects

By its very nature, the sea is a resource that cannot be confined within national boundaries, and any intervention, action or change triggered by a state with a sea border can produce changes affecting the entire marine space. The maritime environment is a global and continuous space, physically unique, but from a legal point of view it is made up of different parts, each of which is subject to specific rules. Participatory maritime spatial planning is essential to address conflicts and resolve disputes between stakeholders, in particular to limit cross-border environmental impacts. In the last decade, increasing pressures on marine ecosystems, as a result of human activity, have led to the proposal that maritime spaces should undergo spatial organisation and planning in order to ensure the sustainable use their resources.

The cross-border nature of the marine environment requires regional cooperation, both between member States and with third countries, to achieve shared, coherent and more effective actions and methods. In this respect, the Marine Strategy Framework Directive (MSFD, 2008/56/EC) guarantees, together with the Common Fisheries Policy, a robust political and legal framework for the fulfilment of international commitments related to the protection of marine biodiversity, representing an important tool for the governance of the marine system, promoting the adoption of complex strategies aimed at safeguarding the marine ecosystem to achieve good environmental status. Like the other two maritime areas, the "Adriatic" area is naturally affected by cross-border environmental effects. One of these concerns fishing. Most of the countries that fish in the Mediterranean Sea and share international waters with our fishermen are not members of the EU.

Therefore, the forum for joint decision-making, having legal force, is the GFCM (FAO), which is the regional fisheries body for this Sea. And also in this context, multi-annual management plans and sub-regionalism serve as the basis for implementing common strategies. Multi-annual management plans under the CFP (Common Fisheries Policy, EU Reg. No. 1380/2013) are adopted per stock and per GSA (or set of GSAs). The fisheries sector is contextualised within the three-year National Programme for Marine Fisheries and Aquaculture 2022-2024, highlighting the structure of the CFP, the means and measures needed to achieve its objectives, in connection with the theme of maritime spatial planning, within which fishing in its own right is considered one of the activities of interest for the national and transnational blue economy. Italy's commitment concerns both strategic-level and multi-sectoral cooperation initiatives, such as the EU strategy for the Adriatic and Ionian Region (EUSAIR), and sectoral cooperation mechanisms, such as those of the Regional Fisheries Organisations (RFOs; among them the General Fisheries Commission for the Mediterranean – GFCM – of the

[24] See https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021XC0218(01)

FAO). Furthermore, the Adri.SmArtFish Interreg Italy-Croatia Projec project envisages the establishment of a consortium between Italian and Croatian operators to enhance artisanal and sustainable fishing, capable of laying the foundations for the co-ordinated management of marine biological resources aimed at the balanced, rational and oriented sustainability of small-scale fishing in the Adriatic area.

The "Adriatic" area, which includes Geographical Sub Areas (GSA) 17 and 18 (FAO-GFCM), is bounded in the east by the limits of the continental shelf, as formally agreed with the neighbouring countries (Yugoslavia, 1969; Albania, 1992; Greece, 1977 and 2020). This area is sub-divided into nine sub-areas, six of which lie within the territorial waters. The three sub-areas A/7 - Northern Central Adriatic Continental Shelf, A/8 - Southern Central Adriatic Continental Shelf, and A/9 - Southern Adriatic Continental Shelf fall within international waters. The Adriatic Sea is a hot spot of Mediterranean biodiversity, especially considering the endemism of fish species. Important fish breeding and growing areas (Essential Fish Habitats) of high commercial value also lie within the basin. This makes this area an area of strategic importance at national level for the fishing sector, and determines, as in the entire Eastern Mediterranean, a fish stock situation that is far from being exploited within sustainable levels. In the cross-border context, the effects of maritime anthropic activities on marine and coastal environments include:

- overexploitation of fish stocks, leading to a lack of available resources for local populations and loss of marine biodiversity;
- trawl fishing, which can release quantities of CO2 equal to those of the entire aviation sector, by virtue of the disturbance of seafloor sediments, which are a key reservoir for long-term carbon storage, thereby contributing to ocean acidification and harming marine productivity and biodiversity;
- illegal, unreported and unregulated fishing, which constitutes one of the most serious threats to the sustainable exploitation of fish populations;
- unfair competition to EU fisheries from other Mediterranean countries that are not bound by the rules, undermining efforts to rebuild stocks;
- pollution caused by maritime traffic (water and air pollution, emission of climate-altering substances, waste dispersion, underwater noise emission, collisions with marine megafauna);
- marine litter;
- introduction and proliferation of invasive alien species;
- warming of the Mediterranean Sea, at a rate 20 % faster than the rest of the world (according to MedECC data, climate change could lead to local extinctions of commercial fish and marine invertebrates of up to 50 % by 2050). Climate change is increasingly altering the distribution patterns and migratory regimes of different fish species and affecting small-scale fisheries in developing countries most vulnerable to its effects;
- industrial accidents.

To this end, the Plan highlights for the "Adriatic" area the relevant items for cross-border cooperation[25] to implement strategies for reducing and/or minimising potential negative impacts, which include:

- contributing to the cross-border management of the environment and natural resources, through the systemisation of the network of environmental protection tools (MPAs, Natura 2000 network, EBSAs – CBD, SPAMI, etc.), through planning decisions that are consistent with the measures agreed at transnational level for the protection of fishery resources (e.g. FRAs – GFCM) and through the adoption of decisions that are consistent with the common European goals defined for the quality of the marine environment (MSFD);
- promoting a systemic, Europe-wide and regional vision of maritime transport and multimodality. This vision is reflected in the Plan's objectives, which provide for the sustainable growth of Adriatic port systems also on the basis of the strengthening and extension of existing cooperation networks between ports, the further development of Motorways of the Sea, as a complementary solution to road transport, the integration of maritime transport with the land transport network in the trans-European perspective of TNT-T multimodal networks, the harmonisation of the Plan-based decisions with existing international planning tools (first and foremost those defined by the IMO as to navigation corridors).

[25] See Section 6.2.7 of the Adriatic Plan.

Another aspect to be taken into consideration, with respect to possible cross-border effects, is related to hydrocarbon exploration and production projects; reference should be made first of all to the contents of the SEA Environmental Report by PiTESAI (Plan for the Sustainable Energy Transition of Relevant Areas), which, in relation to the verification carried out on possible cross-border impacts, excludes the presence of cross-border impacts/effects, given the purposes of the PiTESAI, based on the rationale of the provision (art. 11-ter of Law No. 12/2019) underlying the drafting of the report, as a measure aimed at the pursuit of an effective "energy transition" contributing to the achievement of the environmental goals set by the European Union, mainly through the rationalisation of existing mining activities (therefore, considering that the PiTESAI is not a Plan for the further development of upstream activities).

Specifically, the SEA Environmental Report, prepared within the PiTESAI framework, highlights the application to the sea of a criterion that excludes the future *a priori* opening to upstream activities of new maritime areas of potential geo-mineral interest that are not already open to hydrocarbon exploration and production. In this regard, and in view of the decarbonisation objectives for 2050, the goal of expanding the network of marine protected areas to at least 30% of the marine area (and at least 10% of the strictly protected areas) established by the new European Biodiversity Strategy for 2030, and the environmental targets set out in Framework Directive 2008/56/EC on the Marine Strategy, the scenario of opening new marine mining areas, in addition to the current ones, does not appear feasible, while it would be feasible, according to the PiTESAI, to both exclude the future opening to upstream activities of new marine areas that have not already been opened to hydrocarbon exploration and cultivation, and stop exploration activities in marine areas that have already been opened and where no applications for hydrocarbon prospection, exploration and production have ever been submitted, in an attempt to “redelineate” the current marine areas on the basis of administrative criteria. Moreover, the possibility of carrying out hydrocarbon production activities in the areas straddling the delimitation lines of the Italian continental shelf, as defined by international agreement and, where absent, the median line with the bordering States, is excluded, as mentioned above, with reference to the goals of the plan.

This being the case, and while we would like to make a few brief remarks here on the potential cross-border effects of hydrocarbon exploration and production activities, reference should be made to the blowout phenomenon as the only potential risk in this respect. Blowout (i.e. loss of well control) is, in fact, the biggest risk to the marine environment and is a result of the uncontrolled release of hydrocarbons from a pressurised well, lacking any pressure control systems.

Blowouts can occur throughout the life cycle of a hydrocarbon extraction well, i.e. during the drilling and production phases or during workover activities.

There are different types of blowout, namely:

- surface blowout: hydrocarbons are released into the atmosphere and the surrounding environment together with other materials such as water, drilling fluid, sludge, sand, rocks and other substances;
- submarine blow-outs: these occur mainly due to failures of well pressure control equipment (Blow-Out Preventer, BOP) or pressure imbalances in the underground reservoir.
- underground blowout: a particular situation in which fluids flow from high-pressure zones (usually corresponding to deeper layers in the ground) in an uncontrolled manner to lower pressure zones within the well.

The effects of such phenomena, both in terms of their intensity and distance from the blowout well, depend on many factors, including the depth of the well, the pressure of the reservoir, the presence of oil or gas, the amount of materials discharged into the environment, etc..

Depending on these factors, the potential impacts of a blowout on the marine environment may cover an area of several hundred square metres to several hundred square kilometres, in the most severe cases. Based on the SEA procedure of the PiTESAI, and also considering the fact that, in Italian marine areas natural gas exploration and production is predominant over oil, it is believed that any cross-border impacts related to hydrocarbon exploration and production activities are in any case to be considered negligible.

5.12 Alternative planning options

5.12.1 "No Plan" scenario

The "zero option" or "no plan" scenario is a representation of the likely evolution of the environmental status in the absence of the Plan, analysed according to the relevant time horizon. Although the preparation of a MSP is required by both Directive 2014/89/EU and Legislative Decree 201/2016, the absence of the Plan would imply the failure to identify the framework criteria for sustainable planning and management and for the reasonable organisation of the use of the maritime space and the interactions between uses, for the purpose of balancing the demand for development with the need to protect the marine ecosystems and achieve the desired social and economic objectives in a transparent and planned manner.

According to this scenario, all national marine and coastal areas, including the continental shelf areas, and in particular the Marine Protected Areas and areas within the Natura 2000 Network, except for those subject to regulatory exclusion, would be without rationalisation, organisation and planning, thus allocating the coordination of activities in the marine and coastal areas, in the energy, maritime transport, fisheries and aquaculture, tourism and maritime transport sectors and the exploitation of all types of marine resources, to the local authorities without a coherent vision.

The "No Plan" option would consequently translate into the potential emergence of a great deal of inconsistencies between the different sea uses, which, lacking a spatial reference framework within which to tackle interferences, would overlap and disproportionately increase pressures on the marine and coastal environment. This situation would also lead to the likely impossibility of achieving the goals set by both the European Directives on biodiversity, water, the marine and coastal environment, and the national transposition regulations, such as the favourable conservation status of habitats and species of Community interest, water quality objectives and the "Good Environmental Status" of the marine environment.

The MSP is, therefore, a fundamental tool for the management and governance of national marine and coastal areas, marking a turning point in environmentally sustainable maritime spatial development policies in relation to all the different uses towards the achievement of the Integrated Maritime Policy (IMP) goals.

In preparing the Plan, only one alternative option was considered, namely, non-intervention, defined as the "No Plan" option, which envisages how conditions could evolve in the absence of a MSP, and is described starting from the scenario set out in Chapter 4 and considering the expected territorial transformations and interventions as based on and resulting from the plans and programmes proposed by the higher authorities, plus the implementation of interventions and projects already planned and expected to be implemented in the short and medium term. This scenario does not achieve the development and sustainability objectives required by the IMP and the MSP but shows the possible development of the maritime and land-sea system without any further policies and/or planning other than those previously defined and already in place. In fact, the issues of sustainable development and governance are the cornerstones for implementing the MSP and have been included in the Plan formation process from the start. The MSP has been designed, on the basis of the transposition of the Directive, as a superordinated plan, compared to all other plans and programmes capable of affecting its scope, whether concerning marine waters or land-based activities that may affect marine waters, which shall be absorbed by and harmonised with the provisions of the MSPs.

The Plans, therefore, provide for the coordination of the different policies through a single act of management, in the form of an "integrated plan" and a "comprehensive plan", for identifying all the different uses of the maritime space. Moreover, it is envisaged that, once the Maritime Spatial Plan has been prepared, it will become a benchmark and reference for the individual sectoral plans, constituting the framework within which the sectoral plans will be able to define their sectoral objectives and actions.

This means that it will not be possible to disregard the Plan, by implementing alternative plans or programmes or through administrative measures, thus ensuring clarity and legal certainty with regard to the uses of the maritime space by economic operators, through the coordination of different administrative acts concerning activities taking place at sea or which are in any case capable of impacting on the maritime space.

The territory included in the scope of the planning is very extensive and includes many valuable areas, Natura 2000 sites, MPAs, as well as other specific areas located within a very complex system defined by all the uses of the sea, which makes the environmental management framework even more complex.

Thus, the failure to achieve the objectives underlying the Plans under assessment, in relation to the promotion of the sustainable growth of maritime economies, the sustainable development of marine areas and the sustainable use of marine resources, ensuring the protection of the marine and coastal environment through the application of the ecosystem approach, taking into account land-sea interactions and the strengthening of cross-border cooperation, in accordance with the relevant provisions of the United Nations Convention on the Law of the Sea, would inevitably lead to the "uncontrolled" development of the marine space, without being able to ensure its future development in a clear, reasonable and defined manner, in compliance with the basic principles underlying the MSPs. In conclusion, and in light of the facts emphasised and reiterated above, we can easily infer that a “No Plan” scenario would obviously determine the continuation of all the critical aspects highlighted as existing in the marine areas and described and addressed in Chapters 4 and 5 of the ER. It is further emphasised that the lack of rational programmed strategic planning would lead to the evolution of the marine space without any superordinate monitoring whatsoever capable of ensuring a coherent, transparent and sustainable decision-making framework for the effective management of maritime activities and the sustainable use of marine and coastal resources.

Thus, in a business-as-usual scenario, the “No Plan” option would entail the continuation of current socio-economic activities causing the impacts described in the previous paragraphs to steadily build up, with all the related consequences on the environmental balances and eventually necessarily leading to the further deterioration of the environmental critical factors and a dire future for the human community. Going into the specifics of the energy and climate-related factors, we can see how, in each national homogeneous marine climate macro-region (1M and 2M), the possible anomalies identified with regard to potential future climate changes affecting the various Italian marine areas, would be as follows

- the Adriatic Sea features the most significant change in average temperature of about +1.5 °C (cluster H), with variations in the winter and spring period of up to +2 °C; in contrast, this basin shows a smaller sea level rise of about 7 cm;
- the Ligurian and Tyrrhenian seas, although separated into two different macro-regions, present the same characterisation of future anomalies, with an expected increase of 1.2 °C for temperature and 9 cm for sea level;
- the Ionian Sea and the Strait of Sicily belong to the same macro-region and feature an average increase in temperature and sea level (cluster G) of 1.3 °C and 7 cm, respectively.

With regard to atmospheric pollution, the current and forecast trends show that the marine sector will become the driving sector for decreasing emissions of sulphur oxides and nitrogen oxides, whose greatest emission is related to road transport; instead, in the case of the other pollutants considered ($PM_{2.5}$, NMVOC and NH_3), downward trends are still observed, albeit to a smaller extent.

Overall, according to the Directive 2016/2284 on the reduction of national emissions of certain atmospheric pollutants (NECD), which sets out for each Member State emission reduction targets in the target years 2020 and 2030, compared to the base year 2005, for anthropic emissions of SO_2, NOx, $PM_{2.5}$, NMVOC and NH_3, it appears that based on current emission projections, all targets should be met in 2020 while additional measures should be taken for the 2030 targets. With respect to energy, trend assumptions were made on the basis of the PNIEC (Integrated National Energy and Climate Plan), the strategic plan for the sector. Energy efficiency measures are developed not only on the topics of supply, dependency and security, but also energy costs and, above all, the decarbonisation of the entire energy system.

According to this plan, Italy intends to pursue an indicative consumption reduction target to 2030 equal to 43% of primary energy (PE) and 39.7% of final energy (FE), with respect to the reference scenario; in terms of the absolute level of PE and FE consumption in 2020, it is estimated that the indicative targets set will be exceeded, while in terms of the absolute level of energy consumption in 2030, Italy pursues a target of 125 Mtoe of PE and 103.8 Mtoe of FE, starting from the consumption estimated in 2020. Taken together, the Plan's objectives

and recent consumption trends determine a configuration of the energy system to 2030 that fully meets the PE reduction target set at 32.5%. With respect to the reference scenario related to human health, linked to the safety of seafood products, the "No Plan" alternative scenario would result in the absence of specific criteria for the definition of a framework for the sustainable management of the Plan's activities. The effect of the "No Plan" option would therefore result in the potential continuation of current activities without a spatial reference framework within which to tackle interferences. Specifically, human health is linked to the food safety of fishery and aquaculture products, and the non-implementation of the Plan would result in new impacts emerging and shifting away from the achievement of the priority objectives set by the EU food hygiene policies, aimed at ensuring a comprehensive and integrated approach to food safety based on risk analysis.

Current assessments (2019) for metals, organochlorines and PAHs in samples of fishery products show a qualitative improvement compared to the past (ISPRA 2018). Regarding nano-plastic pollution, EFSA recommends further implementation and standardisation of analytical methods for detecting micro- and nano-plastics in order to assess their presence and quantify their levels in food. The implementation of the plan could allow the implementation of studies for monitoring the various types of pollutants, at both maritime area and sub-area level, for which data are currently totally lacking. Generally speaking, we can state that failure to implement the Plan would not allow the implementation of interventions that would determine positive effects on human health. Promoting the sustainable growth of maritime economies is the reference goal that can be traced back to the socio-economic aspects of fishing and aquaculture. The last Sea Economy Report (2021) showed that, in the maritime economy, added value and employment grew by 0.1% between 2014 and 2019. Italian aquaculture production remains stable, while growth would be desirable to reduce dependence on imported seafood and limit fishing pressure on fish stocks.

The expected growth and development of the sector in Italy, by 2025, could be achieved by implementing the Plan, which could allow the definition and allocation of Marine Areas for Aquaculture (known as AZAs). Another fundamental goal of the MSP, in accordance with the CFP, is the valorisation of artisanal fishing, which offers the best results, from the perspective of the value chain, for the consumption of fish products. The implementation of the plan could allow the valorisation of artisanal fishing and the allocation of AZAs to reduce dependence on the import of fish products and limit fishing pressure on fish stocks, as well as the implementation of measures aimed at the maximum sustainable yield of fish and control of illegal fishing. Generally speaking, it can be said that the non-implementation of the Plan would not allow the implementation of interventions with positive effects on the economy and social aspects of the regions.

Biodiversity and the marine environment are the most exposed and vulnerable elements, as things stand now, to changing conditions in a "No Plan" scenario; in fact, the report on the Habitats (92/43/EEC) and Birds (2009/147/EC) Directives confirms the negative trends and critical conditions of protected species and habitats in our country, with a high number of unfavourable assessments:

- ✓ 54% of the terrestrial and inland flora (of which 13% feature a poor conservation status);
- ✓ 53% of the terrestrial and inland water fauna (of which 17% feature a poor conservation status);
- ✓ 22% of marine species (17% of which feature a poor conservation status);
- ✓ 89% of terrestrial and inland water habitats (of which 40% feature a poor conservation status). Marine habitats, on the other hand, feature a favourable conservation status in 63% of cases and unknown in 37%.

The main threats to biodiversity that cause damage to the extent of complete loss of natural ecosystems are:

- ✓ the loss and fragmentation of habitats;
- ✓ climate change, over-exploitation of resources (e.g. fish stocks);
- ✓ the introduction of invasive alien species;
- ✓ pollution.

Therefore, marine ecosystems are clearly constantly under anthropic pressure due to a variety of stressors, including the anthropisation of coastlines, pollutant inputs from rivers, overfishing, and difficulties in managing international waters, which continue to undermine the preservation of important natural resources.

In particular, currently designated MPAs cover 9.68% of the Mediterranean Sea, but those effectively managed through implemented management plans are only 1.27%, thus highlighting a delay in planning and management and the enormous work that still needs to be done to promote the protection of marine protected areas. Failure to implement the MSP would therefore mean missing the opportunity to produce an overarching instrument capable of incisively protecting the Mediterranean Sea.

5.12.2 Alternative planning options: "Plan Implementation" scenario

Marine Spatial Planning (MSP) is a fundamental tool that marks a major turning point in policies for managing the coastal and marine environment and the economic uses and activities that interfere with it.

The MSP, therefore, introduces a more rational organisation of the use of the maritime space and of the interactions between its uses, balancing the needs related to the demand for development with the need to protect, safeguard and increase marine ecosystems, and to achieve social and economic objectives, representing a fundamental element for a sustainable development of the sea economy. By implementing a MSP Italy not only complies with the European Union provisions set out in the Marine Strategy Framework Directive (MSFD), it also clearly expresses a commitment and contribution towards the achievement of all the sustainability and development objectives defined by international and EU environmental policies (decarbonisation, protection of biodiversity and habitats, sustainable development, reduction of marine pollution, coastal erosion, climate change, protection and enhancement of underwater cultural heritage, etc.).

As previously defined, the only alternative option considered was the "No Plan" scenario (i.e., without the implementation of an MSP), which highlights the failure to achieve the goals envisaged both by the Plan and by all the policies that involve the Plan, thus removing a fundamental pillar in the management of national and international environmental policies. As seen in the previous paragraph, the current environmental conditions point to the constant degradation and impoverishment of marine ecosystems, therefore, it has become absolutely necessary to implement all the actions, interventions and policies capable of slowing down this trend; through the analysis of models developed back in 2018, it has been possible to verify how the current trend can be reversed through the implementation of conservation policies aimed at decarbonisation, reducing pollution or increasing the extent of protected areas. The implementation of these actions, as a means for achieving the objectives, is provided by the Marine Strategy Framework Directive (MSFD), which has boosted the protection and restoration of the marine environment through an integrated approach that encompasses all other instruments and directives somehow affecting the marine environment, and constitutes the environmental pillar of the European Union's maritime policy, the ultimate goal being the achievement by the Member States of Good Environmental Status for their marine waters. A target that had originally been set for 2020. Considering that the Italian coastline comprises no less than 3 of Europe's 6 marine areas, we can understand how the implementation of the MSP is of key importance not only for Italy but for the entire EU.

The implementation of the measures and actions envisaged in the MSP, with the achievement of the strategic and environmental goals, will clearly bring numerous positive effects compared to the "No Plan" option, directing planning and policy decisions towards the sustainable growth of maritime economies, the sustainable development of marine areas and the sustainable use of marine resources

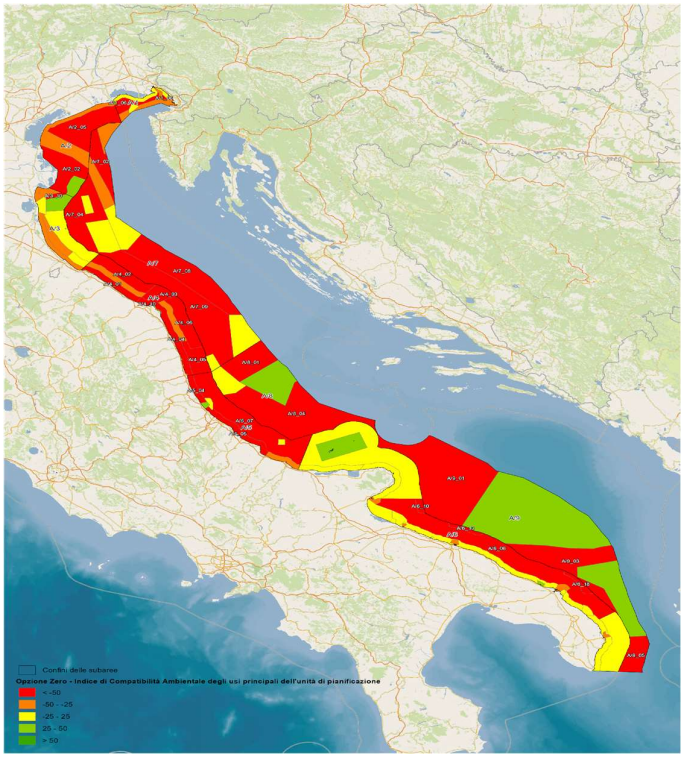
The analysis and elaboration of the values obtained from the **Environmental Compatibility Index**, which indicates the intensity, on all the environmental components considered in an aggregate way, of the impact generated by the planned interventions, provide us with analytical data that clearly and comprehensibly stress how the implementation of the MSP will entail – in the medium to long term – a far-reaching and distinct improvement of the environmental conditions, as opposed to the conditions resulting from the application of the "No Plan" option. The following table shows the different values of the environmental compatibility indices with respect to the "No Plan" and "Plan Implementation" scenarios and, finally, the difference in values between the two scenarios with the relative increase in environmental quality.

What clearly emerges from the comparison of the two scenarios is that the implementation of the MSP is unequivocally the scenario to be preferred.

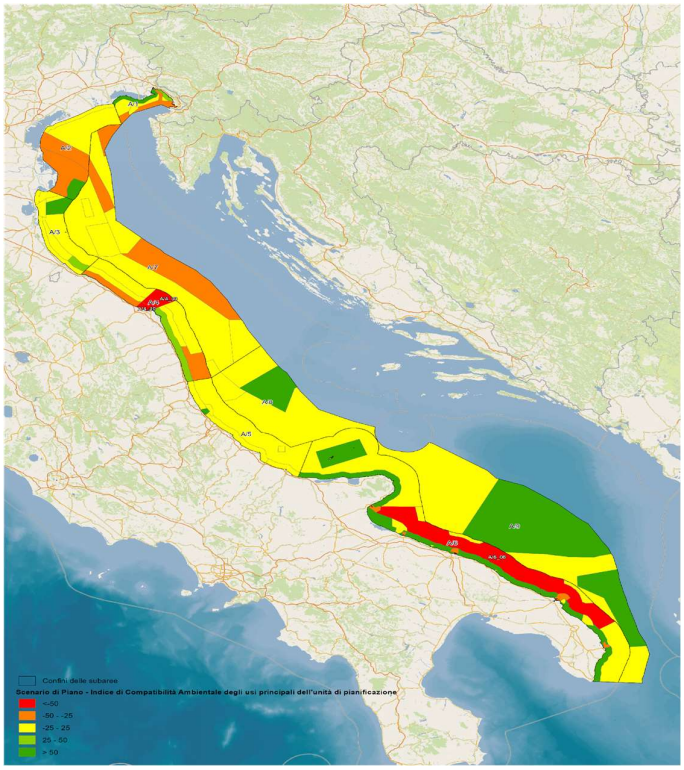
sub-area	Environmental Compatibility Index "Plan Implementation" scenario	Environmental compatibility index "No Plan" scenario	Difference of the Environmental Compatibility Index between the "Plan Implementation" and the "No Plan" scenarios
A/1	159	-202	361
A/2	33	-270	303
A/3	131	-265	396
A/4	99	-798	897
A/5	10	-320	330
A/6	672	-713	1385
A/7	-22	-724	702
A/8	93	-332	425
A/9	185	-446	631
TOTAL	1360	-4070	5430

Environmental compatibility index values relative to the Adriatic sub-area for the "Plan Implementation" and "No Plan" scenarios and difference between the two

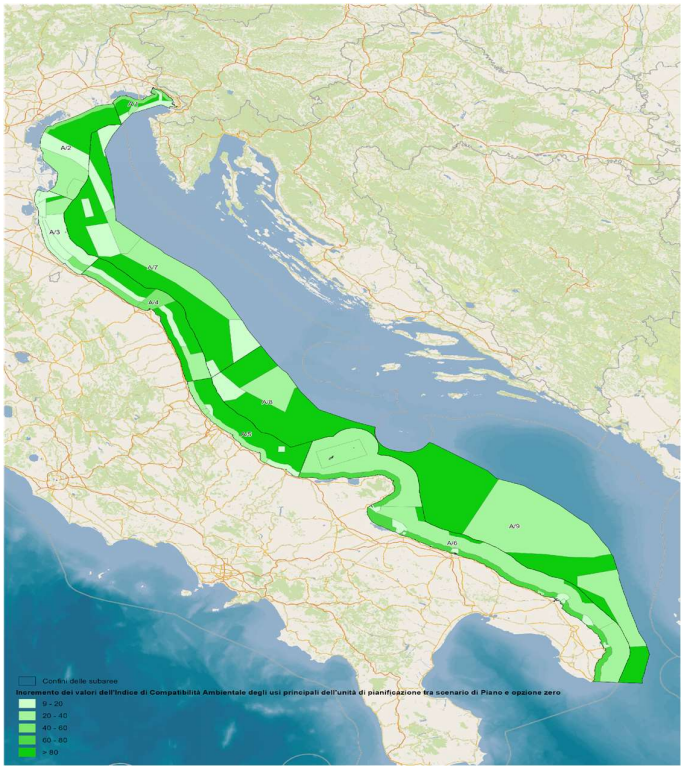
To facilitate the understanding of the table, a graphical representation of the above data is given below:



"No Plan" option



"Plan Implementation" option



Increase in the Environmental Compatibility Index values

6. Further integration, mitigation and environmental monitoring measures for the implementation phase

As already extensively discussed in the previous Chapter 5, maritime traffic and ports, fishing, aquaculture, coastal defense, coastal and maritime tourism and energy represent the uses envisaged by the PGSM that can determine the most significant environmental effects. (both in a negative and a positive key).

Some possible mitigation measures will therefore be presented below which, together with the measures of the Plan highlighted above, can contribute to reducing the potential negative effects during implementation:

- Measures to mitigate the effects on the marine environment related to "Maritime traffic and ports"
- Measures to mitigate the effects on the marine environment related to aquaculture
- Measures to mitigate the effects on the marine environment related to fishing
- Measures to mitigate the effects on the marine environment related to coastal defense
- Measures to mitigate the effects on the marine environment related to coastal tourism
- Measures to mitigate the effects on the marine environment related to Energy use.

The environmental report describes the main mitigation measures in relation to the potential pressures identified and the monitoring measures to be adopted during implementation as required by art. 9, paragraph 1 letter. c) and art. 10 of Directive 2001/42 / EC (SEA Directive).

List of annexes to the Environmental Report

Annex I	Feedback to the observations and recommendations of the competent environmental subjects (SCA)
Annex II	Response to the observations and recommendations of the Technical Commission for Environmental Impact Verification - VAS Subcommittee of the MiTE;
Annex III	Matrix of analysis of the external coherence between the strategic objectives of the PGSM and the objectives of the relevant Plans / Programs
Annex IV	Internal consistency analysis matrix between strategic objectives and national measures of the PGSM and environmental sustainability objectives and related targets
Annex V	Internal consistency analysis matrix between specific objectives and regional measures of the PGSM and environmental sustainability objectives and related targets
Annex VI	Correlation matrix between anthropogenic uses of the sea, pressures, effects and environmental components
Annex VII	Verification matrix of compliance with the DNSH principle for national measures of the PGSM
Annex VIII	Verification matrix of compliance with the DNSH principle for regional measures of the PGSM
Annex IX	Environmental Impact Study
Annex X	Analysis of the state of the art in the transposition of Directive 2014/89 / EU at a cross-border level (EU and non-EU countries)
Annex XI	Non-Technical Summary

List of drawings attached to the Environmental Report

Nr	Nome	Description
1	PGSM_ADR_AMBD001_AMP	Marine Protected Areas Charter
2	PGSM_ADR_AMBD002_EBSA	Charter of EBSA areas and Priority Areas with the value of environmental protection
3	PGSM_ADR_AMBD003_EBSA_A1	Map of the EBSA A / 1 "Northern Adriatic" area
4	PGSM_ADR_AMBD004_EBSA_A4	Map of the EBSA A / 4 "Central Adriatic" area
5	PGSM_ADR_AMBD005_EBSA_A6	Map of the EBSA area A / 6 "Southern Adriatic"
6	PGSM_ADR_AMBD006_Habitat fondo	Background Habitat distribution map
7	PGSM_ADR_AMBD007_Porti	Port distribution map
8	PGSM_ADR_AMBD008_Posidonia	Map of the distribution of Posidonia oceanica
9	PGSM_ADR_AMBD009_BeniCulturali_A1	Charter of cultural and landscape heritage in Sub-Area A / 1
10	PGSM_ADR_AMBD010_ BeniCulturali _A2	Charter of cultural and landscape heritage in Sub-Area A / 2
11	PGSM_ADR_AMBD011_ BeniCulturali _A3	Charter of cultural and landscape heritage in Sub-Area A / 3
12	PGSM_ADR_AMBD012_ BeniCulturali _A4	Charter of cultural and landscape heritage in Sub-Area A / 4
13	PGSM_ADR_AMBD013_ BeniCulturali _A5	Charter of cultural and landscape heritage in Sub-Area A / 5
14	PGSM_ADR_AMBD014_ BeniCulturali _A6	Charter of cultural and landscape heritage in Sub-Area A / 6
15	PGSM_ADR_AMBD015_Sensibilità_AMP-ZTB-FRA_SubAree	Sensitivity map of the System of Protected Areas, Biological Protection Zones and Fisheries Restricted Areas at the Sub-Area level
16	PGSM_ADR_AMBD016_Sensibilità_AMP-ZTB-FRA_UP	Sensitivity map of the System of Protected Areas, Biological Protection Zones and Fisheries Restricted Areas at UP level
17	PGSM_ADR_AMBD017_Sensibilità_Paesaggio	Environmental sensitivity chart for the landscape component
18	PGSM_ADR_AMBD018_Visibilità_eolico	Map of the potential risk of perception of offshore wind farms Sub-Areas A3-A4-A5-A7)