Project acronym: TRITON

Project title: Development of management tools and directives for immediate protection of biodiversity in coastal areas affected by sea erosion and establishment of appropriate environmental control systems

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Abstract

TRITON is based on a bottom up approach thus to allow for an effective multilevel participation to coastal management: a success key factor of sustainable development. In this way, an outline for an efficient decision support system (DSS) allowing inclusive and multi-level stakeholders' engagement in the decision processes underpinning Integrated Coastal zone Management (ICZM) is needed.

To this aim, this deliverable describes and compares all the methodologies and interactions for the integration of Maritime Spatial Planning (MSP), Coastal Erosion Prevention and ICZM as part of the TRITON DSS for the Apulia Region and Greece, toward the implementation of the EUSAIR strategy. The context analysis presented in this deliverable is based on several elements finalized to the featuring of the TRITON platform, as key component of its DSS. Moreover, a deep analysis on the different gaps and challenges against MSP and ICZM implementation, in the TRITON IT-GR intervention area, is provided with the incurrent legislative framework, best practices, case history and results achieved during the TRITON lifetime.

The main features of the AS-IS context analysis showed how to:

a) Use the ecosystem-based management approach to ensure the sustainable development and integrity of coastal zones, their ecosystems and related services and landscapes;

b) Address natural hazards and the effects of natural disasters, in particular coastal erosion and others connected climate-related impacts (e.g. coastal flooding);

c) Achieve good governance among actors involved in coastal zone assessment and management.

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Acronyms

ABMT = Area Based Management Tool
ABNJ = Area Beyond National Jurisdiction
AIR = Adriatic Ionian Region
ALB = Albania
AZA = Allocated Zone for Aquaculture
ADRIPLAN: Adriatic Ionian maritime spatial Planning
BC = Barcelona Convention
B&H = Bosnia and Herzegovina
CAMP = Coastal Area Management Programme
CBD = Convention on Biological Diversity
CEA = Cumulative Effect Assessment
CF = Conceptual Framework
CKAN = Comprehensive Knowledge Archive Network
COP = Conference of the Parties
CORILA: Consorzio per il coordinamento delle ricerche inerenti il sistema lagunare di Venezia
CP = Contracting Parties of the Barcelona Convention
CPMR = Conference of Peripheral Maritime Region
CRF = Common Regional Framework
CRO = Croatia
CSPD/BSR = Committee on Spatial Planning and Development of the Baltic Sea Region
DG Mare: Directorate General for Maritime Affairs and Fisheries
DPCM = Italian Prime Ministerial Decree
DPSIR = Drive, Pressure, State, Impact, Response
DPSWR = Drive, Pressure, State, Welfare, Response
DST = Decision Support Tool
EEA: European Environment Agency
EBSA = Ecologically or Biologically Significant Area
EC = European Commission
EEZ = Exclusive Economic Zone
EMODnet: European Marine Observation and Data Network
EO = Ecological Objective
EU = European Union
EUSAIR = European Union Strategy for the Adriatic-Ionian Region
FAO = Food Agriculture Organisation
FRA = Fishery Restricted Area
GES = Good Environmental Status
GFCM = General Fisheries Commission of the Mediterranean
GIS = Geographic Information System
GRE = Greece

GSA = Geographic Sub-Area
H&BD = Habitat and Bird Directive
HD = Habitat Directive
HELCOM = Helsinki Commission
HOD = Heads of Delegation
ICZM = Integrated Coastal Zone Management
IEC: International Electrotechnical Commission
IHO: International Hydrographic Organization
INSPIRE: Infrastructure for Spatial Information in Europe ISO: International Organization for Standardization MSFD: Marine strategy framework Directive
IMAP = Integrated Monitoring and Assessment Programme
IMO = International Maritime Organisation
ITA = Italy
LSI = Land Sea Interaction
MAP = Mediterranean Action Plan
MES = Marine Ecosystem Service
MON = Montenegro
MPA = Marine Protected Area
MSFD = Marine Strategy Framework Directive
MSP = Maritime Spatial Planning
MSPD = Maritime Spatial Planning Directive
MSPKC = Maritime Spatial Planning Knowledge Catalogue
MUC = Marine Use Conflicts
MTS = Mid-Term Strategy
NAPA = North Adriatic Ports Association
NGO = Non-Governmental Organisation
OECM = Other Effective area-based Conservation Measure
PAP/RAC = Priority Action Programme/Regional Activity Centre
PoM = Program of Measures
PSSA = Particularly Sensitive Sea Area
O&G = Oil and Gas
R&D&I = Research, Development and Innovation
SEA = Strategic Environmental Assessment
SIMWESTMED: Supporting Implementation of Maritime Spatial Planning in the Western Mediterranean region
SLO = Slovenia
SPA/BD Protocol = Spatially Protected Area and Biological Diversity Protocol
SPAMI = Specially Protected Areas of Mediterranean Importance
UCH = Underwater Cultural Heritage
UNCLOS = United Nations Conventions on the Law of the Sea
UNEP = United Nations Environment Programme

VASAB = Vision and Strategies around the Baltic Sea
WCS: Web Coverage Service WFS: Web Feature Service WMS: Web Map Service WMTS: Web Map Tile Service
WFD = Water Framework Directive

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1. Introduction

The overall objective of the TRITON project is to reduce the consequences of coastal erosion by bridging the policy-implementation gap in the ICZM within the IT-GR intervention area, and improving the integration of coastal zone policies within broader spatial planning and socio-economic policies. The Apulian and Western Greece shorelines, in intervention area of the project, are facing significant erosion impacts due to natural and man-induced causes, calling for targeted interventions and adaptation strategies based on risk analysis and management.

The analyses reported in this Deliverable 3.3. are organized as follows:

- **Section 2** focuses on the AS-IS context analysis providing an overview on the indicators and datasets to be considered toward the implementation of the TRITON Decision Supporting System (DSS), aimed at providing support to Maritime Spatial Planning (MSP), Integrated Management of Coastal Zone (ICZM) and Coastal Erosion prevention toward the 2021-2027 challenges (Paragraph 2.1). Moreover, existing gaps and weaknesses in relation to cross border ICZM and MSP (including considerations on data policies) are explored (Paragraph 2.2), also identifying the challenges ahead which pave the way for the development of the TRITON DSS (Paragraph 2.3).
- **Section 3,** building on the TRITON's results from Summer School and the other project work packages, draws key priorities to fill in the identified management gaps, and speed up the development and implementation of integrated coastal plans addressing cumulative risks arising from the complex interplay among multiple human-induced and natural pressures.

The whole deliverable is coordinated considering key outcomes of the other TRITON work-packages.

2. AS-IS context analysis toward the TRITON DSS

The general approach underpinning the AS-IS context analysis developed in the frame of the TRITON project has been organized into five main phases, with a recursive refinement of the analysis and the resulting inventory of reflections:

1. Identification of data and information needs represents the starting phase. The activity was based on TRITON initial assessment and other deliverables (e.g., D3.1 and D3.2), on a review of reports and legal framework plans and/or relevant strategy reports from EU initiatives and United Nation sustainable development goals (SDGs) (United Nations, 2016).
2. An initial collection of data, portals and tools was carried out within Tasks 3.1, 3.2. and 3.4. The collected information was directly inserted and treated as a sort of "Knowledge Catalogue" and straightway made ready for consultation and analysis toward the TRITON DSS.
3. An assessment on the results of TRITON pilot cases under the Tasks 4.1 and 4.2 and the joint-risk based tool developed and applied within Task 4.3.and Task 4.4 on benchmark analysis and results integration/exploitation.
4. A summary on methodology and results of the training model, the challenges from stakeholders and the instrument approaches like Memorandum of Understanding and Follow Up based on the cross fertilization between the activities under the WP5 and Task 1.5.

The objective of the TRITON project is to support Greece and Apulia Region in establishing and developing a DSS toward a coordination in ICZM, MSP and Coastal Erosion Prevention fields finalized to implement cooperation on cross-border planning in this sea basin toward an effective application of the ICZM Protocol and related EU directives.

The action seeks to stimulate the development of a cross-border, integrated based approach towards coastal prevention risks in management perspective combining ICZM/MSP, based on the requirements of the Directive 2014/89/EU on MSP and the incurrent legislative framework.

Besides, the project aims at integrating the framework in appropriate tools GIS-WEB SIT and Mathematics models toward the implementation of common standards, identification of common key performance indicators through the stakeholder's awareness enhancement based on focalized knowledge spreading through training course and demonstration of effects by pilot cases implementation.

Due to the strong connection and interaction among the tasks underpinning the entire WP3, we have adopted a joint approach to their implementation in order to optimize the execution of activities and to achieve more integrated and useful outcomes for the coastal erosion prevention implementation and consequently the ICZM and MSP cross-border application.

Here below are briefly description of the main results of each WP3 task:

1) Task 3.1 'Census of needs/mapping of existing system for coastal management': it focuses on the main territorial and environmental features of the Italian and Greek TRITON pilot cases, also providing details on the dataset, from open-source web data portals (e.g. Copernicus, EUROSION) and supplied by national and local authorities, available at the case study level (Section 2). As summarized in the conclusions (Section 3), this information is exploit in both TRITON pilot cases within the application of risk-based methodologies, allowing to evaluate shoreline evolution against different climate change and management scenarios and provide support to cross border ICMZ in the area of intervention (IT-GR).
2) Task 3.2 "Census of needs/mapping of best practices to be integrated in the TRITON system" analyses the application of standard and indicators, as defined by the legislation at the European, national and regional levels across the IT-GR intervention area, has been censed within coastal management in the perspective of:
   a) prevention and capitalization of assessments;
   b) setting a pattern of environmental targets;
   c) establishment and implementation of coordinated monitoring programmes for the coastal management as far as concern the prevention of risk erosion along the Apulia Region coastline and the Greek areas selected.

3) Task 3.4 describes the TRITON web platform which contains the components of the Decision Supporting System for coastal management defined by the combination of the different output and deliverables of the project.

4) Task 3.5 a deeply analyses tools and methods for coastal erosion risk assessment and management, also providing a general DPSIR-based conceptual framework allowing to disentangle the complex interactions underpinning coastal erosion phenomena by defining the relationships between natural and anthropogenic activities, the coastal environment and its ecosystems, and the resulting environmental, physical and socio-economic impacts.

In this way, the census, herewith provides the features for predictability of results, the setting of replicable approach in similar situations and above all the fact that is based on the bottom up approach and integration of the TRITON WEB GIS[3] with the Apulia Region SIT.

TRITON context analysis as well described in furthers, is not exhaustive to represent the complexity of the phenomenon and impacts for coastal management. To this aim, a framework comparing the approaches, gaps and challenges has been outlined thus to may be capitalized in an effective DSS.

2.1 Indicators and datasets to support ICZM and MSP processes

In the recent years, many initiatives have analysed how data, portals and tools may support ICZM and MSP processes. Only recently, the two approaches have become integrated, and a repository of indicators developed and treated within under this new approach have been developed considering different perspectives: ecological, environmental, social and economics.

In this setting, the MSP Data Study (European Commission 2016) presents a complete overview of data and knowledge requirements by Member States for undertaking MSP decision making processes, taking into account different scales and different steps in the MSP cycle[4].

The 7 steps underpinning the tiered Approach for MSP, toward Ecosystem-based Management, are listed as below:

[3] http://www.sit.puglia.it/portal/portale_pianificazione_regionale/Piano%20Regionale%20delle%20Coste/Cartografie
[4] http://msp.ioc-unesco.org/msp-guides/msp-step-by-step-approach/

- Step 1 Establishing Authority.
- Step 2 Obtaining Financial Support.
- Step 3 Organizing the MSP Process.
- Step 4 Engaging Stakeholders.
- Step 5 Analyzing Existing Conditions.
- Step 6 Analyzing Future Conditions.
- Step 7 Developing the Plan.

A similar framework has been carried out since 2019 for ICZM toward a common framework for Maritime Spatial Planning under the Blue Med Initiative[5]. Actually, , we cannot assume that there is a different level of approach in the combined subject, but for sure within the TRITON project a bottom-up-based approach has been identified and a common Knowledge catalogue developed between the Apulia and Greece[6] Interreg intervention area.

Pan-European initiatives have a strategic role to foster effective data sharing to support transboundary MSP. The main database which are useful within TRITON and for EUSAIR strategy are the following:

1) The European Marine Observation and Data Network (EMODnet 2018a) data portals (EMODnet 2018a) provide access to European marine data across seven discipline-based themes (bathymetry, geology, seabed habitats, chemistry, biology, physics, human activities (EMODnet 2018b). EMODnet data portals and Sea Basin Checkpoints have the potential to support transboundary MSP data exchange needs by providing access to a range of harmonised data sets across European Sea Basins and testing the availability and adequacy of existing data sets to meet commercial and policy challenges (European Commission 2016).
2) Copernicus Marine Environment Monitoring Service (Copernicus CMEMS), providing regular and systematic core reference information on the state of the physical oceans and regional

[5] http://www.bluemed-initiative.eu/blue-community-resources/#organisations
[6] Please, read the http://paprac.org/storage/app/media/Meetings/2019/Adriatic-Ionian%20cooperation%20towards%20MSP/Pan%20Adriatic%20Scope_Draft%20Final_December.pdf

seas. The observations and forecasts produced by the service support all marine applications under EU directives (e.g. MSFD, WFD, MSP dircetives). (https://marine.copernicus.eu/);

3) EU Atlas of the sea, delivering information about Europe's marine environment. Users can view predefined and ready to use maps, covering topics such as nature, tourism, security, energy, passenger transport, sea bottom, fishing stocks and quotas, aquaculture, and much more. (https://ec.europa.eu/maritimeaffairs/atlas_en).
4) The Pan-European infrastructure for marine and ocean data management (SeaDataNet) (Schaap and Lowry 2010; "SeaDataNet" 2018) is actively implementing an interoperable infrastructure for managing, indexing and sharing online comprehensive sets of multi-disciplinary, in situ and remote sensing marine data, metadata and products. SeaDataNet has qualified itself as the leading infrastructure for the EMODNet data management component, since it is driving several thematic portals (e.g., chemistry, physics, bathymetry, etc.) while providing practical and standard solutions for support interoperable data (Schaap 2017).

The INSPIRE Directive (Infrastructure for Spatial Information in the European Community) aims to create a European Union spatial data infrastructure "for the purposes of Community environmental policies and policies or activities which may have an impact on the environment" (European Union 2007; Craglia and Annoni 2007). INSPIRE is in line with the expectation of the EU MSP Directive to cooperate and share data across borders.

According to the MSP Directive (EC (European Council) 2014): "*With a view to ensuring that maritime spatial plans are based on reliable data and to avoid additional administrative burdens, it is essential that Member States make use of the best available data and information by encouraging the relevant stakeholders to share information and by making use of existing instruments and tools for data collection, such as those developed in the context of the Marine Knowledge 2020 initiative and Directive 2007/2/EC of the European Parliament and of the Council (18)*" (European Union 2007).

In addition to the INSPIRE implementation, many other Spatial Data Infrastructures and geoportals can provide a valuable support to MSP process. Marine-driven geoportals, responding to the international quality protocols, are the key asset to support data management and exchange. They are intended to support data sharing to inform transboundary cooperation as well as national efforts in relation to MSP, to integrate analysis and planning activities on different selected areas. Moreover, they represent the interoperability platforms to share information with the public and with all interested parties, as well as to recollect required information in order to inform decision making.

On the other end, several publications have reviewed and investigated how practical software tools may support the various stages of the MSP process (Stelzenmüller et al. 2013; Kannen et al. 2016; Pınarbaşı et al. 2017; Furlan et al., 2018). The EU MSP Platform (European Commission 2018[7]) provides an up-to-date collection of MSP-related practices including tools, studies, methodologies, guidance's.

The Integrated Maritime Coastal Zone Management (IMCAM) as defined under the Convention on Biological Diversity (CBD) has got a totally different approach based on the interactions of EU's policy and International Framework.

In 1973 the Council of Europe concluded a Resolution on the Protection of the Coastline (Resolution (73) 29). Under the auspices of the Council of Europe, the work of the Conference of Ministers Responsible for Spatial/Regional Planning (CEMAT) led to the adoption in 1983 of the European Regional/Spatial Planning Charter. The Council of Europe further supported work on a Model Law on coastal protection and a code of conduct for coastal zones.

The UN Earth Summit of Rio de Janeiro in 1992 kick-started the development of focussed EU policy on integrated coastal zone management. The conclusions of the summit call on coastal states to set up integrated coastal zone management strategies in Chapter 17 of the Agenda 21. Moreover, Chapter 10 of the Agenda 21 stresses the need for sustainable and integrated land management. Consecutively, the Council adopted in 1992 (92 C 59/01) and in 1994 (94C 135/02) resolutions on

[7] https://www.msp-platform.eu/

integrated coastal zone management. In the resolutions the Council acknowledges the integrated approach as particularly important for facing the challenges in regard to coastal management and urges the Commission to come forward with proposals for action in Europe.

From 1996 to 1999, the Commission operated a Demonstration Programme on integrated coastal zone management to provide technical information about sustainable coastal zone management, and to stimulate a broad debate among the various actors involved in the planning, management or use of European coastal zones.

The programme intended to lead to a consensus regarding the measures necessary in order to stimulate Integrated Coastal Management in Europe. In 2000, based on the experiences and outputs of the Demonstration Programme, the Commission adopted two documents:

- a Communication from the Commission to the Council and the European Parliament on "Integrated Coastal Zone Management: A Strategy for Europe" (COM/2000/547 of 17 Sept. 2000);
- a proposal for a European Parliament and Council Recommendation concerning the implementation of Integrated Coastal Zone Management in Europe (COM/2000/545 of 8 September 2000). This Recommendation was adopted by the European Parliament and Council on 30 May 2002 (2002/413/EC).

The 6th Environment Action Programme of the European Community, 2002-2012 (European Parliament and Council decision 1600/2002/EC of 22 July 2002) confirmed integrated coastal zone management among the action priorities in Articles 3.10 and 6.2 (g).

On 12 March 2013 the Commission adopted a proposal for a Directive establishing a framework for maritime spatial planning and integrated coastal management.

Actually, the ICZM in Regional Sea Conventions is based on geographical level:

- Mediterranean: The EU is a contracting party to the Barcelona Convention. A milestone in the development of international legislation on ICZM was achieved by the adoption of the ICZM to the Barcelona Convention. On 13 September 2010, the Council adopted the decision to ratify the ICZM Protocol to the Barcelona Convention (more details here).

- Baltic Sea region: The EU is contracting party to the Helsinki Convention, covering the Baltic Sea. HELCOM Recommendations of specific interest to ICZM include: the Protection of the Coastal Strip (15/1 of 1994), the Preservation of Natural Coastal Dynamics (16/3 of 1995), the Implementation of Integrated Marine and Coastal Management of Human Activities in the Baltic Sea Area (24/10 of 2003) and the Development of Broad-scale Maritime Spatial Planning Principles in the Baltic Sea Area (28E/9 of 2007). In 2010 HELCOM set up a common working group with VASAB (Visions and Strategies around the Baltic Sea), to assist cooperation in the Baltic Sea on ICZM and Maritime Spatial Planning. VASAB adopted in 1996 Common Recommendations for Spatial Planning of the Coastal Zone in the Baltic Sea Region and has been actively developing and supporting coastal management.
- Black Sea: The EU is not a contracting party to the Bucharest Convention covering the Black Sea. However, the EU Member States Romania and Bulgaria are party to the Convention and participate in its ICZM activities. The Strategic Action Plan for the Environmental Protection and Rehabilitation of the Black Sea adopted in 2009 establishes ICZM as one of its 3 key management approaches.

The "Common Regional Framework (CRF) for ICZM"[8] was adopted by the COP 21 in Naples on the 5th of December 2019 by the decision IG.24/5. This document is to be considered as the strategic instrument meant to facilitate the implementation of the ICZM Protocol.

Its objectives are finalized toward the achievement of the following goals:

a) Use the ecosystem-based management to ensure sustainable development and integrity of the coastal zone, its ecosystems and related services and landscapes;
b) Address natural hazards and the effects of natural disasters, in particular coastal erosion and climate change; and
c) Achieve good governance among actors involved in and/or related to coastal zones.

[8]http://wedocs.unep.org/xmlui/bitstream/handle/20.500.11822/31703/19ig24_22_2405_eng.pdf?sequence=1&isAllowed=y

The CRF introduces Marine Spatial Planning (MSP) as the main tool/process for the implementation of ICZM in the marine part of the coastal zone, and specifically for its sustainable planning and management. The "Conceptual framework for the MSP" has already been adopted by the CPs at its COP 19 (Tirana, 17-20 December 2017) by the decision IG.23/7[9].

It includes an Action Plan (AP) from 2020 up to 2027, which has been designed to provide concrete support and guidance for joint implementation of the ICZM Protocol through the CRF. The AP[10] defines the main outputs to be delivered, associated with estimated costs, key actors and corresponding progress indicators.

As defined by Art. 2 of the ICZM Protocol[11]: "*Integrated coastal zone management means a dynamic process for the sustainable management and use of coastal zones, taking into account at the same time the fragility of coastal ecosystems and landscapes, the diversity of activities and uses, their interactions, the maritime orientation of certain activities and uses and their impact on both the marine and land parts*".

By the matching of the approaches, the Context Analysis under the AS-IS paradigm described in this Section has been deployed within TRITON as tool for the implementation of integrated coastal management schemes according to the Common Regional framework addresses[12].

2.2. Scientific and policy gaps for effective ICZM/MSP implementation

The coastal planning such as the coastal erosion prevention both as part of the wider MSP and ICZM is, actually, characterized by an extreme fragmentation between public, regional and local authorities. Besides, the lack of national regulations is partially offset by the presence of many regional laws that establish programs for an integrated management of coastal areas (ISPRA 2015)[13].

[9] https://wedocs.unep.org/bitstream/handle/20.500.11822/21889/17ig23_23_eng.pdf?sequence=1&isAllowed=y
[10] http://iczmplatform.org//storage/documents/eZxBPagEHW5DvtOLbjw1qAXmnZgu9zeovdJ87l9x.pdf
[11] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:22009A0204(01)&from=EN
[12] http://paprac.org/meetings/final-sub-regional-meeting-adriatic-ionian-cooperation-towards-msp

In Italy, different plans for the management of Italian coasts have been realized in thirteen Italian regions[14], based on local/regional initiatives. However, the effectiveness of these actions is subjected to the tyranny of small and local decisions and not to a global programme stated by ICZM/MSP principles toward the coastal erosion prevention and the Green Deal 2030.

In first of all, it still exists a **gap between scientific community involved in ICZM process and policymakers** for an effective implementation of ICZM in Italian coastal regions. Actually, we live in a strange impasse because the efforts at research, planning and policy achievement remain disjointed without any temporal and territorial consistency. In fact, despite to the creation of the National Observatory of Coastal Erosion[15], the fragmentary nature of responsibilities (from local, regional and national authorities) suffers for the high degree of confusion about coastal management and erosion prevention. It is enough to check the ICZM and MSP platform on web site to have an overview about the wider presence of stakeholders and engaged authorities to have the dimension of fragmentation.[16]

The **national policy gap: the mess about responsibility** is highlighted by the total absence of a national coordination in Coastal Planning implementation[17]. This critical state results in a policy vacuum at national level that leaves local and regional authorities without any guidance.

Information gaps and obstacles: the lack of any interaction between the different actors involved in ICZM/MSP implementation is a real problem that could be solved only by a close dialogue between scientific community and policymakers.

One of the main troubles for its implementation might be the **high administrative decentralization** of the country and the extreme fragmentation between different levels of coastal government.

Today, ICZM process is compelled in a shady zone between Science and Policy, restricted to local and temporary projects without any national coastal planning[18].

[14] The description of Apulia Region Coastal Planning Master Plane is fully described in Chapter 3.1.
[15] https://www.minambiente.it/notizie/avviate-le-procedure-listituzione-dellosservatorio-nazionale-sullerosione-costiera , 2018
[16] http://iczmplatform.org/page/international-organization
[17] https://www.isprambiente.gov.it/files/pubblicazioni/periodicitecnici/reticula/Reticula_n10.pdf
[18] https://www.isprambiente.gov.it/files/eventi/eventi-2016/erosione-costiera/gabellini.pdf

To solve this failure, scientists, policy makers and all the stakeholders should appreciate the key role of coastal management in connecting words still divided by outdated limits, so to manage coastal areas under an integrated approach. By this way, ICZM/MSP could become a dynamic process where scientists and policy makers develop a common strategy to achieve the sustainable development of coastal regions, realizing an effective integration between economic sectors, scientific community, administrative field and institutional levels[19].

At the time, the management plans on the landward side of coastal regions aim to an unreasonable urban development, without any landscape planning, while the management of its sea-word side is extremely specific with no connection between terrestrial and marine environments.[20]

As described in the Deliverable D3.1, coastal area is a wide and diverse zone connecting different land-scopes [21] as are: inland regions influencing sea by rivers; coastal regions including wetlands, marshlands and other areas close to sea; coastal waters including estuarine and shallow seas; neritic waters inside the continental shelf.

As a framework to connect these marine and terrestrial landscapes, ICZM/MSP/EP processes have been suggested as key factors for sustainable development by European Union. These hurdles can be overcome with conceptual frameworks such as ICZM, MSP and ecosystem-based management[22]. Although significant development of these concepts has been made, particularly with policy in the European Union,[23], there is still a need to translate policy objectives into specific 'on ground' targets and measures[24]. Besides, the lack of integration of coastal management approaches may be one of the fundamental reasons why coastal ecosystems remain largely unprotected from multiple pressures. Some important hurdles to the integration of management include crossing spatial jurisdictions (e.g. land, water catchments, wetlands and coastal marine environments); overcoming

[19] http://www.erosionecostiera.isprambiente.it/linee-guida-nazionali
[20] MATTM-Regioni, 2018. Linee Guida per la Difesa della Costa dai fenomeni di Erosione e dagli effetti dei Cambiamenti climatici. Versione 2018 - Documento elaborato dal Tavolo Nazionale sull'Erosione Costiera MATTM-Regioni con il coordinamento tecnico di ISPRA, 305 pp
[21] Bin et al. 2009
[22] McLeod and Leslie, 2009
[23] Borja et al., 2016
[24] Katsanevakis et al., 2011)

institutional segmentation that imposes sectoral management policies and; coordinating across international boundaries[25].. For example, lack of institutional structures to support ICZM[26]and human capacity constraints[27] impede the ability to translate policy into measurable objectives. It is currently unknown how commonly these concepts are applied globally to protect coastal ecosystems and to risks erosion prevention. The following table shows the methodological phases underpinning ICZM processes.

1) Identifity data & Information	• Based on the Initial Assesment and capitalizing previus MSP projects: e.g. supporting EBM, addressing Maritime Unse Conflicts and LSI
2) Data inventory	• Collection of information on data, portals and tools through a Knowledge Catalogue on ICZM and MSP
3) Prelimimary analisis	• Data classification, Data coverage, Data distribution, Highllight the main issues
4) Inventorty adjustment	• Fix and complete the inventory
5) Final analisys	• Identification of data gaps, data sharing and management guidelines and proctical tools perspective in supporting coastl management with impacts
6) Testing	• Testing tools in selected areas

Table 1 ICZM phases adapted for Triton from Conscience project 2010

2.3. Common Actions in the AS-IS Context Analysis: the challenges ahead

TRITON project was written in 2016. In 2019 the Protocol on ICZM and MSP went into force. For this reason, a lot of activities and tasks have been carried out in a strict development of the regulatory framework. By the way, TRITON is going to provide a challenging approach to the coastal erosion

[25] Elliot, 2014
[26] Karabiyik, 2012
[27] Goble et al., 2017,

and risk prevention matching the two protocols toward the development of the Coastal DSS integrating different parts such as the results of the TRITON pilot cases, the adaptive tools suggested both by stakeholders and policy makers as described in whole WP 3-4-5- reports.

Therefore, this part of the AS-IS context analysis, which refers to the challenging aspects of the development of management tools and directives for immediate protection of biodiversity in coastal areas affected by sea erosion and establishment of appropriate environmental control systems, is described as a Conceptual Framework (CF)[28].

The CF contains the analysis of interactions between 5 main approaches to coastal erosion prevention, MSP and coastal management, carried out within TRITON with the main aim to define the updated and tested element belonging to an effective DSS tool. These approaches are: ecosystem approach EcAP to marine and coastal management, Adaptive, Multiscale, Integration, Land –Sea Interaction, suitability and spatial efficiency, knowledge based project, connectivity and cross border cooperation. The collagens are based on common principles, contents, data, and portals analysis, which aims at suggesting the further steps to be taken into account for the DSS integration between Italy and Greece with the purpose to have an effective impact on the EUSAIR and next programme period 2021-2027.

Whereas, several customized step-by-step methodologies have been developed (e.g. by Plan Coast[29], SHAPE[30], ADRIPLAN[31], THAL-CHOR[32] projects), used together with technical tools in pilot cases to test them under the Mediterranean environmental and repssures-related conditions (e.g. "Paving the road to MSP in the Mediterranean") and are available for MSP[33] implementation in the Mediterranean. Other on-going projects (e.g. SUPREME[34] and SIMWESTMED[35]) will provide further

[28] People, Power, and the Coast: a Conceptual Framework for Understanding and Implementing Benefit Sharing Rachel Wynberg and Maria Hauck Ecology and Society Vol. 19, No. 1 (Mar 2014) (16 pages)
[29] http://www.plancoast.eu/
[30] https://www.msp-platform.eu/key-words/shape
[31] http://adriplan.eu/
[32] https://www.msp-platform.eu/faq/marine-cultural-heritage-mch-and-msp
[33]https://ec.europa.eu/maritimeaffairs/policy/maritime_spatial_planning_en
[34] http://www.msp-supreme.eu/
[35] https://www.msp-platform.eu/projects/supporting-maritime-spatial-planning-western-mediterranean-region

methodological input. Moreover, the UNESCO-IOC[36] guidebook on MSP represents an overarching inspiring document and the European wide MSP Platform provides a rich catalogue of MSP practices. The challenge is to capitalize available experiences rather than develop new step-by-step methodologies.

Thus, it is possible to complete the TRITON context analysis at April 2020 with the reference of the results and the experience from the above-mentioned projects.

They can be used as a checklist to verify that needed elements of the ICZM/MPS/CEP process are taken in consideration, referring to above mentioned and other methodologies for specific details.

In first of all, TRITON contains in its model the assumptions of EcAP[37] that should become part of the TRITON DSS, thus overcoming the lack previously described.

EcAp is defined as "the integrated management of land, water and living resources that provides sustainable delivery of ecosystem services in an equitable way". This approach goes beyond examining single issues, species, or ecosystem functions in isolation. Instead, it recognizes ecological systems for what they are: rich mixes of elements that interact with each other continuously. This is particularly important for coasts and seas, where the nature of water keeps systems and functions highly connected. Indeed, links between EcAp, MSP and ICZM principles are wide and articulated as highlighted in the diagram presented in Figure 1.

Even the Directive 2014/89/EU establishing a framework for MSP and the ICZM protocol clearly recall the importance of applying the requirements of the ecosystem based approach, both in the preamble and under the article provisions; i.e. art. 5 "When establishing and implementing maritime spatial planning, Member States shall consider economic, social and environmental aspects to support sustainable development and growth in the maritime sector, applying an ecosystem-based approach, and to promote the coexistence of relevant activities and uses."

[36] http://msp.ioc-unesco.org/
[37] https://www.rac-spa.org/ecap

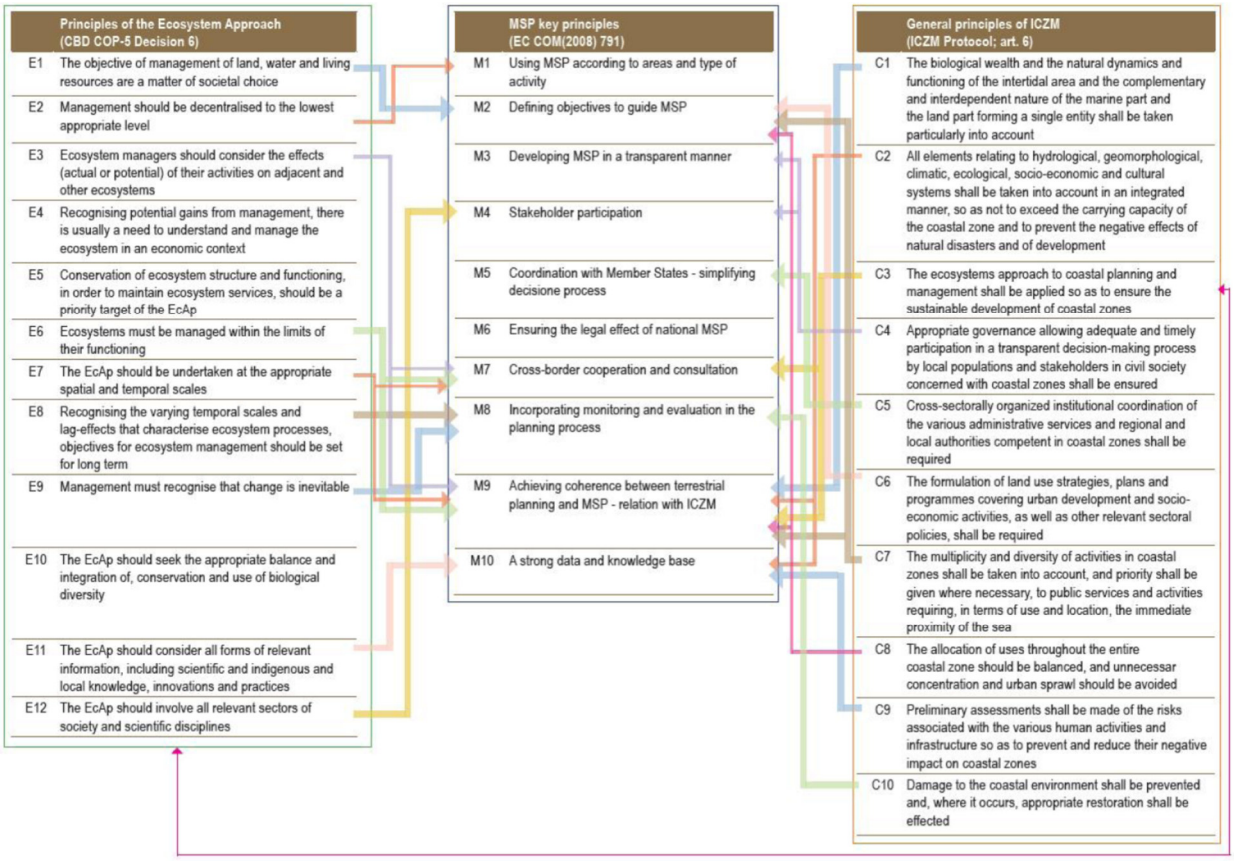

Figure 1 – Link between EcAp, MSP and ICZM principles

Figure 1 Links between EcAp, MSP and ICZM principles

As described in the deliverables belonging to the WP4, within the TRITON project the ecosystem-based approach has been adopted into pilot cases implementation on both the Apulia (Ugento and Bari Fesca San Girolamo) and Missolonghi coastal areas, and has become parts of the methodology adopted for the implementation of the Greek observatory.

Establish clear links among ICZM/MSP/CEP as far as possible, define the planning and management area considering the limits of ecosystem functioning. In fact, whereas EcAp does not stop at sea, it involves land too. Taking EcAp in consideration in the whole process also implies a strong focus on land-sea interactions (LSI) and, in particular, on interactions among terrestrial and marine ecosystems, habitats and species.

The deliberation 1645/2018 by the Apulia the Region foresees the interaction among the different factors and pilot cases toward the identification of the ecosystem services provided by the considered marine area and how they underpin human maritime activities and human well-being in general has been considered with the active citizen participation.[38]

In this setting, the TRITON DSS should take into account also the evaluation of various effects of human activities on the ecosystem, as direct and indirect, cumulative, short and long-term, permanent and temporary, positive and negative effects, also considering environmental impacts arising from the land-sea interaction.[39]

By the pilot cases deployed in TRITON and the risk-based joint tool as developed in the frame of the WP4 (exploiting remote sensing techniques), it is suggested the evaluation of cumulative impacts on the sea that may results from the combination of different (current and future) maritime and land-based activities.

Indeed, the relationship between EcAp and the coastal management in the erosion prevention is a two-way relation, as the second can contribute to the overall objective of achieving the Good Environmental Status - GES[40] as required by the Marine Strategy Framework Directive 2008/56/EC, also through the identification of related spatial measures.

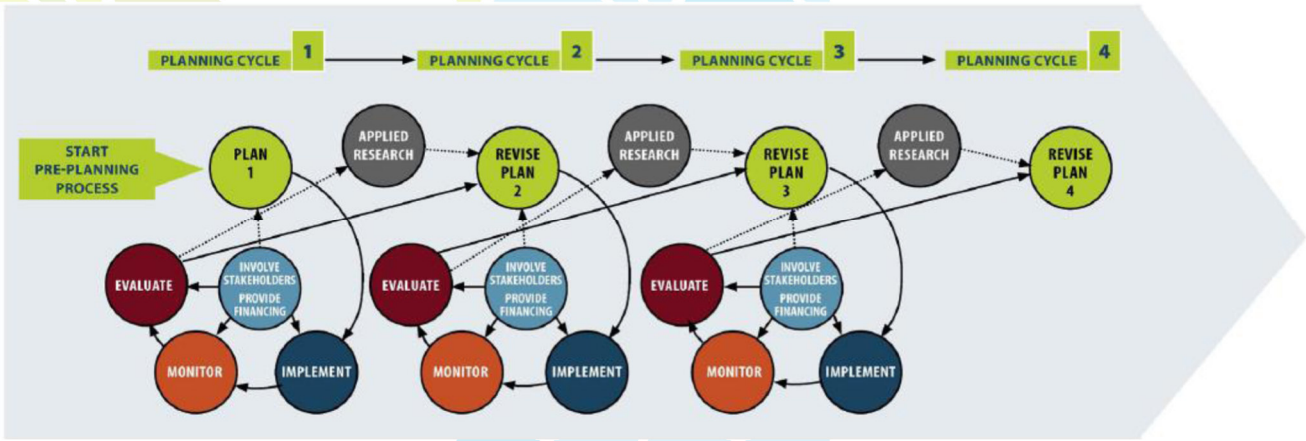

Figure 3 The approaches integration flow - The iterative MSP cycle (source: Ehler and Douvere, 2009)

[38] Please, see also the video under WP2.
[39] https://www.msp-platform.eu/projects/msp-lsi-maritime-spatial-planning-and-land-sea-interactions
[40] https://ec.europa.eu/environment/marine/good-environmental-status/index_en.htm

TRITON, based on the results of the pilot cases, assumes to proper planning of maritime activity through a pattern of actions able to:

1. Reduce marine-based source of pressure affecting the marine environment through spatial efficiency and control of temporal distribution of human activities;
2. Reduce conflicts between maritime uses and protection of areas with high naturalistic and ecological relevance;
3. Identify areas to be protected in order to preserve processes and functions that are essential in achieving the GES;
4. Identify environmental hotspot areas at sea where more intense measures are necessary;
5. Identify coastal hazard-prone areas to potential climate-related impact.
6. Avoid unsustainable uses in protected areas and identify synergies that can provide win-to-win solutions for socio-economic development and environmental protection;
7. Identify connecting elements among relevant habitats through blue corridors even between Apulia and Greece;
8. Ensure an adaptive approach in dealing with complex, dynamic and uncertain issues, including planning of current and future uses of the sea
9. Design the coastal management process including monitoring, evaluation and revision steps since its beginning, through the SIT WEB and a common risk-based assessment tool as suggested under the WP4.
10. Introduce the evaluation and comparison of alternative hypothesis (e.g. *'what-if'* scenarios) about the future evolution of the considered marine area using the models and the AI
11. Develop the DSS with indicators linked to clear objectives and targets, including: governance or process, socio-economic and ecological-environmental indicators.

Within TRITON project a **multiscale approach**[41] has been carried out combining top-down and bottom-up perspectives. Of course, the bottom up approach has been considered as part of the

[41] http://paprac.org/meetings/final-sub-regional-meeting-adriatic-ionian-cooperation-towards-msp. The multi-scale approach includes the following different scales:

whole process highlighted in WP5 of TRITON Project by the way the intervention of Deliberation 1694/2018 on Apulian side and the establishment of Observatory in Greece. The complex of this activities are a lead guide in the measurement of the Barcelona Convention and EU Directive 2014/89/EU for MSP and Naples convention for ICZM toward a Mediterranean integration of activities related such as indicated into the task 1.5 "Follow up " of the project, which has indicated the work in progress, the possible scenario and technical and financial instruments to pursuit it.

The **Integration** is an essential part of the TRITON DSS because the coastal management affects not only blue growth. Indeed, the environmental, social, economic and governance aspects have to be all taken into consideration to pursue sustainability goals because the Integration among sectors is needed to go beyond sector policies, plans and regulations.

Within TRITON, a Vertical and horizontal cooperation among administrations and technical agencies[42] was tuned to proceed towards coordination and integration of sector policies and plans. Moreover, to this aim the integration between land-based and marine planning is essential to harmonize and ensure coherence among parts of the same coastal system, interacting each other in different ways as highlighted by UN and FAO[43].

Moreover, the increasing of stakeholder involvement, public participation and information sharing has been pursued by a pattern under the WP5: training course, survey and paper position addressed to several authorities and stakeholders.

• Mediterranean scale addressing the whole sea basin through cooperation among CPs in the frame of the Barcelona Convention to approach the strategic level of MSP, as for example: (i) definition of elements for a common vision and related objectives, (ii) identification of priority areas and issues to be approached at a transboundary level, (iii) identification of initiatives (e.g. projects) to address transboundary areas and issues;
• Sub-regional scale – where relevant and possible – approaching transboundary MSP issues (elements for a common vision, objectives, priorities and initiatives) in sub-Mediterranean regions, also linking to sub-regional strategies and plans (e.g. EUSAIR and the West Med maritime initiative) for coordinated implementation;
• National scale, fully implementing the MSP process – according to common principles and coherently with the Mediterranean and sub-regional approaches – in marine areas falling within national jurisdiction, with particular reference to the territorial sea according to the geographic scope of the ICZM Protocol.

[42] Please, note that an internal agreement among Apulia Region and ARTI becomes part of the Model for integration of competences by the Deliberation no. 209/2018. http://www.sistema.puglia.it/portal/page/portal/SistemaPuglia/DettaglioInfo?id=51119

[43] http://www.fao.org/3/T0708E/T0708E02.htm

Particularly, the protection of the environment, through early identification and reduction of impacts, as well as the promotion of opportunities for multiple use of the same marine and coastal space has been carried out with pilot in Ugento. Meanwhile, the identification of (spatial) measures that can support the achievement of the Good Environmental Status has been well described within the pilot cases of Bari Fesca San Girolamo and Missolonghi. In Greece, besides, an effective improvement of measures for the protection of cultural heritage and preservation of intangible values of the sea has been outlined by the implementation of the observatory.

The main challenges for TRITON as well as the topic we are discussing is referred to the correct understanding and addressing **land-sea interactions (LSI)**.

The figure below shows how is crucial to ensure sustainable management and development of coastal areas and coherent planning of land and sea-based activities- LSI [44] .

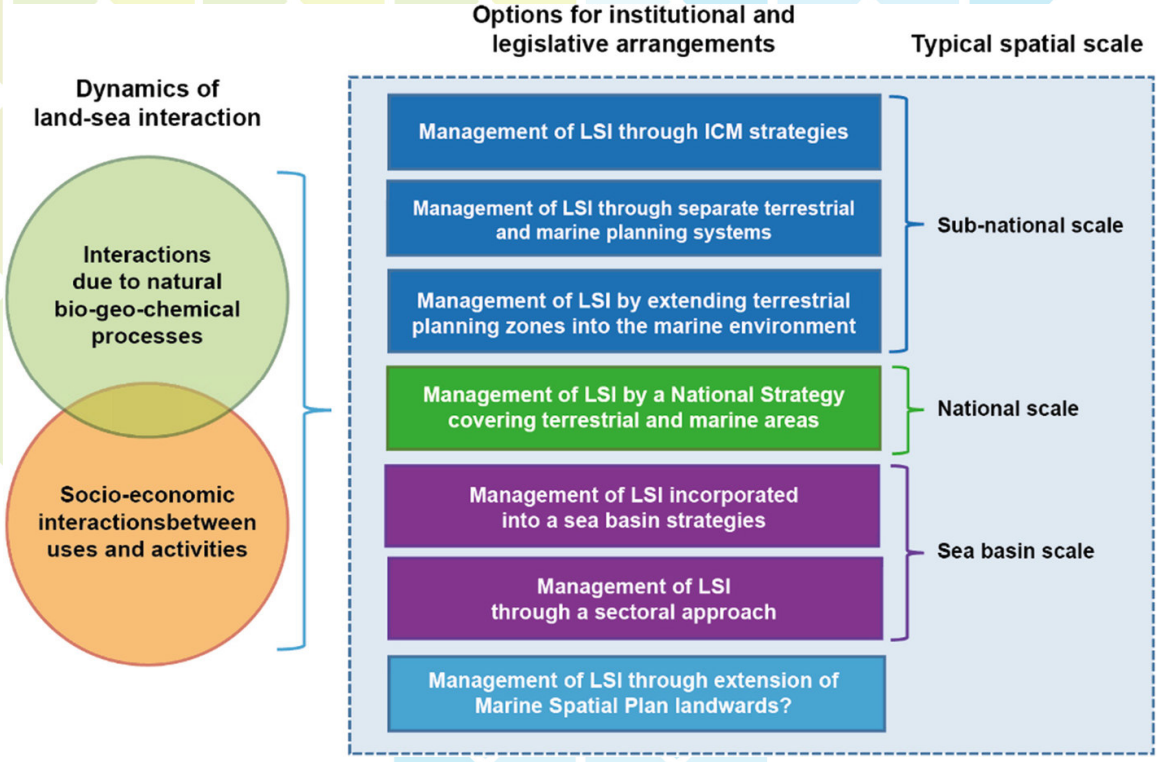

Figure 3 Dynamics of land-sea interaction

[44] Although there is not a single and recognized definition of LSI, land-sea interactions can be defined as "interactions in which land-based natural phenomena or human activities have an influence or an impact on the marine environment, resources and activities and vice versa interactions in which marine natural phenomena or human activities have an influence or an impact on the terrestrial environment, resources and activities". https://ec.europa.eu/environment/iczm/pdf/LSI_FINAL20180417_digital.pdf

The TRITON coastal Decision Supporting System has to consider, as part of the process, the result and state of art for the following items:

a) Interactions related to land-sea natural processes. Implication of such processes on coastal management and planning of alternatives for land and marine activities have to be identified and assessed, considering their dynamic nature. At the same time, human activities can interfere with natural processes, influencing the coastal and marine environment. The analysis of expected impacts of land and marine activities should include the evaluation of their effects on LSI natural processes, and the potential consequent impacts on natural resources and ecosystem services. [45]

b) Interactions among land and sea uses and activities. Almost all maritime uses need support installations on land, while several uses existing mostly on the land part expand their activities to the sea as well.

c) These interactions have to be identified and mapped, assessing their cumulative impacts, benefits and potential conflicts and synergies. Interactions between land and sea activities can extend further beyond the coastal zones[46], for example in terms of long-distance connections related to transport and energy distribution or fish migration up-stream and stemming need for blue corridors. Although the primary focus is on costs, identification and mapping of those wider connections and assessment of their environmental, social and economic implications is also important[47].

d) Interactions of planning processes and plans for land and sea areas. It is important to ensure that legal, administrative, consultation and technical processes are coordinated (and hopefully linked) to avoid unnecessary duplications, incoherence, conflicts, waste of resources and/or excessive demand of stakeholders' efforts. The challenge is to plan and

[45] https://www.msp-platform.eu/practices/land-sea-interactions-framework-iczm-and-msp
[46] Sue Kidd, Stephen Jay, Hannah Jones, Taking Account of Land-Sea Interactions in Marine Spatial Planning, Department of Geography and Planning, 2018
[47] It is important to note that the Art.9 of the Protocol requires that CPs shall accord specific attention to economic activities that require immediate proximity to the sea. This is also one of the general principles of ICZM (Art.6 para g).

manage inshore and offshore activities[48] in harmonized manner considering the functional integrity of the land-sea continuum. This also implies allocation of land space (and related infrastructure and services) to some maritime activities (and/or the allocation of maritime space to some land-based activities.

e) Finally, the achievement of this coherence also requires alignment/integration of the different approaches, methodologies and tools applied respectively on land and at sea[49].

It is useful to outlines the fact the Triton suggests to ingrate the Coastal DSS with the following features:

a) Use best available knowledge to promote the definition of the most appropriate geographic scale and scope for MSP (ICZM/CEP strategies and/or plans, also taking EcAp/IMAP into consideration (i.e. ecosystem limits) and considering LSI an essential element of MSP[50];

b) Focus on the collection of data and information which are really essential for the coastal management[51];

c) Take in consideration any form of "good quality" knowledge. This comes primarily from scientific sources and institutionalized monitoring activities and datasets, but should also capitalize private sources of information, including knowledge generated by people living and working at the sea;

d) Implement the spatial-based tools are particularly useful to this regard[52]. In this sense the WEB GIS /SIT implementation should overcome limitations posed by current available data (limitation linked with spatio-temporal resolution of coastal data) by exploiting potential

[48] Please, watch the video of November 2019 with the items https://www.youtube.com/watch?v=OqJ9ti2Be6k
[49] Research Group of Integrated Coastal Zone Management (GIAL), Av. Republica Saharaui S. N., 11510, Puerto Real, University of Cadiz, Spain. https://doi.org/10.1016/j.enpol.2020.111421
[50] http://www.panbalticscope.eu/activities/integrating-land-sea-interaction-into-msp/land-sea-interaction/
[51] https://op.europa.eu/en/publication-detail/-/publication/f01f1b26-1b60-11e7-aeb3-01aa75ed71a1
[52] A Review of Successful Applications Matthew J. McCarthy, Kaitlyn E. Colna, Mahmoud M. El-Mezayen, Abdiel E. Laureano-Rosario, Pablo Méndez-Lázaro, Daniel B. Otis, Gerardo Toro-Farmer, Maria Vega-Rodriguez & Frank E. Muller-Karger, Enviromental Mangement, 2017. https://doi.org/10.1007/s00267-017-0880-x

of Satellite Remote Sensing for Coastal Management[53], as the risk-based tool applied within the TRITON pilot cases of Ugento, Missolonghi and Patras shorelines (more details in the Deliverable 4.3).

[53] McCarthy, M.J., Colna, K.E., El-Mezayen, M.M. et al. Satellite Remote Sensing for Coastal Management: A Review of Successful Applications. Environmental Management 60, 323–339 (2017)

3. Fill the gaps: key priorities for integrated coastal risk assessment and management

According to the TRITON's results from Summer School and other project work packages (e.g. results from the application of the TRITON joint risk-based tool as presented in D4.4), the following priorities could fill management gaps and speed up the development and implementation of integrated Plans addressing cumulative impacts arising from the complex interplay of multiple pressures acting in concert on the same coastal targets.

1) The coastline habitats require more recognition of their value on a global scale[54]. In democratic societies, the recognition of value puts pressure on government to create policies for protection. Of course, this is not a TRITON direct purpose, but the bottom up methodology and the cross analysis to develop the TRITON DSS are of utmost importance in the definition of the aspects to be taken into account in the Management process at Apulia/Greek level at least.

2) The multitude and complexity of pressures addressed within coastal management requires integrated legislative and planning frameworks. Plans that implement zoning schemes and are integrated with urban or land-use plans provide the most effective method to manage multiple pressures and cumulative impacts[55] occurring at the land-interface. Importantly, such plans can also overcome sectoral and jurisdictional barriers[56].

3) Coastal Management needs to be supported by research that considers the importance of marine coastal ecosystem functional roles and quantifies related ecosystem services[57]. Allowing local communities and stakeholders to have an active voice in planning and budgeting will also contribute to the success of management activities.

4) Public education and outreach documents[58], such as codes of practice, guidelines, vision statements, procedures and programs of work, are important tools to support a wider

[54] Cullen-Unsworth and Unsworth, 2018
55 Please, check the Apulia Region Coastal Planning under Deliberation 1645/2018
56 http://paprac.org/meetings/final-sub-regional-meeting-adriatic-ionian-cooperation-towards-msp
57 Ruiz-Frau et al., 2017
[58] Please, See the Report under WP 5 for TRITON

environmental awareness and should be developed through public engagement in conjunction with planning[59] and regulatory frameworks[60].

5) Monitoring of coastline phenomenon trough GIS and WEB SIT requires a consistent approach across its range to detect inter-annual trends, because this will support both planning and approval processes. Monitoring activities are essential as well to highlight the level of management intervention required[61], providing valuable information to also support the development of specific policy documents driving the management of the multi-uses of the coastal and marine space and the assessment of the resultng cumulative impacts. [62]

6) Management Plans need to consider how local actions to protect coastlines can account for the impacts of climate change[63]. The importance of choosing eco-engineering[64] and nature-based design to reinforce coastal stability needs to be part of climate change policies and adaptation planning.

7) Cumulative impact polices need to be developed to enable consideration of multiple pressures and cumulative impacts through the EIA and similar processes. There are examples of Plans addressing multiple pressures and cumulative impacts. These examples (as those obtained under the SHAPE and Adriplan project) may guide management in regions and in the EUSAIR's perspective that lag in addressing these issues.

8) Lack of data requirements to effectively support the coastal management process at different stages can be summarized as follows:

- Geo-awareness: spatially explicit datasets should be preferable[65]

[59] http://iczmplatform.org//storage/documents/IGkDljMCXJJHTZd8DO3gcJirxR3Nq7eC3okuKmcQ.pdf
[60] For example, in the Gulf of Thailand buoys are used to mark the perimeter of valued seagrass beds in an effort to increase environmental awareness and minimise impact by coastal users (Department of Marine and Coastal Resources, 2016).
[61] http://webapps.sit.puglia.it/freewebapps/PRC/index.html
[62] For example, the United Nations Environment Program Northwest Pacific Action Plan (NOWPOP) Special Monitoring and Coastal Environmental Assessment Regional Activity Centre (CEARAC) is currently developing a tool for mapping seagrass distribution with satellite images using cloud computing technology in the NOWPAP regions (Russia, China, Republic of Korea and Japan) (NOWPAP-CEARAC, 2018).
[63] Please, See the Pilot cases results under WP 4
[64] Ugento pilot case developed by Apulia Region has been indicated by the Finland Environmental Agency as best practice. https://www.ymparisto.fi
[65] In Triton project a SIT WEB system has been developpedctualized to 2018 on Italian Side and to 2019 on Greek side.

- Climate and Data Scenarios;
- Data categories: the datasets should cover multiple topics and support heterogeneous questions and analyses. Four macro categories can be identified:
    a. Administrative and maritime boundaries;
    b. Data and Climate Scenarios;
    c. Description and quantification of the geophysical environment and biological/ecological features;
    d. Description and quantification of human activities and sectors;
    e. Description and quantification of socio-economic and policy-related data.
- Coherence and harmonisation across boundaries.
- Data spatial and temporal harmonization.
- Accessibility: the datasets should be freely accessible through the web[66].
- Usability: the datasets should be directly usable by the end-users making it available as structured data (e.g., shapefile instead of reports and papers, with metadata as required under the INSPIRE rules) and making it available in a non-proprietary open format (e.g., CSV instead of Excel) (Berners-Lee 2010).

[66] Please Check also Chapter 3.4 and 3.5 of TRITON report

4. Conclusions

The purpose of the present Context Analysis evaluation is to ensure quality by means of a regular, standardised review of planning and management processes and outputs under MSP, ICZM and Coastal Erosion Prevention, taking them as starting point for the development of the TRITON Decision Supporting System as far as concern the coastal erosion prevention toward 2030 sustainable development goals.

From the description above, it is clear that there are many different approaches dealing with the monitoring and evaluation of the Context Analysis AS-IS finalized to match MSP and ICZM and Coastal Erosion Prevention to be exploited within a unique DSS in the perspective of an effective coastal management.

What connects the recent insights in these approaches are three essential characteristics:

a) monitoring and evaluation should be performed in the various stages of the management cycle in order to steer and adapt coastal and marine management;
b) monitoring and evaluation should apply indicator and index based approaches, as those described in the Deliverable 3.5;
c) monitoring and evaluation processes should be based on clear (SMART) objectives.

Therefore, the context analysis toward the DSS tool definition should include these challenging elements, applying a double perspective allowing to overcome the gaps and contributes to the common strategy including the follows items:

1) Coastal Management and Erosion prevention are a continuing, adaptive process that should include performance monitoring and evaluation as essential elements of the overall management process;
2) Planners and managers should know how to incorporate monitoring and evaluation considerations into the ICZM/MSP/CEP processes from their very beginning, and not wait until a plan is completed before thinking about how to measure “success”;

3) Effective performance monitoring and evaluation is only possible when management objectives and expected outcomes are written in a way that is clear and measurable, either quantitatively or qualitatively;
4) They have to be considered as part of the logical framework analysis process during the different project design stage, and potentially subsequently when more specific objectives are set for actual planning, following the analysis and clarification of specific issues;
5) Performance monitoring and evaluation moves beyond the traditional input–output focused evaluation, and, when used effectively, helps policymakers and decision makers focus on and analyse outcomes or results. Inputs and outputs tell little about the effectiveness or efficiency of a coastal zone[67]. While traditional evaluation remains an important part of the chain of performance evaluation, it is the outcome that are of most interest and importance to governments and stakeholders;
6) The erosion prevention plans should be evaluated, not only by their outcomes, but for how they improve the understanding of decision makers and stakeholders about present and future problems they face and the opportunities that planning presents to deal with problems in the present to avoid them in the future;
7) No single generic evaluation framework fits all purposes. Different evaluation needs require different evaluation approaches—no one approach fits all needs[68];
8) The identification of indicators and targets are critical for effective performance monitoring and evaluation; the results framework with indicators, targets and baselines should be linked to a monitoring and evaluation plan;
9) The meaning of indicators should be understood by the wider range of stakeholders as possible;

[67] Please, See the table no.2 in the Deliverable 3.2
[68] Please, See the Deliverable 4.3

10) The number of indicators should also be realistic and proportionate in terms of what can be measured with the given resources, but enough to ensure a comprehensive description of the coastal marine system at stake;
11) Performance monitoring and evaluation should be revised over the subsequent stages of the MSP processes, as an iterative adaptive process;
12) All the Coastal Assessment will have to include a process for communicating results and promoting their utilisation as part of a process. Therefore, a few additional criteria, as those presented below, are relevant:
13) Stakeholders are actively involved and committed to the MSP process. This implies the stakeholder involvement in the problem identification, specification of MSP goals and objectives, selection of management actions, and monitoring and evaluation build support for the process;
14) Progress is being made toward the achievement of management goals and objectives. Since MSP is a multi-objective planning process, achieving the outcome of one objective may involve trade-offs with the outcomes of other objectives. In the absence of at least some indication of progress over a reasonable period of time, then there is little justification for continuing the MSP process;
15) Results from performance monitoring and evaluation are used to adjust and improve management actions; and implementation of the Costal Management/Maritime Spatial Planning and Costal Erosion Prevention is consistent with applicable authorities. If not, disruptions in the planning and implementation process are inevitable. A breakdown of trust among stakeholders is likely, and possibly a withdrawal of stakeholder support, loss of funding, and possibly litigation;
16) If stakeholders do not endorse the process and its outputs, the process may not been successful. If performance monitoring and evaluation results are not used to modify revisions to plans, then the process has not been successful.

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