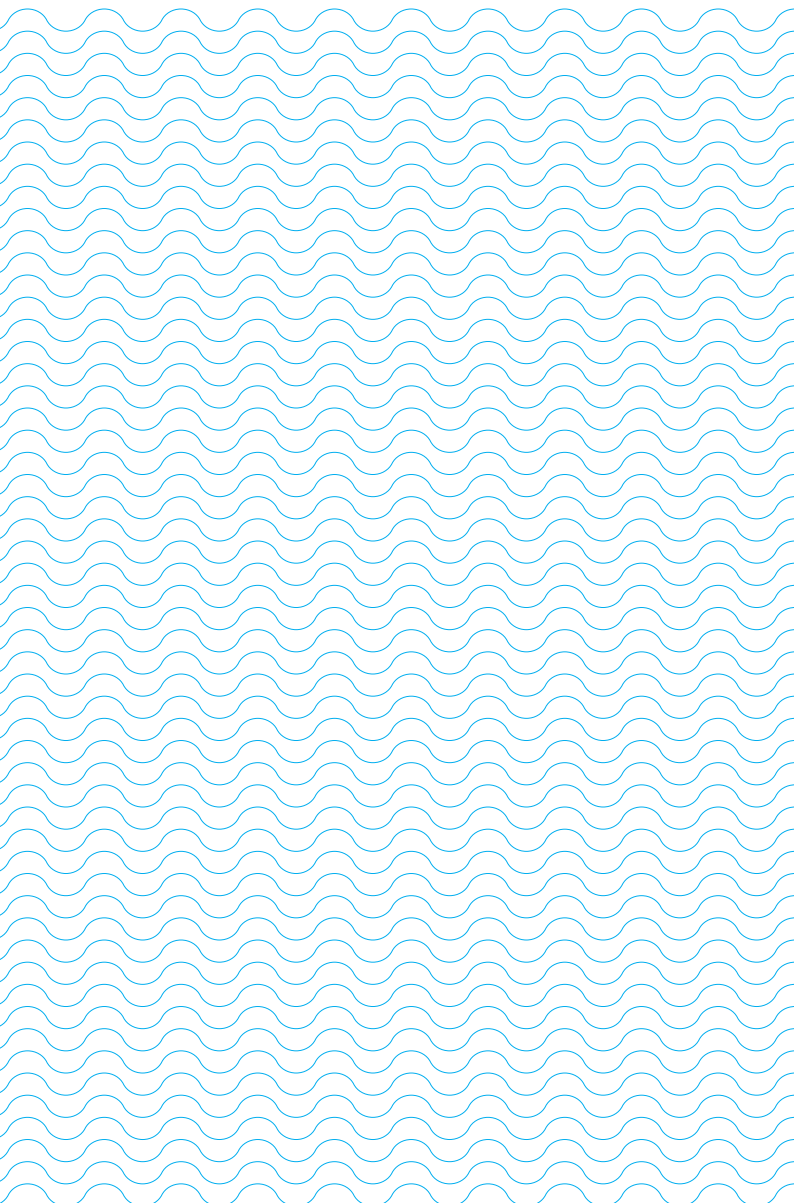


JOINT ACTION PLAN Developing conditions for the Blue Growth in the Mediterranean

on Med coasts Adaptation to Climate Change

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What is the Mediterranean?

A thousand things together. Not a landscape but innumerable landscapes. Not a sea but a succession of seas. Not one civilization, but a series civilizations stacked one upon the other. All this because the Mediterranean is an ancient crossroads. For thousands of years all converged there, complicating and enriching its history.

In the physical landscape as in the human, the crossroads of the Mediterranean, the Mediterranean composite presents itself to our memory as a coherent image, where everything comes together and merges in an original unity.

Fernand Braudel

Abstract

This document represents one of the main outputs of the European project COASTGAP (Best Practice no. 5 – <http://coastgap.fececoast.eu> Programme MED Capitalization Call) and sets out the **Joint Action Plan** of the **Macro-Project** outlined in the **“Bologna Charter 2012”**.

The **“Bologna Charter 2012”**, entitled as “European Regions charter for the promotion of a common framework for strategic actions aimed at the protection and sustainable development of the Mediterranean coastal areas” (<http://bolognacharter.facecoast.eu>), is a policy document subscribed on the 21st of March 2013 by several maritime Regions and Administrations of the Mediterranean, and adopted by the InterMediterranean Commission of the CRPM, General Assembly on the 27th of June 2013 in Barcelona.

The JAP capitalizes the more than decennial common experiences of the coastal Administrations engaged in the BC 2012 and embodies a coherent and coordinated ensemble of initiatives (partially already launched) to be shared, funded and achieved during the programming period 2014-2020 in the field of the Mediterranean coastal zone protection and sustainable development.

The JAP can be defined as the tool of the BC 2012 (studies, researches, projects, communication, dissemination, clustering, etc.), encompassed into the general Macro-Project initiative outlined in the Charter which includes as well infrastructural proposals (coastal works, major projects).

The JAP mainly aims to design a common thematic programme for the Mediterranean coastal zone protection and, based on the pragmatic experience of the maritime Administrations, it works for adopting and fostering European/national maritime-coastal policies in the practical and territorial reality.

1. Introduction

Over the last decades, the Mediterranean basin has increasingly become a complex socio-economic, political and institutional area spanning several geographical spaces and entities as EU Member countries, pre-accession and candidate countries, countries belonging to the southern neighbourhood policy, Euro-Mediterranean and multilateral institutions, as well as different sets of sub-national, economic and civil society actors. This diversity of stakeholders de facto represents a variety of local, regional, national, EU and global cultures, geopolitical situations, strategies and policies that share assets but also cross-cutting challenges at basin level such as sustainable and socio-economic development that concern European, Euromed and global agendas, the **adaptation to and fight against climate change** and **environmental risks prevention**, or the **promotion of Blue Growth**, decentralization and democratic governance, among many others.

In view of these global challenges, it therefore appears crucial to **strengthen multi-level and territorial cooperation between the Mediterranean rims**, in order to reinforce the assets the area naturally benefits from, while reducing and solving the common issues and challenges it has been faced with over time. The forthcoming global agenda post-2015, the European agenda for the 2014-2020 programming period, the election of the new Parliament, the reorganization of the European Commission, and the Italian Presidency of the EU Council, as well as the increased implication of Local and Regional Authorities (LRAs) and stakeholders in EU cooperation (European Territorial and Decentralized cooperation on top) seem to be the opportunity to underline the urgent need to consider, develop, and integrate the Mediterranean as a priority area of action.

The **coastal areas** of the European Union are among the mostly **threatened by climate change** effects. The situation is **especially critical in the coastal areas of the Mediterranean** basin that are more and more inhabited. Population density at the coastline is much higher than in coastal regions as a whole (Eurostat, 2011). Furthermore in the last decade Mediterranean tourism industry has grown significantly, fishing grounds remain overexploited and shipping transport increased approximately up to 50 % between 1997 and 2006.

In this context, the new emerging models of **Macro Regions** (Baltic Sea, Danube, Adriatic-Ionian, and Alpine) and/or Sea Basin strategies, if shared by the key actors and conceived on a variable geometry and gradual perspective, could be encouraged as efficient instruments and frames for the improvement of cooperation at the basin level. Shared visions of a cohesion strategy for the Med, of its governance and implementation, as well as the reinforced participation of the local and regional levels of governance from both EU and Med Partner Countries, would therefore greatly contribute to strengthen the Mediterranean as a binding area acting as one entity towards a more efficient and relevant resolution of its main transversal and global issues.

As a consequence of the increasing activities, marine ecosystems are more and more under pressure. Regarding the emergency, UNEP and EU promote the ecosystemic approach in order to regulate activities and reduce their impacts.

Coastal zone are then subject to multiple natural and human-induced strains, such as the rise of sea level, erosion, subsidence and decline of natural defences. The climate change effects are having more and more impacts not only on **low-land sedimentary coasts** but also on cliff and rocky coast. Inundations and landslides are becoming a constant concern for the coastal populations. The safety of the human settlements as well the natural habitats is becoming a major concern and a prerequisite for developing a blue growth in the Mediterranean basin which has to be promoted not only in sustainable approach but also in ecosystemic protecting one.

1.1 Scenarios and vision

Considering the scenarios¹ and the current crisis, the **Mediterranean undoubtedly represents the European area most in need of innovative strategies** for the South of the Union, which is to play new roles to promote ecosystemic approach and to ensure the sustainable development of the entire area, roused by the new upcoming situations in North Africa and the Middle-East.

Exposure, sensitivity and adaptation capacity are the three main components that determine the **territorial vulnerability**. **Adaptation capacity** is the component on which maritime Public Administrations can have higher influence in facing the challenge of climate change, towards a smart, sustainable and inclusive growth of their territories.

Vision shared by the partnership is that “Blue Growth” in the Mediterranean finds its fundamental conditions in safety, wellness and sustainability-oriented development models of coastal areas and relative maritime space. This including opportunities given by the development of new markets, companies and job creation, in the field of ecosystem-oriented activities related to coastal and marine environment protection, management and adaptation to climate change.

Moreover an important number of EU instruments constitute, or are going to constitute, together an important part of the “framework conditions for the Blue Growth” in Mediterranean countries:

- **EU and intergovernmental regulations or policy initiatives:** Marine Strategy Framework Directive (MSFD), Framework Water Directive (FWD), Flood Directive (FD), Maritime Spatial Planning Directive (MSPD), Habitats and Birds Directives, EU strategy on adaptation to climate change, EU initiatives concerning marine data, the ICZM Protocol for the Mediterranean (Barcelona Convention) and its implementation Action Plan (2012-2019);

- **Set-up specific funding:** EARDF, part of the EMFF devoted to the Integrated Maritime Policy, Horizon 2020, Life+ Program.

Finally, the implementation of the MSFD and MSPD, as well as existing projects funded by several European programs (ENPI-CBC, INTERREG, PROGRAMME MED, etc.) show the need to improve the coordination between EU instruments, international (Barcelona Convention), national and regional policies from a territorial and sea-basin/macro-regional perspective taking in account the global ecosystem and its consistent subdivisions.

The Macro-Project of the Bologna Charter and its Joint Action Plan here below outlined, indeed represents an original and coordinated effort of the Mediterranean coastal Administrations to face concretely the challenges of the coastal natural risk by adaptation policies contributing to develop conditions for the “blue growth” in the Mediterranean.

Its definition takes in account previous experiences (best practices) in order to strengthen and enhance the existing COASTGAP network and FACECOAST Cluster.

As a consequence, the Macro-Project of the Bologna Charter is to:

- **Federate partners** around a project defined as a project for public authorities and policies

¹ Taking into account the JRC - IPTS study (PESETA project 2009) we know that, considering the hypothesis IPCC B2, along the Mediterranean coastal zones, it is expected a range of damages between € 3-7 Billion before 2020, which becomes of € 6-38 billion before 2040. Before 2020 and with the same increasing rate, environmental damages must be added in terms of coastal zones submerged (110 ha), eroded (350 ha) or jeopardized wet land (400.000 ha).

Preliminary results of the PESETA II study (Projection of Economic impacts of climate change in Sectors of the European Union - 2013) indicate that, about adaptation implications in coastal impacts, the overall welfare loss in the EU would be reduced from € 42 Billion (under no adaptation) to € 2 Billion (with adaptation) and from € 4.5 Billion to € 0.13 Billion in Southern EU / Mediterranean (being estimated for the EU as a whole the net welfare loss of the reference runs to be around 0.7% of GDP).

By developing strategies and governance in a multi level approach based on **Marine Ecosystem levels**. The levels should be defined as local, regional, national, multilateral or Med (Barcelona Convention and UNEP MED Plan) with interactions between each other and their dedicated network for each level

_ Define a global approach in accordance with national policies by supporting actions as responses to EU Directives or Barcelona Convention protocols:

Marine Strategy Framework Directive (Framework Directive 2008/56/EC)

Flooding Directive (Directive 2007/60/EC),

Water Framework Directive (Framework Directive 2000/60/EC)

Maritime Spatial Planning (Directive 2014/89/EU)

Integrated Coastal Zone Management (ICZM) protocol for the Mediterranean.

1.2 Participation

With the scope to ensuring adequate and a wider view as possible in the process of definition of the JAP content and aims, a **Coordination Board** within the work group on Integrated Maritime Policy of the InterMediterranean Commission of the CRPM it has been constituted.

The “Bologna Charter Coordination Board” involves the COASTGAP partners, the maritime Administrations signatories of the Charter, other Regions being part of the InterMediterranean Commission, the representatives of the Italian flagship research project RITMARE on marine and maritime research. During the meetings of the Board in 2014, from the start in Bologna (February) and through the ones in Montpellier (June) and in Rome (November), and thanks to the partnership strict collaboration during the whole period, it has been possible to focus on common problems, challenges to be faced and priority actions to be implemented in the next seven years period and beyond.

The result of this process is condensed in this document that represent the way how maritime Administrations intend to face the coming challenges in the period till 2020 and over, through **Joint Actions** (Annex 2) to be commonly developed into projects to be submitted in specific Programs or possibly receiving direct support from EU, through **Major Coastal Projects** (Annex 3) designed following **common principles** of sustainability, ecosystem approach, local participatory process in decision-making and with ICZM-MSP integration, to be implemented by the coastal Administrations to answer to climate change adaptation needs, through **regional monitoring infrastructures and management projects** on coastal and marine areas (Annex 4).

Participation of local communities in decision-making process is considered as crucial element for the Major Coastal Projects included in this operation as well as the participation of stakeholders in the implementation of the Joint Actions.

Then aim is to ensure efficacy of the operation by sharing vision, guarantee collaboration in implementation and future management and by getting precious inputs from diffuse knowledge and experience ripened by local communities on their territories.

This way the JAP aims to contribute in enhancing coastal and maritime governance processes along with ICZM principles, with particular references to Art. 7 and Art. 14 of the **ICZM Protocol** for the Mediterranean, and with **MSP principles** with particular references to of Art. 6 and Art. 9 of the Directive 2014/89/EU.

2. Ecosystemic approach: a consistent approach for Macro - Project definition

Further the fact that adopting ecosystemic approach is a way to be in accordance with EU Directives or Barcelona Convention, the Macro-Project gets geographical consistency with ecosystemic approach (EcAp). EcAp promotes cooperation, as marine Ecosystems' borders are not administrative borders.

It also allows a multi-scale approach in which local, regional and multiregional projects make sense because the ecosystem and the effects of human being activities link them. The way to achieve it implies the establishment of a **network of observatories** not only to improve knowledge but also to monitor the ecosystem status with appropriate indicators.

The definition of the spatial scope of the Macro-Project is to be done in accordance with the regions and sub-regions which have been defined by MSFD. It could also cover unions of a subdivision of these regions or sub-regions as long as they are consistent with ecosystems: the Western Mediterranean Sea, the Adriatic Sea, the Ionian Sea and the Central Mediterranean Sea, the Aegean-Levantine Sea. As it is in accordance with ICZM, the Macro-Project takes in account for its "land" part the shoreline of the abovementioned sub-regions.

The following tab presents in which way Bologna Charter is in accordance with EcAp and what can be improved in the scope of the Macro-Project regarding the existing projects and initiatives.

| | Ecosystem approach Principles | First elements of compliance with ECAP in existing projects and initiatives | Further improvements within the Macro-Project scope |
|---------------------|---|---|--|
| Principle 1: | he objectives of management of land, water and living resources are a matter of societal choice. | "Coastal zones are strategic fields for the harmonic and sustainable development of territories and people of the entire Mediterranean area " Bologna Charter sprang up from MED regional/local coastal administration fully and directly concerned in societal matter. | If regional and local coastal administration are fully and directly concerned, national level is also concerned in accordance with its administrative competencies. The MP's scope has also to be in accordance the share of competencies for sea. |
| Principle 2: | Management should be decentralized to the lowest appropriate level. | Bologna Charter typical bottom up initiative promoting decentralization. | Decentralization means consistency in project conduct in accordance with national guidelines. That means also a top - down guidance. |
| Principle 3: | Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems. | ICZM approach is one of the central point of the BC and its MP | It must also take in account human being in the ecosystem in order to appreciate the effects. That means that stakeholders have to be involved. In order to implement ICZM or MSP, dedicated governance has to be established. It should be done in accordance with MSFD scheme. |
| Principle 4: | Recognizing potential gains from management, there is usually a need to understand and manage the ecosystem in an economic context. Any such ecosystem-management programme should: | | An economical definition of the services, which can be provided by ecosystems, could make sense to politics to appreciate the level of benefits from environment balancing the cost of the human activities impacts. |
| | Reduce those market distortions that adversely affect biological diversity | e.g. avoiding, for instance, coastal defences affecting natural sediment transport and balance and designing new strategies for CC coastal adaptation | That means that the environmental status has to be established in order to appreciate the effects on biological diversity |
| | Align incentives to promote biodiversity conservation and sustainable use | | Disseminating actions in benefit for biodiversity with measurements of the effects |
| | Internalize costs and benefits in the given ecosystem to the extent feasible | | Definition and economical valorisation of ecosystem services which can be provided by biodiversity |

| | | | |
|----------------------|---|---|--|
| Principle 5: | Conservation of ecosystem structure and functioning, in order to maintain ecosystem services, should be a priority target of the ecosystem approach | e.g. the analysis and management of the coastal sediment balance in order to maintain the natural equilibrium | A global approach has to be promoted then with a cross cutting analysis with coastal sediment issues. |
| Principle 6: | Ecosystems must be managed within the limits of their functioning | careful management of the coastal zones and the concerned sediment balance in terms of quantity and quality | Modelization of the global impacts on the environment. It is important to balance the actions with the global consequences. |
| Principle 7: | The ecosystem approach should be undertaken at the appropriate spatial and temporal scales. | need of a MED scale and a long term initiative like the Macro-Project | It is a multi-scale approach, which has to be implemented because the impact on ecosystem is dependant of the scale. For MSFD, at least 4 sub-regions has been defined: - the Western Mediterranean Sea; - the Adriatic Sea; - the Ionian Sea and the Central Mediterranean Sea; - the Aegean-Levantine Sea. |
| Principle 8: | Recognizing the varying temporal scales and lag-effects that characterize ecosystem processes, objectives for ecosystem management should be set for the long term. | | It is a multi-scale approach, which has to be implemented. The level of response on the ecosystem is dependant of the scale because of interactions. That means that ecosystem's monitoring must be adapted to track both local and global effects as those of the short and long term. |
| Principle 9: | Management must recognize that change is inevitable | | Monitoring ecosystem status means that change is inevitable. As a consequence, administrations and society have to adapt. |
| Principle 10: | The ecosystem approach should seek the appropriate balance between, and integration of, conservation and use of biological diversity | The strategic use of the MED marine sand deposits to face the CC effects by an adaptation policy based on beach nourishment | It can be also a strategic retreat regarding not only the efforts which have to be done to adapt but also the impacts on ecosystems |
| Principle 11: | The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices | BC network activities, PEGASO platform can help as infrastructures to collect and deliver information | It is based on an environmental status. It means the overall state of the environment in marine waters, taking into account the structure, function and processes of the constituent marine ecosystems together with natural physiographic, geographic, biological, geological and climatic factors, as well as physical, acoustic and chemical conditions, including those resulting from human activities inside or outside the area concerned. Any way to provide and consolidate information in order to monitor the environmental status and evaluate the way to reach the good environmental status. |
| Principle 12: | The ecosystem approach should involve all relevant sectors of society and scientific disciplines. | PEGASO platform, European projects, FACECOAST cluster, etc. | It can be achieved by implementation of ICZM and MSP with stakeholders' association including politics |

Climate change adaptation implies not only effects on environment but also on society. The EcAp provides a way to get geographical consistency. In the Macro-Project, and relative project lines, it is also important to take in account the impact of and on human being activities. Project lines will be focused not only on environmental issues but also on social ones, in an integrated way.

3. European strategic projects: Coastal Administrations as promoters of macro-regional initiatives and Macro-Project

The objective difficulties to effectively intervene in integrated “framework” macro-areas like the Mediterranean basin, are evident in the effort to redesign the European projects planning for the next period 2014-2020. The hypothesis to include projects in macro-regional contexts is a clear attempt to find new and more favourable settings for long-lasting and efficient outcomes.

The widespread adoption of the term “strategic” in several European programs (ENPI-CBC, INTERREG, MED, etc.) stands for an action aimed to increase the effectiveness of the EU funded projects. Nevertheless, we still lack the elements required to achieve real progress; and the elements suggested basically reproduce those adopted by traditional projects, often only emphasising them in terms of budget and allowed number of partners.

Moreover the strategies currently adopted for many of the next programmes/initiatives (e.g. Horizon 2020, Copernicus, EMODNET, MED) are oriented for a stronger connection between the outputs and their real capacity to be put in practice (mainstreaming) and be clearly useful for the growth. In fact many important European initiatives suffered from a lack of practical impact on the investigated territories.

Thus, if the Mediterranean Administrations intend to play a key role in the Mediterranean policy, they are first of all required to promote projects whose strategic nature stems directly from real needs and their self capacity in sharing visions, solutions and methods to overcome territorial challenges in consistent geographical approaches.

The Mediterranean Administrations, on the grounds of their experience in cooperation, capacity to link with scientific Community, and territorial competence, can promote strategic initiatives (as a Macro-Project) mainly featured as follows:

– **Coherent ensemble of studies, researches, projects and works** aimed to face strategic operations by an integrated approach and to be developed at macro-regional level and in accordance with strategies of upper level.

– **Clear coherence with the most relevant European policies on coastal zones** (like Adaptation to CC, Integrated Maritime Policy, Maritime Spatial Planning, ICZM, Marine Strategy and Water Framework Directives, etc.) in order to be consistent with the current European operational programmes and be eligible to be funded by them (a strategic Macro-Project is indeed designed to be funded by more European/International programs, according to a suitable articulation, also in order to get a budget and time extension adequate to its objectives).

– **Clear coherence also with Barcelona convention and its protocols** (ICZM and its Article 8) in order also to link actions in accordance with Ecosystemic Approach (EcAp) and to be consistent with UNEP organisations’ actions (PAP/RAC, Plan Bleu, ...) and by this way enhancing relations with EU Non Members States.

– **Deep connection with the South and East bank of the Mediterranean** and consistency with the six priority project lines outlined by the Union for the Mediterranean and in particular with Civil Protection project for the effects of climate change (to be enhanced also through working groups linked to ARLEM-UfM)

– **Innovative content thanks to a strongly territorial and participate path**, explicitly endorsed by public and private operating bodies (protocols between States, Regions, Departments, Municipalities, local Communities, Entrepreneurs, Associations, etc.) and their active involvement according to the principles of policy-innovation, open-communication, etc. (Living Lab)

Possibility of mutual integration with other Macro-Projects in order to encourage and facilitate macro-regional policies with multi-sector approach (networking between States and/or Regions) able to enhance the strategic contents in terms of thematic integration and geo-political diffusion with the necessary flexibility.

Designed to be stable through the potential Implementation of specific clustering structures (like PEGASO platform, FACECOAST etc.) or the creation of one (like EGTC -European Grouping for Territorial Cooperation) able to manage long-term initiatives (coastal network observatories, specific programs, etc.)

3.1 Looking to macro-regional and sea basin strategies in the Mediterranean

Looking forward to the upcoming **EU macro-regional strategies**, the initiative responds to the need to foster and to activate advanced cooperation tools (as the Macro-Projects) to make the actions taken by the coastal Administrations more efficient in dealing with the adaptation to climate change through a coastal and maritime space integrated management and protection of the marine environment, in order to contribute in developing the conditions for the Blue Growth in the Med basin.

Regarding the discussion on the **macro-regional strategy for the Mediterranean**, it is considered positively the political message adopted by the InterMediterranean Commission on Macro-Regions in the Mediterranean as follows:

the **variable geometry** characteristic for the proposed strategy: a global Integrated Mediterranean Strategy in the long-term perspective that should include three short/medium term oriented strategies: the Adriatic-Ionian Strategy (on-going), the Western Mediterranean, the Eastern Mediterranean;

the **balanced multilevel approach** top-down and bottom-up and the need to set up public/private synergies;

the **gradual “step by step” voluntary approach** to be applied to the MRS strategy concerning cooperation with the southern countries and territories;

the **synergies** to be set up **with Territorial Cooperation programmes** in the area, the mainstreaming and the importance of capitalisation of previous projects/initiatives;

the need for **thematic concentration** and some of the possible major priorities for the macro-regions: decontamination, transport, energy efficiency, the adaptation to and fight against the climate change, amongst others that could be defined in the future.

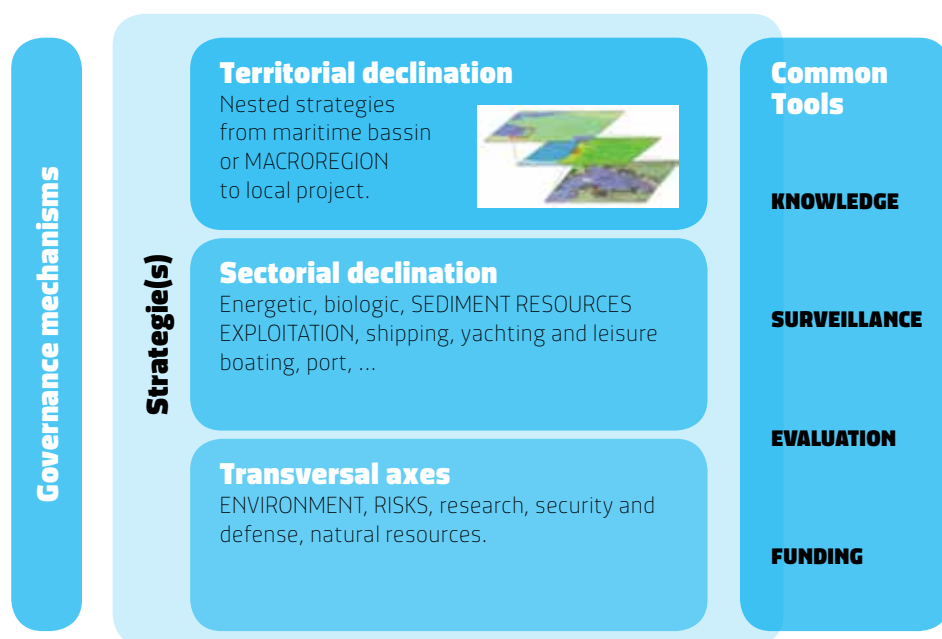
In this frame, the JAP of the Bologna Charter aims to contribute in defining, for its part, the common challenges to be addressed and the actions to be implemented, especially in mitigating risks related to climate change effects and urban pressure along the Mediterranean coasts, and in indicating the way how to deal with, through the promotion and strengthening of the cooperation between Med coastal Administrations.

In the short term and as a second step towards emerging Macro-Regional Strategies in the Mediterranean (following the ongoing implementation of the EUSAIR strategy) a **Sea Basin Strategy for the Western Mediterranean** should also be considered as wind of opportunity for strengthening the cooperation starting from maritime affairs. In this sense, the JAP could contribute consistently to its definition and future implementation.

3.2 A way to promote integration in the macro regional strategies

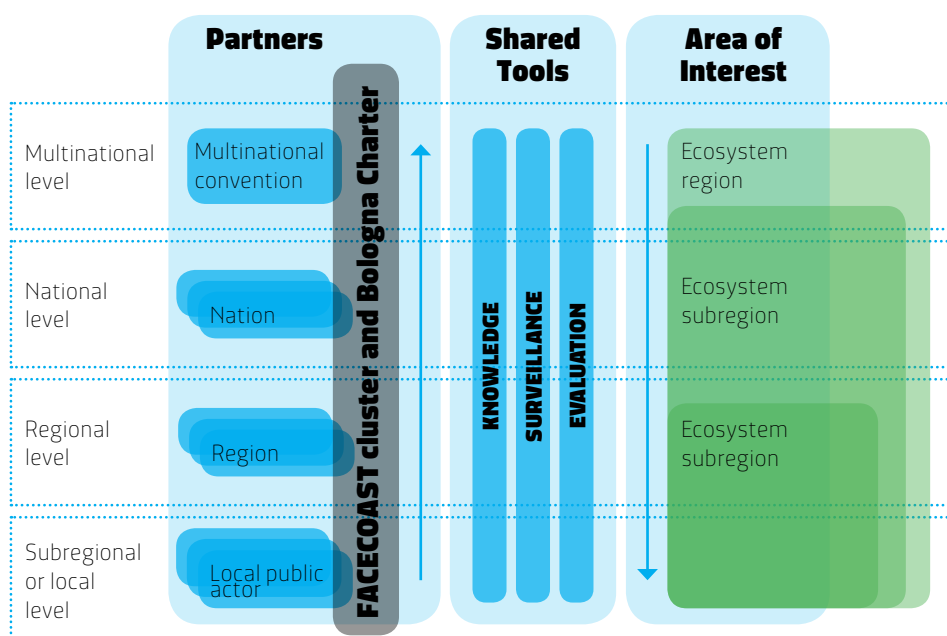
Integration in policy definition means an integration of scales, an integration of sectors either of transverse axes in order to take in account their interactions and to get consistency in their own definition or declination. Common tools covering knowledge, surveillance, evaluation and funding support this policy and its declinations as it is presented on the following schema.

The items, which are taken in COASTGAP projects either in the Macro-Project, are highlighted in capital letters on picture 3.2.1. The schema highlights the interaction between the environmental and risks protection purposes, the mineral resources exploitation within a territorial approach (macro-region) and its nested declinations.



The following picture shows the global scope of the Macro-Project with its potential partners, the shared tools and its area of interest. The picture highlights the nested relationship between levels. The extension of the Bologna Charter is directed to enlarge the cooperation space and the partners involved providing them with a global scope.

Picture 3.2.1 : global view of Integrated Maritime Policy



Picture 3.2.2: Macro-Project scope

4. Joint Action Plan framework and approach

4.1 Joint Actions support regional cooperation and clustering initiatives

The Administrations involved in the Joint Action Plan represent the **diverse geographical conditions, coastal assets and resources** in the European Mediterranean. The objective of the Bologna Charter to extend the cooperation space also towards the North Africa and Mid East Mediterranean, translated in the invitation to those Administrations in participating in the work of the Bologna Charter Coordination Board (being or not being already signatories of the Charter), pushes subjects already involved in considering also those specific conditions and coastal assets. This enhancement of partnerships is done in accordance and consistency with other existing cooperation framework (Barcelona Convention for instance).

Even though there are significant differences between the States or Regions, that come from different competences and coastal territory features (tourism development, urbanisation of the coastal belt, contribution to the regional economies, development of maritime industry and transports, coastal vulnerability, etc.), all of them are sharing the same ecosystem on which activities and climate change have impacts on.

Moreover, for low-land sedimentary coasts, **sediment stocks represent a strategic resource** and its availability is crucial for all Administrations dealing with coastal erosion, coastal environment and ecosystems preservation, adaptation to climate change and protection of their littorals, together with other type actions in the long term, different from coastal nourishment, and dealing with territorial policy re-arrangement. For cliff and rocky coasts the availability of sediments is less significant (except for cases of pocket beaches) and the coastal Administrations necessarily focus on type of actions mainly dealing with **territorial policy re-arrangement for facing climate change impacts**.

The challenge of coastal adaptation to climate change, for both coastal configurations, it is obviously played in the long term, through an overall reorganization of policies for the management of the territory, from the waterfront to a river basin scale approach. In this perspective, the practice of coastal nourishment, **for low-land sedimentary coasts** (management of coastal sediments and new sediment inflow in the coastal system from off-shore reservoirs) allows the coastal Administrations giving answers in the short and medium term (in a more suitable and environmental friendly way, compared to traditional interventions) to those territorial safety needs that our shores and our citizens manifest, and **giving the time to the territorial policies re-arrangement to exert their effects in the long term**.

Anyway, even given the different situations and policies to be applied, the following common needs are individuated by coastal managers in the Administrations:

- _ Reliable and updated surveys and data;
- _ Researches applied to management issues;
- _ Innovation in dealing with coastal issues such as safety of population and settlement, loss of territory by erosion, marine ingression and inundations.

Taking into account the scale of the phenomena and the ecosystem approach, the availability of resources and the need of an integrated approach (both for efficacy and economy of actions) the maritime Administrations are called to **join efforts, widen their vision/approach** to a basin or marine region or its subdivision scale, **create synergies**, in order to better face the challenges brought by climate change and good marine status reach. And this is even more pressing in this period in which, at the European level, they are outlining and launching the **macro-regional**

strategies in the Mediterranean (Adriatic-Ionian, West and East Mediterranean) that will contribute to the definition of the development strategies of the macro-region² and to the destination of resources, actions and projects in accordance with EU Directives.

Elaboration of themes and topics should start in parallel with the design of the consistent **National, Regional Agendas** for Policies, Research and Actions in the specific fields. Thus, while the Regional Agendas define the priorities for research- or policy-driven clusters in the partner Administrations, the COASTGAP Joint Action Plan comprises the activities where the Administrations work together – either one to one or all regions together – to develop and to achieve the goals of the Macro-Project outlined in the Bologna Charter within the new programming period of Structural Funds, till 2020 and over.

4.2 Widening the approach and unlocking Research & Innovation and market potentials in the Mediterranean

The JAP and the Macro-Project, to which the JAP is referring to, aim to contribute in **creating the basis for a wider approach**, among maritime Administrations, to face and manage together the coastal and maritime issues in the Mediterranean, considering their interactions and their interdependencies, with an integrated vision and, thus, with the formulation of adequate integrated policies in coastal and maritime management and planning.

The **JAP outlines a program with Joint Actions** (action lines) to be translated into projects inscribed in the overall strategy introduced by the Bologna Charter (Marco-Project) and to be implemented (start ending 2014 for the period till 2023) by submitting them in EU and international funding programs calls or by direct financing procedures, depending on the nature of the specific initiatives.

Among the scientific and economic expected impacts of the JAP in the Mediterranean area, can be mentioned the following ones:

1. **unlock potentials in Research & Innovation**, towards environmental friendly and ecosystem-based solutions in the field of coastal adaptation and climate change effects mitigation, protection and integrated management in coordination with Maritime Spatial Planning;
2. **unlock potentials of coastal nourishment market** through the fostering of interregional coordinated programs at a larger scale than the one of a single Administration, in order to optimise interventions, to reduce operational costs thus optimising the use of financial resources, laying the opportunities for new jobs creation.

The JAP shall play a major role in the knowledge/technology-based maritime and Mediterranean coastal economies. The demand arising of these innovative interventions by maritime public Administrations, today diffuse also in the Mediterranean but born in the North sea and developed in other areas of the world, determined an arise of knowledge and innovation needs in technologies, specific for the Mediterranean basin and adequate for its characteristics in terms of operational techniques and capabilities.

The **research and development of adequate/new technologies and techniques** in survey, monitoring and modelling of littorals and sea bottoms (erosion phenomena, sediments stocks individuation and characterisation, coastal and marine dynamics, environmental and ecosystems conditions, etc.) and in designing and realising

² including States and Regions

devices and interventions suitable for the diverse ecological and morphologic conditions in the different sea basins, according to the ecosystem approach, could give a strong **impulse to the economy and job creation** in the Mediterranean community.

This without taking into account the benefits, in the economic development, in the enhancement of the environment, in wellness for the local communities and attractiveness of the territories, that should derive by ensuring an adequate level of safety of the coastal zones through a careful and continual intervention and management policy.

An important factor for achieving this goal is the involvement of the **Scientific community and the entrepreneurs** in the R&D activities, through a research-driven cluster. This requires new innovative thinking across sectors and across disciplines. Furthermore, a strong commitment in the regions is needed for implementation of the Joint Actions. The project activities are based on close consultation with the key national and regional stakeholders and connecting the joint activities to the national and regional priorities defined in the National, Regional Agendas. This way the JAP and the whole Macro-Project can strengthen the role of Mediterranean regions in contributing to the “Blue Growth”, to innovation and to the overall competitiveness and vitality of the Med area and its maritime sub-regions.

Through the implementation of the Joint Action Plan and the whole Macro-Project the partners network can represent a reference group to be taken in consideration in the macro-regional strategies definition as well as for other European platforms and policy deliberations.

5. The COASTGAP Joint Action Plan

5.1 The COASTGAP Joint Action Plan and the Bologna Charter Macro-Project

Throughout former initiatives carried out during previous MED European projects (**MedGovernance, Coastance, Maremed**), the Macro-Project has gradually taken its shape until its formal inclusion into the “Bologna Charter 2012”.

The MED Capitalisation Call, launched in 2012, offered the opportunity to setup the project COASTGAP, aimed to gather and mainstreaming many best practices and in particular two strategic ones: the “Bologna Charter 2012” itself and the proposal of the Macro-Project.

The Joint Action Plan is benefiting and will benefit in its developing phase of the scientific contribution and support from the Italian Flagship Project on marine and maritime research RITMARE, through a specific Memorandum of Understanding signed in October 2013. Moreover it is benefiting and will benefit of the experiences, results and tools coming by other relevant projects in the Med area as PEGASO, MEDINA, RESMAR, SHAPE, MAREMED, MEDSANDCOAST and the other adhering to the FACECOAST Med Cluster (www.facecoast.eu), through a specific MoU for collaboration.

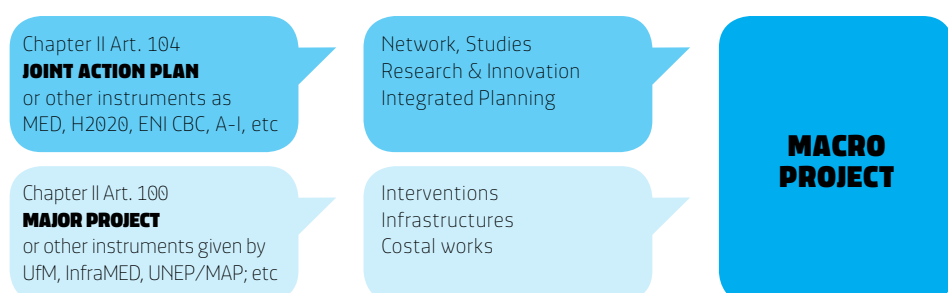
Currently doesn't exist an European initiative shaped at a macro regional level, as the Macro-Project outlined in the Bologna Charter, and the best way found to achieve this objective for 2014-2020, was based on these points:

1st phase: Macro-Project capitalization into the COASTGAP European project by preparing a Joint Action Plan, i.e. the specification of the main envisaged actions/projects of the Macro-Project and methods to deploy them, sharing it among a wide Mediterranean partnership. Such an instrument is defined as well into the Regulation 1303/2013 (Art. 104 “Joint Action Plan”) and it “comprises a project or a group of projects, not consisting of the provision of infrastructure, carried out under the responsibility of the beneficiary, as part of an operational programme or programmes”.

2nd phase: JAP finalisation and development of its actions/projects, while preparing the infrastructural part of the Macro-Project by a number of Major Projects, or integrated initiatives like that, each of which including “a series of works, activities or services intended in itself to accomplish an indivisible task of a precise economic or technical nature which has clearly identified goals”. Also this kind of instrument is described into the Regulation 1303/2013 (art.100 “Major Project”) and represents the infrastructural part of the overall initiative.

3rd phase: JAP conclusion and Major Projects approval and implementation

The whole **Macro-Project** can be then developed by joining the two parts prepared in the above mentioned phases according with the typology of the two instruments foreseen by the EU Regulation EU 1303/2013 (“...common provisions on the ERDF, ESF, Cohesion Fund, EAFRD and EMF...”) or (when not feasible or suitable) with other appropriate instruments and initiatives.



Picture 5.1: Macro-Project scheme

In relation to these instruments (like Major Projects and Joint Action Plan), the Macro-Project is endowed with important peculiarities because:

It means to **gather and develop experiences** coming from different European/international programmes as well;

It funds its action on the cooperation of many actors of a specific area, **addressing prototypal macro-regional policies**;

It needs different and **more advanced agreements** between the European Commission, Member States and other Mediterranean coastal Administrations, the latter being the main promoter and beneficiary of the initiative

It turns also to **other potential financial resources** beyond the Structural Funds;

The Joint Action Plan of the Macro-Project is then going to be designed in 2014, thanks mainly to the COASTSGAP Med project, on the grounds of the Bologna Charter network, to other running projects (e.g. MEDSANDCOAST ENPI-CBC programme), to FACECOAST cluster and also through a specific Coordination Board activated within the Working Group on Integrated Maritime Policy of the IMC-CPMR.

5.2 Main Actions, main Project-Lines and Strategic Themes

The main actions were already encompassed into the MACRO-PROJECT outlined in the Bologna Charter 2012", hereby reported as they are in the official document:

1. to build a **network of the existing coastal Observatories - EURIOMCODE** proposal initiative (European Interregional Observatory for Mediterranean Coastal Defence)....;
2. to survey **erosion status and flood hazard along the Mediterranean coasts - EUROSION-MED** proposal initiative..... compliant with the Flood Directive (2007/60);
3. to promote the **sustainable use of the strategic resources like the coastal territory** to face the "littoralization" process.....;
4. to individuate, characterise and promote the **sustainable use of the strategic resources like the coastal and submarine stocks of sediments** to face the coastal erosion and Climate Change....;
5. to foster **integrated territorial planning**, where necessary, along with the principles of Integrated Coastal Zone Management and Maritime Spatial Planning.....;
6. to design and execute **structural works along Mediterranean coasts** consistently with the above-mentioned integrated planning processes...;
7. to **foster project-clustering initiatives** like "FACECOAST – Face the challenge of climate change in the Mediterranean coastal zones".....

These main actions are expected to be put into effect by the following specific main project-lines:

1. Survey and monitoring before, during and after the foreseen actions through the institution of a network of Mediterranean Observatories (EUROpean Interregional Observatories for the Mediterranean COastal DEfence – **EURIOMCODE**). This network could be enlarged to monitor also marine environmental status and its descriptors³ (first of all n°7, alteration of hydrographical conditions).

2. Characterization of Mediterranean coasts under the profile of their morphological stability and resilience (exposition to erosion, flood hazard, subsidence, etc.) at a territorial scale to allow an aware and integrated planning of the coastal zones (**EUROSION-MED**).

3. Design and develop a Mediterranean Interoperable Spatial Data Infrastructure (**MISDI**) and its components for coastal data and indicators based on the experience of the capitalisation process of the PEGASO FP7 Project within the COASTGAP project, and subscribing the principles of the “ICZM Protocol” and the “Bologna Charter” for the Mediterranean.

4. Research, characterization and assessment of the coastal and marine (off-shore) sediment resources in the Mediterranean region to allow a sustainable, strategic and targeted recovery of the coastal sediment balance (**RESAM**);

5. Environmental strategic assessment of the plans for sediment resources exploitation and sustainable coastal protection (**ENVICOAST**);

6. Identification, federation and definition of legal tools, regulations and agreements needed at adapted levels for the coastal spatial planning and governance provided by the integrated management in accordance with MSP of the coastal resources represented by the territory itself and the sedimentary stocks (**COASTGOV**);

7. Reliable and shared elements for National and/or Regional Master Plans finalized to the sustainable growth of the coastal zones in coherence with MSP, coastal adaptation policies to CC and Local Plans for the Integrated Coastal Zones Management of the Mediterranean (**COASTGROWTH**);

8. Research activities in the field of innovative and customized technologies and solutions for coastal protection and to connect JAP actions and activities to the main research projects and frameworks at national and international scale (**COAST R&I**);

9. Design and implementation of protection/adaptation priority works for a sustainable coastal growth based on proper actions against the natural and anthropic coastal risks and consistent with the ICZM principles at appropriate scale (**MAJOR COASTAL PROJECTS**);

The implementation part of the 9th point represents the infrastructural component of the Macro-Project and will be tackled on the 2nd and 3rd phase. Anyway, all the projects of the JAP will consider the final need of putting in practice their results by specific integrated coastal and maritime works.

³http://www.ospar.org/documents/dbase/publications/p00583/p00583_advice_document_d7_hydrographic_conditions.pdf

The capitalization of this scheme of actions/projects for their mainstreaming, requires a specific organization into the JAP that should not be considered simply as a “group of projects”. The need of a clear framework of integrated (shared) and multilevel relationship between Administrations and the scientific expertise to be widely engaged, requires a structure like a Regional Framework Operation⁴ with **Strategic Themes** for its implementation, that could become a Macro-Regional Framework Operation, involving the National level.

Looking to European objectives and programmes 2014–2020 and after several regional consultations held to share priorities for an efficient international cooperation within the JAP, 4 Strategic Themes have been pointed out:

ST1 - Developing knowledge, network-based monitoring and data management systems

ST2 - Sustainable use of strategic resources for the blue growth of the Med coasts

ST3 - Research and innovation in coastal sustainable development, protection and adaptation

ST4 - Response to challenges driven by climate change

These four Strategic Themes are common for the participating Administrations in developing their response strategy to climate change for coastal and maritime adaptation and management. These can be considered also the action lines of the Joint Action Plan, where joint activities (on research, knowledge, resources, strategies, management, adaptation and other activities) will be initiated.

5.3 Strategic Theme n. 1 - Developing knowledge, network-based monitoring and data management systems

The JAP aims to set-up a permanent coastal and maritime knowledge network, based on existing local “observatories” (within national, regional or sub regional Structures) and fostering the creation of specific structures, if needed, at regional or local level in order to get a consistent network to monitor marine ecosystem.

The JAP aims then to build a **network of Observing structures**, sharing common/comparable standards in coastal and maritime monitoring and surveys, common/comparable indicators for supporting coastal and maritime management and preservation actions and for evaluating coastal and marine dynamics and erosion phenomena.

Particular actions of the network will be focused on the evaluation of **Mediterranean coasts status in order to provide information first of all on D7 (MSFD)** and in terms of **erosion phenomena and coastal risks** and to the survey of littorals and sedimentary balance and sea bottom to individuate and **evaluate sediment deposits suitable for coasts nourishment**.

Moreover it is foreseen the development of an **integrated Mediterranean Interoperable Spatial Data Infrastructure** for the Mediterranean on coastal data also as a condition for the reliability of coastal indicators and the environmental assessment procedures and as a common and reference platform to support networking on needs, policy implementation, best practices, stakeholder involvement, etc.. This data infrastructure could get the benefit of PEGASO⁵ or MEDINA⁶ project which has been developed within FP7 framework.

⁴ “RFO is a strategic cooperation between a group of regions, formed for the joint development of new approaches in regional development policy on a limited number of topics and joint priorities. This strategic framework can be considered as a kind of “mini-programme” where the regional partners can select sub-projects to be funded.” (INTERREG III C programme).

⁵<http://www.pegasoproject.eu>

⁶<http://www.medinaproject.eu>

Thus, several project-lines focusing on this strategic topic will be proposed and launched at the Mediterranean level involving maritime Administrations, Universities, Research Centres, international Organisations.

ST1A. Identification of common standards in coastal survey activities harmonised with the INSPIRE Directive, the MSFD descriptors and indicators, analyse coastal morphological dynamics in the Mediterranean, share monitoring services, find a common structure consistent with the principles of cost-effectiveness and efficiency and more suitable for the participant Administrations, and promote the establishment of specific structures, if needed, at local and regional level for coastal monitoring, the management of coastal zone risks and erosion phenomena, defence interventions and sediment stocks management in coastal areas (EUROpean Interregional Observatories for the Mediterranean COastal DEfence - **EURIOMCODE**).

ST1B. Morphological stability characterization (exposition to erosion, floods, etc.) of the Mediterranean coasts at a territorial/regional scale to allow an aware planning of the coastal zones through an integrated management approach (**EUROSION-MED**).

ST1C. Research, characterization and assessment of the coastal and marine sediment resources in the Mediterranean region to allow a sustainable recovery of the coastal sediment balance (**RESAM**), this project line can have the following sub-projects:

ST1C1. Marine sediment borrow site investigation on the Mediterranean Continental Shelf

ST1C2. Coastal stocks of native sediment investigation and management for beach nourishment (SICELL)

ST1C3. River basin, dikes, deltas management for a feasible sediment transport recovery

ST1C4. Methodologies for exploitation and management of marine sediment borrow site

ST1D. Mediterranean Interoperable Spatial Data Infrastructure (MISDI): Select, organise, standardize and make accessible interoperable spatial data for coastal management and marine spatial planning in the Mediterranean according to the INSPIRE Directive 2007/2/CE, and to other relevant policies. All the data (maps, indicators and tools) will be shared and exchanged through a geonodes network (MISDI) that will allow scientists, practitioners and decision-makers to work together in an interdisciplinary way and at different spatial scales (local, national and regional) and to foster the implementation of relevant policies. Actions and products identified in ST1A, 1B and 1C are directly linked with the development and deployment of a Mediterranean Interoperable Data Infrastructure for Coastal Data and Indicators for Environmental assessment.

5.4 Strategic Theme n. 2 - Sustainable use of strategic resources for the Blue Growth of the Med coasts

A systemic and strategic approach (in space and time) and new solutions are needed to respond to climate change in coastal areas and to reduce the increasing anthropic pressure and "littoralization" phenomena, which aggravates general phenomena as land take, soil sealing, loss of biodiversity.

It must be fostered the concept of the **coastal territory as “strategic resource”**, for the well-ness and socio-economic development, for the ecosystems and environment preservation and for the safety of inland territories.

In the same way more efforts are needed to change the seasonal trend of the coastal tourism, with the well-known problems that specially affects the small islands.

Through the development of regional territorial master plans, with ICZM approach, built to face the expected CC impacts and integrated with wider MSP plans, it is possible to go beyond the actual jeopardized approach on Mediterranean coastal protection and management. From the overarching master plan that looks forward at a wider time scale, several Local Plans can arise applying the principles of Integrated Coastal Zone Management.

The JAP proposes actions and projects to foster these concepts along with ICZM principles, with specific aims to enhance the implementation of the ICZM Protocol (Barcelona Convention) in the Mediterranean, and with MSP Directive (2014/89 EU).

Particular attention will be put on the **environmental vulnerability assessment** of plans and programs in accordance with Directive on the assessment of the effects of certain plans and programmes on the environment (D 2001/42/EC), in order to check and optimise their compliance and harmonization with an ecosystem-based approach, complementing the primary physical nature of the plan with other existing policies, legislation and instruments.

The focus has to be put also on the **policy options** more suitable, case by case, **for the environmental and strategic recovery of the coastal zones**, which should be considered, even in combination, in the coastal plans formulation (e.g. EUROSION policy options: no intervention; limited intervention; hold the line; managed realignment; move seaward). The decision on policy options to be adopted is site-specific, depending on coastal asset, geomorphological setting, sediment availability and erosion phenomena, as well as on a series of social, economic and political factors.

Being aware of the overall complexity of the coastal assets in the Med area, of the need for a proper management of coastal sediments and of the frequent recourse to nourishment interventions, even combined with other policy options in a comprehensive coastal plan, the JAP is to put a particular focus on littoral and offshore sediments management taking into account the effects not only on marine ecosystem but also on territory and society (communities) in order to appreciate the way they face with adaptation to vulnerability.

Thus, the JAP promote actions/projects able to boost the coastal defence and protection and the sustainable use of **sediments deposits as strategic resource** for Public purposes in coastal defence, preserving them from other uses.

From a legal standpoint, all these actions need to go through new public-private forms of cooperation for coastal management and development in which society has to be involved for definition and monitoring. European professionals of the coastal and maritime tourism point out that the conditions for a Blue growth strongly relate to new contractual models of long term coastal monitoring and maintenance.

Thus, actions, plans and projects will be dedicated to foster best practices in sustainable management of sediments and to evaluate (also by the means of traditional and novel modelling approaches) socio-environmental impacts induced by activities dealing with sediments exploitation and coastal protection, looking forward in the future considering the use of those not renewable resources.

The main project lines can be envisaged as follows:

ST2A. Reliable and shared elements for Regional Master Plans finalized to the coastal adaptation to CC and to fight against erosion and consistent Local Plans for the Integrated Coastal Zones Management in the Mediterranean (**COASTGROWTH**):

ST2A1. National and Regional Master Plans, following ICZM principles, in connection with local and basin-scale marine and maritime uses;

ST2A2. Project financing for coastal management;

ST2B. Legal tools and agreements needed for the coastal and maritime zones governance, including the integrated management of coastal and offshore sediments resources (**COASTGOV**);

ST2B1. Environmental monitoring Protocols for sustainable sediment management. Protocols for off-shore and littoral sediments stocks sustainable management and exploitation for beach nourishment;

ST2B2. Structuration of the governance in accordance with marine region or subregion and ICZM principles of the Barcelona Convention

ST2C. Environmental strategic assessment of policies, plans and programs for coastal adaptation and for sediments sustainable management for coastal protection purposes (**ENVICOAST**):

ST2C1. EIA procedure for coastal works

ST2C2. EIA procedure for Continental shelf borrow sediment site exploitation

ST2C3. Coastal natural assets protection/recovery as strategic issue to face natural risks

ST2C4. Mapping and quantification of ecosystem services of coastal areas, in DPSIR framework, including MSFD and EcAp indicators.

5.5 Strategic Theme n. 3 - Supporting research, innovation clusters and implementation

The JAP will be the engine for an innovation chain. Research and innovation will be a cross-cutting issue along the whole JAP and must provide real added value (better performance, longer durability, higher socio-economic benefits,..) to it.

The implementation of the JAP and its specific Joint Actions and projects will be supported by research activities in the field of innovative and customized technologies and solutions for coastal protection (**COAST R&I**).

This project line has several topics to focus on, e.g.:

ST3A1. Improvement of remote sensing techniques and supports, as drones and submarine devices, e.g. advanced use of remote sensing data from Copernicus satellite system (Sentinels) matched with marine LIDAR survey for a broad systematic monitoring;

ST3A2. Integrated modelling tools, monitoring systems, data management and decision support systems e.g. coastal hazard assessment through broad and territorial modelling;

ST3A3. Analysis and forecast of local climate change and sea level rise scenarios and their effect on the coastline, sediment budgets, ecosystems and habitats;

ST3A4. Improvement of sediment moving and handling systems, management techniques and equipment, aimed to design vessels systems suitable for the Med basin characteristics;

ST3A5. Technical improvement in characterization and sustainable management of sediment deposits;

ST3A6. Design and testing of innovative solutions, technologies, materials for coastal protection;

ST3A7. Evaluation in the short and medium-long term of the connections and impacts of intervention on habitats and ecosystems, including the design and study experimental solutions (e.g. “building with nature” approaches)

Such activities will be potentially financed/co-financed in synergy by different frameworks, i.e. Horizon 2020 and the Cohesion Policy Framework, as recommended in the recent EC strategic documents.

Moreover, this Strategic Theme includes two cross cutting actions aimed at:

– **fostering projects-clustering initiatives**, for a closer connection among research institutions and research activities and among research institutions and decision-makers;

– **assuring a close connection with the new EU Research Programme (Horizon 2020)** and other national and international research programmes, in order to promote science-to-policy transfer, lobbying in favour of JAP themes and priorities and promoting the preparation of proposals, with the joint participation of Administrations, Research Institutions, Companies and SMEs.

5.6 Strategic Theme n. 4 - Response to challenges driven by climate change

Following policy options choices aimed at the environmental and strategic recovery of the coastal zones, strategic or major interventions (Major Projects) should be designed in order to upgrade the resilience level and to ensure conditions for a sustainable growth, related to specificity and vocation, of the diverse coastal areas.

The JAP aims also at fostering the design of these kind of interventions, structural works along Mediterranean coasts consistently with the above-mentioned integrated planning processes, for the concrete implementation of adaptation policies to the natural and anthropogenic risks driven by climate change.

To this extent, a specific joint action is foreseen to support the **designing of structural works and management solutions**, with the above-mentioned aims, and the individuation and activation of adequate financing channels, favouring the collaboration between public, private and scientific community sectors.

These integrated projects will be characterized by a definite socio-ecosystem approach and in particular:

– **High adaptation capacity** towards evident natural and social risk and vulnerability (cost/benefit analysis)

– **Integrated approach** combining social, environmental and economic issues

These projects then won't include only coastal defences but as well the infrastructures closely related to, like water-fronts, port arrangements, touristic assets, natural protected areas, etc. These infrastructures will be defined as the best response to reach the goal of a sustainable adaptation.

During the development of the JAP design (2014), a number of pilot sites along the Mediterranean coasts (also South and East bank) are selected in order to propose relevant integrated projects.

5.7 JAP development, from plan to implementation

The JAP horizontal action aims to promote the financial sustainability through the research of financing streams for the projects to be developed within the 4 Strategic Themes. Private sector, in front of a large scale programmed public investment for the coast defence, can be interested into co-financing projects of research and development of new technologies.

Joint Actions schedule at a glance, with reference to phases described in the following point 6.

| JOINT ACTION PLAN | | Component1 | Component 2 |
|---------------------------|---------------------------|--|--|
| Main Project lines | Implementation background | Management of the JAP | Communication, clusters, diffusion, etc. |
| FACECOAST | COASTGAP | Set up of an organizational structure in-side the cluster, provision-ally hosted by the running projects | Group of communication initiatives between European projects and other networks (UNEP/MAP, ICM-CPMR, etc.) |
| | MADSEND-COAST | | Diffusion of the Bologna Charter and Macro-Project initiative among Mediterranean partners beyond EU |
| ST1A. EURIOMCODE | COASTGAP | First agreements between coastal administrative organizations | Connection with FACECOAST cluster |
| | 2nd phase b | Common agreements for specific projects | Connection with relevant networks (CRPM-CIM, Pegaso platform, etc.) |
| | 2nd phase c | EGTC as a final management body | |
| ST1B. EUROSION-MED | 2nd phase b | | |
| | 2nd phase c | | |
| ST1C. RESAM | 2nd phase b | | |
| | 2nd phase c | | |
| | 3rd phase d | | |
| ST1D. MISDI | 2nd phase b | | Contact relevant networks and establish liaisons and agreements (geonodes and system components) |
| | 2nd phase c | | |
| | 3rd phase d | | |

| Component 3 | | | |
|---|--|--|--|
| ST1 - Developing knowledge, network-based monitoring and data management systems | ST2 - Sustainable use of strategic resources for the Blue Growth | ST3 - Research & Innovation in coastal development and protection | ST4 - Response to challenges driven by climate change. |
| | | | |
| | | | |
| | | | |
| Coastal observatories network implementation (Interoperable Data Infrastructure and INSPIRE accomplishment) | | Smart application on ICT; interoperable geodatabases and decision support systems | |
| Common structures and promotion of the establishment of specific structures | | | Data for interventions design and maintenance |
| Knowledge and assessment of erosion phenomena, sediment balance and morphodynamic processes | Data for coastal risks planning | Remote sensing technologies (Copernicus) | |
| | | | Priorities for interventions |
| ST1C1. Marine sediment borrow site investigation on the Mediterranean Continental Shelf ST1C2. Coastal stocks of native sediment investigation and management for beach nourishment (SICELL) | Coastal and off-shore resources and their characterization | Coastal and marine survey technologies | |
| ST1C3. River basin, dikes and deltas management for a feasible sediment transport recovery ST1C4. Methodologies for exploitation and management of marine sediment borrow site | | | |
| | | | Sediment resources exploitation design for interventions |
| Mediterranean Interoperable Spatial Data Infrastructure (MISDI) | | | |
| Development of proposal for the MISDI with a structure based on needs for policy implementation and EU existing networks. | | | |
| Deployment of the MISDI. | Actions and products identified in ST2 are directly linked with the development and deployment of the MISDI. | Actions and products identified in ST3 are directly linked with the development and deployment of the MISDI. | Actions and products identified in ST4 are directly linked with the development and deployment of the MISDI. |

| JOINT ACTION PLAN | | Component1 | Component 2 |
|-------------------------------------|---------------------------|--------------------------------|---|
| Main Project lines | Implementation background | Management of the JAP | Communication, clusters, diffusion, etc. |
| ST2A. COASTGROWTH | 2nd phase c | Relationship with stakeholders | |
| | 3rd phase d | | |
| ST2B. COASTGOV | 2nd phase c | | Relationship with UNCLOS, EU and MS legislation |
| | 3rd phase d | | |
| ST2C. ENVICOAST | 2nd phase b | | |
| | 2nd phase c | | |
| | 3rd phase d | | |
| ST3A. COAST R&I | 2nd phase b | | |
| | 2nd phase c | | |
| | 2nd phase b | | |
| ST4A. MAJOR COASTAL PROJECTS | 2nd phase b | | Relationship with stakeholders |
| | 2nd phase c | | |
| | 3rd phase d | | |

| Component 3 | | | |
|---|---|---|---|
| ST1 - Developing knowledge, network-based monitoring and data management systems | ST2 - Sustainable use of strategic resources for the Blue Growth | ST3 - Research & Innovation in coastal development and protection | ST4 - Response to challenges driven by climate change. |
| | ST2A.1. Regional Master Plans, following ICZM principles, in connection with local and basin-scale marine and maritime uses; ST2A.2. Project financing for coastal management; | Technologies for a sustainable management of the coastal resources | |
| | | | Frameworks and priorities for interventions |
| | Definition of legal tools for coastal and maritime zones STB.1.Environmental monitoring Protocols for sustainable sediment management | Innovative solutions for coastal adaptation | |
| | ST2B.2. Structuration of the governance in accordance within marine region or subregion and ICZM principles | | New multilevel governance models for coastal areas |
| ST2C.1. EIA procedure for coastal works ST2C.2. EIA procedure for Continental shelf borrow sediment site exploitation | Sustainable management of resources | Coastal and marine survey technologies | |
| ST2C.3. Coastal natural assets protection and recovery as strategic issue to face natural risks ST2C.4. Mapping and quantification of ecosystem services of coastal areas, in DPSIR framework, including MSFD and EcAp indicators | | | |
| | | | Environmental permitting on plans and projects |
| ST3A.1. Improvement of remote sensing techniques and supports, as drones and submarine devices, e.g. advanced use of remote sensing data from Copernicus satellite system (Sentinels) matched with marine LIDAR survey for a broad systematic monitoring; ST3A.3. Analysis and forecast of local climate change and sea level rise scenarios and their effect on the coastline, sediment budgets, ecosystems and habitats; | ST3A.2. Integrated modelling tools, monitoring systems, data management and decision support systems e.g. coastal hazard assessment through broad and territorial modelling; | ST3A.4. Improvement of sediment moving and handling systems, management techniques and equipment, aimed to design vessels systems suitable for the Med basin characteristics; ST3A.5. Technical improvement in characterization and sustainable management of sediment deposits; | |
| | | ST3A.7. Evaluation in the short and medium-long term of the connections and impacts of inter-vention on habitats and ecosystems, including the design and study experimental solutions (e.g. "building with nature" approaches) | |
| | | | ST3A.6. Design and testing of innovative solutions, technologies, materials for coastal protection; |
| Priorities | Available resources assessment for a sustainable coastal management | | Preliminary master projects |
| | | New systems for a sustainable and more efficient coastal defense | Advanced master projects |
| | | | Executive master projects and its implementation |

6. Budget, schedule and financial resources

One of the most peculiar characteristics of the Macro-Project stands on its flexibility on financial organisation. Being an initiative born from a grouping of coastal Administrations, the Macro-Project can count on their own resources but, for the completion of the different phases, needs as well of other funds, mainly for its infrastructural part.

The Macro-Project is then designed to be funded by more European/International programs, according to a suitable articulation, in order to get a budget and time extension adequate to its objectives. It is possible to design the following implementation steps and the financial tools that can be taken into account for the launching of the Joint Action Plan, keeping in mind the three phases designed for the entire Macro-Project:

1st Phase: Macro-Project capitalization into the COASTGAP European project by preparing the Joint Action Plan, with specification of the main envisaged actions/projects and methods to deploy them, sharing it among the Med partnership.

a) Thematic and programmatic development of the Macro-Project in a CLUSTER of already existing European initiatives and projects. This is the current phase where the collaboration between running projects is finalized to delineate in the best way the elements of the Macro-Project mainly through the JAP of COASTGAP. The Macro-Project design will be completed by the direct contribution of other European projects specifically focused on capitalisation (MED, ENI, etc.) and the indirect contribution of other projects thanks to clustering action like FACECOAST, before the end of the financial period 2007-2013;

2nd phase: JAP consolidation (by the end of 2014) and development of its actions/projects, while preparing the infrastructural part of the Macro-Project, thus a number of Major Projects.

b) Launching of the first six actions (EURIOMCODE, MISDI, EUROSION-MED, RESAM ENVICOAST, COASTR&I) in the context of European programs directly involving the Mediterranean partners (ENI-CBC, H2020, etc.) or with the help of the concerned DGs (Environment, Regio, Research, Mare, etc.). Budget of **5-7 million euro for about 2-3 years**. First group of partners (Regions), representing at least 5 countries and a large cluster of strategic entities (other Regions, Universities, Research Institutes, Sector Associations, etc.);

c) Accomplishment of the first six activities (EURIOMCODE, MISDI, EUROSION-MED, RESAM ENVICOAST, COASTR&I) and start-up of the other projects of the JAP (COASTGOV and COASTGROWTH). Budget of **10-15 million euro for 2-3 years** (partially overlapping the previous period). New partners join the first group with different level of participation (active members, observers, etc.) and constitution of a network between public coastal Administrations (in case a specific European Grouping for the Territorial Cooperation -EGTC) to ensure the continuity of the actions on the grounds of the Macro-Project. A relevant part of the funds for this phase should come directly from the EC (DGs Environment, Regio, Research, Mare, Clima, etc.) or the phase should explicitly be integrated in the ROP (regional operational programmes) for ERDF 2014-2020.

3rd phase: JAP conclusion and Major Projects approval and implementation

d) Completion of the JAP and start up of the final part of the Macro-Project with the activity No 8 (Major Projects). Budget of about **500-600 million euro to be allocated in 5-6 years** (partially overlapping the previous period); activities to be finished within the terms of the 2014-2020 financial period (2023). Structural pilot interventions on about 30-40 Mediterranean coastal zones most exposed to risks of CC on the basis of the studies carried out. The financial coverage can be provided e.g. by structural funds but also UfM, UNEP/MAP, INFRAMED, or the EIB and other tools destined to the work of strategic relevance for the sustainable development of the Mediterranean area.

Financial options for the MACRO-PROJECT

The M-P is designed to be funded by more EU/International pro-grams, by a suitable articulation, in order to get an adequate budget and time extension

INFRASTRUCTURE

Interventions
Costal works

PLANNING (JAP)

Network, Studies
Research &
Innovation
Integrated Planning

FUNDING INSTRUMENTS

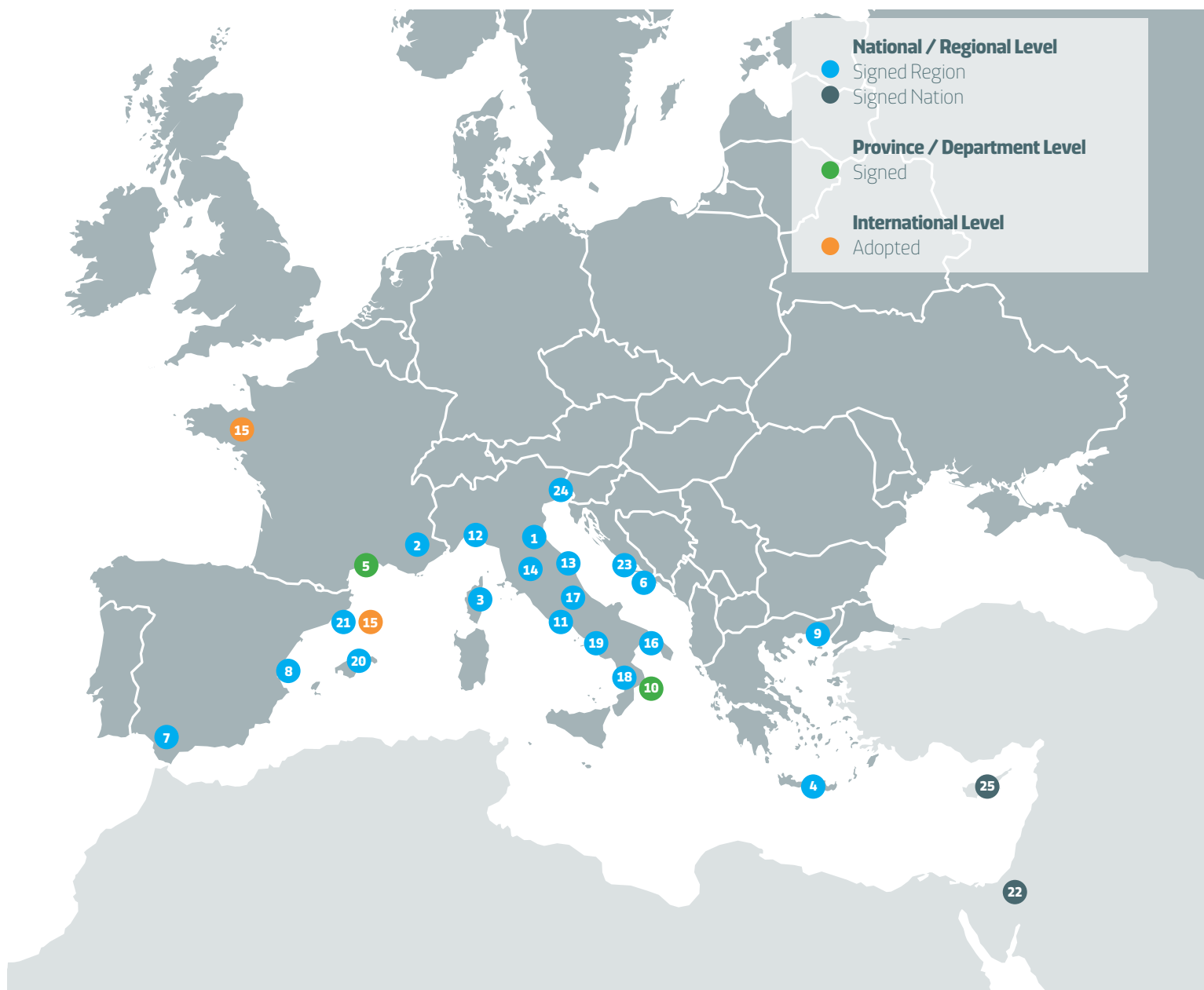
- Regional/National pro-grams (funds)
- International Programs (UfM, InfraMed, etc.)
- Regional Operational Pro-grams (ESI funds)
- Major Projects, Art.100 (ESI funds)

FUNDING INSTRUMENTS

- Regional/National programs (funds)
- EU programs (ECT: MED, ENI, A-I, CBC, IPA, H2020, LIFE etc)
- Mini-programs by DGs (EU direct funds)
- JAPs Art. 104 and Cooperation (ESI funds)

Annex 1

Adhesions to the Bologna Charter



- 1 Emilia-Romagna Region
- 2 Région Provence-Alpes-Côte d'Azur
- 3 Collectivité territoriale de Corse
- 4 Decentralized Administration of Crete
- 5 Département de l'Hérault
- 6 Dubrovnik - Neretva County
- 7 Junta de Andalucía
- 8 Generalitat Valenciana
- 9 East Macedonia and Thrace Region
- 10 Crotone Province
- 11 Lazio Region
- 12 Liguria Region
- 13 Marche Region
- 14 Toscana Region
- 15 Intermittent Commission of the CPMR
- 16 Puglia Region
- 17 Abruzzo Region
- 18 Calabria Region
- 19 Campania Region
- 20 Govern de les Illes Balears
- 21 Generalitat de Catalunya
- 22 Ministry of Environmental Protection of Israel
- 23 Split - Dalmatia County
- 24 Friuli Venezia Giulia Region
- 25 Ministry of Communications and Works of Cyprus

Annex 2

Implementation of the Action Plan

THEME 1 - DEVELOPING KNOWLEDGE, NETWORK-BASED MONITORING AND DATA MANAGEMENT SYSTEMS

Joint Action 1.1 Build a network of coastal Observatories - EURIOMCODE initiative (European Interregional Observatory for Mediterranean Coastal Defence)

Challenge: creation of a network of existing coastal observatory structures in the Mediterranean, also promoting the establishment of new structures, if needed, at national, regional and local level, in order to evaluate and monitor erosion phenomena and other dynamics connected to climate change, exchange of good practices, support the design of surveys and studies in the related fields.

Activities in 2015-2020: Establish links with existing and under development observing systems at national, regional and sub-regional scales, with ESFRI Research Infrastructures for integrated coastal and long-term ecosystems observation and with EU databases, portals and information systems (e.g. SeaDatanet, Atlas of the Sea, Emodnet, etc.). Link with Copernicus initiatives. Define protocols for data exchange and management, identify common standards in coastal and maritime survey activities harmonised with the INSPIRE and MSF Directives, analyse coastal morphological dynamics in the Mediterranean, share monitoring services, find a common structure consistent with the principles of cost-effectiveness and efficiency.

Outcomes: interregional protocols, common standards, EURIOMCODE network functioning

Joint Action 1.2 Survey erosion status and flood hazard along the Mediterranean coasts - EUROSION-MED project initiative

Challenge: Characterisation of morphological stability of the Mediterranean coasts at a territorial/regional scale (exposition to erosion, vulnerability by floods and marine ingression, etc.) to allow an aware planning of the coastal zones taking into account climate change scenarios through an integrated management approach.

Activities in 2015-2020: identify common standards for erosion phenomena assessment. Define and launch a survey project on erosion and vulnerability of Mediterranean coasts, evaluating also the evolution and sedimentary balance of rivers mouth and deltas in combination with rivers watersheds analysis on "sediment traps". Define and start a monitoring program for a continuous alimentation of the EUROSION-Med geo database.

Outcomes: updated framework of the coastal erosion and vulnerability in the Mediterranean, including rivers mouth and deltas balance. Recommendations/guidelines for coastal erosion and vulnerability evaluation and for coastal sediments correct management. Recommendations/guidelines for enhancing the river solid transport. Indications detail suitable for planning and programming activities by coastal Administrations. EUROSION-Med geo database.

Joint Action 1.3 Individuate and characterise coastal and submarine stocks of sediments suitable for beach nourishment – RESAM project initiative

Challenge: Research, characterise and assess the coastal and marine sediment resources in the Mediterranean region, suitable for a sustainable recovery of the coastal sediment balance.

Activities in 2015-2020: design and launch a research campaign for the individuation and characterisation of sediment resources in the Mediterranean, coastal and sea bed surveys, physical and chemical characteristics and available volumes assessment, ecosystems evaluation. Define protocols for monitoring and impact assessment of sediments stocks exploitation,

Outcomes: geo data base on sediments stocks suitable for recovery of coastal balance

Joint Action 1.4 Build a Mediterranean Interoperable Spatial Data Infrastructure (MISDI) -

Challenge: The mission of the MISDI is to organize, standardize and make accessible and interoperable spatial data for sharing on an online geoportal, through a network of partners' geonodes, that allow working together, science and practitioners, in a pluridisciplinary way and from different spatial scales (local, national and regional), exchanging data. The goal is to support the overall "network-based monitoring and data management systems" (JAP ST1).

Activities in 2015-2020: further developing the existing coastal and marine SDI. Further integration of geonodes (from new partners, Mediterranean Networks, etc) to improve SDI performance for implementation of various relevant policies as well as EMODNET. The visibility of participating institutions or networks will be enhanced by sharing in a common platform their spatial data and tools for implementation of related policy or other instruments at various scales.

Outcomes: A Spatial Data Hub to service all actions within relevant Strategic Themes of the JAP via a MISDI interoperable spatial data infrastructures supporting other key networks or other initiatives in the Mediterranean.

THEME 2 - SUSTAINABLE USE OF STRATEGIC RESOURCES FOR THE BLUE GROWTH OF THE MED COASTS

Joint Action 2.1 Promote the sustainable use of the coastal territory

Challenge: foster the integrated territorial planning and ICZM Protocol implementation along with the principles stated in the Recommendation 2002/413/EC, ensuring coordination with Maritime Spatial Planning principles and provisions of the Directive 2014/89/EU establishing a framework for MSP; foster the sustainable development of coastal zones, the landscape and marine environment protection, the coastal adaptation to climate change and the risk prevention, facing the "littoralization" process by combining top-down and bottom up approaches;

Activities in 2015-2020: design and formulate ICZM master plans activating coordination processes with Maritime Spatial Planning, with reliable and shared elements for National, Regional Master Plans and Local Plans (COASTGROWTH project). The plans will include sound stakeholder definition, targeting and consultation at different management scales. Define legal tools and agreements needed for the coastal and maritime spatial planning and dedicated governance including the integrated management of the coastal resources of sediments and in accordance with socio-ecosystemic approach for definition and adoption (COASTGOV project);

Outcomes: ICZM master plans coordinated with MSP, finalized to the coastal adaptation to CC and to fight against erosion and consistent Local Plans. Activation of "vertical" and "horizontal" integration processes and coordination mechanisms with the national level.

Joint Action 2.2 Promote the sustainable use of coastal and off-shore stocks of sediments

Challenge: foster the sustainable and ecosystem-oriented management and use of the coastal and submarine stocks of sediments within coastal defence interventions, also favouring new commercial relationship between Mediterranean countries, creating conditions for a regulated exploitation of sediments stocks in the macro-region;

Activities in 2015-2020: design and formulate ecosystem-oriented management plans of sediments at regional and national levels in littoral and off-shore ambits, for the ordinary maintenance of the beaches (moving within the littoral system) and within intervention of beach nourishment using stocks of sediments from out of the beach system. Environmental and social (when appropriate) strategic assessment of the plans for sediment resources sustainable management for coastal protection purposes (ENVICOAST project)

Outcomes: Sediment management plans. Environmental monitoring Protocols for sustainable sediment management. Protocols for off-shore and littoral sediments stocks sustainable management and exploitation for beach nourishment, which will be adopted by dedicated governance structures.

THEME 3 - SUPPORTING RESEARCH, INNOVATION CLUSTERS, IMPLEMENTATION

Joint Action 3.1 Foster projects-clustering initiatives

Challenge: strengthen the cooperation between Coastal Administrations, Scientific Community, National Authorities, international organisations, SMEs, private actors and stakeholders, maximizing results and favouring synergies in research and innovation

Activities in 2015-2020: foster clustering of projects and further develop and consolidate existing initiatives like "FACECOAST – Face the challenge of climate change in the Mediterranean coastal zones", launched within the Capitalisation process started by the European MED Program. Explore the constitution of an EGTC of coastal Administrations.

Outcomes: maintenance of FACECOAST activities and possibly start of an EGTC of Med coastal Administrations

Joint Action 3.2 Foster innovation in the field of coastal protection and climate change adaptation in the Mediterranean

Challenge: find innovative solutions and technologies for coastal protection and adaptation, for sustainable and ecosystem-oriented management of littoral and off-shore sediments resources, for data management, modelling and monitoring systems.

Activities in 2015-2020: research, design and testing of solutions (also using model-envisaged scenarios), with the joint participation of Administrations, Research Institutions, Companies and SMEs, and other involved stakeholders, for the improvement and customization of sediment moving and handling systems, management techniques and equipments, aimed to design a dredge/ship systems suitable for the Med basin characteristics; technical improvements of survey, characterization and sustainable exploitation of strategic sediment deposits; design and testing of innovative solutions, technologies, materials for coastal protection; evaluation of socio-ecosystem effects, connections and synergies, including experimental solutions (e.g. "building with nature" approaches); observing and monitoring systems, data managements and development of decision support systems; integrated modelling tools.

Outcomes: tested solutions and technologies ready to be developed and applied

Joint Action 3.3 Interaction with the new EU Research Programme (Horizon 2020)

Challenge: contribute in the definition of the priorities, in order to make themes and actions of JAP suitable to access the Programme financing. Promote clustering initiatives involving public and private sector, enterprises, research bodies, in R&D projects.

Activities in 2015-2020: individuate areas of the Programme (Societal challenges, Infrastructures, Support to SMEs, etc.) more suitable for supporting the JAP. Preparation of project proposals favouring joint participation of research bodies, Administrations, involved stakeholders and enterprises supporting adaptive management of coastal systems.

Outcomes: proposals submitted for financing of actions and projects in the field of research and development in coastal protection and adaptation. Science and innovation from research projects supporting and addressing JAP actions.

THEME 4 – RESPONDING TO CHALLENGE DRIVEN BY CLIMATE CHANGE

Joint Action 4.1 Supporting the design of structural works for coastal protection and adaptation to climate change

Challenge: collect a number of coastal works (nourishment, infrastructures, waterfront rearrangement, etc.) shared by bordering or non-bordering coastal Administrations, to be implemented in a coordinated way.

Activities in 2015-2020: survey on needs and framework conditions by different Administrations for coastal adaptation and protection interventions. Share competences and best practices in definition (including civil society position) to support the design of structural works.

Outcomes: package of structural works and Major Projects ready to be implemented.

Joint Action 4.2 Foster adaptive management solutions and structural works for enhance the resilience of coastal systems

Challenge: create the conditions for the realisation of structural works and management solutions (Major Projects), favouring the collaboration between public, private, the scientific community and involved civil society sectors.

Activities in 2015-2020: design of common projects (even combining Major Projects), according with the individuated suitable financing channels, also by diverse sources, for their implementation. Prepare project proposal favouring joint participation of public, private and research bodies for definition, implementation and monitoring.

Outcomes: common design, shared by Administrations, of Major Projects for adaptive structural works and management solutions for implementation and monitoring.

Joint Action 4.3 Individuation, access to and efficient use of funding frameworks

Challenge: ensure adequate financing resources to the JAP and Macro-Project and to the structural works implementation (Major Projects).

Activities in 2015-2020: monitoring EU programs and other funding opportunities consistent with the themes and actions encompassed by the JAP and the Macro-Project, individuation of funding opportunities most suitable for the different actions and projects.

Outcomes: proposals submitted for financing of actions and projects, other funding channels activated for the implementation particular strategic actions (Major Projects) or large scale initiatives (i.e. EUROSION-Med, RESAM project, EURIOMCODE)

Indications of involvement by interested partners in developing joint action project lines into projects

| Strategic Theme 1 | JOINT ACTIONS |
|--|--|
| DEVELOPING KNOWLEDGE, NETWORK-BASED MONITORING AND DATA MANAGEMENT SYSTEMS | 1.1 Build a network of coastal Observatories EURIOMCODE initiative (European Interregional Observatory for Mediterranean Coastal Defence) |
| | 1.2 Survey erosion status and flood hazard along the Mediterranean coasts EUROSION-MED project initiative |
| | 1.3 Individuate and characterise coastal and submarine stocks of sediments suitable for beach nourishment – RESAM project initiative |
| | 1.4 Build a Mediterranean Interoperable Spatial Data Infrastructure for Coastal Data and Indicators - MISDI |
| Strategic Theme 2 | JOINT ACTIONS |
| SUSTAINABLE USE OF STRATEGIC RESOURCES FOR THE BLUE GROWTH OF THE MED COASTS | 2.1 Promote the sustainable use of the coastal territory COASTGROWTH project initiative COASTGOV project initiative |
| | 2.2 Promote the sustainable use of coastal and off-shore stocks of sediments ENVICOAST project initiative Strategic |
| Strategic Theme 3 | JOINT ACTIONS |
| SUPPORTING RESEARCH, INNOVATION CLUSTERS, and IMPLEMENTATION | 3.1 Foster projects-clustering initiatives |
| | 3.2 Foster innovation in the field of coastal protection and climate change adaptation in the Mediterranean COAST R&I project initiative |
| | 3.3 Interaction with the new EU Research Programme (Horizon 2020) |
| Strategic Theme 4 | JOINT ACTIONS |
| RESPONDING TO THE CHALLENGE DRIVEN BY CLIMATE CHANGE (Major Coastal Projects) | 4.1 Supporting the design of structural works for coastal protection and adaptation to climate change |
| | 4.2 Foster adaptive management solutions and structural works to enhance the resilience of coastal systems |
| | 4.3 Individuation, access to and efficient use of funding frameworks |

| | Lazio | RER | ISMAR - CNR | CYPRUS | UPO | MoEP - Israel | Herault | Feports | ISPRA | RERA SD | REMTH | Calabria | DAC | CAT |
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Yellow: interest in being lead partner

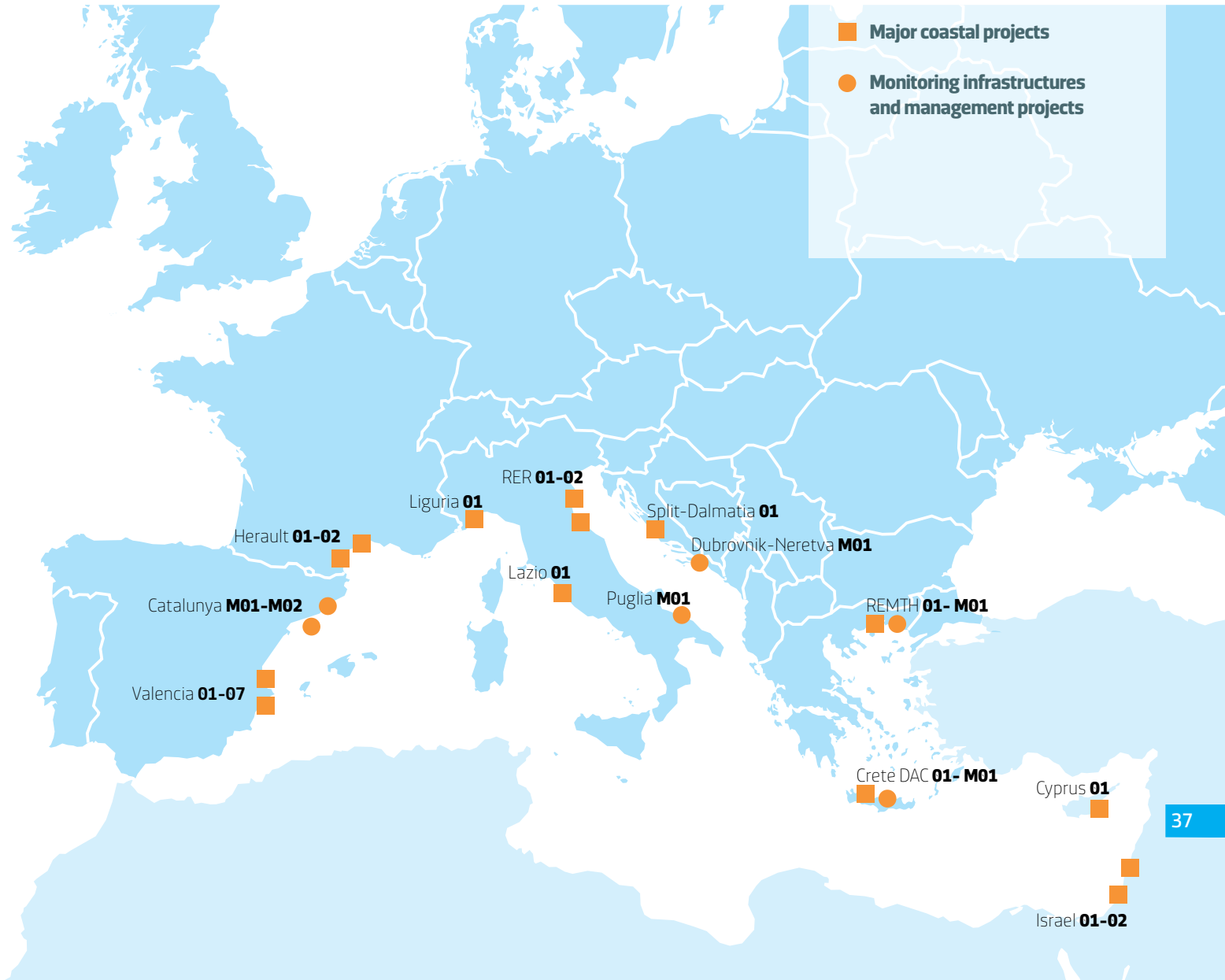
Grey: interest in being partner

lines pattern: interest in giving particular support to lead the proposal or particular support to specific actions



Annex 3

Major Coastal Projects



1. TITLE OF THE PROJECT:

Larnaca North Coastal Redevelopment Project (CYPRUS- 01)

2. BRIEF DESCRIPTION OF THE TYPOLOGY OF THE PROJECT

- _ Hard Coastal defenses – revetments/ sea wall, groins
- _ Requalification of a coastal stretch – conversion from industrial (fuel depot) to residential/ commercial/ tourist area
- _ Rearrangement of the waterfront – pipelines, storage tanks removed. Tourist developments (hotels, shops, restaurants, parks, etc)
- _ Transformation, re-destination of a coastal area – Beach nourishment/ import of sand, coastal protection works to protect the new beaches
- _ Realignment of infrastructures along the coast – new pedestrian/ cyclist road, public amenities

Limitations

- _ Oil distribution companies are currently operating in the area. The relocation of these installations is associated with a significant capital cost. It is also associated with administrative problems since businesses and people need to be relocated.
- _ There are environmental problems associated with the cleaning of the area from the fuel storage facilities. The ground is expected to be contaminated, bearing in mind that the age of these installations is too old.
- _ Main uncertainties and knowledge gaps to be addressed in the design phase include:
 - The actual condition of the sub-soil
 - The reaction of all those employed in the oil companies who will be forced to relocate
 - The demand and value of all this land which will be converted from industrial to tourist/ residential/ commercial use
- _ Larnaca city and the hinterland will enjoy social-economic benefits due to the removal of the fuel storage facilities. The image of the city will improve, the value of the properties next to the oil companies will increase, the risk of a major accident will be eliminated, barrier blocking the city from expanding to the north is removed.

3. LEVEL OF DESIGN OF THE PROJECT

- _ The project has been a Government policy for more than a decade
- _ The master plan for the coastal works is at its final stage
- _ The master plan for the road network is complete and implemented
- _ The town planning zones are agreed

4. BUDGET AMOUNT ESTIMATION & SCHEDULE of INTERVENTION

- _ The budget of the project is of the order of €50 Million
- _ The implementation is scheduled towards the next 5-10 years

5. ACTORS INVOLVED

- _ Department of Town Planning and Housing (development on land side)
- _ Department of Public Works (coastal works, road works)
- _ Ministry of Energy, Commerce, Industry and Tourism (relocation of oil companies)
- _ Larnaca Municipality (Local Authority)
- _ Private sector (oil companies)

6. MAP WITH LOCATION AND GENERAL FEATURES



Location Map. The project area is located north of Larnaca City. Larnaca is bounded by the airport and the salt lake on the south side and the port and oil companies on the north side.



The Project area. All fuel storage facilities will be relocated. The area is to be redeveloped into a tourist, residential, commercial area. The existing coastal works (revetments and groins) will be removed. Detached breakwaters and beach nourishment will create and protect sandy beaches.

Emilia-Romagna Region

1. TITLE OF THE PROJECT:

protection and restoration of the area Foce Reno – Bellocchio – Lido Spina (RER-01)

2. BRIEF DESCRIPTION OF THE TYPOLOGY OF THE PROJECT

- _ Coastal defenses – nourishment, groins, dune reconstruction, sand motor, lagoon channels restoration
- _ Restoration of a costal stretch in a high value naturalistic area (SIC, ZPS, Ramsar), defense of the urban settlements of Lido di Spina, touristic resorts and activities, adaptation to climate change and defense of high value habitat of protected species.
- _ Waterfront of about 5 km and relative internal area, with implications on sustainable management of a coastal stretch of about 10 km

Aspect and Limitations

The area has been subject to severe storms in the last 6-7 years, recording a retreat of about 30 m/year of the coastline. The threatening involves:

- _ the marinisation of the coastal lagoon (Vene di Bellocchio) and the total loose of specific habitats of protected species;
- _ the exposure to sea floods of the State road 309 (s.s. Romea)
- _ the exposure to sea floods of the urban settlement of Lido di Spina South, involving also the Lake of Spina.

Limitations to the interventions are given by the conditions of a natural protected area in which particular low impact techniques and materials should be employed, scheduling subject to breeding and nesting periods.

3. LEVEL OF DESIGN OF THE PROJECT

- _ The project has been designed also for a LIFE program application
- _ The master plan for the coastal works is under discussion

4. BUDGET AMOUNT ESTIMATION & SCHEDULE of INTERVENTION

- _ The budget of the project is about € 25 Million
- _ The implementation is scheduled by 2015-2017

5. ACTORS INVOLVED

- _ Emilia-Romagna Region (Directorate General of Environment, Soil and Coast Protection)
- _ State Forestry Service (Biodiversity Protection Office of Punta Marina)
- _ Delta Po Park Body
- _ Ravenna and Comacchio Municipalities (Local Authorities)
- _ Military Polygon
- _ Private sector: Orsi Mangelli (farm company), Spina Camping Village (resort company)

6. MAP WITH LOCATION AND GENERAL FEATURES



Location Map. The project area is located north of Reno River mouth. The coastal stretch subject to the direct interventions is about 5 km of waterfront and involves about 213 hectares of the Vene di Bellocchio wet area. The total coastal stretch involved in the future management linked to the area of intervention is about 10 km length.

Emilia-Romagna Region

1. TITLE OF THE PROJECT:

extraordinary nourishment intervention on Emilia-Romagna coast with off-shore sand deposits (RER-02)

2. BRIEF DESCRIPTION OF THE TYPOLOGY OF THE PROJECT

The extraordinary nourishment intervention with sand from submarine deposits has the scope to restore the safety conditions of the 8 coastal stretches along the regional coast, in very critical condition, after different sea storms impacts in the last 6 years. It is foreseen the provision of sand taken from two submarine accumulations located from 40 to 50 km off the regional coastline.

The coastal stretches subject to the intervention are located within eight municipal territories (Misano Adriatico, Riccione, Rimini, Bellaria, Cesenatico, Cervia, Ravenna, Comacchio) and concern all the 4 coastal provinces of Emilia-Romagna.

The experience gained from similar interventions, performed in 2002 and 2007, has shown that with a proper enlargement of the beach are avoided damages to infrastructures/settlements and is strongly limited marine ingression risk in the inland. Taking care to follow the intervention with yearly maintenance operations, the benefit of such alimentation with "new" sand resources will affect the whole coastal system (coastal stretches directly interested and nearby stretches, in the 8 most critical zones of the regional coast). The purpose of this project is therefore to implement a significant enhancement of the beach system, considered as the first defense line against marine ingression, based on a rise in altitude and an enlargement towards the sea of the sandy shore, in order to ensure the safety of inland features (settlements, infrastructures, plants, natural protected areas, etc.) for a period of almost 5 years. One of the location of the intervention, destination of part of the sand nourishment, is the area of Foce Reno-Bellocchio, concerning further interventions for restoration and protection described in RER-01a.

Aspect and Limitations

The use of submarine sand accumulations is particularly indicated by:

- _ the input into the coastal system of "new" sand to compensate losses due to erosion and subsidence, practice included in the regional strategy for coastal protection and adaptation to climate change effects;
- _ the low environmental impact during implementation on the coast, on the ground and on the road network (being the transport exclusively via sea) and the low impact in the mid period, as demonstrated in the previous post intervention monitoring, on the ichthyic and benthonic population of the off-shore borrow sand deposit;
- _ the benefit for the tourist economy and for the attractiveness of the different areas, adopting a "soft option" instead of a hard defense works solution.

Limitations to the interventions are given mainly by:

- _ the impossibility to operate during the bathing season (mainly June-September period) and in the case by the conditions of natural protected areas in which the schedule should concern also the breeding and nesting periods.
- _ to contain visual impacts due to the different colors of the submarine sands providing a certain opportune accumulation of site specific "original" sand to be subsequently stringing on submarine sands once put in place;
- _ the depth of excavation, dredging, in the two submarine accumulations must not reach the boundary level between the sands and underlying deposits in order to not alter the composition of the bottom with consequent modification of the benthic fauna associated.

3. LEVEL OF DESIGN OF THE PROJECT

_ The project has been designed in its Preliminary version and approved by a deliberation of the regional government, and it's included in the Rendis database, national platform.

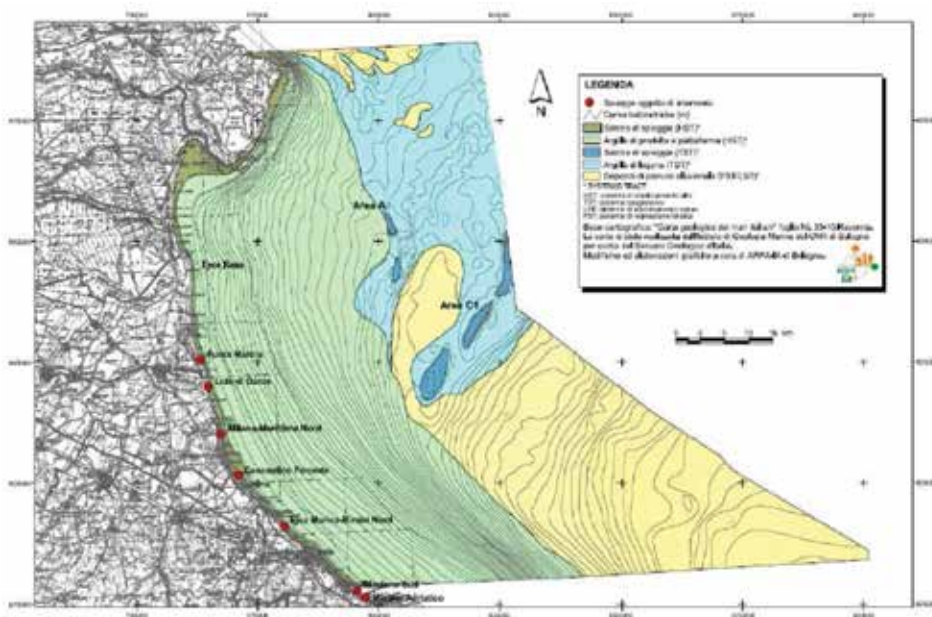
4. BUDGET AMOUNT ESTIMATION & SCHEDULE of INTERVENTION

_ The budget of the preliminary project approved is about € 16,5 Million,
_ The implementation is scheduled by 2015-2016
_ An extra charging of the "sand motor" by Foce Reno-Bellocchio area, with sand coming from submarine deposits, is quoted to add about € 13 Million to the above mentioned budget.

5. ACTORS INVOLVED

_ Emilia-Romagna Region (Directorate General of Environment, Soil and Coast Protection)
_ Municipalities (Local Authorities) interested by the intervention: Misano Adriatico, Riccione, Rimini, Bellaria, Cesenatico, Cervia, Ravenna, Comacchio.

6. MAP WITH LOCATION AND GENERAL FEATURES



General plan with sites of intervention and withdrawal (areas A and C1) and thickness of sand deposits



Département de l'Herault

1. TITLE OF THE PROJECT:

beach nourishment of sandycoasts in Herault Departement / South of France (Herault-01)

2. BRIEF DESCRIPTION OF THE TYPOLOGY OF THE PROJECT

Mediterranean sea is considering as a hot spot for climat change. A lot of damages are previous on our sandy coasts : a study from 2010 for the French Ministry estimates these damages of 30 billions € in 2100. During the last period 2007 /2014, public administrations realized more than 100 M€ to protect beaches on Herault coasts (90 km) – see herewith document.

For the medium term, we project to restore the sand balance along many beaches, considering we will need enough time to sensibilize the coastal population to move behind. We studied a bechnourishment project including 10 millions m3 of sand, associated with some groins to stabilize. We found these offshore sand deposits during Beachmed studies 2002/2008. Moreover the environmental aspects were studied on ESPEXS project 2011/2013.

3. LEVEL OF DESIGN OF THE PROJECT

The project has been designed in its Preliminary version in Beachmed works.

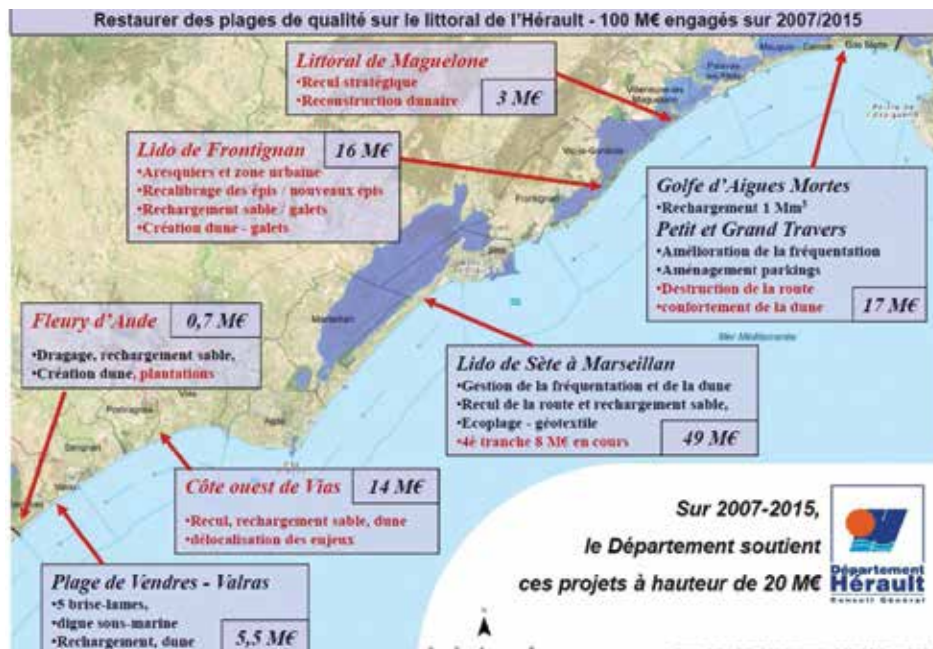
4. BUDGET AMOUNT ESTIMATION & SCHEDULE of INTERVENTION

100 M€ / 10 years.

5. ACTORS INVOLVED

- _ French Central & local Administration
- _ Region Languedoc-Roussillon
- _ Department of Herault - Municipalities
- _ Private sector (owners, economic actors) - Research centers

6. MAP WITH LOCATION AND GENERAL FEATURES



1. TITLE OF THE PROJECT:

protection du Lido de Maguelone à Frontignan – 5 km (Herault-02)

2. BRIEF DESCRIPTION OF THE TYPOLOGY OF THE PROJECT

The project consists to protect and to restore this beach and to reorganize the frequency.

- Sandy Beachnourishment
- Groins
- Break waters
- dunes

3. LEVEL OF DESIGN OF THE PROJECT

Definitive

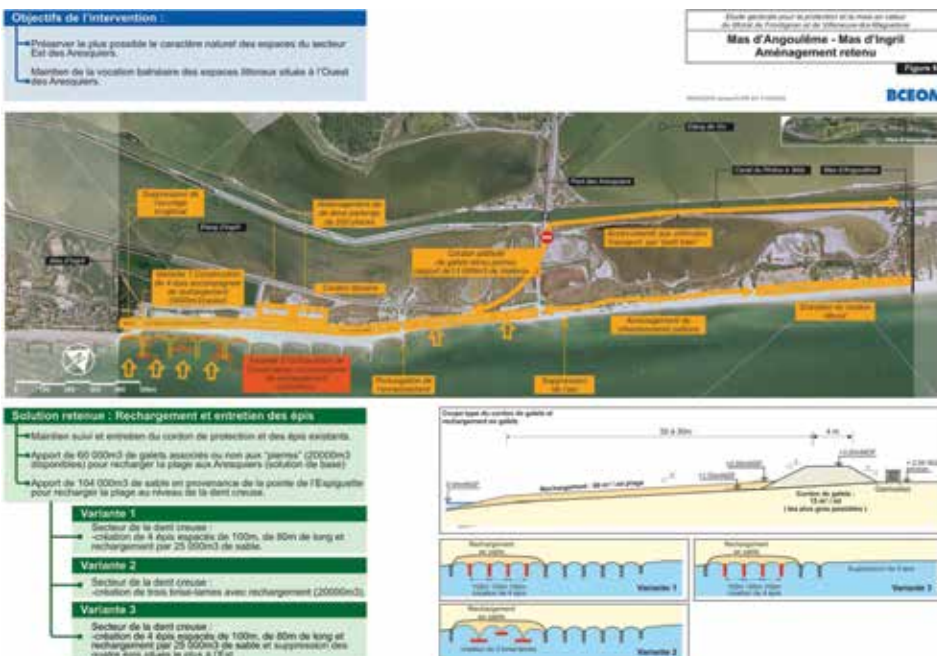
4. BUDGET AMOUNT ESTIMATION & SCHEDULE of INTERVENTION

16 M€. 2015 for the first step (8 M€)

5. ACTORS INVOLVED

- _ French Central & local Administration
- _ Region Languedoc-Roussillon
- _ Department of Herault - Municipalities
- _ Private sector (owners, economic actors) - Research centers

6. MAP WITH LOCATION AND GENERAL FEATURES



Lazio Region

1. TITLE OF THE PROJECT:

“TIBER MAJOR PROJECT” (Lazio-01)

2. BRIEF DESCRIPTION OF THE TYPOLOGY OF THE PROJECT

- _ Increasing sediment transport of Tiber river
- _ Requalification of Tiber river banks and
- _ Environmental monitoring system
- _ Maintenance
- _ Requalification of Tiber River mouth (Passo della sentinella – Idroscalo)
- _ Waters quality
- _ Flood risk mitigation
- _ Tiber at zero emissions
- _ Touristic promotion
- _ Eco-compatible agriculture development
- _ Tiber Start-up (Old buildings re-establishment and co-working initiatives)
- _ Nourishment of Tiber River mouth system beaches (Fiumicino, Roma, Pomezia)
- _ New and existent Marinas and Ports adaptation to sustainable coastal management

3. LEVEL OF DESIGN OF THE PROJECT

Feasibility Study in the Regional Operational Programme ERDF 2014-2020

4. BUDGET AMOUNT ESTIMATION & SCHEDULE of INTERVENTION

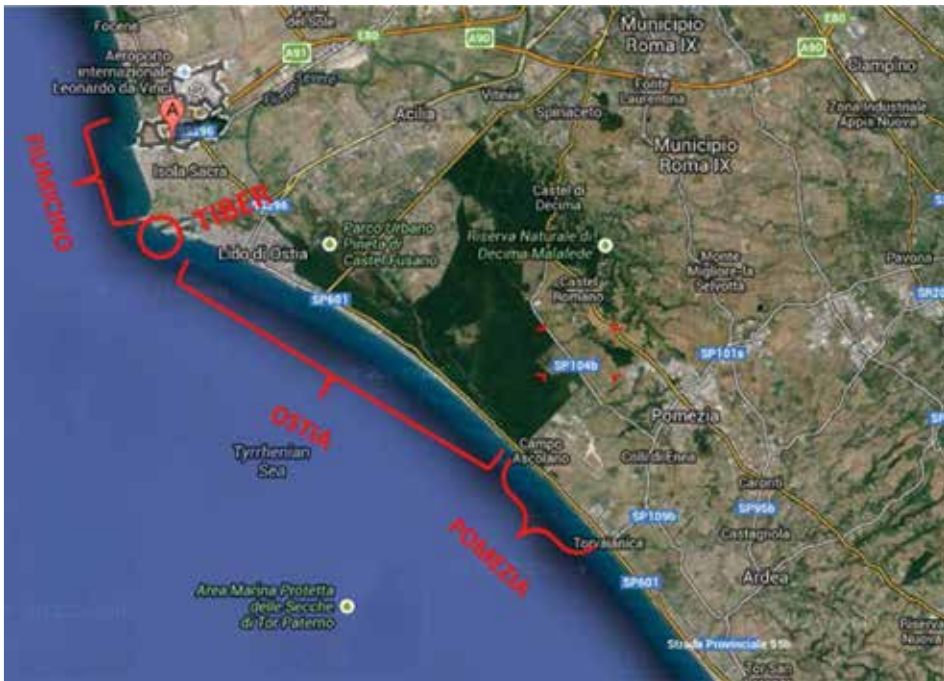
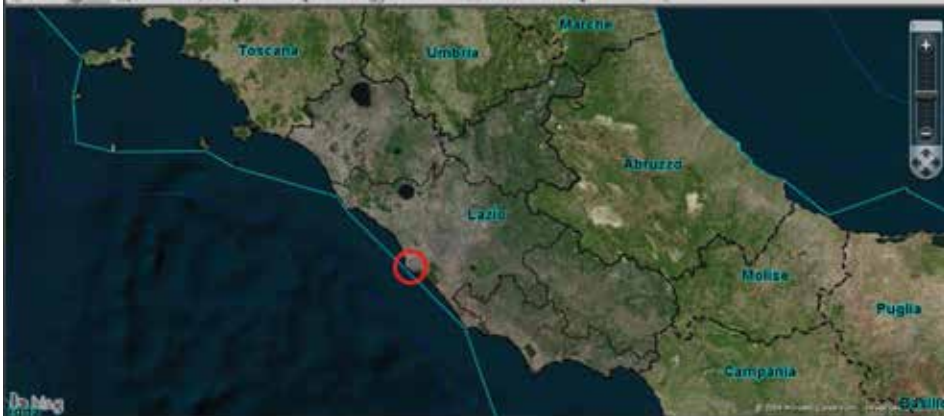
| | |
|---|-----------------------|
| _ Natural sediment transport improvement | 7,2 Million € |
| _ Environmental enhancement | 12,0 Million € |
| _ Nourishment of beaches and dunes restoration | 16,0 Million € |
| _ Tiber Urban stretch and mouth requalification | 11,5 Million € |
| _ Marinas and Ports adaptation | 8,4 Million € |
| Total Tiber major project | 55,1 Million € |

Intervention schedule 48-60 months

5. ACTORS INVOLVED

- _ Regional Administration (Regional Coastal Defence Agency ARDIS, Regional Environment Agency ARPA); planning, tender
- _ Municipalities (Fiumicino, Roma, Pomezia); planning, tender
- _ Tiber Regional Basin Authority; planning
- _ Port Authority of Civitavecchia; planning, tender
- _ Private Sector; planning, work

6. MAP WITH LOCATION AND GENERAL FEATURES



Liguria Region

1. TITLE OF THE PROJECT:

Recupero litorale tra Albenga e Ceriale /Regione Liguria – Provincia Savona (Liguria-01)

2. BRIEF DESCRIPTION OF THE TYPOLOGY OF THE PROJECT

- _ Restoration of a coastal stretch of 6 km completely modified by a sea wall built during the last century to protect the railway
- _ Improvement of the defence against sea floods for a coastal plain through the use of a off shore borrow site for sand nourishment
- _ Integrated planning of the near shore area in order to improve public uses and pedestrian and cycling mobility

3. LEVEL OF DESIGN OF THE PROJECT

- _ The project is already approved at the preliminary level; it was developed by a multidisciplinary team that designed the interventions both for the shore restoration and for a new land use plan in the nearshore area.
- _ The Liguria Region included the intervention in the “Piano Tutela Ambiente marino e costiero (PTAMC)”, now (2014) under EIA procedure
- _ The borrow site in the sea bottom was firstly studied thanks to the Beachmed-e project; additional surveys were carried on by the Region in the 2012 for the PTAMC.
- _ The 7 municipalities of the sedimentary cell signed an agreement for the use of the borrow site

4. BUDGET AMOUNT ESTIMATION & SCHEDULE of INTERVENTION

The budget of the project is €10 million.

The implementation is not scheduled because of the lack of financement.

5. ACTORS INVOLVED

- _ Regione Liguria
- _ Provincia di Savona
- _ Albenga and Ceriale municipalities
- _ All the other municipalities of the sedimentary cell
- _ RFI (Italian Railways)
- _ Ministero Beni Culturali

6. MAP WITH LOCATION AND GENERAL FEATURES



The area of intervention

The railway runs directly by the sea.



An example from the project.

Split-Dalmatia County

1. TITLE OF THE PROJECT:

Restoration of Kaštela Bay Coastline (Split-Dalmatia-01)

2. BRIEF DESCRIPTION OF THE TYPOLOGY OF THE PROJECT

Coastline of the Town of Kaštela has a very specific history and has been part of mayor one of the biggest infrastructural projects in the Mediterranean - Eco Kaštela Bay financed by the WB and EBRD . The value of the project will be 300 MIO euro by its end. It covers construction and reconstruction of sewage systems of for the city of Split, the towns of Solin, Kaštela and Trogir, the municipalities of Seget, Okrug, Dugopolje and Klis and a part of the Čiovo Island.

The project has been implemented due to high pollution caused extensive growth of the population which was not followed by simultaneous development of municipal infrastructure (i.e. construction of water supply and sewage networks). Moreover, several plants (chemical, iron, cement), situated in Kaštela, resulted very high pollution of the area . By now, a 2 level waste water purification plant was constructed. The project has resulted with the rise of the sea quality level along Town of Kaštela coastline, transforming it to beach area for local population. Unstable gravel beaches present 44% of Town's coastline. At the moment the area requires high nourishment costs on the yearly bases, due to lack of planning and technical documentation. Beach erosion presents a big problem for settlements, particularly for historical castles and road infrastructure , located very close to the coastline. A systematic approach to restoration of the costal stretch would present significant contribution to the defense of urban settlements.

The scope of the project is 3,5 km of coastal stretch with very narrow internal area, from Kaštilac castle in Kaštel Gomilica to Villa Rušinac in Kaštel Lukšić. The aim of the project is sustainable management of a coastal stretch with aim to restore the coastal promenade and to integrate it with beach and park areas, protection of Kaštilac castle and construction of 2 marinas.

Aspect and Limitations

The area has been subjected to series of sea flooding in recent years which has affected the inner coastal area, i.e. road infrastructure and urban settlements that are closely connected with promenade. With inevitable coastal area sinking and water level rise due to the climate change the threats are listed:

- _ loss of high value beach area
- _ exposure to sea floods; where boardwalk and road being mostly affected
- _ exposure to sea floods; where urban settlements being endangered in extreme events
- _ saltwater intrusion into the groundwater aquifer, causing loss of specific habitats

Limitations to interventions are given by the fact that the area has a distinctive number of cultural heritage sites, which could potentially turn out to be a hurdle of a kind. The city will enjoy social-economic benefits once coastal area will undergo through restoration process. It will surely alleviate if not totally remove the negative consequences of regular sea flooding and on top restore in full the attractive promenade along with beach and park areas

3. LEVEL OF DESIGN OF THE PROJECT

- _ The project has been a Government policy for more than a decade
- _ The master plan for the coastal works is in preparation
- _ The master plan for the road network is in preparation
- _ The town planning zones are agreed

4. BUDGET AMOUNT ESTIMATION & SCHEDULE of INTERVENTION

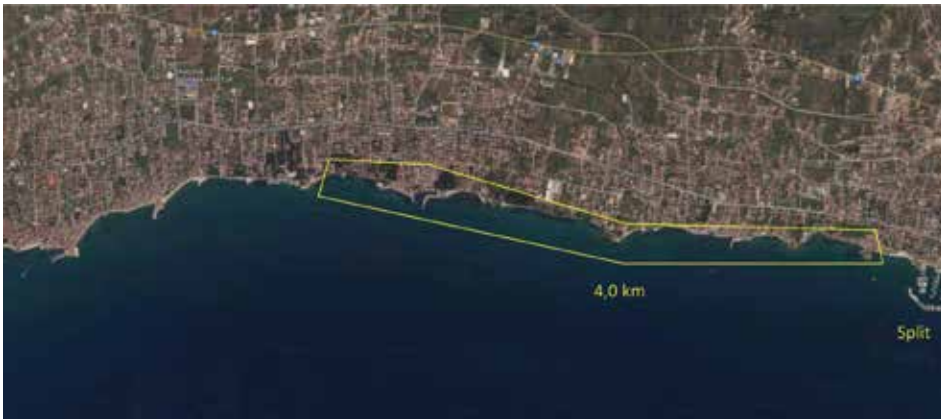
The budget of the project is about € 25 Million

The implementation is scheduled by 2020

5. ACTORS INVOLVED

- _ Department of Town Planning and Housing (development on land side)
- _ Department of Public Works (coastal works, road works)
- _ Kaštela Municipality (Local Authority)
- _ Private sector (tourism companies)

6. MAP WITH LOCATION AND GENERAL FEATURES



An example from the project.

Valencia Region

1. TITLE OF THE PROJECT:

Development and implementation of the shoreline management plan for the northern coast of Valencia /Spain (Valencia-01)

2. BRIEF DESCRIPTION OF THE TYPOLOGY OF THE PROJECT

The project plans a set of actions aimed at overcome the problems caused by the action of the sea over the territory in which it is probably the most erosive coastal stretch within the Spanish Mediterranean.

The project area is the coast between the ports of Burriana and Sagunto, in the north of Valencia. It is a 30 km long stretch of low-lying coast which is subject to strong sedimentary dynamics affecting directly 8 municipalities¹.

Human activities during the twentieth century², generated imbalances that have resulted in severe erosion problems and risks impinging on coastal populations, environment³ and economic activity⁴. Coastal retreat reaches values exceeding 100 m in some areas, with rates greater than 5 m / year.

After half a century taking more or less successful measures with a local approach, in 2011 the Ministry of Environment drafted a study of alternatives in the area under a broad geographical perspective, integrating the long term and therefore considering adaptation to climate change. The feasibility study combines hard engineering measures of coastal protection with soft actions addressed to the management of the sedimentary cycle.

Descriptors: beach nourishment, realignment of coastal infrastructures, adaptation to climate change, reduction of coastal risks.

3. LEVEL OF DESIGN OF THE PROJECT

The strategy is drafted, and the feasibility of the different alternatives (including option 0) is studied and assessed through the quantification of key variables.

Actions that integrate the strategy are currently at different stages: there are projects at preliminary drafting stage, others at drafting stage, and others which would be ready to be tendered having passed the environmental processing.

4. BUDGET AMOUNT ESTIMATION & SCHEDULE of INTERVENTION

The estimated budget for the completion of works is about 50 M € and the deadline for its completion five years (60 months), after which only management and maintenance works are foreseen. The estimated useful life of the works projected is 35 years.

5. ACTORS INVOLVED

_ Directorate General for the Sustainability of the Coast and the Sea, Ministry of Agriculture, Food and Environment, responsible for coastal defence projects and works.

_ Directorate-General for Transport and Logistics and Directorate General for Environmental and territorial assessment, Valencian Regional Ministry of Infrastructure, Territory and Environment, in charge of coastal planning.

_ Municipalities of Burriana, Nules, Moncofa, Xilxes, La Llosa, Sagunto y Canet d'En Berenguer, in charge of coastal maintenance and as final beneficiaries.

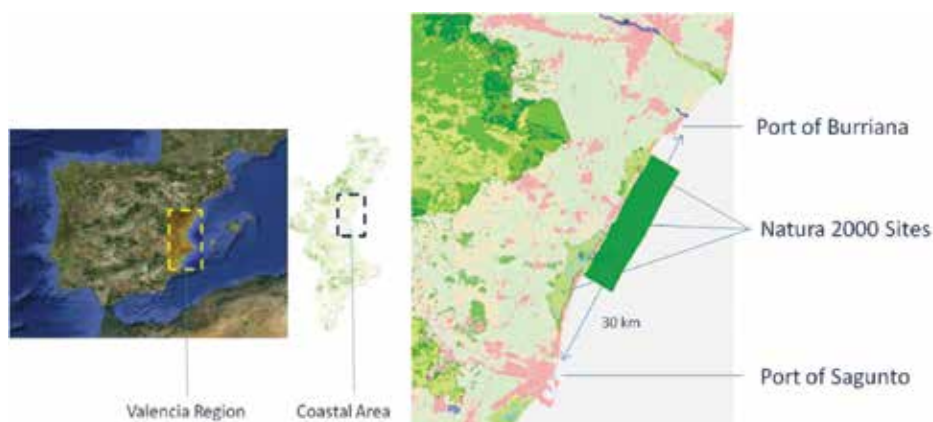
¹These 8 municipalities have near 140.000 inhabitants. The proximity of the metropolitan areas of Valencia (near 1 million inhab.) and Castellón (more than 180.000 inhab.) should be also considered.

²Hydraulic regulation and construction of coastal infrastructures (eg the port of Burriana) which have resulted in a dramatic reduction of sediment supply to the coastal system.

³Within the coastal zone there are three Nature 200 (SCIs and SPAs) sites covering 20 km of the coastal stretch, including wetlands (1150, 1410, 1420, 2110, 2120, 2210, 3140, 3150, 3420, 6430 and 7210) and seabeds (*1120) and other interesting habitats such as dunes.

⁴Flood hazard maps and the flood risk maps, Ministry of Agriculture, Food and Environment, 2014

6. MAP WITH LOCATION AND GENERAL FEATURES



Location. Sources: Google Maps and Terrasit (Valencian Regional Government)



Port and southern coast of Burriana: seashore evolution. Source: Coastal Information System (Valencian Regional Government)



Project coastal stretches from north (Port of Burriana) to south (Port of Sagunto). Source: Google Earth.

Valencia Region

1. TITLE OF THE PROJECT:

Exploitation of deep-waters sand deposits for beach nourishments along the Valencian coast /Spain (Valencia-02)

2. BRIEF DESCRIPTION OF THE TYPOLOGY OF THE PROJECT

The project is framed within the recommendations of the EU projects EuroSION and Conscience, which suggest that Member States investigate the so-called strategic resources to identify potential sources of sand usable for beach nourishment projects at a regional scale and with long-term vision. As consequence, within the context of the EU project Beachmed the Spanish Ministry of Environment launched the works to locate deepwater sand deposits in the Gulf of Valencia. These works resulted in the location of a potentially exploitable site whose resources would be able to mitigate regional problems of coastal erosion, promote coastal environmental regeneration measures and adaptation to climate change, by minimizing the environmental impact of the works. The sand deposit has about 90 million m³ of sedimentary resources usable for future beach nourishment in Valencia. The dredging project already has a positive environmental impact declaration¹ and must be supplemented with the approval of specific projects of beach nourishment and coastal restoration. Given the position and characteristics of the sand deposit it is required by 2020 to have ready a battery of beach nourishment projects which allows economies of scale making viable the exploitation of the deposit. Thus, the project would allow to address major erosion problems in the Mediterranean Spanish coast under a coordinated action. On the other hand, the implementation of the project would have clear synergies with other Regional initiatives on coastal planning such as the Regional Network of Coastal Parks² and the initiatives on rearrangement and requalification of urban waterfronts³. Descriptors: beach nourishment, adaptation to climate change, reduction of coastal risks, coastal restoration, requalification of urban waterfronts, environmental regeneration.

3. LEVEL OF DESIGN OF THE PROJECT

As pointed out the dredging project is drafted and already has a positive environmental impact declaration. Studies assessing strategic options under integrated approaches were previously completed⁴. For its implementation, the action needs to be supplemented by a set of coastal projects. The design of such projects is currently in different phases. Approval and implementation of other synergic actions such as projects of the Regional Network of Coastal Parks are also in different phases.

4. BUDGET AMOUNT ESTIMATION & SCHEDULE of INTERVENTION

The estimated budget for the completion of works is about 75 M € and the deadline for its completion five years (60 months). The estimated useful life of the works projected is 50 years.

5. ACTORS INVOLVED

- _ Directorate General for the Sustainability of the Coast and the Sea, Ministry of Agriculture, Food and Environment, responsible for coastal defence projects and works.
- _ Directorate-General for Transport and Logistics and Directorate General for Environmental and territorial assessment, Valencian Regional Ministry of Infrastructure, Territory and Environment, in charge of coastal planning.
- _ Coastal Municipalities, in charge of coastal maintenance and as final beneficiaries.

1 See Spanish Official Gazzete (BOE) Num. 237 of 3 October 2013..

2 See specially articles 21 "Green Infrastructure" and 147 "Coastal Parks" of the Valencian Territorial Strategy (adopted by Regional decree 1/2011 of 13 January).

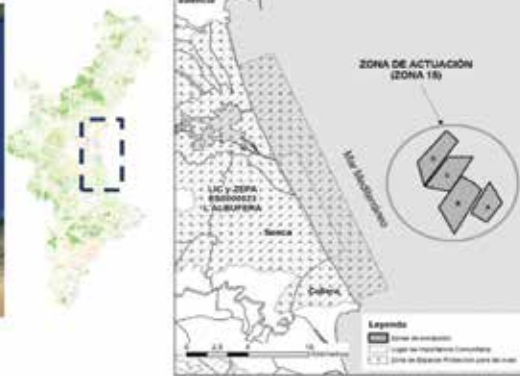
3 As an example see General Protocol on Integrated Actions in the North Bay of the Municipality of Alicante (BOE Num. 268 of 5 November 2010). Should be taken into account that almost 60% of the Valencian coastline is urban.

4 See: "Estrategia para la Sostenibilidad de la Costa", Ministry of Environment, 2008; "Comprehensive study on coastal defense options for the northern coast of Valencian Region (Port of Burriana - Port of Sagunto)", Ministry of Environment, 2011; Works within the "General Protocol between the Ministry of Environment, the Association of Municipalities of La Safor and Generalitat Valenciana for the conservation and restoration of the coast", Polytechnic University of Valencia, 2008

6. MAP WITH LOCATION AND GENERAL FEATURES



Valencia Region



Area and location of sand deposits

Location. Sources: Google Maps, Terrasit (Valencian Regional Government) and Project's Environmental Impact Declaration



| Ubicación | | V aporte arena estimado (x10 ⁶ m ³) |
|--------------|--|--|
| Tramo 1 | Puerto de San Carlos de Rápita. Puerto de Burriana. | 6 |
| Tramo 2 | Puerto de Burriana. Puerto de Valencia. | 10,5 |
| Tramo 3 | Puerto de Valencia. Cabo de San Antonio. | 12,5 |
| Tramo 4 | Cabo de San Antonio. Limite Alicante Murcia. | 5 |
| Tramo 5 | Limite Alicante -Murcia- Cabo Palos. | 5 |
| Total | | 39 |

Assessed needs and estimated allocation of sedimentary volumes for coastal defence. Source: Project's Environmental Impact Declaration.

Region of East Macedonia and Thrace

1. TITLE OF THE PROJECT:

Fanari beach rehabilitation (REMTH-01)

2. BRIEF DESCRIPTION OF THE TYPOLOGY OF THE PROJECT

Fanari beach is a linear dune beach between the Aegean Sea and the Ksirolimni Lagoon. A road crosses the beach and makes it accessible to the public. Along the beach there are beach bars, some non permanent structures and parking lots.

Because of the natural beauty of the beach and the easy access (less than half an hour from Komotini and the Egnatia highway) the beach attracts a great number of tourists and beach activities. However the fragile dune system has been disturbed and rehabilitation works are necessary in order to obtain a sustainable development of the beach front. Furthermore few small coastal works perpendicular to the coastline have disrupted the alongshore sediment transport.

The rehabilitation project can include:

- _ Dune rehabilitation and planting
- _ Dune access management
- _ Rehabilitation of the road and parking lots so as to limit the access of vehicles on the sand and application of ecofriendly materials
- _ Rehabilitation of the perpendicular existing coastal works and sand rearrangement

3. LEVEL OF DESIGN OF THE PROJECT

Preliminary study

REMTH wishes to use Fanari as a demonstration site putting in practice the Bologna Charter Best Practices

4. BUDGET AMOUNT ESTIMATION & SCHEDULE of INTERVENTION

- _ Budget estimation for Preliminary design ~100K€ Necessary time 1 year (mainly for data collection and stakeholders involvement)
- _ Budget estimation for Final Design ~500K€ Necessary time 2-3 years
- _ Budget estimation for works 2M€ to 10M€ Necessary time 2-3 years

5. ACTORS INVOLVED

- _ Central Administration, Cadastral Service, Ministry of Infrastructure and Ministry of Environment
- _ Regional Directorate of Technical Works, Regional Service of Environmental and Spatial Planning, Regional Service of Water Bodies – Municipality of Komotini (**Φορέας Διαχείρισης**)
- _ Private sector - Owners of coastal land, owner of a coastal camping, individuals that rent the coastal infrastructure from the municipality (beach bars, umbrellas etc.)

6. MAP WITH LOCATION AND GENERAL FEATURES



Picture of Fanari beach, approximately 4 Km between the cape of Fanari and the cape of Arogi

Picture of Fanari beach, many activities concentrated on a narrow (approximately 80 -100 m width) and fragile coast



Picture of Fanari beach, relative positioning of Fanari beach from the city of Komotini and Egnatia highway

Picture of Fanari beach, beach and dune condition in 2014

Decentralised Administration of Crete

1. TITLE OF THE PROJECT:

Limenas Hersonisou coastal defence and renovation project (DAC-01)

2. BRIEF DESCRIPTION OF THE TYPOLOGY OF THE PROJECT

The area of Limenas Hersonisou (port of Hersonisos) has been identified by prior studies (Hellenic Center of Marine Research, Anagnostou 2014) as an area of high erosional vulnerability. The coast faces erosion problems because of natural mechanisms and human interventions. Prior projects have studied the geomorphology of the area, the mechanisms of erosion, the local wave climate and the sediment transport mechanisms.

Limenas Hersonisou is a developed touristic area which has been identified from the National Special Framework of Spatial Planning and of Sustainable Development for Tourism (2013) as an area that needs renovation in order to improve the touristic product. According to 2013 data, the municipal department of Hersonisos disposes of approximately 25.000 hotel beds. Many hotels, bars and restaurants are built on the coastline and this is the major attraction of the area. Limenas Hersonisou combines easy access from the airport of Iraklion, organized hotels, a picturesque fishermen's port, many local taverns and interesting night life by the sea and easy access to close by archeological sites. Because of the acute erosion problems and the high pressure for touristic development and further urbanization of the coastal zone, Limenas Hersonisou has already been chosen from DAC as a critical area where coastal works are necessary. This project will include the preliminary design, final design and construction of coastal protection and coastal zone rehabilitation works. The study will take in consideration both technical and socio-economic aspects and propose works friendly to the natural environment and a new urban planning that will limit the erosion phenomena and improve the urban coastal zone.

DAC wishes to use Limenas Hersonisou as a pilot area where the Bologna Charter best practices will be applied and then propose the same methodology for other critical areas in Crete. Limenas Hersonisou presents the typical problems of many Cretan and Greek coastal areas where tourism infrastructure has been developed on the coastline in detriment of the natural coast and a coastal defense and urban renovation project will be a good example for other areas facing similar problems showing that environmental friendly technical solutions and urban planning can help to improve the tourism product and to develop the local economy.

3. LEVEL OF DESIGN OF THE PROJECT

The area of Limenas Hersonisou has already been identified on National and Regional level as a critical coastal area in need for coastal defense and urban renovation works. Many data on coastal dynamics, coastal erosion and socio-economic characteristics are available from prior projects

- _ Preliminary and final design of works
- _ Construction of works

4. BUDGET AMOUNT ESTIMATION & SCHEDULE of INTERVENTION

Budget estimation: 500.000 € for project technical studies.

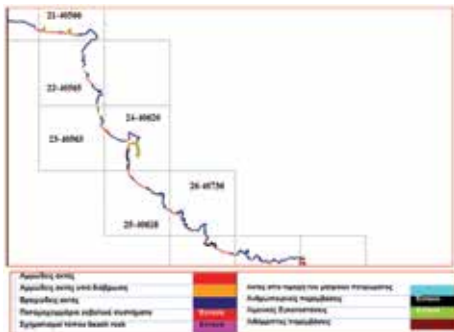
4.500.000 € for the construction of project.

Necessary time 1-2 years for the technical studies and 2-3 years for the construction

5. ACTORS INVOLVED

- Central Administration, Cadastral Service, Ministry of Infrastructure and Ministry of Environment as managing bodies
- Regional Directorate of Technical Works, Regional Service of Environmental and Spatial Planning, Regional Service of Water Bodies
- Municipality of Hersonisos
- Hellenic Centre for Marine Research
- Private sector - Owners of coastal land, professional of tourism (hotels, bars, restaurants, cafes) as end users

6. MAP WITH LOCATION AND GENERAL FEATURES



Natural and human characteristics of the coastal zone of Limenas Hersonisos

Location of Limenas Hersonisos



Location of the municipality Hersonisos (the project area is a coastal stretch of the municipality)



Satellite image of the project area Limenas Hersonisos

Photo of the coastline, the restaurants and bars are positioned on the coastline and the erosion is visible



Erosion phenomena on the coastline

1. TITLE OF THE PROJECT:

ICZM for the northern Tel-aviv to Hertzeliya coastal zone (Israel-01)

2. BRIEF DESCRIPTION OF THE TYPOLOGY OF THE PROJECT

The project area runs about 10 km on Israel's central Mediterranean coast, from the Yarkon River outlet in the northern part of the city of Tel Aviv northward to Apollonia National Park at the northern end of the city of Hertzeliya. This area's rich endowment of man-made features (e.g. power plant, detached breakwaters, sea walls, marina, sewage outlets), combined with its mix of ecological, economic, social, political and cultural interests (e.g. touristic resorts, intensive urban areas, archeological site) exemplify the need for Integrated Coastal Zone Management.

The coastal area's primary feature is approximately 9 km of narrow, sandy beaches backed by eroding aeolianite sandstone ("kurkar") cliffs, up to a height of 30 meters. Today, these beaches are probably Israel's most valued leisure area.

Project objectives:

- _ Establishment of an integrated GIS database for the coastal zone.
- _ Establish a model for an Integrated Coastal Zone Management scheme (bathing, maritime sports activities, marinas, infrastructures etc.)
- _ Restoration and expansion of eroded beaches, by sand nourishment and up-to-date ecological marine constructions (e.g. submerged detached breakwaters based on "Geotube" solutions, reef balls, etc).
- _ Stabilization and minimization of coastal cliffs erosion.

Aspects and Limitations

During the last 50 years, large sections of the sandy coast and coastal cliff have been eroded and retreated due to the construction of marine and coastal structures, together with an extreme sea conditions. An expansion is planned for the coastal power plant, doubling its production capability. This poses a conflict, as the plant is surrounded by a promenade, an urban park and an airport, and stresses the need for the project. There is a large knowledge gap concerning bathymetry, wind, waves, currents, and sea-level data, static information, sedimentology processes, morphology and topography. The cities of Tel Aviv and Hertzeliya will enjoy the social-economic benefits of increased touristic activity in the restored beaches. The general public will enjoy an improved leisure area. The river outlet area should be of special interest, because of its unique ecological system. Up to date, there is no integrated approach to the developments on the one hand and the fragile and sensitive ecological assets on the other, so the risk of quick unsustainable, development is clear and present.

3. LEVEL OF DESIGN OF THE PROJECT

- _ The power plant expansion project is at a preliminary planning stage.
- _ An EIA for the Hertzeliya beaches restoration plan is in preparation.
- _ A submerged Geotube pilot plan is in preparation, on one of the beaches.
- _ A national master plan for the protection of the coastal cliff is in the process.

4. BUDGET AMOUNT ESTIMATION & SCHEDULE of INTERVENTION

- _ The project budget is estimated by €30 million.
 - _ The implementation will take place during the next 10 years.
- Therefore the forecast of this current project is to take place for about 3 years with an estimation of 1.5 million EU.

5. ACTORS INVOLVED

- _ National: Israel Ministry of Environmental Protection (regarding environmental aspects), Israel Port Authority (regarding marinas), Israel Ministry of Interior (regarding spatial planning), Israel Nature and Parks Authority (regarding Apollonia National park and ecological systems), Israel Archeological Authority, Israel Ministry of Tourism (regarding resorts).
- _ Regional: Tel Aviv and Herzliya Municipalities, Yarkon River Authority
- _ Companies: Israel Electric Corporation

6. MAP WITH LOCATION AND GENERAL FEATURES



1. TITLE OF THE PROJECT:

Eco-Friendly Marine Structures for Coastal Protection Solutions (Israel-02)

2. BRIEF DESCRIPTION OF THE TYPOLOGY OF THE PROJECT

The coastline of Israel as a model to many other coastal stretches in the Med region is a vulnerable interphase, subject to heavy degradation processes, partly human induced and partly nature induced. The latter is a process which is gaining attention as the CC is a powerful engine that is threatening the coastal areas. The coastal sandstone cliff in Israel (KURKAR) is a unique feature, occupying about 20% of the total length of the Med Israeli coast. A government decision was taken to protect around 14km of these cliffs, with the building of marine based structures that would reduce wave and current energy and lessen the impact on the shoreline cliffs. Since there are no natural bays or protecting structures in the Israeli territorial Med basin, and on the other hand, these coastal areas are heavily populated including on some cases, on top of the very coastal cliff itself, the only solution seems to be a series of structural works, both marine based and coastal based to reduce the impact of the degradation and erosion of the coastal area. Sand nourishment has been identified around the world and in this case also, as the most environmentally friendly soft and sustainable solution. However, the scarcity of sand reservoirs is of a crucial nature in the Israeli case, so we are bound to look for more innovative solutions.

The conservative ways include building breakwaters and waterfronts out of rocks, concrete structures of many configurations and textures. Attempting to support the design of structural works for coastal protection and while adapting to climate change results, this project which is based on eco-friendly marine structures will try to introduce alternatives for the old conservative structures, which may also enhance the endemic species and thus, strengthen the resilience of the local coastal ecosystem. The regional challenge is therefore to collect a number of coastal works around participating regions in the Mediterranean that would be willing to implement the envisaged structures in a coordinated way. That way, we will be able to create the conditions for the realisation of structural works and management solutions, favouring the collaboration between public (regional as well as national), private and scientific community sectors. The project: We will construct a pilot, real scale, breakwater made out of eco-friendly concrete blocks that will substitute the building blocks such as tetrapod's or natural land-originated boulders that by definition are strangers to the natural marine habitats of the eastern Med. In this project we will strive also to save on the sand resource, and instead, use more efficient, economic, ecological, alternative for the physical protection of the coastline. One of the important issues which this project is aiming to enhance, is the understanding of a feasible marine structures that would serve their main purpose of protecting the coastline features, but at the same time, may lower significantly the uncertainties of invasive species introduction and perhaps, induce the presence of endemic species, thus creating more meaning to ecological management of the coastal regions of the Mediterranean. Private companies such as SeaArc and Ocean Bricks will take part at this initiative and thus incorporating already experimented building blocks which should serve the purpose of the project.

The project will therefore consist of the following steps:

- 1.** Construction of a 1:1 scale of a "soft" breakwater as a part of an already marked project in a water depth of 15-20m in front of the city of Netanya or Ashqelon
- 2.** Continuous measurements of hydrodynamic characteristics of waves, currents, and other physical parameters which will be set a priori.
- 3.** Continuous measurements of biological assets on the breakwater's building blocks as well as on nearby control areas.
- 4.** A choice of at least two the three alternatives will be tested in situ for the construction blocks, possibly all.

5. An ecological, economic, engineering analysis and assessment will be made out of which we could recommend the feasibility of the project for further uses such as to other marine infrastructures.

3. LEVEL OF DESIGN OF THE PROJECT

At the this time we are able to introduced experimental results as well as laboratory test results for both physical and ecological assists of the proposed building blocks. The challenge is to see how it will hold within harsh eastern Med sea conditions, and see the interaction with its surroundings both in terms of marine ecosystems, protection of the coastal erosion, and the added forecasted value of improvement of a degraded marine ecosystem, while keeping the promise of an economic value which is competitive to any other solution. The pictures attached below, show clearly that the potential of enhancing marine life with the use of the Eco-Concrete blocks (by Sea Arc), and are present. The main obstacles of this proposal are financial resources and the lengthy processes in such a project.

4. BUDGET AMOUNT ESTIMATION & SCHEDULE of INTERVENTION

A rough estimation of building 100m of a breakwater, including the surveys needed, monitoring of all parameters is around 10-15 million EU. Schedule of intervention would be around 3-5 years, depending on the willingness of all stakeholders

5. ACTORS INVOLVED

- _ Ministry of Environmental Protection, Israel
- _ Municipality of Netanya/Herzlia
- _ Private companies - Sea Arc , DZ, OBS
- _ Academia – University of Bologna
- _ Research center – CAMERI, Haifa

6. MAP WITH LOCATION AND GENERAL FEATURES



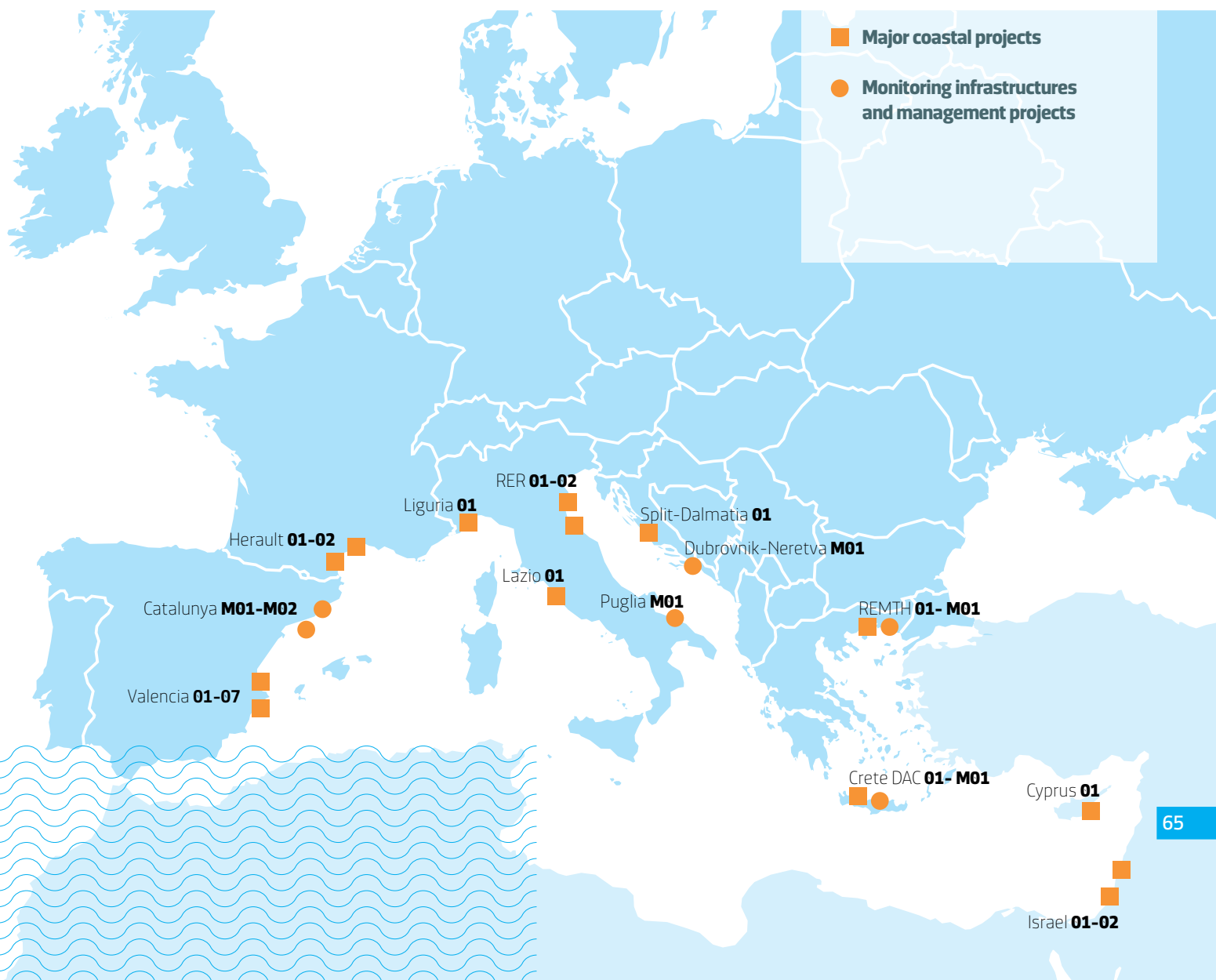
Eco-concrete pilot project, Haifa harbor.





Annex 4

Regional projects for monitoring Infrastructures and management plans Of coastal and marine areas



Catalunya Region

1. TITLE OF THE PROJECT:

The XIOM: a regional coastal observatory for the Catalan coast (Catalunya-M01)

2. BRIEF DESCRIPTION OF THE TYPOLOGY OF THE PROJECT

The Catalan coast is located in the north-western Mediterranean at the latitude $40^{\circ} 45' N$ to $42^{\circ} 25' N$ and long $0^{\circ} 45' E$ to $3^{\circ} 15' E$. Some environmental properties of the NW Mediterranean are highly conditioned by the fact that it is a semi-enclosed sea. The coastal wind field is highly heterogeneous with main components from E, NW and S. This will have some implication for the coastal wind waves. Even with the relatively short fetch in the NW Mediterranean, the Catalan coast can be impacted by damaging waves during storms. At the Ebro delta the complex winds develop bimodal spectral wave features. In the central and north coast typical unimodal spectra are found. The most important variations in sea level in the Catalan coast are due to meteorological conditions and in some areas the resonant effect of bays and harbours. Storm surges may be of the order of 1 m, a magnitude much larger than tidal range. This sea level variation has a very important effect on storm risk and coastal flooding and it is a very important factor when modelling coastal dynamics in extreme events. The continental shelf slope dynamics are dominated by a quasi-permanent slope current. The mean current intensity is not very strong (~ 10 cm/s at 100 m depth) but it presents a seasonal intensification in winter where velocities can reach higher values. The mean current intensity is not very strong (~ 10 cm/s at 100 m depth) but it presents a seasonal intensification in winter where velocities can reach higher values. Over the shelf, little work has been previously done over long time series. The measurements obtained allowed the identification of the relative influence of winds, Ebro river outflow and open sea dynamics on the shelf dynamics. The importance of coasts and the need for improving knowledge of their environment through the observation and modelling of processes is evident from human activities and ecosystems that they support. The capability of monitoring and predicting the marine environment leads to a more sustainable development of coastal and offshore regions. In recent years operational oceanography has been considered a necessity given its essential role in solving economic, environmental and social problems. For this reason, our project objective will be to continue with the coastal observatory activities in the Catalan coast and its contribution to a better understanding of processes that take place in this area. The XIOM network for oceanographic and coastal meteorological measurements (Xarxa d'Instrumentació Oceanogràfica i Meteorològica) will be owned by the Catalan government. wave buoys will collect wave height, period and direction data at local receiving stations, which will be then validated statistically, and the subsequent results will be displayed on website (www.xiom.cat). Water level recordings will be based on radar measurements and atmospheric variables recorded with typical meteorological stations. Finally, meteorological buoys with current meters will be deployed, at the same locations as wave buoys to record atmospheric variables and ocean currents at 5 and 15 m depth.

3. LEVEL OF DESIGN OF THE PROJECT

The XIOM first instruments were deployed by the regional harbour authorities and the coastal management department to provide observations to support local studies of beach evolution. In 1984 two scalar wave buoys were deployed at about 50 m depth in front of the most vulnerable regions close to Barcelona: Llobregat delta and Blanes. In 1990 the constant retreat of the coast line at the Ebro Delta (the main deltaic formation in the Mediterranean Spanish coast) stimulated the deployment of two directional wave buoys at 60 m and 8 m depth in the area, and two tide gauge and meteorological stations in neighbouring harbours. Finally, in 1992 a third scalar wave buoy was deployed in the Roses

bay. In 1997, some instruments were temporarily retired. They were reinstalled in 1999, and were then regarded as a single network providing homogeneous and real-time data, which was able to give support to wave-climate studies and forecast systems in addition to its former goals. In 2003 the Llobregat buoy was replaced by a directional one. Correspondingly, governmental involvement was reinforced by the addition of the Catalan Meteorological Service (METEOCAT) to the involved institutions, and regular instrument maintenance was guaranteed. Finally, in the frame of a regional plan for pollution accidents at sea expanded its measurements by adding current and meteorological sampling in the same locations. Its instrument composition has had no relevant changes since then. However, since 2012 all instruments have been temporarily retired.

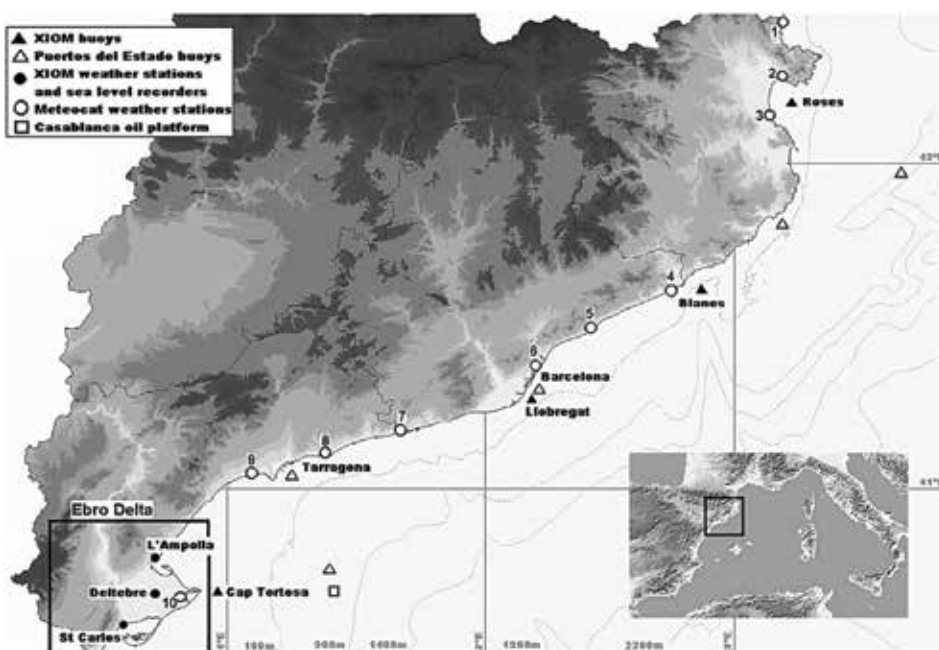
4. BUDGET AMOUNT ESTIMATION & SCHEDULE of INTERVENTION

The project budget is estimated by €2,5 million (deployment and maintenance of the network) during the next 10 years. Therefore the forecast of this current project is to take place for about 4 years with an estimation of €1 million

5. ACTORS INVOLVED

- _ Central Administration: Barcelona and Tarragona Harbour Administration (APB and APT) regarding big regional harbour
- _ Regional Administration: Coastal Management Department (Servei de Costes) regarding spatial planning and environmental aspects, Regional Harbour Authorities (Ports de la Generalitat) regarding marinas, Catalan Meteorological Service (Servei Meteorologic de Catalunya) regarding meteorological forecasting.
- _ Research centers Maritime Engineering Laboratory (LIM/UPC) regarding network manegament and coastal research.

6. MAP WITH LOCATION AND GENERAL FEATURES



Catalunya Region

1. TITLE OF THE PROJECT:

Towards a sustainable management and protection of the Tordera delta coast (Catalunya-M02)

2. BRIEF DESCRIPTION OF THE TYPOLOGY OF THE PROJECT

The Tordera delta is a small cusate delta located about 50 km northwards of Barcelona (NW Mediterranean). Its about 6 km sandy coastline extends from s'Abanell beach at the north (Blanes) to Malgrat de Mar beach at the south (Malgrat de Mar), with the Tordera river acting as a border between them.

This is a highly dynamic zone currently in retreat due to a combination of natural and human-made factors. Among them, the most important factor has been the decrease of Tordera river sediment supplies due to massive sediment extraction from the river course (in the 60's-70's). This has resulted in a progressive and significant narrowing of beaches in the areas closest to the river mouth (southernmost part of s'Abanell and northernmost part of Malgrat beaches). This is an important coastal tourism area, with the activity being essentially supported by camp sites located in the coastal/fluvial plain just back of existing beaches. The combination of existing infrastructures (e.g. those associated to camp sites, beach promenade) and progressive narrowing beaches has resulted in (i) a significantly increase in coastal damage during the last 2 decades and, (ii) in a depletion of the main resource supporting the economic development of the area (beach surface).

The current situation of the Tordera delta coast can be considered as the integrated result of the action of natural processes, human interventions in the territory and, lack of governance to tackle existing problems. In fact, until now, commitment to pursue a solution that considers the participation of all the social agents involved was low from all administrations involved. The favoured approach has been to solve problems as they appear, i.e. reactive management, which in many cases has (unintentionally) produced an increase in their magnitude and, even worse, make the system to approach to a tipping point. Within this context, the main goal of the project is to design a sustainable management and protection plan for the Tordera delta coast based on three main cornerstones: (i) restoring the integrated sediment dynamics, (ii) maintaining/enhancing natural values and (iii) promoting a sustainable economic development.

To this end, three phases have been identified:

- 1.** build up of deltaic coast evolution model during the last decades, assessing actual evolution rates and identifying results of past interventions along the coast;
- 2.** identifying conflicts and problems related to interactions and feedbacks between actual coastal dynamics and land-use;
- 3.** proposal of solutions and pre-design of required actuations.

3. LEVEL OF DESIGN OF THE PROJECT

A first assessment on coastal problems in the area has been already done using existing information. In addition to this, a study to propose short-term solutions to remediate/mitigate the present degradation of the system has been launched. This study has been designed to propose measurements compatible with the natural dynamics of the area in such a way that their implementation will not affect/condition any long-term management plan. In addition to this, other parallel studies affecting spatial planning in the area has also been done. Within them, the Water Agency of Catalonia has delimited flood prone areas to implement the EC Directive on Floods. The IGCC has acquired new data (aerial photographs and Lidar) in the area and, additional campaigns are also planned. All these studies and new data will be used to develop the project here proposed.

4. BUDGET AMOUNT ESTIMATION & SCHEDULE of INTERVENTION

The project budget is estimated by 70,000 € and a total duration of 1 year. The first phase will have a duration of 4 months and a budget of 15,000 € whereas the remaining phases 2 and 3 will have a total duration of 8 months and a corresponding budget of 55,000 €.

This budget does not include the acquisition of large scale topographic (Lidar) data and ortophotos which will be responsibility of the IGCC (Generalitat de Catalunya).

5. ACTORS INVOLVED

_ Catalan Government: Department of Territory and Sustainability. Spatial planning, environmental aspects and competences on management of the coastal zone.

_ Spanish Government: Ministry of Agriculture, Food and Environment (General Directorate of Marine and Coastal Sustainability). Competences on management and protection of the public coastal domain.

_ Regional Administration: Water Agency of Catalonia. River basin management.

_ Local Administrations: Municipalities of Blanes and Malgrat de Mar. Partial responsibilities on beach management issues, urban plans and liason with local stakeholders.

_ Local (economic) stakeholders: Camp sites representatives. Main local economic actors. Providing data, requirements and constraints for economic activity development.

_ Technology Center (Regional Administration): Institut Cartogràfic i Geològic de Catalunya (IGCC). Competences on geodesy, cartography and spatial data infrastructure in Catalonia. Provider of digital cartography (orthophotos) and Lidar data of the study area.

_ Research Center: Laboratori d'Enginyeria Marítima, Universitat Politècnica de Catalunya-BarcelonaTech (LIM/UPC). Coastal research. Analysis of conflicts and problems in the study area and proposal of solutions.

6. MAP WITH LOCATION AND GENERAL FEATURES



Puglia Region

1. TITLE OF THE PROJECT:

Common Implementation of tools for the enhancement of integration among Integrated Coastal Zone Management, Marine Spatial Planning and Marine Strategy Framework Directive in the Puglia Region (Puglia-M01)

2. BRIEF DESCRIPTION OF THE TYPOLOGY OF THE PROJECT

A coherent application of Maritime Spatial Planning (MSP; 2014/89/UE) and Integrated Coastal Zone Management (ICZM) will improve interaction between land and sea based activities supporting an integrated approach. This is not only integration of sectorial interests, but also integration at different governance levels and integration at EU policy level, such as Marine Strategy Framework Directive (MSFD), relevant for marine and coastal areas. Because many of these policy instruments are relatively stand-alone, they miss an overall consistency at a time when social issues and development are becoming more coherent. For a fully integrated management process to work it is vital that EU policies and other instruments (e.g. economic mechanisms) which also drive coastal change are addressed coherently. In order to address these issues this project aims to support, for the Puglia Region, the capacity building for Integrated Coastal (Zone) Management (ICZM) and Marine Spatial Planning (MSP) in relation to the Marine Strategy Framework Directive and specifically the development of new ICZM measures focused on achieving Good Environmental Status (GES).

The project is based on different and coordinated actions in the Puglia Region and foresees the contribution of different local actors (Public administration, Environmental Protection Agency, Universities and Research Centers).

The proposed action are:

— collection of all relevant data and information on many topics, as the geo-morphological features of the marine coastal area, the coastal and marine climate features, the oceanographic features, the marine-coastal biological communities, the terrestrial habitats, flora and fauna species, the environmental protection system, the land and sea uses and the restriction system (landscape, urban, hydrological, etc.)

— application of DPSIR model linking quality element of WFD, qualitative descriptors of MSFD to the natural/human pressure at local level (national or cross-border context) in order to give a global picture of the effect of pressures on marine ecosystems. Analysis of multiple stressors operating in the entire Puglia Region coastal area characterized by different pressures and management regimes (protected zones, touristic, urbanized and industrial ones) in order to identify the best strategy for risk prevention.

— implementation of the Article 8 of the ICZM Protocol in the Puglia Region: individuation of the set-back zone;

— Creation of an integrated GIS database for the Apulian Coastal and Marine Area based on the INSPIRE Directive. The database will support European initiative such as EDMODNET (European Marine Observation and Data Network);

— Implementation of a model for the ICZM and MSP for the Puglia Region.

— 3D hydrodynamic modelling of Apulian coastal waters, including model of sediment transportation (CMCC).

Aspect and Limitations

The Puglia coastal zone is an area of intense activity; the most important are the urbanization and the tourism (bathing), although the industrialization of some specific areas can also affect the quality of the marine-coastal environment.

The Apulian marine-coastal ecosystems are and have been investigated by different technical-scientific local Institutions. The most important are the Universities of Bari and Lecce, the Polytechnic University of Bari, the C.N.R.

Institutes of Lesina (ISMAR) and Taranto (IAMC), the Puglia River Basin Authority, the Regional Agency for the Environmental Prevention and Protection (ARPA Puglia) and the CMCC (Centro Euro-Mediterraneo sui Cambiamenti Climatici). All the mentioned Institution have data and information on the specific topics related to the marine-coastal environment. Particularly, the Polytechnic University of Bari (LIC Laboratory) contributed, as technical-scientific support, to the drafting of the Regional Coast Plan (PRC), while ARPA Puglia is in charge of the surface waters monitoring according to the 2000/60/EC Directive (including the marine-coastal and the waters at specific use as the bathing ones and for mussel-culture purposes). The SHAPE Project of the apulian coastal zone is regulated by actors at different levels (region, municipality) through many Regional Acts, including Laws and Plans for the management of the human activities. Unfortunately, in the current situation the Puglia government system does not provide for the coordination of the integrated management of all the activities that take place on the coastal zone. The fragmentation of both information/data systems and governance levels, is probably the main limitation for a coherent and Integrated Coastal Zone Management.

3. LEVEL OF DESIGN OF THE PROJECT

The nut of the project was planned capitalizing the achievements and results of SHAPE project (<http://www.shape-ipaproject.eu/>), with explicit references to the action 3.2 (“Testing some provisions of the ICZM Protocol through local/regional demonstration projects”) and 4.a (“Pilot Project on ICZM-MSP integration”), both applied to the pilot area of Torre Guaceto and neighbouring costal area of Brindisi (example figure 1 and 2).

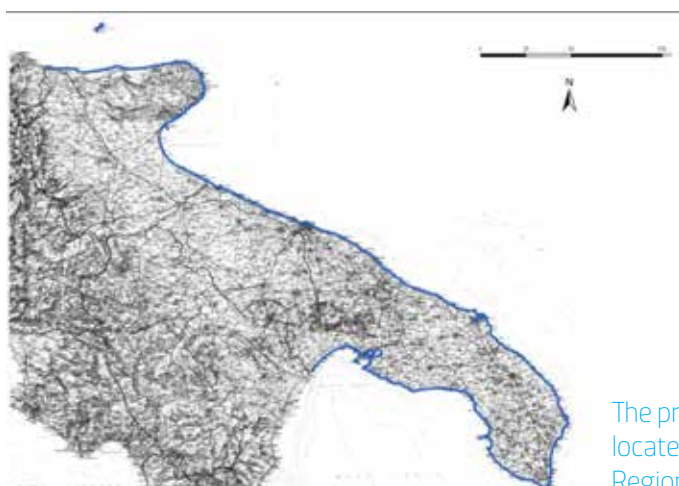
4. BUDGET AMOUNT ESTIMATION & SCHEDULE of INTERVENTION

Project budget: to be estimated
 The implementation is scheduled by 2015-2016

5. ACTORS INVOLVED

- _ Puglia Region
- _ Environmental Protection Agency of Puglia Region
- _ Basin Authority of Puglia Region
- _ Centro Euro-Mediterraneo sui Cambiamenti Climatici
- _ Universities and research centers

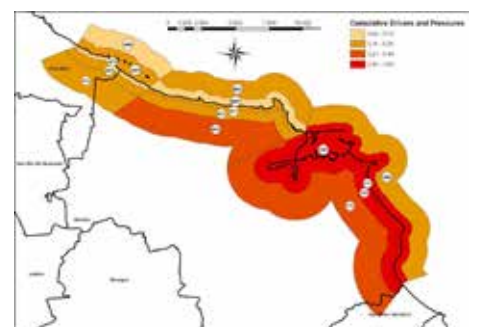
6. MAP WITH LOCATION AND GENERAL FEATURES



The project area is located along the Puglia Region coast line .



Distribution and delimitation of zones subjected to restrictions in the study area (SHAPE Project - ARPA Puglia)



Map of the Driver-Pressure cumulative values in the 15 sectors of the study area (SHAPE Project – ARPA Puglia)

Region of East Macedonia and Thrace

1. TITLE OF THE PROJECT:

REMTH Coastal Management Master Plan (REMTH-M01)

2. BRIEF DESCRIPTION OF THE TYPOLOGY OF THE PROJECT

REMTH disposes of approximately 450 km of coastline without any significant hard defences nor beach nourishment projects, till recently.

Locally severe erosion problems have occurred, EUROSION, COASTANCE and MAREMED projects have studied the phenomena but there are no detailed data for the entire coastline. The Regional Direction of Technical Works of REMTH is responsible for the proposition, construction and management of coastal defence works including beach nourishment projects. Municipalities are also responsible for coastal protection. The Port Authorities are responsible for coastal defence works related to ports. In the last years, because of severe erosion problems and pressure for the touristic development of the coastline, municipalities and other local authorities have proceeded in the design and construction of few coastal works with local impact (nearshore breakwaters in Kavala, seawall in Alexandroupoli etc.). REMTH wishes to develop a regional Coastal Management Master Plan so as to better coordinate the local authorities and plan and manage coastal works in regional level so as to limit the erosion phenomena but also make the best of the available resources.

REMTH plans to create a digital database on the state of erosion of the coastline (an adaptation of SICELL) based on:

- _ existing survey data
- _ the acquisition and elaboration of satellite photos from multiple dates
- _ inventory of existing coastal works (build of planned to be build)

in order to be able to better plan future littoral management and also take preventive measures through planning procedures (urban and spatial planning, major infrastructure etc.)

This database will allow the identification of areas with the most important erosion rate. The next step of the MasterPlan will be to implement the COFLERMAP methodology to selected critical areas, so as to produce Hazard and Risk Maps and prioritize the areas that need coastal works or the areas where future development should be limited because of high coastal flood hazard. The MasterPlan will be completed by the proposition of a long term coastal Monitoring scheme.

3. LEVEL OF DESIGN OF THE PROJECT

Regional Coastal Protection MasterPlan

REMTH wishes to use the MasterPlan in order to use at operational level the Bologna Charter Best Practices

4. BUDGET AMOUNT ESTIMATION & SCHEDULE of INTERVENTION

- _ Budget estimation for the MasterPlan 500K€ to 1M€
- _ Necessary time 3 year

5. ACTORS INVOLVED

- _ Central Administration, Cadastral Service, Ministry of Infrastructure and Ministry of Environment
- _ Regional Directorate of Technical Works, Regional Service of Environmental and Spatial Planning, Regional Service of Water Bodies – All Coastal Municipalities – Management Bodies of the protected coastal areas – Port Authorities of Kavala and Alexandroupoli – Democritus University of Thrace
- _ Private sector – Owners of coastal land, professional of tourism (hotels, bars, restaurants, cafes)

6. MAP WITH LOCATION AND GENERAL FEATURES



Picture of REMTH coastline from the Strimonas River Delta, on the west to Evros River Delta on the east.

Dubrovnik-Neretva County

1. TITLE OF THE PROJECT:

ICZM PLAN FOR THE DUBROVNIK NERETVA COUNTY (DNC-M01)

2. BRIEF DESCRIPTION OF THE TYPOLOGY OF THE PROJECT

The project area is Dubrovnik-Neretva County (DNC), the southernmost county in the Republic of Croatia. It encompasses an area of 1785 km² and has about 127,000 residents. Territorially, it is organized into 22 local self-administration units, divided into 5 cities (Dubrovnik, Korčula, Ploče, Metković and Opuzen) and 17 municipalities (Blato, Dubrovnik coastal region, Janjina, Konavle, Kula Norinska, Lastovo, Lumbarda, Mljet, Orebić, Pojezerje, Slivno, Smokvica, Ston, Trpanj, Vela Luka, Zažablje and Župa dubrovačka) (Fig. 1). The center of the County is the city of Dubrovnik. The specificity of the Dubrovnik-Neretva is in its narrow and heterogeneous coastline, separated from the interior by a mountain range, and divided at Neum by the state border with Bosnia Herzegovina, while it has a natural connection to the interior and the northern Pannonic part of Croatia in the area of the Lower Neretva Valley. Thus, the territory of the county is comprised of two basic entities: the relatively narrow coastal area with its series of islands near the mainland and in the open sea (the most significant of which are the islands of Korčula, Mljet, Lastovo and those in the Elaphite archipelago), and the Lower Neretva Valley with its coastline which is listed as Ramsar site with the most valuable remnants of Mediterranean wetlands on the eastern Adriatic coast.

Dubrovnik Neretva coastal area is very indented and varies from protected bays with sandy beaches of exotic beauty to the exposed steep coast with cliffs to the open sea which makes this county one of the most beautiful areas in the Mediterranean. The County area has all the characteristics of Mediterranean climate with climatic differences that result from the existence of high mountain barriers adjacent to the coast, numerous islands and occasional continental influences.

This area's rich endowment of NATURAL HERITAGE (according to the Nature Protection Act total of 39 natural areas and 1 mineral: 1 national park, 10 special reserves, 4 special forest vegetation reserve, 4 special reserve – ornithological, 1 special reserve - ichthyological –ornithological, 1 special marine reserve, 1 nature park, 6 nature monuments, 5 nature monuments – geomorphological, 1 nature monument - rare specimen tree, 8 significant landscapes, 5 park-forest, 8 park architecture monuments, 1 park, 1 arboretum, 4 individual trees, 2 group of trees, 1 protected mineral; in addition, there is a 166 areas, total of 56,7 % DNC area under NATURA 2000 program) and CULTURAL HERITAGE (especially rich history, total of 1893 cultural monuments, of which 259 registered, 486 preventive protected and in 1145 recorded monuments, urban center of Dubrovnik is UNESCO protected and registered as a World Heritage Site, in this category for protection currently in the process of registration are urban units of Korčula and Ston and tombstone monuments "Stećci". Besides the valuable, protected historical center of world importance, it should be noted numerous fortifications, civil structures, religious buildings and summer residences in Dubrovnik. Furthermore, there are extremely valuable prehistoric archaeological sites - stand out those in Dubrovnik area, and Vela Luka, from Greek heritage - Corkyra, Epidaurus and the Roman period - Narona, underwater around Cavtat and Polače on Mljet, also extremely valuable and intangible cultural heritage of great importance are Dubrovnik Summer Festival and the Festival of St. Blaise in Dubrovnik) exemplify the need for INTEGRATED COASTAL ZONE MANAGEMENT (ICZM).

This process should emphasize the management of the coast using an integrated approach, regarding all aspects of the coastal zone, including geographical and political boundaries, in an attempt to achieve sustainability. It should cover

the full cycle of data collection, planning, decision making, management and monitoring of implementation. It should also involve informed participation and cooperation of all stakeholders to assess the societal goals in the given coastal area. In the long-term context it should balance environmental, economic, social, cultural and recreational objectives, all within the limits set by natural dynamics. The ICZM Plan is crucial for balanced and sustainable development of Dubrovnik Neretva coast, islands and hinterland, as an integrated approach for adaptation concerning climate variability and climate change threats and for preservation and protection of natural and cultural heritage while also improving the quality of life of local population thus increasing the quality of touristic offer as the backbone of economy in this County. The ICZM Plan is document of strategic importance for all development projects and could give direction to our County for application of project ideas on available EU funds.

The area of Dubrovnik-Neretva County has, in the European context, a significant level of natural preservation and good prospects for economic development. A number of obstacles to administrative, institutional, financial and organizational or, simply, the human plane prevent its full momentum today. In addition to the demographic structure, inadequate waste disposal, endangering valuable natural habitats, etc., development and planning documents DNC's, as well as consultation meetings with targeted stakeholders, point to several key issues that require a more detailed discussion. These are:

- _ Littoralization process, with insufficient mechanism and control of the implementation of spatial planning solutions;
- _ Underdeveloped infrastructure;
- _ Unplanned growth of tourism (including nautical tourism);
- _ Inefficient management of maritime property;
- _ Inadequate and insufficient use of professional capacities;
- _ Climate change threats.

PROJECT OBJECTIVES:

_ Analysis and prediction of key problems and vulnerability of the project area, in order to propose optimal development scenarios, analyzing only the strategic matters necessary for proper development of the Plan for Integrated Coastal Zone Management. This objective is crucial for prediction of future development trends and for estimation of the need for coastal resources and their ability to submit these pressures. The predictions should be based on the assessment of the possible effects of activities on natural resources and socio-economic opportunities in coastal areas. It should be displayed in the form of inter-sectorial alternative scenarios, some of which are each dealing with different development directions in the future. Using criteria and indicators defined for each of the fundamental objectives, the most suitable scenario should be elected. Influence of neighboring countries should also be taken into consideration because the environmental issues cannot be viewed individually, but as a synergistic initiatives and through cooperation of all countries involved. By using integrated approach, analysis should also take into account state of the art concerning climate variability and climate change threats.

_ Formation of Integrated Coastal Zone Management Plan as an official document for creating conditions for making operational decisions with the purpose of sustainable development of the given coastal area and adaptation to climate change threats. It must be in connection with the national strategic documents relating to coastal zone management, primarily with the national ICZM strategy and it must set the carrying capacity and terms for the sustainable use of the environment, marine and terrestrial coastal area. Following the formation of

the official Plan, strategic environmental assessment (SEA) should also be implemented as a mandatory document for each plan or program which is adopted at the national, regional or local level. The objectives of the Coastal Plan for Dubrovnik Neretva County should be to promote accepting sustainability and resilience as coastal zone development criteria; to create prerequisites for defining sustainability in concrete domains (population, coast, space, water, sea, nature, production); to contribute to the strengthening of participation and education; provide guidelines for sectoral policies and plans to achieve sustainability and resilience; make recommendations for resolving conflicting issues in achieving sustainability and resilience; offer a platform for sustainable development of the DNC coastal zone based on water as its fundamental resource, blue economy and smart specialization; offer best adaptation scenarios for climate change threats. The Coastal Plan may also have an influence concerning allocation of EU funds linked to coastal development. In addition to other things, the Coastal Plan contributes to protection, restoration and preservation of the coastal zone's resources. Special emphasis should be given to the fact that about 30% of the coastal area in DNC is under a certain level of protection. It should be noted that the preparation and adoption of management plans for protected areas need to be in accordance with the respective laws and regulations.

— Institutionalization of ICZM at the county level by the Dubrovnik Neretva County decision to launch the formal process of ICZM and to form a coordinating body by opening workplaces for the implementation of ICZM within the Institute for Spatial Planning of DNC. This objective involves professional training of staff for the implementation of ICZM courses and practice at qualified institutions, organization of expert workshops, study visits, seminars and promotional activities on ICZM in the County thus strengthening human resources as a fundamental prerequisite for the establishment and perpetuation of the process of ICZM. This objective includes all relevant data on ICZM coordination among all relevant institutions. For this purpose inclusion of GIS (geo-information system), computer-supported information system is planned. Digital display and analysis of geographic features and events that take place over them, which integrates spatial and other data types on ICZM relevance within a known database structure, provides software tools and functions that can be used in the processing and presentation of geographic objects. In addition to the GIS system, introduction of internal web platform to facilitate data exchange is proposed. Establishment of a permanent coordination body on the County level will ensure compliance and the integration of public policies and local development plans.

3. LEVEL OF DESIGN OF THE PROJECT

At this point, we have developed Manual for integrated coastal management in Dubrovnik Neretva County as the base document for ICZM Plan creation and implementation. This Manual has been created through project COASTANCE (Regional action strategies for coastal zone adaptation to climate change) and main makers of this document are experts from Priority Actions Programme/ Regional Activity Centre (PAP/RAC) which are key component of the Mediterranean Action Plan (MAP), itself part of the United Nations Environment Programme (UNEP). Initially through project COASTANCE and following through project COASTGAP (Coastal Governance and Adaptation Policies in the Mediterranean) we have formed a Group for integrated coastal management in Dubrovnik Neretva County which consists of representatives of all institutions in the DNC that directly or indirectly deal with the protection, evaluation and management of coastal areas of the County.

4. BUDGET AMOUNT ESTIMATION & SCHEDULE of INTERVENTION

To be defined.

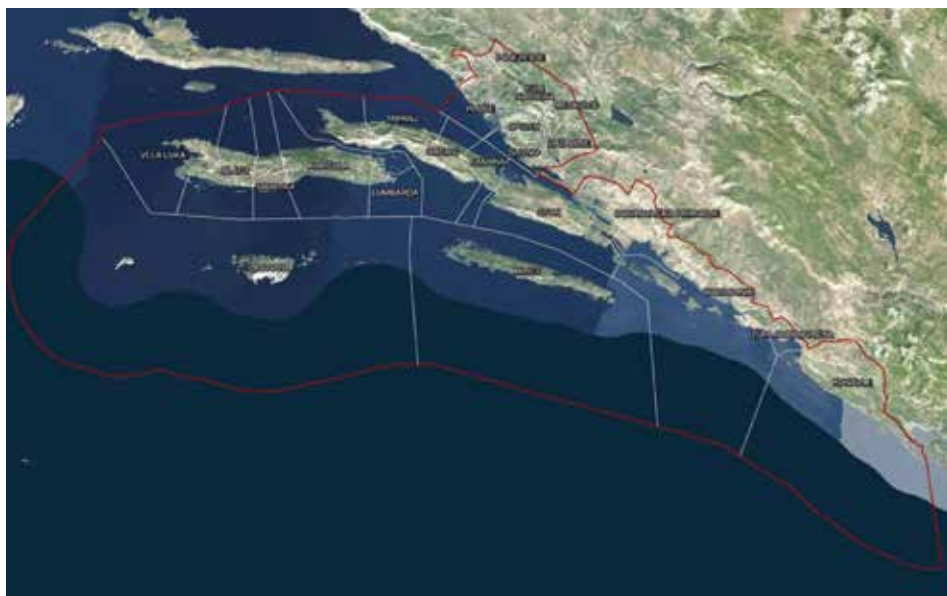
5. ACTORS INVOLVED

Institution members of ICZM Group in Dubrovnik Neretva County:

- _ Dubrovnik Neretva Regional Development Agency DUNEA
- _ Institute for Spatial Planning of Dubrovnik Neretva County
- _ Department of Tourism, Maritime, Enterprise and Energy of Dubrovnik Neretva County
- _ Department for Environmental and Nature protection of Dubrovnik Neretva County
- _ Public Institutions for Management of Protected Natural Values of Dubrovnik Neretva County
- _ Institute of Public Health of Dubrovnik Neretva County – Department for Environmental Health
- _ University of Dubrovnik – Aquaculture department
- _ University of Dubrovnik – Maritime department
- _ Dubrovnik-Neretva County Port Authority
- _ Vela Luka Municipality Port Authority
- _ Croatian Forests (Forestry offices Metković)
- _ Croatian Roads (Technical offices Dubrovnik)
- _ Municipality of Župa dubrovačka
- _ City of Dubrovnik Development Agency DURA
- _ City of Dubrovnik Department for Urbanism, Spatial Planning and Environmental Protection
- _ Natural History Museum Dubrovnik

In coordination with experts from Priority Actions Programme/Regional Activity Centre (PAP/RAC). Kind of involvement will be defined through future collaboration in coordination with all relevant institutions.

6. MAP WITH LOCATION AND GENERAL FEATURES



Location area – Dubrovnik Neretva County

Decentralised Administration of Crete

1. TITLE OF THE PROJECT:

Crete Integrated Coastal Zone Management Master Plan, Observatory implementation (DAC-M01)

2. BRIEF DESCRIPTION OF THE TYPOLOGY OF THE PROJECT

Crete disposes of approximately 1148 Km of coastline out of which 27.7% beaches and 2.7% artificial beach (according to the EuroSION 2004 project), 70% to 80% of the beaches is estimated to be threatened by erosion but no global vulnerability map is available. Based on a through vulnerability analysis of the Cretan coast, using the Coastal Vulnerability Index by Alexandrakis (2014), for the nationally funded ClimaTourism project, established that approximately 65% of the Cretan beaches are under erosion. Locally severe erosion problems have occurred, EUROSION, COASTANCE, AKTAIA, ClimaTourism and MAREMED projects have studied the phenomena but there are no detailed data for the entire coastline.

In the context of the COASTANCE project a first inventory of 125 sites disposing of coastal works have been identified. These works have been constructed without taking in consideration the dynamics of the whole sedimentary cell and many of them have created erosion problems or they have not produced the desired results. In the context of the national AKTAIA project detailed data have been collected for the erosion in the East Crete part, a data set which was further integrated and completed within the ClimaTourism project. This dataset now includes data for all Cretan beaches, referring to shoreline retreat, sedimentology and wave climate. Littoral cells have been identified for 302 beaches. Also, the coupled ClimaTourism and AKTAIA dataset available at FORTH-IACM, include information for man-made structures, and, a specific database recording the interference of these structures with environment. DAC wishes to unify all these available scientific data and create an operational tool for Integrated Coastal Zone Management. DAC in collaboration with FORTH-IACM wishes to develop a regional Integrated Coastal Zone Management Master Plan so as to better coordinate the local authorities and plan and manage coastal works in regional level so as to limit the erosion phenomena but also make the best of the available resources.

DAC in collaboration with FORTH-IACM plans to create a digital GIS database on the state of erosion of the coastline based on:

- _ existing survey data
- _ existing data and from research projects like AKTAIA and ClimaTourism
- _ the acquisition and elaboration of satellite photos from multiple dates
- _ inventory of existing coastal works (build or planned to be build)
- _ socio-economic data like land-use, concentration of economic activities, touristic development etc.

in order to be able to better plan future littoral management and also take preventive measures through planning procedures (urban and spatial planning, major infrastructure etc.)

This database will allow the identification of areas with the most important erosion rate. The next step of the Master Plan will be to implement the COFLERMAP methodology (from the MAREMED and COASTGAP project) and the Coastal Vulnerability Index (from the nationally funded Clima Tourism project) to selected critical areas, so as to produce Hazard and Risk Maps and prioritize the areas that need coastal works or the areas where future development should be limited because of high coastal flood hazard. The joined environmental and socioeconomic approach of the problem can provide a management tool to mitigate the impact of coastal erosion, through a realistic cost-benefit analysis for planning protection measures. The Master Plan will be completed by the proposition of a long term coastal Monitoring scheme. DAC in collaboration with FORTH-IACM will use the results of the Monitoring scheme and

any other new data to periodically update the database and function as a Coastal Observatory. For that purpose DAC will seek for international collaborations in order to become a member of a Mediterranean Network of Coastal Observatories and be able to improve the operation of the Cretan Observatory. The produced database and Hazard and Risk Maps will be open to the public and available on-line. Training sessions will be organized for public services as Regional and Municipal Technical services, cadastral services etc. so as to get familiar with these tools and use them operationally. All new projects public and private (municipal planning, coastal works, port works, hotel resorts etc.) will be able to use these data free of charge. The proposed division of Crete in sediment cells will become a reference for all projects that influence coastal areas and be used as such in the licensing process. For example:

_ Coastal protection works XX are positioned in the sedimentary cell 14B which is under erosion and under the MasterPlan is a first priority zone for coastal protection works.

_ Hotel Resort YY is positioned in the sedimentary cell 11A, which is not under erosion according to the MasterPlan and the proposed construction works are outside the critical zone

The proposed Master Plan will be a useful tool for implementing Integrated Coastal Zone Management in Crete and will gather the necessary information in order to introduce ICZM into the standard Environmental and Spatial planning procedures.

3. LEVEL OF DESIGN OF THE PROJECT

Regional Coastal Protection MasterPlan

DAC wishes to use the MasterPlan in order to use at operational level the Bologna Charter Best Practices

4. BUDGET AMOUNT ESTIMATION & SCHEDULE of INTERVENTION

Budget estimation for the MasterPlan 750K€ to 1M€

Necessary time 3 year

5. ACTORS INVOLVED (and kind of involvement)

_ Central Administration, Cadastral Service, Ministry of Infrastructure and Ministry of Environment as managing bodies

_ Regional Directorate of Technical Works, Regional Service of Environmental and Spatial Planning, Regional Service of Water Bodies – All Coastal Municipalities - Management Bodies of the protected coastal areas – Port Authorities as management authorities

_ IACM -FORTH's Lab of Coastal research as Expert in coastal modelling, surveying and monitoring, will develop and adapt the database for the needs of DAC and will provide the data needed.

_ Private sector – Owners of coastal land, professional of tourism (hotels, bars, restaurants, cafes) as end users

6. MAP WITH LOCATION AND GENERAL FEATURES



Picture of Crete's coastline, the region comprises the island of Crete and small neighboring islands

notes

A series of horizontal dotted lines for writing notes.