The Stable Strait Crossing System. What Developments and Opportunities?

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Abstract. The Strait of Messina area is affected by one of the greatest works of the third millennium: the bridge and related infrastructure that will connect the two sides, Sicilian and Calabrian. Territories will have to be reorganized with respect to the artificial welding, the stable crossing. Territorial continuity will unite two metropolitan cities that will no longer be physically separated. But how will activities be organized along the coast, settlements, ports, relations, and what initiatives will be undertaken to enhance and publicize the cultural and environmental heritage, to revitalize the two territories? Coastal facades will have to be an active part of urban regeneration and development processes, also looking at defense against hydrogeological risk and the long-term effects of climate change.

This is an opportunity to be seized. The essay proposes an interpretation of the environmental, economic and social challenges that the "Bridge on the Strait" project will raise; the Integrated Plan for the Strait Area drafted in 2019 will be illustrated with a far-sighted vision, with and without a stable crossing several.

Keywords: Accessibility · Infrastructure · Strait of Messina

1 Introduction

The bridge over the Strait of Messina is a project for the construction of a road infrastructure between the cities of Messina and Villa San Giovanni, connecting the region of Sicily to Calabria and the European continent, in response to the need for the realization of a stable road and railway connection of the Strait of Messina.

Its realization and all the problems associated with it have been talked about for some time now, but if we tried to reverse the point of view, we would also realize how the current needs are not solely related to the lack of a physical college, but rather to the actual readiness of the host cities.

Real connection would become the outline and consequence of a reorganization of a refocusing of sites of interest.

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O. Gervasi et al. (Eds.): ICCSA 2023 Workshops, LNCS 14109, pp. 240–258, 2023.
https://doi.org/10.1007/978-3-031-37120-2_16

It is necessary to start from a reinterpretation of the territory in order to equip it principally with the necessary responses to today's needs and initiate a profound redevelopment of the areas concerned. This process could trigger a medium- and long-range change that could lead to great goals for the island and the peninsula.

A new perspective must be sought, looking at the coastal strip from the sea and laying the groundwork for the change we are heading for. The essay aims to illustrate the necessities of the place, investigate the proposed strategies of the Master Plan drafted for the Straits area, and help the re-launch of the area by placing it at the center of a new social and economic dimension [1] (Fig. 1).



Fig. 1. Land-sea interface. Source: https://www.gettyimages.it/immagine/mare

2 The Master Plan for the Straits Area

The Strait of Messina has always been considered an evocative place rich in history and folklore, just think of the dense web of myths and history that has been woven for years about that portion of the sea that laps two lands not quite distant, but not quite close either.

Their history for years has been bound together by common issues such as the interminable diatribe over the construction of the Straits Bridge, but even more so they are bound together by their incontrovertible nature. They are places of exchange, of connection, strips of land born and developed around their facing the sea, a characteristic that makes them unique and indispensable for the island as for the peninsula [2] (Fig. 2).

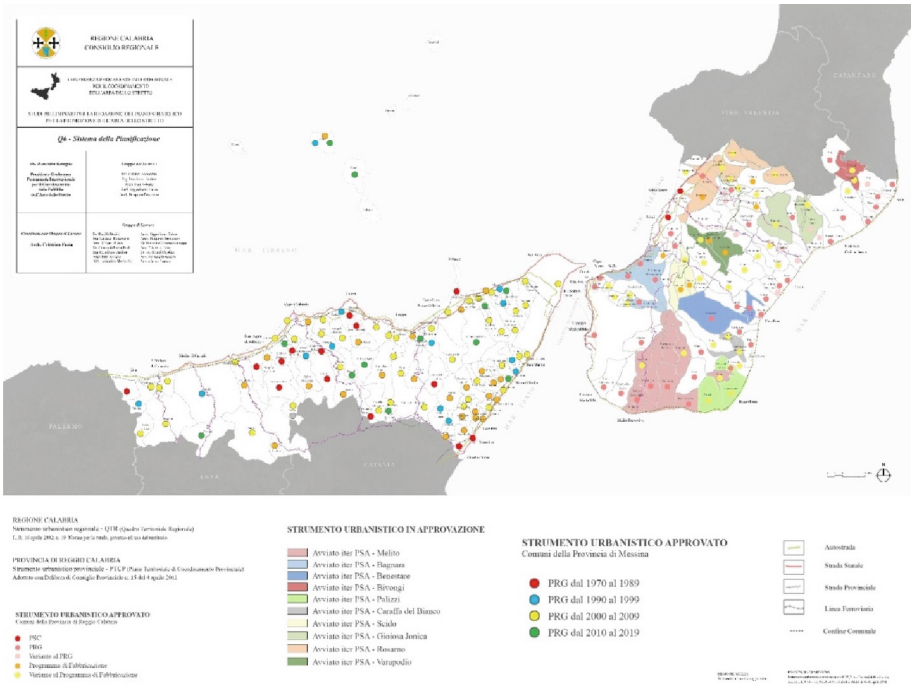

Fig. 2. Planning System Source: Masterplan and graphics drawn up by the group of 13 experts coordinated by Celestina Fazia.

In Greek evocations already their importance and power can be perceived. Scylla, an incredibly beautiful nymph, is transformed by the sorceress Circe into a sea monster, and together with Charybdis, a frightening creature born of ZES, they guard the strait, making that strip of sea difficult to navigate.

Their strategic location has always made these waters and these two cities not only attractive, but above all crucial for cultural, economic and political exchanges.

When talking about the straits, one cannot limit oneself to talking about the settled and settled territory, but a much broader look is necessary. One must talk about their needs as a land-sea interface, a definition inherent in their nature as port and maritime cities. It is this duality that makes the planning process very delicate and complicated.

The Straits area cannot be enclosed only to the mere commercial sphere, but it is also true that it represents a main axis of interchange, a great opportunity to re-evaluate the main and secondary strategic nodes. One of the tools to achieve this ultimate goal is certainly the recently drafted Strategic Plan for the Promotion of the Straits Area, which is preparatory to the Master Plan [1].

The latter by setting as its primary objective the re-functionalization of the areas concerned aims at the better usability of the area, taking into consideration all the actors involved and highlighting the potential of some projects already started, giving space and emphasis to the development of other projects of common interest, creating the right scenarios for the redevelopment of the Strait [2] (Fig. 3).

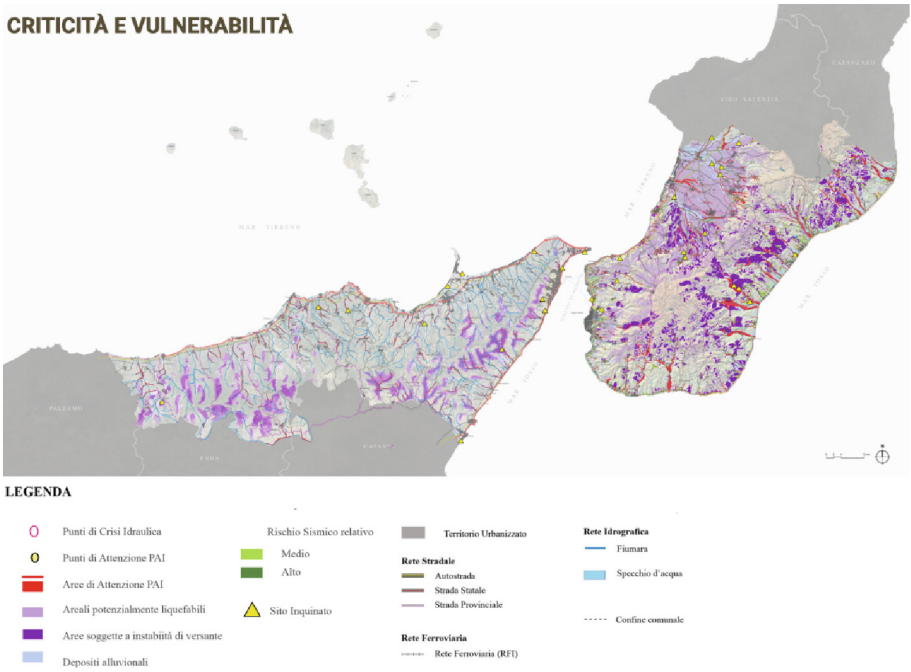

Fig. 3. Strait area criticality and vulenrability. Source: Masterplan and graphics drawn up by the group of 13 experts coordinated by Celestina Fazia.

The Preliminary document for the drafting of the Strategic Plan consists of a reconnaissance analysis document and is accompanied by a variety of graphic works, including a final synthesis document suitable for the definition and overall vision of the project scenarios, gathering and systematizing the outcomes of the analysis work.

In the strategic definition, spatial realities were identified through a macro-zoning that aims to connect the local and wide area systems. Starting from the study of the land-sea interface as locations of flows, interactions, exchanges and opportunities.

The document aims to highlight the hitherto unexpressed possibility of activating territorial coalitions through participation and involvement finally giving the possibility of achieving a metropolitan macro-region gravitating around the identified focal points.

This objective appears to be achievable only by insisting on the right method of planning by placing at the center of the study some salient points such as the accessibility and usability of the Strait area with a multi-level interpretation that interests not only the infrastructural aspect, but also the accessibility of areas with a high tourist vocation, the enhancement of the historical and environmental heritage, of which the area is steeped, and the enhancement of the landscape itself. All this is, of course, aimed at a new promotion of the sites concerned, which will eventually be able to lead to the real interest of economic and innovative development by commanding such important factors as employment growth, the relationship between public administration and business, and much more [3].

The goals set have the ambitious role of triggering the real process of upgrading the physical, infrastructural, environmental, functional and social straits.

Through the analysis process, the five key themes on which to develop the redevelopment process were identified, which compose in summary the strategic actions identified in the plan:

- Infrastructure and mobility (see Table 1).
- Services and metropolitan endowments (see Table 2).
- Environment energy and sustainability (see Table 3).
- Cultural heritage, protected areas and Landscape (see Table 4).
- Settlement systems, socio-demographic dynamics and productive realities (see Table 5).

From the perspective of a new reading of the area, the aspect of port infrastructure cannot be overlooked. In the Strait area, port nodes have very different characteristics and flows. The Strait Port Authority includes Messina, Tremestieri, Milazzo, Reggio Calabria and Villa S. Giovanni. An area daily affected not only by trade, but also by flows of citizens, which also count many commuters. It seems clear that it would be necessary to reinvest in these infrastructures by making the territory's physical and technological connections more efficient. Prepare the infrastructure to accommodate the real flow from which they are interesting and divide it in a more unified way by investing, for example, in other connections such as the Gioia Tauro port.

It seems clear how we need to reinvest in an area with all the qualities needed to live up to today's expectations. Focusing on a medium- and long-range strategy aiming at strengthening the territorial identity, taking advantage of the realization of high-quality works capable of focusing attention on this area of intervention [4].

The strait that has always oscillated between myth and culture, landscape and environmental quality, a place of union and social exchange, can be revitalized in the global scenario and cope with the changes that are affecting the region. A stable physical crossing would certainly underscore the need for a new adjustment to a flow that had hitherto remained only by sea, but the absence of a road infrastructure cannot slow down a reinterpretation of the territory that has already been triggered and is clamoring for its blossoming [5].

Scylla and Charybdis, protective and silent monsters, no longer frighten, but rather must now be the new cradle of the strategic change of which the Strait area is not only deserving, but a necessary spokesman (Fig. 4).

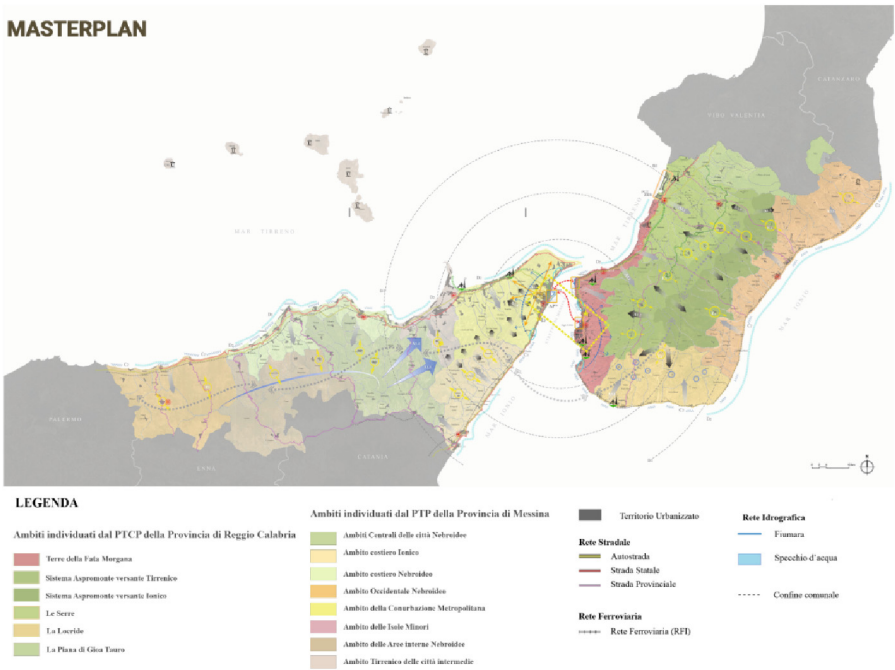

Fig. 4. Master Plan for the Straits area. Source: Masterplan and graphics drawn up by the group of 13 experts coordinated by Celestina Fazia.

Table 1. Summary of the strategies underlying the preliminary document for the Strategic Plan (sector A = Infrastructure and mobility). Source: Masterplan and graphics drawn up by the group of 13 experts coordinated by Celestina Fazia.

Affected sector	General objectives	Specific goals	Strategies	
A Infrastructure and mobility			*N. Identifier*	*Title Action*
	Inner-city cohesion	Improve connections between inland areas and smaller towns, both by upgrading current facilities and reorganizing the public transportation system	A1 A1.1 = aspromonte system/ Ionian slope A1.2 = aspromonte system narrow slope A1.3 = aspromonte system Tyrrhenian slope A1.4 = Nebrodi Milazzo system A1.5 = Nebrodi Messina system	Smart road system_ Improving accessibility by encouraging the use of energy-saving means energy to produce energy from renewable sources (self-producing stations and docks energy/solar) by creating a smart road system
	Countering the spatial and social segregation of urban centers and the territory of the 2 metropolitan cities Facilitate the process of conurbation between the cities of Reggio Calabria and Messina and territorial continuity	Countering the spatial and social segregation of urban centers and the territory of the 2 metropolitan cities Facilitate the process of conurbation between the cities of Reggio Calabria and Messina and territorial continuity	A2 A2.1 = Messina Strait area A2.2 = territorial continuity Messina Strait Area	Intermodality and Crossing the Strait. Intermodality in the Strait and local public transport in the integrated metropolitan area must support the metropolitan strategic plan of the 2 cities in a broader relational and infrastructural logic that integrates urban functions and regeneration processes. Conurbation and Territorial Continuity_ Implementation of the Project Agreement between Reggio Calabria and Messina for Territorial Continuity in the Strait Area, dated 29.5. 2017
	Recovery of disused Infrastructure	Promote sustainable and inclusive mobility, enhancing multi-modality (parking lots intermodal, bicycle lanes, etc.)	A3 A3.1 = disused railway road infrastructure with roadside houses and stations	Slow-road net Recovery of disused infrastructure (rail and road) and creation of a walking and cycling city: New urban connectivity imposing new modes of travel, crossing and emotional enjoyment

(*continued*)

Table 1. (*continued*)

Affected sector	General objectives	Specific goals	Strategies	
			A3.2 = depowered infrastructure, in areas at risk, old disused routes	Life-risk lines_ The system of infrastructures that can perform lifeline functions in the ME and RC metropolitan areas. Management of the infrastructure assets under emergency conditions will take place through the development of new technologies for risk mitigation
		16 Port Authority Organization The creation of the Single System Authority is an answer to the problem of mobility in the Straits Area	A4 A4.1 = Governance and operation 16th Port Authority	16 Port Authority Organization and operation for flow management and crossing in the Straits area

Table 2. Summary of the strategies underlying the preliminary document for the Strategic Plan (sector B = Metropolitan services and endowments). Source: Masterplan and graphics drawn up by the group of 13 experts coordinated by Celestina Fazia.

Affected sector	General objectives	Specific goals	Strategies	
B Metropolitan services and endowments			***N. Identifier***	***Title Action***
	Improve the accessibility conditions of cities and logistics	Reorganize the provision of integrated city and metropolitan level services	B1 Pass and integrated infrastructure	Passenger Modal integration with integrated mobility solutions mainly through the LPT rail and road sector: - Integrated pass, - Integrated logistics, - Integrated infrastructure: effectiveness in programming, planning and management;

(*continued*)

Table 2. (*continued*)

Affected sector	General objectives	Specific goals	Strategies	
	Countering weak urban structure, depopulation of inland areas, abandonment and degradation of historic villages and social isolation	Modernization of urban and intangible services for residents and city users	B2 The new geography of flows B2.1 The new geography of material flows B2.2 The new geography of intangible flows	The new geography of material/immaterial flows Roads, the locations of flows, are also understood as new geographies for the territorial regeneration of inland areas and for integrated mobility, for a new housing welfare-the right for all to accessibility
	Countering the de-qualification of public spaces, the lack of identity of built-up parts, and physical degradation		B3_Liveable and inclusive public space. Necessary to combine economic growth and social cohesion of an area	"Liveable and inclusive public space". De-fragmentation of the public space system (enhancement, reorganization, and reconfiguration of public spaces with the timing of accessibility and connections with transportation)-revitalization project of urban voids with "zero volume" in suburban and peripheral areas, with greening or creation of "porous areas."
	Creating metropolitan-level urban polarities by intercepting flows	Services to support development and growth. Social services to citizens. Simple and efficient interaction with the P.A. for service delivery and in general for administration/citizen and inter-administration dialogue	B4 The metropolitan endowment system_ Sites of strategic interest ICI	The metropolitan endowment system_Sites of wide area interest (Business park, Attractive Poles, etc.). Reggio and Messina must rediscover a "strategic repositioning" of the city, both outward (Integrated Strait and Mediterranean Area) and toward the provincial and regional hinterland

Table 3. Summary of the strategies underlying the preliminary document for the Strategic Plan (sector C = Environment energy and sustainability). Source: Masterplan and graphics drawn up by the group of 13 experts coordinated by Celestina Fazia.

Affected sector	General objectives	Specific goals	Strategies	
C Environment energy and sustainability			***N. Identifier***	***Title Action***
	Incentivize climate adaptation measures (including green infrastructure-based solutions)	Improving the organization of the city to reduce consumption and pollution and the management of urban dynamics Protect and enhance environmental, natural and scenic resources, intergenerational of the right to environmental quality…	C1 Resilient city	**Resilient city** Promote individual and collective well-being through the development of environmental sustainability policies and strategies, seeking to ument the resilience of one's area against critical circumstances and changes that play negative effects in relation to the land and environment
	Reduce fragile conditions and exposure to both natural and anthropogenic hazards	Physical, technological and environmental adaptation of new urban contexts, starting precisely from the network of flows and intercepted public spaces, assuming the systemization of criteria for evaluation and control	C2 Healing and design	Healing and urban design Ensuring quality of urban form with a view to improving the perception of safety; a continuous urban mesh, an accessible and hierarchical road system with respect to public spaces improve users' orientation, their perception of safety, facilitate escape routes, vehicle access, and vehicular transit, and reduce consumption, transportation costs, and pollutant emissions
	Making cities smart and resilient	Urban security and new welfare	C3 Secur plan	Secur plan Technological systems designed to protect access, integrate security systems, ensure the soundness of structures. Advanced systems to reduce energy consumption, incentivize slow mobility (bicycles) and energy-saving means of transportation, produce energy from renewable sources (self-generating/solar energy stations and docks). Urban security in new welfare and services, monitored indoor/outdoor connections with remote surveillance system

Table 4. Summary of the strategies underlying the preliminary document for the Strategic Plan (sector D = Cultural Heritage, Protected Areas and Landscape). Source: Masterplan and graphics drawn up by the group of 13 experts coordinated by Celestina Fazia.

Affected sector	General objectives	Specific goals	Strategies	
D Cultural Heritage, Protected Areas and Landscape			***N. Identifier***	***Title Action***
	Conservation and Enhancement of landscape and historical-cultural values		D1 Plot/network/grid	Plot/network/grid Strengthen the texture of historical fabrics and cultural heritage, River ecological and landscape infrastructure network, grid of connections
	Enhancement of landscape areas and tourist attraction Promotion and communication, Tourist information, networking of accommodation offerings	Redefining the governance of marketing interventions (place branding) - Coordinated and unified management of interventions, - Support of certain, automatic and constant funding sources	D2 Tourism, Myths, legends and environmental uniqueness	Tourism, Myths, Legends and Environmental Uniqueness_ Protecting the Straits tourist The organization of local tourism promotion and reception should be based on a series of interventions that promote the desired behaviors. The local tourism organization (or DMO) should be promoted: a public-private partnership sufficiently representative of tourism stakeholders. The entities that to date demonstrate this type of constitution are tourism districts
	Enhancement of ethno-anthropological centers (example Vallata grecanica)		D3 Memory and Identity	Memory and Identity pursue the innovation of material culture, the conceptual place where Arts and Crafts meet technology and scientific research history-cultural identity that characterizes urban and rural dimensions to be preserved and enhanced (Messina Strategic Plan)

(*continued*)

Table 4. (*continued*)

Affected sector	General objectives	Specific goals	Strategies	
	Enhance the ecological network and Natura 2000 network, parks and protected areas		D4 The space of naturalness	The space of naturalness Structuring the local ecological network for the reconstitution of the ecological potential of the area. (PTCP RC)
	Enhancing UNESCO identities and heritage		D5 Widespread heritage	Widespread heritage Encouraging cultural start-ups and craft/cultural workshops in smaller towns and inland areas

Table 5. Summary of the strategies underlying the preliminary document for the Strategic Plan (sector E = Cultural Heritage, Protected Areas and Landscape). Source: Masterplan and graphics drawn up by the group of 13 experts coordinated by Celestina Fazia.

Affected sector	General objectives	Specific goals	Strategies	
E Settlement systems, socio-demographic dynamics, and production realities			***N. Identifier***	***Title Action***
	Counter the fragmentation and abandonment of coastal and mountain centers	Promote the creation of a network of coastal cities (coastal facades) on the two sides, Calabria and Sicily strengthen the attractiveness of mountain and foothill centers	E1 The new coastal and hill polarities	The new coastal and hillside polarities Define urban transformation areas (city ports, water fronts), increase the traction of the most attractive hillside centers
	Reduce social marginality and strengthen the social service system in critical urban areas	Implement policies for social inclusion, for the most fragile segments of the population and for areas and neighborhoods that are deprived Incentivize the use of public transportation and to lower the city's motorization rate	E2 Against Unsustainable Sub-urbanization	Against Unsustainable Suburbanization (Beyond Suburbanization) Toward a new local housing policy: actions for Social Housing; redevelopment of suburbs and smaller centers, with the inclusion of interchange parking

(*continued*)

Table 5. (*continued*)

Affected sector	General objectives	Specific goals	Strategies	
	Reduce the housing hardship of the disadvantaged	Recover the existing building and urban heritage by promoting the energy improvement of buildings and earthquake-proofing	E3 Energy adjustment/optimization	Energy adaptation/optimization improving The relationships between energy consumption and the physical and functional organization of settlements, to establish through guidelines what can be favorable positions through design guidelines for possible redesign of spaces and for new interventions. Improving the relationship between smart building and smart city. Awareness and information actions to citizens and businesses, it is planned to activate an Energy Desk (strategic plan of Messina)
	A system for interactive resource management	Employment and skills for the local economy. Massive investment in agriculture, fisheries, tourism, cultural heritage enhancement, innovative industry, sustainability and green-economy	E4 Circular Economy	Circular Economy System for interactive resource/service management linked to geographic information systems, service providers and service users. Development of a different welfare model based on innovative forms of social enterprise Supporting the transition to a low-carbon economy in all sectors. Accompaniment and start-up for the creation of new social enterprises

(*continued*)

Table 5. (*continued*)

Affected sector	General objectives	Specific goals	Strategies	
	Reduce inequalities, define training needs consistent with the local economy in order to ensure full employability of properly trained human resources	Fostering identity and interculturalism in the contemporary city: analyzing expectations in the space of multi-ethnic infrastructure	E5 Dialogue and multiculturalism	Dialogue and multiculturalism Reorganizing, through related tools such as the PdS Service Plan, the differentiated demand for services with respect to the plural city: multifunctional integration of needs for the purpose of urban and social quality; development of innovative processes in citizen-P.A. dialogue
	Restoring balances of urban ecosystems under pressure due to: uncontrolled urban sprawl and soil sealing	Reduce the spread of low-density settlements, which require public services that are more expensive and difficult to secure	E6 Water Cycle and Waste Climate Change Observatory	Water Cycle and Waste Building zero-waste communities (Messina strategic plan) Create the 'Climate Change Observatory: the Mediterranean area is a focus area in terms of climate change

3 Scenarios for the Redevelopment of the Straits

The strategic plan, specifically, elaborates a reactivation and redevelopment of the Strait starting with the two metropolitan cities-Messina and Reggio Calabria.

Identifying the actions and directions to be pursued to achieve the expected results. Below are the key points of the planning:

1. Define the infrastructure system in terms of efficiency and endowments, implement programming capable of territories and local institutions to build the response to the new instances of change in the integrated infrastructure and urban system; solicit the elaboration of ideas to integrate in the network logic the port system and the SEZs in the most neuralgic Italian hub for the Mediterranean [6] (Fig. 5 and 6);



Fig. 5. The Strait of Messina between myth and culture. Source: Image taken from "Land-sea interface and the places of contaminations: the treasures the myths and fears" contribution by Celestina Fazia created for the "Biennale dello stretto" 2022, Graphic processing by Federica Sortino [11].



Fig. 6. Defining a new infrastructure system. Source: Elaboration by Federica Sortino.

- define suitable strategies for the reorganization of the supply of metropolitan endowments and services by qualifying and prioritizing them with respect to their strategic relevance, invest in infrastructure in terms of inter-modality, mobility, territorial continuity and safety because the reorganization of networks must be rethought in a system logic in which the Strait Sea is an active part and is not just a "discontinuity element" interposed between the two mainland;
- strengthening and integrating the places of polycentrism, emphasizing the importance of focal nodes: in major urban areas, intermediate urban poles are expected to strengthen their level of connection with the hinterland, "fragile" suburban poles, inland areas and smaller centers, activating a connection between municipalities and cities while also giving rise to a new and denser network of exchanges [7];
- provide a strategic vision of the territories' potential by enhancing the common cultural heritage, landscape and environment. By analyzing the socio-demographic and production reality dynamics, the SP draws new geographies for the territorial regeneration of inland areas including metropolitan areas by promoting the economic and tourism revitalization of the territory, the rediscovery of a landscape heritage and local values for new tourist attractions capable of reconceptualizing, not only locally, but also on a large scale the regional territory.
- laying the groundwork for shared policymaking on some systems of welfare, 'energy' and digital networks, business support, not underestimating citizen and community welfare;
- capturing the specificities and connections of cities, in terms of wide area, in relation to interregional, national and European levels;
- identify new ways to optimize the usability and environmental performance of the territory, in terms of safety, quality of life, accessibility, alternative mobility;
- the Plan incentivizes innovative forms of regeneration for local economic development based on the territory's ability to be a catalyst for new entrepreneurial initiatives linked to cultural and landscape resources; recovery can take place through start-ups of territorial regeneration actions in inland areas, small towns. Provides for the possibility of conveying territorial brands -new centers for territorial economic development, as reward measures for the participation of subjects in the implementation of interventions, for the spread of soft tourism related to the sea and landscape resource, treasures and myths and mirages referable to them [8] (Fig. 7).

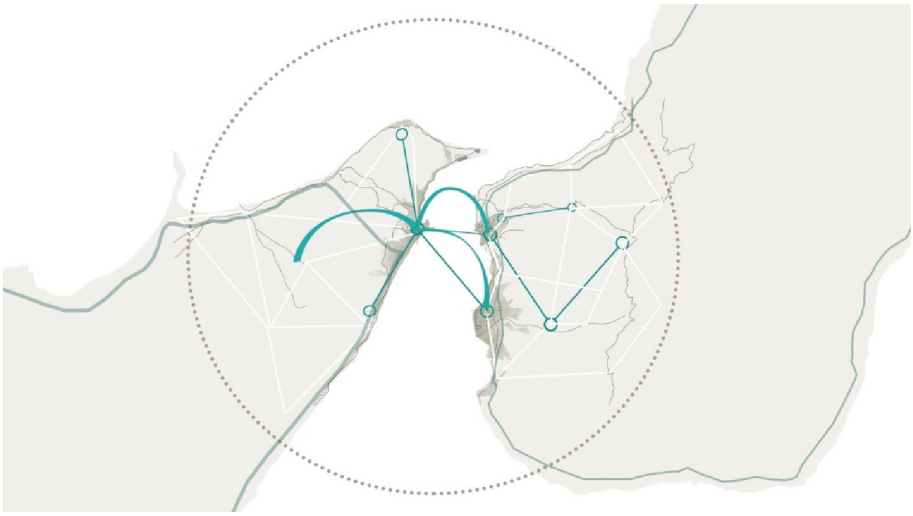

Fig. 7. Defining a new network of connections. Source: Elaboration by Federica Sortino.

4 Conclusions

The Master Plan is closely connected and consistent with the guidelines of the strategic and territorial plans and of the urban planning instruments in force in the municipalities of the two metropolitan cities (Reggio Calabria and Messina). The two urban contexts, which are the result of the still "formal" metropolisation processes, are distinguished by the fragmentation of the settlement systems, with the risk that, by intervening on the pre-existing territorial balances, homogenizing the different cultural landscapes and the different forms of the urban globalized, efforts can be frustrated by encouraging phenomena of environmental impairment and territorial "injustice", with the risk of gaps within the integrated area of the Strait. It is necessary to act on several fronts, perhaps reversing the point of life, starting precisely from the internal areas, marginalized and at risk of a slow recovery.

The Master Plan integrates with the plans for parks and protected areas, the Natura 2000 network and the regional ecological networks. In particular, *the Beach Plans Operational Protocol*[1] *and the Action Plan*, which is a knowledge and guidance tool for the correct management of coastal ambitions affected by Caretta Caretta nestings, identifies

[1] The Region of Calabria-Department of National and Community Programming_Cittadella Regionale, Germaneto (CZ)-partner in the Life Caretta Calabria Project, was responsible, among other actions, for the Work Package: the Beach Plans Operational Protocol and Action Plan.

the broad strip of coast of the coast on the Ionian side of Reggio: the Municipalities of Bruzzano Zeffiro, Bianco, Africo, Condofuri, Ferruzzano, Montebello, Melito P.S., S. Lorenzo, Bova Marina [8], according to the timetable of the works, should have received the guidelines of the Action Plan addressed to the sustainable and integrated management of coastal areas.

Compared to numerous ongoing studies, the Master Plan proves to be current and feasible.

Along the same lines is the *LAB Spazio_ Stretto, Permanent Laboratory for the Bridge on the Strait*[2] is conceived as an open construction site and places the territories of the two cities (Reggio Calabria and Messina) [9] in a context of economic and social integration in "progress", defining the identity of the overseas dialogue and the direction of development induced by a possible building, setting up territorial coalitions, new methods of participation with the actors involved on a voluntary basis, favoring the integration of resources for the development of some projects of common interest by reconnecting to some strategic projects that have already started [10].

Contribution Authors

Corresponding authors: although the research is the result of the work carried out jointly by all the authors, which Celestina Fazia is the supervisor, the drafting of the essay is to be attributed differently to each of them:

§ abstract § 1 introduction by Celestina Fazia and Federica Sortino; § 2 by Celestina Fazia 3 by Federica Sortino; § 4 Conclusions by Celestina Fazia and Tiziana Campisi.

Graphics optimization by Federica Sortino.

Essay review: Tiziana Campisi.

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