

The reconversion of the Litoranea Venetian Waterway: an opportunity to rethink the eastern Venetian coastal system

*Original*

The reconversion of the Litoranea Venetian Waterway: an opportunity to rethink the eastern Venetian coastal system / Emanuelli, L.; Grando, A.; Lobosco, G. - In: Projecting Shkodra. operative fragments between lake, river and sea / Aliaj B., Rossi L., Porfido E.. - STAMPA. - Tirana : POLIS press, 2018. - ISBN 9789928445995. - pp. 236-247

*Availability:*

This version is available at: 11583/2981259 since: 2023-09-28T07:54:59Z

*Publisher:*

POLIS press

*Published*

DOI:

*Terms of use:*

This article is made available under terms and conditions as specified in the corresponding bibliographic description in the repository

*Publisher copyright*

(Article begins on next page)



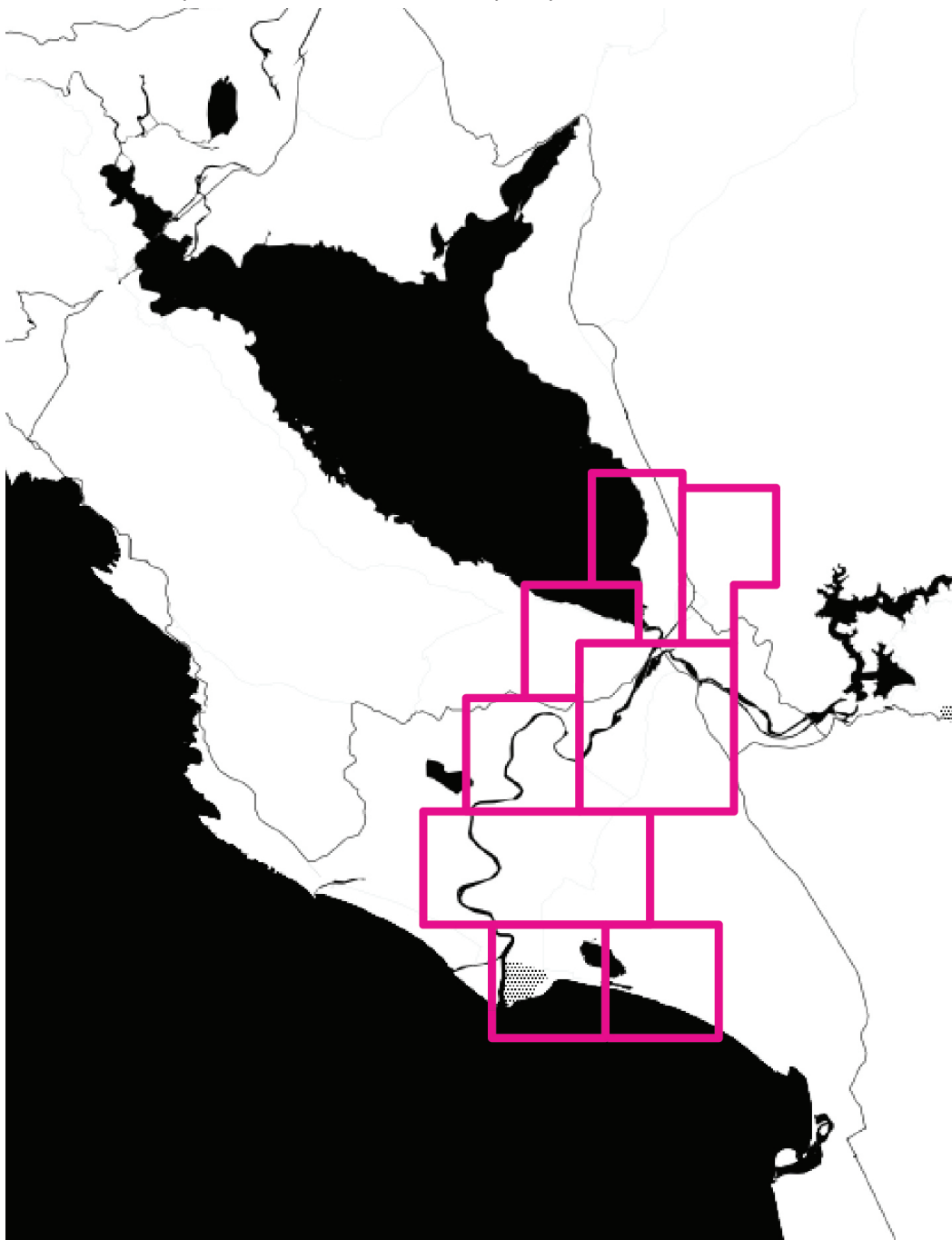
Observatory of Mediterranean Basin

## Projecting Shkodra

Operative fragments in-between lake, river and sea

**A Project of the IDAUP  
Joint International PhD Program**

POLIS University Albania / Ferrara University Italy





dipartimento  
architettura  
ferrara

**ISBN** 978-9928-4459-8-8 (Kolana)  
978-9928-4459-9-5 (V. 4)

**Printed by** POLIS press, Tirana

**Editors** Prof Dr Besnik Aliaj, Adj Prof Dr Loris Rossi, Arch Enrico Porfido

*Besnik Aliaj, Loris Rossi and Enrico Porfido are the scientific responsible for this publication, developed as result of the international PhD workshop organized in the frame of the IDAUP - International Doctorate in Architecture and Urban Planning programme between POLIS University of Tirana and the Department of Architecture of Ferrara University, Italy. The publication collects practical and theoretical experiences elaborated within the context of the Applied Research Department, the research unit Observatory of Mediterranean Basin (OMB) and MetroPOLIS I.t.d. In this publication Besnik Aliaj, Loris Rossi and Enrico Porfido have also contributed in terms of contents in the introduction, interventions in some chapters, conclusions and in the elaboration of the index structure.*

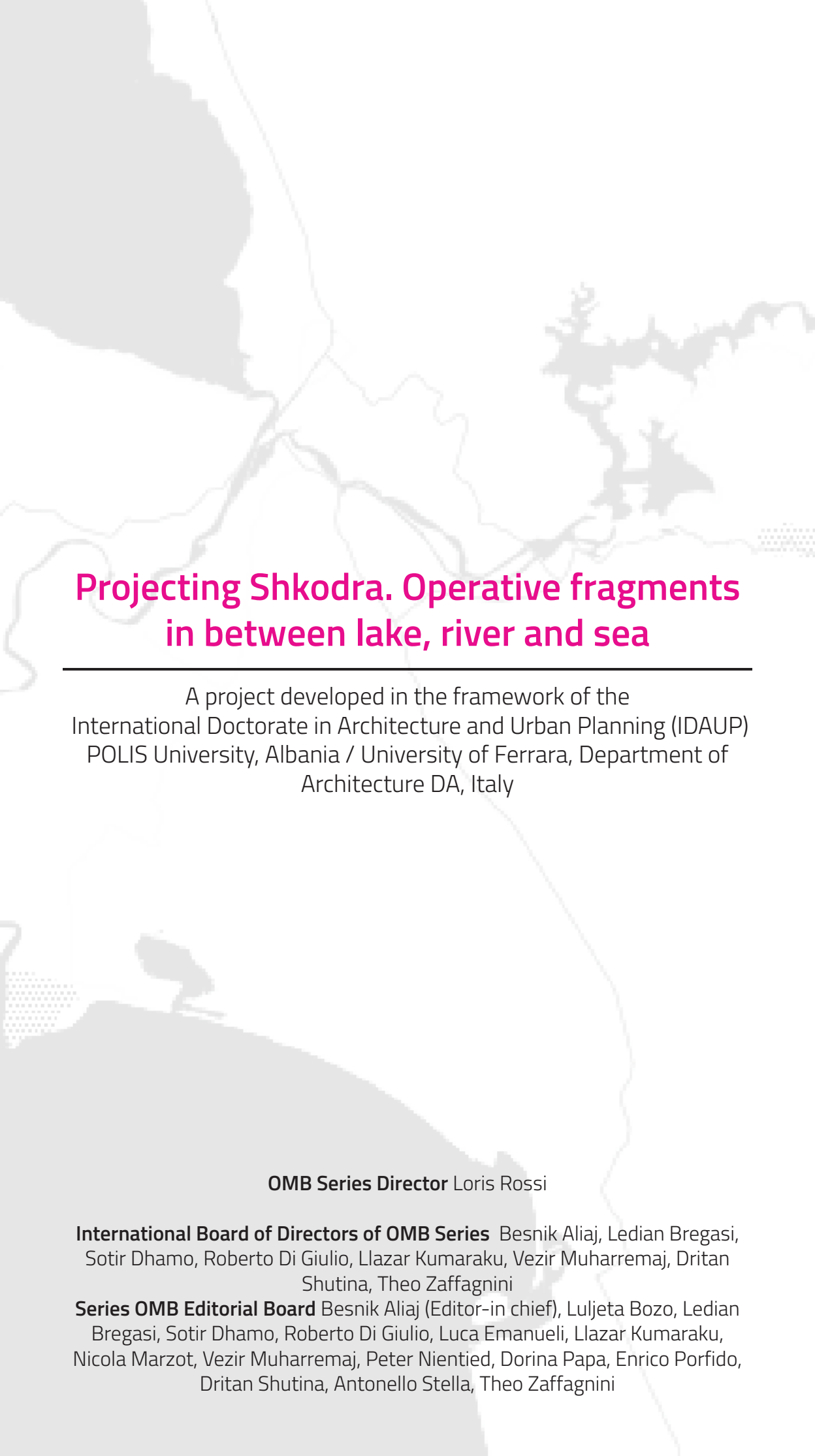
**Scientific Committee of the number 4, 2018 OMB** Besnik Aliaj (Rector Polis University), Vezir Muharremaj (PhD Programme Vice-Coordinator IDAUP), Luljeta Bozo (Emeritus Professor), Loris Rossi (POLIS PhD Programme Supervisor IDAUP until 32nd cycle), Ledian Bregasi (POLIS PhD Vice-Programme Supervisor IDAUP until 32nd cycle), Dorina Papa (POLIS University), Roberto Di Giulio (PhD Programme Coordinator IDAUP), Theo Zaffagnini (DA Deputy Vice-Coordinator PhD Programme Supervisor IDAUP), Gastone Ave, Marcello Balzani, Giacomo Bizzarri, Riccardo Dalla Negra, Pietromaria Davoli, Luca Emanuelli, Rita Fabbri, Romeo Farinella, Manuela Incerti, Gabriele Lelli, Federica Maietti, Vincenzo Mallardo, Nicola Marzot, Alessandro Massarente, Giuseppe Mincoelli, Andrea Rinaldi, Antonello Stella, Giovanni Zannoni (DA University of Ferrara, Italy), Pantelis Skayannis (University of Thessaly, Greece), Sara Favargiotti (University of Trento, Italy), Thomas Dillinger (TU Wien, Austria), Silvia Lupini (University of Camerino, Italy), Daniele Pini (UNESCO Consultant), Jason Payne (UCLA Los Angeles).

**International Reviewers** Prof PhD Michael Jakob (Haute École du paysage, d'ingénierie et d'architecture de Genève, Switzerland) and Prof PhD Michelangelo Russo (Università Federico II di Napoli, Italy)

**Layout & Design** Arch Enrico Porfido

**English Editing** Alkeda Recì

*Note / This book uses double-blind review, which means that both the reviewer and author identities are concealed from the reviewers, and vice versa, throughout the review process. All the contributions of this book have adopted the Harvard Quote System.*



## Projecting Shkodra. Operative fragments in between lake, river and sea

---

A project developed in the framework of the  
International Doctorate in Architecture and Urban Planning (IDAUP)  
POLIS University, Albania / University of Ferrara, Department of  
Architecture DA, Italy

**OMB Series Director** Loris Rossi

**International Board of Directors of OMB Series** Besnik Aliaj, Ledian Bregasi,  
Sotir Dhamo, Roberto Di Giulio, Llazar Kumaraku, Vezir Muharremaj, Dritan  
Shutina, Theo Zaffagnini

**Series OMB Editorial Board** Besnik Aliaj (Editor-in chief), Luljeta Bozo, Ledian  
Bregasi, Sotir Dhamo, Roberto Di Giulio, Luca Emanuelli, Llazar Kumaraku,  
Nicola Marzot, Vezir Muharremaj, Peter Nientied, Dorina Papa, Enrico Porfido,  
Dritan Shutina, Antonello Stella, Theo Zaffagnini

## Preface

*Shkodra is one of the biggest municipalities of Albania. It is almost like the 'capital' of northern Albania with strong impact also in Montenegro and Kosova. The city has a great history and culture, and was considered a stronghold of anticommunist resistance between 1945-1990. Since then it went towards a turbulent transition during 90-s and a significant transformation in the last 10-15 years. Nowadays Shkodra is one of 3-4 main cultural-touristic attractions of the country, but the city is facing also the problems of national recession after 2010. Since the three years ago a newly elected female Mayor - previously an expert of local governance - has been trying to build a team and draft/implement a participatory development vision, at least for the next decade of Shkodra. The new territorial-administrative reform of the country created chances for establishing a great municipality in terms of surface, resources and boundaries, but no real fiscal and resources decentralization has been following from the central government. Meantime the newly established municipality did not inherit a readymade strategy and plan, despite those for the 'old/urban' municipality before the reform.*

*Therefore the mayor could generate support from central government (AKTP, National Agency of Territorial Planning and expertise from Polis University Tirana and Arizona State University, USA. During 2016 an intensive bottom-up process of public consultations was initiated, with public community meetings, sectoral and institutions meetings, professional networks and interests groups meetings. All was about transparency, and this achieved by many public meetings, online charrettes, live television broadcasting, focused groups and thematic meetings, etc. Thanks to such process a municipal strategic vision and a general local territorial plan was drafted and latter approved with debate at Municipal Council of Shkodra. A second filtering and approval was also undertaken by several ministries and by the national territorial committee of the central governments. At this moment Shkodra has an important document to guide its own present and future developments.*

*However the local situation is not as perfect as it seems. Financing for the strategic projects and programs is harmed by the lack of financing of central government's share. Meantime, the climate change has negative impact over the vast municipal territory that expands from Albanian Alps mountainous region (north-east), ending up to the Adriatic coastline (west). Municipality is part of one of the richest water energy production watershed regions, but flooding is becoming annual emergency for the western plain of Shkodra. Life of people is endangered, while material and financial costs are increased and agriculture/business is*

*harmful. What can be the emergent interventions? What can be mid- and long-term strategic programs and projects? The general strategic territorial plan that was drafted and approved helps to orient interventions and developments. But more is needed to help local communities and improve quality of life.*

*Therefore, cooperation between Municipality of Shkodra and Polis University continued in a qualitative way. Two years ago a group of researchers and staff from the Joint International PhD Program of Polis University and Ferrara University Italy, started a research project for the region of Shkodra with the core theme: the relation between water and territorial development. The starting point was the work done by Municipality and POLIS/ASU as regarding the general strategic territorial plan (PPV). A field visit was also undertaken in the region including Shkodra, Podgorica, Ulqin and all the rest of living settlements and territories around Shkodra lake. The ecosystem of Shkodra Lake, Buna and Drini River was studied, especially in relation with the city of Shkodra and flooded areas. Other focus was to understand different territorial typologies and for each of the to develop models of interventions and development in the form of strategic interventions. Case studies from other international experiences served as reference to adopt to local conditions, and as result several strategic projects are generated. We hope in this way that the contribution of our International PhD Program between POLIS and UNIFE does not simply remain theoretical and academic, but inspires and helps local authorities to detail further the so called PPV Plan. This is also a great example of how local government institutions and academic and research institutions can work together to improve the lives of people and communities! We believe this publication serves for that!*

*Last but not least, the publication is part the International PhD Program research series, published by POLIS\_Press in cooperation with UNIFE, starting with the national visioning: Albania 2030 Manifesto; continuing with regional plans of Durara, Riviera, Semani, Prishtina. This series of publication is also documented by several international and partner libraries, including the Library of Congress, Washington DC, USA.*

*Voltana Ademi  
Mayor, Municipality of Shkodra*

*Besnik Aliaj  
Rector of POLIS University, Tirana*

# 1 introduction

## 1.1 Fragments as methodology / an overview of OMB's research

*Loris Rossi*  
*POLIS University / Tirana*  
[p 12]

## 1.2 The coast as an intelligent device: from conceptual to physical interventions

*Enrico Porfido*  
*POLIS University / Tirana*  
[p 22]

# 2 interdisciplinary exchanges

## 2.1 A Bike Ride for Local Pomegranate Juice / Opportunities for Sustainable Regional Development in Shkodra, Albania

*Braden Kay, David Pijawka, and Michael Underhill*  
*Arizona State University / USA*  
[p 32]

## 2.2 The role of environmental Strategic evaluation, as instruments for promoting sustainable planning and development in Albania / The cases of Shkodra Municipalities

*Sherif Lushaj and Besnik Aliaj*  
*POLIS University / Tirana*  
[p 40]

## 2.3 Defining hindering factors of the informal settlements in

## the general regulatory plan of Shkodër municipality

*Artan Kacani*  
*POLIS University / Tirana*  
[p 50]

## 2.4 Creative cities along water margins / Urban and cultural regeneration of Shkodra, city of water

*Daniela Kavaja*  
*POLIS University / Tirana*  
[p 60]

## 2.5 A breathing city / Shkodra and its representative places on the water

*Michele Montemurro*  
*Polytechnic University of Bari*  
[p 70]

# 3 the regulatory plan

## 3.1 Planning the "new" Shkodra

*Amanda Terpo and Ledio Allkja*  
*POLIS University and Co-PLAN Institute for Habitat Development / Tirana*  
[p 82]

# 4 workshop

## 4.1 projecting shkodër / description

*OMB research unit*  
*POLIS University / Tirana*  
[p 100]

## 4.2 Innovative technologies for a

## biomimetic adaptive landscape design / The application of 3D printing processes to the definition of technological components on a territorial scale

*Sara Codarin*  
*PhD researcher / Ferrara University*  
[p 128]

## 4.3 (Un)margin the Shkodër's gate / An opportunity to regenerate an important landmark

*Saimir Shtylla*  
*PhD researcher / POLIS University*  
[p 138]

## 4.4 Strategies for urban regeneration through the intervention on the existing buildings / A proposal for the city of Shkodër

*Valentina Frighi*  
*PhD researcher / Ferrara University*  
[p 148]

## 4.5 To code or not to code? Investigating the urban-rural transect and other Smart Code instruments in the territorial development context of Albania / Case Study: city of Shkodra

*Kejt Dhrami*  
*PhD researcher / POLIS University*  
[p 156]

## 4.6 Limita(c)tion – How to use the limit as a concept tool of sustainable development

*Gian Andrea Giacobone*  
*PhD researcher / Ferrara University*  
[p 166]

## 4.7 Increasing ecosystem resilience through landscape interventions: the case of flooding in Shkodra

*Eranda Janku*

*PhD researcher / POLIS University*  
[p 176]

#### 4.8

##### Slow Valley: Walking, Making and Growing

*James Stevens*  
*PhD researcher / POLIS University*  
*and LTU Detroit*  
[p 188]

#### 4.9

##### Amphibious Devices / Interventions that adapt to land and water in the protected area of Bask-Rrjoll, Shkodra

*Gerdi Papa*  
*PhD researcher / POLIS University*  
[p 196]

#### 4.10

##### Toolkit design / Architectural analysis and project by classification and taxonomy

*Giuseppe Resta*  
*PhD researcher / Università Roma3*  
*and Politecnico di Bari*  
[p 206]

## 5

### city of water

#### 5.1

##### Docklands engine in transition/ Hybrid identity towards new urbanity: the (unpredictable) role of Art

*Silvia Lupini*  
*Ass Prof / UNICAM Università degli*  
*Studi di Camerino*  
[p 216]

#### 5.2

##### Barcelona: A tale of two rivers

*Melisa Psoa, Cynthia C. Pérez*  
*Researcher / Grup de Recerca en*  
*Urbanisme - DUOT - Universitat*

*Politécnica de Catalunya - Barcelona*  
[p 222]

#### 5.3

##### The Mediterranean City-World

*Roberto Pasini*  
*Full lecturer / Universidad de*  
*Monterrey, Mexico*  
[p 230]

#### 5.4

##### The reconversion of the Litoranea Venetian Waterway: an opportunity to rethink the eastern

*Venetian coastal system*  
*Luca Emanuelli, Alberto Grando,*  
*Gianni Lobosco*  
*Sealine research centre / DA -*  
*Ferrara University*  
[p 236]

## 6

### conclusions

#### 6.1

##### Conclusions

*Ledian Bregasi and Besnik Aliaj*  
*POLIS University / Tirana*  
[p 250]

## The reconversion of the Litoranea Venetian Waterway: an opportunity to rethink the eastern Venetian coastal system

keywords / infrastructure, coastal systems, waterway, rural landscape, land reclamations

*Luca Emanuelli, Alberto Grando, Gianni Lobosco*

*Sealine research centre, Department of Architecture, University of Ferrara, Italy*

This article investigates the relationship between territory and infrastructure in order to offering new ideas for the management and design of coastal landscapes. As a case study, are exposed the results of a project concerning the Venetian Litoranea Waterway, an old waterway that flows along the Adriatic venetian coast. The need for reactivate the waterway - now under-utilized and never fully completed - becomes an opportunity to study a broad-minded approach, based on the analysis of the of both the environmental and economic issue. The aim of the work is to provide a model able to face with the problems afflicting the entire coastal system and provide a valid alternative to the current seafront employment strategies.

The concept of combining skills deriving from civil engineering, economics, and landscape architecture, is fundamental in order to studying a wide-ranging approach to the problems emerging from the analysis and the critical issues affecting the coast and the entire waterway system. This point of view permit to obtaining results usually not taking into account by ordinary planning. On the basis of the problems affecting the Adriatic coast under examination - such as coastal erosion, subsidence and saltwater intrusion - the project proposes a radical transformation of the reclamations area surrounding the waterway, towards a more resilient and less burdensome structure to manage. By the creation of a wet buffer, developed along the waterway, makes it possible to unveil new opportunities for

tourism exploitation linked to the lagoon areas, which can be used as a flywheel to implement compensation and financing of the project itself. The process would be able to obtaining a safer and more cost-effective territory. The entire approach contemplates a large-scale organization of urban development, using planning tools capable of modifying coastal morphology, supporting trends of erosive phenomena.

The deepening of the relationships that arises from the process of urbanization of the soil, together with the awareness of the variability of economic contexts and environmental conditions, become the starting point for the development of new synergies between infrastructures, tourist offer and coastal occupation processes.

### Introduction

The landscape, like the socio-economic context of the culture where we live, is always in constant evolution<sup>1</sup>. This dynamic is accentuated if we consider the coastal systems, where a little change of the forces at stake, often generate huge transformations, with effects that can get to redefine the entire morphology of a coastline. Often, these phenomena are not taken in account in the long-term urban planning and infrastructures are perhaps the most complex point of the whole question. Infrastructures are essential for the defense, the management, the economic development of an area and at the same time contribute and define the morphology of modern territorial occupation. As it is understandable, it is not only a question of considering large



Fig1 / La Grand Motte  
source / Camargue

works such as roads or railways, but rather the system in its articulation, composed of control and defense structures that interact the urbanized soil in which we live.

Infrastructures play a key role in the landscape management and planning process, even more in complex systems such as defense or hydraulic management. Moreover, we have to contextualize this concept in dynamic scenarios, able to react to unavoidable changes, extending the life useful of the interventions.

Reuse, reconversion and transfer of meaning of the existing, are therefore fundamental design tools capable to trigger processes to guarantee development and management. These are indispensable criteria for including large-scale planning - which normally proceeds with discontinuous steps - in the rapid evolution of modern scenarios. This practice acquires greater importance in areas already heavily urbanized such as the coastal stretches, where often the amount of available economic resources is not commensurate with the funds really needed to solve the problems. A project methodology and a new approach is needed, that will enable to propose alternative solutions based on reuse of the existing, on the design of broad views and on the elaboration of scenarios in order to guarantee key concepts such as hydraulic safety or environmental improvement in general.

The research concerns the reuse of the Litoranea Venetian Waterway, a waterway

that runs parallel to the coast in eastern Veneto, Italy. The intervention rises from the need of local administrations to put their hands on the infrastructure, developed on the basis of scenarios of use no longer current: specifically, the need of review of maintenance costs requires a reflection on its future. This work demonstrates how the reactivation of the infrastructure become an opportunity to rethink both the functional and economic location of the entire area. Furthermore, it is indicated how to purpose an alternative scenario that modifies the costal morphology: the proposal suggest a new model developed on a second axis focused on the waterway, beyond the coast. The design phase is preceded by a deep analysis that shows how the waterway axis function is only one of the numerous emerging aspects, behind which latent synergies are hidden, able to provide interesting design ideas. This approach allows to explore new hypotheses of contextualization and relationship with the surroundings, to assign new functions, to extend the project boundaries embracing various disciplines. For reasons of clarity and brevity, the article has been divided according to the following points:

- design reference;
- case study analysis;
- strategy elaboration;
- project.

It is therefore proposed a development of the main points that have marked the drafting of the plan.



**Reference**

As examples, some current cases focused on the development of coastal system are exposed, in order to highlight the strengths and weaknesses of employment strategies and the choices made. The first example concerns the center the Grande-Motte<sup>2</sup>, a tourist settlement born at the beginning of the '70s, on the southern French coast. The intervention was proposed and coordinated directly by the French central government and represents a project on a national scale, aimed at intercepting the tourist flows that from the north of France, heading to Spain. Although the case of la Grande-Motte represents a wide-ranging project, guided and planned from the central government, it is evident that this model of development is no longer up to date. In particular, it is based on scenarios of economic expansion now no longer in progress. This structure, in fact, leaves in inheritance a deeply urbanized coast that will require resources for the management and defense of the entire stretch of coastline in the future. Although the project has broadly met the expectations, it is therefore stressed the need for a reflection on the settlement strategy of the shoreline, based on the analysis of the contemporary situation and on a resilient attitude towards the surroundings. The second example is represented by the numerous port that due to their dispersion and morphology - although of much smaller proportions - cause an overall stiffening of the coast. In general, they can be a problem in the management of large stretches of sea, forcing the public administration to

expensive defense interventions in the future for their protection and operation. In Italy the Adriatic coast is dotted with a lot of this type of interventions<sup>3</sup>, moreover of private initiative: by their nature they follow the rules of the real estate market, without a conscious settlement strategy in such a sensitive environment as the coastal one. As a final example we mention The Atlantic Intracoastal Waterway<sup>4</sup>, an interesting project where a waterway, initially designed for military purposes, has created an interesting wetland landscape, as well as a precise settlement strategy.

**Analysis of the Litaranea Venetian Waterway**

In accordance with the considerations above, is presented a study on the reactivation of a waterway in the eastern Veneto coast. The reconversion of the infrastructure becomes the starting point for the proposal of a settlement strategy, able to coordinate the future tourism development according to sustainable and wide-ranging criteria. Furthermore, all the interventions have to supporting as much as possible the natural erosive tendencies of the coast and directing private development initiatives in a way to avoid a disorderly occupation of the coast.

In particular, the study concerns to a navigable waterway flowing between the Venice lagoon and the Isonzo river. It runs alongside to the Adriatic coast, with distance between 2 and 4 km from the sea. The overall length is about 127 km, 68 of which are in the Veneto region and 59 in the Friuli Venezia Giulia region,

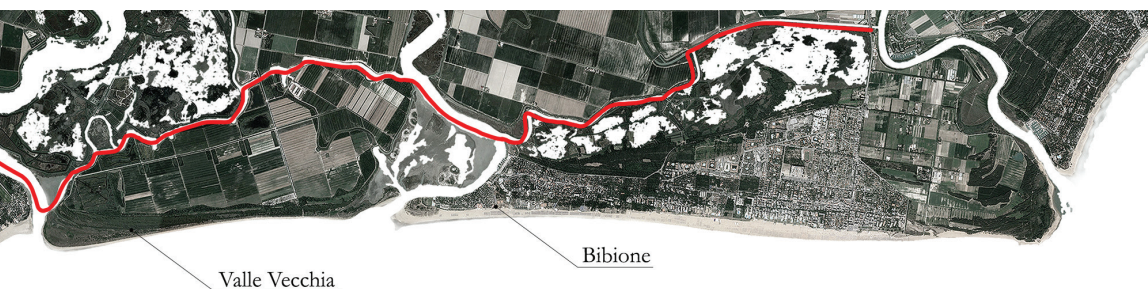


Fig2 / The Litoranea Venetian Waterway  
source / the authors

north-est of Italy. The waterway is made up of a multitude of canals - mostly of spontaneous origin - and crosses mainland areas and lagoon areas. From the mouth of the river Isonzo, it is possible to get to Trieste in 35 km of sea: the latter part is not part of the waterway, but it's in a certain sense an extension. For centuries it has been an important alternative way to cabotage, historically linked to the fortune of the Republic of Venice. The current configuration is the result of centuries of interventions, the last of which dates back to the 50s of the last century. The study focuses on the section of Idrovia between the mouth of the river Piave and that of the Tagliamento, involving the municipalities of Caorle, Eraclea and San Michele al Tagliamento, for a total area of 362 km<sup>2</sup>. The infrastructure has very variable characteristics depending on the traits, but globally it is to be considered compatible with the characteristics of the CEMT class II vessels<sup>5</sup>. The situation of its branches is similar. The poor maintenance

of the seabed exposed to a frequent interruption - due to the grassy nature of the banks that increasingly reduced volume of exchange with the sea caused by the reduction of the lagoon areas - risk compromising its functionality. The effective under-utilization of the waterway has not recently encouraged large investments to guarantee its functioning. Furthermore, the current configuration derives from scenarios written after World War II, a period in which a major development of water transport was assumed; the evolution of economic dynamics has led to preferring the transport of goods by road or by train.

### *Environmental issues analysis*

Not insignificant aspect is the connection to the hydraulic framework of the surrounding territory. The waterway affects many of the main rivers of the eastern Veneto, including the Piave, Livenza and Tagliamento river and crossing a lots of reclaimed areas. For this reasons it

1 / see Ministry of agricultural policies (2012), *The rural landscape, a look between past and future*, Florence, Italy: Giunti.

2 / On this matter see "démier de Découvrir la Grande-Motte (Hérault), cité de loisirs, prepared by the groupe Ressources, compétences, pratiques pédagogiques auprès des jeunes du pôle Sensibilisation de la Fédération nationale des Conseils d'Architecture, d'Urbanisme et de l'Environnement avec le concours de l'IFÉ et le soutien du Ministère de la Culture et de la communication, 2015, pp. 1-126, available online at <http://www.fncaue.com/wp-content/uploads/2015/09/DecouvGdeMotte.pdf> (consulted on 02/06/2018).

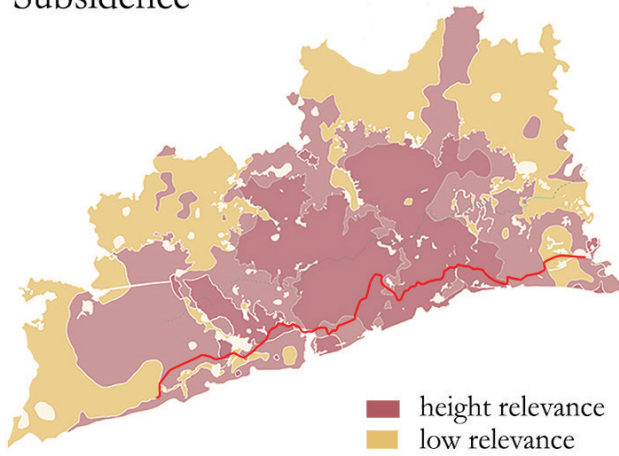
3 / Just to name a few examples in the Adriatic coast of Romagna see *Marina di Porto Reno in Casalborgorsetti (RA) or Porto Verde in Misano Adriatico*.

4 / The Intracoastal Waterway (ICW) is a 3,000-mile (4,800 km) inland waterway along the Atlantic and Gulf of Mexico coasts of the United States, running from Boston, Massachusetts, southward along the Atlantic Seaboard and around the southern tip of Florida, then following the Gulf Coast to Brownsville, Texas. More information available online at <http://www.nao.usace.army.mil/Missions/Civil-Works/AIWWW/> (consulted on 02/06/2018).

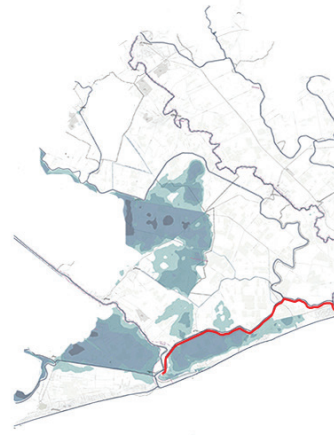
5 / CEMT is a set of standards for interoperability of large navigable waterways forming part of the Trans-European Inland Waterway network within Continental Europe and Russia. It was created by the European Conference of Ministers of Transport (ECMT; French: *Conférence européenne des ministres des Transports*, CEMT) in 1992. In this particular case class II refers to tonnage between 400–650t.

6 / On this matter see *Dalle praterie vallive alla bonifica: cartografia storica ed evoluzione del paesaggio nel Veneto orientale dal '500 ad oggi*, by Francesco Vallerani, Portogruaro, Consorzio di bonifica Pianura veneta tra Livenza e Tagliamento, 2008.

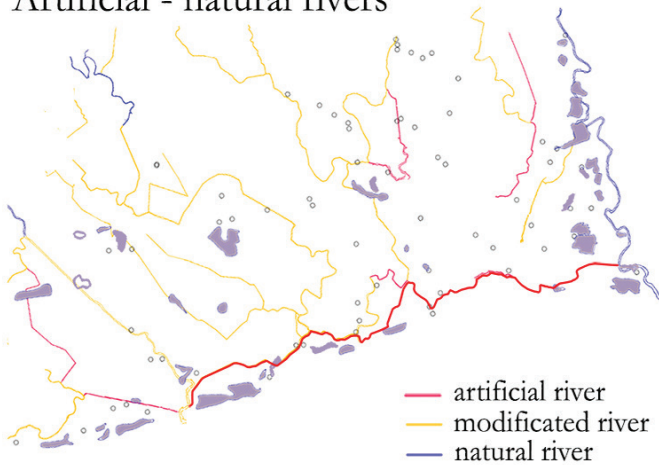
## Subsidence



## Flood height



## Artificial - natural rivers



## Microaltimetry



has a decisive role in ensuring the delicate water balance of the surrounding areas<sup>6</sup>. The territory is mostly below the sea level and is therefore subject to mechanical drainage of the waters. The problems regarding the extreme vulnerability to flooding phenomena, others related to subsidence and the damages deriving from the ascent of the salt wedge should be highlighted. All this factors produce conditions that are not favorable to the development of agriculture. In fact, these problems are worsening year by year negatively affecting productivity, while forecasts of climatic trends and seafaring phenomena do not outline encouraging scenarios. The identification of the critical areas, often adjacent to the waterway, together with the consultation of the historical maps are an essential phase of the project and are the starting point for the drafting of a new development that takes into account these emergencies. In a

nutshell, environmental criticalities can be listed as follows:

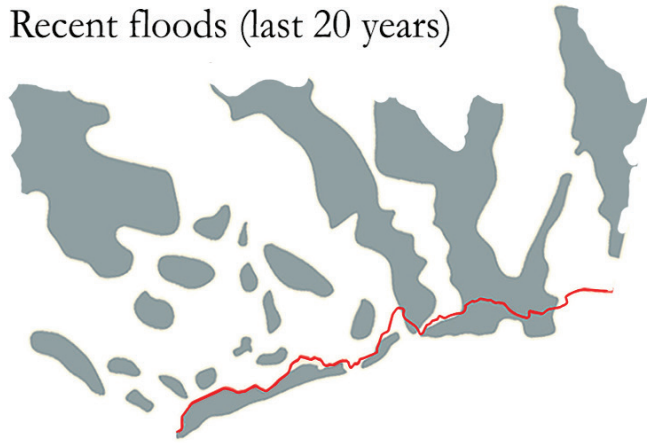
- hydraulic risk (frequent flooding of depressing areas);
- waste of energy resources to maintain the operation of the valleys in spite of the productivity of these areas;
- salt inclusion;
- poor quality of the agricultural landscape.

### *Economic scenarios analysis*

The development of the tourism sector has gradually turned the use of the waterway towards forms linked to this form of fruition. The analysis of ISTAT<sup>7</sup> regarding tourism in the cities affected by the waterway draws an overall positive scenario. The arrivals recorded in the municipalities of Cavallino, Jesolo, Eraclea, Caorle, San Michele al Tagliamento and Lignano recorded a steady growth, going from 2,522,789 in 1997 to 3,308,504 in 2015, with some fluctuations



## Recent floods (last 20 years)



## Urbanitation

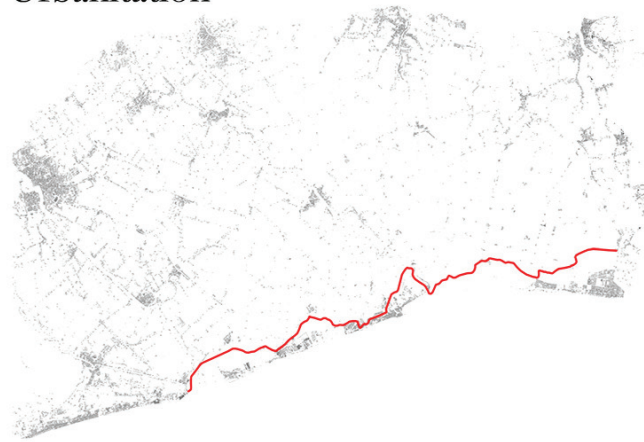


Fig3 / Analysis of the Litaranea Venetian Waterway  
source / the authors

and temporary falls due mainly to macroeconomic conditions. Speech slightly more complex is what emerges from the trend of presences, which go from 19.401.571 in 1997 to 21.654.432 in 2015, reaching a peak of 22.434.927 in 2011. The last few years, however, show a slight decline due to the general tendency to reduce the period of stay by the vacationers, which pushes to rethink the offer and the development strategies, especially towards a strengthening of the recreational services.

Different trends concern the agricultural sector. The number of companies in the sector in the province of Venice fell by 40% compared to 2004, showing evident

signs of suffering. The technicization has also significantly lowered the request for employees and at the same time has seen a considerable increase in the average extension of companies, which are forced to merge to ensure profitability. On the basis of the data collected, it is considered that a cultivated area of about 300 ha is necessary to guarantee sufficient income for a family today. In addition to this there are the problems related to the indirect costs and the benefits denied to the community for the maintenance of such a structure. The surveys on historical data, present since 1984, clearly show a growing tendency to abandon the land. It should be noted that this phenomenon is often linked to incentives granted for the

7 / The Italian National Institute of Statistics (Istituto Nazionale di Statistica) is the main producer of official statistics in Italy. Its activities include the census of population, economic censuses and a number of social, economic and environmental surveys and analyses. Istat is by far the largest producer of statistical information in Italy, and is an active member of the European Statistical System, coordinated by Eurostat.

seasonal planting of the plots but does not hide a general tendency to impoverish the sector.

### *Perceptual aspects*

The waterway flows along a territory made up by land reclamation. Many of the plot patterns are called "alla larga" or "alla ferrarese" which represents the most modern and most suitable method for the mechanization of cultivation operations. In it the plots are rectangular and are bordered by deep field ditches. The size of the plots, especially in the areas of more recent reclamation, are about 50 m wide with a length that in some cases may exceed half a kilometer. The reasons for the success of this pattern are essentially connected to the rationalization of mechanization and the elimination of losses due to the trees: that's means that is possible to increase the unit productivity using the same area.

Besides the positive aspects from the point of view of the volume of crops, it is necessary complain the extreme simplification of the agricultural landscape, with the onset of significant environmental problems and serious damage to biodiversity. The resulting effects on the environment are easily understood, given that all the elements of diversification of the landscape disappear, which take on the connotations of a shapeless "tabula rasa"<sup>8</sup>. It is worth remembering that the indirect negative effects of an aesthetic-perceptive nature that such a landscape has on the near tourist coast.

### *The strategy*

The areas under consideration are the results of the policy of ruralization and public reclamations started on '30s, during fascism lapse. Since the post-war period, the economics of the area has gradually turned towards a view of exploiting tourism linked to the hotel facilities, along the coast. The result of this shift is a misalignment between the agricultural vocation of the territory and its actual exploitation. The aim of the proposal is a transformation process that harnesses planning tools - permeable to private initiative - that is financed through the opportunities created by the new economic configuration.

### *The identification of the areas of intervention*

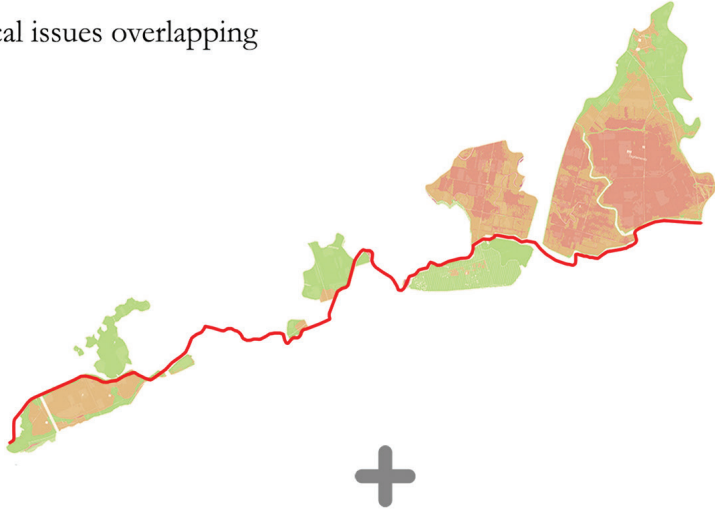
The first step was to map and recognize the critical issues by overlaying the plans of the critical issues and historical maps of the territory. In this way it was possible to identify the most risk areas and especially where agriculture production is now below

projection – due to the saltwater intrusion of the soil. In this area, where now is mainly used like a high intense crop, the production will eventually disappear or reduced. The second step was to analyze the hydrography and the morphology: the territory is based on land reclamation and from this point of view, each reclamation area behaves like an independent island. Moreover, these sites are often circumscribed by banks of canals and rivers. That means that the conversion to new equilibriums is less burdensome, since many embankments are already prepared and they permit to transform large areas without affect the areas around. On the basis of these considerations, it has been decided to design the areas of intervention taking account of these banks. This fact pulled us to define different actions of transformation and to dedicate to each area a different way of mediating the relationship with the surroundings. For example, the creation of a wet area near an urban front, certainly positively qualifies the inhabited area; but if it were necessary to interpose a safety barrier of 3 meters, this would greatly reduce the potential advantages of this operation. Here is the need to create areas from the water configuration compatible with the needs required by the site.

To ensure the financial sustainability of the project it is necessary to provide for real estate development interventions, associated with the transformation actions of the territory. For this reason, the program is also divided into territorial transformation actions - that concern in large areas crossed by the waterway - and in real estate development interventions, where services and hot activities are concentrated. Some of this actions are already present in the urban plans, for example the incentive for the re-naturalization of rural areas in exchange for construction credits. The proposal aims to organize the construction according to the development of the coastline, identifying the course of the waterway as potential growth, with the advantage of being able to manage urban growth and avoiding the fragmented and disorganized development that affects the territory.

The strategy consists in triggering a process of environmental improvement through the water reconfiguration of vast areas of the coast crossed by the waterway, towards a safer and less burdensome setup to manage. Of course, this changes takes into account the criticalities that have emerged in the analysis. The

Critical issues overlapping



Hidrography



Wetlands system

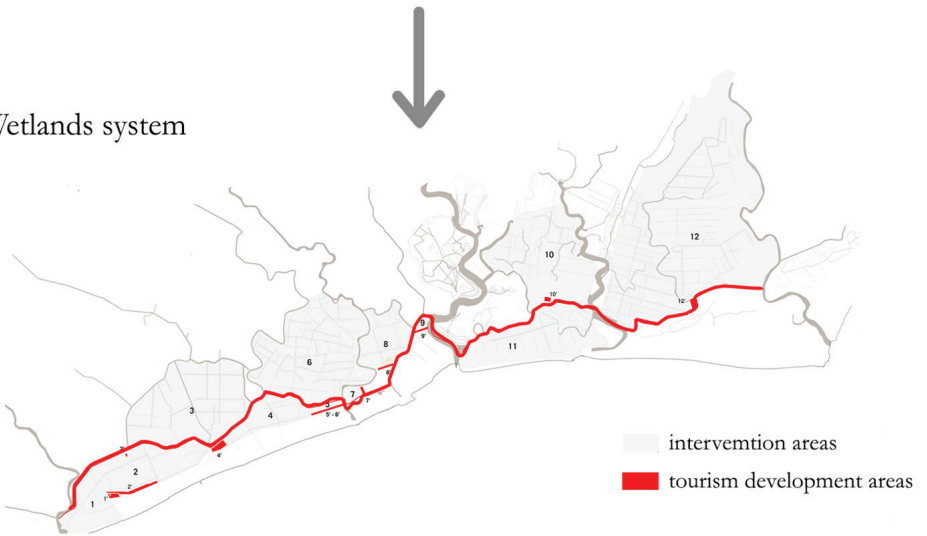


Fig4 / The strategy of interventions  
source / the authors

project envisages the establishment of a path of wetlands along the course of the waterway. The process is financing through the creation of hot activities that allow to monetize the new possibilities created through the granting of building credits. In this sense an important step is identifying strategically important areas along the waterway. Areas with problems of flooding and stagnation are transformed into wetlands, suitable for collecting excess water in rainy periods or to keep water during the dry season, functioning as "sponges". Other areas are exploited as natural scrubbers, using plant-based sewage-treatment facilities, improving the quality of water strongly compromised by summer savage during the tourist season. These interventions are aimed to improving the quality of the landscape, as well as improving the quality of the landscape, opening up new possibilities for those areas that now constitute a rear of the coast.

### The project

Due to the extension of the project area, it was decided to identify four different types of intervention, depending on the criticality, position and potential that the transformation can activate. In this way some areas become an extension of the waterway: starting from a thin stream, the infrastructure will become to assume a lagoon morphology. For safety reasons, these areas must be included within the waterway embankments. In other sites, affected by the risk of sea ingression, the project expected a decommissioning from the control of land reclamation, thus being able to recede the coastal defenses in banks more backward and less subject to the erosive action of marine currents. Here are the 4 type of interventions: A, B, C, D.

#### Type A Area

- Where: areas under the sea level, with low urbanization and with marked problems related to the rising of the salt inclusion and flood risk. Areas in part or in anticipation of being transformed into nature reserves and SCI<sup>9</sup> areas, not affected by tourism exploitation activities. Areas with limited agricultural productivity and high impact of maintenance costs, characterized by poor environmental quality.

- What: detachment from the mechanical drainage network with a consequent return to the pre-reclamation condition. It is proposed a natural flooding followed by a free and autonomous evolution of the morphology of the sandy strings, following the geological trends of the coast.

- Advantages: limitation of hydraulic risks and marine ingression due to the exclusion from the human exploitation of these areas. Indirect benefits to tourism given by the environmental quality improvement. Limited installation costs, which provide for the almost total absence of embedding work for the securing of the surrounding areas. Benefits to the ecosystem. Increase in the volume of water exchange between inland waters and sea that contrasts the silting of existing port mouths.

#### Type B Area

- Where: agricultural areas under the sea level, suffering hydraulic risk and in contexts where there is the possibility of qualifying less valuable urban areas or which now represent a back to the coast, with consequent opportunities for new real estate developments and phenomena of enhancement of existing heritage.

-What: inclusion of vast areas of reclamation within the embankments of the waterway. Creation of wetlands that offer development opportunities for the leisure sector. Development of a new water-front interconnected with the waterway.

- Advantages: development of hot activities related to tourism. Environmental benefits favors tourism activities and transition from agriculture to fish-farming. Benefits related to the quality of the water given by the plant-based sewage-treatment facilities. Action of aquatic plants that develop in shallow water, with a consequent reduction of the biological load given by the sewage drains, especially in the summer season. The wetlands allow to naturally stem the consumption of the territory, avoiding sprawl risk and implementing building densification policies. Increase in the volume of water exchange between inland waters and sea that contrasts the silting of existing port mouths.

#### Type C Area

- Where: depressed rural areas next to the waterway, under mechanical drainage and with low environmental value, located mainly upstream of the waterway, burdened by flooding and potentially useful for solving hydraulic problems.

- What: slow reduction of the flow rate of water-drainage systems until a natural water balance is reached. Formation of reservoirs in the most depressed areas. Creation of a typically humid environment, under the sea level and therefore able to receive large volumes of water to protect the surrounding territory without economic damage.

- Advantages: water stagnation improves the feeding of ground water storage, for the benefit of the surrounding crops. Water accumulation allows to dampen extreme weather patterns and avoid the overloading of mechanical drainage systems. Furthermore, some of these areas can be used as expansion basins for the reduction of the peaks of flow, to protect the urbanized coastline.

#### *Type D Area*

- Where: agricultural areas next to C areas.  
- What: rural areas that needs a landscape improvement quality and a transition technologized form of agriculture, in symbiosis with the 3 areas. Redesign of the grids that characterize the reclamation to the advantage of buffer zones for the development of hedges and ditches, with consequent lower of the production pressure.  
- Advantages: reduction of the useful productive pressure of the soil, that contributes at a more permeable territory, less burdensome to manage, more resilient to climatic changes.

#### **Expected results**

The project plans to achieve the following objectives:

- a perceptually and qualitatively improvement of the territory;
- a safer territory in terms of hydraulic risk;
- a territory less burdensome to manage and more resilient;
- improvement of tourism supply and new job opportunities.

#### *Improvement of the agricultural landscape*

The reconfiguration of the territory considerably changes the perceptive aspects of the landscape. In fact, in addition to solving the problems related to water management, the aim of the work is to improve the overall environmental quality. The project envisages different transformation actions and each one leads to perceptually different results according to the planned real estate development measures. Overall, the general aspect shows the territory to a configuration of wetlands that are realigned to the morphology of the territory and result in agreement with the tourist vocation of the area. The waterway is therefore the connecting point of this system, which becomes a tourist route characterized by a wide range of services and and naturalistical interesting views. In this

way, the touristic offer linked to seaside tourism is strengthened, with considerable advantages for the overall economy. For actions of type C and D, which concern the rural areas next to the waterway, trends are to make the territory more resilient, while preserving the agricultural character of the area. In this sense there are areas for water reservoir, and plantations of poplar groves and the recovery of hedges that delimit the cultivated areas. The set of measures, together with easing the production pressure, allows to positively characterize the agricultural landscape, today without any quality.

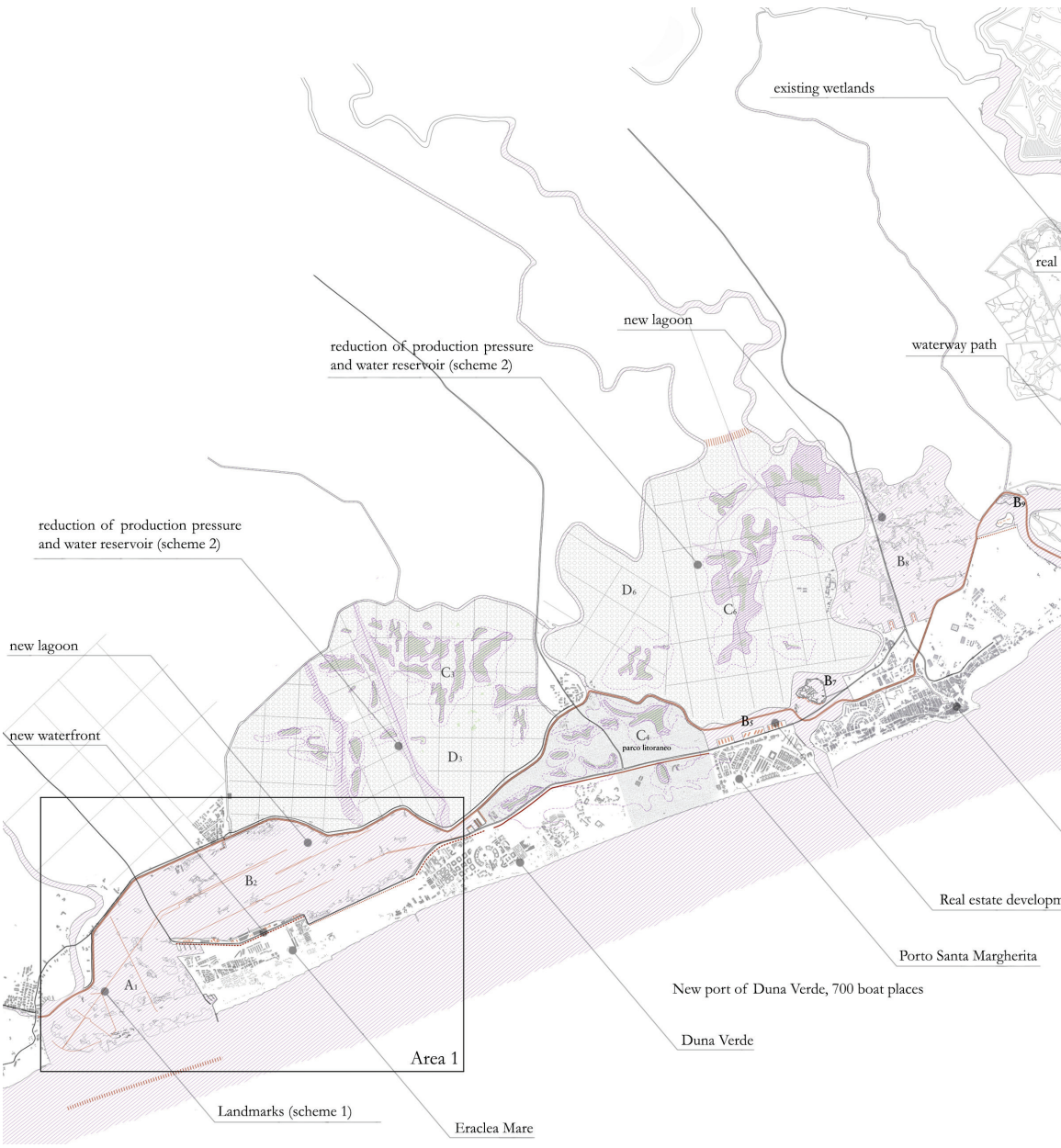
The theme of perception was dealt with in the new wetlands created: in this sense, paths have been planned formed by footbridges that allow the new lagoons to be enjoyed and which follow the country routes that characterized the reclamation. Along with the routes, a network of cornerstones has been designed, which constitute emergencies with respect to the flat territory of the wetlands, with the aim of acting as reference points and for measuring the new areas. These significant points offer services such as landing, rest area and viewpoints.

#### *Territory safer and protection from flooding*

The entire water system of the waterway, as configured in the project, is able to store more than 3 million cubic meters of water. This has also a positive effect to the areas not involved in the transformation. The management of the landscape heritage requires not to react in a rigid way to emergencies, which pushes to sacrifice some areas to ensure the safety of others. In other words, this choice implies both economic advantages, since the administration will no longer have to bear the costs of maintaining the reclamation or any compensation for damage to crops, and benefits related to safety as the exclusion of areas anthropogenic control effectively excludes the occurrence of potential flood damage.

#### *Land less burdensome to manage and more resilient*

In passing from natural ecosystems to urban ones, the role of man in guaranteeing the balance of the ecosystem increases progressively; for example, it is evident that the maintenance of the current balance between the different environmental components in urban areas



is almost entirely due to the man. Instead, in the cultivated areas, an increasing role is played by the original natural factors of the environment. Unlike natural ecosystems, urbanized areas always have a historical dimension, being the result of a work of transformation of the environment and not of adaptation to it.

*Improvement of tourism supply and new job opportunities*

The creation of a second axis of development along the waterway and in direct contact with the coast, allows to qualify large fronts that today constitute a "back" compared to the beach, with obvious repercussions both for future scenarios of development of activities related to tourism, both as regards the enhancement of existing real estate assets. Moreover, as mentioned above, the transformation process involves

associating transformations with tourist development interventions: it is therefore envisaged to build about 4000 boats slip and related services, able to increase the range of traffic and the wealth of territory.

**Conclusions**

This work highlight that a broad-minded analysis can reveal latent potential for problem solving, related with land use planning. An infrastructure as the waterway, which today is a mark in the territory without a precise functional, becomes the thorn for the development of a series of interventions that modify the landscape, attract investments and optimize the management of public resources for the securing of areas.

The result of the transformation leaves the population a less burdensome territory to manage, able to react in a resilient way



*Fig5 / General Masterplan of the project proposal source / the authors*

to the increasingly acute atmospheric phenomena. The Venetian Litoranea Waterway project is able to provide a model for the development of the coastal environment capable of reacting to the problems highlighted by the analysis.

capable of generating wealth or financially supporting transformation.

The attention given to the management of the process is aimed to demonstrating that the governance of the soil can take place, as well as the imposition of constraints or the granting of contributions for improvement, through the generation of visions. This task puts the public operator at the center of the process, the only actor able to manage large amounts of information and at the same time guarantee the transparency of the work. The project aims to be a vision that proposes a new balance with the territory, but which at the same time can reveal new economic configurations