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MAIN SECTION

Designing a Waterspace in a Sea of Land. The Basso Ferrarese: a Territory Poised Between Reclamations and Sea Level Rising

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ABSTRACT

The text discusses the tangible impacts of climate change in the floodplain between Romagna and Lower Ferrara, where rising sea levels and frequent floods challenge traditional reclamation efforts. Despite attempts to control nature through drainage and embankments, the economic and practical feasibility of these measures is diminishing, emphasizing the need for a new approach. The essay advocates for a paradigm shift in perceiving these areas as potential water spaces, envisioning a future where they coexist with water. The rising sea in Lower Ferrara is deemed unstoppable, urging a proactive design strategy that embraces a "land sea" concept, acknowledging the fluidity of landscapes in the face of climate change. The contribution suggests exploring future maps and projections to understand evolving needs. Three exploration journeys focus on analyzing future water boundaries, offering insights into the changing territory. The narrative then transitions to the present, emphasizing the importance of creating experiential landscapes adaptable to future changes. By integrating architecture and water relationships, the floodplain can transform into a continuous park, fostering coexistence between humans, nature, and future waters across multiple levels. Ultimately, the essay advocates for a forward-looking design that navigates the challenges posed by climate change and envisions a harmonious future for these evolving territories.

KEYWORDS

Water Space, Flood Architecture, Experience Landscape, Architecture Adaptation, Terraqueous Territories.

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Designing a Waterspace in a Sea of Land. The Basso Ferrarese: a Territory Poised Between Reclamations and Sea Level Rising

> "Today a large part of the planet is poised between water and land and on the verge of catastrophe. The Basso Ferrarese has always been. This world of borders and polykenos[1] has always been extreme. And it is an extreme outpost. The climate disaster pushes us to meet the ghosts of our territory, makes us aware of them, gives us opportunities to question them. Bewilderment and the absence of models can allow potential elsewhere unthinkable to be expressed. The landscape can be an instrument of inspiration and knowledge: the geography and history of a territory where water and earth have been struggling for millennia can feed knowledge useful for living and fighting within the climate crisis. The new climate activism can treasure this."[2]

The situation in the Basso Ferrarese[3] could not be better summarized than with the words used by Moira dal Sito: a territory on the borderline between land and water, depopulation and tourist attraction, reclamation and rising sea levels. Its history is linked by a continuous struggle against water. A battle that continues, silently, but which becomes increasingly difficult, costly and complex. A perfect field of investigation for those theories related to coexistence with nature and water, in a place where water, at present, is often not there or cannot be seen.

This poignant struggle between man and territory, symbolized by the great reclamation works which over the centuries have wrestled space from the Mediterranean Sea, today leave a sea of land, cultivated and indefinite. The local population is fleeing, estranged from the artificial nature of the place and the lack of work perspectives caused by industrial crops, leaving a situation of disentanglement that seems to be an insurmountable caesura in this territory.

No less there is the raising of the sea, which hangs over its future, increasing its character of instability and uncertainty.

Firstly, the Basso Ferrarese is therefore a territory to be understood, in a story that is inextricably mixed with water and its incessant change. Secondly, it is a territory to be re-imagined and reinvented to guarantee its future development. An answer must therefore be given to the question: what are those design actions that can match the need to re-appropriate water spaces to resolve the disentanglement between the population and its own territory and at the same time protect themselves from it and its

1 From Byzantine Greek: many voids

2 Moira Dal Sito, *Quando qui sarà tornato il mare. Storie dal clima che ci attende,* ed. Wu Ming 1 (Roma: Edizioni Alegre, 2020), 35–36.

3 The territory largely below sea level (*basso*) in the province of Ferrara (*ferrarese*) located in the Po River delta.

catastrophic rising?

To answer this question, it was first of all necessary to explore the Basso Ferrarese through historical maps, testimonies, vintage images of reclamation and flooding, making journeys and exploring the water boundaries of this territory by hand. Exploring the edges of the future sea, those flooded areas viewable on the map through forecasts, which today are lands reclaimed from the sea.

It is necessary to immerse ourselves in the future Archipelago of historical centers that will be the Basso Ferrarese, to try to identify possible solutions for the design of the future landscape.

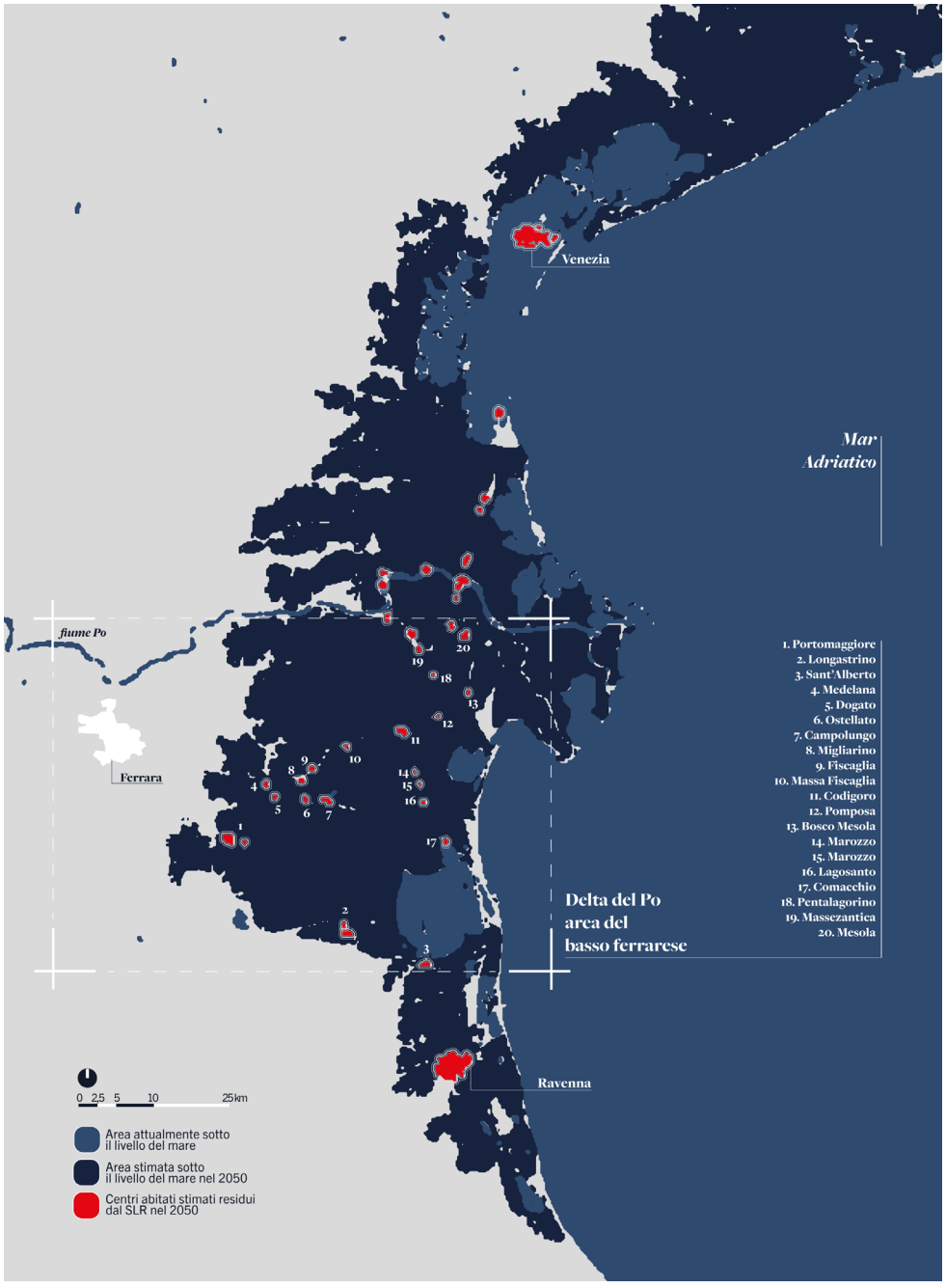

FIG. 1 Map of the northern Adriatic in 2050 according to the forecasts provided by Climat Centraal. Graphics by Rosa Grasso

History of a fight against water

The Delta is a marginal territory not only to be "reinvented" because it is subject to depopulation, but also because it will face the challenge of climate change and at the same time, as a delta territory, its history tells of water fluctuations and re-adaptation.

The instability of the area is due both to its intrinsic characteristics linked to the Po Delta (the Po in fact derives its name from *Bodinkòs* or *Bodenkùs*, from an Indo-European root (*bhedh-/*bhodh-) which means "to dig", or "make deep", the same root from which the Italian terms "*fossa*"- pit - or "*fossato*" – moat - derive), and for the conditions of global variation. Suffice it to say that in Roman times this area was defined as the *Padusa*, a huge marshy area that extended from the then coastline to beyond Modena. An area that has therefore seen continuous changes in its territory over the centuries and whose construction speaks of the relationship between architecture and water. At the same time, the delta area is also called Polesine, from the Byzantine Greek *polykenos*, meaning land with many voids. Perhaps today this is the definition that best suits her: the sea of water in which the first settlements and hillocks arose is today replaced by a sea of land, one of the areas with the lowest population density in the entire national territory.

FIG. 2 Conformation of the ancient Padusa. Credits: Gaetano Baldini

From the analysis of the historical cartography, it emerged that there are two overlapping settlement systems in the area: a first linked to a settlement logic according to the morphological structure of the territory, with the settlements that follow the emerging parts with respect to the sea level, or that are relocated according to calamitous events. An example is

the displacement of the town of Codigoro, after the advent of the only tsunami from inland waters verified in the Adriatic. Testimony of how a part of the inhabited area has already faced the challenge of water and brings with it the experience of past centuries.

The second settlement system found is that of reclamation, which instead testifies to the other attitude of morphological colonization through the anthropic modeling of the territory. A system made mainly of water and land, of small sprawl phenomena and designed cities. Just think that today the territory of the lower Ferrara area is reclaimed from the water thanks to a network of 4191 km of canals, with 78 drainage pumping plants for 1510 million cubic meters of water lifted annually.[4] These are all managed by the consortium of Reclamation of the Ferrara plain. This huge network is not only a recent work but is the result of continuous human work that began in the 16th century and continues today.

The first reclamations were carried out by natural drainage by the Estensi. Right from the start this need to regulate the water against its natural structure proved to be counterproductive: in 1526, under pressure from the city of Bologna, the dukes of Ferrara accepted the Reno to be introduced into the Po of Ferrara, clogging it irreparably, producing numerous breakages which flooded the territory south of the city. Despite this, the reclamations continued with the Grande Bonifica Estense between 1564 and 1580. What happened to it? It flooded again due to the cold climate which tended to close the mouths of the canals, a phenomenon increased by the Breakage of Porto Viro (1599-1604) carried out by the Venetians to divert the Po Grande towards the Ferrara coast.

In the mid-1800s the climate change had significant impacts on plain with frequent flooding. From 1872, with the new dewatering pumps, its drainage began, until 1950 when the great reclamation of the Mezzano was carried out, leading to the current layout of a large territory of 256,733 hectares, of which 130,000 hectares below sea level, with an area valley of 14,145 ha (5.5% of the entire area), with an urbanization of less than 3%, of about 7400 ha.[5]

4 Alessandro Bondesan, 'La gestione dell'acqua, risorsa a rischio', *Annuario socio-economico ferrarese 2022*, 2022, 266.

5 Ibid., 267.

FIG. 3 Chart of the Ferrara Ducatu, 1571. Credits: Galleria delle Carte Geografiche in Vaticano

Looking at the Charter of the Ferrara Ducatu of 1571, i.e. coinciding with the first reclamation operations by gravity, and the current altimetric one provided by the Reclamation Basin, it can be seen how in fact the system of dewatering pumps and canals allows to eliminate the part of cannot be eliminated by gravity, creating a continuous artificial landscape. The work of the Reclamation Basin is a silent work which is often not known to those who live in or pass through the area. However, it is certain that this work is not a foregone conclusion, and indeed the data from Bondesan's publication speak precisely of the problems that this ongoing struggle is facing and which it will increasingly have to face. With what costs and with what prospects is this artificial landscape maintained?

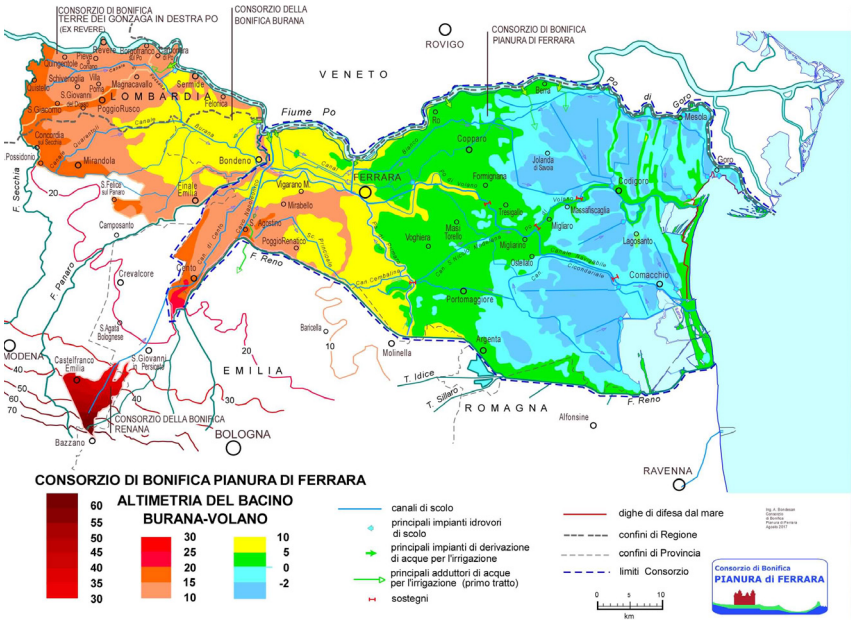

FIG. 4 Burana-Volano Basin altimetry map. Credits: Consorzio di Bonifica Pianura di Ferrara

In addition to the sea that rises, the Ferrara area lowers, both for natural phenomena and for artificial reasons. The methane gas extraction

actions between 1930 and 1950 caused about 30 cm of subsidence per year. Understood the phenomenon, the extractions were stopped in 1964, and today the subsidence is around 8-10 mm per year.

Meanwhile, the tide gauge active in Porto Garibaldi for 12 years, recorded a variation of +9.4 cm during its period of operation, including eustatism and subsidence. Almost 10 cm in 12 years. This means that the 78 plants constantly in operation thanks to the use of huge electricity, will have to work more and more and very often beyond the limits of the function for which they were designed.

The dewatering systems will be able to operate for a further 10 cm of difference and if in 2022 the cost of energy stood at 6.6 million euros, if the water level differed by 10 cm, the cost would increase by 1.5 million of Euro. The IPCC 2013 scenario foresees a variation of 97 cm between now and 2100, the Ramshtorf 2007 scenario of 140 cm. The system does not seem to be able to hold in the future, even more so if we consider that many plants date back to the 1800s and are already working with one meter more than their project prevalence.[6]

What would happen if the dewatering plants were turned off today? It is not difficult to imagine, since on 18 August 1979 a heavy storm caused a blackout in a large part of the lower Ferrara area and thirty-one thousand hectares of land were submerged. Today those fields that are kept out of water with great economic and energy effort are mainly used for large crops worked with industrial machinery in large plots, mostly dedicated to the cultivation of corn.

The conversion of the land from water to land was one of the causes of the depopulation of the area: the transition from a micro-economy made up of fishing and marsh reed processing to large industrial holdings caused a decrease in the need for manpower and job opportunities. Even the history of sugar mills has run its course, many of which remain large empty skeletons in the landscape. The perception of this detachment is clear going into the internal areas of the lower Ferrara area, where abandoned houses alternate with fields. Is the threat of the return of water so a threat? Or could it be an opportunity for a new rebirth in the Po delta?

6 Ibid., 277–79.

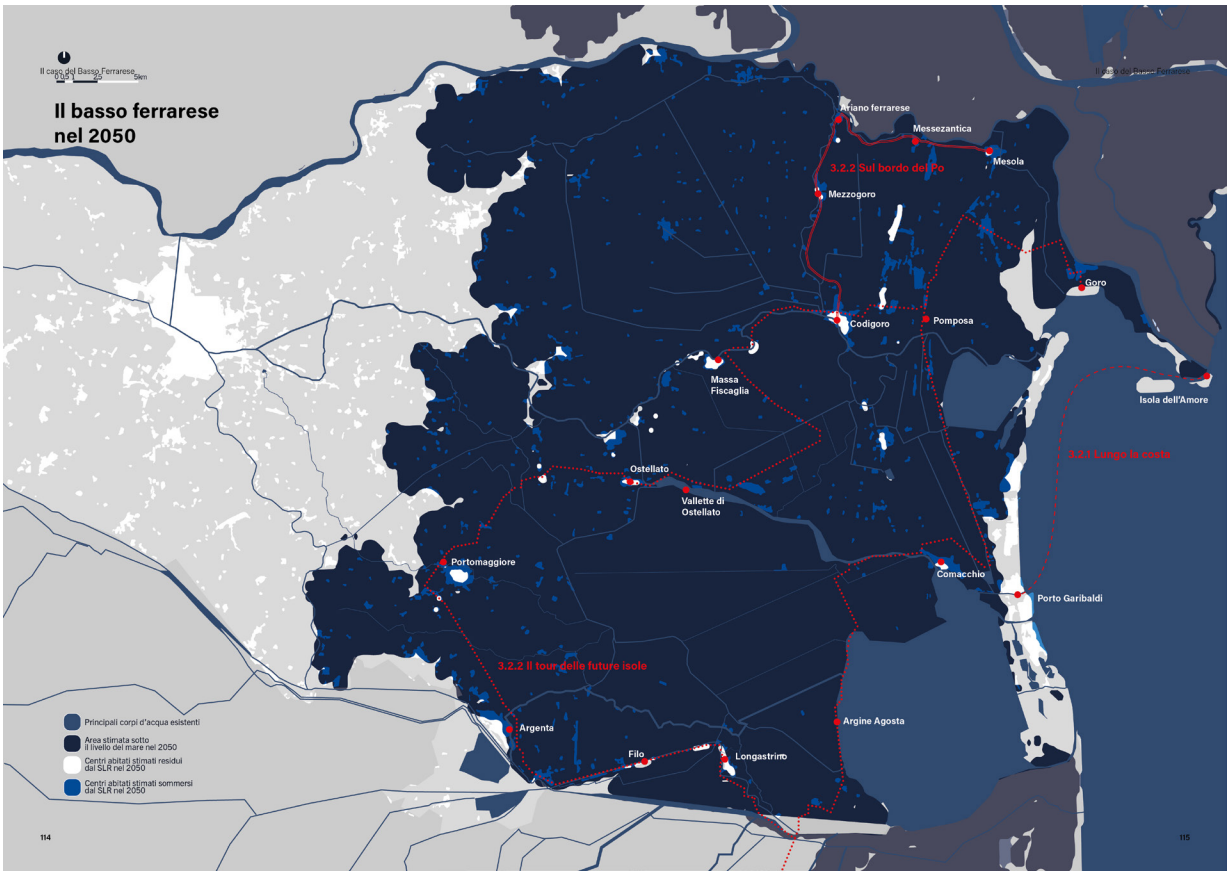

FIG. 5 Map of the Basso Ferrarese in 2050 SLR Forecasts and routes of exploration. Graphics by Rosa Grasso

Exploration of future edges

To try to better understand this relationship between the Basso Ferrarese area, the water and the situation of disentanglement, three journey were made within the area. Each was made considering both the historical maps and the projection that is made on the area regarding the rising sea level. Observing the map proposed by Climat Centraal, where it shows the emerged areas according to the altimetric model projecting to 2050, there will be a part of the coast that will remain like the current layout, while the reclamation area will once again be invaded by water.

The trips therefore intend to document the map of the future, looking at the territory and trying to understand what its configuration would look like. Furthermore, each part carries with it the traces of the past, those ghosts that have previously been mentioned return and can guide the design.

The first trip was made by sea, starting by boat from Porto Garibaldi to reach the Isle of Amore with its lighthouse. An inspection that makes understand the link with the historic water of this place, in a landscape that recalls that of the Padusa.

The second journey was on the edge of the Po, starting from Mesola up

to Ariano Ferrarese, to then move away reaching Codigoro. A place where one understands how the great river is a looming but distant space and where the water appears only through the artificial canals.

The third and last trip was a grand tour of the future archipelago, following the series of islands and historical centers that will remain. An inspection among the land seas of reclamation, where the water always appears extremely regulated and with geometric edges, where you can see the traces of ancient, closed canals and a city of water immersed in industrial crops.

Along the coast

The coast of the Basso Ferrarese is the most lived-in and built-up place: there are seven shores that are the center of tourism in the area, making this place extremely popular during the summer season. At the same time, it is possible to experience what the historical landscape of the delta looked like at the time.

Leaving Porto Garibaldi by ship (Fig. 6) the horizon is marked by a series of buildings that rise in the middle of what remains of the pine forest. Porto Garibaldi is the oldest of the seven shores and was born with the function of a port, then the tourist expansion led to a change in the landscape.

FIG. 6 Porto Garibaldi seen from the sea. Credits: Rosa Grasso

The coast is then punctuated by the pine forest and bathing facilities, which protrude towards the sea with piers, to then become characterized only by the pine forest (Fig. 7).

FIG. 7 The coast of Lidi Ferraresi seen from the sea. Credits: Rosa Grasso

The sea is extremely populated: between solar panels, poles to mark the routes, mussel crops, signs, small buildings, it gives the idea of an organized and lived-in landscape. The closer you get to the junction between the Po and the Adriatic Sea, the more the landscape is lost in the water, dividing the land into sandbars, small islands that the river creates by accumulating debris. The real landscape of the delta, made up of small shrubs and reeds, on which the economy was based before the reclamations. The Faro di Goro stands out among these small, dispersed islands (Fig. 8).

FIG. 8 Goro Lighthouse seen from the sea. Credits: Rosa Grasso

The delta is populated through light interventions: small floating piers, connection bridges and paths among the reeds. Inland from the coast, returning towards Ravenna, there is the Punta Alberete reserve: a wetland reserve of 190 hectares which is one of the last examples in Southern

Europe of swampy forest, typical of the Po Valley. In the forest, a hygrophilous wood alternates between the stables (the highest parts) and the low areas, submerged grasslands, and more open spaces. One of the last places where it is possible to see the geomorphology of the Delta before the arrival of human work.

On the edge of the Po

Mesola means "media insula" and is built on one of those lands that were part of the reclamation of the Este family. Mesola Castle is a few meters from Corso del Po di Goro. A very close proximity that is not perceived, however, in the town itself.

The Po is in fact separated by a high embankment (Fig. 9), which runs alongside the built-up area, at times almost incorporating it inside. From the castle of Mesola to see the Po you must go up to the top floors. In what from the map might appear to be a river town, the relationship with it is completely precluded.

FIG. 9 Mesola castle seen from the embankment. Credits: Rosa Grasso

Going up the embankment you can see how the river level is higher than the first floors of the town. The river is almost felt as an impending threat, without the possibility of experiencing it. Suffice it to say that the great flood of Polesine, which occurred 70 years ago, is still present in the memory of the inhabitants.

On November 14, 1951, a large part of the province of Rovigo was invaded by water, causing hundreds of victims and more than 180,000 homeless people, many of whom never returned to their homes. The river began to overflow in several places, eroding the embankment body and

then breaking it. Until November 15, the waters remained uncontrolled, submerging almost 100,000 hectares and inundating more than 5,600 homes.[7] "*To return to a desolate and excruciating normality, six months will not be enough and at that point many of the displaced will never go back, convinced they have lost their war with the river forever.*"[8]

The images of the Polesine flood can still be seen today through the documentaries of the Istituto Luce, which show the recovery of displaced persons waiting from the windowsills of their homes (Fig. 10). A catastrophic and symbolic memory of how this place is held in the balance only thanks to the artificiality of human work.

FIG. 10 Polesine flooding of 1951. Credits: Fioravante Bucco

Moving away from Mesola and continuing towards Messezzantica, the Po embankment remains alongside the route, always blocking the view of the river, as well as its space. The Bianco canal takes up its space, forming part of the water regime.

The city of Messezantica does not even relate to this: passing through the town, one does not have the perception of being close to the water, which remains hidden in the back of the houses (Fig. 11), surprisingly at a lower level even than the level of the canal water.

7 Gian Antonio Cibotto, *Cronache dell'alluvione. Polesine 1951* (Milano: La nave di Teseo, 2021).

8 Ibid., 11.

FIG. 11 Messezantica embankment. Credits: Rosa Grasso

The landscape between one inhabited center and other alternates between abandoned houses in the midst of large cultivated plots and canals flanked by extremely constant plantings of trees, both the result of hyper-anthropization. An extremely artificial landscape that does not seem to be lived in or welcomed by the local population, a large place dictated more by economic interests rather than by the needs of the community.

In Ariano Ferrarese it seems for the first time that the town is looking for a certain relationship with water, perhaps also revealed by the passage of a bridge that connects the two banks of the Bianco canal. Alongside the bridge a house expands leaning over the water, on the other side different types of quays and small gardens allow access by small boats.

The general feeling that is perceived in this space is that of abandonment and non-use. The vegetation abounds uncontrolled, the backs of the houses are not maintained.

The only sign that suggests that this space could be used in some ways are the large fishing nets or rods that emerge from the houses, ready to be used (Fig. 12).

FIG. 12 Bianco canal in Ariano Ferrarese. Credits: Rosa Grasso

All these places are born from the subtraction of land from the water, and it seems that here the landscape is suspended, in search of a form of acceptance by the people who inhabit it.

Moving away from the places below the Po, at the limits of the Basso Ferrarese, and entering more inland, we find Mezzogoro. Here too the water is always at the back of the town, but it can be perceived between one volume and another even when passing from the main street (Fig. 13).

The small stairs, the gates and the backs are always abandoned, even if in the houses there seem to be signs of life such as hanging sheets, flowerpots with some plants. The space on the canal that passes through Mezzogoro is a large space that could be lived in, but for which local interest is not found.

FIG. 13 Huse backyards at the canal in Mezzogoro. Credits: Rosa Grasso

Finally, in Codigoro, there is the Po di Volano, which cuts the town in two with its course. Here it seems that the city has become aware of the river and wants to dialogue with it. Both shores are lived in and open onto the water space. If you look at the map in 2050, this is the only space that will remain highlighted among those visited on this trip. the built-up area that has historically faced water will continue to do so (Fig. 14). Moving away into the newly expanded area, this relationship changes again, presenting high defense walls to prevent the river from overflowing, again going to distance itself from it.

FIG. 14 Po in Codigoro. Credits: Rosa Grasso

Future islands tour

The last part of the territory that therefore remained to be explored was that of the great reclamation: a territory that has always lived with water, but from which it has been deprived. The 2050 map defines a series of future islands, places that could find their image in a post-anthropocentric landscape.

With this last trip to the lower Ferrara area, we therefore wanted to understand how these edges and the edges of the other "islands" are made, which will remain if the water actually rises again, almost always coinciding with that historical settlement with which the first populations started populating the area.

Arriving in Longastrino, one immediately realizes how that limit between land and future water is marked by a very pronounced hillock, the houses are built on completely different floors (Fig. 15).

FIG. 15 Longastrino hillock between land and reclamation. Credits: Rosa Grasso

The entire road of that “isthmus” that goes from Filo to Longastrino is placed on a large hillock that rises above the level cultivated today. Looking at the historical maps, this has always been the natural condition: these two small poles were born on a strip of land that extended into the valley spaces, so much so that in the ancient maps it was defined as the Filo Riviera. That margin, once so clear between water and land, is now colonized and occupied. An occupation of the space taken up by the water that took place in various ways along the “riviera” of Filo.

In Fig. 15 a small bridge connects the road to the house, in other cases a small descent leads to low ground, or a series of single-family buildings expand the floor below the level by joining the house with the street level via a small patio (Fig. 16).

FIG. 16 Filo houses in the reclamation área. Credits: Rosa Grasso

Of particular interest is how this edge has been colonized, re-appropriating a space that used to be water. If water returns here one day, how will this place be able to live with it again? Is there the possibility of implementing a decolonization of the future by activating relations with the water of the future today?

Continuing, in Argenta the space of a historic canal has been closed and a high rise divides the city from the railway. The map also marks it as the limit of future water, making Argenta a peninsula protruding into the sea. Today the closed canal is a pedestrian path, an urban park used by the inhabitants (Fig. 7).

FIG. 17 Argenta closed canal. Credits: Rosa Grasso

In Portomaggiore, which seems to conform as a real island, the edges are formed by fields with scattered houses, often abandoned or in ruins. (Fig. 18) It seems that the water will submerge all the ground floors, making these buildings small islands in the sea through which it will then be possible to reach the center of Portomaggiore, free from rising water.

FIG. 18 Portamaggiore “future Island” edges. Credits: Rosa Grasso

The Vallette di Ostellato are a naturalistic oasis, testimony of the valley landscape. This large body of water is connected to the rest of the canal system. Going up the embankment it is interesting to see how different levels of water coexist a few meters away (Fig. 19).

FIG. 19 Vallette di Ostellato. Rosa Grasso

On reaching Comacchio, the most alienating perception one has is that of arriving in a city of water surrounded by a sea of land. In fact, Comacchio only minimally preserves its original conformation made up of small islands. Within the town of Comacchio you can find different types of relationship and variation between the edge of the water and the water itself. Closed or open walls, doors, small bridges, overhangs. Of particular interest is the wall that frames the entrance to the Church in via del Rosario: the internal volumes emerge from the building, giving shape to the space around the water (Fig. 20).

FIG. 20 Comacchio Church canal edge. Credits: Rosa Grasso

The journey then concluded with the August bank, a symbolic place of the differences in the landscape before and after the reclamation. In Fig. 21 it is possible to see the Comacchio Valley on the left and the reclamation of the Mezzano on the right. If on the one hand the water reflects the sky making the limits of the horizon disappear, on the other there is that sea of land of reclamation and large plots of land.

FIG. 21 Argine Agosta at sunset. Credits: Rosa Grasso

Designing the future Basso Ferrarese

The space in the Basso Ferrarese is a space to be repopulated, through water scenarios that can connect land and sea, present and future. Considering the looming sea to create new experiential landscapes of the existing. It is therefore necessary to understand how to act, which elements to incorporate to imagine new design actions. Unlike what is done for large metropolitan areas, where the phenomenon of rising sea levels produces extremely costly protection actions, it is instead necessary to identify, for marginal territories, actions of coexistence. Light works, which

can involve the community, without creating barriers, but which can allow scenarios of coexistence with water.

Before the reclamation, the history of the territory itself speaks of a colonization of the territory according to nature, following the possibilities of what the morphology allowed. In line with what ecological theories claim today. As Henk Ovink also argues, we must develop theories that lead to the adaptation of the existing to future scenarios through its metamorphosis. We must define those grafts that can allow the existing to be adapted, through new hybrid forms of the inhabited.

In Clement's idea of a planetary garden,[9] not defining edges, but working through the existing and its paradigms. By creating a weak metropolis, like the one theorized by Branzi,[10] where the territory functions as a system of small but interconnected elements. The need is to create scenarios of metamorphosis, as Didier Faustino argues, which we will then go to inhabit.

To design a future of coexistence with water, we need to understand how the existing infrastructure relates to it. By analyzing the relationships that water has with the built environment through the examination of publications and projects, as well as elements identified during the tour of the Po Delta, four different types of relationships can be identified:

Spatial relationships: series of relationships between architectural volumes and water space such as floating, stilt house, quay, distance, overhang, edge, inside, underwater

Functional relationships: typological elements of water space usage such as wharf, canal, reservoir, bridge, lighthouse, dam, dock

Formal relationships: Water as a formal compositional element divided in geometric, informal, interacting.

Perceptive relationships: Water as a perceptual physical phenomenon such as variation, reflection, color, sound, mutation.

The result of this subdivision is an abacus of elements for the composition of the water space, a small vocabulary to highlight the main points. This part of the general analysis was extremely useful to then carry forward the design experimentation phase on the Basso Ferrarese.

9 Gilles Clément, *Giardini, paesaggio e genio naturale*, trans. Giuseppe Lucchesini (Macerata: Quodlibet, 2013).

10 Andrea Branzi, 'For a Post-Environmentalism: Seven Suggestions for a "New Athens Charter"', *Ecological Urbanism*, 2010, 110–11.

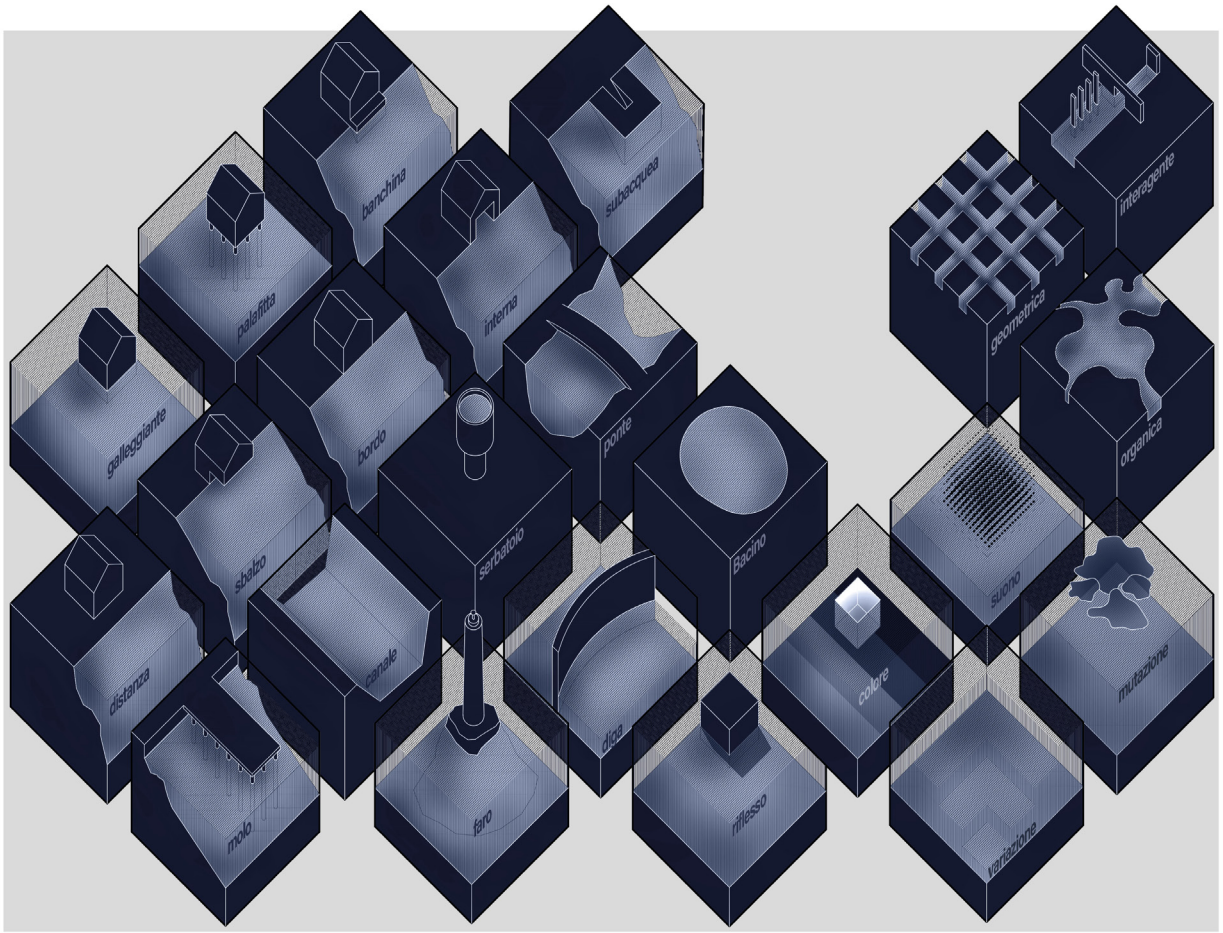

FIG. 22 Abacus of the elements of the water space. Credits: Rosa Grasso

In this relational panorama, the spatial relationships (float, stilt house, quay, distance, cantilever, edge, internal, underwater) are the ones that mostly intervene in the definition of the relationship between water and architecture in the landscape, the most changeable and adaptive as they are unrelated to purely functional or perceptive aspects, but constitute the punctual relational definition. During inspections in the Delta area, all spatial relationships are present and can be found in the previously mentioned descriptions and photographs. The large buildings rising like stilts in the landscape, the boats floating in the canals and along the banks, the fronts projecting out, embracing or shaping the water, and so on. Other types of relationships also characterize the Po Delta: lighthouses and signaling elements are widespread, water is regulated in different parts, creating a regular geometric pattern that defines the entire area. Similarly, physical variations change its landscape, where fog is one of the elements that significantly influences its perception. If we want to discuss the adaptation of existing structures to sea level rise, as mentioned earlier, it is the relationship with the built environment that must take center stage in the debate and help understand the possibilities for future development.

How can we start from the characteristic elements of the delta and its relationships with water to create an imagined future? Eight examples have been developed, each carrying with it eight possible actions. The

result is an idea of a continuous landscape, where the land sea and the future water sea coincide, bringing with them a concept of landscape that permeates the inhabited areas, colonizing them and defining amphibious spaces for coexistence.

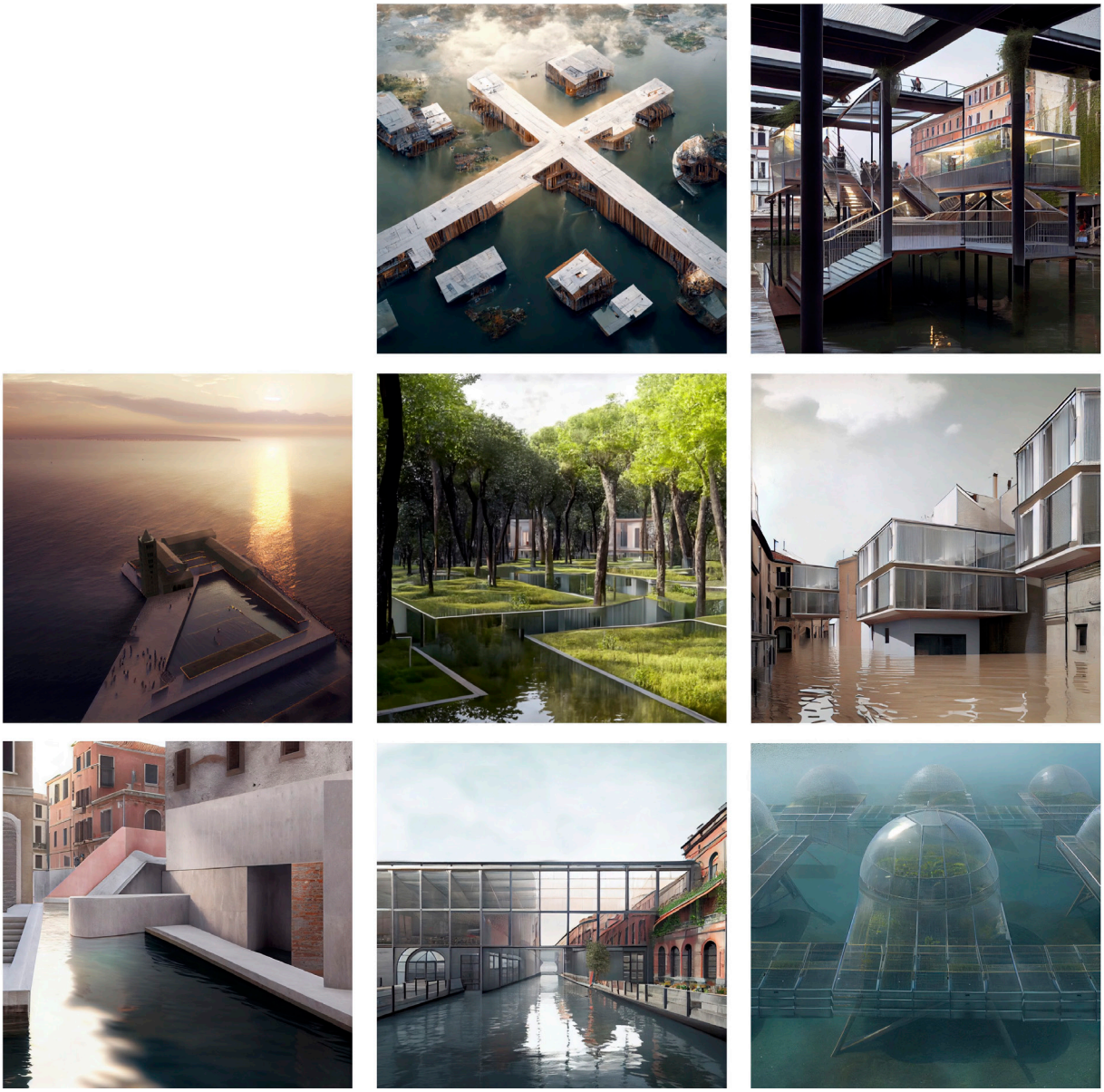

FIG. 23 Imaginary for the future Po river Delta. Credits: Rosa Grasso

Floating

FIG. 24 Imaginary of floating. Credits: Rosa Grasso

The small pole system needs, both today and in the future, a networked system to ensure shared services among different administrations. The canal system connects almost all the poles in the area, creating an interconnected waterway system. Floating buildings today embody the concept of 'scarless architecture' and 'city apps': architecture that leaves no permanent marks and can become shared infrastructure. Public functions of a large metropolis can be distributed to small poles, allowing services such as cinemas, theaters, museums, or specialized clinics and school classrooms, which a small municipality might not afford, to be shared and managed by multiple administrative entities simultaneously. This concept, reminiscent of the floating mills in the Delta area, allows for the efficient and shared use of services. A warehouse-mole, connected to the existing canal network, can serve as a collection point for shared services, becoming an additional new hub within the system.

Stilt

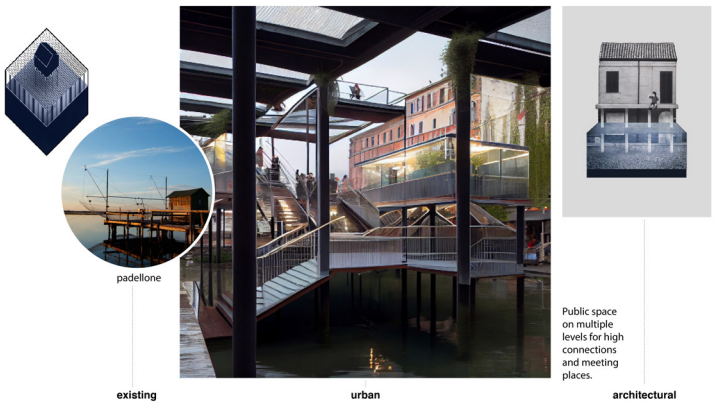

FIG. 25 Imaginary of stilt. Credits: Rosa Grasso

The stilt house proves to be the most versatile action in designing water space. Its ability to easily create vertical space is highly useful, serving as a connection between parts, a balcony, or a significant pathway in the landscape. Often overlooked is its ability to rhythmically shape space beneath its supporting plane, introducing elements at different levels and heights. Delta squares, like Ostellato's, subject to future fluctuations, could be rhythmically enhanced and discover new urban dimensions through its use. In the Delta, stilt houses are represented today by 'padelloni,' structures on stilts once used for fishing. Now more than a productive function, padelloni serve tourist, convivial, and meeting purposes. These places, typically used by small groups, could become part of public space, three-dimensionally defining future aquatic spaces in the inhabited environment.

Quay

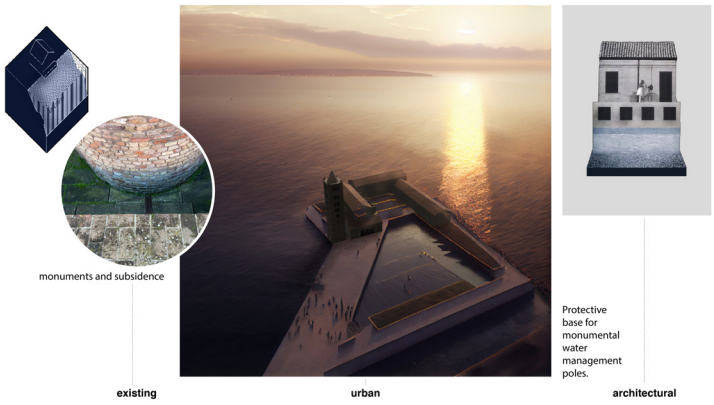

FIG. 26 Imaginary of quay. Credits: Rosa Grasso

The base can elevate new buildings, creating a division between land and enjoyed space, defining compact and elevated pathways. In delta regions, it can protect 'monument islands,' guiding floodwaters to a collective basin, akin to the pavement around Ravenna's monuments. This avoids enclosing buildings in high fences, instead forming a scenic platform within the landscape. Examining Pomposa, for instance, a base could reinforce its existing morphology. Water could immediately find a new space to reflect monuments, potentially becoming a future catchment basin. Additionally, the base can serve as a container for spaces, expanding the informational offerings of the defined area.

Distance

FIG. 27 Imaginary of distance. Credits: Rosa Grasso

In this case, the distance from the water's edge is considered a fluctuation zone for the sea. This distance space can transform into a wetland capable of managing water level changes. Wetlands were historical landscapes in the lower Ferrara area, characterized by alternating trees and small pools. The petrified forest of Punta Alberete is one of the few remaining examples, featuring a mix of hygrophilous woodland and submerged meadows at different levels, creating denser forest sections alternating with more open spaces. This alternation can become a design theme in areas where water might sporadically arrive due to fluctuations. As proposed in the Argenta metaproject, trees can act as a mitigation system against the force of currents and tides. This suggests planning peripheral areas of poles with a series of green belts, large floodable parks, protecting settlements and mitigating water force while revitalizing parts of the territory with an image of the original landscape.

Overhang

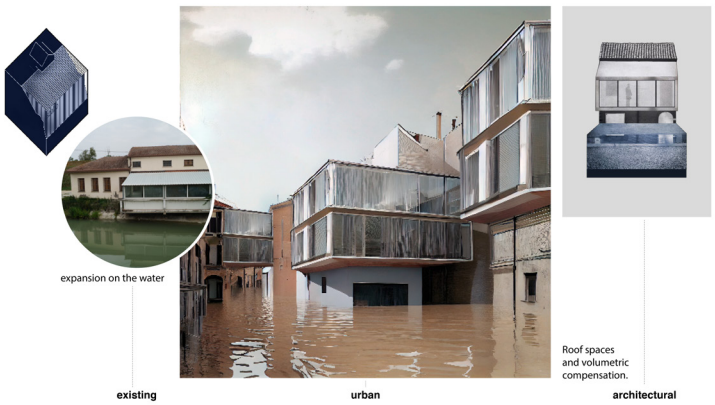

FIG. 28 Imaginary of overhang. Credits: Rosa Grasso

The projection of small volumes attached to the main building is a characteristic of historic structures. Extending these projections over water could create a continuous vertical public space, simultaneously expanding living spaces. Water prompts a reevaluation of roof space, forming connections between different volumes that may serve as bridges or suspended walkways. While vertical growth is considered in resilience plans, horizontal expansion fosters new urban relationships, connecting volumes and establishing a shared common space, compensating for the loss of ground-level space. During surveys in the lower Ferrara area, cantilevered structures with glass elements were encountered, enhancing the building's interior with greater interaction with the water, creating intermediate spaces between the interior and exterior.

Edge

FIG. 29 Imaginary of edge. Credits: Rosa Grasso

The water's edges often require resistance practices to protect them from rising waters. Examining the settlement of Comacchio, these edges can take various forms, creating diverse spaces over water. In Comacchio, water edges manifest as walls, small bridges, convex elements, recesses, and different openings, offering varied ways of interacting with and reaching the water. The plasticity and articulation of the edge can define aesthetic defense and barrier practices, contributing to the creation of experiential landscapes, even in cases where low fronts are closed off. Areas currently shielded by high protective walls could be redefined through plastic elements, allowing interaction with the water while maintaining their protective function. Protruding elements, concavities, varying heights, steps, and openings can all contribute to shaping the volume of a protective wall, defining new water landscapes that adapt to changing conditions.

Inside

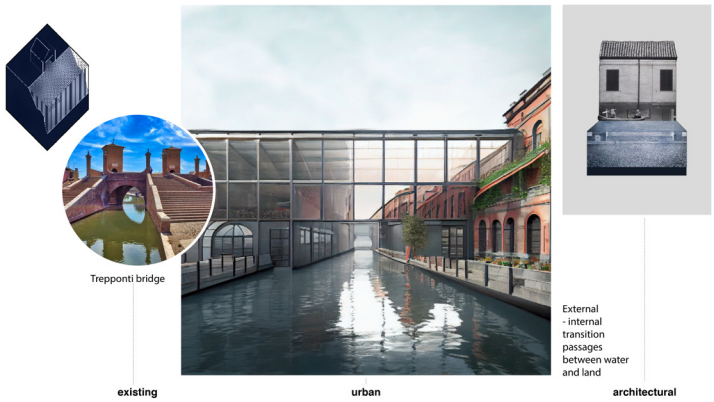

FIG. 30 Imaginary of inside. Credits: Rosa Grasso

External-internal transition passages between water and land serve as dynamic interfaces that blend aquatic and terrestrial realms. These passages, observed in Comacchio's urban fabric, take diverse forms such as bridges, walkways, and openings, facilitating fluid movement and interaction. Comprising walls, small bridges, and recesses, they create varying ways to engage with water, showcasing adaptability. Their plasticity defines both aesthetic defenses against rising waters and barriers, contributing to diverse water landscapes. In areas currently shielded by protective walls, redefined through plastic elements, these passages enable ongoing interaction with water while maintaining their protective role. Protruding elements, concavities, and different heights can shape protective walls, forming novel water landscapes that harmonize with changing conditions, emphasizing the potential for aesthetic, functional, and resilient integration.

Under

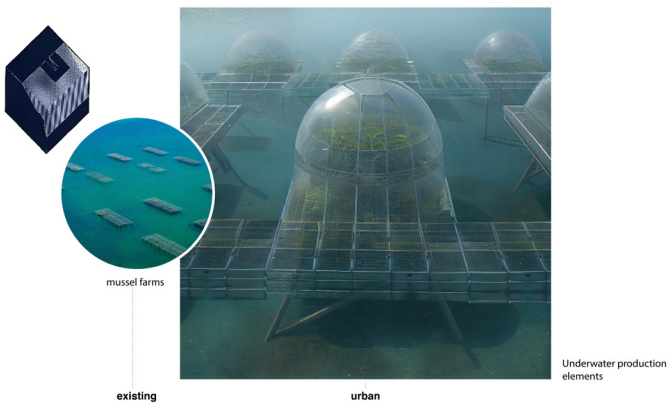

FIG. 31 Imaginary of under. Credits: Rosa Grasso

The underwater world of the Delta is intricately tied to production, whether it's mussel farming or extensive pipelines bringing resources from the sea to land. Near the coast, the sea is densely populated with structures that rhythmically shape the landscape, creating a productive seascape. In a scenario where land is reclaimed by the sea, what form of production might this space adopt? Experimental projects like Nemo's Garden use underwater cultivation systems, leveraging underwater constants for plant growth.

Reclaimed lands are currently dedicated to agriculture, mainly corn cultivation. In the face of rising sea levels, these lands become uncultivable. Ongoing studies may define new underwater space occupations, replacing current production. What could the underwater environment look like, and what employment opportunities might it offer?

Conclusion

The experience of exploring the territory according to the silent edges of the catastrophe has allowed to look at the area with a different gaze, fully understanding the problems of abandonment, depopulation and disentanglement. The strong contrast between history, present and future, of which the present is probably the most alienating part, marks the possibility of a different approach to this territory.

The objective that the internal area of the lower Ferrara area has given itself is to build canals and bridges, while through the aim was to pursue the possibility of building water spaces where there is no water yet. This point of view can make it possible to identify otherwise invisible places and connections, planning unexpected interventions on the existing and its relationships.

The possibility that forecasting tools give us today to explore the future is certainly interesting and can provide new fields of exploration for architectural research, previously impossible to explore.

The Basso Ferrarese has proven to be a territory which, in its marginality, allows the creation of new landscapes of exploration. The idea of comparing the current and future seas may lead to conceiving the landscape as a unified entity, erasing distinctions between full and empty spaces and transcending the very definition of territory.

Envisaging a continuous amphibious space allows the territory to both reimagine itself and prepare for future challenges. For instance, the recent flood in Romagna, an area adjacent and historically prone to flooding like the Lower Ferrara, underscores the pressing theme of adaptation.

Flooded areas have always been identified as at risk, but human activity has often ignored this, persisting in construction as if this risk did not exist. Instead, considering the possibility of flooding could define a new

coexistence landscape, fostering fresh relationships today and safeguarding against water in the future. A continuous park, an amphibious landscape for a flood-prone territory.

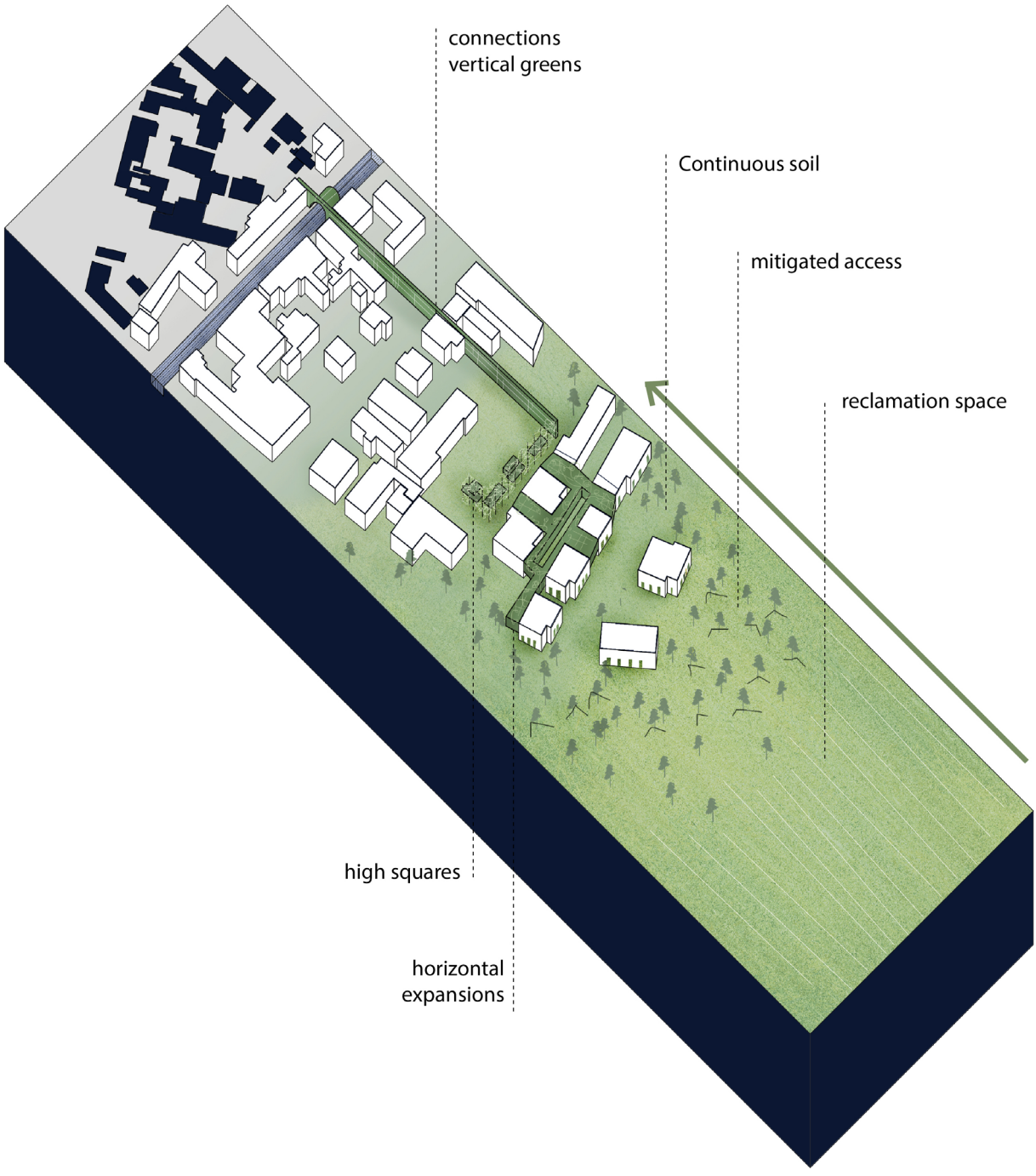

FIG. 32 Continuous Amphibious Landscape Park Concept. Credits: Rosa Grasso

Rosa Grasso is specialized in architecture composition addressing territorial, social, and climatic challenges. Her interests developed through different experiences such as her thesis on rural house reinterpretation, “Lille et l’eau” design workshop, internships, personal projects, and active involvement in the Atelier Appennini Association. She has also been deeply involved in the management of the crisis from the May 2023 flood in Romagna as Assessor of Modigliana Municipality. Since 2018, her research has focused on Architecture and Water, particularly peripheral areas adaptation to rising sea levels, providing compositional solutions for climate change. She has a Ph.D in Architecture and Design Cultures, has collaborated with TuDelft’s Port City Futures research group and has presented at conferences and publications.

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