E17 NALÓN ESTUARY

TERRA FLUXUS

Dynamics, Processes and Times: the Estuary as a Complex Adaptive System

"Verde de montes y negra de minerales"
"Green from mountains and black from minerals"

Asturias had two colors, two colors that characterized it for Pedro Garfias. Coal transformed a territory that had been agricultural, poor, and emigrant. A landscape devastation: mine entrances from which the coveted coal flowed, staining the neighboring meadows black, wires, embankments, wagons, washing facilities; the river flowing with dirty water; the chestnut trees cut down...

The uncontrolled extraction of natural resources, driven by an excess of consumption as a species, subjected the Nalón estuary to a strong process of transformation in a short period of time. The lack of consideration for natural aesthetics during the past century, encouraged by the achievements of the Industrial Revolution, had numerous consequences for its configuration. The landscape has become the new field of action where humans have ceased to be mere observers and have become an indispensable element for the transformation of the territory, giving rise to a kind of conglomerate of artifacts and natures. This territory is perceived as a heterogeneous mixture of contrasting identities. The coexistence of natural, rural, industrial, and urban landscapes means that each of them continues to battle for the character of the place. This has led to the emergence of heterodox building and urban planning models that carry within their genetic code the conflict upon which they are built..

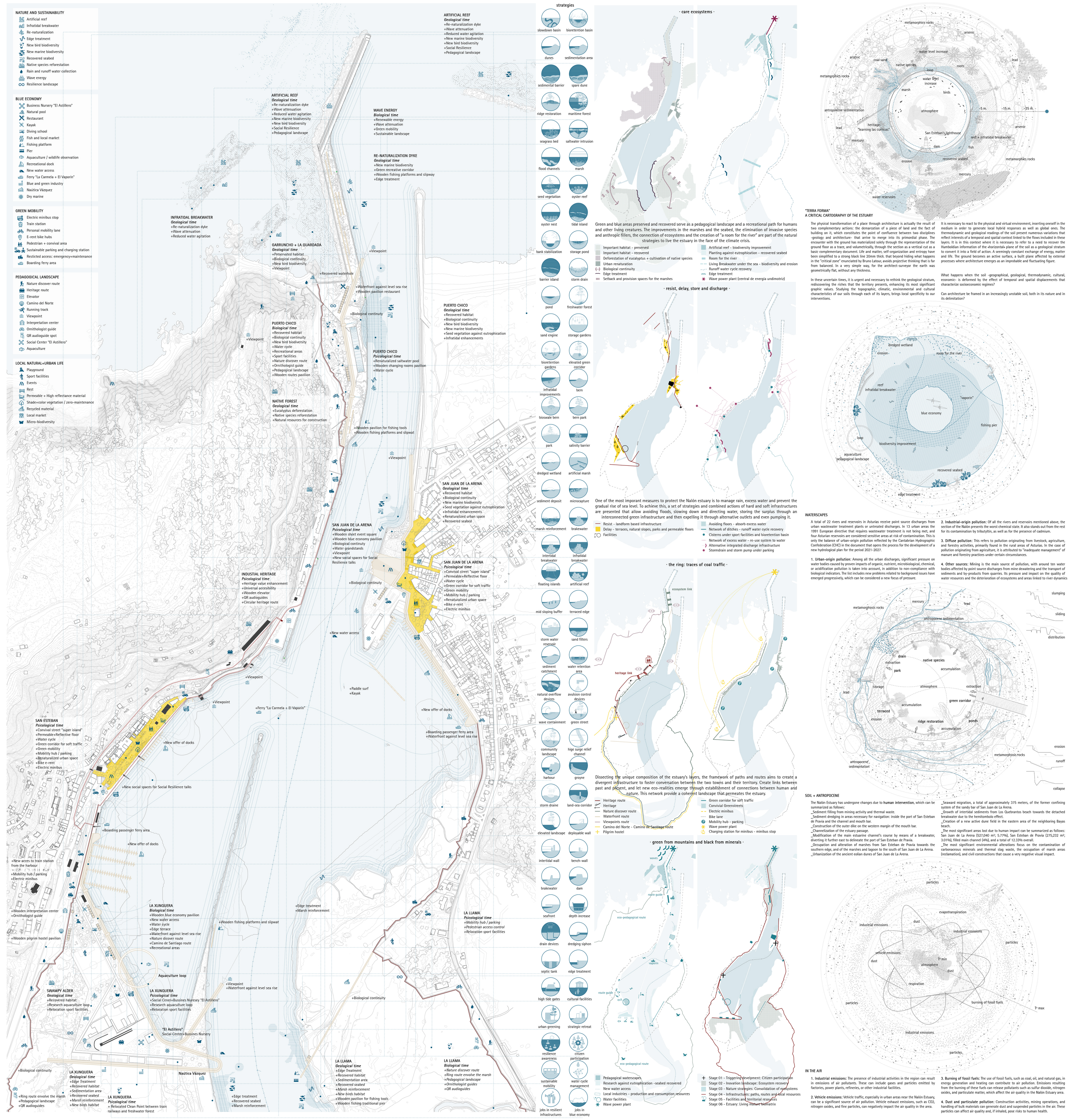
The proposal understands that the recovery of the fragile relationship between the place's heritage memory and ecologically vulnerable generational transition involves consolidating and enhancing inherited identity and tradition, adapting them to instability and climate crisis. Based on the collective intensity of a community awareness on both sides of the Nalón, which expects the logical enhancement of its "artifacts of identity", forming an open-air museum, its involvement is sought in a model of coevolutionary processes between neighbors and their natural environment. Interpreted in a contemporary code that introduces the ecosystem into a process of re-signification, where the model capable of accommodating any productive, economic, ecosystemic, sustainable, residential, or work space is not stable but gives way to changing processes, dynamics, and times. A transition to an "eco-centric" model where the preservation and recovery of ecosystems of great natural value become the center around which the rest of the nature-based strategies are articulated. In this line of thought, the construction of a generative landscape based on cycles, processes, and flows that engender different forms of interaction with nature is proposed. The estuary emerges as an improbable and fluctuating figure capable of buffering and self-organizing in the face of chaos while maintaining tradition, rootedness, and self-sufficiency, enabling the use of resources and excellent water management within a circular ecosystem.

TERRA FLUXUS offers a practical application of the lessons learned from the writes of Robert Smithson, Gilles Clément, James Corner, Bruno Latour, Miriam García, Paisaje Transversal, and Sara López Arraiza, to reinterpret the conventional image of a culturally denigrated but strongly identified landscape from an unbiased perspective and with concern for the current climate crisis. Today, more than ever, in this times of uncertainty, it is necessary to understand that it is not enough to recover and preserve an original state, mummified under the lens of nostalgia. Neither in terms of natural landscape nor in connection with industrial heritage. Its recovery must be accompanied by the challenge of a resilient design, planning, and anticipation based on the understanding of the estuary as a complex adaptive system that adapts to changes introduced by human activity.

NOTIONS OF THERMODYNAMICS AND RESILIENCE: chaos and self-organization.
The application of Ilya Prigogine's theory of dissipative structures and Holling's panarchic approach provides an integrative perspective of open systems and their irreversible dynamics. This theory emphasizes the importance of change and adaptability in complex systems beyond natural resilience, and it can be applied to re-conceptualize the aesthetic of a devastated landscape. The estuary exemplifies the response of an ecosystem capable of adapting to changes introduced by human activity. Within our proposal, it can maintain its structure and complexity by exchanging energy and matter with its environment, allowing for a constant flow of energy and maintaining its organization. For this, understanding the rest of the subsystems as part of a larger complex is essential. The proposal does not share the prevailing opinion that considers the estuary obsolete and advocates for a state of overprotection, balance, or rest that condemns it to "thermal death." Instead, it trusts in its re-signification as a space for experimentation, research, and environmental education. A catalyst for new strategies for socio-ecological systems that coexist with the diversification of innovative activities that exchange energy and matter with the estuary under the name of the blue economy.

Through the study of the dynamics and the various adaptive cycles of the estuary, the thinking associated with excessive protection and the idea of not causing 'impacts' on the environment to adapt it to new human and non-human needs in the face of the climate emergency is demystified.

DYNAMIC LANDSCAPE: from Terra firma to Terra Fluxus.
The designation of terra firma -firm, unchanging, fixed, and defined- gives way in favor of the shifting processes coursing through and across the urban field: terra fluxus. This means designing and planning slow processes, of long duration and global scale, while being prepared for intense and rapid disturbances at the local scale. The proposal experiments with new areas of opportunity in contemporary architectural thinking and reinterprets the conventional image to conceive it as contemplative under a new ecological aesthetic. The adaptation of architecture as an artificial habitat conditioned to these scenarios involves understanding natural resilience processes.



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THE PLACE HAS CHANGE: Coevolution with what surrounds us.
The proposal focuses on four fundamental strategies and four time scales to preserve the identity of the place and anticipate self-organization in a higher structure. Evocative non-formal images reinterpreted in a contemporary code introduce a synergy of coexistence between inhabiting and renaturalizing within a territorial and urban scale through a global intervention that blurs the strict zonation of the estuary, with the intention of permanence, belonging, and coevolution.

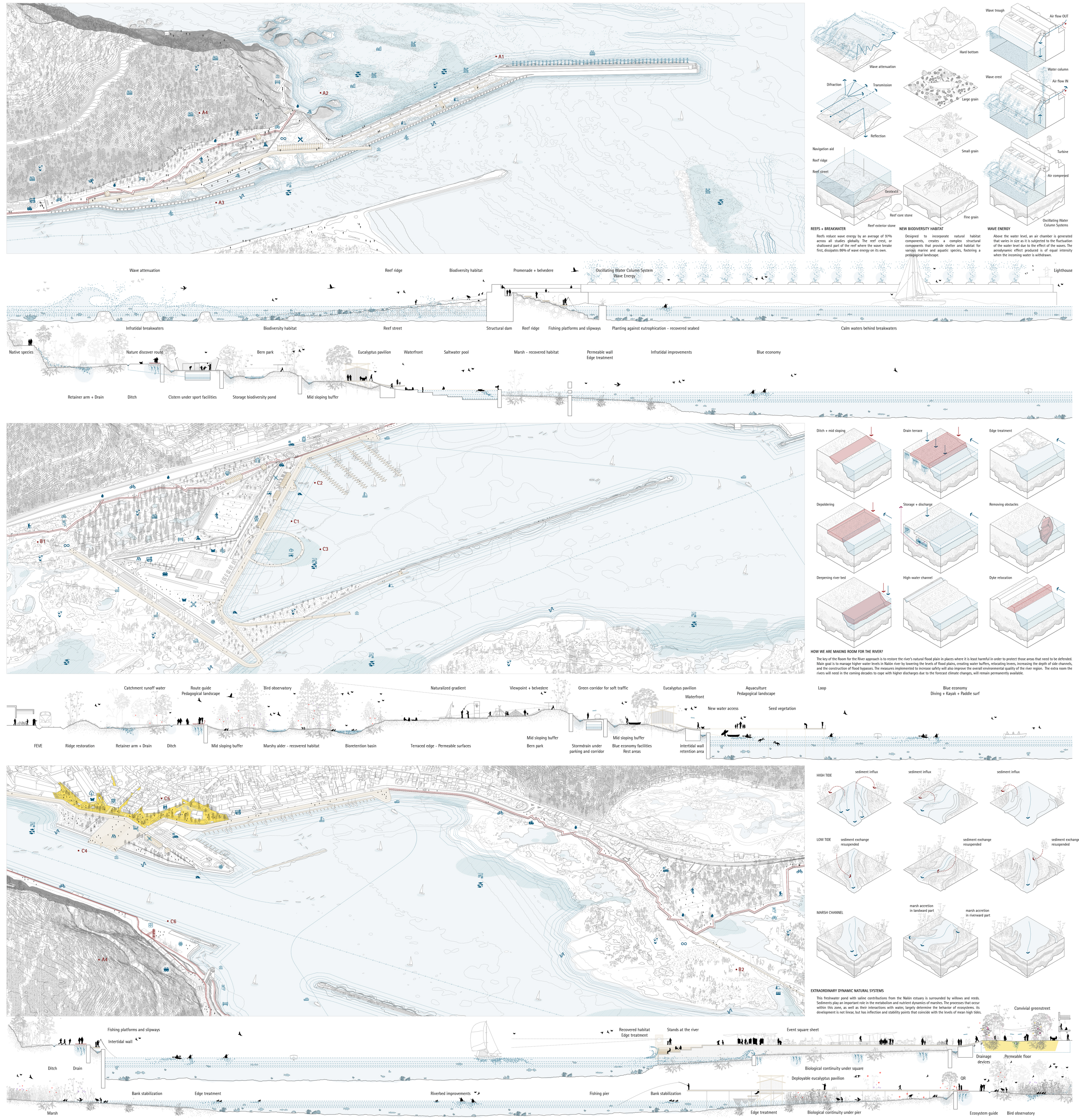
A_Geological Time: An Adaptive Infrastructure of Dynamics and Processes for the Formation of a Resilient Landscape.
The natural heritage of the estuary acts as a catalyst for sustainable development, where urban and economic development and the preservation of endemic flora and fauna strike a healthy balance above and below the water level. In light of the environmental crisis, proposing new development without addressing the increasing biological challenges occurring in the soil and water layers of the Nalón is difficult. Long-term action is taken through the application of measures based on community consultation, present-future prioritization, testing, monitoring, adaptation, and consolidation to become a model for sustainable development, circularity, and new ideas in urban development, with the aim of creating new habitats for all living species.

PRESERVATION OF THE INHERITED ECOSYSTEM.
Inherited natural structures are preserved with the aim of protecting the estuary, conserving its biodiversity, and adapting to climate change. Existing marshes in Xunquera and Llama, the swamp alder, and the beaches of Garruncho and La Guardada are expanded by recovering the surrounding environment that constrained these ecosystems and did not allow their advancement or retreat.
RECOVERY OF THE DEGRADED ECOSYSTEM.
The main objective is the expansion of valuable ecosystems by incorporating these areas. The degradation of ecosystems due to human action is reversed through intervention in the large concrete areas in Puerto Chico, La Xunquera, as well as the platform of La Llama beach and the recovery of the beaches originally located at the northern and southern ends of the San Juan de la Arena platform, in favor of the Nalón waters.
THE ROOM FOR THE RIVER.
Manipulating the terrain, especially its relief, is the response of any civilization to flooding. One variable of these landforms is what we call the "voids," meaning giving more space for floods.
RE-NATURALIZATION OF THE DIKE.
Another type of terrain features are artificial reefs proposed for use as breakwaters in Puerto Chico and at the entrance of the canal. In other words, they dissipate the energy of the waves before they hit the dike. Instead of reinforcing the wall between people and the sea, the proposal embraces the sea, increases risk awareness, and reduces damage by designing a breakwater collar capable of cushioning the impact of wave energy, floods, and erosion.
BIOLOGICAL CONTINUITY PROCESSES IN THE ESTUARY BELT.
It is not only essential to preserve and recover green and blue systems, but the success of the action depends on connecting their essential elements in an overlapping network of ecosystems. Ecosystems are not conceived as independent and isolated systems
PHYSICAL AND SOCIAL RESILIENCE.
This living infrastructure is combined with programs and projects of social resilience in the adjacent local and regional neighborhoods, on a territorial platform comprising the Nalón estuary, to help increase risk awareness, empower citizens, and engage local schools in education about the sea.

B_Climate Time: Resist, Delay, Storage, Discharge /Adaptation strategies to the clieemate crisis.
The estuary is exposed to significant risks of river and tidal flooding. A fully comprehensive solution goes beyond our means, time, and resources; therefore, the proposal prioritizes, builds intelligently, and recognizes where efforts are best focused. By implementing strategies integrated into natural and urban environments, investments in risk reduction should also empower communities, and promote the blue economy.

WATER CYCLE.
A new local water management system must be established. Waste substances, environmental toxins, nitrogen, and microplastics are discharged into the estuary through excess surface water, leaks from industries, and local agriculture. A new local water management system could protect the river, provide reliable access to clean drinking water, and utilize excess runoff and floodwater, gray and blackwater as valuable resources.

RESIST, DELAY, STORAGE (RE-USE), AND DISCHARGE.
One of the most important measures to protect the Nalón estuary is managing rainfall, excess water, and avoiding the progressive rise of sea levels. To achieve this, a set of combined strategies and actions of both hard and soft infrastructures are presented to prevent flooding, slow down and channel water, store excess water through an interconnected green infrastructure, and then discharge it through alternative drains and even pumps. The comprehensive strategy based on excellent water cycle management coexists in scheduled hard infrastructures and soft landscapes for coastal defense (resist); neighborhood policy recommendations for water management and consumption, soft topographies, and urban infrastructures to slow down and redirect rainwater runoff (delay); an interconnected green infrastructure circuit to store and channel excess rainwater (storage); and water pumps and alternative routes to support drainage (discharge). The objectives of this multiple strategy are to manage water, both for disasters and long-term growth.



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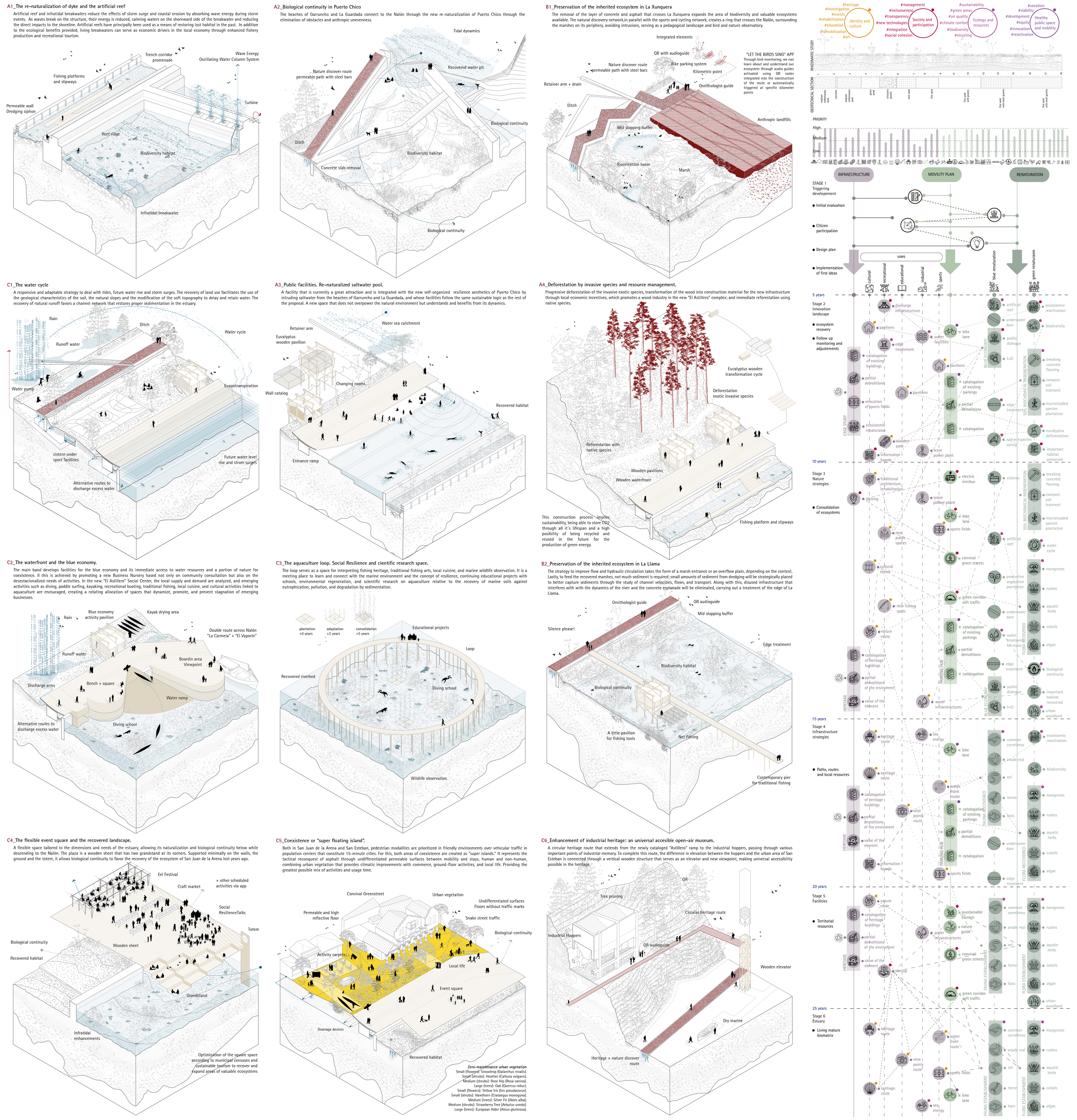
C_Biological Time: Coexistence infraestructures based on permanence and belonging to the place.
The reordering of the old shipyard of La Xunquera and its physical connection with the marshes develop under the parameters of permeability, integration, co-evolution, and coexistence of a network of deeper processes and activities. Organized by the geometric figure of a right-angled triangle, whose epicenter coincides with the new heritage catalog of the shipyard ramp as an industrial heritage, the hypotenuse of this triangle is equidistant in four bands whose hinge is located at the new access to the train station from the harbor, and the re-naturalized parking area, where only necessary traffic for economic activities is allowed. A fifth productive band organizes industrial and artisanal activities, leaving the heart of the geometry for public initiatives such as existing warehouses, the heritage cataloge shipyard ramp, and the creation of the "El Astillero" new Social Center and Business Nursery, which includes an outdoor event space at the beginning of the ramp to give visibility to local and territorial initiatives.

BLUE LANDSCAPE.
La Xunquera has a strategic location for water-related industries due to its position facing the water and its short distance to low-density inland areas embraced by the beauty of the marsh. Band zero, located at the wide waterline, not only expands the offer of docks in number and quality but also provides a new space for passengers embarking on La Carmela and a proposal for a new initiative that complements these round trips with a vessel evoking the lost image of "El Vaporin." Ramps and water access points for users and the blue economy, event spaces along the land-water boundary, arms reaching out to the estuary, and a loop dedicated to conservation, research, and ecosystem culture are other available facilities.
GREEN LANDSCAPE.
The second band is developed between the habitat of the alder marsh and the lands of the former rail tracks. Here, transitional spaces, recreational areas open to the public, the relocation of sports facilities, and low-maintenance nature are emphasized.
PRODUCTIVE LANDSCAPE.
The fifth band, acting as the side of the triangle, comprises the pre-existing Náutica Vázquez with large spaces reserved for wood and sea-related production. There, eucalyptus wood will be transformed into various solutions as mentioned. Far from closing off the ensemble, it allows visual and biological permeability between pieces, either due to the detachment of the buildings from the ground or by making use of the voids as "campas" or re-naturalized recreational facilities.
PEDAGOGICAL LANDSCAPE.
The estuary is visualized as a potential research satellite connected to university scientific networks. La Xunquera proposes a framework for innovation, marine research, and aquaculture, intertwined with urban life.

D_Psychological time: everyday and ordinary phenomena.
We see ourselves capable of giving a special meaning to all the everyday and ordinary phenomena that shape contemporary society. The socio-ecological interpretation based solely on aesthetic parameters is a thing of the past. The regulation and incorporation of ecosystem services into urban centers promote the physical and psychological health of the population, emphasizing a quality landscape and environmental relationship with their surroundings. Therefore, feasible short-term actions in human time provoke a comparison with past states that leads to a conscious feeling of coevolution with nature towards a green management system. For this reason, these actions are developed in the urban environment, extending their boundaries through an ecosystem ring.

GREEN MOBILITY.
The proposal prioritizes mobility that promotes health, is low in emissions, uses renewable and efficient energy in the available space. The existing car infrastructure is modified at the ends of the estuary, Puerto Chico and La Xunquera, and in the area of the San Juan de la Arena harbour, in favor of new investments in green mobility.
COEXISTENCE OR "SUPER FLOATING ISLANDS" IN THE ESTUARY.
Both in San Juan de la Arena and San Esteban, pedestrian modalities are prioritized in friendly environments over vehicular traffic in population centers that constitute 15-minute cities. For this, both areas of coexistence are created as "super islands." It represents the tactical reconquest of asphalt through undifferentiated permeable surfaces between mobility and stays, human and non-human, combining urban vegetation that provides climatic improvements with commerce, ground-floor activities, and local life.
PUBLIC FACILITIES.
This juxtaposed network functions thanks to attractive focal points, among which stand out the mentioned Acuaculture Loop, the new Social Center or Business Nursery "El Astillero," the elevator viewpoint of the grain silos, the event plaza in San Juan de la Arena, a flexible space tailored to the dimensions and needs of the estuary, allowing its naturalization and biological continuity below while descending to the Nalón; and the renaturalization of saltwater pools.
ZERO-MAINTENANCE.
Green spaces and their inherent ecology are not simply "added" to urban planning as a mere gesture. All the actions of psychological time coexist with the impulse of renaturalization. Like Gilles Clément, we propose a management by abandonment. Not an unconscious abandonment, but a fully conscious one of constructing a planetary garden, biodiverse, flexible, dynamic, and self-organized. A third landscape that reduces maintenance costs to zero by favoring native species that have been there long before human activity.