Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences

Graduation Plan:

Personal information	
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Studio	
Name / Theme	Flowscapes / LAB: Circular Water Systems
Teachers	Nico Tillie (L.A.) & Taneha Bacchin (Urbanism)
Argumentation of choice of the studio	Landscape studio related to water and delta urbanized areas.

Graduation project	
Title of the graduation project	**Rethinking the territory of Concepción, Chile.** *Resilient & strategic planning for a vulnerable urban coastal system*

Goal	
Location	Concepción Chile.

The posed problem, research questions and design assignment in which these result.

It is not the strongest of species that survives, not the most intelligent that survives. It is the one that is the most adaptable to change.
Charles Darwin

Fascination & Problem statement

In our living environment there is an existing and increasing tension between the *fixed* and the *dynamic*, creating a dichotomy in many aspects of our lives. One of the biggest of these dichotomies in the urbanized areas is the continuous struggling between cities and nature. Human settlements look for stability and safety, in a way, we want our cities *to be fixed over time*; however, there is an underlying aspect that has nothing to do with a static quality: the landscape and nature itself. In that sense landscape has its own dynamism and path of flow, that affects and influences our constructed environments.

Chile, as a territory, is exposed to multiple dynamic forces such as the flow of the sea with a coastal line of 6.435 km and at the same time this coastal line is defined by the collision of two tectonic plates in constant movement: The South American plate, which at its western edge converges and generates subduction zones with the plate of Nazca. Thus, this geomorphological aspects of the territory determine a series of *natural disasters* that affect the cities in different ways and magnitudes along the country.

In the middle of this vast territory there is the city of Concepción, that has been specially affected during the last two decades. Concepción is a coastal urban area that has increasingly grown in the flood plain of two river mouths and upon an ecological important wetland landscape: the urban settlement has controlled and subjugated the landscape completely to the needs of human society.

Although Concepción is built in a *wet ground*, city and water never meet; there is a dissociation where one is superimposed on the other, generating a *vulnerable* coastal system. This coastal system is increasingly at risk due to the urban pressure of the expansion of the city, creating a degradation of the

ecosystem and the natural infrastructure, exposing the coastal city and their inhabitants to more frequent and severe natural hazards.

As a citizen of this human settlement I had the *opportunity* to witness three major natural events that almost destroyed the city in different dimensions: A dramatic flood by rain and overflow of rivers and channels in 2006; the 8,8 MW earthquake of 2010 and its subsequent tsunami with waves of 10 meters high; and finally the forest fires of 2017 that resulted in 596.000 ha of burned surface (forestry and native species).

In order to face this uncertainty, Concepción has lost is memory and it is developing an urban expansion over the affected wetland areas, destroying the natural landscape that underlies the city: the territory is becoming a *disrupted landscape.*

As a witness of these events and seeing how the city is dealing with it (building more extensively and with a *strongest* techniques), the paradigm of the natural disasters started to shifts my cognitive perception towards the idea that they are not *disasters*, but the natural flow of the landscape that is fighting for its own place.

Therefore, in an environment where natural hazards occur periodically and with major effects for the human settlements, the continuous change and uncertainty is now our *new normality.*

In that sense, we can understand the city as a living system where change creates growth and renewal. And as a system, the city is constantly evolving where the concept of stability is scale dependent, it is not a constant phenomenon and cannot defines the whole system in time or space.

Given the uncertainty inherent to the territory of Concepción (and the whole world) it is likely necessary to change the way we design and manage interventions in our living systems. Therefore, what is needed are more flexible, adaptive approaches to managing urbanization and designing within the systems that sustain us.

Because of that, there is the urgency of propose a strategic urban and landscape planning (merging both, the dynamic and the static) in order to create a city more resilient and adaptive to the natural dynamics and the uncertainty of the future.

Research definition: Objectives and Research questions

In order to address a more adaptive and resilient city there is necessary to change the opposition paradigm of the city against nature. It is indispensable to investigate and develop designs that will establish a dynamic balance between natural and urban environments, to work with nature and not against it.

In the context of Concepción, the opportunity to face the existing challenges does not lie in the primacy of one system upon the other. Both, city and landscape need to interact in a more redefined way, looking for multifunctional structures and a new awareness of the importance of the now disrupted landscape, to improve it and make it part of the whole living system.

The main objective and question of this research can be defined as the following:

> Create a spatial framework for the city of Concepción that deals with uncertainty related to natural disasters.
>
> How to create a spatial framework for Concepción that can deal with the uncertainty of natural disasters and at the same time can be replicated on other locations?

From this main goal, four sub-questions can be derived:

- How to understand physical dynamics and uncertainty in the natural and urban landscape of Concepción?
- What design principles and design tools can be extracted from the existing situation to create new conditions for coexistence between city and nature with an adaptive-resilient approach?
- How to put on practice the concepts of uncertainty, adaptability and resilience in a cohesive design to deal with the challenges of Concepción?
- Which are the implications of the final design in terms of urban, social and ecological aspects? It is possible to replicate them in further designs for similar locations?

Process

Method Description

Research approach: Theory & Methods

As a research approach, the project is based in a literature study on theoretical investigations of landscape architecture and urban planning with the goal of understanding the opportunities and challenges of natural disasters, uncertainty, resilience and adaptability in order to apply those principles in a practical design for the challenges and opportunities of the city of Concepción.

Specifically, the literature review will be focused in the *Resilience Theory & Praxis: A Critical Framework for Architecture* by Michelle Laboy and David Fannon, with a special focus in the concept of *Social-Ecological (Adaptive) Resilience* by Holling and Gunderson. Furthermore, to narrowing the scope to landscape architecture, the *Five urban planning & design strategies for building urban resilience* by Jack Ahern in combination with the *Strategies for guiding infrastructure design* synthesized by Copley (2014), will be analysed to comprehend the main principles and possible design strategies to be developed in the context of an adaptive planning. Finally, as application method, *Swarm Planning* by Rob Roggema will be used as a base to define a framework model to deal with time, uncertainty and dynamic functions of the urban and landscape system.

The intention of this literature review lies in comprehending how these theories come together to understand the uncertainty condition of the territory and what they suggest towards creating a more resilient and adaptive city through a landscape planning design. In that way the revision of these theories offers conceptual tools to understand the challenges and identify potentials to address the objectives defined.

The main objective of the theory review is to create a *robust adaptive framework model* to guide the exploration of probable future development scenario studies by research-by-design, to be used in the case of the city of Concepción in a time where the trend of over-controlling nature is over.

<u>Spatial Framework: Adaptive void network</u>
A *strategic planning through natural and urban unplanned spaces*

Once the territory has been understood, there may be an opportunity to reframe the narrative around uncertainty and vulnerability to include natural infrastructure and elevate new solutions that enhance the *city-landscape* duality, merging both in a whole living system.

In order to do that the proposed approach is based in autonomous, emerging patterns and self-organization instead of controlled, pre-programed and hierarchical centralised processes. In that sense, this framework proposes to increase spatial optionality & redundancy in the urban fabric through the mapping of where the potential and risks lie.

This *design-through-voids* framework allows to identify and plan for (in)visible voids in the urban fabric to implement a bottom up building of the city, giving opportunities and potential for spatial adjustments. It also allows current realities to be transcended and future potential to be created and imaginable. In that way the city can be seen as the provider of nature, creating larger green spaces and connecting green grids, building with nature and including redundant unplanned space.

Designing with voids is a pivotal step in allowing the city and its constituent parts to become better and enduring whatever very different futures may produce.

Given the conceptualization of the Spatial Framework, it is possible to define strategies and measures for the landscape planning of the territory:

- Value the natural system (mainly wetlands & water bodies) as the base infrastructure for the future city.
- Use of *voids* (unplanned natural & urban spaces) as an emergent, autonomous and self-organized network to create redundancy and multifunctional spaces for risk management.
- Reformulate the city as a provider of nature: larger green spaces, landscape connectivity and protection of the ecological value of the existing nature.

Literature and general practical preference

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Reflection

Relevance

Scope and Relevance

The continuous struggling between cities and nature has led to human settlements to look for stability and safety, trying to over-control the dynamism and flow of the underlying landscape. These situation creates a dissociation between both systems where one is superimposed on the other, generating a *vulnerable* urban-landscape system.

The present research aims to re-envision the conception of the city understanding it as a living system where change creates growth and renewal, and where uncertainty is our *new normal*. Given the uncertainty inherent to the territory of Concepción, the course of the research looks for a shift in the way we design and manage interventions in our living systems.

Adaptation, appropriation and flexibility became understood as the essence of a successful system. In that way, the vision of this project is to create awareness about the idea that cities and landscapes as a whole system can develop the ability to respond to changing environmental conditions making persistence possible.

Time planning