

Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences



Graduation Plan: All tracks

Submit your Graduation Plan to the Board of Examiners (Examencommissie-BK@tudelft.nl), Mentors and Delegate of the Board of Examiners one week before P2 at the latest.

The graduation plan consists of at least the following data/segments:

Personal information	
Name	Kinga Murawska
Student number	5160103

Studio		
Name / Theme	Transitional territories / Inland, seaward. The trans-coastal project.	
Main mentor	Taneha Kuzniecowa Bacchin	Urban Design
Second mentor	Daniele Cannatella	Landscape Architecture
Argumentation of choice of the studio	The choice of the Transitional Territories studio is related to my interest in the relationship between land and water. What intrigues me is the coastal area which is a space of vulnerability, yet it attracts many. I believe that in this studio I will gain knowledge in the areas of my interest, such as climate adaptation, transformations of maritime post-industrial landscapes as well as regeneration of social and ecological systems. Besides, the program of interdisciplinary lecture series, the symposium and the exhibition assured me that this year-long process will be inspiring and challenging and that it will lead to a rewarding outcome. Moreover, the collective mapping exercises and group meetings proved that even though everyone works on a different location, we can always seek help from our groupmates since everyone knows each other project.	

Graduation project	
Title of the graduation project	Edges in transition. Spatial strategies for a regeneration of socio-ecological systems along the Vistula River
Goal	
Location:	The Vistula River Delta Urban context – city of Gdańsk
The posed problem,	The changing condition of the edges between land and water, different water systems as well as between diverse land use along the Vistula River stems from

anthropogenic pressures and climate change (European Environment Agency, 2019).

The Vistula River basin holds a position of the second largest river basin within the Baltic Sea catchment area, which means that its condition strongly affects the state of the sea (Pastuszak et al., 2012). The semi-enclosed Baltic Sea has a limited water exchange through a very narrow connection to the North Sea, and thus it is particularly vulnerable to contaminated input from the rivers (Andersen et al., 2017). Besides that, the rising seawater temperature increases the vulnerability of the sea to eutrophication (European Environment Agency, 2019).

The pollution of the Vistula River originates from anthropogenic activities namely urbanization, agriculture and industrialization (Kannen et al., 2004). Various compounds and waste directly enter the waterways, whereas excessive nutrient input from agricultural runoff infiltrates the soil and is transferred through it to the waterways. While a part of the pollution flows to the sea, the rest sinks to the riverbed (Kannen et al., 2004). Because of that, the cities located closer to the sea, such as Gdańsk, have a limited opportunity for nutrient retention and therefore a bigger impact on the seawater than upstream cities. However, the contaminated sediment in the riverbed may be disturbed in the event of flooding or because of dredging activities and thus release the pollutants back to the water body (Cañellas-Boltà, 2005). The flood is a threat to the quality of water also in places where the soil is polluted or hazardous waste is present on the ground, namely in the industrial areas (Trozzi & Vaccaro, 2000). A particularly advantageous location for industries is in the proximity of port cities (Fujita & Mori, 1996), which are therefore especially prone to water pollution. The port activities also affect the quality of water, soil and air. These factors harm the health of people as well as the state of ecosystems (EPA, 2008). Another factor which poses a threat to the ecosystems is regulation and damming of the Vistula river, which would be in alignment with the Polish government ambition to create an inland waterway through the Vistula River as a part of E40 waterway connecting the Baltic Sea with the Black Sea (Maritime Institute, 2015).

Next to the environmental vulnerabilities in the edges along the Vistula River and health issues resulting from them, there are spatial urgencies in prominent locations

	such as waterfronts. Cities like Gdansk, located by the water, saw the potentiality in the waterfront and used it often for industrial and port purposes (Hein, 2014). The shift towards service-based economy induced deindustrialisation and caused the emergence of disused post-industrial landscapes (Marshall, 2001; Rachwal, 2011). Moreover, changing maritime transport requires vast, deep-water areas, and thus leads to migration of port activities seaward and reclamation of land, as projected for the city of Gdansk, and consequently raising an issue of abandoned landscapes adjacent to the city center (Hoyle, 2000). In conclusion, it may be said that there is a strong link between anthropogenic activities and the state of the environment, which eventually affects human health. The edge condition is a reflection of that issue and hence there is a need to propose spatial strategies for change. The hypothesis is that the landscape and ecosystem services embedded in it can be used as a medium to cope with socio-ecological and spatial urgencies along the edges of the Vistula River.
research questions and sub-research questions	Can landscape be used as a medium to cope with socio-ecological and spatial urgencies along the edges of the Vistula River through a regenerative design? Sub-research questions: 1. What are the urgencies in the social and ecological systems along the Vistula River, what do they originate from and how are they interrelated? 2. What are the potentialities of using landscape as a medium for regeneration? 3. Can the presence of spatial urgencies along the edges become a potential to respond to environmental issues of a larger territory? 4. What stakeholders could drive the transition towards regenerative practices?
design assignment in which these result.	Research aim Regeneration of socio-ecological systems The research aims at evaluating the prevailing condition of edges between land and water, different water systems as well as between diverse land use along the Vistula River.

	Moreover, the intent is to reveal variables of spatial, environmental and human health vulnerabilities to expose the impact of externalities caused by climate change and anthropogenic activities, such as urbanization, industrialization and agriculture. The goal is to find regenerative design practices and strategies for transitioning socio-ecological systems in the edges of agricultural landscape in The Vistula River Delta and in the post-industrial edges in the city of Gdańsk. Expected research outcomes The thesis is a form of spatial manifestation of transitions that might happen in the edges of the Vistula River due to climate change, continuation of the current approach to landscape or shift towards regenerative approach. The ambition is to imagine, illustrate and describe those transitions in the matrix of four scenarios. Two of the projected scenarios show consequences of persisting with degenerative practices considering high and low intensity of climate change. The other two scenarios project possible effects of regenerative practices, similarly regarding the climate change severity. The final design outcome is a set of spatial configurations of design interventions and strategies which use landscape, and ecosystem services embedded in it, as a medium to achieve the regeneration scenarios projected in the matrix.
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Process

Method description

Literature review is a method used in the theoretical framework. It allows evaluation of scientific literature, policies in place and professional reports about the state of the researched location. The main bodies of literature which were analyzed are landscape urbanism, landscape ecology, socio-ecological systems and regenerative design and development.

The location-based papers and reports concern primarily environmental conditions of systems in different scales, from the local to territorial.

Document analysis is used to back the research with evidence-based data derived from various reports, fact sheets and publications researched through the literature review. The qualitative information is collected through subjective-evidence-based sources such as media and websites forums.

Critical mapping aims at representing the relationships between the processes present in the territory through a juxtaposition of data collected via the literature review. It allows a better understanding of the dynamics of different systems and how they influence each other.

Site visit is a key method to understand better the researched phenomena through observation of the chosen context. Moreover, it is used to document the site through

photographs, sketches and videos to back the arguments in the report and presentations.

Scenario building is used to explore possible future developments. It is based on a matrix of four different directions. The horizontal axis addresses a variety of practices, whereas the vertical axis talks about the intensity of climate change.

Stakeholders analysis is needed to examine the interest and power of various actors in the process of promotion and implementation of proposed strategies. It also helps to establish what might be the possible collaboration of the stakeholders.

Research through design is used to test various spatial configurations of performative practices to manipulate the edge condition. The method helps to develop strategies and design interventions to arrive at the projected regeneration scenarios (right side of the scenario matrix - ecology- health-driven practices).

Spatio-temporal analysis helps to imagine how the strategies and design would strengthen over time, what changes in policies are needed to support the development of the proposal and if the proposed design is capable of responding to the evolving socio-ecological systems.

Literature and general practical preference

[The literature (theories or research data) and general practical experience/precedent you intend to consult.]

Resilience of socio-ecological systems

Crawford S. Holling (1973), Lance H. Gunderson (2000), Marina Alberti & John M. Marzluff (2004), Gilberto Gallopín (2006), Muriel Cote and Andrea J. Nightingsale (2012)

The socio-ecological systems (SES) represent the dynamics of relations between human and environment, as social and ecological systems are interdependent and cannot be conceived separately (Cote & Nightingale, 2012). The resilience of these systems can be defined as their ability to withstand disturbance without flipping into another state (Gunderson, 2000). The concept helps to propose strategies addressing the issue of flood risk in the context of water-land edges along the Vistula River.

Landscape urbanism

Charles Waldheim, James Corner and others (the 1990s)

Landscape urbanism is an ethos that covers the complexity of urban ecology (Corner, 2014). Within this framework, a city is seen as a dynamic matrix of layered systems, which cannot be operated with any degree of certainty what a design outcome will be. Use of landscape in reshaping the urban form allows for accommodation of new temporal functions. Time is used as an actor in the transformation processes of disused degraded areas, while the landscape is a medium to restore the ecological capacities of the site. This concept is used to give clear directions for designing the edge in the urban context - the post-industrial waterfronts in Gdansk - to reach an objective of urban performance and diversity.

Regenerative design

Steve Larrick (1997), Pamela Mang & Bill Reed (2012), Raymond J. Cole (2012)

Mang and Reed (2012) stated a premise that the regenerative design goes beyond the mitigation of consequences of human activities. It is intended as a reconnection of social systems with the evolving ecological systems in order to improve the condition of both social and ecological systems, including the health of people and environment (Larrick, 1997). This concept enables building the capacity of society and landscapes to regenerate themselves. It also allows restoration of the landscape's inherent resilience.

Landscape ecology

James D. Olson, Richard T.T. Forman, and Wenche E. Dramstad (1996), Richard T.T. Forman (2008)

Landscape ecology principles help maximize the integrity of ecological systems and minimize land degradation and fragmentation when a new entity or structure is introduced in a landscape. They encourage long-term planning and cross-disciplinary design, especially connected with environmental design. The landscape ecology principles help shape the composition of landscape and bring forward transcalar proposals.

Reflection

1. What is the relation between your graduation (project) topic, the studio topic (if applicable), your master track (A,U,BT,LA,MBE), and your master programme (MSc AUBS)?

The topic of my graduation project regards transitioning of the edge condition along the Vistula River with the focus on the pollution, flooding and urban performance. The processes happening within the analysed systems are interrelated, e.g. the pollution from the anthropogenic activities is transported seaward by the rivers and affects marine ecosystems. On the other hand, the phenomena, like rising sea level and more frequent storm surge, increase the flood risk inland. The relation to the topic of the studio "Inland, seaward. The trans-coastal project" can be also seen more literally in the analysed urban context of Gdańsk, where the port moving seaward causes spatial urgencies in the edges of the city and the waterfronts. My graduation project, similarly to other projects developed in the Urbanism track, has a multidisciplinary approach since it draws from disciplines such as spatial planning, urban design and landscape architecture. Besides, in formulating the problem statement and the research aim, I tried to integrate social, economic and cultural aspects with the condition of the landscape and the ecological systems. Furthermore, the research objective shows the relation between the project and the master programme as it reveals an ambition to propose regenerative design practices and strategies for the built environment.

2. What is the relevance of your graduation work in the larger social, professional and scientific framework.

The thesis aims to benefit society and contribute to their mental and physical health by improving safety in the edges along the Vistula River, namely by the reduction of environmental pollution and the risk of flooding. The proposal for transitioning of the edge conditions through regenerative design practices focuses also on enhancing the urban performance of the post-industrial waterfronts and increasing the diversity of

uses in those edges. The creation of a network of open spaces promotes the livability of the landscapes.

Furthermore, the intention behind the use of the matrix of scenarios is to manifest possible consequences of continuing the current practices and thus to increase the public awareness of relations between anthropogenic pressures and the severity of disturbances in socio-ecological systems.

The thesis builds on the understanding of the concepts of regeneration and socio-ecological systems (SES). The concepts are based on extensive research, however, the practical implementation of them is limited. The project is an attempt to translate the concepts into practice by proposing design interventions and strategies for regeneration of the socio-ecological systems.

In this way, the thesis aims to bridge the gap between the theoretical and practical knowledge of the functioning of SES.

Besides that, the proposed transition of the edge condition and regeneration of the socio-ecological systems builds on the notion of using landscape, and ecosystem services embedded in it, as a medium to restore ecological capacities of a site.

The ambition of the thesis is to contribute to the promotion of ecological awareness and advocacy in Poland.

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