

beyond adaptation

Exploring an approach to address the climate crisis and shrinkage on the coastline of
the Gulf of Riga

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Colofon

Beyond adaptation:
Exploring an approach to address the climate crisis and shrinkage on the coastline of the Gulf of Riga

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Department of Urbanism

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All the photos present in this report, unless stated otherwise, are taken by the author.

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This journey may have ended, but there are new paths to be discovered...

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Fig.1: The path towards the light.
Roja, Latvia, 2020

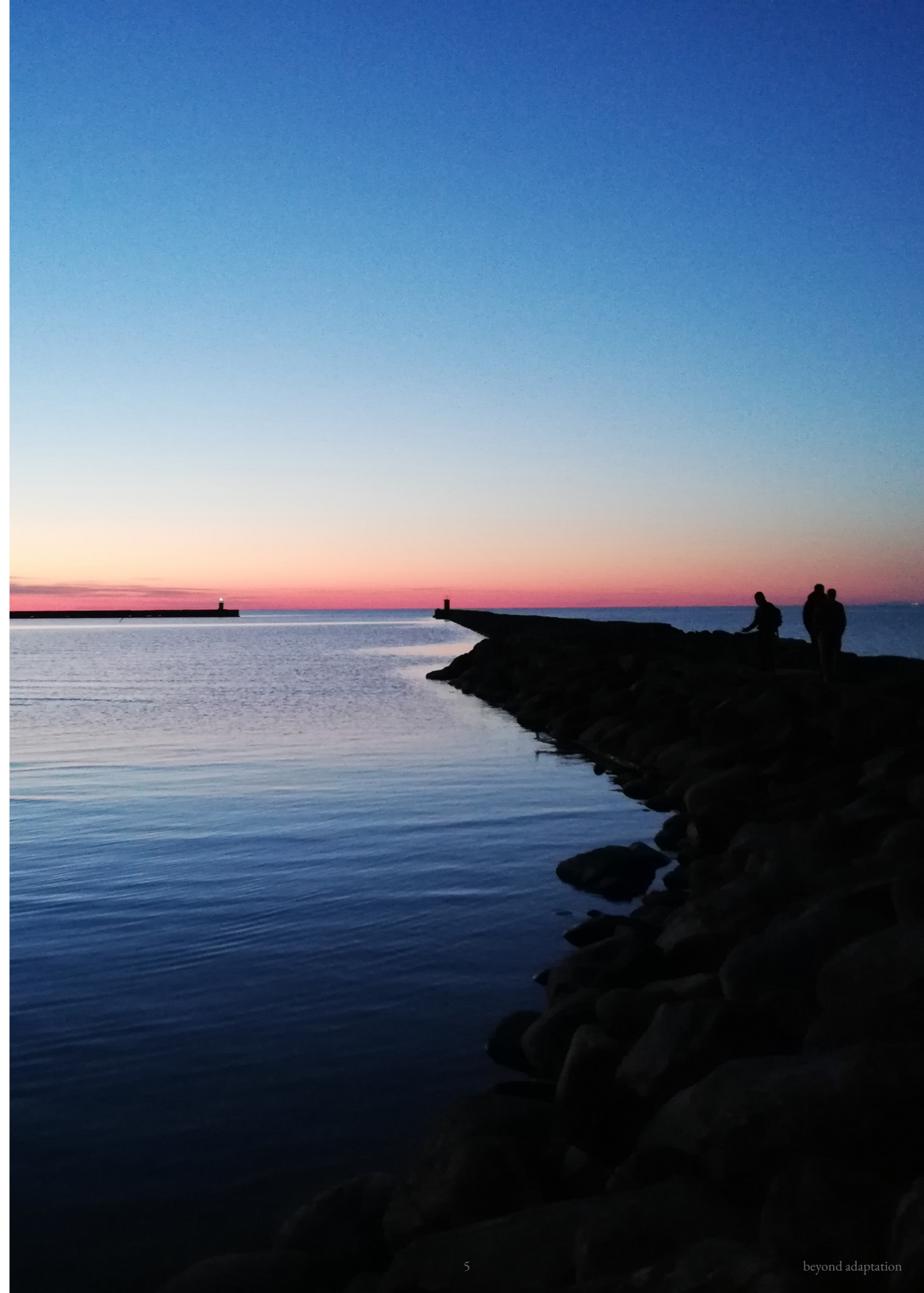


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Abstract

The Baltic Sea region is facing multiple ecological and socio-economic challenges that will significantly influence the coastal communities and habitation on the coastline in the future. Eutrophication, decline of fish resources, climate crisis and sea level rise are the effect of irreversible anthropogenic actions in the region, which demand to rethink how the sea and territories around it are used now and can be adapted to ensure a sustainable development and healthy marine and coastal ecosystems in the future.

Besides the environmental challenges in the region coastal territories along the Gulf of Riga are also experiencing socio-economic restructuring due to decades-long population decline that is projected to continue in the future. However, in the existing planning documents and development projects the notion of shrinkage and climate adaptation is underrepresented, questioning the acceptance of these irreversible, yet unpredictable processes. Considering these specific local conditions, adaptation of the existing habitation patterns on the coastline of the Gulf of Riga asks for a specific approach that not only considers the long-term impacts on the natural processes and ecosystems, but also takes into account the depopulation, possible challenges of long-term maintenance and use of these spaces, and the strong cultural connection with the nature.

The thesis proposes an approach on how to address the climate crisis and shrinkage on the coastline of the Gulf of Riga by using acceptance of the physical and socio-economic erasure of the coastline as spatial planning and design tool. This approach

allows to reconceptualize the notion of sedimentation, discovering and using local material and non-material anthropogenic sediments as the main design elements in the transition of the coastal surface.

The multi-scalar design projection envisions the possible transformation towards sustainable degrowth in the region of the Western coast of the Gulf of Riga and shows this transition on an urban scale in coastal village of Roja. By reinventing the economic activities in the port towards more localized resource use, it is possible to maintain the port infrastructure and provide economic possibilities for the remaining inhabitants. However, the erosion along Krasta street and population decline will continue in the future. As the erasure is happening in a long period of time, the local inhabitants need time to adapt, therefore the project composition along Krasta street in Roja proposes infrastructure and landscape elements to be finite, deteriorate in the landscape and have a significant cultural meaning. By not intervening in this process and transforming previously inhabited spaces along the coast it is possible to transition towards more natural coastal landscape with specific anthropogenic material sediments that perform as a reminder of human actions in past.



Fig.2: Still standing.
Roja, Latvia, 2020

the points of entry

Motivation

Anthropocene

The points of entry

Motivation

I have been studying architecture and design since 2008 on different levels of education. Throughout the studies I have tried to seek the deeper understanding of the processes that influence our surrounding environment. The challenges I was given in TU Delft has inspired me to look for answers to questions that I deeply care about – the future of the Baltic Sea and the coastline of Latvia.

For all my life I have lived within 15 km from the sea. For me the sea is place for inspiration, meditation, work, rest and so much more. I have experienced heavy autumn storms and calm summer evenings at the beach, ice cracking during winter and first swim in the cold water in spring. The sea gives energy to my life, therefore the changes in the sea affect my life on a very personal level.

The Baltic Sea coast in Latvia is facing multiple challenges – population decline and aging, coastal erosion, decline of fishing industry and seasonality. I know the depressing feeling of looking at dark, empty windows during a walk on a cold autumn evening. I know the child's sadness when the pine tree you used to climb on is lost to the sea. I know the struggles of a family that have to close their business due to lack of customers. And I know that there isn't an easy answer to these situations and problems.

I believe that the Sea and the land should be in equilibrium. We, as humans inhabiting both water and land, have to work together with these elements to truly become a part of the natural system.

This thesis is the continuation of my contribution to the

Baltic coast that I started already in 2011 with my first social project-workshop I organized in Roja, Latvia. Since then I have organized or participated in several projects that were dealing with certain issues regarding the Baltic Sea coast.

The thesis is not the end. I believe it is only the beginning of my work to understand the coastal territory of the Baltic Sea and the Gulf of Riga.



Fig.3: Im memorium for a tree
Photo: personal archive

The points of entry
Anthropocene

The thesis is positioned around the notion that the global climate change is irreversible process that has been the result of long-term human exploitation of the natural resources and limits of the Earth (IPCC, 2014; (Pelling, 2010)).

The anthropogenic activities have changed the Earth's geological structure, exploit resources and leaving traces of human activities that will be seen long after the human activities have ended. These traces can be seen not only in excavation sites or deforested natural areas, but also simply walking along the coast of the sea, where man-made materials are mixed with natural shellfish and pebbles.

By accepting that the human activities have created a new epoch in the Earth's geological development, it is important to investigate not only how this came into being, but also how to move forward.

“Human activities are exerting increasing impacts on the environment on all scales, in many ways outcompeting natural processes. Because human activities have also grown to become significant geological forces, for instance through land use changes, deforestation and fossil fuel burning, it is justified to assign the term “anthropocene“ to the current geological epoch.”
Paul J. Crutzen

Fig.4: The new geology
Roja, Latvia, 2020



The points of entry

The voice of nature

The cultural heritage and the preservation of folklore tradition and rituals has a significant role in the Latvian identity. The non-material cultural elements consist of traditional folk songs which were spoken in the society throughout the centuries but written by Krišjānis Barons in late 19th century.

These songs depict a strong cultural link and appreciation of nature and its elements. The folksongs are usually 4 lines long with a characteristic rhythm of words.

Nowadays, even though the meaning of folklore in everyday life is less evident, Latvians still celebrate traditional pagan festivals, such as midsummer eve or winter solstice as a National holiday. The songs are sung by a very rich choir culture, in this way keeping the traditions alive and continuing to praise the nature as an important element of the local cultural identity.

Kas var dziesmas izdziedāt,
Kas valodas izrunāt?
Kas var zvaigznes izskaitīt,
Jūras zvīrgzdus izlasīt.

*Who can sing the songs,
Who can speak the language?
Who can count the stars,
and the small splinters of the sea.*

Latvian folk song

Fig.5: Voicefulness
Photo: Jānis Upītis

In the photo J. Bērziņš second from the left with choir "Norise"



the matter

Problem field

Problem statement

Academic paper

Purpose and aim of the research

Research questions

Problem field

Conditions of the Baltic Sea

The Baltic Sea, from the point of geology, is one of the youngest seas in the world due to the active geological processes that formed the existing conditions of the sea and the coastline only approximately 3000 years ago. (Nikodemus et al., 2018, pp. 321), therefore it is important to understand the human influence on these processes.

The Baltic Sea had several development stages, changing from a melting Ice Lake to a saltwater sea (Āboltniņš, 2010). This dynamic change of coastline between land-locked lake and connected sea has influenced not only marine habitats, but also the coastal territories, leaving marine sediments far inland. The changing coastline can still be visible in the topography where the old Baltic Ice Lake coast is forming a visible slope in the landscape.

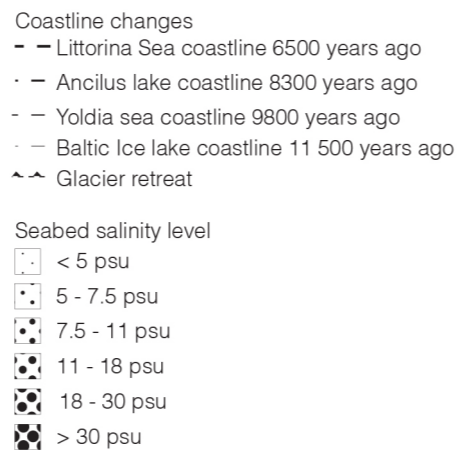
Nowadays the Baltic Sea is almost land-locked and is connected to the Atlantic Ocean and North Sea only through three straits, as well as its drainage basin is almost 4 times larger than the size of the Sea making the salinity level in the Sea is quite low. These conditions make the Baltic Sea a place for unique marine ecosystems that is influenced by the actions of 85 million people that live in the drainage basin of the sea. (HELCOM, 2018).

The salinity level, as well as surface temperature rises closer to the connection with the Atlantic Ocean, where the water exchange with the ocean is stronger. This condition influence marine habitats and species. Specific species, like mussels, who are living in saltwater, are growing better closer to the ocean than

in the North where the water is almost 5 times less salty (HELCOM, 2018).

The health of the Baltic Sea is depending on the anthropogenic pressures put on the Sea. Extensive fishery has resulted in lack of fish resources and even ban of Baltic cod fishing in the Baltic Sea ('EU bans cod fishing in Baltic Sea', 2019). The pollution and nutrients that flow into the sea from the river discharge is a cause of eutrophication that damages marine habitats, creating "dead zones" in several parts of the Baltic Sea (HELCOM, 2019). Nevertheless, the warming climate influence the formation of ice during winters. Several species, for example, seals, are depended on the ice to successfully reproduce. Therefore, it can be argued that the Baltic Sea is "pushed on her knees" due to anthropogenic pressures within the limits of the Baltic Sea.

Fig.6: Geological development of the Baltic Sea coastline and Salinity level



Adapted from: HELCOM salinity level, (Āboltniņš, 2010)

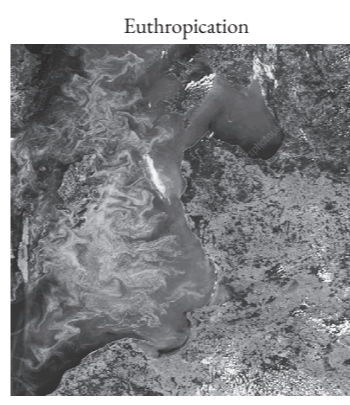


Photo: Eurpean Space Agency, 2005

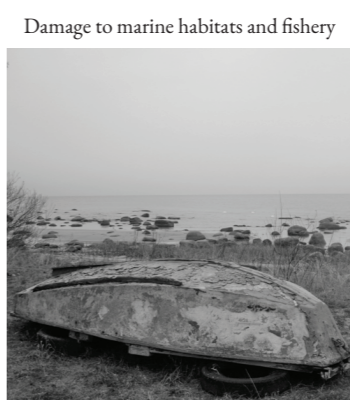


Photo: Kaltene, Latvia

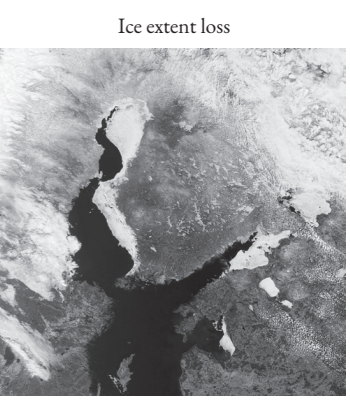


Photo: NASA (2014)

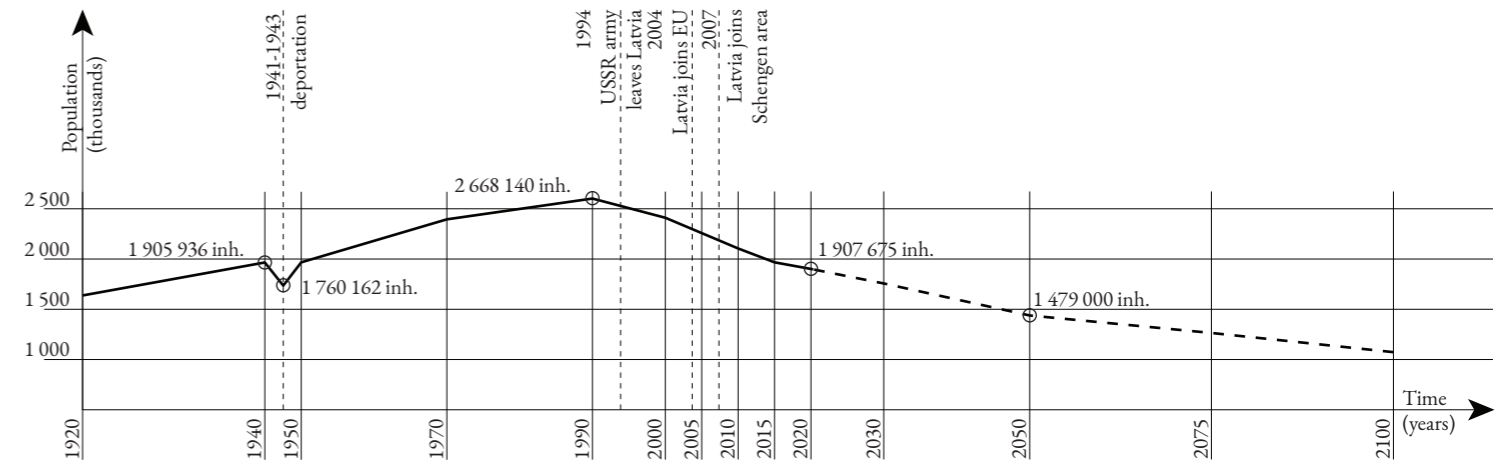


Fig.7: Population decline in Latvia (UN, 2020)

Problem field

Features of the Anthropocene on the coastline of the Gulf of Riga

The unique landscape and nature zones that include dunes, coastal pine forests and meadows are attractive spaces for recreation, therefore the tourism activities along the coastline has increased in the last decade (Klepers, Jāņa Sēta SIA, Mardega, & Ulme, 2020). This phenomena creates pressure on the coastal territory by adding new structures, such as car parkings and other spatial elements to accommodate the needs of tourists and increase the accessibility of the coastal space for growing amount of visitors. This need is also recognized on national level, resulting in a national development plan for the public infrastructure on the coastline (Jūras plānojums, 2019).

However, the coastal territory is not only meant for the accommodation of the needs for tourists. The local economy of settlements long the Gulf of Riga are linked with the activities of small port, such as Salacgrīva, Engure, Mērsrags and Roja. The changes in the economy in the last 30 years in combination with fish resource decline and environmental challenges in the Gulf of Riga, has resulted in decline of the fishing fleet (Benga, 2014) and switch from fishery-oriented activities towards timber export and tourism (Mēgnis, 2021, see app.1). Nevertheless, the national population decline, that is projected to also continue in future, resulting in loss of 450 000 people in Latvia by the year 2050 (UN, 2020) will also influence the coastal villages along the coast, where depopulation is projected between -10% to -20% in the next 10 years (Jūras plānojums, 2019). The shrinkage manifests in the space by empty residential and industrial buildings nationwide, however, on the coastal territory the shrinkage is visible more in

ports and public service buildings.

Thus, coastal erosion is an important natural phenomenon that influence coastal landscape and is underrepresented not only on the national planning documents (Jūras plānojums, 2019), but also on local municipal spatial planning documents (Eberhards, 2008, Lapinskis, 2019), resulting in development of national guidelines for coastal erosion mitigation (Vadlīnijas, 2014) that are suggestive, but not mandatory. This can be seen on the coastline, where people try to protect the coast from the erosion using different approaches and materials that often damage the appearance of the coastal landscape and natural habitats.

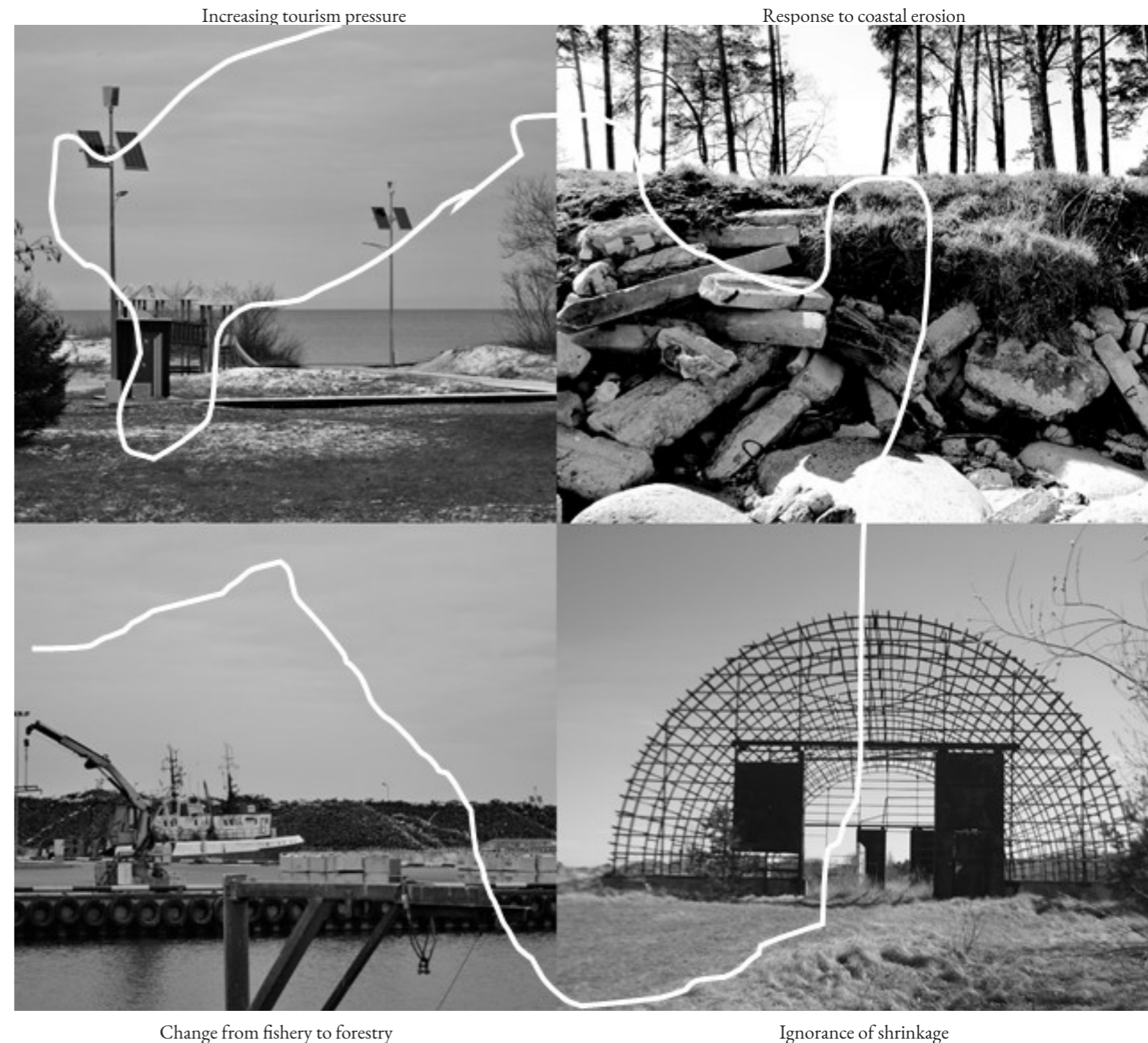


Fig.8: Anthropogenic pressures on the coastline of the Gulf of Riga

Problem statement

The problematics in the Baltic Sea region and the implications of anthropogenic pressures on the Gulf of Riga and the coastal communities in Latvia form the base of the problem statement.

The coastline of the Gulf of Riga besides the environmental challenges in the Baltic Sea region (HELCOM, 2018), (Kļaviņš & Andrušaitis, 2008) is also experiencing **depopulation** (Krūmiņš, 2019, p. 284), (United Nations, 10.11.2020), (Pužulis & Kūle, 2016). Decline of the fish resources due to overfishing (HELCOM, 2018), **coastal erosion** risks (Nikodemus et al., 2018) and potential changes in the **coastal landscape** due to climate crisis and increasing tourism, puts the economic activities of the **local communities** and existing infrastructure **under pressure to adapt**, questioning the future of the coastal identity if the current, growth-oriented development continues.

Fig. 9: Errasure
Upesgrīva, Latvia



Climate change and shrinkage:

Challenges and possibilities of climate change adaptation in the context of shrinking cities and regions on the coastline of the Gulf of Riga in Latvia.

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Abstract

The climate change puts pressure on urbanized areas all around the world to adapt to the new climatic conditions, however, certain the cities and regions that face depopulation and are going through socio-economic changes due to shrinkage, are more vulnerable to face the new climate conditions. Lack of human and financial resources, environmental and spatial challenges, as well as local cultural and political conditions ask for specific approach of adaptation measures for the shrinking cities and regions. Because of these specific conditions, the future risk management of the new climatic conditions, mostly is not considered an urgent problem. Thus, shrinkage can be seen as opportunity to implement the concept of degrowth, increasing the sustainability and liveability of the shrinking urban territory.

This paper investigates the potential spatial planning and design challenges and solutions that are implemented in cities that are identified as shrinking and understands the relation between adaptation of climate change and shrinkage. By understanding the local conditions of Latvia, the paper identifies the possible challenges and opportunities for spatial planning and design solutions that could be implemented for the climate adaptive development of the coastal communities on the Gulf of Riga in Latvia.

Keywords

Climate change adaptation, shrinkage, degrowth, Gulf of Riga, Latvia

Introduction

Global climate change and temperature rise are creating extreme weather conditions that humanity will have to deal with in the future. Climate change is an ongoing and inevitable process. The global temperature rise due to increasing amount of greenhouse gas emissions that has been evident in since the industrial revolution in the 19th century is projected to continue in the 21st century as well. Depending on the scenario and human actions to mitigate the greenhouse gas emissions, the change in the global temperature is projected to increase by 1.5°C or even up to 4°C. (IPCC, 2014), leading to more extreme climatic conditions, such as global sea level rise, droughts, reduction of ice extent and others (Kļaviņš & Andrušaitis, 2008, pp. 60-74). These events will create pressure on the existing built and natural environments to adapt to the new climatic circumstances.

The understanding of climate change adaptation has been shifting from the focus on technological improvements towards a broader understanding of the global changes, implementing notions of the existing social and economic systems that need to be adapted to the changing climate conditions (Pelling, 2010). Importance of adaptation to the climate change is relevant not only in the cities that are experiencing or projected an increase of population, but also in the cities and regions that due to globalization processes have been left out and are experiencing depopulation that leads to shrinkage (Martinez-Fernandez et al., 2012, p. 218). Bridging the present and future

changes in the shrinking urban areas with the possible challenges of the climate change, the adaptation process of the existing spatial and socio-economic systems in the urban areas and regions that are experiencing shrinkage can be considered crucial to envision sustainable development without economic growth.

This paper investigates the challenges and opportunities of the climate change adaptation in the context of shrinkage and questions if the concept of degrowth could be applied in the specific context. Building on the understanding that the climate change adaptation “is a process of socio-political transition and transformation” (Pelling, 2010) and that it can be conceived as a “dynamic phenomenon”, the adaptation process in urban and regional shrinkage is understood revealing possibilities of development for the uncertain future of the shrinking rural coastal communities on the coastline of the Gulf of Riga in Latvia – country experiencing one of the most rapid depopulation rates in Europe, having lost 25% of its population in the last 30 years with indication of continuous depopulation in the future (United Nations, 10.11.2020, (Ubarevičienė et al., 2016), (Pužulis & Kūle, 2016).

Towards the uncertain future

Impact of the climate change in the Baltic Sea region and Coastline of the Gulf of Riga

The global climate change is evident across the world, although the impacts of it is manifested on the local scale. Nevertheless, the evidence prove that the climate is changing, despite speculations and high level of uncertainty for the future vulnerabilities (Pelling, 2010), (Carter et al., 2015) and it can be linked to the existing human activities and the pressures they put on the limits of the planet Earth .

The global temperature rise in the Baltic Sea region is causing the water surface temperature increase, that can further accelerate and increase eutrophication that damages marine ecosystems and fish resources in the sea. Due to warmer air and water temperatures, the maximum ice extent on the northern part of the sea has been decreasing. More precipitation and water discharge from the rivers can influence the salinity level of the Sea, that, due to its geographical location, is already quite low (HELCOM, 2018), (Kļaviņš & Andrušaitis, 2008). However, the warmer temperatures are increasing the number of vegetation days in the growing season, leading to possibilities for more productive crops and forests, yet forcing some species to migrate towards north and new, alien species migrate from the south (Nikodemus & Brūmelis, 2015, pp. 99).

Although the sea level rise in the Baltic Sea region does not cause the same risks for all countries in the region, some coastal territories in the future will experience more flooding on the lower coastal areas. In the context of the Gulf of Riga, this flooding is caused by the storm surges that due to more extreme storms in the future is projected to happen more often and cause more damage to the existing urban areas. The storm surges and warmer air temperature during the autumn and winter storm periods will also accelerate the coastal erosion process. It is calculated that there are 4 km of the coastline at the moment where a decision needs to be made about adaptation to the coastal erosion. If the climate change conditions will stay the same and no action is taken, in the next 50 years the risk zone will be already 10 km long (Nikodemus et al., 2018, pp. 142), (Eberhards & Lapinskis, 2008, pp. 5), leading to a physical shrinkage of the territory, significant structural damage to the existing infrastructure and coastal ecosystems.

The inevitable shrinkage

The discourse of shrinkage has been a focus of several researchers for the last decades. As the post-industrial transitions emerged in countries like, USA, UK, Germany and Japan, researchers noticed transformations in the cities that went through economic shifts and population decline (Pallagst, Wiechmann, & Martinez-Fernandez, 2013). Closure of factories, physical and economic decay and financial constraints are some of the factors that follow demographic change (Haase et al., 2013, p. 104). In the last decade, the research of shrinkage has broadened the understanding of the term by implementing analysis not only on neighborhood or city scale, but also on a regional scale, expanding the definition of shrinkage as a “multi-dimensional phenomenon encompassing regions, cities and parts of cities or metropolitan areas that are experiencing a dramatic decline in their economic and social bases and are facing population losses” (Pallagst, Wiechmann, & Martinez-Fernandez, 2013, pp. 20), however, more detailed factors and spatial implications of shrinkage are coming from the analysis on the urban scale.

Although the drivers of shrinkage in the urban areas across the world could be similar, the spatial manifestations of

the shrinkage are visible locally and vary in different cities (Haase et al., 2013, p. 105). Vacant lots, abandoned buildings, lack of social and economic services in the area, as well oversized and underused physical infrastructure like roads, sewage and water supply systems demand additional funding for maintenance, that due to decreased economic activity negatively influence the fiscal abilities of the city (Martinez-Fernandez et al., 2012, p. 221). Nevertheless, the visual appearance of this neglect caused by the abandonment can reduce the sense of safety of the local residents, (Herrmann et al., 2016, p. 968) decrease the property value and impact the overall quality of life, creating “a vicious circle that increases the chance of people moving out ” (Martinez-Fernandez et al., 2012, p. 221), leading to further shrinkage.

Shrinkage affects not only urban areas, but also entire regions and countries. In the European context, these regions are concentrated in the Mediterranean and post-socialist countries in Central and Eastern Europe (European Parliament and UMS RIATE, University Paris Diderot, 2008). Due to dramatic changes in the political regime and economic system, these regions in the last decades have been trying to “catch-up” with other regions in the Europe, that has created a national, regional and local policies that are oriented towards growth, rarely acknowledge the exiting threads and impacts of population decline and rely on foreign investments through financial aid to increase the competitiveness (Haase et al., 2013, p. 106), (European Parliament and UMS RIATE, University Paris Diderot, 2008), (Ubarevičienė et al., 2016, p. 15). Since the 1990s population of the Central and Eastern European countries have been migrating weather to the larger cities within the region or has been the power of the economical immigration for the Wester European countries, emptying the rural countryside regions that has been experiencing the reduction of importance of agriculture, that was set as priority under communism and socialist regimes. (Ubarevičienė et al., 2016).

In the context of Latvia these processes are experienced on a national level. Population growth has been evident only on the metropolitan region around Riga – The capital city of Latvia and the largest city and economic center of the Baltic states, however this phenomenon can be considered a short term (Pužulis & Kūle, 2016, p. 94), because the population projections for the coming decades on a national level projects continuation of the depopulation, resulting in population loss of up to 20% in the next 30 years, leveling the population around 1.6 million inhabitants (Krūmiņš, 2019), (United Nations, 10.11.2020). It will mean that Latvia, in a time period of 60 years will have lost approximately 1 million inhabitants. This dramatic decline will significantly influence the development of the whole country, which will echo also in rural territories, including the coastline of the Gulf of Riga. The paradox of the situation is that academics and researches in Latvia that could provide knowledge and research for these specific conditions, have been silent, resulting in limited data on the specific conditions and impacts of shrinkage on the urban and rural areas. The first, international scientific research paper analyzing the shrinkage conditions in Latvia has been published only in 2016 by Pužulis & Kūle, hinting to ignorance and lack of acceptance of shrinking as inevitable process is evident not only in local and national development policies and strategies, but also in the local academia (Pužulis & Kūle, 2016). In the context of the changing climate and adaptation, the extreme weather conditions in some areas in the world can be linked to migration from these areas, causing shrinkage and depopulation (Khavarian-Garmsir et al., 2019, p. 101480), however the impact of this process on the depopulation of Latvia still needs to be analyzed, adding this topic to the research agenda and urgency in Latvia.

Knowledge, understanding and analysis on the specific local conditions of a territory that is experiencing shrinkage is crucial to adapt for the uncertainties that the future can bring .The loss of

skilled and talented locals who leave to live and work in more prosperous areas can significantly influence the capability for the loosening-out territory to innovate solutions to increase the quality of life (Martinez-Fernandez et al., 2012, p. 221).

Climate change adaptation in shrinkage

Existing studies and practice show that understanding on the climate change adaptation has been shifting away from being viewed as merely technical reaction that works as a defense mechanism against certain risks and hazards of extreme weather conditions, towards a more broader understanding of the economic, social, political and environmental processes that are forced to change within the new climatic conditions (Pelling, 2010), (Carter et al., 2015). This shift has opened a discussion between academics on how to define the adaptation and respond to the changing climate.

From one perspective, adaptation can be viewed from the point of view of evolutionary biology, that define adaptation as “an action that allows a form or a structure (i.e., a household, community, group, region or even a country) to better cope with a stressful condition” (Yan & Galloway, 2017, pp. 6). This understanding leads to narrow view on the climate change adaptation as a collection of activities that are taken either before the risk turns into hazard, or reactive activities that are taken during or after a disastrous event. “This kind of adaptation often takes the form of reconstruction” (Yan & Galloway, 2017, pp. 7), that in an urban area with existing infrastructure that is already underused and neglected could lead to preventing necessary structural change to improve other social, economic or environmental conditions.

On the other hand, Pelling argues that “the climate change is no longer an external threat to be managed ‘out there’, but is an intimate element of human history – both an outcome and driver of development decisions for individuals, organizations and governments” (Pelling, 2010, pp.6). He sees the adaptation as a multi-layered process with potentialities for alternative development pathways that could lead to future change in the existing social and socio-ecological systems. It can be argued that this approach is necessary for the adaptation in context of shrinkage, because, in this context the changes in the existing systems are already happening, creating opportunities for implementing new ways for developing spatial planning and design solutions and policies that tackle several problems and scales at once. Because the climate change can be viewed as a dynamic, uncertain and sometimes even invisible process on the everyday life, the adaptive actions towards the climate change in the context of shrinkage should coevolve together with the ecological systems they interact with (Pelling, 2010, pp.6).

Such an approach is needed to avoid the “lost opportunities” that can be caused by implementing new infrastructure for climate change adaptation without considering the local context. This is evident in a case study from Japan where construction of seawalls that prevents local coastal communities from the risks of Tsunamis were built without considering the shrinking and aging population (Yan & Galloway, 2017, pp. 391). Because such infrastructure that prevents a urban system from a specific risks is usually a fixed asset with a long lifespan (Carter et al., 2015, p. 53), it should be designed in a way that responds to the uncertainties of the climate change and shrinkage.

One of the ways how the climate change adaptation in the context of shrinkage be achieved is by implementing more collaborative and inclusive spatial planning that “implies institutional coordination of multiple actors vertically across and horizontally between multiple spatial levels” (Pike et al., 2010, p. 68), including interests of the silent actors, i.e. future generations,

non-humans, meaning natural and ecological actors, and the marginalized communities (Pelling, 2010, pp.6). This is a particular challenge for the coastal communities on the Gulf of Riga, because the existing spatial planning documents and policies often overlook the local conditions and that require an insight and understanding of the specific conditions that these communities are experiencing (Pužulis & Kūle, 2016).

Linking degrowth with shrinkage

The necessity and possibilities of a new socio-economic system that are embedded in the understanding of the ecological systems and natural limits of our world is brought to an extreme in the concept of degrowth. Originated from the concepts within political ecology, degrowth, from the perspective of ecological-economy, can be defined as “socially sustainable and equitable reduction of materials and energy a society extracts, processes, transports and distributes, to consume and return back to the environment as waste” (Kallis, 2011, p. 874). The concept is a strong critique on the existing capitalism policies and actions that require constant growth by increasing the societal throughput and negatively affecting the biosphere (D’Alisa et al., 2014, p. 10). Sustainable degrowth, by Kallis, et al. (D’Alisa et al., 2014) is viewed as a possibility to limit humanities ecological footprint and live more simply with less resources. Absence of economic growth is not considered a problem, but an opportunity for more social and ecological life in the future. However, the concept entails multi-layer systemic change in the economic and social structures, that can be criticized as being “too vague” and “not specified” (Kallis, 2011, p. 875). Nevertheless, the implementation of the concept of degrowth in the context of shrinkage opens a discussion towards acceptance of systemic changes when population is declining that can bring new opportunities for increasing the quality of life in these areas.

The spatial implications of degrowth are manifested in examples of shared urban gardens, eco-villages, consumer-producer cooperatives, and other examples that create more autonomy and localized economies (Kallis, 2011), (D’Alisa et al., 2014). Similar solutions have been applied in several cities that has experienced shrinkage in the past. Re-greening of vacant lots by creating communal rain gardens can not only bring ecosystem services closer to the existing residents, but also adapt to the increasing precipitation by changing climatic conditions (Herrmann et al., 2016). By involving the knowledge and participation of local community it is possible to create a flexible place that can adapt not only to the uncertainties of the future climate, but also needs of the local inhabitants by developing social amenities (Pallagst et al., 2017).

In the context of Latvia, the existing spatial planning and development policies, strategies and documents have been focused on the economic growth, disregarding the impacts of national level depopulation and nation-wide shrinkage (Pužulis & Kūle, 2016), therefore the application of the concept of degrowth would involve dramatic, multi-scalar and systemic change on a national level. However, the application of the concept for the smaller, rural municipalities and communities in the countryside and also along the coastline could bring an innovative development possibility in the context of rapid depopulation, however the spatial implications of the concept on regional scale needs further research.

Conclusion

This paper investigated the main challenges and opportunities for climate change adaptation in the context of shrinkage, by analyzing the existing climate change and depopulation patterns from global to local scale. Theoretical concepts of shrinkage and climate change adaptation were bridged to reveal the potentialities for implementing the concept of degrowth in the context of shrinkage on the coastline of the Gulf of Riga.

The main challenges and opportunities for the adaptive development of the coastline can be divided in 3 main branches: environmental – risks and advantages imposed by the climate change; social – systemic changes caused by the shrinkage; and economical – discourse of focusing on growth/degrowth paradigm. Adapting to the climate change on the coastline should include innovative, local and place-based solutions that coevolve with the changing climate and respond to the uncertainties of future development in the context shrinkage. However, by implementing the understanding of degrowth as an opportunity for creating more ecologically and economically sustainable life for the society, the spatial manifestations of shrinkage that were viewed as negative consequences can be turned into opportunities.

Further research investigating the local actors – human and non-human, as well as more in-depth analysis of the existing planning and governance structure of the coastal municipalities is necessary for developing local, place-based design solutions specific for the municipalities and communities on the coastline of the Gulf of Riga in Latvia ensure their ability to face the uncertainties of the future.

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the approach

Objectives of the research

Theoretical framework

Conceptual framework

Analytical framework and methods

Proposition

The approach

Introduction

This master thesis is exploring a spatial design and planning approach to address the climate crisis in the context of shrinkage on the coastline of the Gulf of Riga in Latvia. The purpose of this chapter is to underline the main arguments that sets the theoretical, conceptual, and analytical frameworks for the thesis, as well as explain the steps and methods used in the further research design. The frameworks set the base for the research and design proposition and proposal.

The thesis is positioned around the notion that the global climate change is irreversible process that has been the result of long-term human exploitation of the natural resources and limits of the Earth (IPCC, 2014; (Pelling, 2010,). Although the increasing urbanization of the world puts different cities around the world under pressure to adapt to the new climatic conditions, there are urban areas and rural regions in the world that are experiencing depopulation, leading to shrinkage (Martinez-Fernandez et al., 2012), therefore, by understanding the problematics of the shrinking coastline of the Gulf of Riga, deductive research approach is used to form theoretical framework of the thesis, based on the theories on climate change adaptation (Pelling, 2010), (Yan & Galloway, 2017), (Pike et al., 2010) that are understood in the context of shrinkage (Martinez-Fernandez et al., 2012), (Pallagst et al., 2013), revealing the spatial implications and the possibilities of implementing the theory of degrowth (Kallis, 2011), (Kallis, 2011) in the specific context. The necessity to localize the adaptation solutions, as well as planning and design strategies and changes in the existing socio-economic and spatial

systems is conceptualized through notion of “sedimentation” and “acceptance of change” that informs the necessary components for Nature-based solution (Cohen-Shacham et al., 2016), (Morris et al., 2018) implementation in the coastal landscape and form the base of the conceptual framework

This combination of theories and concepts helps to understand the specific challenges and possibilities of future development and spatial interventions in the context of shrinkage. As the research on shrinkage in Latvia is highly underrepresented in the local and international academia (Pužulis & Kūle, 2016, p. 102), the thesis also supplement the knowledge on the local conditions of Latvia that can be used for the spatial planning and design projects in the future.

The approach

Research objectives

Latvia is experiencing one of the most rapid depopulation rates in Europe, having lost 25% of its population in the last 30 years with indication of continuous depopulation in the future (United Nations, 10.11.2020, (Ubarevičienė et al., 2016), (Pužulis & Kūle, 2016), however different population prognoses projects the continuation of population decline leveling the population around 1.6 million inhabitants (Krūmiņš, 2019), (United Nations, 10.11.2020). It will mean that Latvia, in a time period of 60 years will have lost approximately 1 million inhabitants. This dramatic decline will significantly influence the development of the whole country, which will echo also in rural territories, including the coastline of the Gulf of Riga.

However, this phenomena has been underrepresented not only in national, regional and municipal planning documents that has mostly been focusing on growth-oriented policies to stop the depopulation, but also in research of local academia (Pužulis & Kūle, 2016), showing the ignorance of this inevitable and influential process. Nevertheless, the coastline of the Latvia is under pressure to adapt to the climate change. Due to warmer temperatures, some coastal areas are experiencing coastal erosion and flooding during storm surges (Nikodemus et al., 2018) that poses hazards to the existing public infrastructure and urbanization on the coastline. These problems are presented in the problem statement that bridges the challenges on the Baltic Sea region to the local conditions of the coastline of the Gulf of Riga.

The purpose of the research is based on the knowledge gap between the existing planning documents that either not recognize nation-wide shrinkage as an influential factor, or either underrepresent the challenges and opportunities for climate change adaptation, therefore the aim of the research is set to explore spatial design and planning solutions that would bridge the gap in order to achieve more sustainable development that recognizes the specific local conditions and challenges.

The main research question is focused on understanding how acceptance of shrinkage and erosion can be used as a spatial planning and design tool to develop sustainable living conditions for the local inhabitants.

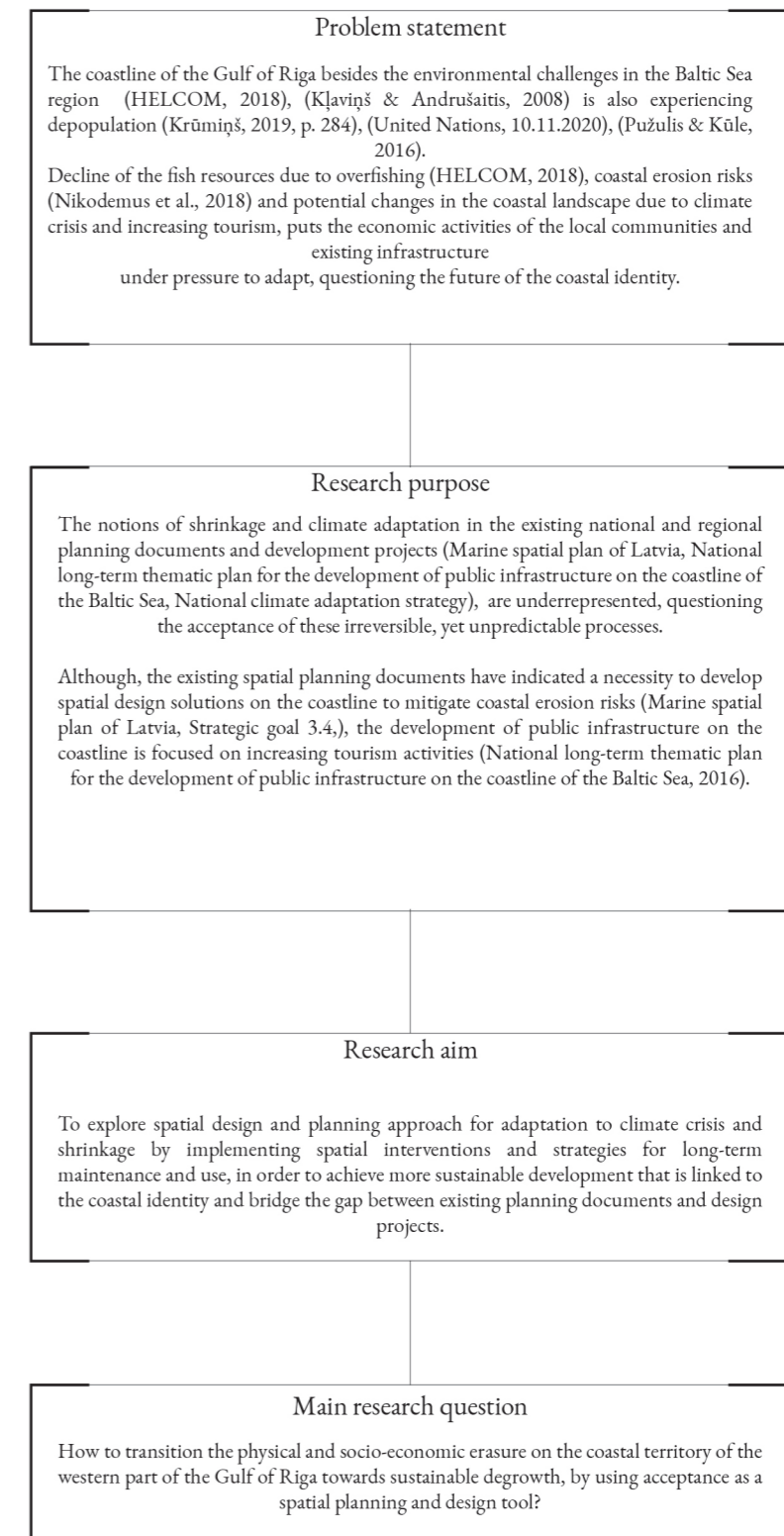


Fig.10: Research objectives
By author

The approach

Theoretical framework

In order to understand the theoretical underpinnings of the proposed research question, theories of climate change adaptation (Pelling, 2010), (Yan & Galloway, 2017), (Pike et al., 2010), phenomena of shrinkage (Martinez-Fernandez et al., 2012), (Pallagst et al., 2013), and degrowth (Kallis, 2011), (Kallis, 2011) are interrelated to each other in order to reveal the common theoretical notions or spatial implications.

Degrowth and shrinkage can be linked by the spatial solutions that are given as example in the theory of degrowth. Communal gardens, eco-villages, consumer-producer cooperatives, etc. are similar solutions that have been implemented in urban areas that are experiencing shrinkage (D'Alisa et al., 2014), (Herrmann et al., 2016). As degrowth envisions a change in the existing socio-economic and spatial systems that are relying on the extraction and exploitation of natural and fossil resources (Kallis, 2011), these changes can be linked with the broader understanding of the climate change adaptation. Nevertheless, by accepting the shrinkage as opportunity to reevaluate the existing systems and spatial conditions, the neglected infrastructure, vacant lots and other spatial manifestations of effects of depopulation can be used in order to adapt to the new climatic conditions, implementing green and blue infrastructure or downsizing the existing systems to mitigate the climate change.

The links between the theories are combined to understand the common notions that could be implemented in the context of shrinking rural coastal communities on the coastline of the Gulf of Riga. The challenges and possibilities for

of the combination of these theories are revealed in theoretical essay “Climate change and shrinkage: The challenges and possibilities for climate change adaptation on the context of shrinkage”, that has been written as a part of the AR3U023 course – Theories of Urbanism.

The interrelation of theoretical notions of the chosen theories are concluded by setting the ground for the conceptual framework. By accepting the changes in the landscape, shrinkage and climate, it is possible to implement local, nature-based engineering solutions that are linked with social amenities and coevolve with the changes. This can be achieved by inclusive, adaptive local planning system that respects the needs of different actors and respond to their needs in different times.

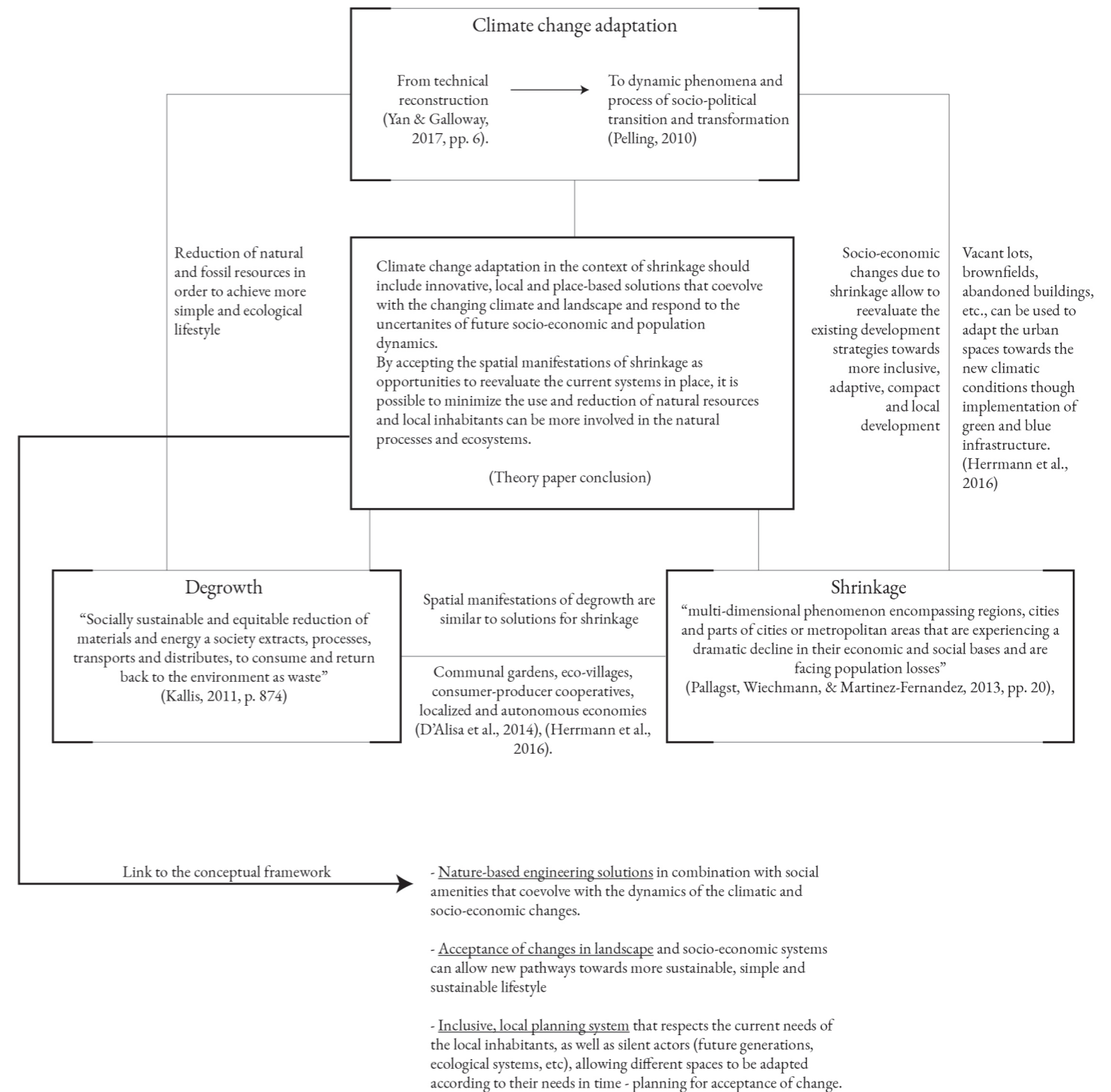


Fig.11: Theoretical framework
By author

The approach

Analytical framework and methods

The analytical framework is based on the concepts that are identified in the problematization of the research, as well as in conceptual and theoretical frameworks. By choosing an analytical component in each of the concept, sub-research questions are set to provide an answer to the main research question. These analytical components are analyzed in 3 different scales using mixed methods, combining qualitative and quantitative data collection, literature reviews on specific topics, field observations and interviews, as well as stakeholder analysis. The outcomes of the analytical framework are used to form a proposition that is later tested in the strategic design project.

The analytical framework and methods are used for the Transitional Territories studio research on 4 lines of inquiry. The critical mappings, sections and spatio-temporal diagrams are used to make the conclusion drawings on the topics of Mater, Topos, Habitat and Geopolitics in order to understand the complex processes, systems and elements on the chosen research areas – Gulf of Riga, Coastline of Kurzeme, Village of Roja and Krasta street in Roja.

Because of the global pandemic, as well as limited GIS data online and limited research on the specific topics in the context of Latvia, the chosen methods could lead to subjective outcomes that are based on educated assumptions.

Site visit: 15 January - 29 May, 2021

Scales: G Gulf of Riga / Territorial K Kurzeme coastline of the Gulf of Riga / Regional R Village of Roja / local Kr Krasta street in Roja/ micro

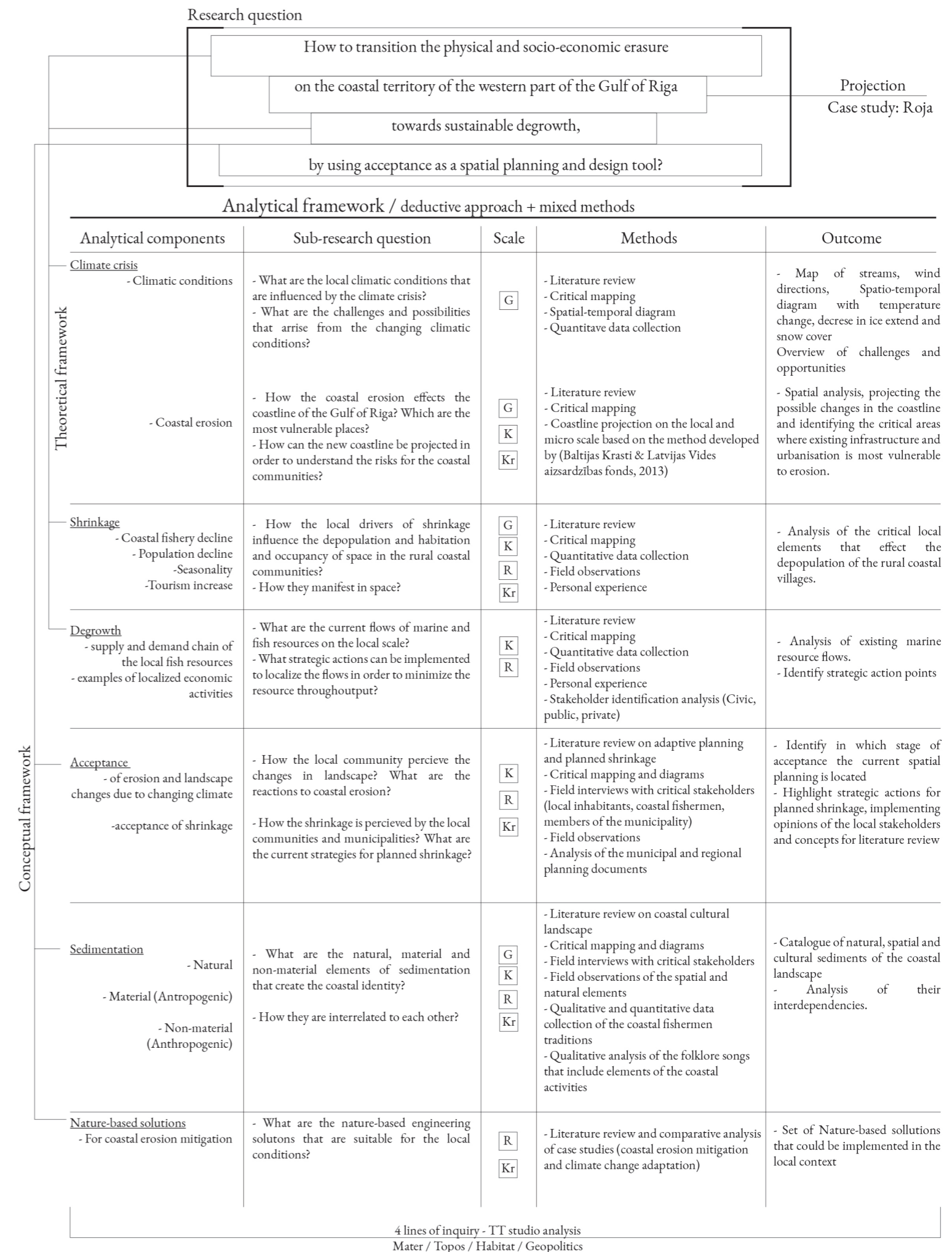


Fig.13: Analytical framework and methods
By author

The approach
Projection

The outcomes of the analytical, theoretical, and conceptual frameworks form the design proposition that incorporates climate change adaptation, shrinkage, degrowth, sedimentation, acceptance of change and nature-based solutions. This proposition for the spatial design approach is tested in the design proposal, starting from the local scale in the adaptive strategy for one of the shrinking coastal villages – Roja. The village, with approximately 2000 inhabitants are chosen as a strategic project location because the local economy in the village is linked to the coastal fisheries in the Gulf of Riga, is experiencing population decline and exposed to coastal erosion risks.

A street in the village – Krasta street is chosen as a strategic project location, because it is projected that the street will be lost due to coastal erosion in the next 30 years (Lapinskis, 2019), causing degradation of existing coastal ecosystems, decreasing accessibility of properties and damaging the existing public and private infrastructure.

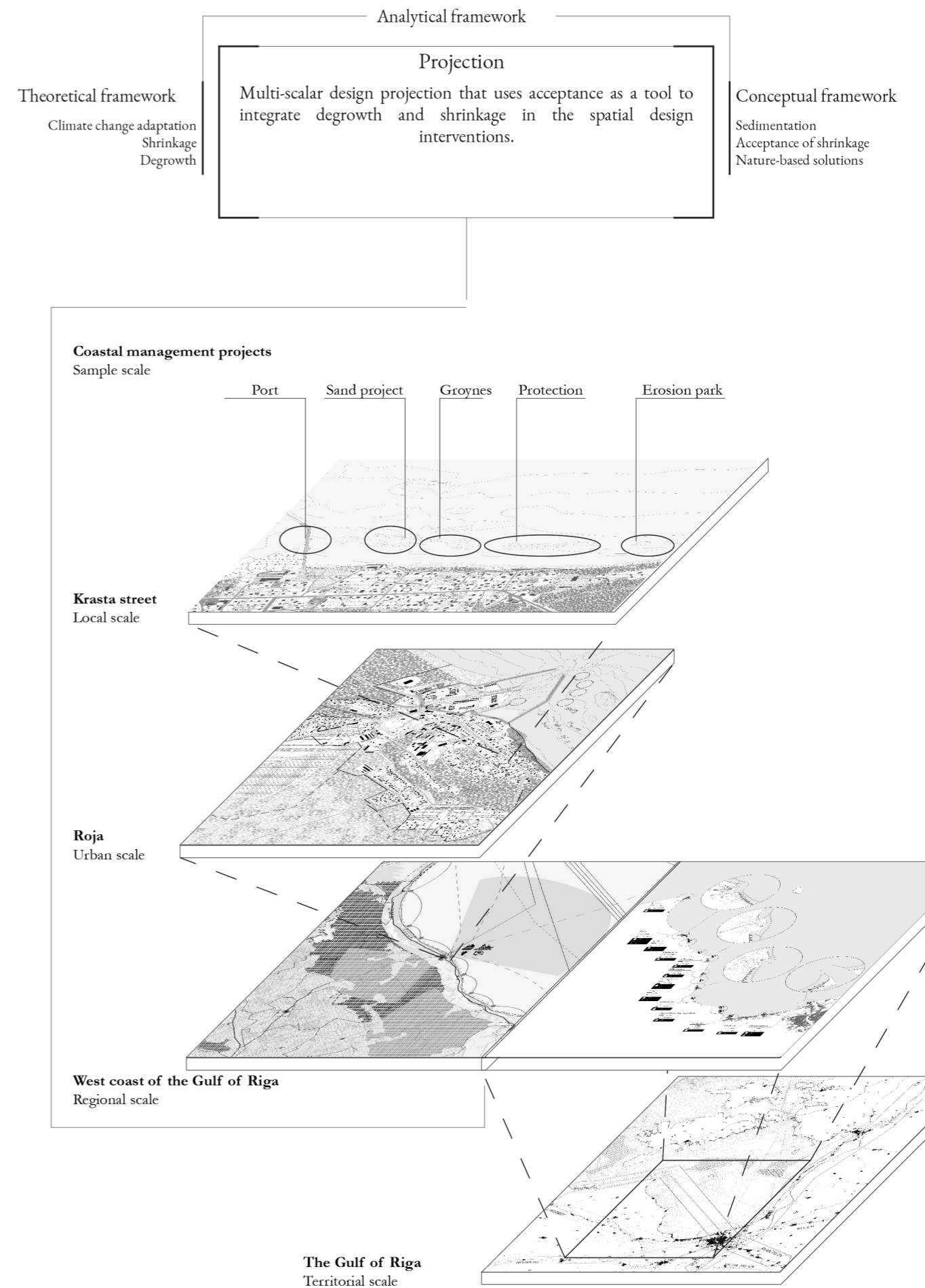


Fig.14: Projection and deconstruction scales.
By author

deconstruction

Mater

Topos

Habitat

Geopolitics

Mater
Water and Air

Lai ir grūt', kam ir grūt',
Zvejniekam visai grūt':
Lai lij' liet', lai krit' snieg',
Zvejnieks zvej' jūriņei.

*Who has hard life,
Fishermen has hard life.
Rain is falling, snow is snowing,
Fishermen is still fishing.*

Latvian folk song

In this chapter, the changes in the coastal climate is analysed to understand the potential differences in the coastal landscape and influence on the local culture.

Fig.15: Different winters. 2019 vs 2018
Roja, Latvia



Mater
Composition

The Baltic Sea can be considered almost a land-locked Sea because it is connected to the Atlantic Ocean only through 3 straits in Denmark. This means that the sea water level changes are influenced by wind rather than tides. As the Gulf of Riga is connected to the Baltic Proper through straits of Irbe and several smaller straits between Islands of Saaremaa, Hiiumaa, Muhu and Vormsi the changes in the water level in the Gulf are more visible than in the Baltic Proper (Nikodemos and Brumelis, 2015,75-76). As the main wind direction in this territory is South-West and West, the highest water level fluctuation can be seen in the Gulf of Parnu on the eastern coast of the Gulf of Riga.

Nevertheless, the South-western winds bring also warmer air masses from the Atlantic Ocean and the open sea, influencing the air temperature on the coast, resulting in warmer temperatures along the coastline in comparison to the inland. Due to climate change, the average air temperature is projected to increase by several degrees, resulting in visible changes in the landscape especially in the winter (Klavins, et.al, 2008, 75-85). It is projected that due to the increasing average air temperature, the snow-covered area will move towards North-East and during winter months there will be no permanent snow cover thicker than 1 cm on the western coastline of the Gulf (Klimata parmainu analyzes riks, meteo.lv).

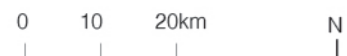
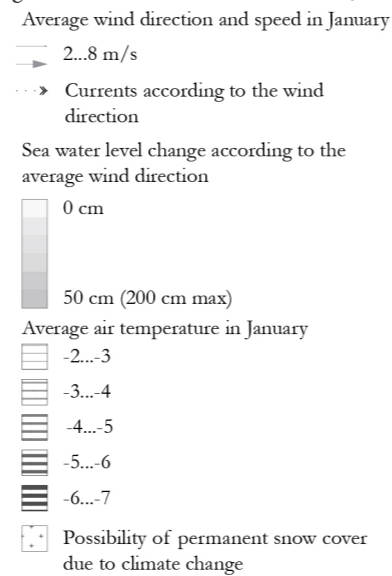


Fig.16: Air and water conditions in January



Based and adapted from: Baltijas Juras locija (2014), Meteo.lv, ilmateenistus.ee, Klavins, et al (2008),



Mater
Alterations

Warmer air temperatures in winter have been increasing in the past decades, however on the coastline the most evident changes in the landscape during winter can be seen on the Gulf. The ice on the Gulf is not forming annually, but occasionally and becomes thinner. Although this process eases shipping and fishing in the Gulf, the influence of this process on the marine habitats is yet to be evaluated in the long term.

With warmer air, the vegetation period on the coastline is also becoming longer, potentially increasing the productivity of the forests and agriculture lands, although welcoming invasive species from more southern climates (Nikodemus and Brumelis, 2015).

Warmer air temperature also warms the upper soil levels. The level of soil frost is becoming shallower, causing more severe coastal erosion during autumn and winter storms due to the fact that the sandy soils on the coastline are not frozen and are more exposed to the water fluctuation (Eberhards, 2004,10)

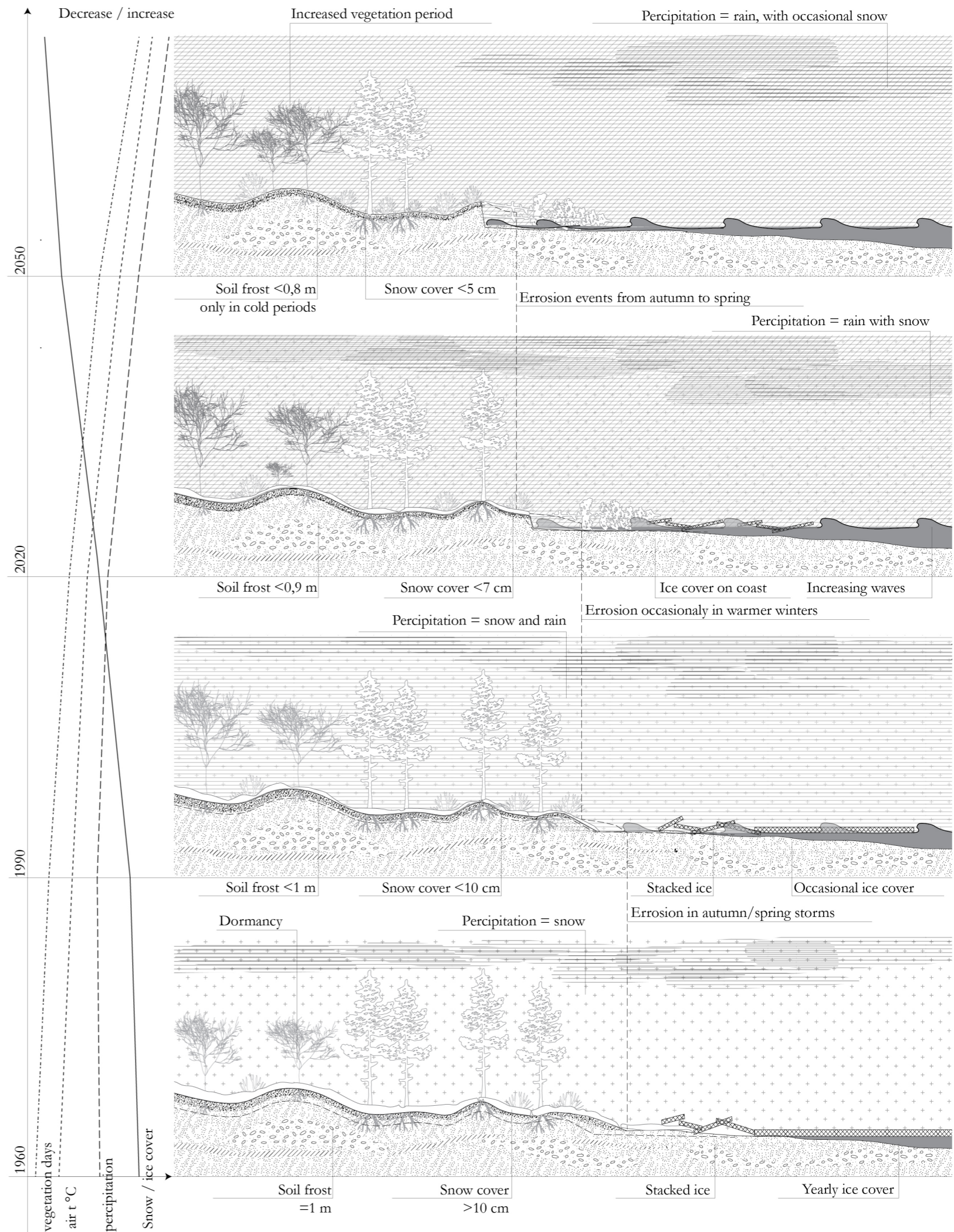


Fig.17: Changes on the coastline

Mater Limits

The monthly average air temperature has significantly increased in winter and spring months, resulting in major changes in the climatic conditions associated with traditional cultural events. As the pagan tribes living in modern Baltic states, including Latvia, was one of the last to be Christianized by the German crusades in the 13th century, the pagan traditions were well maintained and cherished throughout centuries. These notions are visible also nowadays with public holidays and cultural events associated with the pagan celebrations that were linked to the natural processes in nature and the circular notion of time.

The changing climate puts limits on these traditions, because the time of the year when these celebrations take place is not linked with the natural processes in nature. For example, a tradition on winter solstice eve includes rolling a log in snow and pulling it around your house to collect all the evil spirits and then burning it, however, due to lack of snow, this tradition is happening differently. Another example is linked to the Jumji celebration, in which the harvest of the season is evaluated, but with the warmer summers, the harvest season is extended.

On the other hand, it can be argued that the strong link to the past events put the limit of the society to accept the inevitable changes in climate.

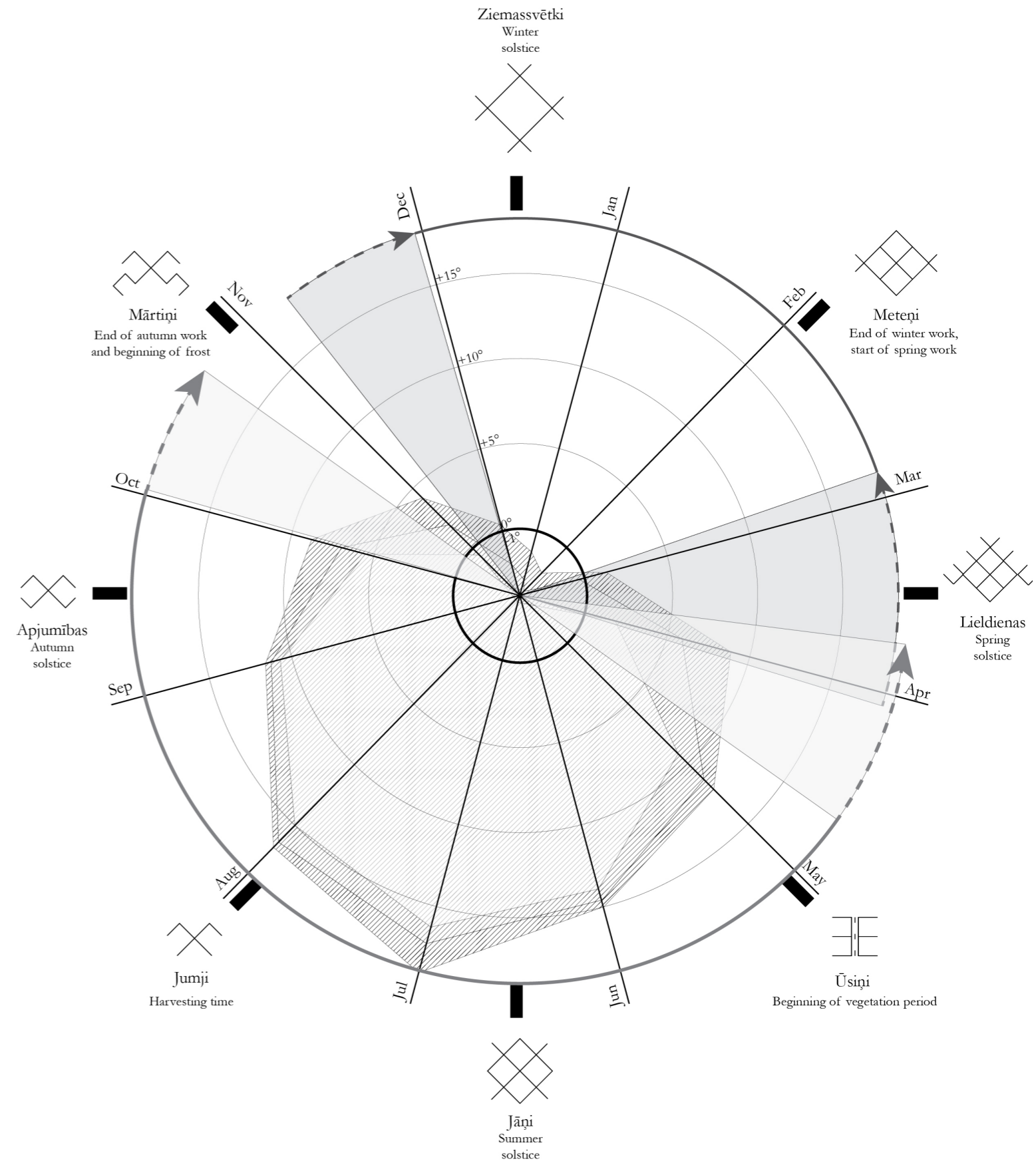


Fig.17: Monthly average temperature change and traditional culture events

Average air temperature per month

- ▨ 1851
- ▨ 2010
- ▨ 2080, according to ICCP scenario 8.5
- 2080, according to ICCP scenario 8.5

Based and adapted from: Meteo.lv, Kļaviņš, et al (2008), authors personal knowledge on the traditional events

Topos

Translations

Es apgūlu saldu miegu
Jūras kāpas maliņā:
Dzied akmens, raud ūdens,
Vēja māte gavilē.

*I laid down in a sweet sleep
At the side of the sea dune:
Rock sings, water cries,
Mother of the wind cheers.*

Latvian folk song

This chapter provides and insight in the anthropogenic pressures on the coastal dynamics and natural processes that form the coastal landscape and topography.



Fig.18: The new sediment
Roja, Latvia, 2020

Topos
Composition

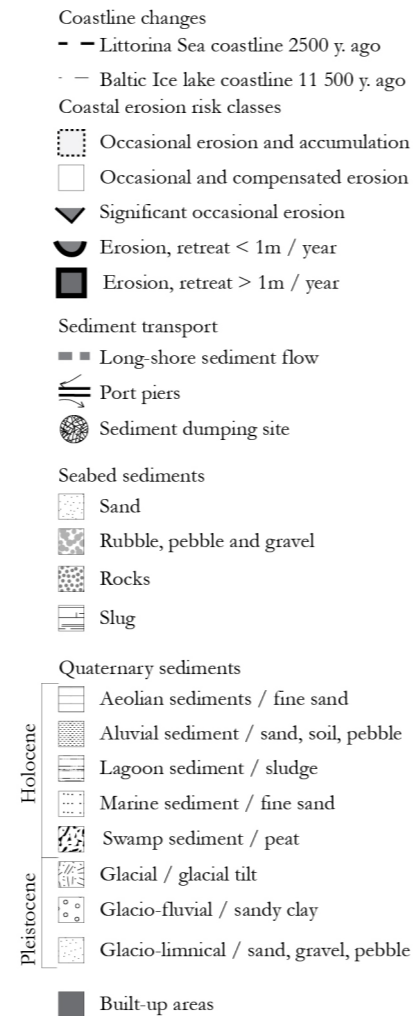
The Baltic Sea is one of the youngest seas in the world, therefore the coastal processes that form the Sea are dynamic and still ongoing. The first stage of the Baltic Sea was formed by the melting glacier that created the Baltic Ice lake. The glacier activity left different sediments, mainly sandy clay, gravel, rocks, and pebble that can be found inland from the current coastline (Aboltins, 2010, 67-74)

As the water level fluctuated and decreased, different stages of the Baltic Sea were formed, from which the latest was the Littorina Sea 2500 years ago. This stage corresponds with the Holocene period in the Quaternary epoch, that by wind and long-shore sediment flow created aeolian and marine sand sediments. The Littorina Sea retreat also formed lagoon lakes and marshes in the low-lying areas, in which peat and lake sediment is created. (Nikodemus et. al, 2018, 61-80, 179-181; Atlas, 2014).

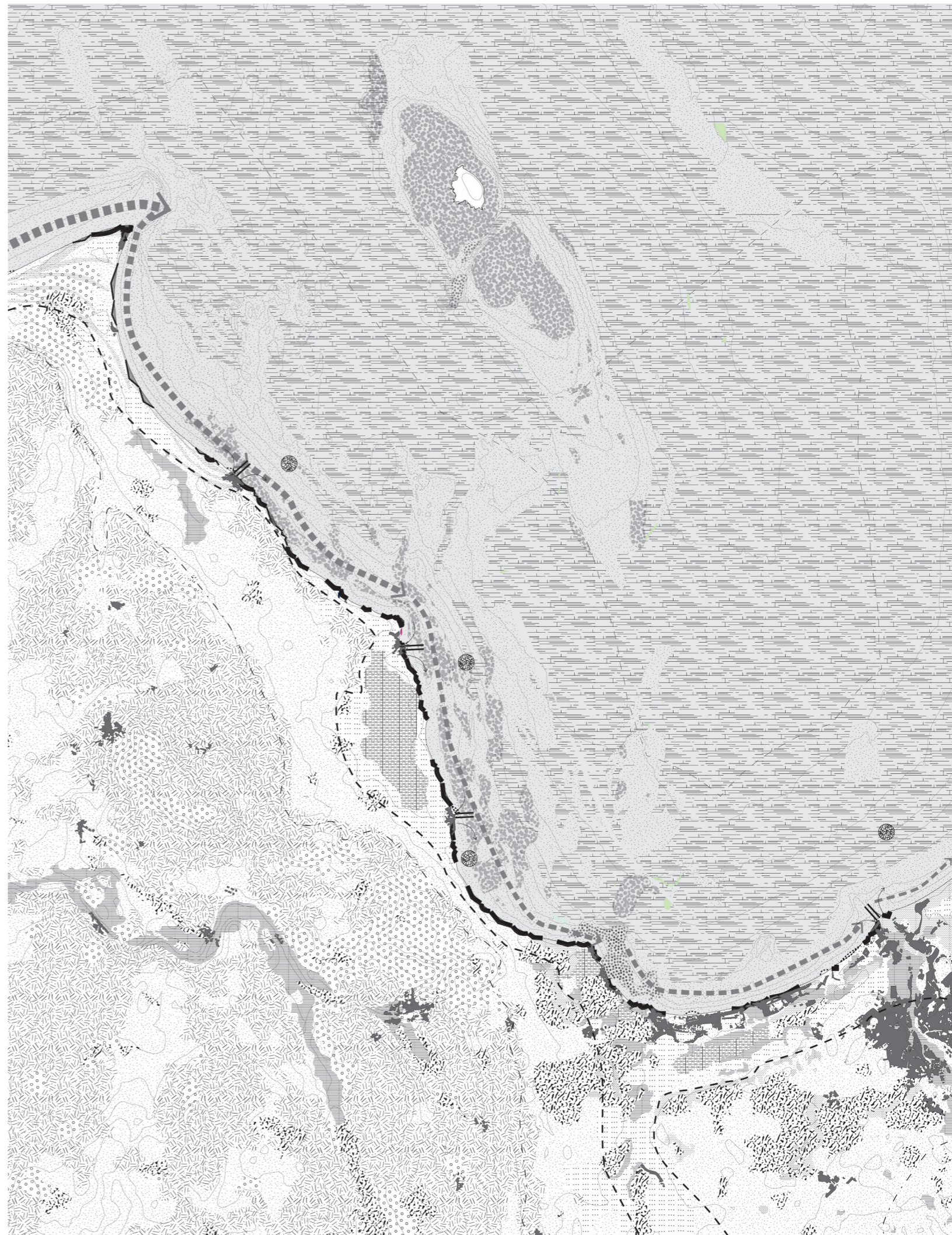
However, the longshore sediment flow is still active nowadays, bringing in the Gulf more sand sediment from the Easter Baltic sediment flow. The coastal erosion processes that are increased by the wind and sea level changes are persistently changing the coastline. Thus, anthropogenic activities, such as building ports and excess sediment dumping from the ports, as well as indiscreet coastal protection are influencing this natural process, causing alterations in the sediment flow and increasing erosion (Eberhards, 2004,4-8).



Fig.19: Coastal processes and sedimentation



Based and adapted from: Vadlinijas (2014), Nikodemus, et al (2008), Marine spatial plan (2019), Dabas aizsardzības plans (2008)



Topos
Alterations

The transgressions and retreat of Baltic Ice lake and Littorina Sea have left visible changes in the topography of the coastal landscape. Different heights in the topography can be traced to the dynamic processes that happened over thousands of years. However, the coastal formation is still happening also nowadays. (Atlas, 2014; Āboltiņš, 2010, 67-74)

The current dynamic coastal processes can be divided into two major influential processes – accumulative and eroding coasts. In accumulative coasts marine sand sediments brought to the beach by long-shore sediment flow are translated over the old dunes, forming new dunes. In contrast, the erosion coast has minimal beach area and the wave fluctuations erode the old sand dunes. The sand from the eroding dunes supplement the long-shore sediment flow and are transported away along the flow. (Atlas, 2014; Nikodemus et. al, 2018, 136-142)

This natural erosion process is altered by coastal protection infrastructure, that is created using concrete rip-rap blocks and debris. With continuous erosion, the pieces of debris are detached from the coast and mixed in the natural sand and rock sediments, creating a new, anthropogenic layer of sediment that flows together with the natural sand and pebble sediments.

Fig.20: Coastline dynamics

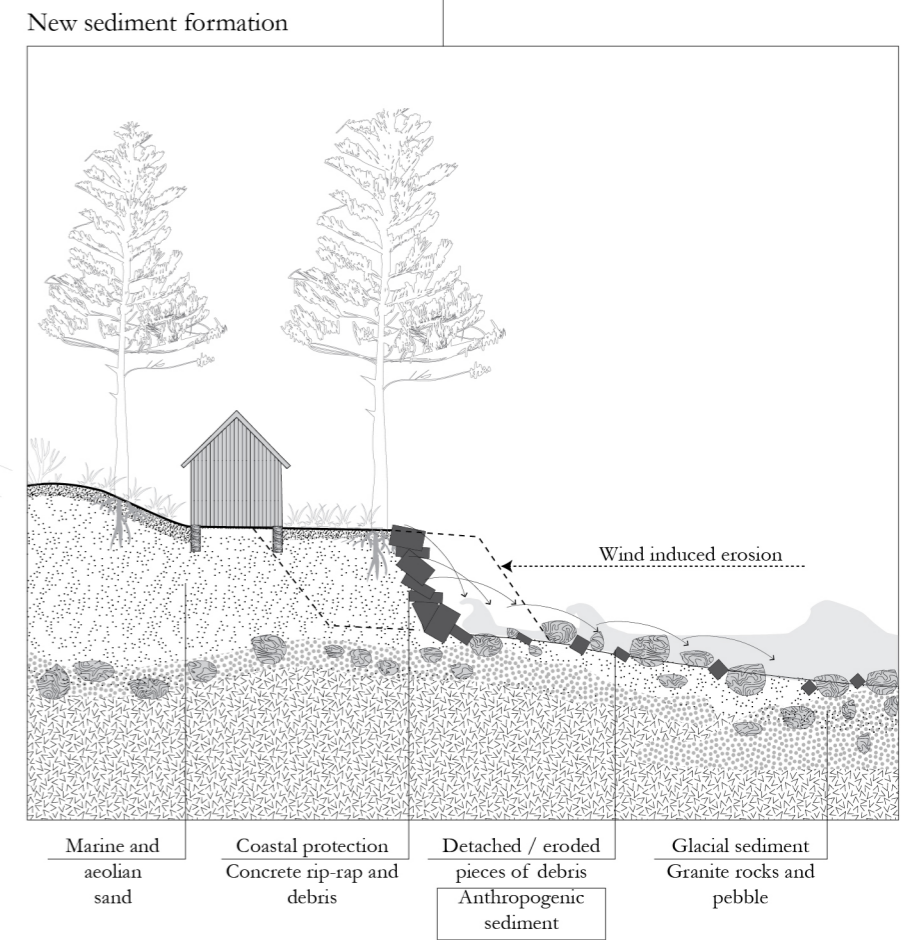
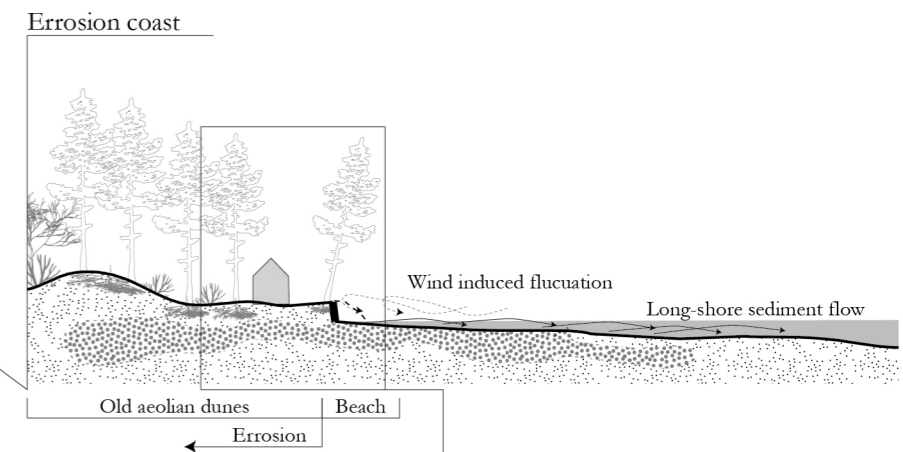
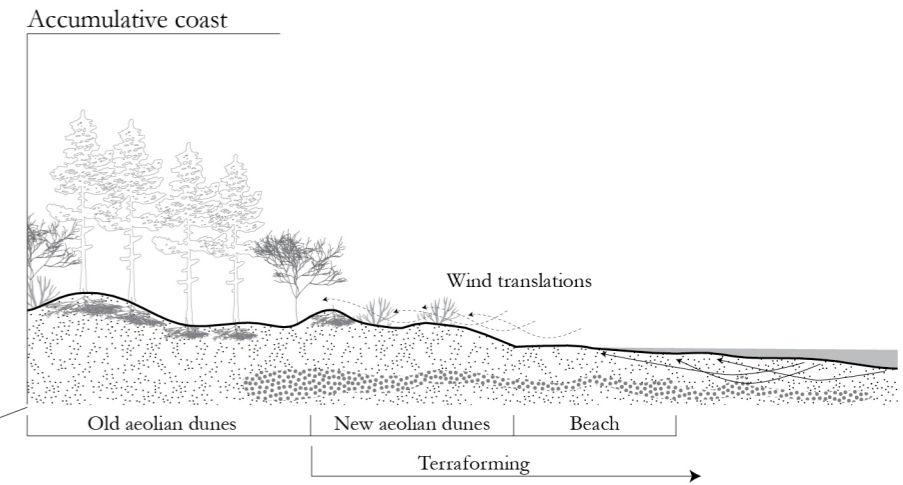
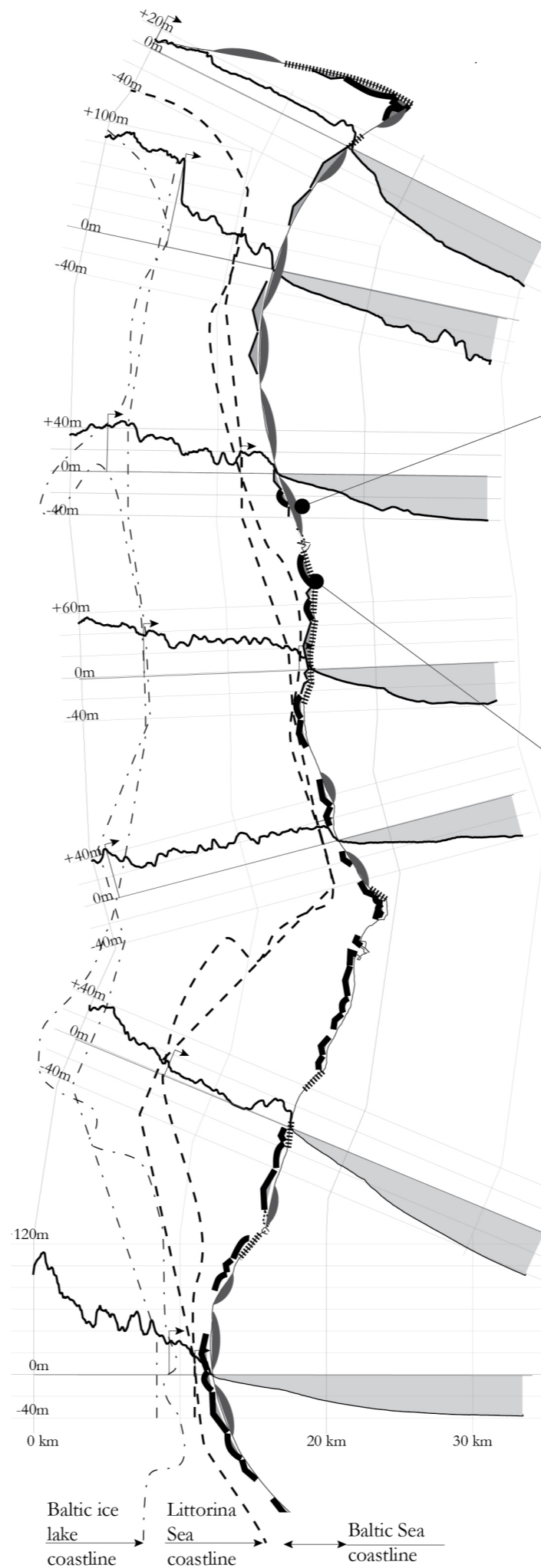
Coastline changes
 - - Littorina Sea coastline 2500 y. ago
 · · · Baltic Ice lake coastline 11 500 y. ago

Coastal morphology
 ▬▬▬▬▬▬ Cliff / bluff
 ◐ Accumulative, sloping coast

Sediment transport
 ← Long-shore sediment flow
 ← Wind translations
 ← Concrete debris flow

Organic soil
 ▨▨▨▨▨▨ Glacial sedim. / Rubble, pebble, gravel
 ▩▩▩▩▩▩ Glacial sediments / Granite rocks
 ▫▫▫▫▫▫ Aeolian and sand sediments / Sand

Based and adapted from: Āboltiņš, 2010, personal observations,



Topos
Limits

From the perspective of urbanization, coastal erosion puts pressure on the existing infrastructure and human habitation along the Western coastline of the Gulf of Riga. Although in most areas the erosion affects natural areas with low or non-existent urbanization, in several villages and urban areas multiple buildings, roads and other infrastructure elements are in risk to be lost or severely damaged by the erosion. It is projected that till 2060 the coastline could retreat by up to 100 m in several areas (Vadlinijas, 2014; Lapinskis, 2019)

The guidelines for mitigating the risk of coastline erosion (Vadlinijas, 2014) suggests to not interfere in the natural processes in cases where it does not oppose risk to human habitations. However, in Roja, Mersrags, Engure and Riga, the damage to the existing infrastructure is caused by the erosion that is created by distraction of long-shore sediment flow by port piers (Eberhards, 2004,7-8) . From the perspective of erosion as a natural process, the existing urbanization and port infrastructure on the coast can be viewed as a limit to the natural process, because the coastal protection infrastructure limits and distracts the natural process.

Therefore, it can be concluded that the anthropogenic limits of coastal erosion are not only the endangered buildings and infrastructure of the coast, but also the man-made port structures that both limits and creates the erosion.



Fig.21: Coastal erosion and anthropogenic limitations

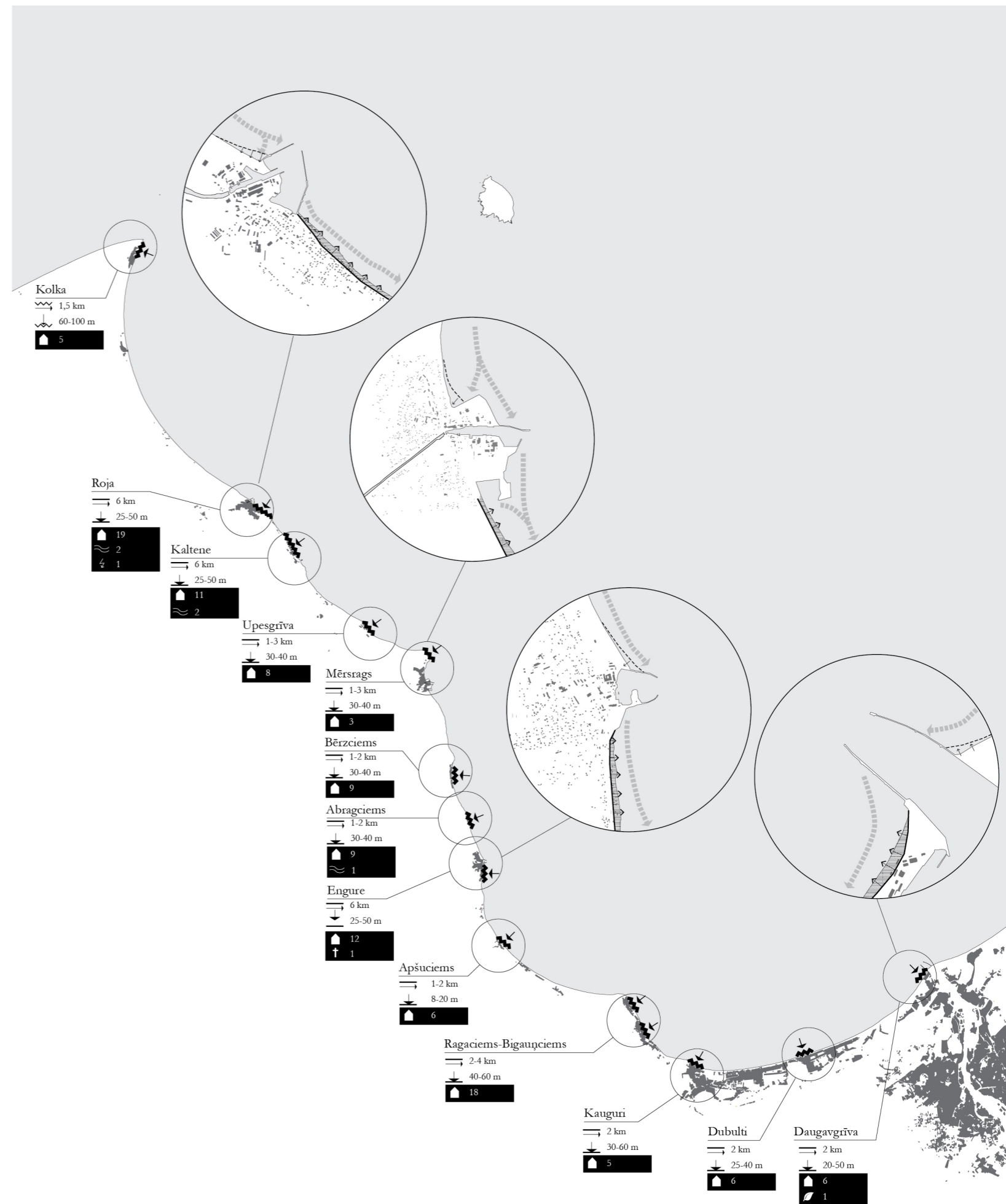
Erosion risks and terraforming 2010 - 2060

- Coastal erosion risk zone
- Length of the affected coastline
- Land loss, m
- Area affected by coastal erosion
- Terraforming by sand accumulation
- Long-shore sediment flow

Anthropogenic limits

- Buildings
- Roads
- Energy infrastructure
- Cemetery
- Protected nature site

Based and adapted from: Atlas (2014), Vadlinijas (2014), Eberhards (2004)





Topos
Anthropogenic resistance

As mentioned before, the coastal protection in several places along the coast of the Gulf is done by the local residents. People try to protect their properties with means and materials that are available for them. In the case of Roja, according to residents, (see app.1) the coastal protection started in the beginning of 1990's when Kolhoz "Banga" started to place rocks along several places on the coast on the south from the port.

The placement of rocks shows the intention to save the land from erosion. However, the rocks did not survive the intensive storms of 2001 and 2005 when they failed to protect the coast from erosion, resulting

in retreat of the coastline for up to 5 meters after one storm. After these storms, local residents started to put concrete blocks and debris, as well as dredged soil and clay from the port to regain the lost land and protect it from further erosion.

As one of the local residents, who also own a carpentry located on the edge of the coast, Indulis Lūsis say: "The concrete blocks protect us very well! And if the storm comes, we will just rebuild, just like we already did with this shed after the storm in 2005." The same opinion is also shared by another local resident, Raivis Briģis: "The concrete works quite well. I know that people don't like how they look, there have been complaints from

the nature protection agencies as well, but what else can we do?". The notion of helplessness and the justification of this action is expressed by I. Lūsis: "Noone wants to take responsibility and invest time of dealing with these issues. Noone wants to deal with the Greens (meaning - nature protection agencies, author). They will not allow anything! They say this (Erosion, author), needs to happen naturally! But if it goes naturally, half of Roja will stay without sewage! All around the world the coast is protected with structures! Why Spain, France, The Netherlands can do it, but we can't? It's absurd! I don't get it why the erosion has to happen uninterrupted?"

These opinions and actions show the disconnection between

official policies and specific actions in place. However, as the protection actions are taken by local people who communicate with each other, it also shows a possibility for more coordinated process, involving the residents in understanding and planning for the long-term development of the coastal areas.

Fig.22: The man on the coast
 I. Lūsis, posing on the concrete blocks that protect his shed from the storms.
 Roja, Latvia, March 2021

Habitat
Diversity

Sika reņģe, brēteliņa,
Nāc ar mani spēlēties,
Tu dziļā jūriņāi,
Es ozola laiviņā

*O, you small sprat,
Come and play with me,
You are in a deep sea,
I am in an oak boat*

Latvian folk song

This chapter focuses on the diversity of socio-economic activities in the coastal territories in the Western part of the Gulf of Riga and in coastal village Roja.



Fig. 23: The catch and the catcher
Roja, Latvia, 2019

Habitat Composition

The local human habitation on the Western coastline of the Gulf of Riga is strongly linked to three main actors: fishery, forestry and tourism. The local residents living in the villages along the coast are surrounded and strongly linked with the diverse forest and marine ecosystems from which a significant amount of territory is nature and marine protected areas that are established to preserve the natural habitats.

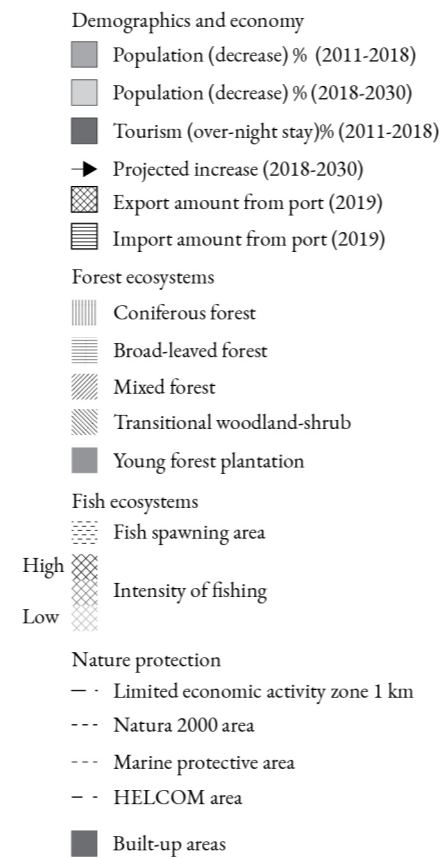
Although the dominant forest typology in Latvia is mixed forest (Nikodemus, 2018), on the coastline conifer forests dominate the landscape. This can be linked to the sandy soil types and marine sediments. However, with increasing demand for renewable resources, the amount of forest clear cutting and young tree plantations are increasing (Pelēce, 2015).

The local fishery industries nowadays are linked with catching the fish species in the Gulf. The main species are sprats, Baltic Haring, Flounder, Baltic Salmon. The fish species spawn closer to the coast and therefore the highest density of fish catches is found closer to the coast.

The unique coastal habitation also attracts tourism that plays a significant role in the local economy, providing recreational services for incoming tourists and additional income for the local residents. The importance of tourism tends to increase, that is represented in the growing number of nights spent on the coastline (Klepers, Mardega, Jāņa Sēta, & Ulme, 2020). However, the increase can be seen further from Riga, exceeding 100 percent in the last 10 years.

However, the diversity in habitation is connected by the local residents that perform certain actions in forestry, tourism and fishery. This diversity is strongly influenced by the depopulation of the coastal communities, that in the last decade has lost up to 15% of the inhabitants and it is projected to continue in the coming years (Jāņa Sēta & Ministry of Environmental protection and regional development of Latvia, 2020)

Fig. 24: Important ecosystems for coastal communities



Based and adapted from: Corine Land cover 2012, HELCOM nature protected areas, (Klepers, Mardega, Jāņa Sēta, & Ulme, 2020), atr.kartes.lv



0 5 10km N

Habitat Alterations

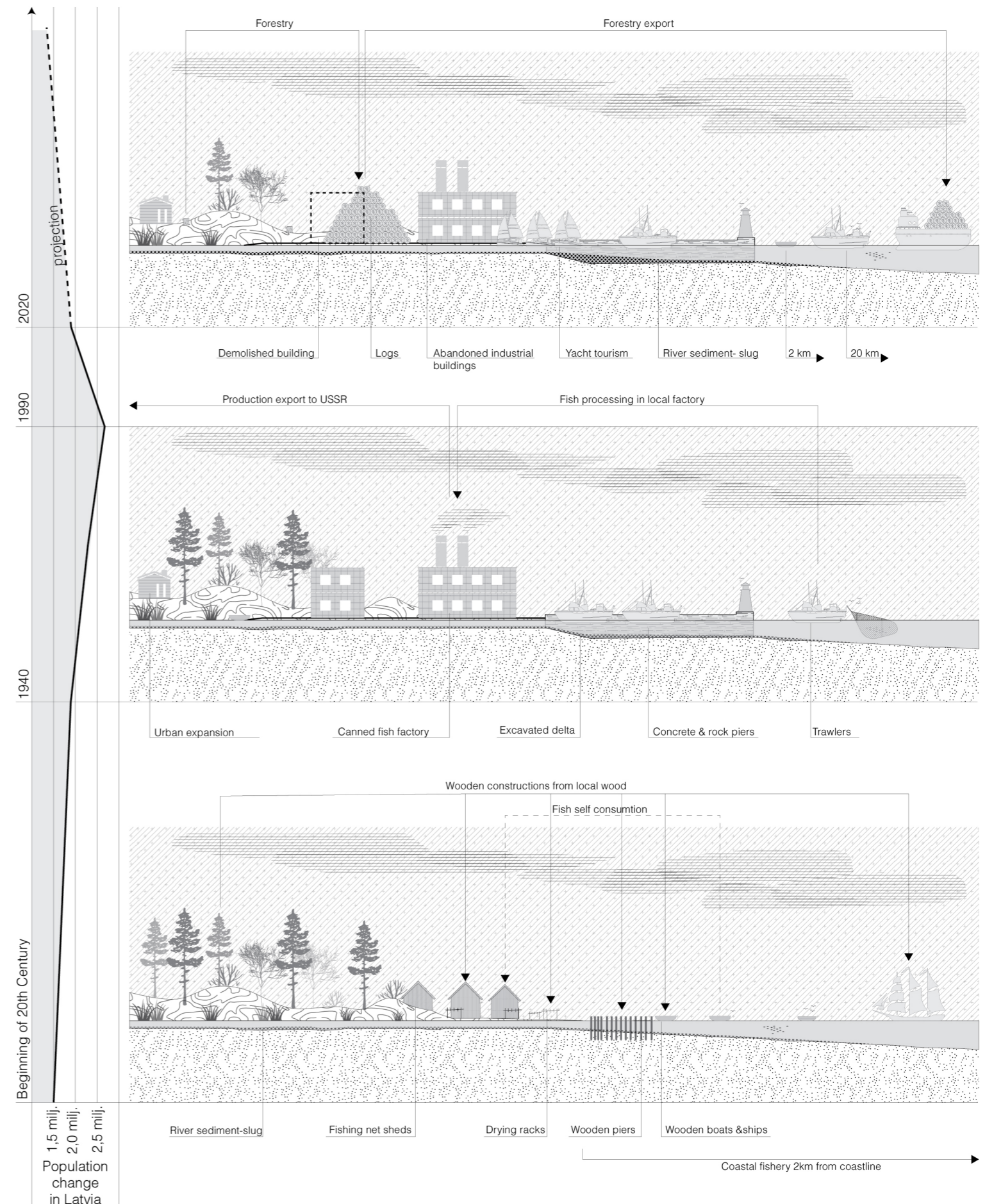
The interdependencies between fishery, forestry, tourism and local inhabitants can be seen in the changes of the small port development throughout the time. In the beginning of the 20 century the local economy was based on fishing and wooden ship building. Wood was also used to make piers, fishing net drying racks, huts for storage and living houses.

With the industrialization under the soviet regime, the number of inhabitants in the villages also increased. The importance of forestry and usage of wood was minimized, giving the way to use concrete, bricks and other imported and man-made materials. With increased fishery, wooden boats were replaced by larger metal trawlers that also demanded to construct additional infrastructure, such as piers, docks and several maintenance buildings and deepening the river delta. The fish brought to the coast by the trawlers were then processed on the coast in a canned fish factory that exported the production to other USSR republics. (Marine fishery Museum of Roja, 2015)

Since the fall of the Soviet Union in 1991, the local economy has had to adapt to the new market-oriented economy. Several buildings and infrastructure objects were not necessary anymore, becoming empty or demolished. Limits to avoid overfishing lead to downsize the existing fishing fleet (Latvijas Valsts agraras ekonomikas instituts & Benga, 2014). However, with the growing demand for sustainable resources, the forestry export has decreased. The empty areas in the ports are used to store logs before they are exported overseas. The increasing tourism is represented with new yacht docks and additional infrastructure.

These alterations in the port development can be linked with the overall population changes throughout the time, however, it is not yet clear what will be the direction towards the further depopulation and how will it alter the use of the small ports.

Fig.25: Changes in Roja port development



Based and adapted from:
(Marine fishery Museum of Roja, 2015)

Habitat Limits

The limits of the habitation are highly influenced by the seasonal change. Due to the geographical location and climatic conditions, Latvia has four distinct meteorological seasons (Klavins, et.al, 2008, 75), therefore all types of habitation have adapted to these conditions. This can also be seen in the time period of forestry, fishing and tourism season.

Forestry season starts in November after the vegetation period of the main tree species, such as pine, birch, spruce, white alder, aspen and black alder have ended and lasts till March (z/s Mikeli, 2020). The active fishing season starts in April after several fish species have had spawn and lasts till mid-June. Although several fish species have different spawning times, the fishery season is limited to the spawning time of the main fish species, such as Baltic salmon, flounder, sprat and Baltic herring. It overlaps with the tourism season that traditionally starts in mid-May and ends in mid-September. During the tourism season, the coastline attracts not only local tourists from Latvia, but also from other countries, such as Lithuania, Estonia, Russia, and Germany (Klepers, Mardega, Jana Seta, & Ulme, 2020).

It can be concluded that due to the highly seasonal aspects, the economic activities linked to fishery, forestry and tourism are not present all year round, putting the pressure on the local inhabitants to adapt to the seasonal diversity, limiting their potential to focus only on one of the activities.

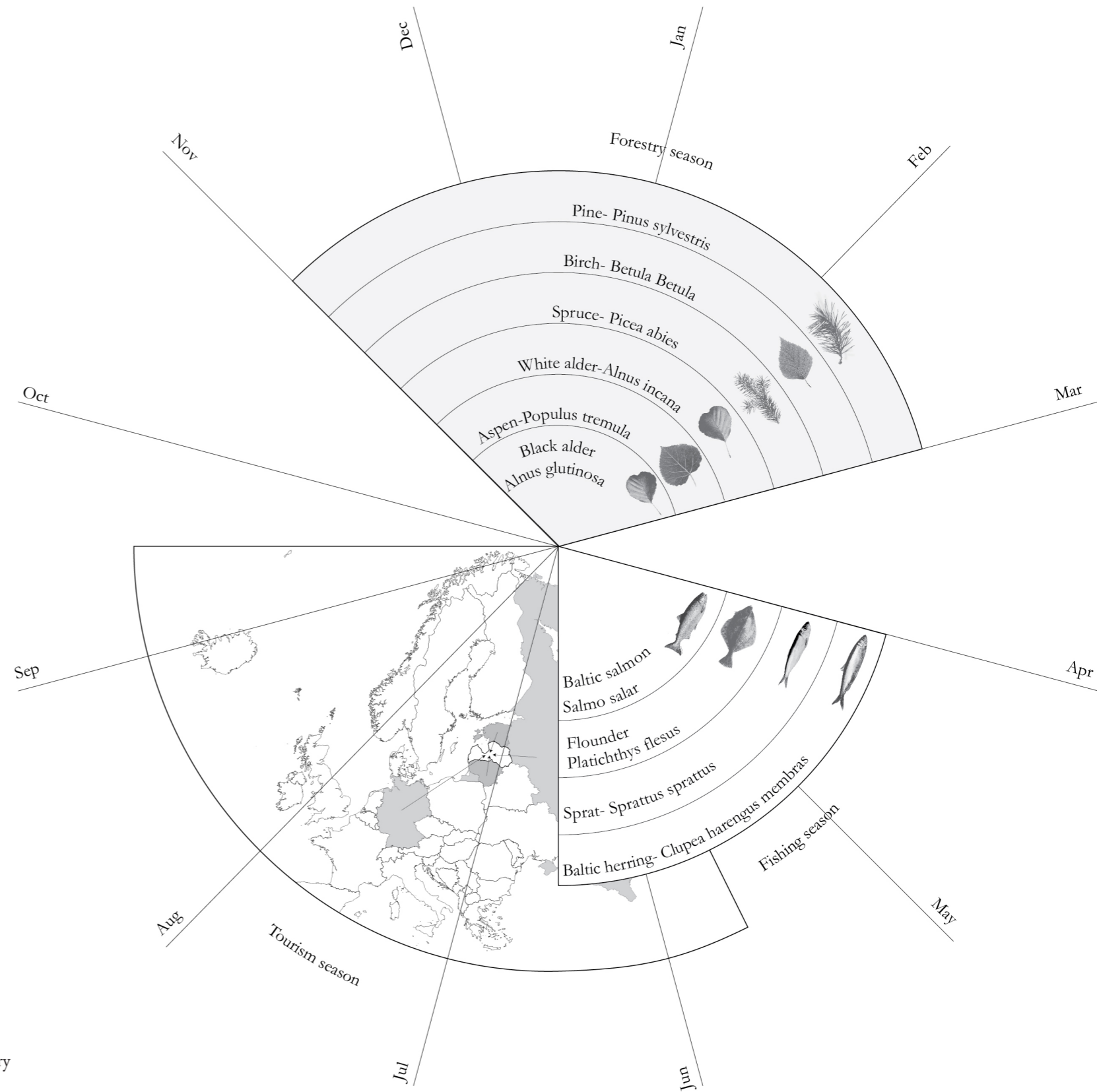


Fig.26: Seasonality of tourism, forestry and fishery

Based and adapted from:
(z/s Miķeļi, 2020), (Klepers, Mardega, Jāņa Sēta, & Ulme, 2020)

Habitat
Local economy

The main economic activities in Roja are strongly linked with the port and its position on the coast of the Gulf. The port accommodates fishing fleet of 7 coastal fishery vessels, which is the largest among the small ports in Latvia, owned by the SIA "Irbe". Fresh fish, mainly Baltic herring and sprat are also used by several canned fish factories that are located not only in the port but also in other industrial areas in the village. This relation is also visible in the statistics and productivity of the port, which indicates that the fishery sector in the port alone employ 460 people, contributing to the social and municipal taxes.

However, as the manager of the port authority Jānis Megnis, points out, the forestry sector has a significantly larger amount of cargo exported through the port. As the port gets its income from the fees that are linked to the gross cargo of the ships, the port receives significantly more money from the forestry sector than from the fisheries, however, as the forestry only employees 4 people, the municipality receives almost 10 times less tax money than from the fishery. According to J.Megnis, this synergy between the 2 main economic activities help to provide the necessary funding for maintaining infrastructure for fisheries, that further provide economic possibilities for local residents.

Nevertheless, the seasonal tourism also plays an important role in the local economy. Several guest houses, hotels and rental apartments are located in the village, allowing residents to earn money by renting their properties and providing seasonal services for incoming tourists. To promote tourism, the port has also invested money to develop new yacht docks, and the

municipality is investing in providing diverse cultural activities during the summer season In the newly built open-air concert hall.

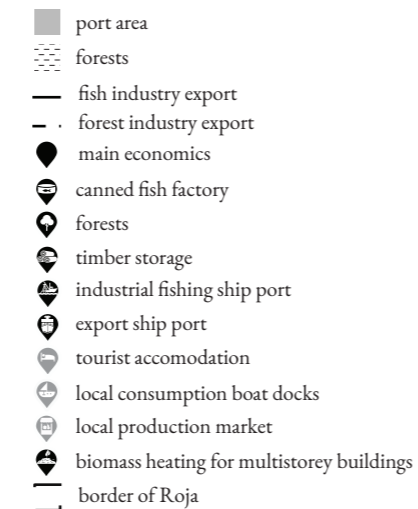
By analyzing the local resource flows, it can be concluded that the economy is already quite embedded in using local natural resources, however, the seasonal characteristics of these actions question the economic sustainability for the long-term.

Fig.27: Productivity of Roja port

	Employees	460
Fishery	Cargo	11,7 t.t
	Paid social tax	3 031 000 Eur
	Employees	4
Timber	Cargo	35,2 t.t
	Paid social tax	350 641 Eur

Source: Roja port authority, 2019

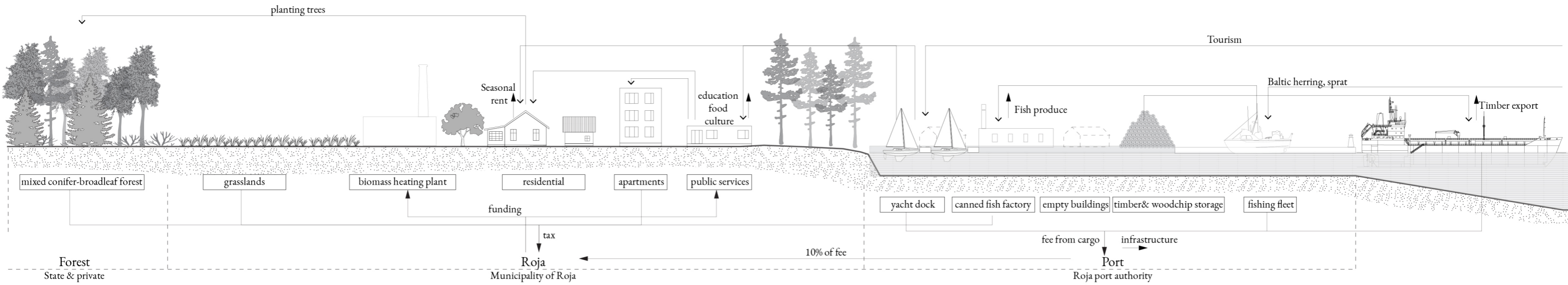
Fig.28: Local economic patterns in Roja



Based and adapted from: personal observations, Corine land cover 2012, Spatial development plan of Roja municipality (2011)



Spring / summer



Autumn / winter

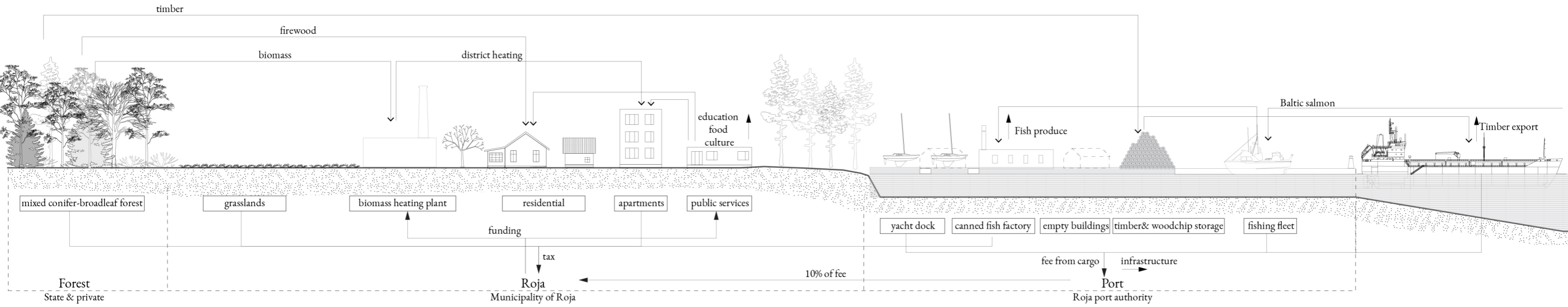


Fig.29: Existing Seasonal economic activities and flows

Habitat

Seasonal flows

As mentioned before, the local economic activities have a seasonal character. This is linked to the natural processes and seasonal change in nature. The forestry sector is more active during winter period when the tree-cutting is possible due to weather and environmental conditions. That is also visible in the landscape when the timber storage in the port is more expanded than during the summer.

The fishery activity also relies on the natural processes in the sea, following the fish spawning during different seasons.

However, during the winter, the lack of tourism shows the everyday occupancy of the properties and residents who are living in the village all year, meaning the loss of income from rent and lack of public services during winter.

Habitat

The masked shrinkage

Shrinkage in space manifests through abandoned buildings that are no longer in use and are not necessary for the decreased population still living in the urban area (Martinez-Fernandez, 2014). The abandonment can be seen also in Roja.

By mapping the abandoned buildings in Roja, majority of them are industrial or public buildings, mainly concentrated in the centre of the village and in the port. However, there are only few empty residential buildings, despite the declining number of residents in the last 30 years. According to the data provided on site by member of Roja municipality, the village has lost 27% of the inhabitants since 1990, reaching approximately 2000 inhabitants in 2021. However, the population prognosis projects the decline in population in the next 10 year by - 15%, resulting in approximately 1800 inhabitants. That would be loss of almost 900 people in comparison to 2700 inhabitants at 1990.

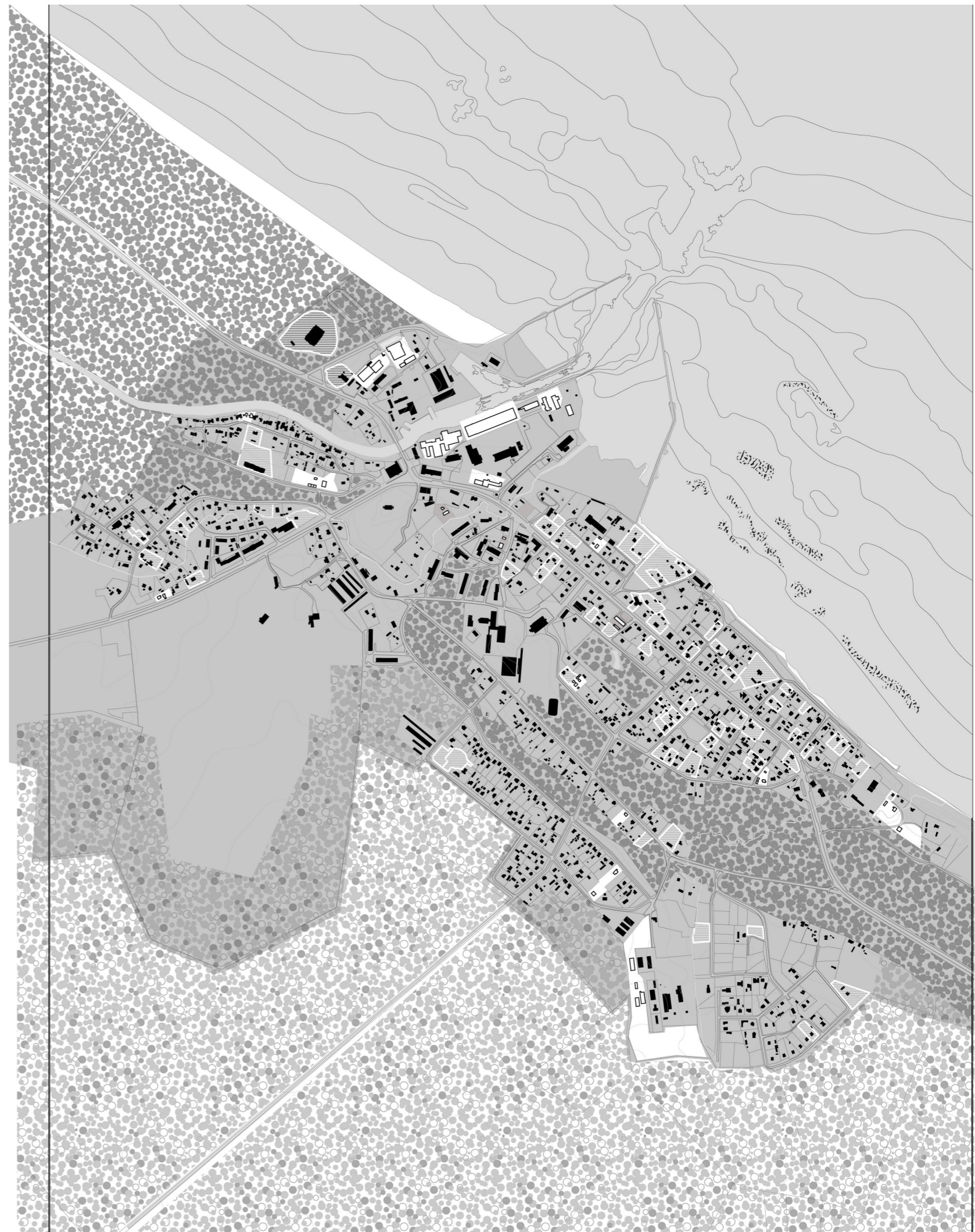
Thus, personal observations suggests that there is an increasing number of seasonal residents that buy or take over the empty buildings. The municipality, unfortunately, does not provide statistics on how many residents live in the village all year and how many are seasonal residents. Therefore, by making personal observations and assuming that seasonally used properties are usually with less maintenance during spring, closed doors and gates, without permanently used objects present outside in the garden, a map of the village was made, mapping the seasonal and abandoned properties.

This analysis shows that low-rise residential properties closer to the coast are used more by the seasonal residents than properties further inland. This phenomenon when the residential buildings are still seasonally occupied, but the number of permanent residents is still declining, masks the spatial manifestations of the shrinkage in Roja. This masked shrinkage could lead to misconceptions about the socio-economic challenges the village is going through, if the conclusion is only based on the amount of abandoned buildings.

Fig.30: Seasonal and abandoned buildings

- Buildings in use
- seasonal residential plot
- abandoned industrial plot
- abandoned building
- abandoned residential plot
- border of Roja

Based on personal observations during site visit and personal knowledge





Habitat

Spatial manifestations of the shrinkage

The abandonment in Roja manifest in a gradient. The seasonally used buildings are mostly empty during winter when nature takes over people objects that humans use during their temporary stay.



However, the abandonment is present also in post-industrial port areas which are close by newly built summer open-air concert hall. In this place, the emptiness, and the lack of human presence in winter creates a chilling atmosphere.



Fig.31: The gradient of abandonment
Photo: Roja, March 2021

Empty residential buildings are also present in the landscape and tell the stories of former glory that is slowly taken over by nature.

Extract

Store

Export

Use



Fig.32: The ritual of energy
Photo: Roja, January - March 2021

Habitat

The ritual for energy

As mentioned before, the forestry play a significant role in the local economy. However, this economic activity also influence the coastal landscape. Forest clearcutting not only significantly change the forest biotope, but the storage of timber in port is a visible landscape element.

Thus, timber is not used just for export. Residents use wood as the main energy and heat source during the winter. During winter and spring – the active forestry season – piles of timber can also be seen on streets and next to residential buildings, ready to be chopped for firewood. Although it is time and energy

consuming process, people prefer to use this sustainable energy source. *“We use wood as an energy source, because we own a forest. Forest needs care, in example, to take out the trees that are damaged by storm and then we take them home to use as a material for making us warm in the winter”*, says Aivars Bērziņš, a local resident.

Process

Struggle

Catch

Smoking

Meal



Fig.33: From the catch to the plate
Roja, March 2021

Habitat

The ritual of fishing

Fishing activities not only happen in the port. As the fishing is important part of the local culture, there are people, mainly men, who are fishing as a hobby-level fisherman or so-called self-consumption fisherman. They are allowed to fish specific amount of fish and but license for putting nets in the sea not closer than 100 meters from the coast. However, to limit the extraction of fish resources, these fishermen are not allowed to sell their catch but use it only for their own consumption.

When asked, why these men still fish even if there is no economic gain, they usually respond that it is linked with their

heritage. *“My father thought me how to fish, and it is in my blood. People need some kind of mental relief and the being on the sea can provide that.”* says Oskars Vaivodis, one of the local fisherman who considers the fishing as a hobby. However, he points out that he prefers to fish outside of Roja, traveling more then 10 km with car before letting his boat in the sea at the coast more easy access with car. In his opinion, the water quality and the environmental conditions closer to Roja is a reason why there is a lack of fish in the sea. *“It is more difficult to catch the fish here, in Roja. Nets are getting damaged by the rocks. The pollution is getting worse year by year. And that is also another reason why I chose to fish in Žocene. Because it is*

closer to the open Baltic Sea and I think that the water exchange between the gulf and the open sea bring more clear water closer to the cap of Kolka. And that also influence the possible catch.”

Raivis Briģis is the only local resident who is still fishing on the coastline in Roja. He doesn't consider the environmental conditions as obstacles to continue a tradition that he's father started. *“Yes, sometimes the nets get stuck, but the fish like it here. My father used to be a fisherman and I continue this tradition. I like to be on the sea, it is a tradition that I like to continue. It's a part of who I am”* he points out.

However, as the fish resources continue to decline and the number of

permanent residents keep declining, the future of this tradition of coastal fishing is yet unclear. The seasonal residents - or incommers as the local residents call them, do not have the local knowledge about the specific living conditions on the coast. R. Briģis shares his thoughts on that: *“People think that it is nice to live right next to the sea. The view is nice, and it is close by. But when the cold North wind hits the house in winter and you can't get the heat up, or during a storm trees start to fall down and the coast erodes, at those times the real difficulties appear. And people who don't live here all year round don't experience this! The incommers don't know the real deal with the sea.”*

Take



Fertilize



Return



Habitat

The ritual of taking and giving back

People use the sea not only for fishing and recreation. Residents have discovered that the algae washed out from the sea is a valuable nutrient for gardening. Vita Freimane, teacher in the local secondary school use the algae for her garden. “We also collect the seaweed for garden, although this year on this part of the coast there were quite small amount of seaweed washed out from the sea. But in the spring time I also take the green seaweed, not only the brown ones, although, according to my parents, they are more nutritious than the green ones. I use them for tomatoes in the glasshouse and also other plants in my garden. If they are not

collected, then in the summer they can start to stink on the coast and that is not very pleasant smell.”

However, people are also giving back to the coast. The organic garbage from gardens are often put along the coast. When asked why, V. Freimane says: “...after the storm in 2005 all the clay (put by the municipality after dredging of the port. J.B) was gone and the rocks were also scattered along the coast. That’s why we started to plant some bushes and also put the branches along the coast to protect it from the erosion, especially when the Northern winds hit the coast. There are times when someone from the municipality reproves that it is

not good for the environment, but what else can we do?” Her response to the question points out the understanding that putting organic garbage on the coast is not good for the sea, however, in her opinion this action, together with planting new trees and bushes with more extensive root systems help to protect the coast.

Fig.34: The ritual of taking and giving back.
Roja, May 2021



Fig.35: The observation spaces
Roja, January - April 2021

Habitat

Ownership of space

The presence of humans in space can be identified in different ways. One of them – understanding where people want to sit and enjoy the nature. Along the Krasta street, multiple benches have been placed, however most of them are made by the local residents despite the fact that the coastline is a public property or the land on the coast is owned by Latvian State forests. People take care of the coast and make the necessary infrastructure elements according to their needs in places where they choose to be. *“I don’t mind the tourists and visitors. They can use the bench I made as long as they take their trash with them and don’t make a*

big noise,” says Raivis Briģis, who made one of the benches using a log found on the beach.

This action shows that people take ownership of a public space and transform it according to their needs. In return they take care of the place by cutting grass and taking away the garbage without the involvement of governance institutions. This connection with the space is an important factor in designing an interventions along the place, because people feel attached to the public space in front of their house. However, the visible ownership of the place shows participation in creation of common goods. This factor can help to

implement changes and spatial interventions.

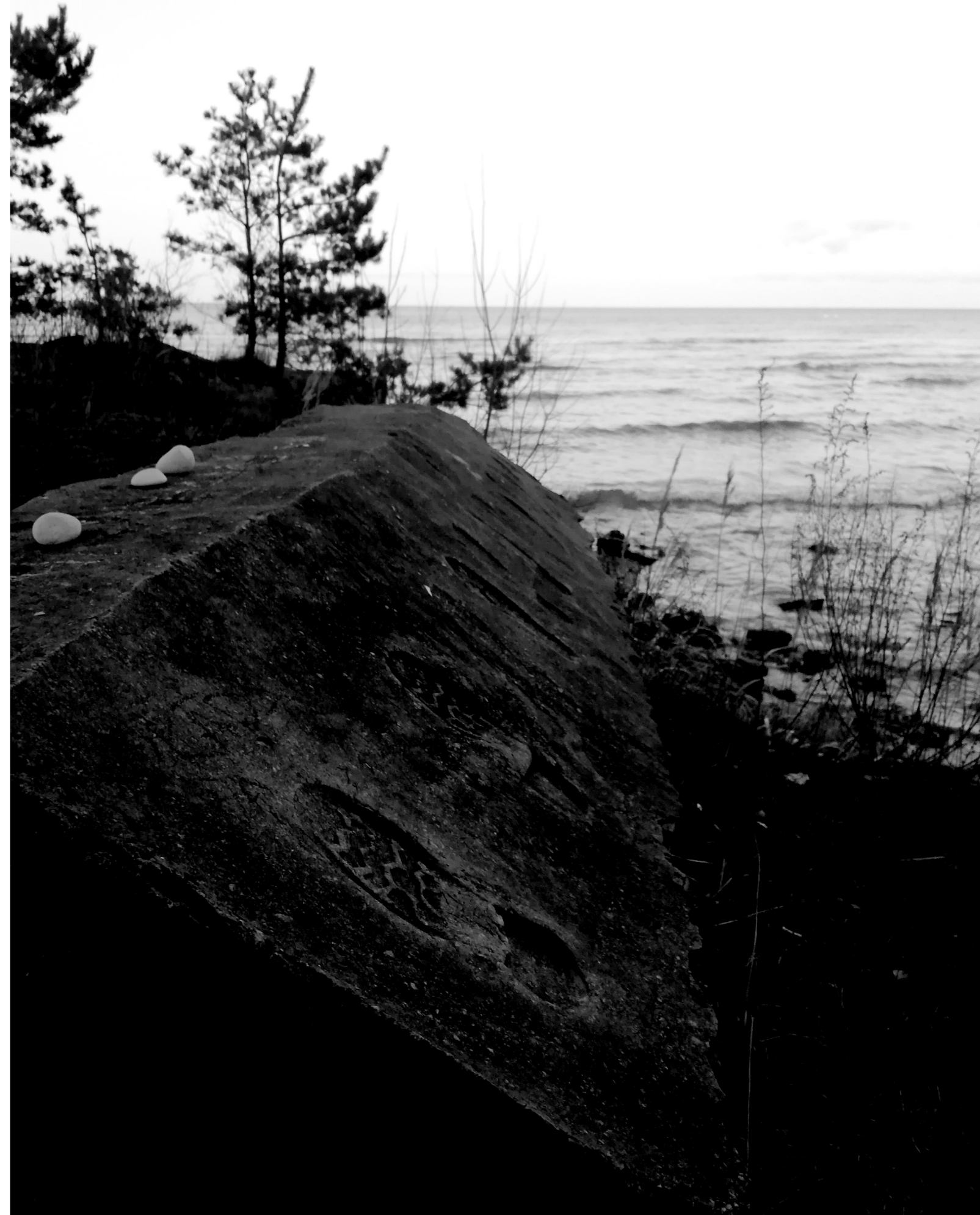
Geopolitics
Displacement

Krievi, Krievi, Leiši, Leiši,
Visi manim draugi, radi.
Krievam devu sav' maāsinḡu,
Pats es ņēnemu Leišu meitu,
Iem' Krievōs, iem' Leišōs,
Visur manim znoti, radi.

Latvian folk song

*Russians, Russians, Lithuanians, Lithuanians,
All are my friends, relatives.
To Russian I gave my sister,
I took Lithuanian girl,
Going to Russians, going to Lithuanians,
Everywhere I have sons-in-law, relatives.*

Fig.36: The pressure
Roja, 2020



Geopolitics
Composition

Due to its geographical location, Latvia is on the crossroads between different trade routes that has led to development of infrastructure and economy based on the transit of goods and resources between neighboring and oversee countries. Russia has played an important role in the transit and development of transit infrastructure since the territory of Latvia was part of the Russian Empire. During the Soviet regime, the link with Russia was strengthened, developing 3 big ports in Riga, Liepaja and Ventspils that exported Soviet resources to other countries, i. e. the existing railway gauge width is developed according to the “Russian” standard of 1520 mm (Nikodemus, et. al, 2018).

Since the fall of the Soviet Union, there can be seen a shift and displacement of the main trading directions. The amount of transported goods in East – West direction has been declining, however with the new railway line “Rail Baltica” with “European” standard 1435 mm gauge, which is under construction, new cargo and passenger traffic is expected to connect the region in the South – North direction. With the development of Salaspils logistics center and new connections towards China, it is projected that the container cargo from China will be shipped from the Port of Riga across the Gulf of Riga and Baltic Proper towards Scandinavia. (Ministry of Transport of the Republic of Latvia, 2020)

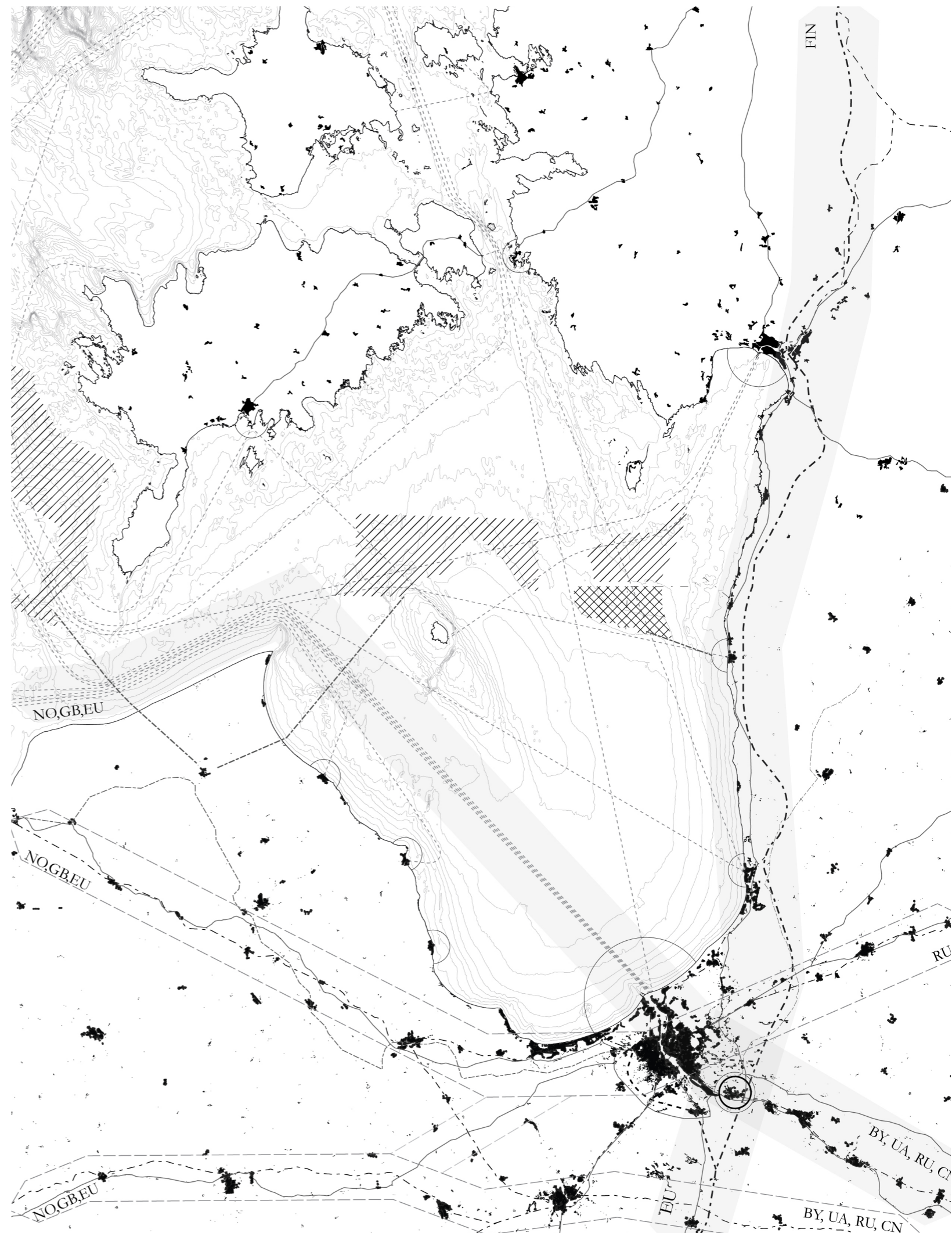
Nevertheless, with the national and European level climate adaptation and mitigation strategies, there is a growing demand for clean and sustainable energy. By developing offshore wind parks in the Gulf of Riga and attracting EU funds, it is possible to meet the EU opposed goals to increase use of sustainable energy not only for Latvia and Estonia, but also export the energy to other countries via trans-national electricity connections. (Jakovics & GORWIND project, 2012) However, the impact of this new infrastructure on the existing landscape and local inhabitants can be considered irreversible.



Fig.37: Main transit and energy directions

- Transport corridors
- Increased importance
- Reduced importance
- Railway 1520 mm gauge
- National and European level highways
- Ship routes
- New Rail Baltica 1435 mm gauge
- Planned Salaspils logistic center
- Offshore wind parks
- Wind park in territ. waters of Latvia
- Wind park in territ. waters of Estonia
- Main magistral electricity lines
- Existing line 330 kV
- Planned electric cable line
- Urbanization
- Urban area
- Port

Based and adapted from: Marine Spatial plan (2019), GORWIND (2012), Rail Baltica (edzl.lv).



Geopolitics
Alterations

The alterations in the transect of the Gulf of Riga can be seen by analyzing the different uses and interests of several countries. As stated before, the off-shore wind parks, developed by Estonian energy company “Eesti energia” will have a significant impact on the marine and coastal landscape, because the wind turbines planned in the area is going to be up to 250 m high (Jakovics & GORWIND project, 2012), exceeding the reference height of the new buildings constructed in the city of Riga - St. Peters church. Although the energy produced from the wind parks will be divided between Latvia and Estonia, the mechanical parts of the wind turbines are mainly produced in companies and factories in the Western Europe (WindEurope, Mbistrova, & Pineda, 2017).

On the other hand, more container ships transporting Chinese and Scandinavian goods will be present in the marine landscape. It can be assumed that the ships transporting logs and other wooden export products from Latvia and Estonia will be present also in the future, because the export of these goods tend to increase (Central statistical bureau of the Republic of Latvia, 2020).

It can be concluded that based on the current trends and projections, the influence of foreign interests on the Gulf of Riga will be altered by using the Gulf as a transit space and energy source for economic interests of Estonia, Latvia, China, Sweden, Norway, Great Britain and other countries.

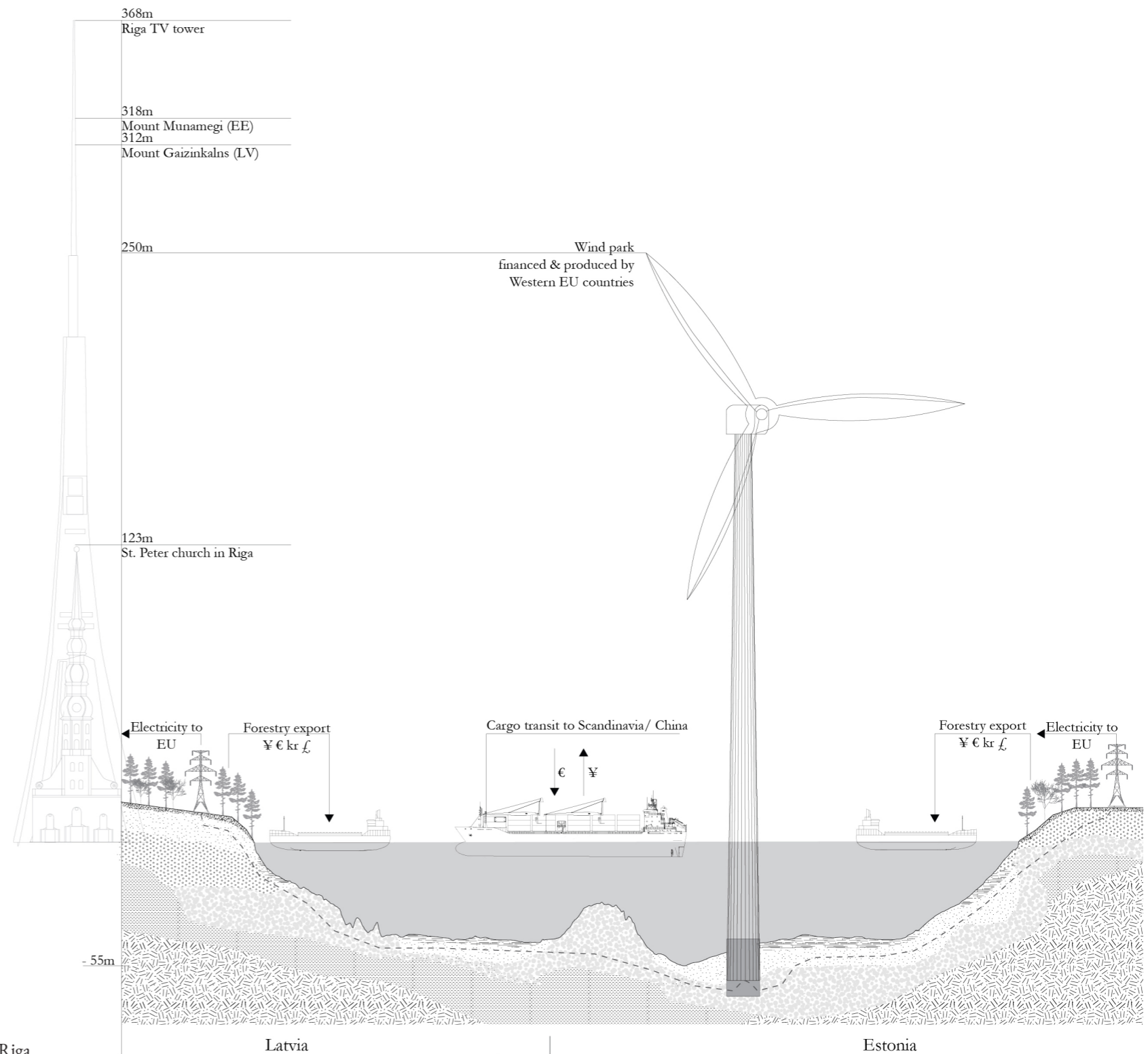


Fig.38: Foreign influences on the Gulf of Riga

Fig: by author

Geopolitics
Limits

The geopolitical conditions in Latvia are very complex. As the country is relatively small compared to neighboring countries, such as Russia, Belarus and overseas neighbors as Sweden, it has been influenced by the power play between the larger countries and Unions. As Latvia was part of the Soviet Union and was located along the Western border of the Soviet Union, it was considered to be more prosperous than other regions of the Soviet Union. However, today the Baltic countries, including Estonia, Lithuania and Latvia are considered Eastern-European due to their location along the Eastern border of the European Union. The differences in the economical conditions in these countries, including Latvia, has resulted in emigration towards the Western Europe, mainly to Great Britain, Germany, Sweden, France, The Netherlands and other countries (Bērziņš & Zvidriņš, 2011).

Nevertheless, the political elite of Latvia are changing the discourse to associate Latvia with the Northern European country, that is represented in a speech from the president of the republic of Latvia E. Levits (Levits, 2019) in order to shift away from the association of often negatively used term – Eastern European country. In contrast, the planning documents and research compare the Baltic Sea coastline and Baltic Region with the Mediterranean region (Klepers, Jāņa Sēta SIA, Mardega, & Ulme, 2020; Jūras plānojums, 2019), disregarding the geographical distance to the South and local context.

It can be assumed that there is a complete displacement in compass that can result in the crisis of identity and misleading future decisions.

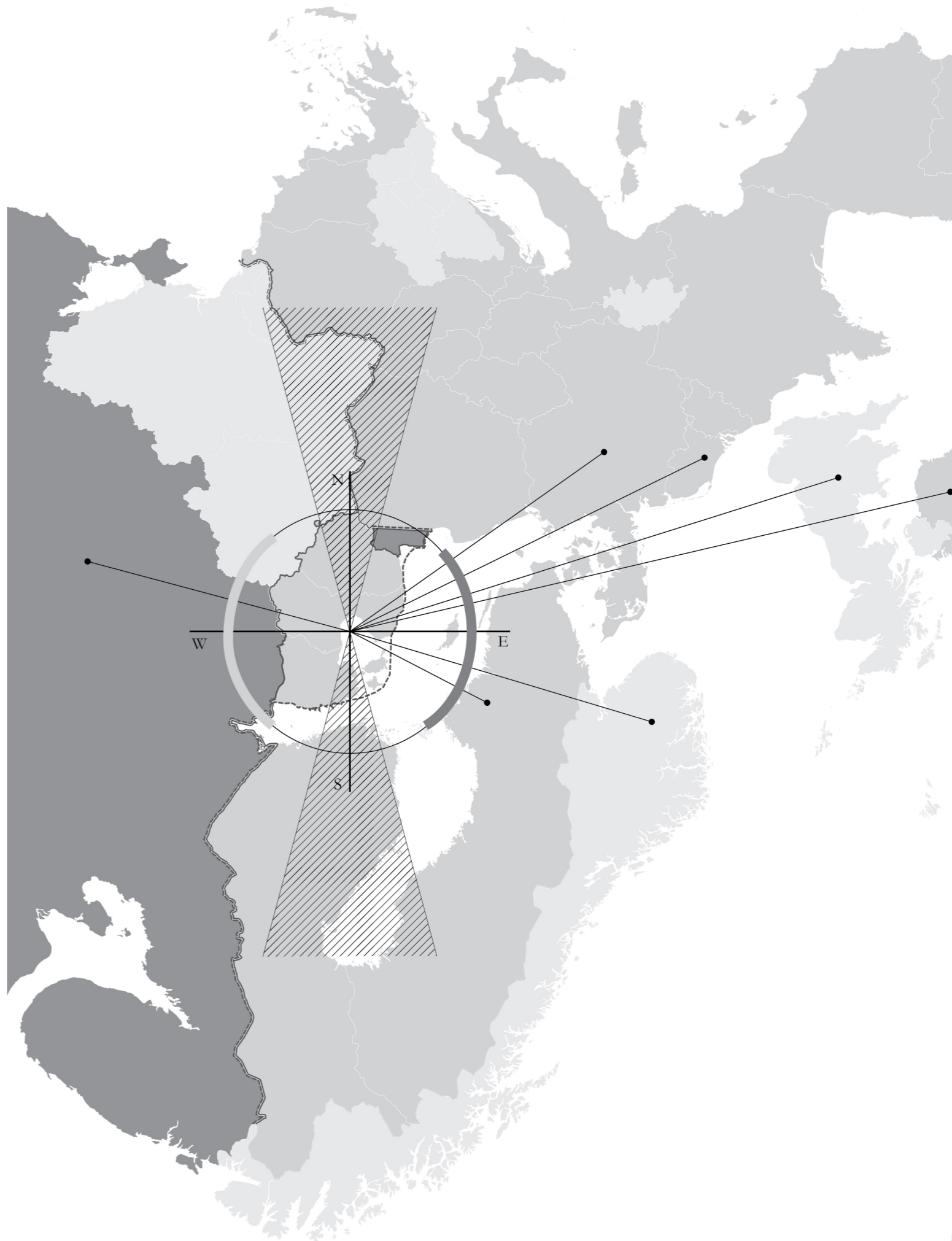


Fig. 39: Displacement in orientation

- Countries outside EU
- EU countries
- Russian Federation
- - - Western border of former USSR
- Eastern border of EU
- Main emigration routes since 1990
- ▨ Directions of comparison

Fig: by author

projection

Abstract

Region in degrowth - vision

Roja 2100

The dynamic coastal territory

Coastal projects

Timelines



Fig.40: Act on what is offered
Drawing by author

Projection

Acceptance comes from within

The existing every-day rituals and cultural connection with the nature show that people who are living on the coast are linked with the natural processes and landscape. The appreciation of nature and respect for the strength of natural forces can be the guiding values towards acceptance of the erasure. Acceptance can come from within the individual.

Neņem mani, jūras māte,
Savos asos palagos.
Ļauj rītiņu ieraudzīt
Tavu krastu ecējam

J. Bērziņš

*Do not take me, o mother of the sea
inside your harsh sheets.
Let me see the morning rise
while I harrow your coast*

By the author

Projection

Region in degrowth

The Western coast of the Gulf of Riga in Latvia is a region in degrowth. With the population shrinking, the region has become more efficient in the use of existing infrastructure and distribution of services. The regional center is placed in the Talsi city, which is also the administrative center of the municipality. Here, the majority of services are concentrated, that serves the needs of inhabitants of the rural areas in the surrounding territory. The main roads connecting Talsi with Mērsrags, Roja and Dundaga are the main mobility corridors in the region that allows fast public and private transport connections to the regional center.

By concentrating on the local resources, the region is focusing on 3 main activities that are embed in the existing landscape structure and natural resources that it provides. The central part of the region is focusing on agriculture, providing variety of crops and local food produce to the inhabitants in the region and outside of it. Along the coast of the Gulf of Riga stretches a productive forestry area in which active and sustainable forestry provides possibilities to harvest high-quality local wooden materials and biomass. These materials are then transported to both small ports in Roja and Mērsrags, where these resources are used for export and production of variety of sustainable ecological goods. Both ports have central management and collaborate in their activities, allowing port of Mērsrags to specialize in logistics and export while port of Roja is focused on knowledge-based production and fishery industry. The existing know-how knowledge about fishery allows new innovative approach to commercial and self-consumption fisheries, harvesting mussels and providing new local food products. Mussel farms have improved the water quality along the coast allowing the native fish and marine plant species to thrive.















-  productive agricultural
 -  productive forestry
 -  urban shrinking
 -  new region parish borders
 -  asphalt roads
 -  gravel roads
 -  local fishery ports
 -  local fishery routes
 -  timber resource
 -  fish resource
- Protective zoning
-  Limited economic activity zone 1 km/ no forest clearcutting
 -  Natura 2000 area
 -  Marine protective area
 -  HELCOM area

Fig.41: Regional vision map



Projection
Roja 2100

Roja has become a smaller, more compact village where people appreciate the nature that surrounds them. The surrounding nature – forests, sea, meadows, and beach not only provide them with necessary resources for their basic needs, but also strengthens their identity and feeling of belonging to this village.

The new climate has opened possibilities to extend the harvest season, allowing to expand the individual gardens to provide healthy, organic food. The sea level has risen, and the coastal erosion is continuing, however, local inhabitants understand this process and not intervene, but accept it by retreating and creating a new coastal meadow along the coast to preserve the coastal habitats.

By maintaining and adapting the existing buildings, using local ecological building materials, such as wood and reeds, the village has gained a new, distinct identity where the historic village structure has been preserved, but the built environment has been adapted to allow demolition, removal, and reuse when the buildings are not used anymore.

In the village there are fewer public services than several decades ago, however, the digital technologies, on-demand services and high-quality mobility connections with the regional center Talsi provides access to necessary health, economic, educational, and other services.

The port of Roja is a local innovation hub where the forestry and fishery industries use local knowledge and resources to produce high-quality food, building materials and other products for local consumption and export. The commercial fisheries in the port have adapted to new fishing methods and are farming mussels and algae, however, the local fishermen traditions have been maintained by the self-consumer fishermen who are actively fishing on the coastal zone to provide the food for their households.

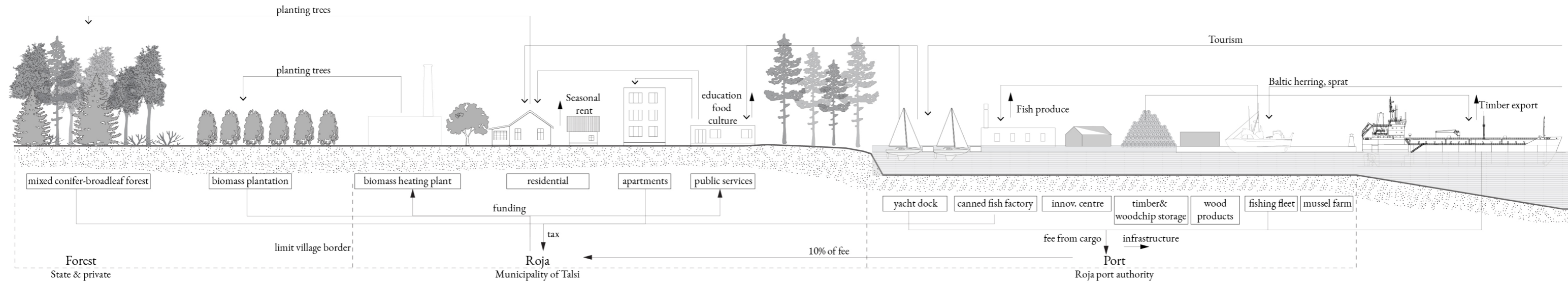
The seasonal inhabitants of the village are part of the community and engage in the local activities even when they are not in place. By communicating and exchanging opinions with the permanent residents, they together create a unique coastal lifestyle

Fig.42: Vision map of Roja 2100

-  Productive forestry area
-  Coastal dry pine forest
-  Mixed conifer-broadleaf forest
-  Coastal meadow / erosion zone
-  Biomass plantation
-  Grasslands
-  existing village border
-  proposed village border
-  Demolished buildings
-  Revitalized buildings / Production
-  Revitalized buildings / Public use
-  Mussel farming
-  Seasonal tourism
-  Port territory



Spring / summer



Autumn / winter

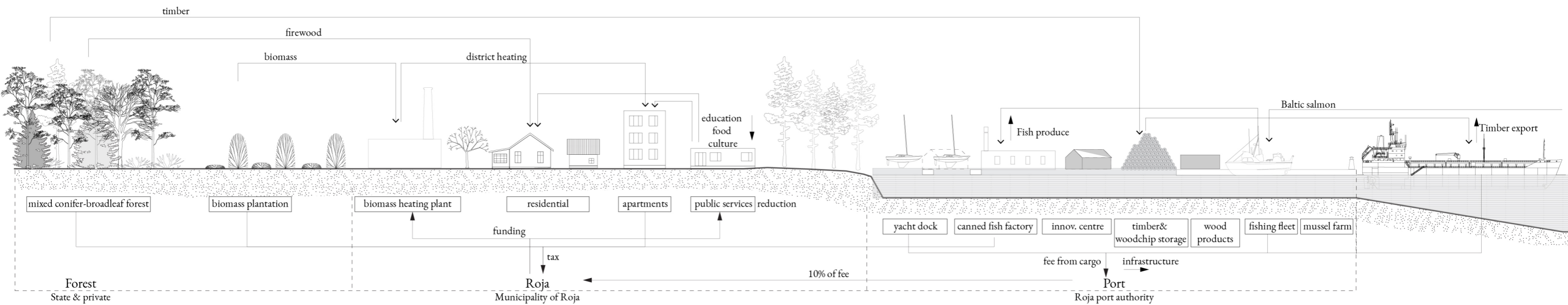


Fig.43: Projected seasonal economic activities and flows

Projection

Systemic interventions

As mentioned before, the port plays a significant role in the economic development of the village. With innovations towards the mussel farming, the fishery industry can develop new products and diversify their resources. In the port, new wood product manufacturing allows to use byproducts of the timber export, creating new sustainable and local products, such as wood planks, wooden building materials, chip briquettes for residential heating systems. The new industries by paying taxes to the port and the municipality supports the maintenance of the existing port infrastructure that results in continuation of the coastal erosion

on the south of the port.

The local biomass heating plant has switched to locally grown biomass that is grown right next to the heating plant, providing clean and local energy to the apartment and public buildings in the centre of the village.

Residents who live in the coastal territory are more using the surrounding nature to provide different materials and resources for their livelihoods. The coastal meadow not only provides free access to the coast to collect necessary natural fertilizers, but also brings possibility to collect medicinal plants, as well as wool from the

sheep that has been maintaining this coastal biotope. Locally grown food in the gardens and forests provide healthier and cheaper food options. The productive forest area just outside the village provide the possibility to collect the necessary firewood, as well as mushrooms and berries in autumn.

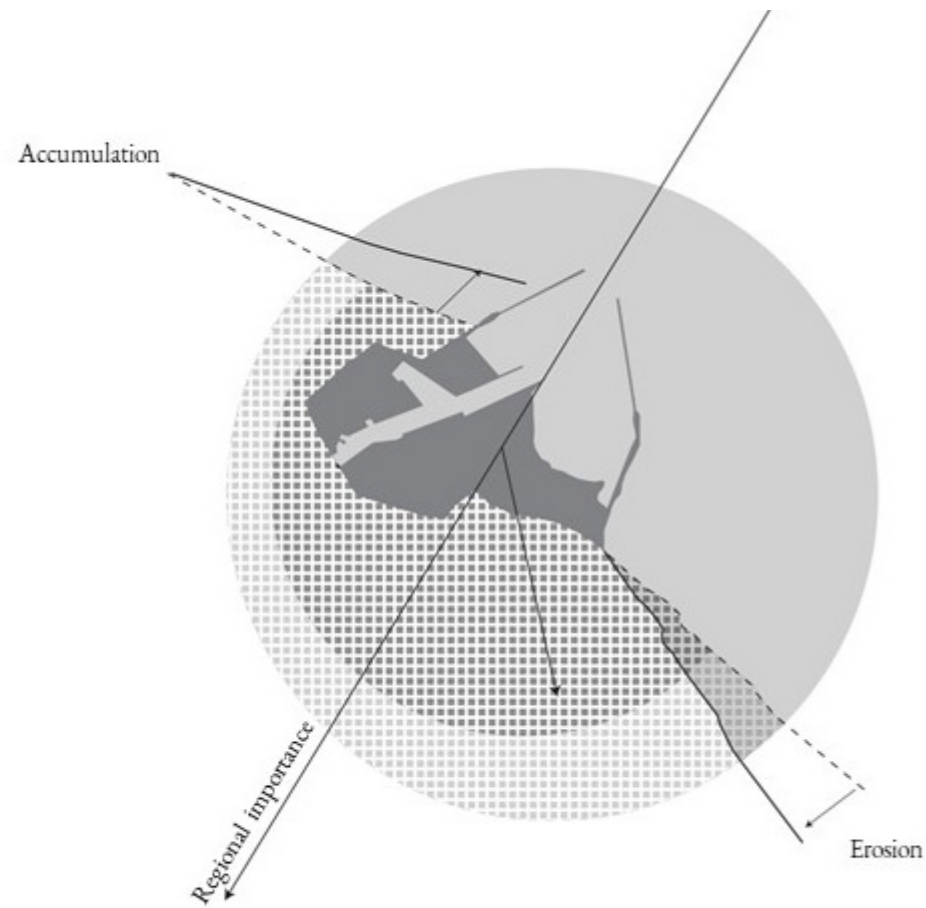


Fig.44: Port - village relation

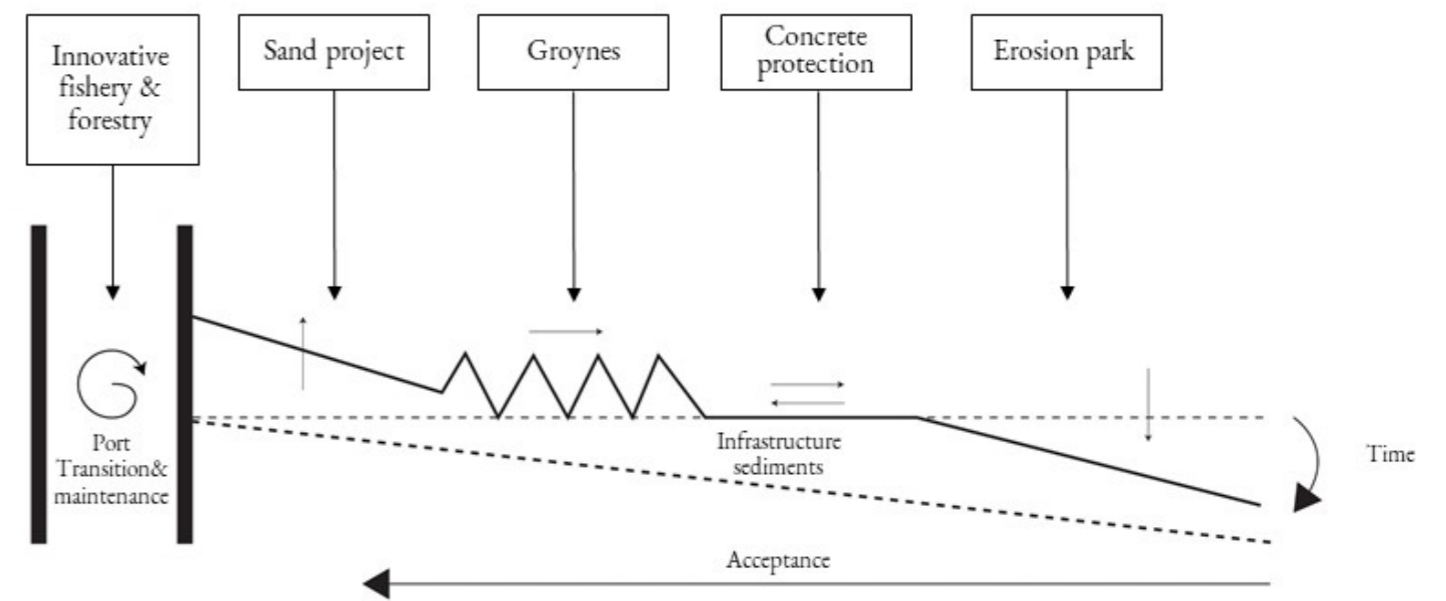


Fig.45: Project composition

Projection

Conceptual project composition

The project composition is based on the research that concludes the importance of port of Roja in the local and regional economy. By developing the economic activities in the port, the existing infrastructure, including piers, will remain in place and will be maintained, resulting in further erosion and accumulation on coastline. However, the shrinkage and depopulation of the village will continue in the future, resulting in connection of development and shrinkage between the port and the village.

The composition of the spatial interventions along the coast allows the residents to accept and adapt to the

changes gradually with time. By implementing the notion of finite infrastructure and sedimentation, the erosion of the coast can happen gradually, exposing people to this natural process.

The spatial interventions are diversified, reaching seawards and inland. Sand project and groynes are active interventions that entail specific landscape changes, creates new sediments, and protects the existing coastline for a specific amount of time. Concrete protection protects existing road and properties while legal transformation inland take place, allowing the erosion to continue after the infrastructure fails. Finally, the erosion park allows erosion to

happen naturally without human intervention, resulting in creation of bluff – a new landscape element.

However, through time, the interventions that were meant to protect the coastline will have reached the end of their effective stage. By experiencing this process people can gradually accept the erosion as a part of their daily life and not as a thread.



Projection
Coastal territory 2021

Fig.46: Existing situation in the port and along the coast in 2021

At the present moment, the coastal territory has diverse land use patterns, stretching from abandoned plots and buildings in the port to permanent and seasonal residential zones.

of the beach and visual identity of the coast.

The coastal dynamics are influenced by the existing spontaneous coastal management infrastructure, i.e. concrete blocks and debris that have been placed by the residents in the last 15 years to prevent the coastal erosion. This infrastructure along the coast is creating local accumulation and erosion zones, influencing the coastal habitats and plants, as well as accessibility

Legend

- Buildings used all year
- Asphalt road
- ▨ Extensive gardens/locals
- Sediment flow
- Seasonally used buildings
- ▨ Gravel road
- ▨ Seasonal resident garden
- Coastal dynamics
- ▨ abandoned buildings
- ▨ Temporary road
- ▨ Coastal meadow
- ▨ Pine forest
- ▨ Reeds
- ▨ Temporary use
- ▨ Wooden path
- ▨ Grassland
- ▨ Demolished buildings
- Erosion zoning





Fig.47: Projected changes in the port and along the coast in 2025

Projection
Coastal territory 2025

By placing series of spatial interventions, it is possible to change the coastal dynamics and use the sediment flow to create a new layer of sand along the coast. The sand could be used from the dredging of the port that is being done once every 2 to 3 years. The constant sediment flow would transport the sand towards the coast, at the same time stabilizing the existing bluff to maintain the part of Krasta street from Liepu to Jomas street and preserving existing sewage and water pipelines.

Along the existing concrete blocks, a line of new concrete protection can be placed, using old concrete drainage pipes from reconstruction works of streets and roads in the municipality. This intervention would allow to preserve the part of Krasta street between Jomas and Lašu streets in order to provide access to several private properties for the next 20 years.

The existing concrete blocks along the coast has not yet been tested under the pressure of a severe storm, therefore their functionality is questionable. However, based on the observation, it

can be concluded that they prevent erosion during smaller storm surges when the water level does not increase higher than 1 m. At the end of the street, erosion park is starting, providing visitors possibility to experience coastal erosion and bluff formation without any anthropogenic interventions.

Legend

■ Buildings used all year	■ Asphalt road	▨ Extensive gardens/locals	→ Sediment flow
■ Seasonally used buildings	▨ Gravel road	▨ Seasonal resident garden	→ Coastal dynamics
▨ abandoned buildings	▨ Temporary road	▨ Coastal meadow	
▨ Temporary use	▨ Wooden path	▨ Pine forest	
▨ Demolished buildings		▨ Reeds	
□ Erosion zoning		▨ Grassland	

N 0 50 100m



Fig.48: Projected changes in the port and along the coast in 2040

Projection
Coastal territory 2040

20 years after the first interventions have been built, the groynes have caught the sand sediment from the flow and the sand project have been slowly moved along the sediment flow, creating a beach lagoon. This lagoon is rich with coastal plants and insects that attract seabirds. The functioning groynes has created small accumulation and erosion zones. However, the erosion has been increased after the groynes next to the concrete block protection. The existing concrete block protection could fail during a storm, allowing the erosion to continue after them.

In erosion park, the bluff formation has started, creating a new landscape element that has not been present in this particular territory before. The erosion spatial zoning has been assigned to several properties to indicate which households should relocate to different location within the village in the next 20 years. Because the local residents have witnessed the failure of their attempts to protect the coastline and their properties, they accept the possibility to move. Based on the observations during field trip, the majority of the residents in this

zone are retired, therefore the decision to relocate would be passed on to the next generation or the new owner of the property. However, within this specific zone, the municipality has to use their right of purchasing the property if it is being sold.

Legend

■ Buildings used all year	■ Asphalt road	▨ Extensive gardens/locals	→ Sediment flow
■ Seasonally used buildings	▨ Gravel road	▨ Seasonal resident garden	→ Coastal dynamics
▨ abandoned buildings	▨ Temporary road	▨ Coastal meadow	
▨ Temporary use	— Wooden path	▨ Pine forest	
▨ Demolished buildings		▨ Reeds	
□ Erosion zoning		▨ Grassland	

N 0 50 100m



Projection
Coastal territory 2060

Fig.49: Projected changes in the port and along the coast in 2060

40 years in the future, the erosion is continuing. There are new spatial elements present in the landscape that indicate where the coastline used to be, for example, the concrete blocks are forming an island and the concrete block from the soviet army. The buildings along the coast at the erosion zone have been demolished, allowing to recreate a coastal meadow, which is a protected biotope.

As the erosion continues, the erosion zone has been increased, including new properties closer to the port and more

inland from the sea.

Nevertheless, the innovation Center in port together with experimental mussel farm inside the port aquatorium have resulted in creating new commercial mussel farms also outside the port. The mussels not only are helping to clean the pollution in the sea, but also provide new production possibilities for the local fisherman that have been struggling with declining fish resources in the past.

Legend

■ Buildings used all year	■ Asphalt road	▨ Extensive gardens/locals	→ Sediment flow
■ Seasonally used buildings	▨ Gravel road	▨ Seasonal resident garden	→ Coastal dynamics
▨ abandoned buildings	▨ Temporary road	▨ Coastal meadow	
▨ Temporary use	— Wooden path	▨ Pine forest	
▨ Demolished buildings		▨ Reeds	
□ Erosion zoning		▨ Grassland	

N 0 50 100m



Projection
Coastal territory 2080

Fig.50: Projected changes in the port and along the coast in 2080

By the end-of-the lifecycle for the groynes, they are not serving their function anymore and the sediment accumulation is not happening anymore. Erosion in this part of the coast is continuing, leaving a partly destroyed groyne in the landscape. However, as the groynes were built by using local wood and stones from the beach, these elements can deteriorate in the landscape naturally, blending in with the other natural elements present in the site.

Legend

■ Buildings used all year	■ Asphalt road	▨ Extensive gardens/locals	→ Sediment flow
■ Seasonally used buildings	▨ Gravel road	▨ Seasonal resident garden	→ Coastal dynamics
▨ abandoned buildings	▨ Temporary road	▨ Coastal meadow	
▨ Temporary use	— Wooden path	▨ Pine forest	
▨ Demolished buildings		▨ Reeds	
□ Erosion zoning		▨ Grassland	

N 0 50 100m



Projection
Coastal territory 2100

Fig.51: Projected changes in the port and along the coast in 2100

80 years in the future, the coastal zone has fully become a new coastal meadow biotope with few fruit trees left to indicate that this used to be a garden area in the past.

The former coastal protection elements have become a part of the landscape during deterioration. Pieces of concrete have been mixed in with the granite rocks and marine sand and the wood from groynes also have been severely damaged by the salt water, however, some pieces are still visible and are mixed with the existing rocks and pebbles.

The erosion is present at the whole coast, because there are no protection elements and the port has been maintained.

Legend

■ Buildings used all year	■ Asphalt road	▨ Extensive gardens/locals	→ Sediment flow
■ Seasonally used buildings	▨ Gravel road	▨ Seasonal resident garden	→ Coastal dynamics
▨ abandoned buildings	▨ Temporary road	▨ Coastal meadow	
▨ Temporary use	— Wooden path	▨ Pine forest	
▨ Demolished buildings		▨ Reeds	
□ Erosion zoning		▨ Grassland	

N 0 50 100m





Fig. 53: Groynes with new sediment



Fig. 54: Groynes as the new sediment



Fig.54: Sections with projected changes and interventions. Krasta street between Peldu and Jomas street. Erosion projection based on Atlas (2014), Lapinskis (2019).

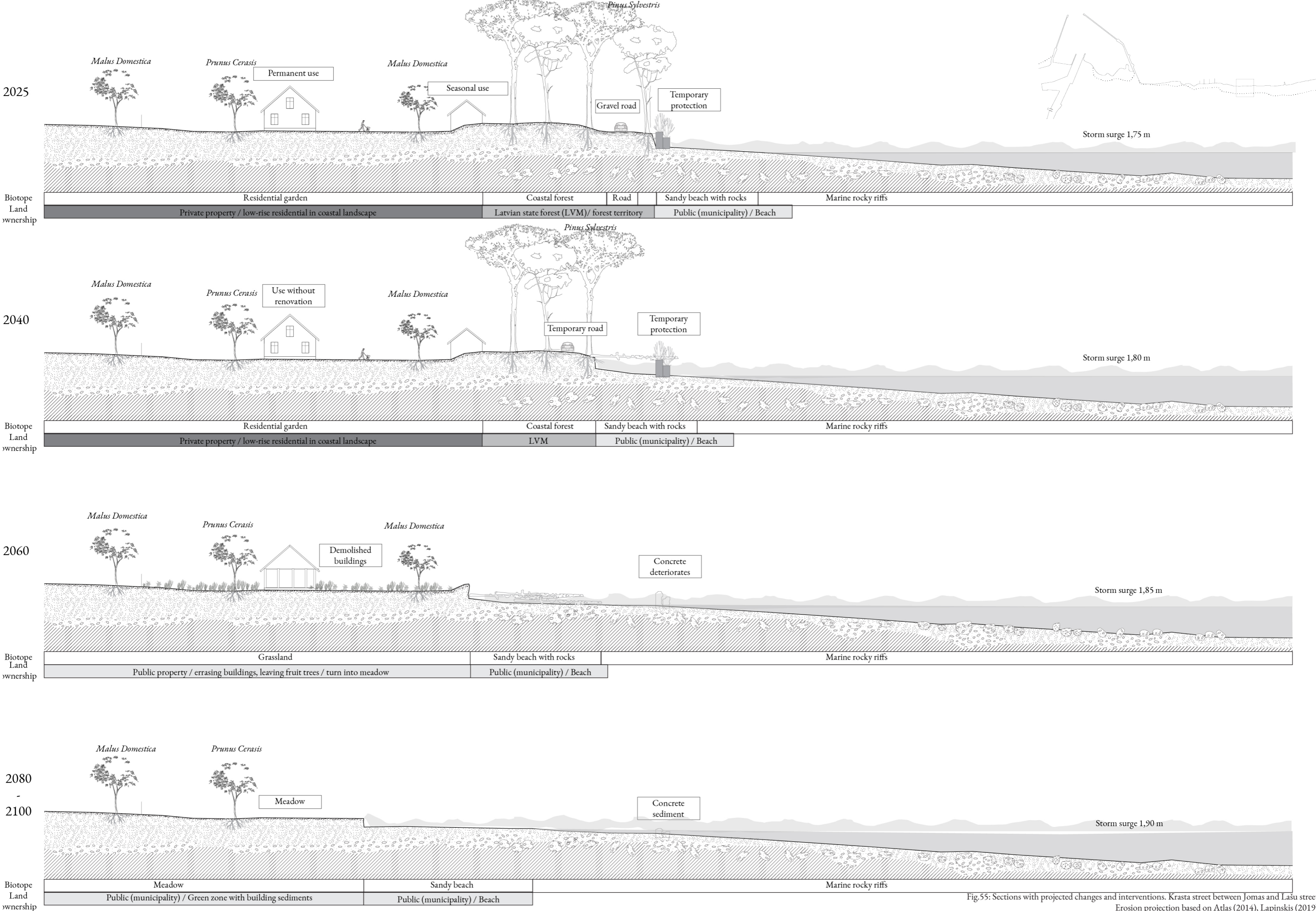


Fig.55: Sections with projected changes and interventions. Krasta street between Jomas and Lašu street. Erosion projection based on Atlas (2014), Lapinskis (2019).

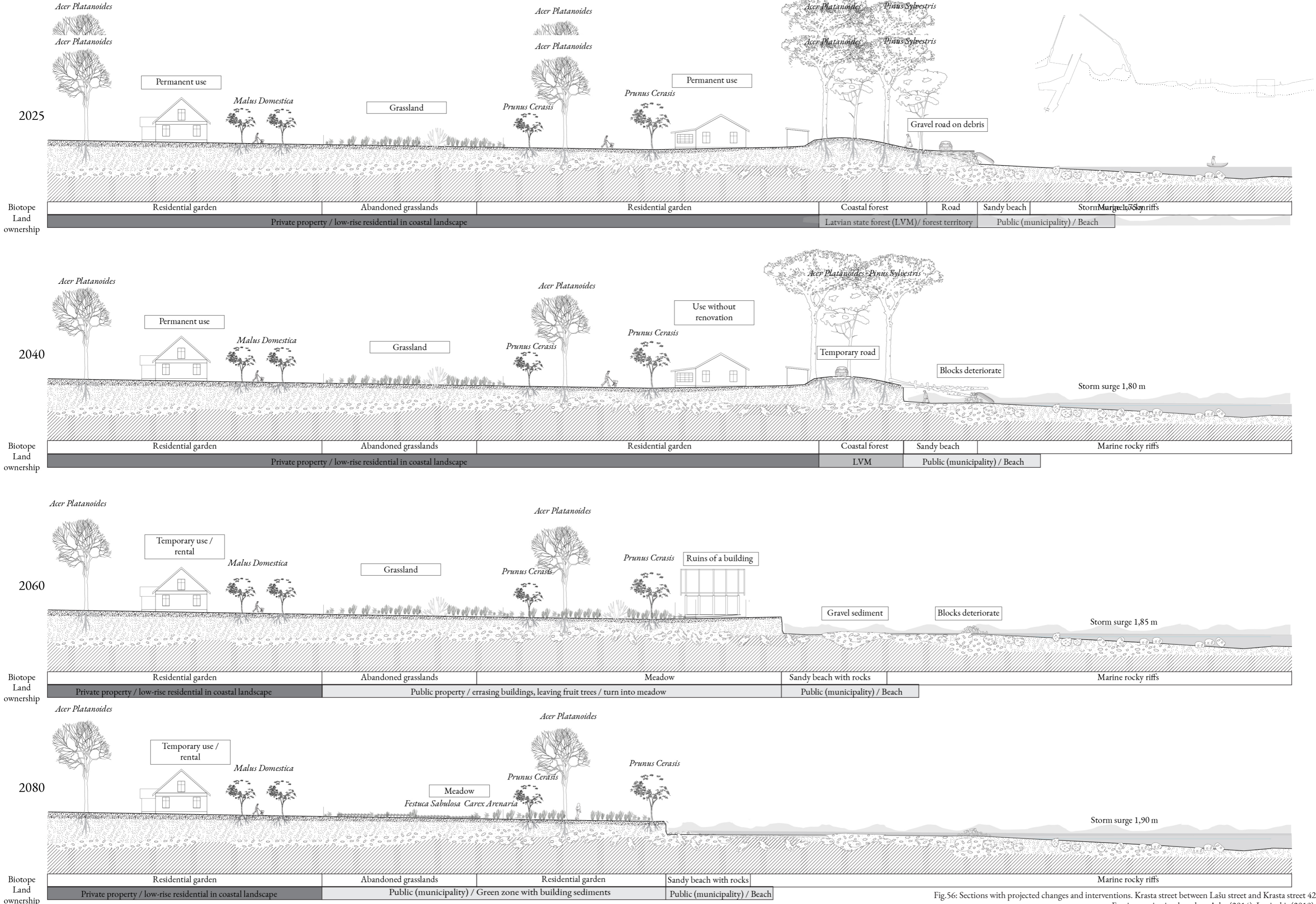


Fig.56: Sections with projected changes and interventions. Krasta street between Lašu street and Krasta street 42. Erosion projection based on Atlas (2014), Lapinskis (2019).

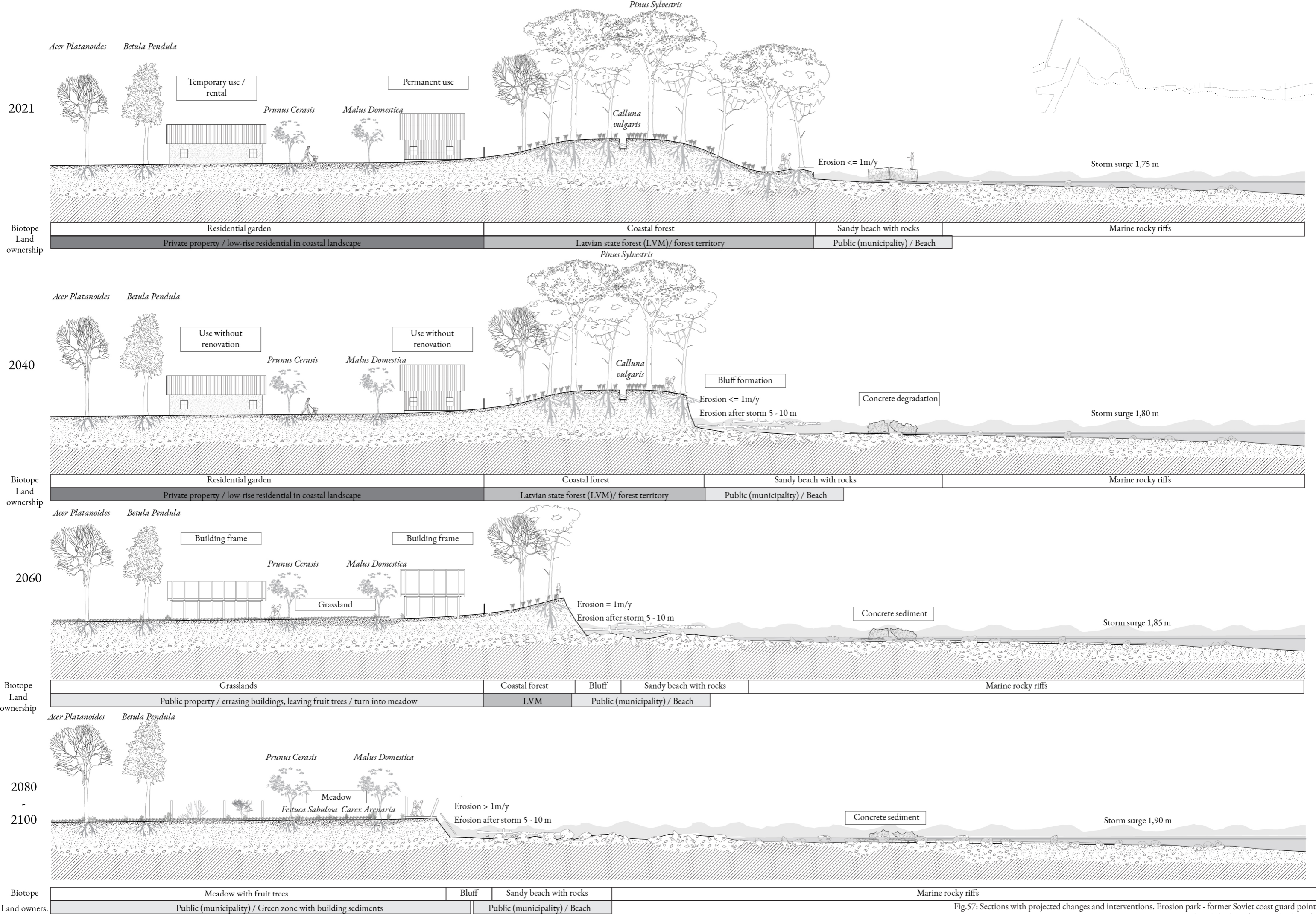


Fig.57: Sections with projected changes and interventions. Erosion park - former Soviet coast guard point
Erosion projection based on Atlas (2014), Lapinskis (2019).

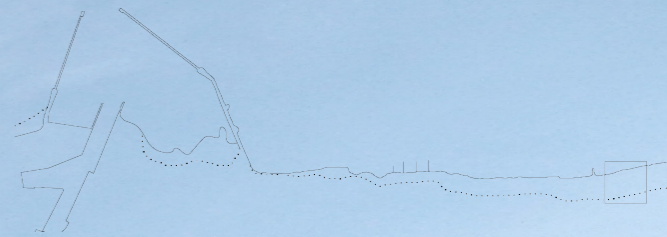


Fig. 58: Coastline in 2100

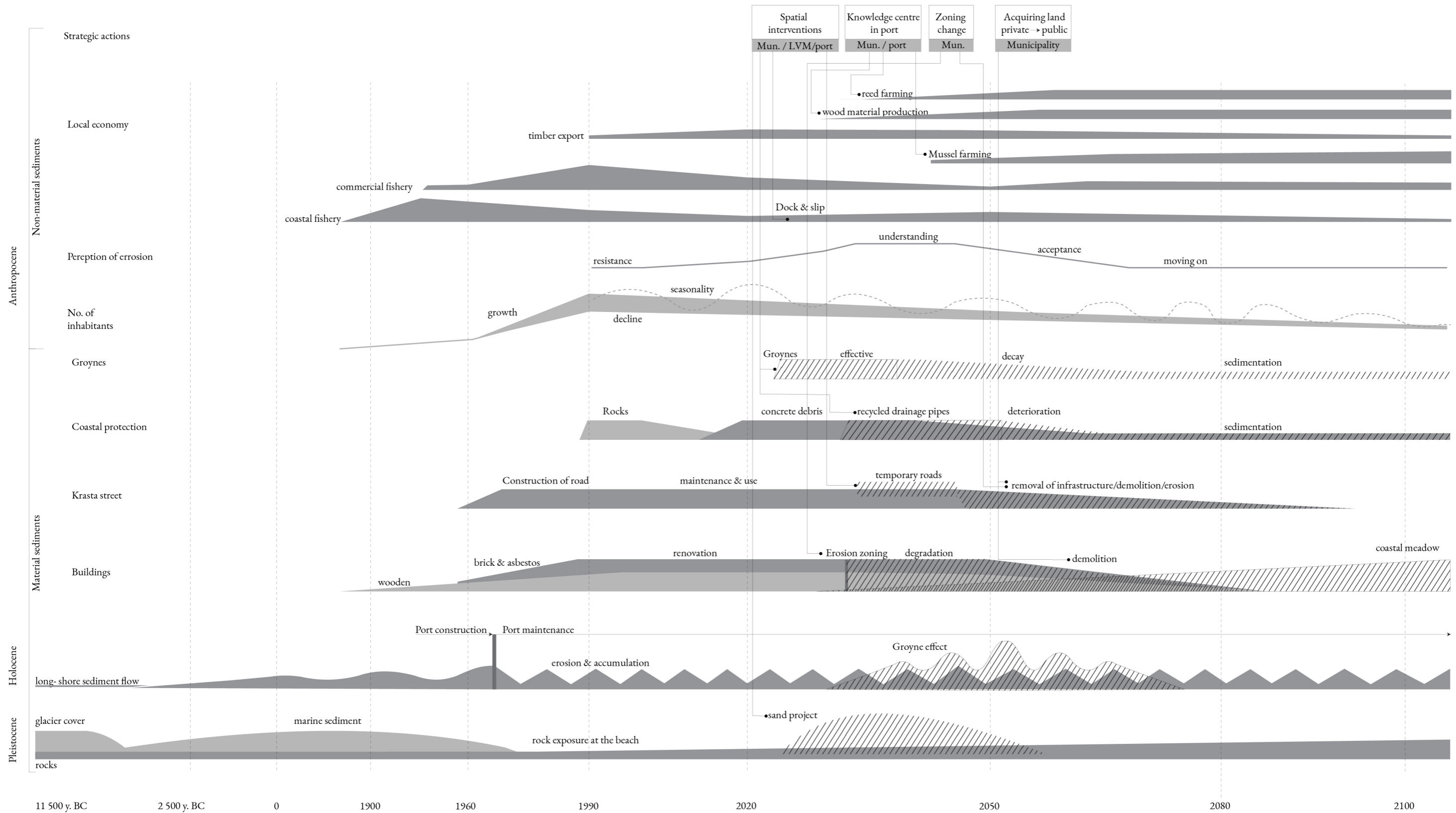


Fig.59: Acceptance and sedimentation timeline

Projection
Sedimentation and acceptance timeline

Human actions on the coastline result in specific development that result in consequences and residuals of material sedimentation. Through time the accumulation of the past actions also influences the further development. By understanding what is offered, it is possible to implement strategic actions that allow to innovate and make changes, creating new material and non-material sediments.

The acceptance of change relies on specific strategic actions by local municipality, the port authority and local

inhabitants. The implementation of new local knowledge-based economic activities in the port will allow to maintain the port infrastructure, at the same time eroding the coast. Spatial interventions in the coast can transition the understanding of erasure from resistance to understanding and towards acceptance. This can be done by exposing people to the natural processes in the landscape. Legal actions, such as implementation of specific zoning area within the existing (DZJ territory) in the new spatial development plan will result in demolition of buildings. However, to change the ownership, municipality need to assign specific financial funds in order to use the

pre-emptive right when the properties are sold or inherited.

conclusion

Conclusion

Discussion

Reflection

Conclusion

This thesis is focusing on exploring an approach to address the territorial urgencies of climate crisis and shrinkage on the coastline of the Gulf of Riga. The multi-scalar research and design process allowed to understand socio-economic and spatial conditions of the territory through the lens of local inhabitants.

The investigation of systemic interdependencies between the coastal landscape and socio-economic activities it is possible to redefine the coastal territory of Roja from a line in map to a surface that stretches inland and seaward. The redefinition of the coastal territory provides new insight in specific living conditions between the sea and land, and is helpful for planning a sustainable future development.

With incorporating the notion of sedimentation as a consequence of human actions in the landscape, it is possible to rethink how infrastructures influence the landscape when they are built and what is left after these material structures are no longer necessary. The shift in gaze from infinite to finite infrastructure allows to plan and design with nature, resulting in specific spatial interventions that are embedded in the landscape and can become a part of it.

The spatial planning and design approach to address the physical and socio-economic erasure on the coastline of the Gulf of Riga in Latvia is based on the acceptance of these processes. By accepting and embracing the changes in the landscape, built environment and economic activities, it is possible to transition towards sustainable degrowth. With these changes the urban environment on the coastal territory becomes not only more natural, but also people are more linked to the natural processes that surrounds them.

The transition depends on providing new localized economic possibilities that are linked with the existing rituals and knowledge. In the context of Latvia and Roja as a case study, the acceptance of the erasure can be based the deep cultural links with the nature. Embracing the cultural understanding of natural forces over human capabilities redefines the understanding of adaptation to threats as an opportunity to look beyond technical solution to problems. Thus, these actions involve the change of values, habits, and rituals, therefore it is important to provide time for accepting the change and transition the understanding.

Discussion

The topic of the thesis is aligned with ongoing discussion about the ownership and accessibility of the coastal spaces. As the erosion is projected to influence several properties located on the coast of the Gulf of Riga, the necessity to address the changes in property borders has been recognized by the decision makers in the Ministry of Environmental protection and regional development of the Republic of Latvia by investigation possibilities to implement notion of “highest wave line” (Baltijas krasti, 2019). According to the research, this line would serve as a dynamic property line that indicates where the private ownership ends on the coastline, proving public access of the coastline and legally determining the coastal beach as a public good.

However, as this legal term is not yet implemented in the legislation, the thesis projection provides a different approach how to address the public – private ownership issue on the edge of the coast. By using depopulation and shrinkage as an opportunity to reevaluate necessity for investment in infrastructure, it is possible to demolish buildings that are projected to be lost due to erosion and acquiring the properties for public use. In this scenario, the “highest wave line” would determine the border between two public properties, minimizing conflicts between ownership.

The change of ownership, demolition of buildings and replacement of inhabitants not only involve significant financial resources, but also would provoke negative response among people who are affected by these changes. The psycho-emotional attachment to the property and influence of loss of home is an important subject to include in the implementation of the change, however, this thesis focused on the possible spatial interventions and landscape changes.

Nevertheless, with the municipal reform that is taking place in Latvia in 2021, there is a need for new spatial development strategies and plans for the new municipalities. Thesis provides possibility to start the discussion of the future development of the coastal areas, considering long-term effects on the territory and rethinking the development that exceeds the usual 10 – 20 year time period.



Fig.60: Projection: Acceptance of Erasure
Fig: by author

Reflection

Process

Relationship between graduation topic, studio topic, master track and program

The thesis proposes an approach on how to address the climate crisis and urban shrinkage of the Gulf of Riga coastline with a multi-scalar spatial design. The understanding of the natural, spatial, and cultural elements through a re-conceptualization of sedimentation through a cultural aspect and combined with the concept of acceptance, allows for local and site-specific spatial interventions. These respond to future changes in the coastal landscape, accepting unrelenting natural and socio-economic processes of sea level rise and population shrinkage, allowing for new and unique inhabitation models on the coastal territory.

The theme for the thesis was chosen based on my personal interests and familiarity with the coast of the Baltic Sea. I have always been fascinated with the life that are present between the land and the Sea. With this thesis I had the opportunity to discover the complexity of natural and man-made systems that are present on the Gulf of Riga, how human interaction with nature not only influence natural processes, but also how the nature and landscape shape the rituals of people on the coast.

The new three-year cycle of the Transitional Territories studio “Inland – Seaward. The trans-coastal project” looks at the coastal territory as a place in transition due to growing anthropogenic pressures on marine, coastal and land biophysical systems. The studio proposes to redefine the coastline by understanding the systems and processes influencing the territory between the land and the sea. The thesis project uses this notion to understand how the geomorphological development of the Baltic Sea has influenced the coastal landscape, the economic systems in the region and the importance of the coastal territory within the region in land and on the sea.

As the thesis is focusing on the shrinkage as an opportunity for climate change adaptation, the chosen approach expands the urbanism track knowledge on the importance of sustainable development through the lens of decline and erosion. In this process, the role of the urbanist is not only to mitigate the needs of different human and natural actors, but also to change the mindset and values of the people who are experiencing these processes; therefore, the spatial design interventions have to be communicated through in-depth understanding of the local conditions and context.

Relationship between research and design

The Transitional Territories studio collective research phase deepened my understanding about the economic, social, cultural, and political dependencies between natural and human actors through analysis of 4 lines of inquiry – Mater, Topos, Habitat and Geopolitics. This approach was used to discover the spatial manifestations of the Anthropocene, climate conditions, cultural significance, and shrinkage on a territorial scale.

In combination with this analysis, the theoretical and conceptual frameworks were developed that was based on the problem statement, regarding the climate crisis and population shrinkage present on the coastline of the Gulf of Riga and projecting the theory of degrowth to address the climate change adaptation. The analytical approach towards the lines of inquiries were based on the acceptance of the Anthropocene – the new geological epoch where human actions have irreversibly changed the Earth geological structure, leaving man-made sediments that will be present in the Mater for centuries. This understanding guided the conceptual framework and further research of the coastline of the Gulf of Riga to discover the existing material and non-material sediments that are becoming a part of the coastal landscape and shape the identity of the place. To do so, the project location of the coastal village of Roja – my hometown, was chosen as the case study area to explore the application of the research and design approach.

The thesis design projection depicts the possible changes in the coastal landscape by accepting the process of erosion and shrinkage. As these processes are happening in a long period of time, the local inhabitants need time to adapt, therefore the project composition proposes infrastructure and landscape elements to be finite, deteriorate in the landscape and have a significant cultural meaning. By designing the interventions that stretch inland and seaward, it was possible to discover the sediments of the place, I am so familiar with. I started to gain different insight of the life of the coast. With the theoretical knowledge gained through different lecture series, I was able to understand the coastal processes of sediment flow, water fluctuations and erosion from a different perspective that resulted in redefinition of the coastal space from a linear space to a territorial entity and helped to design the projection.

Although the familiarity with the project location gave me additional background information about the history and functionality of space, it was hard to abstract myself from the place I live in. As I am the researcher and also the research subject, both roles played a significant part in the research and design process. Even if the scientific research evidence projected the necessity to act on the inevitable changes on the coastline, as the local inhabitant, I had to accept the results that are changing my psychological attachment to this space. This struggle shows the importance of the designers, researchers, urbanists and planner to not only include the local actors in the decision-making process, but also to relive the experiences of the people who are influenced by the imposed design actions.

Societal and scientific relevance

The thesis bridges several topics that has not been widely analysed in Latvian and European academia and researched in the local context of the coastline of the Gulf of Riga. As the implications of shrinkage in Latvia are highly underrepresented not only in local planning documents, but also in the local and international academia (Pužulis & Kūle, 2016, p. 102), the thesis also provides the knowledge on the local conditions of shrinkage in Latvia and specific to rural coastal communities that can be used for the spatial planning and design projects in Latvia, as well as foundation for further research on shrinking rural areas.

The focus on the rural coastal communities provides the possibility to highlight the necessities and problematics of inhabitants that often are marginalised due to the location of their living space. However, the habitation patterns and actions, such as unplanned and improvised coastal protection infrastructure, can influence large scale natural processes, i. e. long-shore sediment flow and erosion, that leave impact on larger territory.

By giving the voice to members of the community, analysing local cultural traditions, and understanding the coastal identity, as well as highlighting the importance of interdependency between human and natural processes, it is possible to provide insight on how to accept the inevitable changes in the climatic conditions and population patters to provide sustainable living conditions for the inhabitants of the rural coastal communities.

Methods and limitations

By researching the TT Studio’s research on Mater, Topos, Habitat and Geopolitics (4 lines of inquiry), a critical mapping method was applied that involved analysis of GIS data, literature review and quantitative data collection. During this phase I was able to improve my analytical and graphic design skills by depicting different systems and processes of the Gulf of Riga through diagrams, sections, and maps.

During this research phase, I discovered the limited availability of open-source data from Latvia. The GIS data in Latvia, for example, the building outlines, the existing infrastructure, or land use, especially on an urban scale, is not updated or are accessible only by requiring paid licensed access, therefore I tried to access Estonian databases and contact the local municipality in person. I discovered that although the Gulf of Riga is one waterbody that is shared by two countries, there are limited information and research on the coastal processes and climatic conditions along the coastline of the Gulf. Nevertheless, most of the scientific literature used for the analysis was in Latvian language, therefore it needed to be translated in English for the use of this thesis, allowing broader audience to access the information about the spatial conditions of the site.

The individual design phase included data collection, interviews, and observations that was based on the field trip, planned in January 2021. After the P2 presentation with consultation from the mentors, a decision was made to extend my stay in Latvia from December 15, 2020 to May 29, 2021. This extended field trip was possible because of the global pandemic and online education. Being on the site for several months allowed me to collect the necessary digital data from the municipality of Roja and the local inhabitants that would not be possible otherwise.

Nevertheless, the living on the project location allowed me to research and design on the site, constantly reflecting my design choices on the landscape and getting inspired by the everchanging scenery. During this stay I was able to capture moments of everyday people and landscape changes through different seasons over extended timeline. It allowed me to engage and understand the rituals and processes by participating in them

and reflecting my experiences through pictures, diagrams, and maps. However, as mentioned before, the continuous living, working, and researching of the same location can become too familiar, causing subjective opinions that are limited by personal experiences. Thus, dissociating myself from the location was hard, I was able to overcome this by considering this situation as an asset that allowed me to collect additional information, I would not be able to obtain.

Ethical considerations

The conceptual framework of the thesis consists of notions of acceptance of socio-economic and climate change that are manifested by the population shrinkage and coastal erosion. These changes significantly influence the psycho-emotional state of the residents, including myself, and are linked to loss of spatial objects, land, and economic activities, resulting in a nostalgic view, glorifying the past and limiting the future development. Therefore, the spatial interventions, such as, erosion park, proposed by the thesis could be viewed controversially because these changes in the existing landscape ask for change of mindset and values towards future development which not necessarily include economic growth.

Decline of resourceful industry, such as fishing, in the case study of Roja has allowed to develop forestry. With sustainable management of these industries and planning for decline of population, it is possible not only to preserve habitats and natural processes, but also to create sustainable living conditions with more localized resources for the inhabitants that will stay or continue living in this place in the future.

Application

Implementing the conclusions and understandings of the research and analysis, it was possible to focus on strategic project design to test how the theoretical and conceptual notions can be implemented in the specific, local context. Spatial design interventions on the coastal territory shows different adaptation measures that can be taken to accept the climate change and shrinking population. The outcome of the analytical and conceptual framework together with the site and context analysis allowed to create site-specific spatial interventions that are embedded in the unique landscape.

The application of these frameworks would be possible in other small port villages along the Gulf of Riga, for example, Engure, Mērsrags, Skulte and Salacgrīva, where coastal erosion is caused by the port infrastructure and which are also experiencing population decline and shift from fishing to forestry industry. However, as the approach analyses the specific context of the sites, the spatial interventions and necessary adaptation measures in these sites would be different from the described project case chosen in this thesis.

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appendix

Interview transcripts

Appendix 1 interview transcripts with local residents



Vita Freimane, teacher
3 March, 2021,
[Krasta iela, Roja](#)

J.B. First, I would like to complement your garden design and the use of rocks and old trees from the sea.

V.F. Thank you!

J.B. First question: how do you feel living on the coast of the sea?

V.F. Well, since the storm of 2005, quite alarmingly. On that storm, 5 meters of the dune was eroded. And that continues also now. I remember in my childhood the dune was quite bigger and we used to play games there. Now the dune is almost gone. For my lifetime, the coast will be enough (*far J.B.*), but the sea is approaching.

J.B. During the walk I noticed that along the coast next to your house there are organic garbage and branches put on the coast. Are you doing that on purpose?

V.F. Yes, and also my neighbors. We also planted willow trees.

J.B. Have you noticed an initiative or help from the municipality with this process?

V.F. Some years ago, the municipality offered to put excavated clay from the port, but my neighbors opposed this initiative, because then we wouldn't have the white sand on the beach anymore. The clay was put along the coast after Lašu street and along our house some rocks were put. But after the storm in 2005 all the clay was gone and the rocks were also scattered along the coast. That's why we started to plant some bushes and also put the branches along the coast to protect it from the erosion, especially when the Northern winds hit the coast. There are times when someone from the municipality reproves that it is not good for the environment, but what else can we do?

J.B. But do you feel safe if the sea is coming closer and closer?

V.F. During the storms, especially one in 1978, it is not comfortable to walk along the dune. The sea is bubbling and in vain, angry. It is an enormous force.

J.B. How do you and your family use the sea and coast in your everyday life? Only for walks or for some other activities as well?

V.F. Yes, we are walking, but we also collect the seaweed for garden, although this year on this part of the coast there were quite small amount of seaweed washed out from the sea. But in the spring time I also take the green seaweed, not only the brown ones, although, according to my parents, they are more nutritious than the green ones. I use them for tomatoes in the glasshouse and also other plants in my garden. If they are not collected, then in the summer they can start to stink on the coast and that is not very pleasant smell.

J.B. You are a teacher, but are there any other family members who are connected with the Sea?

V.F. My grandfather used to be a fisherman, and both of my sons are sailors. One is working on the cargo ships, the other is in the marine forces.

J.B. Is it easy to get fresh fish for you, especially if you are living at the coast?

V.F. Well, its quite difficult. It's good that we have the small fish shop "Zivju namiņš", otherwise, it would be very difficult.

J.B. Is there something that you miss in this beach that is present in the beach on the other side of the port?

V.F. The white sand. Here the sand is quite wet in the summer and is not loose.

J.B. But from an infrastructure point of view? More docks, stairs, benches?

V.F. Noone will make these things on this beach.

J.B. And why do you think that?

V.F. I have been born and raised on this coast. I like this beach as it is. I wouldn't go to the other beach just to swim. I like the rocks, I am not afraid to go swimming here. I just think that the other beach is more attractive to other people because of the wide sand coast, it looks more like a traditional beach.

J.B. But would you mind if more people would use this beach?

V.F. No, I am used to them, because in the summer there are already quite a lot of tourists that are coming here to swim and sunbath, as well as just walk, for example, the annual hike from Kolka to Dubulti.

J.B. How do you experience the seasonality and the difference between summer and winter seasons?

V.F. During the winter, in weekends people come to walk along the sea anyway, but definitely less then in the summer, because the incomers (*Seasonal residents – iebrāucēji (LV)*) are not here. But I have only few neighbors that are seasonal residents or are here on the weekends. But in other streets almost every second house are with incomers. It used to be more active around here, but it's not that bad yet.

J.B. In your opinion, what will change after the municipal reform?

V.F. Nothing. I don't think that we will matter. We will be far from the decision-making in Talsi. We were and we are maintaining the cost on our own and probably that will not change.



**Indulis Lusis,
owner of carpentry**
3 March, 2021,
[Krasta iela, Roja](#)

J.B. Have you noticed the coastal erosion?

I. L. Not really, it is hard to see it with your eyes.

J.B. But you haven't noticed that the sea has come closer in the last years?

I.L. Well, a bit, but not really. If there is eastern wind, then the beach reaches 100 m seaward.

J.B. Previously (*before the recording, J.B.*) you mentioned that in 2005 the coast was quite eroded and that your shed was also destroyed.

I.L. No, the shed was not destroyed. There was water inside the part of the shed closer to the sea. And the coast before the storm used to be flat and sloped. But because during the kolkhoz times some of the concrete blocks were put here, they protected one part of the shed, but the coast was eroded right next to them were they were not put. But the big concrete blocks stabilized the coast. The erosion hit the coast were the concrete blocks were smaller, so we continue to put some more blocks once in a while.

I can see that after storms the blocks are subsiding because the sand is washed away, but lately in the last years I have not seen big storms.

But basically, we are now standing on concrete and rocks. This is all artificial (*points to specific rocks, blocks and gravel on the coast where the interview is conducted*). These rocks, for example, were taken here from Kunči (*Neighborhood in Roja, J.B.*), after the construction of sewage and water pipelines.

J.B. But did you ask the construction company for these rocks and blocks?

I.L. No, they were a leftover for them, and they approached me, asking if they can put them here. And we said yes. Because we needed to regain the lost land to the sea. The property line and indication point (*Kupica (LV)*) were already in the sea. And the sea is continuing to wash away the coast. There (*points to Krasta iela, J.B.*), the grass is there only 2 m, in the previous storm the coast was taken away quite significantly, so the neighbors started to put some branches and leaves there to protect the coast. But something must be done there, otherwise during the next storm the central sewage pipeline that goes under the street there, could be damaged.

J.B. So, in overall, do you feel safe because of the concrete blocks?

I.L. Yes. The concrete blocks protect us very well! And if the storm comes, we will just rebuild, just like we already did with this shed after the storm in 2005.

J.B. So you do not rely on initiatives from the municipality but rather take care of the problem yourself?

I.L. Well, yes. Some of the structures were put already by kolkhoz, we just finished them. And in 2002 when the port was dredges, they needed to put the clay and excavated soil somewhere, so we got the clay for free and they put it here along the coast. But after the storm in 2005 all the beach and water was red, because the clay was washed away. And for several years we couldn't go swimming here and also more down the coast because all the sand was mixed with clay.

J.B. Do you think that after the municipal reform when our municipality will be added to Talsi, these kinds of negotiations will be easier or harder to make?

I.L. I think that it is difficult now, and it will be more difficult in the future. Noone wants to take responsibility and invest time of dealing with these issues. Noone wants to deal with the Greens (*meaning – nature protection agencies, JB*). They will not allow anything! They say this (*Erosion, JB*), needs to happen naturally! But if it goes naturally, half of Roja will stay without sewage! All around the world the coast is protected with structures! Why Spain, France, The Netherlands can do it, but we can't? It's absurd! I don't get it why the erosion has to happen uninterrupted?

J.B. I can oppose you by referring to some of the projects in the Netherlands, where they consider the natural coasts of rivers and the sea as a unique asset and value. I have walked along a coast of the Sea in the Netherlands (*In Vlissingen, J.B.*), where asphalt slope exceeds in the water without any natural beach. There is nothing natural in that kind of coast. But we have the luxury of natural coastline and beaches here.

I.L. I am not suggesting that we need that here. But we could use the big rocks that we already have here! Or someone could plant something, like they are doing in Lithuania in Curonian lagoon. Some bushes that grow fast and have large root structure that protects the dune.

J.B. But do you feel like that this coast is kind of abandoned in comparison with the other beach across the river?

I.L. Yes! Because here are rocks and it is harder to maintain the beach. I remember now that one of my employees used to tell stories of how this coast used to look like. That there were sloped dune with electricity line and a road. Now it is all gone.

J.B. But this process will also continue. With the climate change, the winters are becoming warmer, the sea level is slowly rising ...

I.L. Well, yes, it's true, slowly these changes are happening.

I remember that the storms used to be in the autumn, then in November, but lately the last storms occur in January and only then winter starts. The climate and seasons are shifting...

J.B. Ok, let's change the subject a bit. Do you mind that people are passing by your property when they are walking along the beach?

I.L. No, not really. But its hard for them to walk here, because in the summer there are reeds and that's why they come up on the blocks. Someone even put the concrete stairs here to make the climb easier. I don't know who did that; people sometimes just put the debris here, but I don't mind as long as I am informed, and the concrete are in big pieces.

J.B. But people who are passing by probably think that you have one of the best views from your workplace in the country! Direct view to the sea!

I.L. We don't pay attention to the view anymore. We have been here for so many years that it's not something special anymore. It is a part of our everyday routine. To those, who say: "Oh, what a view!", I ask them to come by during winter, when we have to work and keep the building warm. When the sea freezes and the norther wind keep blowing for 3 weeks in a row, then it is a real struggle to work here. But in summertime, it is nice! A fresh breeze and oxygen from the sea.

J.B. Can you tell me about the history of this building?

I.L. The building was built before the World War I as a warehouse. At that time there was no highway, no railroad in the village, and in the river delta only small fishermen boats could sock. So all the goods were transported here and then by boats transferred to bigger ships who docked further from the coast. A friend of mine have dived in the sea and found remains of the docking place, couple hundred meters from the coast at this spot. After the World War I, the port was modernized, and this building was privatized. During the Soviet period, carpentry of kolkhoz "Banga" was placed here. After the collapse of the Soviet Union we privatized the property and we are here ever since.

J.B. OK, thank you for the very informative conversation!

I.L. Thank you as well. At the end I just wanted to say that probably the best solution for this coast would be to put the rocks in a beautiful way, because the concrete blocks, of course, don't look nice. But who will finance that?

Oskars Vaivods, local fisherman

9 March, 2021, Varoņu iela, Roja

J.B. Are you fishing in the territory on the south of the port, aka, the rock coast?

O.V. No, I am fishing at North of Roja, in Žocene

J.B. What are the reasons or obstacles for this choice?

O.V. It is more difficult to catch the fish here, in Roja. Nets are getting damaged by the rocks.

J.B. Is it also because it is hard to get the boat down the coast?

O.V. Partly yes, but this problem is also in other places further from the village. There are couple of places where you can get the boat down on the coast with a car, for example, in Ķirkragas, next to Leišu houses.

J.B. Ok, you mentioned that in the past, in soviet times, on the coast along Zastāvs (*Former soviet army coast guard station J.B*) you were fishing eels.

O.V. Yes, they like the rocks on the seabed.

J.B. Were you allowed to catch fish with your own boat during the Soviet period?

O.V. Yes, but the procedure was different from the present. Every day you had to register in the coastguard and get the permit to go in the sea. It was more difficult than it is now.

J.B. Have you recently caught the eels here?

O.V. No. Last time I got the license for eels 5 years ago and it was a complete miss. 15 years ago, I could catch eels every morning.

J.B. Do you think that this is related with the pollution in the sea?

O.V. Yes, The eels are definitely not here because of that. Also eelpouts are affected.

J.B. Do you think that the pollution is coming from the agriculture and the land? Or it has a different source?

O.V. Yes, the pollution comes from the land. Also the sewage treatment ends up in the sea. The pollution is getting worse year by year. And that is also another reason why I chose to fish in Žocene. Because it is closer to the open Baltic Sea and I think that the water exchange between the gulf and the open sea bring more clear water closer to the cap of Kolka. And that also influence the possible catch. I have heard that in Melsils they have quite good catches.

J.B. So, the costal fishery is a hobby for you?

O.V. Yes, it's a hobby. My father thought me how to fish, and it is in my blood.

J.B. I have read articles and statistics saying that the number of costal fishermen is decreasing. What do you think will happen in the future with this profession?

O.V. It depends on how you classify the costal fishermen. Yes, the number of professionals are decreasing, also because of the limited fish resources available, but the hobby or self-consumption fisherman are becoming more popular.

J.B. And why do you think so? Would that be related to the possibility to get the license to access the beach with a car?

O.V. No, not necessarily. People need some kind of mental relief and the being on the sea can provide that.

J.B. Which are the most active fishing seasons?

O.V. Spring and autumn. Then I catch the Baltic Salmon and Brown trout. In the summer I used to also catch eelpouts but lately the catch is so small that it is easier to buy the fish from the professionals rather than to catch it myself.

J.B. And what kind of technique do you use for fishing?

O.V. I have a license for one 50 m long net. I am allowed to place it not closer than 100 m from the coast. I place it perpendicularly to the coast, from the shallow water to the deep.

J.B. Can you place the net also deeper?

O.V. Yes, but it doesn't make the effect, because the fish are spawning in this area. In the deeper waters I couldn't catch anything.



Raivis Brigis, local fisherman

17 March, 2021, Krasta iela,
Roja

J.B. Why do you choose to fish along this coast?

R.B. Because I live here. It is close to my home; I don't need to get the boat on the car and drive somewhere.

J.B. But I have heard that it is more difficult to catch fish here because of the rocky reefs.

R.B. Yes, sometimes the nets get stuck, but the fish like it here.

J.B. As I understand, you are employed as a fisherman by the local fishery company. Why do you catch fish also in your free time?

R.B. My father used to be a fisherman and I continue this tradition. I like to be on the sea, it is a tradition that I like to continue. It's a part of who I am.

J.B. Have you noticed the decline of fish resources in the sea?

R.B. Yes, definitely! I remember that in the 1980's we were able to catch cod with just a fishing rod from the coast. Now it is forbidden to catch the Baltic cod because they are so little left in the Sea. Now, there are times when there is more seaweed in the net than fish.

J.B. What was it like to live on the coast during the Soviet times? How was the interaction with the coast guards?

R.B. It was fine, actually. Of course, there were patrols, but I experienced it during the 1970's and 1980's. The guards were normal guys, and they knew us. If we didn't break the rules, everything was fine. We could swim and fish, and do some other activities.

J.B. Have you noticed the coastal erosion? Are you afraid of it?

R.B. Yes, I have noticed. I remember that the coast used to be further away. There was a meadow where we used to play football. But then in the early 1990's the kolkhoz (*Collective fisherman entity during the Soviet period, J.B.*) put the rock along the coast to protect it. After the storms in 2001 and 2005 they broke, so people started to put concrete blocks and debris to repair the road that was taken away by the sea. The concrete works quite well. I know that people don't like how they look, there have been complaints from the nature protection agencies as well, but what else can we do?

J.B. Do you think it will protect you and the property?

R.B. Well, for now yes. But the sea has enormous force. It is hard to fight against it.

J.B. How is it to live next to a force like this?

R.B. It is hard! People think that it is nice to live right next to the sea. The view is nice, and it is close by. But when the cold North wind hits the house in winter and you can't get the heat up, or during a storm trees start to fall down and the coast erodes, at those times the real difficulties appear. And people who don't live here all year round don't experience this! The incomers don't know the real deal with the sea.

J.B. Why are you maintaining the costal area along your property even though it belongs to the Latvian State Forests (LVM)?

R.B. Because no one else is doing it. The neighbors are also doing it and it is nice to come back home to a nice road and clean grass. I have also made the bench so I can sit and watch the sea.

J.B. But don't you mind that other people who are passing by can also use the bench and the bonfire place?

R.B. I don't mind the tourists and visitors. They can use the bench I made as long as they take their trash with them and don't make a big noise.



Viesturs Grosbahs, retired mechanic

19 March, 2021, Krasta /
Lašu iela, Roja

J.B.: The coastline has changed a lot during these past years...

V.G.: Very much so

J.B.: When did these changes started to appear? Was it when they built the port piers?

V.G.: No, it started before that.

J.B.: If I understand correctly, these stones weren't here, right? All of this was beach?

V.G. Yes.

J.B.: Sloped coast and dune, road and a phone line went here... And this block of concrete, there were tracks on top of it. What exactly they used those for?

V.G.: On those? A spotlight. They pulled it out and looked at the sea.

J.B.: and this part of the beach, up until the coast, there were this scarce forest and a meadow.

V.G.: Trees, forest...it wasn't that scarce, but here it was flat.

J.B.: How is it now when these stones and blocks of concrete has been placed here? Are you convinced that the cost won't come closer?

V.G.: there is no conviction. The level of the water... it's up there already.

J.B.: Is there anything else that you have noticed except the erosion? Has the sea changed in any way?

V.G.: not that I know of

J.B.: I have been talking to other people and they claim that the fish... there aren't that many in the sea anymore. You said before that back in the day you could easily catch them from the coast?

V.G.: Back in the day, the cod...when I walked by the sea, the cod were washed out to sea.

J.B.: That easy?

V.G.: washed out to sea and you go, grab it, and go home. Now there are none.

J.B.: yes, there are no cod fish anymore. It's also illegal to catch them.

V.G.: After the war there were many of them. They went away for a while, and then came back. What has changed, the saltiness of the sea has changed, and the cod... they can't be found.

J.B.: And how was it during the soviet times? You went to the sea? Were you a fisherman or a captain?

V.G.: Mechanic

J.B.: where you left at the base or you also went into the sea?

V.G.: to Atlantic ocean

J.B.: You were on those ships that went to Atlantic ocean?

V.G.: to Atlantic and here...

J.B.: Cool! And how was it? How long did it take?

V.G.: 6 months, 3 months?

J.B.: 3 to 6 months, that's a lot!

V.G.: it differed

J.B.: I want to ask again of the border guards. So, if there were a unit of them then you couldn't freely walk by the beach, could you?

V.G.: No, it wasn't allowed

J.B.: And for how long? Was it up until the collapse of the Soviet

Union? Up until 90ties?

V.G.: I don't remember exactly... something like that.

J.B.: So it wasn't allowed to come to the sea during daytime and night-time?

V.G.: Not in the daytime, not in the night-time.

J.B.: Does it mean that you can't put out any fishing net, can't have a walk, can't have a swim..

V.G.: Can't do anything...

J.B.: Wasn't it hard? You live by the sea but you can't get to it? Or did you just get used to it?

V.G.: You get used to it, knew that it's not allowed...

J.B.: Just to come and look...

V.G.: You come to the see and they see you and they take you in.

J.B.: There were such occasions?

V.G.: yes, there were such occasions

J.B.: what did they ask?

V.G.: what could they do?... warned me against it and let me go home. What else could they do...

J.B.: What role does the sea play in your life?

V.G.: Mainly it is connected with the work. All my life I have lived by the sea, I also had a workshop...

J.B.: If you have the chance to move somewhere else, would you have done that? Or is it better here

V.G.: It's better to live by the sea, the air is better here.

J.B.: Looking now at the sea, seeing what happens to the coast, erosion and everything else, you have been taking care of this seaside and the beach. Is it because you live so near the sea or is there any other reason? Maybe it's just because no one else takes care of it?

V.G.: I don't know... no one else takes care of it, and I like to live where everything is in order, cleaner.

J.B.: Do you think that creating an environment at the seaside is municipality's responsibility, or are you okay with the fact that you do it yourself – making a bench, little steps etc.

V.G.: What is there that we can do ourselves? Municipality should make some benches, but yes, those steps I made myself.

J.B.: Yes, I know, other neighbours also are making little stairs/steps to get to the seaside.

V.G.: Well, you have to have a way how to climb there...

J.B.: Is there anything at all that, looking from an infrastructures point of view, could be beneficial for the seaside? Maybe to walk down to the sea? Or maybe some lantern?

V.G.: I don't know, I don't think that anything else is needed.

J.B.: Looking from your perspective, as a person who has lived all his life by the sea, what the future is going to bring?

V.G.: It's hard to tell. Everything can happen. Back in the day all this coast along the sea... till Lube ,... I remember us digging the sand and dumping it, there were lots of shells.

J.B.: Yes, that's the old coast of the sea. Yes, at Lube and Slitere. The hypothesis is that that's where the sea was and now, year by year it's disappearing.

V.G.: Well, that's hard to tell. I don't think that there is anyone who knows for sure. All sorts of times has passed, ice age and what else not.

J.B.: Yes, but if we look at the short-term changes – look here, we can see lots of people who live here only during summertime. Back in the day this street was livelier, wasn't it There were more people in the town.

V.G.: I'm not so sure, it was quiet here...

J.B.: Quieter? In the sense that there were more locals here?

V.G.: Yes, not so many tourists.

J.B.: And these tourists ...do you have anything against them or you don't care?

V.G.: I don't mind them, they are not walking here...not very often.

J.B.: Have you used algae as a fertilizer for your garden?

V.G.: In the past there were algae and then I took them, yes. The cost

was shallower and then it was possible to take them up to my house, but now... i haven't seen them.

J.B.: what could be the reason for that? Winds have changed, algae have died out?

V.G.: I don't know, maybe because of the winds, streams for sure... they don't get off those stones. The level of sand has risen, when they dug up out the sand from the port, then they dumped the sand elsewhere... and now the streams bring the sand to the shore.

J.B.: yes, the sand that was dumped into the sea now is appearing at the shore.

V.G.: ... appearing at the shore...

J.B.: When you built your house, did you use any stones from... oh, but when you built your house there were no stones at the beach, right?

V.G.: Stones were there further down. You don't use these stones ... we brought them from the woods.

J.B.: From the woods? Because it's easier to take them?

V.G.: well, you can't take them from the beach

J.B.: true, they are protected by the law.

V.G.: they brought these here.

J.B.: well these at the shore, yes.

V.G.: During Soviet times they brought them..

J.B.: Where did they come from during Soviet times?

V.G.: From the woods... From Pūņu meadow, into the woods somewhere.

J.B.: Was that an initiative from Kolhozs?

V.G.: Yes, from Kolhozs. Theses stones...here where the bank is eroded ..here they put those stones and then added sand.

J.B.: But that clay was washed-out in the year 2005., when the big storm hit, was it not?

V.G.: In the year 2005 clay was already under the stones, then it couldn't be washed out that much.

J.B.: During Soviet times were there any fishermen? Or did they all were based in the port?

V.G.: All fishermen were based in the port. In the port and in Kolhozs.

J.B.: And here were no one...

V.G.: there were fishermen here, before Russian times.

J.B.: Where there many?

V.G.: There were even a shed for them.

J.B.: And what did the beach looked like? There were fishermen, boats, fishing nets and shacks. To compare to those times, what's different now?

V.G.: It was a lot more interesting.

J.B.: Oh was it?

V.G.: It was! Pulled your boat into the sea and..

J.B.: The boat is still here. So there were more people then?

V.G.: I don't remember that clearly now how was it... many years have passed...

J.B.: So, as I understood from you earlier, at the end of Lašu street there were a weathercock... and from Lašu street to the direction towards Riga there were the tower of meteorological station. Was it very close to the bank?

V.G.: It was located near the bank.

J.B.: And then they were able to climb up...

V.G.: Yes, to climb up. Some kind of a measuring instrument stood there. You could see and measure the height of waves.

J.B.: into the bay?

V.G.: Yes, yes, into that direction.

J.B.: Someone came here and took those measurements? You said that there was a woman who lived here...

V.G.: That woman came and took many measurements into the water. Temperature too.

J.B.: And this road, it has changed it's location a lot – then closer,

then further away, yes?

J.B.: Well, that road just goes here

J.B.: And then after the road they made it as a street

V.G.: Yes, after some time they made the street

J.B.: But I think that it will take one big storm and the road will be gone. One decade...

V.G.: This part isn't suffering as much as there ... behind those blocks, that bank is more damaged.

J.B.: After that block?

V.G.: Yes. The trees have roots, that's why the sea hasn't damaged the back as much as further down.

J.B.: The weather and the impact, isn't that constant, is it?

V.G.: It depends on the winds, yes, it's inconsistent.

J.B.: Which wind is the prevailing one?

V.G.: Northwest. Wind from the west brings in the water and the wind from North does the tearing.

J.B.: But if the wind is from southwest, what happens then?

V.G.: If it's from southwest then the water goes back.

J.B.: We don't have tidal.

V.G.: yes, it just depends on the wind.

J.B.: But if this all was sand/land, the big stone wasn't visible?

V.G.: No, that stone was under the sea, under the sand. And this stone...only the beginning of the surface was visible.

J.B.: Only, the surface.

V.G.: Yes, and then it was washed up...

J.B.: And it takes few storms ...

J.B.: Have you noticed that the bank is getting greener, that it's overgrowing with shrubs and grass?

V.G.: Some things are planted on purpose

J.B.: Oh, are they?

V.G.: Yes, these are planted, there where the pine trees are.. all of those are gone.

J.B.: Yes, they are gone.

V.G.: Further down there was green grass.. cows came to graze there.

J.B.: Oh, really? Now there is nothing close to a meadow.

V.G.: Now there is nothing

J.B.: Isn't it scary when the sea is coming closer?

V.G.: No, I'm used to it.

J.B.: Who is stronger the man or the sea?

V.G.: That's hard to tell...I assume that the sea... the nature.

J.B.: I think so too. Man can only try to do something...

V.G.: ...To do what ever man wants to do...

J.B.: ...and no matter what you try to do, the sea will find a way how to do something differently

V.G.: Not only sea did this .. it's all together.

J.B.: Yes, nature as a whole.

V.G.: Nature as a whole.



Janis Megnis,
manager of the Roja port
authority
16 March, 2021.
Roja port authority, Roja

Source: nra.lv

J.B. Can you tell me about the long-shore sediment flow and the difficulties that you encounter?

J.M. The sediment flow blocks the port canal, but it changes year by year. I am not a scientist; I am practitioner, and I can see that it changes every year. But we monitor the port canal with echolocators to understand how much it is blocked.

J.B. So you dredge the canal every year?

J.M. It depends on the type of cargo port exports. At the moment there is an increase in demand for wood – timber, lumber, woods chips and biomass. The demand for woodchips is increasing, especially because in Stockholm there is biomass treatment plant. If Latvia would cut down its yearly amount of biomass and would export it only to Sweden, it would be only 36% of the total amount of biomass needed for this energy plant. So, to export this amount, specific ships -bulklers, are coming in the port and they need at least 4,5 m of canal depth. Therefore, we are dredging the canal every year now. But in the past when the focus was more on the firewood export, we dredged the canal once in 3 years, because those ships needed a depth around 4,2 m. The core basis of our port has been fishing, that's why the port does not have enough space for timber. There are fishermen that pay large amounts of tax. In the eyes of the district the fishing makes more sense than timber, as timber only employs a few people. Only with timber it is impossible to the port with revenue.

J.B. But doesn't the timber bring in more taxes for the municipality?

J.M.: No...I will find the statistics... I will send you other interesting parameters. The Ministry of Transport collects the measures for productivity of the ports.

J.B.: I haven't seen such data.

J.M.: They aren't widely available to the public. The data is being collected as of 2014. There can be seen what is the deviation in terms of taxes.

J.B. So, does that mean that the productivity is being measured against the income of tax?

J.M.: Yes, it is very crucial to the small ports. Then we can see that fishery brings in hundreds of thousands in income tax for the overall tax mass for the millions.

Although the contribution of vessels from fishing vessels is about 3 thousand a year to the port authority. The district income is approximately 650 thousand. I have prepared the data for Mersrargs, as we are planning to cooperate.

J.B.: Yes, this is very useful information.

J.M.: These are the taxes that are not very popular, because Mersrargs likes to position itself as the second port of Kurzeme, right after Ventspils, but that is not entirely true, from the position of the tax. These are the taxes that is being paid by the fishermen of Roja. Wood is not even placed in the list, because the amount of tax that is being brought in is very symbolic.

J.B.: But the fishery in Mērsrags is very tiny, or does it even take place there?

J.M.: It's their tax. The difference between tax and income tax is 650 versus 50. That's 13 times more. It's all Stividor. Finext is Stividor, Gamma Rent is Stividor, Mērsrags Terminal, and that's it, they do not

have any other registered companies there.

J.M.: To reflect on the competition between Mērsrags and Roja again... It has been there since the Kolkhoz times. If there wasn't a fight between the kolkhozes in a ball or discotheque, then it wasn't a good ball. But speaking more seriously, after the reform when both ports will be in the same municipality, we have to look at them as a whole.

J.B. In a way that investments go into both ports, and they still compete?

J.M.: We need to look at them as 2 berths.

J.B.: Because the ports are so close to each other?

J.M.: Yes. One berth provides taxes, the other one – cargo. If one port has spare resources, then it helps the other one. It's already in the process, because here, in Roja, it's not possible to place more cargo storage. There are simply no space and potential for that.

J.B.: Is there space for more cargo in Mērsrags?

J.M.: Yes, there are many unused territories. But at the same time, there are specific types of cargo that can not simply be moved to Mērsrags. For example, wood chips.

J.B.: In my opinion, it sounds logical. The distance between the ports is approximately 30 km and they both will be in the same municipality.

J.M.: We will get to this eventually. Before elections this opinion is very unpopular.

J.B.: Does it mean that the timber cargo could be moved to Mērsrags from Roja?

J.M.: No, not at ll. Everything needs to stay as it is. There are privet investments made in ports and it is not that easy to move. The fees made in Mērsrags port could be invested in infrastructure in Roja port. And the taxes made in Roja could be invested in Mērsrags for public services, such as library and kindergarten.

J.B.: If we look at the future, do you think that the timber export and fishery will grow an there will be need for new infrastructure to accommodate this growth?

J.M. It is hard to tell. What I can tell is that last week I had a talk with an investor who wants to build a wooden plank workshop. They were ready to come to Roja and build the workshop, but we simply do not have space for that. They would produce the planks, one ship for export a month and they have the wood chips as by-product they could sell to the companies that are already in the port. But we do not have space for them. The land belongs to the state, but all buildings are private. And some are empty. The port authority does not own anything. And we don't have the instruments to fight with the private owners who have empty buildings. What we can do is to raise the property tac. In one occasion it worked ant the owner bankrupted. We were able to find a new owner who is now working.

J.B. Why did the investor chose to invest in Roja?

J.M. Because here there is still a human resource with technical knowledge. In Mērsrags it is already lost. And they need extra technical services for their business that could be provided by other businesses in the port. The property tax, also the electrical costs are the same in Roja and Mērsrags, but the main difference is in the human resource. In Engure it is the same, the human resource is lost there as well. In Roja, the fish factories have been active, more or less also after the collapse of the Soviet Union and the knowledge has stayed.

But I remember how SIA "Irbe" got a property where they built the new fish factory. There was an auction, some company bankrupted, and they owned the empty buildings. And "Irbe" was against some forestry company. If the forest guys would have wone, it would be an empty space with only timber storage

there now with maximum 4 employees. Yes, then the port's export amount would have been close to Mērsrags' amount, but "Irbe" won, build a new factory and 100 people have place to work now.

J.B.: How do you manage in which spaces what type of cargo will be stored? Do you consult or inform the municipality as well? I am asking this because the timber storage is put right next to the public beach and the port is at the very centre of the village.

J.M.: The companies before they start investment and their work come to the authority. And I inform the municipality about it as well. But some years ago we had a discussion in the municipality and I asked them – do you want cargo or not in the port? I asked them, if you make a political decision to not have cargo export, then we need to shut the port down; then there is no money for the infrastructure, dredging of canal and other works. So, before I started to work here on getting new cargo in the port, I asked for the direction from the municipality. And they agreed with me.

J.B.: Can you tell me about the territory between the sewage treatment plant and the pier?

J.M.: In 2015 there was a project developed, a draft for master plan to build a new dock, slip and several buildings for defragmenting the ships and recycling metal. It went through the Environmental assessment process as well. But the project delayed, also lack of funding, and it lost its meaning. So now we are thinking about developing it towards more added value businesses, like the wood workshop or carpentry. But, as it went through the environmental assessment, we are allowed to develop it into less damaging businesses.

J.B.: And this project is also linked with the newly built bridge across Mazupīte river?

J.M.: Yes, because otherwise this property does not have any access to roads.

J.B.: Speaking about access, the piers are publicly accessible. DO you mind that people are walking there?

J.M. No. The piers are nice, but they of course could be in better technical state. But the funds are limited.

J.B.: And they are also private property, right?

J.M.: yes, they belong to SIA "Līcis 93". But we have very good relationship with this company. If there will be a EU funding and a project, in 24h the piers will belong to the port. I am sure about that.

J.B.: I have not noticed any major repair work to the piers in the past. In how critical condition are they?

J.M.: Like every other port infrastructure in Latvia. It serves its function. Yes, they are not very nice for walking. I think there is possibility to acquire some EU funds, for example, naming it as a cultural heritage and then make the piers with some path or benches. But it's the municipalities responsibility.

J.B.: If we are considering a radical scenario where a new crisis comes, the export amount radically decreases, and the infrastructure deforms even further. DO you think that the port needs such a big infrastructure element? Maybe it can be demolished and made it smaller to minimize the amount of infrastructure that needs to be maintained?

J.M.: I am not hydro engineer, so I can not answer this question. I assume that the engineers that designed these piers in 1970's were not the worse ones, and they took into consideration the flows, streams and wave strength. If the piers would be straight and shorter in length then, similar to Pāvilosta, there would be higher waves in the canal. Not they are blocked.

J.B. These constructions also influence the erosion of the coast South from the port.

J.M. ... The erosion has been here always. We just need to live with it. I don't think that redesigning the piers would change that. We can just live with the erosion in the long-term.

J.B.: It also goes along with the climate change, more devastating storms and warmer winters. How the port functions in the winter now?

J.M.: The Baltic Sea is basically one big lake, Yeah, we are screwing it up with the pollution, the dead zones ... I am more concerned about the living organisms rather than apocalyptic storms. The sea accumulates energy. If there is a warm winter, the energy explodes somewhere, like in the storm in 2005. In January I even colored some wooden planks with bare hands, it was that warm. But the winters are warmer and colder. This year, the ice caused some problems in the port, but the gulf as free of ice, the fisherman went out in the gulf. The problems start with bigger ships when they enter the port and pushes the ice to banks. And if the bigger ships can not come in the port, then the timber storage gets full and the demand for the cargo goes decreases. At the moment when the port defreezes, no one needs that timber anymore.

J.B.: The last question is about yachts.

J.M.: Yachts need one day long trip to have a nice, comfortable experience. Let's say from Ruhnu to Roja, then to Mērsrags. While there was no yacht infrastructure in Engure, it was a problem in the Gulf.

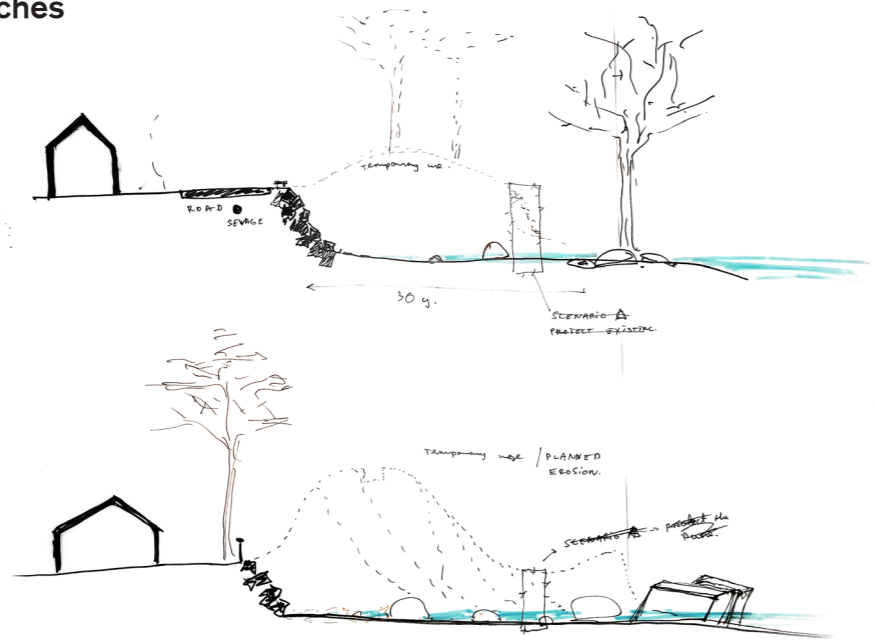
J.B. Yes, because the next stop after Mērsrags was Jūrmala or Rīga.

J.M.: Yes, Well, there are guys who like the challenge, but the average traveller doesn't want to spend more than 5 – 6 hours in the sea. And this problem is still between Ventspils and Roja, because there is no dock in Kolka.

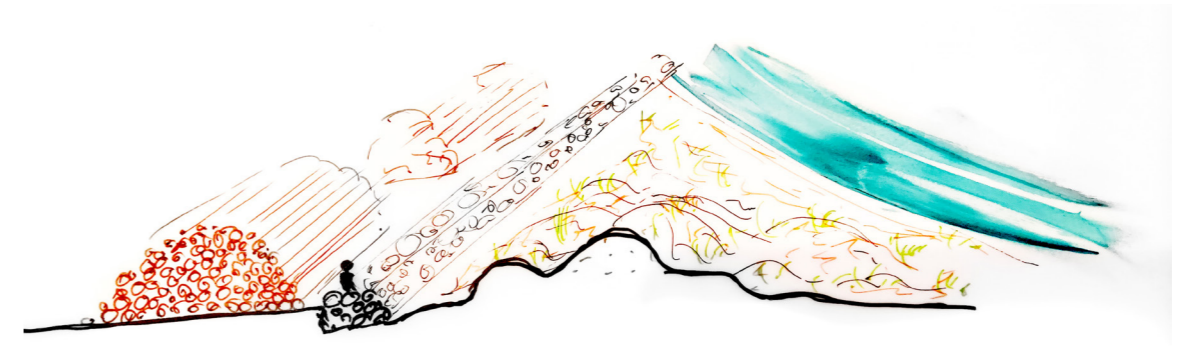
J.B.: Is there any new infrastructure planned for the yachts?

J.M.: We have a project of new docks for 60 yachts ready to be built. We are just waiting for funding.

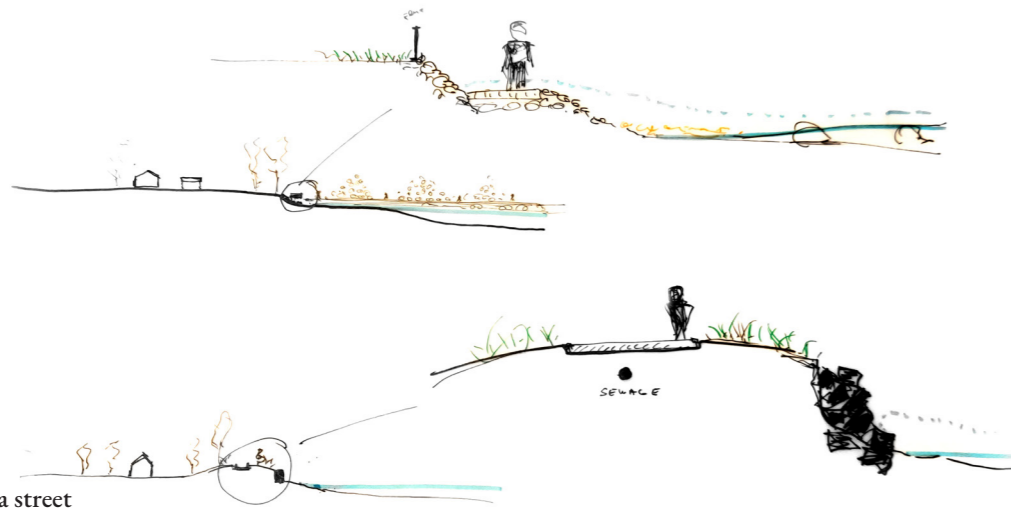
Appendix 2
design process sketches



Erosion park sketch



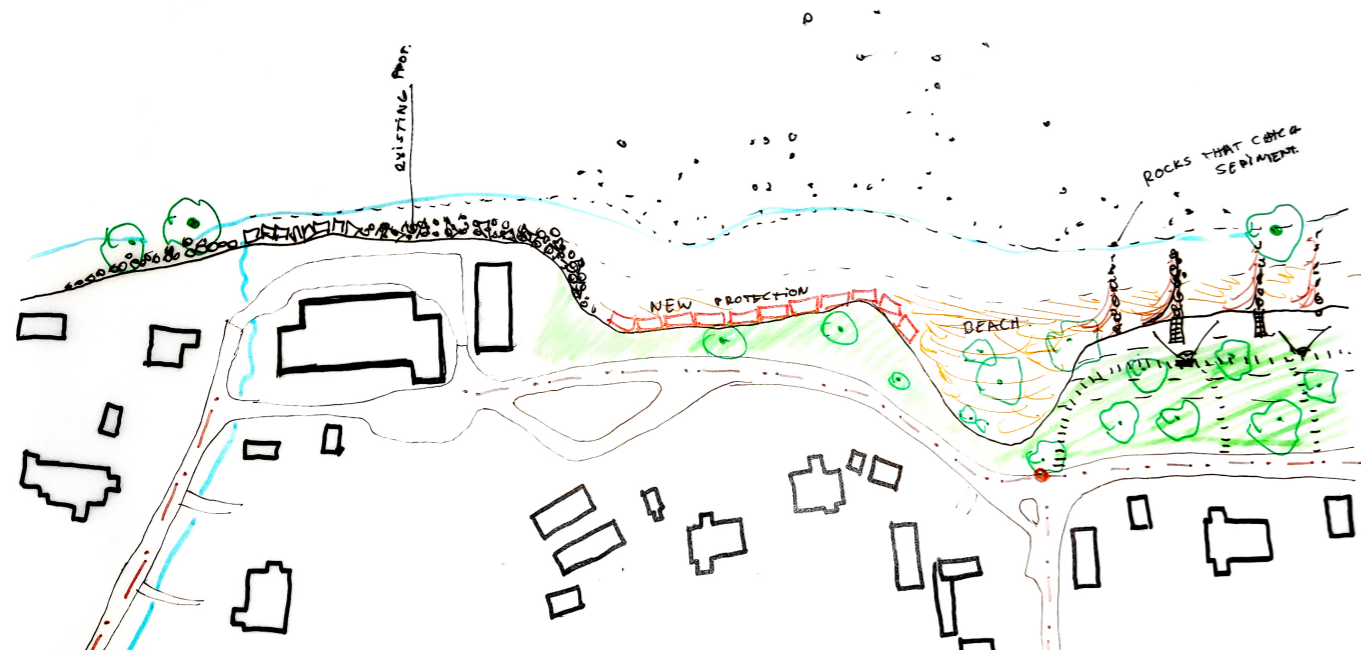
Sand project and pier sketch



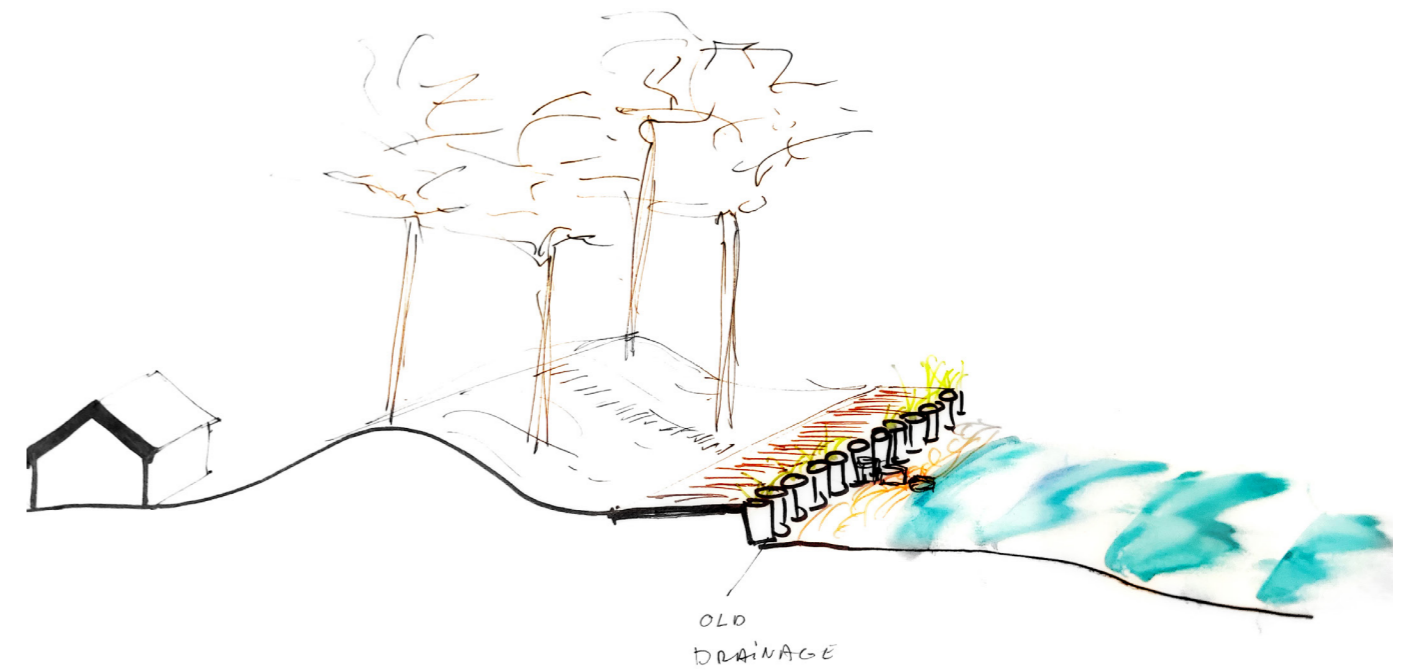
Sections along Krasta street



Groynes sketch



Liepu/Peldu street



Liepu/Peldu street

