Nomadic Territories.

Reconceptualizing resilience in the Wadden Sea Region.
The experiment of Texel.

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P5 Report

Transitional Territories Studio North Sea: Landscapes of Coexistence. A Topography of Chance.
2019-2020

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Delegate of the Board of Examiners: Ir. L.M.M. de Wit

June 2020

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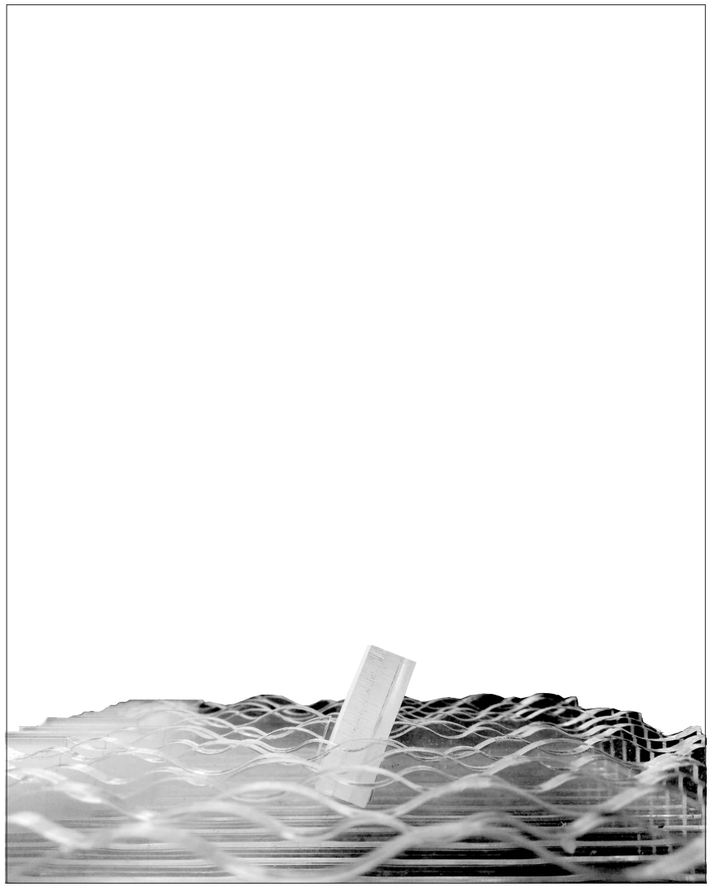

Sinking stability - conceptual model

* all images and drawings have been created
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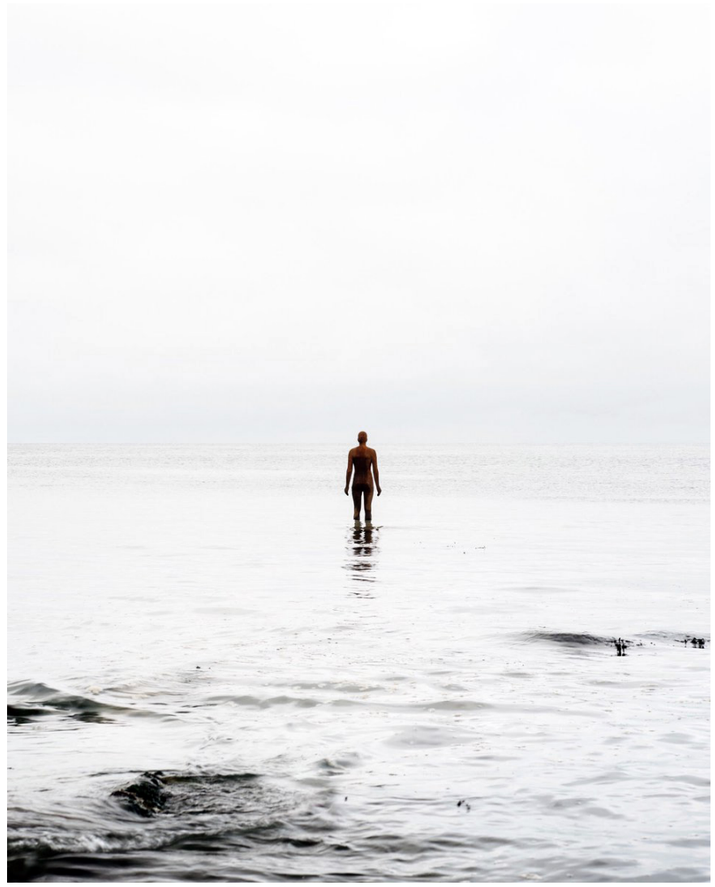
Abstract

The scope of this graduation thesis is to examine up to what extent nomadism as a way of life and human existence can inform spatial planning and landscape design concerning risk mitigation and adaptation to the uncertainty of the future, and eventually, reconceptualise the resilience framework within the spatial context of the Wadden Sea Region. The thesis starts with an inquiry around the very notion of nomadism, outlining the figure of the nomad in relation to the territory, as a habitat and as a field of knowledge. Nomadic territories are distinguished by co - habitation between human and nature systems accompanied by a synchronized performance of natural and anthropogenic agents. The nomad is fully embedded with the territory and its nature, meaning that he or she is not only aware but also part of the biophysical cycle. The ex ante of Sámi contributes to the establishment and definition of the nomadic paradigm and simultaneously supports the previous argument. A hypothesis transition moves the scope of the study from Sápmi to the Wadden Sea Region, aiming at testing how the nomadic paradigm could trigger a shift in the way sedentary civilization, currently based on permanence, stability and over – exploitation of ecosystems carrying capacity, values the landscape. The analysis and diagnosis of the multifaceted pressures related to climate change and human activity in the Wadden Sea Region highlight the urgency for a new balance between economy and ecology, based on co - habitation and de – growth. A shift towards the nomadic paradigm, thus, seems extremely relevant. Following this, an evolutionarily adaptive strategic framework is developed and applied on Texel Island which becomes an “in situ” experiment. Here, the strategic actions turn into place specific (plug in) design interventions. The living lab of Texel is an iterative, robust, open innovation ecosystem, where water management, land use and human activity are reprogrammed through design, in a way that mitigates risk, enhances the island’s adaptive capacity, activates awareness and participation of permanent and temporary actors, towards a sustainable development that will set a (neo nomadic) example for the Wadden Sea Region as a whole.



Turner Contemporary - art installation
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Acknowledgements

I would like to thank and express my gratitude to those who contributed with their support and patience throughout this long, exciting and sometimes painful journey. First, I would like to thank my mentors, Luisa and Diego, for their guidance, words of wisdom, and vast amount of knowledge. I am also grateful to my family and friends in Greece, UK and the Netherlands for their positive attitude and smile from the very beginning of this journey until the end and for the wonderful discussions during dark times. Finally, I would like to deeply thank the people from Eugenides Foundation in Athens, for their strong belief in me and support during these last two years.

Contents

1

INTRODUCTION

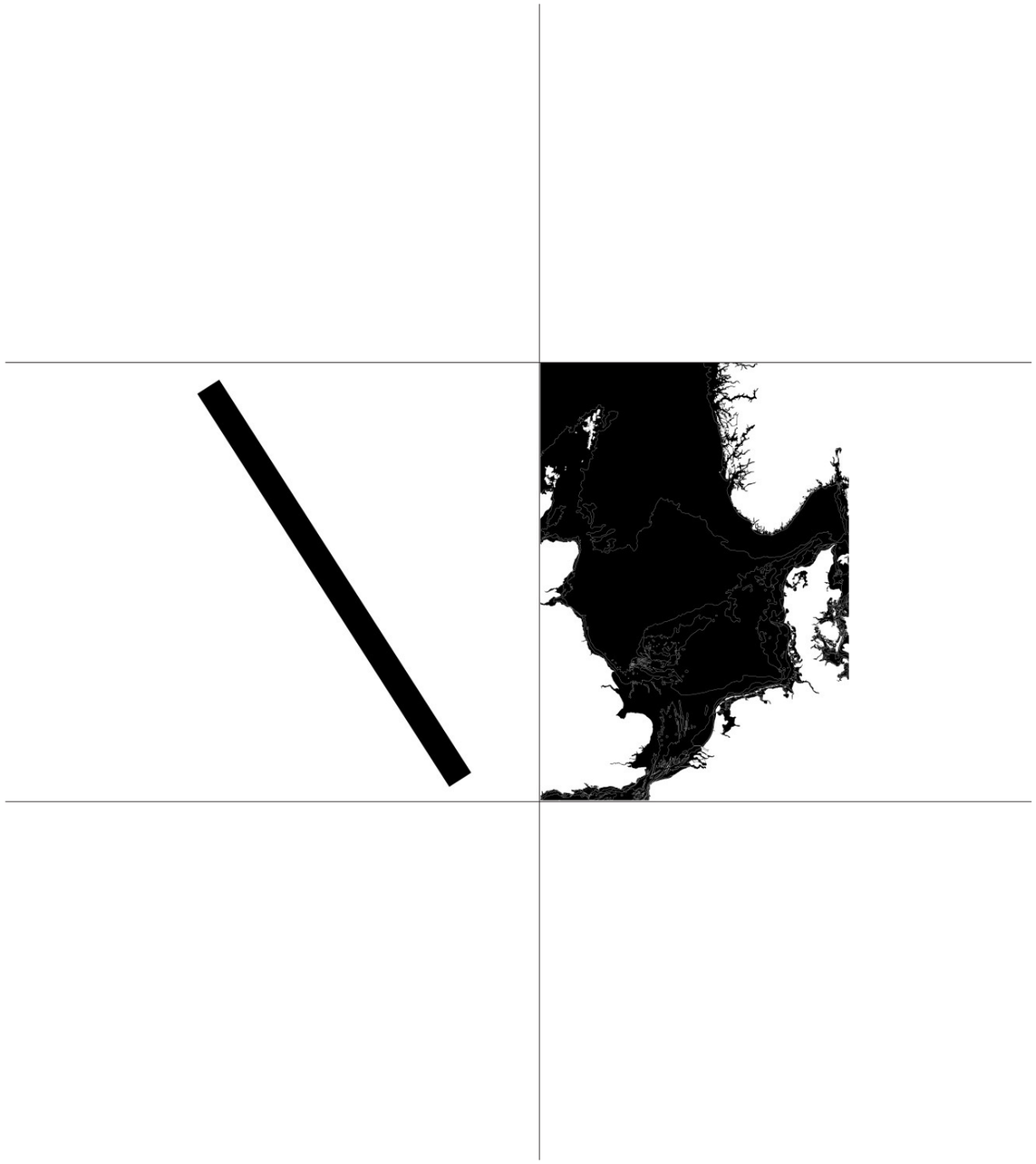
In the light of climate change and the uncertainty of the future our surroundings are constantly changing. Impacts of climate change can be experienced either through precipitous and unforeseeable short – term hazards, such as floods and wildfires or through longer term intrinsic processes like for instance sea level rise, water pollution, coastal erosion, land degradation and biodiversity shrinkage (Adams, Adger, 2013). Namely, and according to the climate scenario RCP8.5 (which follows the Representative Concentration Pathways – RCPs –, as defined in IPCC AR5), ice mass loss in the Arctic and increasing seawater levels, potentially exceeding 1 m by 2100, can disturb ecosystem services worldwide, severely affecting coastal populations and threatening vulnerable ecological and morphodynamic regions, such as the Wadden Sea UNESCO World Heritage Region (Vermeersen, Slangen et.al. 2018).

What is more, current neoliberal global tendencies, embedded with an opportunistic mentality towards planetary natural resources, shape an additional pressure. The excessive and unhindered mobility and the constant flows of people, information, goods, services and capital, result in a “disappearance of space” and the “dominance of a global culture” (Rohkramer, Schulz, 2009), manifesting a socio – economic development where “more is more”.

Many representatives of the scientific community claim that the significance of space is now depleting. Others argue that space should be considered as the key element for social sciences and humanities. They demonstrate an indispensable “spatialization of the temporal” (Rohkramer, Schulz, 2009), meaning a shift in the way we perceive territorial space. The latter opens a debate among human scientists, indicating the urgency for a reconceptualization of the territorialisation process. Instead of a permanent, static container, space should be perceived as a living organism, in transition, as a “space of going, space of passage, nomadism, transition, circulation and transformation in time” (Careri, 2002). In this new type of space, inhabitation is no more the same. New opportunities arise, new limits for freedom and experimentation occur.

This graduation thesis reflects the above mentioned speculation and explores the way in which nomadism could trigger a shift from normative to adaptive spatial planning and eventually alter the way humans perceive and inhabit the territorial space. To begin with, the ex ante of Sámi together with a theoretical research around the notion of nomadism and the figure of the nomad in relation to the territory as a habitat, leads to the term “nomadic territories”. Nomadic territories are those characterized by co – habitation between human and nature systems and a synchronized performance of all the dynamic agents both natural and anthropogenic. The nomad is fully embedded with the territory and its nature, meaning that he or she is not only aware but also part of the biophysical cycle. The chosen area to test the possibility of such a shift in the territorialisation process and the way spatial planning performs is the Wadden Sea Region. Therefore, the research question is the following: How can a shift towards the nomadic paradigm inform spatial planning concerning risk mitigation and adaptation, in order to re – conceptualize the resilience framework within the Wadden Sea Region?

In the adjacent chapters of this report, the reader can gain a thorough understanding of the thinking process followed in order to define the nomadic paradigm, which is the result of theoretical research and an insight view of the way Sámi nomads have managed to survive and adapt to changes within the context of climate change, globalization and neoliberal socio economic development. The theoretical and conceptual frameworks provide definitions of theories and fundamental links in order to guide the research towards the analytical, strategic and design framework. Key to the project is working with a multiscalar lens. Each scale of analysis and synthesis elaborates on the objectives and contributes towards the exploration of the research sub – questions, while the whole setting, eventually, helps addressing the main question stated above. For this reason, the project evolves from the North Sea territorial scale towards the Wadden Sea regional scale and the Texel island scale.



The North Sea - Delta Urbanism
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1.1

Motivation and relevance

Aspiring to become an urban thinker and designer has always been a difficult and sometimes, even a lonely choice in this building and massive development – oriented discipline. However, this journey in a complex field with direct social, economic and political dimensions, among different scales of compensation and design, vivid conversations and well – chosen words seems more than exciting to me and has been my sole desire to which I wish to become passionately committed in the future.

During my undergraduate architecture studies in Athens, I had been always considering architectural design as an analytical and synthetic tool which combines simultaneous thinking in both human and urban scale. Apart from fulfilling its purpose and function, each architectural structure should also correspond to the larger system of the city. Thus, the city should not be perceived as a passive and static recipient of the architectural form, but, instead, it should be seen as a living organism in constant dialogue with the architectural structure. Scaling up and thinking about the territorialisation process, spatial planning should reflect the pursuit of an efficient and sustainable synergy between all the related environmental, societal, economic and political agents that perform and shape the territory. According to Andreas Faludi, in order for spatial planning to achieve this, “it must make the various agents that are normally shaping development according to priorities of their own, fall into line” (Faludi, 2000). Therefore, borrowing Faludi’s term, I see “planning doctrine” as a regime that requires some kind of wisdom, a constant multi – scalar, multi – perspective thinking and working ability, especially considering the ubiquity of change that our nature is embedded with and the uncertainty of the future. This intriguing puzzle – solving that spatial planning and design resemble with, is what makes me most allured about urbanism.

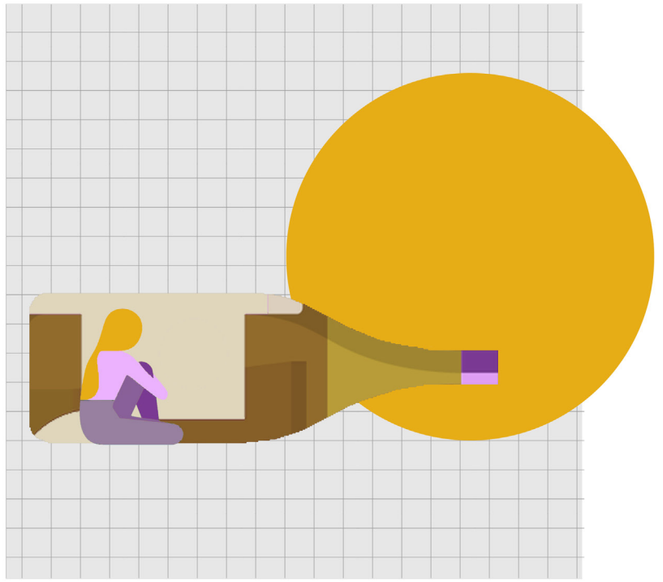
These last two years of my studies in TU Delft, Faculty of Architecture and the Built Environment (Department of Urbanism) have been proven a fruitful and unique experience. I have been given the opportunity to rethink urbanity in different ways, in a collaborative and inspiring design environment and also broaden my horizons by implementing and becoming familiar with new urban planning strategies and urban and landscape design approaches.

Entering my Masters’ graduation year, the last step of this academic journey, my research has been focusing on interpreting the complex interplays and relations between urbanization processes and the ever changing landscape of the North Sea territory, through analytical, conceptual and projective approaches. Highly urbanized, the North Sea could be seen as a game board of such an interaction, where neoliberal tendencies, flows of people and constantly altering landscape patterns coexist. The complex and dynamic synergies between ecology and economy in such a territory, which can only be studied within the context of risk and uncertainty and the idea of change, triggered my interest and constituted the driving force behind my decision to become a member of the Transitional Territories graduation studio.

2

NOMADISM

Nomad //ˈnəʊmad / / noun
Noun: nomad; plural noun: nomads
from the Greek word **νομάς** – nomás, “roaming, wandering, especially to find pasture” – (wiktionary, 2020).



The body inside the bottle

2.1

The “encapsulated nomad”

This nomad does not live continuously in the same location, but rather moves from place to place, following defined routes and migration patterns. The body is the key element that describes his or her transition in space. The bottle here functions as a capsule that constantly surrounds the body of the nomad, maintaining a gap between the nomad and the outer territory. According to Erwin Goffman’s theory of “bodily vehicles”, these nomads use their body as the “vehicle of sensory experience, the membrane between perception and cognition” (Goffman, 1963).

Compensating our globalized world, which is dominated by endless flows of people, goods and capital, and could be characterized by a “disappearance of territorial space”, this nomadic figure seems rather familiar. The “encapsulated nomad” finds his or her position within a no – topos, a new “No – stop city”, resembling Archizoom ’s utopian project, where the territory looks like an infinitely extending grid, an endless and rather featureless space in which humans, nomads, live as campers. Similarly to Constant’s “New Babylon”, this speculative nomadic scenery constitutes a spatial form of freedom, offering only the minimal conditions for a behaviour that remains as free as possible, implying a utopian alternative to the functions of the city defined by Le Corbusier: recreation, traffic, working, and living (Jorgensen, Wilson, 2017). Everything is possible and able to happen.

The “encapsulated nomad”

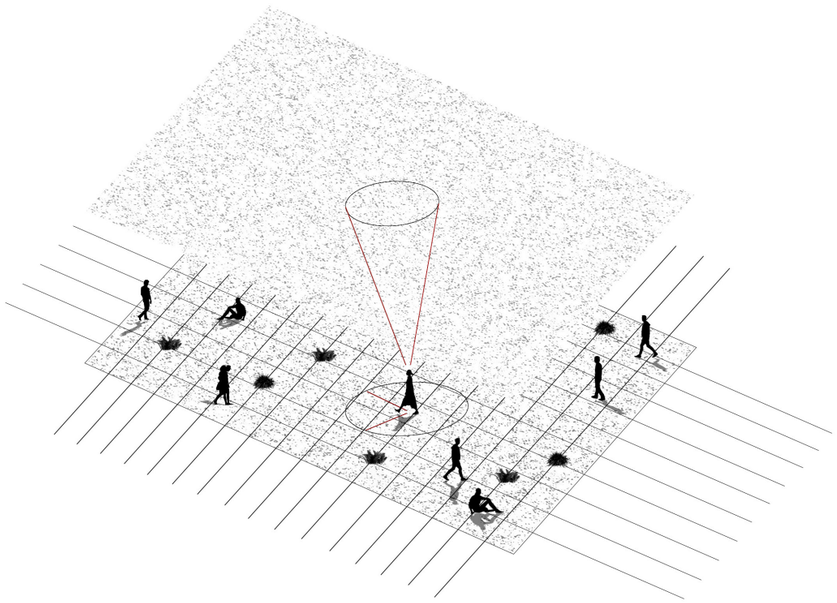
2.2

The “nomad in co - habitation”

This nomad is associated with the nomadic tradition, moves cyclically or periodically, inhabiting space temporarily (Encyclopedia Iranica) and “is not an explorer of ever-new terrain, but his or her cyclical movements turn into a constant change between territorialisation and de – territorialisation” (Cuppers, 2005). This nomad is fully embedded with the territory and its nature, constantly observing it and absorbing wisdom from its undergoing biophysical mechanisms, which later projects on a new “topos”. The bottle here is the habitat of the nomad. There is a constant interaction between the two of them, in other words this nomad lives in co – habitation with his or her surroundings.

Originally, nomadism is a collective way of living, directly affected by the changing natural and anthropogenic conditions and is ecologically adapted to the pursuit of available resources in distant places that are neglected from sedentary civilization. Mobility is the most efficient strategy for exploiting resources, allowing the development of economic activities in order to ensure nomadic livelihood (Encyclopedia Iranica). Adaptable settlement, such as portable and flexible shelters, is also part of the nomadic tradition.

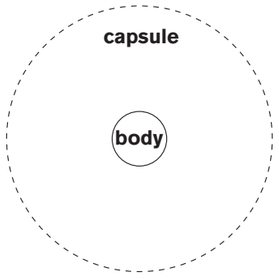
The nomadic way of life is characterized by living in harmony with “the ephemeral” and takes place in complex, fluid transitional territories. The traces that nomads leave behind when moving from one place to another reflect the temporality embedded in the territorialisation and de - territorialisation process, in other words, the spatiotemporal nature of nomadism. Permanence is replaced by transformation, adaptation and change.



The “nomad in co - habitation”

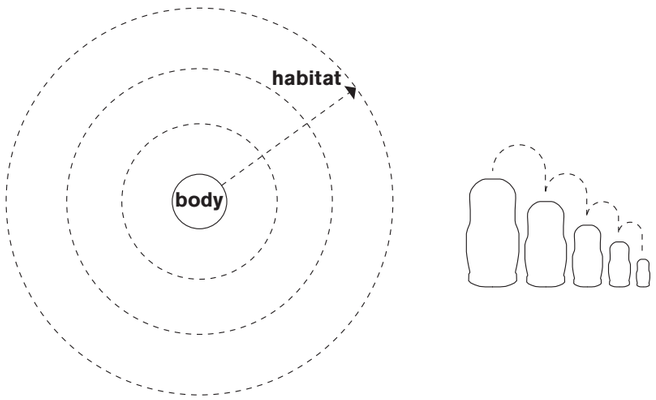
First interpretation: The “encapsulated nomad”

Body = nomad
Bottle = capsule



Second interpretation: The “nomad in co - habitation”

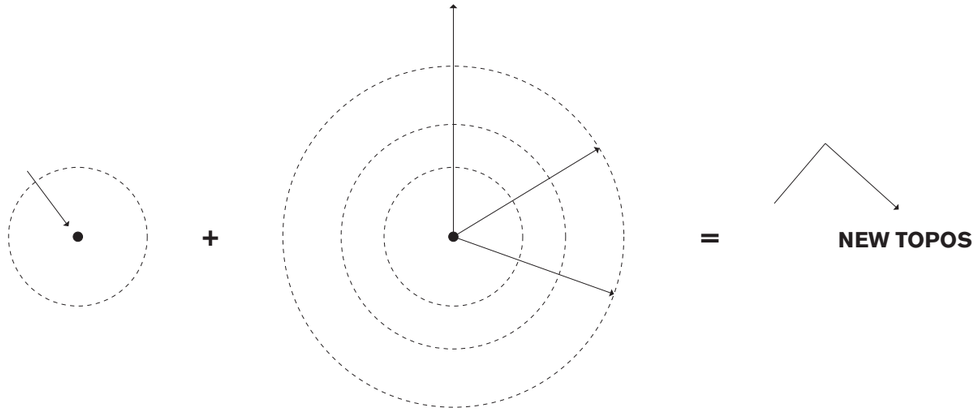
Body = nomad
Bottle = habitat



Interpreting the relation body - bottle

2.3

Acquisition of knowledge



self - referential
knowledge

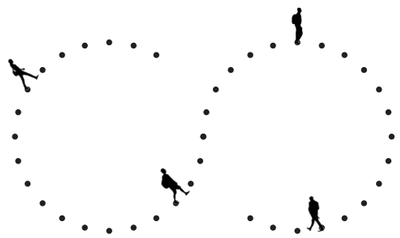
habitat
knowledge

The two types of knowledge

After outlining the two nomadic figures in relation to the territory and understanding the way they move and act in space, one would come to the assumption that there is a clear distinction between the knowledge they acquire. On the one hand, the encapsulated nomad is a figure enriched with self – referential knowledge. The enclosed body is exclusively stimulated by the bottle, neglecting the outer world. On the contrary, the nomad in co – habitation acquires knowledge from his or her surroundings, and therefore is not only aware of the way the territory performs, but also becomes part of it. The bottle here symbolizes the habitat, the territory. The ability to read the sky and land, to read the habitat, makes this nomad able to adapt to the changing conditions, able to face the ubiquity of change and the uncertainty of the future, thus, time is an integrated factor. When this nomad migrates, the acquired knowledge is projected on a new “topos”.

2.4

Nomadic territories



Schematic representation of nomadic territories

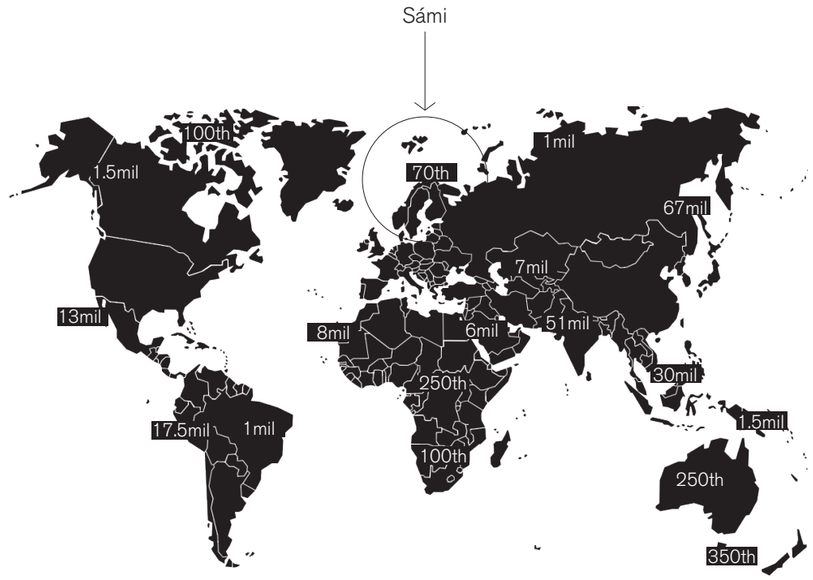
Looking back to the “nomad in co – habitation” the one who is associated to the nomadic tradition, we can draw some assumptions concerning nomadism as a way of life and human existence. More precisely, nomadism means the process, the constant alteration between territorializing and de – territorializing. According to Deleuze and Guattari, the “nomadic” space is defined as a smooth space, heterogeneous, in continuous variation, amorphous and not homogenous (Deleuze & Guattari, 2004), embedded with multiplicity. This multiplicity, this fluidity, links to the complexity of the territory and consequently it is what creates new arrangements of forces, new possibilities for territorialisation. Following this rationale, with nomadic space being characterized as smooth and fluid, nomadism reveals how what is de – territorialized becomes re – territorialized, pausing the “movement of the infinite” before de – territorializing again (Deleuze & Guattari, 2004). Ultimately, it is a transition, both in time and space.

Nomadic territories can be resembled with utopian sceneries. Utopia, a notion diachronically found in the epicentre of philosophical and architectural debates, etymologically stands for the unconditional de – territorialisation. However, it is related with the present relative “topos”, and the undergoing mechanisms, the latent forces of this “topos”. It refers not only to no – where but also to now – here. Thus, it is directly related to space. “It appears not as a finished object but rather as an open project: not a utopia as a state of perfection to be reached, but a utopia as a regulating idea, as a project whose force stems precisely from the fact that it cannot and should not be realized in any definitive form” (Deleuze & Guattari, 1994).

Nomadic territories are in fact territories in transition, territories where the relation between the individual and the habitat is re – invented. Thinking of the territory, as a habitat and as a field of knowledge, nomadic territories are distinguished by co - habitation between human and nature systems accompanied by a synchronized performance of natural and anthropogenic agents. The nomad is fully embedded with the territory and its nature, meaning that he or she is not only aware but also part of the biophysical cycle.

3

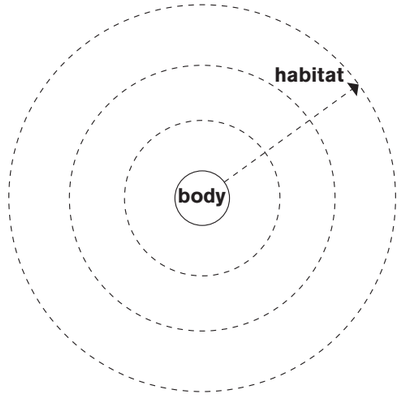
EX ANTE: SAMI



Indigenous and nomadic peoples around the world
Retrieved from: http://www.samer.se/2137, edited by the author

Nomadism is traditionally related to prehistoric times, however, nomads can be still found around the world. Today, there are 370 million indigenous people around the world and their territories cover 24% of land worldwide. Almost 10 per cent out of them live as nomads. Nomads and indigenous peoples inhabit areas of high ecological value (their land contains 80% of the world's biodiversity), which value they are often called to defend (Etchart, 2017).

Along the centuries, they have managed to overcome multiple exogenous and endogenous pressures such as violent oppression and war. Their land has often been confiscated, they have been displaced and their cultures have been suppressed through the use of assimilation methods. Although usually placed on the fringes of the society, their struggle for survival finds fertile grounds, thanks to their strong cultural identity and their increased adaptive capacity.



Sámi herders
"girl", retrieved from: https://ejfoundation.org/ The rest retrieved from: www.nordnorge.com

Sámi: Who are they?

The Sámi people (also Saami) constitute the only recognized indigenous nomadic group in Europe, inhabiting Sápmi (Sámiland), which today encompasses the coastal and inland parts of northern Norway, parts of Sweden from Idre northwards, northernmost Finland and the Kola Peninsula in Russia (Brickhill, 2019). Sámiland used to cover a broader surface in the past, but through the years Sámi have gradually been forced back (Svensk Information, 2005).

Although a large percentage of Sámi still lives in Sápmi, there are also people who live elsewhere, outside of the Sámiland. The total Sámi population is estimated around 70,000. More than half – 40,000 – live in Norway, 20,000 live in Sweden, 6,000 in Finland and 2,000 in Russia (Svensk Information, 2005).

The traditional Sámi lifestyle is dominated by hunting, fishing, trading but primarily by reindeer husbandry. Reindeer is an essential part of the Sámi everyday life. It has multiple functions such as transport, milk and meat production. Traditional knowledge on reindeer herding has been passed down from generation to generation, constructing a strong cultural component and an important part of the Sámi identity. Although reindeer husbandry is a core Sámi occupation, nowadays more and more Sámi are involved in tourism, food production and other economic sectors (Svensk Information, 2005).

The Sámi language, which is in fact a combination of three languages, similar enough to the Finnish, has a long history, since findings indicate that it has been spoken in Northern Europe for thousands of years. The richness of the Sámi language is impressive, especially when it comes to naming weather conditions and natural phenomena. For instance, there are over 300 words describing different snow and ice attributes (Svensk Information, 2005).

The affluence of the vocabulary used for the description of different climate and weather provides evidence concerning the Sámi way of life. It is a life in harmony with nature, from which this deep traditional knowledge derives.

Similar to the language, religion and culture are very much defined by this way of life, too. Sámi believe in a cosmos divided into three spheres: the underworld, the real world and the celestial world. Originally, their arts and crafts refer to the past, when the Sámi, as nomads, needed light and practical utensils in order to survive in nature and facilitate their everyday life (Svensk Information, 2005).

Sápmi region

3.1

Problem field

Nowadays, both Sámi nomads and their habitat are under risk. The Arctic as a whole faces enormous challenges and threats. Symptoms include reduced sea ice, increased levels of carbon-carrying organic waste in the Arctic Ocean caused by melting tundra, coastal erosion due to increased wave activity, loss of habitat for large mammals such as seals and polar bears and growing disruption of indigenous human communities. Environmental degradation and destruction is reinforced and accelerated by over – exploitation within the context of global capitalism and the opportunistic mentality towards nature. Thus, the Sámi economy and culture, which is directly depending on natural resources, is becoming more and more vulnerable.

Living in the Arctic regions, Sámi people have experienced the harshest environmental conditions for centuries (The 350.org Team, 2018). But nowadays, off-the-scale warming, deforestation and large scale energy projects are severely affecting their way of life, threatening their cultural identity. More precisely:

Rising temperatures and consequently higher precipitation levels in the Arctic (Brickhill, 2019), together with the extensive deforestation constitute two major pressures for the Sámi people and the reindeer. Both generate a decrease in the amount and quality of grazing land and a disruption of the migration routes. Reindeer's pursuit for food sources becomes harder, due to the altering snow conditions (WWF, 2019). As a result, more animals are led to starvation each year, their population declines and Sámi economy and culture which is directly dependent on reindeer husbandry, is eventually harmed in multiple ways.

Increased seawater temperatures, affect fishery as well. Once water close by the coastline gets warmer, native fish migrate further away to reach more suitable warmth conditions, while simultaneously invasive species arrive, attracted by the new water conditions. These species are not suitable for fishing and eating and some of them can be even dangerous and disturbing for the ecosystems' health and balance.

During the last decades, a large amount of productive land in the Arctic has been degraded or destroyed due to the extensiveness of drought and wildfires, which require long lasting processes in order to fully recover. However, climate change is

not the only threat for Sámi's traditional culture (The 350.org Team, 2018). Diachronically, the pressure is directly related to the exploitation of natural resources through war, industrial development and economic development (Mao, 2018).

As it has been already mentioned above, indigenous peoples have been oppressed over the centuries and in many countries they are among the most vulnerable inhabitants. In our case, Sámi history is very much determined by long – lasting wars and violent incidents, like the Sápmi border intrusion by the Nordic countries and Russia, which led to a distribution of Sámi people in four different countries: Sweden, Norway, Finland and Russia. The "Lappland War", left behind both victims and ruins (Mao, 2018).

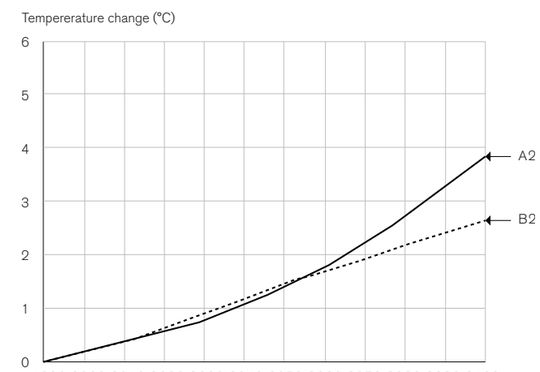
Following war and violence, the next and maybe most intense form of pressure for Sámi people was the industrial colonization. This phenomenon, which took place during the 20th century, was expressed in space through newly introduced activities such as logging, hydropower development, mining, oil drilling and wind farm, directly affecting land use and giving birth to several conflicts, especially among the reindeer herders community (Mao, 2018).

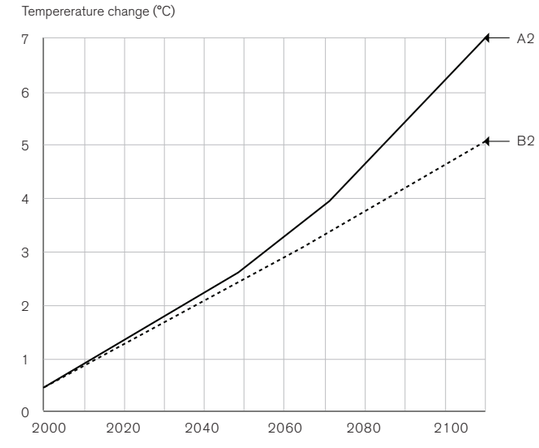
Hydropower development constitutes the major activity regarding energy generation. Constructions such as dams and power plants disturb the natural river flows and therefore create additional obstacles along the reindeer migration routes that seek for pasture, threatening both the animals and the Sámi herders who are directly linked to them (Mao, 2018).

An additional form of pressure in Sápmi is without doubt mining already from the beginning of the 20th century. Over - extraction is a harmful activity for the ground above the mine, which subsides and eventually swallows the land settlements are built on. Despite its precarious effects, mining is encouraged by governance and over – extraction of resources is taking an extremely dominant role over the Sápmi habitat.

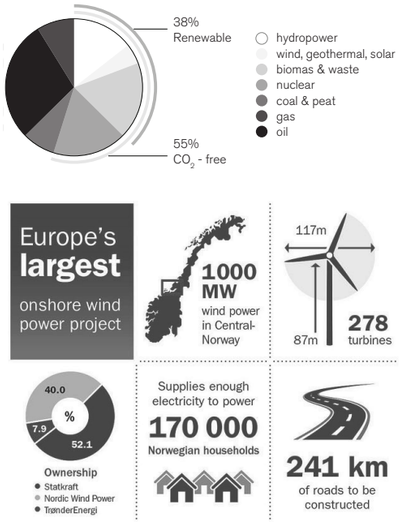
The expansion of wind farming can accordingly be seen as a type of resource exploitation with several cases indicating that, such as the Markbygden Wind Farm in Sweden and Fosen Peninsula in Norway. Wind farms cover a large percentage of reindeer grazing land, and become obstacles along their migration pathways, affecting the balance of the ecosystem (The 350.org Team, 2018).

Touristic development is also considered as a type of pressure, threatening the local identity and the traditions of the nomads. Reindeer husbandry itself has been transformed by the touristic industry which is liable to encroach on the land

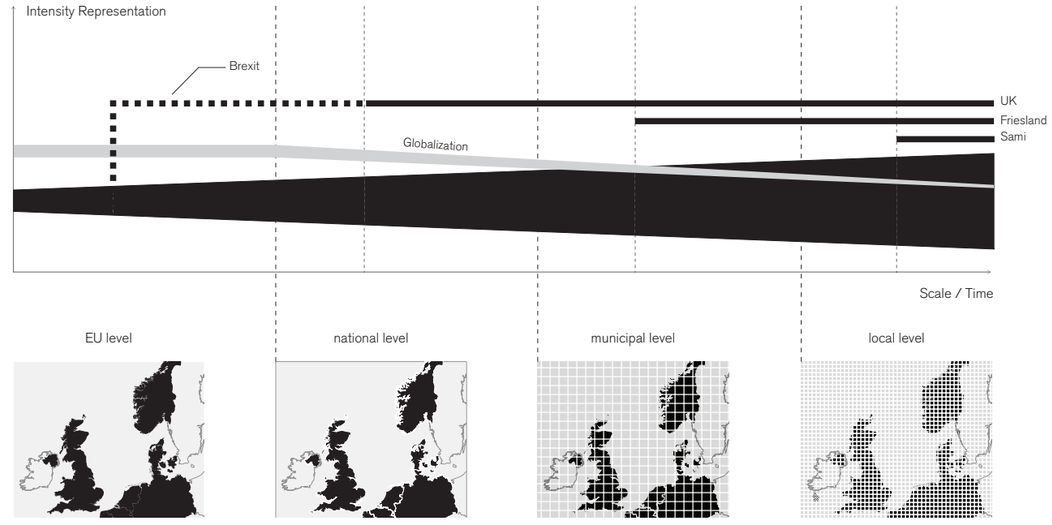




Increase in arctic temperature (for 60°-90°N) projected by an average of ACIA models for the A2 & B2 emissions scenarios, relative to '81-2000
ACIA, (2004) Available online at: www.acia.uaf.edu



Impacts of climate change and global development
"Windmills at Smøla, Norway, southwest of the Fosen region", retreived from: www.newsdeeply.com
Nordic total primary energy supply 2014, source: Nordic Energy Research 2015, IEA 2015
"Frozen lake near Jokkmokk", Sweden, "Starving reindeer": retrieved from: https://ejfoundation.org/



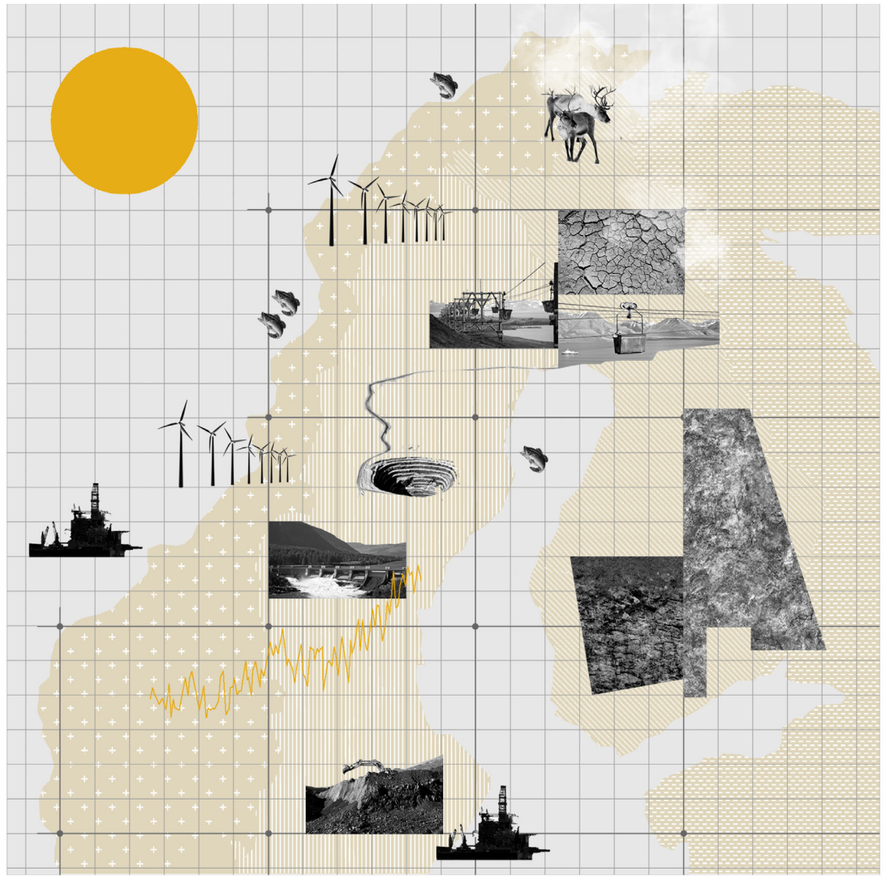
Spatiotemporal diagram of anthropogenic representation - lack of local representation

that is needed for reindeer grazing. The focus often shifts from the preservation of the Sámi culture to the maximization of the economic profit, which becomes the driving force behind initiatives related to the modernization of nomadic societies (Svensk Information, 2005).

What is more, future development plans for the whole region reflect this modernization. According to the Nordic vision for 2030, in order for this rich and diverse landscape and waterscape to mitigate risks related to climate change, pollution and biodiversity loss and continue to thrive, a new sustainable development is more than urgent to be established. Therefore, the Nordic region, relied on the co-operating Nordic Council of Ministers, has the ambition to become the most sustainable and integrated region in the world by 2030. Green transition of societies, carbon neutrality, circularity, innovation, mobility and technological integration are some of the objectives (Nordic Co – operation, 2020).

Although this plan envisions a more sustainable and eco - friendly Nordic Region, it is not clear up to what extent it considers minorities such as the Sámi nomads, whose habitat will be primarily affected. Large scale projects, infrastructure, innovation, and technological development might supress the rights of indigenous nomads who wish to prevent incursions into their territory for exploiting natural resources and decide for themselves the level of their integration into the global economy and polity (Etchart, 2017).

The intrinsic political challenge here refers to the level of inclusiveness of the supranational, national and local decision making processes. Until recently, instead of advocating, juridical decisions had been constantly excluding and depriving nomads' rights by selecting, for instance, non – Sámi people as representatives for the Sámi rights. This marginalisation was evident until the twenty – first century. Sámi were identified as environmentally vulnerable groups, victims of the effects of climate change, rather than as agents of environmental conservation (Etchart, 2017). However, nowadays, their rights and role are more acknowledged and they are mainly represented by the Sámi Parliament which has been established in Norway, Sweden and Finland (Mao, 2018). Since 2008 they have been actively contributing to combating climate change through their participation in international environmental conferences and climate change negotiations, their decision – making power at the United Nations, as well as by means of activism and political engagement at local and national levels (Etchart, 2017). Their dual role in combating climate change, both by maintaining the health and balance of vulnerable ecosystems and by raising awareness, is now recognized.



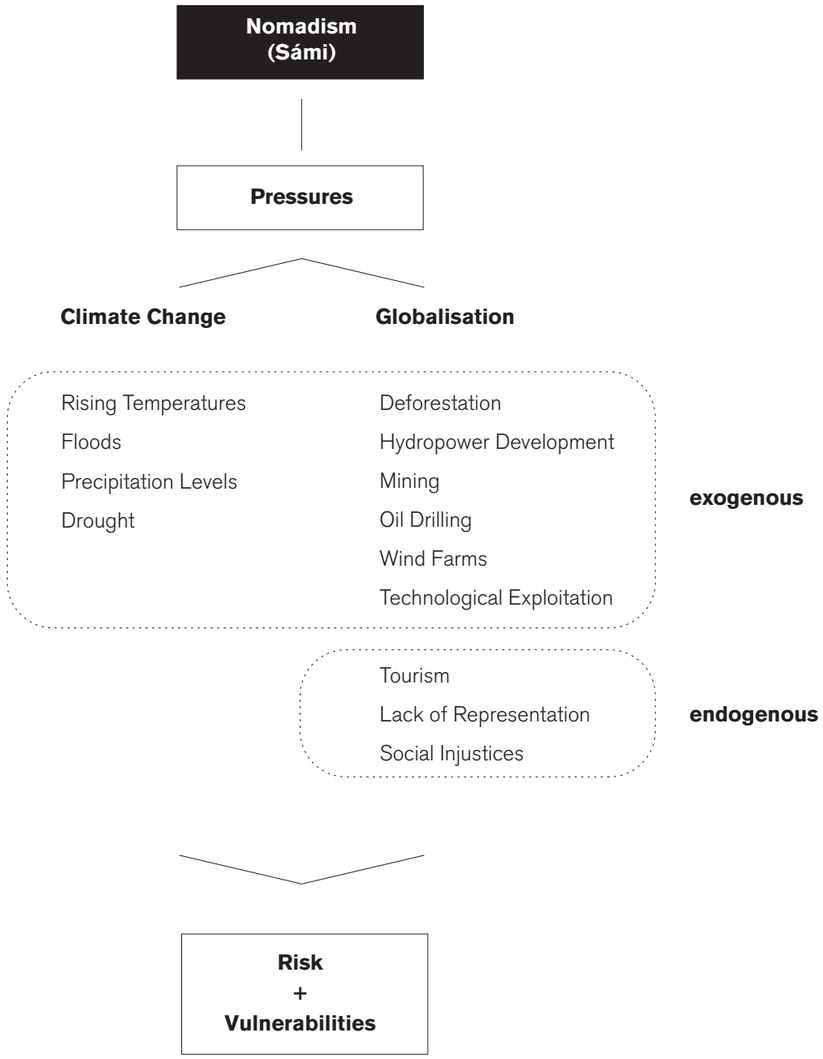
A collage of pressures

3.2

Problem statement

Summarizing we could argue that:

Climate change is the defining issue of our time. From slowly altering weather patterns that disturb ecosystem services in the long run (Adams, Adger, 2013) threatening land productivity, biodiversity and human settlements, to rising sea levels that result in unpredictable and catastrophic short – term floods, the **risk** is global in scope and unprecedented in scale (United Nations, 2020). Human mentality and activity is core to the problem (IPCC, 2013). Current **neoliberal global tendencies**, embedded with an opportunistic mentality towards planetary natural resources, decrease **ecosystems carrying capacity**, manifesting a socio – economic development where **"more is more"**. Without **shifting in terms of actions but primarily values, mitigating risk, adapting** to future extreme and unforeseeable **hazards** and managing socio – environmental **vulnerabilities**, will become harder to achieve in the coming years.



Problem statement diagram

3.3

The nomadic paradigm

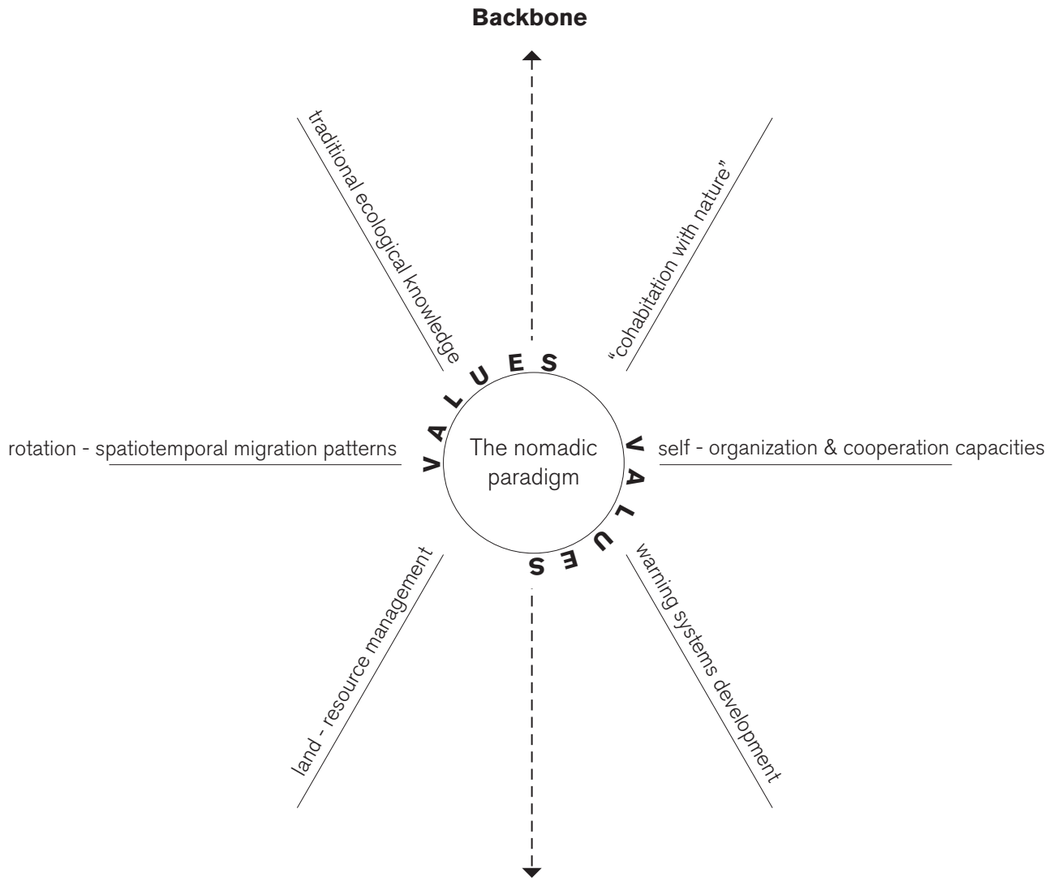
"What can we learn from Sámi nomads?"

Climate change and global capitalistic socio economic development threaten indigenous nomadic communities. The Arctic region is extremely vulnerable to global warming and intense exploitation of resources. However, the Sámi, similarly to other nomadic indigenous peoples, have always adapted to resource scarcity and changing environmental conditions. They have lived in a sustainable way for millennia, in "Harmony with Nature" (Etchart, 2017) and not against it. Along the centuries, the Sámi community has developed methods of land and resource management, efficient cooperation, municipal leadership, communication and early warning systems in order to prevent their livelihood from catastrophic phenomena such as flooding (Tisdall, 2010). Adverse effects of climate change on pasture and traditional herding trails have been met with new rotation and spatiotemporal migration patterns and also by a tighter communal discipline.

Living in cohabitation, in an ethical relation with nature, they have developed a deep traditional ecological knowledge about the weather conditions, about the flora and fauna, the diet and the resources (Tisdall, 2010) reflected also in their culture, language and spiritual beliefs. For instance, in order to keep a reindeer herd safe, deeper knowledge of different types of snow has been proved to be determinant. The variety of names that they use in order to describe the distinction between the types of snow indicates the level of familiarity with such weather conditions. More specifically, Muohta (ordinary snow) or oppas (untouched snow) are considered as a safe ground. On the contrary, the presence of sievla (wet snow), skarta (thin, ice-like snow layers) or ceavvi (a hard layer that the reindeer cannot penetrate in search of lichen) could dictate a life – saving change of route or resettlement, displacement (Tisdall, 2010).

In order to understand the spatiotemporal nature of the Sámi nomadic life, we refer to their time cycle more extensively. The following data are based on Mikkel Nils Sara's lecture in Samisk Høgskole, 9520 Kautokeino.

As it has been already mentioned, the Sámi culture is directly dependent on reindeer herding. Reindeer is regarded as a free, mobile and independent being that cannot be fully controlled by the humans. Therefore, man must carefully observe and have knowledge of the nature of the reindeer, grazing mass, the topography, weather and climate of the areas, and



The nomadic values

the mutual relationships between all these time and space factors. In this context, reindeer husbandry is mostly related to the types of landscapes, seasons, weather and the altering annual conditions.

Traditional understanding of time and space:

To start with, the traditional Sámi sun symbol contributes to a better understanding of some basic features in thinking about time and space.

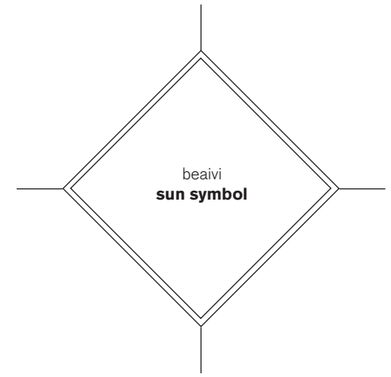
The square symbolizes the solar year with summer solstice, autumn equinox, winter solstice and spring equinox. It also includes the main division into the summer and winter months, and a directional indication of the movement throughout the year. Here the terms “north” and “south” refer to the topographical alteration of the weather, i.e. summer and winter. Our autumn and fall, for them represent a vertical difference with respect to location in the terrain. Thus, throughout the year, the reindeer moves both longitudinally and vertically through the annual cycle.

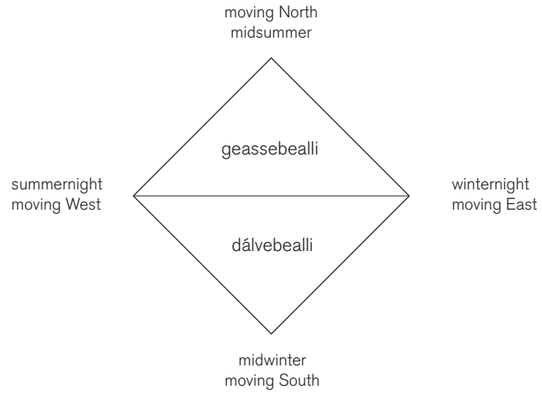
As for the annual division based on the amount of daylight, there is a delay in the ecological seasonal changes, compared to the cosmic seasonal changes. Wilderness occurs long after the spring equinox, and in the same way the snow settles long after the autumn equinox. This results in the division of the year into eight seasons. But ecological seasonal changes can vary widely, for example, spring grazing conditions may occur in early April or late May. This is the moving part of the picture, known as “jahkodat” or varieties of pasture.

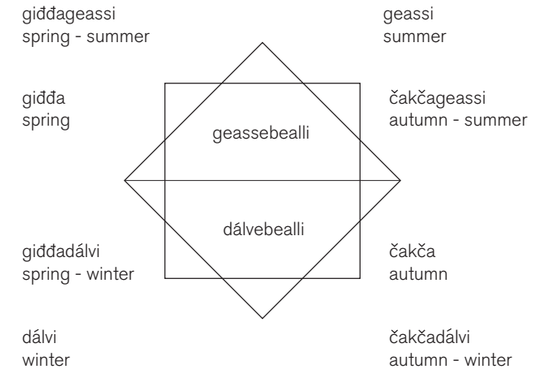
The moon is also important, to some extent as a light source, but traditionally it is mostly significant as an indication of activities and events throughout the year. Traditionally, the names of the weeks were given according to the expected annual changes or events in nature. Nicknames are rarely used today, but the information and awareness about changes and events in nature still remains. Months were also given names based on the annual natural changes. For instance, some summer months were named according to the reindeer’s hair change. The reindeer husbandry obtains information about the reindeer movements which are driven by the weather and wind direction. From the reindeer rest periods - which vary throughout the year and according to pasture conditions - the shepherd also knows when the flock movement is large or decreasing.

The reindeer grazing movement throughout the year:

[Autumn summer, autumn and autumn winter]
During this period, all terrain is available to reindeer for residence and pasture. The reindeer choose areas with the most







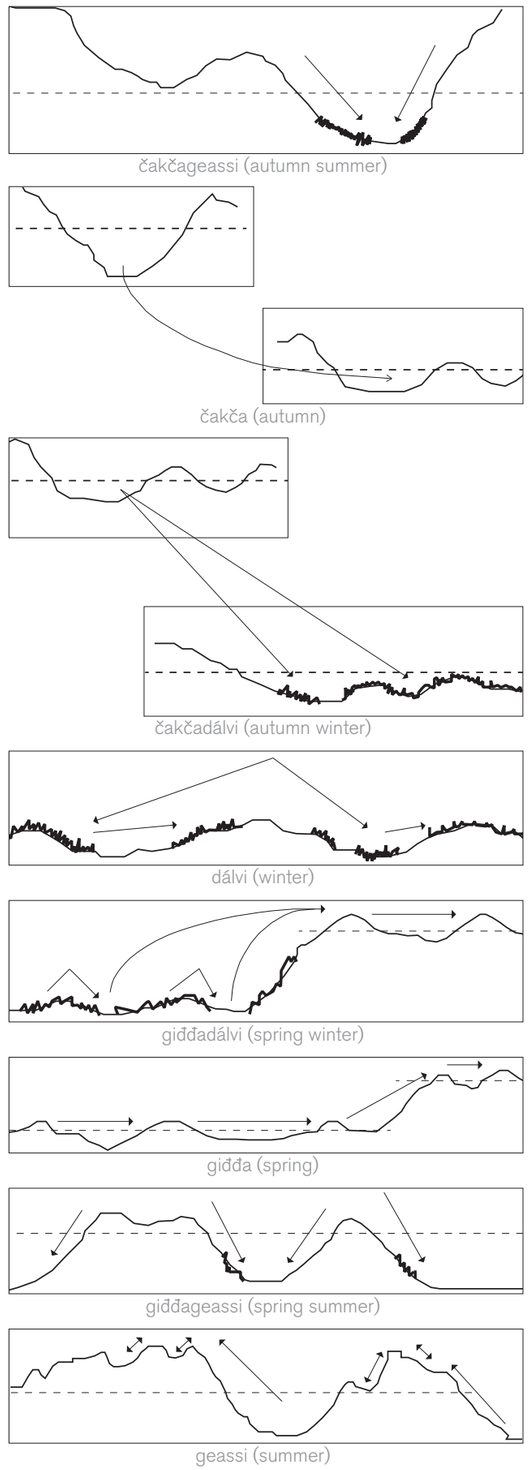
a. The traditional Sámi sun symbol, b. Summer - winter division according to the sun direction, c. annual division according to the amount of daylight
source: Mikkel Nils Sara’s lecture in Samisk Høgskole, 9520 Kautokeino.

abundant pasture and pasture plants with the greatest nutritional value. The reindeer generally follow the lowest and densest overgrown acreage units. Mating slows down the movement of the herd and therefore a uniform, unbroken area with longer grazing duration is needed. The reindeer swims from here to the gathering place on the mainland. Here labelling and harvesting is done. This process usually stops by the end of September when brownstone begins. By the end of the autumn winter, all siids have usually moved into the permanent winter pasture area.

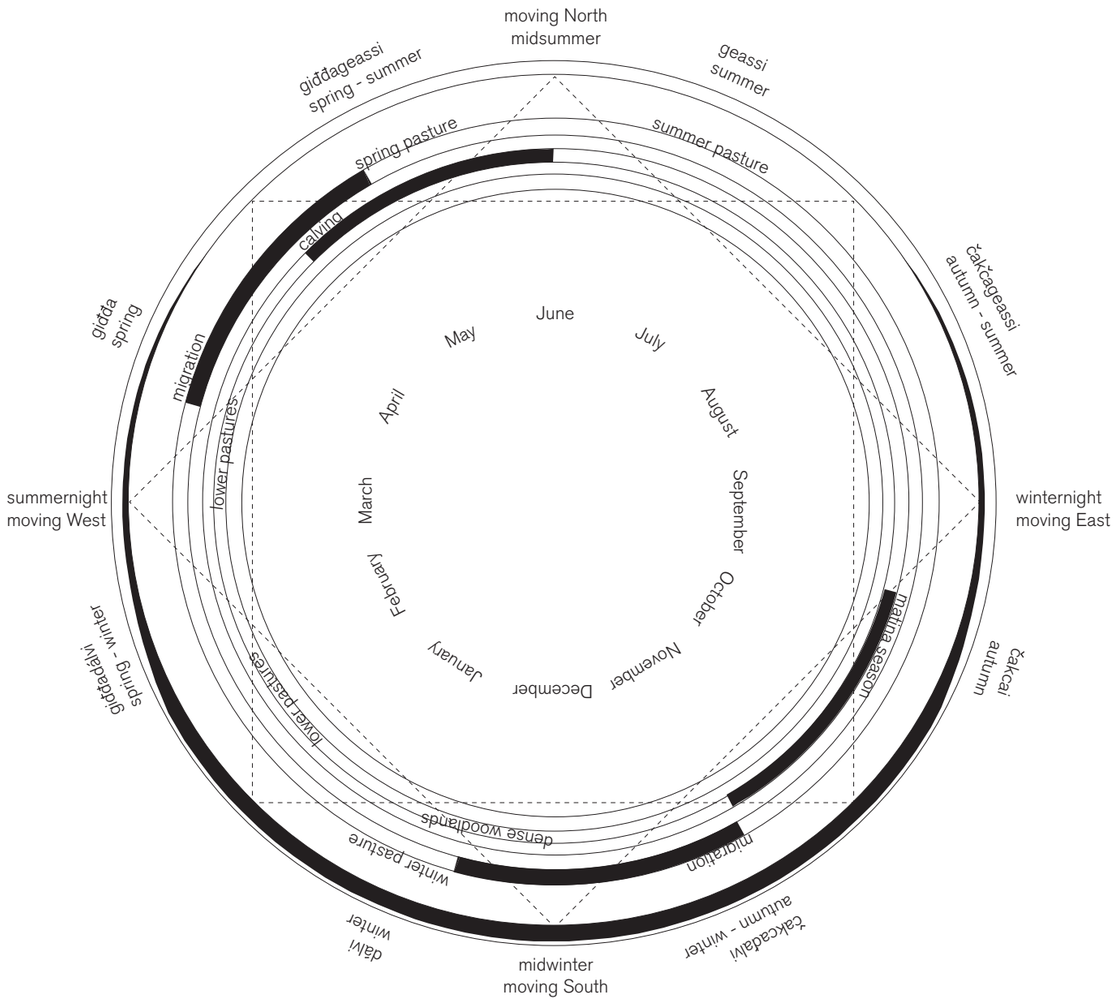
[Winter]
During the winter or in the dark, the reindeer find themselves in the thickets and low - growth, relatively dense woodland. It is dark almost 24 hours a day, and the forest is often shaded and unclear. In denser forests where it becomes harder and harder to dig and keep a pasture pit, there is tougher herd competition for grazing. The reindeer husband's job in this case is to keep track of where there is grazing with limited snow, make decisions about where and when the flock should be moved.

[Spring winter, spring, spring summer and summer]
During this time, climatic conditions (snow, insects) limit the availability of pasture and stay in the terrain. In short, it is not only the choice of the reindeer, but also the restrictions on pasture availability that control the reindeer movements in the terrain.

["jahkodagat" - annual changing conditions]
The seasons in the way they are experienced in terms of weather conditions, their duration, the transition between one another very much resembles a card game, where one either has to deal with good or bad cards. One seasonal event itself can rarely result in reindeer death or other losses. In most cases, the moderate, negative effect of one season can be eliminated or amplified by the next season. For instance, the slightly negative snow conditions and poorer pastures of spring winter themselves, would not have any greater impact. However, these, combined with a warm insect - intense summer could deteriorate the situation resulting in the loss of the parasite - infested calves. The seasonal changing conditions can affect significantly the reindeer life, either positively or negatively. Organic production, the conditions of the reindeer habitat and the percentage of calves depend on how each year turns out, or as a Sámi herder would say: on what a "jahkodat" is. The term "jahkodat" is very central to reindeer husbandry. "Jahkodat" is not a calendar year or year of operation, but is an aggregate of how seasons follow one another together with the effects of this sequence. Another issue relevant with "jahkodagat" over a long period of time is how it affects the fluctuations in real numbers and changes in biomass (Mikkel Nils Sara - Samisk Høgskole, 9520 Kautokeino).



The reindeer grazing movement throughout the year
source: Mikkel Nils Sara's lecture in Samisk Høgskole, 9520 Kautokeino.



The time cycle, the Sámi seasonal migration patterns
source: Peters, B (TU Delft, thesis)

4

METHODOLOGY

This section provides the outline of the thinking and working processes that the author followed, after the definition of the problem field and problem statement. More precisely, it provides the diagrammatic overview of the research frameworks which constitutes the backbone of the thesis. These frameworks are the following:

- Theoretical framework
- Conceptual framework
- Spatial & analytical framework
- Strategic & design framework
- Evaluation & assessment framework

The theoretical framework provides the set of notions which structure the body of the research and subsequently inform the strategic framework and the design, as well as the evaluation phase. This chapter also presents the hypothesis transition, key methodological step during the research, where the spatial context shifts from the Sápmi to the Wadden Sea region. The presentation of the research question and sub – questions is related to the different scales of analysis and synthesis. An overview of the approaches, methods and techniques that aim at exploring these questions is presented schematically. Namely, the roadmap showcases a more explanatory plan of the thesis. It highlights all the major steps, methods, scales and processes that guide the research in its whole and it can be seen as a guiding document that helps communicating the overall plan of the thesis.

4.1

Research hypothesis - hypothesis transition

In the light of climate change and the uncertainty of the future, responding to the crisis is about adapting to risks. In such a constantly changing environment both in time and space, socio – ecological systems do not function independently, but rather in complex interrelations, adapting and evolving, reflecting a paradigm shift in how sedentary civilization should think about the world. Rather than seeing the world as orderly mechanical and reasonably predictable, we should see it as chaotic, complex, uncertain, and unpredictable.

Globalization and neoliberal growing tendencies, lead to over – extraction and uneven distribution of resources and multi-faceted social injustices. Thus, escaping from this economic model, by re – ordering values in a more democratic direction will reduce our ecological footprint, the measured deterioration or degradation of the ecosystems as a result of human activities, products and services.

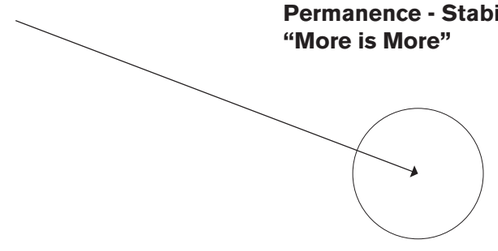
Learning from the nomadic paradigm, through studying the particular case of Sami and the adapting mechanisms that they have developed, which also constitute a founding part of their culture, living in harmony with "the ephemeral" rises as a new value.

By turning it from a vulnerability asset into a new reality, the ephemeral becomes the new ordinary and the nomads the agents of the new cartography, indicating an alternative way of inhabiting space, towards the reconceptualization of urbanization.

In order to explore this hypothesis, we need to make a transition. For this purpose, a new location is needed. In addition, the pressures in that location need to be defined. The adoption of the nomadic paradigm from the sedentary civilization, will lead to a new state, a reconceptualization of space and sedentary people will become neo - nomads.

[North Sea context]

Who?	Nomads Sámi	Sedentary Civilization
Where?	Sápmi	**?** define case study
Pressures	**Climate Change** Rising Temperatures, Flood Risk, Upredictable Precipitation Levels, Drought **Globalization & Neoliberal Growth** Deforestation, Hydropower Development, Mining, Oil Drilling, Wind Farms, Tourism, Technological Exploitation, Lack of Representation, Social Injustices **Current Tendencies** Nordic Vision	**?** define pressures
Current State	**Nomadic Paradigm** "Living in harmony with the ephemeral"	**Permanence - Stability, "More is More"**
New State		



Hypothesis transition

4.2

Research question

How can a **shift** towards the **nomadic paradigm** inform **spatial planning** concerning **risk mitigation and adaptation**, in order to **re – conceptualize the resilience framework** within the **Wadden Sea Region**?

4.2.1

Research sub - questions

The following research sub - questions aim at complimenting and helping examine the main research question. Moreover, they offer supporting guidance in the construction of the frameworks developed in the next chapters.

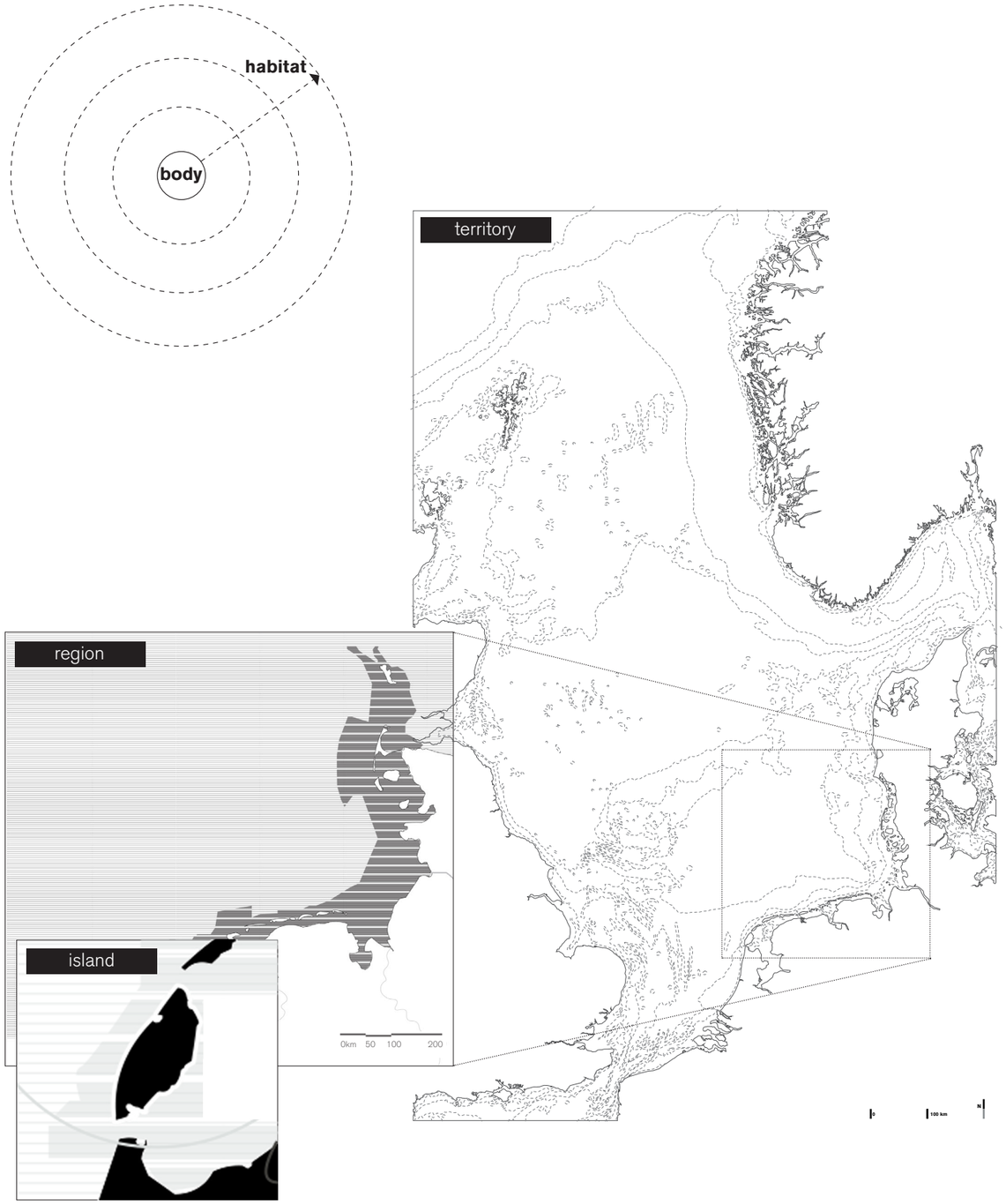
Sub - Questions	Framework	Time	Scale
How Sámi nomads traditionally adapt to environmental and socioeconomic pressures and how is the nomadic paradigm defined?	1	present	MA ME MI
What are the current and future pressures for the Wadden Sea Region in relation to climate change and over – extraction and what kind of synergy between ecology and economy would allow risk mitigation and climate adaptation?	2	present, future	MA ME
Which adaptive spatial strategies need to be implemented on Texel Island, in order to enhance co – habitation of nature and human systems?	3	present, future	ME MI
Which specific interventions would enhance adaptive capacity on Texel Island, activate awareness and increase involvement of the local actors?	3	present, future	MI

Frameworks:

1. Conceptual & Theoretical Framework
2. Analytical and Spatial Framework
3. Strategic and Design Framework

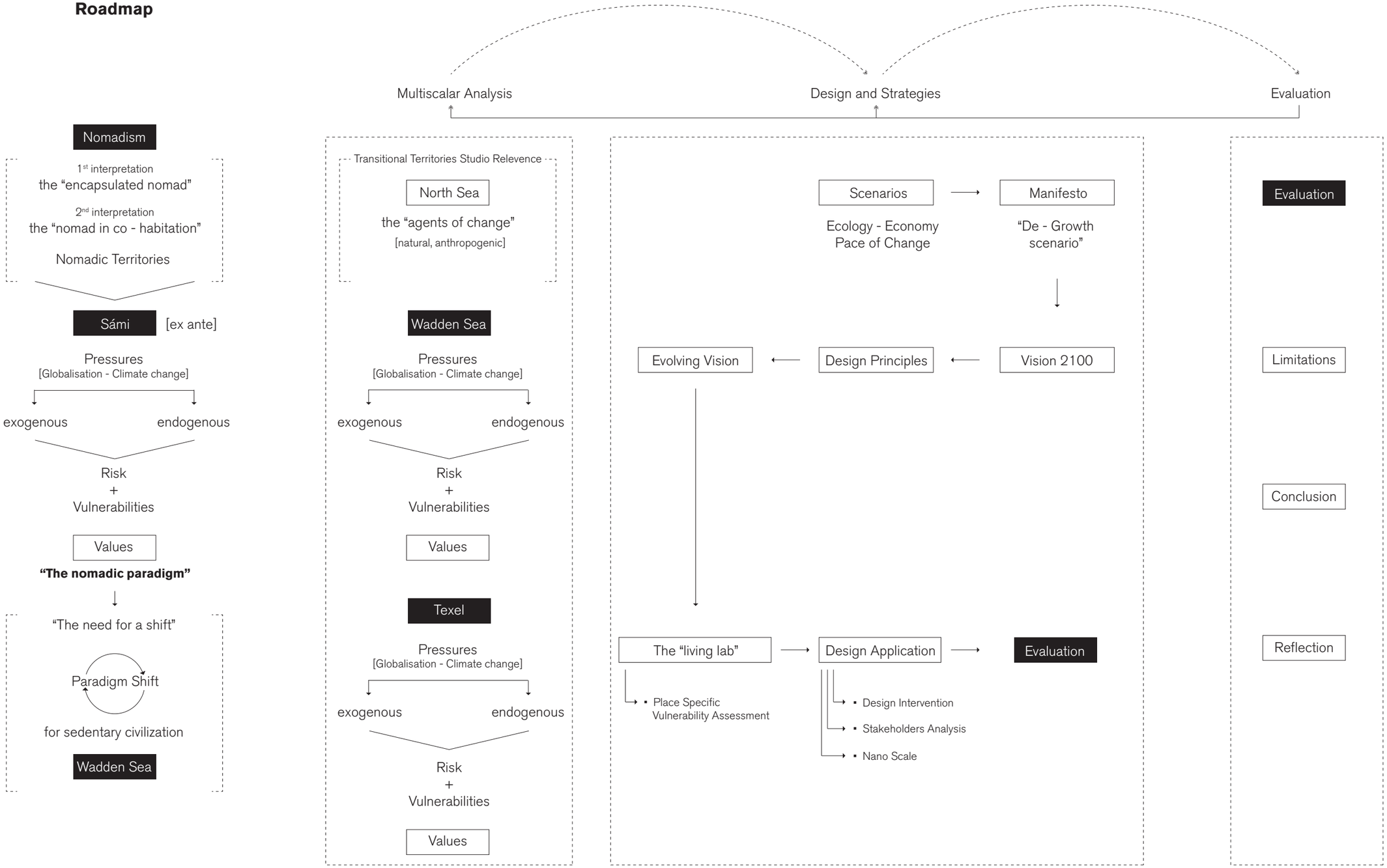
Scales:

- MA Macro
- ME Meso
- MI Micro



Multiscalarity - territorial scale, regional scale, island scale

Roadmap


Multiscalar Analysis
Design and Strategies
Evaluation
Nomadism
1st interpretation
the "encapsulated nomad"
2nd interpretation
the "nomad in co - habitation"
Nomadic Territories
Sámi
[ex ante]
Pressures
[Globalisation - Climate change]
exogenous
endogenous
Risk
+
Vulnerabilities
Values
"The nomadic paradigm"
"The need for a shift"
Paradigm Shift
for sedentary civilization
Wadden Sea
Transitional Territories Studio Relevence
North Sea
the "agents of change"
[natural, anthropogenic]
Wadden Sea
Pressures
[Globalisation - Climate change]
exogenous
endogenous
Risk
+
Vulnerabilities
Values
Texel
Pressures
[Globalisation - Climate change]
exogenous
endogenous
Risk
+
Vulnerabilities
Values
Scenarios
Manifesto
Ecology - Economy
Pace of Change
"De - Growth
scenario"
Evolving Vision
Design Principles
Vision 2100
The "living lab"
Design Application
Evaluation
Place Specific
Vulnerability Assessment
Design Intervention
Stakeholders Analysis
Nano Scale
Evaluation
Limitations
Conclusion
Reflection

4.3

Research framework

Motivation & Relevance

Nomadism

Problem Field + **Problem Statement**

The “nomadic paradigm”

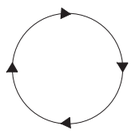
Hypothesis
and Hypothesis Transition

Research Question
Sub - Research Questions

Methodology Frameworks

Theoretical Framework
Risk,
Vulnerability,
Adaptive Capacity

Analytical & Spatial Framework
Spatial Analysis



Conceptual Framework
Evolutionary Resilience,
De - Growth

Design & Strategic Framework
Research by Design
Scenario Development
Adaptive Spatial Strategies

Evaluation & Limitations

Reflection

Interrelated frameworks

5

THEORETICAL & CONCEPTUAL FRAMEWORK

Once both the problem field and problem statement, and also the research questions have been declared, the next step is to develop the theoretical and conceptual framework. The theoretical framework provides definitions of theories in order to guide the research. In addition, it supports the project providing the knowledge backbone that is essential for the research steps to come.

The conceptual framework is defined as a “network of interlinked concepts that provide a comprehensive understanding of a phenomenon or phenomena” (Jabareen, 2009). Its role is to create synergies among theories and concepts that should be well – integrated to the project in order to lead in assumptions.

5.1

Theoretical framework

In order to have a clearer apprehension concerning the discourse presented in the problem statement, the following notions have been explored through the conduct of a literature review:

- Risk
- Vulnerability
- Adaptive Capacity
- Evolutionary Resilience
- De - Growth

5.1.1

Risk

In order to understand risk, it is described as a function of hazards and vulnerability. Risk research is targeted at highlighting those conditions that are responsible for disaster generation while simultaneously addressing the prevention or reduction of disaster side effects (Sobiech, 2013).

The scientific community estimates risk by the possibility of "occurrence of a disaster and evaluate the effect of risk reduction strategies in cost-benefit analyses. They follow the objective risk concept which is characterized by probability, intensity and the potential impacts of a disaster. Risk can be defined as the probability of harmful consequences due to conditions of a natural hazard and social vulnerability which together can lead to a disaster" (Sobiech, 2013). It is also important to note that risk is a social construct and refers to the perspective shaped by humanity and is influenced by a wide range of variables. Therefore, risk assessment can result in subjective outcomes, and thereafter on risk reduction strategies.

In the following paragraph the four phases of the disaster cycle, mitigation, preparedness, response and recovery are described, aiming at revealing the way vulnerable groups of people are affected by disasters and the sequence of measures in order to overcome the problem. Especially the focus is on mitigation the first phase of the disaster cycle, since it is embedded to the development of spatial strategies.

RISK = hazard x exposure x vulnerability

Disaster cycle, Sobiech, 2013

Apart from paying attention to the affected areas, risk management also integrates mitigation strategies in order to address the extreme externalities. According to the disaster cycle, the four phases of risk management are the following:

Prevention/mitigation refers to the specific measures and activities that are integrated in the regional and national spatial planning development and aim to eliminate the probability and the malignant effects of disasters.

Preparedness relates to those policies and actions aimed at enhancing alertness to react to any urgent circumstances that might occur, through programmes that reinforce the technical support, increase the systems' capacity and accelerate the decision making process regarding every level of responsible authority.

Response concerns the specific measures and activities targeted at providing immediate support and keep an adequate level of health and well – being for the affected people under unexpected and urgent circumstances. The response phase focuses on covering the primary anthropic needs until better organised, more suitable and sustainable solutions can be implemented.

Recovery refers to the specific measures and activities aimed at rebuilding livelihoods and providing infrastructure assistance, making use of opportunities to reduce future vulnerability. The "build back better" concept fits here to ultimately enhance prevention and preparedness (United Nations, 2018).

5.1.2

Vulnerability

According to Edward Soja, the current models of urban structure are often correlated to the uneven development and distribution of resources constituting an additional pressure on human and ecosystems carrying capacity. This pattern creates fragmentation, resulting in increased vulnerabilities (Soja, 1985). In general, vulnerability to environmental hazards implies the loss potential. Since loss varies geographically, over time, and among different societies, according to the specific development context, it can be assumed that vulnerability varies respectively over time, space and social context. Therefore, vulnerability has many different perspectives, depending on the research. However, the main principles in vulnerability

research are the following: the undergoing conditions behind human and place vulnerability, the assumption that vulnerability has a social aspect and a way to measure social resilience to hazards (Cutter et. al., 2003). While the majority of disaster management cases and research focuses on environmental hazards, social vulnerability is frequently underestimated and neglected (Flanagan et. al., 2011). At this point it is important to stress the fact that vulnerability is not a factor easily defined. Instead it is a multifaceted variable with economic, social, environmental, political and cultural dimensions. Therefore equal attention is needed to each of the above mentioned vulnerability aspects.

5.1.3

Adaptive capacity

In order to respond and overcome environmental hazards, anthropogenic agency needs to be activated.

Risk mitigation and adaptation can be achieved through the implementation of policies targeted at resource management and infrastructure development.

Adaptive Capacity is defined as "the preconditions necessary to enable adaptation to take place, it is a latent characteristic that must be activated to effect adaptation" (Brown & Westaway, p. 322, 2011).

Systems increased adaptive carrying capacity is what provides the opportunity for growth and future development within the context of uncertainty and change. Although associated to uncertainty, the measuring process of adaptive capacity needs to remain objective. At the same time it is necessary to apprehend that these issues are reflective and dynamic. Adaptive capacity is thus, immanently tied to resilience meaning that it reflects the understanding of the system itself and the way it changes.

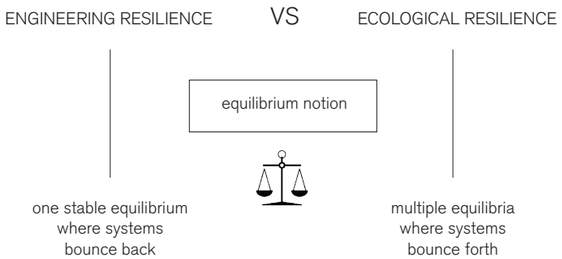
These key factors interact across temporal and spatial scales and are necessary for building resilience and adaptive capacity in socio ecological systems to deal with dynamics and change. In gaining a better understanding of how adaptive capacities and resilience can work together, they can be utilized to strengthen and find linkages, question areas related to capacity, determining who is responsible for initiating change, and shaping governance.

5.1.4

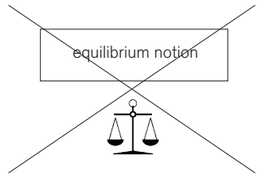
Evolutionary resilience

To begin with, evolutionary or socio – ecological resilience advocates that the very nature of systems may transform through time with or without an external disturbance. It introduces a new conceptualization of socio – ecological systems, which are now characterized as complex, non – linear, self – organizing systems, broadening the engineering and ecological descriptions of resilience, which are based in the equilibrium notion, aiming to incorporate the dynamic interplay of persistence, adaptability and transformability across multiple scales and timeframes (Davoudi et al., 2012). Following this conceptualization, resilience is not perceived as a return to normality, a rebalance of the equilibrium after bouncing forth or backwards. It rather shows the ability of complex socio – ecological systems to change, adapt and transform in response to multidirectional pressures. The perspective of uncertainty implies that the past performance of a system is no longer a trustworthy predictor of future behaviour, even when circumstances are similar, since there is no linear relation between cause and effect (Davoudi et al., 2012).

The way systems work and interact within this uncertain framework, is best articulated by the “panarchy model of adaptive cycle”, developed by Gunderson and Holling. This model represents the four distinct phases of change in the structure and function of systems, based on the evolutionary understanding of resilience, which are: growth or exploitation, conservation, release or creative destruction, and reorganization (Gunderson, Holling, 2002). It implies that as systems mature, their resilience reduces and they become more vulnerable to externalities, while after systems collapse, new opportunities arise and unpredictable possibilities appear for alternative systems configuration. According to the diagram, the “omega” phase, the collapse time of greatest uncertainty but high resilience, is rapidly followed by an alpha phase of reorganization and renewal, a time for innovation and transformation, when a crisis can be turned into an opportunity. The notion of “panarchy” is used to clarify that the model is based on adaptive, paradoxical interrelations rather than stable, sequential, well – defined, hierarchical relations. It represents a number of dipoles such as persistence versus change, flexible versus efficient, resilient versus transformational, and connected versus adaptable. These dipoles function at multiple scales, speeds and in various timeframes (Gunderson, Holling, 2002). This function allows a higher level of systemic efficiency and innovation while



EVOLUTIONARY RESILIENCE



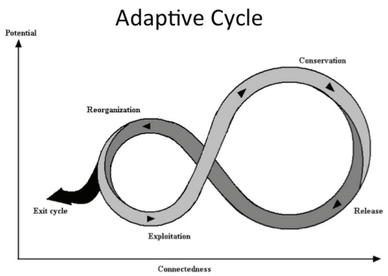
The very nature of systems may change over time with or without an external disturbunce

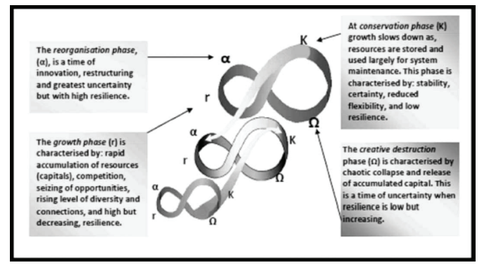
SOCIOECOLOGICAL RESILIENCE

resilience not seen as a return to normality but as the ability of complex socio - ecological systems to change, adapt, transform

The Panarchy Model of Adaptive Cycle

articulates the evolutionary understanding of resilience
“panarchy” VS “hierarchy”





The panarchy model of adaptive cycle. Source: Davoudi, et al (forthcoming) adapted from Holling and Gunderson (2002, pp. 34–41) and Pendall et al (2010, p. 76).

EVOLUTIONARY RESILIENCE & PLANNING

Space + Time

Resilience, The panarchy model of adaptive cycle. Davoudi, et al (forthcoming) adapted from Holling and Gunderson (2002, pp. 34–41) and Pendall et al (2010, p. 76).

at the same time it allows more space for multi – scalar and time – free experimentation.

Evolutionary resilience can be projected in space, demonstrating a relational understanding of spatiality and guiding a spatial planner to speculate places not as neutral, rigid or fixed containers, but rather as complex, interconnected, socio-spatial systems with extensive and unpredictable feedback processes which operate at multiple scales and timeframes. Evolutionary resilience offers a useful framework which allows thinking in new ways about planning, based on the relational understanding of space and time. Planning should recognize the ubiquity of change and the latent uncertainties; therefore it should reach a higher level of preparedness which implies a higher capacity to provide alternative solutions and turn a crisis into a new opportunity (Davoudi et al., 2012).

5.1.5

De - growth

As far as de - growth is concerned, apart from understanding the way systems function and interact within the context of uncertainty and change it is no less significant to define the systems themselves. Considering that our growing global economic system has already overcome the carrying capacity of the planet, there is a need for 'de-growth', urgency mainly expressed through social thinkers in Western Europe. De – growth is a civic movement that challenges the continuous and uncontrolled economic growth based on the fact that due to this growth, the limits of our planet have already been exceeded (Gaziulusoy, Houtbeckers, 2018). Building upon the critical tradition against modernity (Fournier, 2008), which has been expressed by several central European thinkers, for example Jacques Ellul and Ivan Illich, Serge Latouche challenges the neo-liberal globalized economic development and growth. This kind of growth focuses mainly on production itself, aiming to maximize the economic profit but simultaneously ignoring values such as justice, democracy, ecosystems' health, well – being and social relations (Fournier, 2008). On the contrary, de – growth highlights the need for systemic change, a shift of values, involving all the actors that would carry out such transitions. Thus, in its very essence de – growth constitutes a political movement (Gaziulusoy, Houtbeckers, 2018).

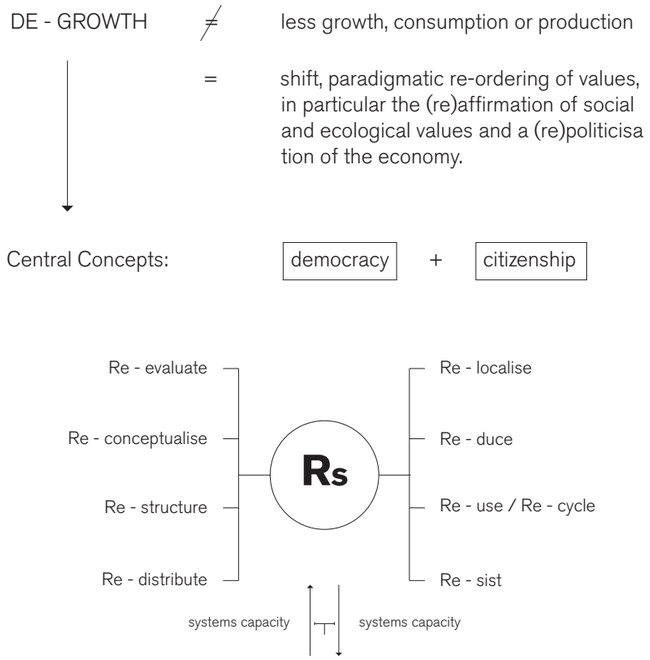
The movement's main goal is not less growth, consumption or production, but rather a shift and re – politicization of the terms

in which economy is considered. In other words, it is not just referring to a quantitative matter of doing less of the same, but instead it indicates a re-ordering of values. The ultimate and broader intention is to "escape from the economy", to redefine economic relations in a political base. Therefore, de – growth movement stresses the notions of democracy and citizenship (Fournier, 2008).

Democratic choice, as the first core concept to de – growth, should not be pushed aside by political imperatives, when confronting a crisis, such as environmental degradation. The future of the planet is common for everyone, thus, it should be shaped collectively and democratically. However, de – growth should not be perceived as an ecological imperative, but as an opportunity to initiate debates and make decisions around the restructuring of socio – economic systems, taking into consideration questions of power, gender, class, ethnicity etc. (Gaziulusoy, Houtbeckers, 2018). This emphasis on democratic choice over "imperative" implies an according emphasis on human and social values (Fournier, 2008). Although the elimination of systems capacity mainly refers to the overexploitation of natural resources which exceed ecological limits, de – growth is strongly attached to anthropocentric values and social justice.

Citizenship is the second key concept to de – growth. Despite its ecological parameter, in the sense of excessive ecological footprint (Perez Carmona, 2013) in relation to limited ecological space (ecological citizenship) and the urgencies emerging from this unbalanced dipolar relation, citizenship is mainly interpreted in a political way. More precisely, the inequalities in ecological footprints between wealthy and poor, demonstrate a redistribution of ecological space, which in fact constitutes a collective, political practice, offering an escape window from the economy (Fournier, 2008). People do not anymore identify themselves as consumers but as citizens, who are involved actively and contribute in the decision making process. Although it is proved that multi – scalar, thus local, national and global action is necessary (Gaziulusoy, Houtbeckers, 2018), Latouche highlights the Greek Agora as a paradigm of public life and civil society, in order to emphasize the importance of community and individual initiatives (Fournier, 2008).

As a matter of fact, Latouche's strategy begins by stressing the significance of localism as a response to globalization. Instead of neoliberal opportunistic economic growth, which is dominated by over – development, over – production, over – exploitation, over – abundance, over – extraction, over – fishing, over – grazing, over – consumption and over – supply, he



De - growth, Perez-Carmona, A (2013)

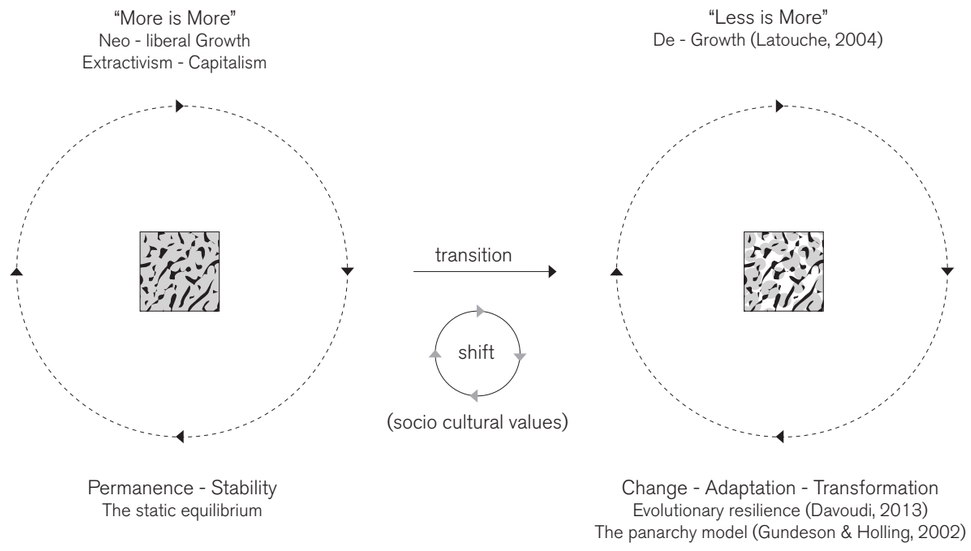
advocates for a cultural change, a shift in mentalities, which will expand gradually while being guided by a set of interrelating R concepts (Reevaluate, Re – conceptualize, Restructure, Redistribute, Re – localize, Reduce, Re-use/recycle, Resist) (Perez Carmona, 2013).

5.2

Conceptual framework

With regards to the above mentioned theories, we could argue that nomadism is a way of life which is fully embracing adaptation, transformation and change. Throughout the times, nomads have learnt how to live in harmony with nature, ex-

tracting knowledge from the way complex ecosystems function and interrelate. This knowledge constitutes part of their cultural heritage and it is deeply enriching against possible crises caused by extreme environmental phenomena. Nowadays, altering climate conditions become more and more evident in their everyday life. Uncertainty is the new ordinary, the new reality. However, the ephemeral inhabitation of space and cohabitation with nature provide fertile grounds for nomadic adaptation. Instead of creating permanent settlements and over – extracting the land and the sea, nomadic planning mechanisms foresee the ubiquity of change, the hidden risks and the latent uncertainties. Instead of adopting the sedentary mentality, which advocates that “more is more”, they resist to neoliberal opportunistic economic development respecting the limited carrying capacity of the planet. Nomadism reflects the notion “less is more” but as a paradigm, so far, it remains in the shadow. Climate change mitigation and adaptation are a question of human rights for nomadic indigenous people. Although, in our case the Sámi have fought hard to protect their rights, speaking about current threats such as the carbon crisis (Brickhill, 2019), governments still resist the idea that Arctic nomads should take part to the global debate, since they have something unique to contribute.



Socio - cultural transition

5.2.1

The nomadic paradigm within the North Sea: alignment with TT lines of inquiry

A multifaceted crisis

The North Sea„ mophologically, it is very much defined by different temporalities – day, season, year, decade, century, millennia – in the dynamic interchange between sea and land. As a whole it is an ever – changing canvas of waterscapes and landscapes, where land becomes water and vice versa. Climate change takes a cyclical role in the shaping of the territory (Lisiecki and Raymo, 2005). “Flux, erasure and terraforming” agents together with low and high tide set the conditions of inhabitation to a wide range of species, constituting a multi – scalar dynamism that humankind tends to ignore and fight against. The conflicting performance of natural and anthropogenic agents of change resembles a battle that finds nature impaired. The “legacy of thought”, wherein the environment is objectified and reduced to human consumption (Boehnert, 2018), results in a socio ecological crisis, with unprecedented consequences.

From the above mentioned, it becomes evident how man – made activity plays an important role in the ecological balance of our planet. The effects of human political, industrial and economic activity, often bring financial gains against environmental degradation, while the social impact seems to fluctuate in between benefits and drawbacks (Harvey, 1973), outlining another face of the crisis, namely the one related to the “dual nature of externalities”. The North Sea, as the most urbanized sea, is a territory where extreme extraction, production and consumption and extreme weather conditions are considered as ordinary. The current excessive production model, largely based on the use of fossil fuels, affects the atmosphere, the yield of agricultural crops, the freshwater supply and the health of entire habitats. The massive consumption patterns manifest in space as litter and chemical pollution with respectively harmful consequences. Human – engineered intrusions into natural systems, in the form of emissions, ground pollution and salinization, are deeply reshaping the territory and the risk of these changes get more and more threatening for the territory itself and a wide range of species.

This extreme extraction, production and consumption can be explained by the economic benefits they bring and the constant human desire for further development. North Sea is a highly rich territory, in terms of natural resources, thus, it tends to be perceived as a source of income. The pursuit of “capital” constitutes the driving force of its territorialisation, reflecting

another form of the crisis. The socio economic and cultural values that foster this development are determined by an opportunistic mentality towards planetary resources, with the current economic model manifesting that “more is more”.

From a cultural perspective, the North Sea has been for centuries the place where cultural exchange, free flow of people, energy, trade and innovation took place, driving the transformation of the whole Europe. However, today, neoliberal global tendencies, with the excessive and unhindered mobility, energy generation and the massive flows of people, information, goods, services and capital, illustrate a “pervasive ecology of flows” embedded with a “disappearance of space” and the “dominance of a global culture” (Rohkramer, Schulz, 2009). Thinking about the encapsulated nomads, the latent crisis here refers to the losing contact with the territory itself.

What is more, and as for the political aspect, North Sea used to be a common ground that bounded territories together, yet encouraging their own identity to develop. However, its current territorialisation shapes a mosaic of conflicting issues within the same reality, triggering a “crisis of representation”. Such crisis refers particularly to the manner in which people, countries and the territory as a whole feel represented and correlates with globalization. Although common risks and environmental hazards require evenly targeted care, levels of representation and management provide an obstacle to social and environmental justice. The contrast lies between central and local governance, cities and rural areas and its further effect on territorial policy making and the people. Hence, even if supranational representation is high when it comes to economy and governance, the territory and minorities, the most vulnerable are being overlooked or unheard.

The nomadic paradigm

In a world of extremes, that is dominated by a culture of stability, permanence and power, climate change responds to the increase of externalities at a pace that depends on the intensity of human activity. In the near future, economic and environmental impacts of emissions, pollution, salinisation and extreme weather will, strongly be reversed on society, that will have to pay the return costs of inconsiderate actions. The nomadic paradigm suggests an alternative behavior of the humankind. Learning from the Sámi nomads, the conflicting performance of natural and anthropogenic agents is replaced by co – habitation and co – existence, with respect to the cyclical role of climate change in the shaping of the territory. Re – programming the human agents, meaning both systems and activities, according to the dynamic change of the biophysical conditions will foster this co – habitation.

What is more, the nomadic paradigm manifests a shift in the values determining the management of resources, linking the values of extraction, production and consumption to the dynamic change of biophysical patterns. This shift towards a different way of producing and consuming, similar to the Sámi nomads who develop their economic activities with respect to the carrying capacity of the ecological systems, in fact triggers a change of the terms in which eonomy is considered in our capitalistic world. In other words, it is not just referring to a quantitative matter of doing less of the same, but instead a re – ordering of values.

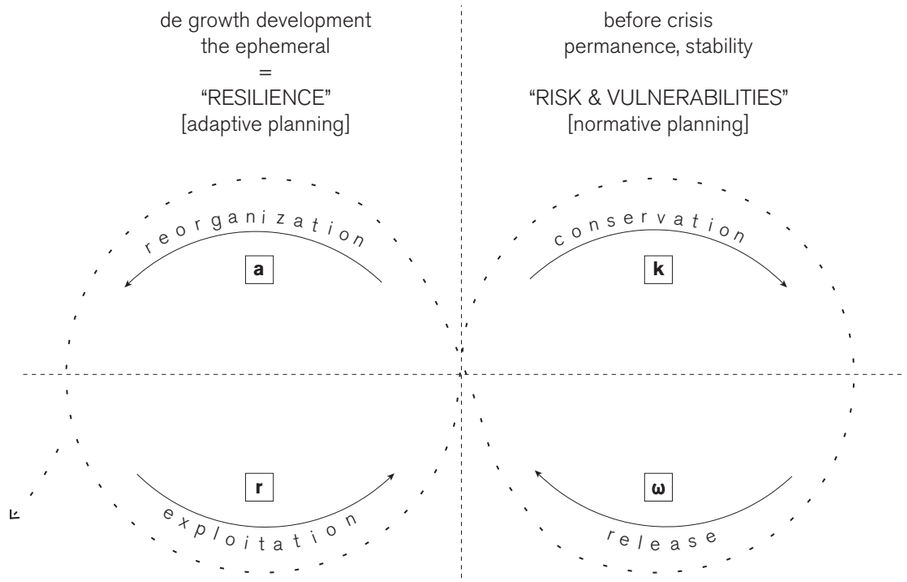
From a cultural perspective, nomadism suggests a new way of territorialising and deterritorialising, a new perception of space. Key element is the deep ecological knowledge, which derives from the territory itself. Living in co – habitation with nature, they have learnt how to read the territory, the land and the sky, observing it and absorbing wisdom from its undergoing biophysical mechanisms, which they later project on a new "topos", when migrating. They are not only aware of the way ecosystems perform but they are also part of the ecological cycle. Therefore, nomadism reconnects humans with the territory, and suggests a new set of conditions under which human flows should take place.

Sedentary civilization has much to learn from nomads on how to mitigate risk and adapt to change and the uncertainty of the future. It is precisely this ecological knowledge which may contribute to environmental conservation, highlighting the importance for their participation in global governance of the environment (Etchart, 2017). Acknowledging the important contribution that the nomadic paradigm may have in combating climate change, a new non obstructive cooperation and inclusive involvement to the decision – making process needs to be considered. Hence, it is necessary to have a new multi scalar reciprocal approach to the different levels of representation. Within the contradictions and conflicts between local, national and regional policy making, the new way of representation should give more freedom and equal importance to the individual groups of people (local), the secluded, indigenous nomads.

5.2.2

The nomadic contribution to spatial planning

Climate change poses unforeseen and unexpected challenges to the current way of living. A change towards a more sustainable and durable life by mainstreaming mitigation strategies into the daily practice becomes increasingly urgent. Sustainability in policies, procedures and investments applied



by governments, the public and private sector and civil society should be prior goal. Apart from risk mitigation, which is fundamental for hindering climate change, societal adaptation to the potential unanticipated impacts of climate change, is also essential. The spatial configuration of our societies requires revision since current ways of using the environment are becoming less safe and no longer feasible, due to the constantly altering weather patterns. Sea level rise is an additional pressure for urbanized deltas and coasts around the world. Vital economic domains, such as agriculture, are affected by extensive periods of drought, extreme wind conditions, fresh water shortage etc.

Key element to this revision, as a response to the effects of climate change, is the adjustment in natural and human systems, in order to moderate hazard but also to examine new beneficial opportunities. Normative planning, in terms of design, decision – making and implementation, seems insufficient to support the realization of climate adaptation, due to the de-

mands that climate change formulates on the arrangement of spatial planning. These attributes involve the uncertainty of climate change, the controversy of the urgency to act, the complexity of climate change and the multifaceted character of climate change impacts, and their implications affect pillars of spatial planning, such as the governance of the actual planning processes, the institutional principles and the role of public – private initiatives and the relevance of financial instruments in order to balance costs and benefits.

Spatial planning refers to the strategies and methods used by governmental agencies to influence the distribution of activities in spaces on various levels. The role of spatial planning, according to Andreas Faludi, should be the identification of an efficient and sustainable synergy between all the environmental, societal, economic and political agents that contribute in the shaping of the territory (Faludi, 2000). Based on the qualitative and quantitative research on nomadism that has already been presented, this paragraph reveals the contribution of the nomadic paradigm in the "planning doctrine".

In our near future, the definition of a New Climatic Regime, in which political decisions are merely based on a lack of resources, seems inevitable, thus, planning with vulnerabilities and aligning land uses with respect to the risk factor should be regarded as an integrated part of the spatial planning. The nomadic paradigm triggers a shift from normative planning towards adaptive spatial planning, meaning that it allows the monitoring of changes, both in climate and socio – economic perspective, through a knowledge change. It also fosters a strategic and collaborative planning, coordinating approaches and adaptation measures spatially, involving the risk measure and the vulnerability aspect, and eventually creating synergies and allignments, towards a resilient future development.

With "planning doctrine" referring to the "deep structures of values, assumptions and concepts that underlie plans" (Faludi, 1996), the nomadic paradigm suggests a new set of values and concepts that can inform spatial planning, therefore it constitutes a new "planning doctrine". The nomadic figure becomes operalized. Instead of a marginalised, vulnerable figure, it turns out to be the representative of a new planning époque.

6

The analytical and spatial framework forms the quantitative and qualitative analysis in order to answer the theoretical research question and sub – questions. This will then enable the transition towards the design and strategic framework.

Mapping is the main method and tool used in order to apprehend the way different variables are related and the spatial impact they have. According to James Corner, mapping goes beyond tracing which depicts the collected data on the map. Instead, the process of cartography goes a step further, reflecting and critically interpreting the existing knowledge opening new horizons in the field of science.

Based on the notions highlighted within the theoretical and conceptual framework, this framework aims at making observations and drawing clear conclusions on the different spatial contexts. Key to the project is working in multi – scalar dimensions. Each scale of analysis aims at elaborating on the objectives and contributes towards the exploration of the research sub – questions. The selected scales are the following:

- (Macro) Territorial Scale – North Sea Territory
- (Meso) Regional Scale – Wadden Sea Region
- (Micro) Island Scale – Texel Island

In relation to the inspirational image in the first pages of the report, each scale acts as the “bottle” for the following one, which is the body. Since it has been argued that there is a direct interrelation between the body and the bottle there is a clear interdependence between the different scales, as well.

The following pages include the cartographic analysis and the presentation of the existing pressures revealing the critiria behind the selection of the specific area of interest. The outcome is a multiscalar study, integrating work in Macro, Meso and Micro scale.

6.1

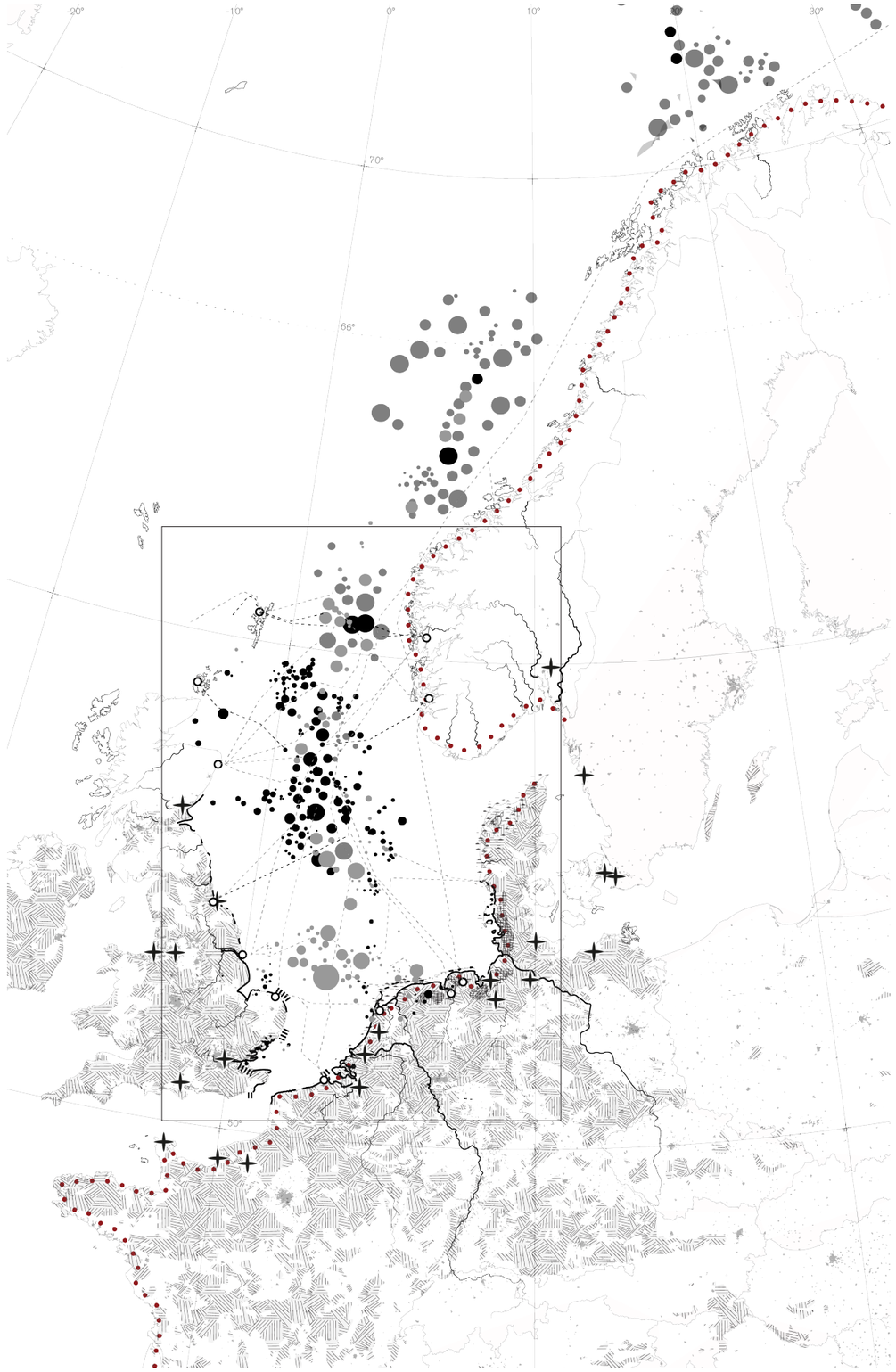
North Sea territory

The North Sea coastline, as we define it today, is a virtual line whose position is defined by different temporalities - day, season, year, decade, century, millennia- in the dynamic interchange between sea and land.

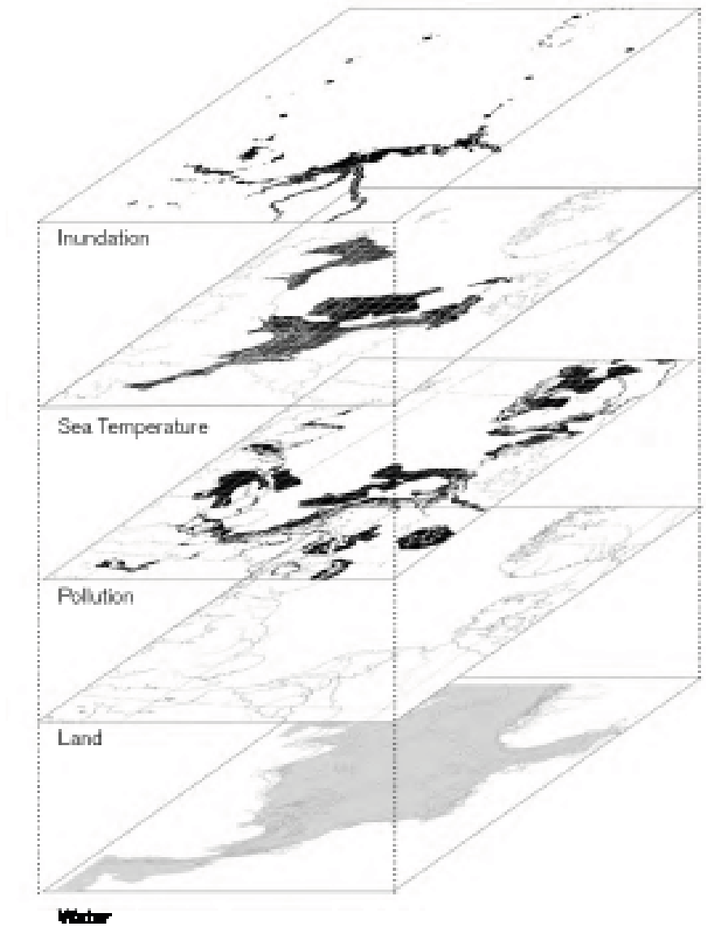
From a cultural perspective, the North Sea has been for centuries the place where cultural exchange, free flow of people, trade and innovation took place, leading to the transformation of the Europe.

Nevertheless, today the North Sea is not perceived as this place of exchange, but rather as a source of income and resources. This has led to its eventual territorialization.

Based on this view, where nature is perceived as a “resource” (Boehnert, 2018), “hard” engineering approaches (such as dams, storm surge barriers and defensive coastal management) have been built to control the aforementioned land-sea interchange, hence reclaiming land for human consumption and setting the socio-economic conditions for a rich and thriving North Sea territory. The structures and systems that used to protect and build the North Sea economies, countries and cultures are, ironically, the ingredients for vulnerable grounds: large areas are currently suffering from soil subsidence (in the Netherlands) and higher rates of erosion (in the South-West of England) while others are threaten to suffer from even more severe land-loss, coastal and marine ecosystem services loss, and irreversible damage to the built environment and its inhabitants (IPCC, 2019, p.4-8) in the not-so-far future. Large scale developments such as the 1 million homes assignment



North Sea, anthropogenic activity
TT studio, collective phase, for map sources: see references



Layer analysis, pressures North Sea

in the Netherlands (before 2030) ulteriorly pressure land uses, consequently questioning the feasibility of (new) urban developments in areas that are susceptible to the risk of erosion or floodings.

In a culture of stability, permanence, and power, the humankind tends to ignore and fight against the multi-scalar dynamism of the coast, forgetting that climate change takes a cyclical role in the shaping of the territory (Lisiecki and Raymo, 2005).

The agents act always in relation to time. Whereas natural agents refer the biophysical conditions of a site, the accelerated anthropogenic agents relate to both human systems and activities that affect the natural conditions, and can accelerate the rate of climate change related issues.

continuous change in **time** and **space**

natural agents

climate
precipitation (intensity)
temperature
wind (directions)
humidity
solar radiation
sea level rise (relative)

natural forces
wind
water
glaciers (soil frost, melting)
gravity
biological factors

topography
slope/height differences
plate tectonics

soil
physical soi conditions
vegetation coverage
organic matter content
moisture content
soil density

anthropogenic agents

human systems
food system
- land preperation crops
- grazing cattle
- deforestation
- (lack) soil conservation

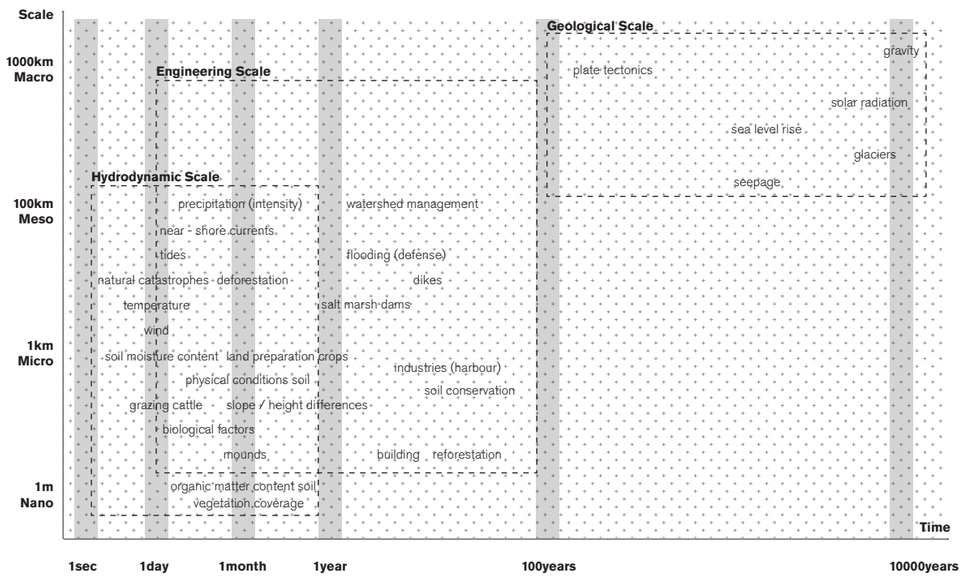
transport / mobility system
- (air)ports (industries)
- road, railway, canals

watermanagement
- watershed management
- floodings/ inundation
- canalization
- artificualization waterfronts

urban settlements
- housing

human (infra)structures
dikes
defence lines, inundation
salt marsh dams
mounds

socio cultural systems



Agents of change, TT studio, collective phase

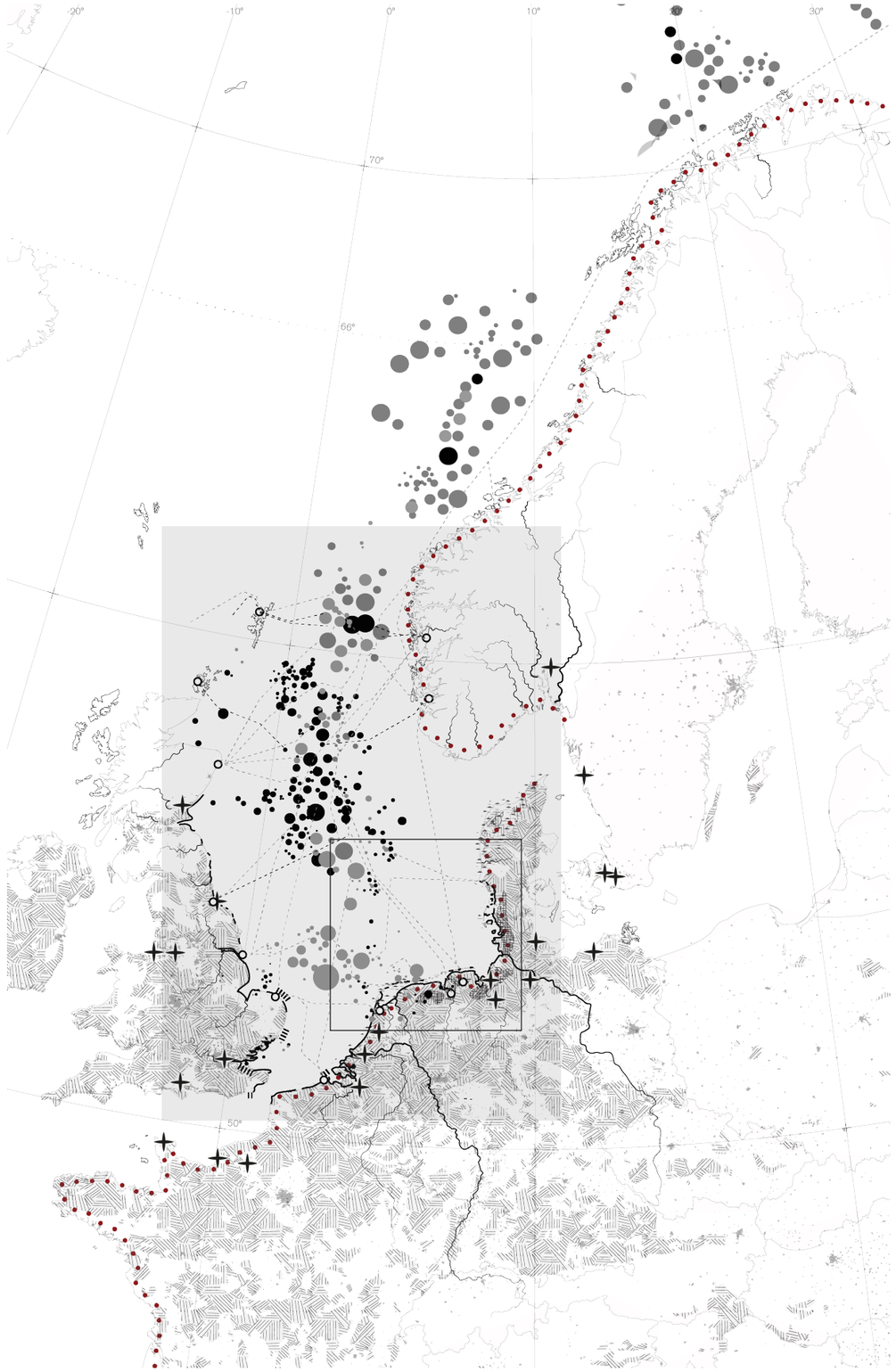
6.2

Wadden Sea region

The Wadden Sea region is an area of unique ecological value, where the dynamic interchange between land and water is more than evident (Vermeersen et.al 2018).¬ Being one of the largest tidal areas in a global scale, justifies its designation by UNESCO as a World Heritage Area (Deltares, 2014). The dynamism of the ecosystems and the diversity of the habitats along its coast are of vital significance to a wide range of species, including about 12 million migratory birds that are touching the area annually. Both the Wadden Sea and extensive parts of the barrier islands are belong to the Natura 2000 sites, meaning that they are protected natural areas, under the European Birds and Habitats Directives (Deltares, 2014).

The high natural value of the region explains the intensity of human presence and activity. More than a quarter million people inhabit the region. Tourism and recreation constitute the most thriving economic sectors, especially for the islands, followed by agriculture, fisheries, industry, energy production and transit, mainly in relation to the four large ports, and shipping which are also broadly developed (Deltares, 2014).

However, climate change puts extra pressure on the region in its whole. As a vulnerable coastal wetland region, it is highly threatened by the rising levels of the seawater and the extreme storm surges (Nicholls & Cazenave, 2010). The constantly increasing frequency and magnitude of high water levels (Wahl et al., 2017), make it for dikes and dunes harder to endure. Flood defense is, therefore, a critical issue for the Wadden Sea World Heritage area and its population, since environmental externalities can disturb the system's fragile equilibrium (Kirwan & Megonigal, 2013).

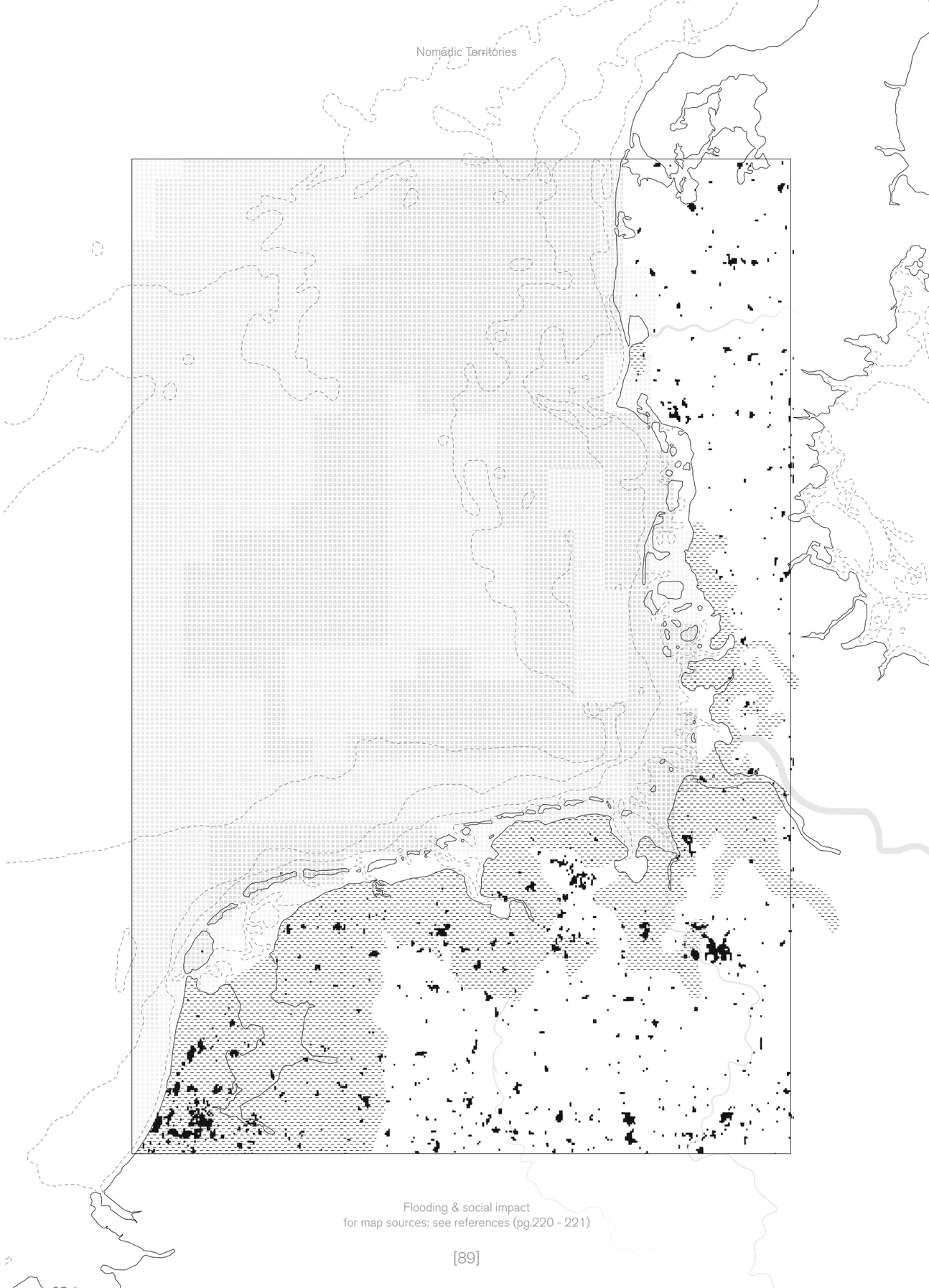


base map: North Sea, anthropogenic activity
TT studio, collective phase, for map sources: see references

6.2.1

Flooding & social impact

The map highlights the effects of climate change for the Wadden Sea Region. More precisely it shows the consequences of +1 sea level rise (SLR) according to 8.5 RCP scenario without any human action. The pixelated pattern of the sea represents a prediction for the relative sea level rise for the years 2081 – 2100. The flood risk areas according to this scenario, as it can be seen concern the largest part of the coastline, which should be reconsidered in terms of water defence systems and planning strategies. The entire seascape is going to be reshaped and urban coastal human settlements, land uses and economic sectors will be affected (Climate Central, 2018).

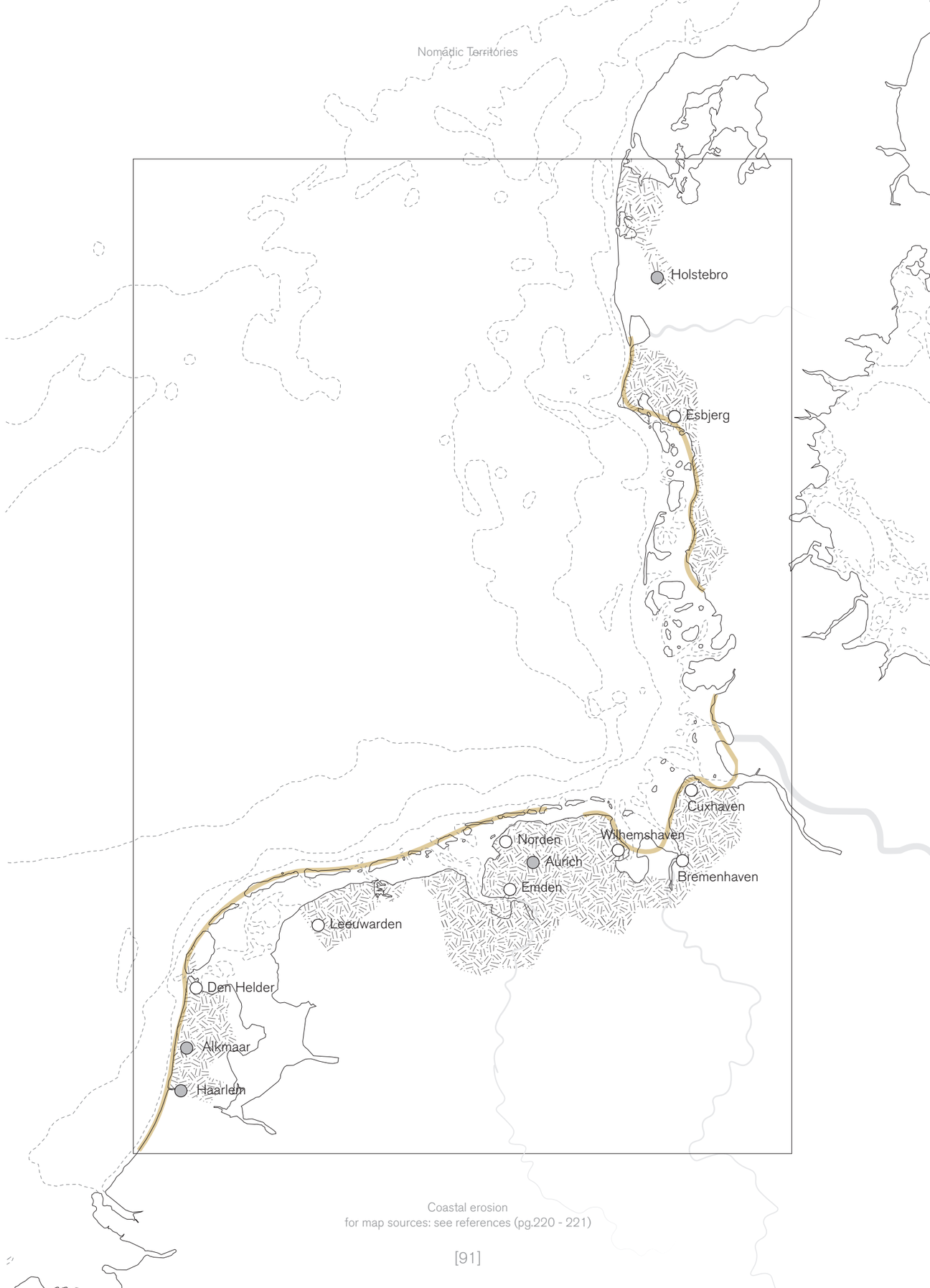


Flooding & social impact
for map sources: see references (pg.220 - 221)

6.2.2

Coastal erosion

As far as coastal erosion is concerned, extreme weather risk, and more precisely, storm surges, wind direction and strength, tidal amplitudes, will also affect the coastal zone of the Wadden Sea Region. According to the type of soil some areas are more vulnerable than others. For instance, dunes and beaches in the Netherlands, Germany and Denmark are some of the habitats under high risk.

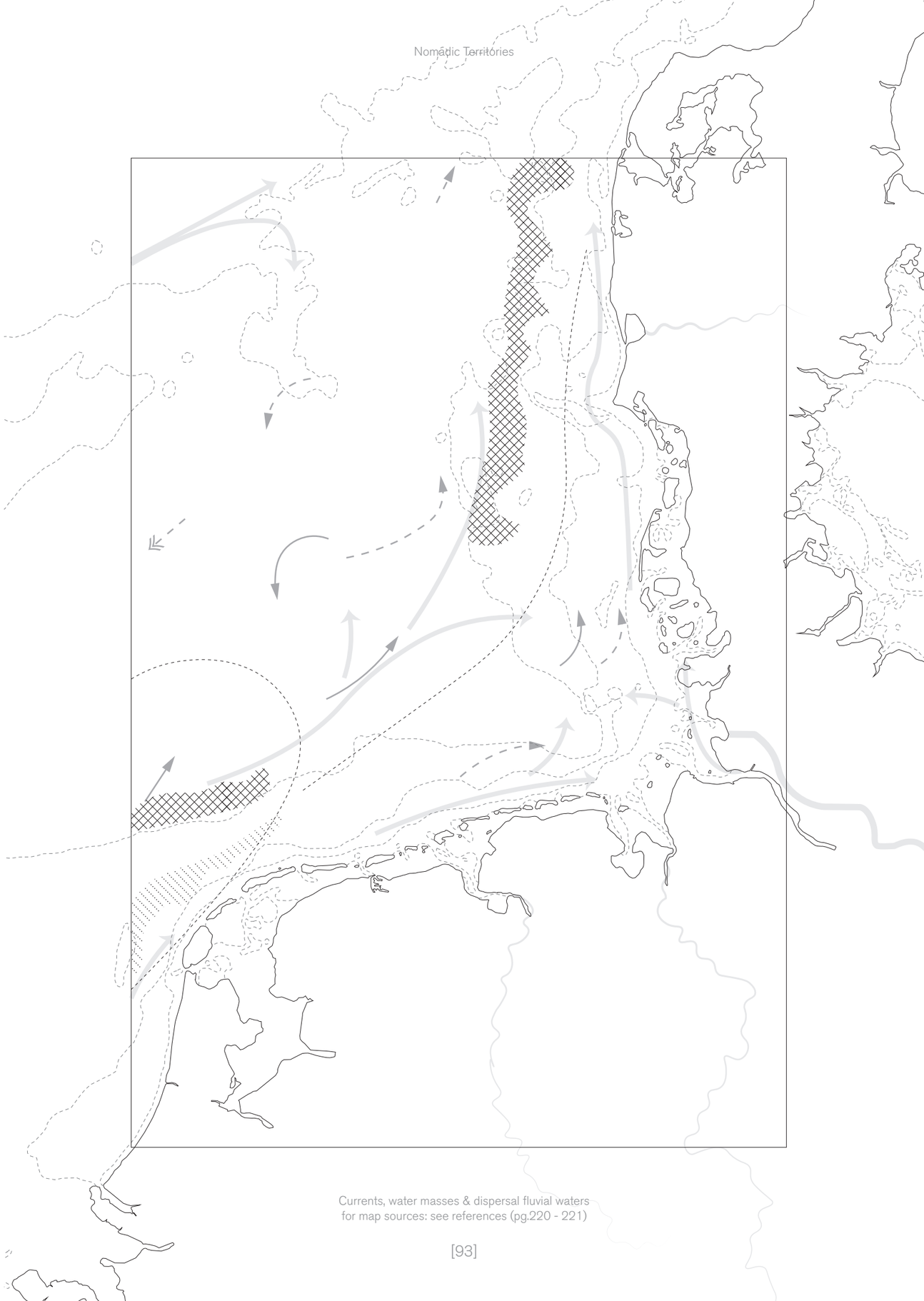


Coastal erosion
for map sources: see references (pg.220 - 221)

6.2.3

Currents, water masses & dispersal fluvial waters

The map depicts the variations in water circulation in the Wadden Sea according during the seasonal cycle (winter – summer). The continuous thick light-grey arrows indicate the flow of the Atlantic waters, while the darker grey arrow represents other types of water. The arrows' width represents the magnitude of volume transport. The small black arrows show the residual currents, namely the average currents over a certain period of time called "tidal cycle" (summer or winter). These currents are also differentiated based on their depth in surface and seabed ones. Water masses are often separated from each other by "fronts", transitions where the water properties change in terms of salinity, temperature, nutrients and pollution. These areas are more marked in summer than in winter as the water is less strongly agitated by the wind, so there is less vertical mixing and the horizontal gradients remain longer intact. Together with the fronts it is possible to define water masses boundaries which are as well dependent on the season.

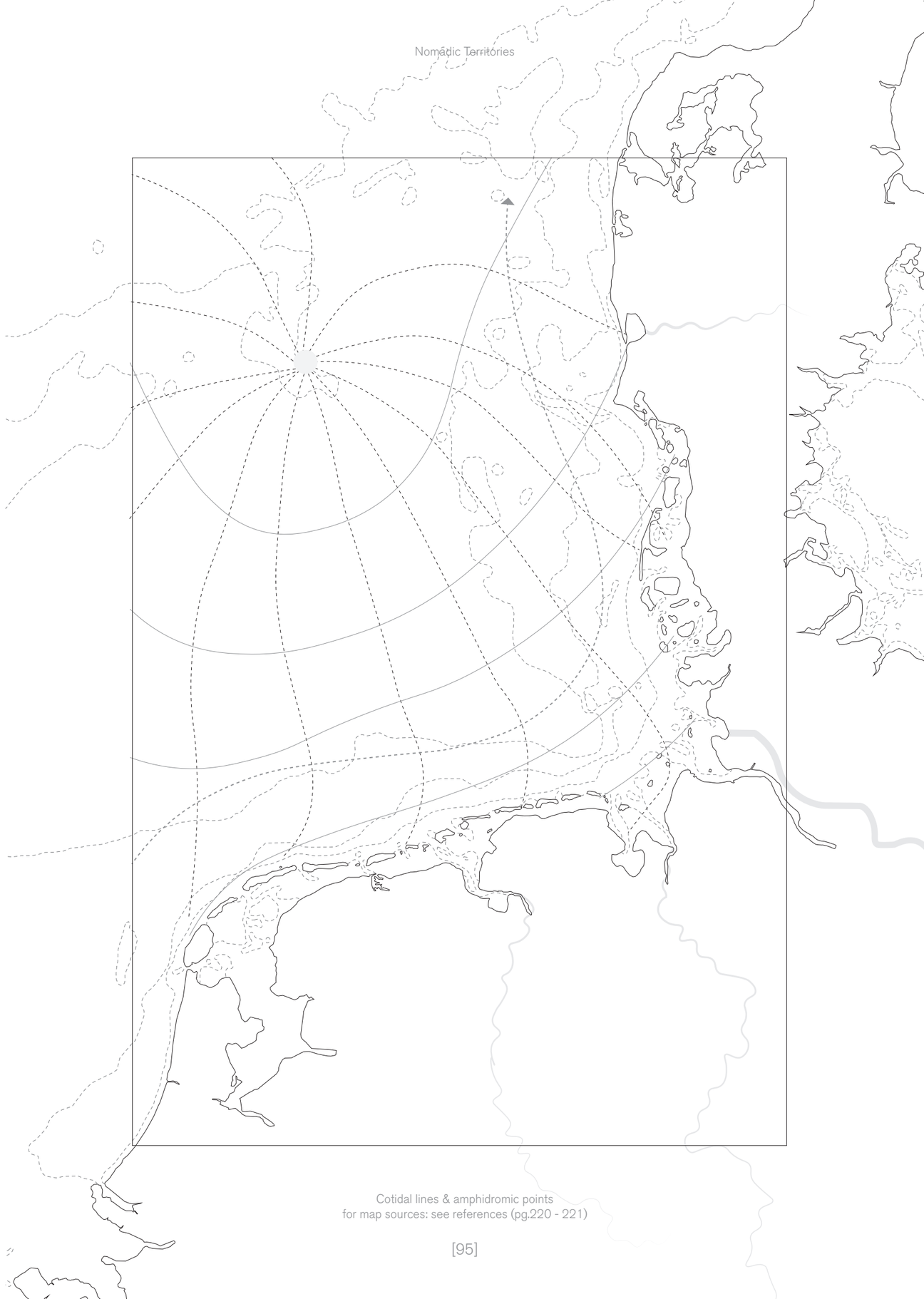


Currents, water masses & dispersal fluvial waters
for map sources: see references (pg.220 - 221)

6.2.4

Cotidal lines & amphidromic points

The moons gravitational force acts upon the Wadden Sea causing (lunar) tides. Approximately twice a day low tide and high tide occurs. This tidal influence affects the waves and points of impact. The main movement of the tides in the Wadden Sea is counterclockwise. Amphidromic points occur in which there is zero tidal amplitude. The tidal constituent increases with distance from the amphidromic point. Specifically during the alignment of the moon, sun and earth the gravitational field causes spring tides and death tides, in which more extreme high and low water levels are reached.

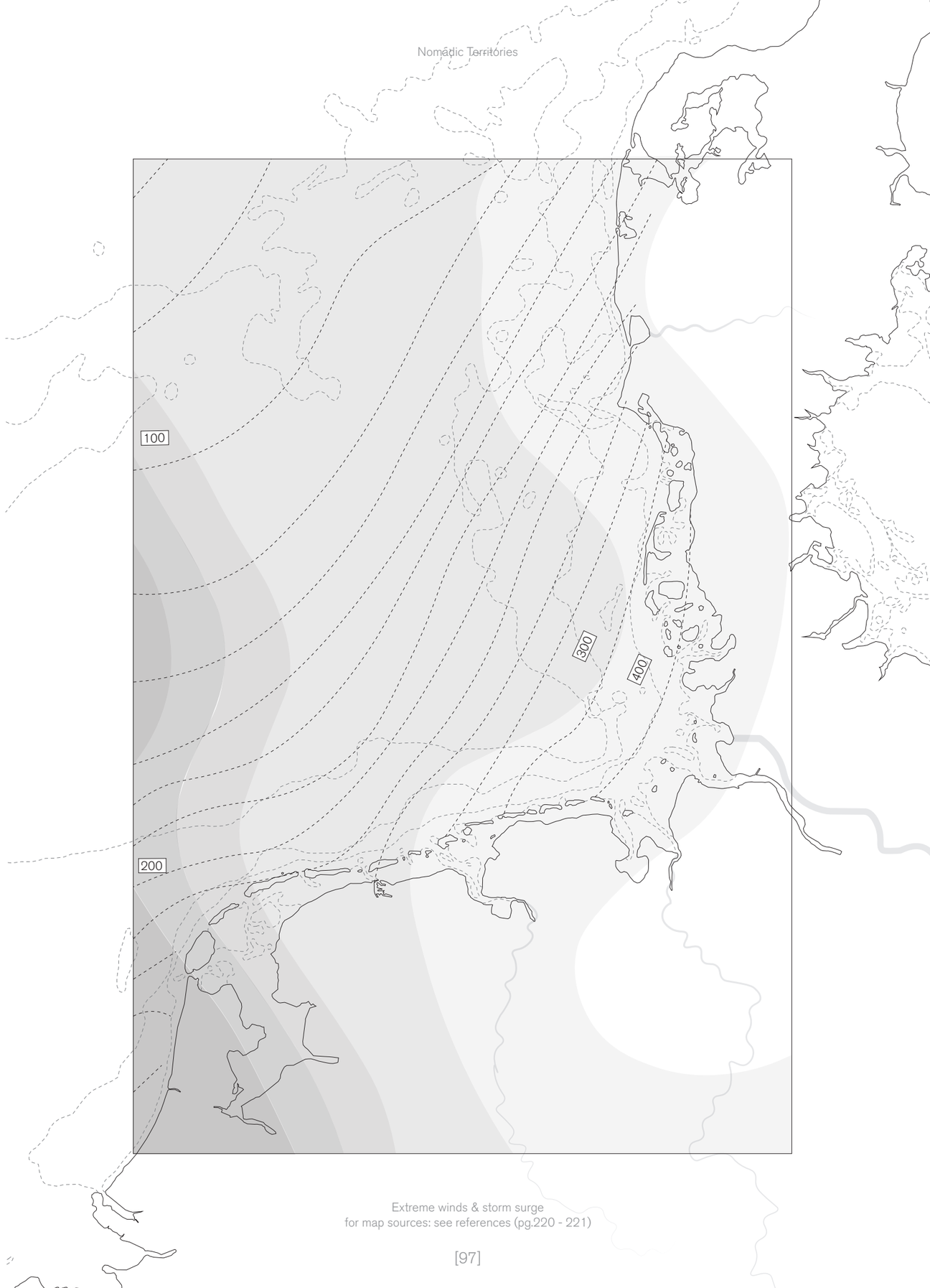


Cotidal lines & amphidromic points
for map sources: see references (pg.220 - 221)

6.2.5

Extreme winds & storm surge

This map represents the extreme scenario for wind speed and air pressure in the future, during winter time. These conditions will create more storms along the coastal zone and islands of the Wadden Sea Region, leading to storm surges. In addition, wind will push water towards the coast (coastal erosion and will transport moisture resulting in higher levels of precipitation over evaporation.

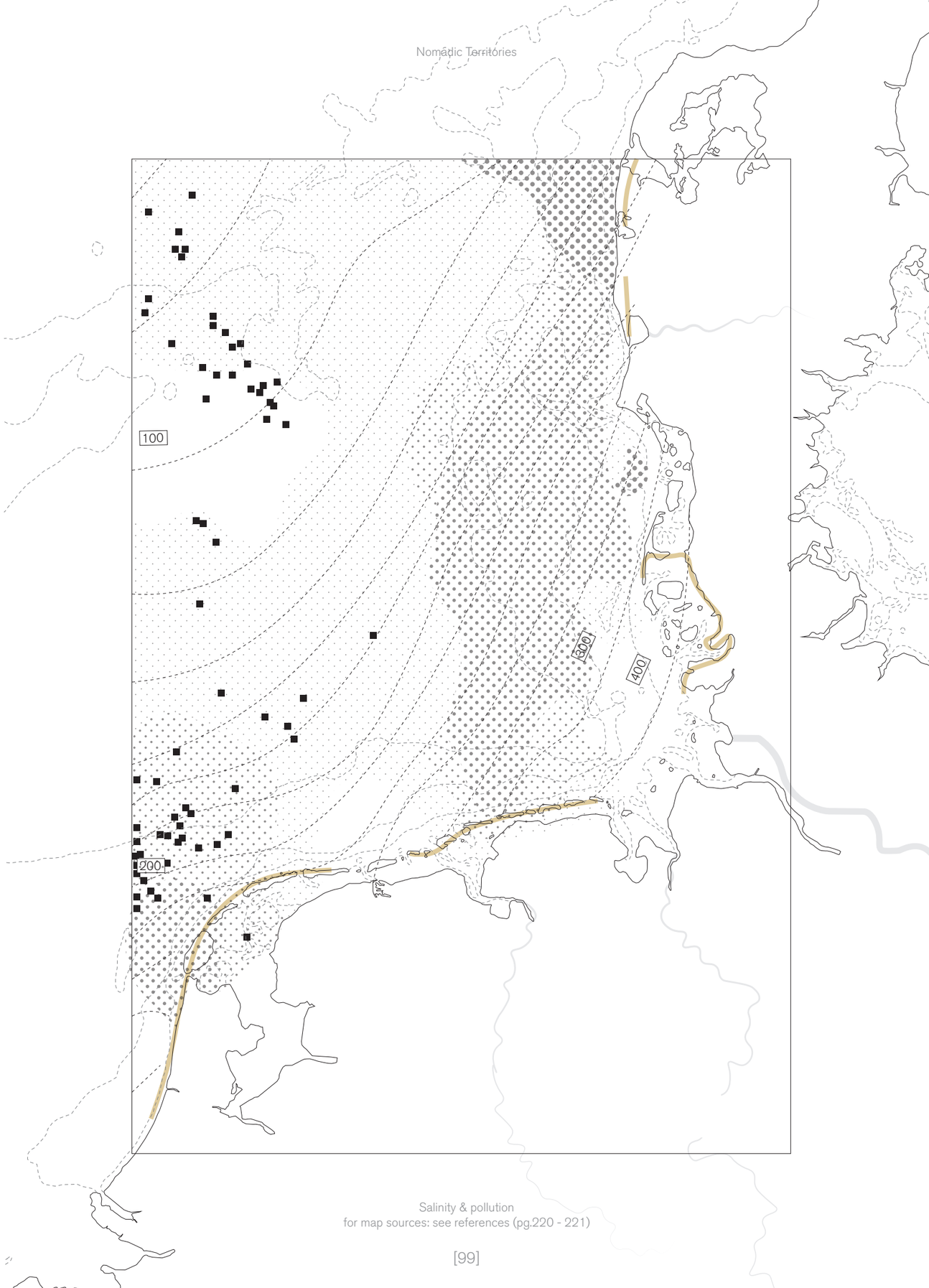


Extreme winds & storm surge
for map sources: see references (pg.220 - 221)

6.2.6

Salinity & pollution

Salt intrusion is driven by both natural and anthropogenic pressures. One of the natural drivers is storm surges, whose action is short – term. When storm surges occur, saltwater will enter the aquifers via direct infiltration during the first flooding waves and infiltrate through the permeable sands that are typical of coastal aquifers. Then the agricultural land and drinking water will be contaminated by saltwater, which may result in health issues in coastal communities and a reduction in land productivity. This map illustrates the prediction of the increase of extreme storm height in 50 years. In the Wadden Sea context, the coast will suffer from more than 10% increase.

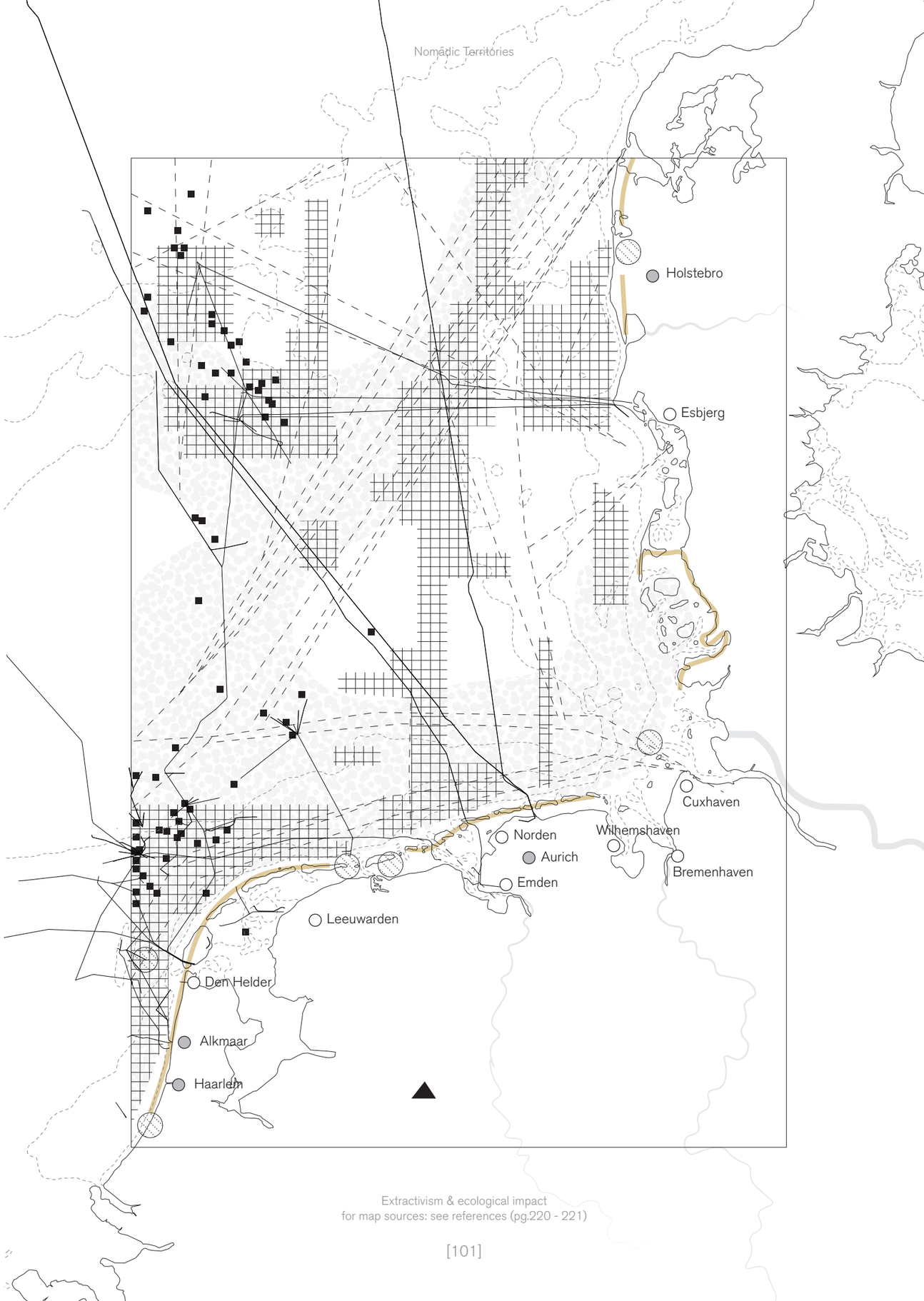


Salinity & pollution
for map sources: see references (pg.220 - 221)

6.2.7

Extractivism & ecological impact

Human exploitation of land, such as the agricultural use of land and deforestation, has been affecting the physical conditions of soil and vegetation cover for stability, leading to loss of biodiversity. Water management has led to soil subsidence of clay and peat areas, and increased salinization in lower areas alongside the coast. Intensive construction of artificial waterfronts, for instance port activities, has led to a decrease in natural habitats in deltas. The continuous and extensive pollution of the water due to oil spills that temporarily cover water surfaces and ultimately sink to the bottom, in the form of hydrocarbons, affects marine habitats and substrates. Oil spills and PAH can be hazardous once found in marine habitats. Large scale infrastructure, pipelines have a well noticing presence. Biodiversity in the Wadden Sea Region is threatened by human activities and the massive extractivistic mentality.



Extractivism & ecological impact
for map sources: see references (pg.220 - 221)

6.3

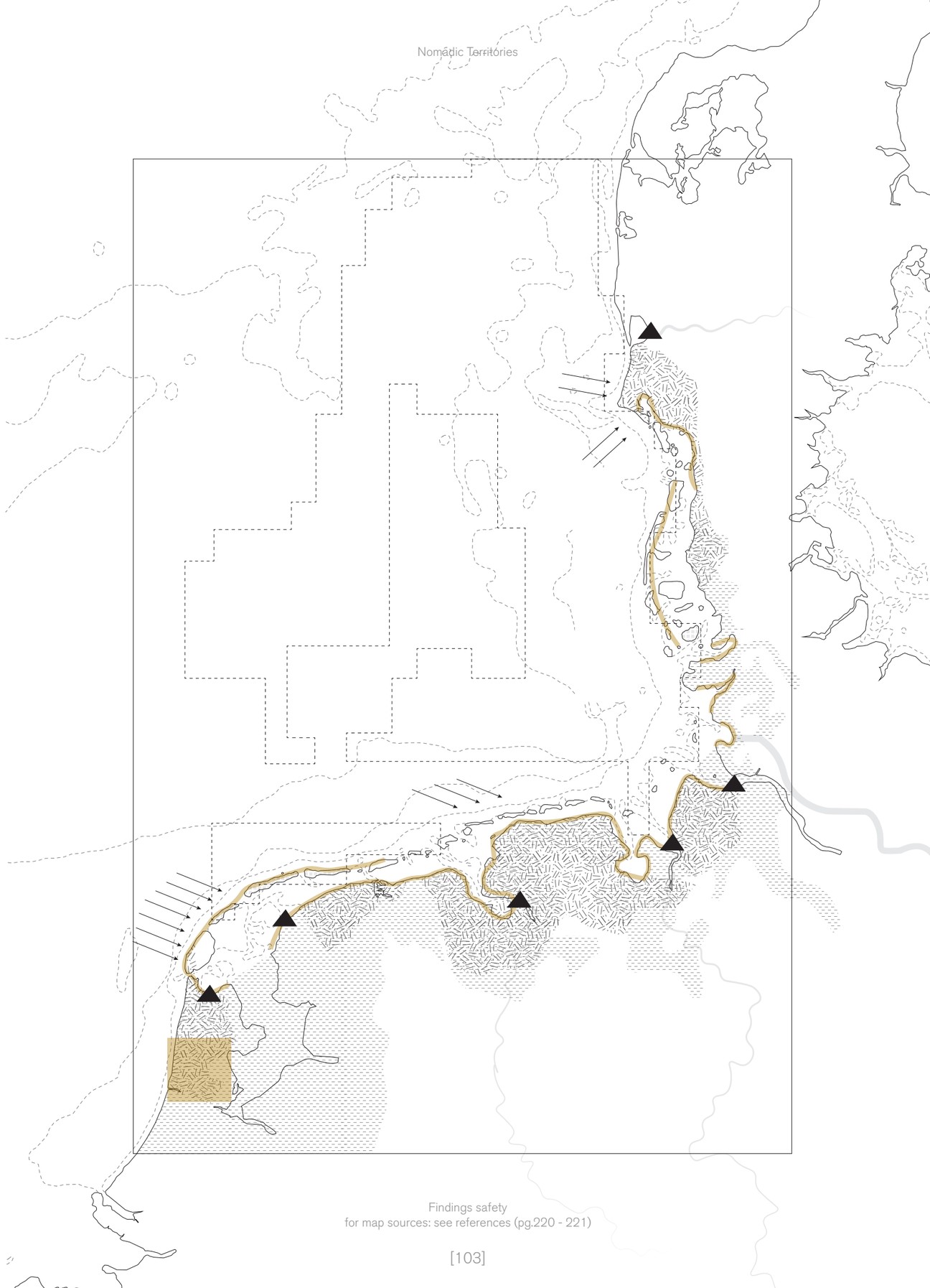
Findings

The analysis of the stressors and their performance within the Wadden Sea Region indicates that climate changing conditions and anthropogenic activity constitute a continuous pressure for the marine, coastal and land habitats. It is doubtful whether those habitats will be liveable in the years to come both for humanity and marine life. The main problems will be related to the lack of safety, productivity and permeability.

6.3.1

Findings safety

Safety is an important value that is threatened. The vast majority of the coastal zone, as well as most of the barrier islands are expected to be flooded within the coming decades if defence systems and infrastructure is not further improved. Erosion of dune and beach habitats will increase extensively. Finally, surges and extreme wind speed add extra pressure.



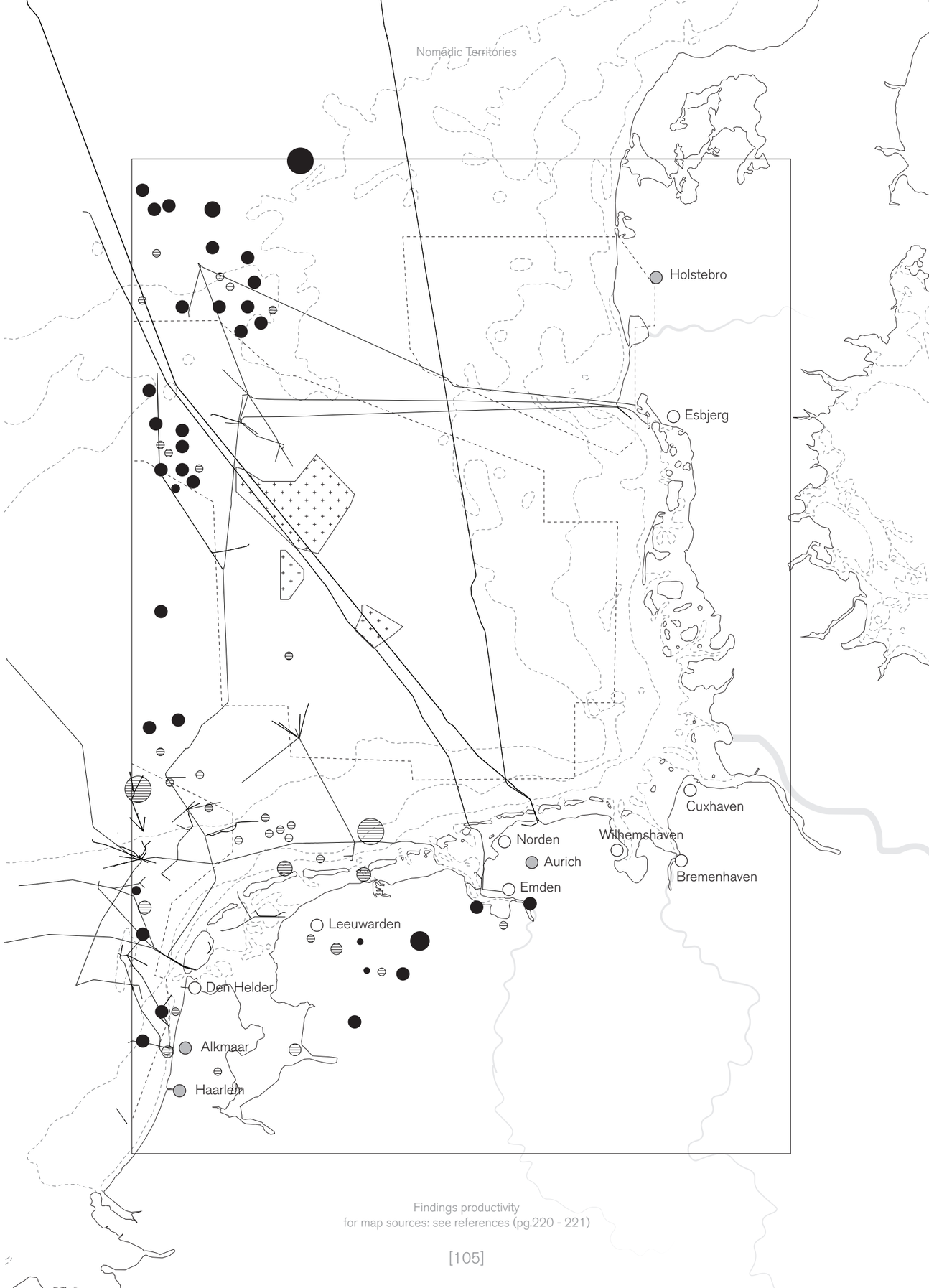
Findings safety
for map sources: see references (pg.220 - 221)

6.3.2

Findings productivity

The density of human activity results in high levels of pollution both in water and land. The current excessive production model, where industry is based on fossil fuel energy generation, affects the atmosphere, the yield of agricultural crops, the freshwater supply, eliminating productity, decresing the carrying capacity of the ecosystems and the health of entire habitats.

The massive consumption patterns manifest in space as litter and chemical pollution with respectively harmful consequences. Human – engineered intrusions into natural systems, in the form of emissions, ground pollution and salinization, will have a reversed impact on urban and rural populations and human societies and will deeply alter the territory. The risk of these changes gets more and more threatening for the territory itself and a wide range of species.

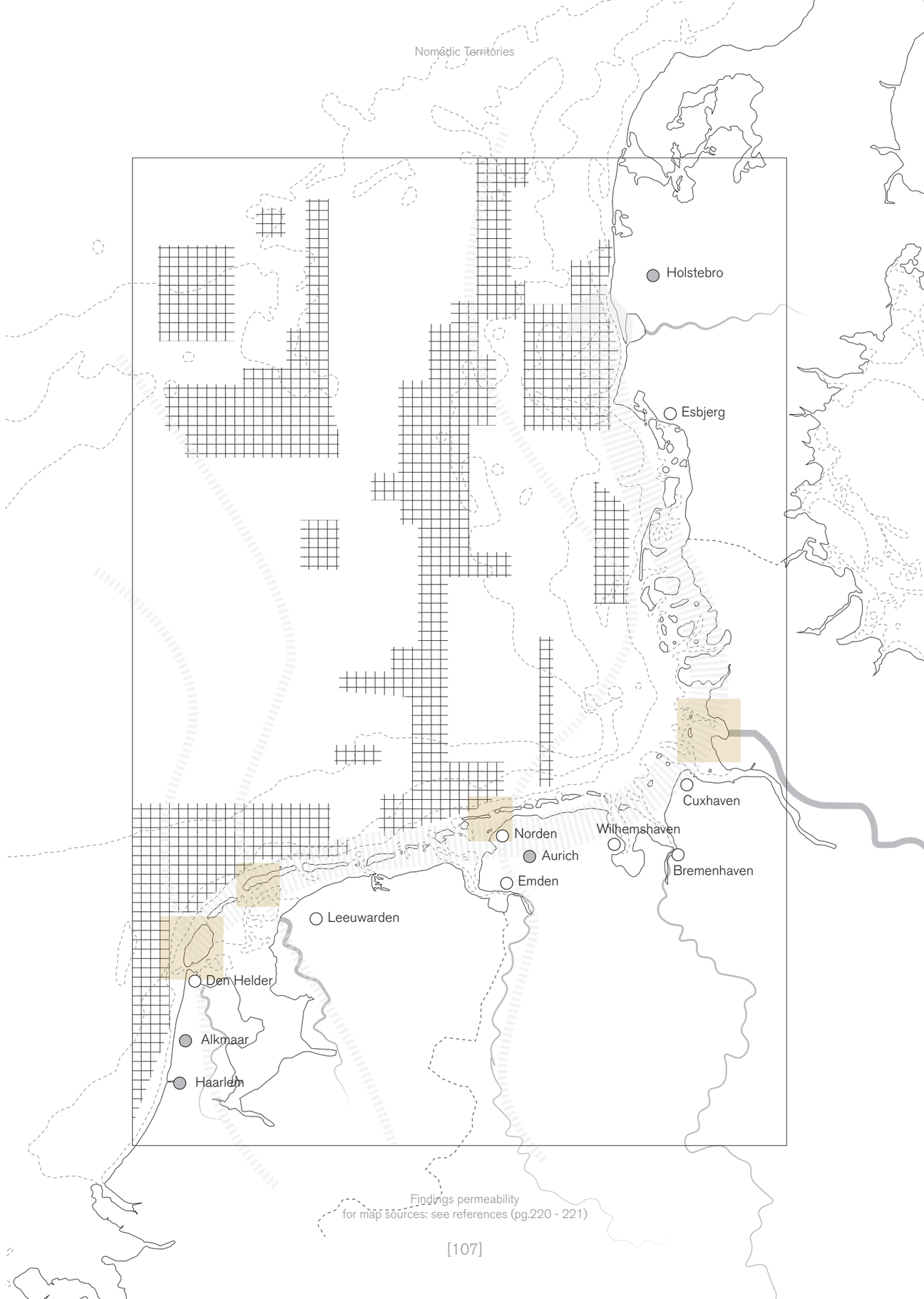


Findings productivity
for map sources: see references (pg.220 - 221)

6.3.3

Findings permeability

Water management has led to soil subsidence of clay and peat areas, and increased salinization in lower areas alongside the coast. Intensive construction of artificial waterfronts, for instance port activities, has led to a decrease in natural habitats in deltas and coasts. Water pollution also affects marine habitats decreasing biodiversity concentration and disrupting permeability. Physical obstacles such as pipelines and ship routes provide an additional obstacle for marine life.

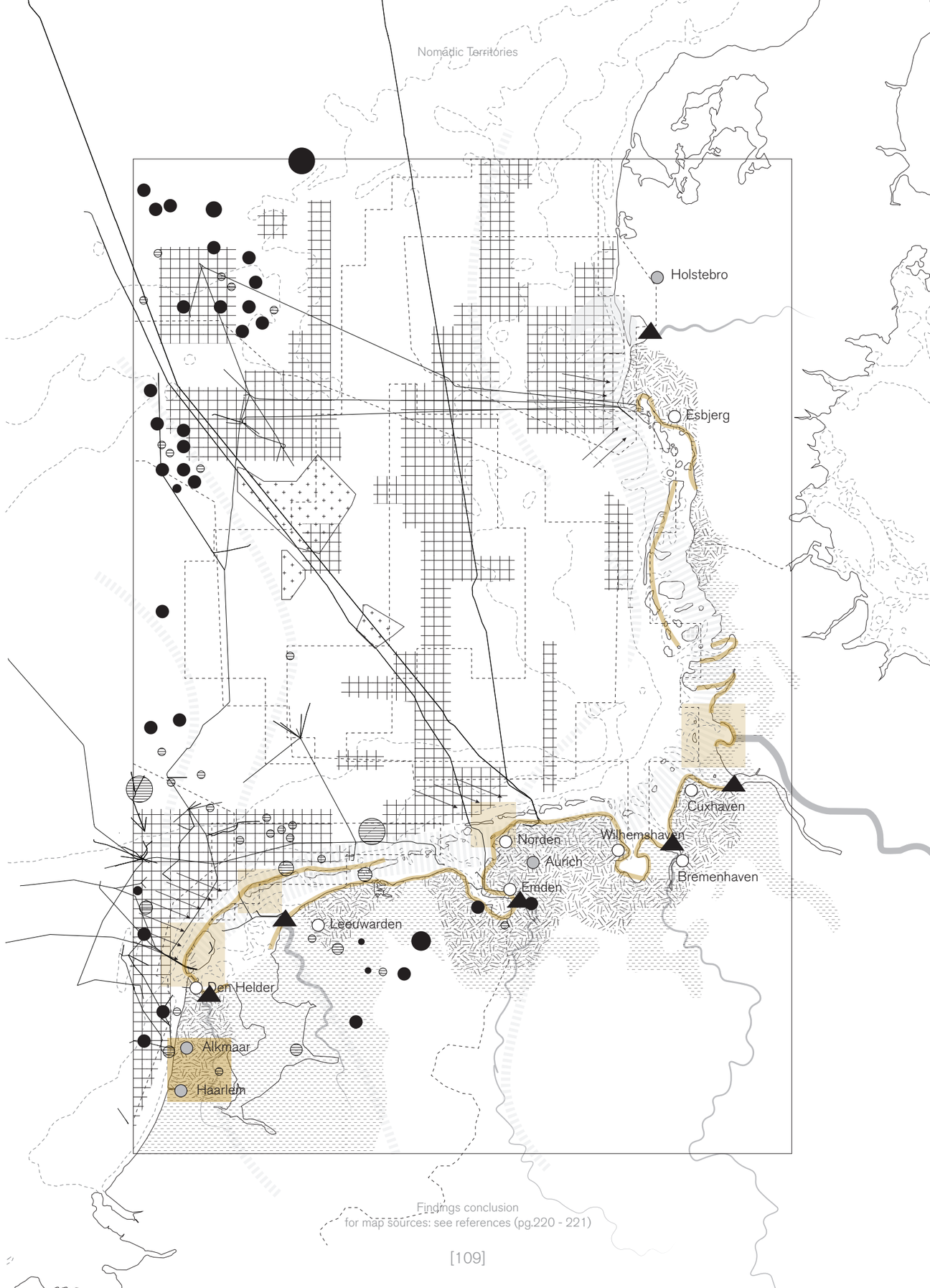


Findings permeability
for map sources: see references (pg.220 - 221)

6.3.4

Findings conclusion

By combining the previous findings we can identify areas of high risk with regard to safety, productivity and permeability, within the context of climate change and human over – exploitation of resources, advocating the urgecy to find a new synergy between economy and ecology that would mitigate risk and allow adaptation to climate change related hazards.

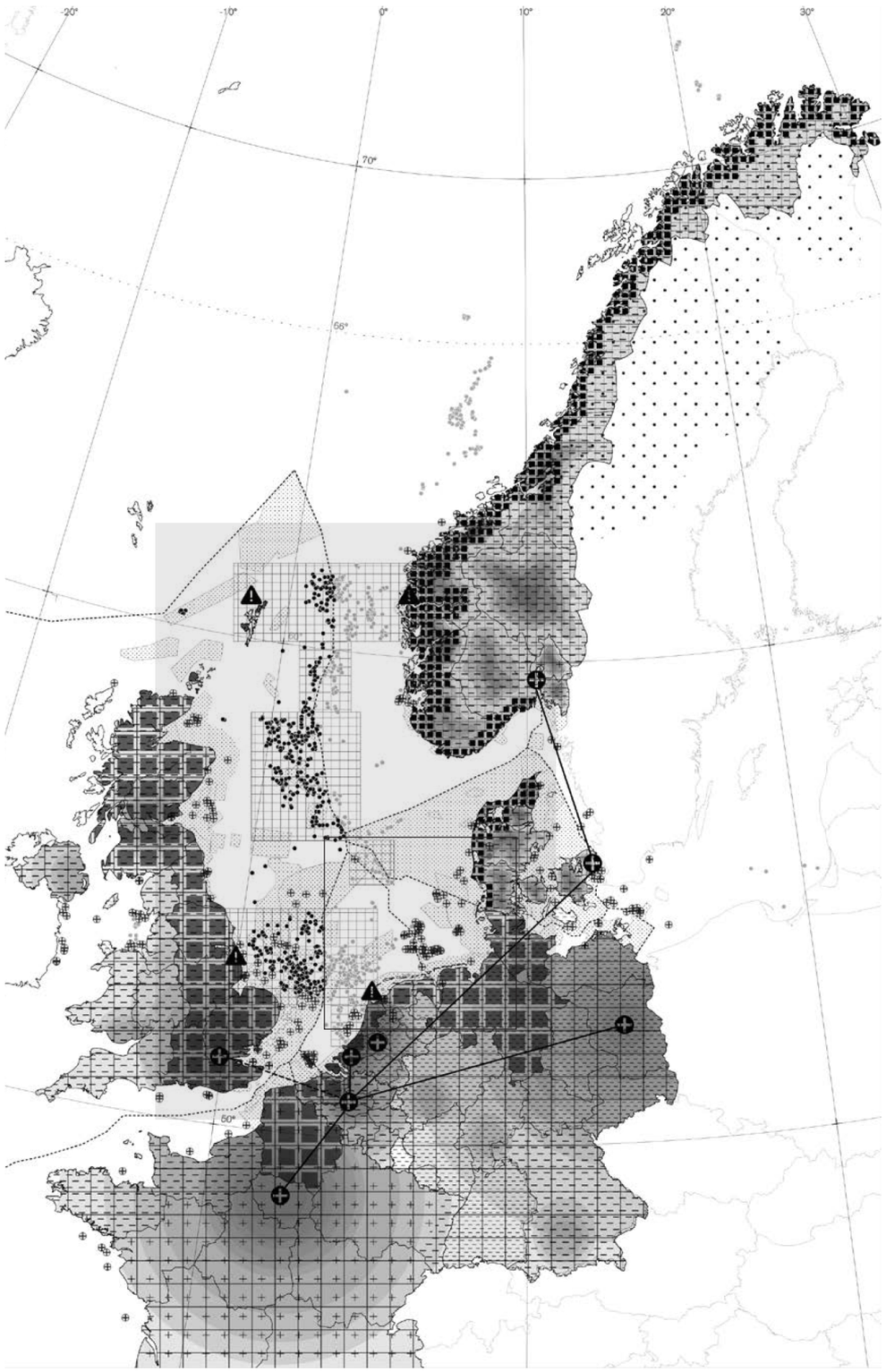


Findings conclusion
for map sources: see references (pg.220 - 221)

6.4

Governance

With regards to governance, we could argue that the North Sea territory resembles a game board of different political, economic, environmental claims that can either be oriented towards the same direction or create dissonances, “crises”, meaning conflicting issues within the same reality. The map shows the conflicting tendencies as a result of the different layers of governmental representation, from the macro (EU) to the nano (local boards) scale. EU policies and efforts get blurred as we scale down, lowering their impact and reducing the feeling of representation in the local scale. Considering the contrast between rising extractivist activities of national gov¬ernments and the commitment efforts towards sustainable energies and protection, it seems that these opposite realities that coexist and conflict create a polarized political scenario and a weak representational system. As globalization travels through scales, it decreases, defining a clear distinction between the global and the local. Therefore, this crisis materializes and becomes evident precisely where the individual and communal interests are affected by the macro policy making.This objective requires above all reciprocity among the different levels of representation and a multi level cooperation in national and international scale but also the raise of awareness in an individual level and the involvement of local actors. The decision making process requires multidisciplinary involvement. Politics, nature conservation organisations, the scientific community and administration, combined with local stakeholders should be in an open dialogue and contribute to the decision making process. Regarding the territorial,economic and environmental claims on the Wadden Sea, Denmark, Germany and the Netherlands have been cooperating to protect the region since 1987. The Trilateral Wadden Sea



Governance, TT studio collective phase
for map sources: see references (pg.220 - 221)

Cooperation has already defined a set of guidelines in order to achieve sustainability and unhindered continuation of the natural processes. The region is perceived as a spatial entity with a high ecological and cultural value, that requires common strategic planning and policies concerning protection, conservation and management, towards a sustainable future development. Considering the unique value of the local cultures but also the capacities of the different localities, it seems relevant to argue that these local identitites could foster such change towards a future robust and sustainable Wadden Sea region.

6.5

Scenarios

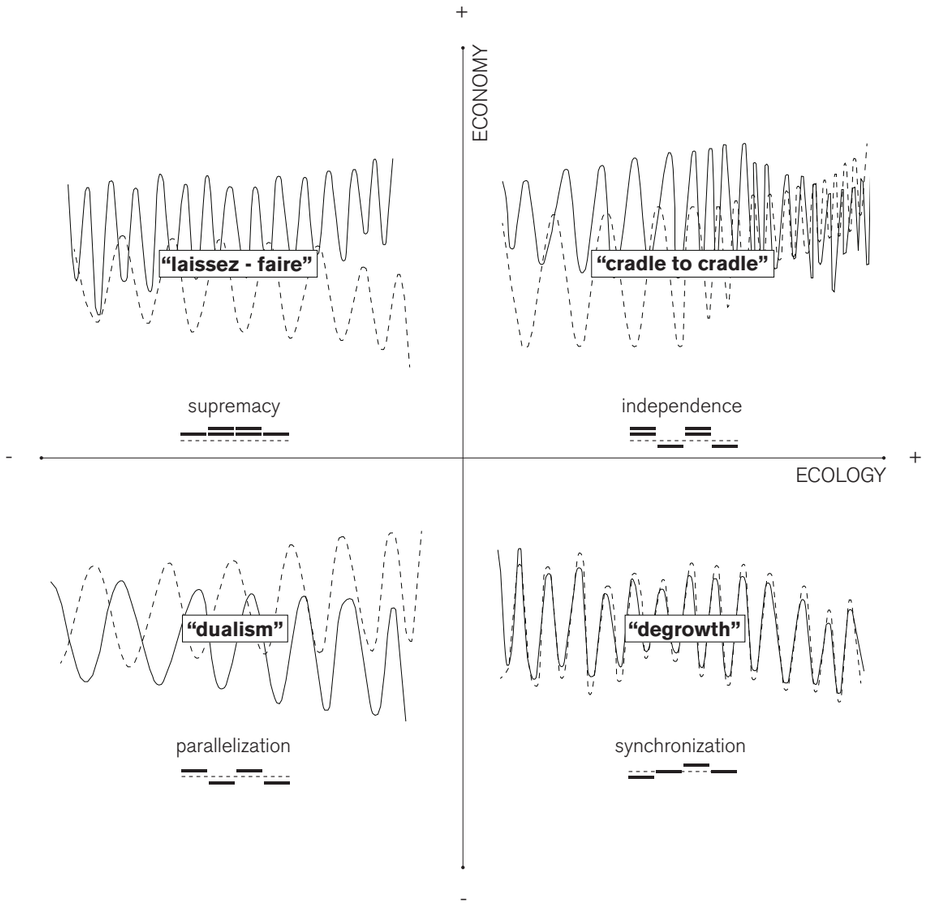
Following the previous thought, we come to four different scenarios, based on a set of aspects, concerning levels of representation and the intrinsic socio cultural values behind economic and territorial claims, that eventually reflect a different balance between economy and ecology. Thinking about economy and ecology as two engines, the diagram showcases the interrelation between their pace of change, for each one of the four scenarios.

“Laissez-faire” scenario advocates that the individual is the key element for the societal structure. It envisions a future economy based on individualism also embedded with the right for absolute freedom. Ecology is a self – regulating system dependent from the human agency. Competitiveness rules economy following a capitalistic rationale, and as a result man turns into the master of nature in order to make the most out of resources and maximize profit.

“Cradle-to-cradle” scenario envisions a model where human industry is projected on natural processes. Economy should work for ecology, enriching ecosystems’ carrying capacity while also maintaining a safe, productive and metabolism based on circulation, where waste equals food. It is a scenario that benefits ecology, however the socio economic framework it suggests is rather holistic and thus, dystopic.

“Dualism” or else the doctrine of duality, is the scenario that conceptualizes the existence of economy and ecology as two separate but symbiotic sets of processes. They are perceived as equally important , however each one follows its own path. The two paths remain parallel and never meet.

“De Growth” is a scenario based on speculations from a diverse range of origin, such as political ecology, ecological economics and environmental justice. De Growth advocates the importance of eliminating global consumption and production, envisioning an ecologically sustainable society based on self – organisation commons, the idea of community, cooperation and work sharing.

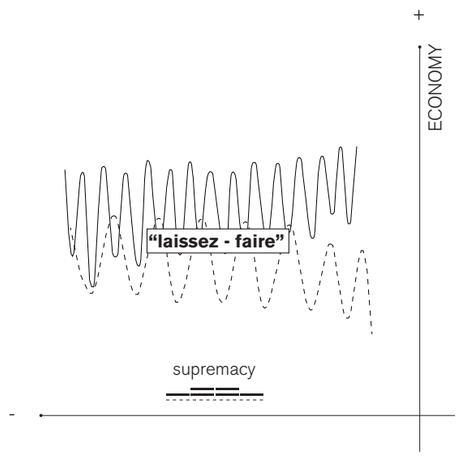


Scenarios, pace of change

6.5.1

Worst case scenario

The map illustrates the future vision of the Wadden Sea Region and the aftermath spatial footprint of the “laissez – faire” scenario considering also the climate change variables presented in previous paragraph. Human presence in both waterscape and landscape becomes more and more evident harming ecosystems' robustness and decreasing their adaptive capacity. The shape of the whole ecological coastal zone changes, due to flooding events and erosion.

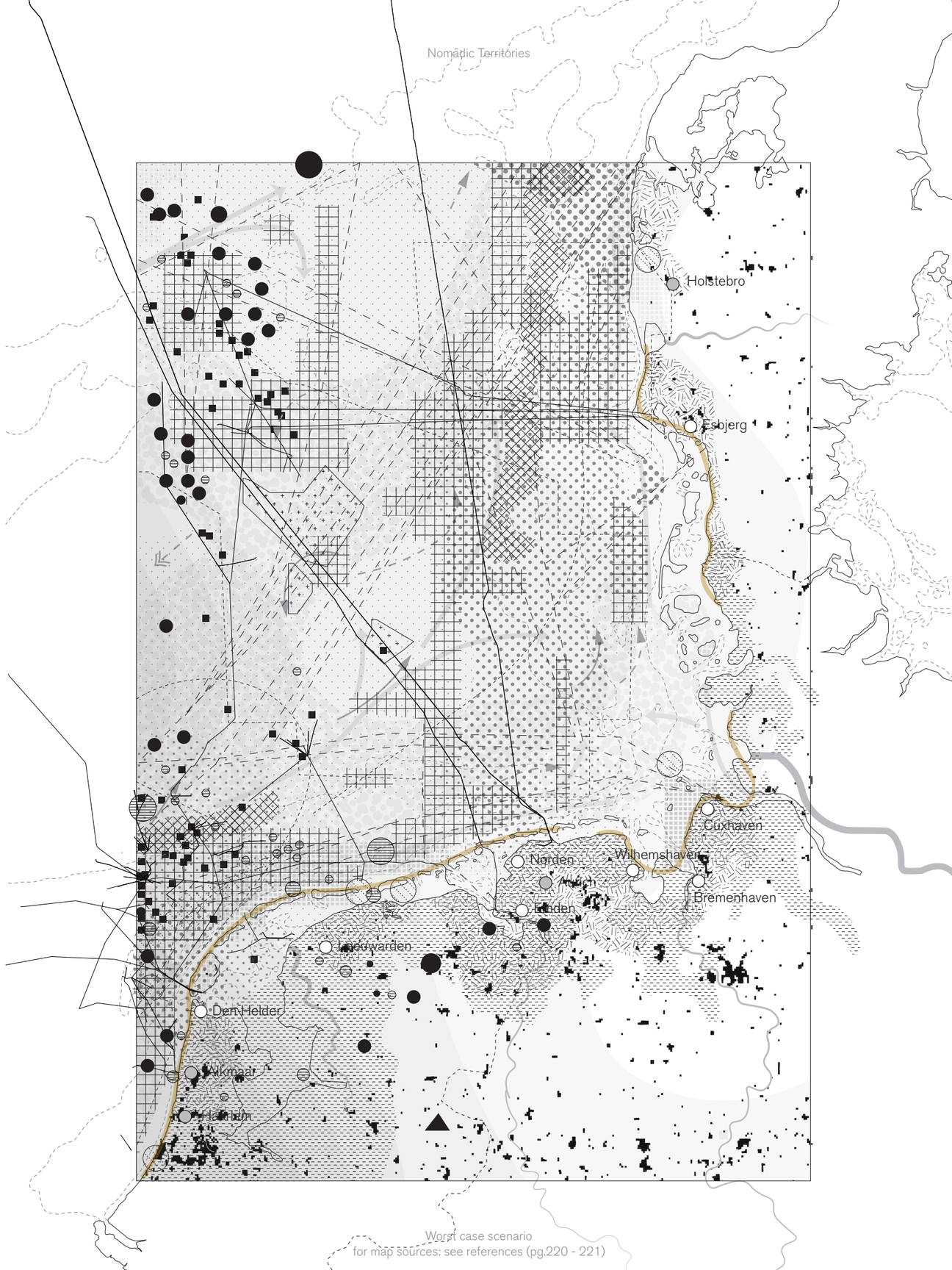


surge height
300 wind pressure
wind speed
±2.5
±5.0
±10
±20

biodiversity concentration <28
ship routes
oil rig
high density oil spill
PAH
affected coast
explosion

1m SLR | flooding
0.5-0.6m
erosion
river estuaries
stress
affected areas
wind farms
fishing zone
pipelines
gas field
oil field
crossings, crusial areas
ecological zones and corridors
biodiversity concentration <28
city
port

0 10km 20km 40km

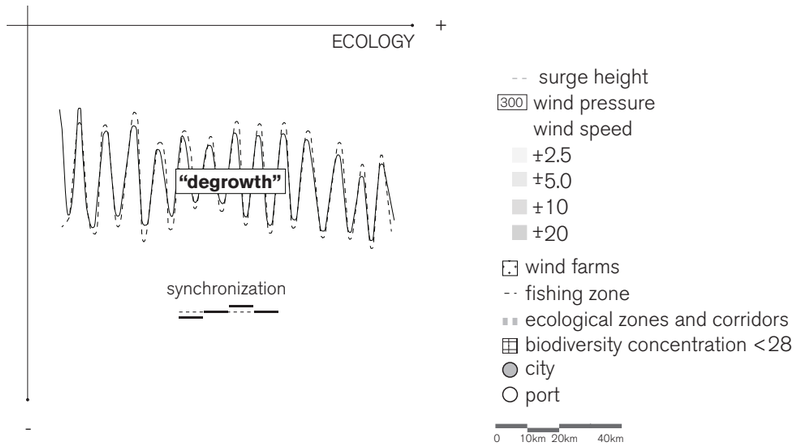


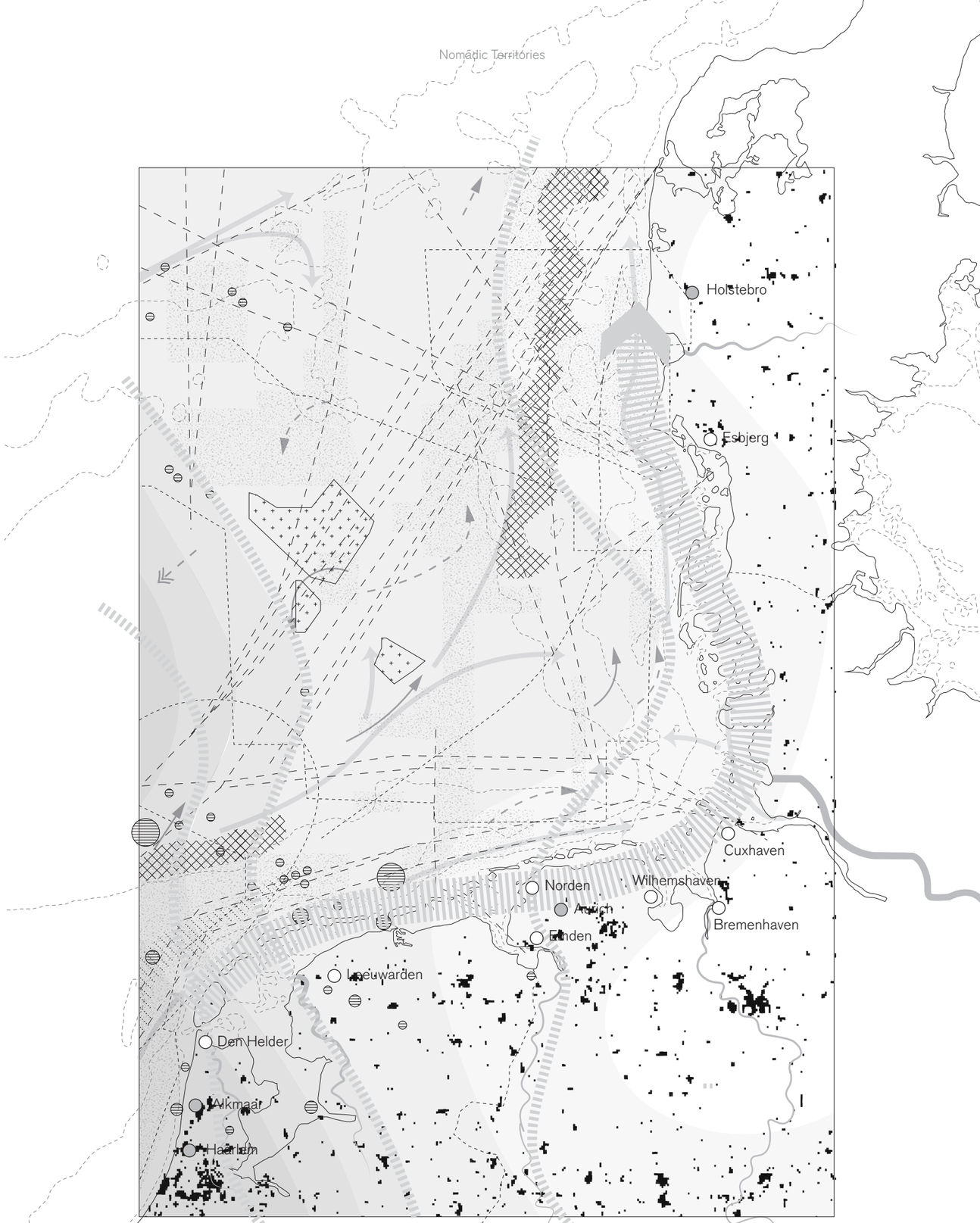
Worst case scenario
for map sources: see references (pg.220 - 221)

6.5.2

Proposed scenario

Following the De – Growth scenario, global awareness and the establishment of an economic development based on “less is more” can help towards the enhancement of ecosystems’ robustness and a future vision of the Wadden Sea promising environmental justice. The Wadden Sea Region will remain an ecologically rich archipelago.

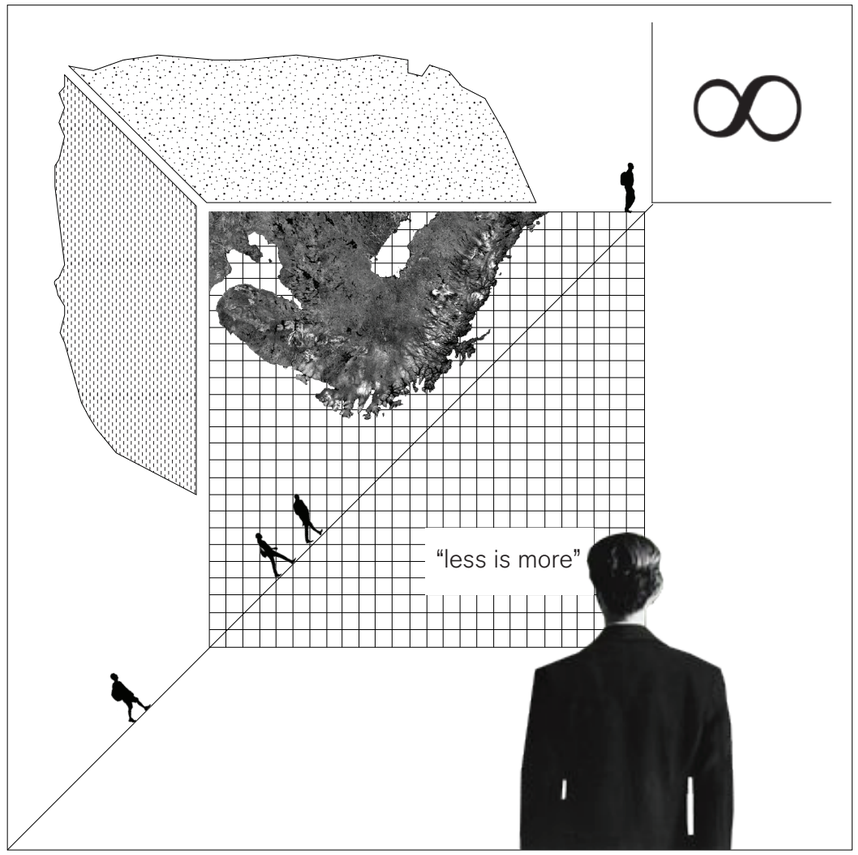




Proposed scenario
for map sources: see references (pg.220 - 221)

6.6

Manifesto



The nomadic contribution towards a balanced relation between economy-ecology

The ubiquity of change and the constantly degrading systems carrying capacity demonstrate the urgency to reduce our ecological footprint and rethink the latent values of the current model of development towards a more democratic and sustainable direction, where “less is more” (Fournier, 2008). This is where the nomadic paradigm can contribute towards risk mitigation and adaptation to climate changing conditions, informing spatial planning strategies.

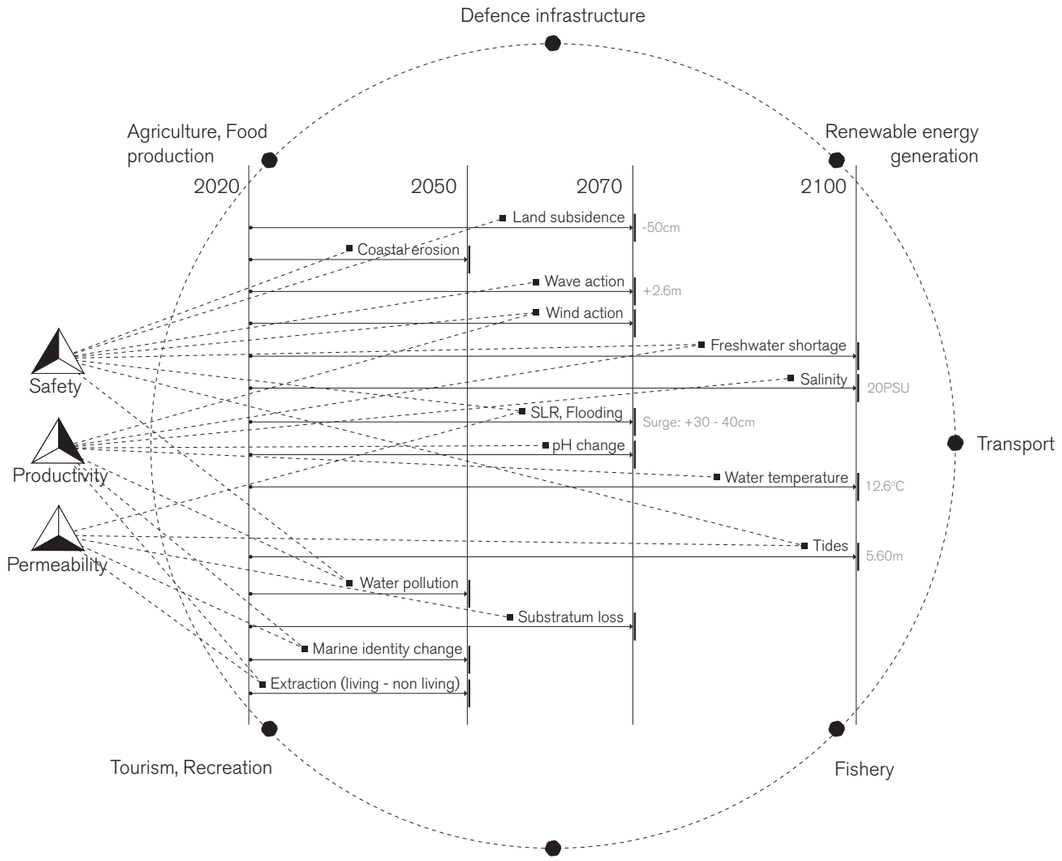
In a world of extremes, the nomadic paradigm suggests an alternative posture of the humankind. Learning from the Sámi nomads, the conflicting performance of natural and anthropogenic agents is replaced by co – habitation and co – existence, with respect to the cyclical role of climate change in the shaping of the territory. Re – programming the human agents, meaning both systems and activities, according to the dynamic change of the biophysical conditions will foster this co – habitation.

In fact, the nomadic paradigm manifests a shift in the values determining the management of resources, linking the values of extraction, production and consumption to the dynamic change of biophysical patterns. This shift towards a different way of producing and consuming, similar to the Sámi nomads who develop their economic activities with respect to the carrying capacity of the ecological systems, triggers a change of the terms in which eonomy is considered in our capitalistic world. In other words, it is not just referring to a quantitative matter of doing less of the same, but instead a re – ordering of values.

In the end, nomadism reconnects human with nature. Key element is the deep ecological knowledge, which implies that humans are not only aware of the way ecosystems perform but they are also part of the biophysical cycle.

6.7

Deadlines for adaptation

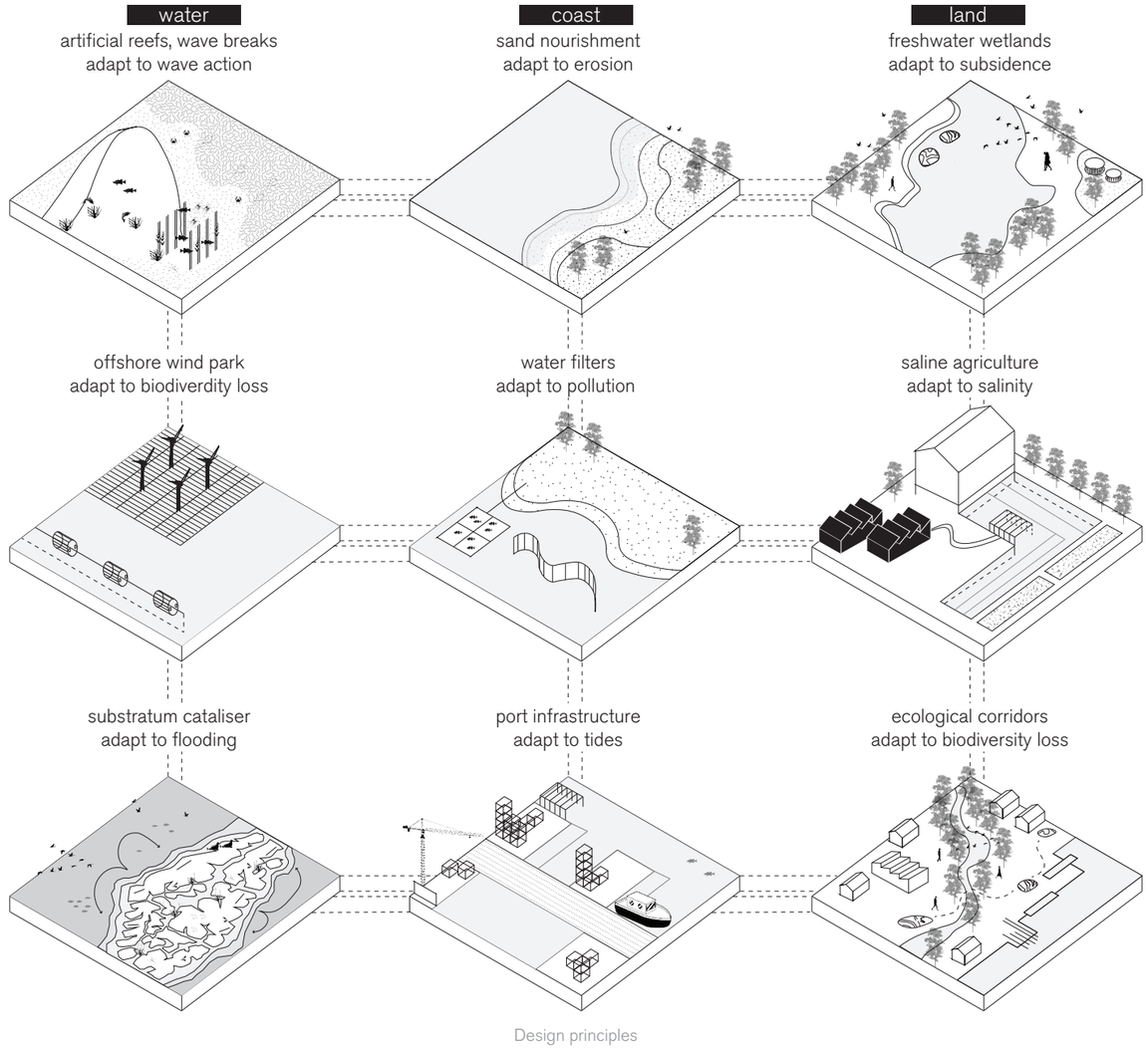


Deadlines for adaptation
and most affected human systems

Moving towards strategic design this table summarizes the existing and future risk factors for the Wadden Sea Region, and the deadlines for adaptation as well as the most affected human activities.

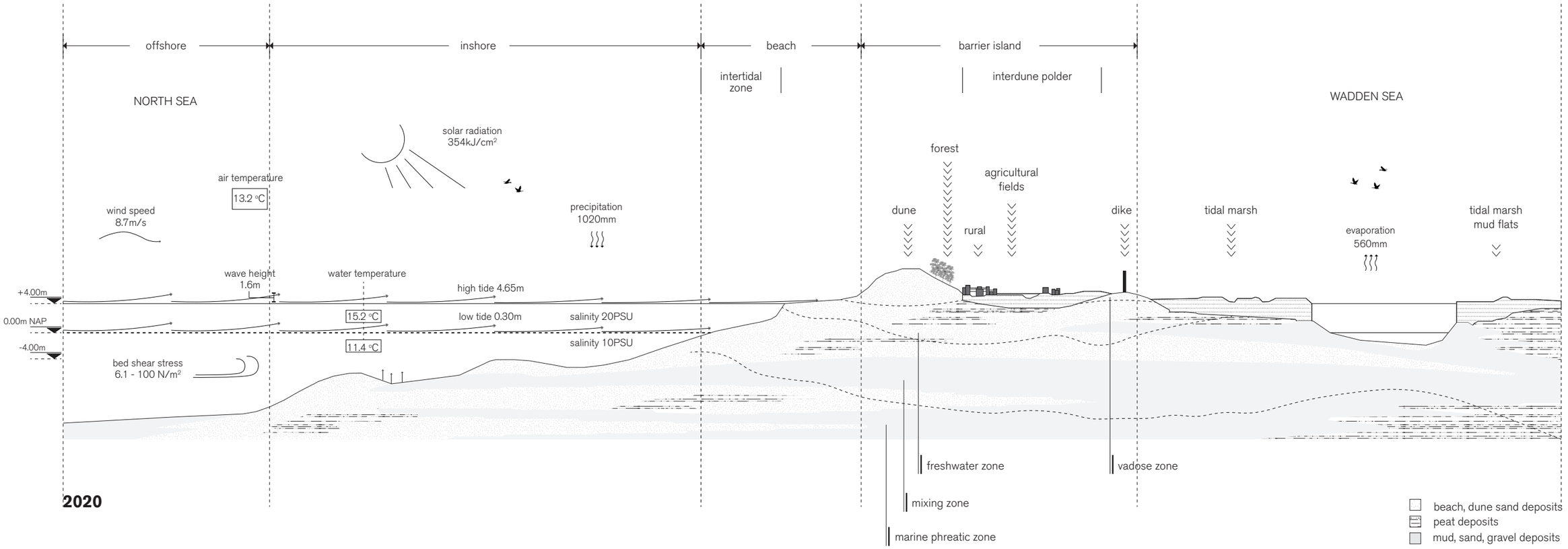
6.8

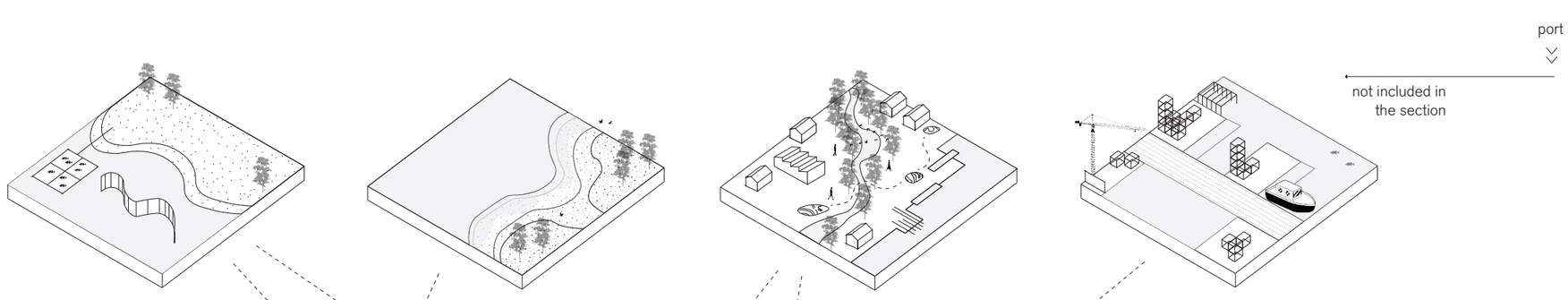
Design principles & evolving adaptation



Design principles

This leads to a set of design principles for adapting to current and future hazards and reducing vulnerabilities of human and ecological systems. These proposed principles, which correspond to the before mentioned challenges concerning safety, productivity and permeability, contribute towards an evolving adaptation and will later on turn into specific site related interventions, guiding the design phase.



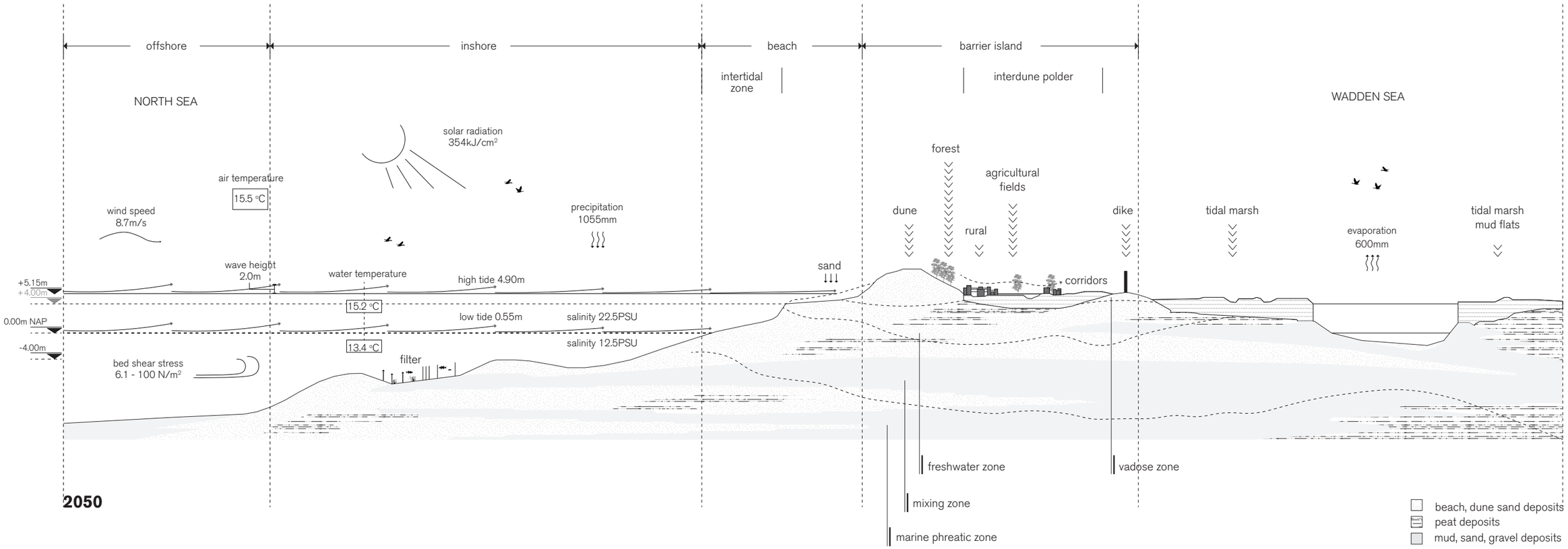


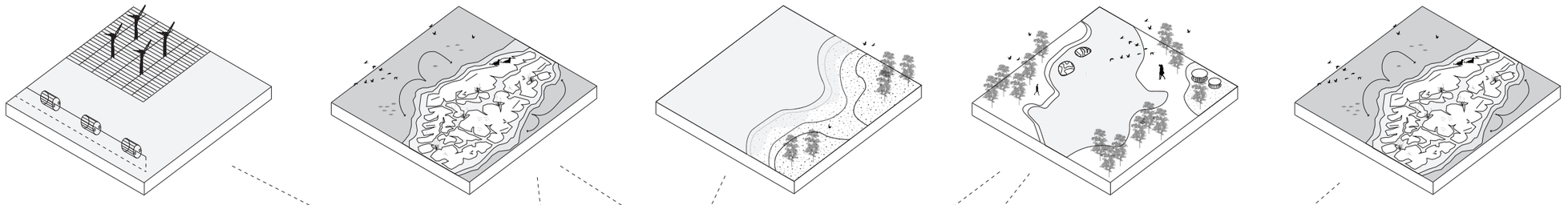
Present
2020

Safety — Productivity — Permeability

2050

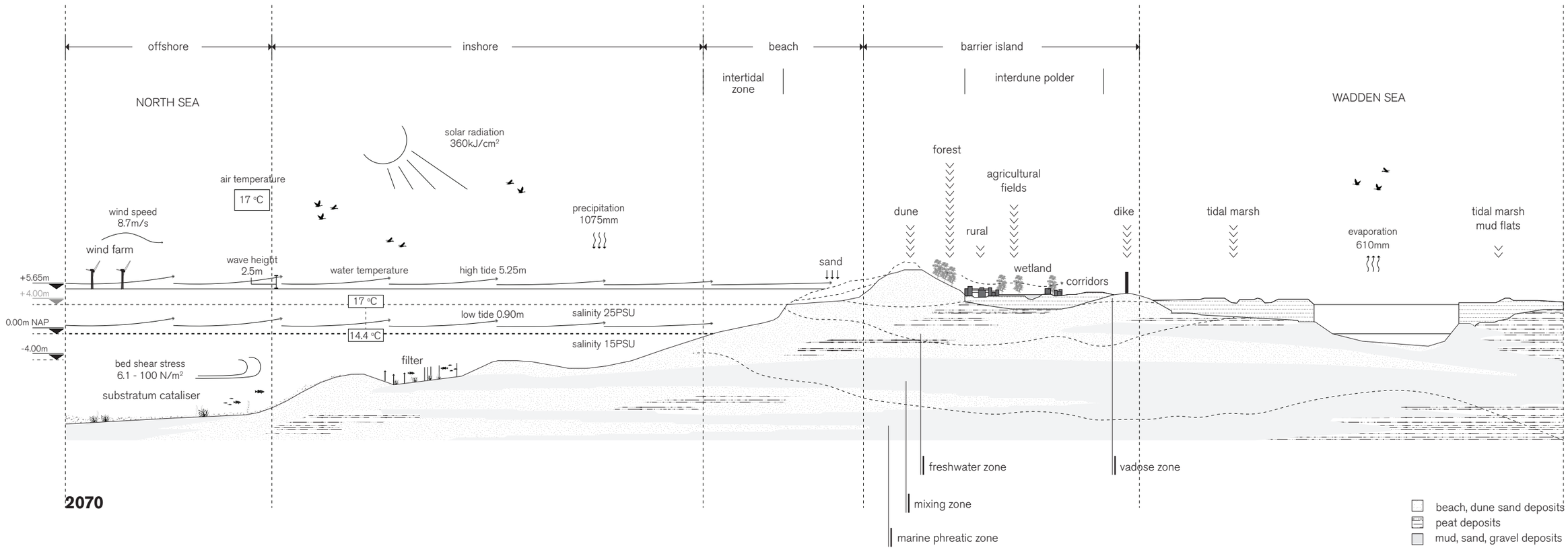
Evolving vision, 2020 - 2050

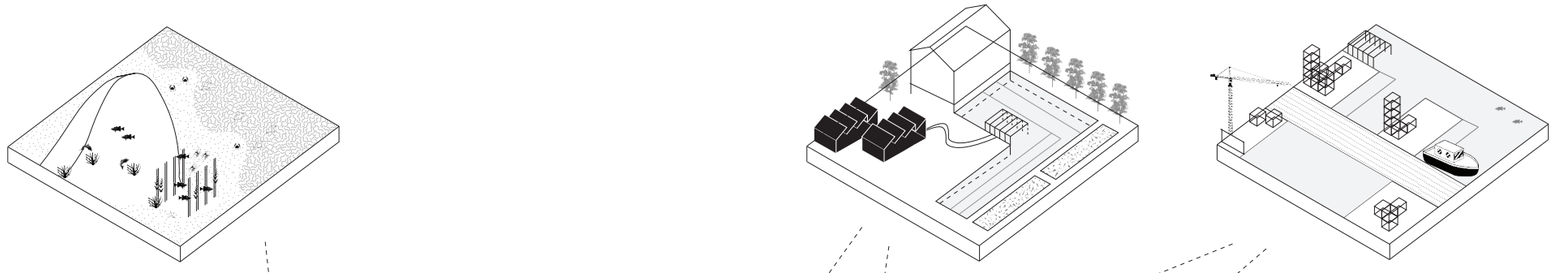




2050 — Safety — Productivity — Permeability — 2070

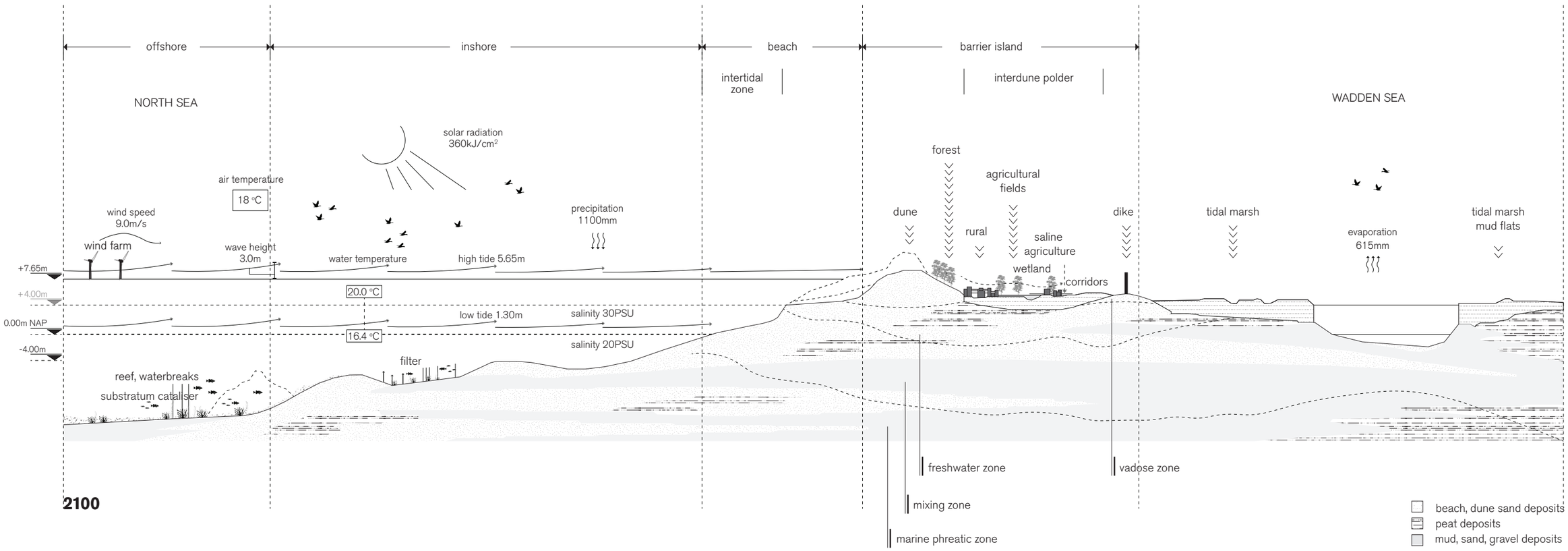
Evolving vision, 2050 - 2070





2070 — Safety — Productivity — Permeability — 2100

Evolving vision, 2070 - 2100



2100

Safety — Productivity — Permeability

Vision 2100

7

WADDEN SEA REGION

TEXEL ISLAND

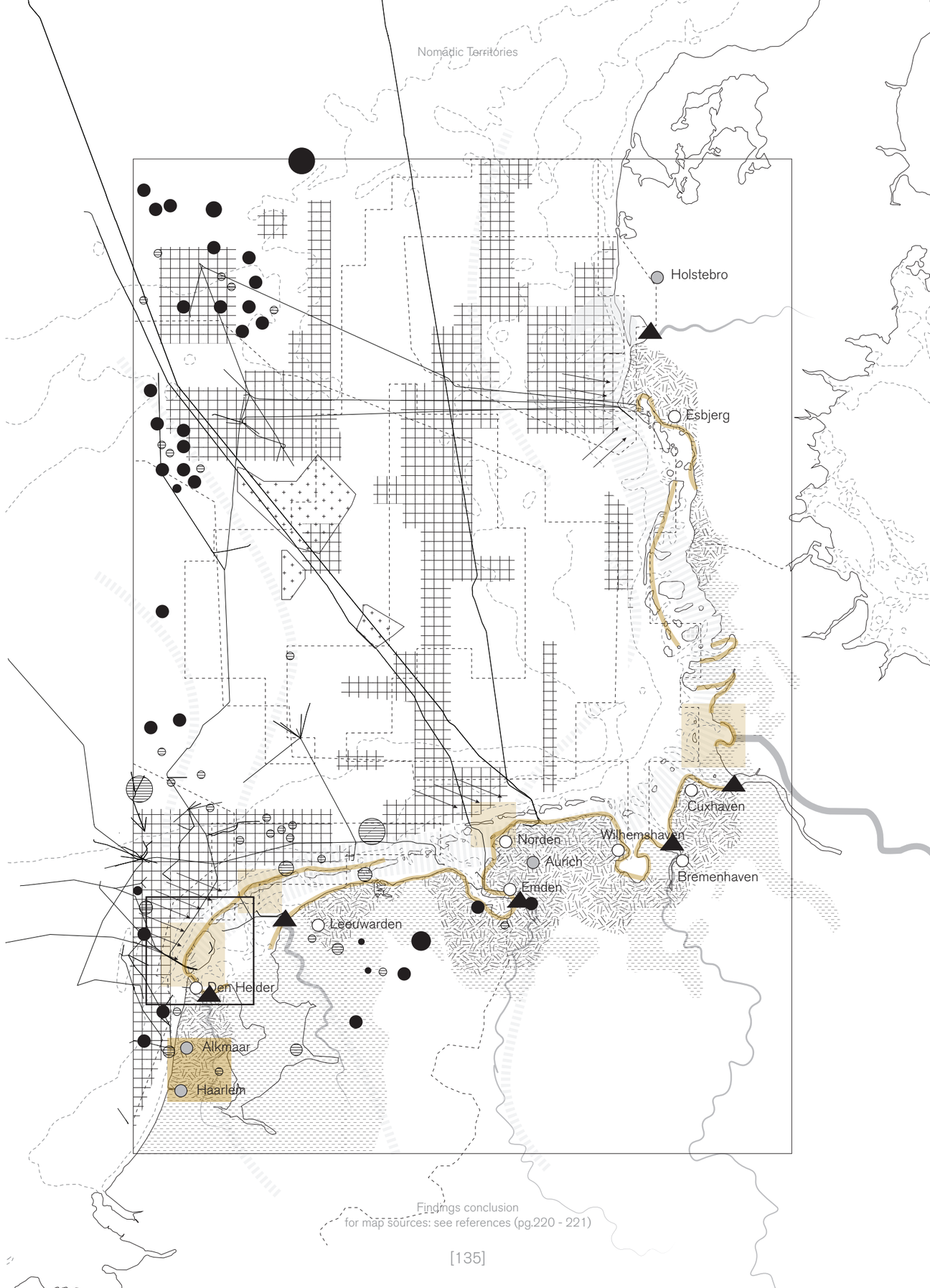
Texel finds its position in the southern part of the Dutch part of the Wadden Sea Region, at the frontline of multiple pressures that threaten its high ecological and cultural values.

Texel wants to achieve a sustainability transition and set an example for other municipalities in the Netherlands towards autonomous sustainable development. The launched innovative programs (“Energie voor Texel, Vision 2010 - 2020”, “Master Water for Texel” etc) already work towards that direction. Its surface (13000ha) provides adequate organizational and entrepreneurial strength to accommodate this transition.

7.1

Relevance:
findings safety, productivity, permeability

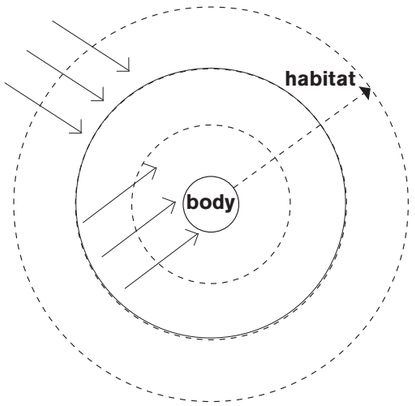
Texel is the largest and most populated island in the Wadden Sea region and in the front line of pressures, that according to the previous cartographic analysis they relate to climate change and excessive human activity. Therefore, challenges concerning safety, productivity and permeability for the area in its whole could be further explored within the spatial context of the island.



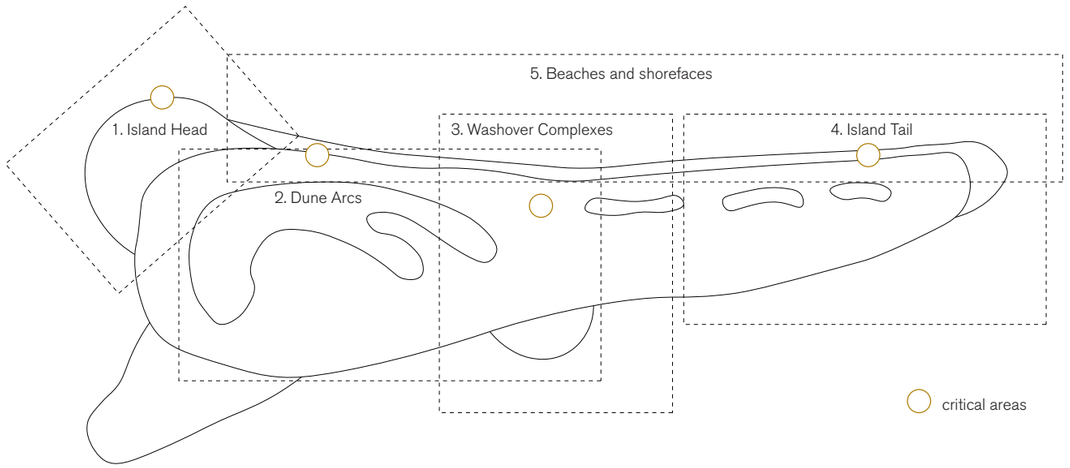
Findings conclusion
for map sources: see references (pg.220 - 221)

7.2

Exogenous & endogenous pressures



Exogenous & endogenous pressures

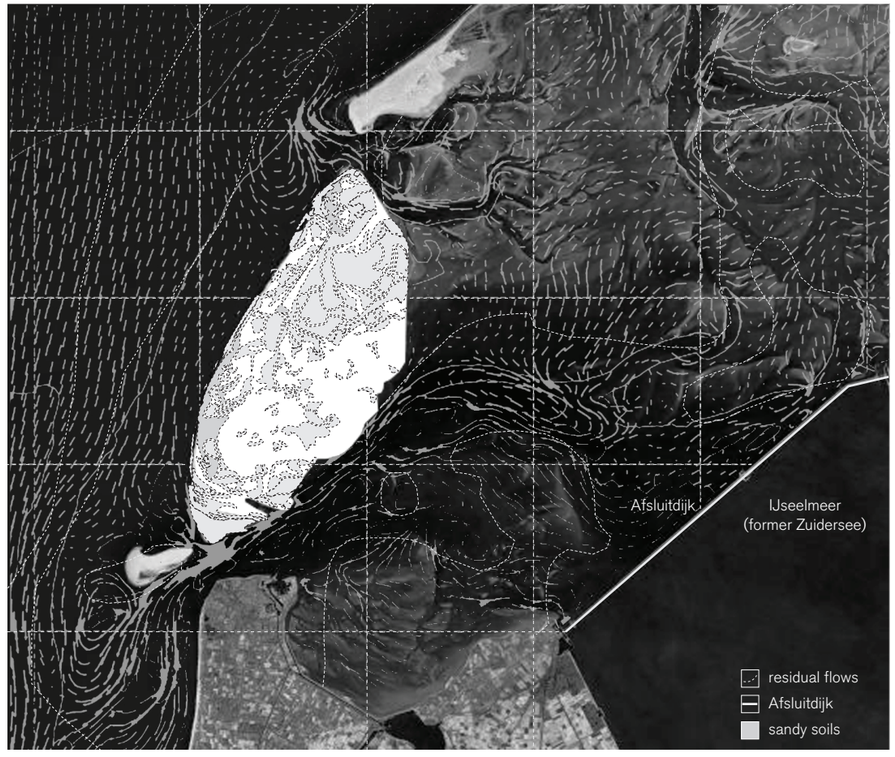


Island model
source: prototype island (Hoekstra et al., 2009; Löffler et al., 2011).

7.2.1

SLR, sediment deposition, salinization

In the coastal groundwater system of quatenary deposits, salinization of the upper layers is taking place. At present, brackish water already occurs close to the surface of the low-lying polder areas at the eastern part of the island. Freshwater occurs up to –50 m M.S.L. in the sand - dune area at the western part. Groundwater flow and salt transport was simulated for the coming centuries. The salinity in the top layer as well as the salt load at the surface of the polders will increase substantially during the next centuries. In addition, a relative sea level rise of 0.75 meter per century definitely intensifies the salinization process, causing a further increase in salt load in the polders. As such, the increased salinization of the top layer will affect the surface water system from an ecological as well as a socio-economical point of view (de Louw, 2010).



Texel, sediment deposition

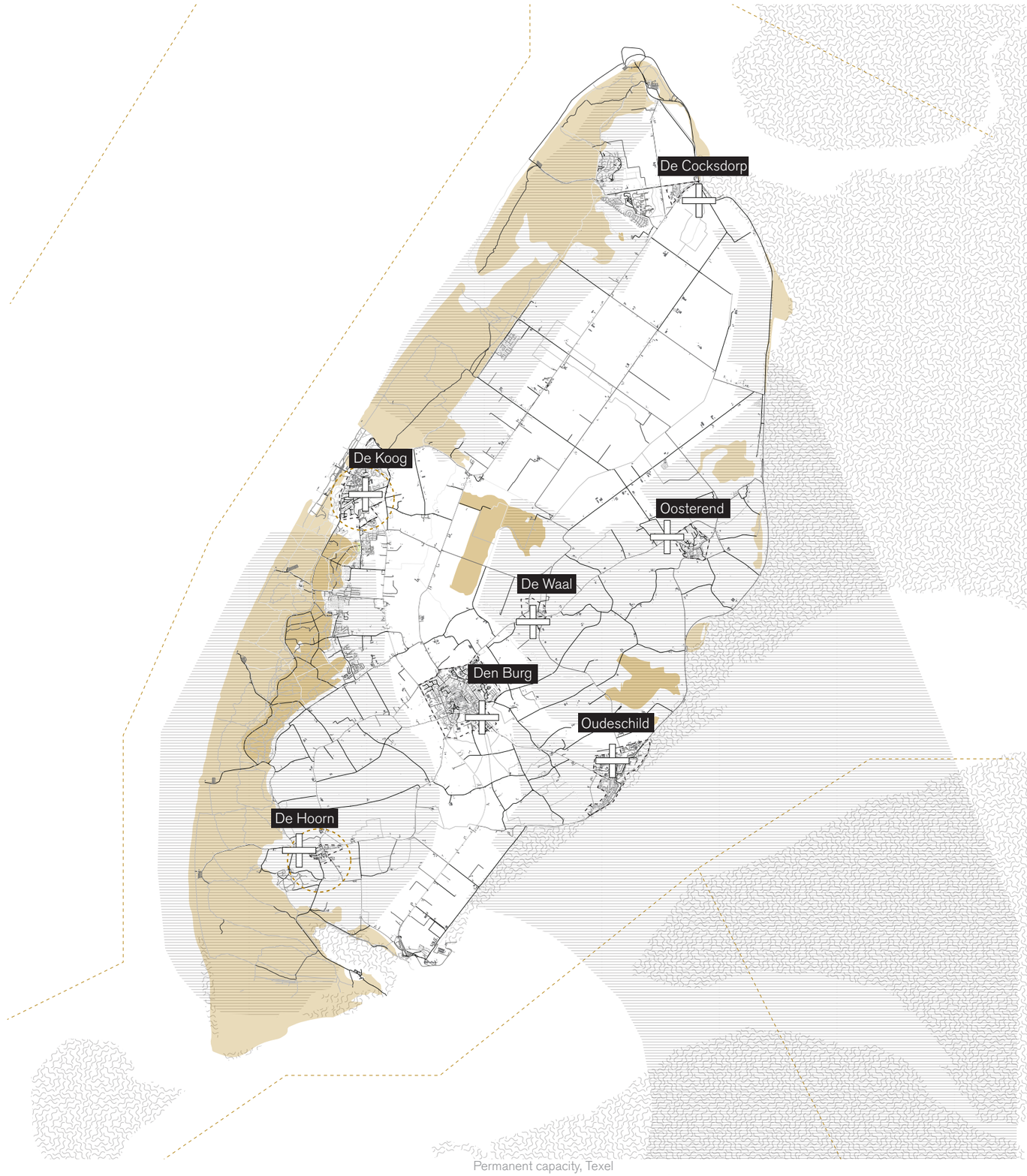
7.2.2

Permanent capacity

Texel covers an area of approximately 16000ha and its permanent population reaches the number of 13,547 inhabitants. Texel is the westernmost island of the Wadden Sea barrier island chain. The west coast of Texel, the one facing the North Sea, is a sequence of dune areas of approximately 4000ha, with great importance in terms of defense against wave action and extreme storms. In addition, it provides a unique habitat for a wide range of species, and constitutes part of the Natura 2000. The main village in the center of Texel is Den Burg, with a population of 7000. However De Koog that lies behind the dunes attracts the highest number of tourists. Texel is mainly developed based on tourism, agriculture and nature conservation (Van der Duim, Caalders, 2004).

Texel		13,547 inhabitants
De Cocksdorp		842
De Koog		1,300
Oosterend		1,200
De Waal		415
Den Burg		7,000
Oudeschild		2,170
De Hoorn		620

Texel population distribution (Van der Duim, Caalders, 2004)



Permanent capacity, Texel
for map sources: see references (pg.220 - 221)

7.2.3

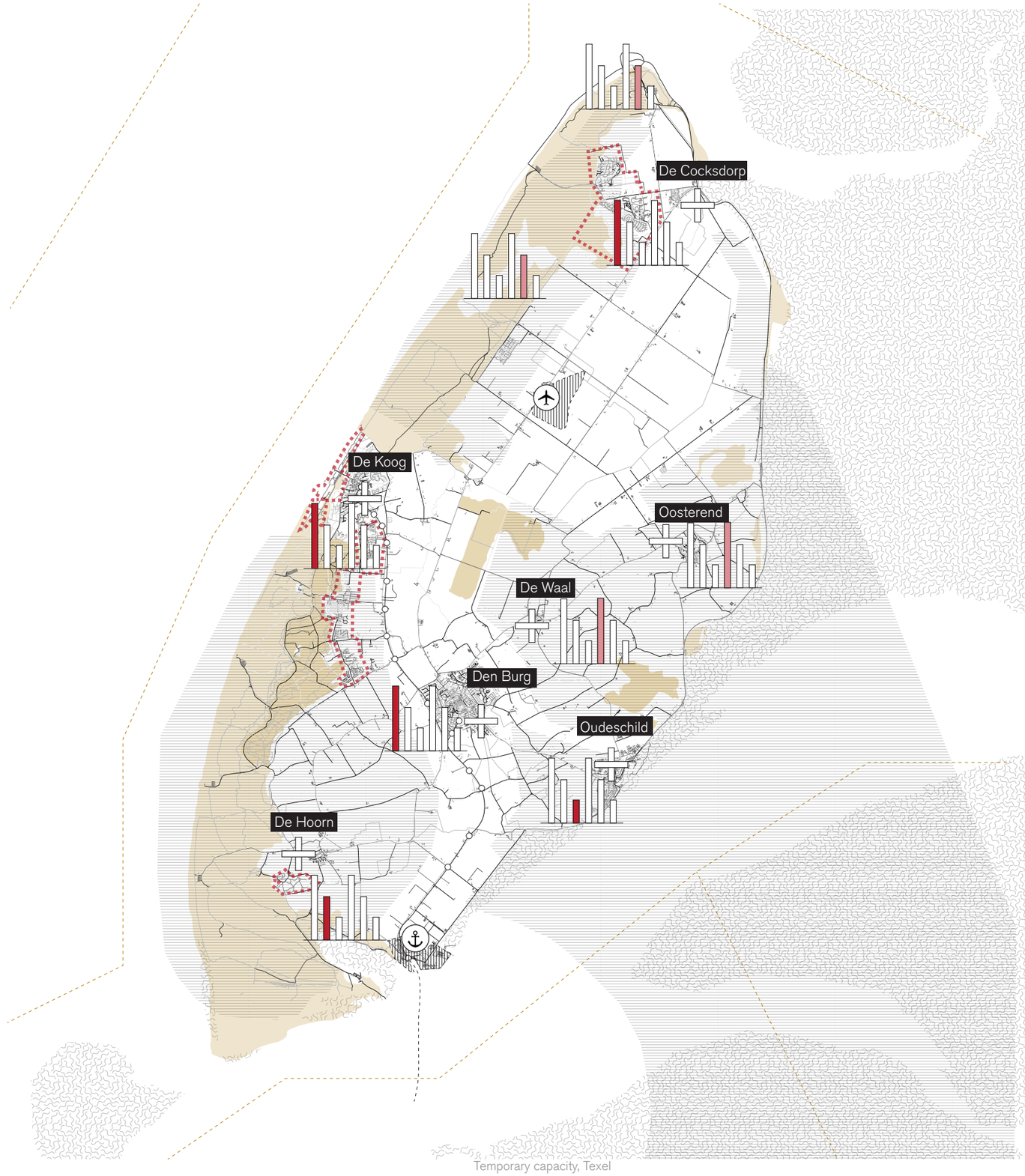
Temporary capacity

Comparing with the past, when agriculture was the dominant sector, nowadays, the main source of income for the island derives from tourism. In terms of gross turnover, tourism accounts for about 91 million Euros, compared to 55 million Euros for agriculture and 32 million Euros for fisheries. Especially during the 1960s the number of visitors as well as number of tourism beds on the island 'boomed'. Within a ten-year period, the number of registered beds increased from approximately 14,000 in 1960 to 33,000 in 1970. The number of tourism beds currently amounts to approximately 43,000 (Van der Duim, Caalders, 2004). The challenge here relates to the exploration of new linkages between tourism and other economic sectors that define the cultural identity of the island, such as agriculture and the raise of awareness and involvement of tourists at the processes and actions that take place on Texel.

EMPLOYMENT ON TEXEL

SECTOR	AMOUNT OF PEOPLE	PERCENTAGE
Agriculture & Fishing	799	10%
Industry & Construction Industry	793	10%
Accomodation & Recreation	1,856	24%
Retail	1,299	17%
Services	1,133	15%
Education & Healthcare	1,056	14%
Other (eg. transport & storage)	755	10%
TOTAL	7,691	100%

Texel employment (CBS, 2020)



Temporary capacity, Texel
for map sources: see references (pg.220 - 221)

7.2.4

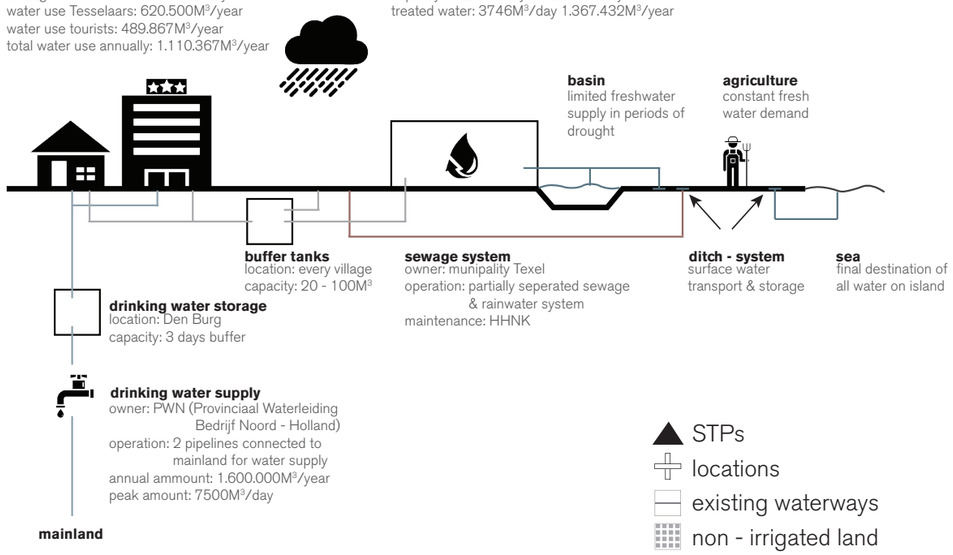
Water management

Texel is surrounded by saline seawater. There is only one drinking line connecting the island with the mainland. Apart from that, there is no other external fresh water supply, so in fact Texel needs to form its own watershed. The broad expansion of agriculture, which requires lower ground water tables, has led to a gradual intrusion of saline water in the ground water, decreasing the fresh water lens bellow the island. What is more, human intrusion through hard engineering (dikes) forms an extra barrier for the establishment of robust marine ecosystems and diverse habitats (Kampf et. al, 2002).

precipitation
annual average: 996MM/M²
average high: OCT (245MM)
average low: APR (28MM)

households & tourist accomodations
Tesselaars: 13.547
tourists: 694.847
days spent by tourists: 4,7 days on average
average water use Tesselaar: 125L/day
average water use tourist: 150L/day
water use Tesselaars: 620.500M³/year
water use tourists: 489.867M³/year
total water use annually: 1.110.367M³/year

sewage treatment plant Everstekoog
owner: HHNK (Hoogheemraadschap Noorderkwartier)
operation: 2 days treatment with bacteria
3 days in helophyte filter
capacity: 8024M³/day 2.928.760M³/year
treated water: 3746M³/day 1.367.432M³/year



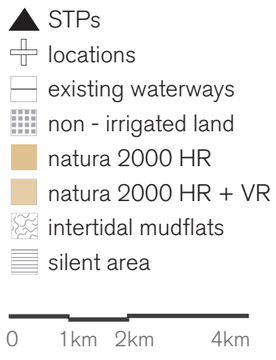
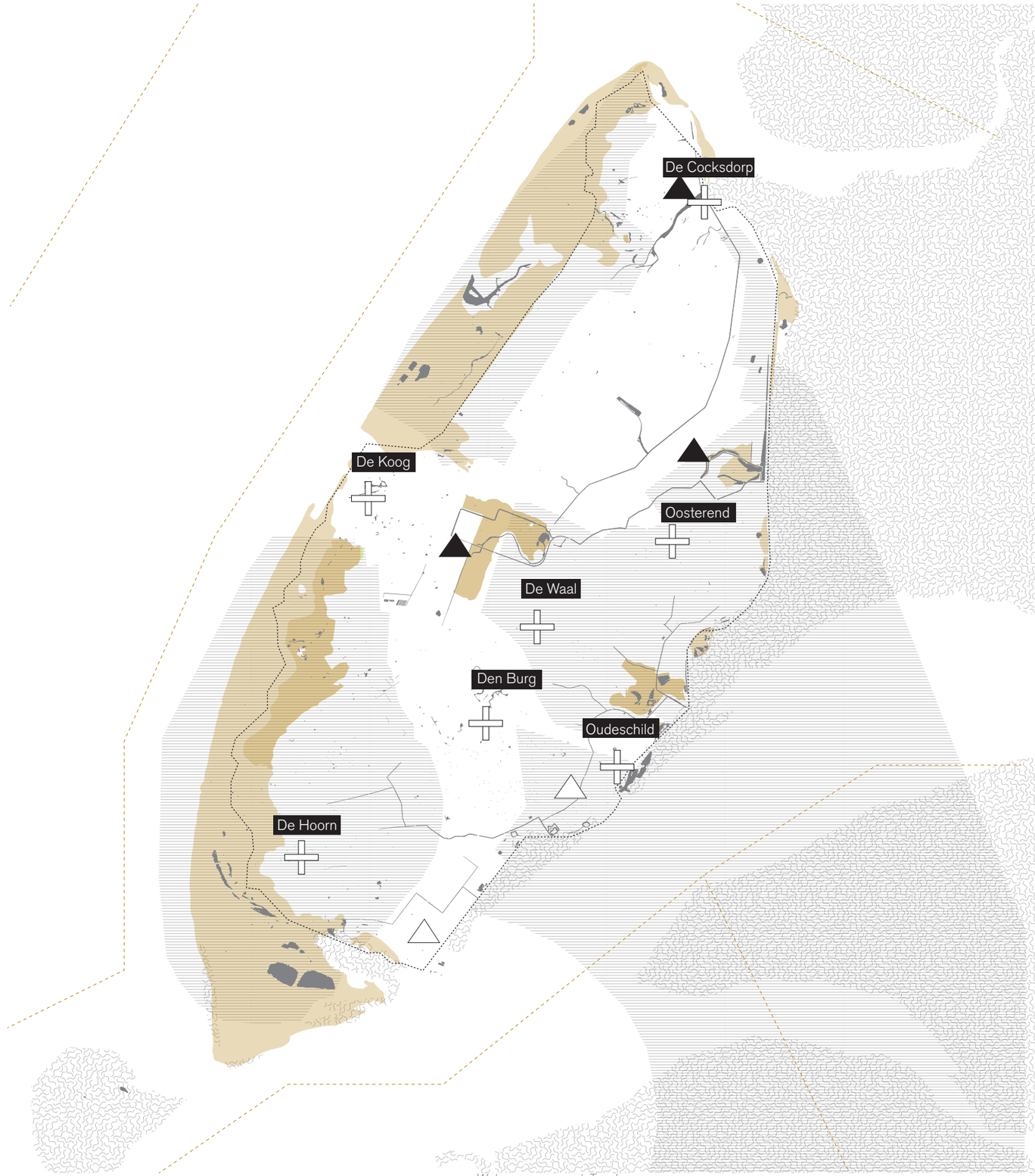


diagram based on Jesper Goorden's
http://www.being-here.net/page/7355/current-water-system-of-texel



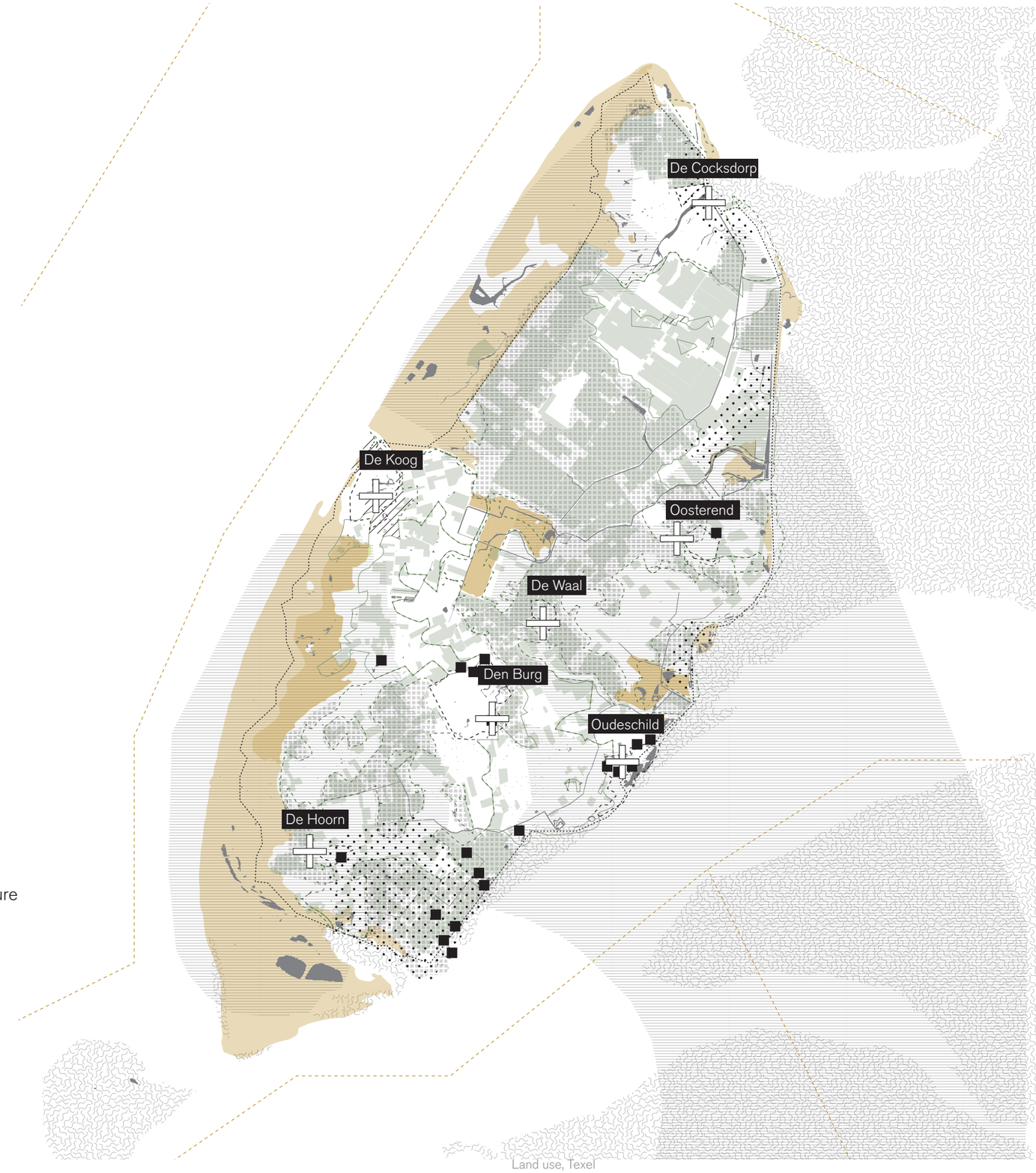
Water management, Texel
for map sources: see references (pg.220 - 221)

7.2.5

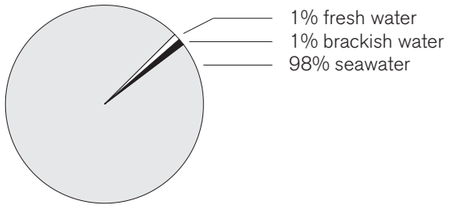
Land use

Agriculture covers half of Texel surface. Pastures cover an extensive part of the island. There is a mixed pattern of dairy cows, sheep, bulbs, and some arable farming of crops. Following the development trends in the rest of the country, employment in this sector is declining, with the number of farms having decreased from 160 in 1985 to 112 in 2000 (Van der Duim, Caalders, 2004).

Although the agricultural sector still dominates local politics, its position is uncertain and challenged by external influences, such as climatic change, EU policies and land claims by nature conservation and tourism. With the sea level supposed to rise between 25 and 75 cm in the next 30 years, Texel polders of will be salinized. Their bellow layers will be compacted, which would affect significantly soil fertility and thus yield per acre (Van der Duim, Caalders, 2004).



Land use, Texel
for map sources: see references (pg.220 - 221)



Soil Salinity Class	Current Use	Effect on crop plants
Non-saline	Drinking and irrigation water	Salinity effects negligible
Slightly saline	Irrigation water	Yields of sensitive crops may be restricted
Moderately saline		Yields of many crops are restricted
Highly saline		Only tolerant crops yield satisfactorily
Very highly saline		Only a few very tolerant crops yield satisfactorily
Brine	Seawater	-

Salt Tolerance Scale

Salt Sesitive

Moderately Salt Sensitive

Moderately Salt Tolerant

Salt Tolerant

Crops

Rice (Oryza sativa) Potato (Solanum tuberosum) Bean (Phaseolus vulgaris)
Carrot (Daucus carota) Grapefruit (Citrus paradisi)
Orange (Citrus sinensis) Plum (Prunus domestica)
Sugarcane (Saccharum officinarum) Corn (Zea mays)
Broad bean (Vicia faba) Egyptian clover (Trifolium alexandrium)
Cucumber (Cucumis sativus) Lettuce (Lactuca sativa)
Tomato (Lycopersicon esculentum)
Soybean (Glycine max) Cowbean (Vigna unguiculata)
Millet (Sorghum bicolor)
Barley (Hordeum vulgare) Cotton (Gossypium hirsutum)
Sugarbeet (Beta vulgaris) Wheat (Triticum aestivum)

Salicornia (Salicornia spec., Sueda spec., Salicornia dolichostachya, Salicornia bigelovii, Salicornia europaea)
Seabeet

Dry mass increase of some succulent native plant species from salt marshes is enhanced under increased salinity (EC 10 - 40% dS/m) compared to the controlled salinity (EC 0 dS/m). Salicornia species are cultivated using seawater and brackish water and their green tips are now widely consumed as vegetable crops.

18.0 tons/ha of biomass and 2.00 tons/ha of seeds over a 200-day growing cycle > sunflower yield across the world in 2007 was 1.2 tons/ha.

Soil salinity class, Salt tolerance
source: Rozema, J et.al. Saving fresh water by crop cultivation on salinizing soils

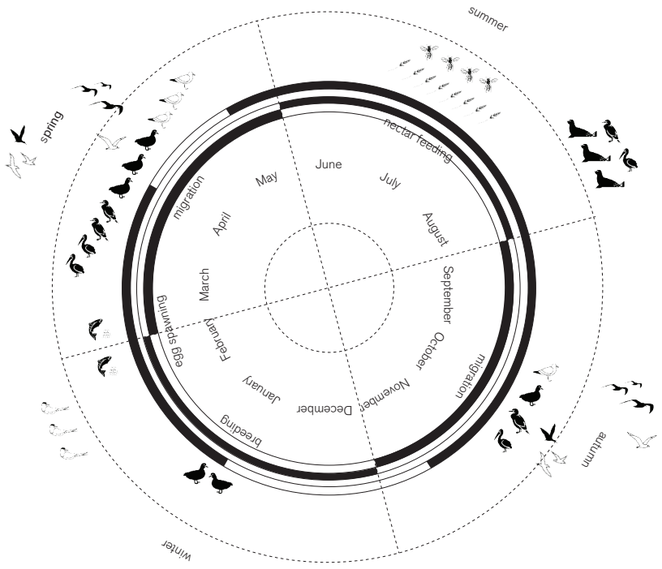
Saline Agriculture in Texel				
		Values		
Crop	Variety	Treshold	Slope (% per dS/m)	50% yield
	Miss Mignonne	4.1 (2.9 - 5.2)	6.6	11.6
	Achilles	2.9 (1.5 - 4.4)	5.6	11.9
	Foc	2.1 (0.3 - 3.8)	5.2	11.7
	Met	1.9 (0.2 - 3.7)	5.0	12.0
	927	3.4 (1.8 - 5.1)	5.2	13.1
	FAO ref	1.7	12	5.9
	Cas	4.5 (1.8 - 7.3)	5.6	13.4
	Ner	3.6 (0.5 - 6.6)	6.1	11.8
	Nat	-	-	-
	Ben	-	-	-
	101	3.0 (0.3 - 5.8)	9.0	8.6
	102	5.0 (1.9 - 8.1)	11.2	9.4
	Pri	2.1 (0 - 6.0)	9.0	7.6
	FAO ref	1.0	14	4.6
	Alo	2.4 (0 - 7.6)	7.7	8.9
	Red	5.9 (2.7 - 9.2)	11.7	10.2
	San	3.2 (0 - 7.2)	7.4	10.0
	Hyb	3.4 (0 - 8.0)	11.6	7.7
	FAO ref	1.2	16	4.3
	Batavia, heading, red	-	-	-
	Butterhead, Suzan	2.3 (0 - 8.7)	6.8	9.6
	Butterhead, Lob	1.8 (0 - 10.7)	5.8	10.3
	FAO ref	1.3	13	5.1
	White cabbage, early	4.6 (2.9 - 6.2)	7	11.7
	FAO ref	1.8	9.7	7.0
	Broccoli	5.6 (1.2 - 10.1)	6.3	13.6
	FAO ref	2.8	9.2	8.2
	Que seed 2014	3.3 (0 - 7.3)	5.3	12.8
	Que shoot 2015	1.7 (0 - 3.6)	8.4	7.6
	FAO ref	8.0	5.0	18.0

Saline agriculture
source: Crop salt tolerance under controlled field conditions in The Netherlands, based on trials conducted at Salt Farm Texel, December 2016

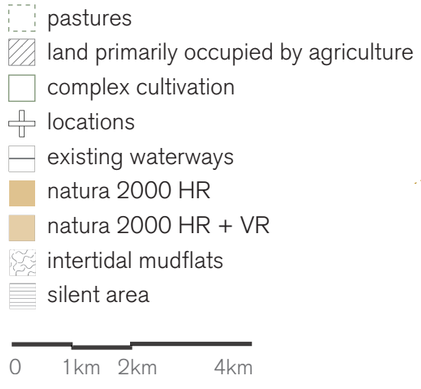
7.2.6

Habitat diversity & ecosystems sequence

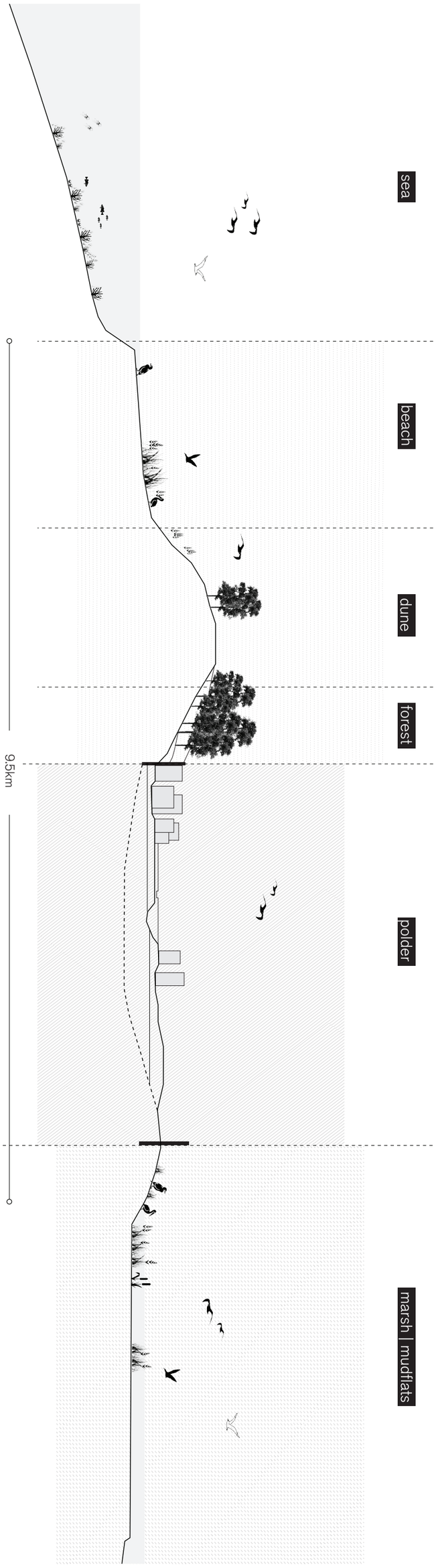
Texel finds its position in the crossroads of water bird flyways, demonstrating its key role for worldwide biodiversity. Each of the various nature areas on the island accommodates their own characteristic flora and fauna. They contain large numbers of aquatic species. Many North Sea fish and crustacean species use the island as a nursery. The bird population includes both breeding birds, such as gulls, terns, and several species of shorebirds, and nonbreeding migratory species. The latter, including geese, ducks, and many species of shorebirds, breed mainly in the Arctic and visit Texel as a stopover site during migration or as a wintering site (Wolf, 2001).



Seasonal patterns of species



Biodiversity, Texel
for map sources: see references (pg.220 - 221)



Sea

- algae (seaweed)
- oysters (shells)
- crustaceans (crabs)
- jellyfish
- mammals (seals, whales)

Dune

- plants (moss, lichens, orchids, creeping willow, heather, autumn gentian, sedge, buckthorn, sand couch, marram grass, reed, pines)
- insects (grasshopper warblers, beetles, ants, bugs, cockroaches, spiders)
- amphibians (British toad)
- fish (sprat, sandeel)
- birds (spoonbill, cormorants, lapwings, redshanks, black-tailed godwits, nightingales, common whitethroats, willow warblers, terns, long - eared owls, herring gulls, black - backed gulls, water rails, grebes, marsh harriers)
- mammals (root vole, cattle, Exmoor ponies, galloways)

Forest

- fungus (mushrooms)
- plants (back pines)
- insects (beetles, ants, bugs, butterflies, cockroaches, spiders, wasps, bees)

Old Polder

- plants (marsh plants, green - winged orchids)
- birds (black-tailed godwit, redshank, lapwings, black-tailed godwits oystercatchers, ruffs)

New Polder

- fungus (waxy caps)
- plants (marsh orchids, grass of Parnassus, fen orchids, marsh helleborine, chaffweed, brookweed, seaside centaury, chara)
- birds (common teals, wigeons, mallards, shovelers, common pochards, goldeneyes, crested grebes, reed warblers, bluethroats, reed buntings, sedge warblers, geese, Bewick's swans, bearded tits, marsh harriers, bitterns)

Salt Marsh

- plants (sea lavender)
- insects (bees, wasps, ants)
- birds (oystercatchers, spotted redshanks, spoonbills, curlews, bar-tailed, godwits, red knots, dunlins, black - headed gulls, common gulls, gray plovers, Kentish plovers, greenshanks, avocets, wigeons, cormorants, common teal, pintails, brent geese, eider ducks, sky larks rough-legged buzzards, peregrines)

Mud Flats

- crustaceans (shrimp, crabs)
- fish (sticklebacks, flatfish)
- birds (avocets, black-headed gulls, ringed plovers, terns, black-tailed godwits, lapwings, wigeons)
- mammals (seals)

Koffijberg K. et al, 2017 Breeding birds. In: Wadden Sea Quality Status Report 2017. Eds.: Kloepper S. et al, Common Wadden Sea Secretariat, retrieved from: waddenseaworldheritage.org/reports/breeding-birds

8

THE LIVING LAB

The final exploration step of the research questions will be conducted through the lens of design. The living lab of Texel constitutes a design experiment before extinction, considering the current conditions, the active systems at stake, the current and future threats and the involved actors. It performs as the activator and platform for integrated learning and adaptive, iterative, flexible, inclusionary and evolving management (Sepulveda Carmona, 2019).

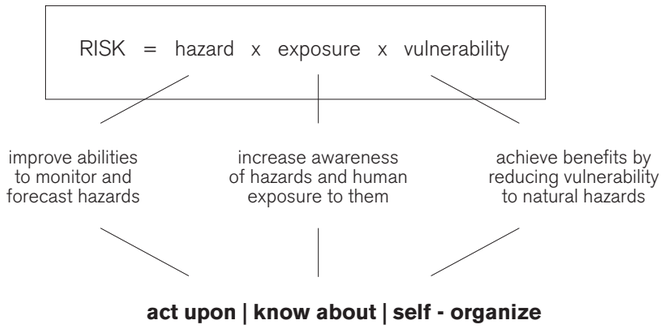
“Living lab is the research concept, which may be defined as a user-centered, iterative, open - innovation ecosystem, based on a systematic user co – creation approach in public – private – people partnerships, integrating research and innovation processes in real life communities and settings” (ENoLL, 2013).

The design interventions aim at reinterpreting the existing landscapes of the island towards a more spatiotemporal direction, enhancing synergies between the operating systems or creating new ones that will be eventually used to offer suggestions for alternative, flexible and multi – functional land use, human awareness and involvement, leading to a more economically, socially and ecologically resilient and robust ecosystem. In order for the design process to be better guided and targeted, the following set of points is declared:

Considering resilience as the ability of the ecosystem to absorb and adapt to change, the design intervention scenarios should, therefore, embrace uncertainty and incorporate change and the ephemeral dimension as intrinsic ingredients of the design.

The dynamic interchange between land and water should be visible on design, corroding the strict and static distinctions between landscape and settlement layers, creating a more blurry image that reflects the strong synergetic relations between economic activity, ecology, community and culture. In a speculative scenario, all the above mentioned functions should perform simultaneously, shaping the archipelago and the territory.

Risk mitigation and climate adaptation should be addressed through the design of a speculative operative landscape that considers energy transition as a fundamental component. In other words, all the evoked functional and economic benefits and introduced processes should be oriented towards new

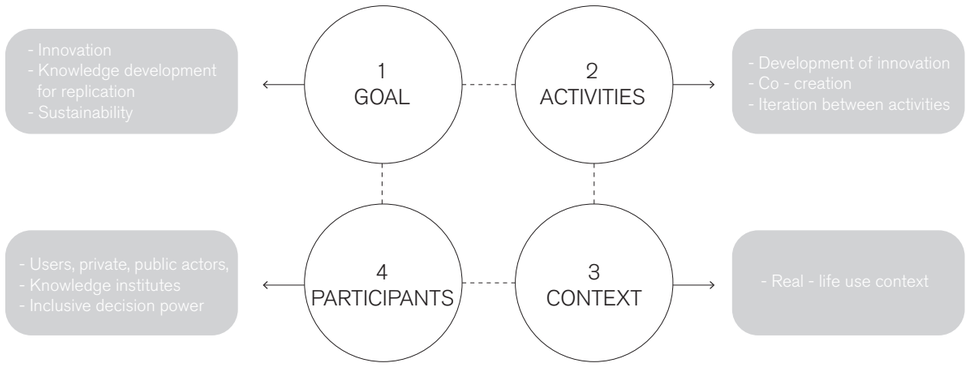


source: Sepulveda Carmona D. (2019) The defining characteristics of urban living labs "Connecting deltas" conference proceedings, Alexandria Egypt

sustainable industries, e.g. renewable energy, saline agricultures, aquacultures, instead of fossil fuel dependent industries and over extractive activities.

As it has been mentioned before, the living lab of Texel is a design proposal that reconsiders landscape patterns and human action within the framework of the already known future flood predictions. It is an experiment that takes place before extinction and, therefore, the horizon of the design is the year 2070. It is no doubt true that within the context of climate change and rapidly growing economies, urbanized coastal areas with high ecological value and sensitivity are severely affected. The current hipper – concentration of people and the multiplicity of functions determine a complex level of diverse and increasing pressures and generate multi – scalar impacts on the natural territory. The WSR is such an example. Texel finds its positions in the southern part of the Dutch part of the Wadden Sea Region, at the frontline of multiple pres¬sures that threaten its high ecological and cultural value. Fossil fuel based industries, degrading ecological systems, water pollution and altering soil composition are some of the main issues, showing that impacts of climate change can be manifested at particular localities (Ostrom et.al. 1999).

However, at a systemic level, Texel has a unique, strategic position that allows to capitalize on its own potential as a biodiversity hotspot, restoring the ecological permeability along the coastline and to improve its status as a recreation destination, attracting visitors that embrace the cultural identity of the island. What is more, a shift of its agricultural base towards an alternative type of production could have increased beneficial effects thanks to its adjacent location to some of the most urbanized and industrialized areas in northern Europe. Coordi-



source: Sepulveda Carmona D. (2019) The defining characteristics of urban living labs "Connecting deltas" conference proceedings, Alexandria Egypt

nately re – programming these assets could evidently benefit the local community and economy of the island but also set the base for further positive regional and territorial impacts.

The ambition is already there, since Texel wants to achieve a sustainability transition and set an ex¬ample for other municipalities in the Netherlands towards au¬tonomous sustainable development. Its surface (13000ha) provides adequate organizational and en¬trepreneurial strength to accommodate this transition and its morphology (island) provides fertile grounds for this as well. The launched innovative programs ("Energie voor Texel, Vision 2010 - 2020", "Master Water for Texel" etc.) work towards this goal.

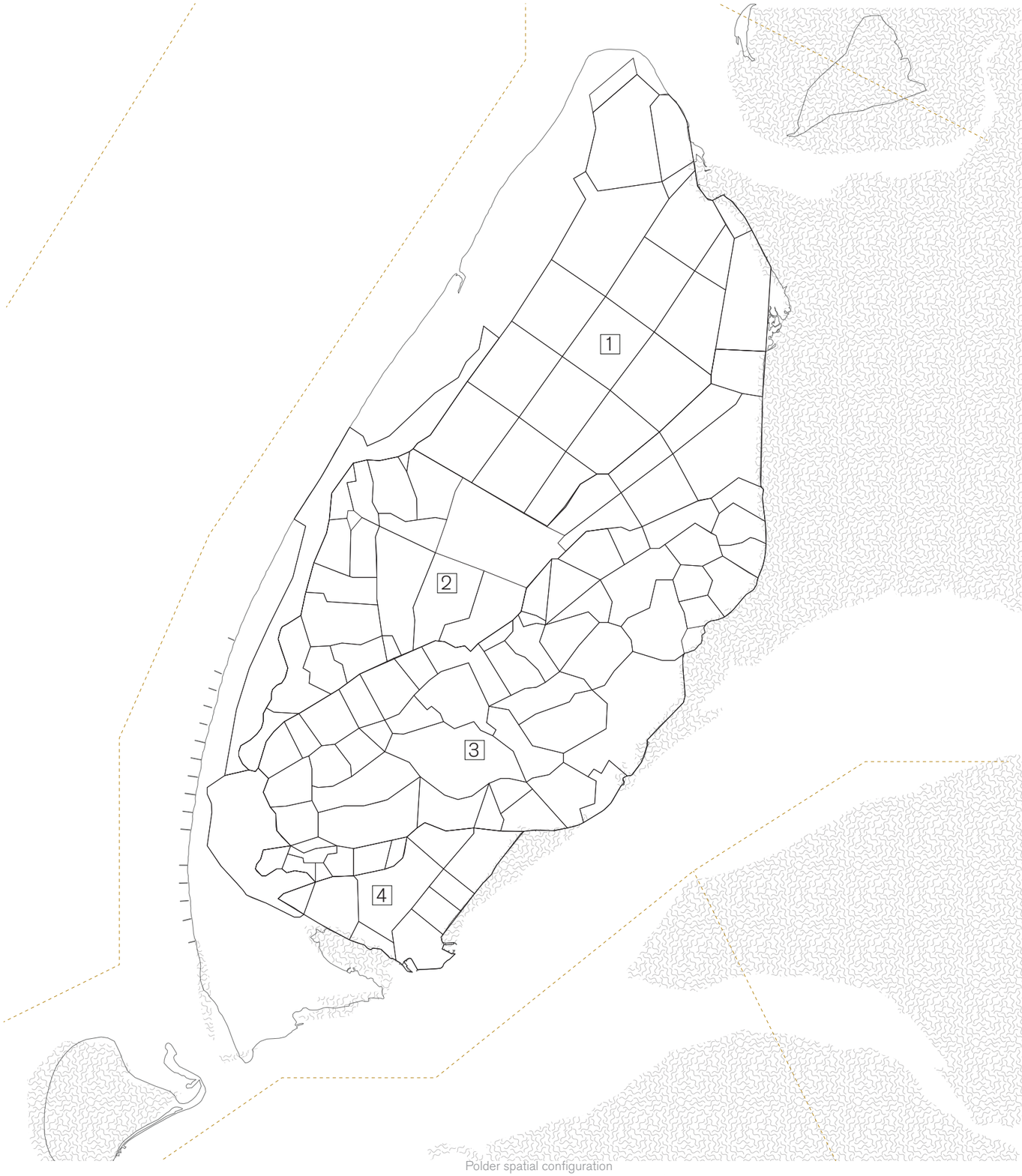
This phase of the project focuses on how to transform Texel into an engine of biodiversity and habitat generation, through the redefinition of the synergy between natural and human systems. It also aims at enhancing its cultural identity as a recreation and innovation hub and an ecological counterpoint to urban and industrial extractive land uses. For this purpose part of the current traditional agriculture and pasture land behind dikes and polder walls is re – colonized by natural processes (de - poldering & flooding). The beneficial character of the newly introduced wetlands will be enhanced by the integration of ecosystem engineering principles and practices. Such practices will improve spatial, environmental and economic conditions, for instance, through sedimentation rate increase, wave attenuation, intertidal balance and habitat arrangement. The establishment of saline agriculture practices will also shift production towards a more sustainable model. Salt marshes improve water quality and can be used as a source of food, nutrients and biomass.

8.1

Land parcellation: polder as spatial unit

The previous cartographic phase illustrated all the currently performing systems on Texel and the interrelations among each other. At this phase, it is important to understand the existing landscape pattern, which is based on the structural and morphological polder unit. In the following paragraphs the polder as a spatial unit and its functional relations with the natural processes will be re – considered, fostering an alternative naturalistic spatiotemporal landscape pattern. Salt marsh habitats will boost biodiversity and will enhance nutrient waste filtration and flood defense.

Polder and dike management constitutes one of the most common traditional forms of engineering in the Dutch culture. The broad expansion of the polder logic which has been occurring during the last centuries has led to the current image of the landscape which is an assemblage of layers of primary and secondary dikes, a patchwork of polders. The age of a polder is related to the type of soil and the elevation. Polder landscapes, especially those on peat soils, subside over the years, therefore the older the polder, the lower it is found (Hoes, van de Giesen, 2015). The polders found in lower levels are in general easier to flood and benefit from vertical accretion and sediment intrusion; however they often host higher populations and infrastructure.



Polder spatial configuration
for map sources: see references (pg.220 - 221)

8.1.1

Specific site: Prins Hendrikpolder

The island of Texel consists of four main polders or groups of polders: 1. Eijerland Polder, 2. Waal en Burg en Het Noorden, 3. Gemeenschappelijke Polders and 4. Prins Hendrikpolder. The previous cartographic phase identified some of the characteristics of these sub – divisions (for instance accessibility via road network, ferry network, permanent rural settlements, population and potential temporary capacity – tourism, proximity to Natura 2000 areas). These attributes, together with the highest risks (for instance in terms of soil salinity), eventually lead to the specific site selection, where the current traditional agriculture and pasture land use will shift towards a salt marsh system which promotes a more naturalistic landscape pattern.

Prins Hendrikpolder is considered the most suitable for testing a sequence of evolving ecological infrastructures, flooding currently dry polder areas in order for new salt marsh landscapes to shape, changing the existing land uses. It is believed that this area that now lies behind the primary dike line would benefit from the subsequent advantages of such change, from a natural, economic and social aspect. It has an additional importance as it is the entry point to the island, therefore, it could provide connection with the coastal urban areas on the mainland and enhance a harmonious sense of cultural and redefined spatial identity.

Local characteristics:

Rural settlement De Hoorn: 620 inhabitants

Tourism: Texelcamping Loodsmansduin (surface: 38ha | capacity: 241 tourist places,128 annual pitches,100 seasonal pitches, 79 pitches on the naturist area, 60 rental chalets)

Pasture land: 800ha

Port

Bus line

Natura 2000 - west coast

Agro – food industry: Salt farm (innovation center)

current orthogonal pattern

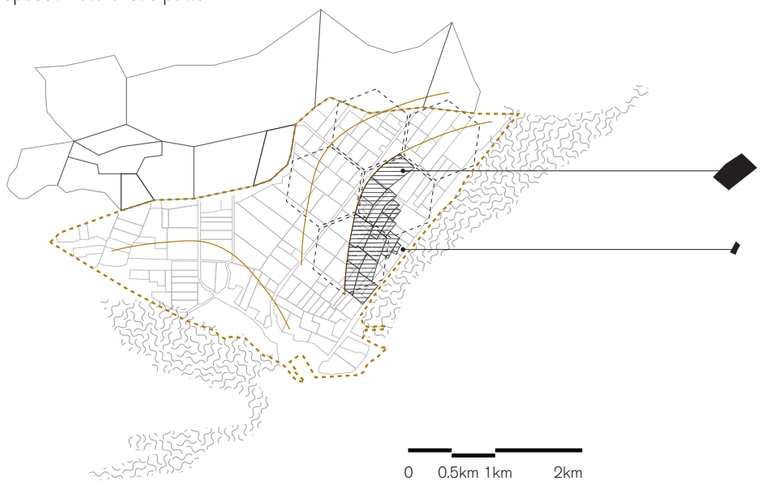
parcel scale

largest parcel: 25ha

smallest parcel: 2ha

The speculative landscape will be divided into smaller parcels in order for more landowners and farmers to be able to share the benefits of such change (local participation and involvement reinforcement)

proposed naturalistic pattern



parcel scale

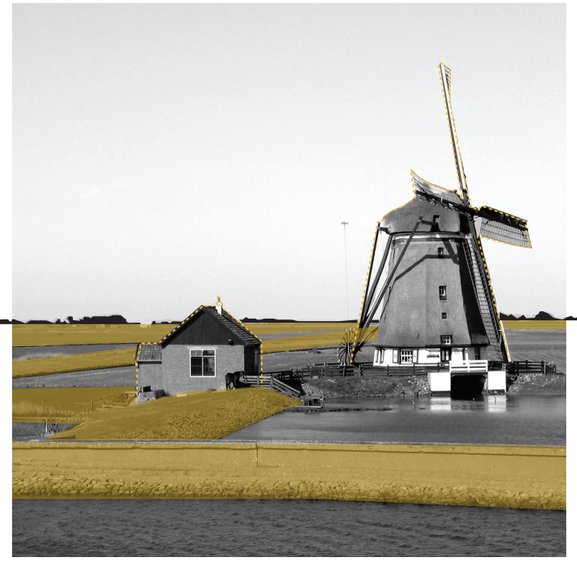
largest parcel: 12.5ha

smallest parcel: 2ha

Prins Hendrikpolder, towards a speculative landscape, Texel
map retrieved from: https://www.bing.com/maps

8.1.2

A patterrned landscape



Windmill near Oost on the island of Texel, Netherlands (2005)
Retrieved from: https://commons.wikimedia.org/wiki/File:Texel_Oost_windmill.jpg, edited by the author

In the Netherlands, the morphology of the landscape, meaning both the spatial configuration and the organization of infrastructure, is directly linked with the cultural aspect. A well – defined, structured ground plane, whose function is always in dialogue and dependence on water is enriched with various vertical elements also related to water management or indicative of human settlements. These elements disturb the consistent overarching horizontal character of the Dutch landscape. Considering that the typical Dutch landscape is defined by the constant interaction between agriculture, and water management specificities and that so far this is achieved within the spatial and functional context of the polder, we conclude that the evolving step of this orthogonal model should also correspond to the same natural processes and functions,

A patterned landscape, Texel
for map sources: see references (pg.220 - 221)

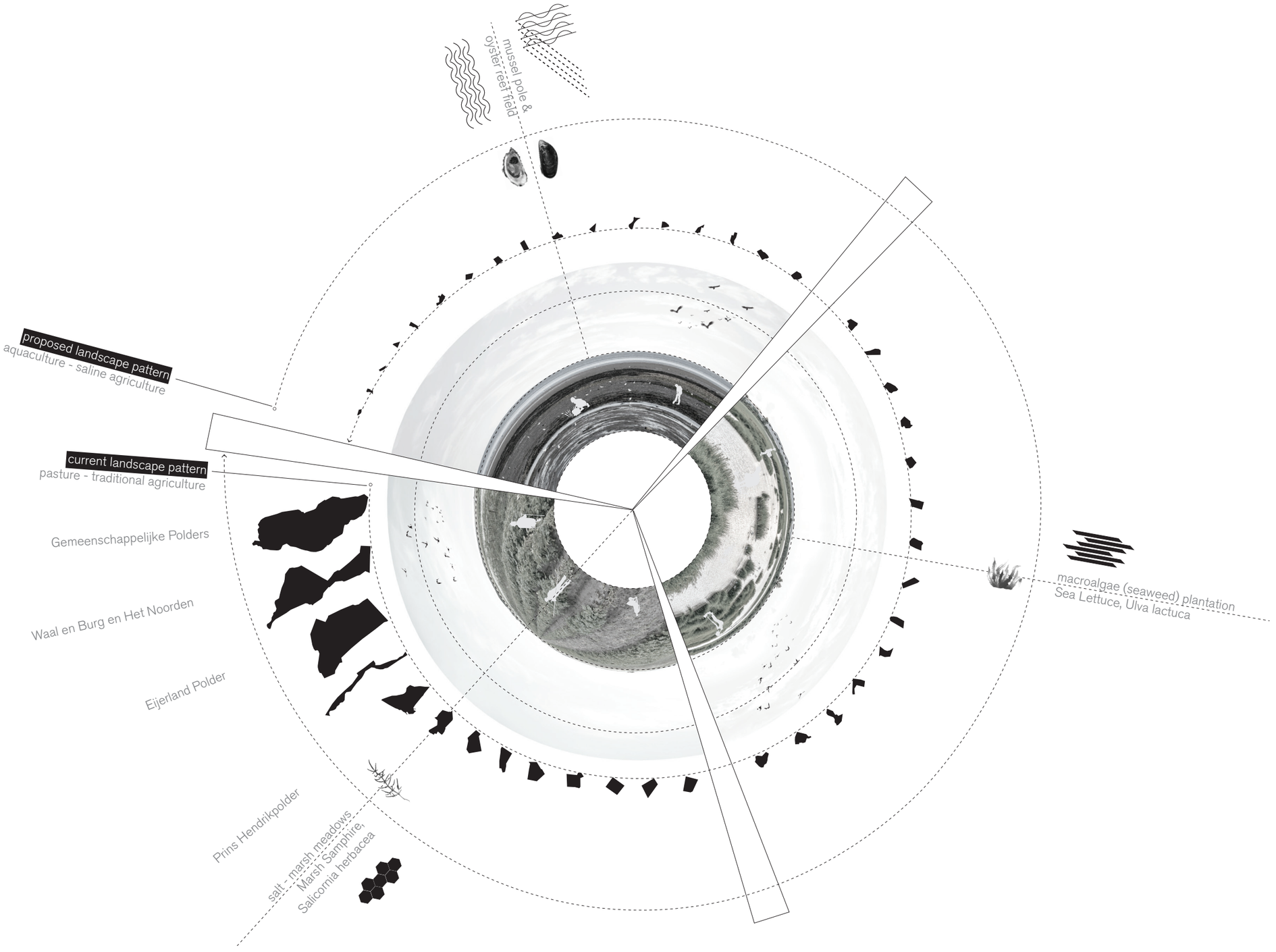
maintaining the cultural value of the landscape. The question that rises is what would be the equivalent alternative of this landscape? What would be its new pattern, operation and systemic spatial configuration? And how the proposed landscape could foster safety via flood protection, alternative productivity and permeability? The designed landscape will operate differently, aspiring though to keep consistency with the spatial language of the Dutch landscape, reinforcing the cultural value of the island.

8.2

Speculative landscape

The designed landscape will operate differently, aspiring though to keep consistency with the spatial language of the Dutch landscape, reinforcing the cultural value of the island.

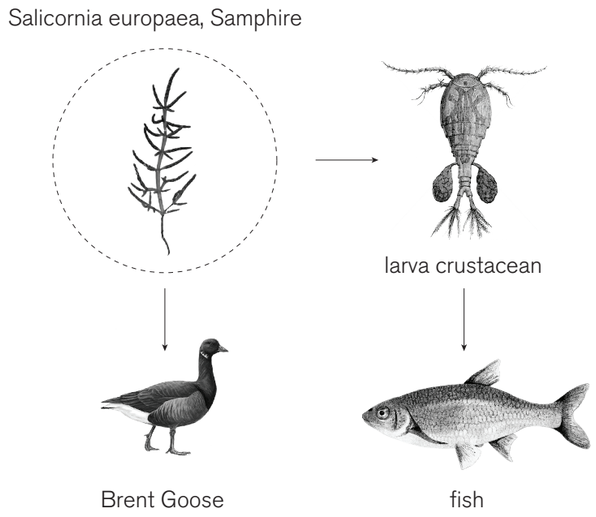
Speculative landscape
for map sources: see references (pg.220 - 221)



Land - use re orientation
The depleting polder spatial configuration is replaced by a new speculative landscape

8.2.1

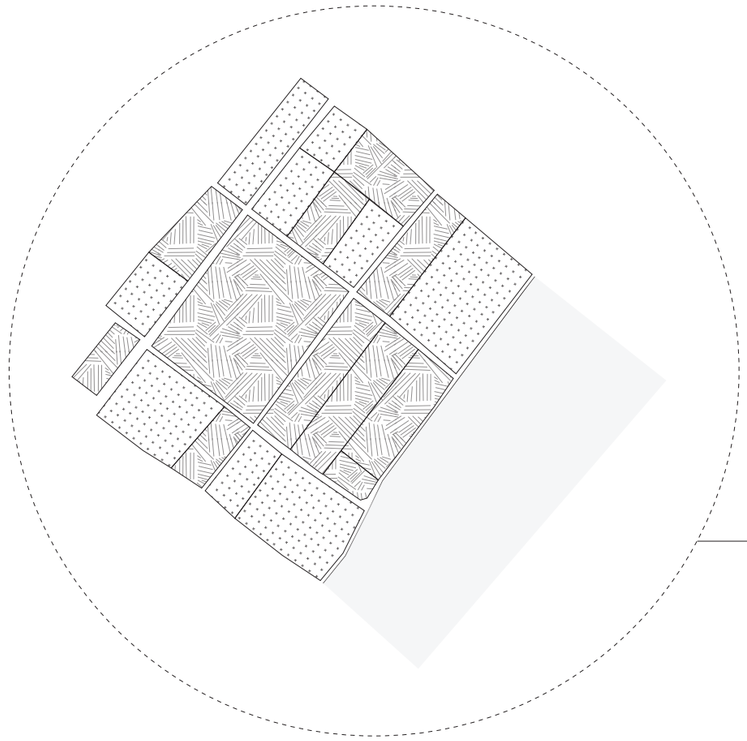
New ecological infrastructure systems

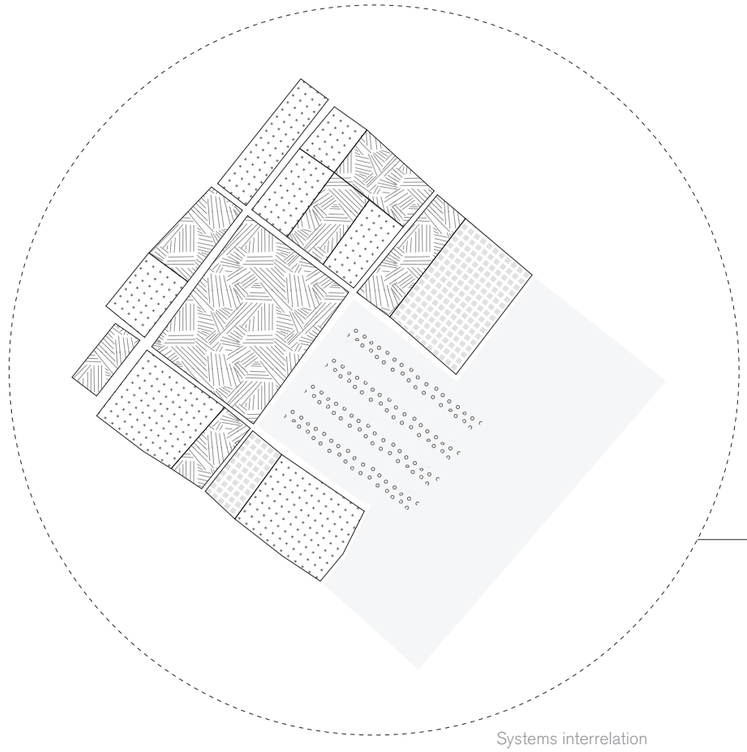


[1-->2] de – poldering, return to salt marsh condition

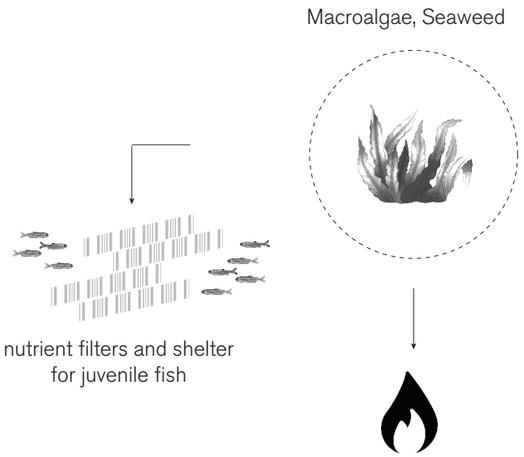
The de – poldering practice, meaning the partial return of land behind the dike line to the salt marsh condition, is an alternative flood defense method and provides protection against wave action. Moreover, the de – poldered areas could be used for saline agricultural cultivation responding to the constantly increasing salinity of soil and freshwater and keeping up with the rising global food production and consumption needs. Salt marshes covered by salt tolerant crops, such as Salicornia europaea, Samphire, can have an additional beneficial impact for the environment, since they are considered as nature's water purifiers, facilitating waste – stream treatment combined with the production of valuable secondary plant crops. They perform as nutrient filters, since they make use of the nutrient waste from traditional agriculture, and also enhance the generation of renewable energy (biofuel and biodiesel) and the production of raw materials for industrial use.

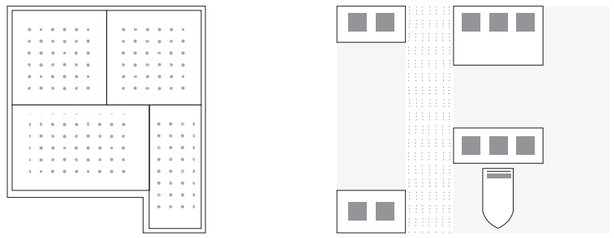
In addition, a selective return of land to the salt marsh condition could affect in a positive way the associated natural habitat. More precisely, the island chain of the WSR is already of great significance concerning the migration of bird species. Therefore, such change could provide additional foraging and nesting shelters for those birds. Salt marshes also host a wide range of phytoplankton and benthic species which constitute a primary food source for larval fish populations. An increase of the above mentioned populations would enhance biodiversity, boosting also the local economy of Texel (tourism, fishing industry, restaurants and accommodation sector). Marsh vegetation enhances landscape beauty and diversity, and wetlands offer habitat for fauna and recreational areas (Lange et.al, 2013).





Systems interrelation
de - poldering, return to saltmarsh condition





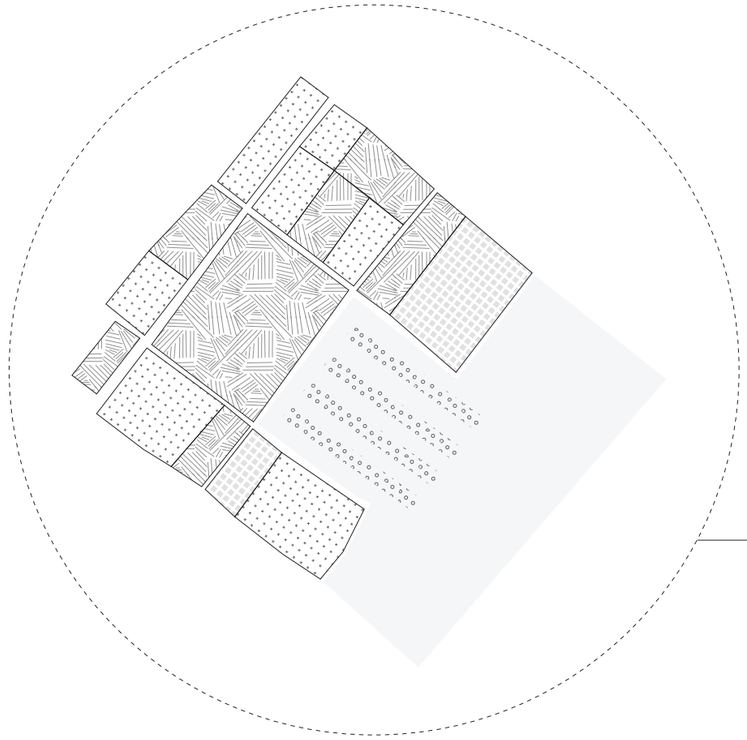
use of biomass benefits for the remaining
traditional agriculture and port activity

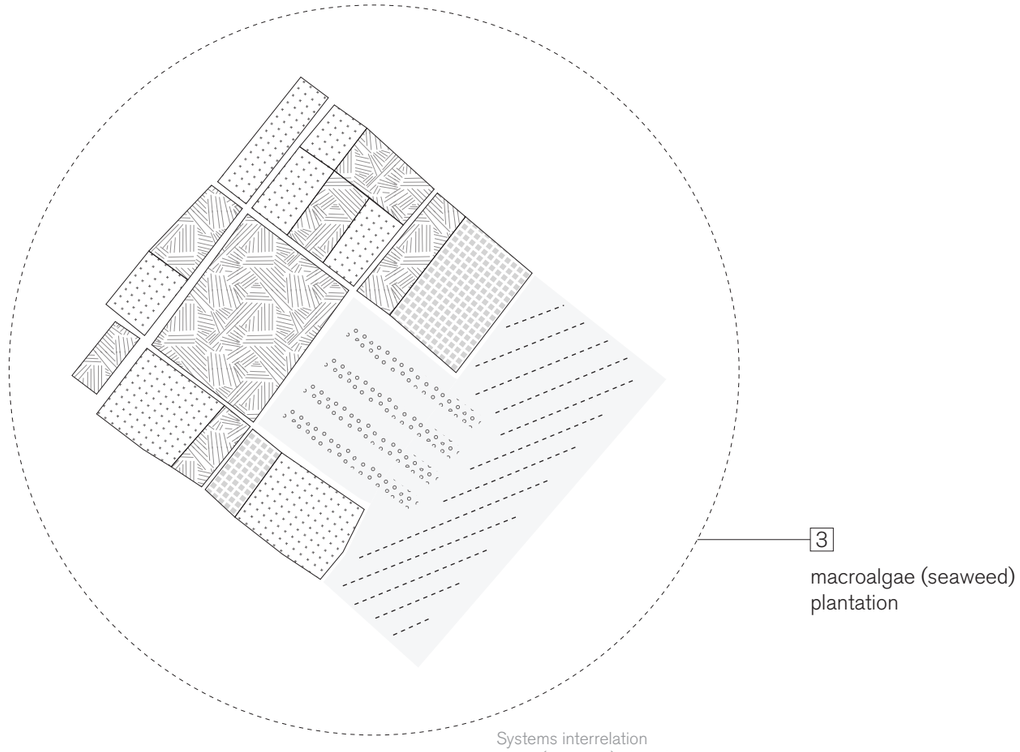
[2-->3] macroalgae (seaweed) plantation

Macro algae (seaweed) plantations could expand nutrients filtration and become an additional shelter for the juvenile fish populations, along their way towards the open sea. Apart from using macro algae as a food source (for animals and humans), there is a wide range of products that can be obtained from seaweed plantation, such as industrial chemicals, medicines, oils for bio – plastics. Macro algae can also be used as a source of oil for biofuels or biomass which can be potentially converted into biogas. Therefore, the spread of macro algae plantations could push the associated industries towards a more sustainable direction.

Macro algae as fertiliser - Processes on the island

Late studies taking place on Texel focus on the identification of a legume species as a green fertiliser. Adding nitrogen to a saline agricultural cropping system using legumes as fertiliser would significantly improve the sustainability of the system (Bruning and Rozema, 2013), subsidizing the fertilizing costs of the remaining traditional agriculture. The environmental value of such sustainable manure is evident, if we think that the broad use of synthetic fertilisers produces huge amounts of energy globally and leads to the eutrophication of natural ecosystems.





Systems interrelation
macroalgae (seaweed) plantation

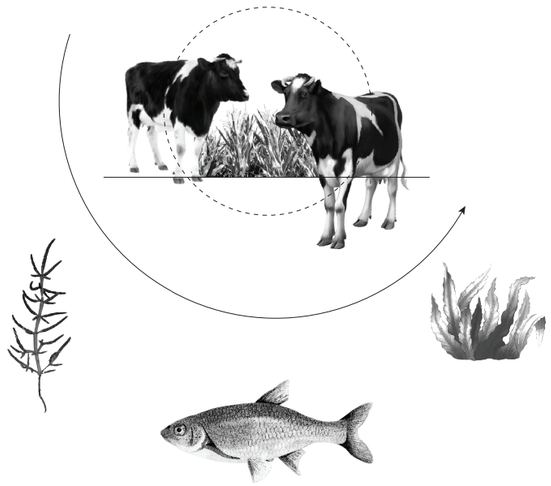
[3-->4] salt tolerant crop cultivation, floating hubs, network expansion

About 65% of Texel is used for agriculture, which is the dominant land use on the island. The sheep population is 2.5 times higher than the human population, explaining the extended pasture land surfaces. Meat and wool are considered two of the main local products. However wool sales have started to decline and high levels of soil salinity have decreased agricultural yields recently. In general, crops tend to produce lower yields at higher salinity levels and sometimes farmers need to relinquish their fields and cultivate new land, adding to the pressure on natural ecosystems and biodiversity. What is more, salinity is expected reach even higher levels in the years to come. Therefore, considering the growing human population and global climatic changes, salt tolerant crops cultivation can contribute to address the salinization of freshwater and soils (waddenacademie, 2020).

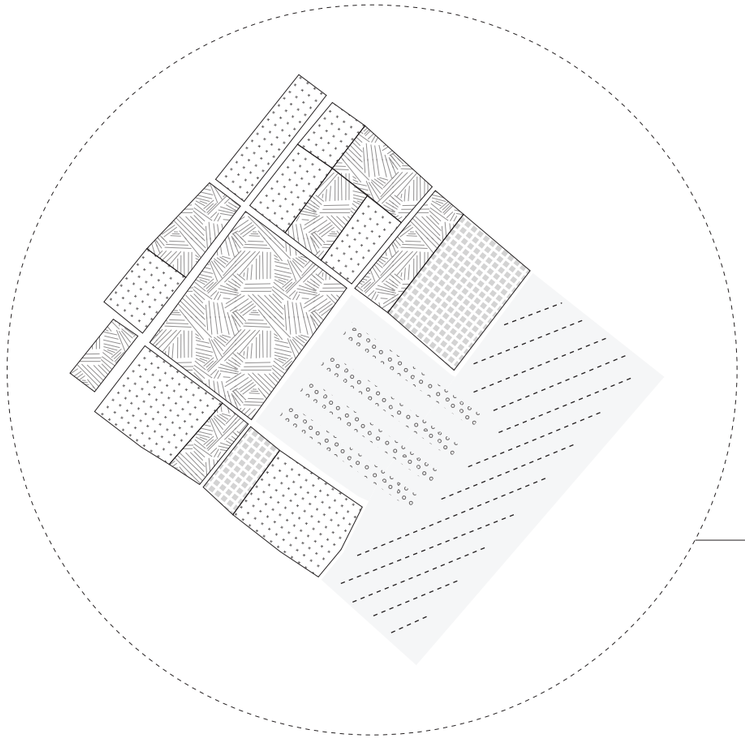
Salicornia europaea - Processes on the island

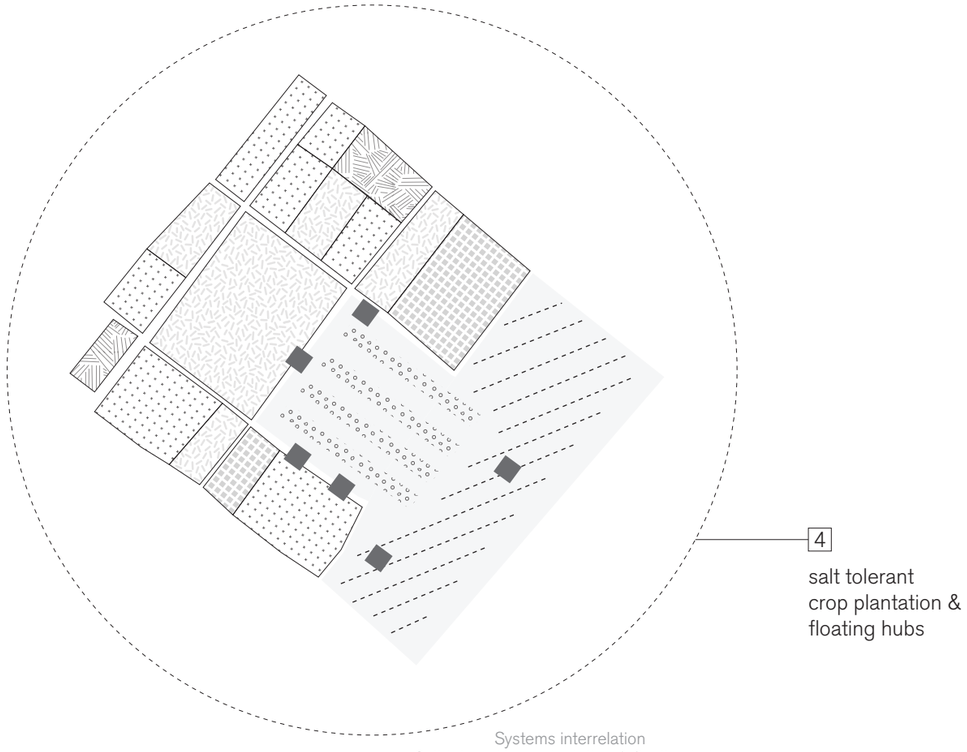
Salicornia europaea processing already takes place on Texel. Pilot wetland filter beds planted with this saltmarsh plant were evaluated over 88 days under real conditions on a marine fish and shrimp farm, with the results highlighting the effectiveness of N and P removal from wastewater from land – based intensive farms by Samphire saltmarshes (Webb et.al, 2012).

The systems and processes described above need to be regulated and monitored by humans. The floating hub functions as the machine that controls the performance of the interdependent systems. It is a flexible, modular construction that is divided in four parts: 1 the processing lab, where waste flows get released or redistributed, 2 the macro algae ponds, where pollutants are absorbed and harvested in – situ, 3 reuse lab, where



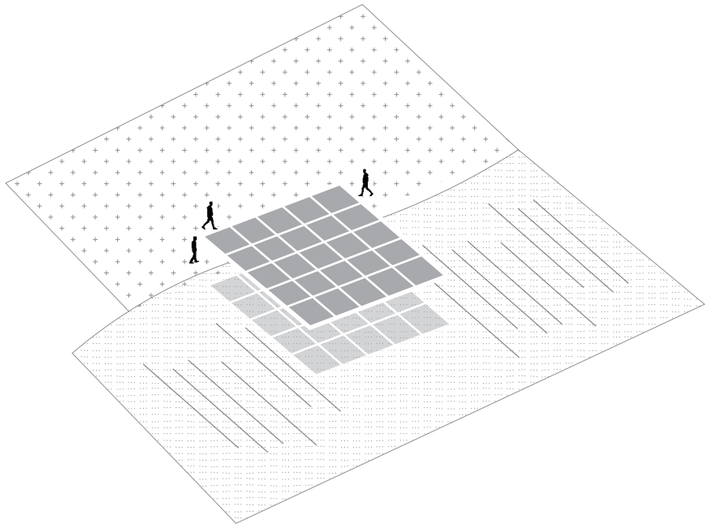
Re - orientation of the agricultural and pasture landscapes towards aquaculture, seaweed cultivation & saline agriculture





Systems interrelation
Salt tolerant crop plantation & floating hubs

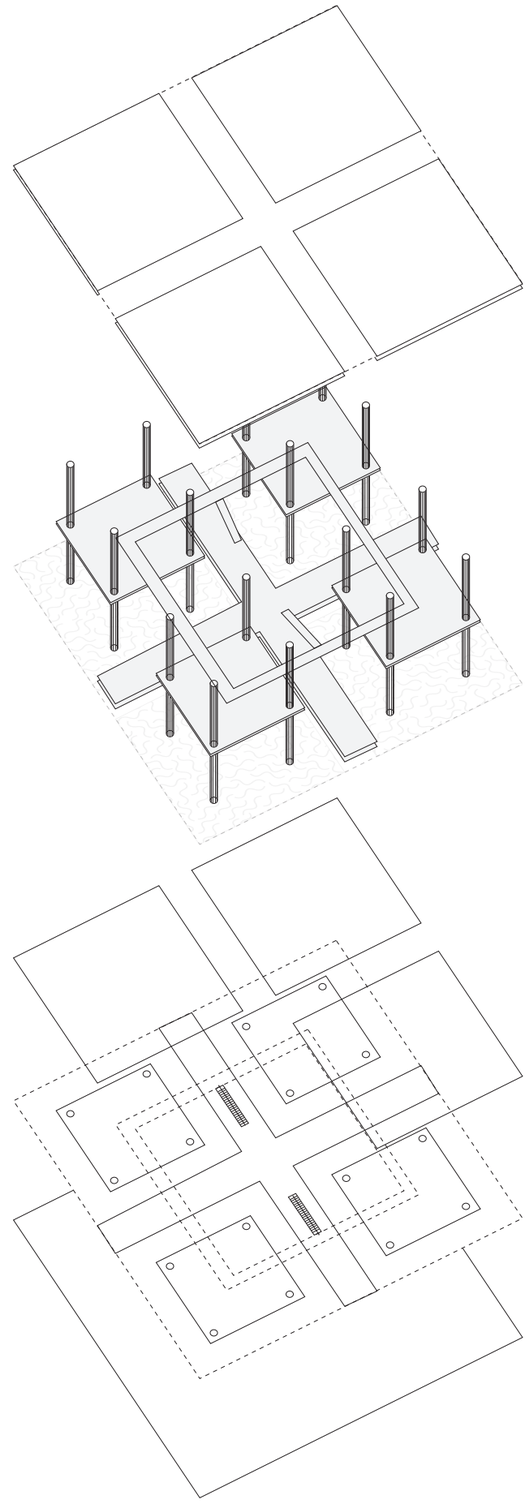
Floating hubs
(controlling & processing facilities)



apart from controlling and processing the flows the hub informs the visitors about the content, raising awareness

the harvested inputs are processed and transformed into useful nutrients for the salt marsh, 4 the expo center, where the content of the living lab processes becomes acknowledged by visitors. The four parts can be found all together or separately. The form of the hub is also similar to a plug – in machine, a piece of floating infrastructure in the middle of the salt marsh. With the floating hub, an anthropocentric aspect is added in order to allow humans to both maximize the benefits and meet broader strategic goals. It is the place where humans meet nature and absorb knowledge from it.

As mentioned in the cartographic phase, the permanent human capacity of Texel is quite small (13,547 inhabitants), but the temporary capacity, meaning the visitors of the island can reach high levels (more than 1 million visitors per year). Agriculture is a main source of employment. The land use change premises that the farmers and landowners will not lose their source of income and property respectively. They will just need to be trained, adapted to the new cultivation system. They will also need to learn how to use the newly introduced equipment in the hub (the equipment will function partially automatically and partially manually). In the end, these new hubs, innovation centers, cultural hotspots, will raise awareness and engage the visitors in understanding the urgency for depollution, the transition from linear to circular models of production, reflecting a way in which humankind can intertwine harmoniously with ecosystems.



Floating hub
design intervention

8.3

Design application

The new land uses contribute towards the enhancement of biodiversity and the restoration of permeability in the sequence of habitats, improving the environmental and cultural values of Texel as a whole. They provide an alternative flood defense and water management system that, instead of hard, engineered approaches, it is oriented towards softer and more naturalistic infrastructures, able to adapt to the constant increase of the seawater level. Finally, the new land uses, and the accompanied methods of crop cultivation and harvesting, suggest a circular model of production, shifting the economic values and practices towards a more sustainable direction. The four new ecosystem engineering typologies are: 1 mussel pole fields, 2 oyster reefs, 3 macro algae (seaweed) plantations and 4 salt marsh meadows.

8.3.1

Mussel pole field

Mussel cultivation has been occurring in Europe for years, shaping the culinary culture of the areas where they are produced. Mussels also perform as sedimentation catalysts of high significance. Following the cultivation of mussel pole fields in France, the proposed technique is the one in nets arranged in a spiral on poles in intertidal areas (Clyde et.al, 1997).

Benefits – Increased adaptive capacity:

Wave attenuation (safety | adapt to wave action)

Sedimentation catalyst (adapt to tides)

Oyster reef facilitator (adapt to wave action)

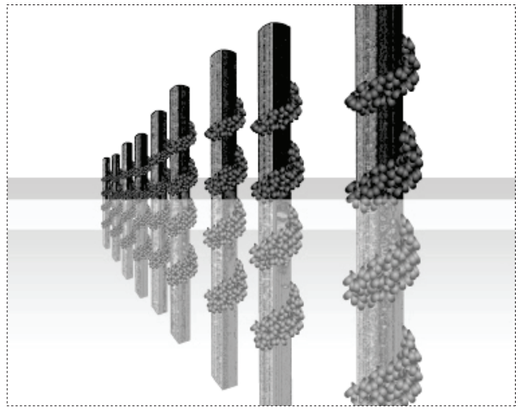
Water filtration (adapt to water pollution)

Habitat provision (permeability | adapt to marine identity loss)

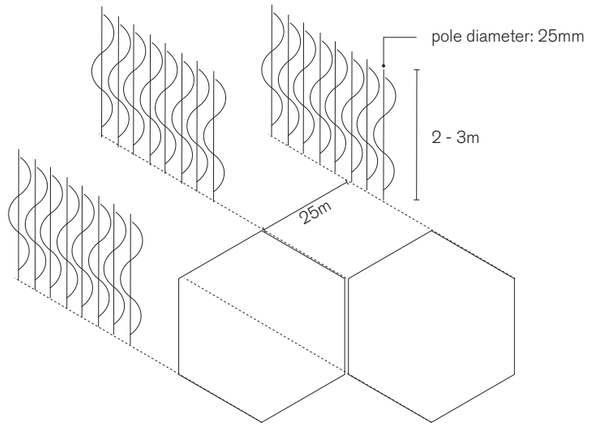
Productivity rate:

60kg of mussels per pole every 12 – 15 months | annual yield for 1ha of mussel poles: €42,000

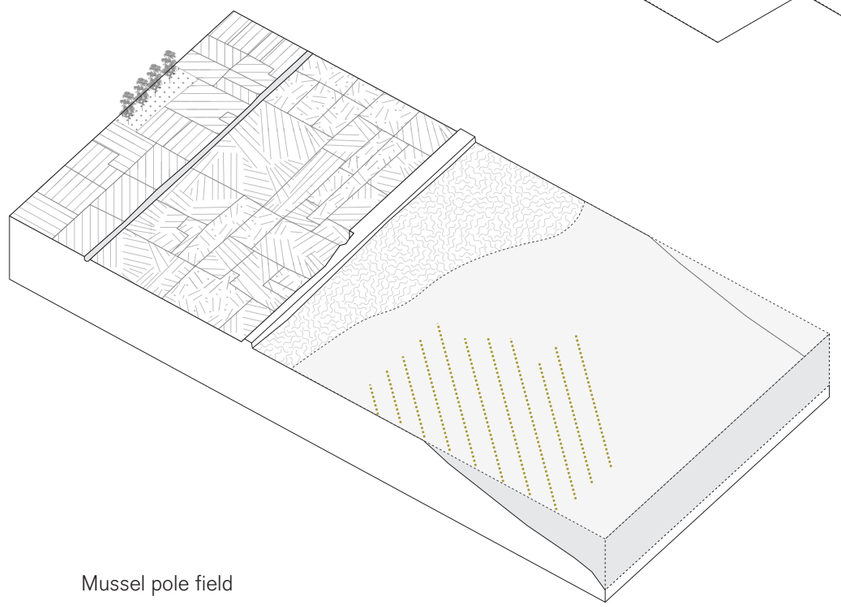
Blue Mussel (Mitilus edulis)



Mussel poles with nets containing the mussel crop arranged in a spiral



Mussel pole arrays



Mussel pole field

8.3.2

Oyster reefs

Oyster reefs are considered an innovative coastal flood defense practice, thanks to their ability to extenuate wave energy and their ability to boost sedimentation, by simultaneously providing and maintaining natural habitats, especially for juvenile fish populations and benthic species (plankton and crustacean). What is more, oyster reefs stabilize coast lines, resisting to eroding forces. It is an adaptable mechanism, since reefs are able to rise and multiply onwards, keeping up with the increasing seawater level. They encourage nutrient abundance in the associated systems, since they capture filtered sediments in the form of faecal matter.

Benefits – Increased adaptive capacity:

Wave attenuation (safety | adapt to wave action)

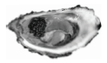
Shoreline stabilization (safety | adapt to coastal erosion)

Reef accretion (safety | adapt to flooding)

Habitat provision - Salt marsh establishment (permeability | adapt to marine identity loss)

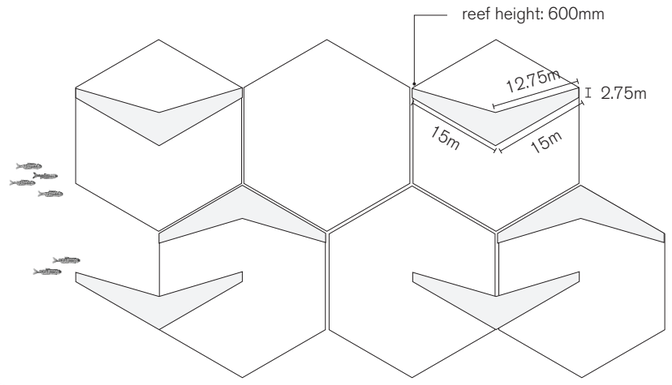
Sediment deposition facilitator (adapt to tides)

Water filtration (adapt to water pollution)

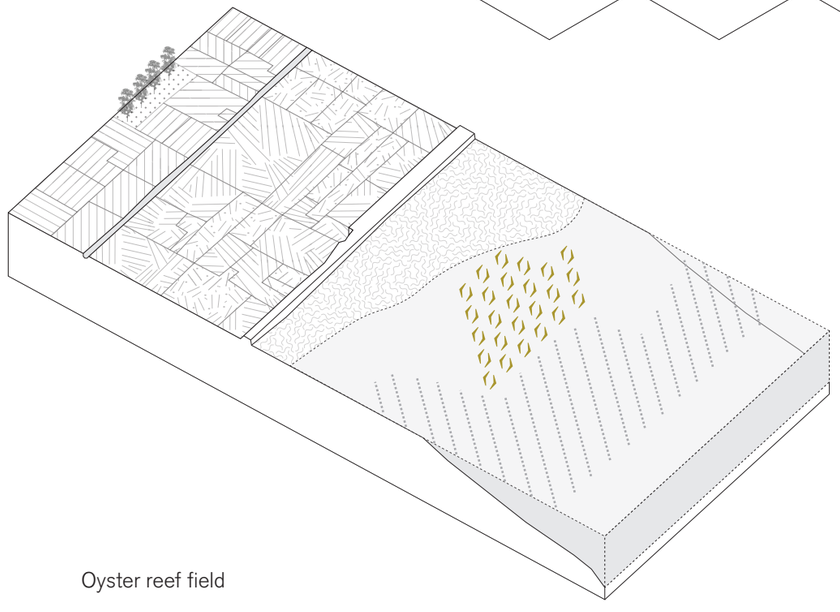


Pacific Oyster (Crassostrea gigas)

Naturally occurring oyster reefs
https://www.nature.org/en-us/newsroom/oyster-reef-restoration/



Oyster reef spatial organisation



Oyster reef field

8.3.3

Macro algae (seaweed) plantation

Macro algae (seaweed) plantation is already acknowledged in Europe for its value as a source of bio – chemicals and food. Recently, there is rising interest regarding its potential use as a source of food for animals and fish and as a source of biomass and biofuels. Seaweed cultivation also addresses eutrophication in marine ecosystems, filtering nutrient waste generated from the adjacent traditional agricultures.

Benefits – Increased adaptive capacity:

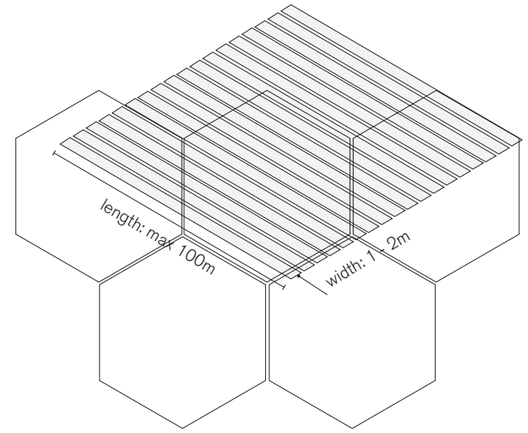
Biomass, oils (bio – plastics, biofuels, biogas production)

Habitat provision (permeability | adapt to marine identity loss)

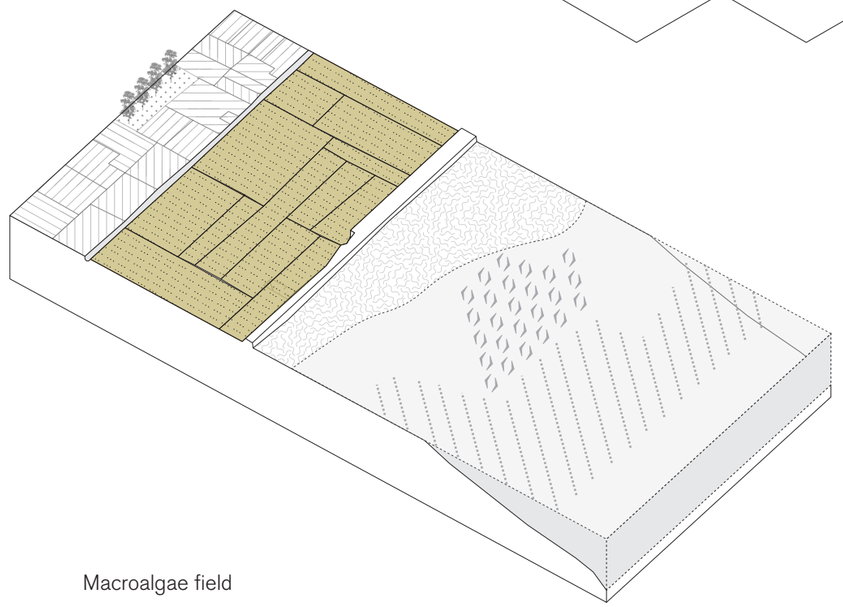
Agricultural runoff filtering (adapt to water pollution)

Sea Lettuce (Ulva lactuca)

Seaweed plantation
https://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.0219958&type=printable



Macroalgae field
spatial organisation



Macroalgae field

8.3.4

Salt marsh meadows

Similar to oyster reefs, salt marshes have a beneficial impact in terms of wave attenuation and resistance to erosion, encouraging sediment deposition and thus, accretion, providing a variety of marine and terrestrial habitats that evolve through time. The evolving adaptability of salt marshes is embedded with their constant change in terms of vertical elevation, moving constantly from wet and dry productive periods. Such conditions encourage the establishment of plant species (e.g. Samphire) and therefore the continuation of sediment deposition and eventually the establishment of other species as well, as the ground level moves above high tide level. The spatial identity of salt marsh meadows is also of great significance, shaping a canvas of water bodies, colours, plants, birds and other species of high aesthetic value, that all together form a unique landscape.

Benefits – Increased adaptive capacity:

Wave attenuation (safety | adapt to wave action)

Shoreline stabilization (safety | adapt to coastal erosion)

Sediment deposition facilitator (adapt to tides)

Accretion – up to 1cm/year (safety | adapt to flooding)

Biomass (biofuels, biogas production) thanks to the oily content of salt marsh plant species

Habitat provision for a wide range of species including benthic organisms, plants, animals, birds (permeability | adapt to marine identity loss)

Carbon capture and storage facilitator

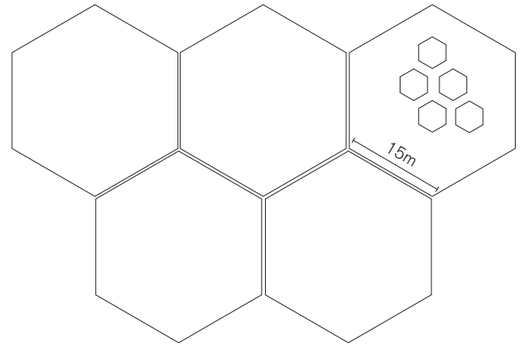
Water purification (adapt to water pollution)

Productivity rate:

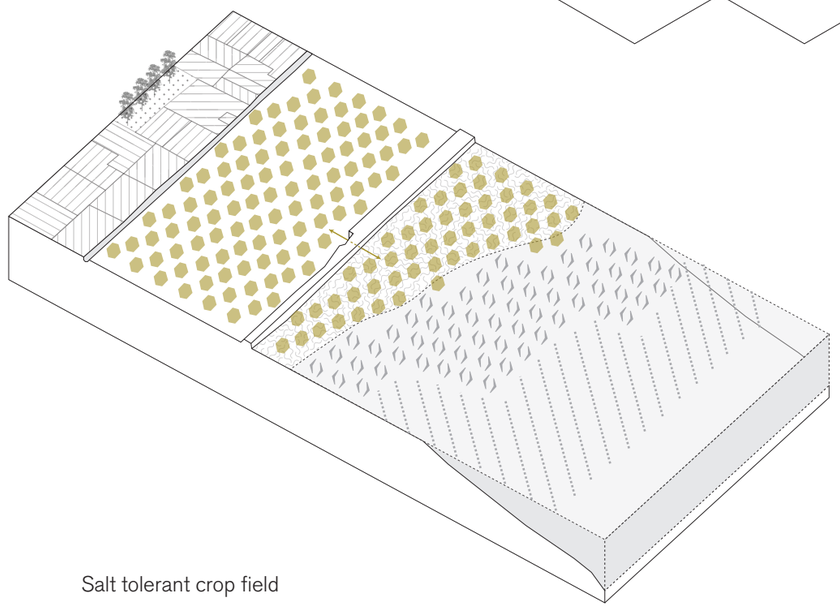
Samphire cultivation: yield up to 15 tons / ha & up to €84,000 / year

Salicornia europaea (Samphire)

Salt tolerant crop cultivation
http://hortadospeixinhos.com/en/salicornia/



Microalgae field
spatial organisation

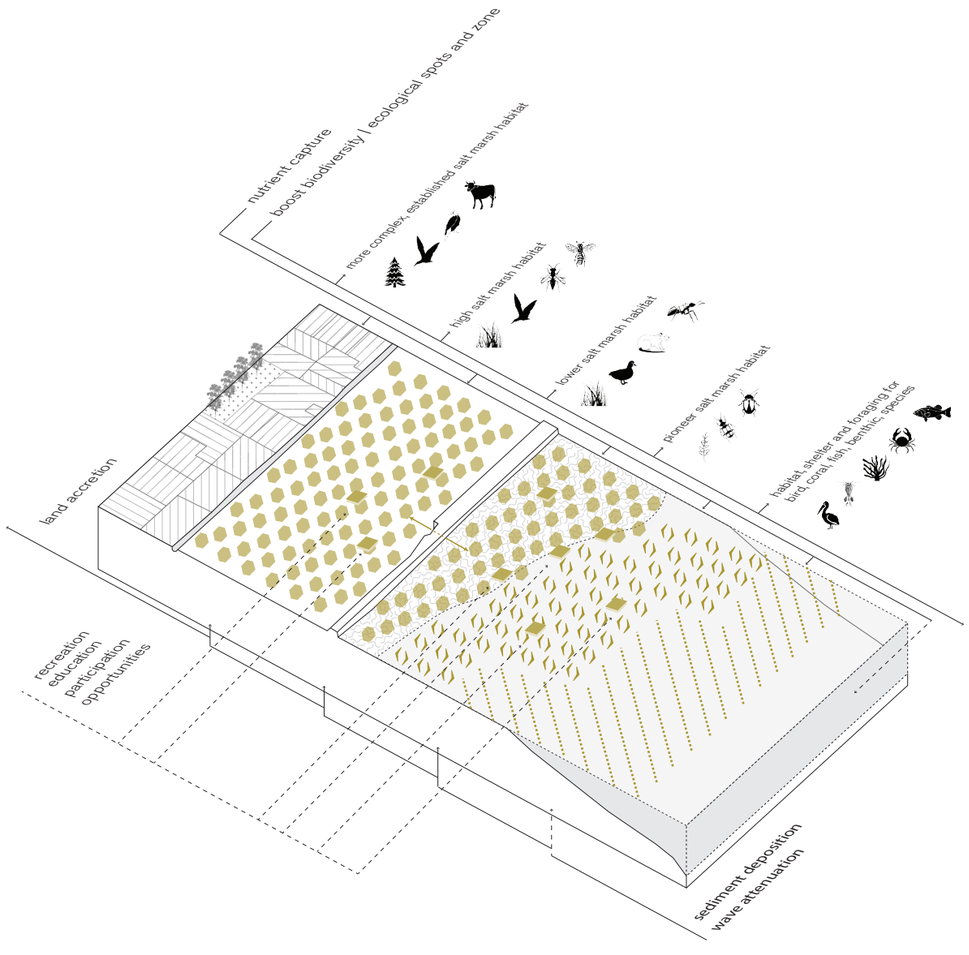


Salt tolerant crop field

8.3.5

Timeline & benefits

An attempt of introducing a mussel pole field aside Prins Hendrikpolder, and the subsequent oyster reef area formation, could encourage sedimentation allowing the establishment of new alternative land uses. The expansion of the oyster reefs would determine safe conditions along the shoreline allowing the formation of a salt marsh habitat that boosts biodiversity, provides a flood defense system, increases ecosystem adaptive capacity, reflecting a way in which soft ecological engineering can foster a spatiotemporal inhabitation.



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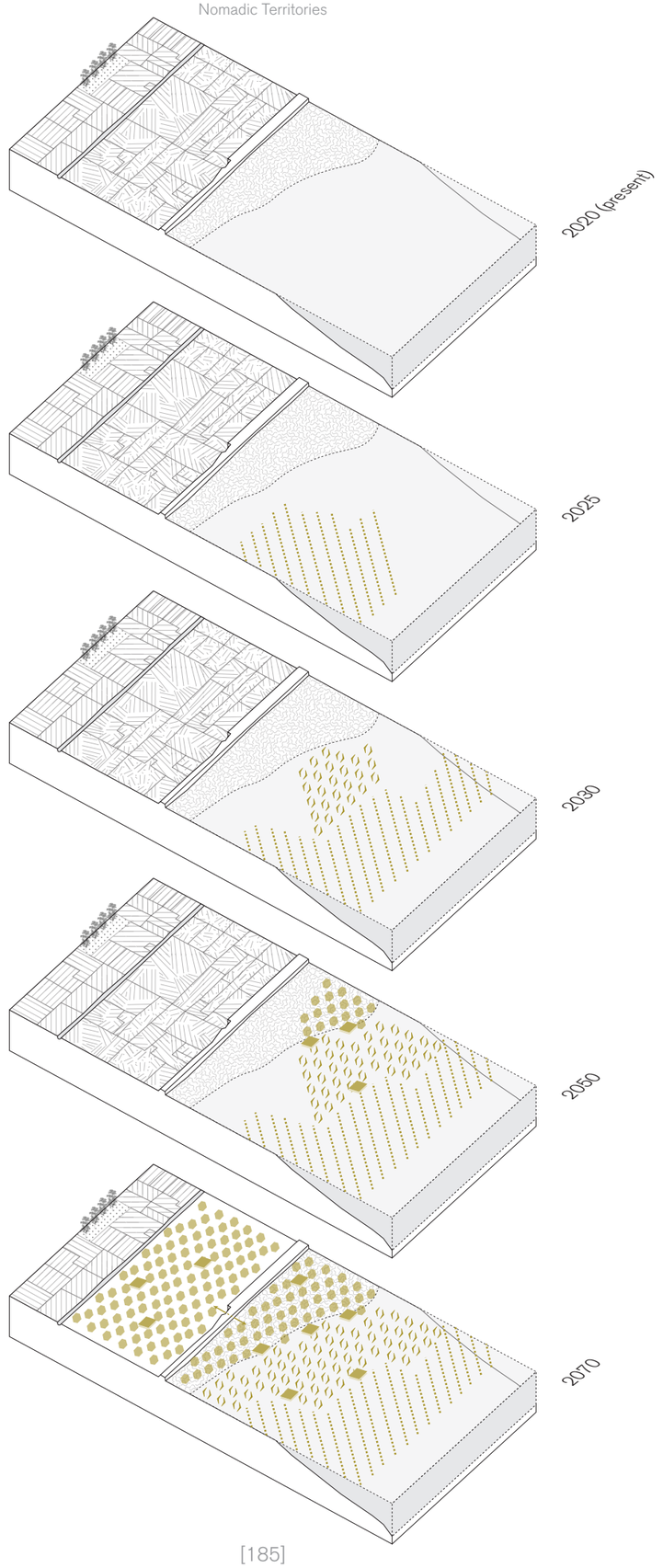

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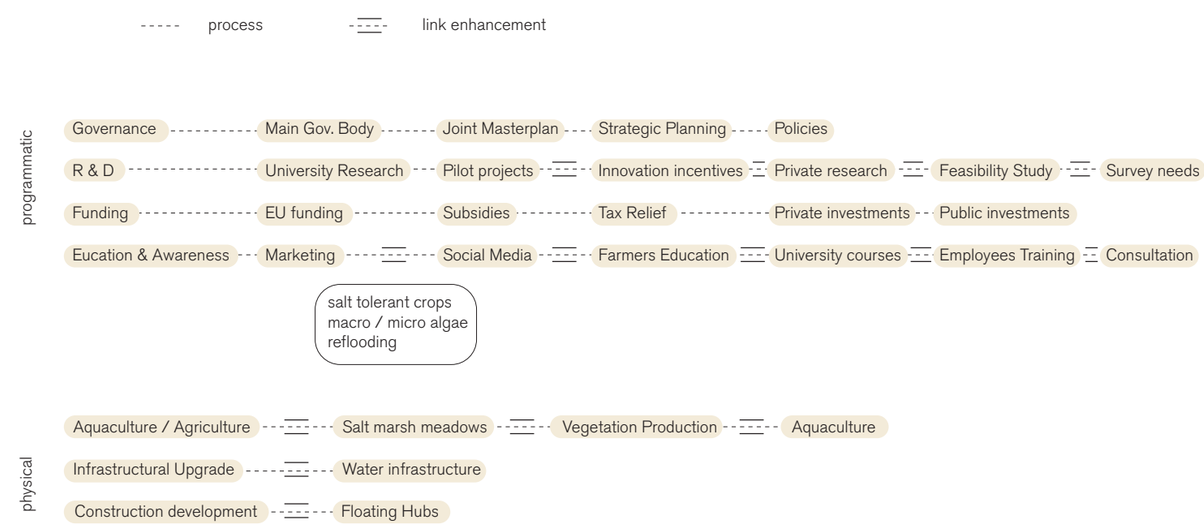
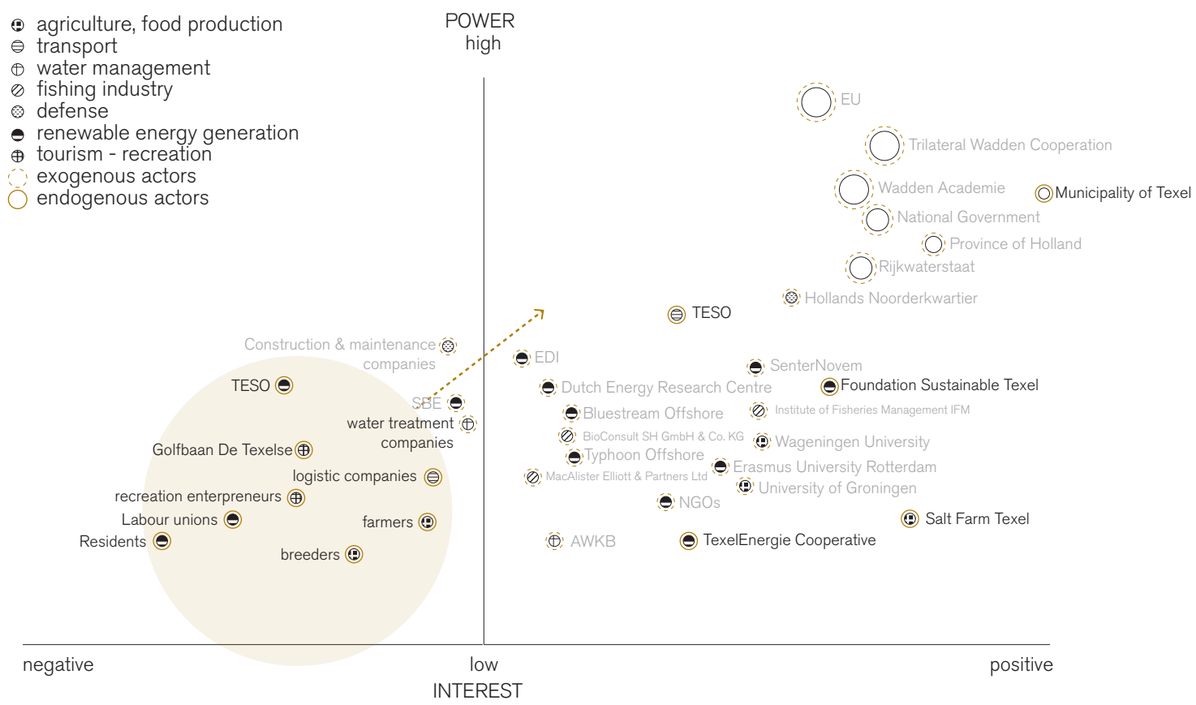
8.3.6

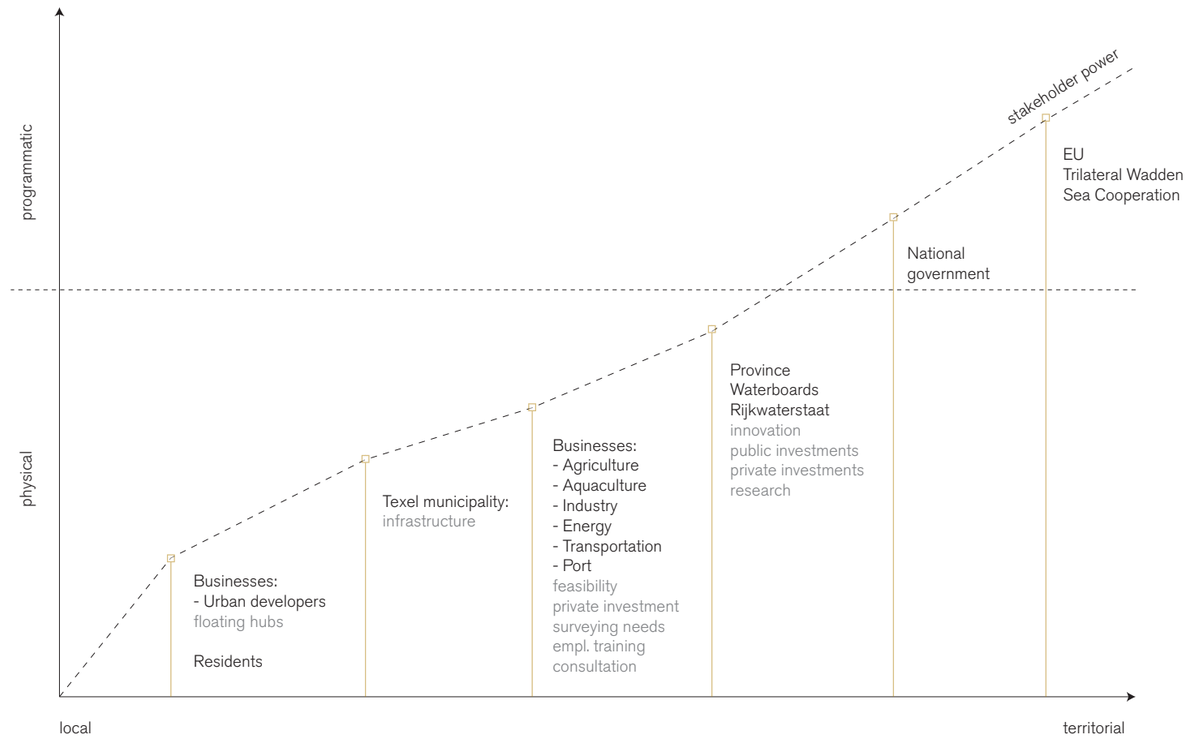
Stakeholders analysis

As it has been already mentioned, this proposal evolves in a multi scalar level. The implications of a reorientation of an area's land use requires the identification of the existing key stakeholders, their categorization into public, private, civil society and R & D and a suggestion of new functions that could potentially link them. From supranational to local level, from EU to small scale farmers and breeders, the following diagrams showcase how these actors integrate.

In general, the responsibilities can be categorized into programmatic and physical and then into precise categories, such as governance, R&D, funding, education & awareness, aquaculture / agriculture, infrastructural upgrade and construction development. The first four categories relate to the non – spatial framework of the proposal implementation and therefore the transition. The empowered governing body will have to







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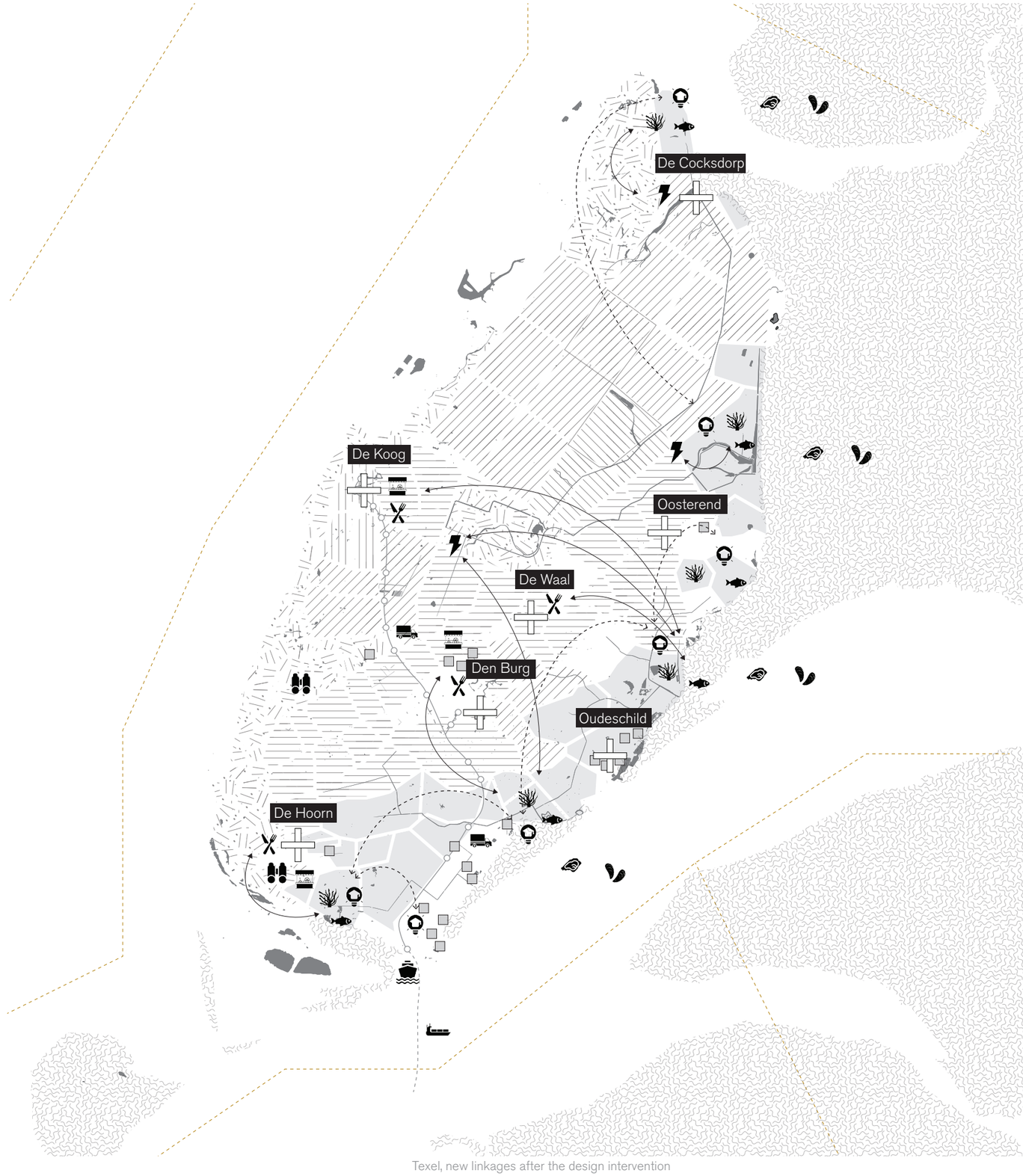
[187]

sponsor and coordinate the development, following the plans but mainly start launching projects in order to test in practice the feasibility of the various agriculture and aquaculture methods that are proposed.

Educational institutions and research initiatives should absolutely be part of the pilot projects. Funding is supposed to come primarily from international sources (EU). Convincing local actors such as farmers and breeders for this change to their way of living and working methods, on the one hand in terms of knowledge, education and awareness and on the other in terms of income needs to be an integrated part of the project. Simultaneously, infrastructural upgrades need to take place in order to be able to support the re flooding processes.

An important benefit of this change, meaning the reclamation of the biophysical processes, will increase the adaptive labour capacity of the island. Labour force transition will shift from the traditional cultivation crops and techniques to new field specialisation and a constant pursuit of new knowledge and skills. More space, therefore will be given to younger people, who will benefit from this new circular type of economy

Interrelation between the different types of employees, temporary visitors and industrial systems will foster multi - disciplinarity, enhancing the feedback loop from one sector to the other. The output of one sector will be the input for the other and vice versa.



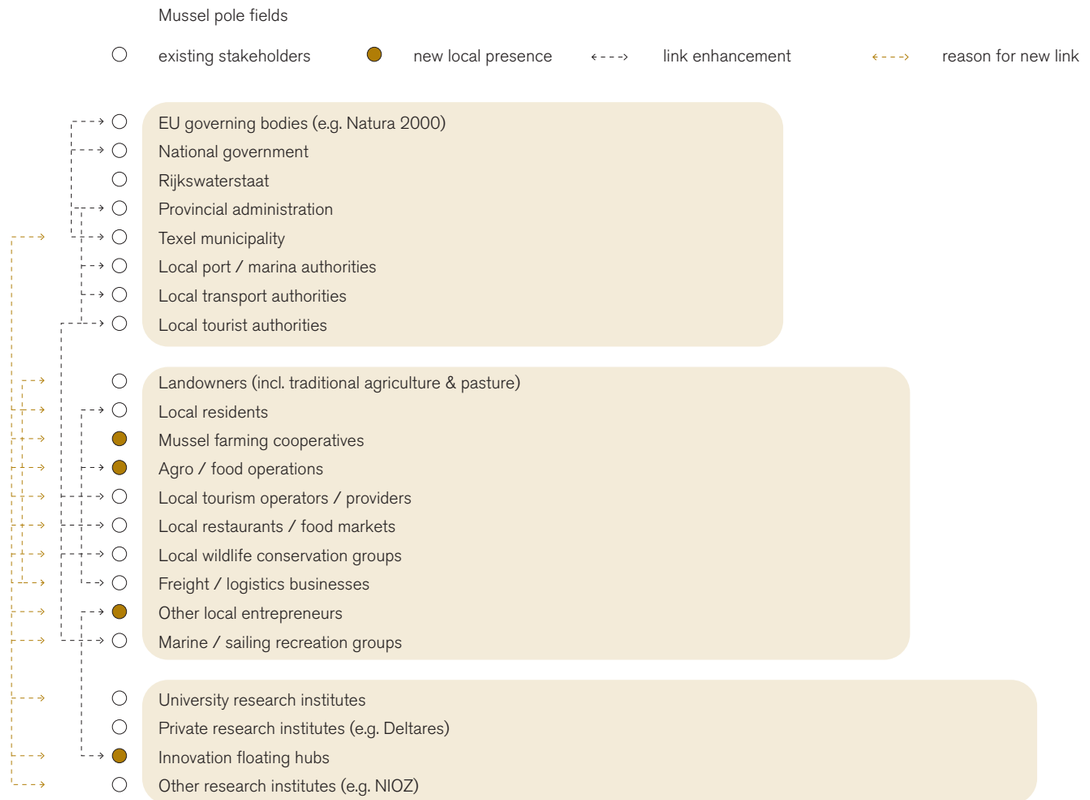
Texel, new linkages after the design intervention

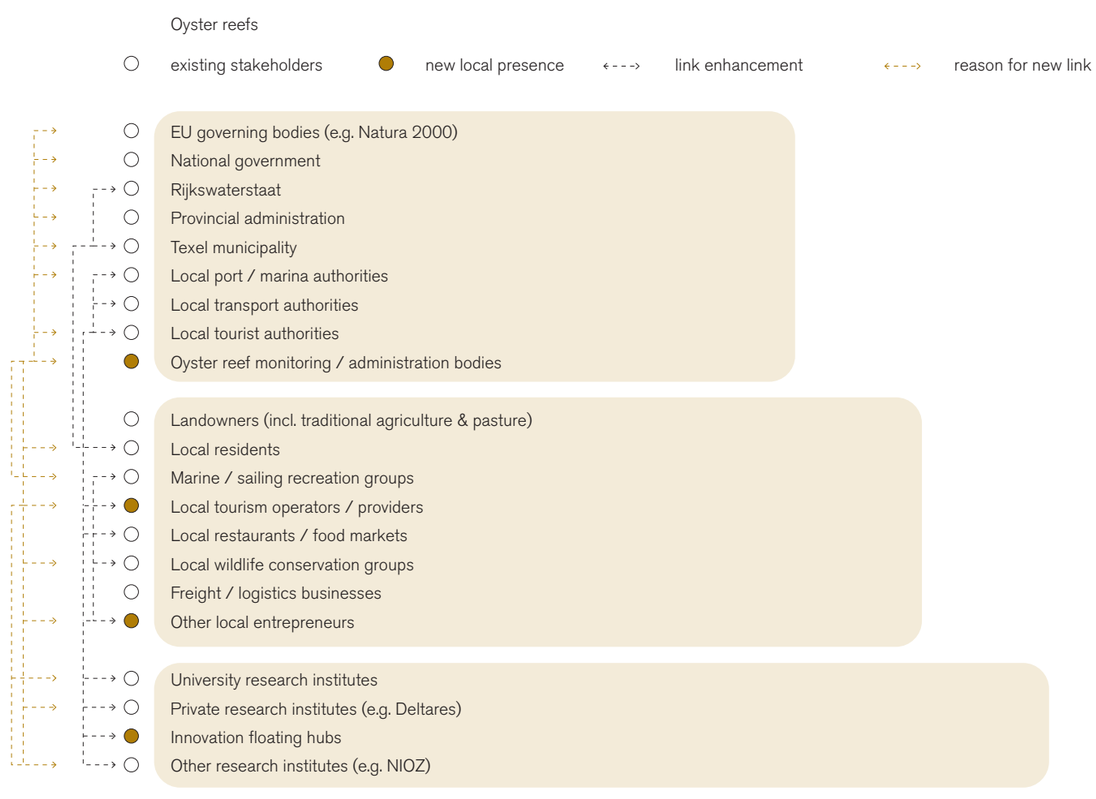
Local farmers are integrated in new processes and tourists are aware of the content

More precisely, the introduced systems will create the following interrelations among the multiple sectors:

The mussel pole field will foster a re-orientated productive landscape and will become the new aquaculture industry – employer. Apart from creating new labor opportunities, it will become one of the main elements that will eventually link the ecologies with tourism, restaurants and local culinary culture, enhancing the area's seafood habits and using tourism routes in order to establish the connectedness with the adjacent mainland urban centers (eg. Den Helder)

While the initial purpose of the oyster reef new habitat is to create a protective buffer zone for the alongside salt marshes, a role with minor significance in terms of economic benefits, the same does not happen with its significance as a new cultural element that offers a new spatial character to the island and the adjacent area. Managing and monitoring this part of the project will re – orient local and broader communities towards a deeper comprehension of ecological infrastructural landscapes and their performance and added value to the overall beauty and health of the ecosystem.





The new macro algae plantations will promote local biomass production that will be used in order to generate the residential power that is required for the rural and urban centers nearby, establishing a network of energy sharing and transition. This system could also upgrade the adjacent industrial and maritime facilities, providing them raw materials such as biofuels and bio - plastics. Finally the promotion of biomass will benefit local traditional agricultures covering part of their manure needs.

The salt marsh meadows will replace a large percentage of the current agricultural land and will be connected to the new aquaculture operations in order to encourage a steady supply of nutrients and reinforce circularity with the related economic sectors (agro – food industries). The hubs will monitor and ensure the maintenance of the landscape, contributing to the preservation of the health status of the ecosystem.

Public sector

International
- European Union (EU)
- Trilateral Wadden Cooperation
- Wadden Academie

National
- National Government
- Rijkswaterstaat

Regional
- Province of North Holland

Local
- Municipality of Texel

Semi public sector

Governmental agencies
- Hollands Noorderkwartier
- SenterNovem

Educational institutes (MBO, HBO, WO)
- Erasmus University Rotterdam
- Wageningen University
- VU University Amsterdam
- University of Groningen
- Leiden University

Transportation companies
- Koninklijke NV Texels Eigen Stoomboot Onderneming (TESO)

Private sector

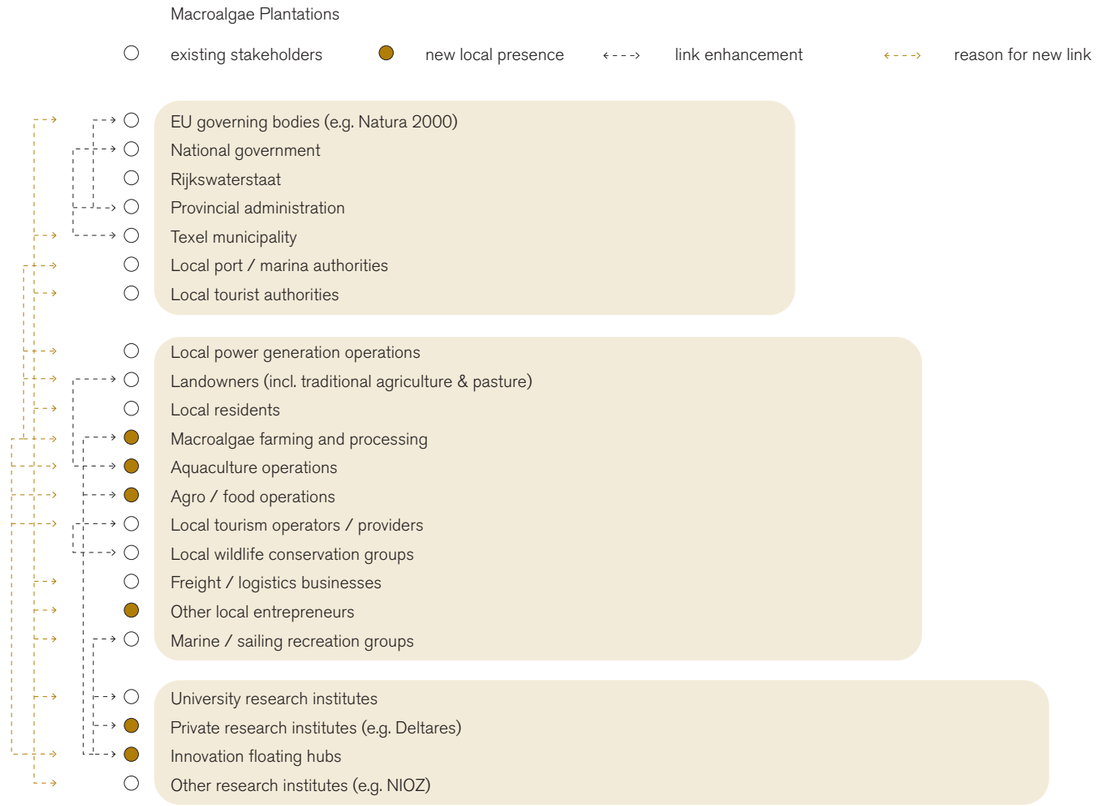
- Energy Delta Institute (EDI)
- Companies related to: Renewable energy infrastructure, efficiency, storage (ex. Bluestream Offshore, Typhoon Offshore)
- Construction and maintenance companies
- Golfbaan De Texelse
- recreation enterpreneurs
- AWKB wastewater chain company
- water storage and treatment companies
- MacAlister Elliott & Partners Ltd
- BioConsult SH GmbH & Co. KG
- Institute of Fisheries Management IFM
- Salt Farm Texel
- logistic companies

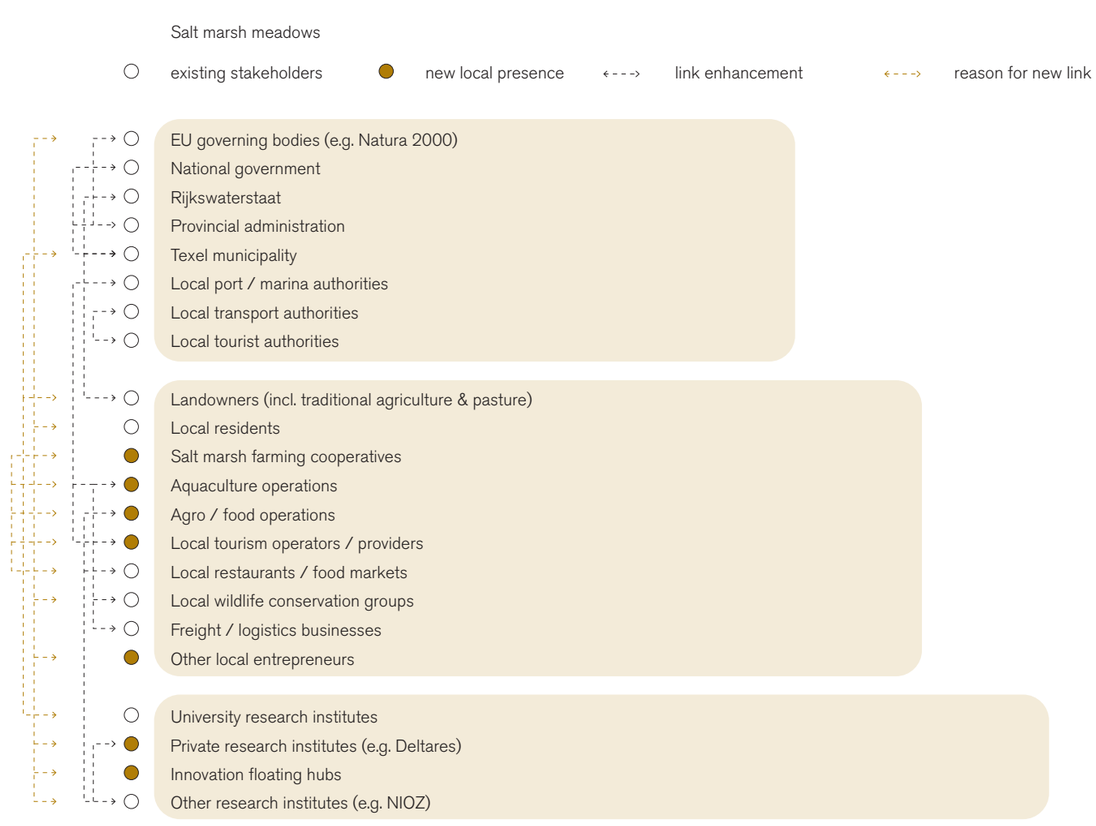
Civil society

NGOs - Civil foundations
- TexelEnergie Cooperative
- Foundation Sustainable Texel
- SBE operating company of the Association of Technology Transfer Association (ATO)

Labour unions
- farmers
- breeders

Residents



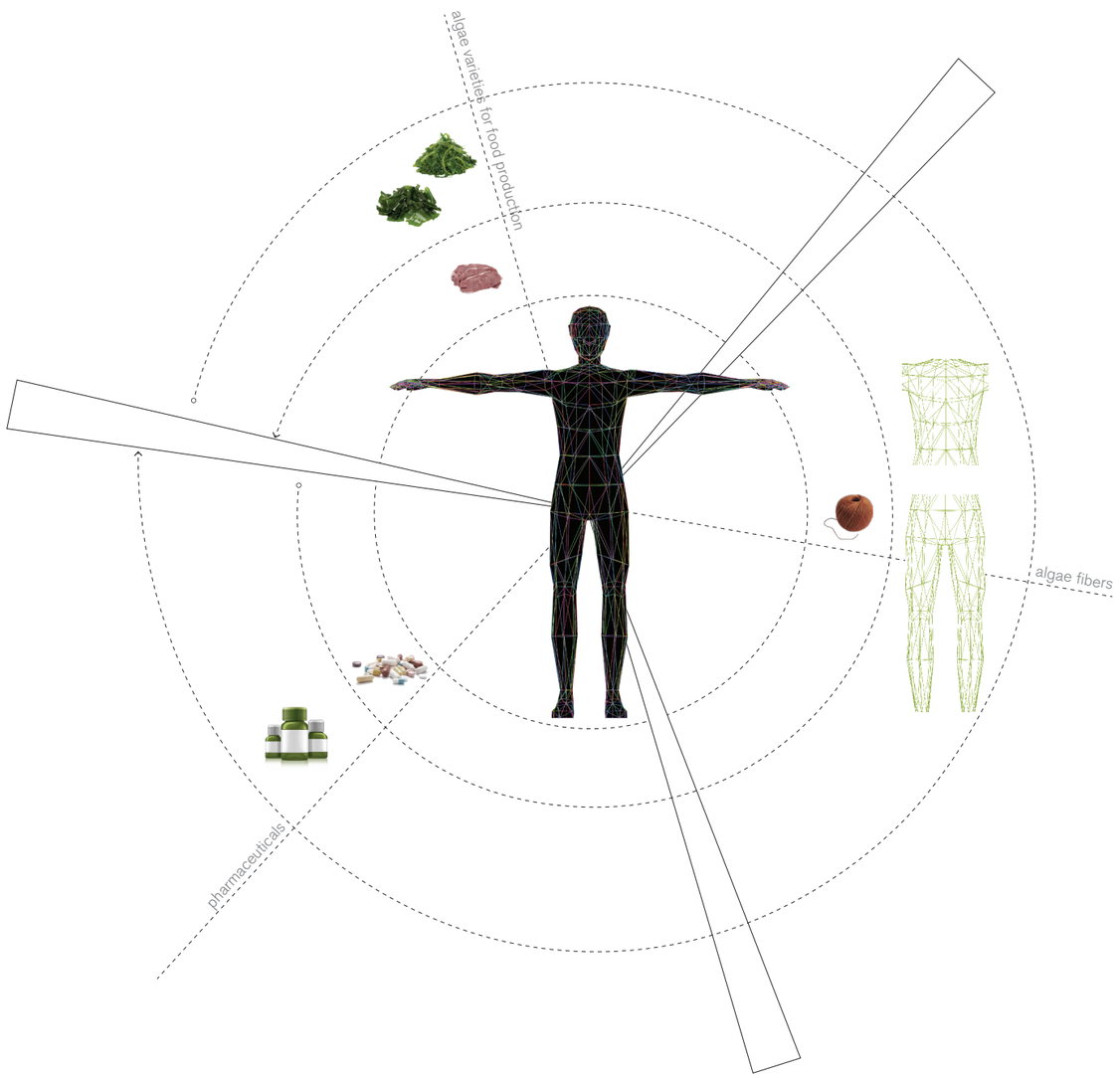


New wetland, towards a robust ecosystem

Nomadic territories, an extended network of new land - uses, floating hubs, controlling the process and creating knowledge for local actors and visitors

8.3.7

Nano scale



9

EVALUATION & CONCLUSIONS

In this final chapter of the report, the research outcomes are presented. Options, constraints, and limitations on the proposed solutions and their transferability are highlighted. Aspects that require further investigation are also indicated. Finally, the relevance of the thesis, from a societal and scientific perspective is revealed.

9.1

Limitations

As far as effectiveness is concerned, the research has been proven successful in tackling the original goal. While in the meantime the hypothesis transition from the ex ante of Sámi to the Wadden Sea Region context and the case study of Texel Island was a hard step to make along the building process of my methodology framework, the overall direction remained the same and now I feel I have a strong base to build on with my design. However, there are several limitations to the overall scope of the project:

- Design limitation: Since design is a personal and subjective exercise, there is not only one way of addressing the defined challeges and move towards the specific intervention, especially when it comes to regions or territories of high complexity. Therefore design is subjective to criticism and to an open dialogue with the scientific community. In my opinion, though, this is more a strength than a drawback.

- Knowledge limitation: This thesis cannot elaborate enough, and thus describe comprehensively, the detailed way in which the ecosystems function and interrelate at the moment, much more when they will return to a more natural condition. I acknowledge that a simplistic understanding of the way natural processes perform is a potential weak element of the thesis. For this, I have instead tried to give emphasis to the natural and human synergies and propose possible ways of how manipulation of these synergies could mitigate risk and contribute towards climate adaptation.

- Vulnerability limitation, regarding the extent of vulnerabilities addressed by design. As stated in the theoretical framework, vulnerability has many different perspectives, depending on the research. Although vulnerability constitutes a key element in the present research, the focus is mainly on environmentally driven vulnerabilities, while for instance social vulnerabilities are not evenly addressed.

- Time limitation: The proposed systems, namely the salt marshes and oyster reefs have the adaptive capacity to encourage sedimentation and vertical accretion. However, in case sea level rises in a faster pace than the salt marshes can grow, they might no longer be able to provide a flood defense measure and remediation mechanism.
- Case study specificity limitation, meaning that there might not be enough evidence for generalization due to challenges linked to the specific location that is chosen.

- Scalability limitation, concerning the level of applicability of the proposed spatial strategies and design principles on cases of different scale. Some of the proposed local interventions might not be able to be tested on another scale.

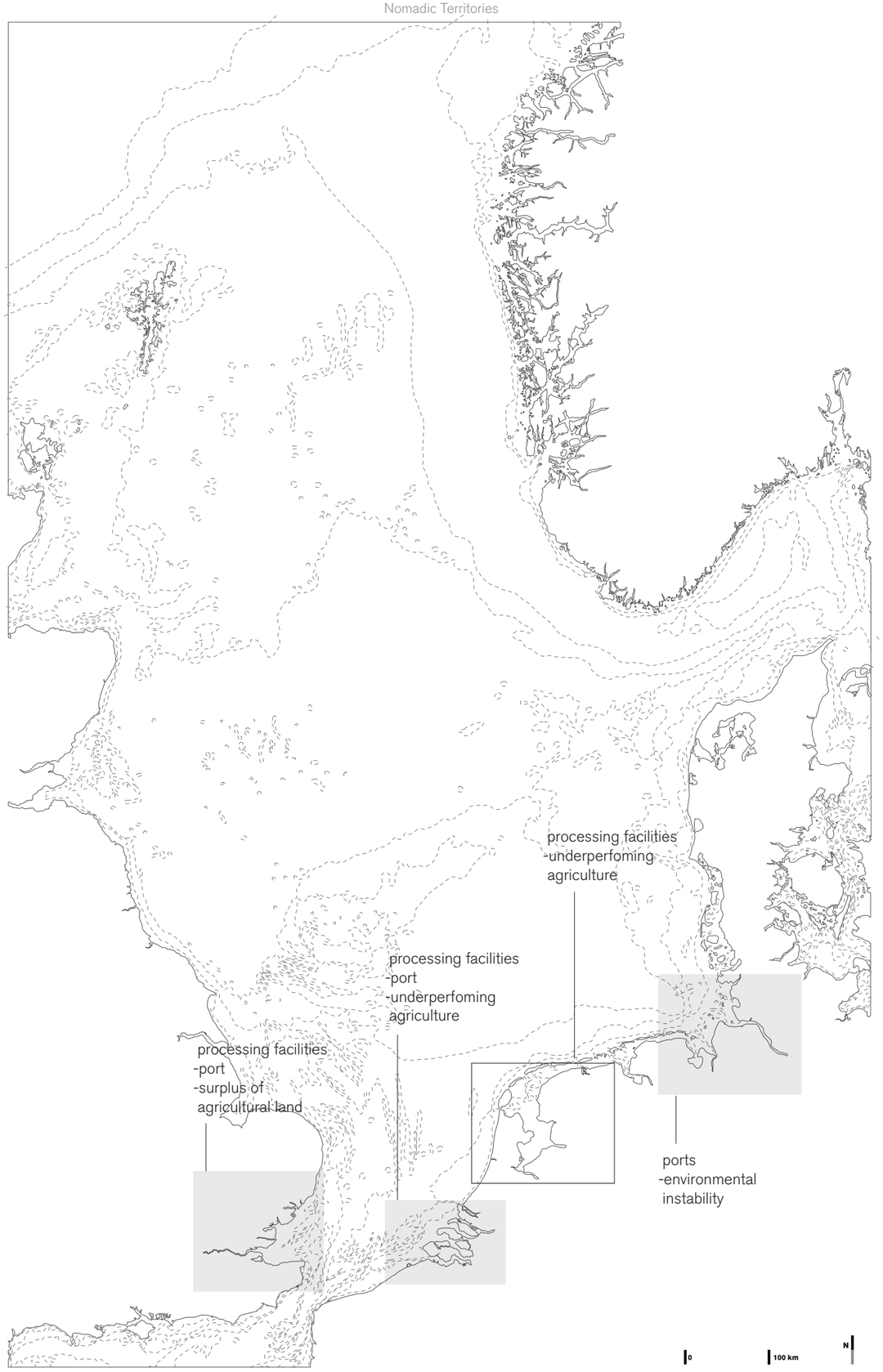
- Transferability limitation: The frameworks and models developed refer to the Wadden Sea Region, thus, there might be a limited constraint on how much the developed design principles can be implemented on other countries based on geopolitical differences, particular regulations, economic statuses and cultural norms.

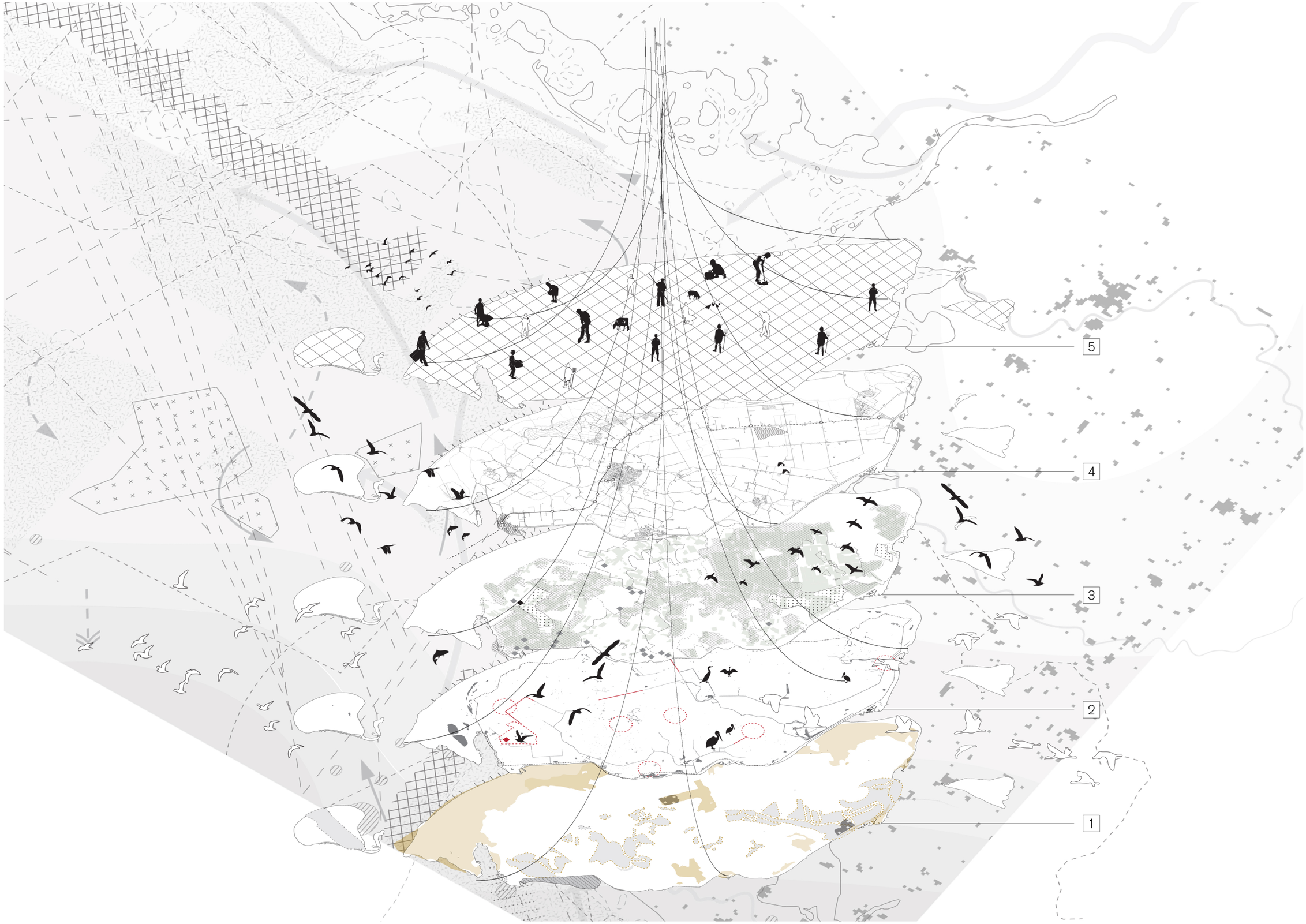
- Adaptivity limitation, meaning that the level of adaptive capacity might be restricted by other factors that have not been taken into account and can relate to certain financial, economic, political, social and cognitive attributes.

9.2

Up - scaling

Further arguing on the scalability and transferability limitations, a question that remains refers to what would be the impacts, positive or negative, of the local interventions for the broader region and beyond that. The new land uses will enrich natural habitats and increase the adaptive capacity of Texel ecosystems, but the benefits for instance for the North Sea territory in its whole are harder to be detected. The new synergies between natural and human systems might have a limited effectiveness on a global level, due to the diverse climatic, flood risk or cultural conditions. However, the proposed interventions could be applied on other areas with similar conditions across the North Sea, and for example, an algae – based bio – fuel network could be potentially created. Also a re – orientation of the land use and the establishment of remediation processes, with respect to the ecological and cultural identity of each place, could provide a way of addressing land pressures, social, economic and environmental, envisioning a future territory that is depolluted, bio – productive and safe.

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9.3

Conclusions

While coastal and delta areas around the world face unprecedented environmental, social and economic challenges and experience a decline of ecosystem services, human postures and claims on planetary natural resources, manifest a development where “more is more”. Slowly changing weather patterns threaten land productivity, biodiversity and human settlements and rising sea levels the safety of the inhabiting populations. This thesis aims at revealing nomadism as a way of life that fosters actions, but primarily values that could be beneficial for the humankind concerning risk mitigation, adaptation to future extreme and unforeseeable hazards and the management of socio – environmental vulnerabilities, enhancing the robustness and resilience of the today’s and future’s territories.

With the main research question asking up to what extent a shift towards the nomadic paradigm can inform spatial planning concerning risk mitigation and adaptation, in order to re – conceptualize the resilience framework within the Wadden Sea region, this thesis starts as an inquiry aiming at first outlining the nomadic figure and especially his or her relation to the habitat, the territory. The ex ante of Sami shows that nomads have managed to overcome multiple pressures and adapt to changing environmental, economic and sociopolitical conditions, thanks to an acquisition of knowledge which is both self – referential and habitat – referential. Nomads have developed the ability to “read” the sky and land and project the gained knowledge on a new “topos”, by moving, following seasonal migration patterns, developing self- organization capacities and living in harmony with nature. With this research outcome being the tool, a shift towards the Wadden Sea Region context could then occur in order to test the paradigm, seeking for an alternative territorialisation of space, based on the co – habitation of human and nature systems.

The new ecological infrastructures that are applied on Texel island could enable the thrive of the island’ s natural processes, boosting its productivity and promoting ecological permeability. The suggested design principles promote change towards a more circular, interconnected and participatory development that is mainly based on de – poldering interventions and algae production. The specific spatial typologies and the role of human in processing, controlling and becoming part of the cycle could also support the design goals, since the applied tactics focus on rural areas with an adequate self – organization capacity and could therefore strengthen the decision making role of the local community.

Although there remain a large amount of unanswered questions, concerning the way those new systems are functioning in their detail and according to existing limitations and timelines, and the precise economic benefits for the locals, this approach to introduce new land uses that interconnect and create new synergies between human and natural systems, does have a potential to meet the requirements and maximize benefits while minimizing environmental vulnerabilities, however, it is the broader theoretical framework that might be more transerable to other contexts.

Summarizing, within the context of constant change and transition, a new interpretation of the dynamic agents, will alter the way people value the landscape, managing risk and becoming less vulnerable to the externalities. Following this thought, the project suggests an adaptive way of planning and living, a different apprehension of space, a new balance between the territory and the individual.

9.4

On ethics

Lastly, the thesis in its very essence reflects the following ethical consideration: How can we talk about permanence and stability in the way we plan and inhabit space, when our environment is constantly changing? Within the context of constant change and transition, a new interpretation of the complex interrelations between dynamic and stable forces, will alter the way people value the landscape, managing risk and becoming less vulnerable to extreme externalities. Following this thought, the project suggests an adaptive way of planning and living, a different apprehension of space, towards adaptation, transformation and change. Taking into account the fact that most western economies aim at promoting constant and unhindered growth, regardless of the impacts on the environment, this sociocultural shift that the thesis suggests might materialize in the long – term. However, it would be totally authoritarian one to argue that the risk of flooding, salinization and the loss of marine habitats is not a threatening issue in the Wadden Sea region and by extence in the North Sea. The spatial configuration of change, with the de poldering and algae practices might be difficult for local people to accept, since such processes are always addressed with fear, even in a country like the Netherlands that has been taught how to work with nature, mainly due to the area's suffering in the past from natural extreme events. Therefore, one of the main phases of the interventions refer to the raise of public awareness and the launching of education programmes, that seek to change public perceptions and encourage involvement and local action.

9.5

Relevance

As far as **societal relevance** is concerned, the project aims at having a critical perspective on the impact of global forces and climate change on the current inhabitation of space. Adaptation capacities and assessment frameworks are also utilized to emphasize the importance of risk management. Given the fact that our era is characterized by uncertainty, transformation and the ubiquity of change, it is important to understand in what way the proposed way of thinking about territorialisation will actually help people in order to prevent from hazards and explore new ways of adaptation. Eventually, the proposal contributes to the resilience of the area, by generating safe, productive and permeable landscapes. It envisions a a win-win situation where negative environmental conditions are turned into opportunities for benefit maximization and enhancement of local adaptive capacity, production rates, robustness and ecological equilibrium, in other words, sustainable development.

¬Regarding **scientific** relevance, during the annual conference "Delta design in times of climate crisis" which took place at TU Delft at the beginning of March, I noticed that the majority of the topic presented and discussed was aligned to the focal point of my thesis. This constituted evidence of the societal and scientific relevance and actuality of my topic.

Regarding the **Transitional Territories Studio** approach, the thesis is relevant, since it embraces the notion of territo-

ry as a multi scalar project, exploring the interplays and relations embedded within the territorialisation process, through an analytical, conceptual and projective scope. Climate change risk mitigation and adaptation to the uncertainty of the future constitute key issues for both the studio and the project, envisioning a future world that is rather dynamic, complex and unpredictable.

As far as **Urbanism** is concerned, the project goes beyond the individual, trying to answer crucial contemporary questions around the role of spatial planning in relation to future demands. The complexity of the research question implies the necessity of a multidisciplinary knowledge and experience background and requires a multi - scalar design approach. Considering these, the final project is a scientific report, and as such it finds common grounds with most of the tracks (A, U, BT, LA, MBE) of this master program.

Regarding **innovation,** although the thesis deals with issues that are already part of the existing bibliography, it tries to go a step further, by proposing a new way of relating nomadism with spatial planning and design. After revealing the values of this way of human (co) existence with nature, through the ex ante of Sámi, it suggests a new way of thinking and planning for sedentary civilizations by projecting these values on the Wadden Sea Region and particularly on Texel Island. In this way, it informs the public about the nomadic paradigm, opening new windows of interpretation in relation to the territorialisation process. It finds relations between the two areas, concerning pressures and ways of addressing them and mitigating risk. Moreover, the theoretical and conceptual framework of the project is built on well - known concepts and theories, such as evolutionary resilience and de growth, exploring new links as far as nomadism and “the ephemeral” are concerned.

9.6

Further research

It is no doubt true that in order to reach a detailed feasibility of the suggested design interventions, further analysis is needed. As it has been already mentioned in the conclusions, a next step would explore in a more detailed level the way the new systems function and interrelate, according to existing limitations and timelines. Moreover, a social cost – benefit assessment for the various parties needed for implementation would be included.

9.7

Personal reflection

Aspiring to explore new scientific pathways and broaden my horizons towards new fields of knowledge and research processes, this year’s road was not easy for me. Many times during these last months, I found myself struggling with theories and concepts hard to grasp, like the evolutionary theory for resilience (Davoudi et al., 2012) and de growth theory (Fournier, 2008), interpreting the way systems function and interrelate. Although it takes an effort to be coherent and find the spatial projections of the above mentioned notions, I admit that, it was a challenging and intriguing experience.

I started my graduation thesis without knowing exactly which would be the final outcome, mainly because of my lack of knowledge concerning the spatial context of the North Sea and the theoretical base. The main skills I acquired refer to the pursuit of theoretical interrelations, landscape design, strategic planning and systemic design. Moreover, I deepened my knowledge on climate adaptation and risk mitigation scenario making, as well as on governance issues.

Thinking back to these last months and the unforseeable circumstances that humanity experienced, I would say that the obstacles and difficulties I faced gave me the chance for adaptation as an individual and as a member of society and also some time for personal reflection. The world is living through an unprecedented crisis as COVID-19 continues to spread, with tens of thousands of lives lost and over two hundred countries affected. In just a few months, the pandemic has transformed the way we live, work, travel and socialize (UN-Habitat COVID-19 Response Plan, 2020). Global pandemics present new frontier issues at the intersection between urbanization and globalization. This crisis, and how it is managed locally and globally, will require a rethinking of sustainable urban development models, influenced by a rebalancing of the public and private sector and new ways of working and living (UN-Habitat Covid-19 Policy and Programme Framework, 2020).

This health crisis constitutes above all a human crisis and as such it offers the opportunity to compensate and estimate things that were taken for granted and now have changed. Evolutionary thinking of resilience seems now extremely relevant, since the current social mechanisms and human systems are vulnerable to an extreme externality. The collapse time of greatest uncertainty, can be followed by a phase of reorganization and renewal, a time for innovation and transformation, when a crisis can be turned into an opportunity (Gunderson, Holling, 2002).

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- Temporary capacity
Source: Street network: Geofabrik (2020) Available at: https://www.geofabrik.de/data/
Buildings: Open street map (2020) Available at: https://www.openstreetmap.org/#map=7/52.154/5.295
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Source waterways: Open street map (2020) Available at: https://www.openstreetmap.org/#map=7/52.154/5.295
Water: Master Water for Texel, (2003) Project Program 2003 - 2006

- Land use
Source Land use: Copernicus (2020) Available at: https://land.copernicus.eu/pan-european/corine-land-cover/clc2018
street network, buildings: https://www.openstreetmap.org/#map=7/52.154/5.295
Soil: Archgis (2020) https://www.google.com/search?client=firefox-b-d&q=archgis

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Source: Biodiversity ConcentrationICES (2008). Report of the ICES Advisory Committee 2008. Book 6 – North Sea. Copenhagen: ICES Advice
Ecomare Natuurmuseum & Zeehondenopvang (2020) Available at: https://www.ecomare.nl/
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- Polder spatial configuration
Source Land use: Copernicus (2020) Available at: https://land.copernicus.eu/pan-european/corine-land-cover/clc2018
street network, buildings: https://www.openstreetmap.org/#map=7/52.154/5.295
Soil: Archgis (2020) https://www.google.com/search?client=firefox-b-d&q=archgis
Water: Master Water for Texel, (2003) Project Program 2003 - 2006

- A patterned landscape, Texel
Source Land use: Copernicus (2020) Available at: https://land.copernicus.eu/pan-european/corine-land-cover/clc2018
street network, buildings: https://www.openstreetmap.org/#map=7/52.154/5.295
Soil: Archgis (2020) https://www.google.com/search?client=firefox-b-d&q=archgis
Water: Master Water for Texel, (2003) Project Program 2003 - 2006

- Speculative landscape
Source Land use: Copernicus (2020) Available at: https://land.copernicus.eu/pan-european/corine-land-cover/clc2018
street network, buildings: https://www.openstreetmap.org/#map=7/52.154/5.295
Soil: Archgis (2020) https://www.google.com/search?client=firefox-b-d&q=archgis
Water: Master Water for Texel, (2003) Project Program 2003 - 2006

APPENDIX

APPENDIX

THEORY PAPER

Living in harmony with “the ephemeral”.

An interpretation of nomadism through the lens of Evolutionary Resilience and De – Growth. The case of Sámi.

Abstract

In the light of climate change and the uncertainty of the future, our surroundings are constantly changing and, therefore, an unprecedented need for adaptation is emerging. In such continuously transforming in time and space (transitional) territories, socio – ecological systems do not function in distinction to each other but rather in complex interrelations, responding to the crisis, through transformation and evolution. Global opportunistic economy and neoliberal growth complete the final canvas of this crisis, eliminating the carrying capacity of our planet. Nomadic culture has developed a way of adaptation, through living in harmony with the ephemeral, spatiotemporal inhabitation, territorialization and de-territorialization of space. Living in harmony with the ephemeral and in coexistence with nature, has been proven to be an asset of nomadic way of life. Studying the example of Sámi, the nomadic minority which today encompasses large northern parts of Scandinavia and Russia, this essay defines the nomadic success through the theories – concepts of evolutionary resilience and de – growth. The ultimate goal is to indicate an alternative way of inhabiting space, towards the reconceptualization of contemporary urbanization process.

Keywords

Nomadism, Sámi, climate change, globalization, risk, uncertainty, adaptation, evolutionary resilience, de – growth,

Introduction
Nomad /ˈnəʊmad/ noun
Noun: nomad; plural noun: nomads
It comes from the classical Greek word **νομάς** – nomás, “roaming, wandering, especially to find pasture” –, from Ancient Greek **νομός** – nomós, “pasture” –.

By definition, nomadism refers to the way of life of peoples who do not live permanently in the same location but they rather move cyclically or periodically, inhabiting space temporarily (Encyclopedia Iranica). Directly depending on altering weather conditions and the availability of resources, nomadism is characterized by a fixed annual or seasonal pattern of movements and settlements. Nomadism, as a way of life and human existence is characterized by living in harmony with “the ephemeral”. The traces that nomads leave behind when moving from one place to another reflect the temporality embedded in territorialization and deterritorialization process, in other words, the spatiotemporal nature of nomadism. Permanence is replaced by transformation, adaptation and change.

Nomadic movements between several locations follow defined paths and routes, and simultaneously they have clear destinations. There, the nomads spend equally defined periods of time, developing their traditional economic activities in order to ensure their livelihood (Encyclopedia Iranica). Originally, nomads travel by animal, canoe or on foot and they use adaptable means for settling, portable and flexible shelters such as tents. Nomadism is ecologically adjusted to the utilization of marginal resources since nomads usually inhabit distant places that are neglected by sedentary civilization. As a way of life, it is adapted to infertile regions, amidst inhospitable landscapes; either too dry or too steep for agriculture such as steppe, tundra, or ice and sand, where mobility is the most efficient strategy for exploiting scarce resources.

Although traditionally associated with prehistoric times, nowadays, there are still remaining nomadic indigenous peoples around the world who have managed to get through exposure to multiple risks and pressures. Nomadic indigenous peoples have been oppressed, often with violence throughout history. Their land has been confiscated, they have been displaced and their cultures have been suppressed through the use of assimilation methods. Their struggle for survival finds fertile grounds, thanks to their strong cultural identity and their adaptive temporary way of inhabiting space, even when they have to live on the fringes of the society or when they face unpredicted environmental externalities.

However, in the light of the 21st century, climate change and the rise of global capitalism define a multifaceted threat for nomadic indigenous peoples around the world. Their economy and culture, which is often based on activities such as farming, fishing and herding, and is directly depending on natural resources, is becoming more and more vulnerable, due to rising temperatures, heavy storms, lasting drought and stifling heat from the Amazon rainforest to the Arctic Circle (Brickhill, 2019). Contextualizing spatially, the Arctic as a whole faces enormous challenges and threats. Symp-

toms include reduced sea ice, increased levels of carbon-carrying organic waste in the Arctic Ocean caused by melting tundra, coastal erosion due to increased wave activity, loss of habitat for large mammals such as seals and polar bears and growing disruption of indigenous human communities. Environmental degradation and destruction is reinforced and accelerated by extreme natural resources exploitation within the context of global capitalism which is dominated by an opportunistic mentality towards nature.

The case of Sámi

The Sámi people (also Saami) offer a case within the Arctic context. They constitute the only recognized indigenous nomadic group in Europe, inhabiting Sápmi, which today encompasses parts of northern Norway, Sweden, Finland and Russia (Brickhill, 2019). Their culture has significance along time since it has been existed before the Finnish, Swedish and the Vikings (The 350.org Team, 2018). The traditional Sámi lifestyle is dominated by hunting, fishing, trading but primarily by herding reindeer. Reindeer is an essential part of life for the Sámi. It has multiple functions such as transport, milk and meat production. Traditional knowledge on reindeer herding has been passed down from generation to generation, constructing a strong cultural component and an important part of the Sámi identity. Living in the Arctic regions, the Sámi people have survived the harshest environmental conditions centuries (The 350.org Team, 2018). But nowadays, off-the-scale warming, deforestation and large energy projects are severely affecting their way of life, threatening their cultural identity, since they have to deal with extreme weather fluctuations and unpredictable conditions.

Temperatures in the Arctic are rising twice as fast as the global average (Brickhill, 2019). Together with increasing deforestation, they are disrupting reindeers' grazing land and migration routes, destroying the Sámi economy and culture. More precisely, high temperatures lead to higher precipitation levels. Water freezes, forming a thick layer of ice on top of the snow, altering its structure. Reindeer are struggling to dig through the ice layer and, therefore, lichen, which is found below and constitutes their primary source of food, can be hardly reached. Animals starve and this decline in reindeer population due to no longer predictable snow conditions (WWF, 2019), affects significantly and in multiple ways indigenous herders as well. In addition, unpredictable ice sheets make traditional routes over frozen lakes precarious (Brickhill, 2019). People and reindeer have drowned because of unprecedentedly thin ice. For instance, the scientific community was alarmed when the strongest and thickest Arctic sea ice located north of Greenland started to break up, reminding that the threat is real. The latest unprecedented drought and wildfires in the Arctic Circle have destroyed in quite a large percentage the winter grazing lands of reindeer, which will take decades to recover.

However, climate change is not the only threat for Sámi's traditional reindeer herding culture. Global extractivism also suppresses their basic rights. For example, large – scale energy projects, such as hydropower dams, threaten their way of living. The dams, which run along river valleys and change their natural patterns, constitute obstacles along the reindeer routes. Taking into consideration the fact that the dams collect the water in the summer, when the river flow is stronger, and release it during winter, there is a further exacerbation of the thinning of the ice sheets. Last but not least, wind farms on reindeer grazing land cut off their migration pathways, neglecting to take into account the needs of the ecosystem and of the local communities (The 350.org Team, 2018).

What should we learn from Sámi? | The nomadic success

Global warming and global capitalism threaten indigenous communities. However, the Sámi, similarly to other nomadic indigenous peoples, have always adapted to assimilation, and changing environmental conditions. As precipitating climate change and man-made activities leading to environmental degradation directly threaten the planet, sedentary civilization has much to learn from the Sámi people about how to adapt, survive, and thrive. Their adaptation ability emerges from their traditional and deep ecological knowledge. Living in cohabitation with nature for decades, they have developed broad knowledge about the weather conditions, about the flora and fauna, the diet and the resources. The Sámi people have an ethical relationship with nature, originated by their cohabitation with nature, a respect which also has a spiritual side (Tisdall, 2010).

Along the centuries, the Sámi community has found new ways to adapt to flooding conditions. They have developed efficient cooperation, municipal leadership, communication and early warning systems in order to prevent their livelihood from such catastrophic phenomena (Tisdall, 2010). Adverse effects of climate change on pasture and traditional herding trails have been met with new rotation and spatiotemporal migration patterns and also by a tighter communal discipline. For instance, in order to keep a reindeer herd safe, deeper knowledge of different types of snow has been proved to be determinant. The variety of names that they use in order to describe the distinction between the types

of snow indicates the level of familiarity. More precisely, Muohta (ordinary snow) or oppas (untouched snow) could be safe. On the contrary, the presence of sievla (wet snow), skarta (thin, ice-like snow layers) or ceavvi (a hard layer that the reindeer cannot penetrate in search of lichen) could dictate a life-saving change of route or resettlement, displacement (Tisdall, 2010).

The Arctic region is extremely vulnerable to global warming. However, the Sámi methods of land and resource management, communal co-operation and communication and their local knowledge are those that keep this culture alive along time. Most importantly though, it is the very essence of nomadism as a notion, as a way of life, that has contributed to their survival. Living in coexistence with nature, instead of fighting against it, living in harmony with the ephemeral, the spatiotemporal nature of nomadism has been proved to be a life – saving adaptation method to altering climate conditions and the uncertainty of the future.

An interpretation of the nomadic success

At this point, we will try to speculate and interpret the nomadic success through the lens of the following two theories / concepts: evolutionary resilience and de – growth.

To begin with, evolutionary or socio – ecological resilience advocates that the very nature of systems may transform through time with or without an external disturbance. It introduces a new conceptualization of socio – ecological systems, which are now characterized as complex, non – linear, self – organizing systems, broadening the engineering and ecological descriptions of resilience, which are based in the equilibrium notion, aiming to incorporate the dynamic interplay of persistence, adaptability and transformability across multiple scales and timeframes (Davoudi et al., 2012). Following this conceptualization, resilience is not perceived as a return to normality, a rebalance of the equilibrium after bouncing forth or backwards. It rather shows the ability of complex socio – ecological systems to change, adapt and transform in response to multidirectional pressures. The perspective of uncertainty implies that the past performance of a system is no longer a trustworthy predictor of future behavior, even when circumstances are similar, since there is no linear relation between cause and effect (Davoudi et al., 2012).

The way systems work and interact within this uncertain framework, is best articulated by the "panarchy model of adaptive cycle", developed by Gunderson and Holling. This model represents the four distinct phases of change in the structure and function of systems, based on the evolutionary understanding of resilience, which are: growth or exploitation, conservation, release or creative destruction, and reorganization (Gunderson, Holling, 2002). It implies that as systems mature, their resilience reduces and they become more vulnerable to externalities, while after systems collapse, new opportunities arise and unpredictable possibilities appear for alternative systems configuration. According to the diagram, the "omega" phase, the collapse time of greatest uncertainty but high resilience, is rapidly followed by an alpha phase of reorganization and renewal, a time for innovation and transformation, when a crisis can be turned into an opportunity. The notion of "panarchy" is used to clarify that the model is based on adaptive, paradoxical interrelations rather than stable, sequential, well – defined, hierarchical relations. It represents a number of dipoles such as persistence versus change, flexible versus efficient, resilient versus transformational, and connected versus adaptable. These dipoles function at multiple scales, speeds and in various timeframes (Gunderson, Holling, 2002). This function allows a higher level of systemic efficiency and innovation while at the same time it allows more space for multi – scalar and time – free experimentation.

Evolutionary resilience can be projected in space, demonstrating a relational understanding of spatiality and guiding a spatial planner to speculate places not as neutral, rigid or fixed containers, but rather as complex, interconnected, socio-spatial systems with extensive and unpredictable feedback processes which operate at multiple scales and timeframes. Evolutionary resilience offers a useful framework which allows thinking in new ways about planning, based on the relational understanding of space and time. Planning should recognize the ubiquity of change and the latent uncertainties; therefore it should reach a higher level of preparedness which implies a higher capacity to provide alternative solutions and turn a crisis into a new opportunity (Davoudi et al., 2012).

As far as de - growth is concerned, apart from understanding the way systems function and interact within the context of uncertainty and change it is no less significant to define the systems themselves. Considering that our growing global economic system has already overcome the carrying capacity of the planet, there is a need for 'de-growth', urgency mainly expressed through social thinkers in Western Europe. De – growth is a civic movement that challenges the continuous and uncontrolled economic growth based on the fact that due to this growth, the limits of our planet have already been exceeded (Gaziulusoy, Houtbeckers, 2018). Building upon the critical tradition against modernity

(Fournier, 2008), which has been expressed by several central European thinkers, for example Jacques Ellul and Ivan Illich, Serge Latouche challenges the neo-liberal globalized economic development and growth. This kind of growth focuses mainly on production itself, aiming to maximize the economic profit but simultaneously ignoring values such as justice, democracy, ecosystems' health, well – being and social relations (Fournier, 2008). On the contrary, de – growth highlights the need for systemic change, a shift of values, involving all the actors that would carry out such transitions. Thus, in its very essence de – growth constitutes a political movement (Gaziulusoy, Houtbeckers, 2018).

The movement's main goal is not less growth, consumption or production, but rather a shift and re – politicization of the terms in which economy is considered. In other words, it is not just referring to a quantitative matter of doing less of the same, but instead it indicates a re-ordering of values. The ultimate and broader intention is to "escape from the economy", to redefine economic relations in a political base. Therefore, de – growth movement stresses the notions of democracy and citizenship (Fournier, 2008).

Democratic choice, as the first core concept to de – growth, should not be pushed aside by political imperatives, when confronting a crisis, such as environmental degradation. The future of the planet is common for everyone, thus, it should be shaped collectively and democratically. However, de – growth should not be perceived as an ecological imperative, but as an opportunity to initiate debates and make decisions around the restructuring of socio – economic systems, taking into consideration questions of power, gender, class, ethnicity etc. (Gaziulusoy, Houtbeckers, 2018). This emphasis on democratic choice over "imperative" implies an according emphasis on human and social values (Fournier, 2008). Although the elimination of systems capacity mainly refers to the overexploitation of natural resources which exceed ecological limits, de – growth is strongly attached to anthropocentric values and social justice.

Citizenship is the second key concept to de – growth. Despite its ecological parameter, in the sense of excessive ecological footprint (Perez Carmona, 2013) in relation to limited ecological space (ecological citizenship) and the urgencies emerging from this unbalanced dipolar relation, citizenship is mainly interpreted in a political way. More precisely, the inequalities in ecological footprints between wealthy and poor, demonstrate a redistribution of ecological space, which in fact constitutes a collective, political practice, offering an escape window from the economy (Fournier, 2008). People do not anymore identify themselves as consumers but as citizens, who are involved actively and contribute in the decision making process. Although it is proved that multi – scalar, thus local, national and global action is necessary (Gaziulusoy, Houtbeckers, 2018), Latouche highlights the Greek Agora as a paradigm of public life and civil society, in order to emphasize the importance of community and individual initiatives (Fournier, 2008).

As a matter of fact, Latouche's strategy begins by stressing the significance of localism as a response to globalization. Instead of neoliberal opportunistic economic growth, which is dominated by over – development, over – production, over – exploitation, over – abundance, over – extraction, over – fishing, over – grazing, over – consumption and over – supply, he advocates for a cultural change, a shift in mentalities, which will expand gradually while being guided by a set of interrelating R concepts (Reevaluate, Re – conceptualize, Restructure, Redistribute, Re – localize, Reduce, Re-use/recycle, Resist) (Perez Carmona, 2013).

With regards to the above mentioned theories, we could argue that nomadism is a way of life which is fully embracing adaptation, transformation and change. Throughout the times, nomads have learnt how to live in harmony with nature, extracting knowledge from the way complex ecosystems function and interrelate. This knowledge constitutes part of their cultural heritage and it is deeply enriching against possible crises caused by extreme environmental phenomena. Nowadays, altering climate conditions become more and more evident in their everyday life. Uncertainty is the new ordinary, the new reality. However, the ephemeral inhabitation of space and cohabitation with nature provide fertile grounds for nomadic adaptation. Instead of creating permanent settlements and over – extracting the land and the sea, nomadic planning mechanisms foresee the ubiquity of change, the hidden risks and the latent uncertainties. Instead of adopting the sedentary mentality, which advocates that "more is more", they resist to neoliberal opportunistic economic development respecting the limited carrying capacity of the planet. Nomadism reflects the notion "less is more" but as a paradigm, so far, it remains in the shadow. Climate change mitigation and adaptation are a question of human rights for nomadic indigenous people. Although, in our case the Sámi have fought hard to protect their rights, speaking about current threats such as the carbon crisis (Brickhill, 2019), governments still resist the idea that Arctic nomads should take part to the global debate, since they have something unique to contribute.

The need for a shift

It is no doubt true though, that climate change is threatening sedentary civilization as well. Sea level rise, floods and

other extreme weather – related risks and land degradation directly affect urban and rural settlements, increasing the urgency for displacement. Impacts of climate change can be experienced either through short term weather – related hazards or through longer term processes such as coastal erosion and impacts on biodiversity, disturbing ecosystem services available to people (Adams, Adger, 2013). According to the Millennium Ecosystem Assessment, changes in these ecosystem services, in terms of productivity, risk and well – being, are those that interfere between environmental degradation and the decision to resettle. The decision to move varies in terms of scale, duration and distance, depending on the type of the event. Extreme events lead to large-scale but generally short distance and temporary migration. On the other hand, slow onset events such drought, which gradually affect the natural resources, tend to lead to migration decisions that involve longer distance more permanent moves either in an individual or a community scale (Adams, Adger, 2013).

Climate change expressed through extreme and unpredictable environmental events is forcing more and more people, both individuals and communities, to move. Migration can be interpreted as an adaptation strategy to deal with changes in resource productivity and risk to life and livelihood. It can be conceptualized as an adaptation strategy to insecurity caused by environmental and other pressing factors and an important process in the sustainability of resource use (Adams, Adger, 2013). Simultaneously, though, migration means adopting a way of life characterized by coexistence with the ephemeral. Either as a way to recover after an external shock or as a coping mechanism to reduce risk associated with uncertainty and maintain social resilience, it is fully embedded with a spatiotemporal territorialization.
Learning from the nomadic paradigm, adopting this idea of living in coexistence with the ephemeral, and accepting to replace permanence with temporality, can lead to a reconceptualization of inhabiting space.

Conclusion

Nomadism is a collective process, which differs from unrestricted and undirected wandering and does not take place in abstract empty spaces but in complex, fluid transitional territories. As a way of life, it is fully embedded with the territory and its nature. Thus, the nomad is not an explorer of ever-new terrain, while his or her cyclical movements turn into a constant change between territorialization and deterritorialization (Cuppers, 2005). The key element to describe the transit(ional) subject is his or her body, his or her spatial language and behavior. Resembling Erwin Goffman's theory of 'bodily vehicles' (Goffman, 1963), nomads use their body as the vehicle of sensory experience, the membrane between perception and cognition.

There should be a shift in the way we perceive the territorial space. Instead of a static, empty container, space should be regarded in transition, shifting the philosophical and built-environment discourses from the fixed, permanent space of staying, to a new perspective regarding the 'space of going', the space of passage, nomadism, transition, circulation and transformation in time. Here new forms of behavior, new ways of inhabiting space, new windows for freedom and experimentation and new opportunities appear. The nomadic city lives in osmosis with the settled city (Careri, 2002).

In the light of climate change and the uncertainty of the future, responding to the crisis is about adjusting to risks. In such a constantly changing environment both in time and space, socio – ecological systems do not function independently, but rather in complex interrelations, adapting and evolving. The evolutionary view of resilience reflects a paradigm shift in how sedentary civilization should think about the world. Rather than seeing the world as orderly, mechanical and reasonably predictable, we should see it as chaotic, complex, uncertain, and unpredictable. Globalization and neoliberal growing tendencies, lead to over – extraction and uneven distribution of resources and multifaceted social injustices. Thus, escaping from this economic model, by re – ordering values in a more democratic direction will reduce our ecological footprint, the measured deterioration or degradation of the ecosystems as a result of human activities, products and services.

Learning from the nomadic paradigm, through studying the particular case of Sámi and the adapting mechanisms that they have developed, which also constitute a founding part of their culture, living in harmony with "the ephemeral" rises as a new value. The ephemeral, as an asset of nomadic way of life, becomes the new ordinary, the new reality and the nomads the agents of the new cartography, indicating an alternative way of inhabiting space, towards the reconceptualization of urbanization.

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