Master thesis - Mayke Giesen - 4713567 - Planning Complex Cities

GRIEVING ECOLOGICAL LOSSES

Creating space for **ecological grief**
in the **urban context**
to contribute to a **societal transition**
towards **ecocentric values.**

Ecological grief; Human-nature relationship; environmental crisis.

COLOPHON

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TU Delft
Delft University of Technology
Faculty of Architecture
and the Built Environment

TABLE OF CONTENT

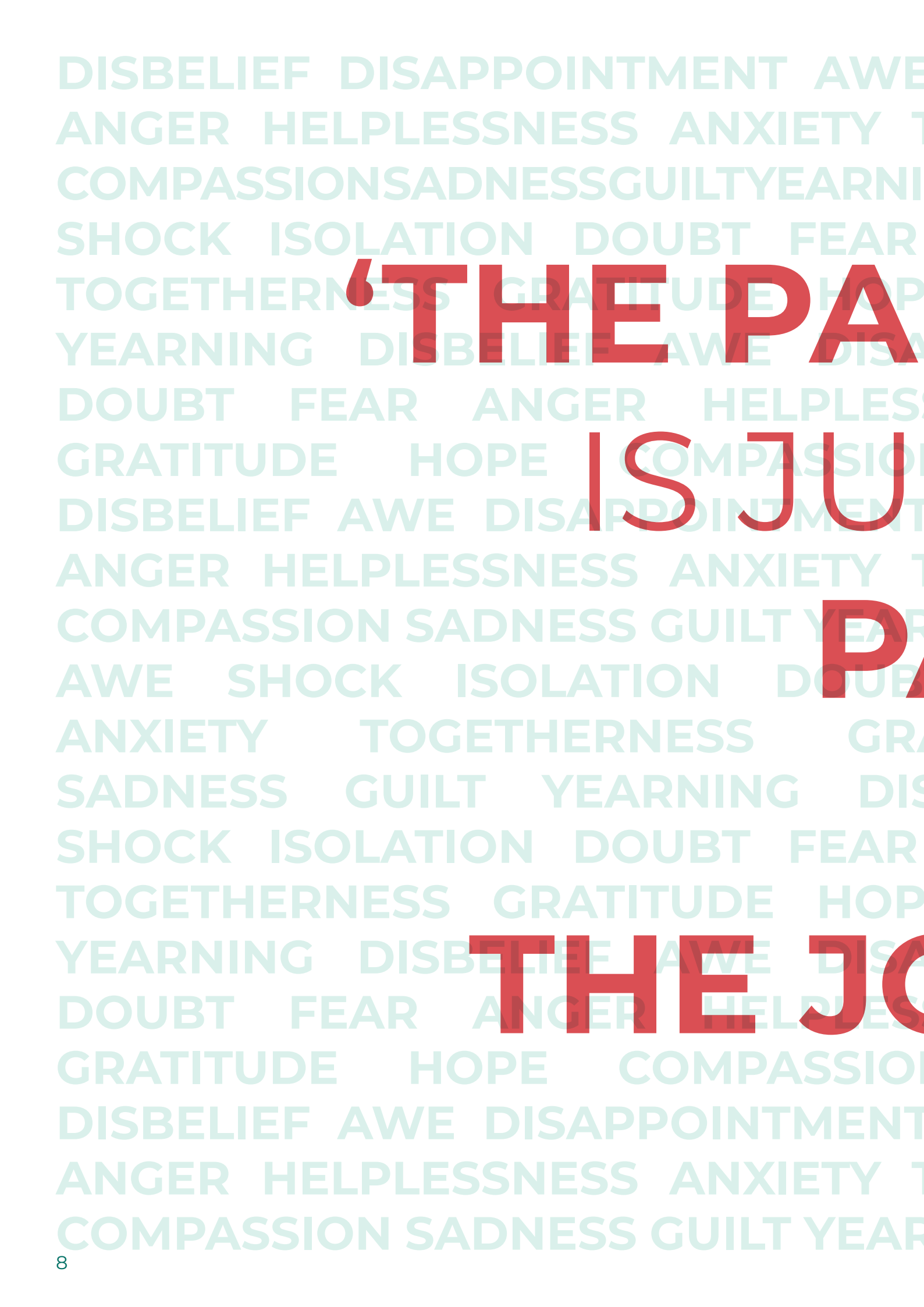
Bless grief
May it soften our hearts

Dedicated to my father
Leo Giesen

That's OK
I love, I care
I grief, I dare
To live in pain
For what i takes
To love and care

Can you bear witness
Raise your own awareness
All thats surrounding us
The way we treat it, is it just?
You know, its a mutual relation
Do you feel the desparation?
Do you recognize the kinship?
Nature's value is intrinsic
It touches us in a million ways,
So dont avert your gaze.
It's up to you'll what to do
But know that you touch it too.

The world that's surrounding us
We're part of it, so do you trust
me, when I say I love and care
And try my best to dare
To open up and allow the pain
Though it might feel in vain
It is the starting point
Dont be afraid to raise your voice
You are not alone
This ritual will help to show
It might hurt,
but thats OK
Because how we treat our earth right now,
it's supposed to feel that way.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ART OF LIFE

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OY OF LOVE'

(PARKES & PRIGERSON, 2013, P.6)

PREFACE

Confronting ecological grief is not for the faint of heart, but it is essential for our existence. It is a journey fraught with difficulty and challenge, both professionally and affectively. To delve into the depths of ecological grief is to confront the magnitude of the ecological challenges facing our global society – to bear witness to the devastation wrought by climate change and environmental degradation. In the words of Parkes and Prigerson (2013), grief is not merely a burden to be borne, but a transformative process through which we find strength and maturity. It is, perhaps, the "price we pay for love" – a testament to our deep connection to the natural world and our profound sense of loss as we witness its degradation.

As Marilyn Krysl reminds us, 'to deny the dark is to make a mockery of the light'. In confronting ecological grief, we must be willing to embrace the full spectrum of human experience – to acknowledge our sorrow, grief, and rage in the face of environmental destruction. When we mourn this destruction, it is not merely a personal loss, but a collective tragedy that transcends individual boundaries. It is a recognition of our interconnectedness with all beings – a planetary anguish that lifts us onto another systemic level of awareness. The crisis that threatens our planet is not just ecological, but existential. It stems from a dysfunctional and pathological notion of the self – a delusion that we are separate and immune to the consequences of our actions. In truth, our fate is intricately intertwined with the fate of the natural world.

Although the notion that 'nature will grow back' has long been a comforting refrain, we must recognize the fallacy of this belief. Natural systems do not age like humans; they grow more lively and complex through time. By destroying pristine nature and depleting natural resources, we are robbing from ourselves and future generations.

In embarking on this thesis journey, I am reminded of the words of Joanna Macy: "As your heart breaks open, there will be room for the world to heal." May this thesis be a testament to the power of ecological grief – a catalyst for healing, transformation, and collective action in the face of planetary crisis.

experience of loss

mindfull of other losses

faced with impermanence

discomfort & unknowing of others

the need for grief-literacty & mourning rituals

finding support

to guide in times of despair

acknowledging loss

deepening connections

expressing emotions

honoring life & find meaning

MOTIVATION

'As I sat on the asphalt in the burning sun surrounded by music, friends, and strangers handing out snacks and rain capes, I experienced the hopeful feeling of other people caring. People do care. This moment at an Extinction Rebllion protest last year was a moment of collective solidarity, a shared recognition of our interconnectedness and shared responsibility for the world we inhabit. However, as I returned home and got caught up in social media comments, I experienced the despair of feeling like no one cared. Comments full of hate and ignorance. The digital world seemed to amplify feelings of isolation and helplessness, casting doubt on the significance of individual actions in the face of overwhelming environmental challenges. Such a protest is one of the rare, societal practices that give shape to the wide range of feelings that ecological grief encompasses.

Growing up in a green neighbourhood in the east of the Netherlands, my main childhood memories take place in nature. While writing this thesis, I realized that since the day I set foot into this faculty, I've been striving to create urban spaces where I too would feel at home. For me, the feeling of home is inseparable from a connection to nature—a connection that nourishes and sustains me in both times of joy and times of sorrow. Yet, amidst the beauty and wonder of awakening nature in the spring of 2021, I encountered the harsh reality of impermanence through the loss of my father. During the intense period of grief, I found solace in Zen Buddhist practice, which has since gained a permanent role in my view on life. The teachings of impermanence, awareness and interconnectedness offered me a framework for navigating the complexities of grief and finding meaning amidst uncertainty. By creating space for grief and nurturing it when needed, I allowed the depth of grief to exist and consequently experienced the depth of my father-daughter connection. Because what is grief if not love preserved.
Through this process, I learned to bare witness to the painful side of life and suffering in the world, as well as to become mindful of other losses without succumbing to despair or denial fostering a sense of compassion for all sentient beings, humans and non-humans alike. As Joanna Macy, who is an activist, scholar and Buddhist, expresses, embracing ecological grief does not diminish our capacity for joy and aliveness. Rather, it allows us to fully inhabit our humanity, to experience the full spectrum of emotions with openness and vulnerability. By embracing the pain of ecological loss, we open ourselves up to a deeper sense of connection, resilience, and compassion.
My experiences with Extinction Rebellion protests, search for urban nature and on-going process of dealing with loss fueled my exploration of ecological grief. These personal experiences, coupled with insights from Buddhist practice, have profoundly shaped my understanding of ecological grief - a journey of mourning, resilience, and ultimately standing up from the meditation cushion to engage in transformative action. In my thesis, I seek to delve into the nuances of urban ecological grief – to explore how it manifests in the urban landscape and its implications for urbanism practices. Through this exploration, I hope to shed light on the transformative potential of grief – to inspire a renewed sense of reverence for the natural world and a commitment to creating more resilient and sustainable cities for future generations. For me, this thesis turns out to be just one of my attempts to give shape to the ungraspable side of life, and another step in my personal grieving process.' - **Mayke Giesen (2024)**

Figure 1.1 (left): Alternative condoleance postcard 'present in absence' by Verlieskunst (n.d.), with text added by author, saying: 'Today we celebrate you with everything that was and everything that is missing. Sometimes there is joy and sometimes there is pain. Because the two can exist side by side' (translated).

ABSTRACT

The world is facing an escalating environmental crisis marked by major socio-ecological losses. Human-induced environmental threats, like biodiversity loss, climate change, and pollution, underscore the onset of the Earth's sixth mass extinction, recently termed 'ecocide'. Despite the urgent warnings from the scientific community and growing public awareness, inadequate and insufficient action has been taken to address the environmental crisis. In addition, recent research has shown that people are increasingly experiencing anxiety and feelings of hopelessness concerning these environmental issues, which prevents meaningful engagement with these topics. Yet, the role of emotions is often neglected in the Western discourse, impeding public acknowledgement of ecological grief (eco-grief).

This study recognises eco-grief as a legitimate response and the process of eco-grief as a catalyst for true engagement and pro-environmental attitudes, demonstrating how this alternative approach can inform the governance and planning of eco-centric cities. A conceptual framework based on Latour's cognitive, emotional, and aesthetic virtues, the process of eco-grief and the X-curve for societal transitions is used to understand how people perceive the ongoing crisis.

Rotterdam Noord is taken as a case study, and a survey is used to gather citizens' perceptions of nature, their experiences of ecological loss and grief, and their attachments to their local environment. In combination with a spatial and a governance analysis, a governance strategy is designed to create both physical and mental space for eco-grief to exist and be acknowledged in the urban context in order to contribute to a societal change towards eco-centric values. The strategy involves three elements focussed on building the relationship with our environment, revealing environmental losses and coping with the corresponding feelings.

This research contributes to debates around eco-grief by providing empirical insights from an urban setting while addressing urban-specific challenges like the "anti-urban bias" and the "shifting baseline syndrome".

OUR PLANET IS CHANGING, WHY AREN'T WE?

DISBELIEF DISAPPOINTMENT
AWE SHOCK ISOLATION
DOUBT FEAR ANGER
HELPLESSNESS ANXIETY
TOGETHERNESS GRATITUDE
HOPE COMPASSION SADNESS
GUILT YEARNING DISBELIEF
AWE DISAPPOINTMENT SHOCK
ISOLATION DOUBT FEAR
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1. INTRODUCTION

1.1 Problem statement

1. INTRODUCTION

1.1 Problem statement

'To know and not to act is not to know' - Yangming (X)

Planetary crisis

The loss of species, forests, lakes, glaciers and landscapes are merely characteristics of the escalating environmental crises that the world is facing today. The rate and magnitude of the current wave of species extinction indicate Earth's sixth mass extinction event (Ceballos et al., 2017; Dirzo et al., 2014). Unlike the past five mass extinctions caused by natural disasters, the sixth mass extinction is the result of human-induced environmental changes, like climate change and pollution (Ipcc, 2022; Shivanna, 2020). The interlinked, global threats of biodiversity loss, climate change and pollution are referred to as the triple planetary crisis by the United Nations. Its cascading effects are exacting their toll on individuals, communities and society as a whole (Passarelli et al., 2021). To briefly illustrate the nature and scale of the problem Curry (2011: p.6; as in original) uses the notion of 'ecocide: the wholesale destruction of life and the source of life, including ours – an Earth able to provide a livable home.' (also see Bender, 2003; Manes, 1990; Gare, 1993; Diamond, 2004). This ecocide can be understood through the dominant imaginaries of the current era referred to as the Anthropocene, which revolves around the notion of human dominance (Malhi, 2017) and ecological dualism separating humans from the natural world (Poole, 2020).

Urbanization

In the Anthropocene, urbanization is one of the main, defining trends, involving economic, biophysical, political, social and cultural transformations (Biermann et al., 2016; Friedmann, 2006). As the world has not seen anything like today's urbanization before, in terms of scale, rate, location, form and function (Seto et al., 2010), the urbanization ratio is not surprisingly seen as a key indicator of this human-dominated era (Steffen et al., 2016). Since half of the world's population is living in urban environments, this urbanization trend has been dominant in the lifestyles of most people (United Nations Department of Economic and Social Affairs, Population Division 2017: 1). By 2050, this number will grow towards 68% (United Nations Department of Economic and Social Affairs, Population Division 2017), having irreversible implications for ecological systems, as well as for its non-human and human inhabitants. Not only human communities who live with the land are displaced, but urban communities are also diminished in their capacity for self-reliance, food security and maintaining sustainable ways of life (Poole, 2020).

Inadequate action

Despite the collectively sounding alarm by the scientific community, as well as an increasing number of politicians and citizens acknowledging the human-induced planetary crisis, the world is hesitative to take adequate action in order to mitigate the catastrophic impacts (Korteling et al., 2023; Passarelli et al., 2021). Zooming in on the Netherlands, while the effects are clear, influential companies, like Shell and Tata Steel, keep on polluting our environment (Milieudefensie, n.d.; Schildkamp, 2021), and even the Dutch State keeps subsidizing the fossil fuel industry (Hendrickx, 2023). Although ¾ of the Dutch population is concerned about the consequences of the climate crisis (Centraal Bureau voor de Statistiek, 2021), society seems to continue business-as-usual. This distortion in human judgment and decision-making, referred to as cognitive biases (Korteling et al., 2023), illustrates the need for a more holistic approach to address the ecocide.

Trouw

DUURZAAMHEID&ECONOMIE RELIGIE&FILOSOFIE OPINIE CULTU

Interviews Biodiversiteit

In dit tempo is Nederland binnenkort wereldkampioen soortenverlies

Future Affairs
27 MEI 2023

nrc›

- **Eco-rouw** wordt een steeds serieuzer onderwerp in de psychologische wetenschap.

> Het gaat er niet om je van die ander los te maken, maar om de door de dood veranderde relatie opnieuw vorm te geven.

> Ga ervóór staan, zoek het op. Dan is er verdriet, misschien wel boosheid, verwarring of opluchting of weet ik wat er allemaal is, liefde.

NOS

RIVM: direct verband tussen uitstoot Tata Steel en kans op ziekte

Mensen die in de IJmond wonen, hebben meer kans om ziek te worden door de uitstoot van Tata Steel. Dat concludeert het RIVM in een omvangrijk rapport.

Hoe vind je troost tijdens de klimaatcrisis? Filosoof Wouter Kusters: 'Het is niet gek om bang te zijn'

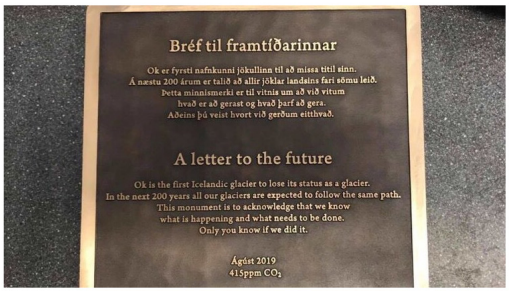
Hoe moeten we leven met de dreiging van klimaatrampen? Druk je angsten niet weg, zegt schrijver en filosoof Wouter Kusters in deze serie over troost. Als je begrijpt waar je bang voor bent, kun je ook bepalen wat je doet met dat gevoel.

Laura de Jong 17 augustus 2023, 14:27

Gedenksteen voor gesmolten IJslandse gletsjer

Bij de eerste gletsjer die in IJsland grotendeels is verdwenen als gevolg van klimaatverandering, komt een gedenkteken te staan. Het monument is er 'om te erkennen dat we weten wat er gebeurt en dat we weten wat er gedaan moet worden'.

Het Parool 22 juli 2019, 21:33



Achtergrond

Rouwen om de natuur: klinkt gek, maar het helpt

Lyanne Beets • 15 juni 2022 • 09:52

Voor jongere generaties ligt de klimaatcrisis hun hele leven lang al op de loer: bedreigend, groots en vaak onzichtbaar. De tijd dringt, de klimaatcrisis groeit en de druk op onze schouders neemt toe. Maar wat doet dit eigenlijk met onze emoties en wat betekenen die emoties voor ons gedrag? Verlamt de klimaatcrisis of maakt die ons juist strijdlustig?

Figure 1.2: Collage of news articles regarding the environmental crisis and ecological grief (Beets, 2022; Havermans, 2021; Het Parool, n.d.; Jong, 2023; NOS, 2023; Stoker, 2024; van Noort, 2023).

Cognitive, aesthetic and emotional virtues.
Since humanity seems to lack the rationality that is needed to take action (Korteling et al., 2023), the challenge we face extends beyond the cognitive realm. A broader perspective is taken by philosopher Latour, emphasizing the need for a realization of the consequences of our actions by experiencing the global in our local environment through 'a slow, gradual fusion of cognitive, emotional and aesthetic virtues' (Latour, 2017, p.140). These virtues, that coincide with Schneider et al.'s (2018) elements of psychological empowerment, would lead to insights that go beyond rationality.
However, within Western philosophy emotions are often considered to be undermining knowledge (Jaggar, 1997; Gould, 2011). This devaluing of emotions presumably plays a role in the absence of grief and mourning of environmental losses in the public discourse. This could also account for the scarcity of successful articulations of group emotions as a platform for societal change in the Western world (Mourning Nature, 2017), while indeed research shows an increase in experiences of anxiety, guilt and grief concerning the ecological crisis (Ágoston, Urbán, et al., 2022). Acknowledging the importance of emotional intelligence, the emotional shaping of our lives is seen as a powerful source for motivating pro environmental behavior (Mourning Nature, 2017), hereafter referred to as PEB.

Ecological grief as a counter-narrative
Despite the dismissal of the emotional realm, acknowledgement of ecological grief as a legitimate response to the ecocide (Cunsolo & Ellis, 2018) is suggested as a counter-narrative to battle the imaginaries of the Anthropocene. Cunsolo & Ellis (2018) define ecological grief, hereafter called eco-grief, as 'the grief felt in relation to experienced or anticipated ecological losses, including the loss of species, ecosystems and meaningful landscapes due to acute or chronic environmental change'. Facing and coping with eco-grief stimulates PEB and helps to prevent the potential anxiety and depression hindering this action (Pihkala, 2022). Moreover, by publicly mourning the on-going environmental losses the systemic flaws of our current way of living can be exposed, reinforcing environmental advocacy (Honnacker, 2023; Craps, 2023). Public mourning reveals the ethical side of the crisis by questioning what is grievable and inducing reflection on the value of and the relationship to the mourned entity. Therefore, eco-grief can be understood as a key emotional experience for transformation to fight the on-going ecocide.

In the field of urbanism
Recognizing the increasingly dominant role of cities in shaping human lives, this thesis situated in the field of urbanism, addresses the inadequate action regarding the ecological crisis through a spatial strategy for an urban neighbourhood, using Rotterdam Noord as a case study. Approaching the urban through the lens of eco-grief provides a novel perspective on our relation to the natural features of our living environment, addressing urban-specific challenges, like the "anti-urban bias" and the "shifting baseline syndrome" (A. K. Poole, 2020; Soga & Gaston, 2016), while the ecological importance of urban areas is indeed emphasized (Ojala & Cambell, 2020). Therefore, the aim of this thesis is to engage and empower citizens to foster to eco-centric societal change in order to provoke PEB. Thus, eco-grief will serve as the guiding theme of this thesis to improve the governance and design of our cities in order to contribute to a society that cares for its environment.

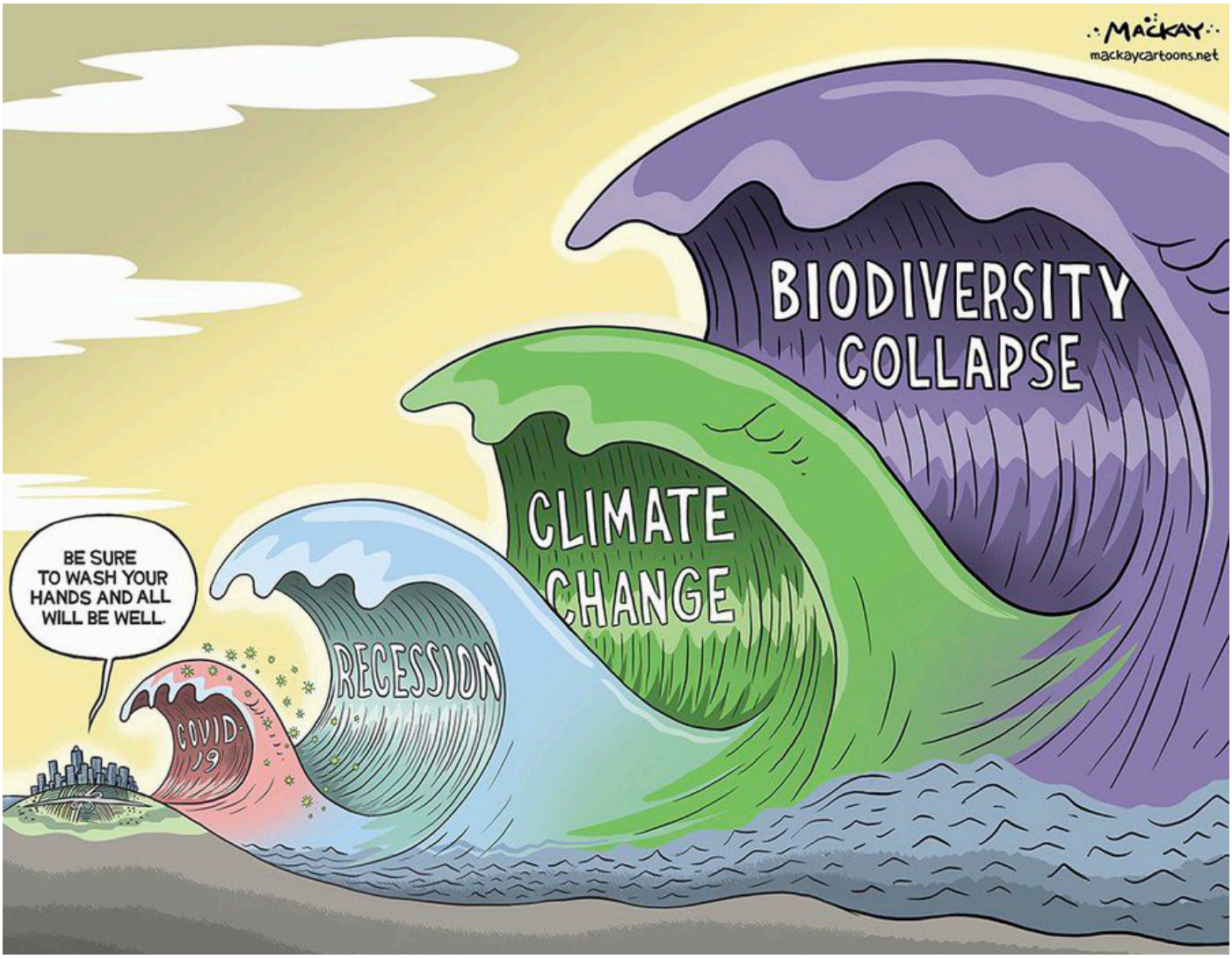


Figure 1.3: Cartoon depicting the global crises (Graeme MacKay, 2020).

TOWARDS ECOCENTRIC SOCIETAL CHANGE

DISBELIEF DISAPPOINTMENT
AWE SHOCK ISOLATION
DOUBT FEAR ANGER
HELPLESSNESS ANXIETY
TOGETHERNESS GRATITUDE
HOPE COMPASSION SADNESS
GUILT YEARNING DISBELIEF
AWE DISAPPOINTMENT SHOCK
ISOLATION DOUBT FEAR
ANGER HELPLESSNESS ANXIETY
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2. RESEARCH PLAN

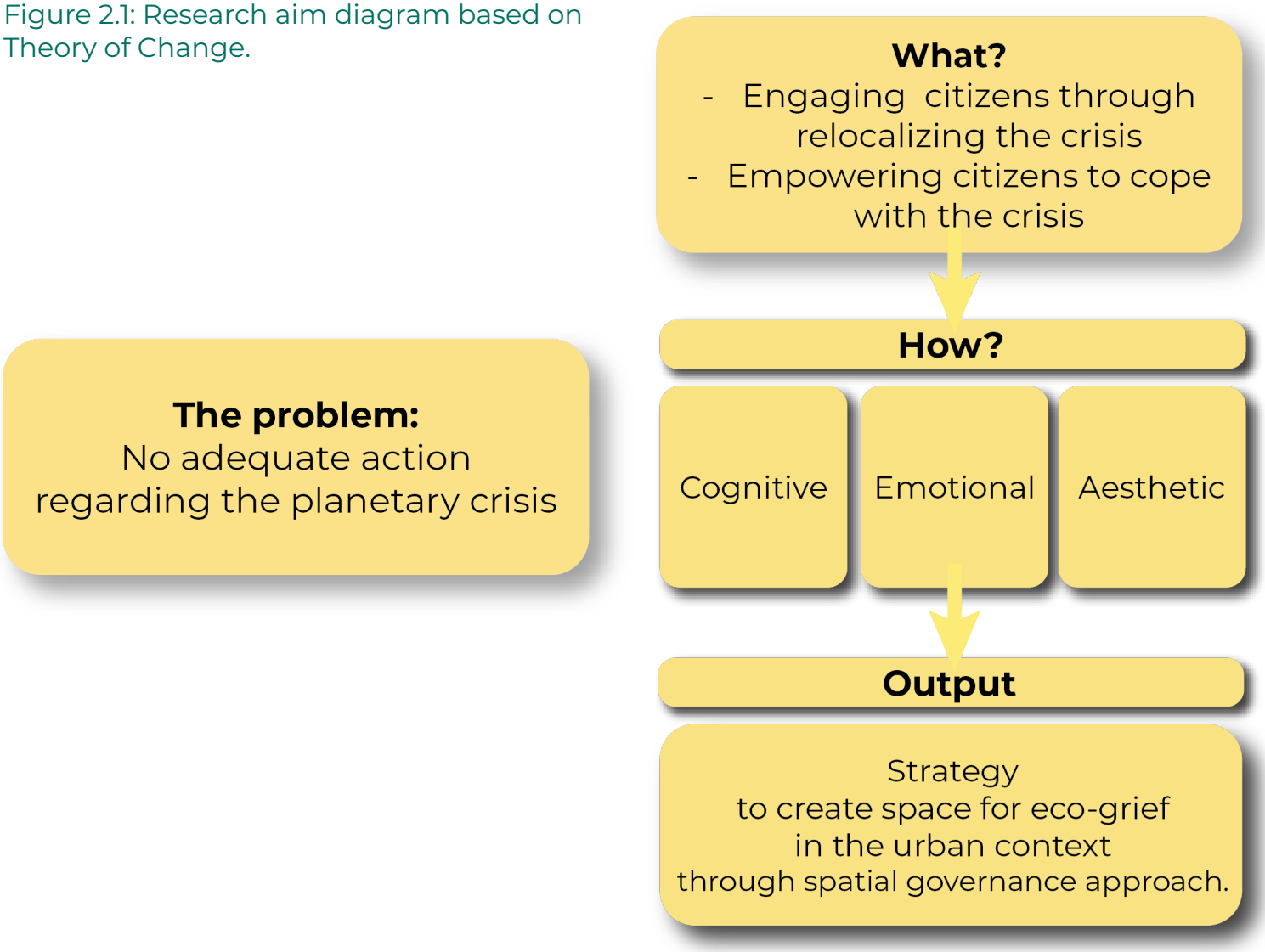
2.1 Research aim
2.2 Research questions
2.3 Research flow diagram
2.4 Time line

2. RESEARCH PLAN

2.1 Research aim

The aim of this thesis is illustrated through a Theory of Change diagram (figure 2.1). The broad goal is to contribute to societal change to battle the planetary crisis. This study adopts a human-centered approach that aims to engage and empower citizens through a holistic approach including cognitive, emotional and aesthetic virtues. The output is a spatial governance strategy to create space for eco-grief to exist in the urban context, and to foster the corresponding eco-centric values needed to acknowledge eco-grief as a legitimate response to environmental losses. Engagement and empowerment are essential elements of the process of eco-grief to move towards environmental action. First, the focus lies on building the relationship to the environment in order to foster our attachments to our surroundings for engagement. These emotional attachments lead to feelings of care and can simultaneously result in feelings of eco-grief. Subsequently, citizens are empowered through community building and commemoration to cope with the environmental losses and become emotionally and socially resilient enabling positive environmental behaviour (PEB). The long term goal of this project is to foster ecocentric, societal change through both emotional and spatial perspectives, offering a more comprehensive response to the complex ecological crisis. An extend version of the Theory of Change can be found in the appendix 10.1, in which the danger zone is

Figure 2.1: Research aim diagram based on Theory of Change.



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Long-term outcomes:

- Fostering attachments to the environment
- Social & emotional resilience regarding crisis

Impact on broad goal:
Ecocentric, societal change

...can influence **...contribute to**

2.2 Research questions

In figure 2.2, the research questions and the corresponding products are illustrated, showing the phases of exploring, defining, contextualizing, and engaging and empowering. The thesis process started with my personal fascination and formulating the problem statement resulting in the main research question and the theoretical framework.

The main research question is: *'How can ecological grief contribute to a societal transition for eco-centric values in the urban context?'* The urban context is chosen, because this thesis has an human-centered approach and eco-grief in the urban environment addresses a new research topic.

The first sub-question relates to the spatial context to find out how eco-grief relates to the urban environment. To identify the environmental losses, the following question was formulated: 'How does the planetary crisis translate to local level? As the focus lies on the human perspective, the local level is analyzed. Thereafter, the experiences of the citizens are studied to find out how these losses relate to feelings of eco-grief, leading to the second sub-question: To what extent do citizens experience ecological losses and grief? The first two sub-questions result in the socio-ecological analysis and the portrait of Urban Eco-Grief .

The final question is about translating the research into a strategy that fosters eco-centric values: *'How to use eco-grief as a planning tool to contribute to an eco-centric societal transition?'* The final product is a strategy that is build around the Urban Eco-Grief Cycle, which is an governance tool with a spatial focus.

Figure 2.2 (right): Diagram for the strategy to foster eco-centric values using eco-grief as a planning tool, including the research questions and the correpsonding products.

Explore

Personal fascination

Problem statement

Main research question:
How can **ecological grief** contribute to a **societal transition** for **eco-centric values** in the field of **urbanism?**

Define

Theoretical framework

1. Spatial context:
How does the **planetary crisis** translate to the **local level?**

2. Social context:
To what extent do **citizens experience ecological losses and grief?**

Context

Socio-ecological analysis associated with eco-grief to inform a design.
Portrait of urban eco-grief in Rotterdam

Engage & Empower

3. How to use **eco-grief as a planning tool** to contribute to an eco-centric societal transition?

Urban Eco-Grief Strategy:
Spatial governance approach
to build relations, reveal losses and cope through mourning practices.

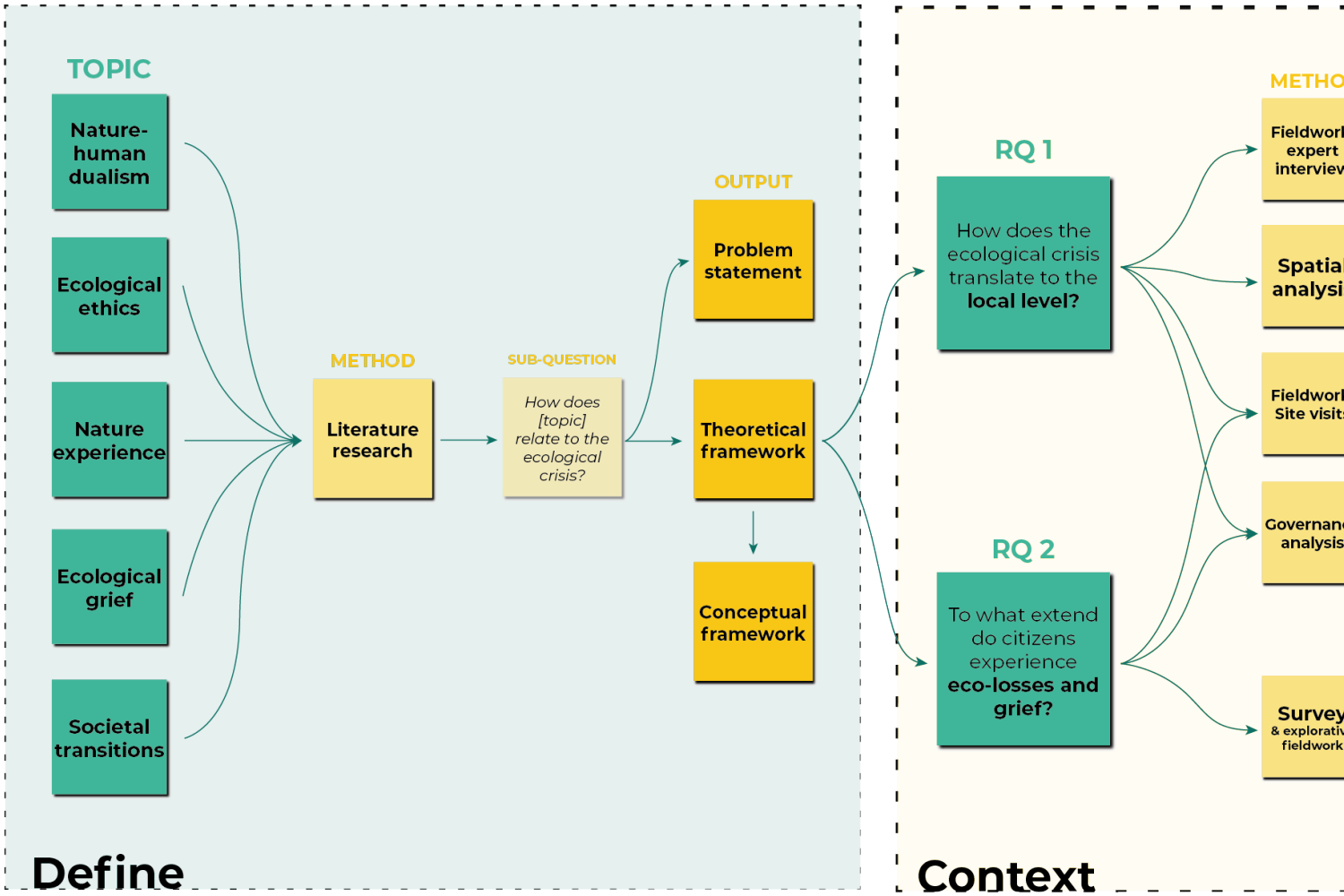
2.3 Research flow diagram

The research flow diagram is divided into three part: Define, Context and Engage & Empower (figure 2.3). Each part has its own methods, (sub-)questions and outputs complementing the former section. A further elaboration on the methods can be found in the methodology section.

Define

The first phase consists of an extensive literature research forming the basis for the problem statement, theoretical framework and conceptual framework. It informed the phrasing of the research questions as well. An exploration is done on the philosophical side of addressing the ecological crisis. The topics that are elaborated on are the notion of nature, ecological ethics, extinction of nature experience, ecological grief and societal transitions.

Figure 2.3: Research flow diagram.

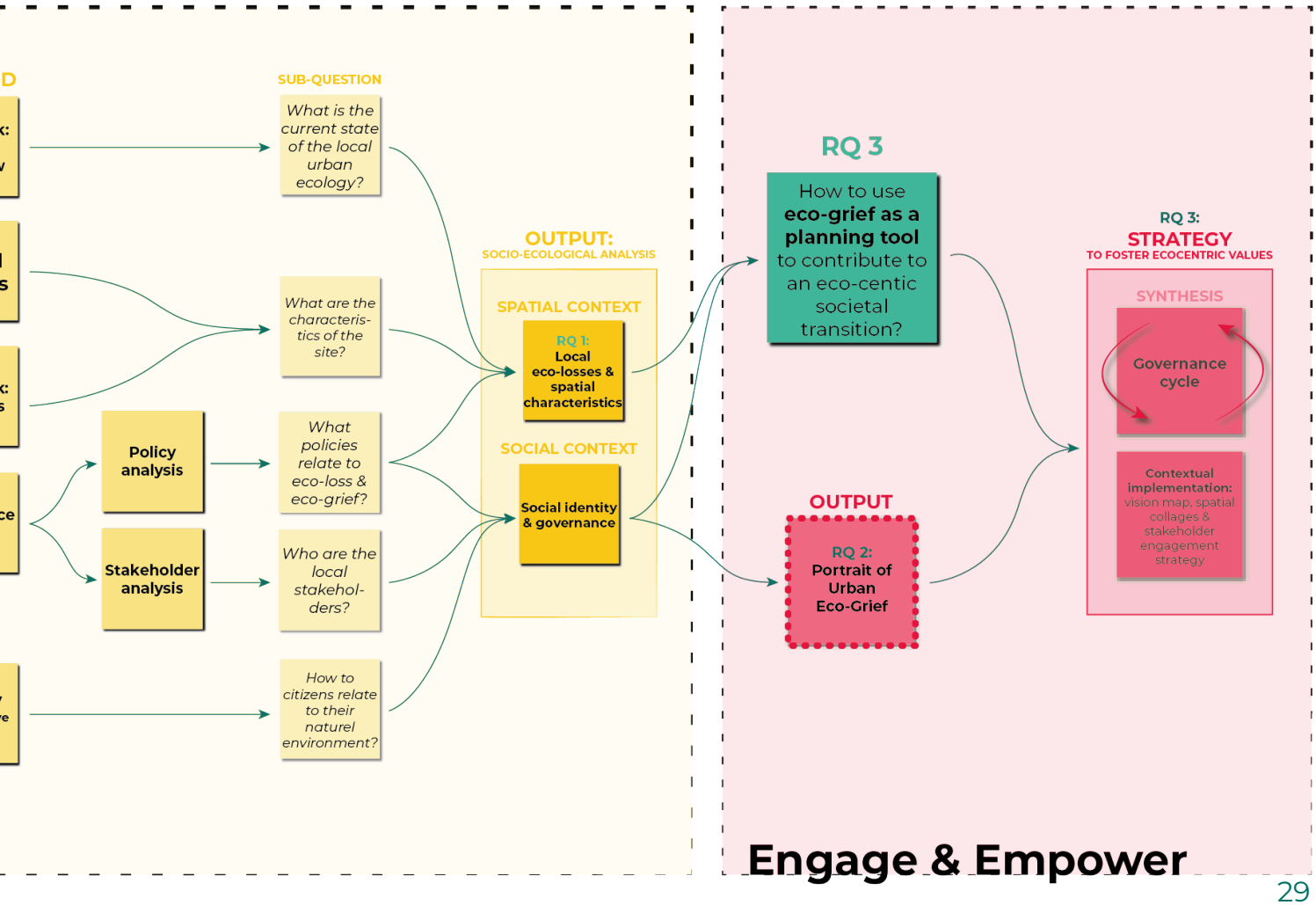


Context

The next step is the gathering of data through several methods to constitute a comprehensive socio-ecological analysis consisting of the spatial and social context in order to answer the first to sub-questions. This analysis helps to understand the factors that influence the experience of eco-grief. The used methods are the spatial analysis, governance analysis, a survey, expert interview and field work. The socio-ecological analysis is translated into the portrait of Urban Eco-grief and forms the foundation for the next step.

Strategy: Engage & empower

In the Engage & Empower-step, eco-grief is explored as a planning tool in order to create the strategy to foster eco-centric values. Engagement and empowerment are inseparable elements of the eco-grief process, as these are needed to move towards the last phase of sustainable action. In this step, the spatial governance cycle is shaped and its contextual implementation is illustrated through vision maps, collages and a stakeholder engagement strategy.

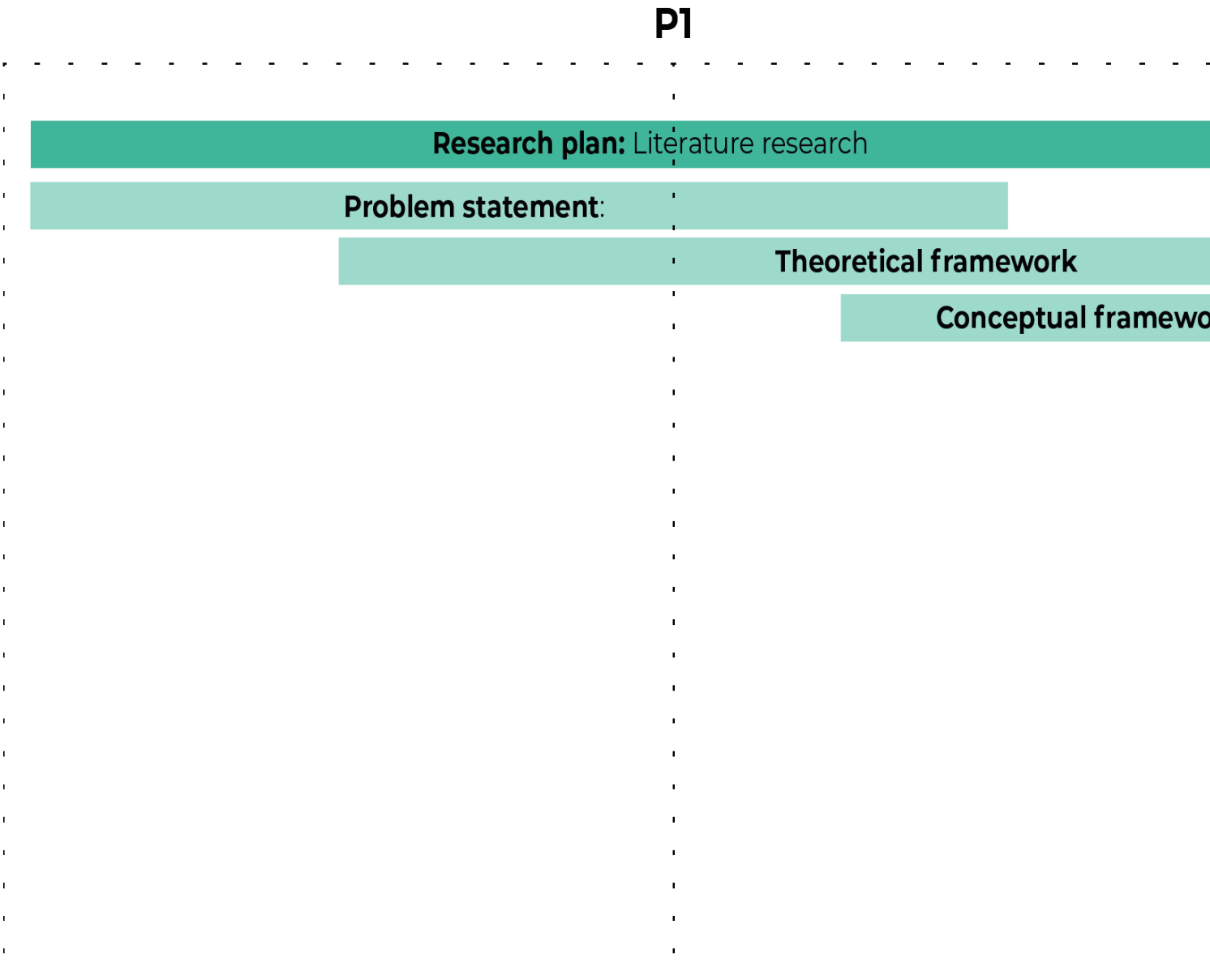


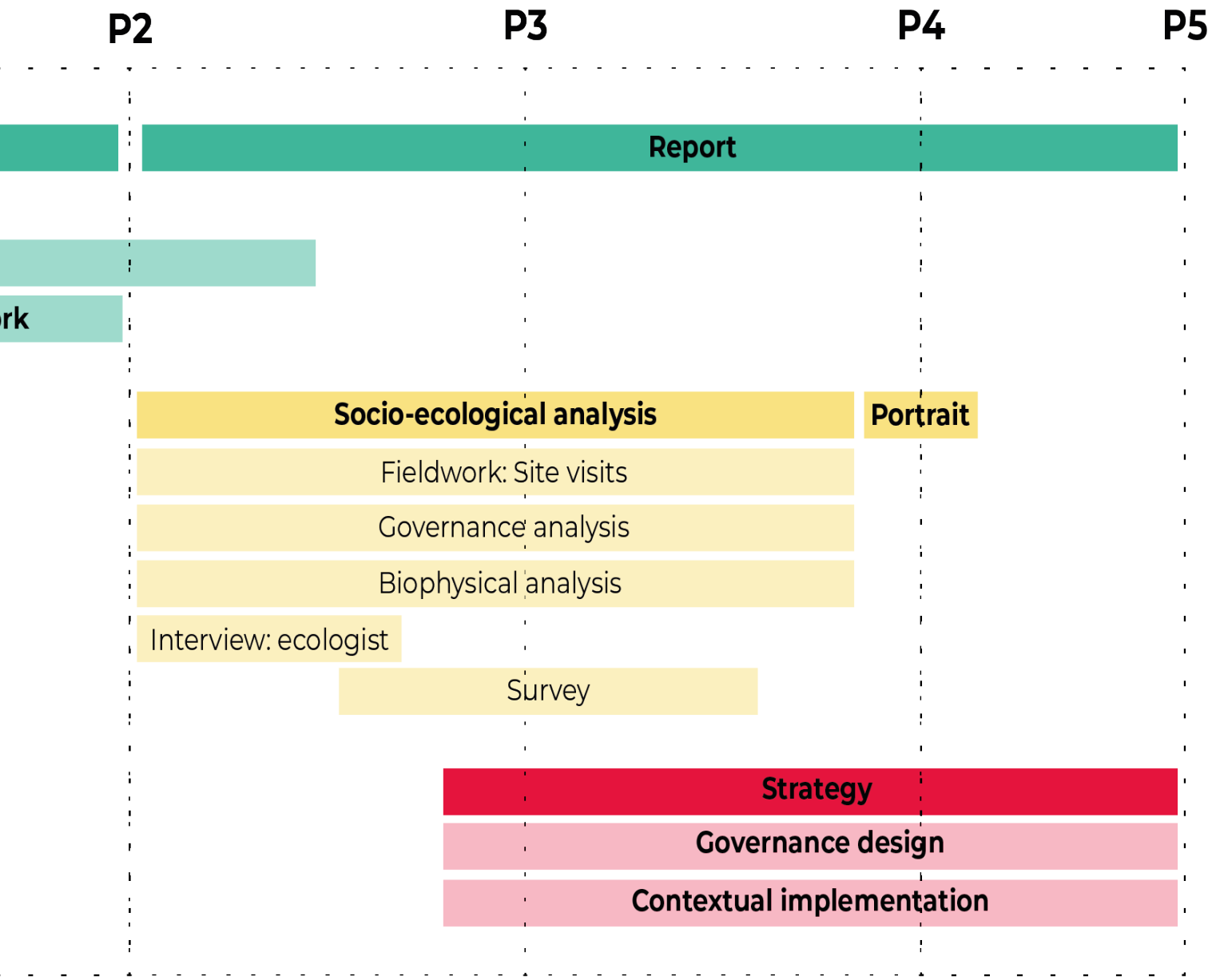
2. RESEARCH PLAN

2.4 Time line

In figure 2.4, the used methods and corresponding products can be seen projected on a timeline. The first phase (till P2) focusses on shaping the research plan, including the problem statement, theoretical framework and conceptual framework. In the second phase (till P4), the socio-ecological analysis is executed and the design exploration is started. In the last phase (till P5), the portrait, strategy and its contextual implementation are finalized.

Figure 2.4: Timeline.




P2
P3
P4
P5
Report
rk
Socio-ecological analysis
Portrait
Fieldwork: Site visits
Governance analysis
Biophysical analysis
Interview: ecologist
Survey
Strategy
Governance design
Contextual implementation

A HOLISTIC APPROACH TO ADDRESS THE ECOLOGICAL CRISIS

DISBELIEF DISAPPOINTMENT
AWE SHOCK ISOLATION
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GUILT YEARNING DISBELIEF
AWE DISAPPOINTMENT SHOCK
ISOLATION DOUBT FEAR
ANGER HELPLESSNESS ANXIETY
TOGETHERNESS GRATITUDE
HOPE COMPASSION SADNESS
GUILT YEARNING DISBELIEF
AWE DISAPPOINTMENT SHOCK
ISOLATION DOUBT FEAR
ANGER HELPLESSNESS ANXIETY
TOGETHERNESS GRATITUDE
HOPE COMPASSION SADNESS
GUILT YEARNING DISBELIEF
AWE DISAPPOINTMENT SHOCK
ISOLATION DOUBT FEAR
ANGER HELPLESSNESS ANXIETY

3. THEORETICAL FRAMEWORK

3. THEORETICAL FRAMEWORK

Introduction

Since the imaginaries of our time appear to be unfruitful for life on our planet, the theoretical framework starts with an exploration of alternative philosophical concepts regarding the notion of nature looking for a way to restore the nature-human relationship. This will be approached through an holistic perspective including emotional, aesthetic and cognitive virtues. Related to these virtues, the concepts of ecological grief, the extinction of nature experience and ecological ethics are discussed. Finally, this holistic approach will be positioned in societal transitions theory. The topics of the theoretical framework are visualized in figure 3.1.

3.1 The human-nature relationship

In the exploration of the sustainability discourse for battling the ecological crisis, the work of sociologist and philosopher Bruno Latour was of great importance for the development of this thesis. The imaginaries of the Anthropocene shaped our understanding of the notion of nature resulting in an human-nature dualism. To move away from this destructive perspective a reconceptualization of nature is needed to restore the nature-human relationship. An elaboration on these topics can be found in appendix 10.2.

For the sustainability transition, Latour emphasizes the importance of relocalization as the lesson of the Anthropocene (Latour, 2017, p. 136). This relocalization can be explained as a realization of the consequences of our actions by experiencing the global in our local environment through 'a slow, gradual fusion of cognitive, emotional and aesthetic virtues' (Latour, 2017, p.140). He highlights the personal aspect by stating that everybody should experience this for themselves (Latour, 2017). Latour repeatedly discusses the needed emotional and aesthetic equipment to cope with the on-going crisis (Latour et al., 2018). Through his work, he aims to lay the foundation for future collaborations among scientists, theologians, activists and artists, following his own interdisciplinary projects (Latour, 2017). The cognitive, aesthetic and emotional virtues also correspond with the psychological component in the empowerment framework of Schneider et al

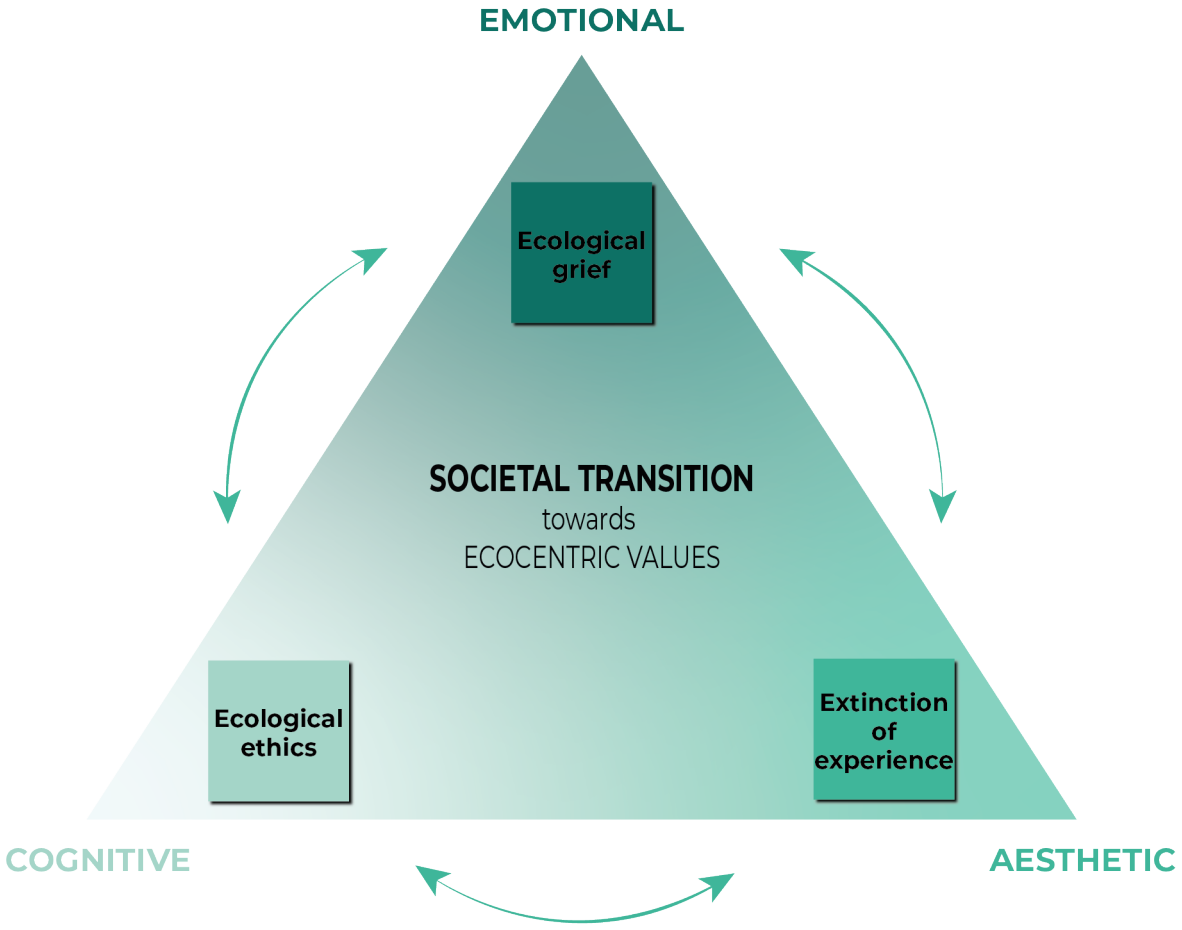


Figure 3.1: Visualization of the theoretical framework.

(2018) making a distinction between the interdependent elements of knowing, feeling and doing.
These virtues are all attachments that guide the actions of humans that can help to transition towards good attachments to the Earth. Therefore, these virtues will be foundational to this thesis, hence the following elaboration on these terms.

Cognitive

The cognitive dimension focusses on the knowledge and understanding of the causes and consequences of environmental threats, as well as the corresponding ethical considerations.
Currently, the call for action is predominantly rooted in scientific evidence of environmental threats. Despite of the sounding alarm by the scientists, as well as politicians and citizens, no sufficient change can be seen to mitigate the impacts of the planetary crisis (Korteling et al., 2023; Passarelli et al., 2021). This common cognitive understanding alone has not caused the desirable transition in collective behaviour. The persistence of unsustainable practices reveals a distortion in human judgment and decision-making referred to as cognitive biases (Korteling et al., 2023).
More action-oriented is the ethical aspect of the cognitive dimension. Although also shaped by emotion and aesthetics, it involves a critical examination of how to appropriately respond to these environmental threats. As defined by Curry (2011), ethics addresses the question of how one should best live and act. Although this question has been discussed for centuries, seriously considering ecological ethics in Western philosophy is a recent phenomenon. Ecological ethics refers to the broadening of this ethical perspective towards the entire natural world, instead of restricting it to how to treat human beings. In the light of ecological ethics, an emotional apprehension of nature's intrinsic value is essential, whereas the anthropocentric image of human beings as solely rational individuals seeking to maximize their own self-interest is problematic (Curry, 2011). Nonetheless, it can not be seen as a coincidence that the reoccurrence of ecological ethics is in parallel with the increasing awareness of the ecological crisis (Curry, 2011).
In the end, the cognitive dimension does help to communicate our ideas about the world, hence it remains a central element of this thesis. Accordingly, the underlying ecological ethics will be elaborated on in more detail in the chapter 3.2.

Aesthetic

In order to make the translation to a spatial-oriented thesis, the understanding of aesthetic will be discussed.
The concept of aesthetics involves sense-perceptions and

their relations to emotions and knowledge making, including all types of perceptions and sensuous connections to the world (Wildemeersch et al., 2022). Contemporary German philosopher Rudolf zur Lippe (1987) specifies that aesthetics is about the ways we as humans perceive, respond to and learn from sensuous impressions. It is a source of experiential knowledge in which not only our senses but also our bodies, emotions and mental state plays an important role. So, aesthetic knowledge making is about practical experiences, always including emotions and values. Consequently, it is no surprise that nature experience has been associated with cognitive interests and emotional affinity towards nature (Bögeholz, 2006).
In line with this, the importance of the aesthetic dimension relating to experiences should be emphasized in the quest for societal change. Subsequently, the extinction of nature experience will be elaborated on in chapter 3.3.

Emotional
Finally, the involvement of the emotional world of people in the ecological crisis remains a undervalued and understudied perspective.
Within traditional Western philosophy emotions are often considered to be undermining rationality and knowledge (Jaggar, 1997; Gould, 2011). However, as discussed by Gould (2011) emotions constitute a main element of reasoning, thus an integral element of human intelligence. Reason and emotion are intimately intertwined and share joint responsibilities. In fact, cognitive and emotional realm do not just intersect, but they reinforce each other. Since our brain is able to process far more information than solely through our conscious reasoning, our lives are not paralyzed by permanent indecision. Reason is unlikely to trigger action without emotional motivation (Gould, 2011). The trouble lies in what is valued, because in the end that is what will be cared for in practice (Curry, 2011). The fundamental and intertwined role of emotion in enabling reason makes it an essential part of activating citizens (Mourning Nature, 2017). For instance, emotions motivate to engage in politics constituting a driving force behind social movements (Goodwin et al. 2001) and enables us to participate in public deliberation (Marcus and MacKuen 1993: 672). Furthermore, Goodwin et al (2001) states that emotion plays a connecting role between humans, as well as the world around them, which underlines its role in new attachments to the earth. However, the permanent feedback loop that emotion and cognition are part of make it difficult to isolate their impacts (Mutz 2007). Indeed, this emphasizes the need for integrated solutions.
To conclude, acknowledging the importance of emotional intelligence, emotion is seen as a powerful source for shaping our reason and motivating action. As observed by Gould (1993: 40), the battle against the ecocide is impossible without forging an emotional bond between ourselves and the rest of nature ‘for we will not fight to save what we do not love’. Accordingly, the strong emotional bonds underlying the grieving of ecological losses will be discussed in more detail in chapter 3.4.

Conclusion: a holistic approach
In conclusion, to move away from ecocide a reconceptualization of nature is needed to restore the human-nature relationship. Relocalization through the cognitive, aesthetic and emotional virtues provides a basis that transcends traditional boundaries shaping new attachments to our environment needed for sustainable living. Considering the cognitive biases that hinder the necessary change, it underpins the holistic approach to sustainability transitions taken in this thesis, including the so-called non-rational elements, in order to restore the nature-human relationship. Hereafter, following the virtues, there will be elaborated on ecological ethics, the extinction of experience and ecological grief.

3.2 Cognitive: Ecological ethics

Hereafter a deeper understanding of ecological ethics will be discussed to redefine our role in nature. Whereas ethics discusses how one should best live and act, ecological ethics explores the value of extending ethics to non-humans and the challenges of grieving non-human entities. In the anthropecentric view, ethical questions limit are restricted to how we treat other human being, while in an eco-centric perspective these questions involve the entire natural world (Curry, 2011) (figure 3.2).

The need for ethics

In the light of the ecological crisis, the need for a new philosophy is urgent as the ethics that revolve around the current imaginaries of the Anthropocene have destructive consequences.

However, thinking about ethics can be troubling and for many people, either for individuals as collectives, it seems easier to avoid them. Nonetheless, all human societies have ethics and they are among the most important factors that determine our behavior (Curry, 2011). The consequences of avoiding ethics and focussing on efficiency have been illustrated in an extreme historical example: 'Ethics was not a word used in Auschwitz. Doctors and other spoke only about how to do things most efficiently, about what worked best' (Lifton, 1987, p.91, in Curry, 2011). As Feyerabend (1987: 313) comments: 'Auschwitz is a manifestation of an attitude that still thrives in our midst.' Considering ethics as optional is thus dangerous. To pretend otherwise simply allows the values that do guide our choices to go unexamined and undiscussed, often under a cloak of a 'sensible consensus' (Curry, 2011).

Furthermore, ethics should not be left to experts only, as it will hold solely their ethical perspectives, whereas it is this one-sided perspective that has caused the destruction of the natural world. As ethics can never be like mathematics, there is not one right answer that will save anyone from being confronted with ethical dilemmas. In fact, it is this conflicting values in real life that emphasizes the need to make it part of the public realm, including as many perspectives as possible. 'Whether personally or socially, ethics grow out of the ongoing interaction between one's ideas and values and the world, each affecting the other; and that does not happen without you being there, so to speak' (Curry, 2011, p.10).

So, in order to address the ecological crisis, Curry (2011) states that 'our ethics needs to change, because our behaviour, as influenced by ethics, needs to change' (p.3).

'Our ethics needs to change, because our behaviour, as influenced by ethics, needs to change'
- Curry (2011, p.3):

Introducing ecological ethics

Although ecological, or earth-centered, ethics is the focus on this thesis, it is not intended as an replacement of traditional human-centered ethics. The latter has an legitimate and essential role in intra-human relationships. In the words of Curry (2011), the goal of ecological ethics is to add new insights to enable an ethical behaviour that an anthropocentric ethics can not achieve. The different levels of ecological ethics are discussed in appendix 10.2.

In 1970s when the environmental philosophy emerged, the political climate was such that it was considered absurd to describe the ethical, aesthetic, metaphysical, political, or epistemological relations of nonhuman beings (Poole, 2020). However, there can not be spoken about a 'new' ethic, since it is rather something that has been forgotten and been preserved by the culture of the vast majority of indigenous people (Curry, 2011). The ethics of communities who consider themselves close to the land argues from a perspective in which the identity of being human is inseparable from the natural world. Besides indigenous worldviews, this can also be seen in agrarian ethics and biocultural ethics (Poole, 2020). Although the indigenous peoples only account for around 5% of the world's population, they conserve the land that holds 80% of the planet's biodiversity (United Nations Department of Economic and Social Affairs, 2021)

So, in the light of the ecological crisis, the time has come that Western philosophy should reckon that the disregard of the more-than-human can no longer be overlooked. This requires the recognition of the existence of many more world philosophies, besides the western perspective, as part of the ancient lineage of all distinct human cultures and their relationships with the Earth, that should be taken seriously in our efforts to protect life on our planet (Poole, 2020).

The urban blind spot

The rapid urbanization and the pressing planetary crisis poses new philosophical questions addressing the impacts of the Anthropocene. It emphasizes the challenges about the construction of space and development of sense of place, as well as the shaping of our cultures and values (Lefebvre 2003; Vogel 1996). While the public consciousness is shaped by the urbanization, the philosophic work on what it means to develop ecological ethics of the urban, in terms of rights, morals, obligations and duties, remains marginal (Poole, 2020). The nature-human dualism is deeply embedded in ecological ethics as the human domain of the city is mostly left unconsidered. Thus, there is an urgent need to finally address the 'urban blind spot' within ecological ethics and come to terms with the great urban shift.

According to Light (2001) (in Poole, 2020), this blind spot results from a desire to protect idealized 'wild' nature and consequently devaluing man-made environments. The conservation of 'wild' or pristine nature has been a key value within ecological ethics. As it becomes more and more rare, the focus lies on its conservation. With regard to ongoing ecocide, it is needless to say that the protection of such areas is essential to prevent further degradation of the natural world. Nonetheless, the focus on this discussion brings the risk of 'prescriptive dualism', indicating polarization, where humanity is only considered for its negative impacts, leading to an anti-urban bias within ecological ethics. 'Nature' , however, does not limit itself to these 'wild' spaces. In fact, nature can be recognized in our society through all the beings that participate in our communities, ranging from monoculture grass lawns, community vegetable gardens and ancient tree lanes to all other commodified objects and animals that are used as resources. Part of this is the overlooked animal realm that cohabitates urban space (Noll, 2015, in Poole, 2020). Palmer identified four categories: pets, wild urban animals, opportunists(adaptive species thriving on urban structures, possibly followed along the urbanization trail) and feral urban animals. Generally, these co-dwellers of ours are not considered as a part of the human community. But, as we eat, drink, breathe and grow, we interact with all entities

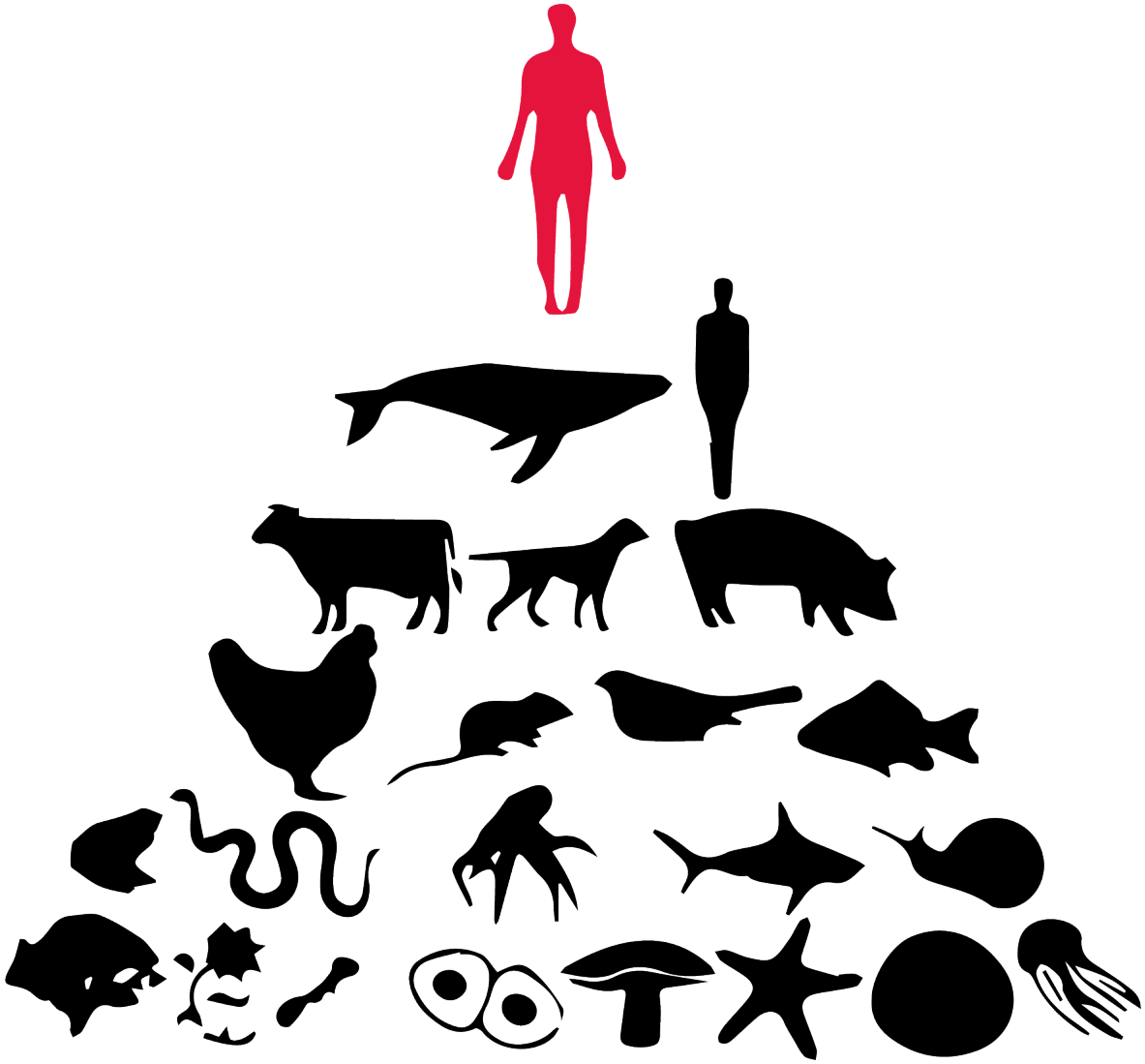
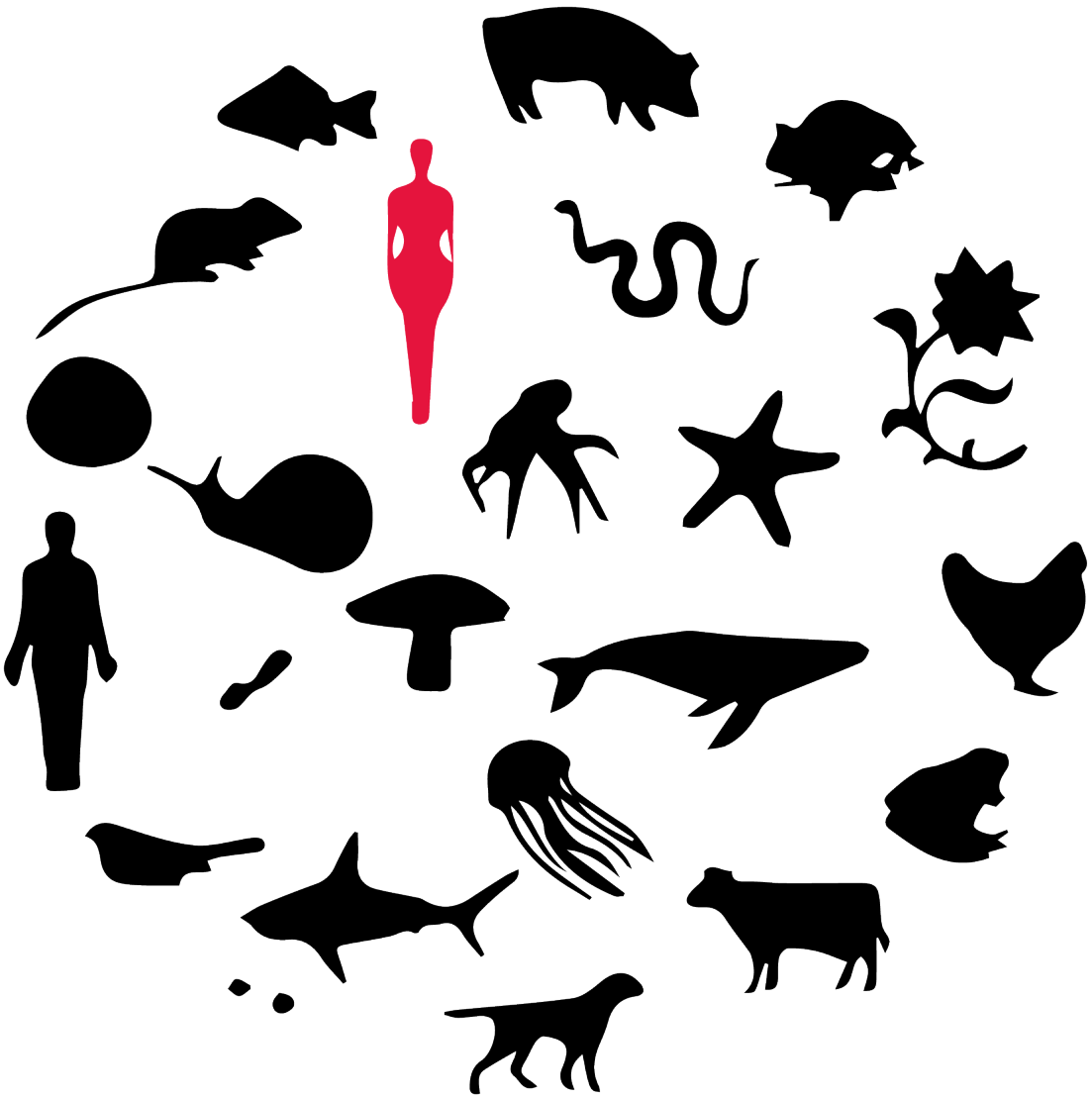


Figure 3.2: Visualization of the anthropocentrism and ecocentrism.



Ecocentrism

in our surroundings to stay alive, so where does nature even end and humans begin? As mentioned by Latour (in Kleinherenbrink, 2022), there is a need for acknowledging the hybrid entities in between the pristine nature and purely manmade. To respond to the urban challenges, the urban and the natural should be connected. As cities exist in, with and of nature, the conceptual divide should be abolished in order to form a sustainable formulation of urban ecological ethics (Poole, 2020).
Thus, the city does not only hold the potential to encompass an urban ecosystem in which nature and humans co-exist, but where all sentient beings live interdependently.

Urban land ethics
Overcoming the anti-urban bias, the eco-centric Land Ethic, as formulated by Aldo Leopold (1887-1948), has been present in the urban realm. Leopold, being a wildlife biologist and conservationist, has been an influential voice in the development of ecocentrism in the West. He explains that 'the land ethics simple enlarges the boundaries of the community to include soils, waters, plants, and animals, or collectively: the land' (1949:204, in Poole, 2020). Leopold's land ethics called for an ecological conscience focussing on the need for a sensitivity within human communities, leading to the need to explore the material and social conditions in order to facilitate such a conscience to become part of society. (Leopold, 1968 in Poole). Leopold described the consequences of the urban as follows:

> 'Our urban society is provided with mowed parks, paved playgrounds, plush automobiles to move us around on asphalt roads, housing with automatically regulated heat and cooling, and supermarkets with wheelie baskets in which we can gather our food supplies from orderly shelves. This human-built environment serves to **buffer urban society from the untamed biological world**. The buffering is evident in homes, in play, in recreation, in travel, and in the act of acquiring food and supplies. It is easy to see how families can become **alienated from the system of nature that sustains us.** And the contemporary expansion of affluence and consumer lifestyles can further promote alienation from nature.' (Leopold, 2004 in Poole, 2020, p341)(bold not original)

Recognizing the interrelation of our livelihoods with the land, it should be acknowledged that ecological ethics is indeed part of our everyday lives (Poole, 2020). This relationship between human culture and biophysical landscapes has been critically studied by scientists, as well as artists and naturalists (Poole, 2020). Although it has been hampered by the inertia of urban structures themselves, Leopold's ecological conscience has been present (Poole, 2020). In fact, there have also been studies focussing on the mourning of biodiversity loss, untouched landscapes, ecological values, land ethics and ecological knowledge and the alienation from nature (Cunsolo & Ellis, 2018; McKinnon, 2014; Willox, 2012). So, even within these urban societies, an alternative view of the nature-human relationship is possible. However, the loss of local ecological knowledge by urban ways of living complicates the development of the urban land ethic, undermining the capacity to care for such things (Soulé, 1985). This extinction of nature experience will be elaborated on in the chapter 3.3.
In a society alienated from nature, Vogel (1996) argues that the build environment should reflect environmental values, while currently it often emphasizes the artificial nature-human dualism. Our environment is shaped and constructed through our practices indicating our responsibility for it. According to Vogel (1996), it is this recognition of our inextricable connection to our environment that lies the foundation for a morally justifiable environmental ethic. However, this also involves the acknowledgement of the absurdity of indicating an alienation from nature, as Vogel states:

> ‘If “environment” means “that which environs us,” it isn’t clear why environmentalist thinkers so often identify it with *nature* and not with the *built environment* that a quick glance around would reveal is what we’re actually environed by. It’s a familiar claim that we’re “alienated from nature,” but I argue that what we’re really alienated from is the built environment itself.’ (Vogel, 2014, 87; italics in original)

He suggests to completely drop the concept of nature and instead only refer to the build environment.
To conclude, at the intersection of ecocentrism and the city, it is necessary to accept, appreciate and recognize that human systems are not inherently harmful for the environment. In the contrary, these human systems have the potential to become a valuable part of an ecological system. Ecocentrism challenges Western human society to articulate an ethic recognizing intrinsic value of non-human entities, acknowledging the limitations of the discourse and its deep ties with the dominant nature-human dualism. Otherwise, nature will become a reflection of the past symbolizing what has been lost, and the urban will symbolize our own destructive nature and embody the corresponding inherited guilt (Poole, 2020). So, rather than excluding humans, eco-centric advocates should help shape a sustainable relationship with our environment. In order to develop such an ‘urban land ethic’, awareness of the engagements of everyday life is needed, regardless of the gradient from pristine nature to the city. Nature in cities, even as it is colonized by the urban, just as good sustains our lives, so in the words of Kimmerer (2013): ‘Sustain the ones that sustain you and the earth will last forever’ (Kimmerer, 2013) p.183).

Conclusion

After defining ecological ethics, as well as placing it in the urban context, the question that lingers is: how to encourage people to change their ethics and induce eco-centric societal change? As Sylvan and Bennet point out, ‘Changing to respectful approaches to the environment and supplanting the place of humans in the world and their ethical systems may seem excessive and extreme. Yet what is now seen as unthinkable, as the voice of extremism, will in a decade or two be seen as necessity’ (Sylvan & bennet, 1994: 184 in Curry, 2011). Although times are indeed changes, there is a long way to go while the ecological crisis is worsening, and this thesis is just a modest attempt to contribute. Notwithstanding, even as human beings within the dominant Anthropocentric worldview, we have not entirely lost touch with an awareness of our involvement and interdependence on the natural world, bringing hope for overcoming the anti-urban bias and nature-human dualism. It is this hopeful feeling of living ‘within a vast whole – nature – which is in some sense the source of all value, and whose workings are quite generally entitled to respect’ (Midgley, 1997: 95-96, in Curry, 2011, p6), that will be built upon on the practical side of this thesis.

3.3 Aesthetic: Extinction of experience

Nature experience is regarded as the main aesthetic ingredient within this thesis, as physical experience can play a major role in shaping our relationship with nature. Therefore, the value of personal experiences in nature will be discussed first. Thereafter, the 'shifting baseline syndrome', referring to the decrease or extinction of nature experiences that people have, and the variety of nature experiences are addressed.

Value of nature experience

Since nature experience can not be seen as a matter of course in the urban context, the value should not be underestimated. A decrease in nature experience does not only reduce public health and well-being benefits, but it also decreases emotional affinity towards nature. In the context of the ecological crisis, reconnection to nature through outdoor experience is essential as it is an crucial predictor of pro-environmental behaviour (Braun & Dierkes, 2017; Soga & Gaston, 2016). Based on empirical studies with nature experience, Bögeholz (2006) concludes that experiences in nature are foundational to the development of knowledge and values in relation to the environment, as well as sparking action with low task complexity. In sustainable decision making regarding high complexity challenges knowledge and values play a significant role as well. To be more specific, the frequency of time spent in nature as a child, as well as the present frequency turned out to be strong predictors of emotional affinity towards and cognitive interest in nature and indignation about insufficient nature protection. These predictors explain several parts of behavioural decisions. Childhood experiences are also perceived as decisive for activism by environmentalists. Therefore, fostering opportunities for urban nature experiences is not only beneficial for individual well-being but also critical for fostering eco-centric societal change.

Shifting baseline syndrome

While nature experience plays a main role in the ecological crisis, daily contact with natural environments and their associated wildlife is decreasing rapidly over the last generations. This trend is exacerbated by urbanization (Cumming et al., 2014; van Heel et al., 2023). For example, children have increasingly less access to natural areas to freely explore and play in their direct environment. This 'extinction of experience' as coined by Pyle (2011) exacerbates the challenges of reconnecting people with nature resulting in the 'shifting baseline syndrome' (figure 3.3). This phenomenon refers to the process whereby

Shiften baseline syndrome: *the process whereby each new generation perceives the on-gonig environmental degradation as the normal, natural conditions as based on their own experiences*

each new generation perceives the on-going environmental degradation as the normal, natural conditions as based on their own experiences, leading to an under-estimation of the magnitude of the long-term , global ecological crisis (Jones et al., 2020). This gradual loss of ecological knowledge and experience over generations perpetuates the alienation from nature and complicates efforts to promote ecological awareness and sustainable behaviors in urban environments.
Moreover, this alienation of nature is further complicated by the process of losing local ecological knowledge through time because of the new ways of urban living. Within the urban system, social, institutional and infrastructural inertias preserve the extinction of experience as an ongoing process. Intergenerational knowledge and cultural heritage are neglected and replaced by generalizable, technological habits and knowledge. Local ecological knowledge is often overlooked in urban communities as a result of the nature-human dualism within their fundamental values. However, any knowledge about the local environment and management practices can be considered as local ecological knowledge, and it can be seen as a fundamental aspect of all cultures (Poole, 2020).
To counteract this process and maintain sustainability practices, a new interplay of the urban cultures, their local communities, biocultural heritage (meaning the interrelation between the diversity of land and the culture) and urban management practices is needed to promoting greater intergenerational communication and increasing local nature experiences (Poole, 2018; Jones et al, 2020). The challenge is to make this happen while the shifting baseline syndrome pervades.

Types of nature experience
Cultural ecosystem services encompass a broad range of benefits that humans derive from their interactions with ecosystems. These services extend beyond material or tangible resources to encompass intangible values deeply rooted in human culture and society, which are referred to as cultural ecosystem services (CES). These CES relate to the variety of cultural relations people have to nature, therefore they are used to reflect on the several types of nature experiences that exist. The following types are distinguished by Kosanic & Petzold (2020) and can be understood as the following:

1. Spiritual and Religious: Ecosystems can hold spiritual or religious significance for communities, serving as sacred spaces for rituals, ceremonies, and spiritual connection with nature.
2. Recreation: Ecosystems offer recreational opportunities and ecotourism, such as hiking, camping, fishing, and wildlife observation, contributing to leisure and well-being.
3. Aesthetic: The sensory experiences of natural landscapes contribute to cultural appreciation.
4. Cultural Diversity: Ecosystems support diverse habitats and species, reflecting the cultural diversity of human societies and fostering a sense of inclusivity and cultural richness.
5. Place Attachment and Sense of Place: Ecosystems shape the identity and character of places, fostering emotional bonds and a sense of belonging among communities.
6. Social Relations: Ecosystems serve as meeting places and gathering spaces, facilitating social interactions, community cohesion, and the exchange of cultural knowledge and traditions.
7. Knowledge Systems: Ecosystems harbor traditional ecological knowledge (TEK) and local ecological knowledge (LEK), representing indigenous and local communities' understanding of ecosystems, biodiversity, and sustainable resource management practices.
8. Educational Values: Ecosystems offer opportunities for experiential learning,

environmental education, and hands-on engagement with nature, fostering environmental literacy and stewardship.

9. Inspiration: Natural landscapes and biodiversity inspire creativity, innovation, and intellectual pursuits across various fields, including art, literature, science, and technology.

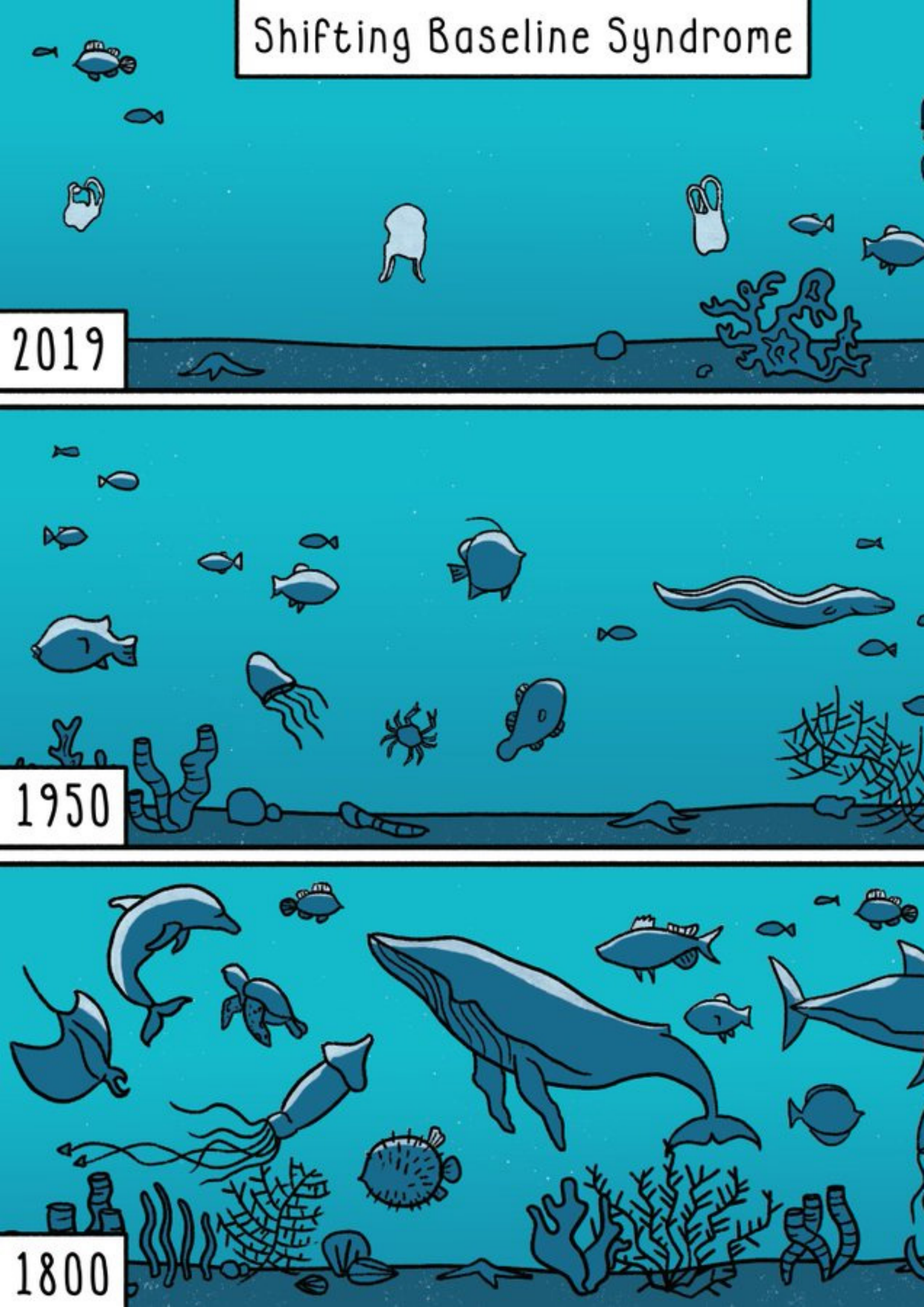
10. Cultural Heritage and Identity: Ecosystems embody cultural heritage and identity, representing ancestral connections, historical narratives, and traditional practices that define a community's identity and values.

This variation of cultural ecosystem services shows the diversity for which urban nature can be designed in relation to citizens, thus should be taken into account in urbanism practices.

Conclusion

In the light of the ecological crisis, the importance of reconnecting people with nature through personal experiences is underlined, particularly in the urban context. While the shifting baseline syndrome continues through extinction of experience, intergenerational communication and local ecological knowledge should be fostered. By recognizing and valuing the variety of nature experiences, urban planners and policy makers can design environments that counteract there challenges.

Figure 3.3: Visualization of the shifting baseline syndrome (Shephard, 2019).


Shifting Baseline Syndrome
2019
1950
1800

3.4 Emotional: Ecological grief

Eco-grief:
*'the grief felt in relation to **experienced or anticipated ecological losses**, including the loss of species, ecosystems and meaningful landscapes due to acute or chronic environmental change'.*
- Cunsolo & Ellis (2018)

In the sustainability discourse, the focus lies on rational solutions, mostly leaving grief and mourning associated with ecological losses negated. However, ecological grief, hereafter eco-grief, holds the potential for exposing the ethical side of the crisis, as well as triggering action. Underlying emotional bonds are revealed by the grief as it constitutes a profound aspect of our relationship with our environment. Therefore, ecological grief will serve as the main source of inspiration to inform the final products of this thesis contributing to a change in values and behaviour regarding the ecological crisis.
To get a better understanding of the concept of ecological grief, the ethical implications and the definition will be discussed in more detail. Thereafter, the phases of the process of ecological grief will be explained, including the associated risks and opportunities. Consequently, the influential factors are specified through a socio-ecological perspective reflecting on who is affected. Finally, the practical side of grief will be elaborated on.

The ethical side of grief

Grief:
'The pain of grief is just as much part of life, as the joy of love; it is, perhaps, the price we pay for love'
- Parkes & Prigerson (2013, p.6):

In psychological literature, grief related to human losses is well researched, but the extension to non-human entities remains a seldom occurrence within the scientific community. As eco-grief is not publicly or openly acknowledged, it can be treated as a form of 'disenfranchised grief' as pointed out by Cunsolo & Ellis (2018). This form of grief has the potential to shed light on entities that are considered to be outside of the scope of human care and ethical responsibility (Cunsolo & Ellis, 2018) By illuminating our relational ties and dependency upon complex ecosystems, experiences of eco-grief expose our ethical and political responsibilities to them (Butler, 2020). Grief is argued to have 'we-creating' capacities that reveal our known, unknown and unacknowledged relations to others, as well as helps us to reach across differences in order to connect with them (Butler, 2020; Cunsolo & Ellis, 2018). In this line of thought, eco-grief questions fundamental assumptions about what we value, thus what we choose to grieve. So, the emotions of eco-grief rise from a sense of connection towards the more-than-human world prompting individuals to question their ethical stance towards our environment and future generations.

The concept of ecological grief

As the ecological crisis worsens, the mental health effects are increasingly researched over the last decade. The corresponding emotional reaction was named

ecologically driven grief, in short ecological grief or eco-grief, by Cunsolo & Ellis and defined as 'the grief felt in relation to experienced or anticipated ecological losses, including the loss of species, ecosystems and meaningful landscapes due to acute or chronic environmental change' (2018). Eco-grief has been linked to acute events, like storms and floods (Ebhuoma, Gebreslasie, Ebhuoma, & Leonard, 2022; Gobster et al., 2022), as well as to chronic changes, especially those related to lived experiences of climate change (Cunsolo & Ellis, 2018; Ellis & Albrecht, 2017).

Serious scholarly interest in emotional responses to environmental losses was scares until more recent. Especially after being popularized by Cunsolo and Ellis in 2018, the concept has undergone a rapid rise in use within the scholarly literature, from 43 to 656 results on Google Scholar (Benham & Hoerst, 2024). Although indigenous accounts are foundational to the field, other communities with an apparent attachments to a place, like farmers, fishers and coastal communities, are associated with eco-grief as well (Boon, 2019; Clissold et al., 2020; Cunsolo & Ellis, 2018; Eakin et al., 2019; Marshall et al., 2019). Eco-grief, however, turns out to be a major issue for sustainability professionals and advocates as well (Pihkala, 2023).

Furthermore, despite it being a relatively new concept, eco-grief can be observed well before it arose. Especially communities that have close emotional ties with the more-than-human environment have been affected, like indigenous peoples due to centuries-long colonial destruction. Nonetheless, western expressions of affective relations to the natural world certainly also exist throughout history, like poetry of Hopkins in 1800s and writings by Leopold in 1900s (Pihkala, 2023).

Moreover, the expression and recognition of emotions related to environmental degradation are also starting to be discussed in the public realm through activism, art, newspaper articles and books (Craps, 2023; Extinction Rebellion NL, n.d.; Pihkala, 2023). An illustrative example of public eco-grief is the story of the funeral for the Icelandic glacier Ok attended by 'about a hundred scientists, activists, dignitaries, farmers, politicians, journalists and children' (Johnson, 2019). The world's first memorial service for a glacier got worldwide attention, and many funerals followed. The memorial plaque that was installed reads: 'Ok is the first Icelandic glacier to lose its status as a glacier. In the next 200 years all our glaciers are expected to follow the same path. This monument is to acknowledge that we know what is happening and what needs to be done. Only you know if we did it' (Howe & Boyer, 2020). By acknowledging the death of the glacier through this event and media attention, space is created for the corresponding emotions.

Understanding Ecological Grief

In order to understand eco-grief, it should first be clarified what grief entails. Throughout our lifetimes, hardly anyone will be saved from the experience of losing a loved one. While being one of the most painful experiences that most of us will face, grief is a natural human response to loss (Parkes & Prigerson, 2013). Scientifically speaking, Comtesse et al (2021) argue that attachment predominantly features as the explanation for feelings of grief, subsequently associating place attachment with eco-grief. It is important to note that these attachments do not solely lead to the painful feelings of grief, but are also foundational to positive feelings of love and care, forming an inseparable duo. In the words of Parkes & Prigerson (2013, p.6): 'The pain of grief is just as much part of life, as the joy of love; it is, perhaps, the price we pay for love'. Acknowledging this will prepare us to handle future losses and help others that share the same fate.

Moreover, despite the inevitability of death, grief can also be understood as a meaning-seeking venture. While dwelling in desire for the lost entity might occur, grieving is inherently about resisting that despair and seeking hopeful paths in your own life. It reminds us of our vulnerability and finiteness and reflects our caring involvement in the world. Significant loss challenges us to rise above our own suffering and learn to live

meaningfully again (Attig, 2004).
In addition, the feelings of loss are dependent on personal values and attachments, which are shaped by various psychological factors and cultural contexts (Pihkala, 2023). This means that not all losses generate the same feelings in all people (Barnett, 2019; Cunsolo & Landman, 2017). For that reason, feelings of eco-grief vary strongly across the world.
Furthermore, Menning (2017) addressed a main difference that can be appointed between ecological and human losses as we are living in the anthropocene. Most of us are indeed complicit in the ecological losses as most are caused by human activity, whereas human deaths generally are a natural occurrence. This means that we should not only mourn what we loss, but what we destroy as well. Although the complicity might be direct or indirect, guilt complicates the grieving process. Thus, grieving ecological losses asks for the development of mourning practices that respond to the challenges of both loss and guilt.
Therefore, eco-grief is argued to be a potential, but legitimat e response implicating caring involvement, but it asks for a novel approach that fit the context and implications of ecological losses.

The Process of Eco-Grief

The risks and possibilities of eco-grief can be understood by taking a closer look at the process of eco-grief. The model as described by Pihkala (2022a), focussing on individuals as part of a collective and based on an extensive literature review, provides the foundation for this section.
The main reason to elaborate on the process of eco-grief is to illustrate the interconnection between eco-grief and pro-environmental behaviour(PEB). At first, eco-grief seems counterproductive, which indeed it might be in the short time span. Nonetheless, scholars indicate that over a longer time period, grief can inspire and sustain action (Cunsolo & Landman, 2017) and multiple studies confirm the relation between feelings of eco-grief and pro-environmental behaviour (Ágoston, Urbán, et al., 2022; Anneser et al., 2024; Bright & Eames, 2022; Westoby et al., 2022).
Throughout the process of eco-grief many kinds of emotions and mental states may be present. In the light of this thesis, eco-grief is considered as the overarching process regarding all emotional responses to ecological losses. There are several related concepts that encompass emotional responses to the degradation, loss and transformation of ecosystems, like solastalgia, eco-anxiety and other climate emotions. These are all considered to have to the potential to be part of the process of eco-grief.
The emotional landscape can be illustrated by a wide range of emotions (Pihkala, 2022b) (figure 3.4.1), varying

Figure 3.4.1: Climate activist in the documentary 'Klimaatrebellen' (KRO-NCRV, 2022), and a variety of eco-emotions.

from emotions related to surprise to threat, sadness, guilt, shame, indignation, disgust, anger, envy and hostility. Fortunately, it also involves positive emotions that stimulate sustainability action, like motivation, gratitude, hope, belonging, love, care and empathy. Although not inherently part of grief, the possibility to develop problematic mood disorders, like strong depression or anxiety, and pre- and post- traumatic stress disorders (Cunsolo & Ellis, 2018; Pihkala, 2022a) are considered to be omnipresent, potential risks.

For this thesis, the Pihkala's process is simplified into three phases of Awareness, Coping & Transforming and Living with the ecological crisis (figure 3.4.2). It should be emphasized that the process is not necessarily linear considering the dynamic changes in people's reactions and moods (Pihkala, 2022a).

First of all, the original aspects of unknowing, semiconsciousness, awakening and shock (Pihkala, 2022) will be referred to as the Awareness phase. This phase is mainly about the awareness and acknowledgement of the ecological crisis. For most people, social dynamics plays a strong role in their reaction. Anxiety often grows functioning as an emotional warning system, and milder and practical forms might form a motivation towards direct action. Depending on people's willingness and ability to engage, they try to distance themselves or move from unknowing and semiconscious onward in the process. When avoidance becomes impossible and the knowledge breaks through our defences, the awakening and shock follow. Several difficult feelings have been reported like disorientation, absurdity, isolation and loneliness. As such a realization happens while society just continues business-as-usual, this is not surprising. Regarding this confrontation, it is imaginable that distancing seems more appealing.

The second phase consists of coping, changing, adjusting and transforming, which is characterised as Coping and Transforming. This phase involves active grief work for which (Pihkala, 2022a) distinguished three aspects of coping that should be balanced in order to avoid problematic outcomes. At least some engagement is needed with the aspects of action, distancing and grieving, but much variance in the temporality and sequence can be seen. It should be clearly noted that besides adaptive there are also maladaptive forms of coping, so that the potential for stress and trauma is always looming. If the coping methods are not appropriately adjusted to the context, like the situation or timeframe, they might have a negative outcome. For example, trauma-shaped responses can cause manic action, uncontrolled distancing or complicated grief. The three types of coping will be elaborated on later in this chapter in the section about 'The work of Mourning'. The transformation extends

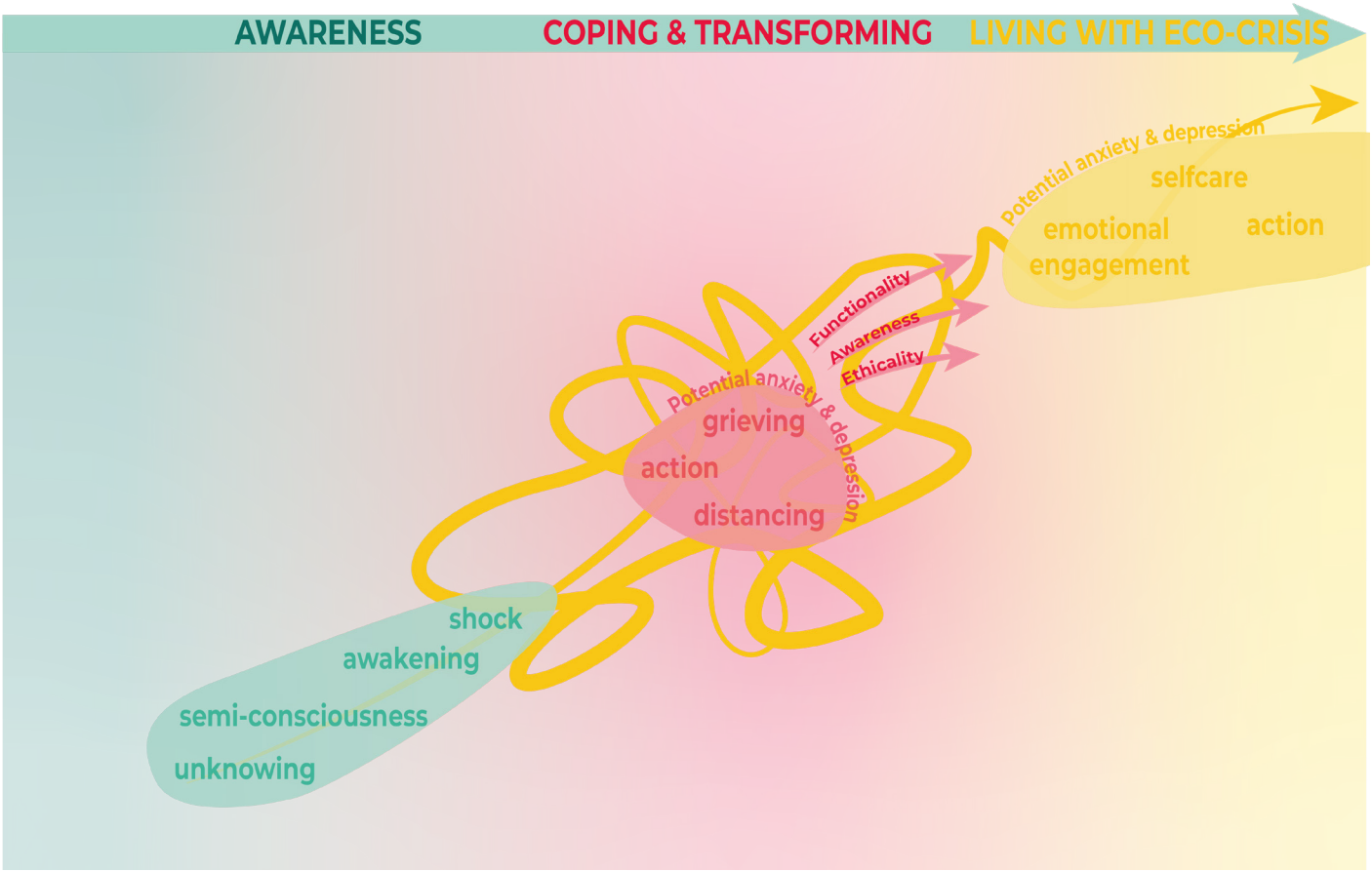


Figure 3.4.2: Simplified version of the process of eco-grief.

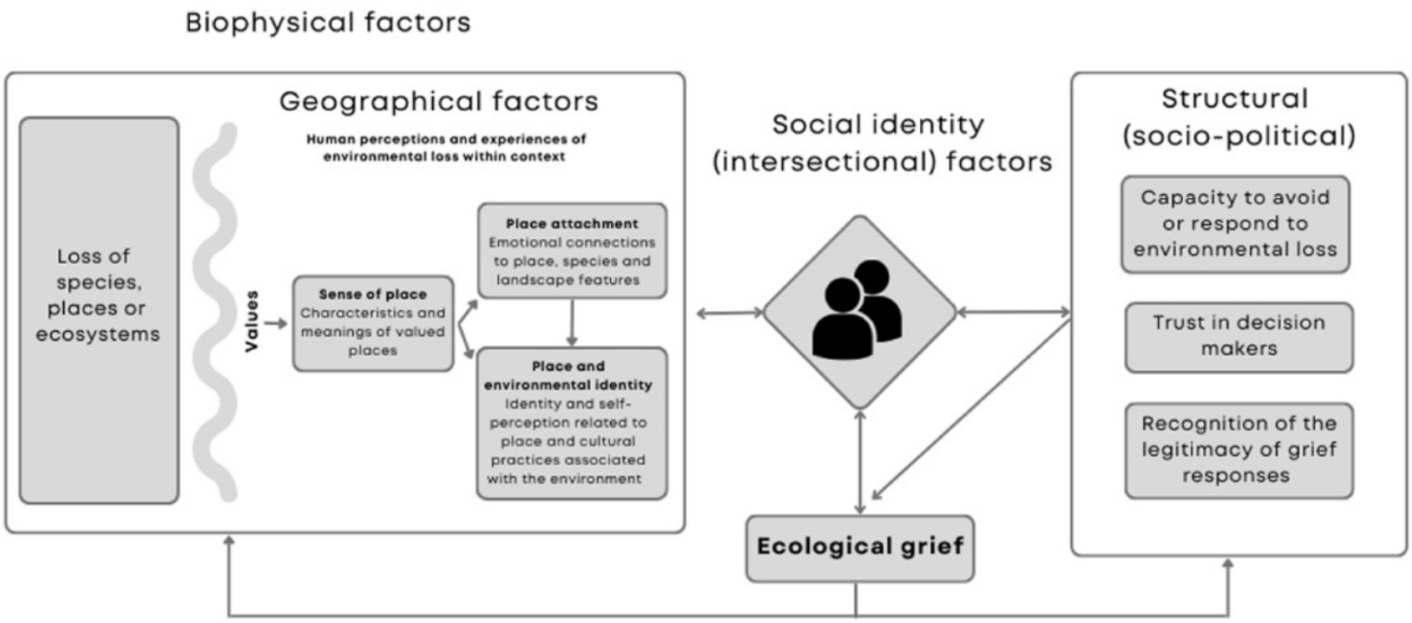


Figure 3.4.3: Schematic representation of socio-ecological factors (Benham & Hoerst, 2024)

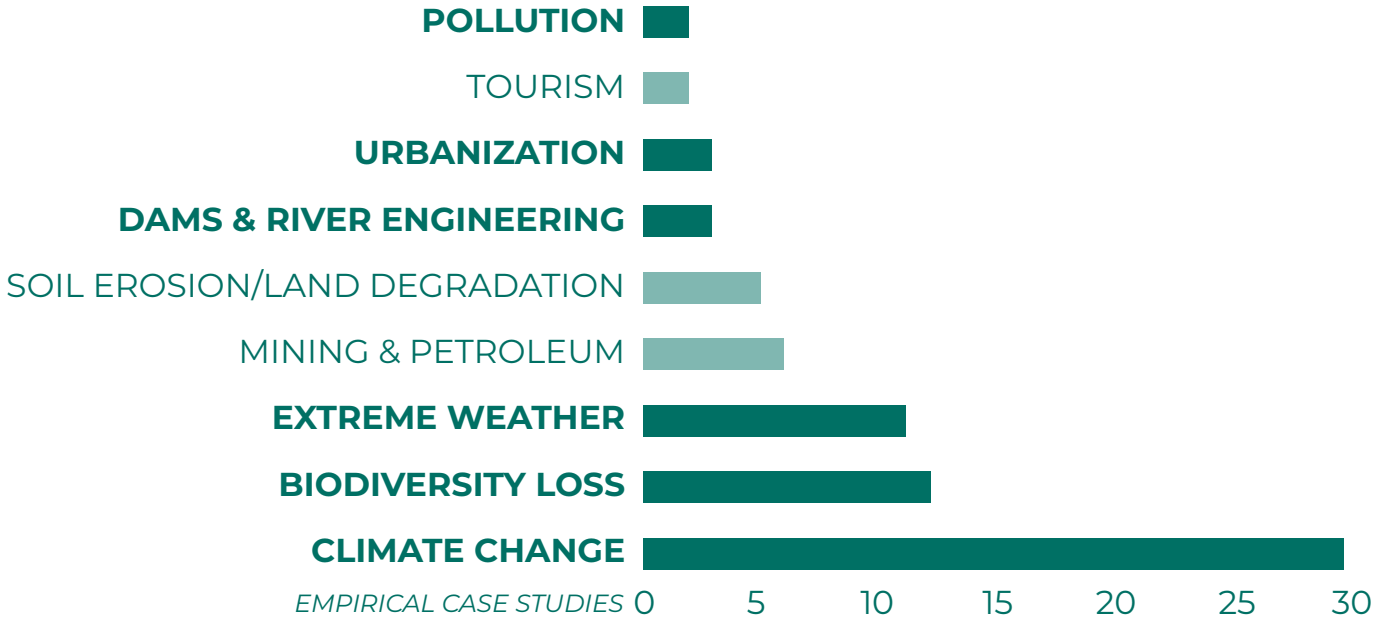


Figure 3.4.4: Environmental losses associated with eco-grief (Benham & Hoerst, 2024)

towards the three key features of this phase: functionality, psychological/environmental awareness and ethicality. The ethical aspect relates to the role of eco-grief as moral emotions and implies that the process is not just about personal gain, but also about changing one's values and practices.
The last phase implies Living with the ecological crisis as mentioned in the original. In this phase, grieving broadens towards a more general emotional engagement, distancing becomes self-care and the need for action remains unchanged. The goal of the process is to reach a state of relative resilience from which sustainable action is possible. According to Pihkala's (2022) study, it is described as 'something they one day notice has happened, rather than any single moment'. In line with constructive outcomes of general grief and bereavement processes, the grief and loss are still present, but progress has been made including a form of acceptance. This can be recognized in theories like 'relearning the world' (Attig), reconstructing meanings and continuing

> bonds (Niemeyer) and the stage of acceptance (Kübler-Ross and Kessler)'. In the captivating words of psychotherapist Gillespie:
> 'These days I am no longer stalked by apocalyptic imaginings or dreams in ways that I once was, although I am even more concerned about climate disruption and its consequences. I have learned to accept that I cannot be sure of any scenario ahead, although I do anticipate immense change. This acceptance enables me to hold a conscious resolve to stay open to the world as it is, beautiful and wounded, while doing what I can to contribute to ecological restoration, climate action and cultural change. While grief and anxiety ebbs and wanes in me, so too does hope

and inspiration, grounded in the resilience and creativity of the natural world, including human nature.' (p. 37)
Pihkala (2022) summarizes this as an acceptance of uncertainty amidst unavoidable changes, as well as one's responsibility and limitations.
In conclusion, the process of eco-grief gives insight into the dangers of denying active grief work, like dysfunctional states as denial, anxiety and depression, that hinder PEB, but also into the potential to move towards meaningful action.

Socio-ecological perspective
This section elaborates on what socio-ecological factors play a role in eco-grief. These factors form the basis for the analysis of the case study informing the final design products of this thesis.
The socio-ecological perspective as illustrated by Benham & Hoerst (2024) (figure 3.4.3) helps to understand how eco-grief arises. As Tschakert et al., (2017:1) already observed, environmental "loss is often given meaning through lived, embodied, and place-based experiences". This socio-ecological approach facilitates an exploration of how eco-grief is experienced, where and by whom. The biophysical, geographic, demographic, socio-economic and political dimensions of the relationship between humans and their environment are addressed, as well as the interrelations between those dimensions.
Benham & Hoerst (2024) identified the following socio-ecological factors that are critical to the shaping of lived experiences of environmental loss, and subsequently of eco-grief: biophysical, geographical, social identity and structural factors (figure 3.4.5). Especially the importance of the geographical and structural processes are emphasized in the shaping of eco-grief responses.
First, the several types of biophysical losses will be examined as it forms the foundation of eco-grief. As can be seen in figure 3.4.4, the losses can be divided into climate change, biodiversity loss, non-climate change related extreme weather events, mining and petroleum, agriculture/soil erosion/land degradation, dams and river engineering, urbanisation, tourism and pollution. Climate change often implicates an amplifier of

pre-existing environmental threats, but it is the way in which it accelerates losses that shapes the eco-grief.
Secondly, the geographical processes of specific places translate these biophysical losses to feelings of eco-grief, as it is never the loss in itself that causes grief. The geographical factors can be divided into three place-based concepts drawing on emotional and meaning-related dimensions of place, as well as other conceptualizations of human-place relations. The values and meanings that people attribute to environmental features and species are described as environmental values and sense of place. The emotional bonds that people form with local places and species is referred to as place attachments. There are three primary ways of place attachment, namely to the biophysical, to social and cultural practices and to the sense of community and social relationships. Place and environmental identity refers to how people describe themselves as belonging to a place and how place changes affect their personal identity. This can also encompasses the identities that are constructed around environmental knowledge and practices.
Thirdly, the characteristics of social identity have an influence on how the losses are experienced. While some broad demographic trends, like age, gender, indigeneity and profession, can be observed in the literature, Benham & Hoerst suggest that these differences generally can not be explained by single demographic parameters. However, these trends rather emerge from the intersection of multiple social identities and values of an individual. An intersectional perspective on ecological grief recognizes the overlapping dimensions of a person's identity that constitute their experiences of discrimination, disadvantage or marginalization (Djoudi et al., 2016; Crenshaw, 2017).
Lastly, the structural processes that deepen feelings of eco-grief refer to 'the broader political, economic, and social conditions and institutions that shape a person's ability to mitigate, avoid or respond to ecological loss'(Benham & Hoerst, 2024, p5). The capacity to respond or avoid environmental loss and the recognition of legitimacy of grief responses play a role. In many cases of eco-grief, a sense of injustice and a lack of trust in decision makers is prevalent. This is particularly evident regarding issues that ordinary citizens have little direct control over, like resource extraction, urbanisation and climate change. Environmental problems based on socially and environmentally mediated factors also include economic and planning policies that entrench injustices.

The process of eco-grief: the active grief work.
After elaborating on the theoretical understanding of ecological grief, the active grief work will be discussed. Regarding coping strategies, several elements of the process of eco-grief are important to take into account.
In the first phase of Awareness, social support could play

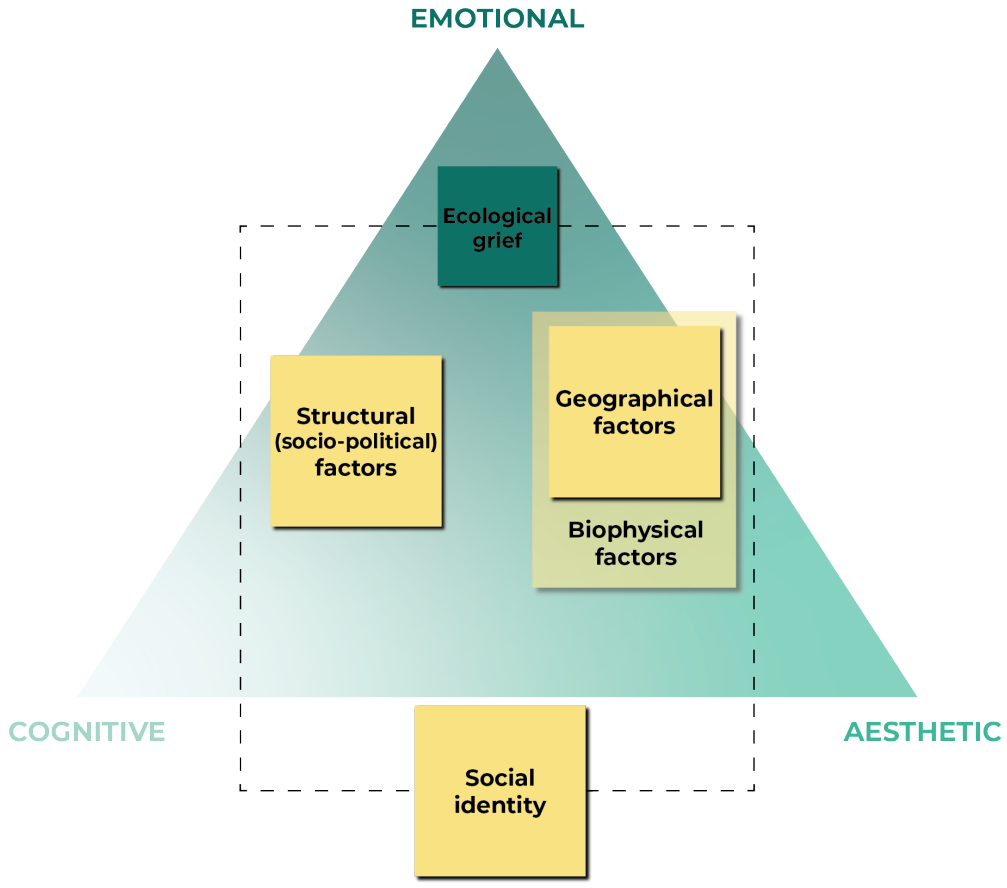


Figure 3.4.5: Socio-ecological factors projected on the visualization of the theoretical framework.

a major role (Pihkala, 2022). The harsh feelings that go with this awakening can not be taken away, but people can be supported emotionally, as well as helped in acknowledging and judging the ecological crisis for what it means, preventing potential denial, anxiety and depression. As for most people, social dynamics play a strong role in their reaction, so contributing to a social environment that allows for this phase to unfold can be a major first step in the process of eco-grief.

In the second and final phases of Coping and Transforming and Living with the ecological crisis, it is key to balance the three aspects: action, distancing/self-care and grieving/emotional work. Related to these aspects, Lazarus and Folkman (Pihkala, 2022a) divide three major types of coping: problem-focused, emotion-focused and meaning-focused. Action can be seen as problem-focused coping as it attempts to solve the problem. However, in the case of the ecological crisis, the magnitude and complexity of the problem means that it is not possible to solve it as an individual. Still, this type of coping can play a role in providing feelings of efficacy and resilience by aiming at for achievable actions (Pihkala, 2022).

Secondly, taking some respite from action and grieving are necessary. Distancing is a restoration-oriented grief task and helps to manage the psychological pressures. Although it is needed to avoid burn outs, overly strong distancing reactions, like forms of denial, also results in undesired inaction. Lazarus argues that in contemporary cultures problem-focused coping seems to be preferred over emotion-focused coping, which can result in problematic outcomes (Austenfeld & Stanton, 2004; Cox, 2011; Pihkala, 2022a)

Finally, engagement is needed with the emotions triggered by the ecocide, such as sorrow, anger, disappointment and guilt. Coping through an emotional approach includes acknowledging, understanding and expressing emotion. Emotion-focused coping can be seen as avoidance or associated with dysfunctional outcomes, but it is needed to alleviate stress, especially in relation to issues that are out of our control.

Regarding the ecological crisis, meaning-focused coping is particularly important due to the complexity of the issue and is in accordance to the previously mentioned idea of grief as a meaning seeking venture. In this case, experience of meaning in life becomes the main element, in which problem and emotion focused coping both play a role. The ability to engage with the three aspects, as well as maintaining a sense of meaning in life both correlate with meaning-focused coping, leading to constructive engagement (Pihkala, 2022a)

The focus of this thesis will be on facilitating action and distancing, as well as shaping emotion- and meaning-focused coping strategies.

'Grieving is inherently a meaning seeking venture. […] Death challenges us to rise above our suffering'
- Attic (2003)

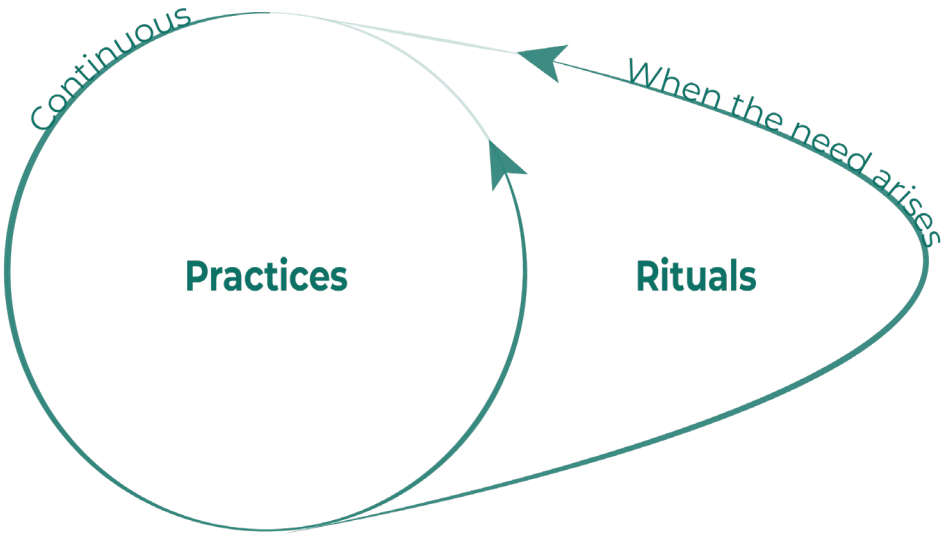


Figure 3.4.6: Visualization of the difference between rituals and practices.

Rituals and practices

Whereas grief is actually the internal emotional and physiological response (Neimeyer, 2015), mourning is the 'period of time during which signs of grief are shown' (Merriam-Webster, n.d.). The work of mourning is thus how grief translates to practical activities. While our capacity to adequately respond to the ecological crisis depends on properly mourning the sustained losses, societal mourning practices to guide us in times of environmental catastrophe are lacking.

Mourning should not be seen as just a personal affair, but as restorative activity with the ability to revive a sense of participation, responsibility and awareness of the connectivity of all life (Burton-Christie, 2011). Throughout centuries, people have developed countless practices and rituals for mourning. Although '[w]e love and are attached to people, places, things, and ideas, [] our most richly developed and culturally embedded mourning practices are those developed to mourn human deaths.' (Menning, 2017) Thus, in this thesis rituals and practices for mourning beyond the human will be explored.

Menning (2017) makes a distinction between rituals and practices (figure 3.4.6), but they do exist along a continuum exposing overlapping identities.

Rituals are performed as the need arises, such as a funeral and memorials, and help to respond to specific losses. These structured activities build around loss guide those who grieve through their mourning process, and can be seen as an anchor in times of disorientation and bewilderment. The rituals can be seen as a tool to ease the transition towards a new reality.

Practices are intentional, repeated performances, like the daily prayers within religious disciplines, that may help us to become resilient in the face of impermanence. Several spiritual practices meditate on death and loss in order to transform the way we understand, prepare for and respond to death. Practices may engage with continual strengthening of remaining connections, as well as establishing new ones. Overall, these practices can raise our awareness of all our bonds. For this, moving past the modern perspective on grief is important, as it suggested that the function of grief and mourning was to cut the bonds with the deceased. Holding on to the deceased was even defined as pathological grief, but Klass et al (1996) demonstrated that grief enables one to maintain a continuing bond, acknowledging the value of commemoration enriching present functioning.

By providing a physical form, mourning rituals and practices acknowledges the loss, redirects the attention to the significance of the loss and support the bereaved. As

Menning describes: ‘It provides a temporal, spatial and social framework upon which to begin reorienting what has become disoriented. And it has an end. [] Our attention is on moving through a dangerous (and powerful) space-time to the farther shore of renewed stability and connection, wholeness and ease.’ The mourning activities guide and nurture the healing process towards a new reality.
Involving profound dimensions of life, mourning activities draw attention to themes like our values, relationships, impermanence, pain and understanding of the world. In relation to this, Menning states that: ‘Rituals produces that kind of attentiveness and practices nurture it.’
Mourning rites help in acknowledging connection, cultivating our bonds, honouring loss, easing pain and rebuilding disrupted lives. These rituals and practices support healing and foster resilience in the light of the ecological crisis. However, these practices draw their meaning and effectiveness from their context. So, the question that follows is how to align mourning rituals and practices with the circumstances of our biographical, ecological and historical context?

Mourning as a social act.
‘Mourning is all about ethical, political and ontological connections [It] is a way of making connections, establishing kinship, and of recognizing the vulnerability and finitude of the other’(Cunsolo & Landman, 2017, p.14)
As grief is all about connections, mourning can be seen as a social act in several ways.
First of all, collective mourning activities utilizes the surviving attachments, drawing on the community to support those suffering most (Menning, 2017). There is a strong social dimension to psychological adaption as various social factors affect people’s adaption and coping (Bradley & Reser, 2017; Reser & Swim, 2011).
Secondly, public mourning is a call to responsibility to engage with the loss through acts of mourning and commemoration. It carries the need to respond through our life and action, through our ethical and political choices. (Cunsolo & Landman, 2017) As eco-grief is inherently connected to ethical considerations, public mourning has the potential to expose the systemic flaws of our current way of living and reinforce environmental advocacy (Craps, 2023; Honnacker, 2023). Publicly raising the question of what is valued and grievable uncovers the relations in our society. For example, the grievability of nature and environmental impactful agreements is questioned by the Red Rebel Brigade within the Extinction Rebellion movement (figure 3.4.7). By realizing that feelings of eco-grief are shared, it is easier to collectively start action and form environmental movements, fostering a sense of shared responsibility.

Thirdly, it has the ability to extend the social community. As social beings, attachments to our surroundings are a natural conditions, and this sociability does not limit itself to humans, as discussed through Latour's the Actor Network Theory. Severing any of these attachments can result in feelings of grief.
Thus, eco-grief should not solely be seen as an individual practice, but also as a social act.

Conclusion

In conclusion, the exploration of eco-grief in this chapter underscores the pressing need for societal mourning rituals and practices to acknowledge and address the profound emotional responses to ecological losses in order to move towards pro-environmental behaviour. By recognizing our shared vulnerability and honoring the transformative powers of grief, the notion of grievability can be extended beyond the humans and a deeper sense of empathy, interconnectedness, and responsibility can be cultivated towards the natural world. In the words of Curry (2011): '[S]ome of the most helpful guides to achieving ecological ethics on the ground have turned out to be those who are not afraid of its emotional, personal, cultural and spiritual dimensions' (p.244)

Figure 3.4.7: Ceremony of grief for COP 26 led by the Red Rebel Brigade wihtin the Extinction Rebellion movement (Red Rebel Bridage, n.d.).

3.5 Societal transitions

The final chapter of the theoretical framework will position the aimed change in the sustainability transitions discourse.

Definition

In the context of a growing scientific and public interest in large-scale societal transformation towards sustainability since 1990s, the field of sustainability transitions research emerged (Loorbach et al., 2017). According to Loorbach et al (2017), transitions can be defined as 'the process of change from one system state to another via a period of nonlinear disruptive change'. In sustainability transitions research (hereafter transitions research), this systemic change is applied to complex societal systems to question how a structural qualitative shift towards a more sustainable state can be made. It seeks to understand patterns and dynamics of structural societal change, as well as unearth strategies of governance to guide societal transitions (Hebinck et al., 2022).

Dynamics of transitions (X-curve)

The current focus on innovation and build-up limits the potential to make sense of the chaotic dynamics of current transitions (Hebinck et al., 2022). However, the increasing relevance of breakdown dynamics for deliberate phasing out of unsustainable practices led to the creation of the X-curve, which is based on socio-technical, socio-institutional and socio-ecological system change. The X-curve for societal transitions (figure 3.5) explicitly captures the patterns of build-up as well as breakdown revealing interactions between them by focussing on varying roles of 'regime' and 'niche'. It includes niche-regime interactions emphasizing the need for 'a less hierarchical representation' From socio-ecological system studies, the notions of chaos, emergence and co-evolution were integrated, originally rooted in complexity theory. These complex change dynamics are also conceptualized in the 'panarchy cycle', which shows the inherent and continuous dynamics of collapse and renewal in ecological systems through processes of decompositions and redefinition (Hebinck et al., 2022).

As described by Loorbach et al (2017), this iterative process develops in a non-linear way on three levels over a period of decades. A specific transitions can be positioned in a regime, meaning the dominant and stable order in a societal system, which is developed through its continued optimization efforts. Meanwhile, it is influenced by on-going higher and lower level transitions. The external

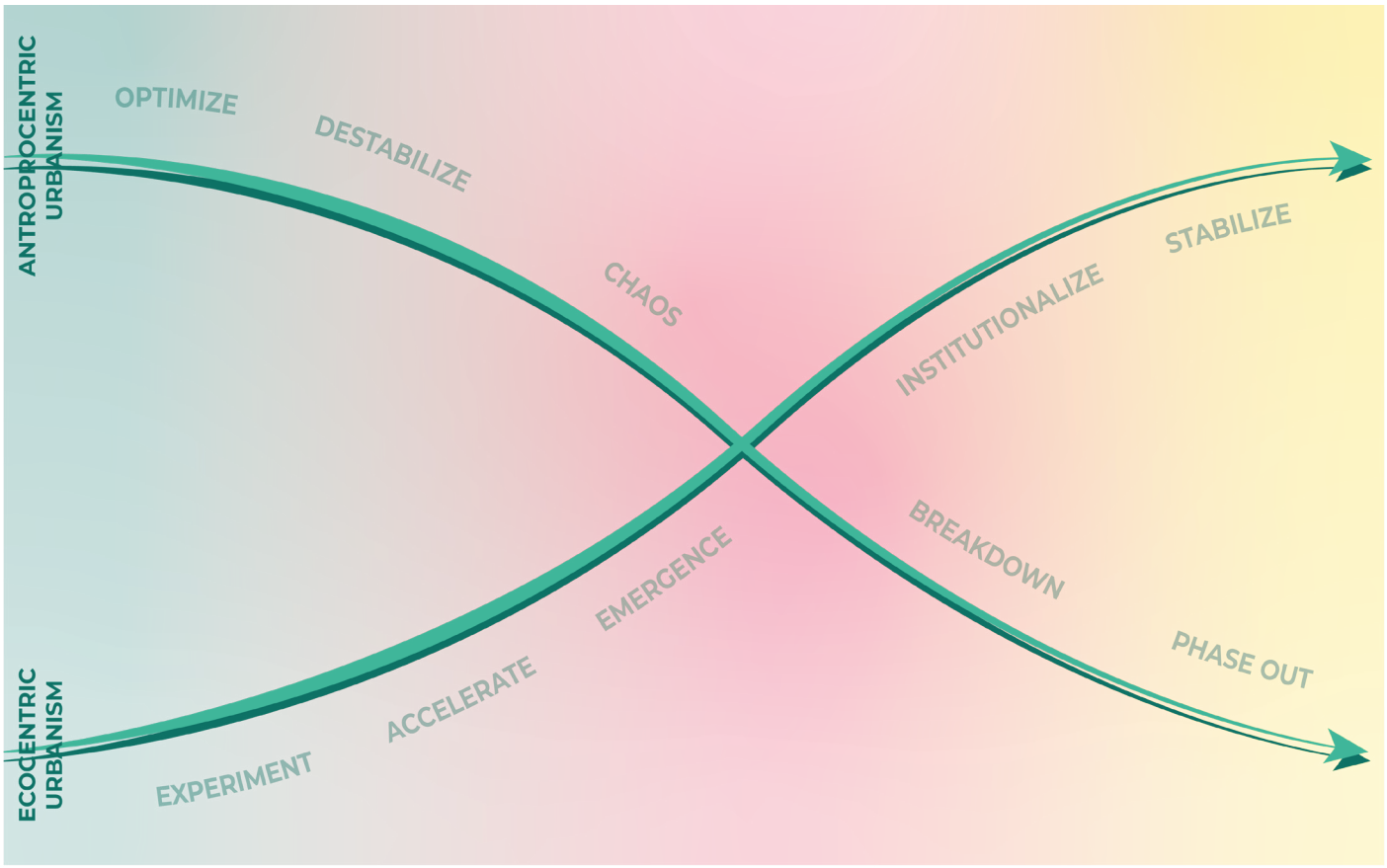


Figure 3.5: X-curve for societal transitions.

pressures to transform destabilize, as experimenting change agents start to accelerate their alternative ideas. Within this phase of chaos, new combinations of emerging alternatives and transformative regime elements institutionalizes and stabilizes into new regime. Chaos is a phase of sudden loss of security as the regime is unable to fulfill its function (Hebinck et al., 2022). Elements of the old regime will be broken down and phased out.

Governance of transitions

The main driver behind the emergence of transition research has been to find insights on how to steer clear from unsustainability lock-in and how to mobilize and empower disruptive innovations and transformative capacity from the system towards desirable sustainability transitions. Transition research advocates that governance is a multi-actor process in which systemic solutions, disruptive innovations, and (reflexive) institutions are formed by experimenting and learning (Loorbach et al., 2017).

Transition governance seeks to influence how actors organize themselves to produce solutions to societal problems and how different types of agency add up by adding the perspective of transitions as regime shifts in societal systems. It calls for targeted strategies to empower context-specific transformative solutions developed in multi-actor networks. Transitions involve multiple actors from various institutional backgrounds and shifts in power relations and role constellations between actors.

Important elements of transition governance:

- Reframing the problem. Support and development of shared and deeper insight and need for systemic change.
- Visioning as a tool to give direction. The belief actors have in alternative futures and fundamental values that they strive to realize. To facilitate and empower actors and networks. To motivate, coordinate and empower actions in the short/medium term.
- Experimenting. Learning-by-doing and doing-by-learning. A way to unpack complexity and gather evidence on new relations/roles.
- Continuous learning and evaluating/adapting. Social innovation implies social learning: reshaping social interactions, roles, knowledge, language and practices. Developing knowledge and contexts that make actors evaluate their thoughts and actions.

Conclusion

An informed understanding of how people respond and adapt to the ecological crisis is a prerequisite to effectively managing the transition. Sustainability discourse has to date failed to fully appreciate the contribution that social and environmental psychology can make to such an understanding (Bradley & Reser, 2017).

3. THEORETICAL FRAMEWORK

Conclusion

The theoretical framework as presented in this thesis navigates through various dimensions that are related to ecological grief, emphasizing its philosophical, ethical, practical and conceptual implications within the broader discourse of sustainability transitions. Through an exploration of the work of Bruno Latour, the Anthropocene era and the notion of nature, the first chapter underscores the urgent need to reconceptualize our relationship with nature in the face of escalating environmental crises. Moreover, the discussion on ecological ethics sheds light on the ethical dimensions of our interactions with the natural world, urging us to reevaluate our ethical stance and recognize the intrinsic value of nature. This recognition is pivotal in fostering a transition towards eco-centric societal change, as it challenges the prevailing nature-human dualism. Additionally, the extinction of nature experience further underscores the importance of personal connections with nature, particularly in urban environments where such experiences are increasingly scarce. Recognizing the diversity of nature experiences, including spiritual, recreational, and educational values, is essential in designing urban environments that promote ecological awareness. Finally, the concept of ecological grief sheds light on the emotional responses to ecological losses and the importance of shaping these through mourning rituals and practices. By recognizing shared vulnerability and honoring the transformative powers of grief, society can cultivate a deeper sense of empathy, interconnectedness, and responsibility towards the natural world.

In essence, this theoretical framework advocates for a paradigm shift in our relationship with nature, one that embraces interconnectedness, fosters attachment, and acknowledges the ethical and emotional dimensions of ecological engagement. By integrating cognitive, aesthetic, and emotional elements into sustainability transitions, we can pave the way for a more harmonious coexistence with the natural world, guided by a profound sense of empathy and stewardship. In the next chapter, this theory will be translated into the conceptual framework as a foundation for this thesis.

ECOLOGICAL GRIEF AS A KEY EMOTION FOR CHANGE

4. CONCEPTUAL FRAMEWORK

4.1 Positioning of thesis

4. CONCEPTUAL FRAMEWORK

4.1 Positioning of thesis

In this chapter, the previous theory is combined into a conceptual framework. The process of eco-grief is projected on the X-curve for societal transitions as summarized in figure 4.1, while the extended version can be found in appendix 10.3. Connecting transition theories to eco-centric change involves promoting a shift in societal values and practices toward a worldview that emphasizes the intrinsic value of nature and ecosystems, advocating for a more balanced and harmonious relationship between humans and the environment. The phases of the eco-grief process relate to the steps of societal transitions and are translated into 5 elements within the conceptual framework. Throughout the process, cognitive, emotional and aesthetic engagement is needed in order to reach the final state of living with the ecological crisis while being able to sustain a durable way of undertaking pro-environmental action.

The awareness phase starts with experimenting with localization and awareness of the environmental losses in order to be able to accelerate into the coping process. This experimentation encompasses reframing the problem, visioning alternative futures, prototyping, continuous learning, evaluating and adapting. Simultaneously , the current anthropocentric regime prioritizing human needs and consumption over ecological well-being should be destabilized by questioning the grievability of the environmental losses. Thereafter, the coping & transforming phase shows the chaos and emergence of eco-grief, which aligns with the disruptive and chaotic nature of the transition dynamics characterized by the sudden loss of security as the regime is unable to fulfill its function. New combinations of experiments and the existing context merge resulting in the acknowledgement of our relation to our environment. By allowing the grief to transform and engaging in active grief work through coping methods, the living with the ecological crisis phase starts. In this last phase, the bonds to our environment, the corresponding local losses, but also our local community, are reshaped in order to fulfill a new role in our lives, which can be associated with the institutionalization and stabilization of the eco-centric changes. Meanwhile, the questioning of the grievability is followed up by the rejection and leaving behind of the identified anthropocentric norms, thus breaking down and phasing out these norms.

This conceptual framework is used to position the stakeholders categories and design interventions onto the process in the final chapters.

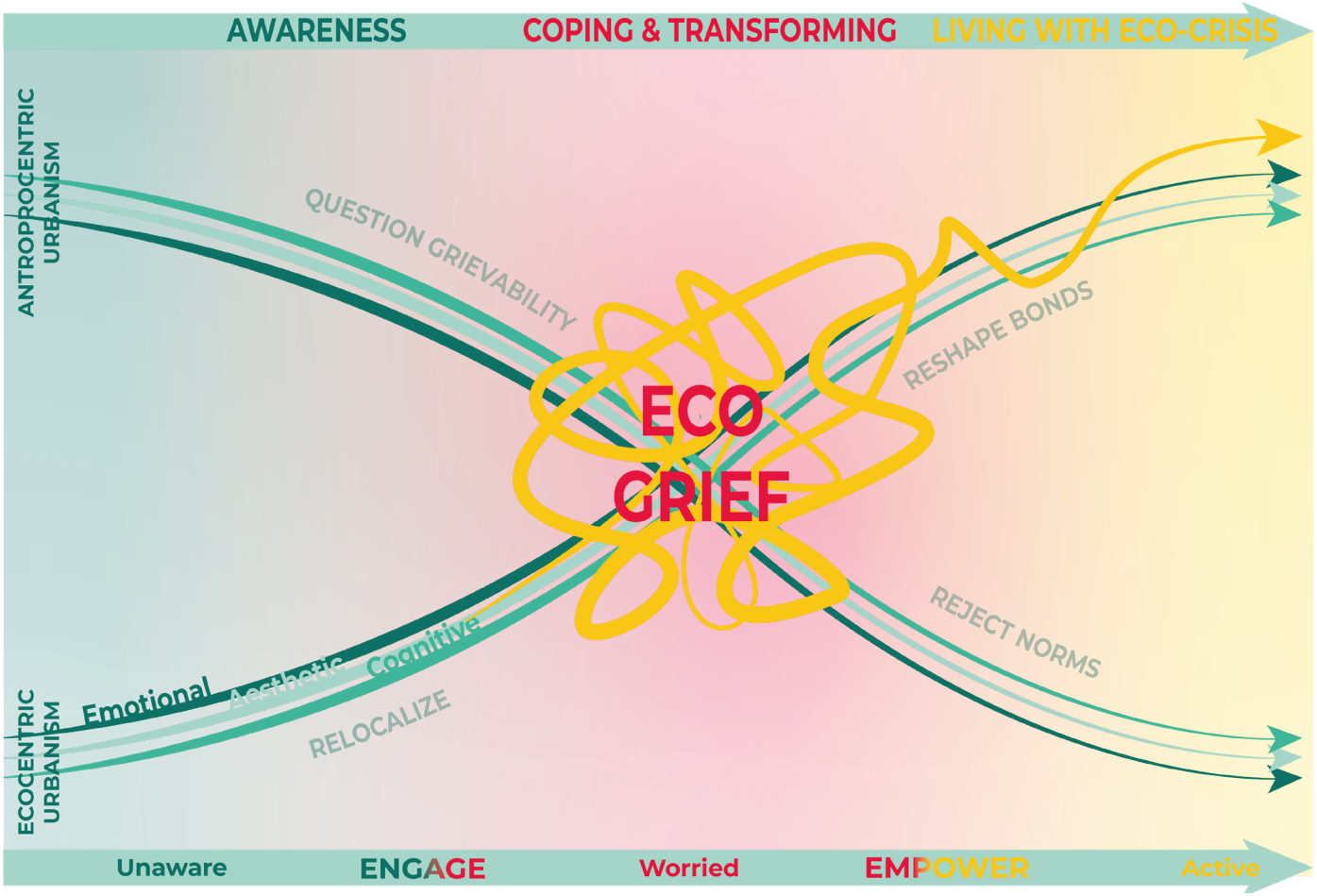
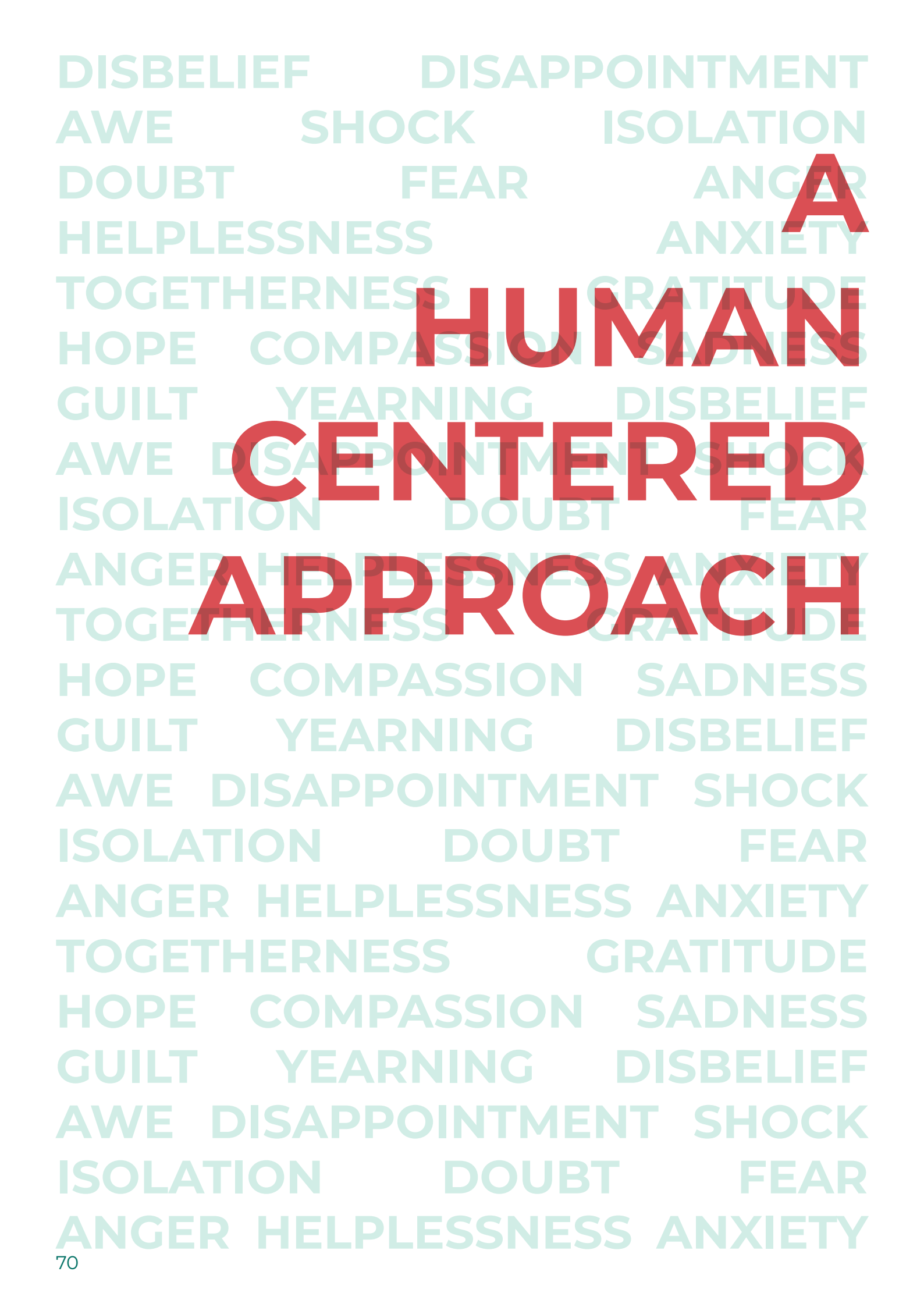


Figure 4.1: Conceptual framework.


DISBELIEF DISAPPOINTMENT
AWE SHOCK ISOLATION
DOUBT FEAR ANGER
HELPLESSNESS ANXIETY
TOGETHERNESS GRATITUDE
HOPE COMPASSION SADNESS
GUILT YEARNING DISBELIEF
AWE DISAPPOINTMENT SHOCK
ISOLATION DOUBT FEAR
ANGER HELPLESSNESS ANXIETY
TOGETHERNESS GRATITUDE
HOPE COMPASSION SADNESS
GUILT YEARNING DISBELIEF
AWE DISAPPOINTMENT SHOCK
ISOLATION DOUBT FEAR
ANGER HELPLESSNESS ANXIETY
A
HUMAN
CENTERED
APPROACH

5. METHODOLOGY

5.1 Methods
5.2 Survey

5. METHODOLOGY

5.1 Methods

This chapter details the methodological approach utilized in this study, encompassing literature research, spatial analysis, governance analysis, interviews and a surveys.

Literature Research
The foundation of this study is built upon a comprehensive review of existing literature. Scientific papers, books, and newspaper articles were sourced through databases such as Google Scholar and the local li-brary. These sources were selected to ensure relevance and credibility, providing a robust theoretical framework for the research.

Spatial Analysis
The spatial analysis involved a multifaceted approach to understanding the urban environment of Rotter-dam Noord. Mapping techniques were employed to examine various dimensions, including morphological, ecological, functional, historical, and demographical aspects. Additionally, sections were created to pro-vide detailed insights into specific areas of interest, allowing for a focused analysis of spatial dynamics. To complement the desk-based research site visits with street interviews were conducted. During these visits, photography and sketching were used to document the spatial characteristics.

Governance Analysis
The governance analysis comprised policy and stakeholder analyses to assess the policy landscape and stakeholder dynamics shaping urban development in Rotterdam Noord. Policy analysis involved scrutinizing relevant mainly municipal documents about spatial, greenification plans and biodiversity, while stakeholder analysis identified key actors and their roles in decision-making processes.

Fieldwork
The field work consists of site visits and an expert interview, as well as an informal exploration through (street-)interviews and participating in events. The expert interview with ecologists was conducted to gather specialized insights to complement the spatial and governance analysis.

Survey
A survey was administered to gather quantitative data on citizens' perceptions, experiences, and attitudes towards their environment. This survey complemented the qualitative insights obtained through site visits, interviews, and expert consultations, providing a holistic understanding of the study area. In the next sec-tion, a detailed description of the method is given.

Through this methodological framework, a comprehensive analysis of Rotterdam Noord was created.

5.2 Survey

Since the survey is focussed on gathering information about the experiences of the citizens, it answers the questions about the geographical factors and social identity. These factors will be taken into account when shaping the survey based on (Benham & Hoerst, 2024). By collecting this data, the design will be contextualized. Each component of the survey will be analyzed on a potential relation to ecological grief. The complete survey can be found in appendix 10.4.

Personal background

Demographics

By collecting the demographics the strongest grievers can be roughly identified and used as a focus group in the design.

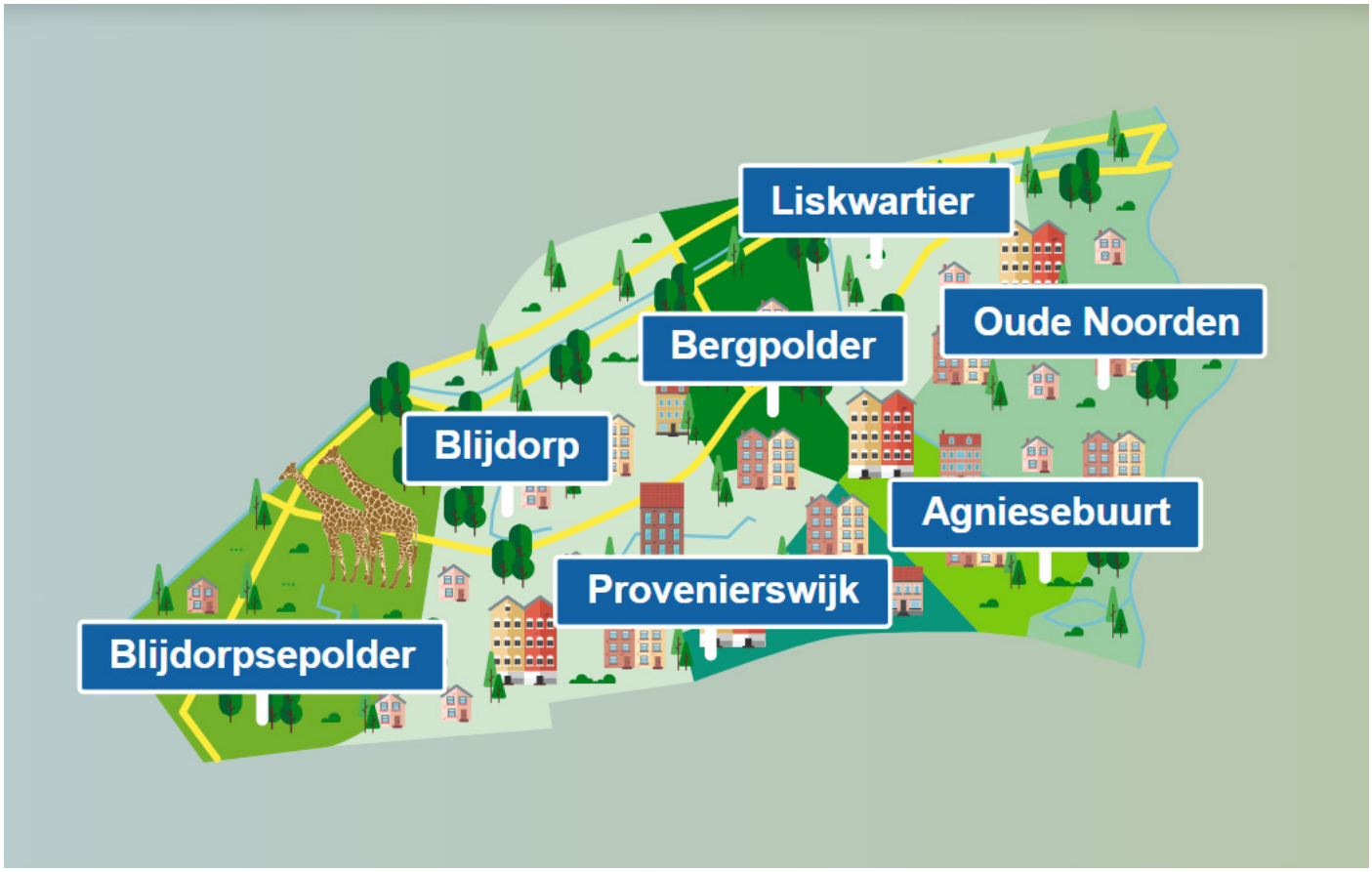
Neighbourhood: Knowing the neighbourhood where the respondents live provides context of their urban environment and its characteristics, and offers the opportunity to roughly check the distribution of responses across different neighbourhoods.

Residency: The time someone has lived in their current residence can provide insights into their familiarity with and attachments to their environment, as well as any changes they may have witnessed over time.

Age: The age could influence individuals' perceptions, experiences and priorities related to nature, and understanding these generational differences can help tailor interventions and policies.

Parenthood: Being a parent is likely to affect one's relationship with the environment, as it may influence decisions about outdoor activities, concerns about environmental quality and values transmitted to children. Therefore, a division is made between childless, young children, teenage children and adult children.

Figure 5.2.1: Illustration of the neighbourhoods of Noord, which was included in the survey.



Personal characteristics
Access to outdoor space: Understanding the availability and proximity of private outdoor spaces can provide insights into the opportunities individuals have to interact with nature and feel a sense of ownership. Additionally, it can shed light on any disparities in access to nature related to demographics.
Childhood memories in nature: This question explore the respondent's past experiences and connection with nature during their formative years. Childhood experiences in nature can have a significant impact on environment values later in life (SOURCE), thus may influence experiences of ecological grief in adulthood.

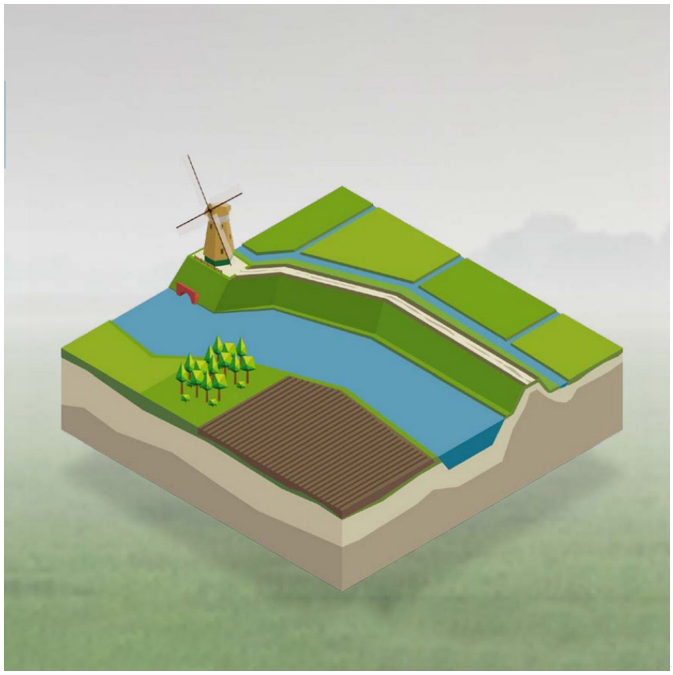
Nature in general
Nature perception
Considering the diverse cultural backgrounds of the inhabitants of Noord, their perception of nature might vary influencing their environmental attitudes.
Urban nature: By asking which image respondents consider to be nature, the perception of nature is explored, including dunes, a meadow, a park, urban animals, a zoo, a vegetable garden, a front garden and a balcony. By examining what individuals view as nature, the relation to their environmental attitudes can be researched.
Nature dualism: This question explores whether respondents resonate more with an ecocentric, being part of nature, or and anthropocentric, being separate from nature, statement, which will be related to their underlying beliefs. The statements are inspired on the experiences of nature by Wals (1994).

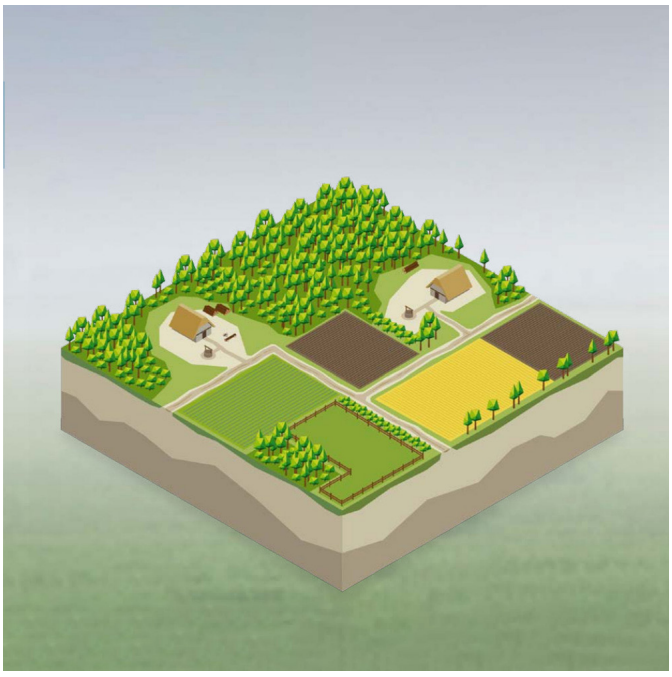
Global, ecological crisis
Awareness: Although it might not be recognized as ecological grief, raising awareness is the first phase of ecological grief, thus is essential in this research.
Grief: The magnitude of the ecological crisis makes it hard to grasp, possibly resulting in seeing it as something 'out there', as mentioned by Latour (X). Respondents might be concerned with the environment, but might not realize the proximity of the crisis. This discrepancy might play an important role regarding ecological grief in cities, therefore this question addresses their worries for global, environmental losses.

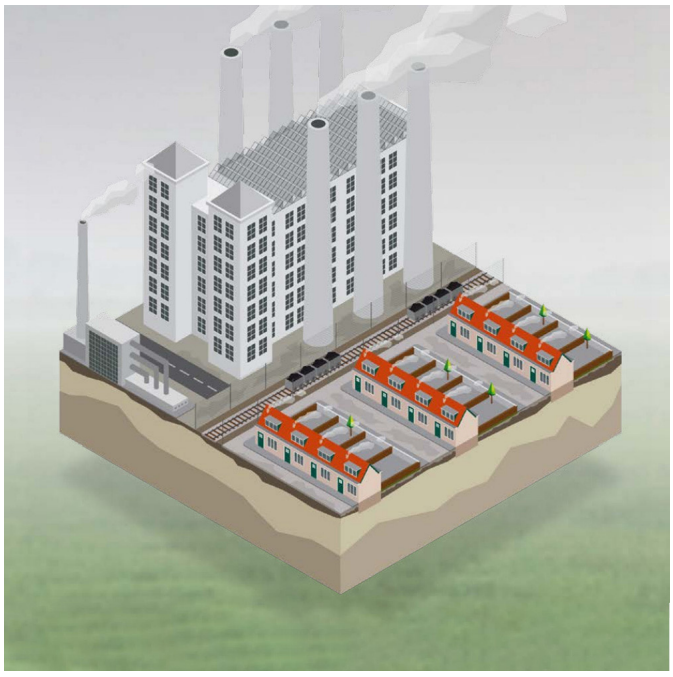
Local natural environment
Collective memory
Four options of collective memories are given regarding the way respondents belief that their living environment looked like 100 years ago. Abstract illustrations are used from a study on the development of the Dutch landscape (Ministerie van Onderwijs, Cultuur en Wetenschap, 2017). The choices include the ancient farmers landscape from 400 to 750, urban development in 1000 to 1400, the Dutch polder system from 1500 to 1850, and industrialization in 1850 to 1950.
Patterns will be explored between collective memories, their current perceptions and visions for the future. (Feola et al., 2023) emphasize the importance of the role collective memories within place framing in sustainability transitions and transformations. Current residents of Noord are supposably unaware of the disruption of the sense of place, a term that relates to the character or meaning of a place, caused by the urbanization over the last century.

Local, ecological crisis
The perception of the local environment can inform the potential local restoration and stewardship projects and awareness campaigns.
Awareness: These questions specifically asks about the awareness of the local environmental problems and changes. By researching this aspect, the relation between personal and emotional involvement, as well as environmental action can be explored.

Figure 5.2.2: Illustrations of the development of the Dutch landscape, which were included in the survey (Ministerie van Onderwijs, Cultuur en Wetenschap, 2017)







Local environmental issues: By asking about their worries on local, environmental issues, it can be researched if the grief feelings relate to their own environment. The extend to which the local environment is grieved in comparison with the global will be examined, as well as its influence on environmental attitudes. Could local eco-grief be considered as a deeper state of grief than for global nature, as the grieving gets more personal and distancing more complicated? Additionally, the role of guilt is given particular attention, since most ecological losses are caused by human activities, differentiating it from grieving natural deaths. In the words of Menning (2017), 'When one feels complicit (directly or indirectly) in the loss being mourned, guilt entwines with sorrow, complicating the grief process' (Menning, 2017).

Personal experience

Place attachment is theorized to be foundational to ecological grief in three primary ways: through emotional attachments to biophysical characteristics of a place, social and cultural practices enabled by a place, as well as sense of community and social relationships associated with a place (SOURCE).

By identifying cherished elements, those can play a leading role in the design process, as well as utilized to strengthen attachments.

Main outdoor activities: Since social and cultural practices are part of place attachment, respondents are asked to select their main outdoor activities in natural environments. Identifying these activities gives insights into how they interact with nature in their daily lives.

Favourite natural place: In addition, respondents choose their favourite natural place and features they value, like engagement in practices, biophysical characteristics, but also the social and cultural aspects, in order to find out what a place means for them. The answer options are inspired by cultural ecosystem services (Kosanic & Petzold, 2020) Whereas the relation between place attachment and ecological grief is evident for indigenous communities, farmers and fishers, this relationship is to be examined in the urban context where citizens are generally unaware of their ecological living environment. However, it should be taken into account that relatively brief interactions with places, like recreational interactions, can also evoke a sense of attachments and, subsequently, ecological grief (Ágoston, Csaba, et al., 2022; Boon, 2019).

Longing for nature: Since this research focusses on urban ecological grief, the difference between the current studies that target communities with a close connection to the landscape and this study that is focussed on urban citizens should be addressed. As urban ecological grief may be characterized by a sense of disconnection from nature, this question asks about their longing for nature interaction in daily life.

Future belief

Using Rotterdam National Park as a reference, this questions aims to assess whether individuals belief in a future where people and nature can thrive together. This vision can be related to their values and collective memories.

Ecological grief

Coping

After making the respondents think about their emotional experiences, the coping strategies that they employ to deal with feelings of ecological grief are addressed. The answer options are based on the process of eco-grief (Pihkala, 2022a), including no experiences with grief/avoidance, action, distancing/self-care and grieving/emotional engagement. Understanding how individuals cope can give insights on support gaps and their ability to transform their feelings into action. Moreover, it helps to understand how they view the legitimacy of their feelings, and the possible isolation that could follow from disenfranchised grief.

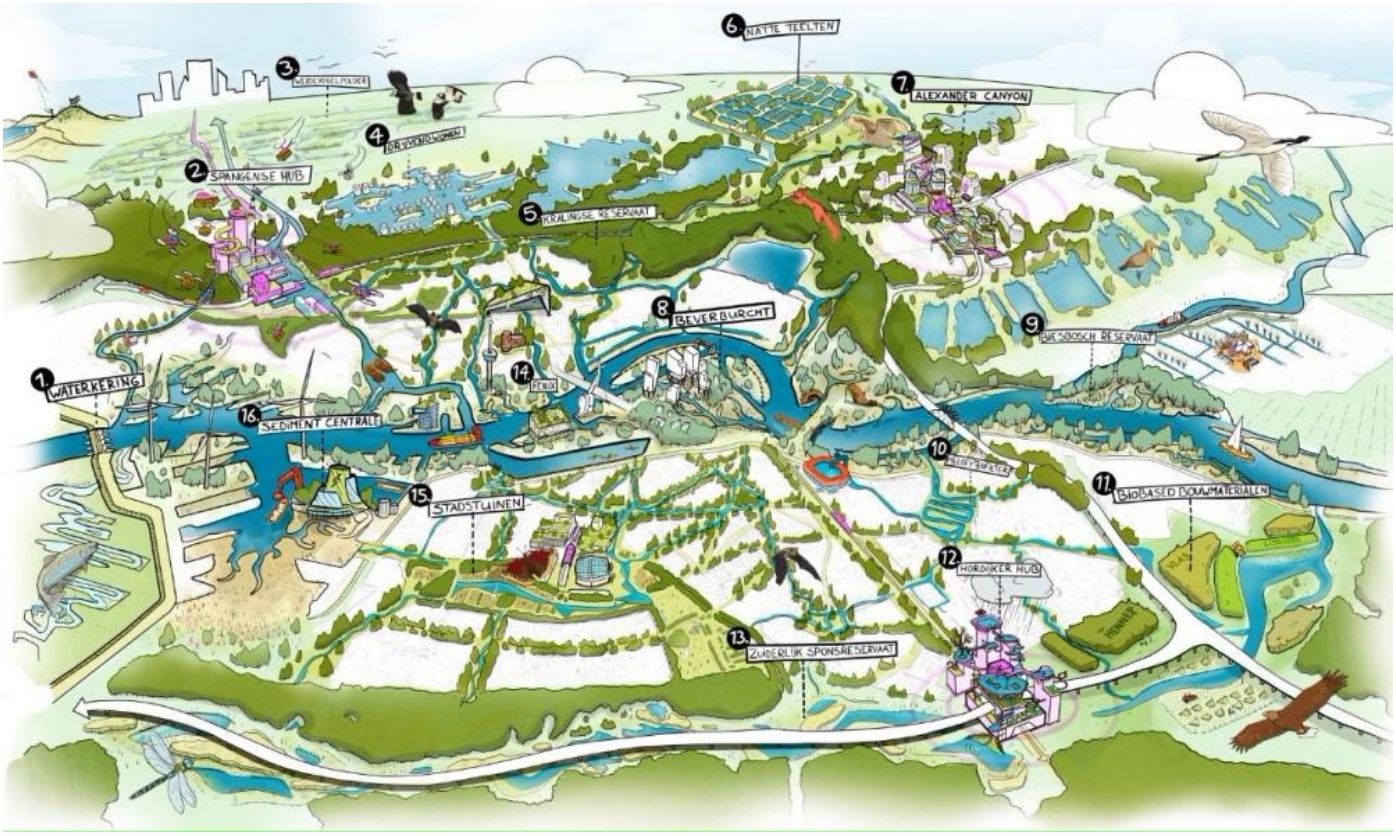


Figure 5.2.3: Visionary image of National Park Rotterdam, which is included in the survey (Witteveen+Bos, n.d.).

GRIEVING NATURE IN THE CITY

6. SOCIO-ECOLOGICAL ANALYSIS

6. SOCIO-ECOLOGICAL ANALYSIS

Introduction

As eco-grief studies have mainly focused on communities that live close to the land, the question here is: what is grieved in the urban context of Rotterdam Noord? Aldo Leopold already mentioned it in 1949: 'We grieve only what we know. The erasure of Silphium from western Dane County is no cause for grief if one knows it only as a name in a botany book' (p.48). Not much has changed, since Menning is still emphasizing it in 2017: 'We don't grieve abstractly; we mourn particular losses of people, places, animals, objects and ideas to whom and to which we are attached.' In the light of the ecological crisis, both statements illustrate the need for personal attachments in order to care for our environment. These attachments can range from the singing of birds to the milky way in the night sky, but while the extinction of experience pervades these might already be forgotten. Thus, we need to rediscover and cultivate our attachments to our environment, not just in order to grieve, but to restore a world of care and connection.

Therefore, the urban site of Rottedam Noord will be analyzed based on the socio-ecological factors shape ecological grief (Benham & Hoerst, 2024). First, the spatial context will be analyzed to identify the location and its biophysical losses in this chapter. Further details on the spatial analysis, including the site visits, can be found in appendix 10.6. This will be followed up by the analysis of the social context touching upon the geographical factors, structural factors and social identity addressed through the survey and stakeholder analysis.

6.1 Location

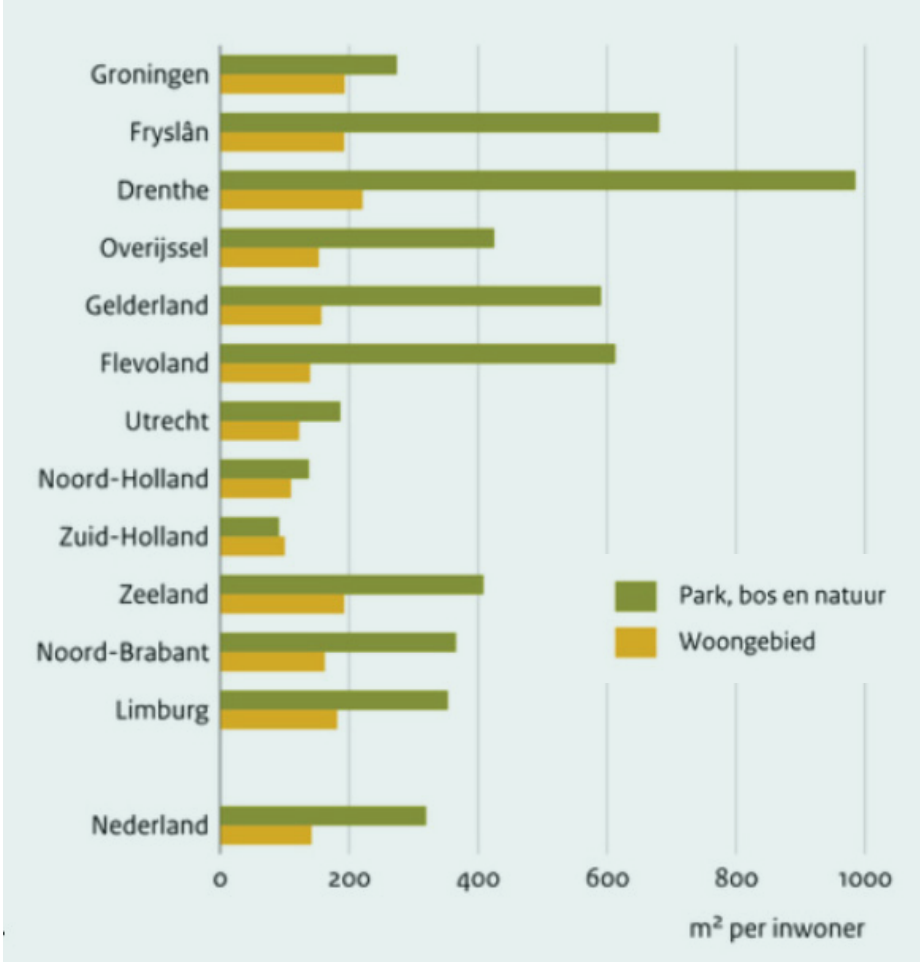
6.1.1 Zuid-Holland

Figure 6.1.1.1: Map of the Netherland with Zuid-Holland (yellow), the municipality of Rotterdam (dark-yellow) and the neighbourhood of Noord (red) highlighted.

The case study of the neighbourhood Rotterdam Noord is situated in the delta landscape of the province of Zuid-Holland in the west of the Netherlands (figure 6.1.1.1). This delta landscape in combination with the impacts of climate change, such as increasing temperatures (6.1.1.3), sea level rise (figure 6.1.1.4) and extreme weather, brings a significant vulnerability.
In the beginning of last century, South-Holland used to be a area characterized by its peat-meadow landscapes and network of waterways with a few compact urban cores. In the last decades, urbanization has reshaped the landscape (figure 6.1.1.5) by housing and industrial developments, with the harbor of Rotterdam and the greenhouses in Westland as major drivers. With the expansion of the Rotterdam-The Hague metropolitan area, the available space has strongly decreased, resulting in the least amount of green space per inhabitant of all Dutch provinces (figure 6.1.1.2). It is the only province with less green space than urbanized space. The pressure on Midden-Delfland is high, which is the open area enclosed by these cities and closest to Rotterdam Noord, because of both the ecological value for animals, such as meadow and migratory birds, as well as the recreational functions for the human population (van Ulsen, 2024).

Zuid-Holland:
'the only province with less green space than urbanized space'

Figure 6.1.1.2: Living area and green space in m² per inhabitants per provice (CBS, 2017.



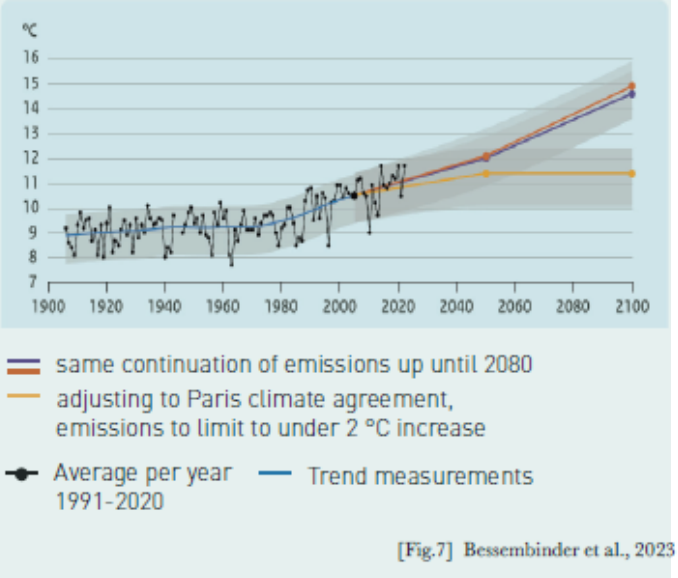


Figure 6.1.1.3: Yearly temperature in the Netherlands

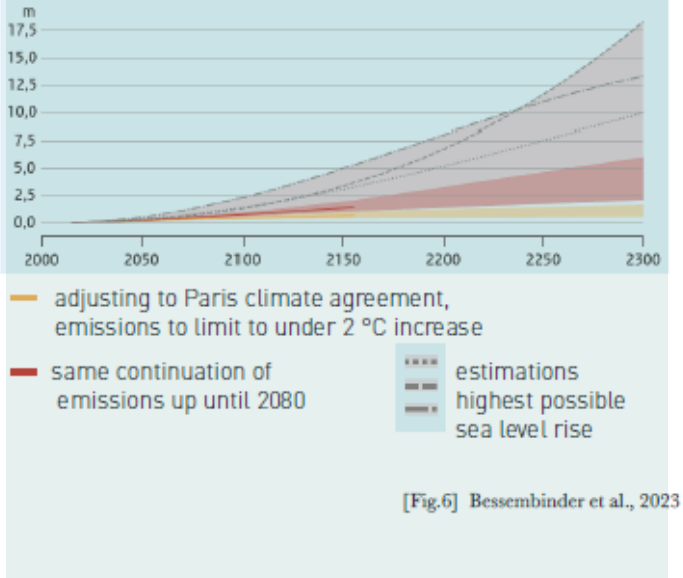
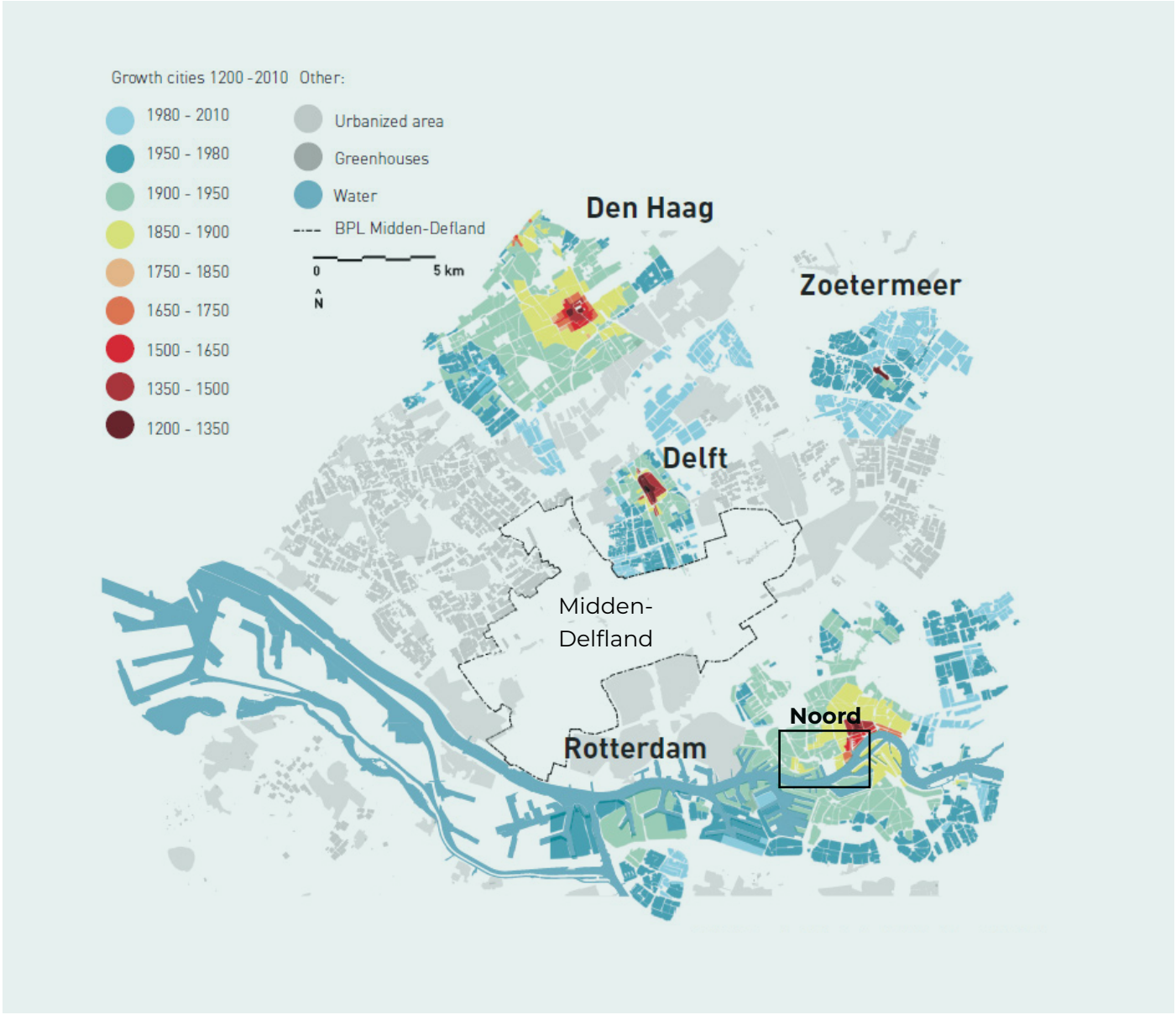


Figure 6.1.1.4: Sea level rise in the Netherlands untill 2300

Figure 6.1.1.5: Growth of cities in Zuid-Holland from 1200-2010 with Midden-Delfland in the middle (Rijksdienst voor het Cultureel Erfgoed, n.d.))



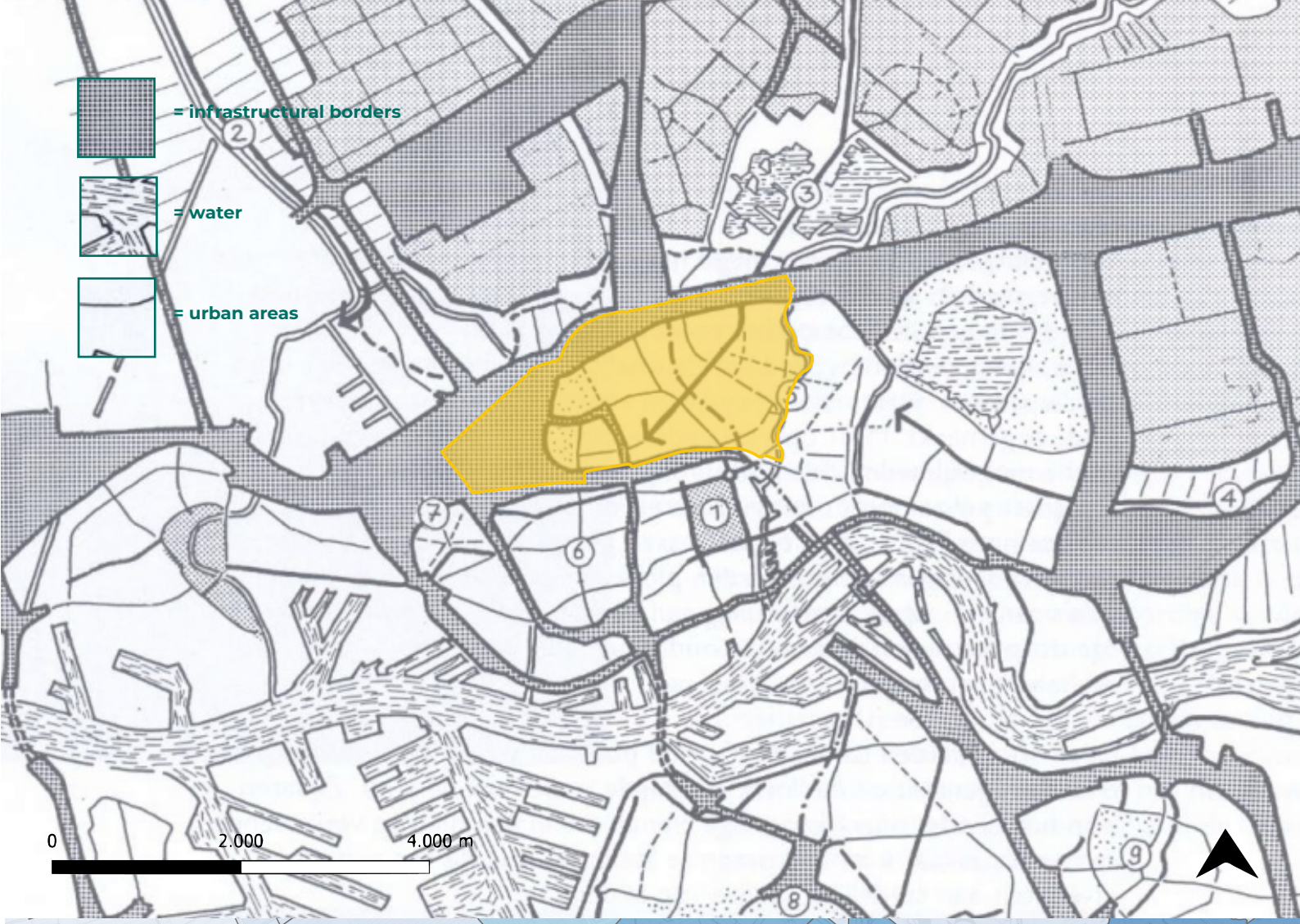
6.1.2 Rotterdam Noord

Rotterdam is the second largest city of the Netherlands with its 663.900 inhabitants. The complexity of Rotterdam's city structure (figure 6.1.2.1) can be roughly explained by the interaction of three factors. Although already explained by Palmboom back in 1987, his analysis is still valid as the main structure and borders remain similar. Showing the long-term impacts of infrastructural interventions, Noord is still enclosed by the same major highways and waterways. Firstly, the dynamic of the delta is expressed through meandering waterways. Secondly, the process of diking, reclamation and urbanization resulted in a highly distorted system of plots, ditches and roads. Thirdly, the development of the 'traffic machine' is laid out over the city as a independent network of cars. The interaction of these layers varies throughout the city resulting in a diverse set of patterns and the absence of one dominant, defining layer. So, instead of revealing a homogenous main structure of the city it can be described as a variety of patterns.

Figure 6.1.2.1: Structural analysis of Rotterdam with Noord highlighted (Palmboom, 1987).

The neighbourhood of Rotterdam Noord (figure 6.1.2.4) is situated on the Northern side of the Maas bordering the city center, waterways and other main infrastructure. Noord is enclosed by the A20 and Noorderkanaal in the north/west, the railway in the south/west and the Rotte in the east. About 8% of the Rotterdam citizens live in Noord, as the population density is among the highest within the city (figure 6.1.2.2). The dense character of Noord also results in an extremely high percentage of apartments (figure 6.1.2.4). The neighbourhood has a historical character as 37% of addresses were built between 1925-1950. Noord is a relatively green neighbourhood, but the percentage of greenery varies strongly as the west has about 45% green area, but the east only has a green density of about 20% (figure 6.1.2.3). From the center of Noord, the Kralingse Bos, Park Zestienhoven and het Park (figure 6.1.2.4) are within the reach of a 15 minute bike ride. The main green spaces in Noord are the Vroesenpark, Roel van Langerakpark, the singels and the waterfront (figure 6.1.2.4).

Figure 6.1.2.2: Population density per neighbourhood.


= infrastructural borders
= water
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0
2.000
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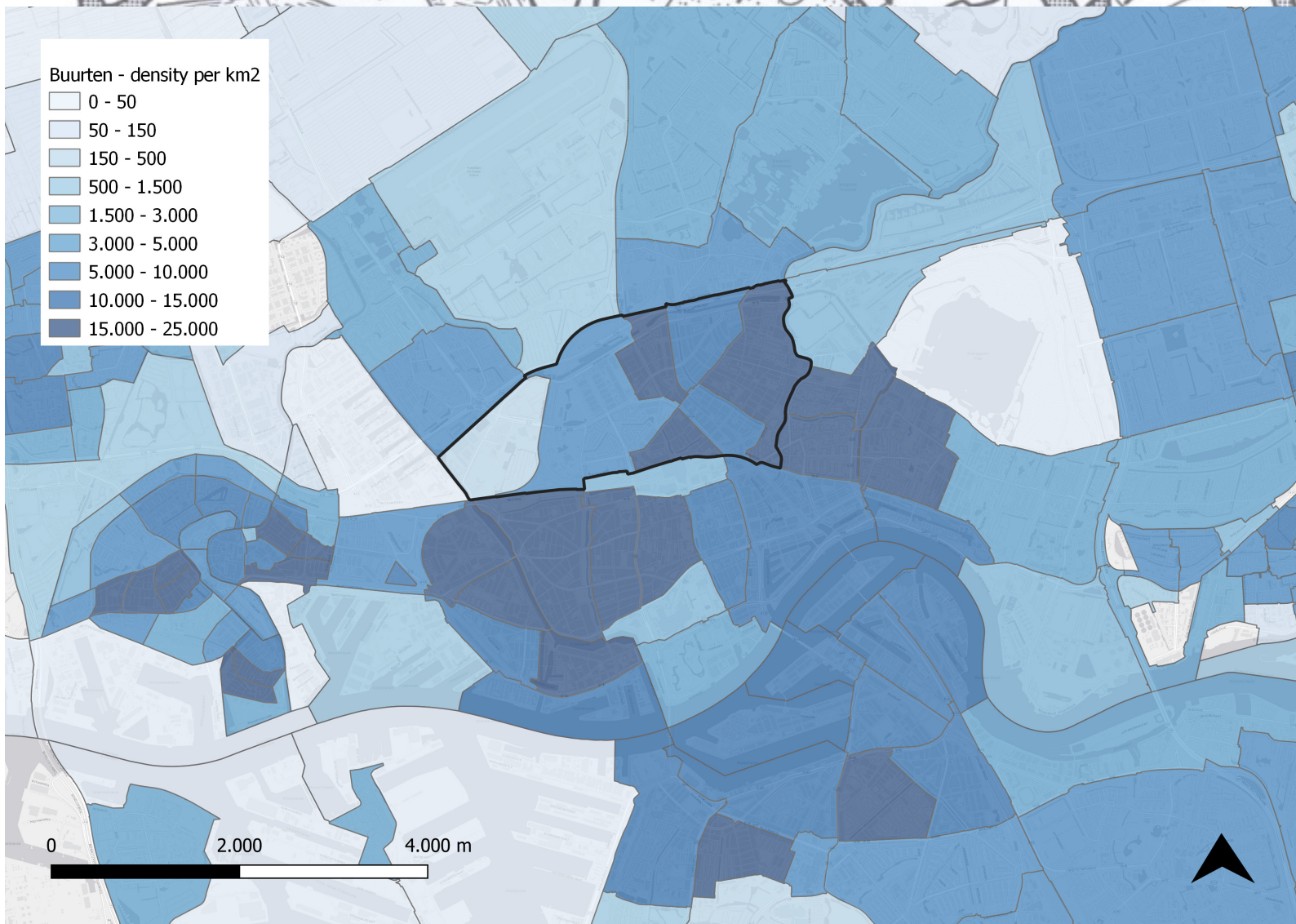
Buurten - density per km2
0 - 50
50 - 150
150 - 500
500 - 1.500
1.500 - 3.000
3.000 - 5.000
5.000 - 10.000
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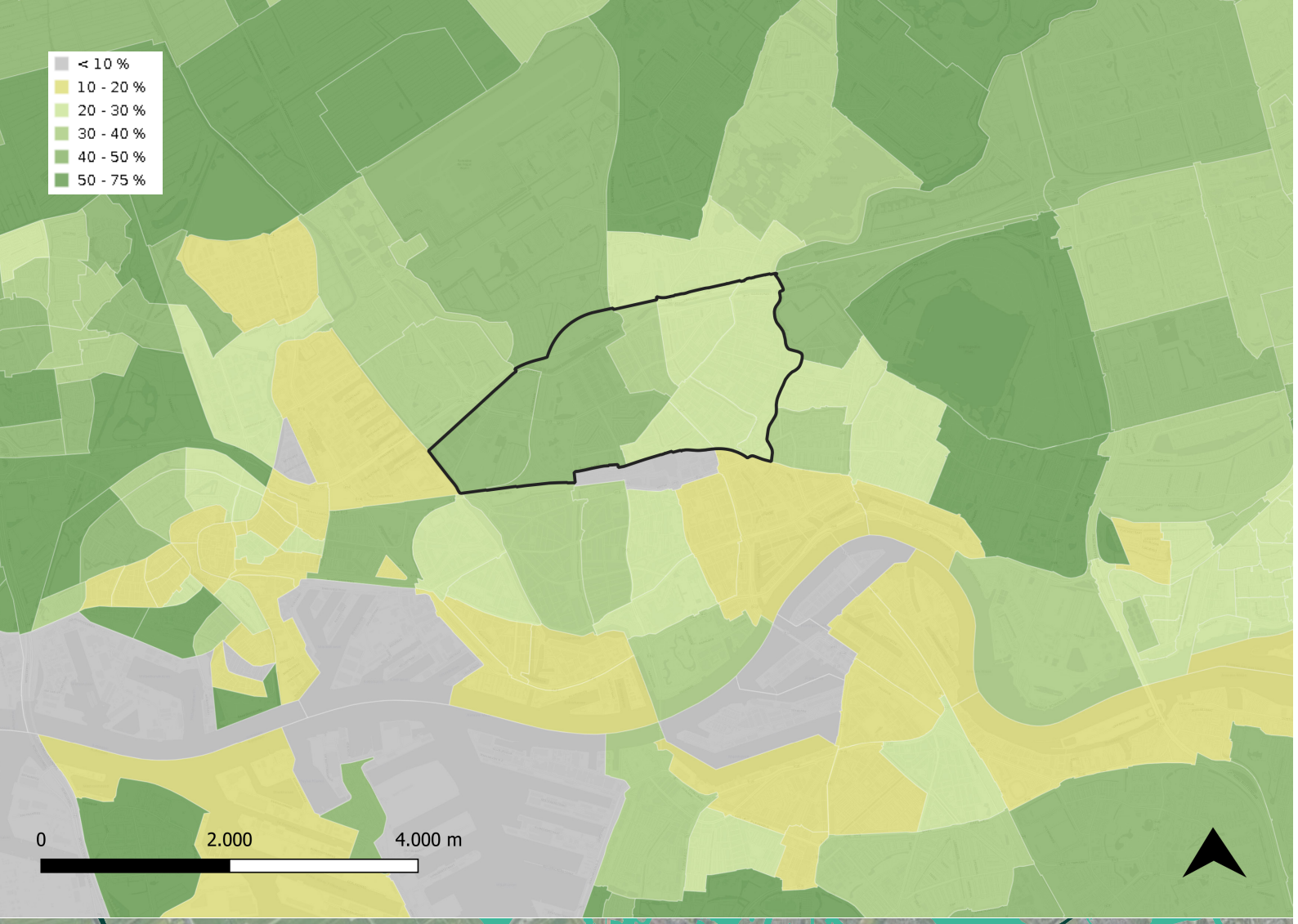
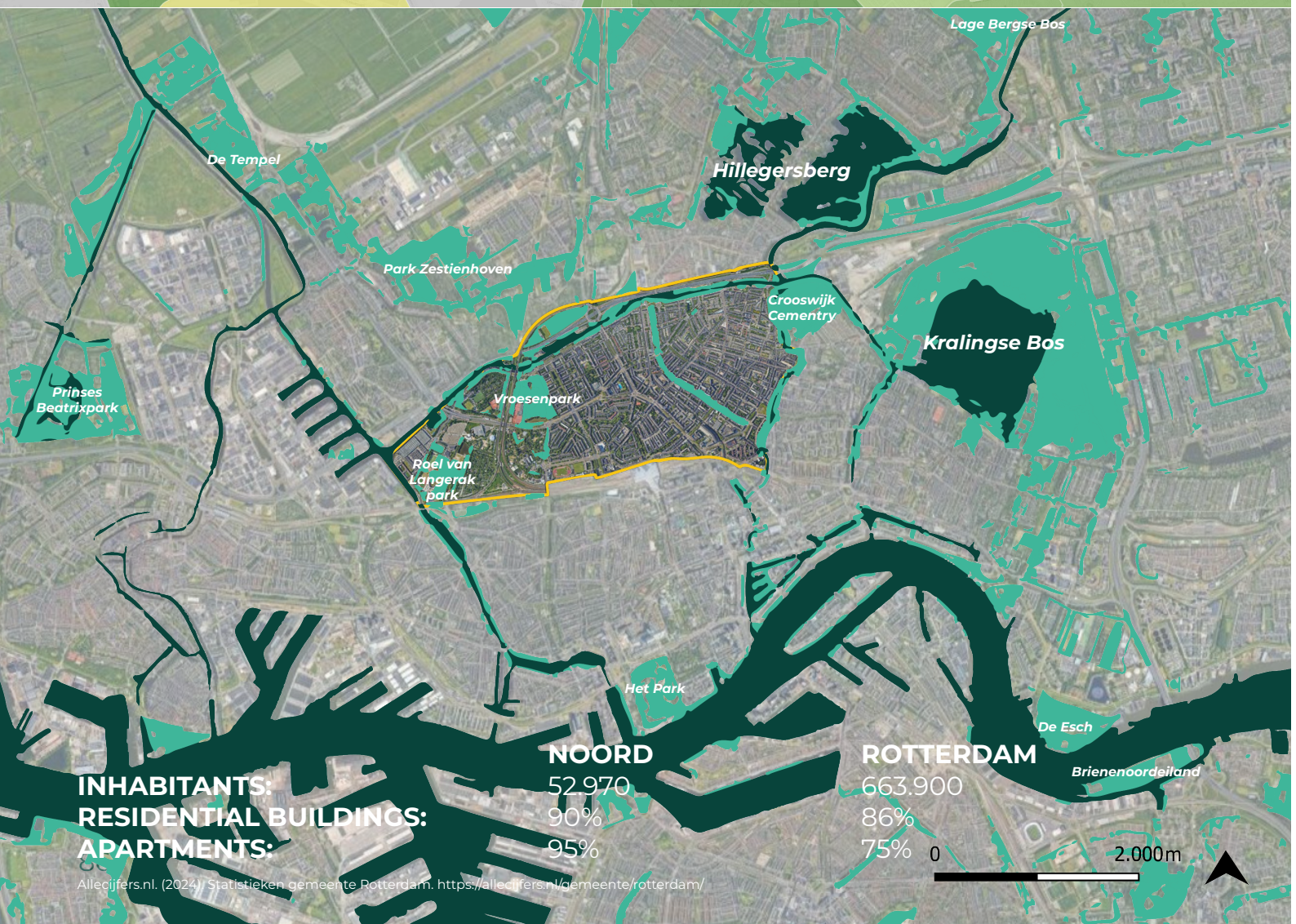




	NOORD	ROTTERDAM
INHABITANTS:	52.970	663.900
RESIDENTIAL BUILDINGS:	90%	86%
APARTMENTS:	95%	75%

Allecijfers.nl. (2024). Statistieken gemeente Rotterdam. https://allecijfers.nl/gemeente/rotterdam/

Main structure

Zooming in on Noord, the main structure can be divided into a roughly three areas (figure 6.1.2.5). Details on the spatial analysis on which the main structure is build can be found in appendix 10.6. The concept of 'Stadspark West' is a grassroot initiative rebranding the green area in the west of Noord in order to secure its existence, which is endangered by urban development plans. Public, semi-public and private functions can be found here, including the allotment gardens, self-managed and municipal parks, the Blijdorp zoo, sports fields, the marina and other recreational functions, such as a natural and a dogs playground, the Bikepark, horse riding school and the camping site. Natural areas without access for humans can also be found here.

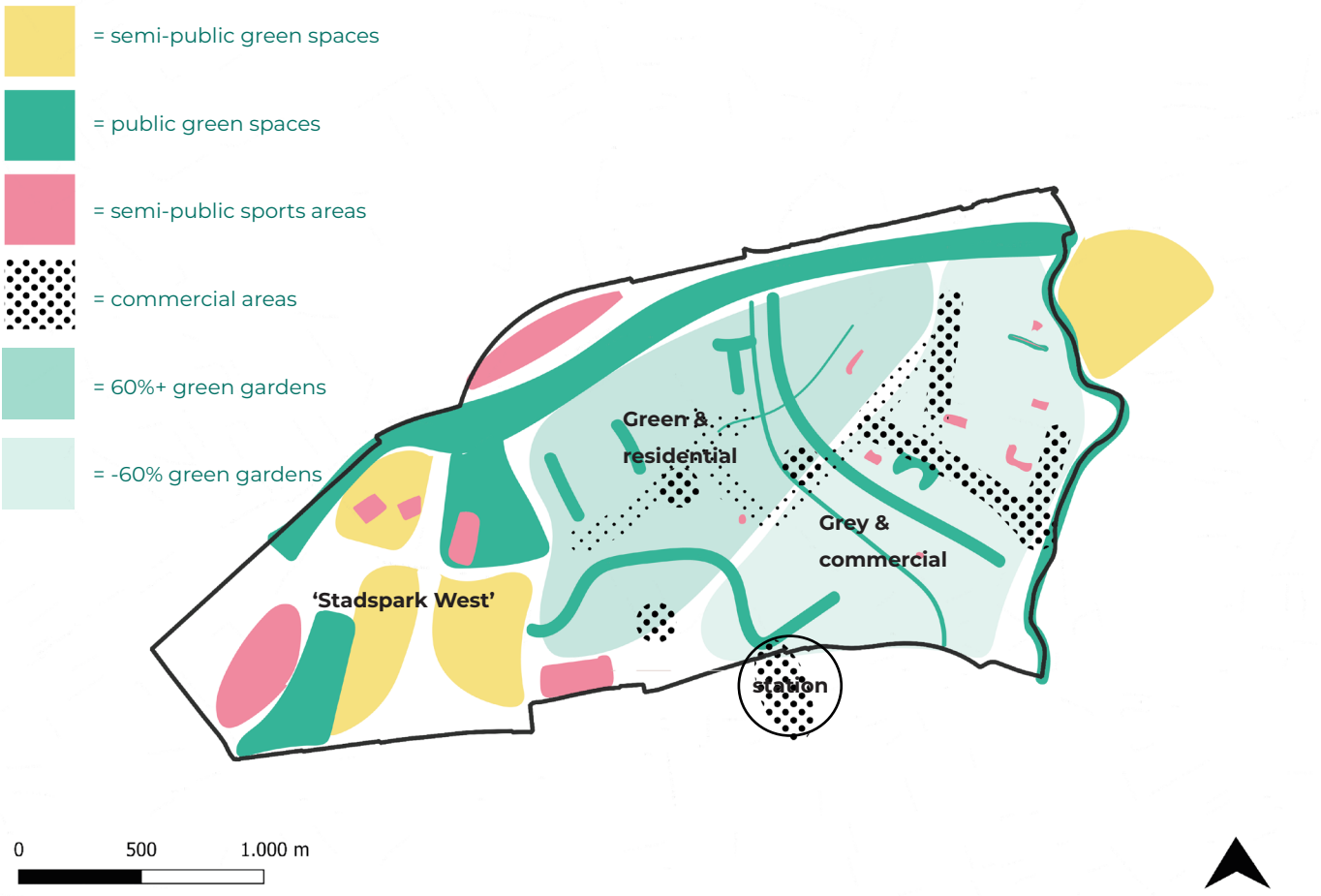
Bordering 'Stadspark West' and the Noorderkanaal, the second identity can be distinguished. This relatively green, residential area has green gardens, less function mix and several smaller parks. Compared to the former, the residential area in the east has a dense, grey and commercial character. Offices and higher educational functions concentrate around the train station area.

The whole neighbourhood is connected by the singels and waterfronts. Green bottom-up initiatives can be found through the whole neighbourhood, such as community gardens and stewardship practices.

Figure 6.1.2.3 (upper left): % of greenery per neighbourhood.

Figure 6.1.2.4 (lower left): The neighbourhood of Noord and the main green spaces in Rotterdam.

Figure 6.1.2.5 (below): Main spatial structure of Rotterdam Noord.



Urban Nature Types

The Urban Nature Types-diagram is used in order to analyze the different types of urban nature with each their own nature experience, of which an explanation can be found in appendix 10.5.

The types of local greenery can be positioned within the diagram (figure 6.1.2.6) and be projected onto the map to get an overview of the Urban Nature Types (UNTs) in Noord (figure 6.1.2.7). The biggest variety of UNTs can be found around 'Stadspark West', where the nature-interaction at the allotment gardens, nature-based playground Speeldernis, and the Vroesenpark standout most. The sports areas represent high human activity, but limited vegetation. The Blijdorp Zoo embodies a large area and represents a recreational, but educational nature experience. Although several small parks can be found, the residential area only has limited options for diverse local nature experiences, where the waterfronts and singels mostly offer structured vegetation and the activities are limited to strolling and dwelling. The Crooswijk cementry in the east has a unique immersive character, but also has limited types of nature interaction. Overall, there seems to be a lack of possibilities for exposure to dense natural areas, and both types of active and passive activities.

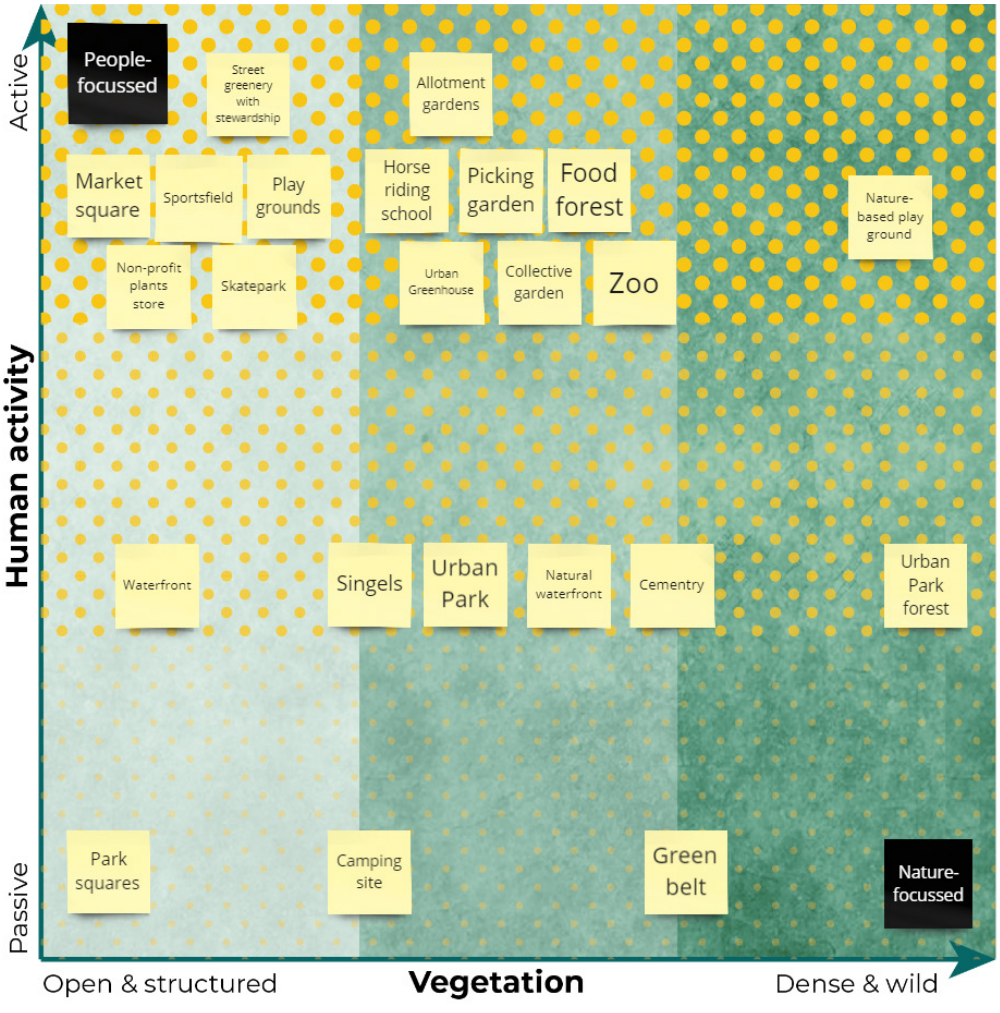
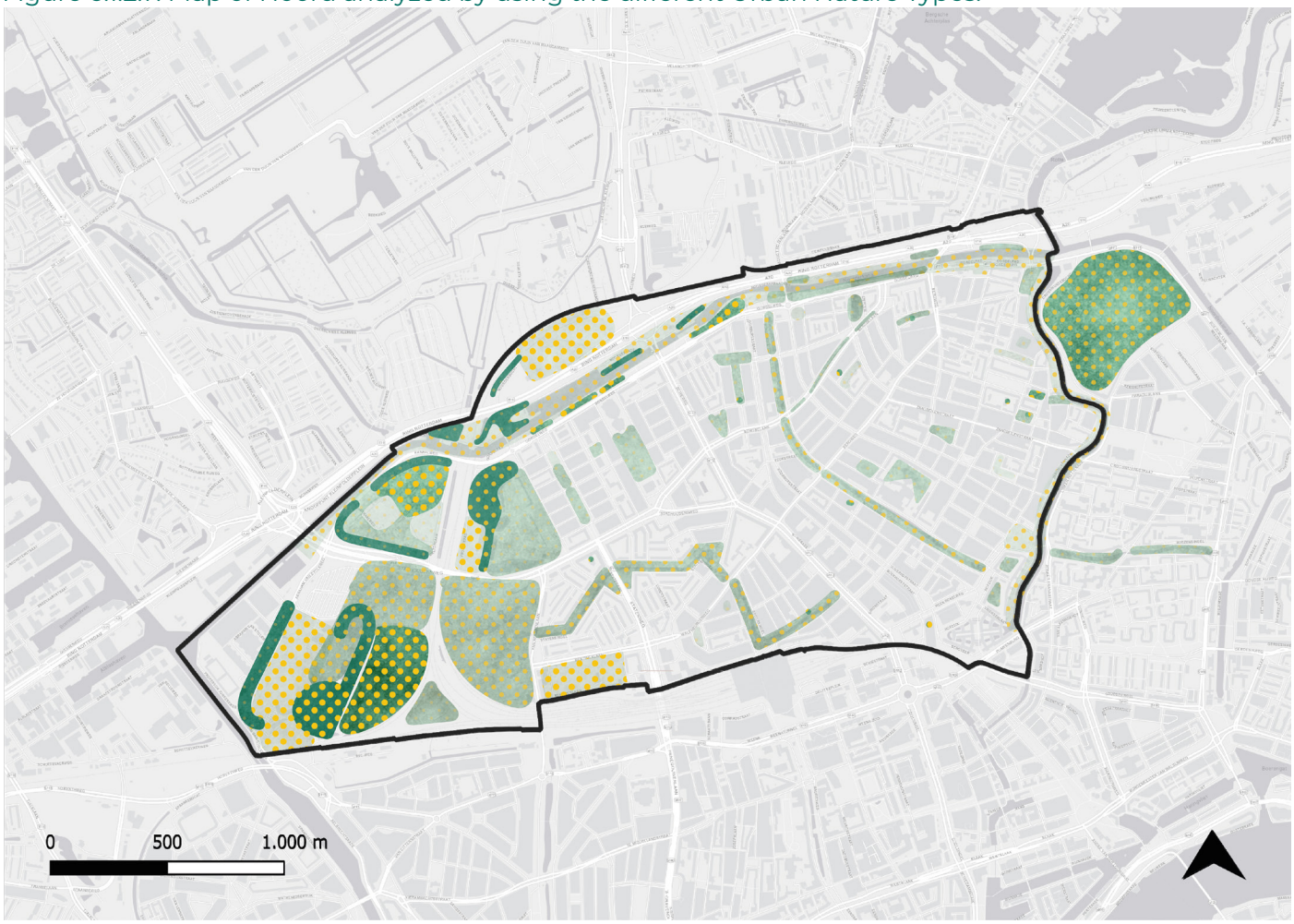


Figure 6.1.2.6: Diagram with Urban Nature Types accompanied with explanatory spatial functions.

Figure 6.1.2.7: Map of Noord analyzed by using the different Urban Nature Types.



Population of Noord

The inhabitants of Noord exhibit several distinctive characteristics. The neighborhood boasts a significant population of individuals aged 25-45 (figure 6.1.2.9), surpassing the city's average by over 10%, yet there is no notable increase in the proportion of children. Moreover, the education level in Noord is notably higher, with approximately 16% more highly educated citizens than average. Additionally, Noord showcases a diverse mix of migration backgrounds, potentially fostering cultural diversity and varying perspectives on nature. Compared to the city of Rotterdam, Noord hosts a slightly higher percentage of individuals with Western (3%) or Moroccan (4%) backgrounds, with the majority residing in the east of Noord (figure 6.1.2.8). Furthermore, the political preferences in Noord lean towards green party, which secures it to have the second-largest share of votes and is over 10% higher than average.

Given the relatively youthful, educated, and eco-centric demographic profile of Noord's residents, they are presumed to support eco-centric societal change. Therefore, the neighborhood presents a promising foundation for integrating eco-grief into the urban context.

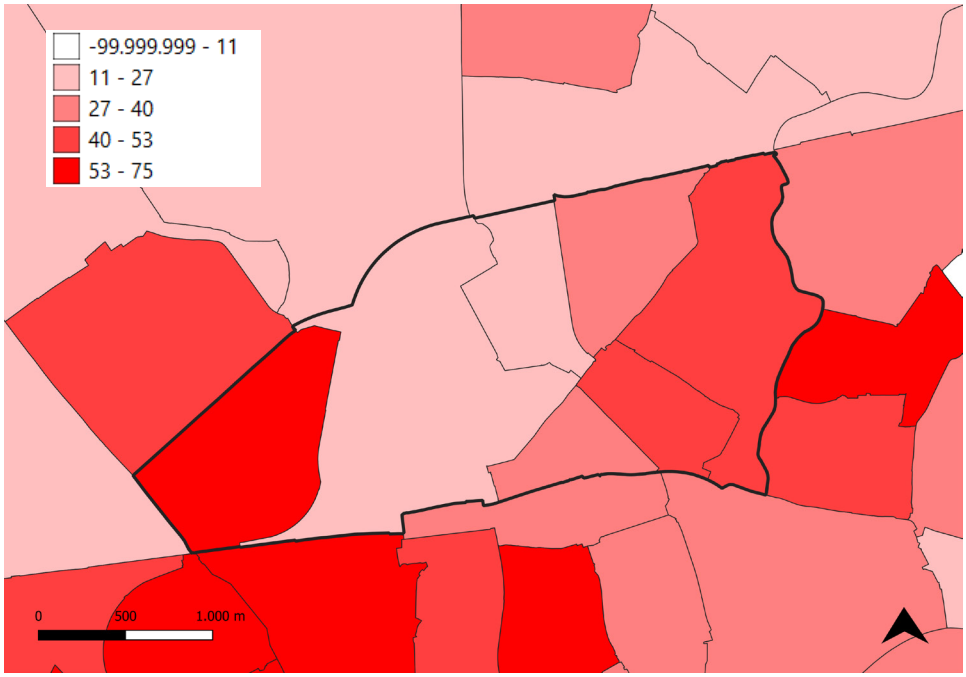


Figure 6.1.2.8: % of non-western migration background (CBS, 2021).

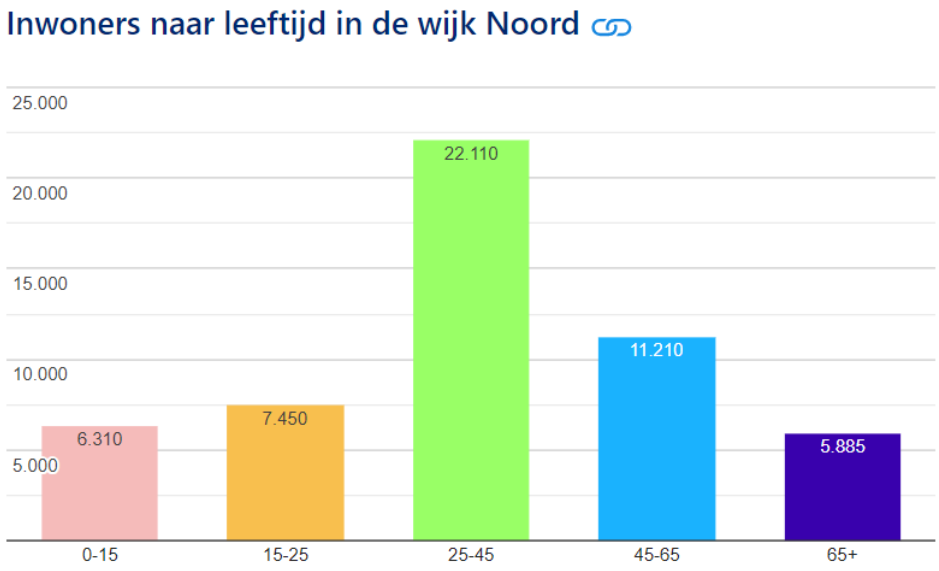


Figure 6.1.2.9: Amount of residents per age group (AlleCijfers.nl, 2024).

Conclusion - location relevance
In contrast to other eco-grief studies, this thesis focusses on a densely populated urban neighbourhood to research a novel perspective on the topic. The transitional landscape of Rotterdam Noord, located in the strongly urbanized province of Zuid-Holland, illustrates the differences of vegetation density and human activity within an urban area at the edge of the city center. The constrasting Stadspark West and the mixed residential areas, as well as the eco-centric character provide a promising opportunity to explore urban eco-grief.

6.2 Biophysical factors

For the biophysical factors, the categories of environmental losses as identified by Benham & Hoerst (2024) will be used for the analysis to identify how the planetary crisis translates to the local level (RQ1). Climate change and other extreme weather events will be combined. Thereafter, a policy analysis on biodiversity and a reflection of the historical development of the urbanization and waterways follow. Finally, the risks of pollution are identified. It is assumed that mining and petroleum, agricultural/soil erosion/land degradation, and tourism are not applicable in the urban context of Rotterdam Noord. Soil and land subsidence are touched upon in the section on climate change and pollution.

6.2.1 Climate change & extreme weather

Climate change functions as an amplifier of pre-existing environmental threats that relate to eco-grief (Benham & Hoerst, 2024). The local climate challenges of Rotterdam Noord are therefore explored to find out how climate change translates to the local level. The Rotterdams WeerWoord is an initiative by the municipality of Rotterdam, local water boards and a national water company to make Rotterdam climate resilient. By mapping out the local consequences of climate change for Rotterdam and translating this to practical tasks, this initiative tries to involve all citizens in this transition. The identified climate tasks address precipitation, floods, heat, soil and drought. The maps in this section are based on the multiple maps included in appendix 10.6, which are modified versions of maps by WeerWoord (2024).

Precipitation

As precipitation is expected to get more extreme due to climate change, the vulnerability to waterlogging during heavy rainfall is examined. In figure 6.1.2.1, the vulnerable locations are marked that would flood after heavy rainfall of 50mm per hour. The public spaces bordering areas that are affected by waterlogging are potential spaces to serve as water buffers. The accessibility of roads and public spaces during extreme rainfall are given special attention, as it could have a disruptive effect on the bigger transport network and emergency services. Especially Oude Noorden has many main roads, cycling paths and pedestrian areas that would become inaccessible.

Floods

Rotterdam Noord lies within the dikes, so it is protected by a primary weir and will not be flooded in the case of high water levels of the Maas river. The likeliness of floods in Rotterdam Noord is once in a 100.000 years, so due to this minimal chance, it is not taken into account.

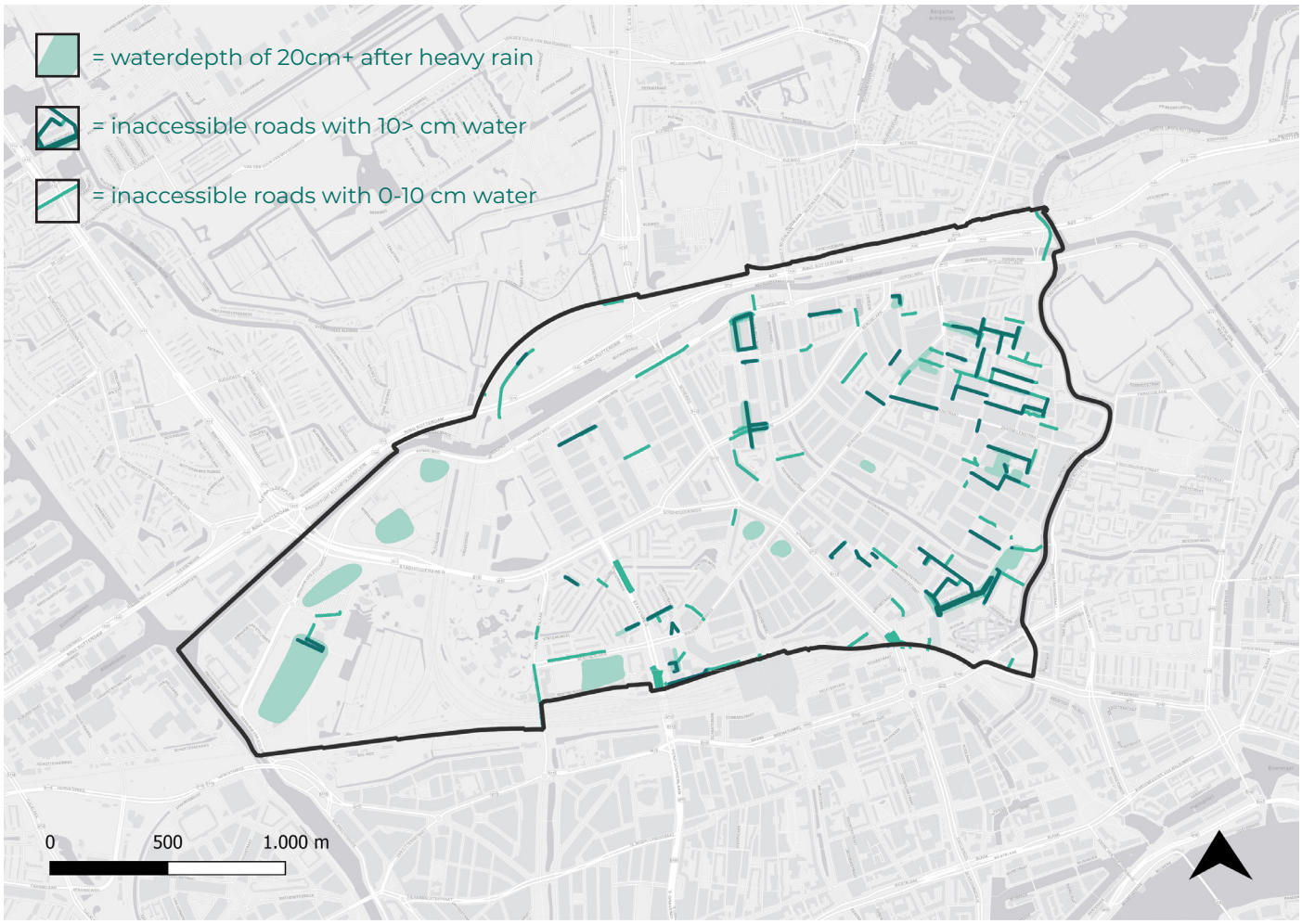


Figure 6.2.1.1: Problem map with precipitation impacts.

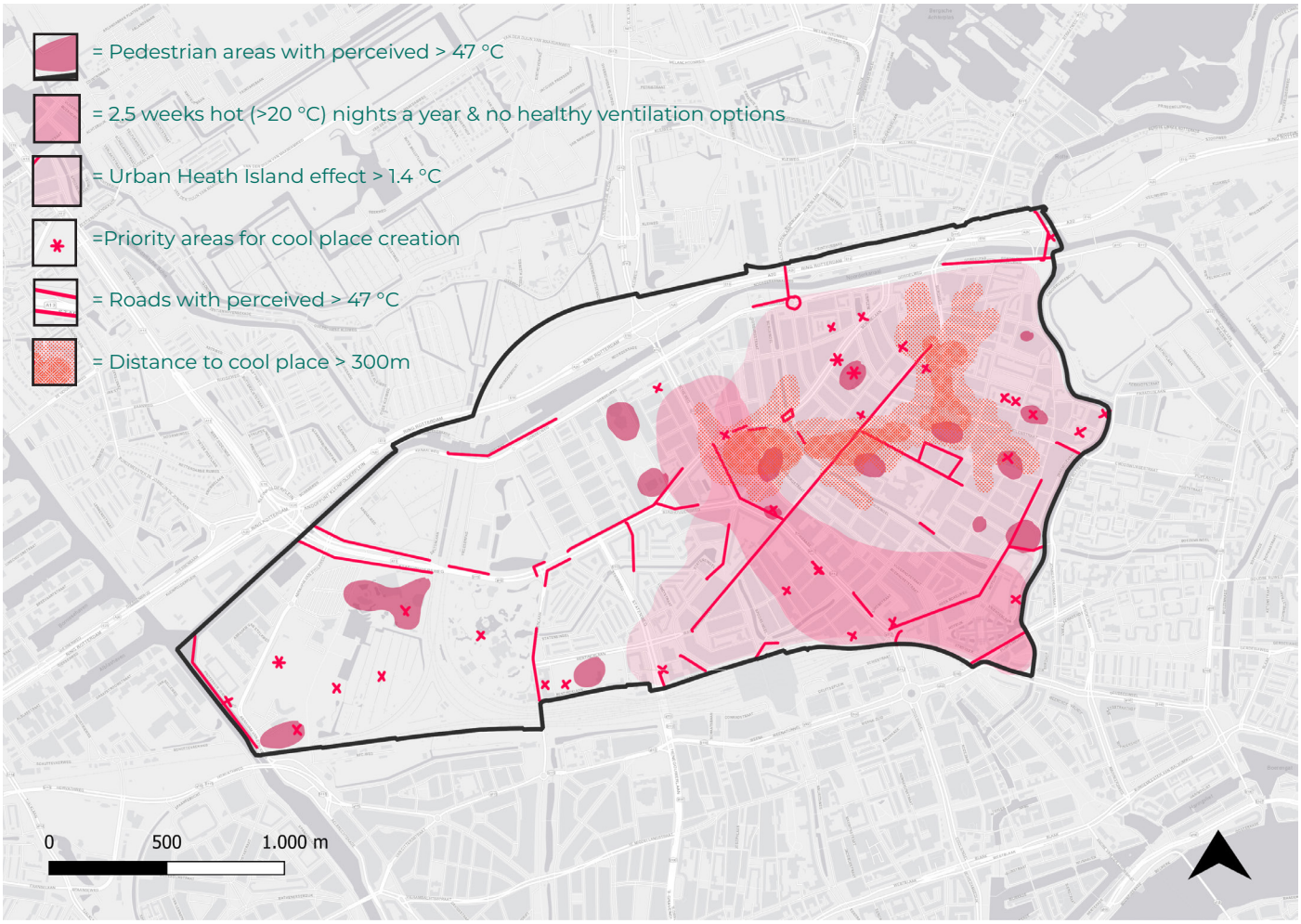


Figure 6.2.1.2: Problem map with heat impacts.

Heat

The urban heat island effect is strong in all living neighbourhoods of Noord, while a considerable drop in heat retention can be seen in Blijdorp and Blijdorpsepolder (figure 6.2.1.2) due to the large, green spaces. Most open spaces and roads might reach a high perceived temperature that goes towards 54 °C, varying locally depending on the design, shadow and paved surfaces in those areas. Many buildings in Noord have flat roofs that could be transformed to cool green-blue roofs, only Oude Noorden has less potential.

During summer, all living neighbourhoods are affected by heat stress, but the core of Noord suffers most. Approximately two weeks a year this core part deals with significantly warm nights (>20°C), which results in the need for natural ventilation. The possibilities for natural ventilation are troubled by air and noise pollution.

During the day, it is desirable to have access to public spaces under 38 °C near dwellings, meaning within 300 meters. The core of Bergpolder, Liskwartier and Oude Noorder has least access to cool public spaces, thus has the highest priority for improvements. The waterfront has a high potential to be transformed. Blijdorpdorpse polder has most existing semi-public cool areas, with the potential to make it publicly accessible during summer.

Furthermore, it is desirable for transportation routes not to reach uncomfortable temperatures for usage. Most main roads do reach a temperature above 47 °C Many walking areas throughout Noord, like parks, play and sports fields with large open and paved surfaces are strongly affected by the heat.

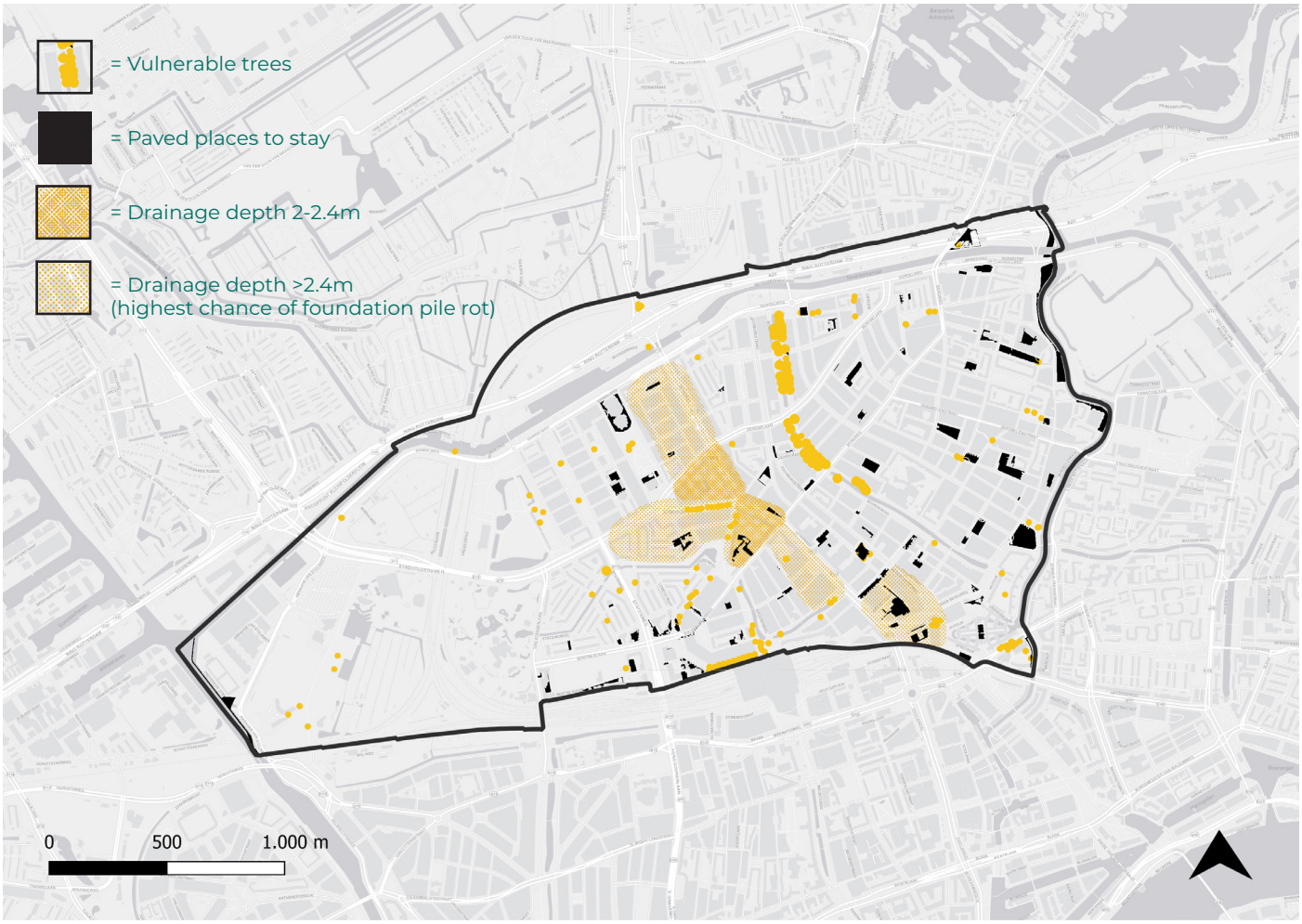


Figure 6.2.1.3: Problem map with soil and drought impacts.

Soil & drought

Impermeable surfaces limit the sponge capacity of the soil leading to droughts and flooding. Regarding this potential sponge effect, transforming the paved gardens, public spaces and schoolyards embody the biggest opportunities (figure 6.2.1.3). Moreover, greenery can be damaged by long term droughts, and consequently loose its ability to cool. Especially drought-sensitive trees and the monumental trees along the singel having cultural significance should be taken into account. In Oude Noorden, the gardens have least greenery and most paved public spaces can be found.

The whole area of Noord has a subsidence rate of 4 to 8 mm a year. Since all buildings in Noord are built before 1992, they do not conform to the current waterproof regulations and are vulnerable to water damage. Furthermore, the middle area of Noord has the highest chance of wood rot in buildings with wooden foundations in periods of drought. Besides that, the resulting rise of the groundwater level can destabilize trees.

Conclusion

In order to localize and expose the impacts of climate change, the following chances are identified:

- Utilize **rainfall and heat** in public spaces and transportation routes
- Utilize **sustainability transformations**, usually greenification:
    - Sponge capacity
    - Green-blue roofs
    - Cool areas
- Utilize **vulnerable trees** as visualization to indicate environmental changes (subsidence and changing ground water level)
- Reveal **spatial injustices**, regarding buildings in risk areas and heat.

6.2.2 Biodiversity

The current condition of the biodiversity in the city of Rotterdam is explored through municipal documents and an expert interview (appendix 10.7) as it is the third type of possible biophysical losses. Biodiversity is described as foundational for a healthy and robust ecosystem, including clean water and air, the mental health of citizens and the possibilities for relaxation, recreation and education (Gemeente Rotterdam, 2023a, 2023b). The importance of urban environments for animals and plants is starting to get recognized since many cities are currently more biodiverse than rural areas due to a larger variety of biotopes and less toxic pesticides (Ojala & Cambell, 2020). However, the biodiversity loss in the whole of the Netherlands, as well as in urban areas has drastically decreased over the past centures (figure 6.2.2.2; figure 6.2.2.3). In total, 40% of the greenery in Rotterdam in municipal ownership. Therefore, the municipal plans regarding greenification and biodiversity will be discussed.

Groen Agenda

The current policy goals of the municipality of Rotterdam regarding greenery is noted in the action plan 'Rotterdam goes green: Groen Agenda 2023-2026'. Climate adaptation, livability of the city and the wellbeing of Rotterdammers are mentioned as main drivers. The municipality described 6 action directions:

- Green close to home
- Green in the neighbourhoods
- The transformation of 15 squares
- Green routes along the water
- Improving existing parks
- Biodiversity and cherishing greenery

Along with greenification in the city comes maintenance, which is sporadically mentioned in the Groen Agenda. On the section about greenery on the municipal website, maintenance and stewardship are mentioned in various sections (figure 6.2.2.1). The neighbourhood director, or 'wijkregisseur' of the Stadsbeheer department, is the main contact for stewardship initiatives, and could connect citizens to the neighbourhood gardener (wijktuinman) as noted in the 'Zelfbeheer' section. The green real estate agent (groenmakelaar) can inform you about all the green plans in your neighbourhood. Also, there is a 'right to challenge' possibility that citizens can use if they want to take over municipal tasks. An overall vision on maintenance and stewardship seems to be missing.

Biodiversiteitskader

In 2019, urban ecologist De Zwarte stated that the municipality of Rotterdam was still lacking a proper nature policy. Recently, the urgency was acknowledged

leading to the creation of the municipal document 'Biodiversiteitskader' (2023), which will be evaluated together with its implementation plan to get a better understanding of the current state of biodiversity in Rotterdam. This documents illustrates the ambitions of Rotterdam and the role of ecology in the local maintenance, developments and design of the city.

The 'Biodiversiteitskader' elaborates on the biodiversity aims for the upcoming years and describes the way how ecology will be integrated in the maintenance, design and development of Rotterdam. The importance of nature in the city as the foundation for health and resilience, as well as the degradation of the quality of nature are acknowledged. However, it is also stated that flora and fauna are often compromised in favor of other developments. The focus of the 'Biodiversiteitskader' lies on expanding missing links, nurturing existing green gems, enhancing diversity and natural values, connecting the current green structure to the local and regional network and improving the water system. Existing legislation regarding biodiversity already address the protection of natural areas and species, nitrogen reduction, water quality and the national ecological network. The following issues are mentioned: soil degradation, impervious areas, design and maintenance of greenery, light pollution, nitrogen emissions, invasive species and climate change.
The current state of biodiversity is addressed shortly. There is a global and national declining trend regarding species diversity with an astonishing 85% of Dutch indigenous species that has disappeared. PBL indicates that the number of urban animals has decreased with 50% since 1990, and emphasizes the need to improve the urban living conditions. Rotterdam itself scores worst on ecological capital of all Dutch cities (Telos monitor). The first version of the Nature Indication Map shows the neighborhoods that need attention in orange and red (Figure 6.2.2.4). Especially, neighbourhoods with a large proportion of impervious areas have a low score. As municipal ecologist Van Veldhuijsen (in Sebregts, 2022) explains that 'just' greenification is not enough, but location specific solutions are necessary. This need exposes the insufficiently mapping of the flora and fauna in certain areas of Rotterdam. In order to make a comprehensive assessment, the limited observation data has to be improved. Therefore, a city-wide monitoring network (Figure 6.2.2.5) is established that is supposed to start keeping track of the biodiversity conditions, with multiple measuring locations in Noord. Over time, it will provide the necessary insights on the conditions and the effects of the taken measures. Thus, there are major biophysical losses regarding biodiversity, but up till now it has been insufficiently mapped to point to specific

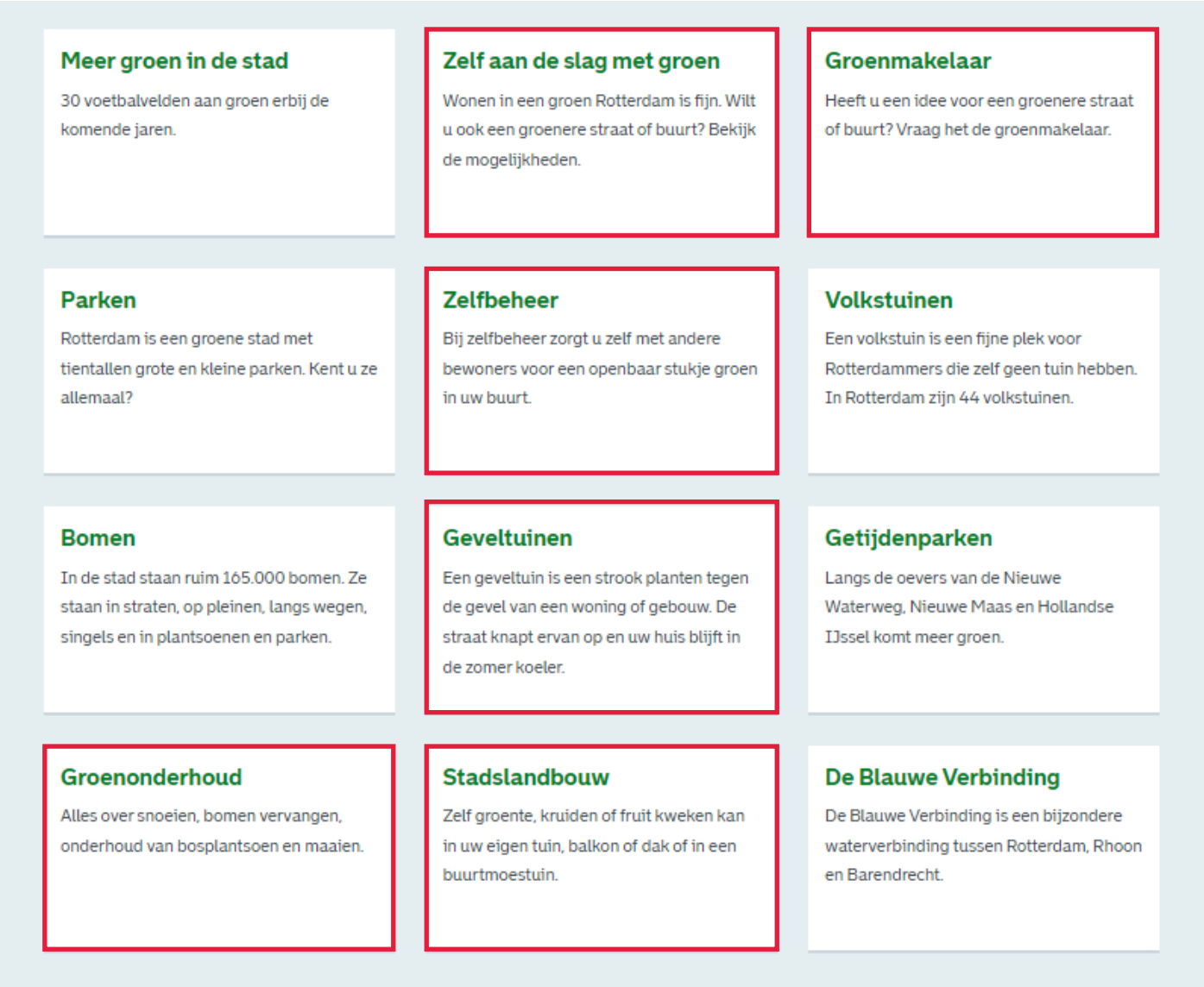
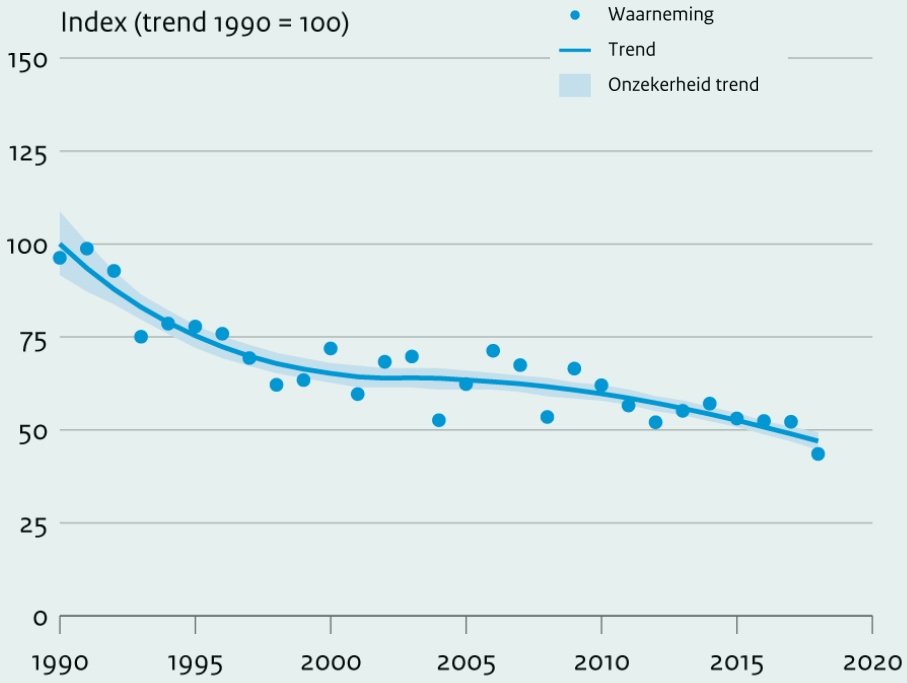
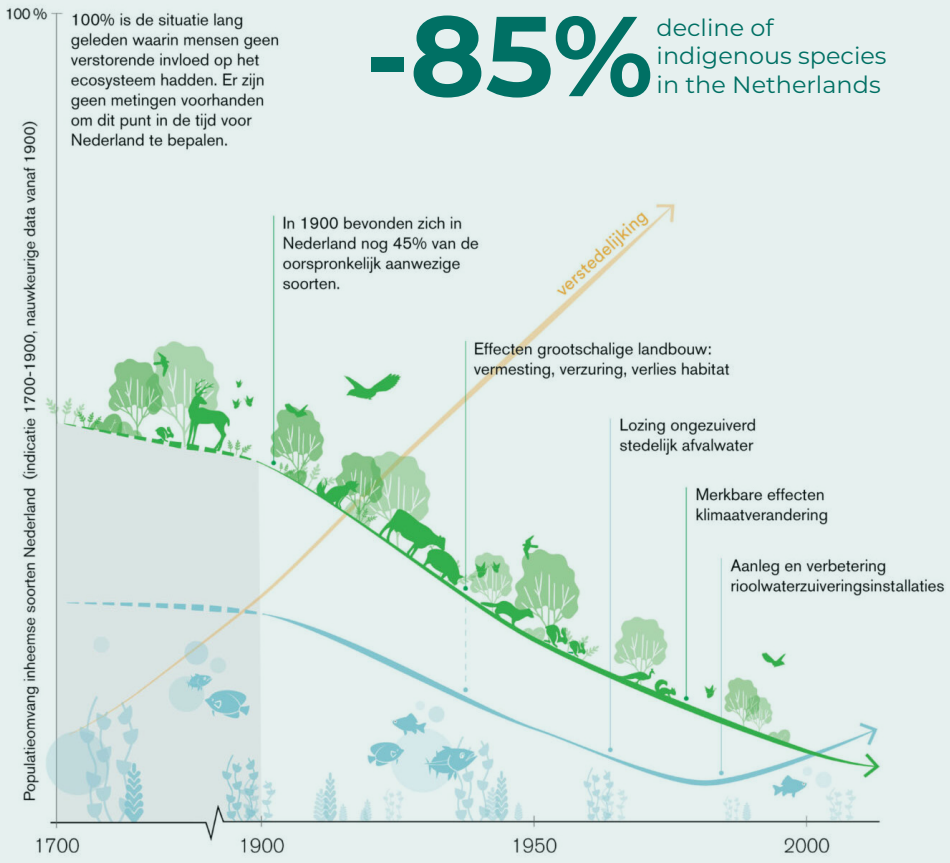


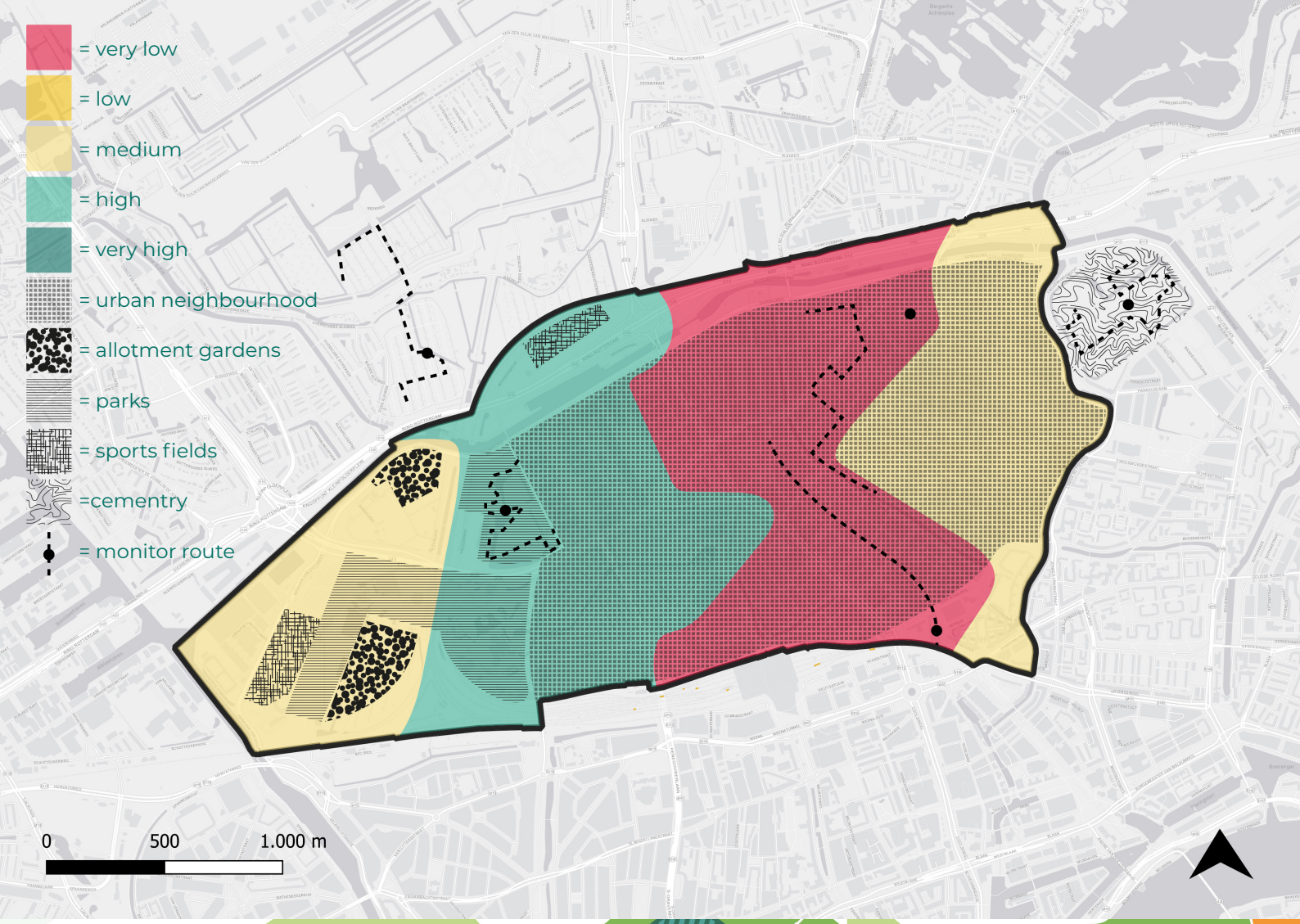
Figure 6.2.2.1: Screenshot of the municipal website of the section about greenery.

Figure 6.2.2.2: Fauna in urban areas (CLO, 2020)

Figure 6.2.2.3: Biodiversity in the Netherlands (De straaDkrant, BoschSlabbers & Buro Bergh, 2022)






= very low
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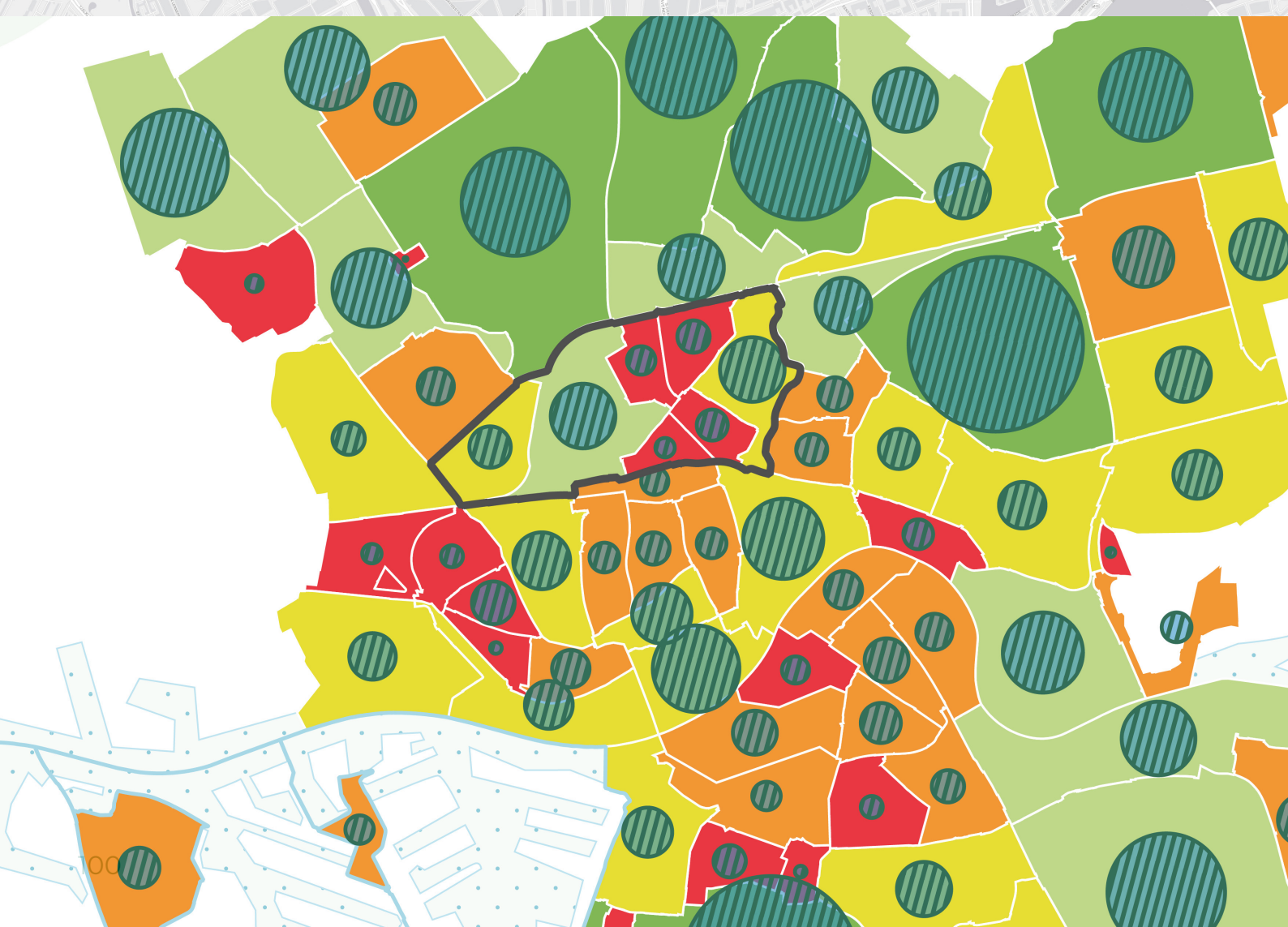


Figure 6.2.2.4: Biodiversity rating , biotope types and monitoring routes.

Figure 6.2.2.5: Nature indication map (Gemeente Rotterdam, 2023)

species per neighbourhood.

In the Biodiversiteitskader and its implementation plan the following topics are discussed in more detail: ecology, integration, monitoring and anchoring of the biodiversity plans.
The base for the documents is constituted by the ecological perspective, starting with the prerequisites for ecology that animals and plants need to survive, namely the 4 V's: Voedsel(food), Veiligheid(safety), Verbinding(connections) and Verblijfsplek (a place to stay). The 4 V's are used to meet the needs of the 'guiding species', which are needs that other species can also benefit from. Moreover, the city is subdivided into biotope types (Figure 6.2.2.4) that are associated with a selection of 'guiding' species. Rotterdam can be divided into several core biotopes. Noord mainly consists of the core biotope called the 'urban neighbourhood'. Urban neighbourhoods, mostly build between 1900-1930 envelope around the city centre are characterized by the narrow street profiles with a network of urban trees. The urban neighbourhood is not the most green biotope, but due to its age it is a ecologically well-developed biotope. Besides the biotopes types, the ecological structure (Figure 6.2.2.7) connects the main green areas, such as the urban parks, singels, waterways and outer green areas. The need to expand and strengthen this structure and its connections is noted in the document. The big challenge for these intensively used urban biotopes is to connect the green structures on several habitat levels (air, ground, water) to meet the needs of the guiding species. This means that all the green elements should be connected: tree rows, verges, plant boxes, as well as backyards.
In addition, an integral approach to the municipal tasks regarding biodiversity, climate adaptation, greenification and the decrease of traffic is described in the Green Agenda. The need for collaboration with other stakeholders is also noted as much of the green and blue infrastructure is privately owned. The maintenance is mentioned as a driver of improvements and conservation. The campagne 'de 10 van 010' has been deployed to raise awareness for the importance of biodiversity. One of big green-blue tasks is about the greenification and implementation of nature-friendly river banks.
Furthermore, the monitoring and managing is mostly directed on the long term to keep track of the climatic developments and robustness of the ecosystem. The biotope types form the base for the monitoring network (figure 6.2.2.6) and a division is made between flora, dragonflies, birds, bats and amphibians. The municipality is planning on starting a collaboration with citizens science in combination with a two-yearly event to gather and share the data with residents, as well as raise awareness

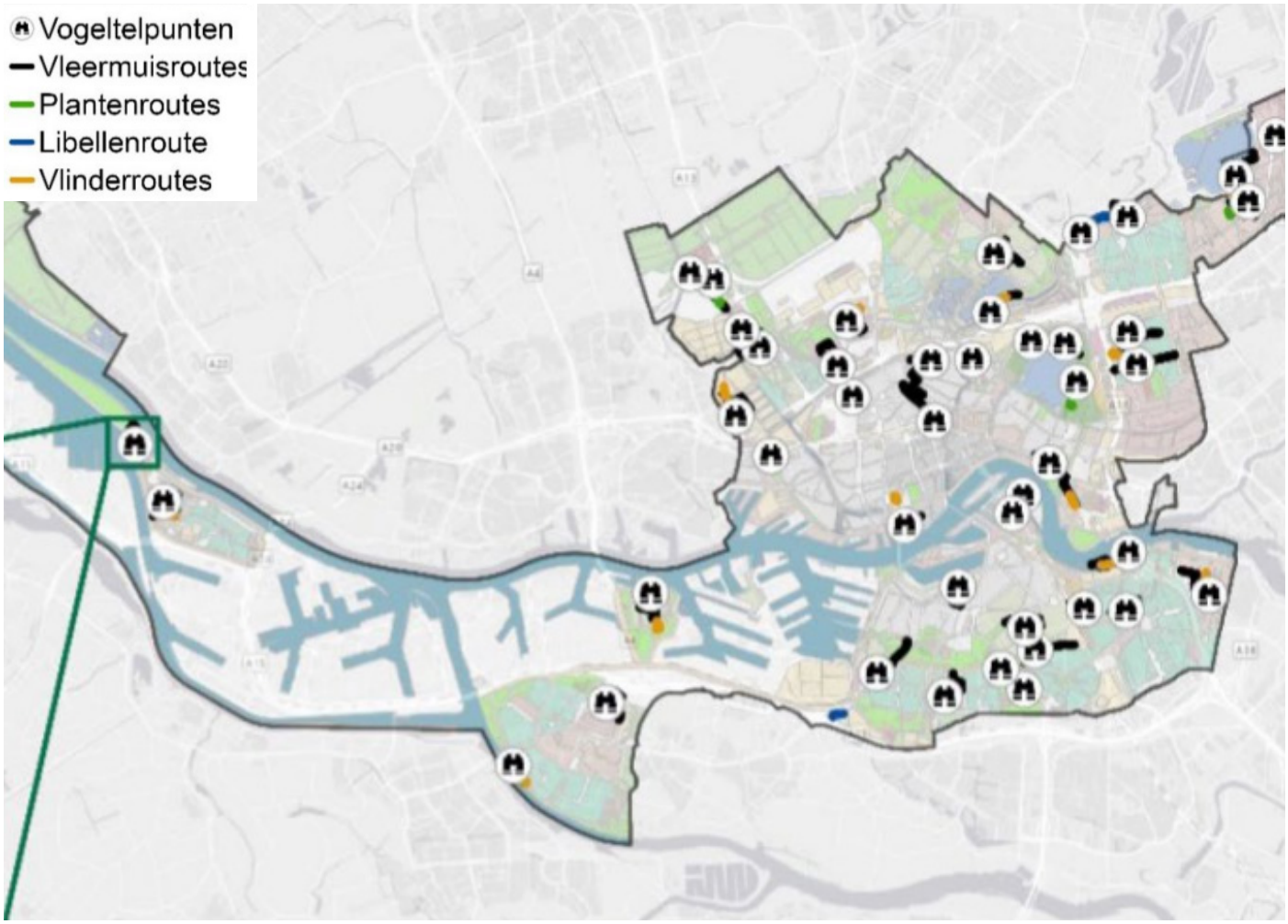
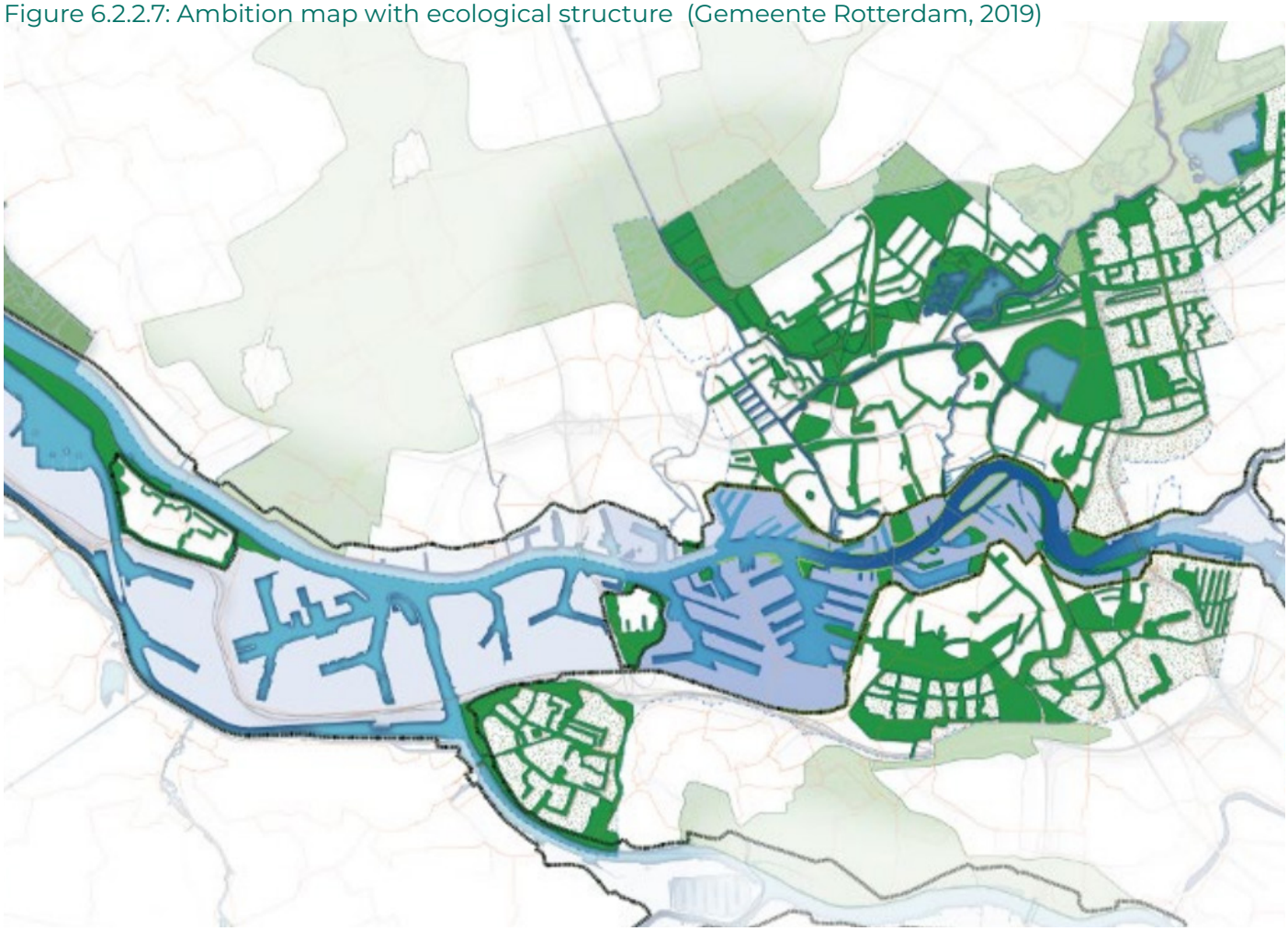


Figure 6.2.2.6: Monitoring network map (blurred as in original) (Gemeente Rotterdam, 2023)

Figure 6.2.2.7: Ambition map with ecological structure (Gemeente Rotterdam, 2019)



and engagement, as the monitoring of biodiversity is best done by people. An ecological green-blue structural plan, urban biotopes and a baseline for nature quality are also being developed.
Lastly, on multiple scales the biodiversity plans will be anchored in the city with the municipality as a learning organization. Special attention is given to the Species Management Plan (SMP) due to the need to value and protect urban and local nature. Due to the interconnection of biodiversity with climate adaptation, health and nature, an integral approach to urban challenges is mentioned. The multiple scales are also apply to the collaborations with national, regional and local partners and existing green initiatives. A close collaboration is set up between Programma Biodiversiteit, the Programma Weerwoord, 'Rotterdam gaat voor Groen' and the municipal management and maintenance.

Conclusion
The following conclusions are drawn about the localization of the biophysical losses regarding biodiversity:
- The role of citizens is only minimally mentioned.
- Specific data on the neighbourhoods is very limited, which complicates the identification of local environmental losses, but a monitoring plan has been developed.
- The condition of the biodiversity is only discussed in a general way and not connected to more specific and tangible elements, like the guiding species. This is a chance for citizens to get a better understanding of the biodiversity crisis and what is being lost.

6.2.3 Urbanization & infrastructure

Dams, river engineering and urbanization are also identified as potential biophysical losses as these have the power to change the landscape.
The historical development from 1900 to now is mapped out in figure 6.2.3.1-6.2.3.4. The urbanization process had a huge impact on the waterways of the area of Noord. Throughout last century, many small waterways disappeared and were replaced by the manmade Noorderkanaal and the singels.
It is striking that most available history of the neighbourhoods of Rotterdam Noord are about the urbanization (Wikipedia, 2024) as if there ware no previous inhabitants. However, the biggest area of Rotterdam Noord only got urbanized between 1900-1950. Before this, the typical Dutch landscape consisted of small-scale agriculture divided by natural barriers (Ministerie van Onderwijs, Cultuur en Wetenschap, 2017). This type of landscape used to be much more biodiverse than the large-scale monocultures of today, being home to animals such as meadow birds.
The development of the urbanization in Noord might not be related to a conscious loss of landscape for the current inhabitants as this already happened about a century ago, but it still strongly influences the lives of its residents. The transportation network results in several clashes between infrastructure and other functions, such as interrupting neighbourhoods, parks and singels. The main transportation lines through Noord vary in scale and function (Figure 6.2.3.5). With their high usage intensity, several 50+ km/h roads and especially the A20 as a part of the Rotterdam Ring create boundaries shaping the experience of Noord.

Figure 6.2.3.1: Water ways and urbanisation in 1900

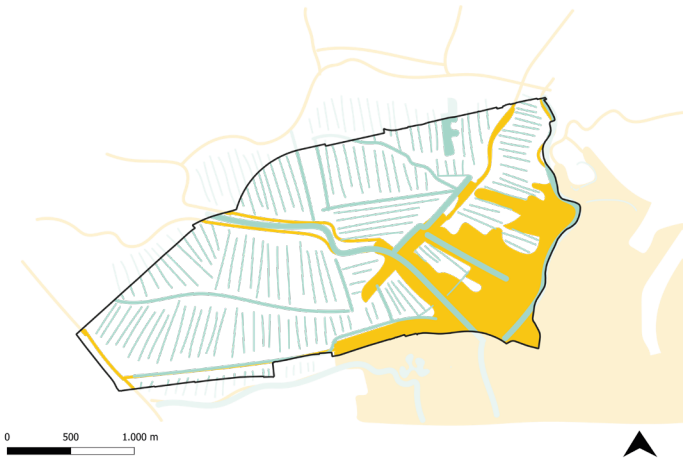
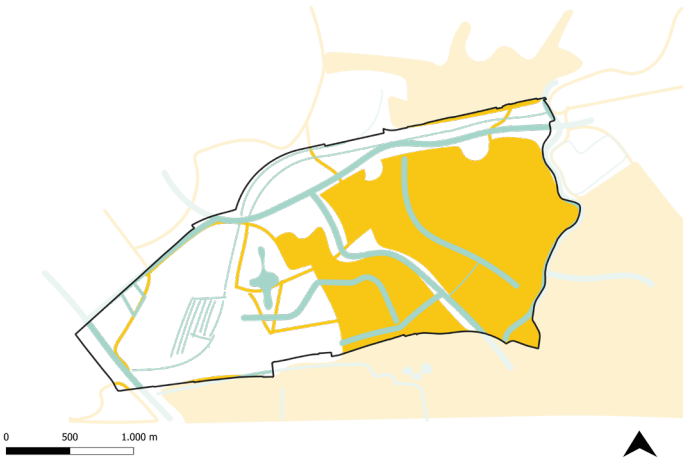


Figure 6.2.3.2: Water ways and urbanisation in 1940



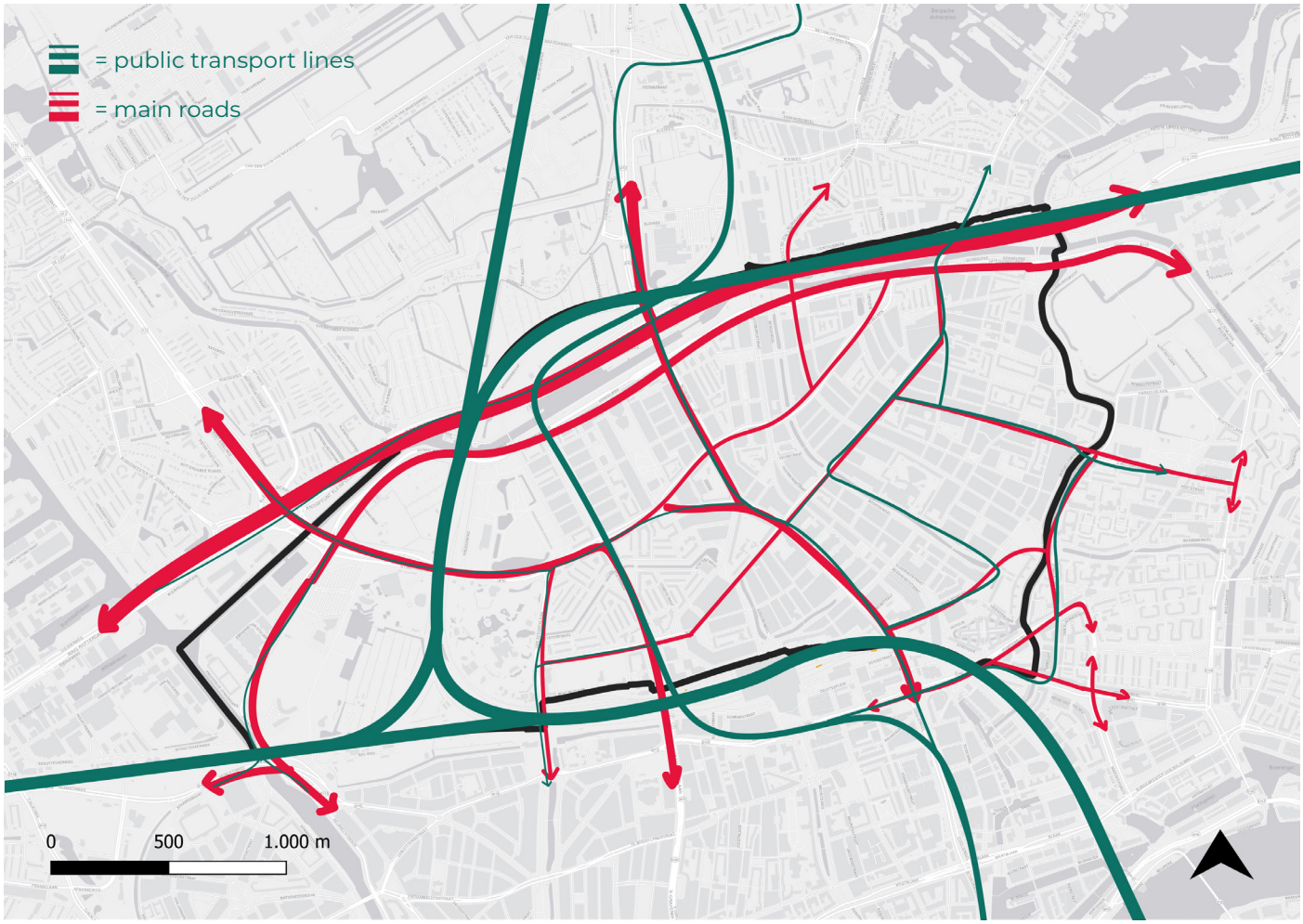


Figure 6.2.3.5: Main infrastructure lines, indlucing roads and public transport.

Figure 6.2.3.3: Water ways and urbanisation in 1980

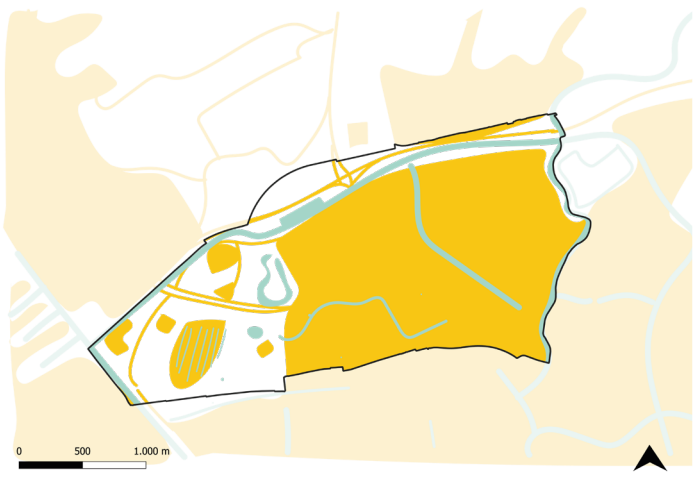
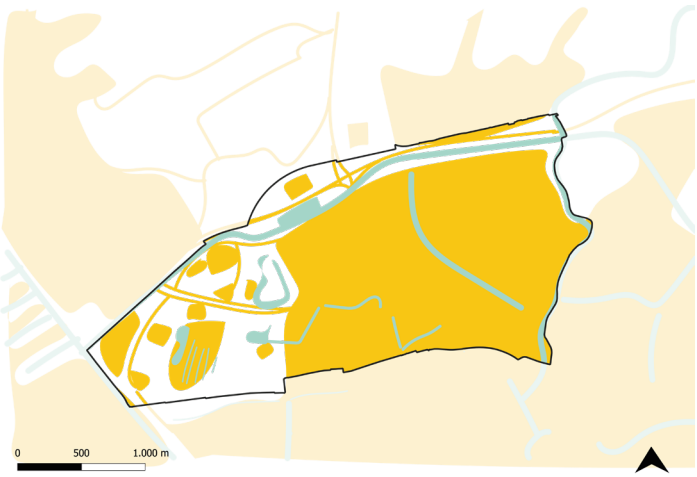


Figure 6.2.3.4: Water ways and urbanisation in 2020



Conclusion
The following opportunities and threats regarding urbanization and infrastructure are identified:
- There is a opportunity to raise awareness about the natural history of the area of Noord.
- The landscape has strongly changed in the last century losing agricultural land and waterways.
- Several clashes can be found between the infrastructural lines and the urban fabric, including the green areas of Noord.

6.2.4 Pollution

Figure 6.2.4: The municipality of Rotterdam is contributing to a healthy living environment through air, noise, soil quality and external safety (Gemeente Rotterdam, 2021)

Pollution is also considered as a biophysical loss that could cause feelings of eco-grief. In the urban landscape, pollution manifests in various forms, of which the following will be discussed: air, soil, water, noise and light pollution. The municipality acknowledges the health challenges of the urban living environment, involving clean air, qualitative soil, balancing of action and quiet and the protection against industrial risks in their policy documents (Gemeente Rotterdam, 2021) (figure 6.2.4). More details on pollution mapping can be found in appendix 10.6.

Air
The amount of air pollution, mainly stemming from traffic and industry, can be based on the harmful particles that could have a acute effect on the health of citizens and ecosystems alike. The less of these harmful particles, the better the air quality. Although the air quality in the Netherlands strongly improved over the last decades, the country still largely exceeds the WHO advisory limits (Atlas Leefomgeving, 2022) to prevent health damage, with an emphasis on the Randstad and main highways. Especially harmful are particulate matter and nitrogen dioxide, causing respiratory problems and cardiovascular diseases for humans. Currently, air pollution encompasses 75% of the environmental contribution to the burden of diseases. The overall impact on health of air pollution (3%) is comparable to the consequences of obesity (3,7%) and lack of exercise (2,3%) (Ministerie van Volksgezondheid, 2018). Air pollution does not only affect humans, but it also throws ecosystems out of balance (Milieucentraal, 2024). An excess of ammonia, from agriculture, and nitrogen dioxide, from traffic and industry, results in the overgrowing of certain plants decreasing biodiversity.
For particulate matter, Rotterdam meets the current European legal standards, which are less strict and to be updated towards the WHO guidelines, but for nitrogen even the European standards are not met (Gemeente Rotterdam, 2024). In figure 6.2.4.1 and 6.2.4.2, the cumulative environmental health risk (EHR) of noise and air quality is mapped out. The EHR indicates how much of the total disease burden is attributed to environmental noise and air pollution in percentages. A high EHR can be observed in the Randstad, meaning that citizens here have a greater chance of getting sick due to environmental

factors than people in the less densely polulated provinces of the Netherlands. Within Rotterdam Noord, the pollution of the main traffic arteries and urbanized area can be recognized. (Atlas Leefomgeving, 2022)

Noise

Noise pollution refers to the presence of excessive or disturbing noise in the environment. Unwanted noise can cause annoyance and health problems, like high blood pressure. Sources of noise pollution include road and train traffic, aircraft and industrial noise. Pleasant noises on the other hand can help to recover from stress, like the sound of flowing water. Outside of cities several silent areas are appointed where several rules apply, such as no motorized traffic, large-scale events and other sources of noise. Local sounds are allowed as they are part of experiencing the rural area as long as they do not long lastingly exceed 40 decibels, which is comparable to the sound of singing birds. Although awareness is raising on this topic, like the innovative inclusion of an auditive design for the new Hofplein in Rotterdam, overall noise pollution is a present problem throughout cities.

Soil

The previously discussed air pollution can result in soil pollution. The excessive nitrogen can acidify the soil, also contributing to biodiversity decrease. Moreover, an acidic soil may have difficulty retaining minerals such as calcium and magnesium, which are important nutrients for plants. An acidic soil also contains less lime, which can ultimately be a problem for the birds living there. Research on coal tits, for example, has shown that they have weak bones in certain areas due to insufficient calcium in their diet (Milieucentraal, 2024).

The municipality of Rotterdam acknowledges the major role of the soil in the energy transition, greenification and water management (Gemeente Rotterdam, 2021). Due to the industrial activity, the city was faced with major soil pollution that came to light in the 1980s. Although the most and worst cases have been remediated, it remains a time-consuming task. Nowadays, companies are held responsible for their environmental damages. The city is divided into functional zones that require a certain minimal soil quality, with Rotterdam Noord consisting of the living function. However, most of Noord has the quality of an industrial area as shown in figure 6.2.4.6. This mismatch in urban areas is mainly caused by lead pollution. This kind of pollution is specifically bad in Rotterdam due to lead white factories that used to be located there. The presence of lead involves health risks, especially for children and gardeners. In certain areas (red and orange in figure 6.2.4.5), measures should be taken by citizens in order to prevent direct contact with the soil.

Water

Connected to the soil is the groundwater, constituting the underground system. So, a polluted soil goes hand in hand with polluted water and fueled by runoff from urban surfaces. Being part of a delta region, Rotterdam has many ditches, singels, ponds and lakes. The responsibility for the quality of the surface water lies with the municipality and requires maintenance activities, like dredging, mowing, weeding and dirt fishing. Moreover, the municipality has a strategy for waste-free water ways: Marien Zwerfafval, consisting of multiple collaborations and initiatives.

The presence of certain substances has effects on life in and around water, which is referred to as toxic pressure (figure 6.2.4.7). In Noord, the water life is suffering from high toxicity at several locations As only surface waters with low toxicity maintain a healthy ecosystem, bad water quality results in decrease and disappearance of species. Over the past few decades, water quality has significantly improved due to measures taken at local, national and European levels. However, it still does not always meet the standards, and

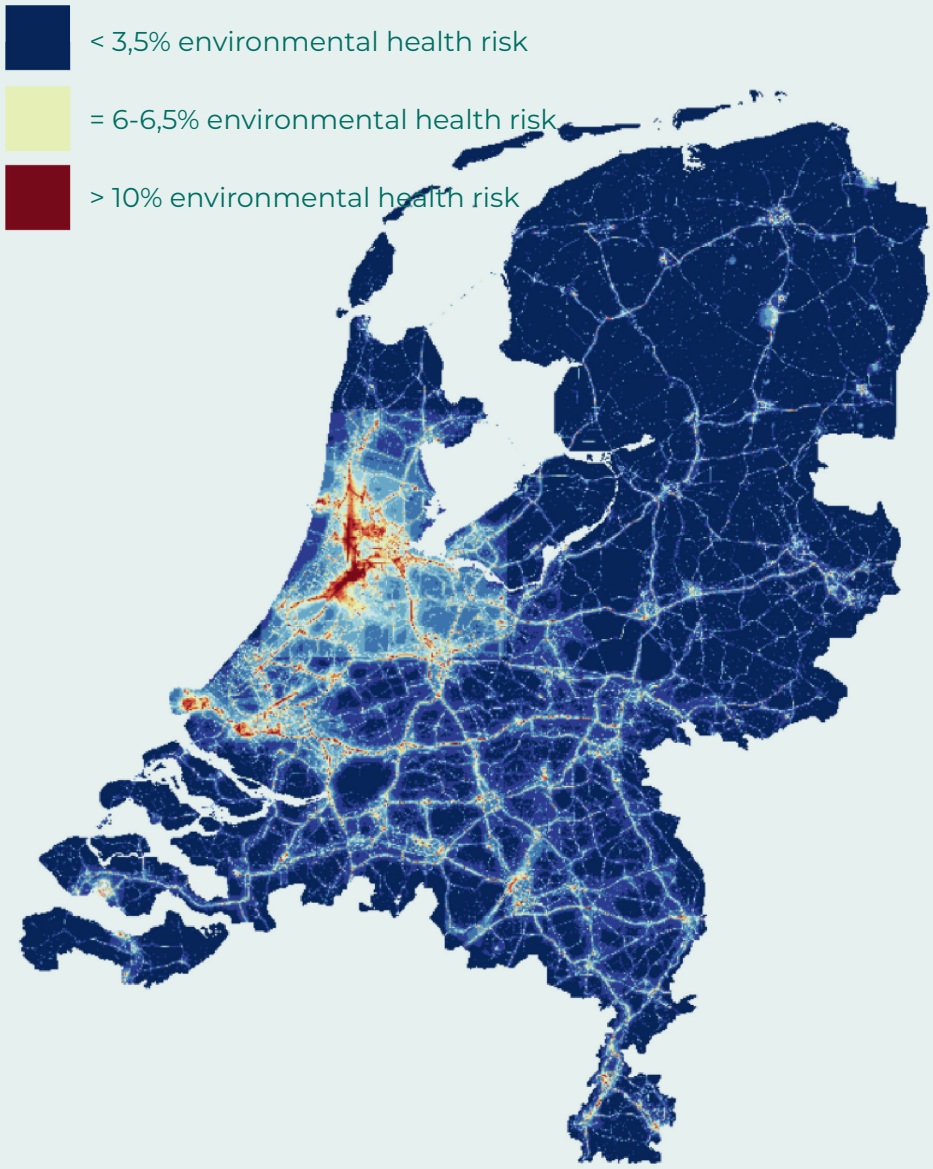


Figure 6.2.4.1: Map of environmental health risk percentage in the Netherlands (Atlas leefomgeving, 2022)

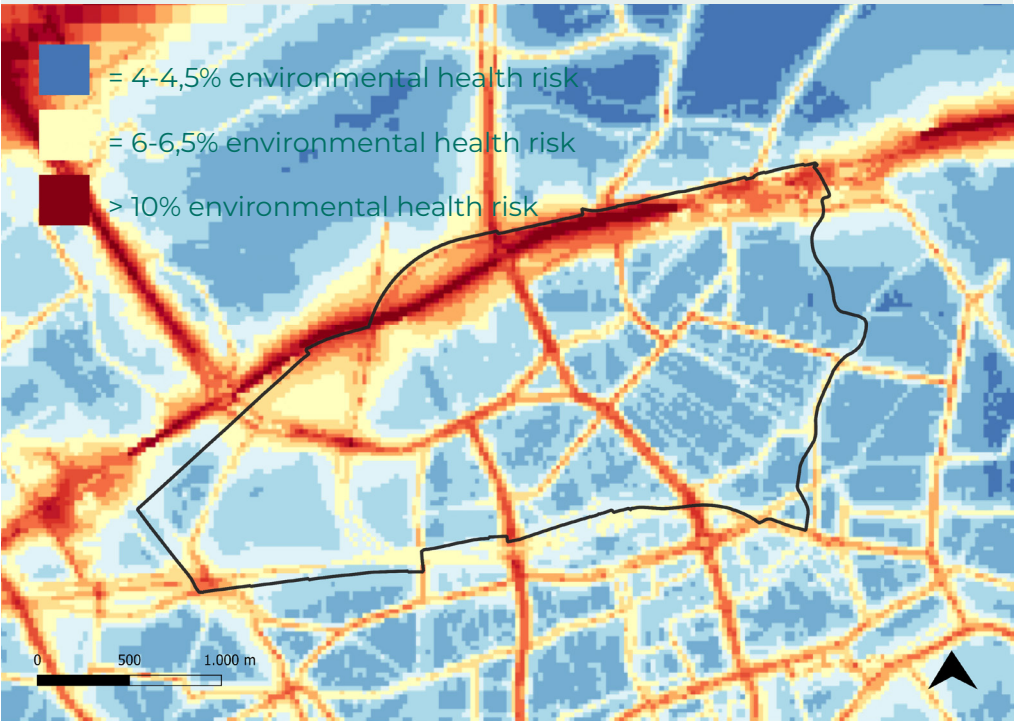


Figure 6.2.4.2: Map of environmental health risk percentage in Rotterdam Noord (Atlas leefomgeving, 2022)

Figure 6.2.4.3: Map of light pollution in the Netherlands (RIVM, 2022)

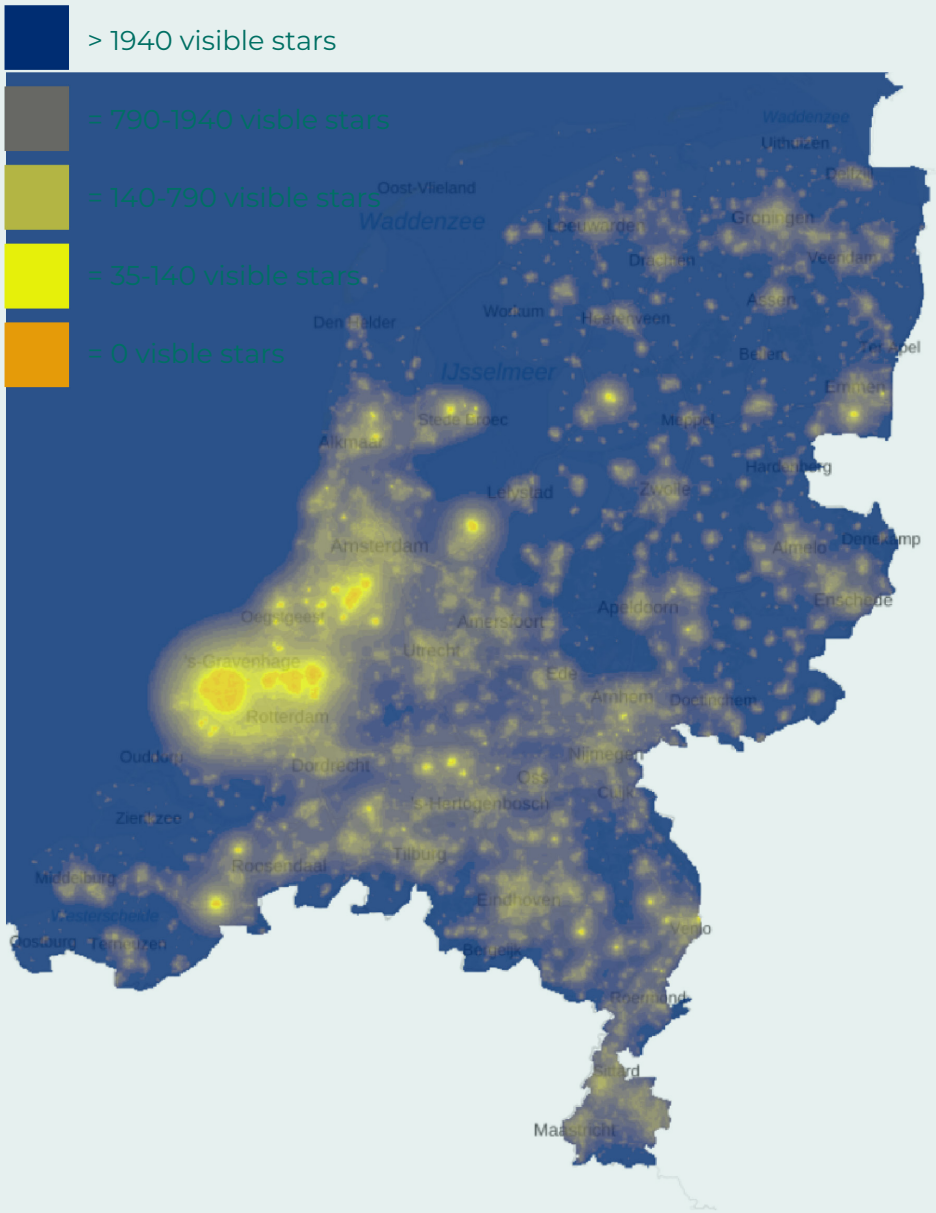
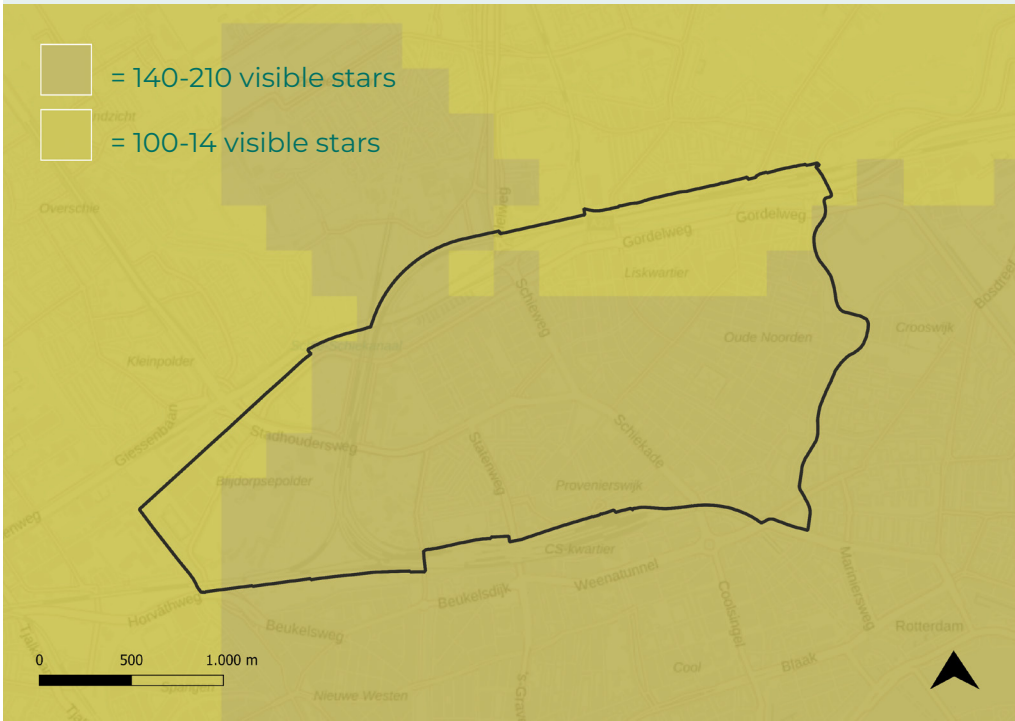


Figure 6.2.4.4: Map of light pollution in Rotterdam Noord (RIVM, 2022)



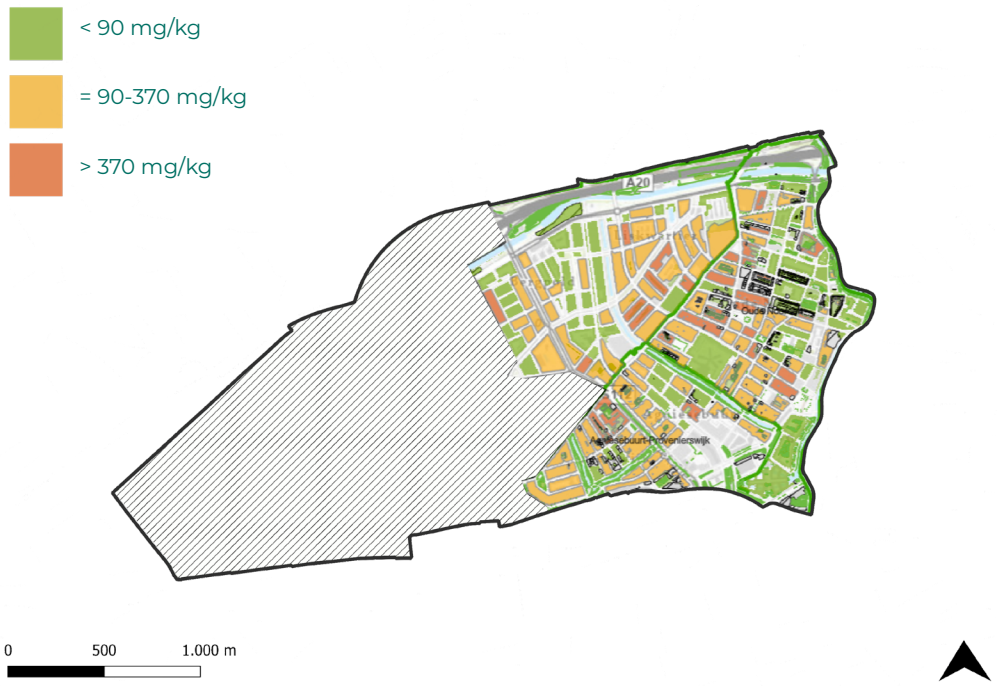


Figure 6.2.4.5: Lead pollution in the soil (Gemeente Rotterdam, 2021)

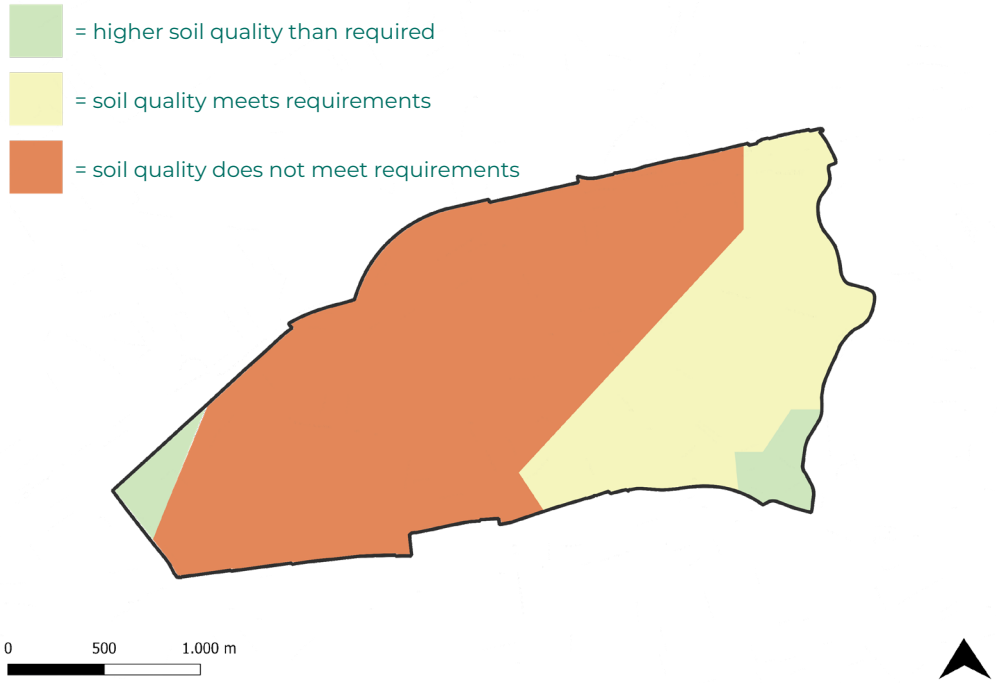


Figure 6.2.4.6: Soil quality (Gemeente Rotterdam, 2021)

Figure 6.2.4.7: Waste and toxicity (Gemeente Rotterdam, 2021)

many aquatic ecosystems have been affected. Although there are plenty of waterways, there is no possibility to swim in natural water in Rotterdam Noord (Zwemwater, n.d.). Thus, while efforts have been made to improve the water quality, the waterways in Noord are still not at the natural condition, which can be defined as biophysical losses, highlighting the importance of environmental stewardship.

Light

Light pollution is a human-made alteration to the natural occurring outdoor light levels. Although light provides safety and enables activities for humans during the night, it has multiple negative effects. Both humans and wildlife have a natural need for darkness in order to sustain a healthy circadian rhythm. When darkness falls, humans produce the hormone melatonin to initiate sleep, and a disruption has been related to serious health issues, like depression, oxidative stress and cancer . Additionally, the behaviour of animals and growing pattern of plants can also be disturbed, such as for bats that rely on darkness to find food. In Figure 6.2.4.3 and 6.2.4.4, the darkness in the Netherlands is shown when there are no clouds, while during cloudy days it would appear even brighter due to the reflection of light against the clouds. In general, cities and industrial areas illuminate most due to the abundant nighttime lighting. Many people have never seen the milky way, since two-third of the world population lives in areas where artificial lighting is stronger than natural lighting. The Netherlands is one of the most illuminated countries in the world, of which the province of Zuid-Holland clearly stands out, indicated by the yellow and orange colours, because of the greenhouses in Westland and the harbor of Rotterdam. The Netherlands lacks a national policy regarding nighttime lighting and darkness protection. Typically, the primary motivation for light policies is saving energy. For certain areas in the North policies are established to safeguard Natura 2000 nature conservation areas. These areas are declared as Dark Sky Parks. So, light pollution has a negative impact on wildlife, human health, energy usage and blocks our view of the universe (Atlas Leefomgeving, 2022).

Conclusion

Collectively, these forms of pollution cast a pall over the neighborhood of Rotterdam Noord. The quality of each of the discussed topics, air, noise, water, soil and light, have been decreased by the urban conditions. Although mostly unconsciously, both the human and non-human inhabitants are affected by the human-induced disturbances of our environment, amplifying the chances of ecological grief and the need for environmental stewardship.

6.2.5 Problem map

Noord

A spatial summary of the biophysical analysis is given through the problem map on the next page (figure 6.2.5.4), which consists of several layers. Firstly, the focus areas with the most climate change impacts, regarding precipitation, heat, soil and drought, are illustrated (figure 6.2.5.1). The residents of these areas are most likely to be confronted with the consequences of climate change and the related feelings of eco-grief. Secondly, for biodiversity loss and green spaces (figure 6.2.5.2), the main area with a lack of greenery is highlighted as having the most potential for greenification to increase biodiversity. The (semi-)public green spaces are shown, since these shape the main ecological structure of Noord foundational for the biodiversity. Therefore, the municipality carries the biggest responsibility, and the semi-public green spaces offer the potential to be included and made accessible for the local residents. The monitoring routes are included to show which areas in Noord are currently left out of the biodiversity data gathering. Lastly, the main polluted and fragmenting lines (figure 6.2.5.3) are drawn, including the main infrastructural clashes with green structures and pedestrian routes, which shape the local experience of the residents.

Based on this analysis, a site is selected for the application of the eco-grief related interventions. The waterfront of the Rotte is chosen since multiple urban challenges and environmental losses collide along the river as a main landscape element. Besides climate change impacts, greenification potential, infrastructural clashes and pollution, this is location has a dense, urban character with both commercial and residential functions and a lack of human-nature interaction. Moreover, this part of the Rotte is not being monitored yet. Additionally, the survey, discussed in the next chapter, shows that the waterfront is a valued green space in the local neighbourhood of Oude Noorden offering an opportunity to strengthen the existing bonds with the environment. Therefore, this location has the potential to explore how to create space for eco-grief in the urban context.

Figure 6.2.5.1: Spatial summary of main climate change impacts

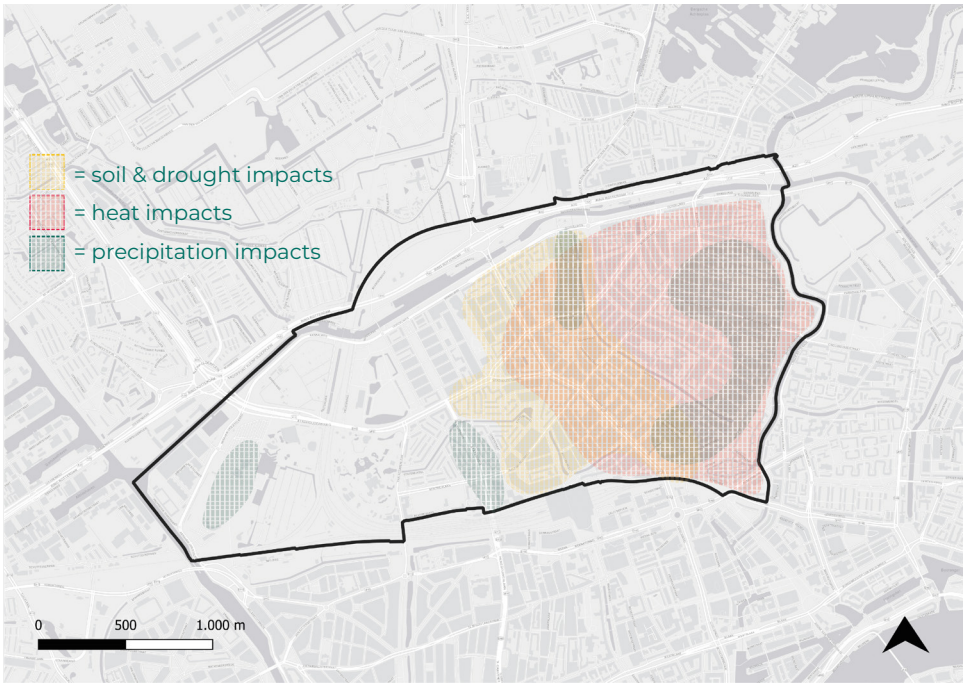


Figure 6.2.5.2: Spatial summary of biodiversity and green space analysis.

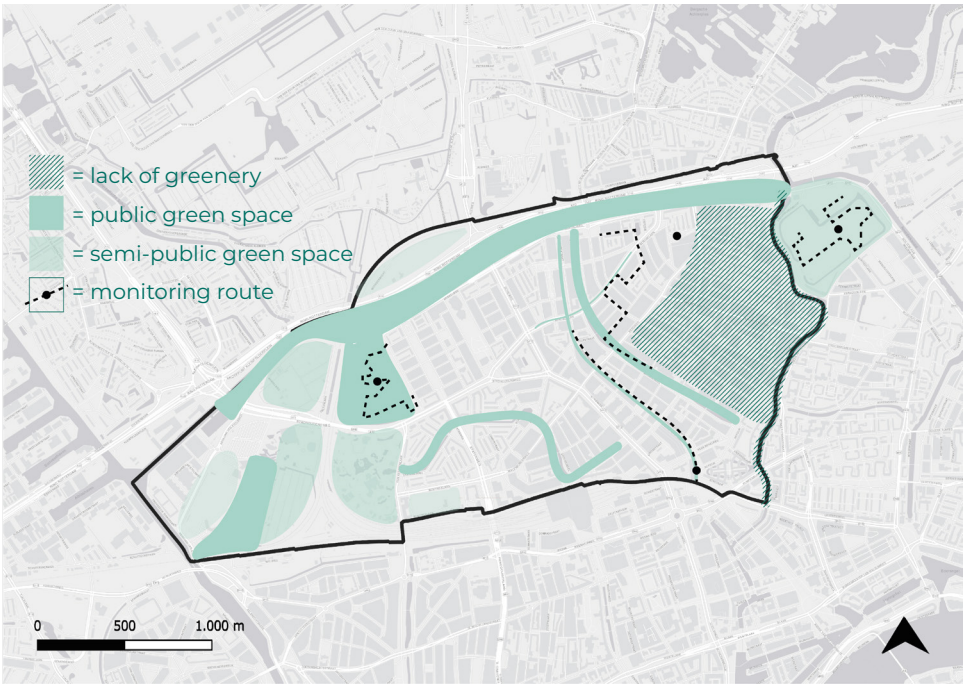
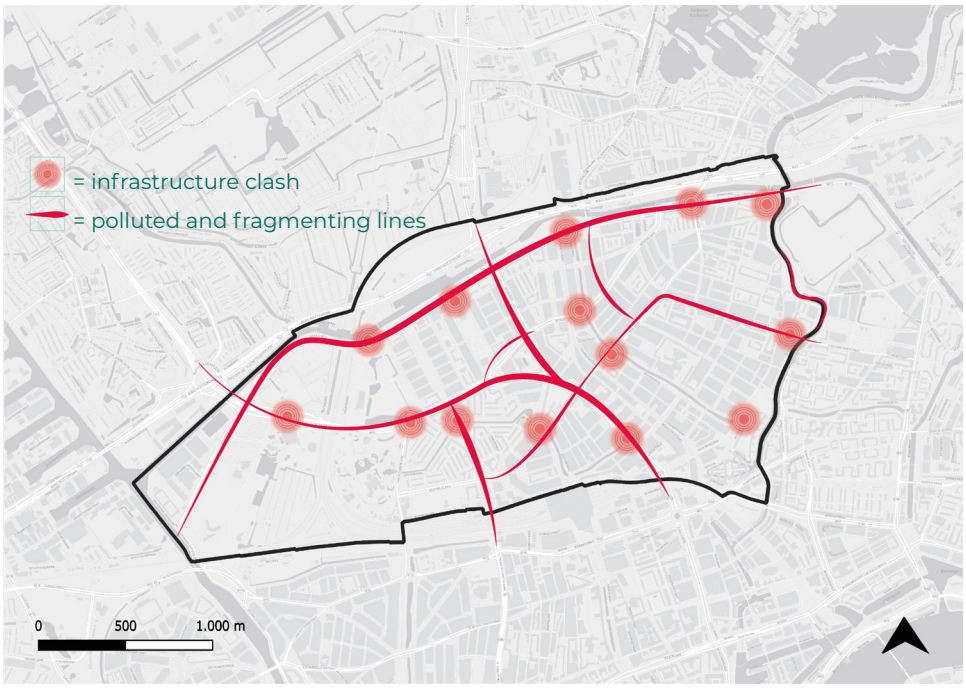
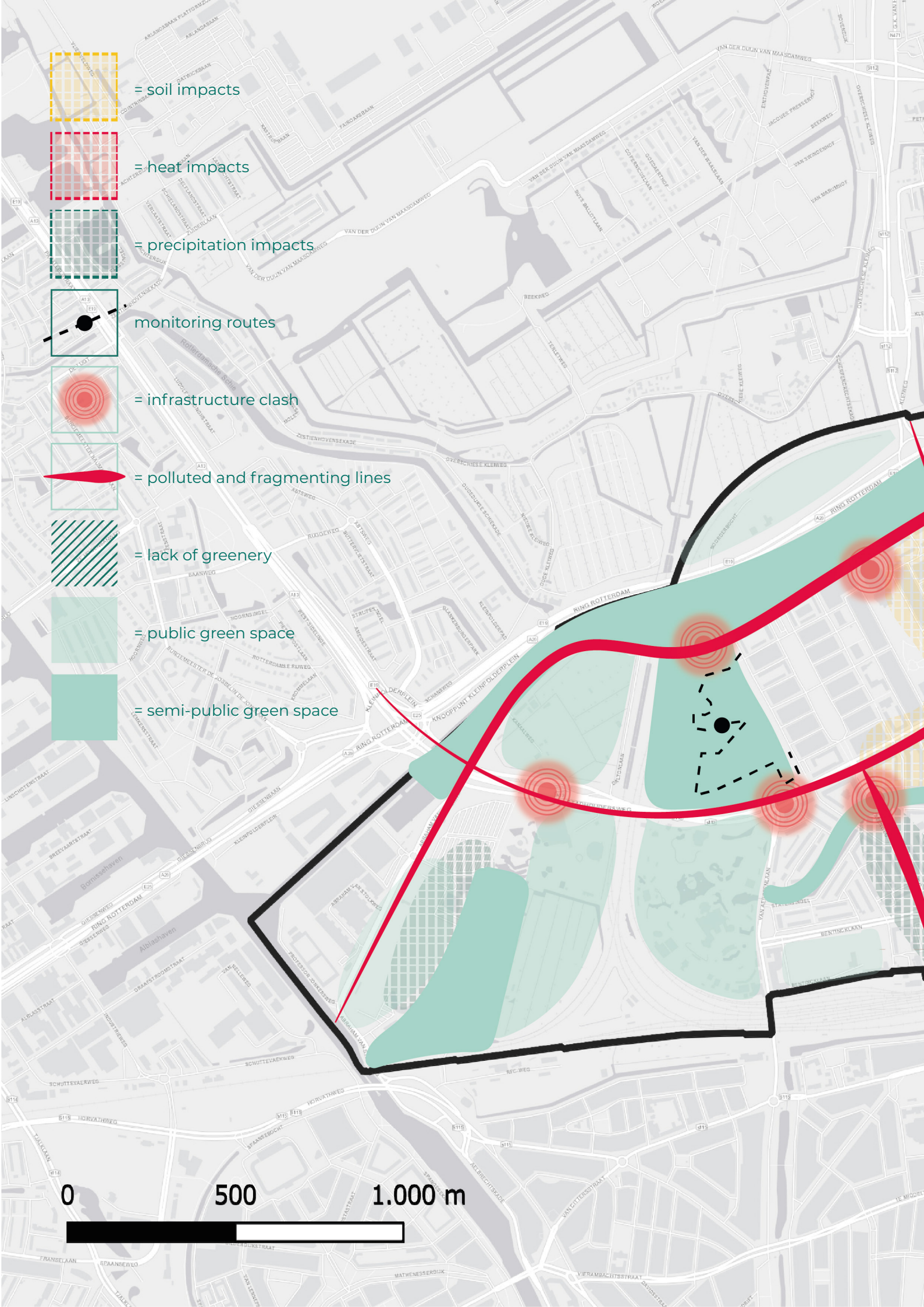


Figure 6.2.5.3: Spatial summary of urbanization, infrastructure and pollution analysis.




= soil impacts
= heat impacts
= precipitation impacts
monitoring routes
= infrastructure clash
= polluted and fragmenting lines
= lack of greenery
= public green space
= semi-public green space
0
500
1.000 m

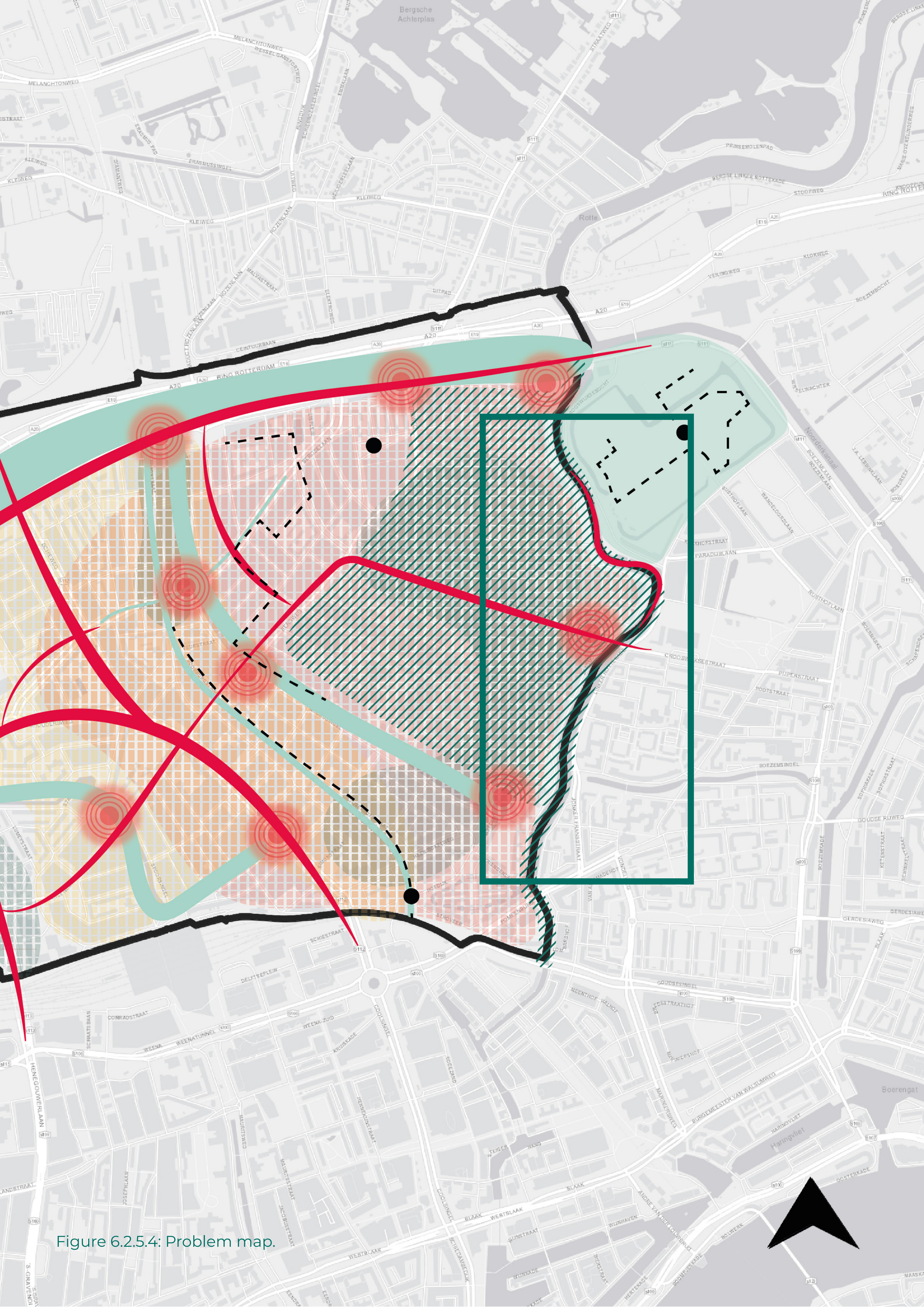


Figure 6.2.5.4: Problem map.

Selected site: Rotte

Along the Rotte, a monotone, open Urban Nature Type is represented (Figure 6.2.5.5), as the waterfront and main market square, the Noordplein, are generally only decorated with trees and focussed on strolling and dwelling. Wilder vegetation can be found in the semi-public cemetery and some inner courtyards with community gardens.

In the problem map (Figure 6.2.5.6), the main environmental problems are highlighted. Regarding climate change impacts, several locations are affected by heat and marked as potential cool areas. Also, multiple areas are flooded during heavy rainfall and some vulnerable trees are located in the area. The river itself suffers from pollution and does not offer direct interaction possibilities through swimming locations. There is one main road that suffers most from air and noise pollution resulting in health risks. Light pollution is present in the whole area. Two main infrastructural clashes are identified, where a main road and the waterfront or the single intersect. Furthermore, the commercial area attracting local and city-wide citizens is shown, as this offers the potential for engagement and awareness raising. The connection from the neighbourhood to the main dense, green space in the area, the cemetery, can also be improved.

Figure 6.2.5.5: Waterfront of the Rotte analyzed through the Urban Nature Types (see UNTs-diagram).

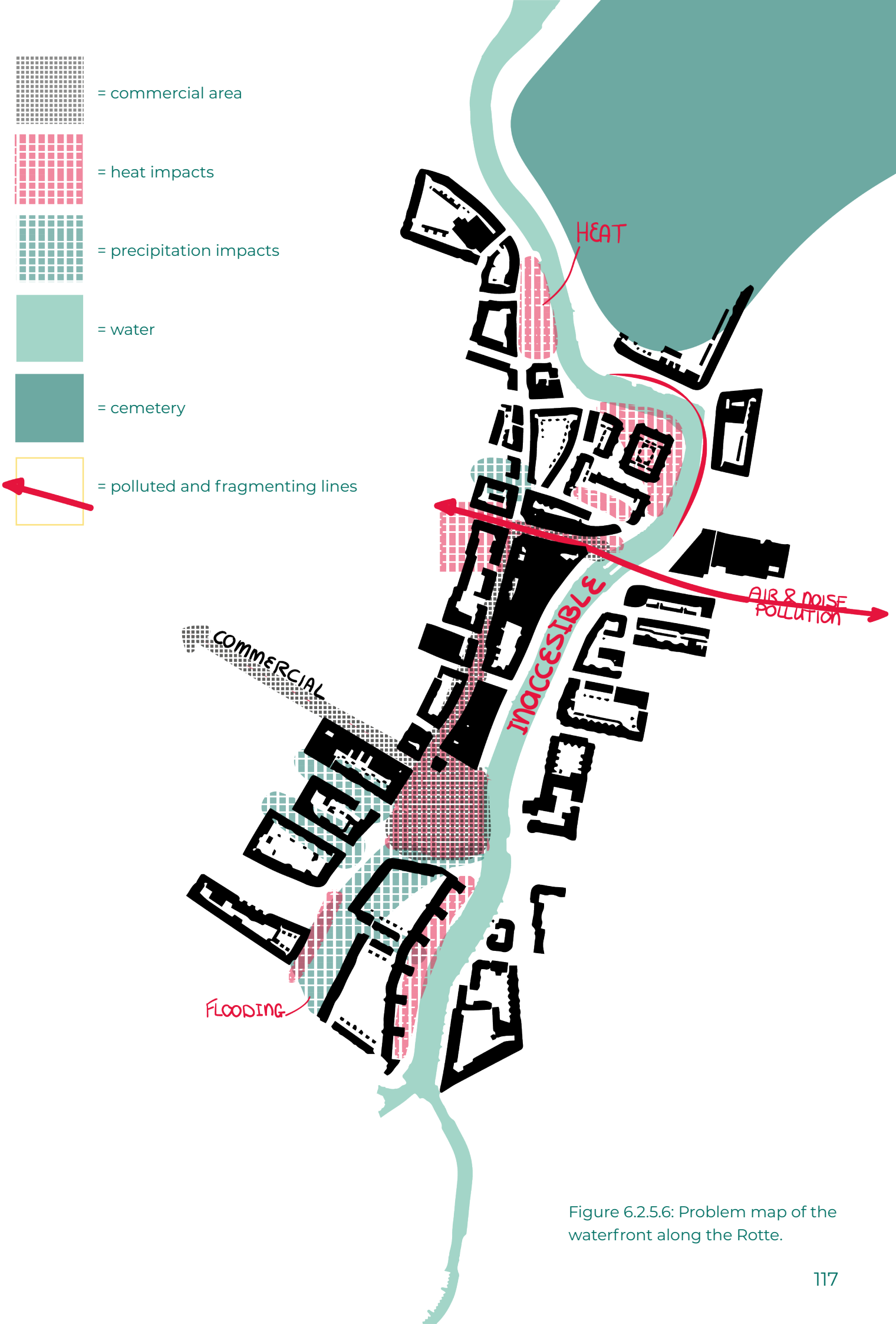


Figure 6.2.5.6: Problem map of the waterfront along the Rotte.

6.3 Urban eco-grief portrait

After the spatial analysis, the social perspective is researched through a local survey in Rotterdam Noord. The study is aimed at exploring the relationship between the residents of Noord and their natural environment, with a particular focus on eco-grief. Through questions about their personal background, view, perception and experience of the global and local natural environment, insights were gained into the urban eco-grief in Noord. Thereafter, urban eco-grief personas are created.

6.3.1 The survey

In this section, a comparision between the grievers and non-grievers of the survey respondents is given (figure 6.3.1). An overview of the responses of all the participants can be found in appendix 10.8.

Almost 70% of the respondents are sure that they experienced a sense of loss related to the degradation of nature. This sense of loss is seen as an eco-grief reaction, thus this group will be referred to as the 'grievers'. Since the respondents were probably the people who were already interested in nature and eco-grief, this group is assumed to be relatively big compared to the actual representation of society. Although the other respondents are referred to as the 'non-grievers', more than 90% of all respondents at least experienced some sense of loss.

Demographics

A raise in the sense of loss can be observed per age group with 53% for younger than 26, 62% in the range of 26-40 and 79% for 40-65 year olds. Since the biggest shift goes from definitely yes to somewhat, it might be that the older the respondents are, the more confident they are about their feelings. It might also be related to parenthood, as 88% of parents have experienced a sense of loss, while only 58% of childless respondents did. Within the childless group, the older respondents (40+ yrs., 67% sense of loss) are also more emotionally involved than the young, childless group (-40 yrs., 52% sense of loss).

Regarding private outdoor space, the respondents with access to a garden experience the strongest grief (81%), also coinciding with the age group of 40-65. 80% of the people with a garden are within this age group, while no 18-25 year olds have a garden. Those with a balcony consist of more younger people (28% 18-25 yrs.) and less grievers (69%). Respondents with no outdoor space at all have least feeling of loss (42%) and are youngest (46% 18-25yrs.)

Overall, about 90% still have some sense of loss, as this decline is replaced by a weaker feeling of loss (somewhat).

Nature perception

Although there is no doubt about the dunes among the groups, the grievers turn out to be less inclusive regarding nature perception. The park, meadow, and urban swans are only chosen by over half of the grievers (65-50%), while more than three quarters of the non-grievers included them as nature (88-76%). In both cases, the vegetable garden is rated as nature by about 60% of the people.

Both groups view nature as a place to explore and learn from (~75%). However, a significant larger share of the non-grievers have an anthropocentric perspective seeing nature as a background to recreation (52% over 18%) and a place

Figure 6.3.1: An illustration of the survey outcomes, with the answers of all respondents (yellow), the non-grievers (green) and the grievers (red).

LOCAL ENVIRONMENT

EW OF
TURE

COPING

'Different days, different actions'

parents
40-65 yrs

for humans to use (20% over 10%). On the other hand, the grievers report a less dualistic view towards nature, as they feel much more comfortable in nature (79% over 40%) and view it as a place that needs care and protection (77% over 64%).
So, if the concept of nature is considered to be broader, respondents experience less loss, while if they are more restrictive to certain characteristics, they are more likely to experience loss and grief.

Awareness
Grievers are much more aware of the global ecological crisis (95%) than non-grievers (64%). Non-grievers are especially unaware about the local ecological problems with only 8% being fully aware and 32% being not aware at all, whereas almost half of the grievers are fully aware (46%). Still, up to half of both groups (48%) are only partially aware of the local biodiversity loss. In addition, grievers are also more conscious of the changes in nature in their environment (70%), while only a quarter of the non-grievers definitely noticed changes.
Overall, non-grievers are less worried about environmental problems in their environment. The only issue that they are more concerned about than grievers is the disappearance of green spaces (72% over 53%). The worries about waste and other kinds of pollution are similarly significant (~70%). The non-grievers seem to be more concerned about the issues that directly affect their own lives. The substantial differences can be noticed considering climate change and the disappearance of flora (63% over 44%) and especially fauna (67% over 32%). The vast majority of the grievers (89%) is worried about the impacts of climate change over 60% of the non-grievers.

Memories
A major difference can be seen in the relation between sense of loss and main childhood memories. The grievers have way more memories that take place in nature (all, some, none; 42%, 51%, 7%) than the non-grievers (all, some, none; 12%, 68%, 20%). Moreover, there is no significant difference between the collective memories of grievers and non-grievers.

Relation to local environment
For both groups, the most popular outdoor activities in a natural environment are walking, socializing and relaxing on their own. In contrast to the non-grievers, the grieving group undertakes a larger variety of activities. The grievers engage in about 15% more nature-related activities, playing and individual relaxing. 85% of the environmental volunteers are grievers who are slightly (10%) more aware of local changes than other grievers and especially enjoy flora. The non-grievers focus considerably more on walking, sports and prefer socializing over solely relaxing.
The majority of the non-grievers value the parks the most followed by the singels, while the grievers rate the park and waterfront similarly, but significantly less, as their favourite places. However, this could be explained by the significant higher share of grieving respondents from the eastern neighbourhoods that are farther away from the park and closer to the waterfront of the Rotte.
The non-grievers mostly value these locations as a place to rewind (68%) followed up by the opportunity to enjoy the flora (56%) and the sensory experiences (44%). About 37% of both groups appreciate them for their social function. The non-griever especially do not care about animals compared to the grievers, since this varies from 4 to 40% votes. The grievers value their favourite places for a bigger variety of reasons, but primarily for the flora and the sensory experiences (both 68%) with rewinding (60%) voted next. Other differences can be seen for the appreciation of changing seasons, activities, learning and meaning, for which grievers all care slightly more (~15% more).
A significant larger share of the grievers strongly want to spend more time in nature

(76% over 52%), whereas the belief in a symbiotic future is evenly distributed among the two groups.

Coping
Lastly, a variation in coping strategies can be seen, but individual action through eco-friendly choices (~80%) is the clear favourite by all. A small share of the non-grievers (20-30%) also talks about their feelings or distracts themselves. On the other hand, about half of the grievers also seeks social support through talking about their feelings and the environmental problems. Thereafter, collective action is the best adopted strategy (33%) followed by distraction (25%) and emotional work (19%). There are even two respondents that seek professional help for their environmental concerns.

Conclusion
General:
- ~60% belief in symbiotic future
- 80% fully aware of global crisis, while 30% fully aware of local crisis
- More worries about visible waste than invisible types of pollution
- Most valued:
    - o Parks, singels & waterfront
    - o Flora and landscape, sensory experiences & place to rewind
- Overall strong urge to spend more time in nature
- ~80% cope through individual action

Grievers:
- The older, the higher sense of loss & the more nature-related childhood memories.
- ~90% of parents are grievers
- More nature-related experiences, activities & memories.
- Less inclusive nature perception, feel more comfortable in nature & views nature as a place that needs care and protection.
- Fully aware of global crisis, about 30% more aware than non-grievers
- About half is fully aware of local crisis, about 40% more aware than non-grievers
- 70% noticed changes, about 45% more aware
- Most worried about climate change impacts, pollution & biodiversity loss. Also care more about animals than non-grievers.
- More variety in reasons of valueing places.
- Coping through individual action, social support (~50%) & collective action(33%).

6.3.2 Urban Eco-Grief Personas

Based on literature research, field work and the survey, the following personas were chosen to represent several types of citizens and their urban eco-grief, as well as their roles in the urban context. An elaboration of their backgrounds can be found in appendix 10.8. To capture a wide range of perspectives the personas consist of citizens and experts, as well as a variety of age groups. This is not an all encompassing analysis of urban eco-grief types, but a synthesis of the research findings.

DISCONNECTION GRIEF

Represents children in the city:
'I want to climb the trees in the park more often!' - fictive

Young girl

'I love the park but ... its just too far away' – anonymous respondent

CULTURAL GRIEF

Represents sub-cultures related to the landscape:
'My grandfather taught me how to fish. I will never be able to catch as many or as big fish as he did.'- fictive

Fisherman

'You have stolen my dreams and my child-hood with your empty words. [...] People are dying. Entire ecosystems are collapsing. [...] How dare you!' (Thunberg in Lai, 2022).

GLOBAL GRIEF

Represents unheard voices & the next generation:

'I am scared to grown up in this world. Action is needed NOW.' - fictive

Teenage activist

'I try to establish change by learning about nature and contributing to nature restoration projects'
- anonymous respondent

NOSTALGIC GRIEF

Represents those who moved to the city:

'I am glad to work in the community garden as it reminds me of my childhood' - fictive

'I used to wake up and hear the sparrows chirping and, so whenever I hear them still it kind of takes me back to my childhood' (interviewee in Cunsolo & Landman, 2017, p.109)

Immigrant gardener

'Cause I created it, I feel connected to it'
– anonymous respondent

LOCAL GRIEF

Represents practical professionals: *'Trees are our biggest co-dwellers. Let them fulfill their life cycles and reach their full potential.' - fictive*

Urban tree specialist

'The rising of the temperature, shifting of the seasons' – worries of an anonymous respondent (translated)

'I work in greenification of the city. And by taking action at work and at home I contribute.' – anonymous respondent (translated)

DOOMERISM

Represents those who lost hope: *'I joined monitoring events for years. I cannot do it anymore.' - fictive*

Wildlife observer

'I don't leave my apartment for a day cause I cant stand the world outside, I share with friends, etc. different days, different actions' – anonymous respondent

'the indifference of people, oppositions, hate loneliness, greed, these are connected to how we treat our earth' – worries of an anonymous respondent

ECO-ANXIETY

Represents theoretical professionals:
'I am scared of what is to come. Positive outcomes in my research surprise me. Sometimes I ask myself why I am still going to work each day.' – fictive

Ecologist

'I chose to spend my professional life trying to limit negative human impact on nature'
– anonymous survey respondent

'I try to see the world with love and compassion'
– anonymous survey respondent

Buddhist monk

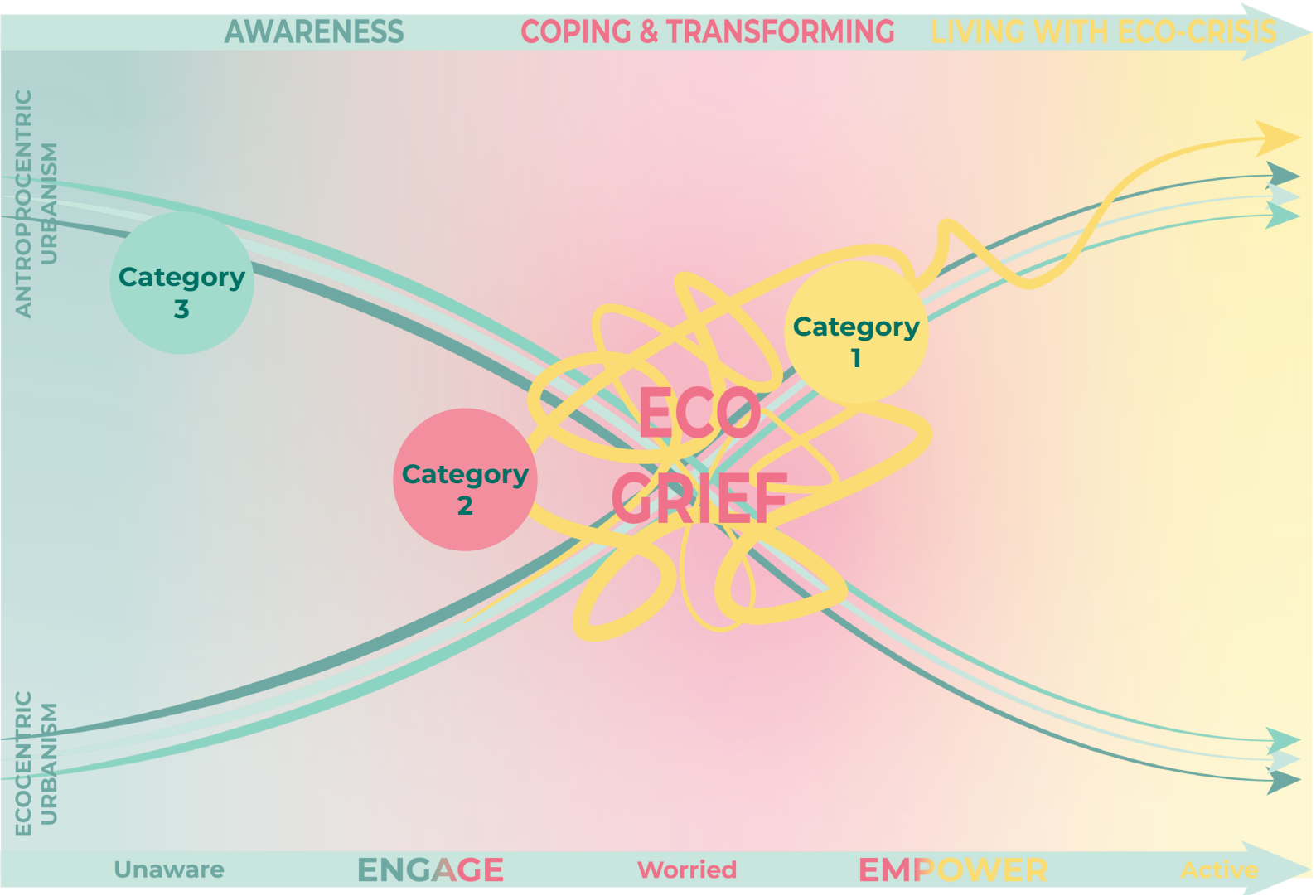
COMPASSIONATE GRIEF

Represents the ones that guide us:
"In my meditation, I bear witness to the environmental destruction. It brings a profound sorrow, but also sparks a compassionate desire to alleviate the suffering." - fictive

6.4 Governance analysis

The identified stakeholders in the context of Noord are divided into 4 forms of capital: economic, cultural, symbolic and social (Harvey & Maclean, 2008). This division allows for uncommon stakeholders that are relevant to the topic of this thesis, like nature, to be included. Furthermore, the forms of capital are combined with the neighbourhood, city and national scale to visualise the diffe-rences between the stakeholders. An explanation of the capital types, and the list of stakeholders can be found in appendix 10.9. Regarding eco-grief, the stakeholders can be divided into three categories that can be projected to the phases of the process of eco-grief as can be seen in figure 6.4.1.

Figure 6.4.1: The stakeholder categories positioned on the conceptual framework.



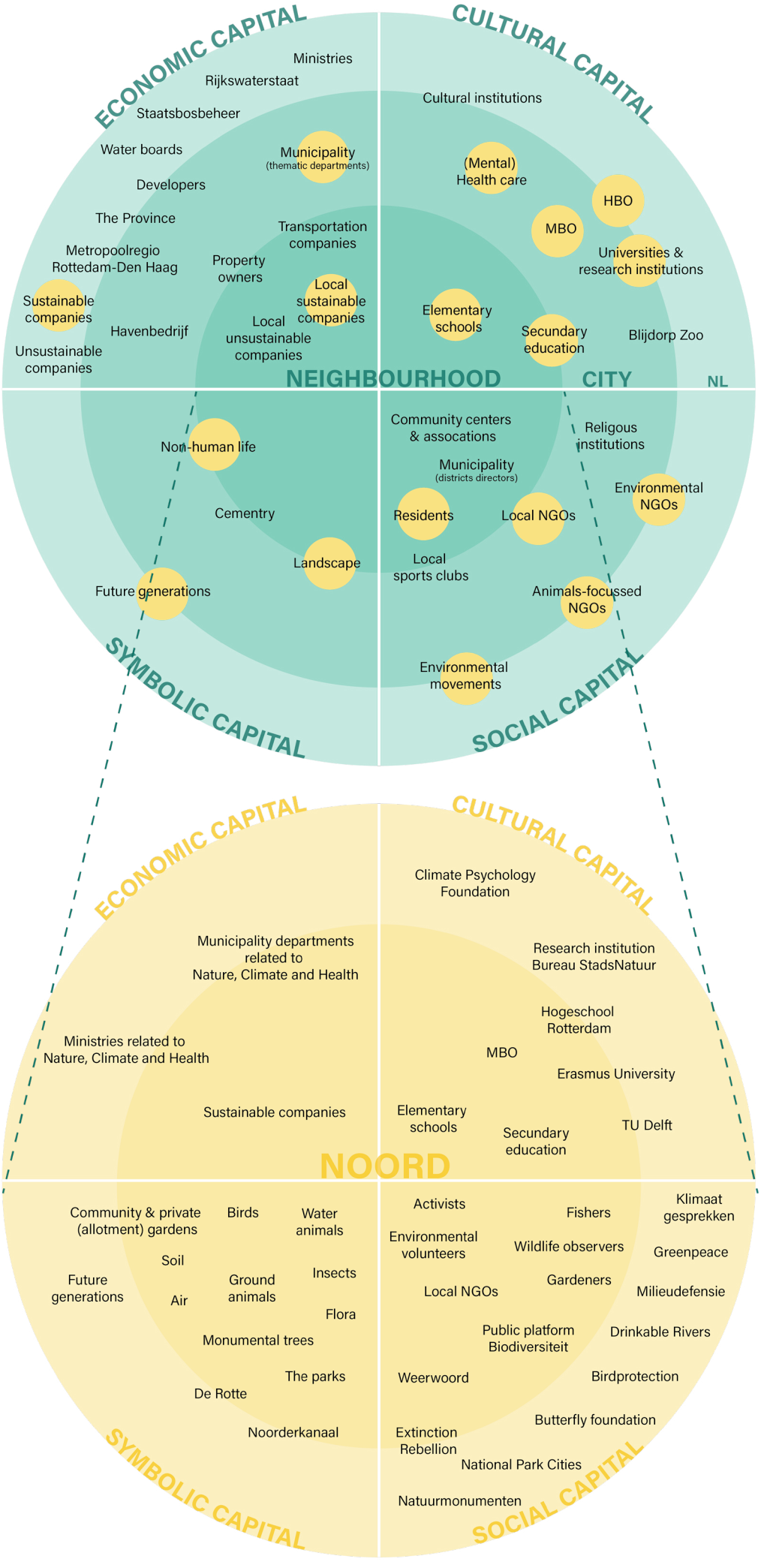
6.4.1 Stakeholder categories

Category 1: Empowerment opportunities

The first group relates to the stakeholders that are, at least to some extend, familiar with eco-grief (figure 6.4.1.1). These actors do not have to literally know the meaning of eco-grief, but feelings of eco-grief are known and acknowledged. This category includes the environmentally active actors concerned with nature conservation. As they are potentially already faced with eco-grief, they have the highest interest in eco-centric societal change, thus they should be targeted for empowerment interventions to secure and strengthen their action, and they can play a leading role in the eco-centric transition.

Figure 6.4.1.1: Diagram with engaged stakeholders that can be empowered.

First of all, the active residents of Noord's civil society can be characterized by their emotional and practical engagement. Part of this group are the environmental activists and volunteers, that are by themselves already committed to contributing to positive change, possibly connected to community associations, NGO's or environmental movements (figure 6.4.1.1). About a quarter of the survey (chapter 6.3) respondents engaged in environmental volunteering. These people might participate in protests, restoration or clean-up projects, or simply in the local community garden. In Figure 6.4.1.4, an overview of all green initiatives is shown, mostly consisting of 'place makers': initiatives connected to a location, such as a community garden. Other initiatives that can be found on the map are the greenification of streets, mobile green initiatives, collaborations, institutions with a green space and mission, and parks. Among the green initiatives, small-scale, local non-profit organizations can be found, such as the Marvy Green the greenery store, but also city and national scale NGOs can play a role in Noord, such as National Park City, Drinkable rivers and Milieudefensie (Friends of the Earth Netherlands). Also well-represented in Noord are the allotment garden associations with a high social and symbolic capital. Bringing together citizens centered around the natural environment, the gardens play a major role in the relationship between urban and nature. However, they lack economic capital as the land is owned by the municipality, which leads to uncertainty regarding their existence as they are currently being threatened by urban development plans (TENT, n.d.). Moreover, there are global, national movements and their local departments, such as Extinction Rebellion Rotterdam, that bring together people to engage in action. Figure 6.4.1.5 reveals gathering places for civil society. The capital of civil society mostly lies in the social realm, but the expertise of NGOs also bring cultural capital.


ECONOMIC CAPITAL
CULTURAL CAPITAL
Ministries
Rijkswaterstaat
Staatsbosbeheer
Water boards
Municipality
(thematic departments)
Developers
The Province
Transportation
companies
Metropoolregio
Rottedam-Den Haag
Property
owners
Local
sustainable
companies
Sustainable
companies
Havenbedrijf
Local
unsustainable
companies
Unsustainable
companies
Cultural institutions
(Mental)
Health care
HBO
MBO
Universities &
research institutions
Elementary
schools
Secundary
education
Blijdorp Zoo
NEIGHBOURHOOD
CITY
NL
Non-human life
Cementry
Landscape
Future generations
Community centers
& assocations
Religous
institutions
Municipality
(districts directors)
Environmental
NGOs
Residents
Local NGOs
Local
sports clubs
Animals-focussed
NGOs
Environmental
movements
SYMBOLIC CAPITAL
SOCIAL CAPITAL
ECONOMIC CAPITAL
CULTURAL CAPITAL
Climate Psychology
Foundation
Municipality departments
related to
Nature, Climate and Health
Research institution
Bureau StadsNatuur
Hogeschool
Rotterdam
Ministries related to
Nature, Climate and Health
MBO
Erasmus University
Sustainable companies
Elementary
schools
Secundary
education
TU Delft
NOORD
Community & private
(allotment) gardens
Birds
Water
animals
Soil
Future
generations
Air
Ground
animals
Insects
Flora
Monumental trees
The parks
De Rotte
Noorderkanaal
Activists
Fishers
Klimaat
gesprekken
Environmental
volunteers
Wildlife observers
Greenpeace
Gardeners
Local NGOs
Milieudefensie
Public platform
Biodiversiteit
Drinkable Rivers
Weerwoord
Birdprotection
Butterfly foundation
Extinction
Rebellion
National Park Cities
Natuurmonumenten
SYMBOLIC CAPITAL
SOCIAL CAPITAL

Secondly, there are environmental advocates that work within existing systems and institutions that are professionally dedicated to studying, protecting, and restoring natural ecosystems. They can be found within governmental, educational and research institutions and are equipped with valuable knowledge, which means that they are strongly cognitively engaged.
Within the municipality, there are urban ecologists, green real estate agents, foresters and neighbourhood gardeners, distributed among the city management and urban development departments, who are all directly involved with urban nature. Within these departments, there are also other officials that have a high influence on the environment, such as the landscape architects, urbanists and the maintenance unit, that might be environmental advocates. In addition, there is a city council, district council and a citizen committee that consist of elected among whom environmental advocates can be found, such as members of the 'Party for the Animals' and 'Green Left'. These individuals have power to steer the top-down plans within the municipality. Also, the municipality is involved with several governmental collaborations, such as Weerwoord, which is focussed on climate adaptation. Overall, the municipality has both economic and social capital having the power to initiate top-down change and facilitate bottom-up initiatives.
Besides that, within universities, schools (Figure 6.4.1.3) and research institutions environmental advocates can also be found. The educational institutions have an interest in preparing their students on future challenges which confronts them with the ecological crisis. In Noord, educational institutions are well represented with 15 elementary schools distributed over the area and 13 secondary schools mostly situated around to the train station. Their students can be involved in educational projects related to the environment, including exploring, testing and creating prototypes and awareness raising. The universities and research institutions with an environmental concern that can play a role in Noord can be found on a city and regional scale, such as Hogeschool Rotterdam, Erasmus University and Bureau StadsNatuur. The interview with ecologists within these institutions (appendix 10.7) illustrated the need for empowerment, as the feelings of eco-grief were familiar, but there was no acknowledged way to deal with it. These institutions have a high social, as well as cultural capital.
Within the private sector, environmental advocates can also be found working for companies that build their business case on sustainability practices. In Noord several sustainable companies can be found such as restaurants using vegan and locally-produced products, like Gare du Nord and the Harvest, and second-hand stores, which are mostly located along the Zwaanhals. Although their priorities also lie in their own financial health, they can be seen as valuable stakeholders because of their financial resources. Their practical approach relates to a strong aesthetical engagement. Through engaging and connected them to environmental projects, they can raise their publicity, especially among eco-centric citizens. Their economic capital is a valuable addition to the previously mentioned stakeholders mostly focussed on social and cultural capital.
A noteworthy collaboration of the civil society and private sector is the Public Platform Biodiversity, which consists of about 10 partners in Rotterdam committed to raise awareness about the value and importance of urban nature and biodiversity among citizens and governors. The urgency of the urban environmental challenges is what binds them making it eminently a place to introduce the topic of eco-grief for empowerment. This platform has social, economic and cultural capital having the capability to play a leading role in the eco-centric transition.
Lastly, actors with symbolic capital can be found in Noord, namely non-human life and the landscape, constituting ecosystems, and the future generations. These stakeholders currently do not have a voice, but they do have huge interest in eco-centric change to secure their existence. Their fate lies mostly in the hands of the property owners (Figure 6.4.1.2) that will be discussed in the next category.

Figure 6.4.1.2: Greenery, building and Blijdorp Zoo.

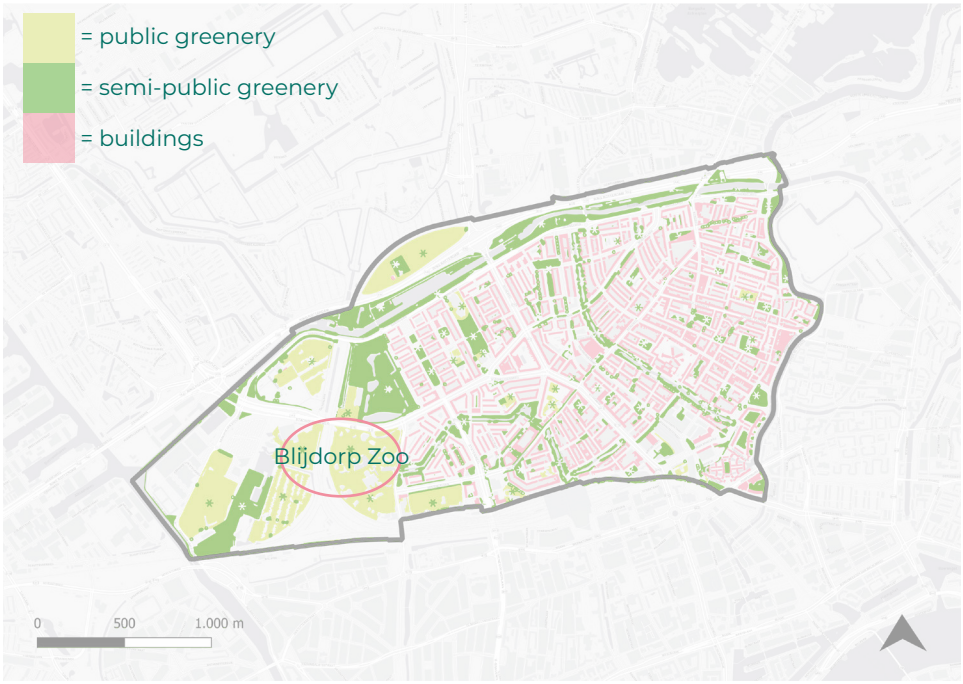
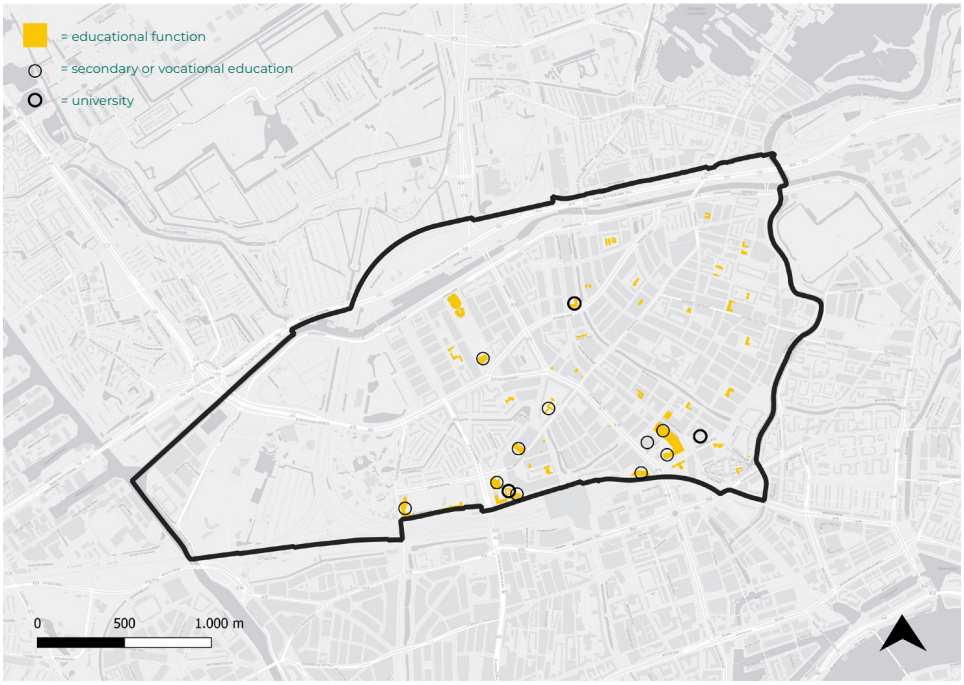
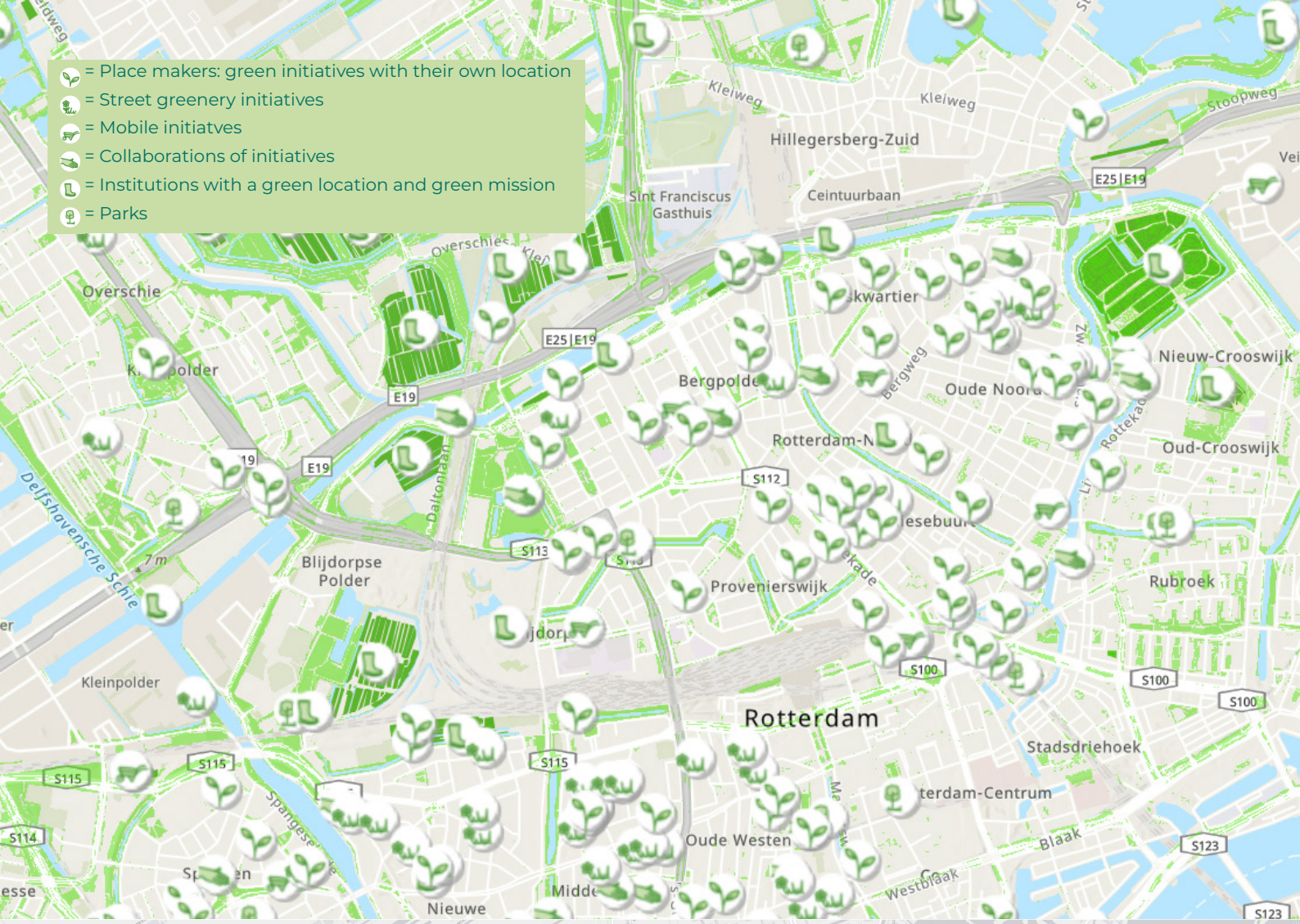
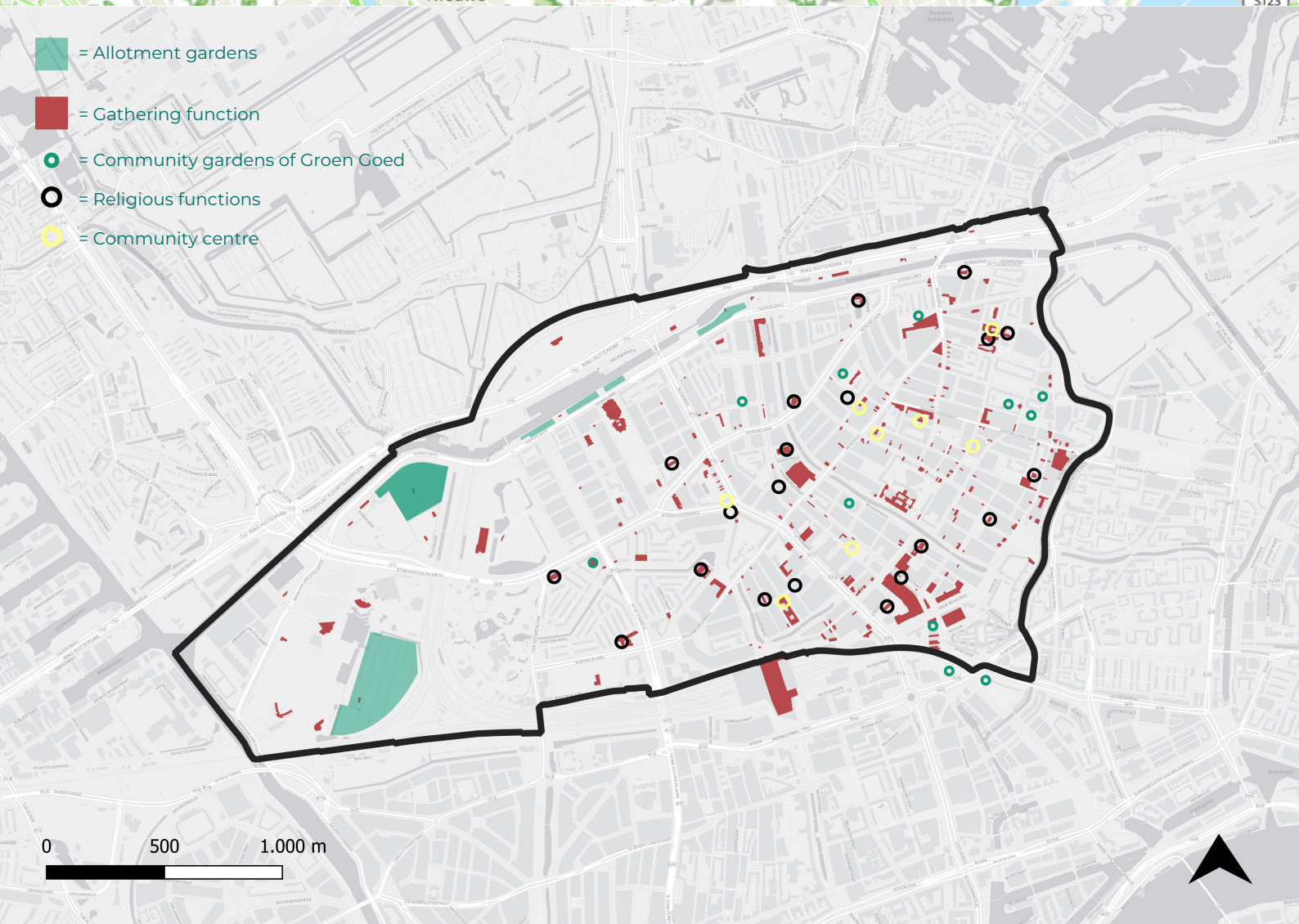


Figure 6.4.1.3: Educational functions.

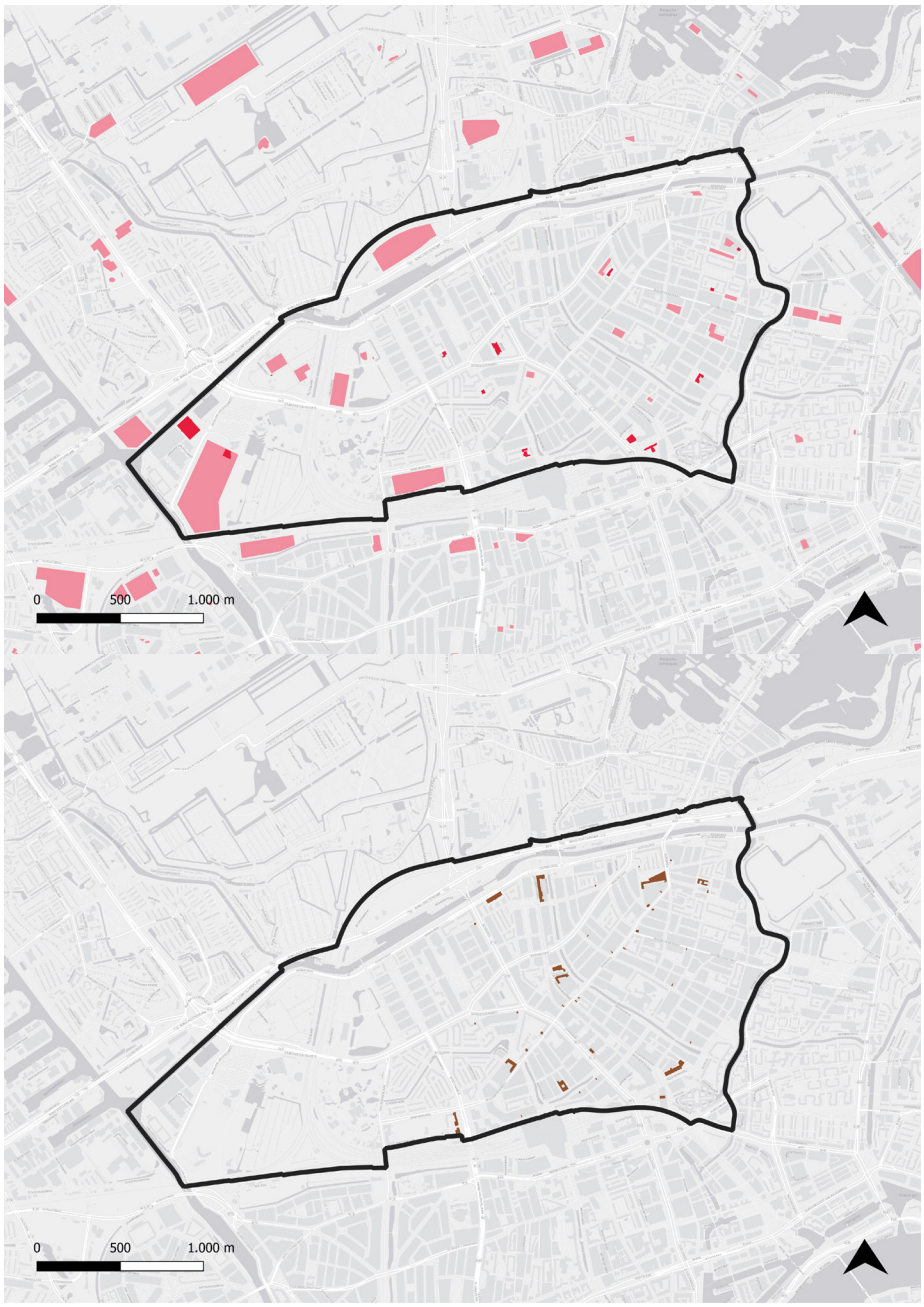



= Place makers: green initiatives with their own location
= Street greenery initiatives
= Mobile initiatves
= Collaborations of initiatives
= Institutions with a green location and green mission
= Parks
Kleiweg
Hillegersberg-Zuid
Sint Franciscus Gasthuis
Ceintuurbaan
E25 | E19
Overschie
E19
Bergpolder
Oude Noord
Nieuw-Crooswijk
Oud-Crooswijk
Rotterdam-N
S112
S113
Blijdorpse Polder
Provenierswijk
Rubroek
Kleinpolder
S100
Rotterdam
Stadsdriehoek
S115
terdam-Centrum
Oude Westen
Blaak
S123
S114
Nieuwe
Westblaak


= Allotment gardens
= Gathering function
= Community gardens of Groen Goed
= Religious functions
= Community centre
0
500
1.000 m

Left:
Figure 6.4.1.4: Green initiatives (Groen010, n.d.)
Figure 6.4.1.5: Civil society gathering locations.

Right:
Figure 6.4.1.6: Sports and play functions
Figure 6.4.1.7: Health care functions



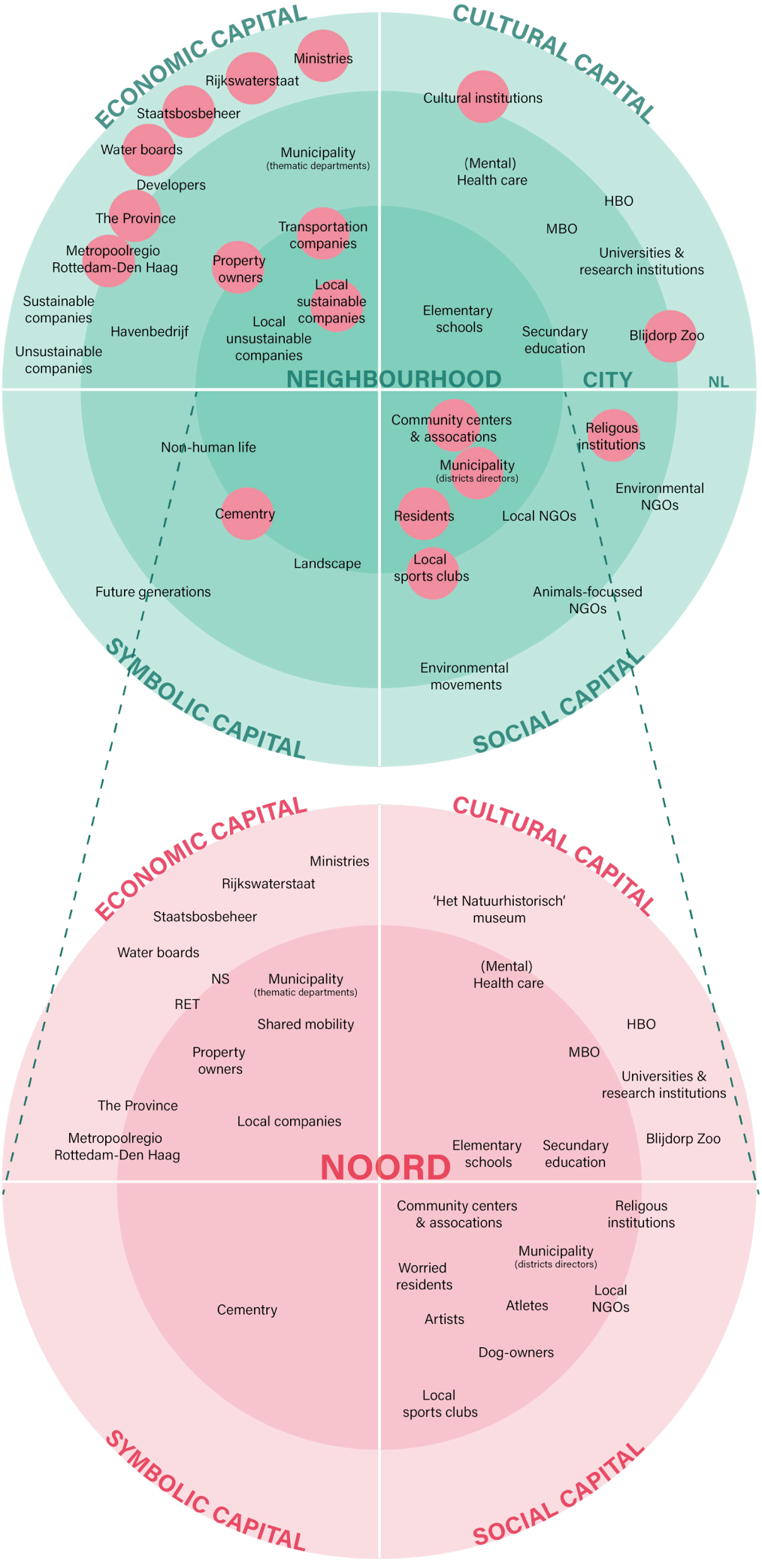
Category 2: Engagement opportunities

Figure 6.4.1.8: Diagram with stakeholders that can be engaged.

Opportunities for engagement regarding eco-grief are identified based on influential stakeholders that have a goal that is in line with eco-centric change (figure 6.4.1.8). Through engagement, their existing interest or power will be translated into action.

Within civil society, there are worried citizens that are not aware of either their interest in societal eco-centric change or their potential to contribute to this change through their personal actions. The non-grievers in the survey (chapter 6.3) were almost all (96%) worried about at least some kind of environmental problems, but only 12% engages in environmental volunteering. The non-grievers were generally younger citizens that engage less in nature-related activities and more in other activities, such as sports, than the grievers. So, to activate this group these activities can be targeted, such as sports clubs and community centers. Furthermore, these citizens are less aware of the ecological crisis, so awareness raising among this group would be a good starting point for engagement. Although there might be environmental advocates present within governmental and research institutions, their overall approach is mainly anthropocentric. Eco-grief is still a new topic, even in their nature protection and monitoring departments, such as Staatsbosbeheer or the ministry for agriculture, nature and food quality. Thus, their social, economic and cultural capital are not fully utilized to reach the goal of eco-centric societal change through eco-grief.

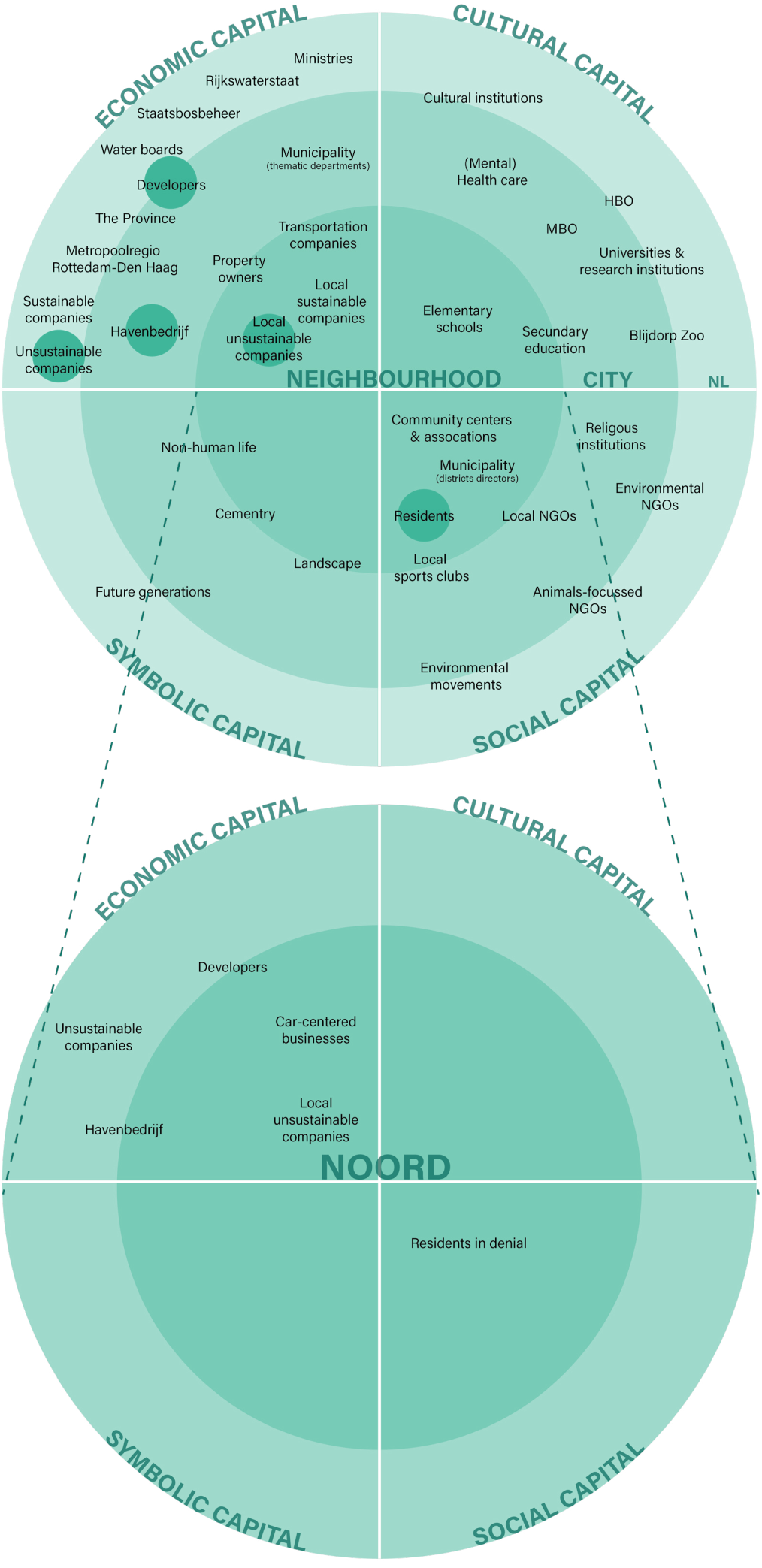
Furthermore, the stakeholders related to nature experience can be engaged in order to improve the relation to nature. This includes the municipality that manages the green public spaces, like the parks and singels, as well as other private property owners, such as owners of (community) gardens. Other types of nature-related experiences connect to leisure activities, such as sports clubs and cultural institutions, represented the potential for engagement collaborations. Sports and play areas are distributed over Noord (Figure 6.4.1.36), with most small-scale fields in the east and large-scale fields in the west. The at least 12 local exhibition spaces, as well as festival areas, such as Vroesenpark and Noordplein, are opportunities to relate culture, nature and outdoor experiences. In addition, the Blijdorp Zoo (figure 6.4.1.2) is a unique stakeholder in the area of Noord that formulated a new mission: ‘Together we bring nature back to life’. Their focus lies on taking a leading role in inspiring and activating people for species conservation and nature restoration, and are open to collaborations as stated in their ambition document (Diergaarde Blijdorp, n.d.). 10 impacts areas are chosen, of which the North Sea, the local nature and the zoo as a last resort for close to extinct


ECONOMIC CAPITAL
CULTURAL CAPITAL
Ministries
Rijkswaterstaat
Staatsbosbeheer
Water boards
Developers
The Province
Metropoolregio Rottedam-Den Haag
Sustainable companies
Unsustainable companies
Havenbedrijf
Municipality (thematic departments)
Transportation companies
Property owners
Local sustainable companies
Local unsustainable companies
Cultural institutions
(Mental) Health care
HBO
MBO
Universities & research institutions
Elementary schools
Secundary education
Blijdorp Zoo
NEIGHBOURHOOD
CITY
NL
Non-human life
Cementry
Landscape
Future generations
Community centers & assocations
Religous institutions
Municipality (districts directors)
Environmental NGOs
Residents
Local NGOs
Local sports clubs
Animals-focussed NGOs
Environmental movements
SYMBOLIC CAPITAL
SOCIAL CAPITAL
ECONOMIC CAPITAL
CULTURAL CAPITAL
Ministries
Rijkswaterstaat
Staatsbosbeheer
Water boards
NS
RET
Municipality (thematic departments)
Shared mobility
Property owners
The Province
Local companies
Metropoolregio Rottedam-Den Haag
'Het Natuurhistorisch' museum
(Mental) Health care
HBO
MBO
Universities & research institutions
Blijdorp Zoo
Elementary schools
Secundary education
NOORD
Community centers & assocations
Religous institutions
Municipality (districts directors)
Worried residents
Local NGOs
Atletes
Artists
Dog-owners
Local sports clubs
Cementry
SYMBOLIC CAPITAL
SOCIAL CAPITAL

species are the most relevant to local eco-grief. These stakeholders related to nature experiences have social, economic and cultural capital.
Moreover, the actors that address mental health and wellbeing also play a role in the aimed social and emotional resilience regarding eco-grief. Health care institutions (Figure 6.4.1.7) with a cultural capital, as well as schools, community centers and associations and religious institutions, having social capital, can function as main pillars to facilitate the wellbeing of citizens. These actors can be introduced to climate psychologists or other environmental advocates in order to raise awareness.
Lastly, companies positioned to benefit from a sustainability transition, such as the public transport or shared mobility sectors, can contribute economic capital and use collaborations to convey their sustainability goals. Also, the funeral services at the cemetery is a private institution that could provide cultural capital through mourning practices.

Category 3: Deniers
The last group consists of residents in denial and the companies that are based on unsustainable practices (figure 6.4.1.9). The latter does have economic capital, but they do not have any interest to change. If these companies prefer to keep the status-quo, the most powerful ones might form a danger to the goal of eco-centric change in various ways, like advertising and lobbying. Residents that deny the ecological crisis also hinder change on a small scale, because of their social capital. The resistance of this category should be kept limited.

Figure 6.4.1.9: Diagram with stakeholders that are in denial.

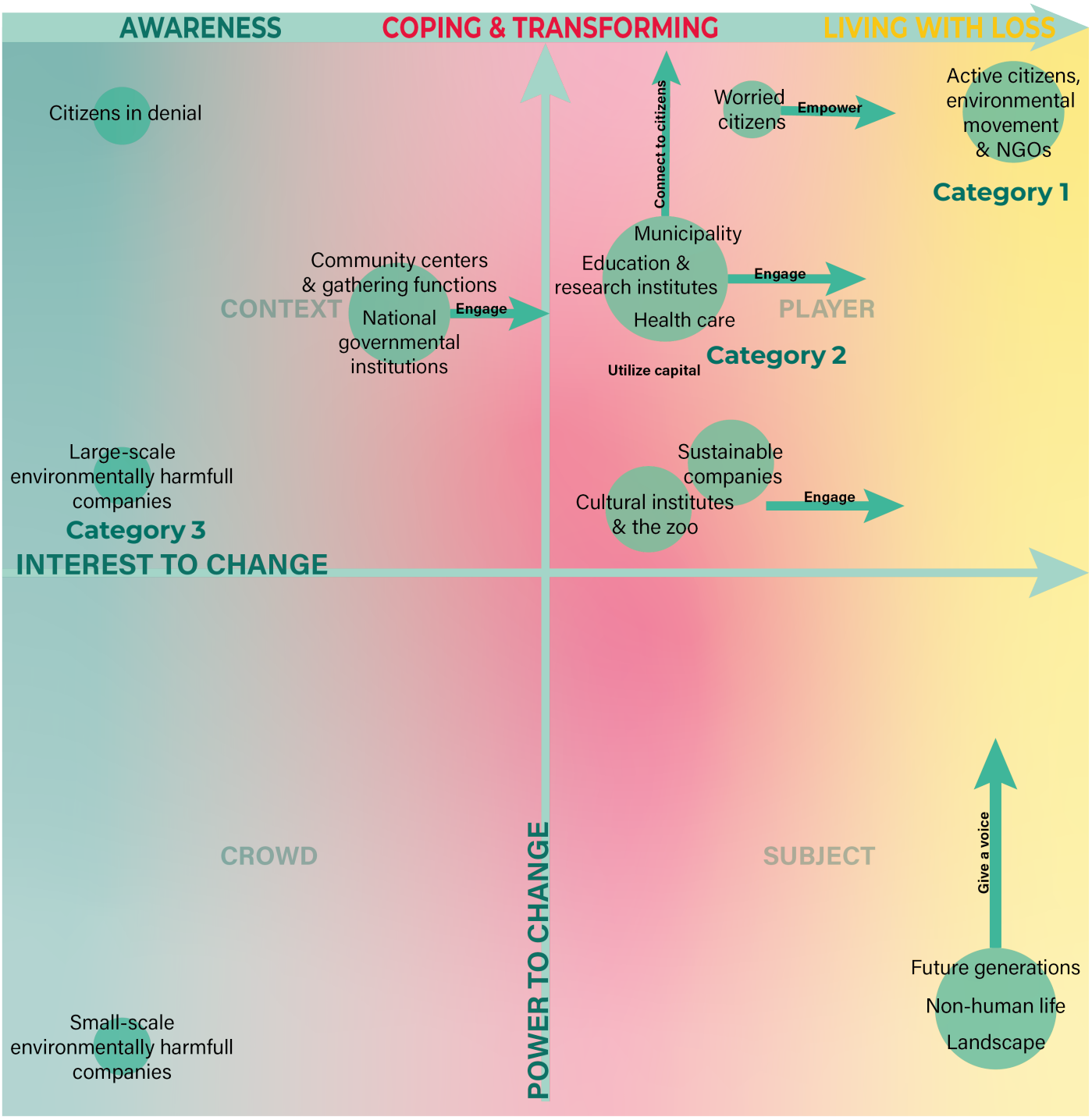

ECONOMIC CAPITAL
CULTURAL CAPITAL
Ministries
Rijkswaterstaat
Staatsbosbeheer
Cultural institutions
Water boards
Municipality
(thematic departments)
(Mental)
Health care
Developers
HBO
The Province
MBO
Transportation
companies
Metropoolregio
Rottedam-Den Haag
Property
owners
Universities &
research institutions
Local
sustainable
companies
Sustainable
companies
Elementary
schools
Havenbedrijf
Local
unsustainable
companies
Secundary
education
Blijdorp Zoo
Unsustainable
companies
NEIGHBOURHOOD
CITY
NL
Community centers
& assocations
Religous
institutions
Non-human life
Municipality
(districts directors)
Environmental
NGOs
Cementry
Residents
Local NGOs
Landscape
Local
sports clubs
Future generations
Animals-focussed
NGOs
Environmental
movements
SYMBOLIC CAPITAL
SOCIAL CAPITAL
ECONOMIC CAPITAL
CULTURAL CAPITAL
Developers
Unsustainable
companies
Car-centered
businesses
Local
unsustainable
companies
Havenbedrijf
NOORD
Residents in denial
SYMBOLIC CAPITAL
SOCIAL CAPITAL

6.4.2 Power-interest matrix

The positioning of the previously discussed stakeholders in the matrix is based on their power and interest considering empowerment of citizens to grief and provoke action to battle the planetary crisis on the neighbourhood level.

Figure 6.3.2.1: Power-interest matrix: Empowerment for eco-centric change on neighbourhood level.

Starting with the crowd that consists of the less powerful section of the unsustainable private sector. These kind of companies are simply guided by market forces, so if the demand changes they will adjust too or stop to exist.
Secondly, the context is constituted by the relatively powerful actors of which the interest lie else where. The community centers and other gathering functions, as well as the national governmental institutions should be engaged as they have a high capital but different priorities. The powerful private sector with high interest in the status-quo will try to sabotage eco-centric societal change, but their focus is mainly on a higher scale than the neighbourhood level. Another group creating the context are the citizens in denial, because they constitute the limits of the potentially empowered citizens.
Thirdly, the future generations, non-human life, such as flora and fauna, and the landscape, such as the river, soil and air, are the subjects. The planetary crisis has a huge influence on them, which is why the subjects should be given a voice to raise their power.
Lastly, the players consist of several groups that should be empowered and engaged with the topic of eco-grief to provoke action, such as the worried citizens. The municipality, education, research and mental health care institutions play a major role as the have an interest in the ecological crisis or the well-being of citizens. Sustainable companies, cultural institutions and the zoo have an interest in being socially engaged in order to resona¬te with citizens. The sustainable companies especially have an interest in an environmentally-friendly paradigm shift as this will raise their profits. The citizens that are already active re¬garding the crisis on a neighbourhood level embody the final goal, as well as play an important role in engaging others. However, it is essential to keep empowering these citizens to ensure and strengthen action.



Conclusion

Empowerment opportunities can be identified for environmentally active residents among civil society who are well represented by green initiatives in Noord, as well as environmental advocates that work within existing systems of the public and private sectors. Engagement opportunities can be identified for the worried citizens, actors related to nature experience, actors concerned with the well-being of citizens and the private sector that would benefit from a sustainable transition. The advocates of the anthropocentric status-quo pose the greatest resistance.

TOWARDS A COMMUNITY OF CARE AND AWARENESS

7. STRATEGY

7. STRATEGY

7. STRATEGY

7.1 The Urban Eco-Grief Cycle

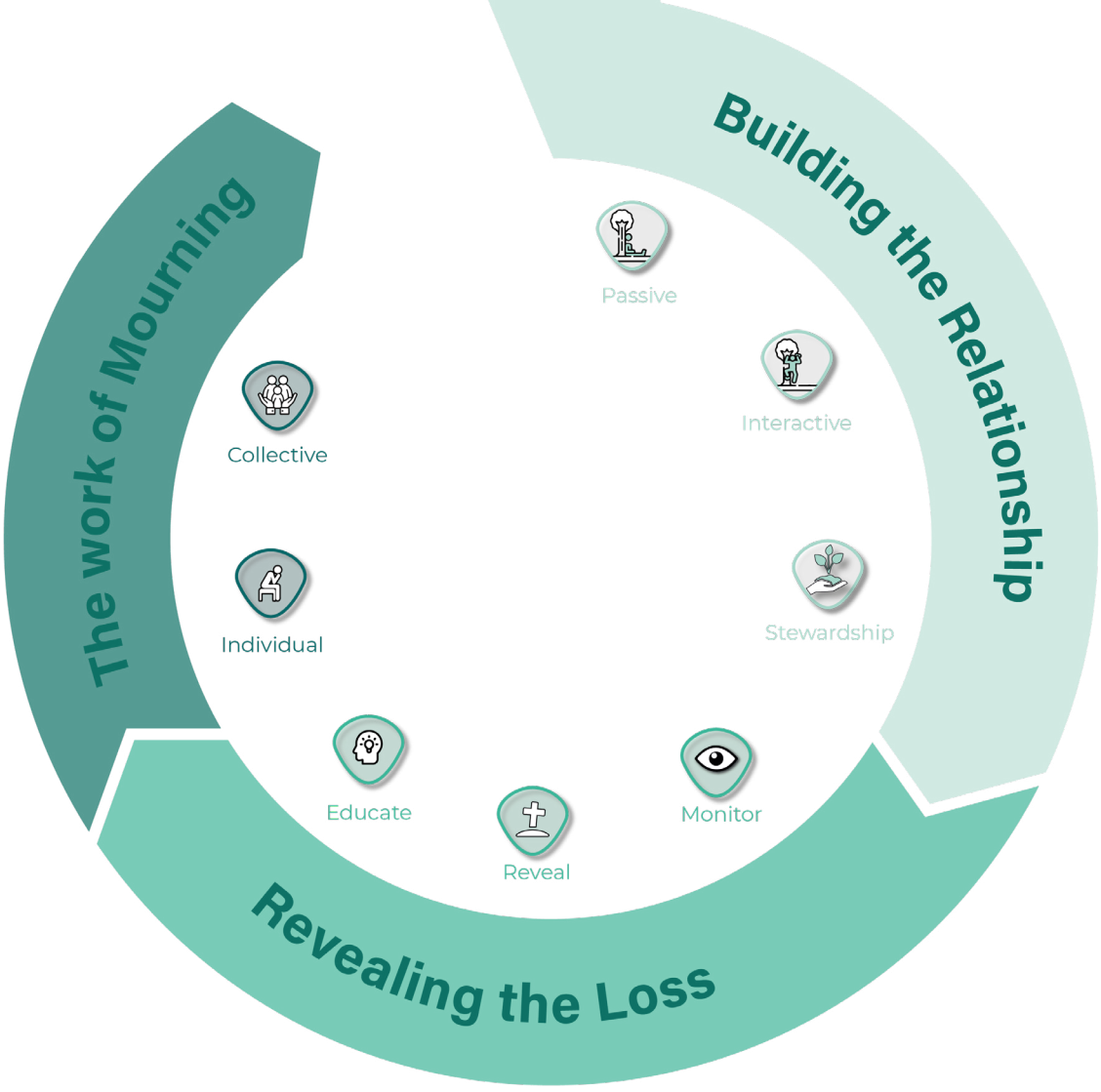


Figure 7.1.1: A simplified version of the Urban Eco-Grief Cycle.

The Urban Eco-Grief Cycle (Figure 7.1.1; Figure 7.1.4) is a spatial governance approach based on a continuous process consisting of three phases – building the relationship to our environment; revealing the environmental losses; the work of mourning related to these losses. Several concepts as discussed in the theoretical framework are integrated into this process. Each stage of the process of eco-grief, awareness, coping & transforming and living with the eco-crisis, is touched when going through the cycle. The phases of the cycle also include a focus on the elements of distancing, action and grieving, as well as the cognitive, aesthetic and emotional virtues. As emphasized in the theoretical framework, all these elements of the process can not be laid out in a linear step-by-step guide, but are essential parts of the continuous process. Throughout each cycle, different elements are touched reshaping the relationship to our continuously transforming environment, and creating space for eco-grief to exist and be integrated in the urban context. The ongoing environmental losses offer opportunities to reconsider our relations and practices. On the long term, the governance cycle will contribute to foster a sustainable way of pro-environmental action and move towards an urban community of care and awareness for its surroundings, and finally to eco-centric societal change.

The process

In the Urban Eco-Grief Cycle existing elements, new elements, sub-elements and the steps of the strategy can be found (Figure 7.1.3). Although the existing elements are based on the case study of Rotterdam, these can be commonly found in similar urban contexts. The steps illustrate how the new elements can be implemented. This cycle does not function as a replacement for existing governance and planning, but as a necessary extension in order to integrate eco-grief in the context.

The 'Building the relationship'-phase functions as the spatial foundation for the eco-grief strategy. It starts with an analysis of the existing structure, top-down plans, municipal maintenance plan and bottom-up green initiatives. The Urban Nature Types (UNT)-diagram (Appendix 10.5) is used as a governance tool to analyze the location in order to identify the strengths and weaknesses regarding vegetation and human activity in green spaces. To integrate new UNTs into the existing urban structure in an Urban Nature vision is created. The UNTs are evaluated and goals are set to balance and intensify the diversity of the UNTs. The types of human-nature interaction activities and the opportunities for stewardship practices are identified and integrated into the vision. The implementation of the Urban Nature vision creates a shift towards more human-nature interaction to build the relationship with the environment and establish a community of care.

The 'Revealing the loss'-phase is focussed on exposing the local environmental problems to the public. The existing monitoring network is needed to identify the losses. However, in order to localize the losses for citizens an environmental awareness infrastructure should be added to the monitoring network to translate and communicate the collected data. By spatializing the monitoring network and integrating it into the urban design and landscaping plans, citizens will become aware of the monitoring network as a first step of engagement. The main intervention to do this is by introducing monitoring stations that can become locations where citizens are educated about how to look at their environment and participate in citizen science projects for monitoring. Connected to the monitoring is the revealing of the identified losses through spatial interventions. This phase contributes to a shift towards a community that is aware of the environment along with its changes and problems.

The 'Mourning'-phase nurtures the community of care and awareness. Based on this community, a network of actors is established to organize events for commemoration and community building to facilitate social support, as well as to create commemoration spaces in order to face and cope with the losses. The more people become aware of the environmental losses, the more the network will expand. The commemoration is directly linked to the monitoring network, and the spatial interventions are embedded into the Urban Nature vision.

Finally, the Urban Nature goals are evaluated through indicators. The successful interventions can be investigated further for upscaling. Then, the cycle continues in order to keep reshaping the relationship to our changing environment, while fostering a community of care and awareness.

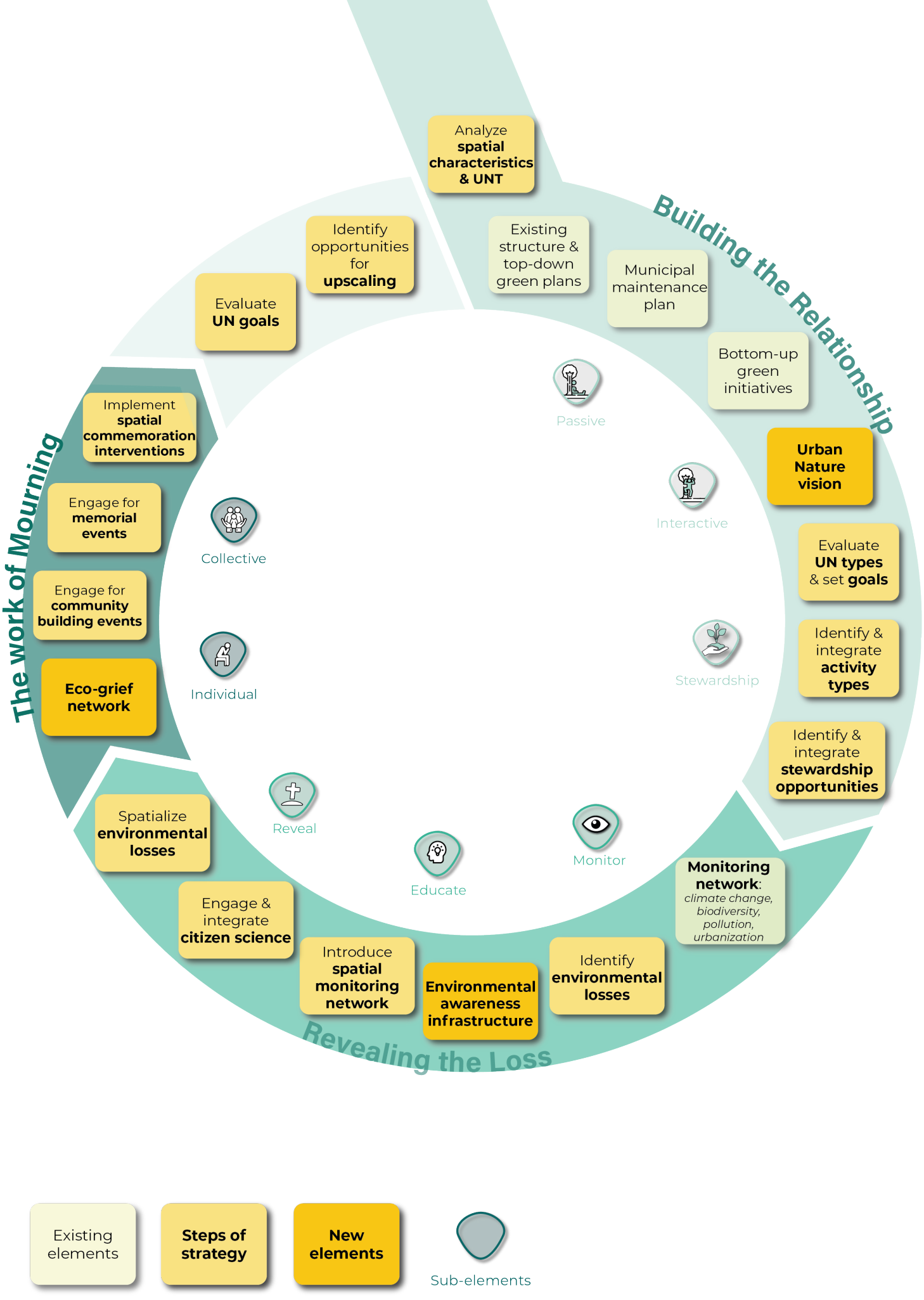


Figure 7.1.4: The Urban Eco-Grief Cycle.

7.2 Contextual application

To illustrate how the Urban Eco-Grief Cycle works, the vision and engagement strategies are discussed in the context of Rotterdam Noord regarding each phase. Thereafter, specific interventions are described in more detail and situated along the Rotte.

7.2.1 Building the relationship

Vision

Noord

Based on the analysis of Noord, the vision map is created in which the diverse UNTs can be matched to the characteristics of the site and integrated in the existing urban structure. The monitoring stations and eco-grief locations will be discussed in the following sections about revealing losses and mourning. Each of the newly introduced UNTs corresponds to a different kind of stewardship or maintenance type, for which Figure 7.2.4 helps to identify the stewardship opportunities.

In the vision map (figure 7.2.5), the urban nature is mostly intensified through the introduction of new green spaces at local squares and the densification of the existing vegetation along the waterfront. The focus lies on the identified areas that suffer most from climate change impacts. To balance and intensify the greenery, interventions are proposed to complement the existing by mixing functions of and densifying the urban nature (Figure 7.2.1). In red, the focus points of nature-human interaction are highlighted, based on the contextual functions of the commercial areas and active, green spaces where people gather and connections to the existing green structure. To increase the availability and accessibility of diverse UNTs, paths are introduced through semi-public areas to utilize the existing quality and the connections of green spaces are improved through redesign of the infrastructural clashes. Through this redesign, the intersections need to express an equal nature-human balance by giving more space to nature and improving the immersive human experience in the green spaces.

In the west, the connections of the fragmented ‘Stadspark West’ is improved and functions are added in order to unify the area as an actual park and utilize the existing qualities. By strengthening its identify, the right of existence of the area as a whole is secured in order to stand against further urbanization. In the middle, the dense vegetation is especially focussed along the waterfront of the Noorderkanaal, and the intersection to access the waterfront from the neighbourhood are improved.

In the east, more new green spaces and human-nature interaction functions are introduced.
Overall, the 'Stadspark West', singels, waterfronts and Hofbogenpark need to be well-connected and adjusted to the nature experience of citizens in order to start to view Noord not only as an urban area, but also as a natural area, to fade the nature-human dualism and anti-urban bias.

Rotte
Based on the UNTs-analysis, the UNTs vision is created (figure 7.2.6) showing the densification of greenery and activity and the focus points for human-nature interaction. The corresponding interventions are positioned on the UNT-diagram (figure 7.2.2) to reach a balanced UNTs composition. Along the waterfront, three zones of Urban Nature are proposed on the vision map based on their contextual characteristics (figure 7.2.7).
The 'wild & dense'-zone is the most active where nature interaction and education are the main aims. This yellow zone has relatively the most space for greenifcation and across the water, a busy road and gather functions for sports can be found. This area offers the opportunity to actively engage through direct nature interaction and active functions, as well as indirect, visual interaction through observing the wild nature from a distance. Therefore, this zone is appointed as the 'wild & dense'-zone, as in wild activities and dense vegetation. The stewardship practices that relate to this zone are mostly based on expert ecological maintenance, but can be supported by volunteers from civil society.
The 'vibrant & open'-zone is related to the commercial functions of the Zwaanhals and Noordplein and its local community. The focus lies on slight greenification, semi-active nature-related activities, community building and collective grief events. This type has to show how urban culture and nature can intertwine. The stewardship practices for this zone partly depends on the private functions, but the small-scale greenery can be maintained by the local residents.
The 'calm & sensory'-zone relates to the existing green spaces of the cemetery and the singel, where vegetation is partly densified and the calm atmosphere is utilized. However, these areas are extended into the neighbourhood and the waterfront. The green zone along the waterfront also has a calm character as there are only minor roads on both sides of the water, and the buildings create (partly) enclosed green spaces. This zone is an restorative area for all life, where nature immersion, sensory experiences and nature awareness are stimulated, as well as individual morning through spatial interventions, such as the cementry-as-a-park for eco-grief. The responsibility for the greenery in this zone can be given to the local residents and be supported by expert knowledge if necessary.

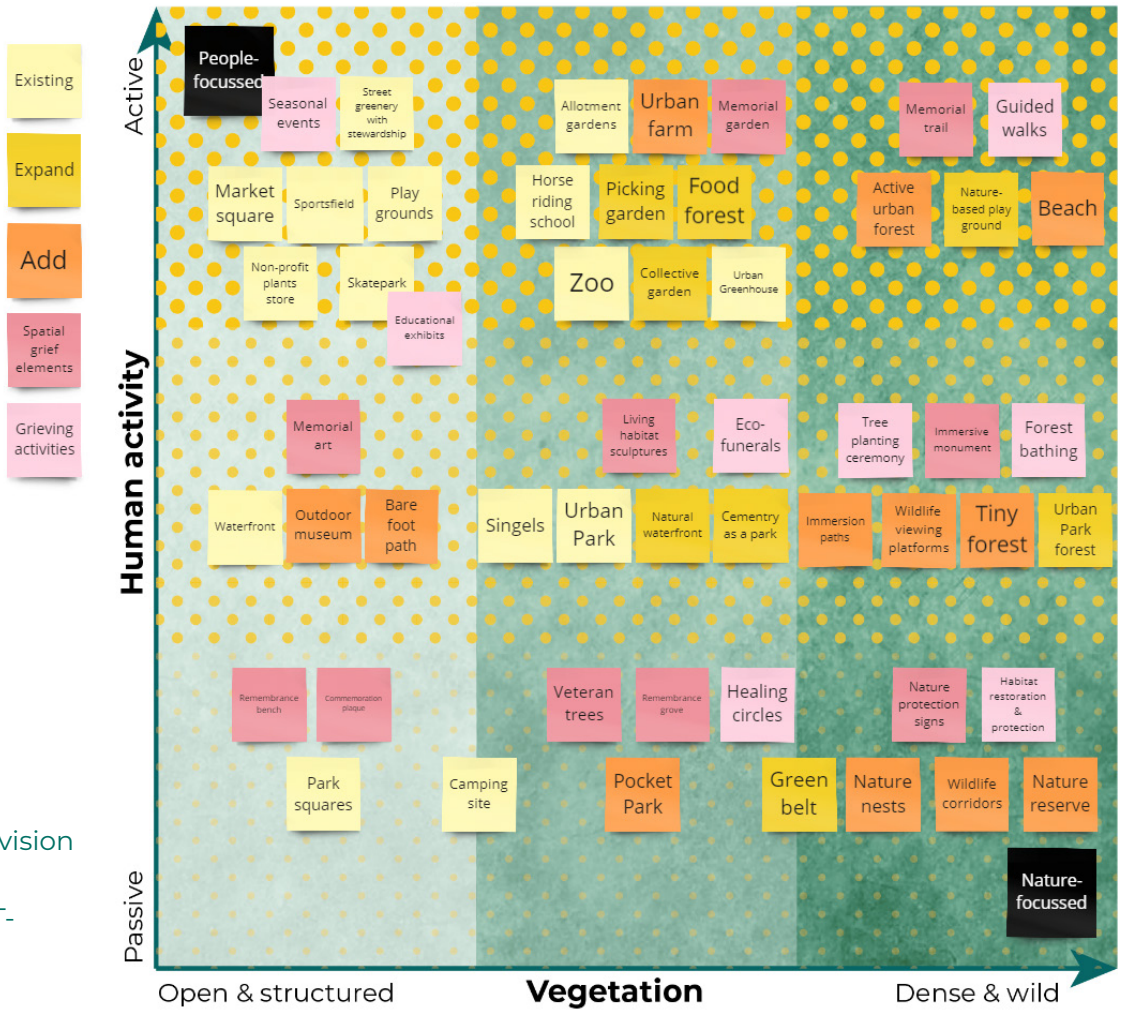


Figure 7.2.1: Design interventions for the vision for Rotterdam Noord projected on the UNT-diagram.

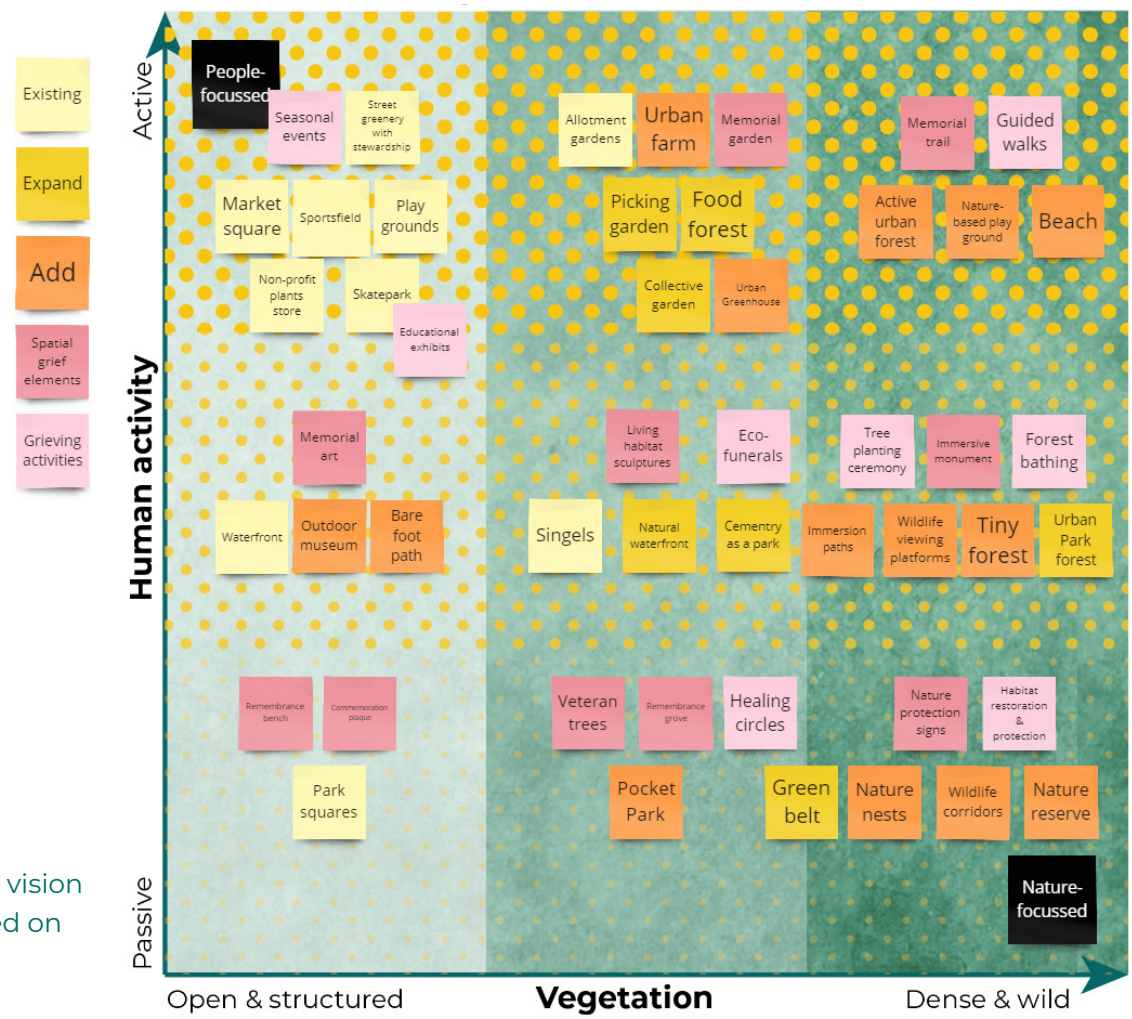


Figure 7.2.2: Design interventions for the vision of the Rotte projected on the UNT-diagram.

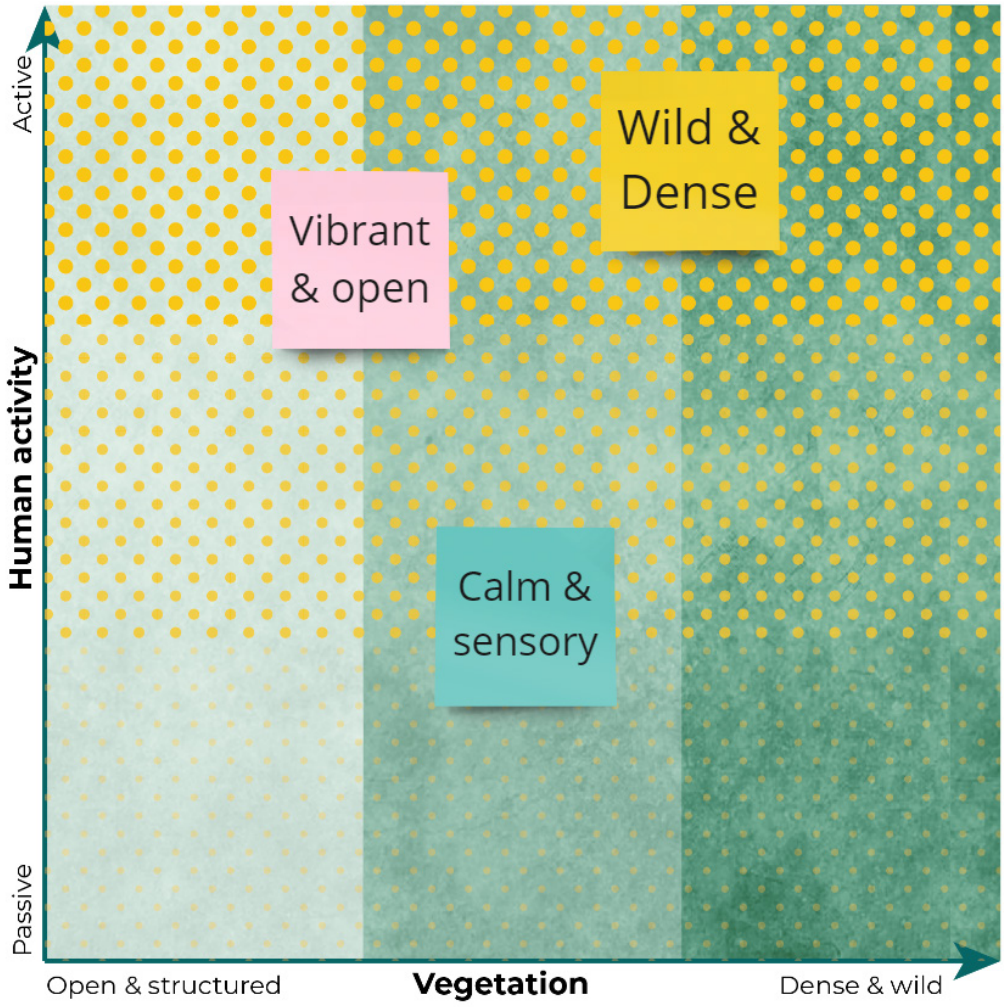


Figure 7.2.3: Zones of the vision of the Rotte projected on the UNT-diagram

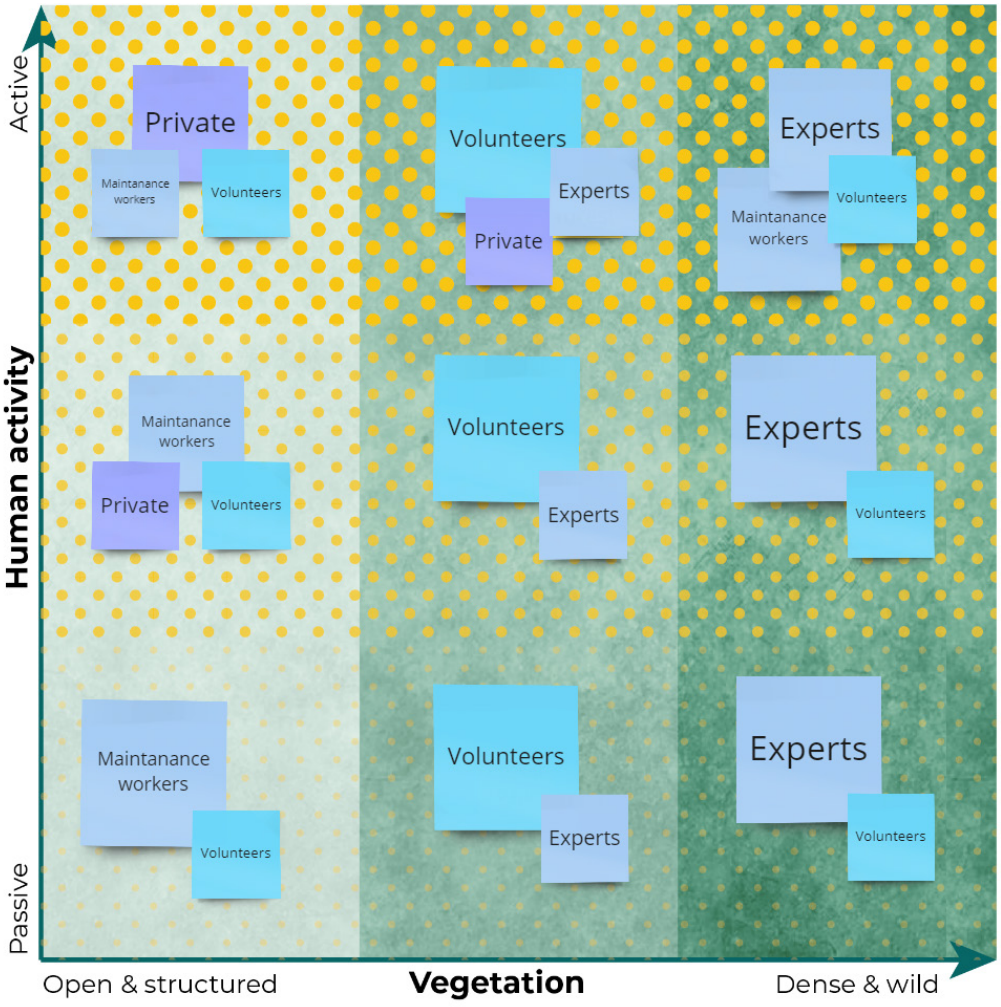


Figure 7.2.4: Stewardship and maintenance types projected on the UNT-diagram.


= Monitoring station
= redesign of infrastructure
= green connections to surroundings
= nature-human interaction focus points
= eco-grief location
= active and dense green space
= Opening up semi-public space
0
500
1.000 m

Figure 7.2.5: Vision map of Noord.

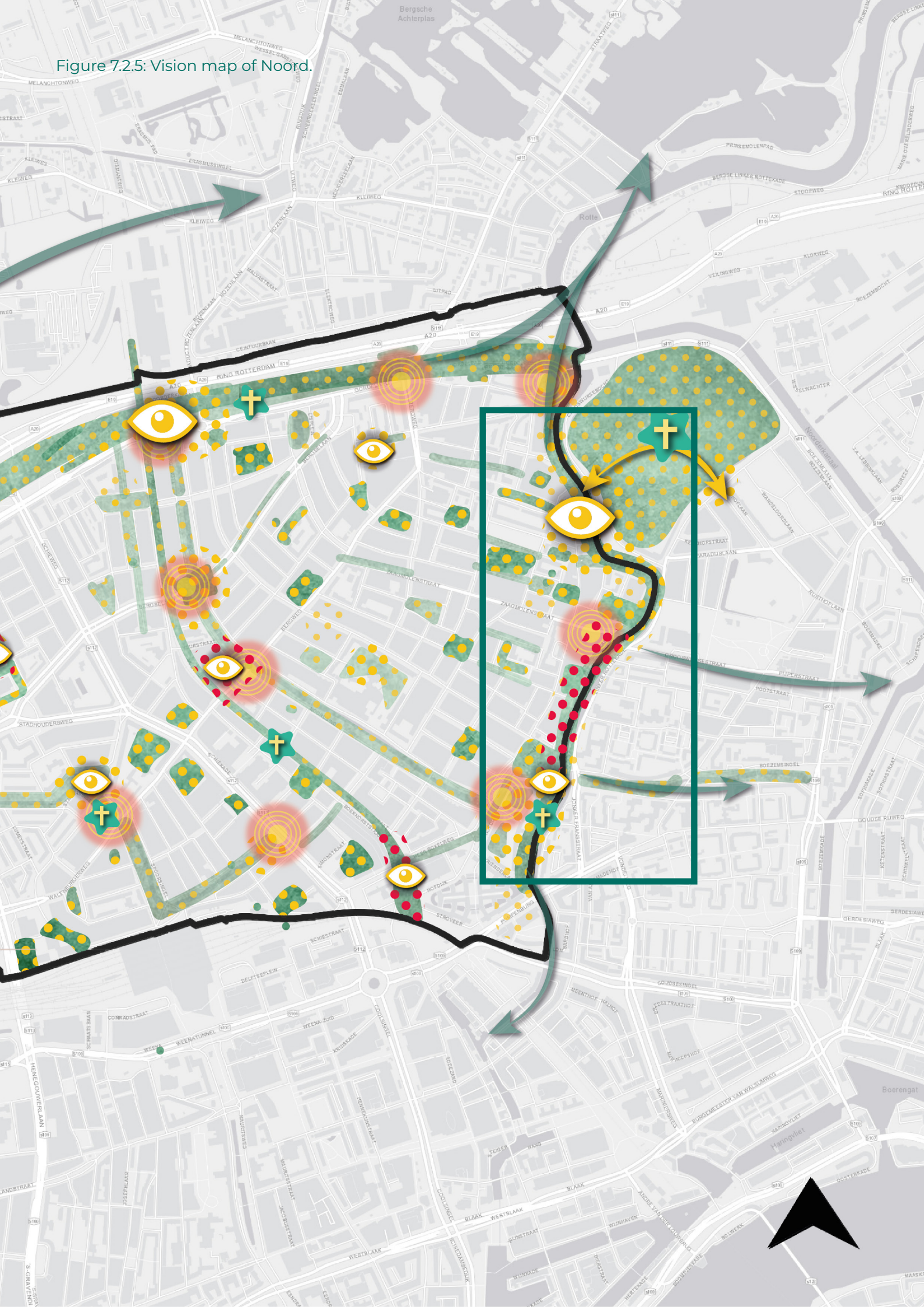


Figure 7.2.6: Vision map of Urban Nature Types of the Rotte.

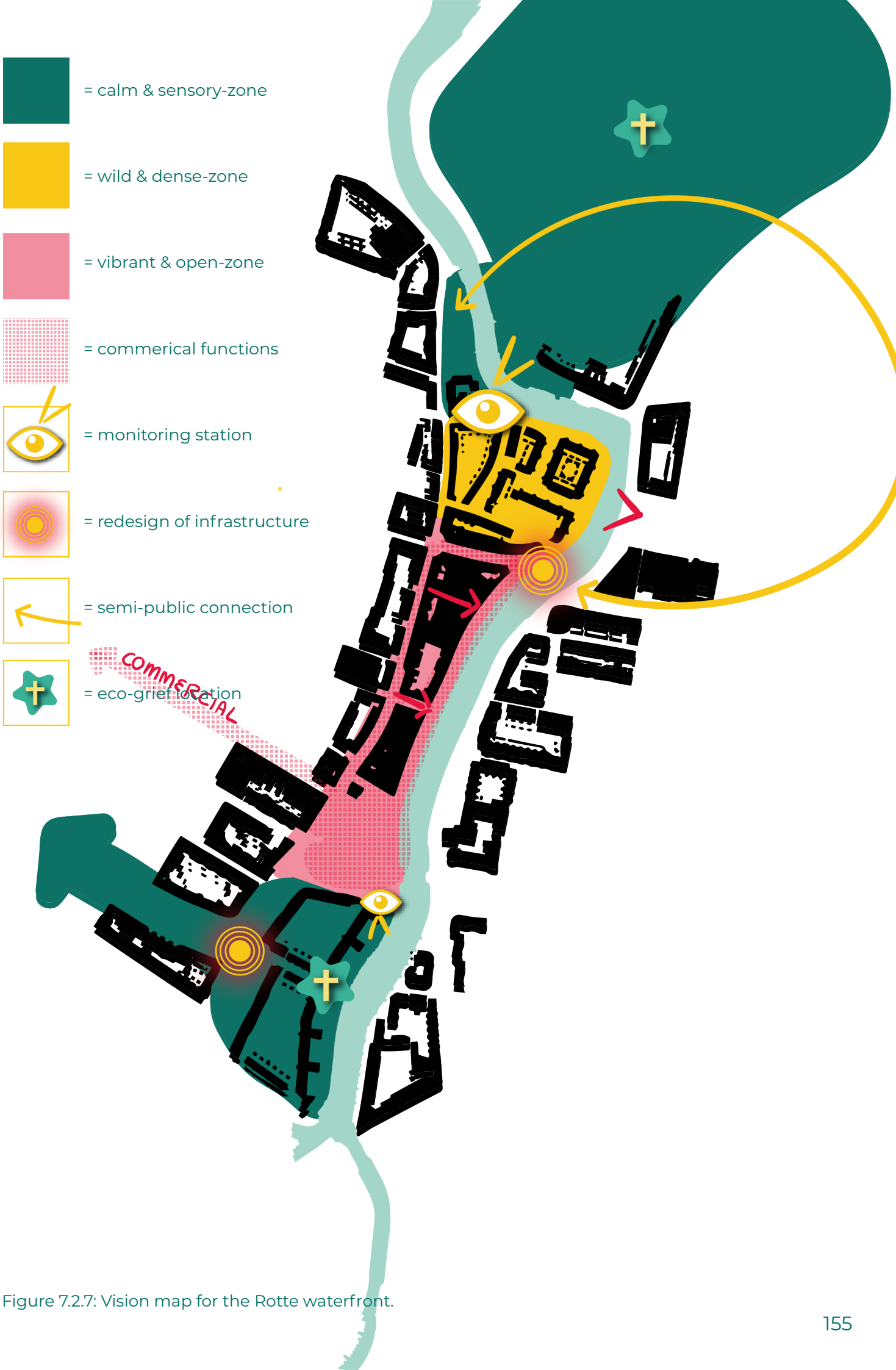


Figure 7.2.7: Vision map for the Rotte waterfront.

Engagement

Urban Nature Types & activities

This phase starts with an UNT analysis directed at governmental institutions that are involved with the design and planning of the urban environment. Although the UNT analysis is used as a governance tool for top-down plans, it can also be used by other parties to identify the needs, such as design firms or green bottom-up initiatives. In this case, the existing greenification plans of the municipality of Rotterdam can be used as the starting point for integrating new UNT. The value of greenery is acknowledged by the municipality and other initiatives, like National Park Rotterdam. Many reasons for greenification are addressed, like climate adaption, biodiversity, recreation and health, but still urban nature is seen as dominated by humans and inferior to 'real' pristine nature. As discussed in the survey, as well as in the interview with the ecologists, the view of Urban Nature influences conservation efforts.

The Rotte offers engagement opportunities as the municipality specifically mentions the goal to greenify the waterfront and the survey respondents from Oude Noorden mention it as their favourite green space. By engaging the existing active community, sustainable companies related to the local food market and local NGOs in the greenification plans, the interventions that are related to the active Urban Nature Types can be executed, while the existing relation is strengthened. The activities that citizens undertake related to the environment offer a chance connect the local community to the landscape, such as the local scouting, fishers and athletes. Through initiatives such as urban farms, food forests, collective gardens and nature-based playgrounds, the power of community and sustainable practices are merged.

The design and planning of the public land depends on the municipal plans, in which especially the less active Urban Nature Types should be taken into account. The municipal cemetery offers a big opportunity for calm and immersive nature experiences if connected to the neighbourhood as a public park. Other property owners may offer land for interventions like pocket parks or wildlife corridors, while community centers and schools serve as educational hubs for nature-based learning and activities. Sports clubs can support initiatives that enhance recreational opportunities and increase biodiversity on their land. Public transport companies also benefit from green, pleasant and walkable neighbourhood with less cars as it promotes sustainable mobility. National governmental organizations and health care institutions may provide funding or expertise to advance biodiversity conservation and public health objectives.

Moreover, the small scale nature reserves have a high ecological and symbolic value representing the feasibility

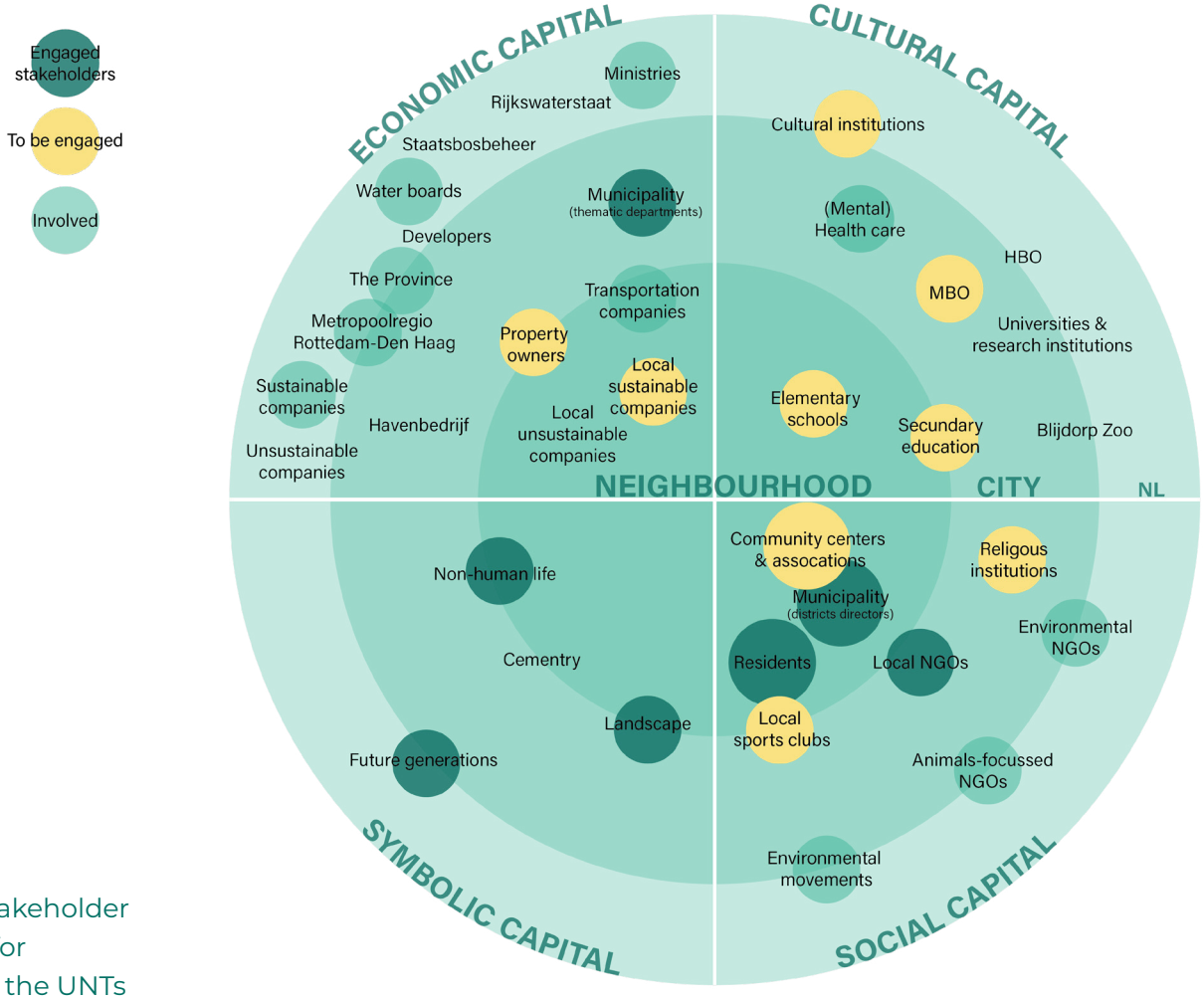
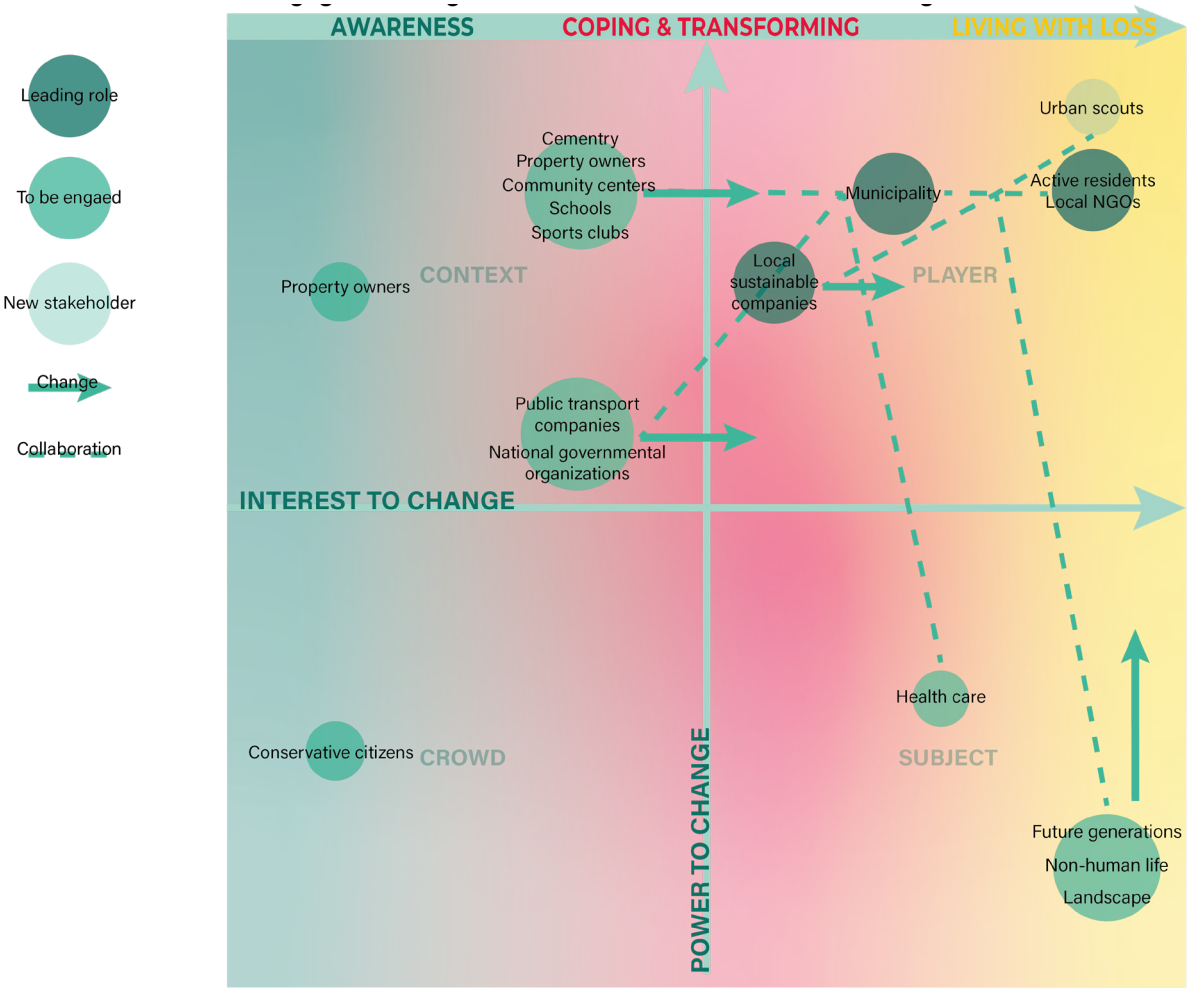


Figure 7.2.8: Stakeholder identification for implementing the UNTs



of human and nature as co-dwellers of the city, in which the municipal ecologists, foresters and maintenance experts are involved. Empowering the symbolic stakeholder noted as future generations and fostering a deeper connection with nature are fundamental goals of the Urban Nature structure. Interventions such as tiny forests, immersion paths, and wildlife corridors provide opportunities for experiential learning and ecological exploration, nurturing a sense of stewardship and responsibility among youth. By integrating nature into urban environments, the structure not only enriches the lives of residents but also safeguards the natural capital of cities for generations to come.
Lastly, conservative citizens and property owners be concerned about the wildness and increase of urban animals in their environment. However, by emphasizing the diversity and benefits of the Urban Nature structure, including health benefit for humans and increased property aesthetics and value, as well as space for open and structured nature, these concerns can be addressed. Engaging stakeholders in dialogue, demonstrating the positive outcomes of similar initiatives, and offering incentives for participation can help build consensus and support for the structure.

Stewardship
Since the municipality has the responsibility over public space, public greenery is maintained by gardeners employed by the municipality. More complex tasks are executed by experts, like urban foresters. Although possibilities are presented by the municipality for stewardship, the maintenance system is not designed to promote this. Stewardship should be taken into account during the making of the greenification plans, but should also be part of current maintenance, cleaning and restoration practices. This should not only be done to engage citizens with their environment, but also because the strong increase in urban greenery requires capital and labor. In the long run, the municipality will profit from the habit of caring for the local environment of citizens. Stakeholders with high social capital, such as schools and community centers, can be targeted and environmental NGOs can support the collaborations.
This shift of focus and approach especially asks a lot of effort from the municipality itself, since the current maintenance is outsourced to a gardening company. On the short term, a change in the maintenance system complicates the planning and funding. In addition, conservative citizens want to keep the status quo with tidy grass lanes and might be uneducated about the benefits.

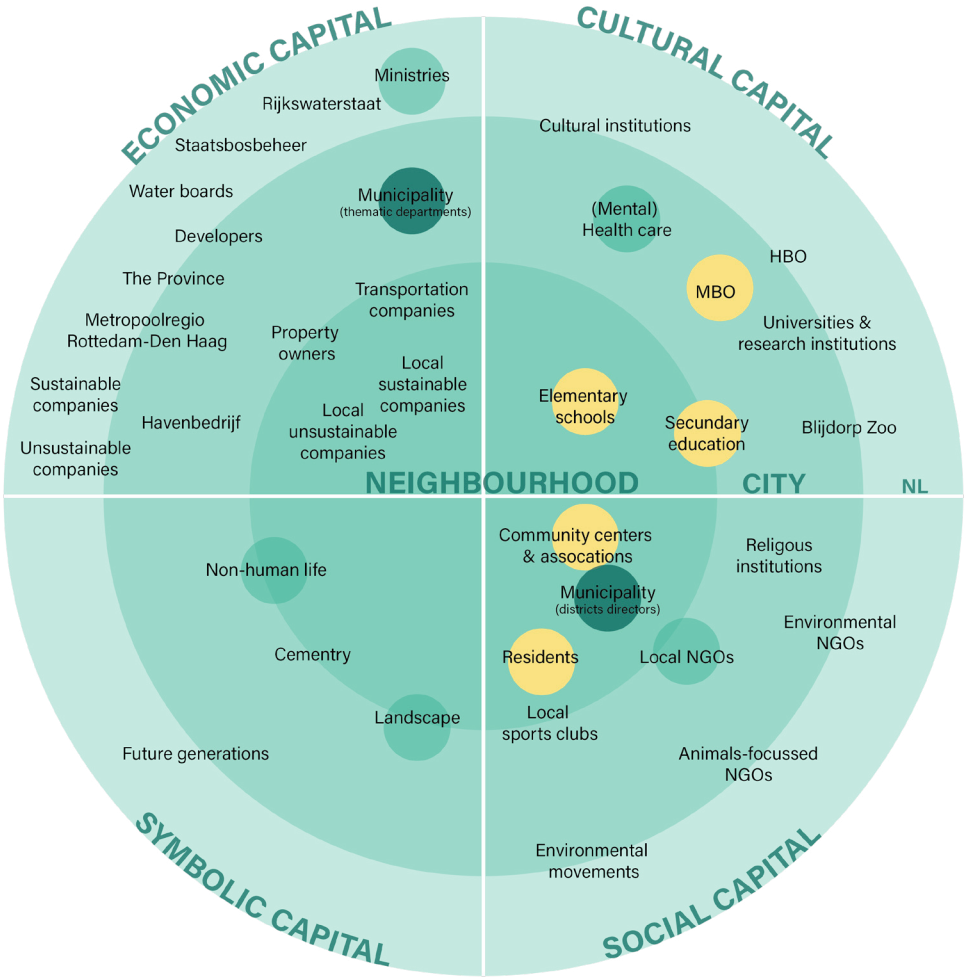
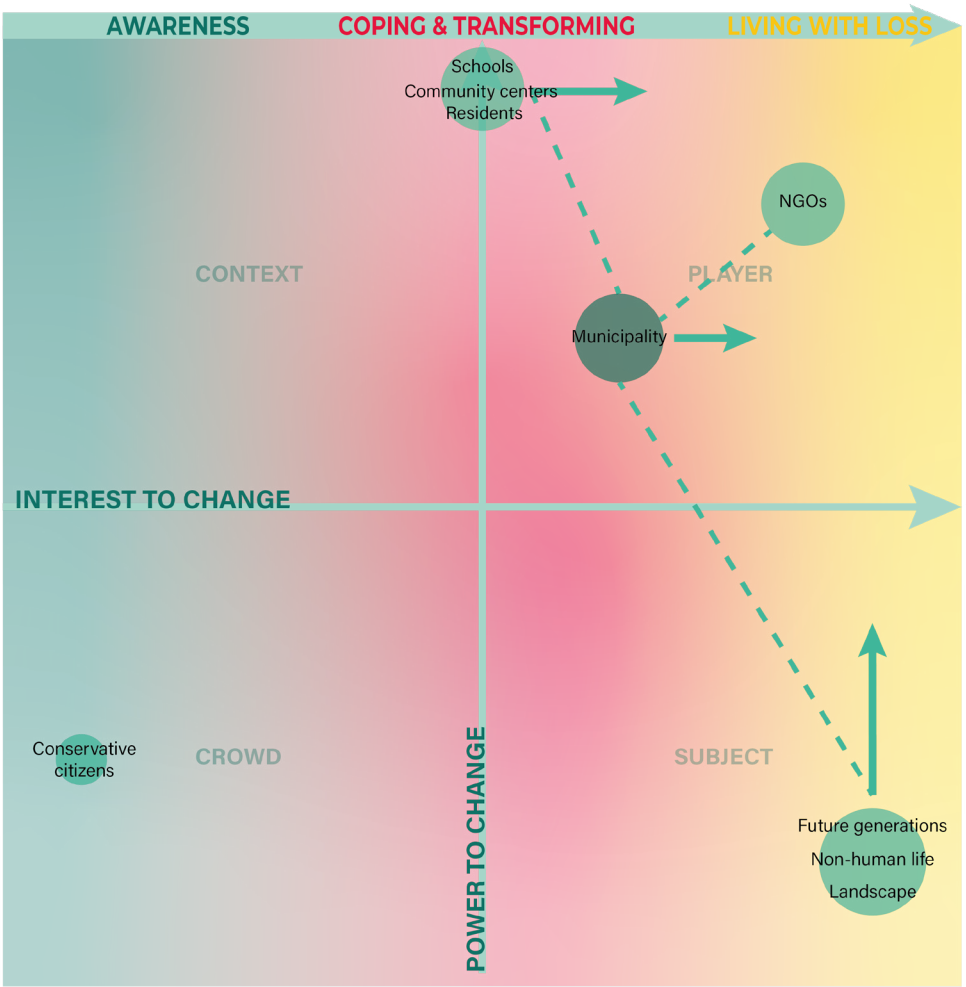


Figure 7.2.9: Stakeholder identification for stewardship practices



7.2.2 Revealing the loss

Vision

The municipality set up a biodiversity monitoring network, which has recently been put into operation. However, the scope of the monitoring is limited to certain biotope types, meaning that not all neighbourhoods are being monitored. This complicates the identification of specific local losses. Data on climate change impacts and pollution are also being monitored. These shape the foundation for revealing the local environmental losses and changes. In the vision map (Figure 7.2.5), the expanded monitoring network is laid out introducing main monitoring hubs and smaller wildlife watching points. The locations complement the existing monitoring routes and are either connected to areas where people gather, such as commercial functions, the park and the allotment gardens, or to the main green spaces, such as the cemetery. The existing environmental monitoring system does not reveal the environmental losses to the public, nor does it localize and engage residents. Currently, the focus of the monitoring routes is solely on gathering a sufficient amount of data. The system should become part of the neighbourhood through spatial interventions. Therefore, monitoring stations will be implemented that will function as wildlife viewing platforms with an educational function. From these stations, events can be organized, such

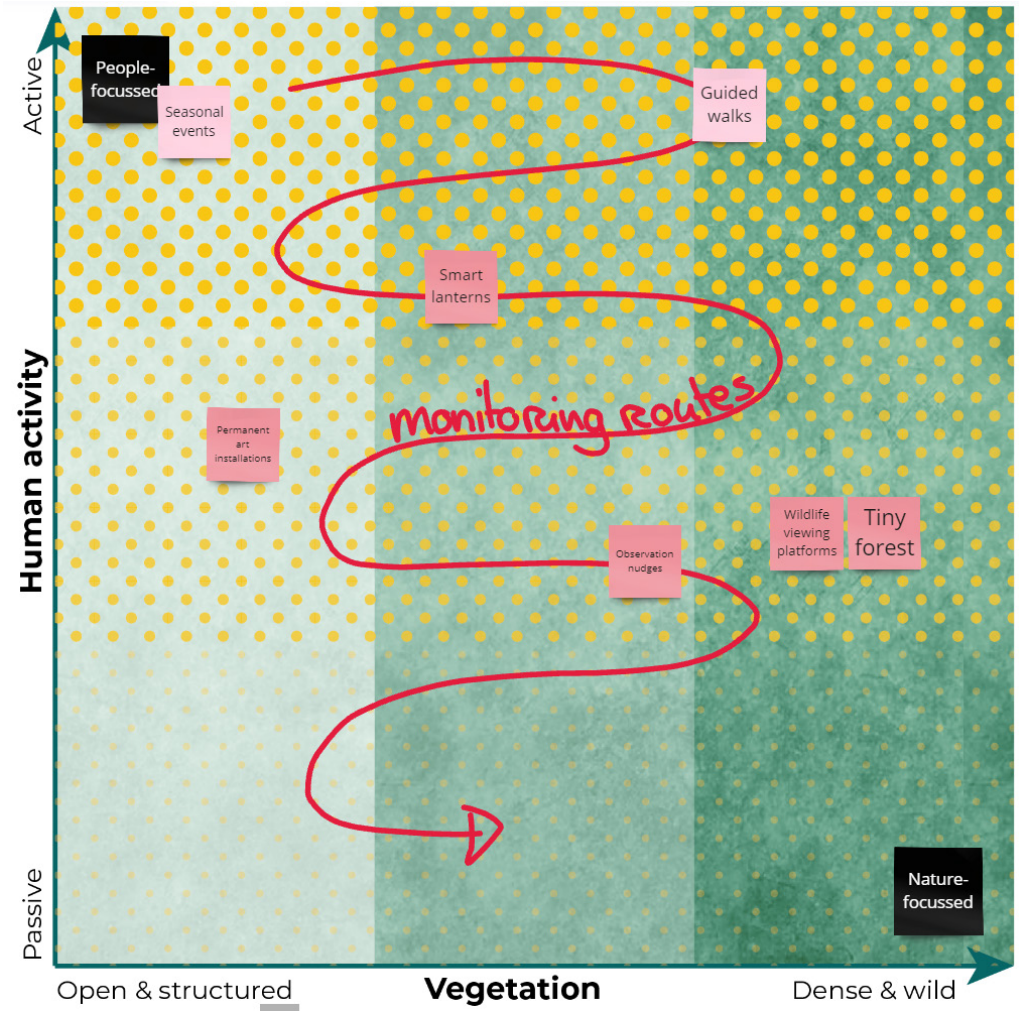


Figure 7.2.2.1: Monitoring interventions and activities projected on the UNT-diagram.

as a seasonal bioblitz which is an intense period of biological surveying within a certain area. Moreover, guided walks can show the monitoring routes, explain the rules and educate about the local wildlife. Besides the station, smaller spatial interventions can be installed along the monitoring routes that nudge to be aware for observation, as well as to reveal the environmental losses.

Engagement

Currently, the main stakeholders considering the monitoring network are the municipality and the research institute Bureau Stadsnatuur. Several NGOs are also involved in monitoring activities, such as Observation.org focussed on citizen science for biodiversity monitoring. These stakeholders have social and cultural capital, because they have broad social networks, knowledge and expertise. National governmental institutions are interested in monitoring, but their focus lies on a higher scale.

Several stakeholder are identified to start a collaboration with. First of all, the local schools and community centers have the most social capital, having the ability to reach local people for citizen science projects. Secondly, the zoo and other cultural institutions have cultural capital to educate people. The zoo is also a private institutions with economic capital to invest in the monitoring stations, for which they can use the gathered information in their exhibitions on local nature. In this way, the zoo extends their boundaries into the neighbourhood, while holding onto their own vision. The cultural institutions can play a role in giving the symbolic stakeholders a voice. Lastly, the wildlife viewing platforms help to view the city as an nature reserve, strengthening the vision of National Park Rotterdam. This initiative mostly has social capital and can raise awareness of the existence of the monitoring infrastructure. However, their focus does not lie on monitoring specifically.

Environmental skeptics, like citizens in denial, might not appreciate spatial interventions of a monitoring network in their neighbourhood, but emphasizing the community, recreational and educational functions might help reduce resistance. Also, revealing the environmental losses in space might confront citizens with unwanted knowledge, which is where the coping and grieving strategy comes in to build social and emotional resilience.

Finally, the monitoring experts themselves might actually be opposed to an extension of the system, as involving new parties and citizens shift the focus on qualitive data. However, the existing monitoring routes can stay in place, and the new routes and infrastructure function as additions. On the long term, more people will be educated about the need of monitoring increasing both data quality and quantity.

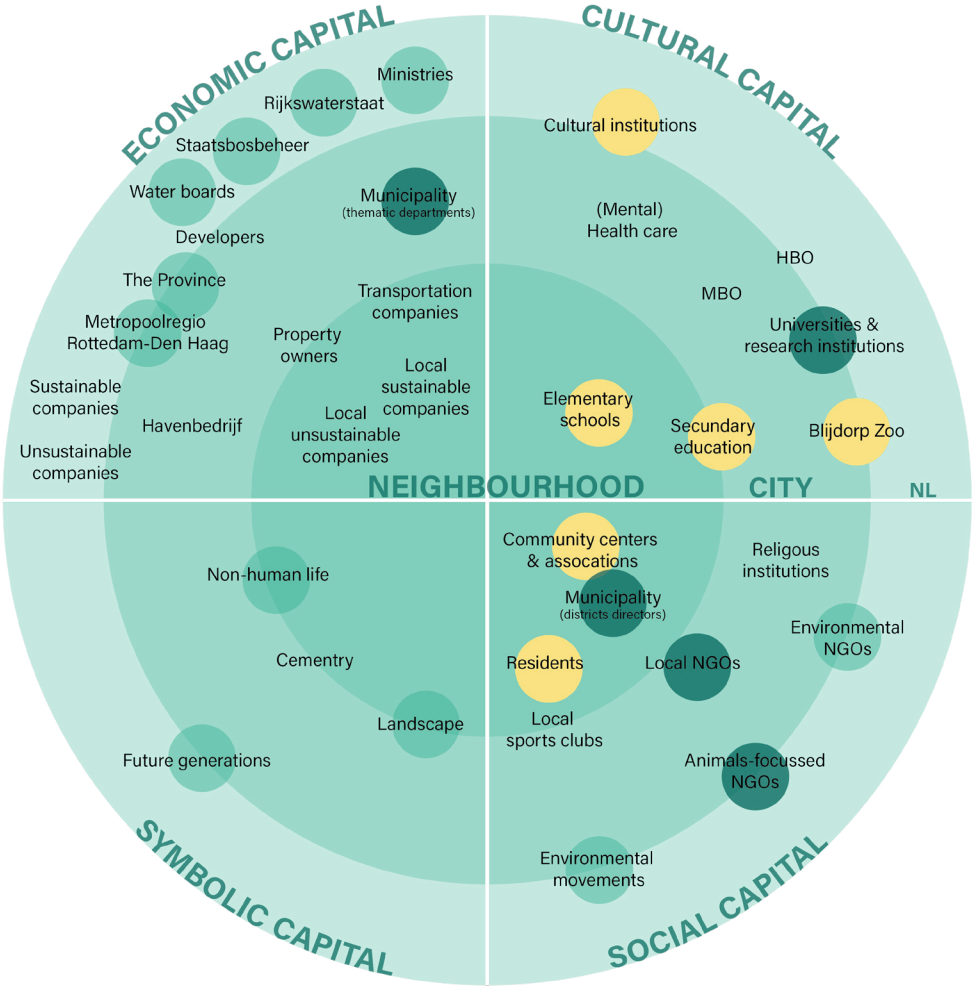
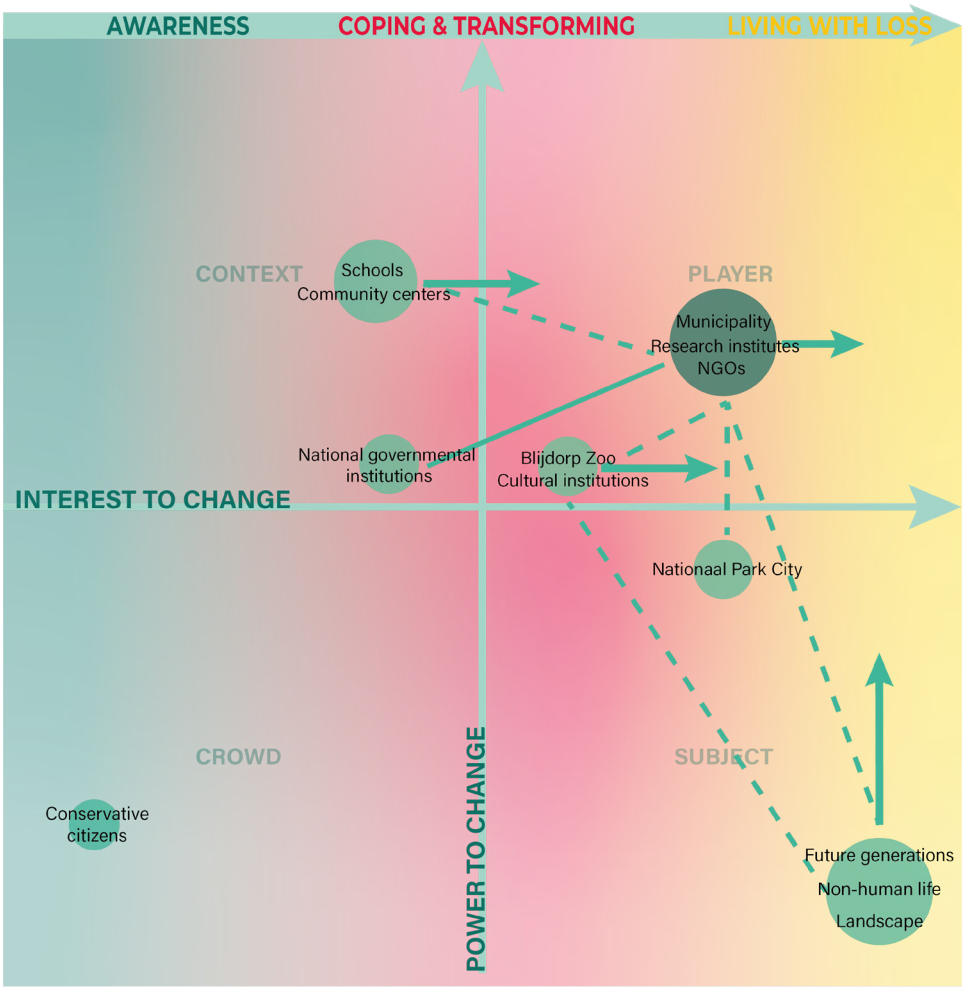


Figure 7.2.2.3: Stakeholder identification for monitoring



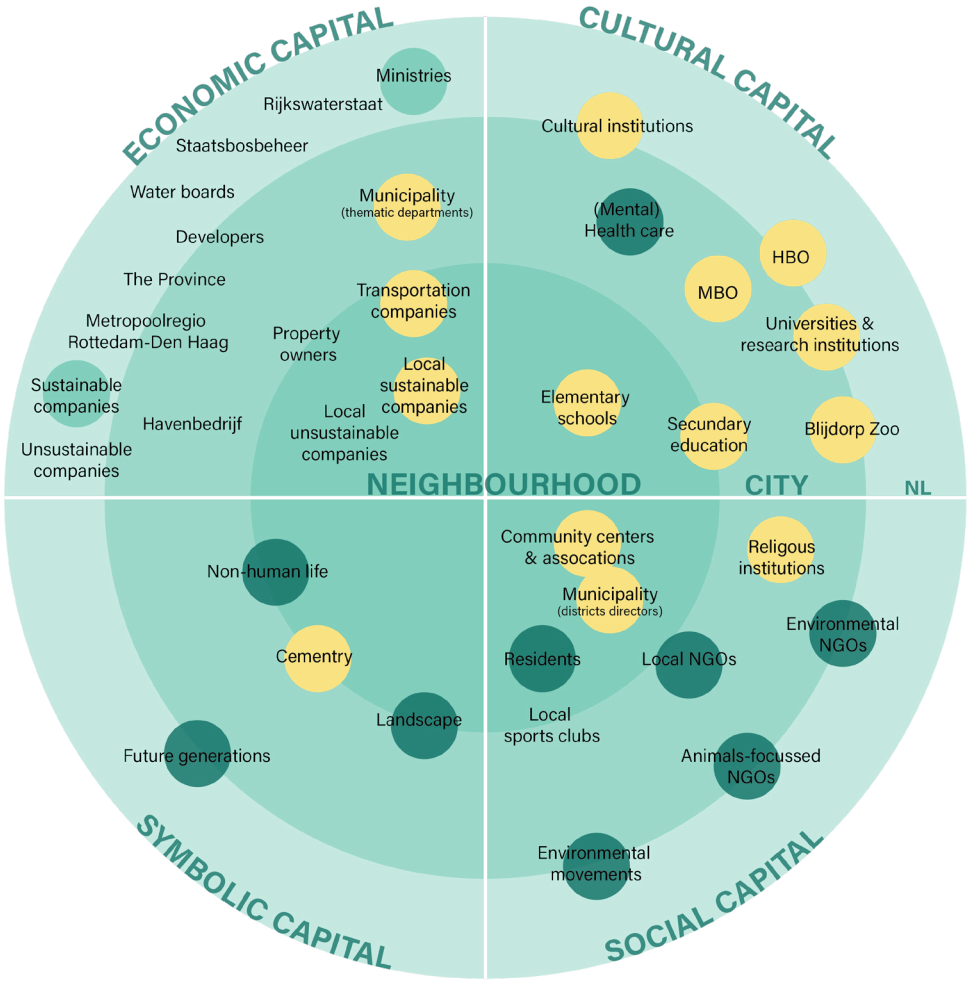
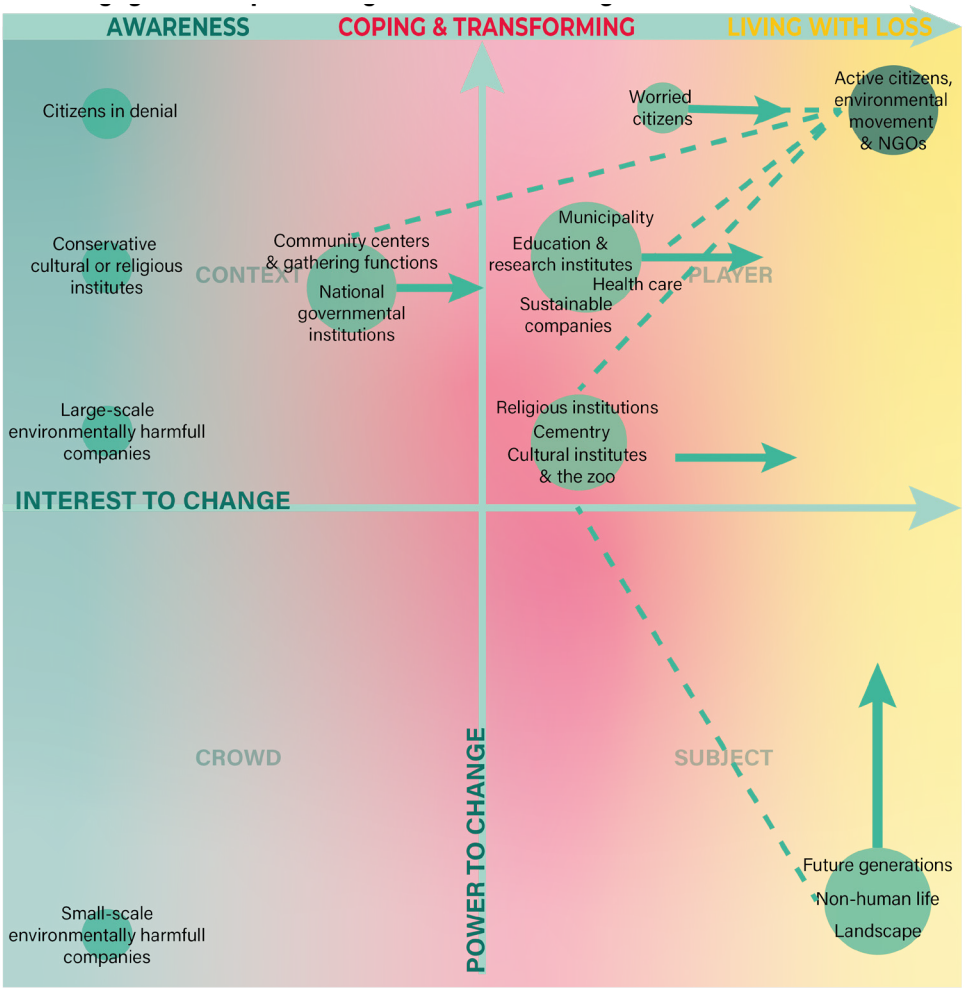


Figure 7.2.2.2: Stakeholder identification for interventions related to 'the work of mourning'-phase



7.3.3 The work of mourning

Vision

As the ecological crisis worsens, the need for societal acknowledgement rises. In the vision map (Figure 7.2.5), the eco-grief locations are situated at places with a calm character, but near paths where people cross and monitoring routes to increase accessibility and visibility. In addition, these locations are always connected to a monitoring station in order to connect to specific losses, as well as to gathering functions to engage the local community. These locations offer opportunities for restorative spaces for individual grieving and commemoration, or eco-grief-literate communities that can facilitate collective grieving and community building related to the environment. As each grieving process is unique, different mourning activities and spatial interventions can be connected to each UNT answering to the diversity of personal grieving processes.

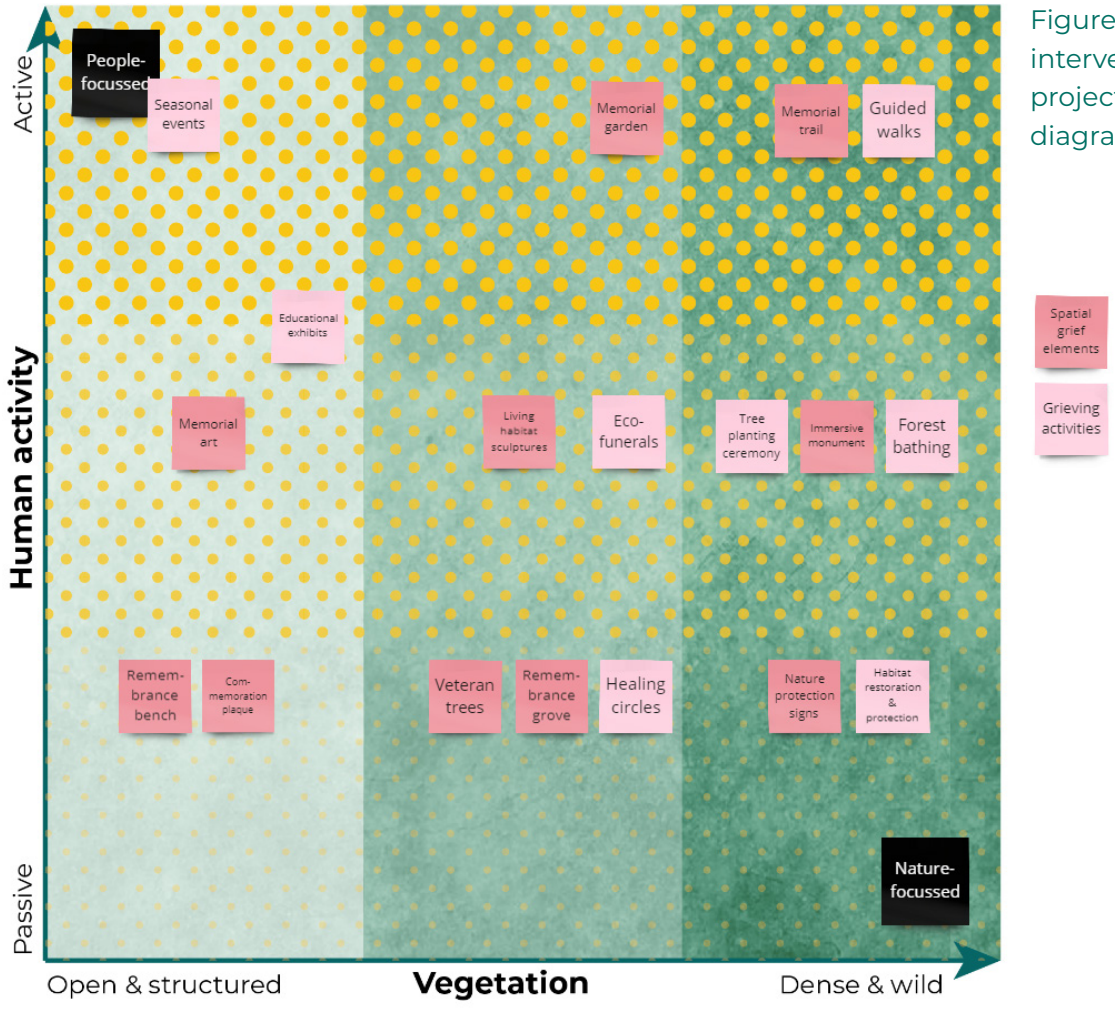


Figure 7.3.3: Mourning interventions and activities projected on the UNT-diagram.

Engagement

The growing group of environmental pioneers and destabilisers of the status-quo need empowerment through coping practices to secure the translation of their feelings into sustainable pro-environmental action. Active residents, the environmental movement, NGOs and other environmental advocates play a leading role in the development of the urban eco-grief network. Gathering events are already been organized, like seasonal harvest dinners, guided walks, eco-funerals, educational exhibits, climate art, healing circles, tree planting days, forest bathing and other habitat restoration and protection practices. Already being invested in environmental causes, they are likely to embrace the concept of eco-grief.

Stakeholders with a lower interest can be engaged through targeted outreach efforts and play a role in facilitating collaborations. Worried citizens may appreciate educational exhibitions and healing circles to cope, while municipalities and sustainable companies can take a supervising role contributing resources for initiatives, like memorial art installations or tree planting ceremonies. Religious institutes, mental health care and community centers could offer spaces for commemorative events and host healing circles. Education and research institutes can provide expertise and facilitate research on the impact of eco-grief and healing practices. Cultural institutions and schools can empower the voiceless stakeholders, like future generations and nature, through ceremonies and art.

Citizen in denial, conservative cultural and religious groups and unsustainable companies form the opposition as their values and interests are questioned through eco-grief practices. Engaging in dialogue, providing education possibilities and highlighting the benefits of the eco-grief network for individuals and communities can help mitigate the opposition. Additionally, these stakeholders, like unsustainable companies, can be offered help to join the transition towards environmentally-friendly practices.

By approaching the development of the urban eco-grief network with a collaborative mindset and customizing mourning rituals and practices to the local community and environment, the network can serve as a valuable platform for community building, commemoration, healing and environmental stewardship in the urban landscape.

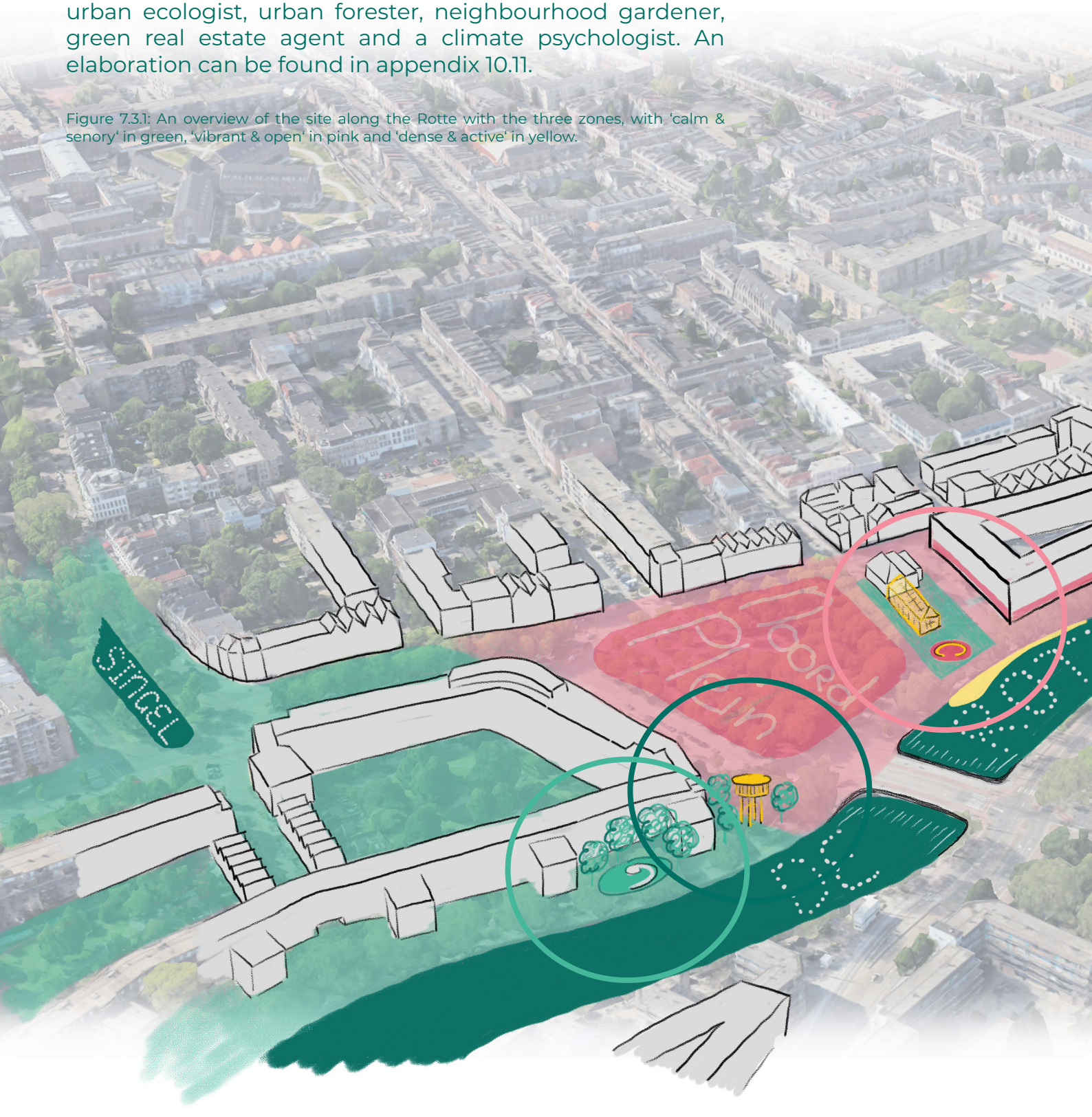
7.3 Interventions

In the following section, several interventions will be discussed in more detail, including the local eco-council, the three zones from the vision and a monitoring station.

Local eco-council

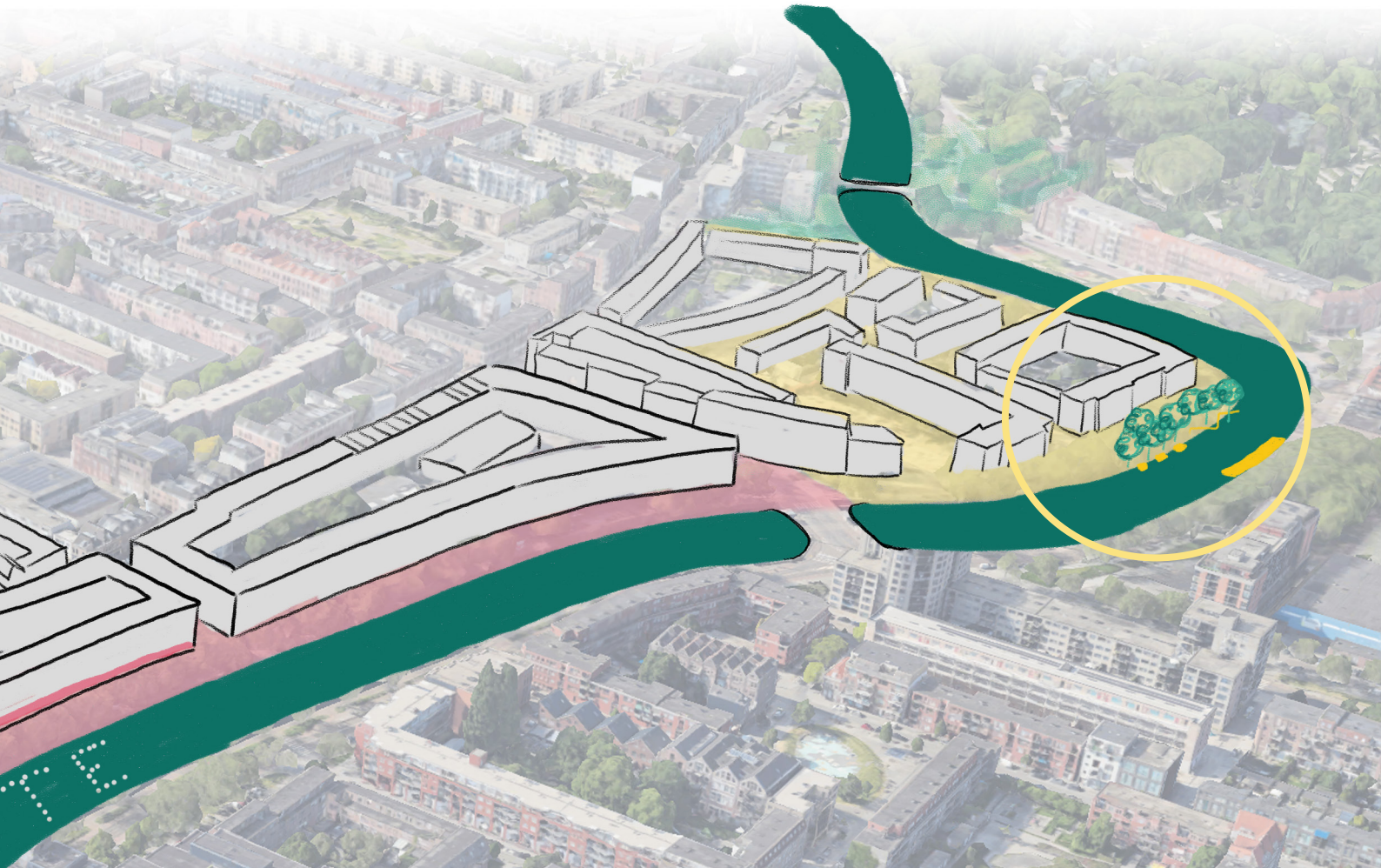
In order to secure the local community of care and awareness, a neighbourhood eco-council is established as a sign of hope and resilience. Through an holistic approach, the council is comprised of environmental advocates with specific local knowledge from diverse backgrounds: local residents, sustainability expert, neighbourhood director, urban ecologist, urban forester, neighbourhood gardener, green real estate agent and a climate psychologist. An elaboration can be found in appendix 10.11.

Figure 7.3.1: An overview of the site along the Rotte with the three zones, with 'calm & senory' in green, 'vibrant & open' in pink and 'dense & active' in yellow.



The zones along the Rotte

In the context of Rotterdam, the Public Platform Biodiversity, which is an eco-centric collaboration of private partners and civil society related to urban nature, can take the lead in raising awareness about urban eco-grief, as well as proposing the use of the Urban Eco-Grief Cycle to the municipality. For the municipality, this can function as a guiding principle for new developments leading to the integration of stewardship practices, citizen interaction through activities and the monitoring system in the urban context. This asks for the involvement of the urban development and city management departments, which include the maintenance unit and the monitoring network. On the long term, this will



alleviate the pressure on the municipality for maintenance, engage citizens with their environment and expand the monitoring system into a more comprehensive network covering the whole city.

After identifying the main weaknesses and opportunities, the urban development department, including landscape architects, urban planners and urban ecologists, will create a vision for the neighbourhood of Noord. The strengths in the existing structure will be fostered, green initiatives will be facilitated and the recently set-up monitoring system will be optimized. For the three identified zones along the Rotte (Figure 7.3.1; also illustrated in a section in appendix 10.12), 4 interventions are elaborated on.

Wild & dense

The ‘wild & dense’ zone can start with planting a Tiny Forest, which is a educative, dense, indigenous forest the size of a tennis court. To create a Tiny Forest, a collaboration will be set up connecting the municipality and IVN Nature education and engage the local schools. Engagement of children is essential to fight the shifting baseline syndrome, which is supported by the survey outcomes showing the decrease in nature-related childhood memories and engagement in nature-related activities by age in Noord, while these are influential factors to develop pro-environmental attitudes. The municipality currently encourages projects for nature education, and IVN is a NGO that guides the development of Tiny Forests. The municipality is needed to find a suitable location and helps to coordinate the responsibilities and maintenance. IVN will provide and guide the engagement of local parties and volunteers, publicity, setting up a maintenance plan, education plan and the practical implementation. The closest local school Prinses Juliana school is situated 500 meters from the Tiny Forest location. They will provide the students that will help with the planting of the trees, monitoring and maintenance of the Tiny Forest. This is a valuable way of greenification as each tree planting is a chance for children to engage in a long-term relation to their environment and learn about the natural processes. The students will be able to watch the trees grow up together with them. By the time that the Tiny Forest and its surroundings have grown into a mature urban forest, new collaborations can be introduced between the municipality and local outdoor sports associations to explore their needs to perform their activities in an urban context, such as the local scouting Calandtroep at the Noorderkanaal. The scouting association can be challenged to explore their needs and help to reinvent urban nature. Through introducing these wild types of urban nature, the urban-nature divide will fade, and citizens will learn to see nature as part of the city.

The municipality can also designate a part of the ‘wild & dense’ zone as an urban nature reserve, where nature can grow freely. Through the urban management department, an ecological maintenance plan is set up, mostly for securing a balanced ecosystem and safety needs, by the municipal urban ecologist and forester. The area will be officially appointed as an urban nature reserve through the urban development department. As a network of urban nature reserves arises throughout the city, it will become part of nature management, which is subsidized by the Province (SNL: subsidy nature and landscape). Information signs and distant viewpoints will be provided to raise awareness. As only 60% of the survey respondents beliefs that nature can flourish in the city, it will show the possibilities and might even spark hope.

The personas that can be found in the ‘wild & dense’-zone are the urban children to play and learn, the urban tree specialist for maintenance, the wildlife observer and the fisherman.

Figure 7.3.2: A collage of the ‘wild & dense‘-zone, including the characteristics related to the Urban Eco-Grief Cycle, visuals, stakeholder collaborations and steps.

Interactive

Monitor

Educate

Stewardship

Wild & Dense

Reveal

Collaboration

	Tiny forest	Urban forest	Urban nature reserve
	IVN Nature education	Municipality	Municipality
	Municipality	Scouting association	Province
	Schools		
Steps	Engage & connect	Engage & connect	Expand & institution-alize


Passive
Educate
Stewardship
Individual
Calm & Sensory
Reveal
Restorative memorial garden
enclosed
Viewpoint
calm area
natural sounds
Wildlife observer
Guided monitor walks
Sensory experience
SLOW DOWN
YOU LOST SOMETHING

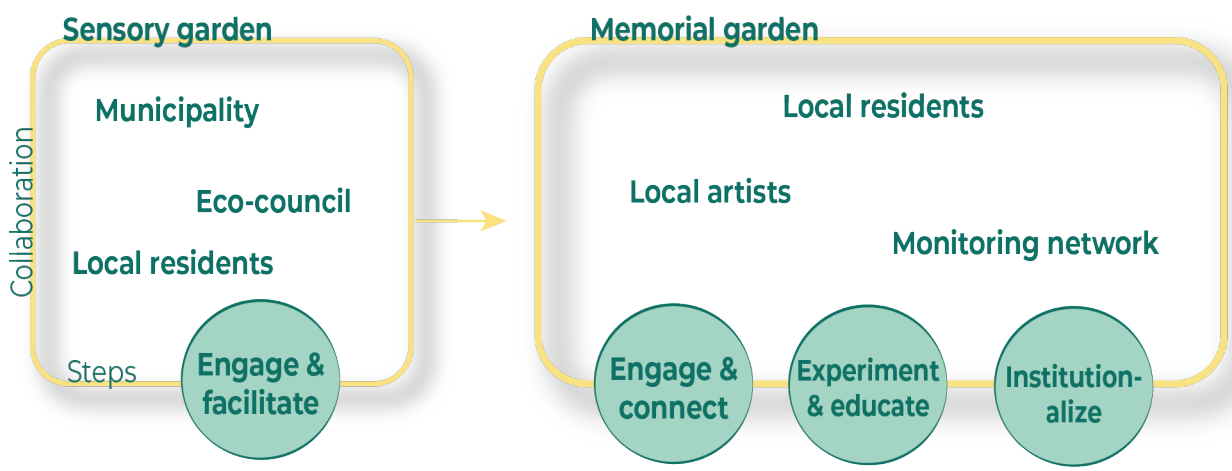

Sensory garden
Municipality
Eco-council
Local residents
Collaboration
Steps
Engage & facilitate
Memorial garden
Local residents
Local artists
Monitoring network
Engage & connect
Experiment & educate
Institution-alize

Figure 7.3.3: A collage of the 'calm & sensory'-zone, including the characteristics related to the Urban Eco-Grief Cycle, visuals, stakeholder collaborations and steps.

Calm & sensory

The 'calm & sensory' zone with a restorative focus can be initiated with sensory garden as a part of the existing greenification plans for the waterfront. As the survey respondents mainly enjoy their favourite green space for the flora, landscape and corresponding sensory experiences, as well as a place to rewind, a sensory garden aligns with their wishes. In addition, the calm identity matches the popular activity of individual relaxing and the individual focus of the main coping strategy. The garden will provide an immersive place for the grievers as they view nature as a place where they feel comfortable. The garden is located in a relatively quiet area, which is partly enclosed by residential blocks. The municipality will engage and facilitate the local residents and community related to the collective garden on the inside of the block to take ownership. Moreover, it should be restorative for all living beings, corresponding to the shared view of nature as a place that needs care, thus a ecological stewardship plan will be established together with the municipal urban ecologist, forester and gardener from the eco-council. Along with the other local developments of the Urban Nature Hub and monitoring network discussed below, the garden can be transformed into a memorial garden. As the local losses are identified through the improved monitoring network, memorial artworks for the specific losses can be created by the local community at the makerspaces at the Urban Nature Hub in collaboration with artists. Through experimenting with temporary spatial elements, such as living habitat sculptures, the garden can be adjusted to local needs and updated after the yearly monitoring events. The artworks will be supported by information signs to educate about the losses and need for commemoration. As a last step, the memorial garden can be institutionalized by officially appointing it as a monument.

All grieving personas can be found in the 'calm & sensory'-zone, but especially the ones that acknowledge their grief and engage in active mourning work, such as the activist, wildlife observer and the Buddhist monk. The immigrant gardener can take care of the garden.

Vibrant & open

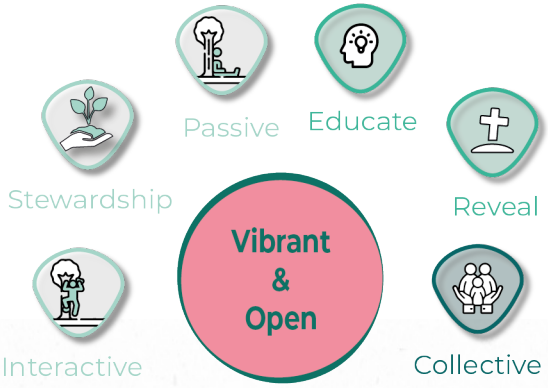
Through the introduction of an urban farm in the 'vibrant & open' zone, the human-nature dualism is challenged. The selected location lies at the intersection of the Noordmolenstraat and the Zwaanhals, which are main commercial streets, and borders the Noordplein square where a weekly local food market takes place. By situating the urban farm here, it can help to bridge the dualism and function as a place for exploration and community building. Since about 60% of all respondents rate a vegetable garden as nature, it can spark the discussion about what nature is in the city. The urban farm functions as a place where grievers and non-grievers come together, where nature is a place to explore and learn from (shared perspective), a background for recreation (non-grievers perspective), as well as a place to become comfortable in nature (grievers perspective). The focus lies on building a community of care and awareness as this creates space for eco-grief to be acknowledged and become socially and emotionally resilient as a community in the face of environmental losses. Mourning is approached as a social act, since social support and collective action are mentioned as the second-most popular coping strategies among the survey respondents. Moreover, socializing is the third most popular activity in nature.

In collaboration with a local cooperative farm, such as de Vlinderstrik, the urban farm can function as an external location and connect the rural landscape to the city. De Vlinderstrik is an initiative supported by the municipality of Rotterdam, Nature Monuments and Herenboeren NL, and this collaboration will be complemented by the local citizens. Nature Monuments is a nature conservation organization and Herenboeren NL is an NGO for regenerative farming. Setting up an coöperative urban farm helps to create and empower (Figure 7.3.4) a community around the landscape, non-human life and citizens. It contributes to dismantling the current food system translating the global system to a local food cycle. The involvement of the citizens is essential to shape and run it. As it is located next to the Noordplein, their products be sold at the local market stand.

However, the farm will create its own urban identity and function as a community center focussed on the intersection of nature and culture. Over time, the urban farm can develop into an Urban Nature Hub as a space to experiment with a variety of engaging and educative events, such as harvest dinners, seasonal festivals, story nights, artistic workshops, memorial services and healing circles. The existing community around the local green initiatives already showed interest in eco-grief, as request for presenting this thesis at a local event was received by the author.

Starting with small-scale harvest dinners, which can develop into seasonal festivals, these events be organized to celebrate the natural processes, bring the community together and raise awareness of the local environment. The 45% of the

Figure 7.3.4: A collage of the 'vibrant & open'-zone, including the characteristics related to the Urban Eco-Grief Cycle, visuals, stakeholder collaborations and steps.



Collaboration

Urban farm

- Coöperative farm: de Vlinderstrik
- Local residents
- Municipality
- Herenboeren NL
- Nature monuments

Steps: **Facilitate & expand** → **Engage & connect**

Nature x Culture Hub

- Local artists & creators
- Local community
- Extinction Rebellion
- Spiritual/religious leaders
- Funeral services
- Climate psychologist

Experiment → **Educate**

survey respondents who appreciate green spaces to enjoy the change of seasons, are indeed 15% more aware of changes in their environment. Also worries about the shifting seasons due to climate change are mentioned in the survey, so this will a moment to cope with these worries.

Remembrance day for lost species (November 30) can be honoured at the Urban Nature Hub by exploring the stories of threatened species, practices and habitats in the local environment. A story night (Haags verhaal, n.d.) can be used as an engagement strategy, where personal stories would be merged with knowledge of environmental experts from the eco-council in order to relocalize the crisis. Through expert knowledge, the non-human life and landscape can be given a voice. To make the connections, the story line should be composed beforehand, but the implementation could vary from live storytelling to the showing of a documentary, listening while walking through the neighbourhood, or an visually exhibition. The story night enables citizens to tell their story and empowers citizens through making them feel in contact with their environment and the crisis leading to a perceived feeling of influence (figure 7.3.5).

After a Bioblitz, which is a monitoring event, an artistic workshop can be performed at the Urban Nature Hub to visualise the feelings of loss regarding the locally threatened species. Within this workshop, the local community, artists and the eco-council are brought together. An artistic workshop lends itself as a tool to explore ways to give a voice to future generations, non-human life and the landscape. Materials from the local landscape could be used to create the artwork. The final output can be exhibited in the local memorial garden. The workshop empowers (figure 7.3.6) the local community to express their feelings, but has a practical focus. For the long term, it should plant a seed that eco-grief is a legitimate response to environmental breakdown. The urban farm will function as a permanent base where temporary spatial interventions can be developed that will change together with the local community, landscape and losses. Moreover, a memorial service can be organized related to the identified local losses, which can be set up by local artists, spiritual/religious leaders, the funeral services of the Crooswijk cementry and the climate psychologist of the eco-council. These actors have experience with rituals, giving shape to feelings and guiding emotional processes. Examples are the funeral of the Ökjokoll glacier and the monumental tree in Amsterdam (Burgers et al., 2020; Stoker, 2024), including artistic expressions.

As the Urban Nature Hub has an eco-centric character where eco-grief is acknowledged, it is eminently a place where mourning circles can take place. These can be led by the local Extinction Rebellion community as giving

space to emotion is part of their strategy. They organize these circles based on the idea of the ‘Skill of Brokenheartedness,’ in which grief is seen as a collective skill instead of a personal feeling (Burgers et al., 2020). These circles are a practice of collective meaning seeking and connection, as eco-grief is a consequence of love and care for the world. By passing on a ‘talking stick’, the participants share their experiences as a foundation to engage in meaningful action.
Although all personas can join in the activities at the Urban Nature Hub, the activist and the Buddhist monk will be involved in organizing the mourning activities. Furthermore, the urban children and immigrant gardener are involved in maintaining the vegetable gardens of the urban farm.

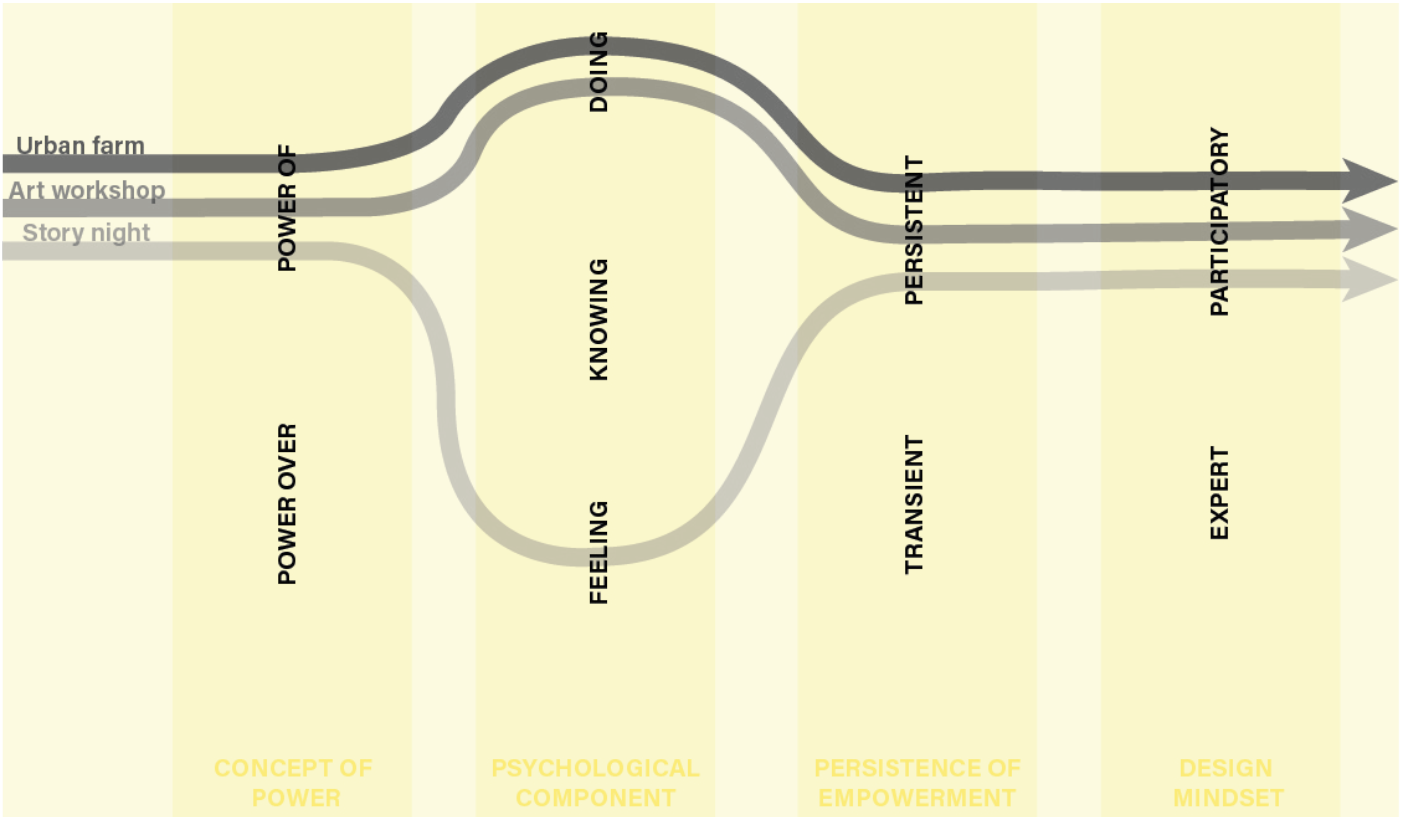


Figure 7.3.5: Story night by Haags verhaal (z.d.), an artistic workshop by Akee (z.d.), an coöperative farm by Lenteland (z.d.)
Figure 7.3.6: Empowerment framework based on Schneider et al (2018)

Monitoring station

The last intervention is located at the edge of the 'vibrant & open' and 'calm & sensory' zones, which is the watch tower that functions as a monitoring station. The tower functions as a spatial engagement intervention, where citizens are invited to experience the landscape in a different way, as well as be educated about the local ecosystem and citizen science projects for monitoring. The main aim is to boost local awareness that turned out to be limited compared to the global awareness in the survey. This intervention aligns with the view on nature as a place to explore and learn from and the popular reason of appreciation of green space relating to enjoying the landscape. From the watch tower, the tree canopies and the animals who live there can be observed. For the construction of the tower, local materials can be used to connect it to the landscape.

In collaboration with the municipality and the partners of the Public Platform Biodiversity, especially Blijdorp Zoo, Bureau StadsNatuur, Nature Monuments and Groen010, the watchtower can be realized. The watchtower is above all an intervention that spatializes the monitoring network. Therefore, the municipal urban development department, Bureau StadsNatuur and the Blijdorp Zoo can be involved. The watchtower is an instrument to expand the existing monitoring system towards citizen involvement, as the municipality plans to start citizen science projects. The municipality is needed for appointing the location and financial support. However, the municipal focus is currently on implementing the newly introduced professional monitoring network. Thus, other parties are needed to lead the citizen engagement for monitoring. For the Blijdorp Zoo, this is an opportunity to put their aim to engage with local nature into practice. For them, this can be a way to gather live information to exhibit to their visitors, as well as a way to make publicity. Blijdorp Zoo can offer financial support. The research institute Bureau StadsNatuur has the knowledge to execute monitoring and citizen science projects. Nature Monuments has experience with the placement of watchtowers throughout their nature reserves, so they can also facilitate this process through knowledge. By placing a similar tower, the borders of nature reserves outside of the city and urban nature start to blur. As it invites citizens to look at their environment as a nature reserve, this project can become part of the National Park City campaign by Groen010 in order to engage citizens and governors. Once the monitoring station is working properly in combination with the bigger network, it can be institutionalized as an official part of the municipal monitoring network.

From the monitoring station, activities can take place, such as guided walks to educate about the local flora and fauna, as well as the monitoring routes. Guided walks are a accessible way to get to learn about the environment and aligns with

Monitor

Reveal

Educate

Network

Passive

Watchtower

National Park City

Groen010

Blijdorp Zoo

Publieksplatform Biodiversiteit

Municipality

Nature Monuments

Collaboration

Steps

Engage & facilitate

Engage & connect

Experiment & Educate

Institution-alize

the main activity that survey respondents undertake in green spaces, which is taking a walk.
The personas involved with the monitoring network are the children and wildlife observer as citizens, and the urban tree specialist and ecologist as experts.

Conclusion
With these interventions, the municipality initiates the various urban nature zones and it includes multiple ways of visualizing losses. As survey respondents turned out to be more worried about the visual losses, this seems to be a relevant characteristic. This will be complemented with support for bottom-up initiatives for the municipality through resources and guidance by the neighbourhood eco-council.

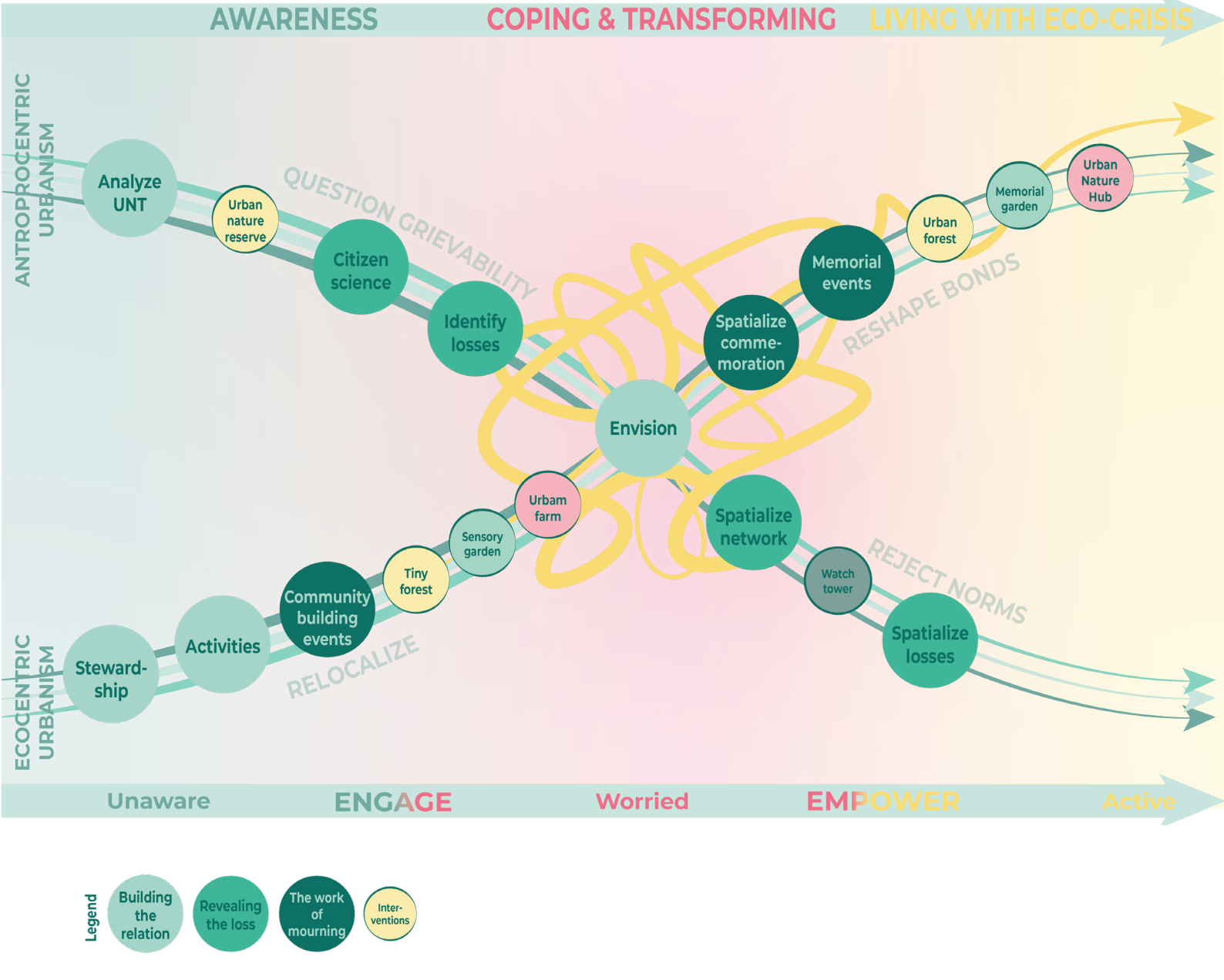
7.4 Conceptual synthesis

The steps of the Urban Eco-Grief Cycle and the interventions on site can be projected to the conceptual framework in order to illustrate the eco-centric societal transition. This conceptual phasing consists of two simultaneous processes working towards to a shared goal of an eco-centric urbanism. However, the breakdown of the anthropocentric regime - the downwards line - is characterized by exposure of its destructive nature, while the build up of the eco-centric perspective - the upwards line - is defined by introducing alternative practices. These can be divided into the early and later stage of the breakdown and the build up lines.

The breakdown line exposes what is getting lost through the anthropocentric regime, which is foundational for the grieving process. Analyzing the existing UNTs, appointing urban nature reserves in the existing context, setting up citizen science projects and identifying losses through monitoring constitute the early stage related to the questioning of grievability as it helps to destabilize the existing structure. The spatialization of the monitoring network and the environmental losses, including setting up a watchtower, compose the rejecting of norms by setting the conditions to phase out and stay aware of the destructive practices.
The buildup line focusses on creating the circumstances to integrate the ecological crisis into our urban society and cope with the losses that are exposed in the breakdown line in order to move towards pro-environmental action. The destabilization of the anthropocentric regime is complemented by the introduction of relocalization through stewardship practices, activities that citizens engage in related to the landscape and community building events. The corresponding interventions are the Tiny Forest, sensory garden and the urban farm. The environmental losses are interwoven into the local context through the spatialization of commemoration and memorial events to reshape our bonds to the environment. The urban forest, memorial garden an Urban Nature Hub set the stage for the stabilization of the eco-centric regime.
Both lines meet through envisioning an eco-centric future as this functions as a rejection of the status-quo.

Overall, the problematic consequences of the anthropocentric regime are exposed and space is created for a community of care and awareness to arise, cope and live with the ecological crisis. It is about the environmental losses can become part of our lives, instead of the current societal coping mechanism of ignorance. By moving through the Urban Eco-Grief Cycle, all these steps are touched upon integrating eco-grief in the urban context contributing to an eco-centric society.

Figure 7.4: Steps of the Urban Eco-Grief Cycle and interventions projected on the conceptual framework.




GRIEF
AS
A
TRIBUTE
TO
LIFE

8. CONCLUSION

8.1 Conclusion
8.2 Reflection

8.3 Conclusion

In the light of the ecological crisis, this thesis focusses on creating space for ecological grief in the urban context to contribute to a societal transitions towards eco-centric values.
While eco-grief can serve as a catalyst for eco-centric change, it has not been studied yet in the urban environment. Therefore, the urban neighbourhood of Rotterdam Noord was taken as the case study. Noord is densely populated neighbourhood in the strongly urbanized province of Zuid-Holland (NL), with a variety of vegetation density and human activity. As these characteristics result in diverse human-nature interactions, and the neighbourhood has a relatively eco-centric character, it provided a fitting location for a first exploration on the topic of urban eco-grief, and the corresponding human-nature relationship. The case study was used to gather empirical data to answer the research questions, as well as to create a contextualized strategy and illustrate its implementation.
The synthesis of the findings of this study resulted in four main products that underscore the importance of addressing eco-grief in the urban context and its potential to drive positive societal change. First of all, the theoretical framework based on literature research shapes the foundation of the thesis shedding light on the philosophical understanding of nature, ecological ethics, nature experience and the concept of ecological grief. Secondly, the socio-ecological analysis shows the spatial and social context including the environmental losses. Thirdly, the survey-based Urban Eco-Grief Portrait illustrates the relationship between the residents of Noord and their natural environment and their experiences with eco-grief, as well as multiple types of eco-grief. Finally, the Eco-Grief Cycle encompasses a spatial governance approach demonstrating how to integrate eco-grief in the urban context of Rotterdam Noord.

This thesis is based on the following main research question:

'How can ecological grief contribute to a societal transitions towards eco-centric values in the field of urbanism?'

Eco-grief can serve as a powerful catalyst for the needed pro-environmental action that is needed for a eco-centric societal transition. By creating space for eco-grief to exist, the emotional bonds with the environment are acknowledged allowing environmental care and awareness to arise. By strengthening the relationship to our surroundings, revealing the environmental losses and introducing coping strategies to deal with losses, the process of eco-grief can be faced and endured in order to reach a state of relative resilience from

which sustainable, meaningful action is possible.

To answer this question in more depth, three sub-questions were formulated and elaborated on below.

1. How does the planetary crisis translate to local level?
Although citizens are generally unaware of the local ecological problems, several serious environmental losses were identified through a spatial analysis, policy analysis, site visits and interviews. By analyzing the environmental losses in the context of Rotterdam Noord, ecological crisis was localized. The four topics that were researched involve climate change, biodiversity, urbanization and infrastructure and pollution. Climate change impacts the local environment through precipitation, heat, drought and the soil, which are issues that can be experienced by residents. Although biodiversity data is limited in the urban context, the loss of species turned out to be severe considering both magnitude and diversity. The current inhabitants of Noord have not experienced the first urbanization and the loss of the rural landscape and waterways, thus the relevant environmental losses relate mostly to the infrastructural clashes. Lastly, several kinds of pollution can be found in Noord, but these are also generally go unnoticed.

2. To what extent do citizens experience ecological losses and grief?
The Urban Eco-Grief Portrait revealed that citizens experience most respondents experienced at least some sense of loss regarding environmental degradation.
The respondents are generally aware of the global ecological crisis and only partially aware of the local environmental problems. Their environmental worries mostly concern climate change and pollution. About half of the respondents are worried about the disappearance of green spaces, flora and fauna. Individual action is the most popular coping method.
The grievers are the respondents that are certain of their feelings of loss. 70% of the grievers have noticed changes in their environment over ~25% of the non-grievers. The grievers are also more concerned about biodiversity loss. Their main coping methods are through finding social support with friends, family or like-minded people, and through joining collective, environmental actions.

3. How to use eco-grief as a planning tool to contribute to an eco-centric societal transition?
To use eco-grief as a planning tool, the process of eco-grief is translated into three phases creating space for eco-grief to be acknowledged and experienced in the urban context. Since the foundation of grief is the attachment to the bereaved, the first phase is focussed on fostering the relationship to the environment to create a community that cares for its surroundings. A diversity of Urban Nature Types serves as a base for the multiple nature experiences that shape the relationship through activities and stewardship practices.
The second phase relates to the revealing of the local environmental losses, which is supported by a monitoring system focussed on spatializing losses, engaging and educating citizens. In this phase, interventions are proposed that contribute to creating a community of environmental awareness.
In the last phase, the work of mourning is addressed, which is needed to nurture the community of care and awareness. To be able to face and cope with the losses, this phase concentrates on commemoration and community building to cultivate social and emotional resilience enabling pro-environmental action.

In conclusion, by creating space for ecological grief in the urban context and engaging citizens to confront and cope with environmental losses, our society can move towards a more resilient, compassionate and eco-centric urban future.

8. CONCLUSION

8.4 Reflection

This research-based thesis addresses ecological grief in the urban context of Rotterdam Noord. By creating space for eco-grief to exist and be acknowledged, our values and emotional bonds to our surroundings are exposed. Through strengthening our relationship to our environment, revealing the local environmental losses and providing methods to cope with our feelings of eco-grief, pro-environmental action is fostered. The main aim of this thesis is to create space for eco-grief to exist and be acknowledged in the urban context in order to contribute to an eco-centric societal transition. In this reflection, I will address the used methods and outcomes, recommendations for future research, the relation with the graduation lab, as well as the social and scientific relevance and ethical considerations.

Outcomes & methods.

The main outcome is a spatial governance strategy in the shape of the Urban Eco-grief Cycle. The Urban Eco-Grief portrait is another major outcome as it illustrates the results on the novel research topic of eco-grief in an urban environment. These products, which will be reflected on below, help to test the theoretical understanding and translate it to the real world as this growing socio-ecological burden needs guidance in order to contribute to positive change.

Firstly, the Urban Eco-Grief portrait serves as a first exploration of eco-grief in an urban environment, but is not an all encompassing analysis. The empirical data is limited and the personas are based on anecdotal evidence, thus further research is needed to draw representative conclusions. However, the results were needed for creating and implementing the strategy, so improving the portrait can also inform improvements of the strategy.

Secondly, the Urban Eco-Grief Cycle is rooted in an extensive literature and spatial analysis, but for each phase opportunities for further in-depth research can be identified. In the first phase, the Urban Nature Types need further research to determine the related activities and stewardship practices, as well as the specific spatial characteristics that shape the nature experiences of its visitors. Furthermore, the impacts of revealing the losses in the local environment on the residents need to be studied in order to learn how to best implement awareness interventions. Moreover, further elaboration on both collective and individual eco-grief coping strategies can complement the last phase. Lastly, the Urban Eco-Grief Cycle is not created with a practical application in mind. Since eco-grief is still a disenfranchised type of grief, and grief is commonly associated with negativity, it is unlikely that it will be adopted in practice in the way it is presented in this thesis. However, the complete focus on the extraordinary topic of eco-grief within this thesis sheds a new light on the ordinary aspects in our urban environment, which can indeed inform practice.

The methodological framework has provided the necessary foundation for this research-based thesis. The thesis is rooted on the theoretical framework based on literature research supporting a holistic and novel approach through cognitive, aesthetic and emotional dimensions to address the inadequate action taken regarding the ecological crisis. Since the concept of eco-grief is a relatively new area of study, the theoretical framework helped to explore the essence and urgency, while the understanding of the role that eco-grief can play in the urban context evolved during the thesis process. The exploratory nature of the thesis process taught me the relevance of reflecting on the underlying philosophy, as it has a significant influence on the use of space and social constructs.

Thereafter the socio-ecological analysis provided the contextual foundation for developing the eco-grief strategy in Rotterdam Noord. The first part of the analysis relates to the location of Rotterdam Noord and its biophysical factors that are researched through a spatial and governance analysis, as well as site visits and interviews. These methods primarily provided insights into the spatial-ecological aspects of the location, while the second part adds the socio-spatial dimension to the socio-ecological analysis. Through a survey about eco-grief and the relation between the residents of Rotterdam Noord and their natural environment, direct input from the residents was collected, which shaped the product of the Eco-Grief Portrait and informed the creation of the strategy. The stakeholder analysis provides the contextual base for the engagement element of the strategy.
Overall, the research provides the theoretical and contextual basis to root the strategy into the neighbourhood of Rotterdam Noord illustrating how eco-grief can be integrated in an urban context to extend the social towards an ecological conscience community of care and awareness.

Future research.
This research plays a pioneering role in urban eco-grief studies contributing to the bridging the gap between theory and practice. While the theoretical framework serves as a academic foundation that can inform future environmental studies through an holistic and interdisciplinary approach, the strategy and design can inspire the practical interventions. The survey and Eco-Grief Portrait gives an idea of eco-grief in the Rotterdam, providing insights for future studies in other urban contexts. Based on this thesis, future research recommendations can focus on:
- Improving the representativeness of the empirical data through a more extensive survey and in-depth interviews.
- The anti-urban bias within ecological ethics through further theoretical research on eco-grief in the urban context.
- Raising eco-grief awareness in practice among public sector, private sector and civil society.
- The implementation and feasibility of the strategy and design interventions aligning with societal needs.
- Evaluation of the interventions to strengthen the relationship between citizens and their environment.
- Elaboration on revealing and communicating urban, environmental losses to get a more comprehensive perspective.
- The growing psychological insights on eco-grief and the practical translation into societal grieving rituals and spaces in collaboration with citizens.

In the end, just as this thesis is build on previous work, this thesis also aims to inspire future action and contribute to a societal shift towards a sustainable future.

Eco-grief within the MSc & the studio.
Recognizing the dominant and increasing role of urbanization in the lifestyles of most humans, this thesis addresses the relation between the urban context and the inadequate action of citizens regarding the ecological crisis. Since the rapid growth of the number and proportion of people living in urban areas are suggested as a trigger to the loss of interaction with nature (Turner et al., 2004; Zhang et al., 2014), a cycle of disaffection towards nature is reinforced (Soga & Gaston, 2016), which in turn enhances the ecological crisis. To address this nature-human relationship the topic of eco-grief, which is based on the indigenous accounts and other communities that live close to the landscape, is explored as this emotional engagement is argued to provoke pro-environmental action. Approaching urbanism through the lens of eco-grief provides a novel perspective on our relation to our natural environment as it reveals our emotional attachments and values.

Although the foundation of this research field lies with communities that live in natural landscapes, the factors that shape experiences of eco-grief can inform the governance and design of the city.
The relation between urban eco-grief and the studio of Planning Complex Cities starts with the observations of conflicts. In this case, the ecological disparities about how we treat our environment are addressed that result in environmental losses and the global ecological crisis. The focus of this studio on research based projects linking spatial and institutional analysis aligns with this thesis approach with an in-depth literature research as the foundation. Furthermore, this project focusses on the role of citizens in the ecological crisis in relation to their spatial environment, which is in line with the role of civic engagement within the studio. Through this human-scale approach, gathering information from the local citizens is foundational to inform my spatial design and recommendations for institutional change.
Therefore, this thesis is rooted in human-centered research, as well as the urban landscape, aiming to contribute to a livable environment for all.

Relevance
My research addresses presumably the most pressing challenge of our time: the escalating environmental crisis. The societal relevance is foundational to this thesis as it addresses this crisis that is intertwined with all aspects of life through a human-centered approach. This thesis aims to create space for eco-grief in order to engage and empower citizens to contribute to societal change to battle this, which should contribute to two social outcomes in the long term. Firstly, our relationship to the environment should be recovered and strengthened to challenge the destructive status quo. Through fostering emotional bonds, this thesis contributes to a society that cares for and is aware of its environment. Secondly, recognizing the importance of psychological well-being in times of crisis, social/emotional resilience should be fostered to prevent the paralysis of pro-environmental behaviour. So, this research strives to contribute to creating a society that is equipped to face, cope and act on the challenges of the future relating to the ecological crisis, ensuring a brighter and more sustainable future for all life.

The scientific relevance of this thesis lies in addressing the relatively overlooked topic of ecological grief. Researchers within social science are starting to acknowledge eco-grief and its associated mental health risks as a legitimate reaction to environmental losses, since it is likely to become a more frequent experience around the world (Comtesse et al., 2021; Cunsolo & Ellis, 2018). Nonetheless, it can still be considered as a form of 'disenfranchised grief' resulting in the remaining research gap on the topic. Battling the ecological crisis through the lens of eco-grief, as well as applying this to an urban environment, is an even more understudied perspective that mostly limits itself to philosophy.
By bridging the gap between philosophy, social science and urbanism, this research offers an interdisciplinary approach to understanding and addressing eco-grief as a planning tool. It contributes to both theory and its practical translation by enhancing the understanding of emotional and psychological dimensions of environmental loss in the context of urbanism and the sustainability transition. Furthermore, this research includes empirical research through a survey. To conclude, this study aims to foster societal change through both emotional and spatial perspectives, offering a novel and comprehensive response to the complex ecological crisis.

Ethical considerations.
The ethical considerations in the context of my thesis encompass a range of sensitive topics involving the social aspects and my personal biases. These will be discussed below.
To start with, social justice plays a major role in the ecological crisis, including principles of

equity, rights, responsibility and accountability. In my thesis, the voices of all stakeholders who cannot speak for themselves should be safeguarded as these unheard voices are most likely to be encountered by ecological grief. This form of 'disenfranchised grief' exposes underlying inequalities within our society. While vulnerable and marginalized communities, as well as future generations and non-human entities, are disproportionately affected, they often have the least impact on the crisis. However, this thesis focusses on a relatively privileged urban neighbourhood, thus the cultural context of western society, regarding our relationship with nature, the concept of nature and attitude towards grief, are taken into account. It is the environmental debt accumulated by those citizens that the marginalized groups will inherit. Therefore, it is this privileged context in which the citizens should be engaged to care for their environment and be aware of their impacts.
The second topic to be considered is about the social aspect of this human-centered research regarding citizen engagement, emotions and action. I should be mindful of the emotional impact my research could have and the action it provokes. Choosing this interdisciplinary approach to my thesis, I should be conscious of my shortcomings as an urbanist emphasizing the governance approach instead of a psychological approach. The theoretical research helped to navigate the emotional and ethical complexities around eco-grief. Therefore, my work is not a psychological guide for individuals about how to cope with eco-grief, but it is about the relational, cultural and political sides of eco-grief with a focus on urban communities.
Lastly, transparency about my personal biases and shortcomings is essential as these will both consciously and unconsciously affect the decisions made throughout this research. This thesis is initiated by my personal belief for the need of environmental activism and my attempt to translate this into a governance design in order to fight to ecological crisis. Upon careful ethical reflection, I have concluded that leveraging the emotional dimension to provoke pro-environmental action is justified considering the urgency of the ecological crisis. While recognizing the potential for bias in advocating for a specific agenda, I believe that the gravity of the environmental challenges we face warrants such activism. Nonetheless, I remain vigilant in mitigating these biases by grounding my strategy in the social context. While my activistic standpoint may seek to inspire citizens to take action, its efficacy ultimately hinges on the societal support to prioritize environmental stewardship. Thus, fostering a sense of societal ownership and responsibility for environmental issues is fundamental to the realization of the proposed strategy.
Furthermore, I will acknowledge the influence of my personal experience with grief and the corresponding life lessons. My attitude as shaped by my experiences fuels my aspiration to reveal the meaningful potential of creating space for grief.
To conclude, the topic of eco-grief shows to involve multiple ethical considerations, including social justice, citizen engagement, emotions, action and personal biases.

YOU ARE NOT ALONE

DISBELIEF DISAPPOINTMENT
AWE SHOCK ISOLATION
DOUBT FEAR ANGER
HELPLESSNESS ANXIETY
TOGETHERNESS GRATITUDE
HOPE COMPASSION SADNESS
GUILT YEARNING DISBELIEF
AWE DISAPPOINTMENT SHOCK
ISOLATION DOUBT FEAR
ANGER HELPLESSNESS ANXIETY
TOGETHERNESS GRATITUDE
HOPE COMPASSION SADNESS
GUILT YEARNING DISBELIEF
AWE DISAPPOINTMENT SHOCK
ISOLATION DOUBT FEAR
ANGER HELPLESSNESS ANXIETY
TOGETHERNESS GRATITUDE
HOPE COMPASSION SADNESS
GUILT YEARNING DISBELIEF
AWE DISAPPOINTMENT SHOCK
ISOLATION DOUBT FEAR
ANGER HELPLESSNESS ANXIETY

9. BIBLIOGRAPHY

9.1 Sources

9. BIBLIOGRAPHY

9.1 Sources

Ágoston, C., Csaba, B., Nagy, B., Kőváry, Z., Dúll, A., Rácz, J., & Demetrovics, Z. (2022). Identifying Types of Eco-Anxiety, Eco-Guilt, Eco-Grief, and Eco-Coping in a Climate-Sensitive Population: A Qualitative Study. International Journal of Environmental Research and Public Health, 19(4), Article 4. https://doi.org/10.3390/ijerph19042461

Ágoston, C., Urbán, R., Nagy, B., Csaba, B., Kőváry, Z., Kovács, K., Varga, A., Dúll, A., Mónus, F., Shaw, C. A., & Demetrovics, Z. (2022). The psychological consequences of the ecological crisis: Three new questionnaires to assess eco-anxiety, eco-guilt, and ecological grief. Climate Risk Management, 37, 100441. https://doi.org/10.1016/j.crm.2022.100441

Anneser, E., Levine, P., Lane, K. J., & Corlin, L. (2024). Climate stress and anxiety, environmental context, and civic engagement: A nationally representative study. Journal of Environmental Psychology, 93, 102220. https://doi.org/10.1016/j.jenvp.2023.102220

Argeloo, M. (2022). Natuuramnesie—Hoe we vergeten zijn hoe de natuur er vroeger uitzag. Atlas Contact.

Atlas Leefomgeving. (2022). Atlas Leefomgeving—Kaarten. https://www.atlasleefomgeving.nl/kaarten

Attig, T. (2004). Meanings of death seen through the lens of grieving. Death Studies. https://doi.org/10.1080/07481180490432333

Austenfeld, J. L., & Stanton, A. L. (2004). Coping Through Emotional Approach: A New Look at Emotion, Coping, and Health-Related Outcomes. Journal of Personality, 72(6), 1335–1364. https://doi.org/10.1111/j.1467-6494.2004.00299.x

Barnett, J. T. (2019). Naming, Mourning, and the Work of Earthly Coexistence. Environmental Communication, 13(3), 287.

Beets, L. (2022, June 15). Rouwen om de natuur: Klinkt gek, maar het helpt. https://universonline.nl/nieuws/2022/06/15/rouwen-om-de-natuur-klinkt-gek-maar-het-helpt/

Benham, C., & Hoerst, D. (2024). What role do social-ecological factors play in ecological grief?: Insights from a global scoping review. Journal of Environmental Psychology, 93, 102184. https://doi.org/10.1016/j.jenvp.2023.102184

Biermann, F., Bai, X., Bondre, N., Broadgate, W., Arthur Chen, C.-T., Dube, O. P., Erisman, J. W., Glaser, M., van der Hel, S., Lemos, M. C., Seitzinger, S., & Seto, K. C. (2016). Down to Earth: Contextualizing the Anthropocene. Global Environmental Change, 39, 341–350. https://doi.org/10.1016/j.gloenvcha.2015.11.004

Bleichrodt, D. (n.d.). Tiny Forest the Netherlands. Tiny Forest. Retrieved May 30, 2024, from https://www.ivn.nl/aanbod/tiny-forest/tiny-forest-worldwide__trashed/countries/the-netherlands/

Bögeholz, S. (2006). Nature experience and its importance for environmental knowledge, values and action: Recent German empirical contributions. Environmental Education Research, 12(1), 65–84. https://doi.org/10.1080/13504620500526529

Boon, P. (2019). The environmental history of Australian rivers: A neglected field of opportunity? Marine and Freshwater Research, 71. https://doi.org/10.1071/MF18372

Bradley, G. L., & Reser, J. P. (2017). Adaptation processes in the context of climate change: A social and environmental psychology perspective. Journal of Bioeconomics, 19(1), 29–51. https://doi.org/10.1007/s10818-016-9231-x

Braun, T., & Dierkes, P. (2017). Connecting students to nature – how intensity of nature experience and student age influence the success of outdoor education programs. Environmental Education Research, 23(7), 937–949. https://doi.org/10.1080/13504622.2016.1214866

Bright & Eames. (2022). From apathy through anxiety to action: Emotions as motivators

for youth climate strike leaders.
Burgers, Meijer, Nowak, & Ambassade van de Noordzee. (2020). De stem van de Noordzee: Een pleidooi voor vloeibaar denken. Boom uitgevers.
Butler, J. (2020). Precarious Life: The Powers of Mourning and Violence. Verso. https://www.perlego.com/book/1841607/precarious-life-the-powers-of-mourning-and-violence?queryID=ffe8f5f1471d180e9217f29548c04699&index=prod_BOOKS&gridPosition=1
Chawla, L. (2015). Benefits of Nature Contact for Children. Journal of Planning Literature, 30(4), 433–452. https://doi.org/10.1177/0885412215595441
CLO. (2020, March 31). Fauna van stedelijk gebied, 1990-2018 | Compendium voor de Leefomgeving. https://www.clo.nl/indicatoren/nl158503-fauna-van-stedelijk-gebied-1990-2018
Comtesse, H., Ertl, V., Hengst, S. M. C., Rosner, R., & Smid, G. E. (2021). Ecological Grief as a Response to Environmental Change: A Mental Health Risk or Functional Response? International Journal of Environmental Research and Public Health, 18(2), Article 2. https://doi.org/10.3390/ijerph18020734
Cox, L. (2011). How do we keep going? Activist burnout and personal sustainability in social movements. Into-ebooks (http://into-ebooks.com). https://mural.maynoothuniversity.ie/2815/
Craps, S. (2023). Ecological mourning: Living with loss in the Anthropocene. In Critical memory studies: New approaches (pp. 69–77). Bloomsbury Academic. http://hdl.handle.net/1854/LU-01GZSJ3SPXYBWM55AEJR45F9V2
Cumming, G. S., Buerkert, A., & Hoffman, E. M. (2014). Implications of agricultural transitions and urbanization for ecosystem services. Nature, 515, 50–57. https://doi.org/https ://doi.org/10.1038/natur e1394 5
Cunsolo, A., & Ellis, N. R. (2018). Ecological grief as a mental health response to climate change-related loss. Nature Climate Change, 8(4), Article 4. https://doi.org/10.1038/s41558-018-0092-2
Cunsolo, A., & Landman, K. (2017). Mourning Nature: Hope at the Heart of Ecological Loss and Grief. McGill-Queen's University Press. https://doi.org/10.2307/j.ctt1w6t9hg
Curry, P. (2011). Ecological Ethics: An Introduction. Polity.
DELEEF. collectief. (2024). ROUWRAVE. Willemeen. https://www.willemeen.nl/programma/rouwrave-van-kanker-tot-k-hole/
DellaSala, D. A. (2020). Has Anthropocentrism Replaced Ecocentrism in Conservation? In H. Kopnina & H. Washington (Eds.), Conservation: Integrating Social and Ecological Justice (pp. 91–104). Springer International Publishing. https://doi.org/10.1007/978-3-030-13905-6_7
Diergaarde Blijdorp. (n.d.). Blijdorp Masterplan 2050.
Extinction Rebellion. (n.d.). Extinction Rebellion | Join The Fight Against Climate and Ecological Collapse. Extinction Rebellion. Retrieved June 12, 2024, from https://rebellion.global/
Extinction Rebellion NL. (n.d.). Actieve Hoop Cirkel. Extinction Rebellion Nederland. Retrieved March 22, 2024, from https://extinctionrebellion.nl/events/actieve-hoop-cirkel-5/
Feola, G., Goodman, M. K., Suzunaga, J., & Soler, J. (2023). Collective memories, place-framing and the politics of imaginary futures in sustainability transitions and transformation. Geoforum, 138, 103668. https://doi.org/10.1016/j.geoforum.2022.103668
Friedmann, J. (2006). Four Theses in the Study of China's Urbanization. International Journal of Urban and Regional Research, 30(2), 440–451. https://doi.org/10.1111/j.1468-2427.2006.00671.x
Gemeente Rotterdam. (2021). Koersnota Bodemkwaliteit—De bodem als basis.
Gemeente Rotterdam. (2023a). Biodiversiteitskader.
Gemeente Rotterdam. (2023b). Uitvoeringsagenda Biodiversiteit.
Gemeente Rotterdam. (2024). Luchtkwaliteit. Gemeente Rotterdam. https://www.

rotterdam.nl/luchtkwaliteit
Gould, D. (2011). Desiring Politics. In M. Engelken-Jorge, P. I. Güell, & C. M. del Río (Eds.), Politics and Emotions: The Obama Phenomenon (pp. 155–188). VS Verlag für Sozialwissenschaften. https://doi.org/10.1007/978-3-531-93201-9_8
Haags verhaal. (n.d.). (20+) Facebook. Retrieved October 20, 2023, from https://www.facebook.com/photo.php?fbid=789669989697632&set=pb.100059639156770.-2207520000&type=3
Havermans, O. (2021). In dit tempo is Nederland binnenkort wereldkampioen soortenverlies | Trouw. https://www.trouw.nl/duurzaamheid-economie/in-dit-tempo-is-nederland-binnenkort-wereldkampioen-soortenverlies~b6eaf940/
Hebinck, A., Diercks, G., von Wirth, T., Beers, P. J., Barsties, L., Buchel, S., Greer, R., van Steenbergen, F., & Loorbach, D. (2022). An actionable understanding of societal transitions: The X-curve framework. Sustainability Science, 17(3), 1009–1021. https://doi.org/10.1007/s11625-021-01084-w
Het Natuurhistorisch. (2024). Nationaal Park Rotterdam—Werken aan een havenstad vol natuur. https://www.hetnatuurhistorisch.nl/exposities/npr/
Het Parool. (2019). Gedenksteen voor gesmolten IJslandse gletsjer. https://www.parool.nl/wereld/gedenksteen-voor-gesmolten-ijslandse-gletsjer~bbd86d09/
Honnacker, A. (2023). Why Mourning for Minks Matters: Rebellious Grief as Practice of Solidarity. Zeitschrift Für Ethik Und Moralphilosophie. https://doi.org/10.1007/s42048-023-00151-4
Howe, C., & Boyer, D. (2020, April 22). Death of a Glacier. Anthropology News. https://www.anthropology-news.org/articles/death-of-a-glacier/
Johnson, Lacy. M. (2019, October 20). How to Mourn a Glacier. The New Yorker. www.newyorker.com/news/dispatch/how-to-mourn-a-glacier.
Jones, L. P., Turvey, S. T., Massimino, D., & Papworth, S. K. (2020). Investigating the implications of shifting baseline syndrome on conservation. People and Nature, 2(4), 1131–1144. https://doi.org/10.1002/pan3.10140
Jong, L. de. (2023, August 17). Hoe vind je troost tijdens de klimaatcrisis? Filosoof Wouter Kusters: 'Het is niet gek om bang te zijn.' de Volkskrant. https://www.volkskrant.nl/boeken/hoe-vind-je-troost-tijdens-de-klimaatcrisis-filosoof-wouter-kusters-het-is-niet-gek-om-bang-te-zijn~b814c0e2/
Kimmerer, R. (2013). Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teachings of Plants. Milkweed Editions.
Klass, D., Silverman, P. R., & Nickman, S. (Eds.). (1996). Continuing Bonds: New Understandings of Grief. Taylor & Francis. https://doi.org/10.4324/9781315800790
Kleinherenbrink, A. (2022). De constructie van de wereld: De filosofie van Bruno Latour. Boom uitgevers.
Kopnina, H. (2016). Of big hegemonies and little tigers: Ecocentrism and environmental justice. https://www.tandfonline.com/doi/epdf/10.1080/00958964.2015.1048502?needAccess=true
Korteling, Johan. E. (Hans), Paradies, G. L., & Sassen-van Meer, J. P. (2023). Cognitive bias and how to improve sustainable decision making. Frontiers in Psychology, 14. https://www.frontiersin.org/articles/10.3389/fpsyg.2023.1129835
Kosanic, A., & Petzold, J. (2020). A systematic review of cultural ecosystem services and human wellbeing. Ecosystem Services, 45, 101168. https://doi.org/10.1016/j.ecoser.2020.101168
KRO-NCRV. (2022, June 16). Klimaarrebellen: Tussen hoop en wanhoop. 2Doc.nl. https://www.2doc.nl/documentaires/2022/06/klimaatrebellen.html
Lai, O. (2022, January 13). 18 Powerful Greta Thunberg Quotes to Inspire Climate Action. Earth.Org. https://earth.org/greta-thunberg-quotes-speeches-to-inspire-climate-action/
Latour, B. (2017). Facing Gaia: Eight Lectures on the New Climatic Regime. John Wiley & Sons.

Latour, B., Milstein, D., Marrero-Guillamón, I., & Rodríguez-Giralt, I. (2018). Down to earth social movements: An interview with Bruno Latour. Social Movement Studies, 17(3), 353–361. https://doi.org/10.1080/14742837.2018.1459298
Loorbach, D., Frantzeskaki, N., & Aveline, F. (2017). Sustainability Transitions Research: Transforming Science and Practice for Societal Change. Annual Review of Environment and Resources, Vol. 42, 599–626. https://doi-org.tudelft.idm.oclc.org/10.1146/annurev-environ-102014-021340
MacKerron, G., & Mourato, S. (2013). Happiness is greater in natural environments. Global Environmental Change, 23(5), 992–1000. https://doi.org/10.1016/j.gloenvcha.2013.03.010
Malhi, Y. (2017). The Concept of the Anthropocene. Annual Review of Environment and Resources, 42(1), 77–104. https://doi.org/10.1146/annurev-environ-102016-060854
McKinnon, C. (2014). Climate Change: Against Despair. Ethics and the Environment, 19(1), 31-48,133.
Menning, N. (2017). Environmental Mourning and the Religious Imagination. A. CUNSOLO & K. LANDMAN (Eds.). In Mourning Nature: Hope at the Heart of Ecological Loss and Grief (pp. 39–63). McGill-Queen's University Press. https://doi.org/10.2307/j.ctt1w6t9hg.8
Merriam-Webster. (n.d.). Mourning. Merriam-Webster.Com Dictionary. Retrieved February 22, 2024, from https://www.merriam-webster.com/dictionary/mourning
Milieucentraal. (2024). Stikstof—Alles wat je moet weten. https://www.milieucentraal.nl/klimaat-en-aarde/milieuproblemen/stikstof-in-de-lucht-en-bodem/
Ministerie van Onderwijs, Cultuur en Wetenschap. (2017). Nederlands cultuurlandschap in vier tijdlijnen [Publicatie]. Rijksdienst voor het Cultureel Erfgoed. https://www.cultureelerfgoed.nl/publicaties/publicaties/2017/01/01/nederlands-cultuurlandschap-in-vier-tijdlijnen
Ministerie van Volksgezondheid, W. en S. (2018, January 23). Gezondheidswinst door schonere lucht—Advies—Gezondheidsraad [Advies]. Ministerie van Volksgezondheid, Welzijn en Sport. https://www.gezondheidsraad.nl/documenten/adviezen/2018/01/23/gezondheidswinst-door-schonere-lucht
Moes, S. (2022). The experience of eco-emotions in young people from Fridays For Future the Netherlands [Master thesis]. Wageningen University.
Murphy, J. T. (2015). Human geography and socio-technical transition studies: Promising intersections. Environmental Innovation and Societal Transitions, 17, 73–91. https://doi.org/10.1016/j.eist.2015.03.002
Neimeyer, R. A. (2015). Techniques of Grief Therapy: Assessment and Intervention. Routledge.
NOS. (2023, September 22). RIVM: Direct verband tussen uitstoot Tata Steel en kans op ziekte. https://nos.nl/artikel/2491421-rivm-direct-verband-tussen-uitstoot-tata-steel-en-kans-op-ziekte
Ojala, T., & Cambell, I. (2020). Urban insight report: Building in biodiversity for climate, for health. Sweco.
OPEN Rotterdam (Director). (2020, November 7). Wat bloeit er in Noord? | Noorddocs #2. https://www.youtube.com/watch?v=rMnJ48Ch6z8
Palmboom, F. (1987). Rotterdam, verstedelijkt landschap. 17, 60–64.
Parkes, C. M., & Prigerson, H. G. (2013). Bereavement: Studies of Grief in Adult Life, Fourth Edition. Routledge.
Passarelli, D., Denton, F., & Day, A. (2021). Beyond Opportunism: The UN Development System's Response to the Triple Planetary Crisis. United Nations University. http://collections.unu.edu/view/UNU:8210
Pedersen, J. V. S., Latour, B., & Schultz, N. (2019). A Conversation with Bruno Latour and Nikolaj Schultz: Reassembling the Geo-Social. Theory, Culture & Society, 36(7–8), 215–230. https://doi.org/10.1177/0263276419867468
Pihkala, P. (2022a). The Process of Eco-Anxiety and Ecological Grief: A Narrative Review

and a New Proposal. Sustainability, 14(24), Article 24. https://doi.org/10.3390/su142416628
Pihkala, P. (2022b). Toward a Taxonomy of Climate Emotions. Frontiers in Climate, 3. https://www.frontiersin.org/articles/10.3389/fclim.2021.738154
Pihkala, P. (2023). Ecological Sorrow: Types of Grief and Loss in Ecological Grief (2023110967). Preprints. https://doi.org/10.20944/preprints202311.0967.v1
Poole. (2020). Environmental philosophy in the city: Confronting the antiurban bias to overcome the human-nature divide. In The Routledge Handbook of Philosophy of the City (pp. 335–352). Routledge.
Pyle, R. M. (2011). The thunder tree: Lessons from an urban wildland. Oregon State University Press.
Reser, J. P., & Swim, J. K. (2011). Adapting to and coping with the threat and impacts of climate change. American Psychologist, 66(4), 277–289. https://doi.org/10.1037/a0023412
Schultz, P. W. (2011). Conservation Means Behavior. Conservation Biology, 25(6), 1080–1083. https://doi.org/10.1111/j.1523-1739.2011.01766.x
Sebregts, L. (2022). 'Zonder biodiversiteit loopt de stad vast'—Architectenweb. https://architectenweb.nl/n51968
Seto, K. C., Sánchez-Rodríguez, R., & Fragkias, M. (2010). The New Geography of Contemporary Urbanization and the Environment. Annual Review of Environment and Resources, 35(Volume 35, 2010), 167–194. https://doi.org/10.1146/annurev-environ-100809-125336
Shepherd, C. (2019, April 22). For #EarthDay I made an illustration on Shifting Baseline Syndrome. I first heard about it from @GeorgeMonbiot and @JeremyRLent. It describes the subtly changing reference point from which we measure biodiversity loss. Daniel Pauly coined the term in 1995> http://legacy.seaaroundus.s3.amazonaws.com/doc/Researcher+Publications/dpauly/PDF/1995/Journal+Articles/Anecdotes%26ShiftingBaselineSyndromeFisheries.pdf https://t.co/P3BBtRqpyo [Tweet]. Twitter. https://x.com/cameron_jms/status/1120259348788338689
Soga, M., & Gaston, K. J. (2016). Extinction of experience: The loss of human–nature interactions. Frontiers in Ecology and the Environment, 14(2), 94–101. https://doi.org/10.1002/fee.1225
Soulé, M. E. (1985). What Is Conservation Biology? BioScience, 35(11), 727–734. https://doi.org/10.2307/1310054
Steffen, W., Crutzen, P. J., & McNeill, J. R. (2016). THE ANTHROPOCENE: ARE HUMANS NOW OVERWHELMING THE GREAT FORCES OF NATURE? In THE ANTHROPOCENE: ARE HUMANS NOW OVERWHELMING THE GREAT FORCES OF NATURE? (pp. 440–459). University of California Press. https://doi.org/10.1525/9780520964297-051
Stoker, E. (2024a, February 24). Nietige schimmel vreet reus van een boom op. de Volkskrant. https://www.volkskrant.nl/kijkverder/v/2024/nietige-schimmel-vreet-reus-van-een-boom-op~v1025254/
Stoker, E. (2024b, February 24). Nietige schimmel vreet reus van een boom op: Afscheid van een stille getuige. de Volkskrant. https://www.volkskrant.nl/kijkverder/v/2024/nietige-schimmel-vreet-reus-van-een-boom-op~v1025254/
TENT. (n.d.). Landjepik, of de redding van de tuinen van Streven naar Verbetering—TENT Rotterdam | Platform voor hedendaagse kunst. Retrieved June 6, 2024, from https://www.tentrotterdam.nl/artikelen/landjepik-een-tuin-is-een-knooppunt-van-geschiedenissen/
United Nations Department of Economic and Social Affairs. (2021). Challenges and Opportunities for Indigenous Peoples' Sustainability (UN Department of Economic and Social Affairs (DESA) Policy Briefs) [UN Department of Economic and Social Affairs (DESA) Policy Briefs]. https://doi.org/10.18356/27081990-101
van Heel, B. F., van den Born, R. J. G., & Aarts, M. N. C. (2023). Everyday childhood nature experiences in an era of urbanisation: An analysis of Dutch children's drawings of their favourite place to play outdoors. Children's Geographies, 21(3), 378–393. https://doi.org/1

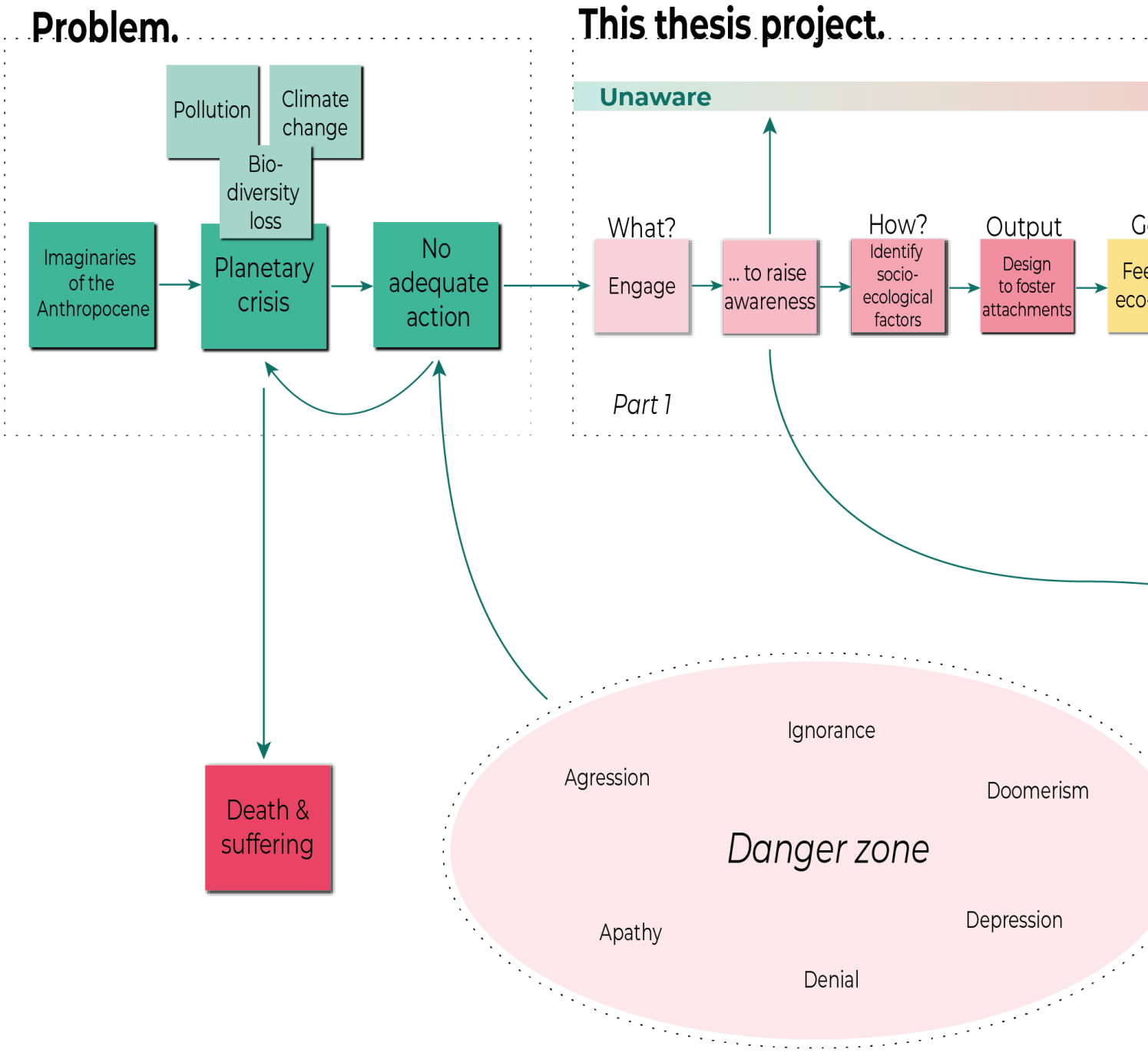
0.1080/14733285.2022.2071600
van Noort, W. (2023). Kunnen we beter leren rouwen? |
NRC. https://campagne.nrcmedia.nl/optiext/optiextension.
dll?ID=6BJGfzjprweHGq9mIpuaZNK1OQwdjhpInr2w9MM1102lzuwfg2JEazu4Fd9p5k_
ARnqOfb90sv3Ov8fFo%2BihjJzkwUJ66Y
van Veelen, N., & de Graaf, P. (2022). Rotterdammers over klimaat en duurzaamheid
2022: Resultaten uit de Ombibusenquête. Gemeente Rotterdam (OBI).
Vind een zwemplek | Zwemwater.nl. (n.d.). Retrieved April 12, 2024, from https://www.
zwemwater.nl/
Westoby, R., McNamara, K. E., & Clissold, R. (2022). Ways of healing in the Anthropocene.
Climate and Development, 14(1), 67–74. https://doi.org/10.1080/17565529.2021.1881425
Wildemeersch, D., Læssøe, J., & Håkansson, M. (2022). Young sustainability activists as
public educators: An aesthetic approach. European Educational Research Journal, 21(3),
419–434. https://doi.org/10.1177/1474904121990953
Willox, A. C. (2012). Climate Change as the Work of Mourning. Ethics and the
Environment, 17(2), 137-164,189.
Wolf, J., Brown, K., & Conway, D. (2009). Ecological citizenship and climate change:
Perceptions and practice. Environmental Politics, 18(4), 503–521. https://doi.
org/10.1080/09644010903007377
Zen Centrum Amsterdam. (2024). Klimaatdag. https://zenamsterdam.nl/nl/klimaatdag

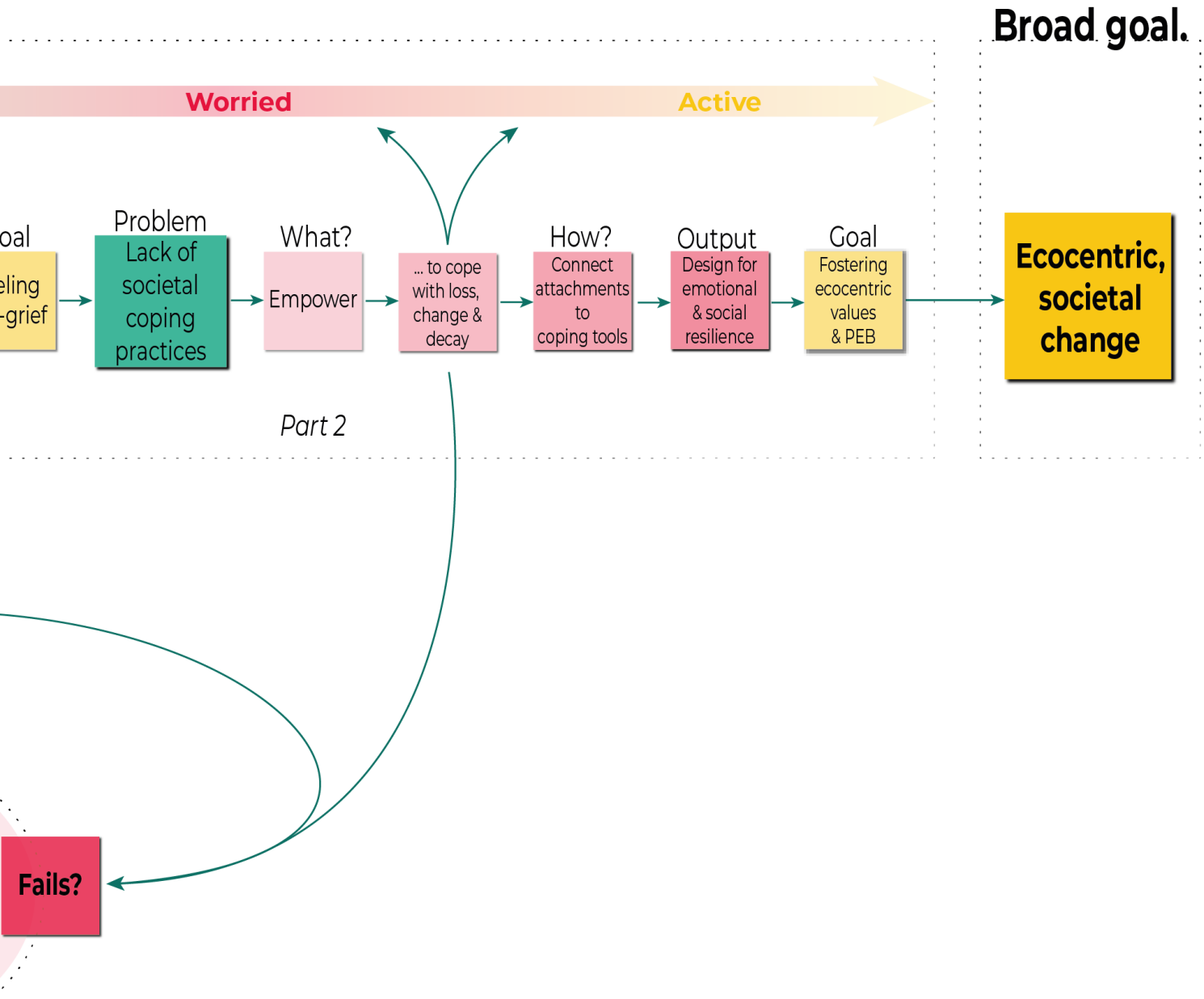

EVERYTHING
DESERVES
A
PLACE
TO
EXIST

10. APPENDIX

10. APPENDIX

10.1 Extended version of Theory of Change




Broad goal.
Worried
Active
oal
eling
-grief
Problem
Lack of societal coping practices
What?
Empower
... to cope with loss, change & decay
How?
Connect attachments to coping tools
Output
Design for emotional & social resilience
Goal
Fostering ecocentric values & PEB
Ecocentric, societal change
Part 2
Fails?

10.2 Theoretical framework
3.1 The notion of nature

The imaginaries of the Anthropocene

The era that we are living in is referred to as the Anthropocene. Although it is a widely debated concept, it can be defined as the geological epoch characterized by human domination of the planetary system (Malhi, 2017). The anthropocentric worldview implies that humans consider themselves as the masters of the world. Using the natural world as an inexhaustible resource for their own emancipation, this leads to a range of crises including climate change, biodiversity loss and waste production (Malhi, 2017). These interlinked global threats constitute the triple planetary crisis as defined by the United Nations (Passarelli et al., 2021). This results in an extinction rate and magnitude that indicates the Earth's sixth mass extinction event (Ceballos et al., 2017; Dirzo et al., 2014). Therefore, the notion of ecocide can be used to illustrate our current state, which is defined as the destruction of life and the source of life (Curry, 2011).

These modern times have shaped our understanding of the relationship between humans and non-humans. The way citizens relate to nature is no longer based on the natural sciences, but on their illusional separation from nature, which makes them feel untouchable (Latour, 2017 in Waringa 2019). Surprisingly, it seems as if it is the curiosity for the natural world, that gave birth to science in the first place, has been demolished by its own rationality. We have lost our ability to look at the natural world as the incomprehensible wonder that we are part of, and to value it as such. Latour describes this as the detachment of nature from the social order, which results in referring to nature as something 'out there' (Latour, 2017 in Waringa 2019). This separation of humans from the natural world is preserved by the conceptual 'ecological dualism'. This radical split has been inherited from Platonism, Christianity and Carteniasnism, and is generally seen as an integral part of the problem by ecologists (Curry, 2011). This overshadows the co-constitutive and embedded relationship between humans and non-humans (Poole, 2020). Latour argues that our separation from the concept of nature has been at the core of, for example, our climate action paralysis (Pedersen et al, 2019).

These imaginaries of human domination and ecological dualism that are at the root of the ecocide. Therefore, a renewed relation to nature is needed to make citizens sensitive to the planetary crisis. (Latour, 2017 in Waringa 2019)

Reconceptualization of nature

Leaving behind the anthropocentric worldview is essential in order to reconceptualize the concept of nature and adopt a fundamentally different attitude towards nature. Latour, being an important voice in the scientific community, challenges the traditional dualities that separate nature from culture. He argues that this modern distinction makes it impossible to recognize the multiplicity of beings existing in the world. Since no entity perfectly fits within the concept of nature or culture, he wants to do justice to all the hybrids existing in this world (Kleinherenbrink, 2022). The way he redefines nature is deeply entwined with the Actor-Network Theory (ANT), which recognizes the agency of both human and non-human actors. Using this theory, Latour reconstructed sociology as the science describing the hybrid chains of associations between humans and non-humans. Therefore, it is not a society we live in, but a collective composed of humans and non-humans (Latour in Czarniawska, 2006). In Latour's world, nature does not shape the passive background to human activities, but it acts as an active participant in the intricate web of relationships.

Furthermore, Latour suggests that the concept of 'territory', as opposed to 'nature' allows to redirect nature from having it out there to a realization of entanglement of land and people. When you realize that the conditions needed for your existence grow

out of this land, it is not the same land you speak of. The disconnection between the 'official' nation-state territory and the 'real territory from which these nation-states feed off' results in the current spatial disorientation (Latour in Pedersen et al, 2019). In this perspective, humans and non-humans must exist in an interrelated dependency in which the health of the environment is at the core of the health of its inhabitants, and vice versa. Following this, humans and non-humans would make up a collective that is responsible for their shared survival and well-being (Wildemeersch et al., 2022). Latour uses climate demonstrations as an example to illustrate this realization of entanglement:

> "So far, most marches for the climate have been practiced in the old sense of 'You should get out of your own egoism and be interested in the climate, which is something of higher importance than your own little interests'. But [using this new notion of nature, the demonstrations that would arise] are not going to be about moving away from self-interest; rather they are self-interested. – and that is more interesting! (...) Arriving at self-interest is a good sign.'' (Pedersen et al., 2019, p. 220)

So, for the reconceptualization of nature, Latour emphasizes the entanglements of nature and culture, as well as land and people.

Restoring the nature-human relationship.

This section elaborates on Latour's ideas on how to restore the nature-human relationship, starting with 'new attachments to the earth' and relocalization. Subsequently, the corresponding dimensions of emotion, cognition and aesthetics are discussed.

Latour imagines the redefinition of nature through, what he calls, 'new attachments to the earth'. He introduced this concept together with Girard Stark, emphasizing that living species are all attached to what their environment provides and that these attachments are heavily conditioned by the circumstances that they live in (Wildemeersch et al., 2022). This perspective is in the interest of the field of urbanism as it influences the living environments of people. Latour (2005) argues that attachment is an inescapable condition. In line with ANT, humans are not only attached to other humans, but in multiple ways to objects. All living species are differentially attached to their environment in either a good or a bad way. Bad attachments are destructive to the environment and ourselves and decrease our capacity to live in a sustainable way, whereas good attachments contribute to more sustainable living conditions. Latour (2018) clarifies that to understand the activity of humans, including their emotions and passions, we must look into what attaches them. In Latour's view, the world needs a major transition from bad to good attachments.

3.2 Cognitive: Ecological ethics

Shades of ecocentrism

This section dives deeper into the meaning of the different levels of ecological ethics, distinguishing three basic levels of ethics: light-green, mid-green and dark green (Curry, 2011).

The first shade of ethics, light-green, limits direct value to human beings. This includes the currently dominant anthropocentric views, which emphasize the instrumental value of nature. It can be defined as 'the unjustified privileging of human beings, as such, at the expense of other forms of life' (Curry, 2011). Also in this category falls environmentalism that is dedicated to the security and sustainability of nature for human resources. Within this view, actions are seen as unjust when displacing environmental risks onto parties that are not implicated in their production. The danger of environmentalism is viewing nature as just a distribution issue (Stevis, 2000). Moreover, the term 'environment' is widely understood as that which surrounds, which denotes a passive background that supports the anthropocentric view of humans as main characters (Curry, 2011).

This is followed by mid-green ethics that involve zoocentrism, placing animals at the center of value, and biocentrism, valuing life itself in all its forms. Mid-green ethics means that value is not restricted to human beings, but neither does it fully extend to whole ecosystems. Animals and other life are considered to deserve protection for their own sakes, regardless of whether they matter to human beings(Curry, 2011).

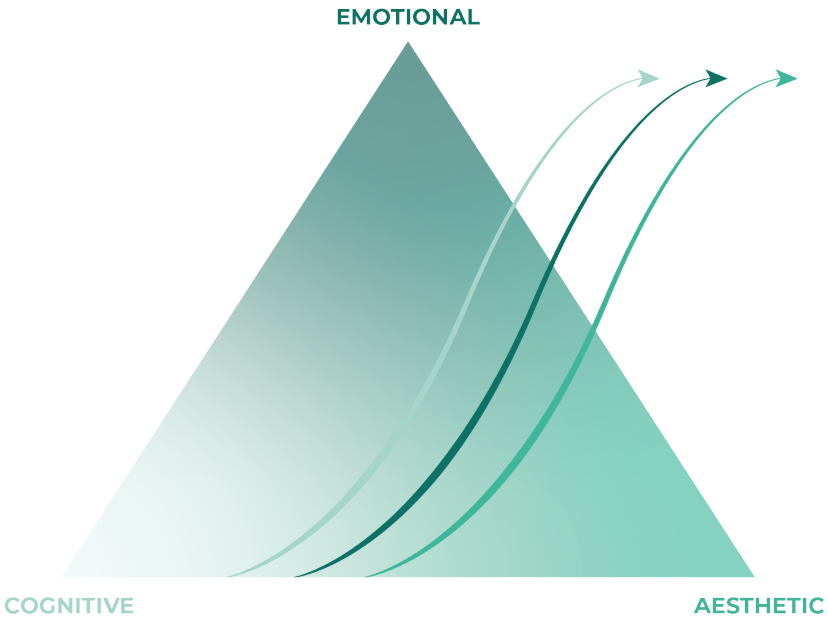
Finally, within dark-green ethics , the former are seen as limited as life is dependent on all components of an ecosystem, organic and non-organic. According to Curry (2011), ecocentrism starts from the perception that nature is the ultimate source of all value. Otherwise said, nature has intrinsic value, which can not be arrogantly claimed as solely human, but as a characteristic of the entire web of life. Intrinsic value means that an entity, like a forest, could have value independent of its usefulness to humans. Through the lens of science, intrinsic value is a complicated concept to grasp. However, humans also value themselves just because they exist, so it can be seen as the same concept just not placing a human being at the center. Curry refers to Latour's Actor Network Theory (1993) as following this same point. He emphasizes the unity by stating that:

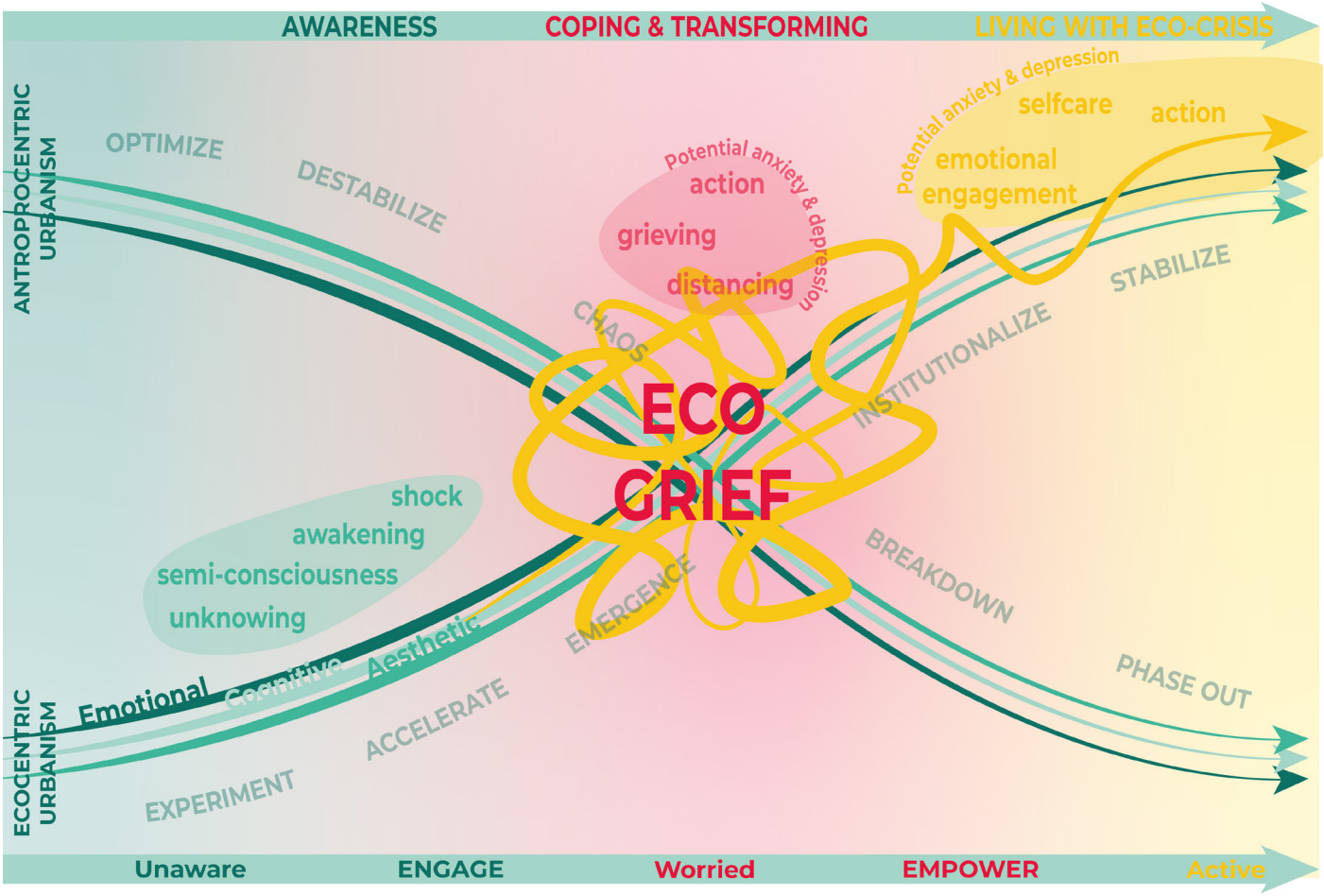
> '[A]n 'ecological' understanding of nature itself is as the extraordinarily complex and subtle web of organic and non-organic life which is entirely relational – so the entities related are constituted by those relations – and reflective, so that it is impossible to stand outside and observe or manipulate it, either as a whole or in part, without affecting it or its other parts, or without being affected by it.' (Curry, 2011, p.8; as in original)

As the relationships between the subjects of the web of life entail ethics, the ecological community also forms an ethical community. Ecocentrism reconsiders humans in ecological terms and non-humans in ethical terms.

It should be noted that ecocentrism is not an inversion of anthropocentrism, because that would preserve the human-nature dualism. If humans are seen as part of nature, they share in nature's intrinsic value. It acknowledges that humans are just a part of life on Earth, and we need it more than it needs us. This kind of ethic implies that all of our relationship to Earth have an ethical dimension to it. The principle of common entitlement points out that humans, as well as other entities, are not expected to undermine their own basic needs to let other forms of life flourish (Curry, 2011). Nonetheless, it should indeed be recognized that this implies the possibility that in certain cases the needs or rights of the Earth or its non-humans inhabitants could take precedence over humans.

10.3 Conceptual framework




AWARENESS
COPING & TRANSFORMING
LIVING WITH ECO-CRISIS
ANTROPOCENTRIC URBANISM
OPTIMIZE
DESTABILIZE
Potential anxiety & depression
action
grieving
distancing
Potential anxiety & depression
selfcare
action
emotional engagement
STABILIZE
CHAOS
INSTITUTIONALIZE
ECO GRIEF
shock
awakening
semi-consciousness
unknowing
BREAKDOWN
EMERGENCE
Emotional
Cognitive
Aesthetic
PHASE OUT
ECOCENTRIC URBANISM
ACCELERATE
EXPERIMENT
Unaware
ENGAGE
Worried
EMPOWER
Active

10.4 Survey

. You are being invited to participate in a research study titled ***'Grieving ecological losses: engaging and empowering citizens through ecological grief to foster ecocentric values'***. This study is part of the Urbanism Master thesis done by Mayke Giesen from the Delft University of Technology. The purpose of this research study is to understand **the relationship between the residents of Rotterdam Noord and their natural environment.** It will take you approximately **8 minutes** to complete. The data will be used for research purposes as part of this Master's thesis.

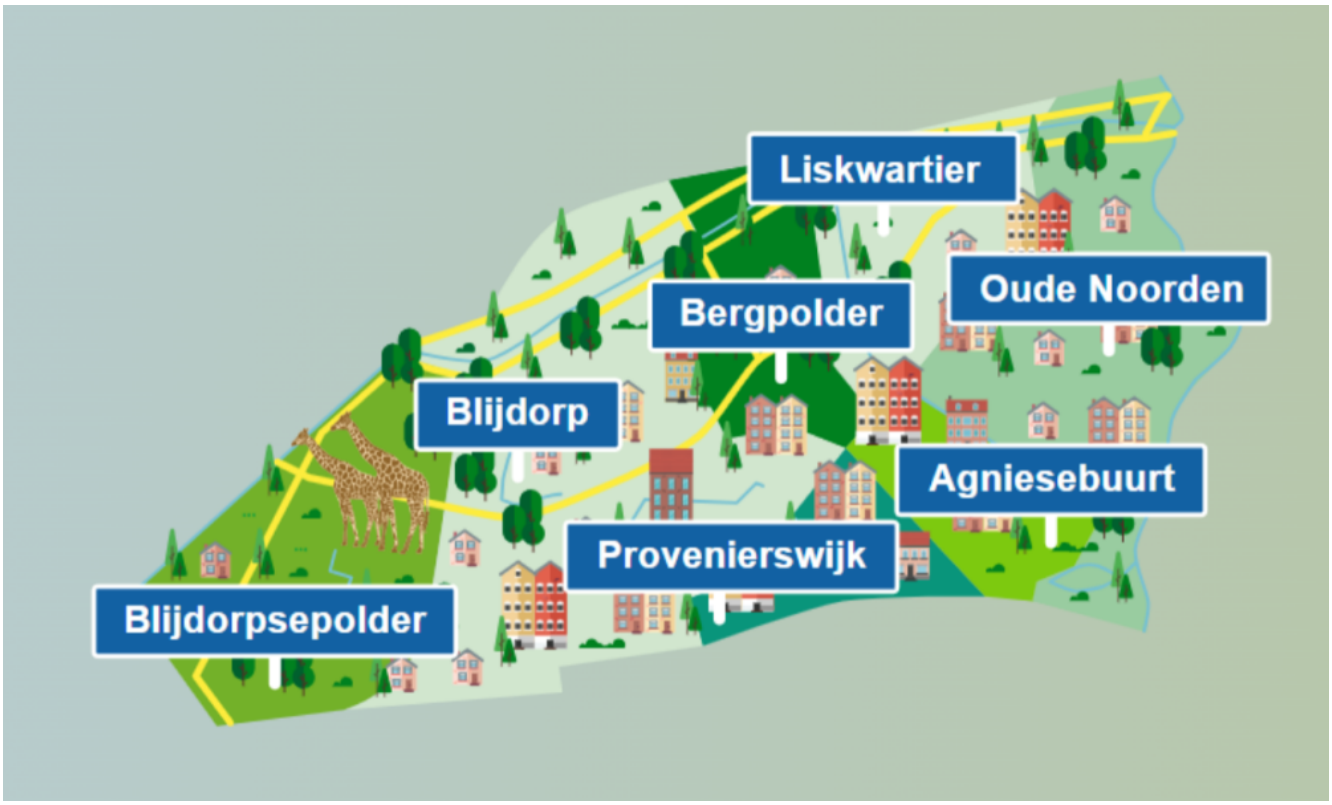
The questions will be about:
- your personal background (age, neighbourhood, parenthood, available outdoor space & childhood memories)
- your view & experiences of global nature
- your view & experiences of your local, natural environment

The survey will be **completely anonymous**. Your participation in this study is entirely voluntary and you can withdraw at any time. You are free to omit any questions. Since it is anonymous, it is not possible to remove data once the form is completed. As with any online activity, the risk of breach is always possible. To the best of our ability, your answers will remain confidential. No personal data will be collected or published.

In case you have questions, or would like to be updated on the outcomes of this study, you can contact us:

Mayke Giesen (corresponding researcher):
Juliana Goncalves (responsible researcher):

By clicking through, you are **agreeing to this Opening Statement** and providing informed consent to your participation.



Q1. In which **neighbourhood** do you live?

- ◯ Blijdorpsepolder
- ◯ Blijdorp
- ◯ Bergpolder
- ◯ Provenierswijk
- ◯ Liskwartier
- ◯ Agniesebuurt
- ◯ Oude Noorden
- ◯ Other, namely ... [ ]

Q2. **How long** have you been living there?

- ◯ 0-2 years
- ◯ 3-5 years
- ◯ 6-10 years
- ◯ 11-20 years
- ◯ 20+ years

Q3. How **old** are you?

- ◯ 0-17 years old.
- ◯ 18-25 years old.
- ◯ 26-39 years old.
- ◯ 40-65 years old.
- ◯ 66-80 years old.
- ◯ 80+ years old.

Q4. Do you have **children?** If so, how old are they?

- ◯ No
- ◯ Yes, I have children under the age of 12 (-12).
- ◯ Yes, all my children are older than 12 years old (12+).
- ◯ Yes, all my children are adults (18+).

Q5. Do you have access to a (partly) **private outdoor space**?

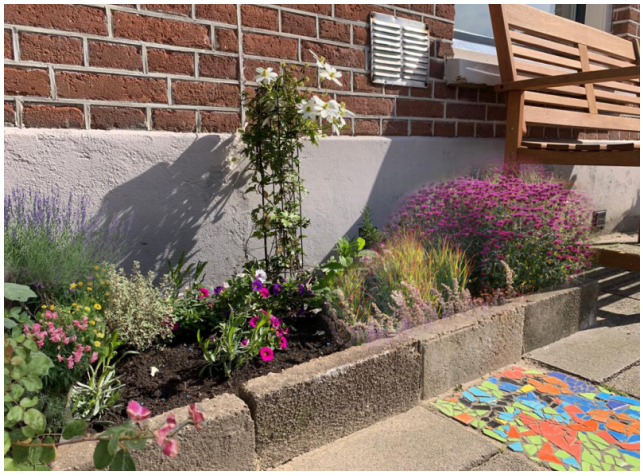
- ☐ Yes, I have a garden.
- ☐ Yes, I have an allotment garden.

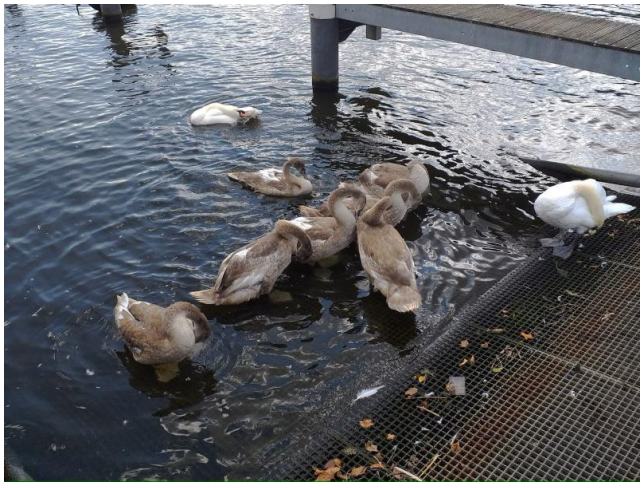
- [ ] Yes, I take part in a shared garden.
- [ ] Yes, I have a balcony.
- [ ] No.
- [ ] Other, namely... [ ]

Q6. Do your main **childhood memories** take place in nature?

- ◯ Yes, most of them involve experiences in nature.
- ◯ Some of them involve experiences in nature.
- ◯ No, they mostly take place else where, like in indoor or urban environments.

Q7. **Is this nature?** Select all pictures that you regard as nature.





Q8. How do you view nature? **Select 3 statements** that best **reflect your personal view** - simply choose 3 options that resonate most with you. **I view nature mainly as ...**

- [ ] a place to explore and learn from
- [ ] a background to recreation
- [ ] a place where I feel comfortable and at home
- [ ] a dangerous environment for wildlife only
- [ ] a place that needs care and protection
- [ ] a place for humans to use (for resources, like food and materials)

. **We're in the middle of an ecological crisis.** Many animals, plants, and entire landscapes are disappearing because of issues like pollution, deforestation, and climate change. People worldwide are losing their homes and livelihoods because **nature is vanishing and degrading.**

Q9. **Did you know** that there is an **ecological crisis** happening in the world?

- ◯ Yes, I'm fully aware of the ecological crisis
- ◯ Somewhat, but I did not know it is this bad.
- ◯ Not really, but I've heard about it.
- ◯ No, I wasn't aware of the ecological crisis.

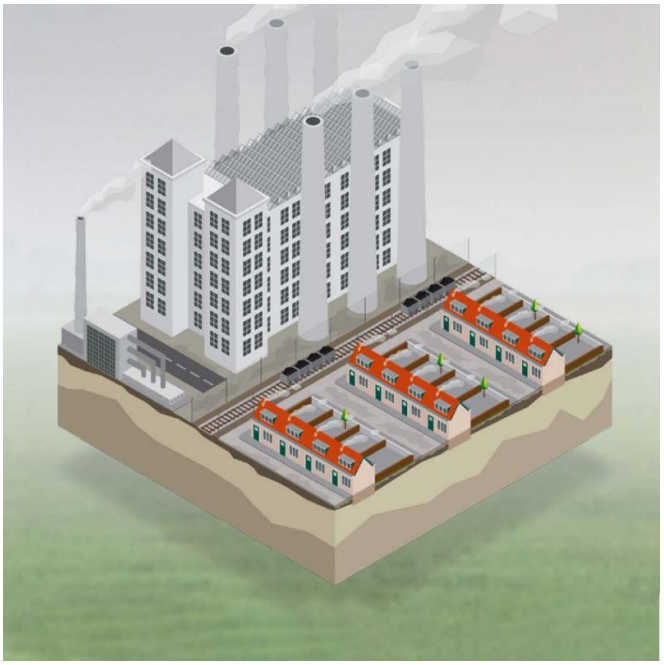
. **Caring about the environment can evoke strong emotions.** If you experience this, you should know: **You are not alone!** For example, 71% of Rotterdammers are concerned about climate change. These emotions are known as **ecological grief** and include **a range of feelings**, like sadness, anxiety, anger,

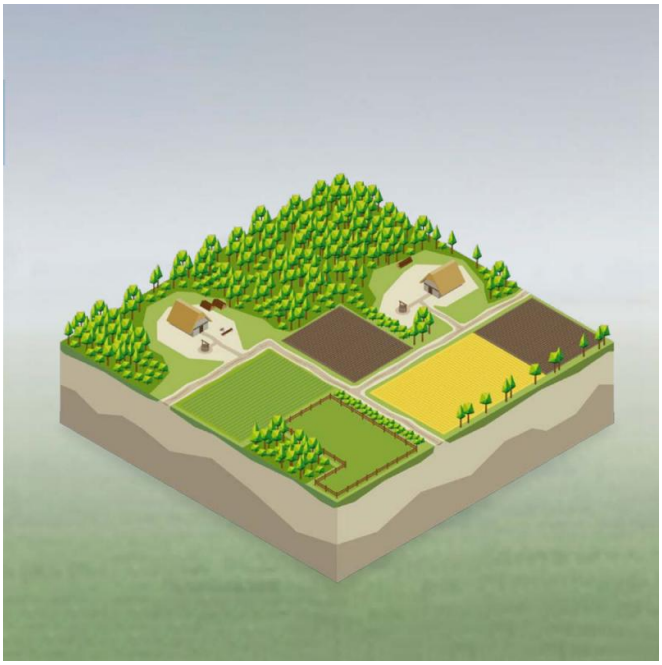
shock or guilt. By acknowledging and sharing these feelings, we can support each other and work together to find solutions.

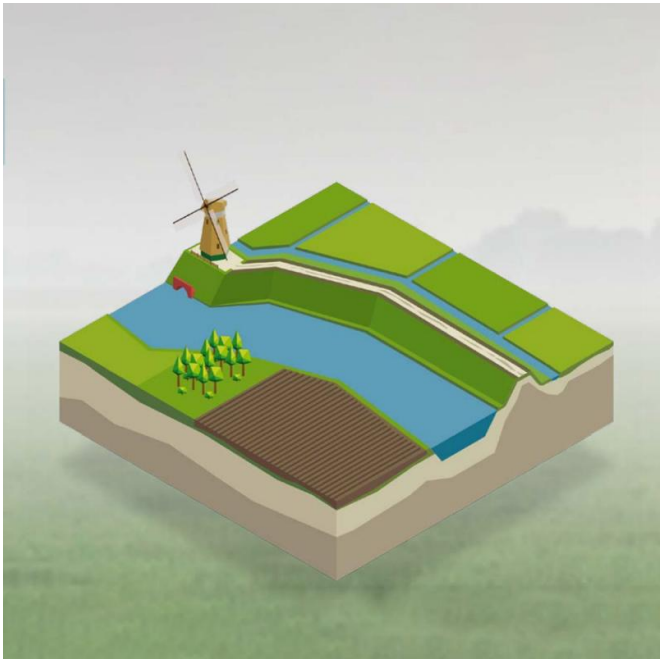
Q10. Do you ever experience a **sense of loss or other feelings** related to the **degradation of nature** (like cutting down of forests, extinction of animals and plants, melting glaciers, etc.)?

- ◯ Definitely yes, I have experienced it.
- ◯ Somewhat, I have experienced it a little or sometimes.
- ◯ I am not sure if I have experienced it.
- ◯ Definitely not, I have not experienced it.

Q11. What do you think that **Rotterdam Noord looked like 100 years ago?** Simply choose the image that represents your first thought.

◯ 

◯ 

◯ 

◯ 

Q12. In the Netherlands, 85% of all the original animal and plant species have disappeared. **Did you know about this decline?**

- ◯ Yes, I am fully aware.
- ◯ Somewhat, but I did not know that it is this bad.
- ◯ I've heard about it.
- ◯ No, I was not aware.

Q13. Have you ever **noticed changes** in **nature** in **your own environment** (plants/trees, animals, weather, landscape, like waterways, etc.)?

- ◯ Definitely yes
- ◯ Somewhat
- ◯ Probably not
- ◯ Definitely not

Q14. Have you ever **worried** about the following problems in **your own environment?** Select the ones that concern you.

- ☐ The disappearance of trees or other plants.
- ☐ The disappearance of parks or other green spaces (for example due to urban development).
- ☐ The disappearance of animals.
- ☐ Waste in public (green) spaces.
- ☐ Air, water or soil pollution.
- ☐ Noise or light pollution.
- ☐ Impacts of climate change, like heatwaves or heavy rainfall.
- ☐ The disappearance of waterways.
- ☐ No, I have not worried about these problems.
- ☐ Other, namely ... _____

Q15. What are your **main outdoor activities** in a natural environment? You can select multiple options.

- [ ] Walking, like a daily stroll with your dog.
- [ ] Sports, like running, basketball, soccer.
- [ ] Gardening.
- [ ] Socializing/picknicking with others.
- [ ] Relaxing on my own.
- [ ] Playing/Going to a playground.
- [ ] Fishing.
- [ ] Riding a boat.
- [ ] Camping.
- [ ] Wildlife observation or nature exploration, like bird watching.
- [ ] Creative activities, like sketching or photography.
- [ ] Environmental volunteering, like tree planting or cleaning up trash.
- [ ] None, I do not engage in outdoor activities in natural environments.
- [ ] Other, namely

Q16. What is your **favourite green space** in your neighbourhood?

- [ ] My (allotment) garden or balcony.
- [ ] The local shared garden, like Savornins Tuin.
- [ ] The local square, playground or sportsfield.
- [ ] The singels, like Noordsingel or Statensingel.
- [ ] The zoo: Blijdorp.
- [ ] A park, like Vroesenpark, Roel Langerakpark or Essenburgpark.
- [ ] Along the waterfront, like de Rotte and Noorderkanaal.
- [ ] Other, namely

Q17. What is special about this location? You can select multiple answers. **I value it, because ...**

- [ ] I engage in activities there.
- [ ] it is a place for socializing and connected with others.
- [ ] I enjoy specific plants, trees or the landscape (like waterways, etc.)
- [ ] I enjoy the animals.
- [ ] of what it means to me personally (like memories, cultural/spiritual beliefs, etc.)
- [ ] I enjoy the change of seasons there.
- [ ] it touches my senses (like pretty views, floral scents, etc.)
- [ ] it gives me an opportunity to learn about nature.
- [ ] it is place to rewind and escape from busy, city life.
- [ ] Other, namely …

Q18. Would you like to **spend more time in green spaces** in your daily life?

- ○ Strongly agree
- ○ Somewhat agree
- ○ Neither agree nor disagree
- ○ Somewhat disagree
- ○ Strongly disagree

*. ** Only 2 questions left! **

Q19. Rotterdam wants to become a **National Park City**: a greener, healthier and wilder city for all life.

. Do you believe that Rotterdam can become **a city where people & nature can thrive together?**

- ◯ Yes, I definitely believe that nature can flourish in the city.
- ◯ Maybe, but I doubt if nature will be able to flourish in the city.
- ◯ No, I don't believe that nature will ever flourish in the city.

Q20. **How do you cope** with feelings related to the poor condition of nature? You can select multiple answers.

- ☐ I regularly discuss environmental problems.
- ☐ I regularly talk about how i feel with friends, family and/or like-minded people.
- ☐ I seek professional help, like a psychologist.
- ☐ I join actions together with other people, like with an environmental organization or public protests.
- ☐ I try to make eco-friendly choices.
- ☐ I actively deal with my feelings, for example through creative expression or meditation.
- ☐ I regularly distract myself by doing fun activities.
- ☐ I completely avoid environmental problems.
- ☐ Otherwise, namely [ ]
- ☐ No, I have never experienced it.

Thank you for your time! Your response has been recorded. You have left the survey page.

If you would like to be updated about the outcomes of this survey, please **leave you email address** here. The survey is **completely anonymous.** It is not possible to connect your answers to your emaildress, because you have been redirected to a new page.

Bedankt! U zult op de hoogte worden gehouden.

Thank you! U will be updated.

Image sources of the survey on 'Grieving ecological losses'/Bronnen van de afbeeldingen in de enquête over 'Rouw om ecologisch verlies':

- Q1: Uitslagen Rotterdam Noord via uitslagen.stembureauinrotterdam.nl/provinciale_staten23/stadsdelen/noord

- Q7: Free images on Unsplash via https://unsplash.com/license

- Q11: Nederlands cultuurlandschap in vier tijdlijnen by Ministerie van Onderwijs, Cultuur en Wetenschap via https://www.cultureelerfgoed.nl/publicaties/publicaties/2017/01/01/nederlands-cultuurlandschap-in-vier-tijdlijnen

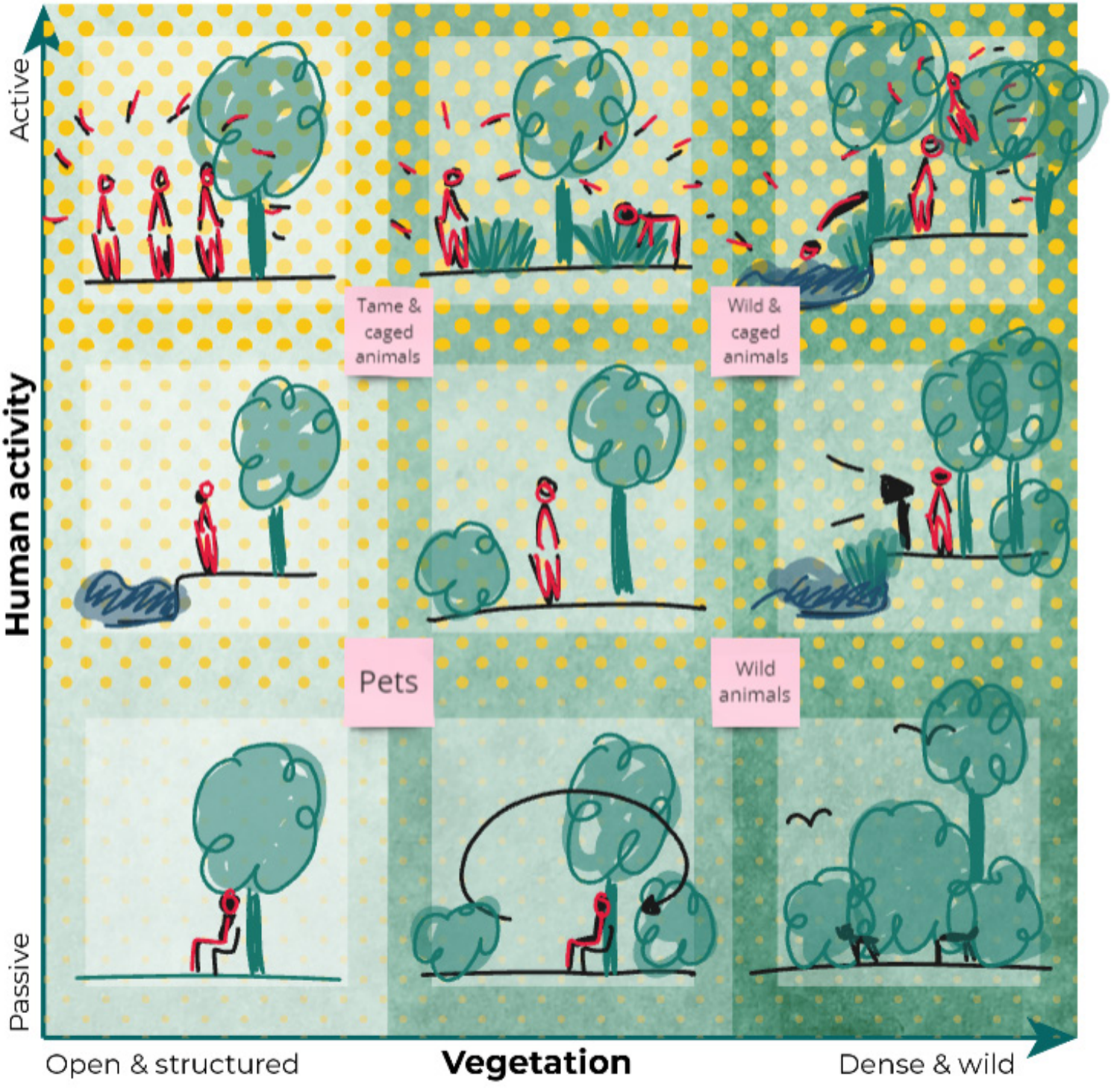
- Q20: Nationaal Park Rotterdam by Witteveen+Bos via https://rotterdam.info/agenda/nationaal-park-rotterdam/

10.5 Urban Nature Types

The Urban Nature Types-diagram (Figure 10.5) is a tool to analyze different types of nature in an urban environment, and provides an alternative perspective on urban nature to revalue its diversity. The tool re-lates to the theoretical framework in the two following ways. The diagram demonstrates the nu-ances of the nature-human dualism in space, and addresses the anti-urban bias, as the types cor-respond to several hybrids between untouched nature and urban environments. The need for these hybrids for fighting this dualism has been emphasized by Latour (in Kleinherenbrink, 2022). In ad-dition, the tool distinguishes a variety of spatial urban nature types that correspond to their own types of nature experiences, as these are foundational for developing pro-environmental atti-tudes.

The diagram is based on a horizontal and a vertical axes. The horizontal axis with different shades of green show a range from open and structured to dense and wild vegetation with each their own spatial character. The amount of human activity can be seen on the vertical axis ranging from pas-sive to active shaping the nature experience and the type of human-nature interaction. Moreover, different kinds of animals relate to the types, such as pets and wild animals. The patterns can be projected on a map to get an overview of the spatial distribution of the UNTs, but the functions of green spaces in an area can also be placed on the diagram to get an idea of the missing types. Through this analysis, the strengths and weaknesses of the urban nature in an area can be identi-fied and related to specific spatial interventions. Thus, the UNT-diagram can be used as a tool to intensify, diversify and balance the functions of urban greenery.

Figure 10,5: Diagram with Urban Nature Types accompanied with explanatory illustrations of the function and nature experience.



10.6 Spatial analysis
10.6.1 Functions

Figure 10.6.1: General function map.

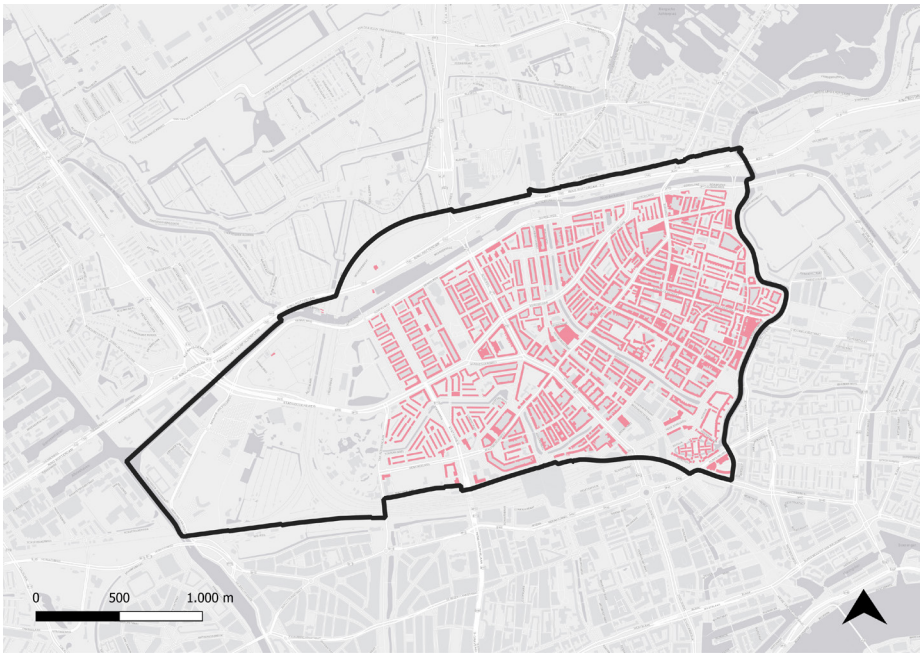


Figure 10.6.2: Buildings with a residential function.

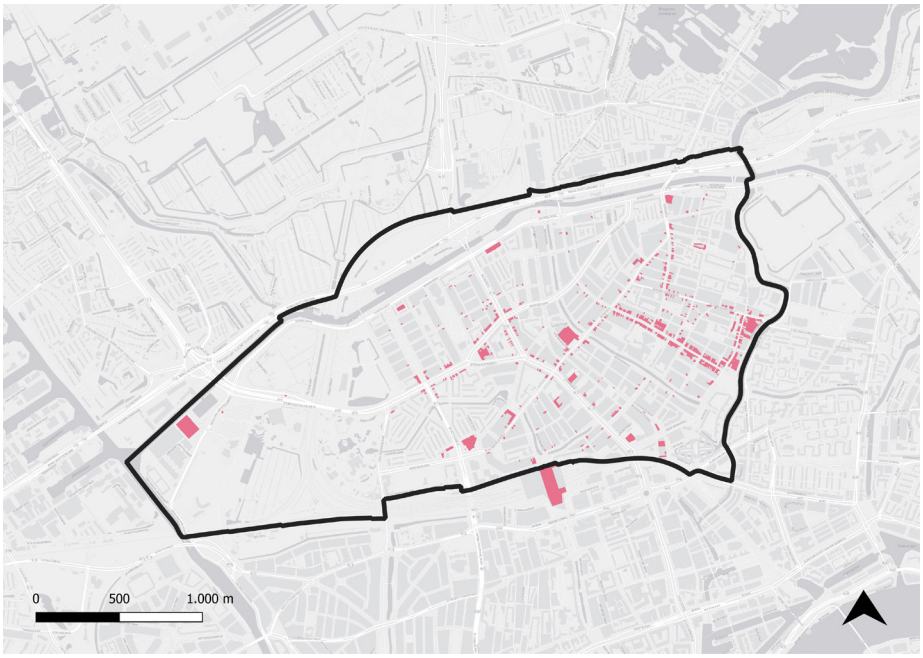


Figure 10.6.3: Buildings with a commercial function.

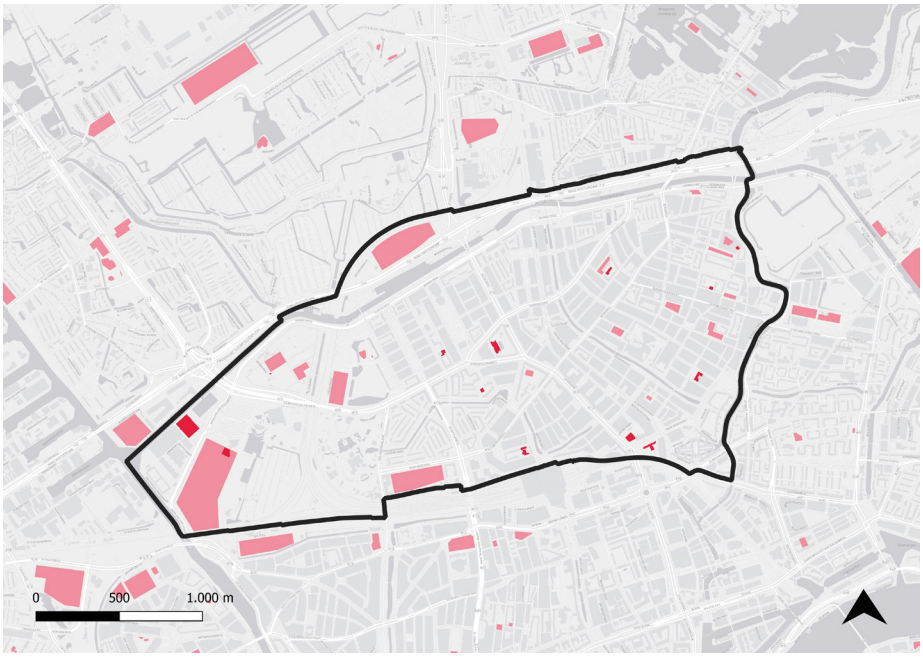


Figure 10.6.4: Buildings with a sports & recreation function.

Figure 10.6.5: Buildings with an educational function.

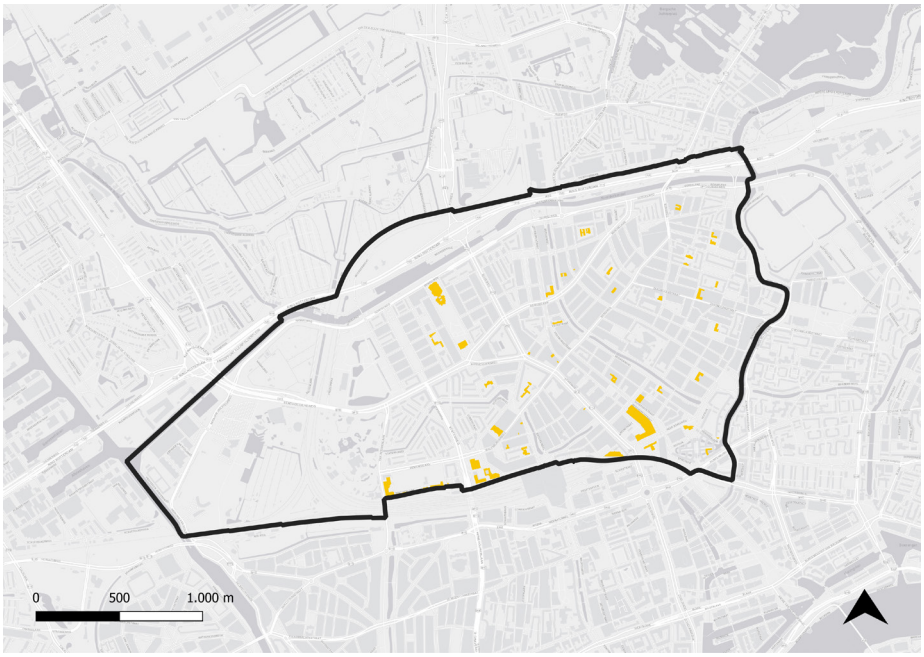


Figure 10.6.6: Buildings with a logies function.

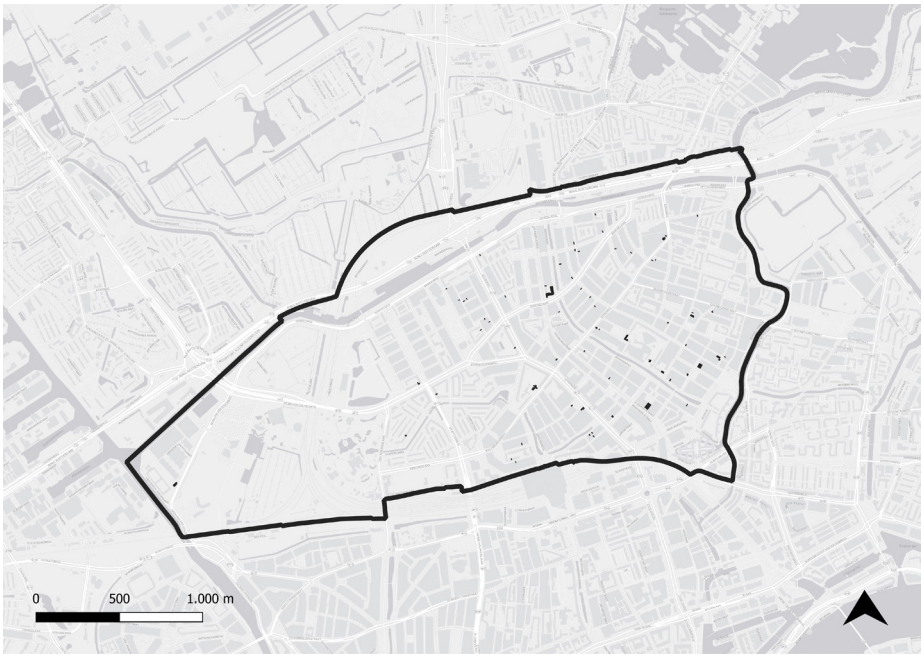


Figure 10.6.7: Buildings with an office function.

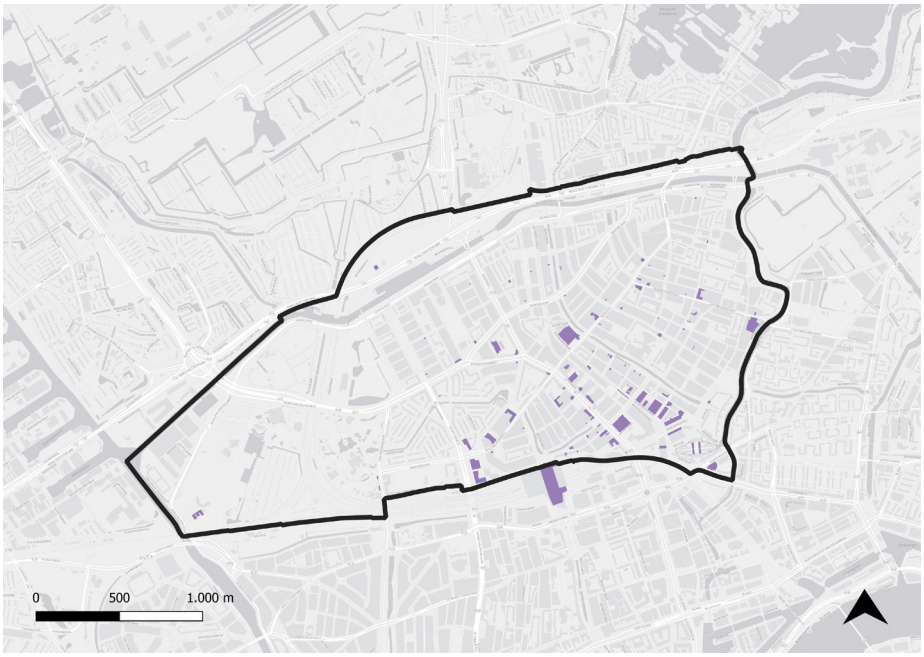


Figure 10.6.8: Buildings with an industrial function.

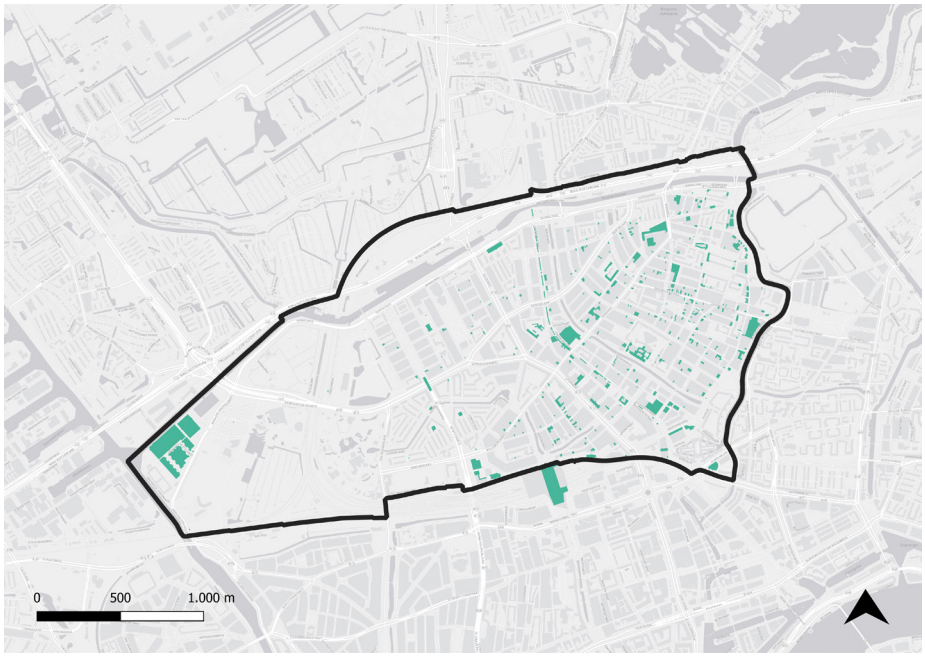


Figure 10.6.9: Buildings with a health care function.

Figure 10.6.10: Buildings with a gathering function.

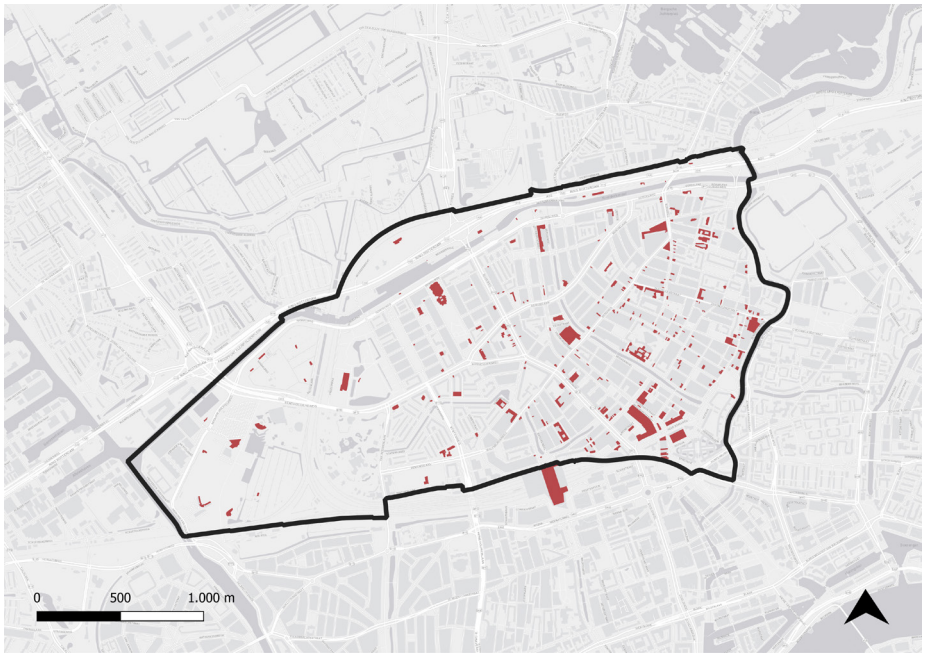


Figure 10.6.11: Swimming locations

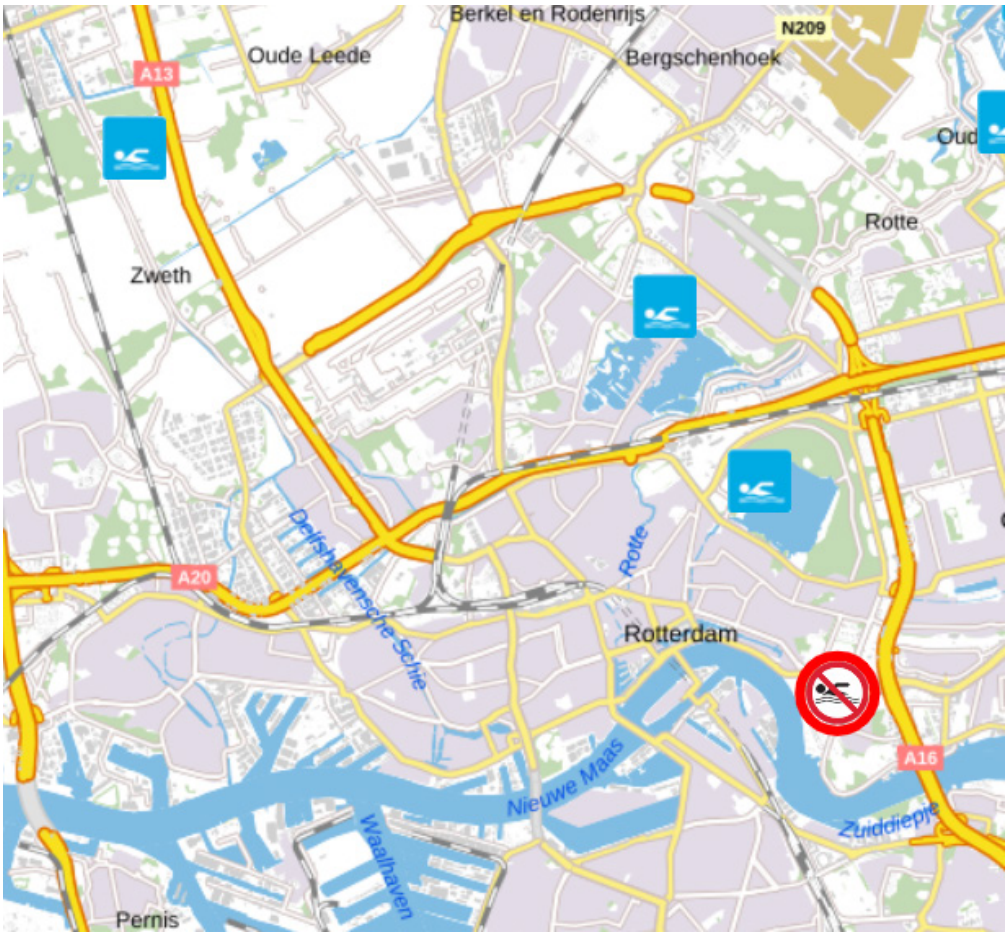


Figure 10.6.12: Scouting locations

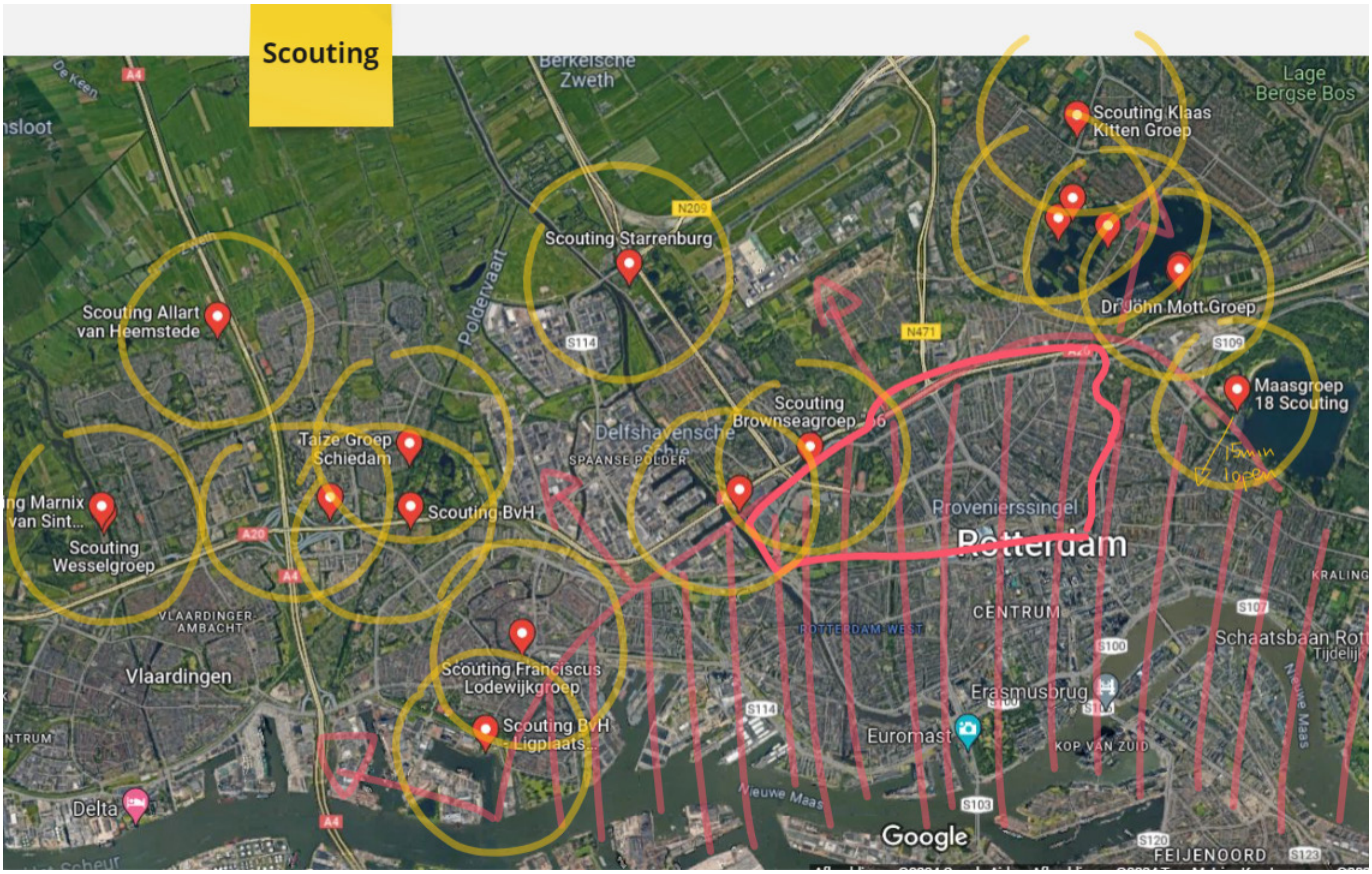


Figure 10.6.13: Situating the Blijdorp Zoo within local context

10.6.2 Climate change related maps

Figure 10.6.14: Urban heat island

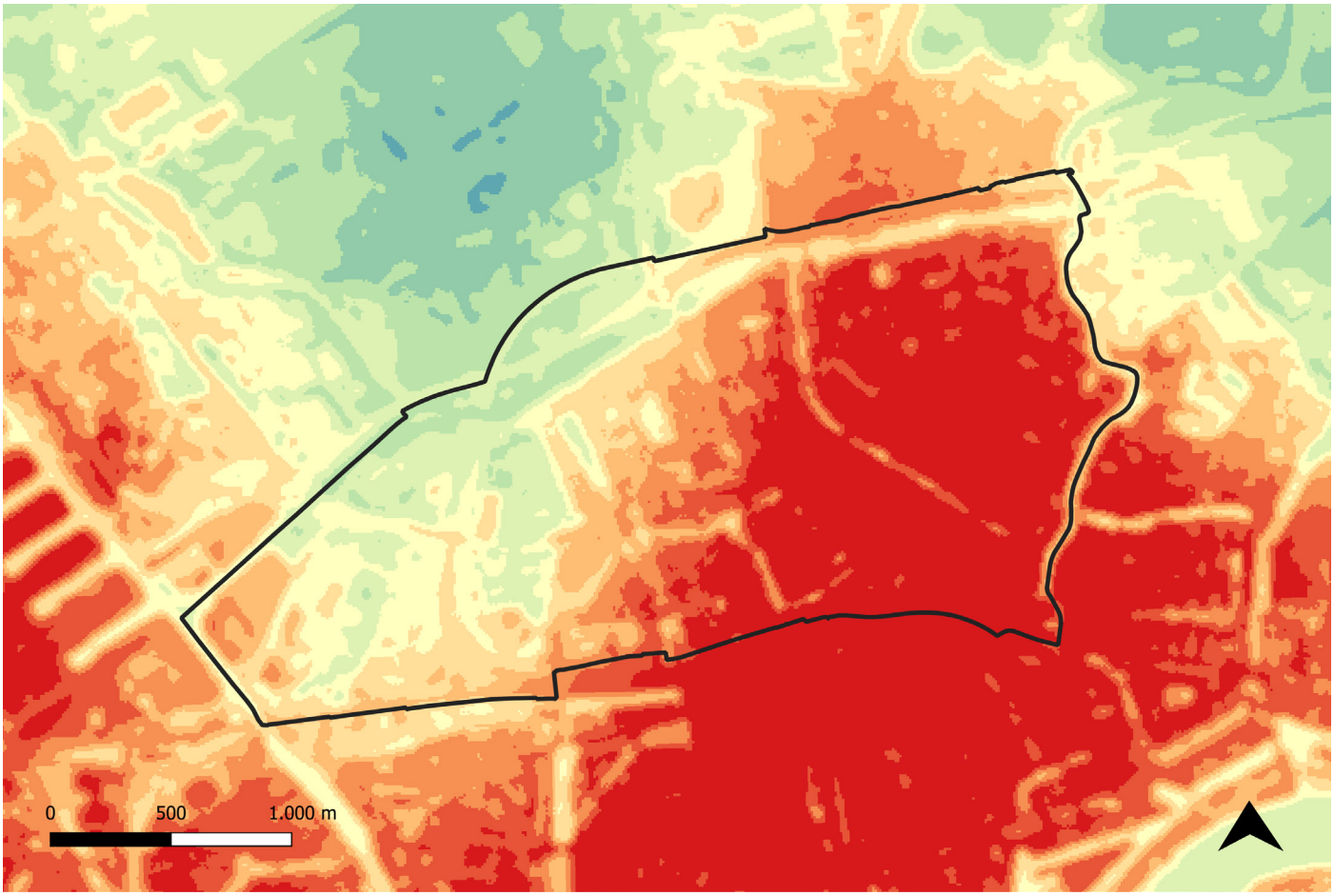


Figure P1: Vulnerability to waterlogging

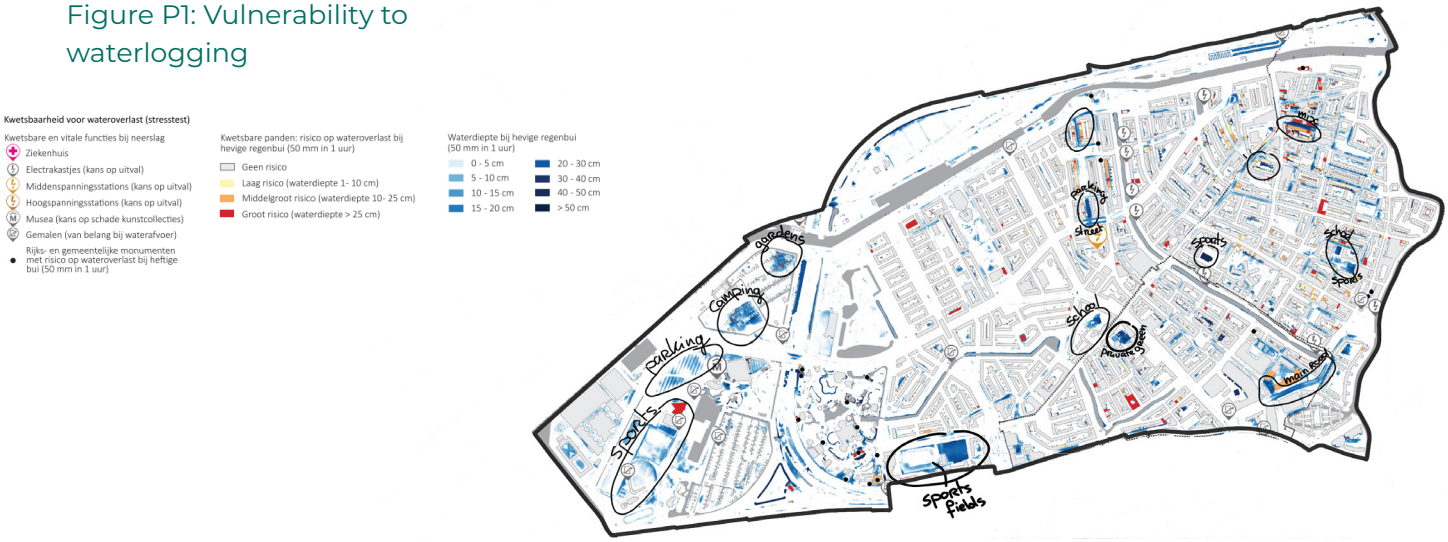


Figure P2: Accessibility of roads during extreme rainfall

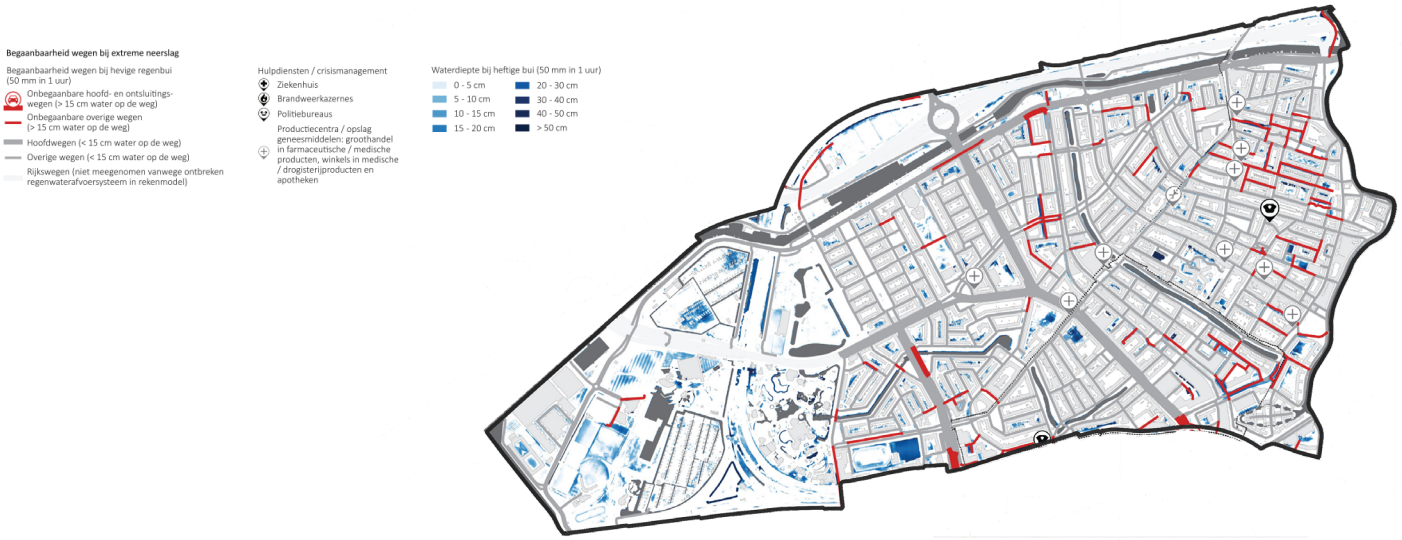


Figure P3: Accessibility of public space during extreme rainfall

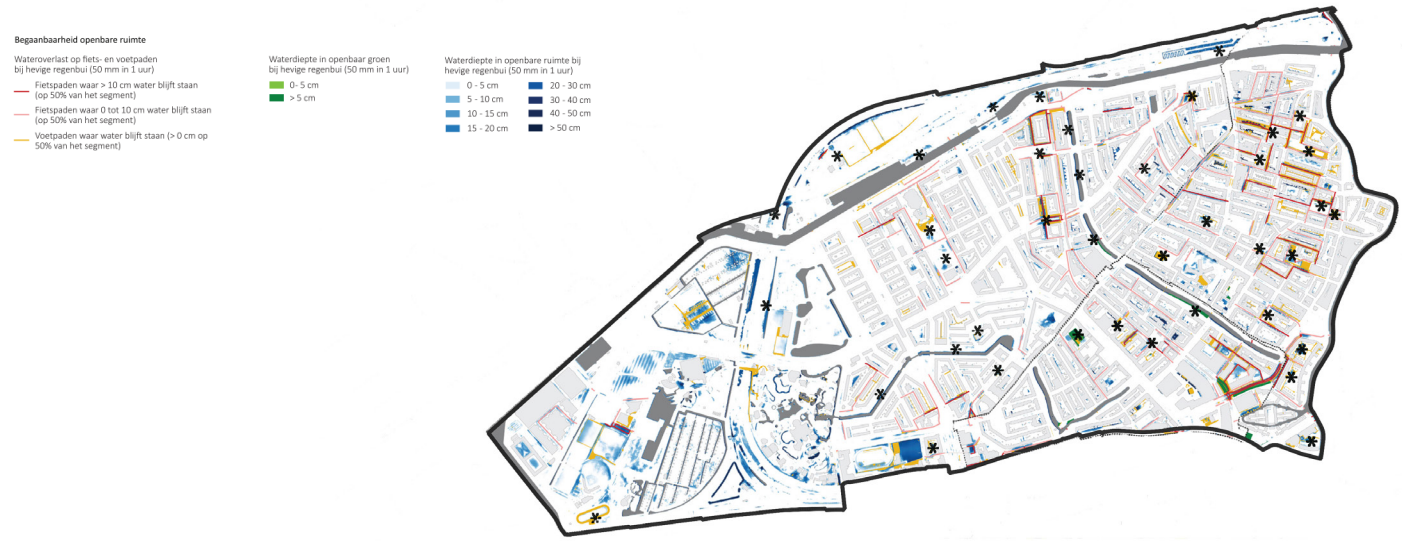


Figure H1: Perceived temperature (PET) and flat roofs

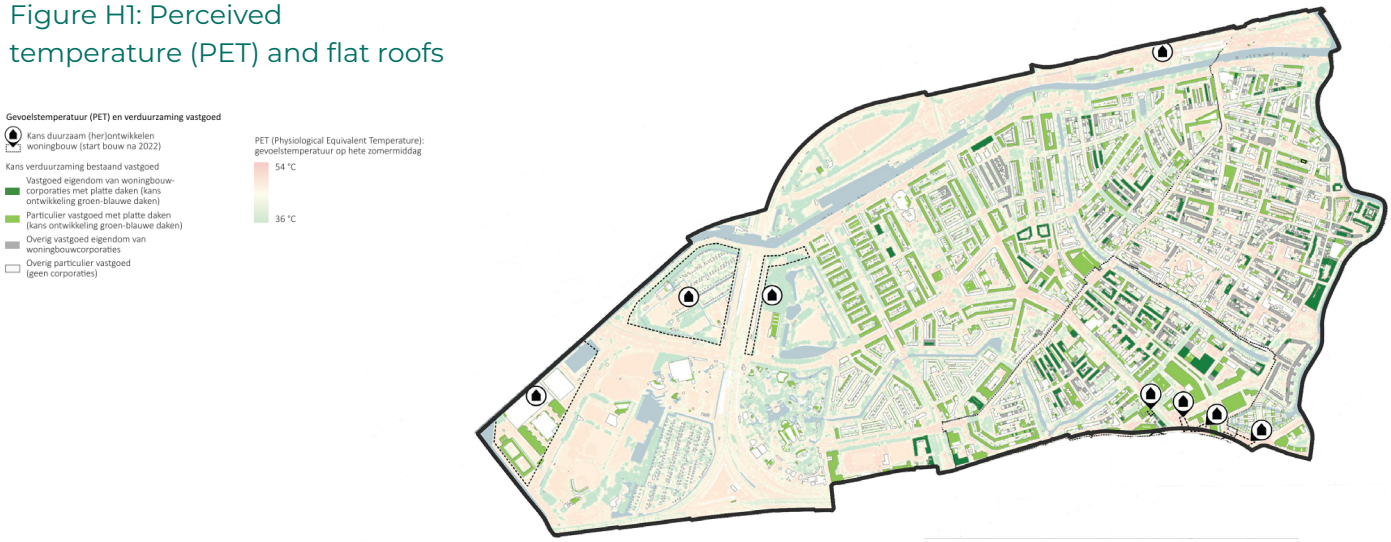


Figure H2: Natural ventilation in buildings

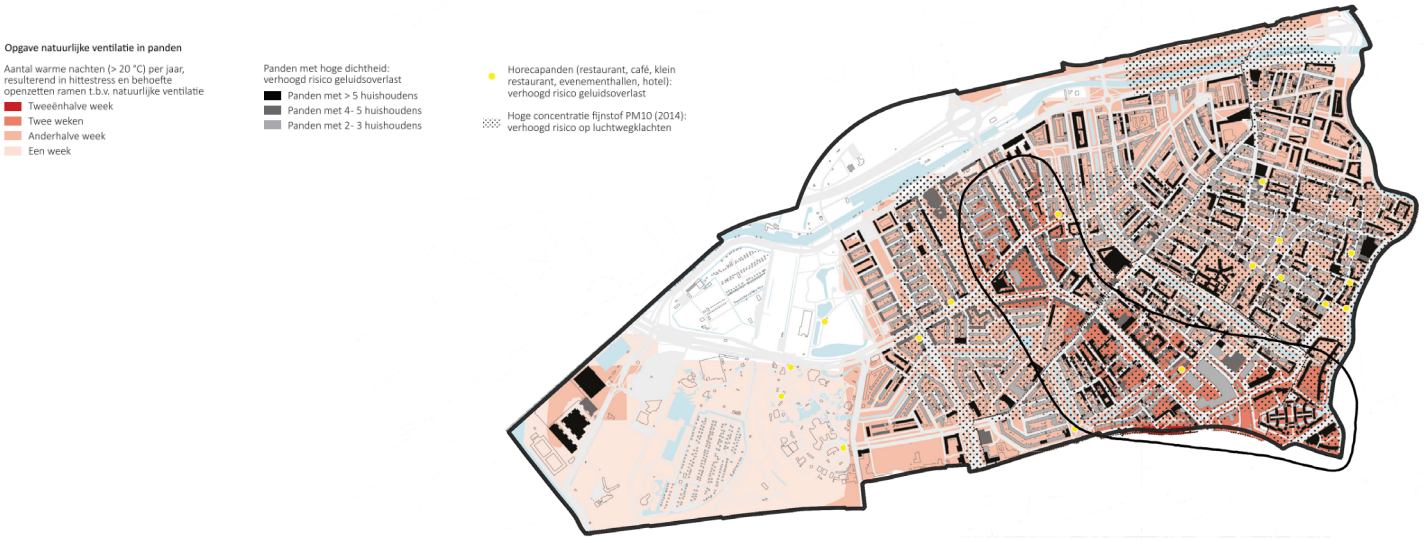


Figure H3: Opportunities for cool areas

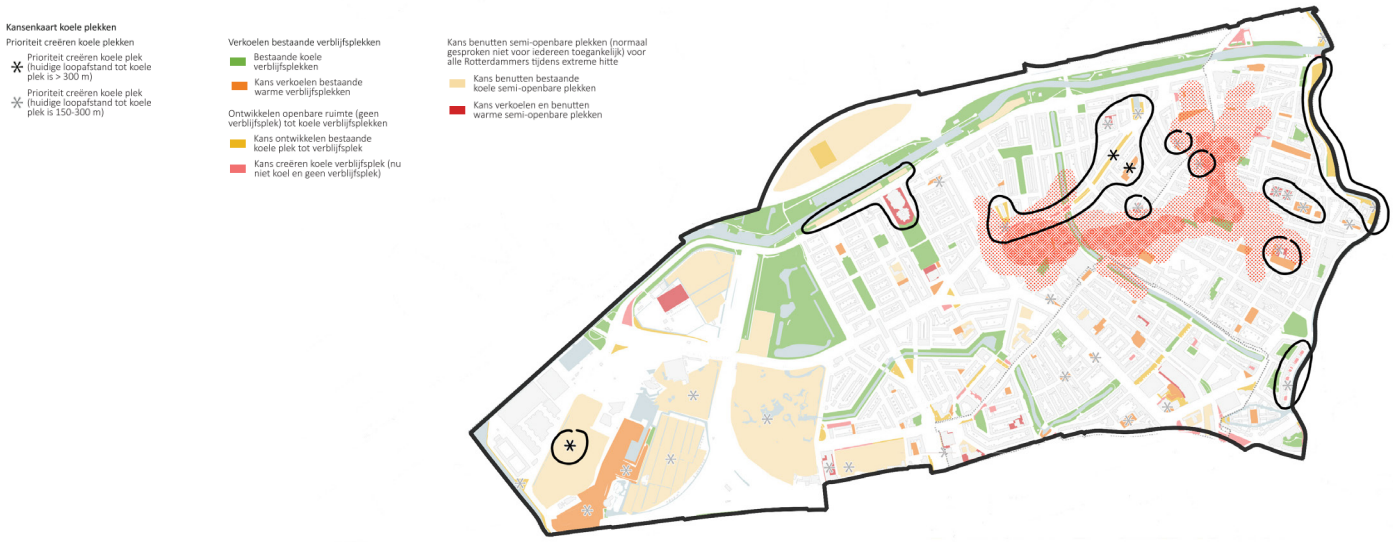


Figure H4: Heat on bike and public transport routes

Figure H5: Heat in walking areas

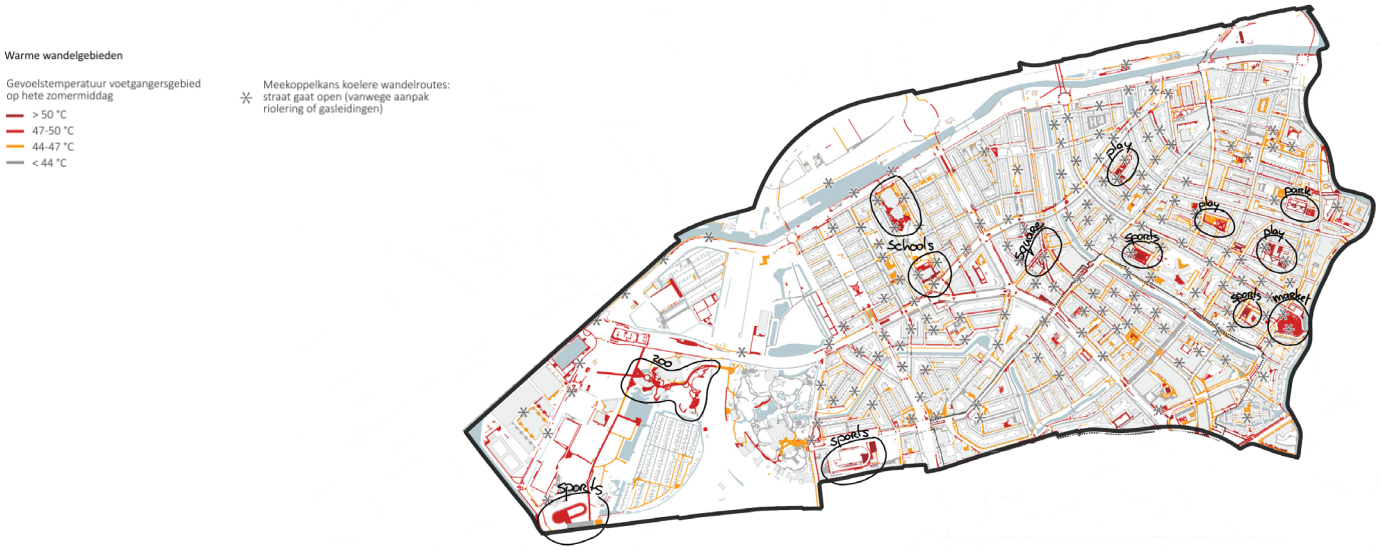


Figure S1: Impermeable surfaces

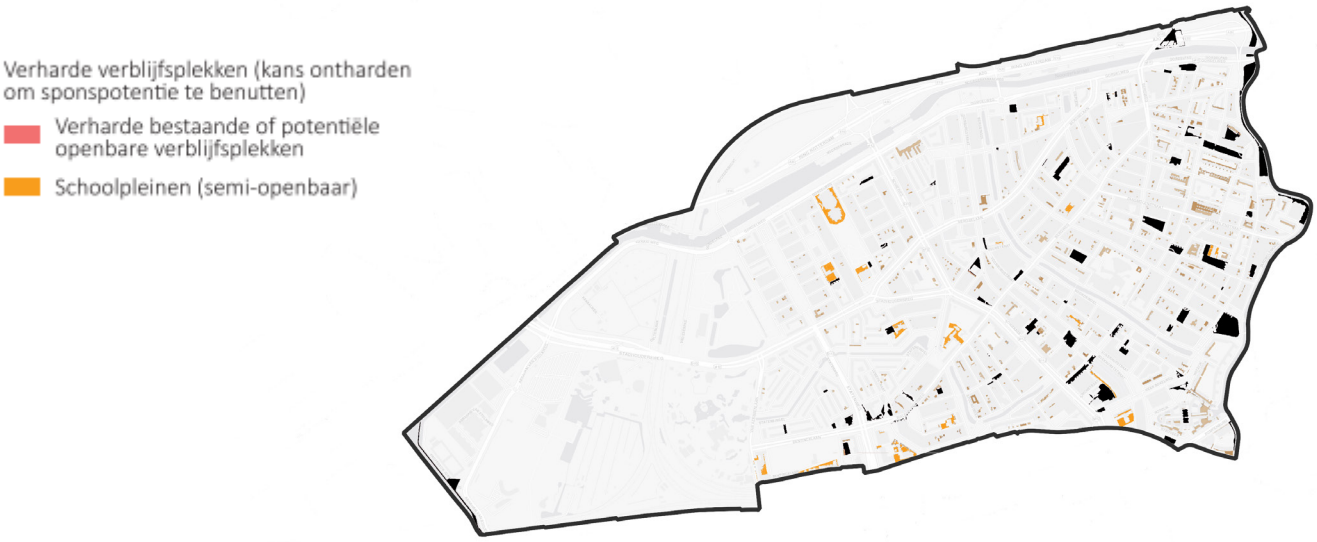


Figure S2: Types of greenery and vulnerable trees

Figure S3: Risk areas due to wood rot in building foundations & flooding

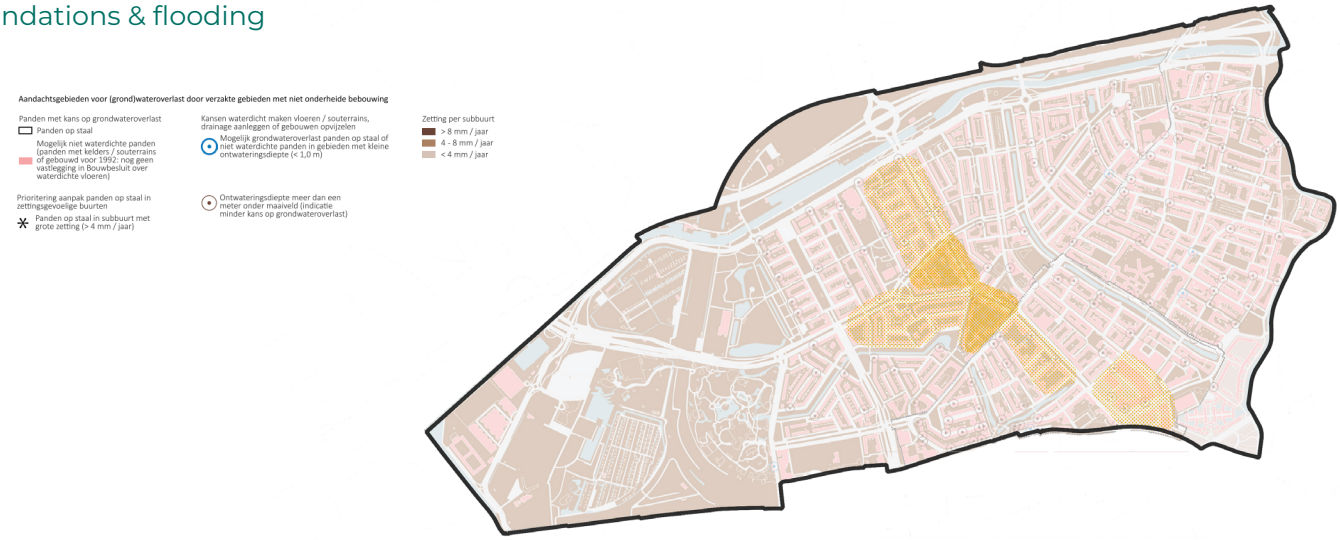


Figure S4: Risk of unstable trees due to land subsidence

10.6.3 Pollution maps

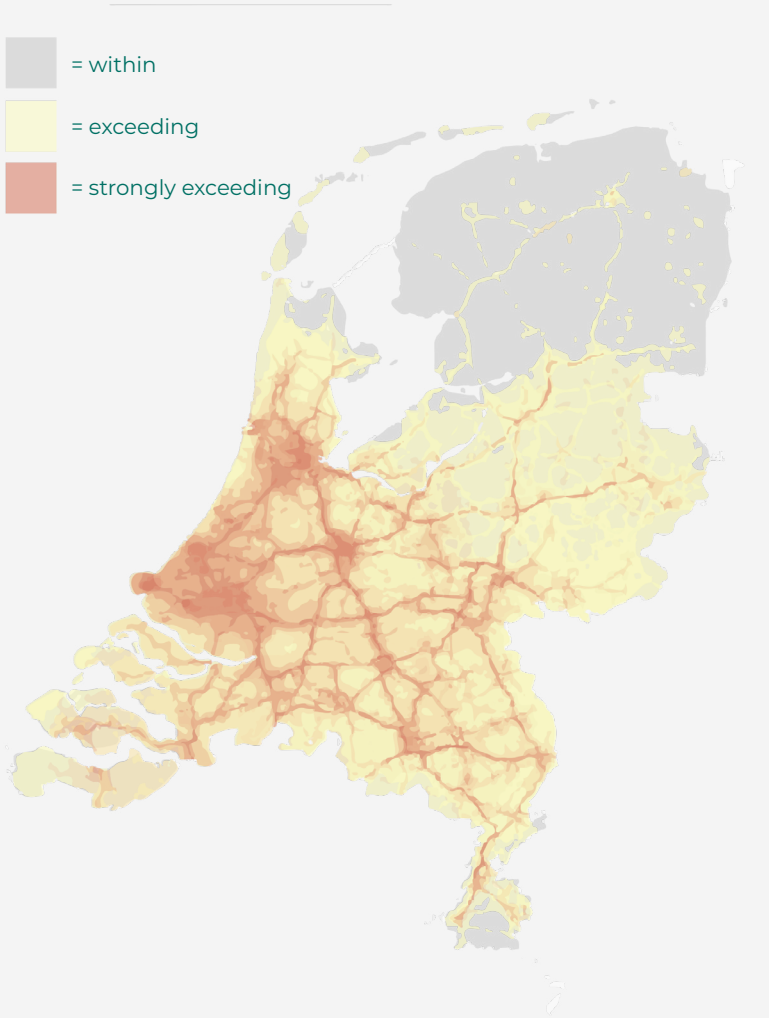


Figure 10.6.15: Map of exceeding WHO advisory limits for NO2 concentration (10 µg/m3) and particulate matter concentration (15 µg PM10/ m3)

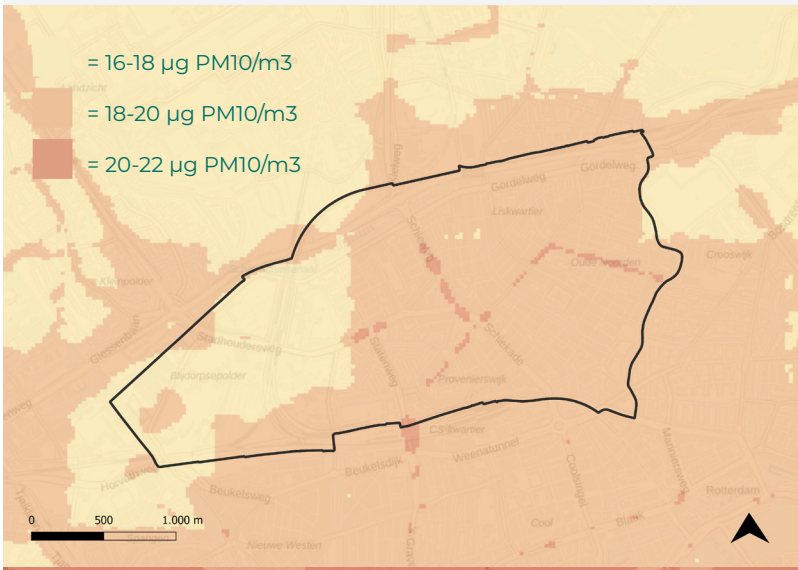


Figure 10.6.16: Map of particulate matter concentration

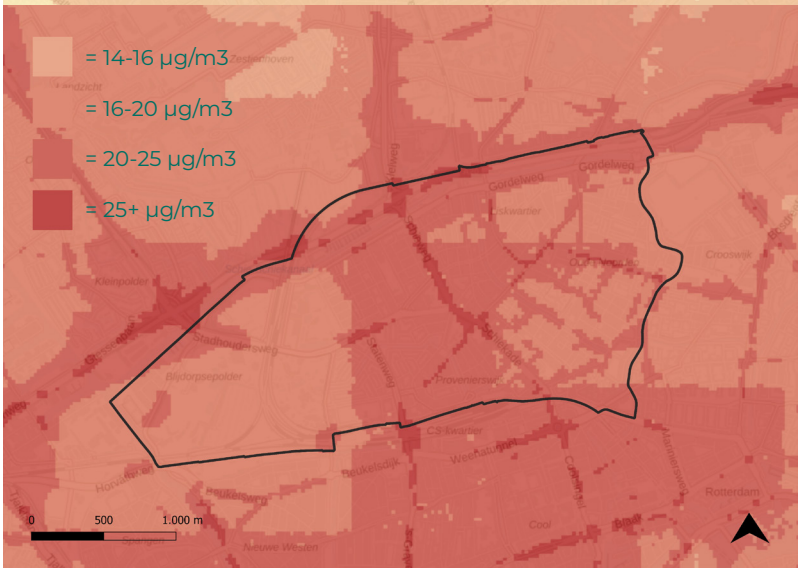


Figure 10.6.17: Map of nitrogen dioxide concentration

10.6.4 Site visit

To get a better understanding of the neighbourhood, several site visits were undertaken (figure 10.6.18), due to technical difficulties most images were lost. The urban character was recorded through the main traffic arteries, car parkings, bike storages and waste in public spaces, but also the art works, monuments and places for people to dwell, like benches. Also the urban life was documented through strolling, people walking their dogs and gardening. The green character was captures through the singels and green initiatives, such as communty gardens and placing of planters.

Figure 10.6.18: Photo's of site visit

10.7 Interview with ecologists

Rotterdam Noord used to exist of small-scale agriculture, meaning many ditches, meadow birds, martens and higher water quality.
Maintenance: People like maintained nature, so the first 2 meter along the paths in Kralingse Bos are tidy, while the rest is wilder. Rewilding needs specific maintenance in the city due to nitrogen/acidification, etc. Otherwise, everything will turn into forest and grasslands (ex. overgrown blackberries). Mowing or using grazing animals will keep it diverse. The mowing should be phased, and signs could be included 'butterflies live here.
Pollution: Pollution of soil, because of ex. old factories, is common through the Netherlands. There might have been a tannery in Rotterdam Noord. The high density of dogs (poo) in cities has an influence on nature.
Monitoring & awareness: The monitoring network has just been set up, and no conclusions can be drawn yet. Every two years each animal category is monitored. Monitoring routes are laid out per urban biotope, and are performed by professionals. Citizen science projects have been performed, including the lending wild cameras to show what animals show up during the night. It has happened that active participants of the Vlindertelling could not handle the decline and decided to stop.
Instead of guiding species, we need to go to an 'living area approach' (Leefgebiedbenadering). First look at the landscape elements, then ask 'what could be living there?' as small scale variation, means many types of biotopes.
Communication is important to show the possibilities, through for example a visionary image of their neighbourhood, and the importance of biodiversity. Emphasize the benefits, instead of costs (ex. health benefits: 10 trees result in less depression rates in neighbourhood)
Nature perception: The city can be seen as the habitat for humans as many people do not leave the city due to a lack of money. But, how can we talk about nature to people in poverty? Should we? The radius of children has strongly decreased in the past centuries, while poverty increases. This makes the urban nature-citizen connection even more important.
Nature perception differs based on cultural background. For example, perceiving nature as a threatening place, while strongly appreciating a specific nut tree. The idea of nature vs. the city is challenging. While the non-diverse, agricultural landscape is perceived as nature, urban nature is not. This leads to conservation of agricultural lands, while urban nature disappears due to densification.
Climate change: Climate change is all about resilience, not about resisting change. The Bordeaux line is moving to the Netherlands. New species of trees are already planted to adjust to the new climate. Wadis are being implemented. It

will lead to more dangerous species, like mosquitos and malaria. If we do not take all changes into account when adjusting, the dark side of urbanism arises. Ex. water roofs will lead to mosquito plagues. This includes dilemma of embracing or excluding exotic species. Should we make integration plans? (ex. duizendknoop)
Grief: Regarding anticipated grief, it should be considered what changes are acceptable and what should be conserved or grieved. Since everything is subject to change. Can we let go, but keep caring for our environment? But the real fear is for the pace of the changes. Seasons could be part of rituals. Grieving is mostly done in gatherings. They are used to doing concessions and nature being treated as subordinate to other goals. Positive outcomes should also be celebrated. Overall, ecologists do not pay much attention to mourning, but the emotional burden exists. Mourning rituals are missing. Ecologist asks himself: is there more fear, than grief? However, it might be easier to be scared than to feel the grief.

10.8 The Eco-Grief Portrait

10.8.1 All survey respondents

Demographics.

The characteristics of the survey respondents show a sufficient reflection of the neighbourhood on one hand, but a lack of variety on other aspects. The personal characteristics that where collected are the living neighbourhood, residency, age, parenthood and access to an outdoor space.

Considering the living neighbourhood, most respondents live in the biggest two neighbourhoods Blijdorp and Oude Noorden (figure 10.8.1; table 1). There are relatively few respondents from Provenierswijk & Agniesebuurt. 13% of the respondents do not live in Noord, but mostly in other neighbourhood in proximity.

Table 1: Proportion of respondents from Noord per neighbourhood compared to the composition of residents (Alle cijfers, 2024).

	Residents	Respondents
Blijdorp	20%	23%
Bergpolder & Liskwartier	30%	32%
Provenierswijk & Agniesebuurt	17%	**11%**
Oude Noorden	33%	34%

While the length of residency is sufficiently distributed, the age does not reflect the demographics of Noord. More than half of the respondents fall within the age range of 40-65 years old, while this group only represents about 20% of the residents. Especially the residents of 26-39 years old are underrepresented, while Noord is known for a high proportion within this age group. Possible reasons for this might be that the survey might have mainly circulated among students and their parents, as well as the underrepresented group might include many young parents who do not have time to fill out the survey.

Parenthood is a relevant factor since it might influence feelings of grief through a heightened concern for their future, an increased sense of care and responsibility and the inability to protect them from environmental threats. The childless group encompasses 60% of the respondents, of which about 60% are younger than 40 years old. The remaining 40% that have children is composed of 90% parents within the 40-65 age group.

About 40% of the respondents has access to a (allotment/ shared/private) garden and 45% only has a balcony or roof terrace, while 15% does not have any private outdoor space.

Nature perception

The dunes are the obvious winner regarding nature perception with more than 90% of the respondents viewing it as nature. Ranging from 70 to 55% votes, the park, meadow,

Figure 10.8.1: Survey respondents per neighbourhood compared to the percentage of residents.

vegetable garden and urban animals closely follow up on each other. The front garden, the zoo and the balcony are least perceived as nature (40-20%).
In addition, nature perception was also questioned through statements, of which the outcomes reflecting a clear preference for the eco-centric view, including nature as a place to explore and learn from, where I feel comfortable and at home, as well as that needs care and protection.

Awareness
A notable difference can be seen between the global and local awareness of the ecological crisis. Although over 80% knows as about the crisis in the world, only ~30% is fully aware of the local biodiversity decline. Most respondents (45%) is partially aware of these local problems. Almost 80% of the respondents are worried about climate change in their own environment, while the representative Omnibus survey revealed that 71% of the Rotterdammers are worried about climate change(van Veelen & de Graaf, 2022). Their second worst worry relates to different kinds of pollution (~60-70%), such as air, water, soil, noise and light pollution and waste in public spaces. About 55% is concerned about the disappearance of green spaces, flora and fauna.

Memories.
Regarding main childhood memories, about 30% note that most of them involve experiences in nature, while the largest group (56%) have some memories involving nature and some respondents (12%) grew up without main memories in nature. It is notable to mention that the older the respondents are, the more memories they have in nature, ranging from 6% among -26 year olds to 42% to 40+ year olds.
The collective memory of what Noord looked like a century ago focusses on the historical city (~40%) with the polder landscape as a close second (~30%) (for the presented visual options see Figure 5.2.2). The industrialized and ancient farmers landscape are equally underrepresented.

Relation to local environment
Taking a walk is the most popular outdoor activity in a natural environment that respondents undertake (~80%), followed by relaxing on their own (~60%) and socializing (~50%), revealing the diversity of outdoor activities. Nature-centred activities, like gardening, wildlife watching, camping and nature exploration (~30-44%) are also represented, just as doing sports in a natural environment (~35%). Lastly, about a quarter is involved with environmental volunteering, like stewardship, of which most volunteers feel a sense of loss and are aware of the ecological crisis.
The parks and singels are the most popular local green spaces in Noord. Only in the neighbourhood of Oude Noorden the waterfront is preferred, presumably because of the location. Almost half of the respondents with a garden

value it as a favourite green space, whereas all citizens that are involved with a allotment or shared garden rate it as such (8/8).
These favourite green spaces are mostly valued because of the flora, landscape and the corresponding sensory experience (~60%), while enjoying animals does not seem to be a main reason (~30%). Additionally, the calm character is also much appreciated, providing a place to rewind and escape from busy city life (~60%), as well as the opportunity to enjoy the change of seasons (~45%). These places turn out not to primarily be the focus of socializing (~37%) or other activities (~25%). Learning about nature or a personal meaning related to the place are the least popular values both supported by about 15% of the respondents.
Almost all respondents would like to spend more time in green spaces in their daily lives (~68% strongly, ~27% somewhat agree).
Nevertheless, the belief in a symbiotic future between people and nature for Rotterdam is only shared by ~60% of the respondents, while ~35% are in doubt and a small minority has no faith at all (~5%).

10.8.2 Personas

Based on literature research, field work and the survey, the following personas were chosen to represent several types of citizens and their urban eco-grief, as well as their roles in the urban context. An elaboration of their backgrounds can be found here. To capture a wide range of perspectives the personas consist of citizens and experts, as well as a variety of age groups. This is not an all encompassing analysis of urban eco-grief types, but a synthesis of my research findings.

Young girl (-18 years old): disconnection grief

This type of grief arises from a lack of nature experiences. As discussed in chapter 3.3, children grow up with less nature experiences than previous generations. This persona represents all the children growing up in an urban environment and embodies the shifting baseline syndrome, where each generation's perception of a "normal" environment diminishes over time. Although this is not necessarily the case of all children in the city, their environment does not facilitate this and their experiences strongly depend our their caretakers (van Heel et al., 2023). An interview about the need for tiny forests revealed an evident example: 'In 2014 I met two girls in the city of the Hague, Cynthia and Ouafa. They were 10 and 11 year old when I interviewed them about their early childhood experience in nature. As it turned out, they had never been to nature' (Bleichrodt, n.d.). The study by (van Heel et al., 2023) showed that children notice and seem to appreciate natural elements, such as animals, water and trees, of which one of the underaged participants described their favourite outdoor space as follows: 'The sun shines on me and the birds whistle and the smell of the flowers. That makes me happy and the nature is just so beautiful' (van Heel et al., 2023). Disconnection grief is related to the lack of accessibility and connection to these natural areas. Besides the unconscious consequences of growing up in an urban environment resulting in missing the benefits of nature contact for children (Chawla, 2015), the realization of these missed opportunities may result in a sense of loss. Addressing this issue involves creating more urban green spaces, integrating nature-based education in schools, and encouraging outdoor activities to help reconnect children with the natural world and foster a sense of environmental stewardship.

Teenage activist (18- yrs.): global grief

Global grief is what activists often encounter manifesting as a feeling a profound sadness and frustration over environmental issues on a global scale. This persona represents the unheard voices and young generation that is worried about the future. As teenagers and other

unheard voices lack the tools to participate in society, they communicate their beliefs through activism. The narratives of young activists can be found in global movements like Fridays for Future (Moes, 2022), which is an youth-led global climate strike movement initiated by Greta Thunberg. Their perspective can be illustrated by a quote from a speech by Thunberg: 'You have stolen my dreams and my childhood with your empty words. And yet I'm one of the lucky ones. People are suffering. People are dying. Entire ecosystems are collapsing. We are in the beginning of a mass extinction, and all you can talk about is money and fairy tales of eternal economic growth. How dare you!' (Lai, 2022). Their strong emotional engagement is expressed by the common saying within the movement: 'with love and rage' (Extinction Rebellion, n.d.). These stories emphasize the emotional burden of the ecological crisis and the corresponding activism driving youth engagement in climate action. Moreover, the survey respondents that join collective actions are twice as aware about the global environmental crisis (95%) than the local problems (48%), and feel a strong sense of loss (90%). This type of grief is driven by awareness of widespread ecological crises and the slow pace of international action to address climate change and environmental degradation. Besides demonstrations, alternatives to express their concerns and translate their energy into local action can help to prevent paralysis or burn out.

Fisherman (18-30 yrs.): cultural grief

Fisherman can experience cultural grief as they witness the decline of water life. Although general cultural bond with the landscape seems present in the urban context in the Netherlands, citizens do engage in several practices that make them aware of their environment. This persona represents not only fishing, but also other sub-cultures and outdoor sports, such as rowing and scouting. These citizens notice changes in their environment and the value of these practices should be cherished. In the book 'Nature amnesia' (Argeloo, 2022) a story is told about families of recreational fisherman that deal with the shifting baseline syndrome in the Netherlands. Initially, the younger generation thought that their (grand)parents were exaggerating about the size and number of fish, but scientific evidence proved them right. These fisherman are unlikely to ever catch fish like their elders. A similar story was included in the exhibition on Urban Nature by Het Natuurhistorisch (2024). Cultural grief is tied to the loss of cultural practices, knowledge and identity that are intimately connected with the health of the local landscape. The value of the practices of this persona needs to be acknowledged, allowed space in the city and can play a role in strengthening the relationship to the environment.

Urban tree specialist (18-30 yrs.): local grief

Urban tree specialists can experience local grief as they closely monitor and care for the trees in the local environment. This persona embodies practical professionals working with urban nature. The story of an urban tree inspector revealed his concerns for trees in the city as they can never reach their full potential in the current urban circumstances (Chlipalski, personal communication, 2022; Giesen et al, 2022). He argues that the lives of trees are not taken seriously in the urban context, while they are essential for all life in the city. This type of grief is centered on the immediate and tangible impacts of urban stressors on local ecosystems and the ignorance regarding more-than-human life. The unique blend of ecological knowledge, practices and passion of practical professionals can play a pivotal role in the localization of environmental losses. Their importance can be emphasized by the lack of local awareness expressed in the survey. This persona can drive environmental stewardship and educate the public to fight the shifting baseline syndrome.

Immigrant gardener (30-50 yrs.): nostalgic grief

Nostalgic grief arises from memories of nature experiences that immigrants might have.

However, all citizens that moved to the city from more natural areas can experience this type of grief, mourning the connection to the landscape they once had. The survey also supported that more memories in nature related to a higher sense of loss (89%) and wish to spend more time in nature (85%). Another study reveals that happiness is greater in natural environments (MacKerron & Mourato, 2013), which is why the absence of natural environments can lead to feelings of longing. These individuals bring valuable knowledge and imagination to urban environments. In the short documentary of 'Noorddocs' (OPEN Rotterdam, 2020), a Syrian man recounts his childhood experiences in nature, with an abundance of fruits and vegetables, and how the community garden keeps those memories alive. Another study on the loss of wild soundscapes also illustrated this type of grief: 'I used to wake up and hear the sparrows chirping and, so whenever I hear them still it kind of takes me back to my childhood' (interviewee in Cunsolo & Landman, 2017, p.109). These feelings are characterized by a longing for the wild nature outside of the city. Their memories evoke feelings of loss and yearning for the natural environments they grew up in. Yet, these memories can play a crucial role in integrating nature into the city. For example, creating community gardens, urban orchards, and green public spaces inspired by their experiences can enrich urban life.

Ecologist (30-50 yrs.): eco-anxiety

Ecologists can suffer from eco-anxiety, a chronic fear of the consequences of the escalating environmental crisis. This persona represents theoretical professionals, such as researchers, who dedicate their career to environmental issues. The interview with ecologists (appendix 10.7) revealed their accustomedness to working in a context where environmental degradation is prevalent, while there is a lack of attention for managing the emotional load associated with their work. This type of grief is rooted in their extensive knowledge of environmental issues and the dire predictions for the future, leading to persistent worry and anxiety about ecological collapse. By acknowledging the emotional burden of their work, these individuals can be empowered to continue and share their passion.

Urban wildlife observer (50+ yrs.): doomerism

Urban wildlife observers can experience doomerism, which is a form of grief characterized by a pessimistic outlook on the future of biodiversity. This persona embodies all individuals who are engaged with the natural world, yet feel paralyzed by the environmental degradation. The story of an elderly wildlife observer, narrated in the interview with ecologists (appendix 10.7), illustrates this struggle. For years, he had participated in monitoring events, counting

animals in the city, while the numbers and variety of animals kept declining. Eventually, the emotional toll became too much, resulting in withdrawing from these activities. This type of grief is fueled by personally witnessing the decline of urban wildlife and natural habitats, leading to a sense of hopelessness about reversing environmental damage. This persona represents the 40% of the grievers that doubt or do not believe that nature can flourish in the city. To support these individuals, communities can establish support groups to let them know they are not alone, and provide mental health resources to deal with these feelings. It is essential to recognize their contributions and find ways to renew hope, such as through citizen science projects or initiatives that restore local habitats. Addressing this grief is crucial for maintaining motivation and fostering a collective commitment to environmental stewardship.

Buddhist (50+ yrs.): compassionate grief

The Buddhist perspective encompasses a compassionate type of grief rooted in spiritual wisdom and care for our environment. This persona represents individuals that can help guide us in times of despair through rituals, art or mental guidance, such as artists, spiritual leaders and climate psychologists. The dedication to the environmental crisis of a Buddhist teacher at the eco-grief ceremony (Zen Centrum Amsterdam, 2024) I took part in made a deep impression. He shared his story on the way he dealt with the ecological crisis through bearing witness and environmental action. He translated existing rituals focussed on human losses into a ceremony for environmental losses, engaging participants who were mostly lay people. Additionally, I participated in an immersive theater show centered around grief (DELEEF. collectief, 2024), which presented an alternative way of dealing with grief, and translated the personal experiences of the artists. This grief arises from empathy for the suffering of others. Just as eco-grief, these individuals are generally unacknowledged, yet they can play a leading role in shaping eco-grief and exploring ways to deal with it.

10.9 Stakeholder analysis

Types of capital
The following types capital are included in the stakeholder analysis.

The **economic capital** refers to tangible assets, mainly focussing on financial resources. These stakeholders can be found within the private and public sector, including businesses, investors, property owners, and economic development agencies.

Cultural capital encompasses the cultural assets, like traditions, customs, arts, literature, language, and historical landmarks that shape the culture of a place. The main cultural capital is possessed by the educational and research institutes, in the shape of valuable knowledge, as well as the cultural institutes, including artists and recreational activities. In the case of eco-grief, mental health care also has an influence on the shaping of the culture around it.

Social capital relates to the networks, relationships and social cohesion within a community. This soft infrastructure is build on trust, reciprocity, social norms and collective action, enabling cooperation and collaborations among individuals and groups. Therefore, this form of capital is essential on the road to a eco-centric, societal transition. Environmental movement and NGOs have a high social capital, but mostly work on national and city level. Stakeholders with a valuable social network on the neighbourhood scale can be found at local community centers, sports clubs, religious institutions, but also at schools. These include grassroots organizations, volunteers, and residents who actively engage in the local community. Municipal district directors represent top-down social capital.

Finally, a major problem addressed in this thesis is the underval¬uing of the **symbolic capital** of the non-human life, landscape and future generations. Symbolic capital embodies the uncommon stakeholders that relate to the symbolic meaning entities have and how these are perceived, typically not taken into account in the public discourse.

Scale	Stakeholder	Specifics
National	Ministries	Economische Zaken en Klimaat; Infrastructuur en Waterstaat; Landbouw, Natuur en Voedselkwaliteit; Onderwijs, Cultuur en Wetenschap; Volksgezondheid, Welzijn en Sport
	Staatsbosbeheer	
	Rijkswaterstaat	
	Province of Zuid-Holland	
	Metropoolregio Rotterdam-Den Haag	
	Waterboard	
	Sustainable companies	
	Unsustainable companies	Car-centered businesses
	Environmental NGOs	Natuurmonumenten; National Park Cities; Milieudefensie; Greenpeace; Drinkable rivers; Klimaatgesprekken
	Animal-focussed NGOs	Vogelbescherming; Vlinderstichting
	Environmental movements	Extinction Rebellion; Fridays for Future
	Future generations	
City	Municipality - thematic departments	Zorg, welzijn en sport; Een veilige, schone, groene stad; Kansengelijkheid; Economie, haven en ondernemerschap; Wonen en mobiliteit; Klimaat en energie; Toerisme en cultuur
	Developers & investors	
	Havenbedrijf Rotterdam	
	Transportation companies	NS; RET; Shared mobility
	MBO	
	Universities & research institution	Erasmus; Hogeschool Rotterdam; TU Delft; Bureau Stadsnatuur
	(Mental) health care	Climate psychology foundation; Regular health care
	Cultural institutions	Het Natuurhistorisch
	Zoo	Diergaarde Blijdorp
	Property owners	
	Non-human life	Ground animals; Water animals; Birds; Insects; Monumental trees & other flora
	Landscape	Rivers; Soil; Air; Parks, community & private (allotment) gardens
	Municipal cementry	Begraafplaats Crooswijk
	Rotterdams Weerwoord	Collaboration of Municipality of Rotterdam, Hoogheemraadschap of Schieland and Krimpenerwaard, of Delfland, Waterboard Hollandse Delta, Evides watercompany
	Publieksplatform Biodiversiteit	Collaboration of Blijdorp Zoo, Botanic garden Afrikaanderwijk, Natuurhistorisch, Erasmus, bSn and Trompenburg
	NGOs	Natuurstad (petting zoos & educational gardens); GroenGoed & Cooperation Tussentuinen (community gardens); Groen010 (green connectors); Groene circkels (collaborations); Stadsboerin Rotterdam (self-harvest farm); Rotterdams Milieu Centrum; De Dakakker (rooftop farm)
Neighbourhood	Municipality - district directors	
	Local companies	Horeca; entertainment; retail; services
	Elementary education	
	Secondary education	
	Community centers & association	Allotment garden associations
	District councils	Oude Noorden; Blijdorp, Bergpolder, Liskwartier; Agniesebuurt - Provenierswijk
	Sports clubs	
	Religious institutions	Churches; Mosques; other.
	Active residents	Environmental volunteers; Activists
	Worried residents	Wildlife observers; Fishers; Gardeners
	Other residents	Artists; Atletes; Dog-owners
	Residents in denial	
	NGOs	GroenNoord (stewardship); Stadskwekerij De Kas (urban greenhouse); GroenGoed (community gardens)

10.10 Theoretical synthesis

The following section will elaborate on the phases and how the main theories are integrated in the cycle (Figure 7.1.1).

The 'Building the relationship'-phase builds the foundation for eco-grief to exist as a caring relationship is needed to mourn. As a relationship is not a static concept, but also a continuous process, this phase of the cycle helps to maintain it. Through a spatial approach, activities and stewardship practices, nature experiences are facilitated and a feeling of ownership is fostered. The activities can be divided into passive and active nature interaction. This phase relates to the early 'awareness' stage of the eco-grief process as it helps to revalue our environment. Moreover, this phase mostly concerns distancing as grief and loss are not yet involved, and it has an aesthetic character as it is focussed on practical nature experiences. The spatial approach introduces a novel perspective on urban nature types (UNT), through the use of the UNT-diagram (appendix 10.5), to battle the anti-urban bias and human-nature dualism adding depth to the meaning and function of greenery in the city through a variety of hybrids. By reinventing urban nature, society learns to value these hybrids for their own identity and let nature flourish in the city. This diversity of interaction with the environment through nature experiences is needed to fight the shifting baseline syndrome.
The second phase of the cycle is focussed on localizing the environmental losses in order to raise awareness of the environment. The survey pointed out the striking difference between awareness of local and global environmental problems. This phase involves monitoring, educating and revealing the losses relates to action and touches upon the start of grieving. Monitoring and revealing have an aesthetic character, while educating is about cognitive engagement. The monitoring is based on the urban biophysical losses associated with eco-grief: climate change, biodiversity, urbanization and pollution. The communication of the monitoring encompasses a step that is often neglected, since the focus regarding environmental problems mostly lies with finding solutions as quickly as possible. However, educating and revealing the losses to the public helps to illustrate the problem, as well as make it visible to engage citizens with the problems in their environment.
The last phase is about grieving and coping with the environmental losses through the work of mourning, which relates to the emotional virtue and the active engagement with grieving within the eco-grief process. The stages of 'coping and transforming' and 'living with the eco-grief' are touched upon in this phase, as it facilitates guidance for coping through rituals, a space to open up to transformation and a place for continuous selfcare and emotional engagement. Grief is not solely seen as a psychological and individual task, but as a relational, cultural and political practice that defines our social community and values. Therefore, mourning can be done individually and collectively, and be seen as a restorative activity that can revive a sense of participation, responsibility and awareness of the connectivity of life. This phase is about creating spaces to foster social and emotional resilience regarding the ecological crisis. To establish an eco-grief literate society, spaces and events are introduced for community building and commemoration for local losses as identified through the monitoring.
The elements of the phases can be divided into practices and rituals (Figure7.1.2) that guide us in these times of environmental catastrophe. The rituals that can be performed when the need arises and are related to specific losses, involving stewardship activities for restoration, revealing local losses and mourning activities. The continues practices focus on raises awareness of our bonds concern passive and interactive activities, stewardship practices for maintenance, monitoring and education. Rituals have a reflective character creating a greater sensitivity for our values, relations, pain and impermanence, while practices nurture them.

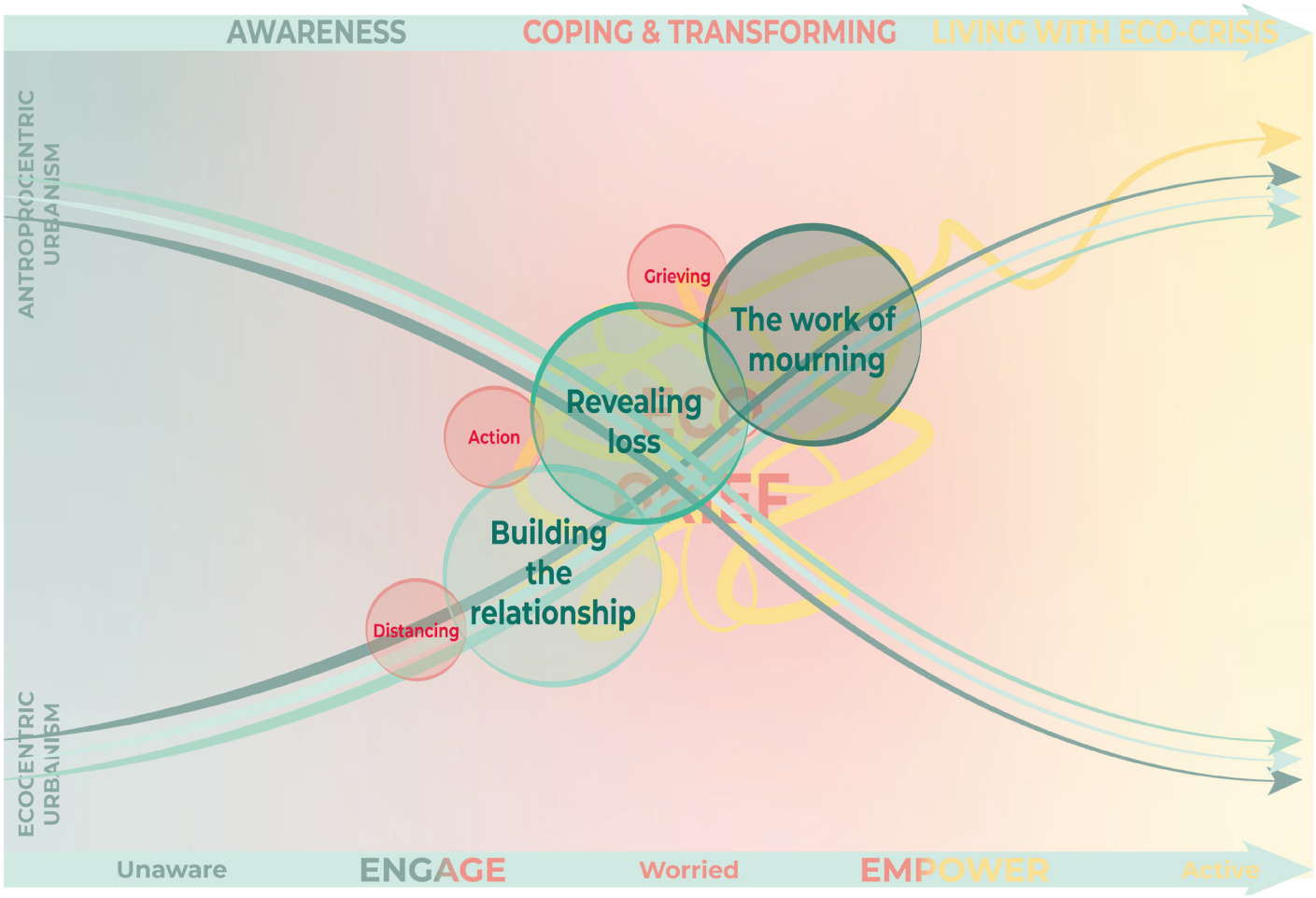
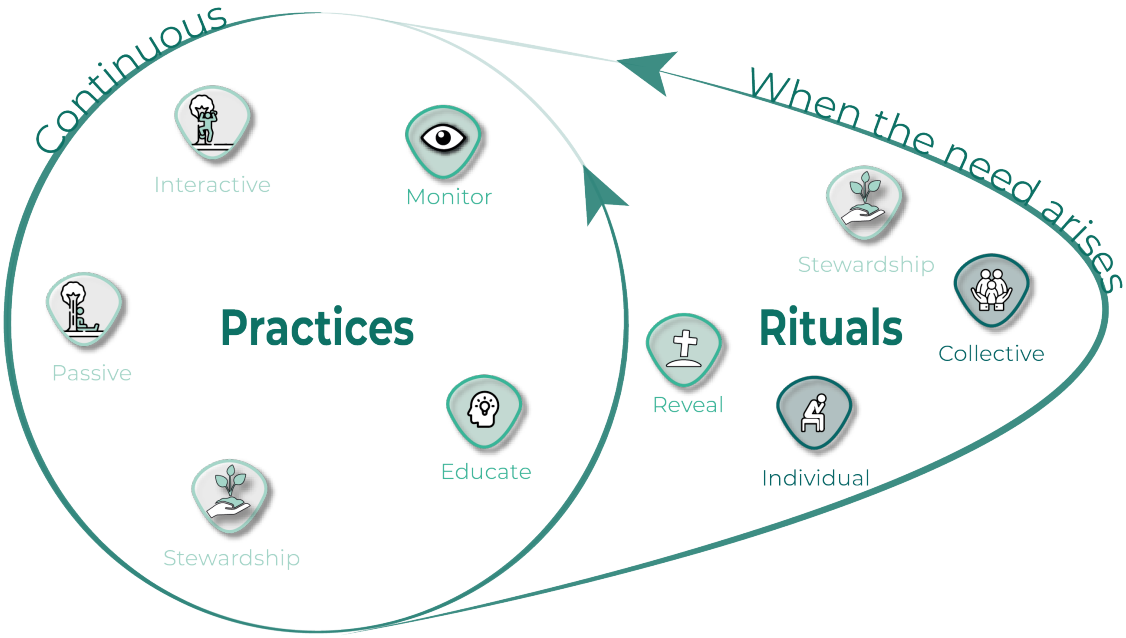


Figure 10.10.1: The phases of the Urban Eco-Grief Cyle projected on the conceptual framework.

Figure 10.10.2: Elements of the cycle divided into rituals and practices.



10.11 Neighbourhood Eco-Council

In order to secure the local community of care and awareness, a neighbourhood eco-council is established as a sign of hope and resilience. Through an holistic approach, the council is comprised of environmental advocates with specific local knowledge from diverse backgrounds (Figure 10.11).

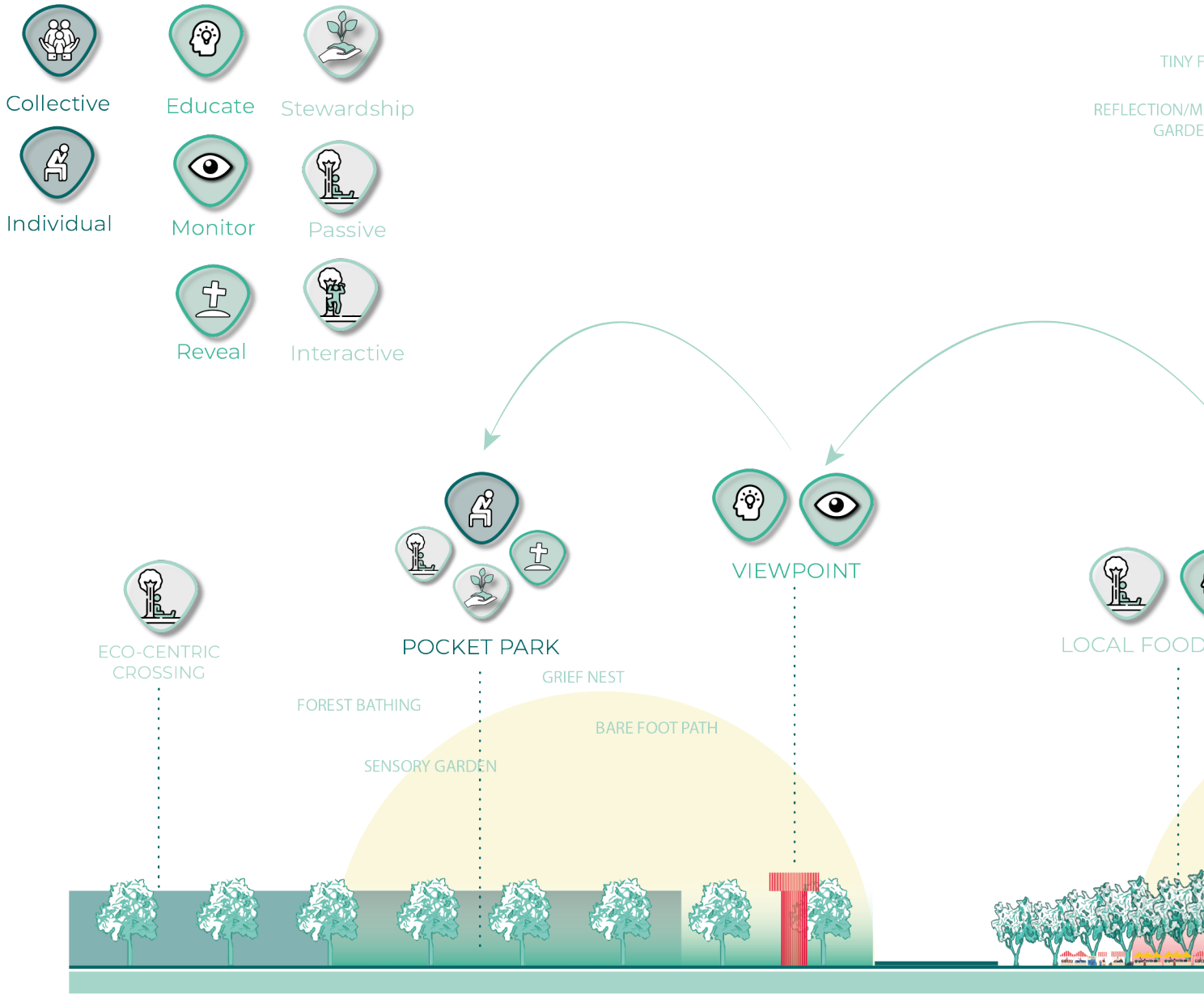
At the helm of the council are esteemed professionals, each bringing unique expertise to the table:
• *Local Residents:* anchoring the council are the residents themselves, utilizing the expert knowledge for grassroot initiatives.
• *Sustainability Expert:* brings knowledge on sustainable practices to leads efforts to implement eco-friendly initiatives and promote sustainable living within the neighbourhood.
• *Neighbourhood Director:* serves as the liaison between the council and the municipality to ensures that community initiatives align with broader municipal goals and regulations.
• *Urban Ecologist*: manages the monitoring network and has a deep understanding of urban ecosystems to make sure the local efforts enhance biodiversity and restore natural habitats.
• *Urban Forester:* takes care of the expert maintenance of the Urban Nature Structure.
• *Neighbourhood Gardener:* is the main contact to manage the stewardship practices of the local community.
• *Green real estate agent:* serves as the expert on all municipal green plans and bottom-up initiatives to ensure a balanced Urban Nature Structure.
• *Climate Psychologist:* provides professional insights into the psychological impacts of environmental loss to offer support and guidance for individuals navigating feelings of eco-grief.

Together, these dedicated individuals collaborate with stakeholders from local community, cultural, religious, recreational and educational institutions, and come together at seasonal events where local residents can utilize their knowledge. The overarching goals are to strengthen the relationship to the environment and to foster social and emotional resilience in the face of ecological loss through community engagement. The council's sub-aims relate to the eco-grief governance cycle:

1. Building the relationship: Diverse Urban Nature Structure: the council supervises the practical implementation of a diverse urban nature structure that enhances biodiversity and placemaking that fosters connections with nature.
2. Building the relationship: Environmental Stewardship and Monitoring: through citizen science initiatives and participatory monitoring programs, the council empowers residents to become stewards of their environment, fostering a sense of ownership and responsibility an become ware of their local habitat.
3. Revealing losses: Sustainability Education and Advising: the council provides resources, workshops, and personalized advise to empower residents with the knowledge and tools to lead more sustainable lifestyles and initiate sustainable interventions. By creating opportunities for youth involvement through school programs and eco-education initiatives should ensure that the voices and perspectives of future generations are heard and valued.
4. The work of mourning: Eco-Grief Support and Healing: the council helps to recognize the profound emotional impact of environmental loss through commemoration and community building. From grieving rituals and therapeutic interventions facilitated by the climate psychologist to seasonal nature walks and tree planting ceremonies, the council organizes a variety of events that acknowledge the environmental losses.

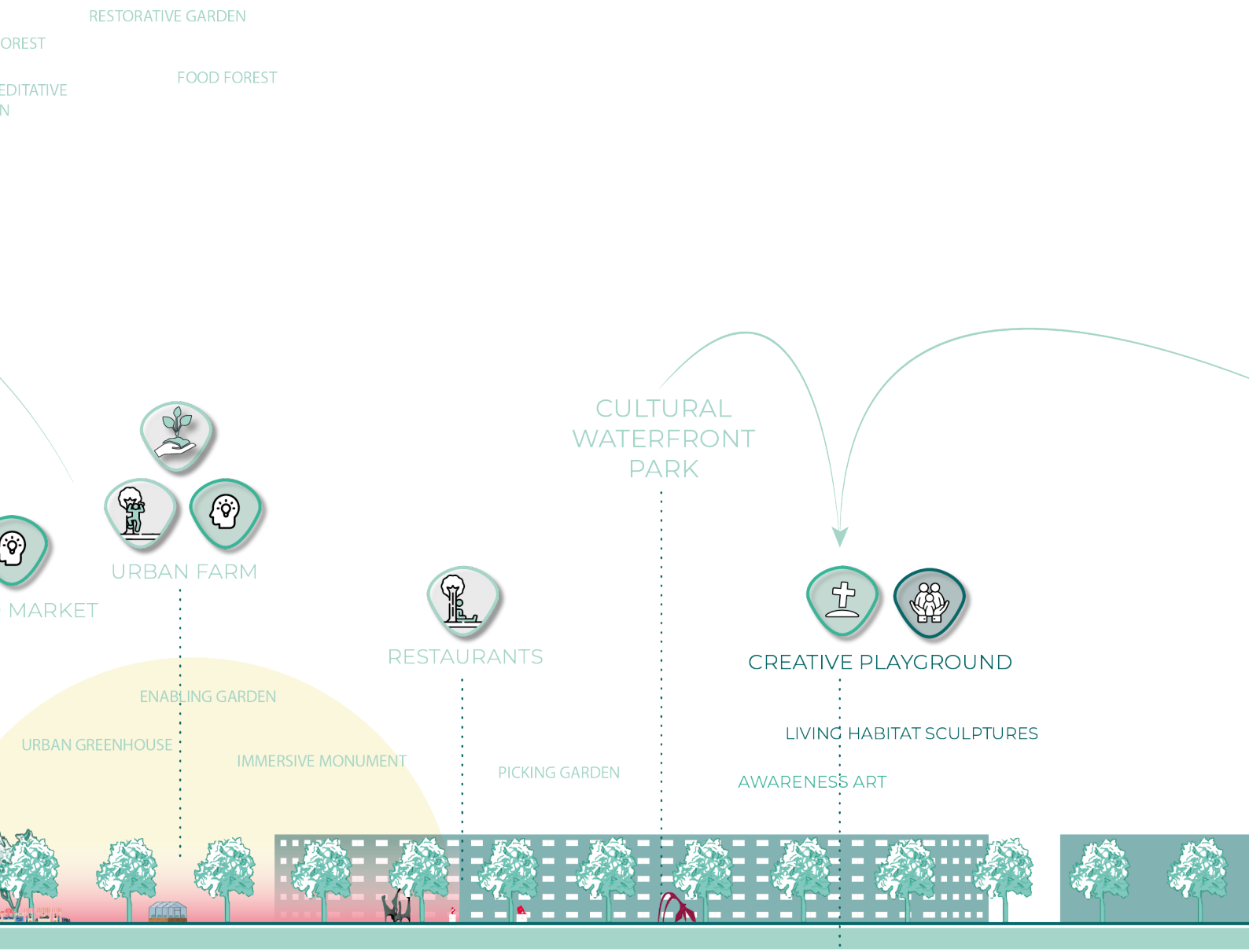
Figure 10.11: The members involved in the neighbourhood eco-council.

10.12 Sections



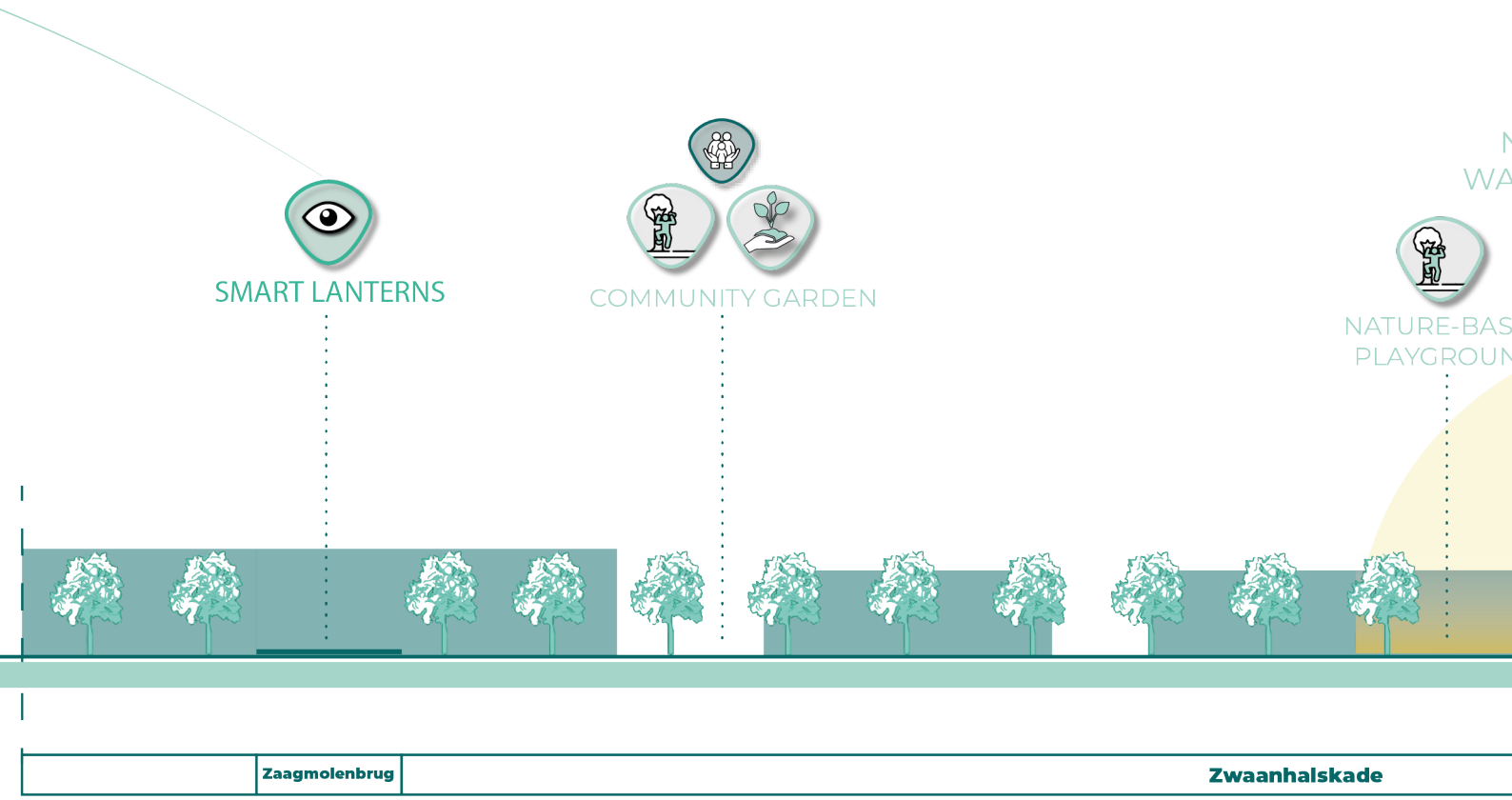
1. (1) CALM x AWARE

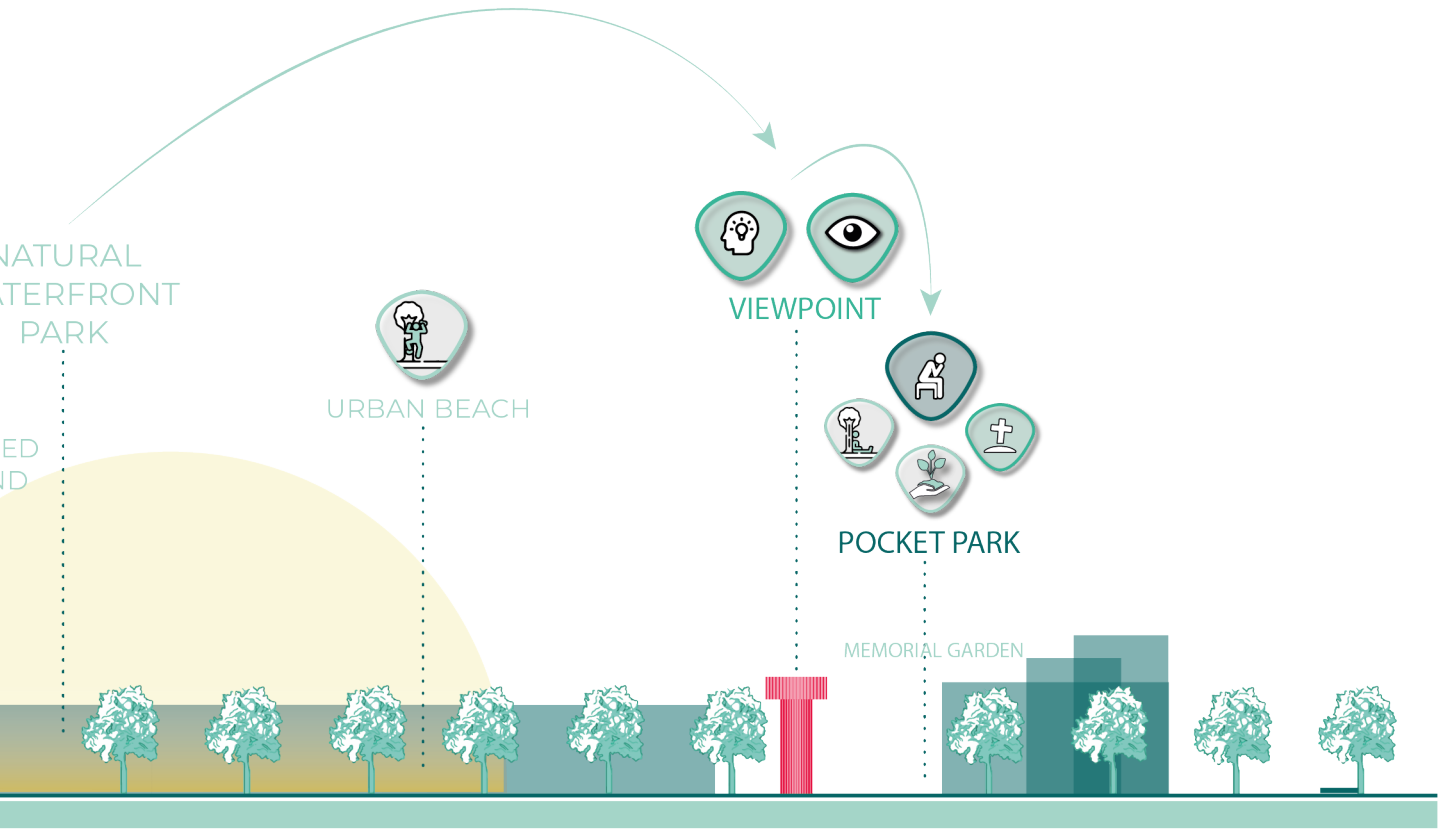
Rechter Rottekade			Noordplein



(2) NATURE x CULTURE

		Zaagmolenkade


SMART LANTERNS
COMMUNITY GARDEN
NATURE-BAS
PLAYGROUN
Zaagmolenbrug
Zwaanhalskade



(3) WILD x ACTIVE