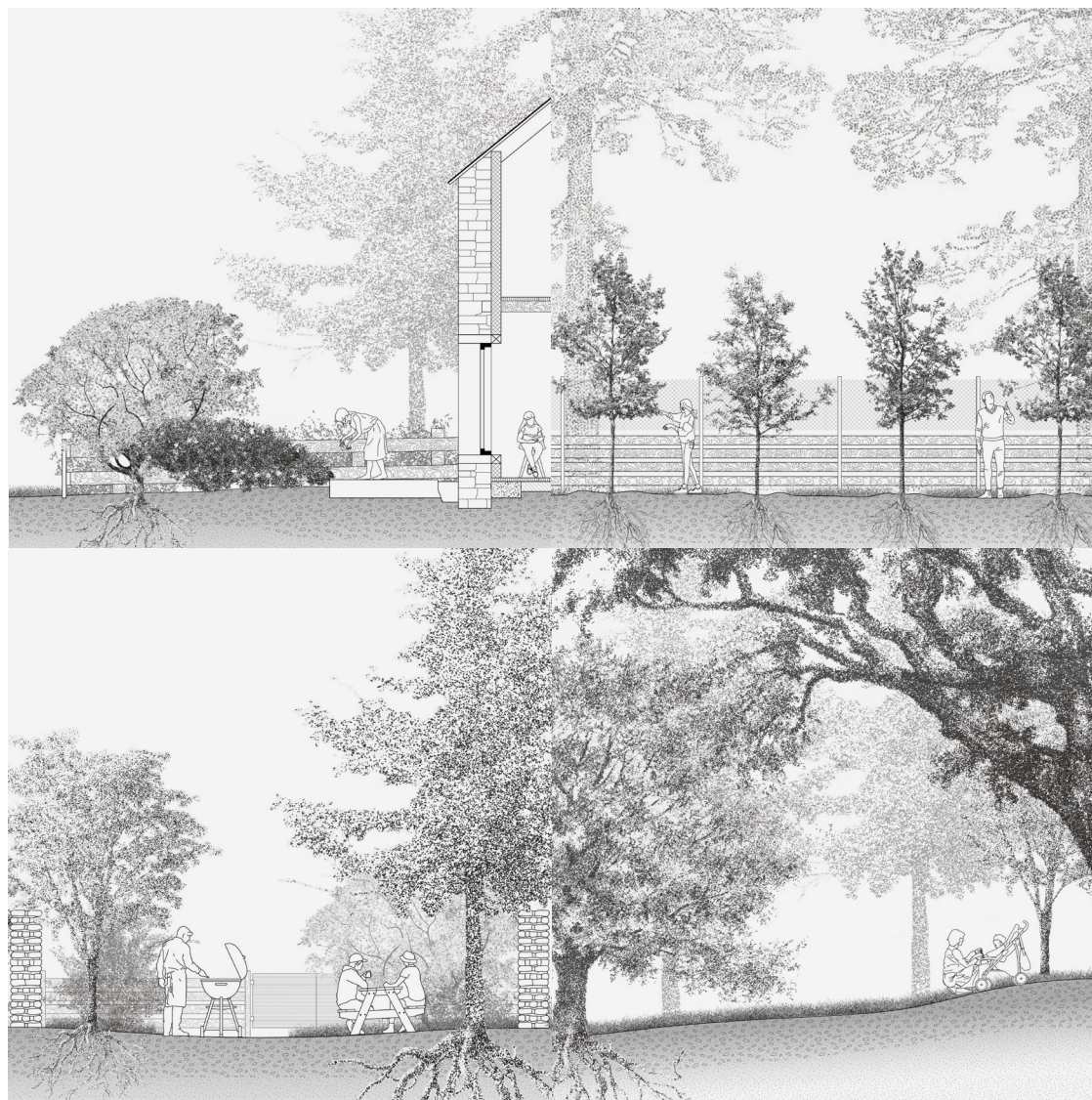


FROM FOSSIL TO FOREST

*Recasting Post-Industrial Landscapes
Through Wooded Commons*



Master thesis Landscape Architecture
September 2024 - July 2025

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Unless stated otherwise all pictures and graphics by author

Acknowledgements

My deepest gratitude goes to my first and second mentors, René and Diego, who provide every support and guidance on my academic journey. Thank you for giving me the freedom and inspiration to explore this discipline, for the timely knowledge and support that grounded me in moments of uncertainty, and for your critical feedback and thoughtful suggestions that helped me recognize and improve my shortcomings.

Thanks to all the tutors who guided me during my master graduation year in Landscape Architecture—Saskia, Denise, Laura, and Inge. The courses provided me with valuable support, inspiration, and space for reflection.

To my lovely labmates in the Urban Forestry Lab—Lin, Xinran and Lara. Thanks for accompanying me throughout this journey. Through countless lab meetings and presentations, your presence brought me comfort. Your diverse research topics and perspectives broadened my thinking and kept me motivated during the long research process.

A special thanks to my study fellow, Yuanjie. We shared the ups and downs of this graduation journey—from academic discussions to daily adventures and emotional support. I will always cherish our time working together in the library.

To Yilin, who is always by my side. Thanks for your patience and care during the most stressful moments of my thesis work. When life feels chaotic, you are my anchor.

Finally, my heartfelt thanks to my dear mom and dad. It is your support that made this unforgettable two-year master's experience possible. Even across the distance, your love and dedication have always been in my heart.

Abstract

The Earth has entered the Anthropocene – an epoch in which human activities have become the dominant force shaping planetary systems. Anthropogenic actions such as deforestation, overexploitation and rapid urban expansion have significantly accelerated global climate change. The consequences of this transformation, including more frequent extreme climate events and environmental degradation, have had profound negative impacts on human life and livelihoods. Moreover, environmental issues have exacerbated broader social challenges, which intertwined with ecological crises, leading to reduced social stability and diminished adaptive capacity.

As one of the most ecologically resilient terrestrial ecosystems, forests have played a vital role in Europe's sustainable development strategies. Moreover, forests serve as cultural and economic landscapes, historically embedded in traditional livelihoods and social practices. As such, increasing attention has been directed toward integrating reforestation strategies with socio-environmental adaptation goals, using landscape interventions to enhance territorial resilience and sustainability.

Post-industrial regions, characterized by environmental degradation and economic decline, exemplify spaces where socio-environmental challenges are most acute. This paper focuses on how forest-based ecosystem services can be mobilized to recast such landscapes. Using the former mining basin of Nord-Pas-de-Calais in northern France as a case study, the research explores how forests can be reinterpreted, planned, and developed as strategic instruments for post-industrial territorial transformation.

Keywords: Post-industrial territory, Urban transformation, Adaptation, Forest ecosystem services

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Actor

In the context of Actor-Network Theory (ANT)—a framework developed by Michel Callon, Bruno Latour, and John Law—the term actor refers to any entity that possesses the capacity to act upon, influence, or disrupt a system. ANT expands the notion beyond the human domain to include non-human entities such as technologies, flora and fauna, and natural forces. These actors are understood as integral components of dynamic and heterogeneous networks, where their relationships, roles, and impacts are mutually entangled and co-constitutive. (Law, 1992)

Anthropocene

The term was introduced by Paul Crutzen in 2000, defining ‘a new planetary era: one in which humans have become the dominant force shaping Earth’s bio-geophysical composition and processes.’(Chua & Fair, 2019)

Context Sensitive Design

Bradley and Scott defined the Context Sensitive Design (CSD) as ‘an approach that places preservation of historic, scenic, natural environment, and other community values on an equal basis with mobility, safety, and economics.’(2004)

Ecosystem Services

The 2006 Millennium Ecosystem Assessment (MA) declared the Ecosystem services as ‘the benefit people obtain from ecosystems’. It is classified as four categories: provisioning (products like food and materials obtained from ecosystems), regulating (benefits obtained from ecosystem process like water purification, etc.), supporting (foundation for other ecosystem services like nutrient cycling and habitat) and cultural (Millennium Ecosystem Assessment, 2005).

Landscape Infrastructure

Landscape infrastructure is a design methodology and planning approach that reimagines the role of landscapes in cities and regions, integrating ecological, social, and infrastructural functions into multi-functional, high-performance systems.(SWA Group, n.d.)

Mining Basin

The term often refers to areas where mining has been the dominant economic, social, and cultural force, shaping the landscape, infrastructure, and communities over time. Mining basins are usually associated with extensive networks of mines, related industries, and distinctive settlement patterns

Post-Industrial Society

Daniel Bell described it as ‘an information society’, which indicates the economy transitions from a focus on manufacturing and industrial production to one centered around services, knowledge, and information.

Social-Environmental adaptation

Social-environmental adaptation represents the dynamic process by which human societies and ecological systems adjust to ongoing and anticipated changes. This is a broad conceptual foundation from which a series of structured approaches have emerged, including the Social-Ecological Systems framework (Berkes & Folke, 2002), the Adaptive Policy Framework (Burton et al., 2005), etc.

Terril

In northern France, the term is used to refer to a spoil tip—a conical heap of waste material or tailings resulting from mining and quarrying activities. Zola's novel *Germinal* (Part I, Chapter I) depicts it: "A gigantic black mass, a pile of cinders, the terril of a pit, rising up in the night like the ruins of some fallen monument. Then, farther on, another terril, then another, the whole plain seemed to be covered with these enormous mounds, looming up, shapeless and monstrous, on the horizon." (1954)

Territory

Clara Olóriz Sanjuán's *Landscape as Territory* (2019) frames territory as a dynamic field where design interventions intersect with historical, legal, and strategic engines of urbanization. This approach challenges passive interpretations of landscape, instead advocating for active engagement with territorial production as a form of critical spatial practice.

Urban Forestry

Miller's definition of urban forestry is among the most widely accepted, namely 'the art, science and technology of managing trees and forest resources in and around urban community ecosystems for the physiological, sociological, economic and aesthetic benefits trees provide society' (Miller, 1997)

Urban Shrinkage

Schilling and Logan defined this term as 'A special subset of older industrial cities with significant and sustained population loss and increasing levels of vacant and abandoned properties, including blighted residential, commercial, and industrial buildings' (2008). Contemporary shrinkage reflects complex interactions between globalization, deindustrialization, demographic shifts, and policy failures

Wooded Commons

Euler formulated the term of 'commons' as 'commons have been defined as social form of tangible or intangible matter determined by commoning' (2018). Wooded commons refer to a type of common land—historically collective or privately owned land over which local communities hold traditional rights—characterized by significant tree cover (Short, 2008).

Chapter One

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Figure 1.1
The power plant in
my hometown.
*Source: Baidu
Commons.*



Figure 1.2
Loos-en-Gohelle
terrils jumeaux de
la fosse 11-19.
*Source:
Photographed by
Hubert Bouvet.
(2011). UNESCO.*



Introduction

Prologue

Motivation and Fascination

Interests in post-industrial transformation.

This comes from my own experience: I was born in an industrial city and grew up in a neighborhood of workers. Unlike the skyscrapers of the modern city or the traditional architecture of the old town, it is the strange industrial giants that anchor my emotions and memories. At the same time, the issue of the post-industrial city is an important part of the discussion of postmodern society in our discipline.

Discussion of landscape as infrastructure.

The idea of “infrastructure as landscape and landscape as infrastructure” (Strang, 1996) forms the conceptual foundation of TU Delft’s Flowscape Studio. This approach advocates for integrated planning across scales – ensuring spatial continuity while embracing local diversity and adaptability (Nijhuis & Jauslin, 2015). It reminds me that the role and ambition of contemporary landscape architects must move beyond form-making, to guide ecological and social systems through design that is both resilient and regenerative.

Ambition to explore a whole territory.

Through reflecting on the previous year's study, I realized that I was very limited in terms of the scale of my designs, which was reflected in the fact that I was always doing microscale or mesoscale designs. Realizing my limitations in macro-level thinking and cross-scale design, I have developed a strong ambition to take on the challenge of researching at the territorial scale.



**Post-Industrial Territory
Nord-Pas-de-Calais mining basin
France**

Research Question

How can urban forestry serve as an **ecosystem services** tool to reshape the **post-industrial territory** and foster **social-environmental adaptation**?

Sub-questions:

How does forestry contribute to ecological regeneration in the Anthropocene?

How does forestry facilitate socio-economic transformation in post-industrial landscape?

How does forestry improve the socio-cultural resilience in the context of urban shrinkage?

How does forestry balance between different roles in the new paradigm of adaptation?

Figure 1.3

A view of the twin slag heaps in Loos-en-Gohelle from the Canadian National Vimy Memorial

Source: photoed by Jean-Michel André

Method

Methodology Framework

Finding

Guided by personal motivation and fascination, the Nord-Pas-de-Calais mining basin was selected as the research site. Initial site research enabled an understanding of the territory and the identification of key issues. Through literature review, the theoretical framework was established, combining post-industrial society, urban shrinkage, socio-environmental adaptation, ecosystem services, and urban forestry.

Integrating theory and site analysis serves two purposes: first, to understand the characteristics and drivers of post-industrial society and explore issues and solutions related to urban shrinkage (problem statement); second, to recognize that regional challenges stem from insufficient socio-environmental adaptation during the industrial-to-post-industrial transition, emphasizing the need for enhanced adaptive capacity (design aim). Finally, ecosystem services and urban forestry theories are synthesized to form an integrated, applicable design approach.

Scoping

The research question was raised:

How can urban forestry serve as an ecosystem services tool to reshape the post-industrial territory and foster socio-environmental adaptation?

Analytical and conceptual frameworks were developed to link spatial scales with different ecosystem service dimensions, clarifying how supporting, regulating, cultural, and provisioning services are emphasized at various levels of intervention. This phase provided a structured foundation for the research by defining key challenges and framing the relationships between ecosystem services, spatial scales, and forestry design interventions.

Exploring

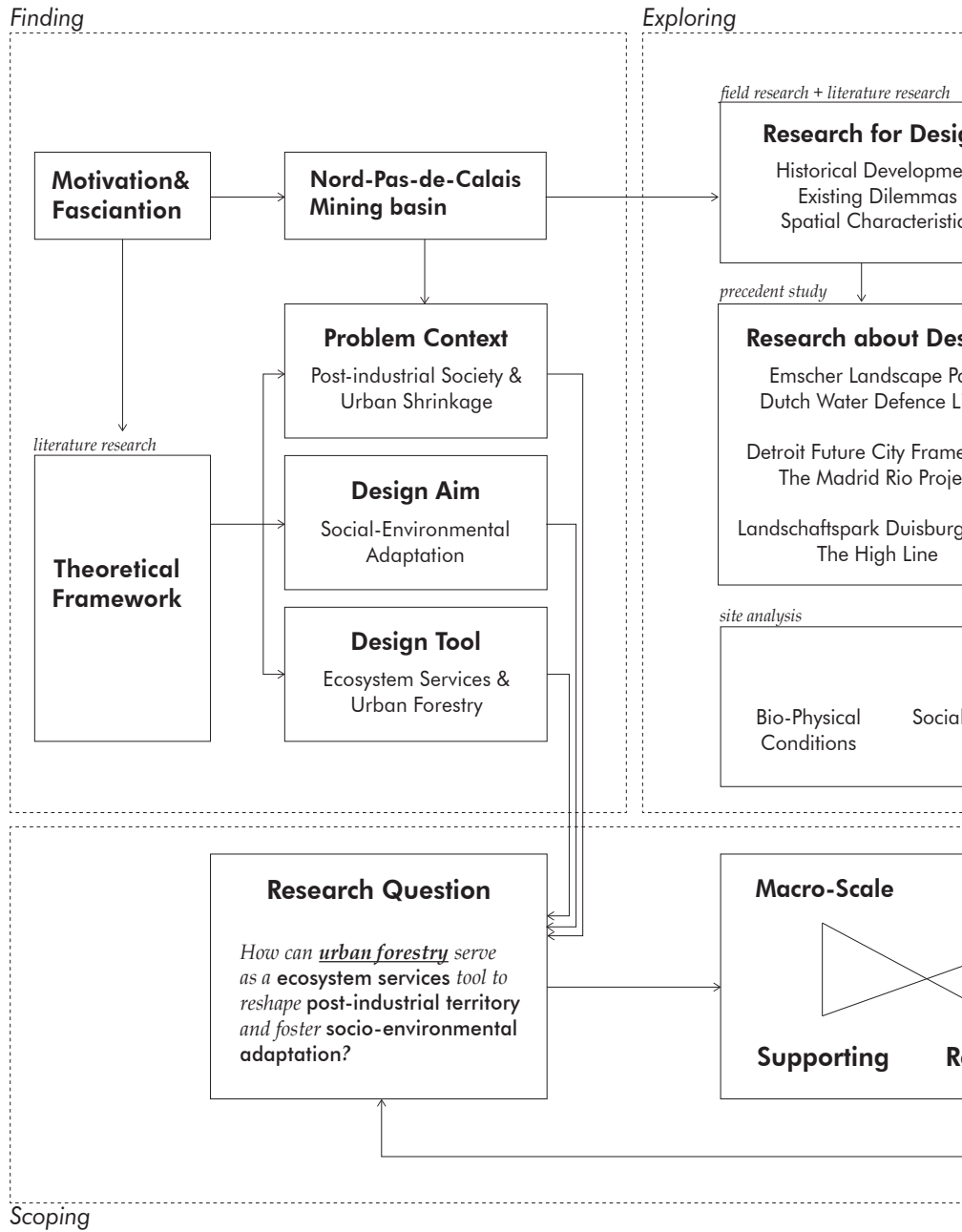
The research question was investigated through an iterative, multi-method process. Site research on the Nord-Pas-de-Calais mining basin included site analysis and fieldwork to investigate spatial qualities and identify specific issues on the ground. Complementing this, design theories and methods under key sub-themes were explored through literature review and precedent study, providing a network of conceptual and practical references.

At each spatial level, four interconnected methods were employed: literature research to deepen theoretical understanding; precedent study to analyze relevant forestry and landscape projects and extract transferable insights; site analysis combining descriptive mapping (GIS, photography) and interpretive mapping (layer analysis, cross-sections, diagrams) to assess bio-physical conditions, social-environmental situations, spatial quality, and stakeholder dynamics; and design experiments to test spatial strategies and explore how forestry can influence existing relational networks and facilitate diverse regional transformations.

Throughout this process of research by design and design through research, the final design proposal – across the three spatial levels of mining basin, urban agglomeration, and on-site practice – gradually emerged. This iterative, interpretive process built continuity and relevance across scales, allowing design projections to evolve through critical reflection and synthesis at territorial, urban, and local levels.

Reflecting

Upon completion of the design, the outcomes will be critically evaluated. The coherence of the multi-scale design strategies in addressing ecological, social, and cultural challenges will be examined, alongside the feasibility of implementing these strategies in terms of multi-actor collaboration and process adaptability.



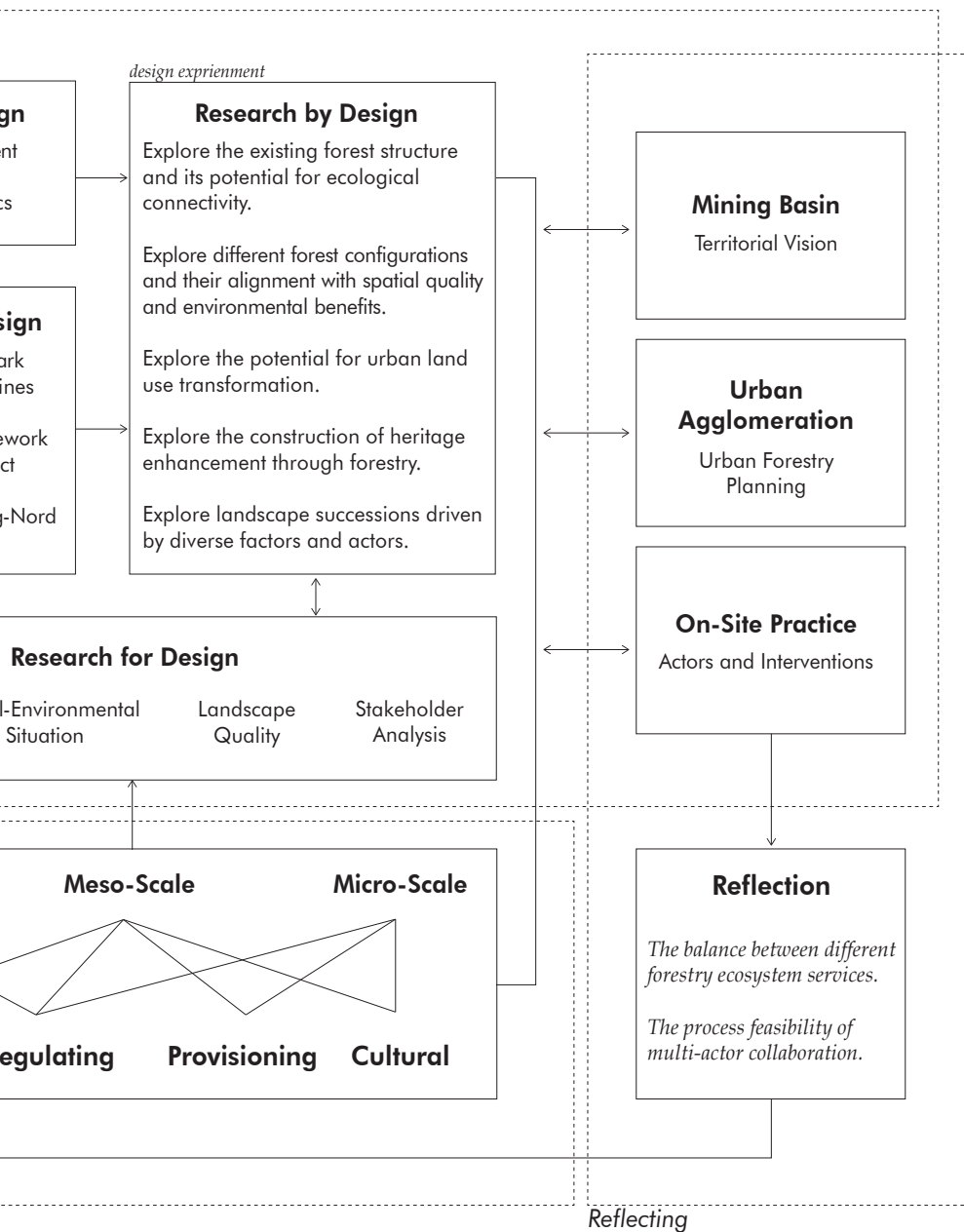


Figure 1.4
Methodology
Framework

Theoretical Framework

This study developed upon a series of related theories to reveal the complexities faced by post-industrial regions that are experiencing urban shrinkage. Integrating insights from the fields of socio-environmental adaptation, ecosystem services, and urban forestry, we provide an integrated view of the complex social-ecological contexts of shrinking cities.

Theories of urban shrinkage highlight the need for adaptive strategies that accommodate for the demographic and economic decline of shrinking cities. Simultaneously, related theories of socio-environmental adaptation have called for the restoration and reinforcement of local ecosystems as these play a vital role in maintaining human well-being and environmental sustainability. The ecosystem services approach provides a vital basis for assessing the various ecological services provided by a landscape (e.g., regulating—climate, water, etc.—and cultural services) and urban forestry practices have shown effective methods for introducing ecological functions back into shrinking urban areas.

Current research on urban shrinkage tends to emphasize strategies for economic revitalization in shrinking cities while neglecting the ecological potential of shrinking cities. Alternatively, most studies on ecosystem services have examined ecological functions in growing or stable urban areas. This research seeks to reposition shrinkage not merely as a challenge but as a catalyst for transformative adaptation, by investigating how urban forestry can provide essential ecosystem services using unique post-industrial vacancies. In doing so, it highlights the potential for shrinking cities to serve as experimental laboratories for innovative socio-ecological regeneration.

In summary, our theoretical study opens the possibility for related research on how urban forestry can be a transformative tool in post-industrial shrinking regions.

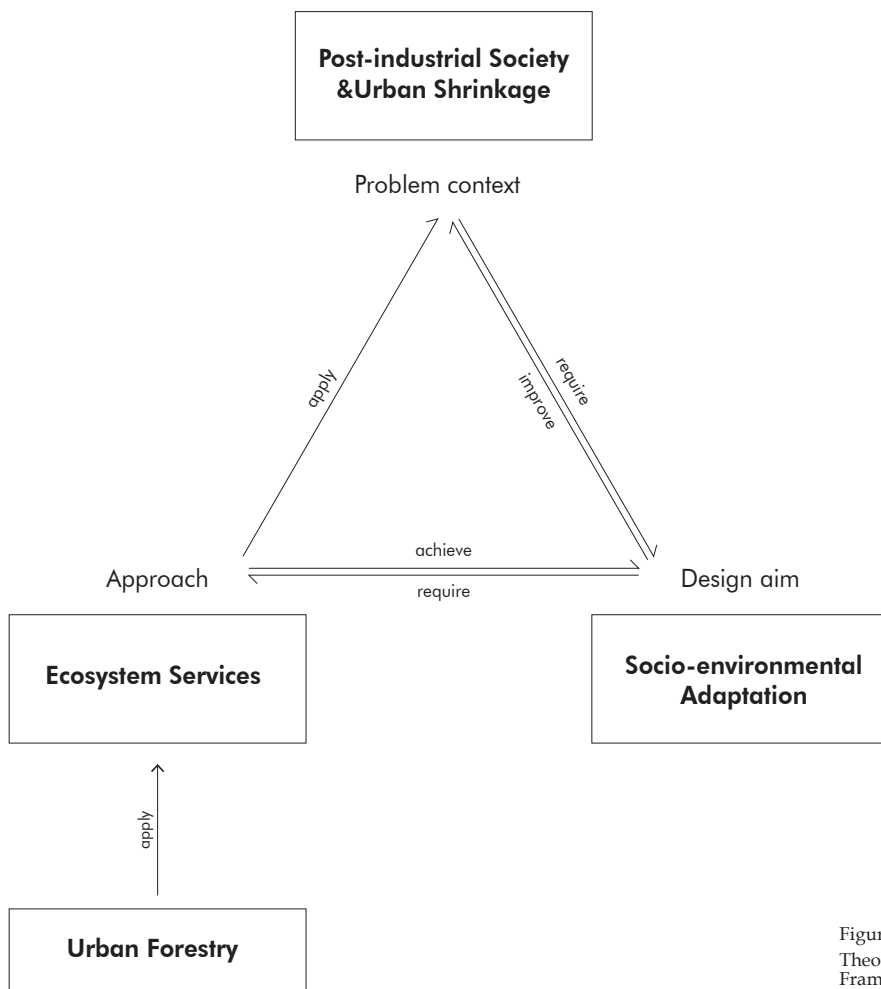


Figure 1.5
Theoretical
Framework

Theory

Post-Industrial Society

As the birthplace of the Industrial Revolution, European cities were the first to face the crisis of recovery following the collapse of industrial capitalism(Carter, 2016). Post-war reconstruction, the energy crisis, and the environmental movement in Europe during the 20th century provided the driving forces for change, initiating the post-industrial transformation. The impact of these crises on European industrial cities is well-documented and can be summarized in several interrelated dimensions(Carter, 2016):

1)The dismantling and relocation of local pillar industries – typically manufacturing or extraction – led to a socioeconomic shift from product production to service provision. 2)The decline of city centers and population loss spurred suburbanization tendencies, exacerbating regional inequality. 3)A large-scale unemployment crisis emerged, with low-skilled workers and immigrants clustering in certain areas. 4)Severe environmental pollution has become a pressing issue.

By the early 21st century, several cities or regions across Europe had successfully reversed these trends and achieved regrowth. At the same time, characteristics of postmodern society became increasingly evident. One of these is the global mobility of capital and labor, described by David Harvey as "flexible accumulation" in *The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change* (Harvey, 1989). This phenomenon led to the reterritorialization of identities and communities, as localities sought to assert uniqueness in the global market. Urban planning shifted towards attracting global capital and tourism through flagship projects, often resulting in uneven development within cities. Deindustrialization left behind abandoned industrial zones, which were repurposed into spaces for culture, leisure, and consumption. Examples include transforming old industrial areas into art districts or loft apartments. However, such developments often triggered gentrification and suburbanization. While older nodes remained in suburban areas,

new hubs emerged in city centers, reflecting a spatial reorganization characterized by processes of decentralization and re-centralization within metropolitan regions.

An alternative aspect of successful metropolitan transformation is the phenomenon of shrinking cities. Some argue that urban shrinkage is merely a direction in the dynamics of urbanization, representing a temporary phase replacing earlier growth stages and potentially giving way to renewed growth (Haase et al., 2017). However, the reality is that certain areas, particularly in aging European nations, face long-term decline. This is exacerbated by internal migration from less developed regions to more competitive areas (Wolff & Wiechmann, 2018). The manifestations of this decline include housing vacancies, underutilized infrastructure, fiscal constraints, and population aging. These challenges have spurred widespread discussion about urban shrinkage in 21st-century Europe. It is important to note that post-industrialization is not the sole cause of urban shrinkage, but this phenomenon is most prevalent in post-industrial cities or regions that have struggled to achieve redevelopment (Martinez & Fernandez et al., 2012).



Figure 1.6 Guggenheim
Museum Bilbao.

*Source: Courtesy of
FMGB, Guggenheim
Bilbao Museum, 2015.*

Urban Shrinkage

In the research conducted by Thorsten Wiechmann and Karina M. Pallagst, shrinking cities are classified into four types based on demographic and economic development trends (Wiechmann & Pallagst, 2012). Aside from the “Urban Gravitation Centers” commonly found in developing countries with high birth rates and/or significant immigration, the remaining three models broadly reflect the typical trajectories and strategic responses observed in the transformation of European and North American cities since the modern era.

The first category, “urban growth poles,” highlights the concept of cities as “growth machines” (Molotch, 1976). This development paradigm focuses on launching new urban development projects to counteract the decline of the economic base and the resulting urban shrinkage (Wiechmann & Pallagst, 2012). Some scholars have criticized these strategies for relying — implicitly or explicitly — on gentrification policies to attract investment and middle-class populations. Urban policies, in this view, are increasingly shaped by the preferences of prospective residents whom officials aim to attract, rather than by the needs of the existing population (Rousseau, 2009). Although this model has yielded successes in several industrialized regions, long-term demographic trends in certain areas underscore the persistence of urban shrinkage, thereby challenging the contemporary relevance of the “growth machine” consensus.

The second category, “transition areas,” is not oriented toward economic or urban expansion. Instead, it emphasizes a compact urban form and stable population structure, aiming for gradual recovery. The focus here shifts away from economic performance toward sustainable development and improvements in residents’ quality of life. Key measures include revitalizing the functionality and attractiveness of city centers, the planned demolition of vacant buildings, thus rationalizing the spatial structure of residential areas and mitigating suburbanization (Wiechmann & Pallagst,

2012). Additionally, disused industrial brownfields are often repurposed for exploratory green space development, serving as a driving force for spatial transformation and urban identity reconstruction (Dogan et al., 2023).

The third category, "downgrading areas," takes the most pragmatic stance by acknowledging the anticipated continuation of urban decline and promoting the reconstruction of the city on a smaller scale, by both reducing its overall size and reorganizing its spatial structure and infrastructure. In response to this objective, new planning principles and strategies have emerged. For instance, the city of Schwedt in Germany implemented strategic large-scale demolition at the urban periphery in the early 21st century (Wiechmann & Pallagst, 2012).

These paradigms not only illustrate different strategic attitudes but also inform how urban form, infrastructure, and ecological potential are managed. As such, they provide a critical foundation for analyzing how ecosystem services can be reactivated across shrinking post-industrial landscapes. More importantly, understanding these paradigms reveals how urban shrinkage is not merely a challenge of loss, but a transformative condition that can enable new spatial logics, ecological functions, and social values. By aligning planning strategies with the realities of decline, these models offer essential insights into how shrinking cities might become laboratories for social-environmental adaptation – where degraded post-industrial environments are reimagined as dynamic, multifunctional ecosystems capable of supporting both human and non-human life.

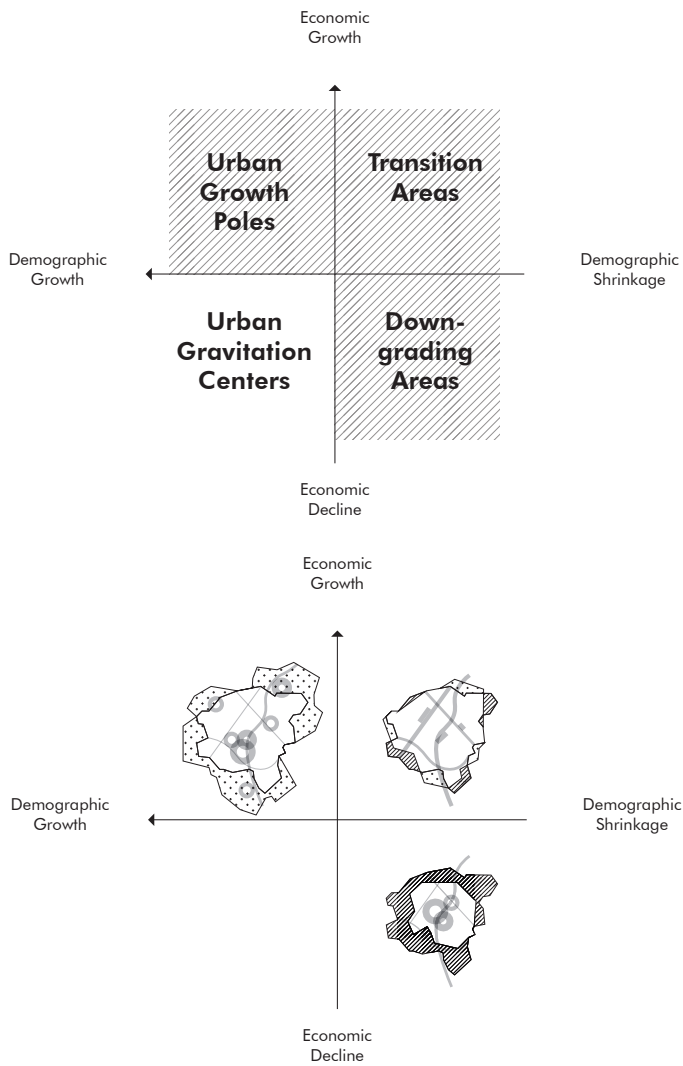
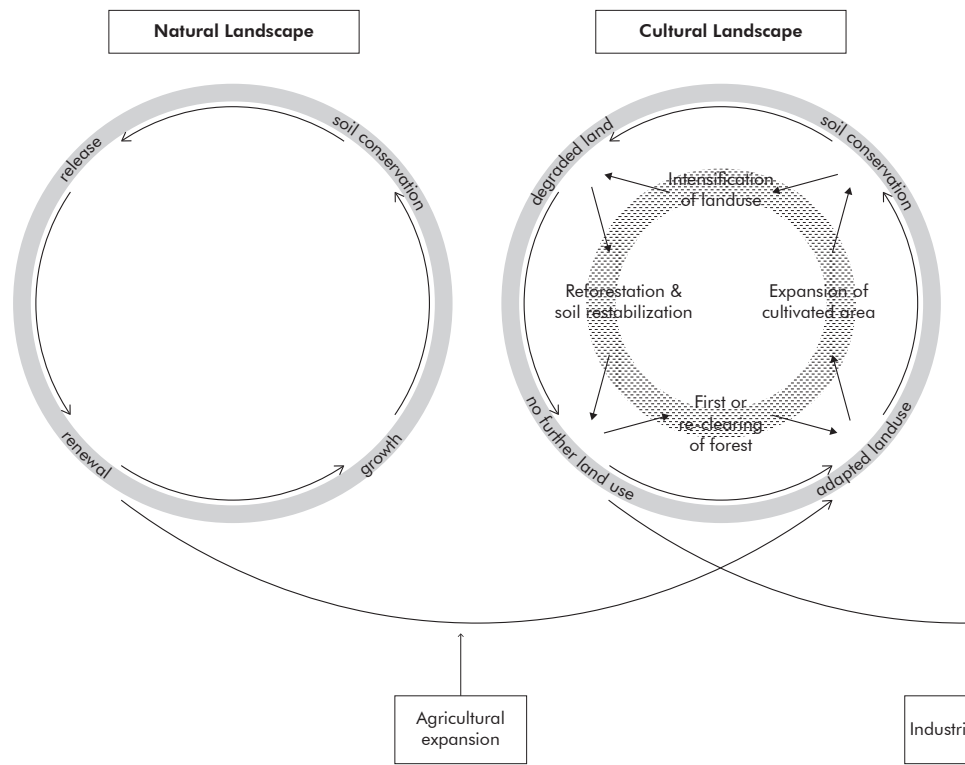


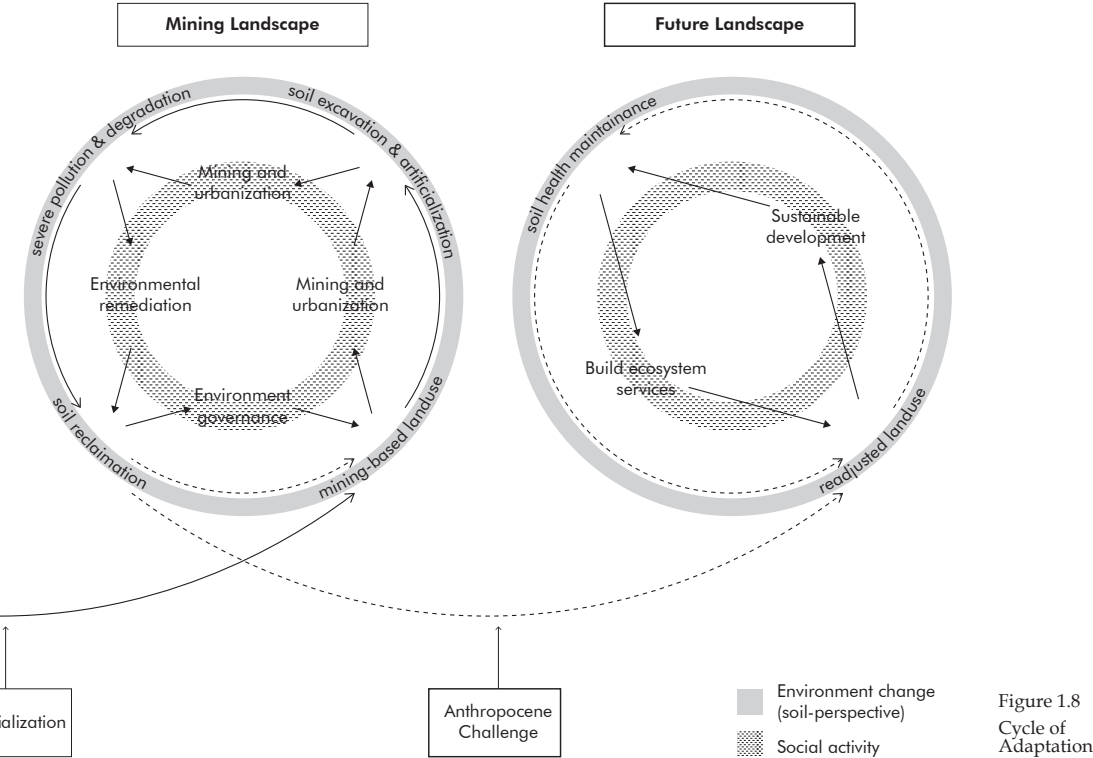
Figure 1.7
Shrinking Cities
Classifications
*Adapted by
author based on
Wiechmann &
Pallagst, 2012*

Social-Environmental Adaptation

Social-environmental adaptation represents the dynamic process by which human societies and ecological systems adjust to ongoing and anticipated changes. At its core lies the recognition of a deep interdependence between social and ecological systems: changes in ecosystems inevitably impact societal structures, just as human decisions and activities reshape natural environments.



From a historical perspective, human societies have continuously adapted to changing environmental conditions, shaping and being shaped by them. This adaptive process is evident in the transformation of landscapes from natural systems to agricultural expansion, through the industrial revolution and into contemporary urbanized environments. Each phase marks a shift not only in land use practices and settlement patterns but also in the socio-cultural values and technological systems that mediate human-environment interactions (Jepsen et al., 2015).



"Given time—time not in years but in millennia—life adjusts, and a balance has been reached. For time is the essential ingredient; but in the modern world there is no time. The rapidity of change and the speed with which new situations are created follow the impetuous and heedless pace of man rather than the deliberate pace of nature."

Rachel Carson , 1962
Silent Spring

However, the capacity for adaptation is not boundless. Societies face significant constraints—both ecological and institutional. Ecological limits, such as irreversible ecosystem thresholds, and socio-political barriers, including inequitable resource distribution and governance failures, can severely restrict adaptive responses (Adger et al., 2009). These limitations have been exacerbated in the Anthropocene, an era in which human activity exerts planetary-scale influence. The dominance of economic growth paradigms, coupled with insufficient recognition of ecological resilience, has accelerated environmental degradation through extractive industries, large-scale agriculture, and intensive urbanization. In turn, these environmental crises—such as biodiversity loss, climate change, and pollution—are intricately linked to and amplify social vulnerabilities, including poverty, cultural displacement, and reduced community resilience (IPCC, 2022).

In light of these challenges, contemporary scholarship increasingly conceptualizes cities not as static infrastructures but as complex adaptive social-ecological systems (Batty, 2008). Within this conceptualization, landscape is redefined as a core component of urban adaptability—not solely as a physical or aesthetic entity, but as an integrated medium through which ecological functions and socio-cultural practices co-evolve.

As such, landscapes play a dual role: they support essential biophysical processes (such as water regulation, habitat connectivity, and climate moderation) while simultaneously serving as spaces for collective memory, identity formation, and social resilience (Nijhuis, 2022). This multifunctional perspective underscores the capacity of landscape to act as both an ecological infrastructure and a socio-political instrument within adaptive urban governance frameworks.

Moreover, the notion of adaptive capacity has expanded from a reactive stance to one grounded in transformational thinking and anticipatory governance. Scholars such as Simin Davoudi (2012) argue that adaptation should not aim for a return to prior conditions, but instead foster social learning, institutional innovation, and value-based transformations in the face of uncertainty. Her concepts of heritage-led regeneration and the just transition of post-industrial cities highlight the necessity of embedding local identity, historical consciousness, and social equity into urban adaptation strategies. This perspective is particularly relevant for post-industrial cities, where adaptation must simultaneously address environmental degradation and entrenched socio-economic injustices resulting from historical industrial decline.

Thus, the theory of social-environmental adaptation not only emphasizes the ecological dimension of resilience but also recognizes the political, cultural, and ethical dimensions of how societies choose to adapt. For shrinking post-industrial cities, this approach offers a pathway to reimagine decline as an opportunity for regenerative transformation—through equitable planning, ecological restoration, and the redefinition of urban purpose.

Ecosystem Services of Forestry

The previous chapter on social-environmental adaptation emphasized that resilience in the Anthropocene requires proactive and transformative strategies that integrate environmental restoration with social justice and community identity (Adger et al., 2009; Davoudi et al., 2012). In this context, urban forestry offers a spatial and ecological mechanism to operationalize these abstract principles. Urban forests are no longer viewed merely as passive green amenities but as dynamic infrastructures that simultaneously deliver ecological functions and social benefits, thus directly contributing to the adaptive capacity of urban systems (United Nations Economic Commission for Europe, 2021). In particular, by providing a broad range of ecosystem services, urban forestry serves as a bridge between environmental resilience and societal wellbeing, aligning environmental restoration with social, economic, and cultural regeneration.

The ecosystem services provided by urban forestry are typically categorized into four interrelated dimensions: provisioning, regulating, supporting, and cultural services (Millennium Ecosystem Assessment, 2005). Each dimension highlights a set of realistic, multifunctional roles that forests perform in urban environments, demonstrating their critical contribution to adaptive urbanism.

Provisioning services refer to the tangible goods and resources provided by urban forests, such as food, timber, and biomass energy. A key application is the reuse of fallen or harvested urban trees, which can be processed into usable timber, thereby reducing landfill waste and creating local economic opportunities (Sherrill, 2003). Additionally, urban agroforestry practices that integrate fruit- and nut-bearing trees with crop cultivation contribute to local food production systems (Clark & Nicholas, 2013). In the context of urban shrinkage, adaptively reusing vacant land for productive green spaces offers a sustainable source of fresh food and renewable materials. Coupled with urban forestry employment programs, such initiatives can

		Scale of the Urban Forest				
		Element	Configuration	Area		
Dimension of the Urban Forest	Spatial	Experience, sequence, green structure, tree architecture			Groups of Ecosystem Services	
	Social-cultural	Identity, recreation, education, mental health, aesthetics				Cultural
	Economy	Food, wood production, employment, leisure				Provisioning
	Environmental	Microclimate regulation, water filtration, air pollution reduction				Regulating
	Ecology	Habitat for biodiversity, nutrient cycle, soil health				Supporting
Design						

Figure 1.9
 Foresry Ecosystem Services
*Adapted by author based on
 Research Fellowship Urban
 Forestry TU Delft, 2019)*

equip local populations with technical skills, mentorship opportunities, and services related to transportation and housing support, ultimately enhancing both environmental and economic resilience

Urban forests play a vital role in regulating urban environmental conditions. Trees improve urban air quality by removing pollutants through stomatal uptake and particulate matter interception via their leaves (Smith, 1990). They also reduce soil erosion and mitigate stormwater runoff through canopy interception and transpiration, thereby lowering the risk of urban flooding (Berland et al., 2017). Furthermore, trees absorb carbon dioxide through photosynthesis, storing carbon in their biomass (wood and roots) and in soil organic matter, thus directly addressing the escalating environmental pressures associated with climate change (Nowak, 1993). As such, the regulating services provided by urban forestry are critical for urban climate adaptation and for maintaining the overall stability of social-ecological systems.

Supporting services underpin all other ecosystem functions by maintaining the ecological foundations of the urban landscape. Urban forests enhance biodiversity by providing habitats, support nutrient cycling, and contribute to soil formation and stabilization (Aerts & Honnay, 2011). By restoring degraded urban ecosystems, forests help rebuild the natural processes necessary for long-term sustainability. In shrinking post-industrial cities, where land degradation and ecological fragmentation are common, the reintroduction of supporting services through forestry plays a key role in reversing environmental decline and reestablishing ecological continuity.

Beyond their ecological functions, urban forests deliver profound cultural services, including recreation, mental and physical health benefits, educational opportunities, and the reinforcement of local identity (De Wit & Van Der Velde, 2023). Access to well-designed green spaces has been shown to enhance community wellbeing, reduce social isolation, and foster a sense of belonging. Furthermore, forests embedded with historical narratives – such as those in former industrial landscapes – can strengthen

collective memory and support heritage-led regeneration strategies (Davoudi et al., 2012). Thus, forestry is not only about restoring nature but also about cultivating social fabric.

Critically, the multifunctionality of urban forestry must be understood across multiple spatial scales. From single street trees to large green corridors and forest patches, the design and configuration of urban forestry structures the delivery of ecosystem services. At the micro-scale, trees enhance local climate comfort and aesthetic experiences; at the meso-scale, parks and greenways support biodiversity corridors and stormwater management; and at the macro-scale, forested regions contribute to regional air quality, habitat connectivity, and cultural landscape identity. Effective urban forestry planning thus requires a layered, scale-sensitive approach that aligns ecological processes with human uses and cultural meanings.

Chapter Two

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Site

"The coal deposit that stretches beneath it earned it its existence and its name: mining basin. A name well known to all, far beyond regional borders. The territory owes its unity to the exploitation of its continuous underground deposit and its industrial mining history of almost three centuries, which is now gone. "

Patou, 2022
*Portrait du Bassin minier
du Nord et du Pas-de-Calais*

Located in northern France, the Nord-Pas-de-Calais mining basin stretches over 100 kilometers, spanning two major French departments. Its advantageous geographical position, combined with physical features favorable to transportation, has historically made the area an important transit hub between Northwestern Europe, other parts of France, and Italy (Patou, 2022). Nevertheless, in earlier periods, the cities in the northern region existed largely as independent trade or economic centers. It was not until the discovery of coal in the early 18th century that rapid urban expansion occurred, significantly enlarging and strengthening the basin's communication and transport networks and ultimately forming the dense urban agglomeration seen today. The mining basin is more than just a shared geological entity: a common historical development trajectory, similar spatial growth patterns, and a shared contemporary experience of decline have blurred the differences between individual cities. As a result, the basin transcends administrative boundaries to form a true "community of destiny." "Symbolically, the term 'mining basin' spontaneously makes sense." (Patou, 2022) Based on this understanding, this chapter treats the mining basin as an integrated landscape territory, examining its historical background, spatial characteristics, and existing challenges.

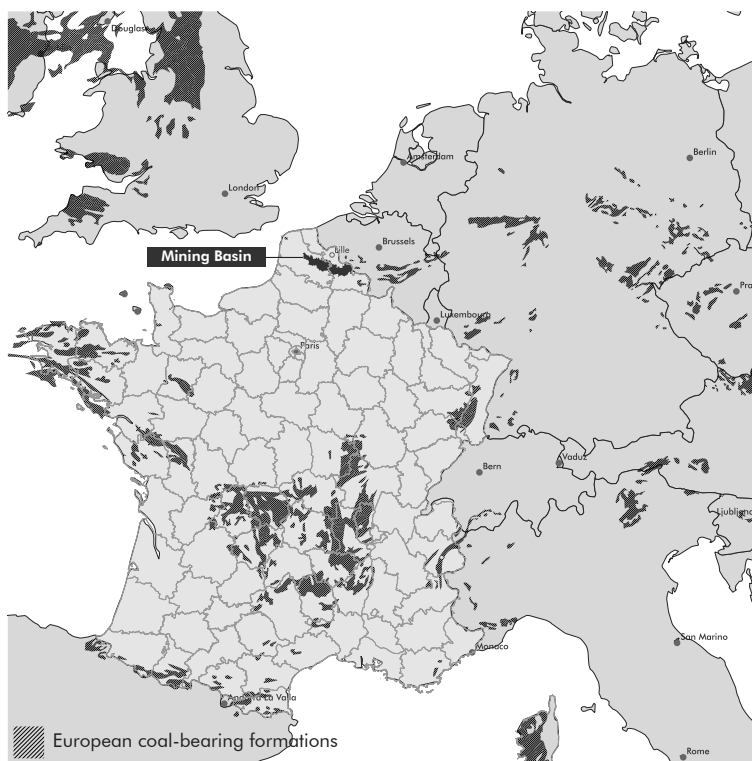


Figure 2.1
Site location

Historical Trajectory

Landscape and Forest

The Nord-Pas-de-Calais mining basin has undergone profound transformations over geological and historical timescales, shaped by natural processes, human intervention, and socio-economic developments. From a prehistoric natural landscape to a highly industrialized region and now a site of cultural regeneration, the basin's evolving identity reflects a dynamic relationship between land, resources, and society.

Formation of Coal: During the Carboniferous period, northern France was characterized by a vast depression with a particularly warm and humid climate. Terrestrial vegetation extended from coastal zones deep into the continental interior, forming extensive forests and wetlands (Dollé, 1985). Over the course of millions of years, plant material accumulated and subsided, eventually forming thick, east-west-oriented underground coal seams – today recognized as the second-largest coal reserve in Northwestern Europe (Patou, 2022).

Natural Landscape: At the early stage, the landscape was a mosaic composed of forests, marshes, heathlands, meadows, and peat bogs (Mission Bassin Minier Nord - Pas de Calais, 2016). The first human settlements appeared, primarily in areas with lower forest cover, where inhabitants began to clear land for agriculture and pasture. For a long time thereafter, forests and human civilization existed in a state of duality; forests were perceived as mysterious, sacred, and untamed realms, a belief reflected in traditional cultural reverence for forest deities (Gaudin, 1996).

Cultural Landscape: By the medieval period, significant historic cities such as Béthune, Douai, Valenciennes, and Lens had been established. Northern France became a major center for textile production and commercial activity. The region's fertile soils and abundant water resources supported the development of cereal agriculture, laying the groundwork for extensive agricultural expansion (Mission Bassin Minier Nord - Pas de Calais, 2016). During this time, the cultural attitude toward forests shifted: land

clearance symbolized civilization and progress. Consequently, large-scale deforestation occurred, although by the late Middle Ages concerns over forest depletion prompted the regulatory measures to manage and protect these resources (Gaudin, 1996).

Mining Landscape: The early 18th century marked the discovery of the basin's coal potential, initiating nearly three centuries of intensive mining activity. Industrialization and labor-intensive industries dramatically reshaped the landscape: towering industrial structures such as "fosse" (pits) and "terril" (slag heaps) emerged as iconic features across the former agricultural plains. Mining communities expanded rapidly, forming a characteristic "fosse-terril-city" spatial pattern centered around industrial production (Mission Bassin Minier Nord - Pas de Calais, 2016). Although forests were no longer at the forefront of the region's identity, the rise of coal as a primary energy source reduced the demand for firewood, indirectly contributing to forest recovery elsewhere in France.

Modern Urban Landscape: Following the "Glorious Thirty" (1945–1973), the decline of the coal industry signaled the onset of the post-industrial era, leading to long-term territorial and economic contraction. Despite this decline, efforts to repurpose the mining landscape persisted. Former mining lands were converted for new industrial uses or underwent ecological restoration, with forests reappearing in the form of urban green spaces (Mission Bassin Minier Nord - Pas de Calais, 2016). Nevertheless, regional stagnation remained a persistent reality. A significant turning point arrived in 2012 when UNESCO designated the mining basin as a World Heritage Site for its cultural landscape value, breathing new life into regional transformation initiatives and landscape enhancement efforts.

Today, the Nord-Pas-de-Calais mining basin stands as a layered cultural landscape, where traces of natural, agricultural, industrial, and post-industrial histories converge, shaping a territory in search of renewed identity and meaning.

Carboniferous Period

359–299 Ma

Neolithic Period

4000 to 2500 BCE

Middle Ages

5th Century

15th Century

Formation of Coal

Early Settlements

Trade and Agriculture

Post-glacial rebound

First forest

Forest
Population

scattered

conquer

The Forest Is in Its Natural State

The Forest Is

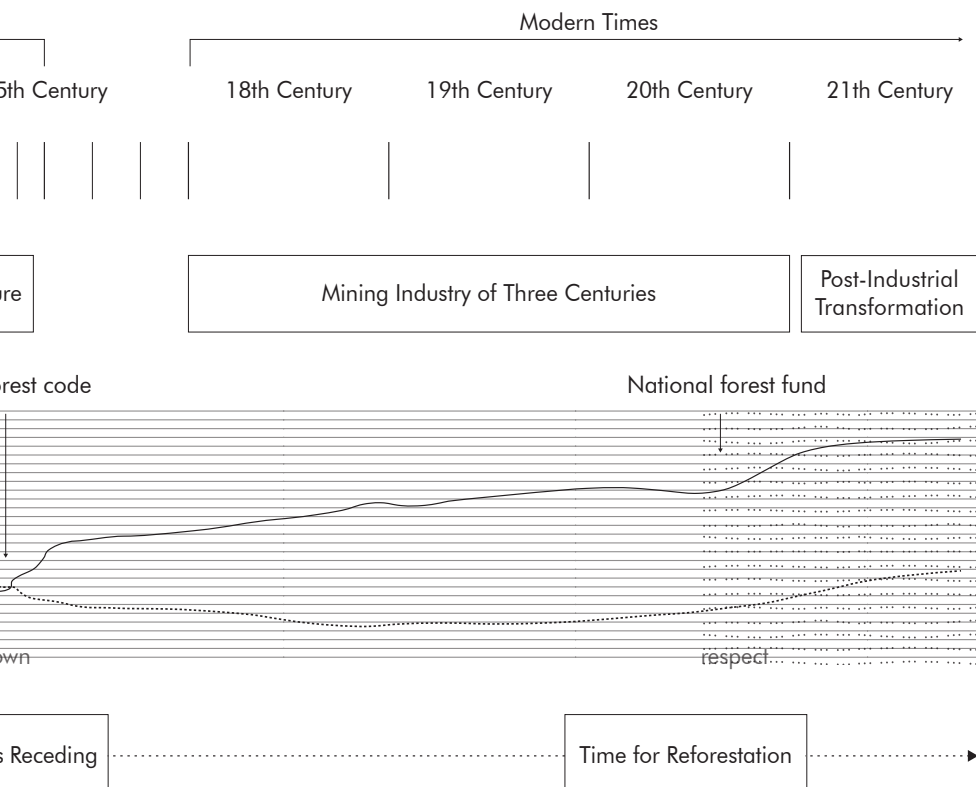
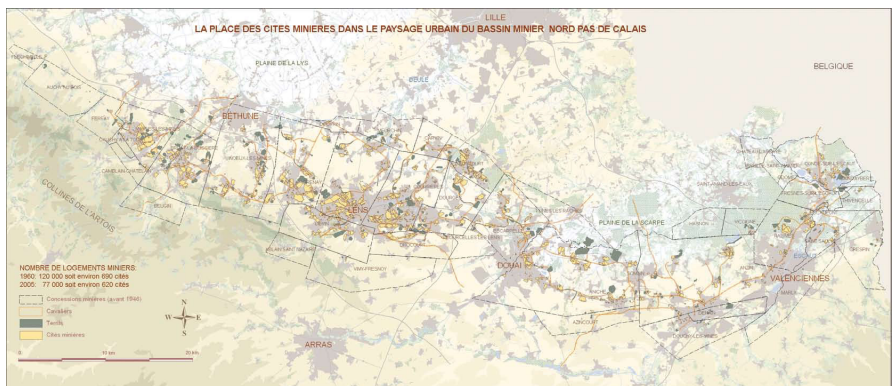


Figure 2.2
Landscape
development

Figure 2.3
The place of
mining cites
in the urban
landscape
of the Nord-
Pas-de-Calais
mining basin
*Source: Mission
Bassin Minier.*



Culture and Heritage

The reputation of the Nord and Pas-de-Calais regions has long been rooted in the hard work of their people, both those who have historically inhabited the land and immigrants who arrived during the industrial period (Frémont, 2011). A deep cultural identity based on labor and self-reliance has been a persistent theme across the territory. This sense of cultural pride reached its peak during the industrial era, when the Nord-Pas-de-Calais became one of France's most economically productive regions. Yet this history is also marked by contradiction and struggle, as the realities of working-class life were often harsh and precarious. Despite the passing of the industrial age, the profound influence of mining on the region's cultural identity remains undeniable. The legacy of this history continues to be felt today – preserved in literature, transmitted through local memory, and inscribed within the landscape itself.

As UNESCO World Heritage List describes, “The site bears testimony to the quest to create model workers’ cities from the mid 19th century to the 1960s and further illustrates a significant period in the history of industrial Europe. It documents the living conditions of workers and the solidarity to which it gave rise” (2012). The cultural identity of the Nord-Pas-de-Calais mining basin has been profoundly shaped by its industrial past. For over centuries, mining activities not only structured the territory physically, but also fostered a strong working-class ethos and a distinct community spirit. Today, traces of this heritage remain embedded in both the built environment and the collective memory of its inhabitants, even as the region faces challenges of depopulation, economic transition, and evolving urban forms.

Building on this cultural foundation, two distinctive landscape elements stand out as powerful expressions of the region's mining heritage: the terrils and cités minières (miners' housing districts).

Terril

Among all the heritage elements in the region, the terril undoubtedly stands out as the most distinctive feature of the landscape. In his renowned novel *Germinal*, the French writer Émile Zola (1954) vividly describes it:

"A gigantic black mass, a pile of cinders, the terril of a pit, rising up in the night like the ruins of some fallen monument. Then, farther on, another terril, then another, the whole plain seemed to be covered with these enormous mounds, looming up, shapeless and monstrous, on the horizon."

Unlike the mechanical coldness often associated with industrial landscapes, the terril presents a unique fusion: its artificial form – most notably the conical shape – melds seamlessly with the natural materiality of the site. This unusual combination softens the imposing presence of these industrial giants, creating a more balanced and nuanced character. Over the past decades, environmental rehabilitation efforts have enhanced the terrils and their surrounding post-industrial environments. In many cases, layers of regenerated natural landscapes now overlay the industrial remnants, enriching the site's spatial complexity. Some terrils are now cloaked in fast-growing forests, while others are enveloped by dense woodlands or integrated into natural parks.

Today, 285 terrils have been preserved across the mining basin (Mission Bassin Minier Nord-Pas de Calais, 2022), forming a powerful symbolic network and serving as a critical component of the local collective memory. Fifty-one of these have been inscribed on the UNESCO world heritage list (2012). Even though mining activities have ceased, the distinctive chain of terrils across the otherwise flat agricultural plain continues to hint at the coal seams hidden underground, offering a silent testimony to the region's industrial past.

Moreover, as the mining industry has faded and new ecological layers have emerged, the role of terrils is evolving beyond their historical symbolism. The rehabilitated terrils now provide nearby residents with new recreational spaces and unique spatial experiences. In many ways, the terrils function like lighthouses within the territory, standing not only as markers of historical identity but also as metaphors for the future trajectory of ecological development in the former mining region. A central concern of this research is how to strategically integrate terrils – both as ecological assets and cultural landmarks – into the broader territorial and urban regeneration processes.



Figure 2.4
A view of
the twin slag
heaps in Loos-
en-Gohelle.
*Photoed by
author*

Cité minière

Another noteworthy feature of the mining basin's landscape is the cités minières (miners' housing districts). As a labor-intensive industry, the explosive growth of mining in the early nineteenth century created an urgent need to attract and accommodate large groups of workers. In response, mining companies established workers' housing settlements around the pits, gradually forming the characteristic "fosse-terril-city" spatial pattern (Mission Bassin Minier Nord - Pas de Calais, 2016). Over time, these mining towns even became a form of advertisement for the mining companies, leading to intense competition in their design (Mission Bassin Minier Nord - Pas de Calais, 2008). This dynamic spurred continuous improvements in community spatial models and housing conditions, ultimately establishing the mining towns of the Nord-Pas-de-Calais basin as recognized exemplars of workers' housing by the late nineteenth century.

Based on an analysis of urban forms and architectural styles, mining towns can be broadly categorized into four types, arranged chronologically:

The 'corons' (1820 – 1890): long strips of small, spartan homes, most of which were built in the 19th century.

The cités pavillonnaires (1860-1939): grouped 2 by 2 or 4 by 4 and common in the late nineteenth and early twentieth centuries.

Garden flats (1904-1939): larger and more comfortable, with indoor bathrooms and WCs, dating from the 1900s to the inter-war period.

Modern housing estates (1946-1970): built after the Second World War, similar to contemporary housing estates and built after the nationalization of the companies.

The mining towns were not merely residential areas for workers; they served as microcosms of mining society. Each settlement functioned as a self-contained social unit, equipped with a full range of services and administrative structures (Mission Bassin Minier Nord - Pas de Calais,

2008). However, under contemporary urban conditions following the decline of the mining industry, this "small society" model has inevitably been dismantled. One of the key concerns of this research is how to integrate the spatial and functional legacy of these mining towns into the broader structure of the urban agglomeration, ensuring their relevance and vitality in the post-industrial landscape.

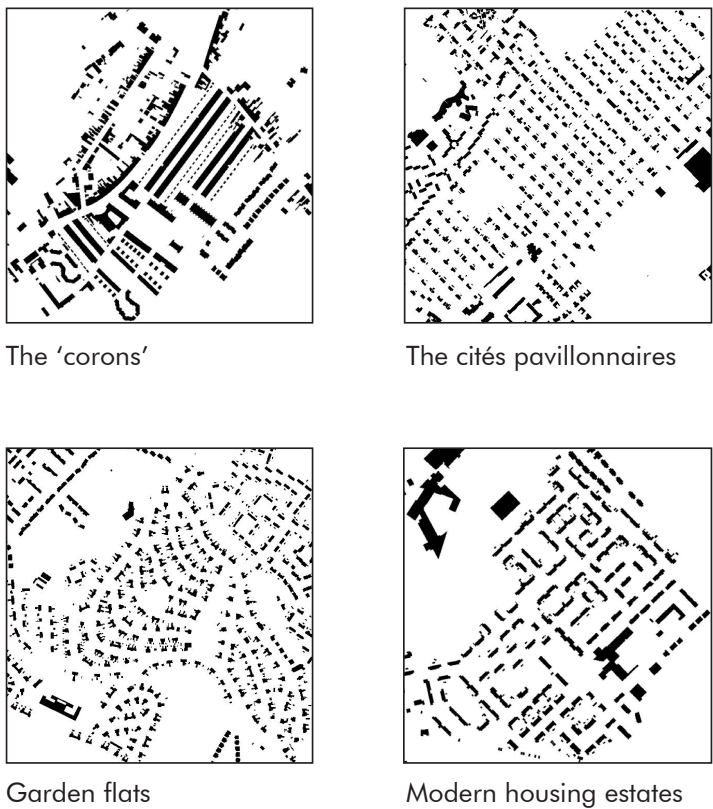


Figure 2.5
Cité minière
spatial
configurations

Contemporary Dilemmas

Social-Environmental Challenges

As discussed in the previous chapter, the decline of the coal industry in the 1970s marked the beginning of the post-industrial era in the Nord-Pas-de-Calais mining basin, leading to a prolonged period of territorial and economic shrinkage (Mission Bassin Minier Nord - Pas de Calais, 2016). The region has since experienced significant population loss, housing vacancies, and urban hollowing. Despite being one of the most urbanized and densely populated areas in France today, the mining basin simultaneously holds one of the highest poverty rates in the country, revealing its underlying social and economic vulnerability (Mission Bassin Minier Nord - Pas de Calais, 2018). Regional authorities attempted to revitalize the economy by introducing the automotive industry to create new employment opportunities (C'artouche, 2000), but such efforts achieved limited success, confined mainly to areas like Valenciennes. The persistent high proportion of blue-collar workers within the mining basin partly explains why the region has struggled to keep pace with the postmodern transition and successful economic transformation.

Beyond economic decline, the region faces deep-seated social and cultural challenges. A history marked by mining disasters, wars, and employment crises has left psychological scars, fostering a climate of collective melancholy and anxiety. Although the government has promoted regional renewal and reconstruction, chronic unemployment continues to undermine social confidence and stability. The inclusion of the mining basin in the UNESCO World Heritage List in 2012 injected new cultural vitality into the region, symbolically reinforcing its heritage value. That same year, the opening of the Louvre-Lens Museum further signaled opportunities for cultural revitalization. Today, mining heritage evokes diverse and complex emotions across generations, reflecting a layered and sometimes ambivalent relationship between the local community and its industrial past.

In addition to economic and cultural challenges, the mining basin faces

significant ecological issues. Mechanized intensive agriculture has exacerbated soil erosion and degradation, while centuries of mining have caused irreversible damage and pollution to the geological substratum and natural environment (Véronique, 2013; Denimal et al., 2005). Environmental improvements and urban renewal projects since the twentieth century have partially mitigated the most severe pollution, with former black terrils now reclaimed by vegetation. However, problems such as soil degradation, wetland loss, and fragmented forest habitats remain largely unaddressed. Groundwater presents another concern: following prolonged periods of dewatering during the mining era, groundwater levels within the Chalk aquifers have begun rising again due to various natural and anthropogenic factors. The mining basin now faces the challenge of high groundwater levels across the Nord-Pas-de-Calais region (Carlier, 1989). While this issue cannot be directly solved through urban forestry, it plays a critical role in assessing landscape potential and urban risk management.

In summary, the mining basin is neither a completely “abandoned” territory – given that numerous projects continue to progress and socio-environmental conditions have improved to some extent over the past half-century – nor is it a territory receiving sufficient attention or intervention. From a planning perspective, current strategies appear moderate and general, raising concerns about their capacity to meet the region’s growing need for enhanced socio-environmental adaptation. This tension defines the contemporary dilemma of the mining basin: a region caught between gradual improvement and persistent structural challenges. To understand this dilemma and to explore how forestry can meaningfully intervene in this territory, it is essential to first grasp the future trajectory of the mining basin: is it a region poised for renewed development, or one destined for continued shrinkage?

Inevitable Shrinkage

The characteristics of urban shrinkage are often intertwined with the social, cultural, political, and economic conditions, as well as the historical context of specific countries or regions. As such, there is no single model or prototype for shrinking cities, underscoring the importance of site-specific studies (Haase et al., 2017). According to research on urban development patterns in European cities, the mining basin in northern France's Nord-Pas-de-Calais region is classified as an area of "intermittent shrinkage in economically lagging regions" (Wolff & Wiechmann, 2018). This type of shrinkage is characterized by recurring employment-driven outmigration, particularly the reduction in the number of young people (Galjaard et al., 2012). These trends align with the typical features of post-industrial societies.

Another perspective for analyzing urban shrinkage is to consider not just the economic decline of a city itself, but the economic growth of neighboring cities as a contributing factor (Wolff & Wiechmann, 2018). From this viewpoint, the rapid development of the Lille metropolitan area in northern France may be an accelerating factor in the decline of the Nord-Pas-de-Calais mining basin. Within this context, it can be hypothesized that increasing labor mobility and intensified competition between cities for employment opportunities and urban amenities (Batey & Friedrich, 2000) have exacerbated the challenges faced by the mining basin. Given these dynamics, the region is unlikely to experience significant economic growth or a substantial increase in employment rates in the short term, making urban shrinkage an inevitable trend for the foreseeable future.



Figure 2.6
The population
migration trend
between Lille and
the mining basin

Call for Adaptation

The cycle of socio-environmental adaptation suggests that the Nord-Pas-de-Calais mining basin remains in transition, shifting from a post-industrial adaptation model toward one oriented around contemporary sustainable development. The economic, cultural, and environmental challenges discussed above are not only issues that demand urgent attention but also latent opportunities for future regeneration.

Recognizing the inevitable trend of territorial shrinkage—reinforced by theoretical studies on the trajectories of shrinking cities—I position the future development of the mining basin as a "Transit Area" (Wiechmann & Pallagst, 2012). Within this framework, territorial recovery can be fostered by strengthening landscape infrastructures and promoting urban forestry, which would simultaneously restructure the urban spatial framework and restore ecological functions. Enhancing ecosystem services becomes a critical strategy to reinforce socio-environmental resilience, aiming to stabilize population dynamics and economic vitality while improving the quality of life for residents.

Ultimately, this approach embodies a broader call for adaptive strategies in the Anthropocene: a rethinking of human settlements that embraces environmental change as a driver for socio-cultural renewal and territorial sustainability.

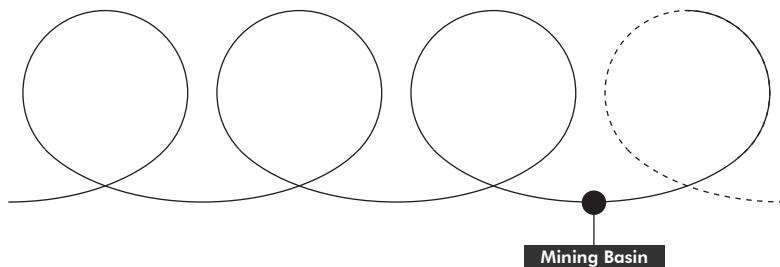


Figure 2.7
Mining basin's
position on
adaptive cycle

Site Readings

Up and Down: Experiencing the Terril

A visit to the mining basin would be incomplete without witnessing, in person, the monumental presence of the terrils. I visited Terril 74 in Loos-en-Gohelle, famously known as the “Twin Peaks” of Lens. Towering over the plains, these immense black mounds seemed at first to promise a direct and clear approach. Yet, to my surprise, the journey toward them unfolded as a richly layered spatial experience, with ever-shifting sightlines and perspectives. The walk began in the mining town itself. Already within the neighborhood streets, glimpses of the terril and the mining structures appeared in the distance—sometimes obscured behind dense clusters of trees and garden walls, other times framed fleetingly between rooftops, or suddenly emerging at the end of a street. As I moved closer, the town’s edge approached, and the path began to descend. A wall of trees blocked the view entirely; the industrial world seemed to vanish from the scene. Only upon crossing an intersection of highway did the terril reveal itself again, hidden behind infrastructural thresholds. Rather than crossing the tree barrier directly, the route required a detour: I turned instead into a woodland path, passed through an open grassy slope, and ascended a verdant pedestrian bridge that spanned the highway, leading into the terril.

Unlike the fragmented and intimate sequence of the urban journey, the terril park’s spatial composition shifted into broader gestures. The initial forest path enclosed me within a dense canopy, before gradually widening into an expansive clearing. Then, at a moment marked by the retreat of the trees, a single ascending path signaled the start of the climb. From that point onward, the landscape became starkly open—punctuated only by scattered grasses, ferns, and low shrubs. Spiraling upward, the view expanded with every step, until the two peaks themselves engaged in a silent dialogue across the void. The summit offered a striking panorama: on one side, a vast patchwork of farmland stretching like a terrestrial sea; on the other, the urban terrain of Lens, its buildings clustered like islands.

Between them, the highway cut a linear swath, flanked by tall bands of forest—a composition imbued with unexpected drama. The terril stands as a beacon on the urban edge, a landmark that anchors both the walker atop its summit and those who navigate the territory below.

During my field trip, I also visited other terrils, such as Terril 105 in Hénin-Beaumont. Covered largely by dense woodland and lacking open vistas, it offered a more immersive, almost wild forest experience. Across the territory, many terrils retain their distinctive forms, their topographic prominence enriched by interactions with urban structures, agricultural textures, and infrastructural networks—holding immense potential for profound landscape experiences.

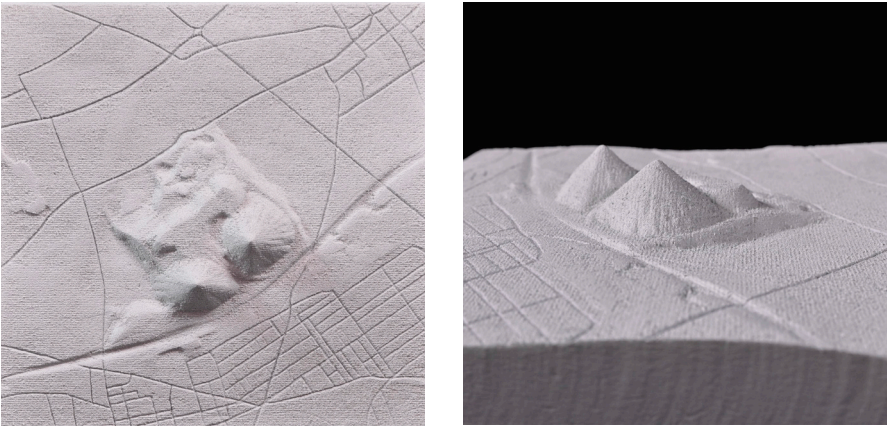


Figure 2.8
Model of
Terril 074 in
Lens

Uncommon Wood: Encountering the Hidden Forest

Standing atop the terril, I gazed across the city below and realized: this is no barren urban desert devoid of trees. Threads of green stretched along highways and rail lines; patches of woodland and scattered trees punctuated the built fabric. At first glance, the city's gray and green seemed in balanced harmony. Yet descending back into the streets revealed a different reality. Much of this greenery disappeared behind fences, walls, and private enclosures. Aside from street trees and public park groves, most urban trees belonged to private or semi-private yards. As a passerby, I could only glimpse the foliage peeking over walls – never fully entering or experiencing these spaces. Trees that from above appeared abundant became, on the ground, inaccessible and distant.

This phenomenon prompted reflection: what might wooded commons mean in such a city? Clearly, the proliferation of privately held trees signals a deep local affinity for vegetation. Yet if public opportunities to gather under trees are scarce, does this privatization encourage a more insular, inward-facing social life? Throughout my fieldwork, perhaps due to it being a weekend or reflecting deeper patterns of urban vacancy, I encountered few residents. Yet in the transformed terril parks and at the Louvre-Lens square, people gathered - quietly coexisting, even without conversation, forming a shared social realm. These encounters suggest that well-designed public spaces, especially green commons - wooded commons in my research theme - could hold the key to reactivating social and cultural life across the territory.

Between Backyards: Variations of "Third Place"

Lofland (1998) proposed a tripartite framework for understanding the realms commonly found within urban settlements: the public realm, the private realm, and the intermediary “parochial realm”. Distinct from the private realm of family and close friends, and from the public realm characterized by streets and encounters with strangers, the parochial realm emphasizes interpersonal networks among neighbors and acquaintances within a community. This concept can be connected to Oldenburg’s (1998) notion of the “third place” (Van Der Velde, 2018), offering a new paradigm for defining third spaces in urban environments. That is, beyond third places with strong public attributes, such as cafés or clubs, there exists another type of third space—semi-public settings more closely tied to a specific social group, such as community living rooms.

In the mining basin, this spatial paradigm manifests in a uniquely local form: narrow passages are carved between private backyards, creating semi-public spaces embedded within the urban fabric. For example, in a neighborhood in Lens, I discovered a wooded path that runs between two rows of residential backyards, producing an intimate, secluded atmosphere. Similar patterns appear in other mining towns as elongated, strip-like communal gardens, while in peripheral villages they take the form of semi-public spaces used for backyard animal husbandry. This research will refer to this spatial model as *‘the 2.5th place’*. Across these varied settings, such spatial configurations exemplify a distinct community-based interpretation of third space—spaces that, through their private-yet-shared character, offer an alternative potential for social interaction. With thoughtful design, these linear semi-public spaces could be transformed into unique venues for neighborhood gathering and social activity, akin to linear parks.



Figure 2.9
Observation of
'Uncommon
woods'



Figure 2.10
Observation of
'Third space'
between backyards

Problematique

Problem Statement

The Nord-Pas-de-Calais mining basin, once a thriving coal mining region, has faced prolonged economic decline since the 1970s. Industrial closure triggered unemployment, population loss, housing vacancy, and entrenched poverty, leaving the territory socio-economically vulnerable. The overall regional development indicates that the continuous urban shrinkage in the mining basin must be acknowledged as an enduring trajectory, rather than a temporary condition. Beyond economic hardship, cultural identity has eroded as mining heritage struggles to sustain meaning across generations. Meanwhile, environmental degradation – manifested in polluted soils, fragmented habitats, and rising groundwater – further undermines territorial resilience. This intertwined triad of economic, cultural, and ecological challenges underscores the urgent need for an integrated, adaptive regeneration approach.

Design Assignment

In response, this design proposes an urban forestry strategy to promote socio-environmental adaptation in the Nord-Pas-de-Calais mining basin. The intervention aims to leverage ecosystem services to restore ecological functions while fostering social resilience through public spaces and cultural reconnection. By establishing wooded commons and forest-based infrastructures, the design seeks to bridge fragmented landscapes and rebuild community ties. Importantly, local spatial characteristics and organizational patterns will be integrated into the forestry network, embedding site-specific qualities within a broader spatial sequence. Ultimately, the purpose of the design intervention is to transform the mining basin into a more resilient socio-ecological system – one that heals environmental degradation, strengthens cultural identity and well-being, and adapts the territory for sustainable development in the Anthropocene.

Chapter Three

Approach

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Approach

Strategy Summary

How can urban forestry serve as an **ecosystem services** tool to reshape the **post-industrial territory** and foster **socio-environmental adaptation**?

Strategies according to research questions:

Restore ecological functions and enhance environmental resilience through woodland infrastructure that delivers **supporting** and **regulating** ecosystem services within post-industrial territories. (Sub-question 1)

Foster cultural identity and strengthen community adaptation by developing wooded commons that integrate **provisioning** and **cultural** ecosystem services in shrinking urban contexts. (Sub-question 2&3)

Balance the **multiple functions** of woodland structures by designing spatial systems that integrate ecological, social, and cultural services **across** territorial, urban, and site **scales** to enhance adaptive capacity. (Sub-question 4)

Facilitate adaptive and inclusive forestry landscapes by embedding multi-actor collaboration into spatial design processes, enabling co-production and shared stewardship in shrinking post-industrial territories. (Actor & process)

Approach Statement

Conceptual Framework

Urban forestry serves as the central design tool throughout this research, operating across multiple spatial scales and layered according to distinct categories of ecosystem services. Conceptually structured like a "forestry services hamburger," the framework organizes interventions into a stacked system, where different types of services correspond to different layers and scales of action.

At the foundation lies the supporting services layer, which provides the essential ecological processes necessary for the functioning of the overall system. Due to its strong connection with biophysical cycles, this layer demands attention primarily at the territorial scale, ensuring that large-scale ecological foundations are established and maintained.

Above this foundation, three additional layers — provisioning, regulating, and cultural services — are integrated through spatial design interventions that vary across scales. These services are envisioned to manifest at the territorial, urban, and on-site scales, with each service gaining different levels of emphasis depending on the spatial context. Their expression will take diverse spatial forms, tailored to the specific ecological and social needs at each level.

At the top of this "hamburger", spatial design represents the tangible outcome of the integration of forestry-based ecosystem services. Through design, the ecological potentials are translated into visible, functional landscapes, embodying the regenerative ambitions of the project. Urban forestry thus provides not only an ecological strategy but also a guiding structure for spatial design practice, ensuring coherence across scales while responding to the unique opportunities and constraints of each site.

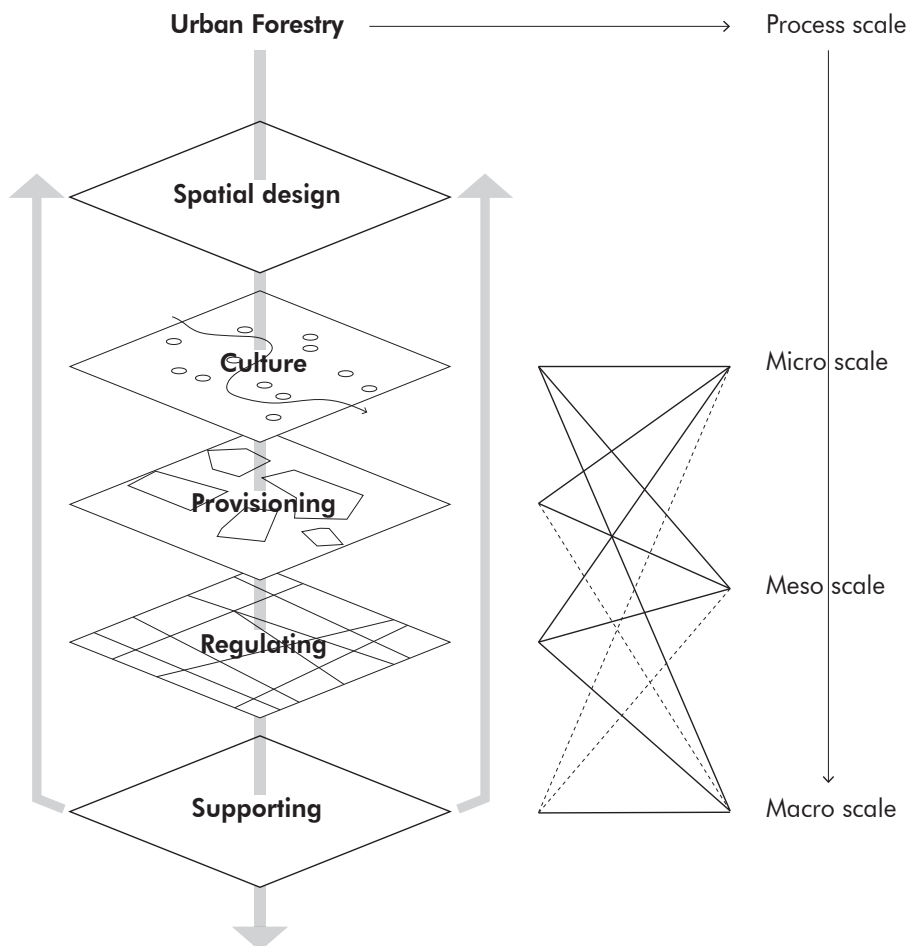


Figure 3.1
Conceptual
framework

Analytical and Design Framework

The research adopts a cross-scalar analytical and design framework:

Process Scale: At the process scale, the framework focuses on the life cycle of trees within different forestry systems. Instead of fixed sites, it highlights temporal interventions – planting, maintenance, thinning, renewal – tailored to silvopasture, woodland parks, and nurseries. Each forestry type follows a cyclical rhythm involving both ecological and social actors. Diagrams illustrate how forestry unfolds over time, emphasizing trees as dynamic agents in adaptive landscape systems. This scale provides a long-term perspective on forestry management and resilience.

Micro Scale: This scale zooms into two selected sites, demonstrating how forestry reshapes spatial form and experience. One site transitions from urban edge to silvopastoral valley; the other reimagine a neighborhood woodland. Designs emphasize sensory transitions – open fields, dense corridors, shaded paths – and encourage community involvement. These sites translate strategic forestry into tangible, lived spaces, revealing how ecological and social layers intertwine at the human scale.

Meso Scale: This scale studies the Lens-Douai urban agglomeration as a critical area where post-industrial challenges are most pronounced. The analysis addresses social, cultural, and ecological dimensions, with an emphasis on how urban spaces can be transformed into forestry spaces, or strategically integrated within broader forestry structures. The design approach aims to rationalize the shrinking urban fabric and enhance living environments by embedding forestry systems as key structural elements.

Macro Scale: At this scale, the entire Mining Basin is examined as a territorial landscape. Research at this scale focuses on identifying major landscape patterns and analyzing the biophysical substrate that supports ecological functioning. Based on this foundation, a territorial forestry support framework is established, strategically embedding provisioning, regulating, and cultural services within the broader ecological matrix.

This approach ensures territorial ecological coherence while promoting adaptive regeneration across the basin.

The Mining Basin is approached as both a landscape territory and a complex socio-ecological system, where human societies and natural processes are deeply interconnected and mutually influential. Addressing this complexity requires a multi-scalar exploration of spatial structures and ecological dynamics, with particular attention to how these relationships evolve over time.

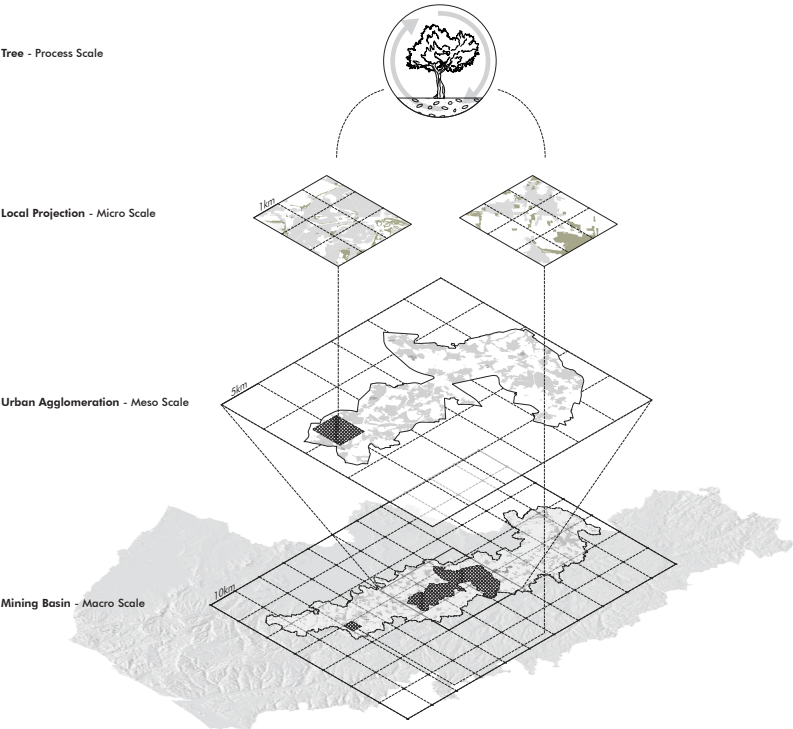


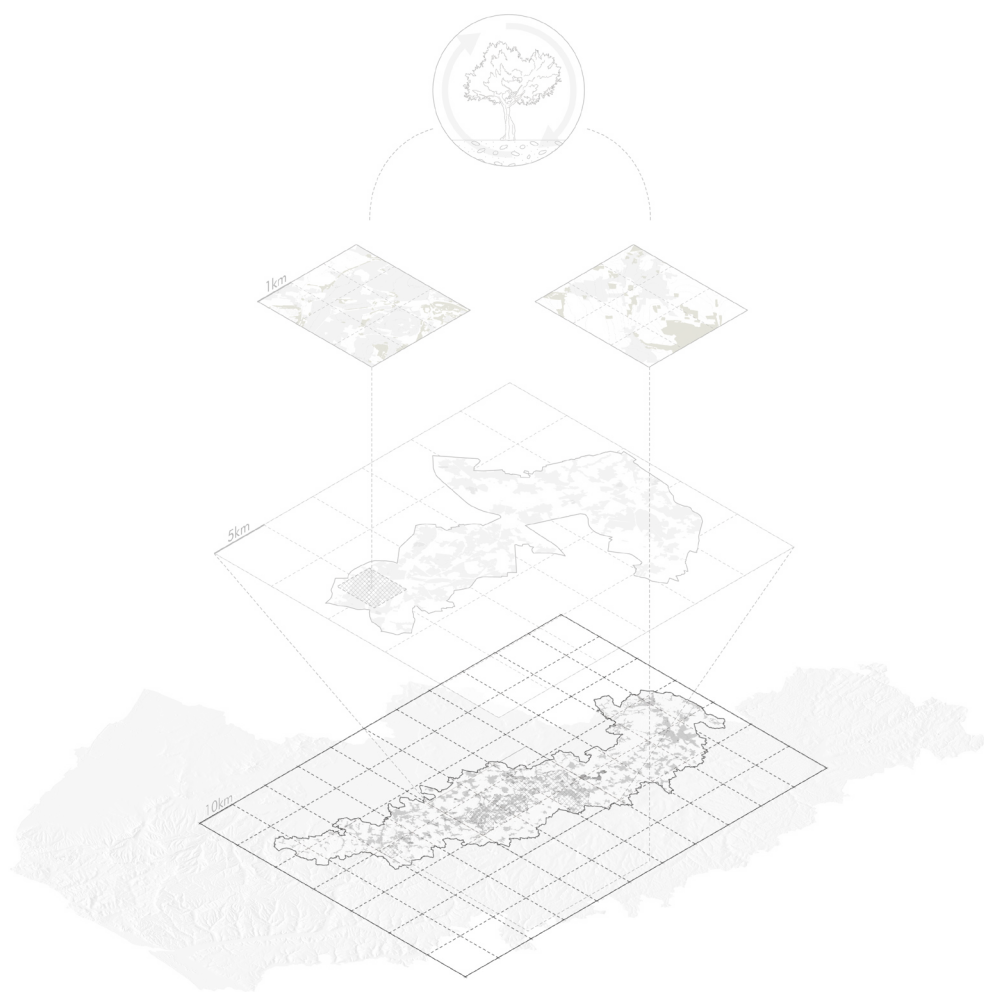
Figure 3.2
Cross scale
selections of
extent and size

Chapter Four

Analysis & Design

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Analysis and Design
Mining Basin - Macro Scale



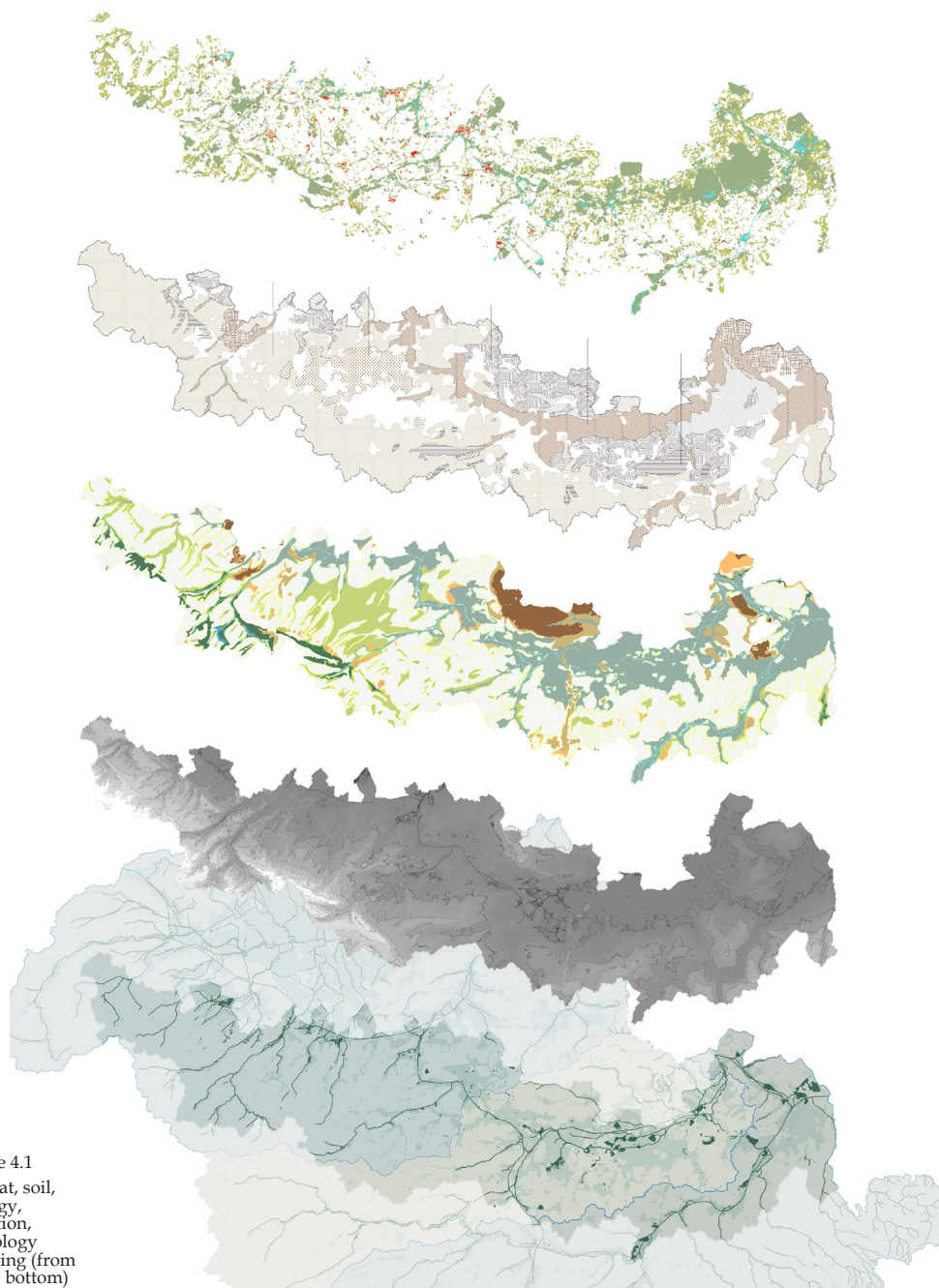


Figure 4.1
Habitat, soil,
geology,
elevation,
hydrology
mapping (from
top to bottom)

Reading the Territory

Biophysical layers

The biophysical layer refers to the environmental components of a landscape shaped by biological and physical processes, such as geology, topography, soils, hydrology, and ecological habitats. These layers, especially those like geology and soil formed over millennia, are deeply interconnected, establishing the substratum of any landscape (De Hoog et al., 1998). Thus, the biophysical layer constitutes the territorial substrate upon which all ecological and socio-spatial dynamics unfold.

From a geological perspective, the dominant feature of the Nord-Pas-de-Calais region is the Artois anticline, which runs northwest to southeast. The mining basin is situated along the margin of this formation, resulting in a terrain that transitions from uplands in the southwest to lowland basins in the northeast. Distinct geological periods have produced a diversity of soils: loamy plains; chalky silts containing flint near Lens; alluvial deposits from Quaternary rivers; and clay-rich soils in the basins. Overall, the majority of the region's soils are fertile and well-draining, particularly loams, making the area highly suitable for agriculture—a key factor in the Upper France region's agricultural expansion (James et al., 2002).

The region's hydrology is complex. On the surface, the basin lies in the upper Escaut watershed, organized by three river systems: the Lys, Scarpe, and Escaut rivers, which run approximately in parallel across the upper basin. Although these river systems are hydrologically distinct, they are connected in the lowland plains by the canal system, primarily the Dunkirk-Scheldt Canal, which follows and expands upon earlier natural tributaries. Below ground, rising groundwater levels in the Chalk aquifer have emerged as a pressing issue following decades of mining-induced dewatering—a phenomenon increasingly shaped by both natural and anthropogenic forces (Carlier, 1989).



Figure 4.2
Heritage,
infrastructure,
urban, landuse
mapping (from
top to bottom)

These physical conditions have enabled a wide diversity of habitat types – from wetlands to dry meadows, from open grasslands to dense forests. In places like the southwestern valleys and the terrils, this diversity extends vertically, creating ecological gradients. Despite current habitat fragmentation and the loss of former wetland systems, the territory retains a fundamentally robust biophysical foundation, offering substantial potential for ecological restoration

Social-environmental layers

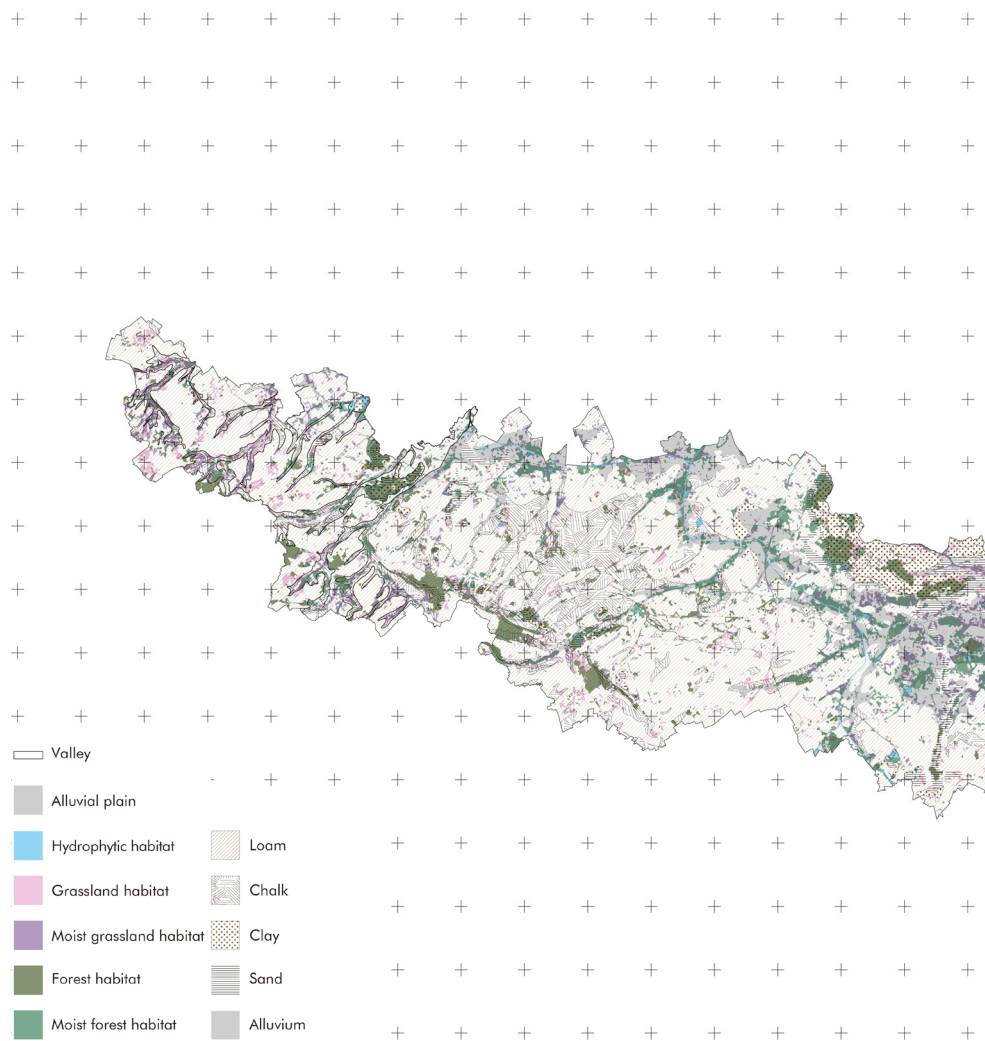
The social-environmental layer addresses environmental features shaped or influenced by human activity, such as land use, infrastructure, and cultural assets. The region is defined by a patchwork of large-scale agricultural lands interspersed with livestock farming and highly urbanized zones. Influenced by biophysical conditions, livestock farming is concentrated along valleys in the southwest and lowland basin area in the northeast, while urbanization follows the coal-bearing strata, forming two major urban agglomerations: Lens–Douai and Valenciennes. In contrast, the remaining towns are more sparsely distributed across the broader territory, scattered across valleys, plateaus, and rural hinterlands.

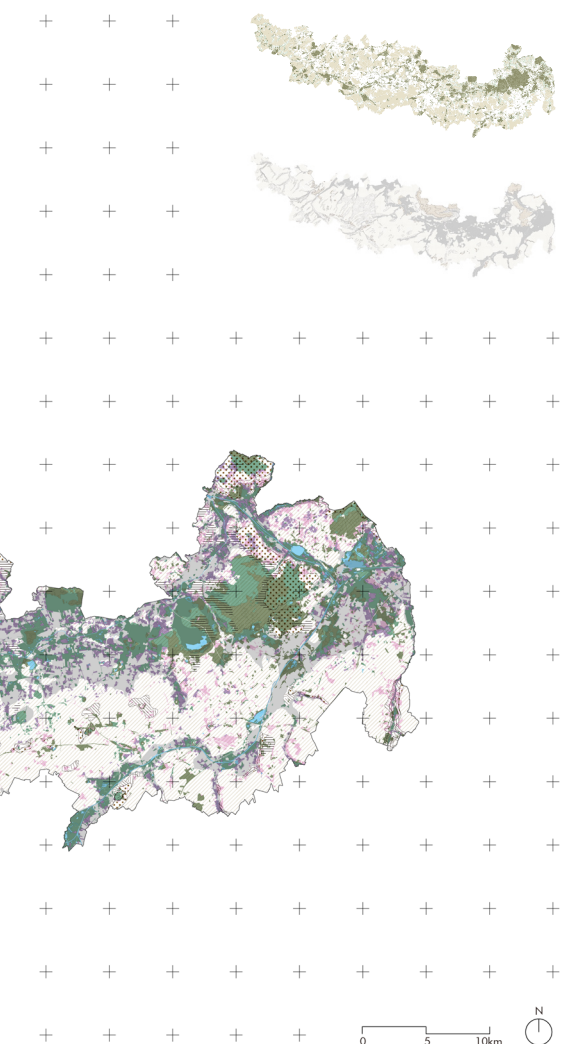
A dense transportation network overlays this mosaic, oriented both laterally across mining towns and longitudinally toward regional metropolitan centers.

Overlapping

Layered analysis is a powerful method for reading territorial systems. By overlaying, one can begin to interpret how landscape functions and socio-spatial patterns interact.

Figure 4.3
Ecological
capacity
mapping





Ecological capacity

Based on geological and soil base maps, along with topography analysis and regional habitat distribution, the ecological potential of the mining basin can be spatially analyzed.

Natural and semi-natural habitats are concentrated along riparian structures wetland area and valley systems, particularly within the Hilly Landscape and Wet-Basin Landscape. Among these, the Wet-Basin Landscape holds the highest degree of ecological diversity and complexity, offering significant opportunities for habitat restoration, rewilding, and ecological connectivity.

Targeted interventions (such as wetland reintroduction, woodland patch reinforcement, and ecological corridor enhancement) can support species migration, improve water regulation, and strengthen landscape resilience in these zones.

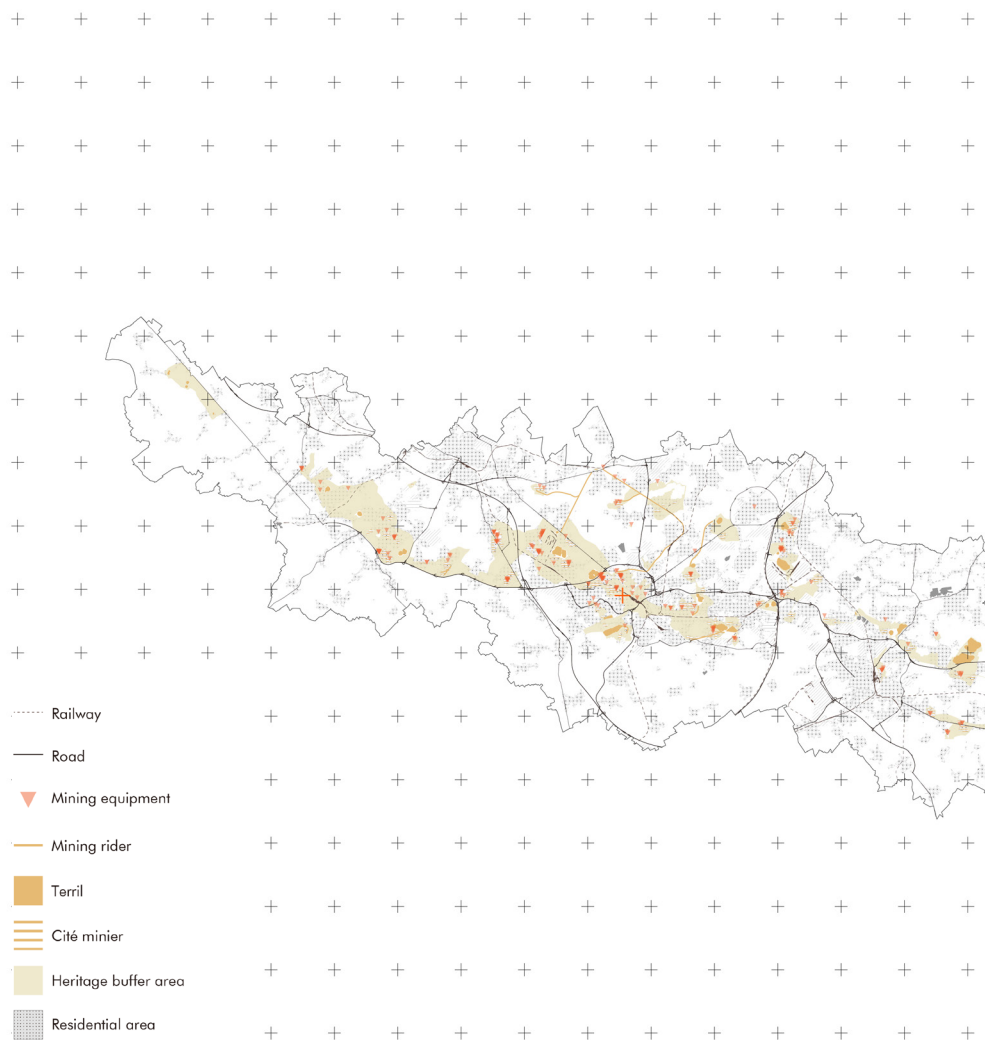
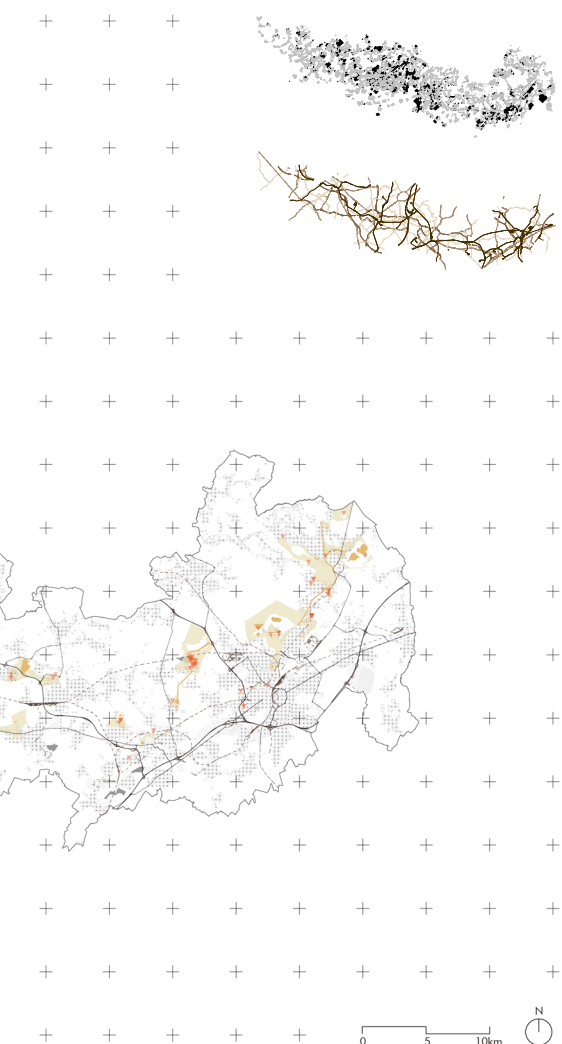


Figure 4.4
Culture
focuses
mapping



Cultural focuses

Cultural focuses in the mining basin are shaped by the interplay between infrastructure, urban morphology, and layers of industrial heritage.

The region exhibits a relatively homogeneous cultural identity, deeply rooted in its mining past. As noted by Biferale et al. (2024), the potential of cultural assets increases with their proximity and accessibility to residential communities. The dense urban agglomerations can further contribute latent cultural vitality, waiting to be reactivated through spatial and social integration.

Landmark institutions such as the Louvre-Lens Museum and the Mining History Centre in Lewarde serve as prominent cultural anchors. Additionally, the Terrils, with their iconic conical forms and striking elevation, have assumed the role of territorial landmarks.

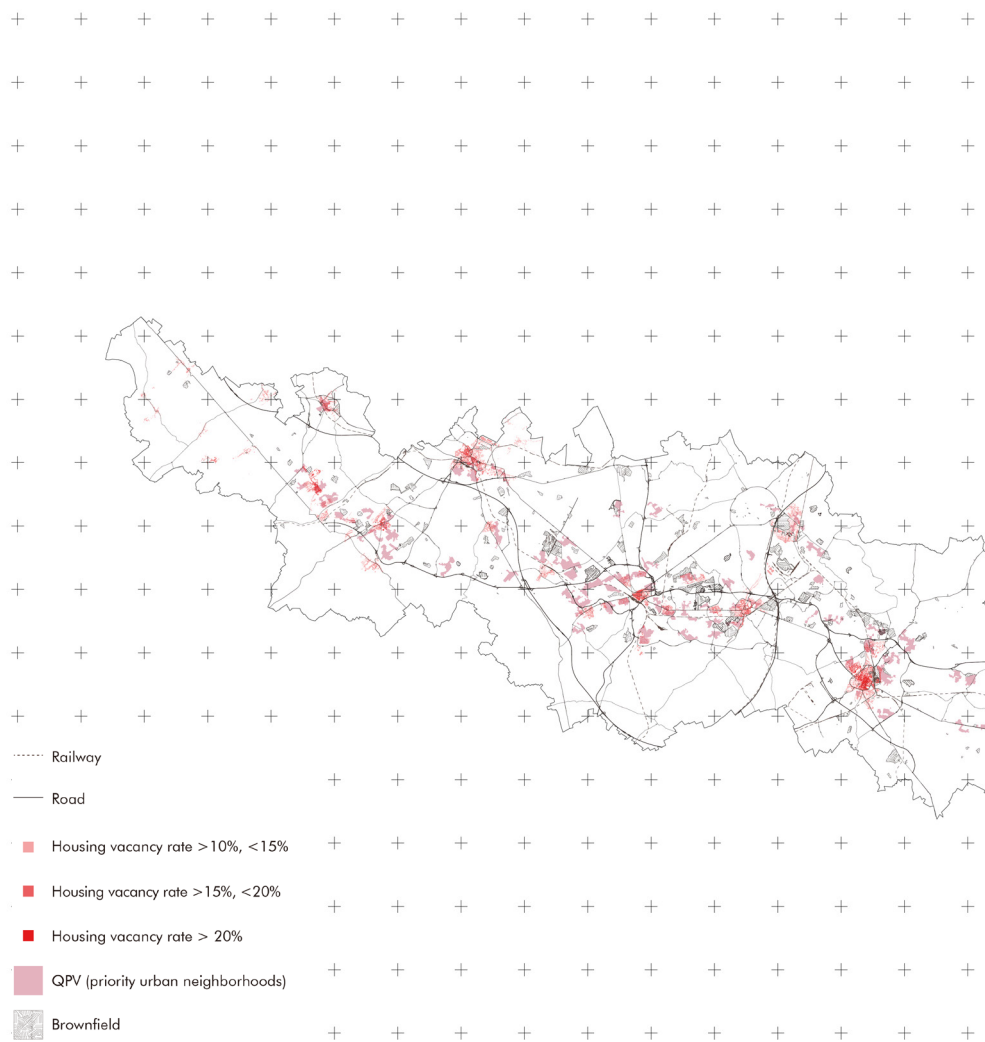
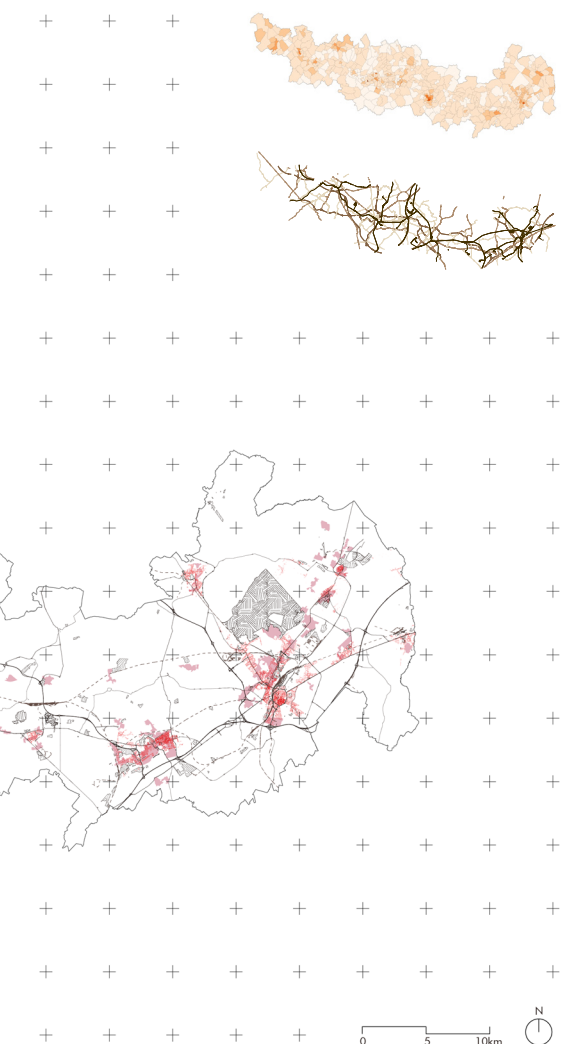


Figure 4.5
Economic
potential
mapping



Economic potentials

Economic potential can be assessed through the spatial analysis of vacancy patterns, infrastructural accessibility, and demographic distribution. In studies such as Detroit, Desimini (2014) highlights the importance of viewing vacant and underutilized urban spaces as “potential for conversion,” suggesting that urban brownfields, high-vacancy neighborhoods constitute transformable zones with latent socio-economic value.

Moreover, QPVs(priority urban neighborhoods) hold underutilized human capital. When strategically included in green infrastructure and urban forestry projects, these areas can act as catalysts for equitable and sustainable economic transformation, activating both local labor potential and environmental services while reinforcing community resilience.

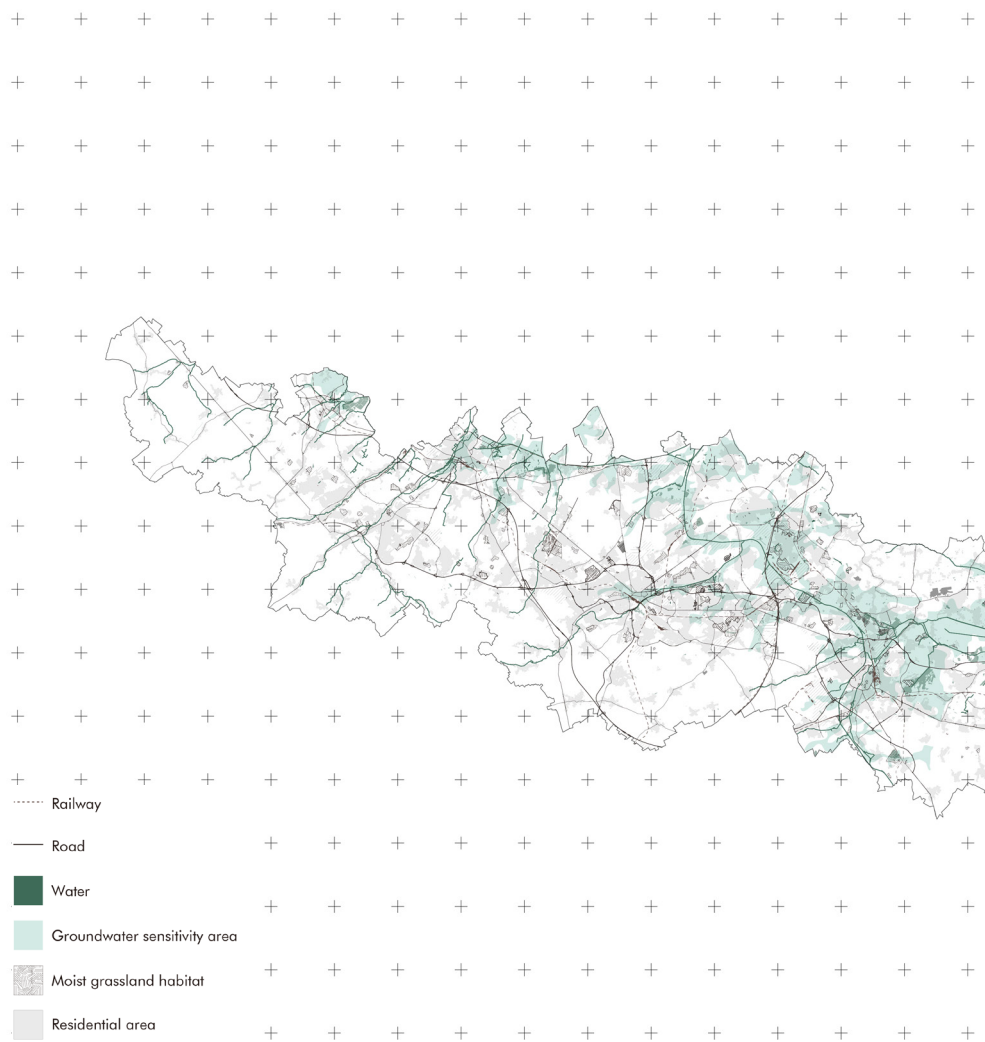
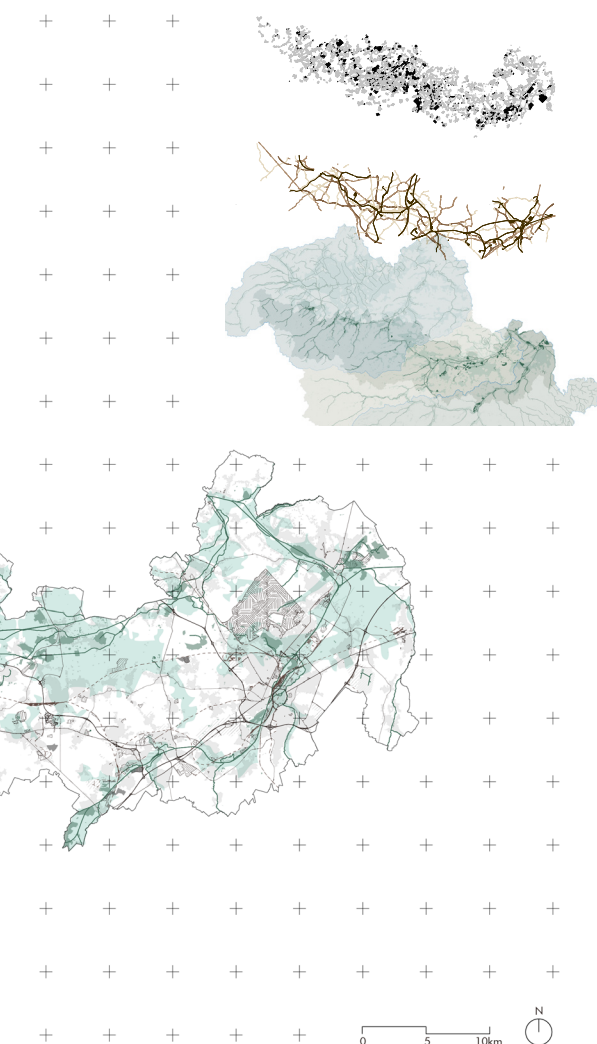


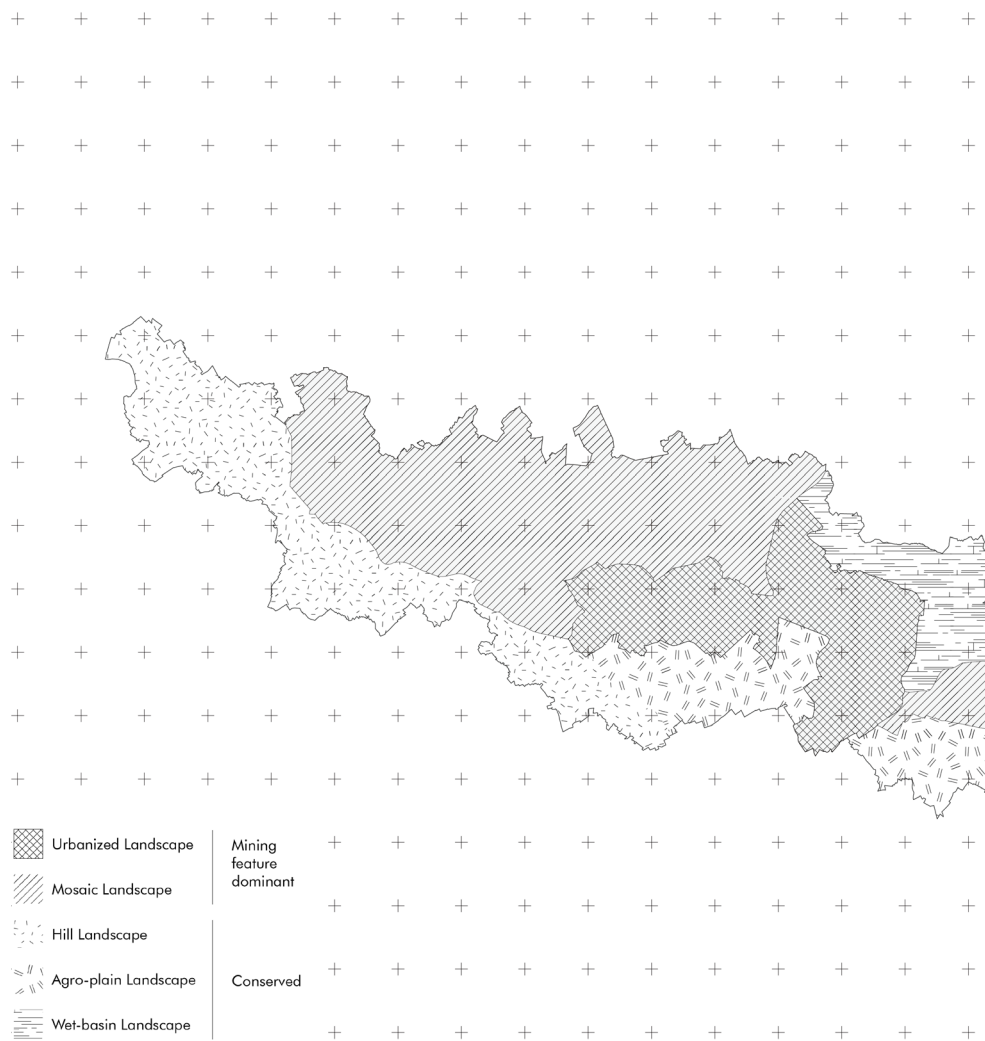
Figure 4.6
 Underground
 water and urban
 conflicts

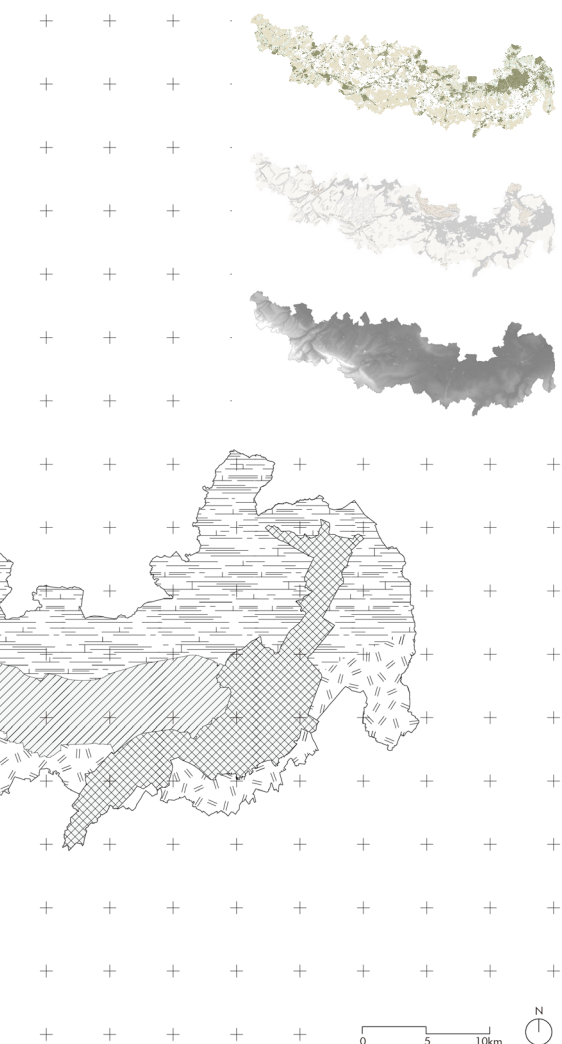


Socio-environmental conflicts

Intersections between the urban and hydrological layers reveal increasing social-environmental conflicts. As groundwater levels rise due to post-mining aquifer rebound, many built areas face drainage issues and structural risks. This tension reflects the spatial mismatch between infrastructural design and evolving hydrological regimes. In such sensitive zones, land-use planning must account for ecological thresholds and promote adaptive designs, including rain gardens, buffer forests, and decentralized water systems.

Figure 4.7
Landscape
typology
classification





Landscape typology

Based on topography, land use, habitat distribution, and complemented by official territorial planning documents and images – the basin can be classified into five landscape types (The first two exhibit distinct mining-related characteristics, whereas the latter three have largely retained the traditional agricultural cultural landscape):

Urbanized Landscape:

Dominated by dense mining towns and infrastructure.

Mosaic Landscape: Mixed-use zones of industry, housing, and fragmented agriculture.

Hilly Landscape: Undulating rural zones with pasture and forest remnants.

Agro-plain Landscape:

Large-scale mechanized farming zones.

Wet-basin Landscape: Low-lying areas rich in wetland and floodplain habitats.

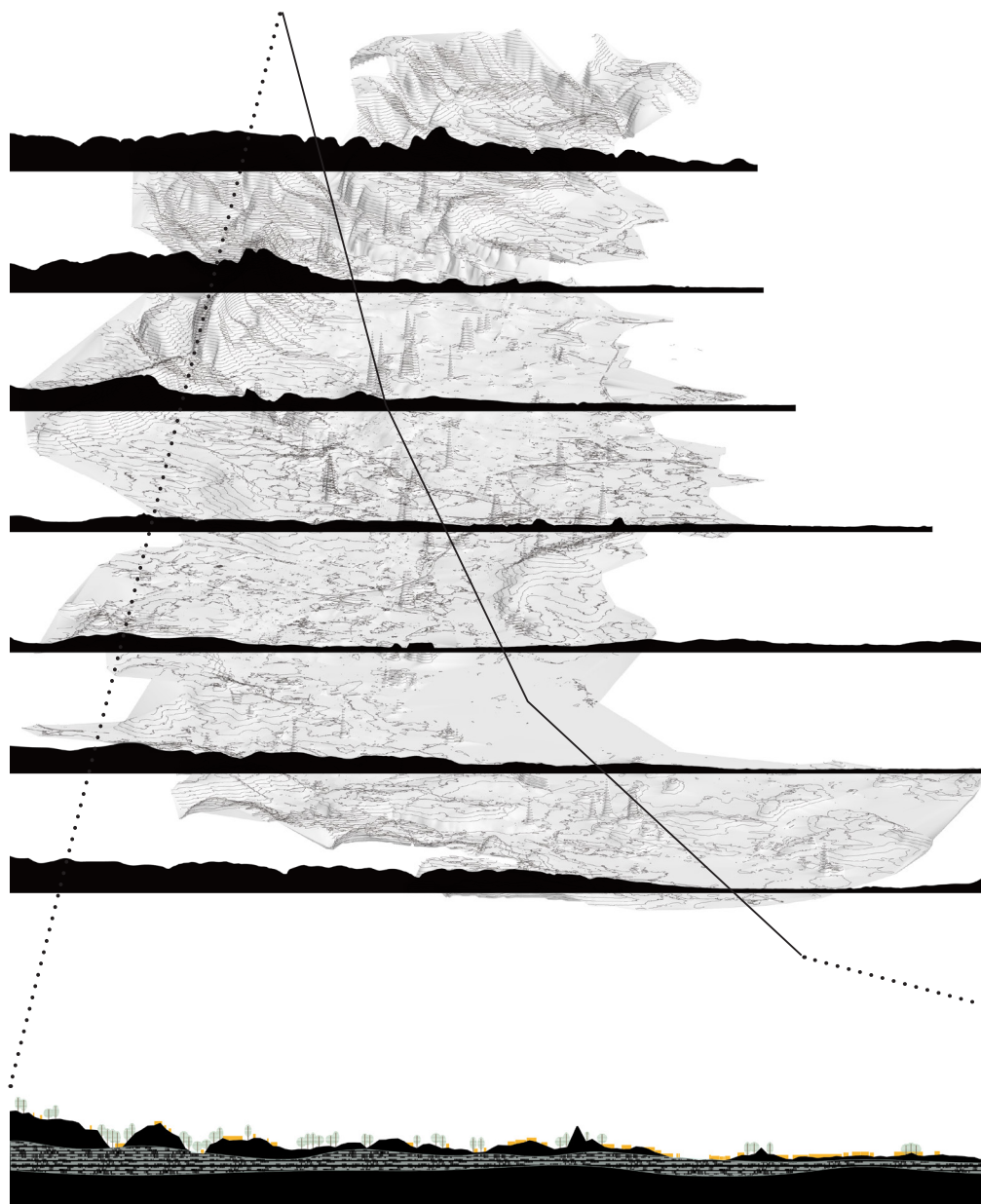
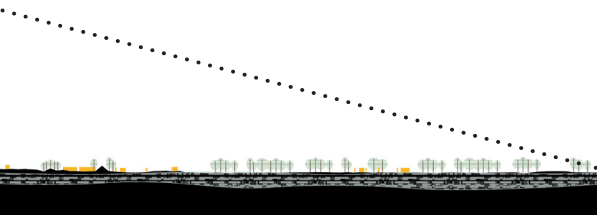


Figure 4.8
Serial sections
and conceptual
cross-section

Sections

Serial sections illustrate the topographic variation across the territory.

Additionally, a conceptual transect extending from the southwestern highlands to the northeastern basin is used to portray the spatiotemporal structure of the territorial landscape, offering a clearer understanding of the spatial transitions from hills to plains, urban areas, and lowland basins.



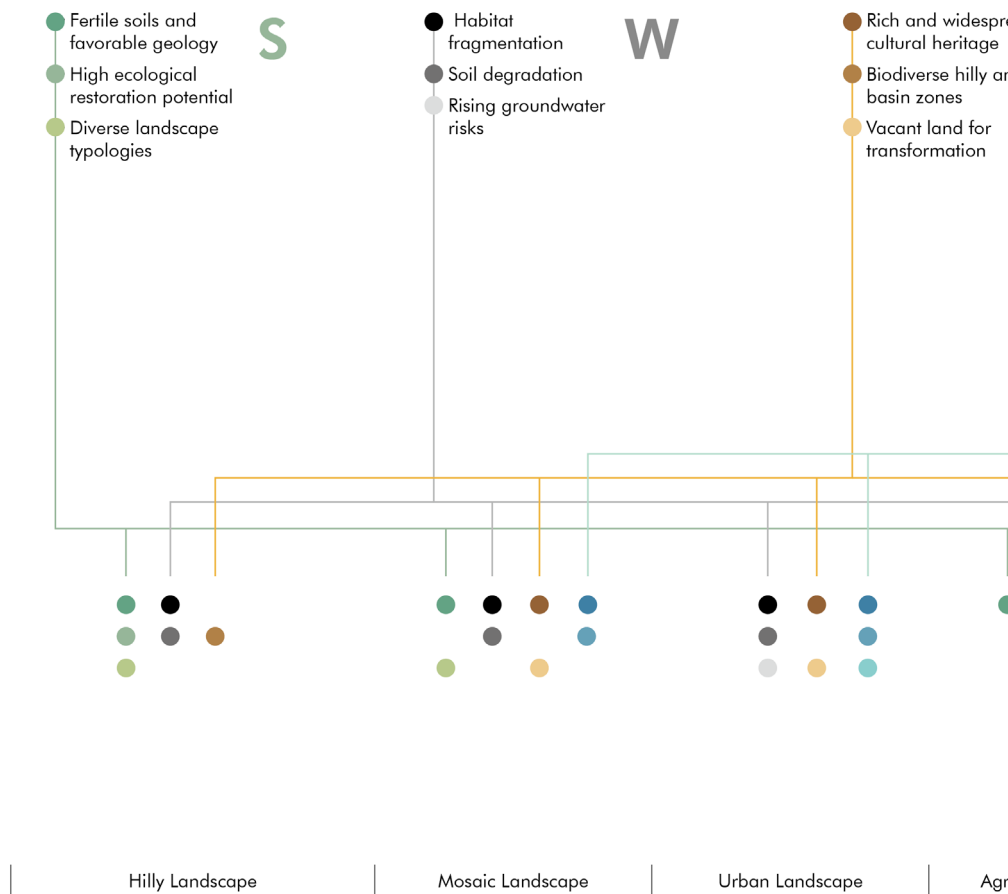
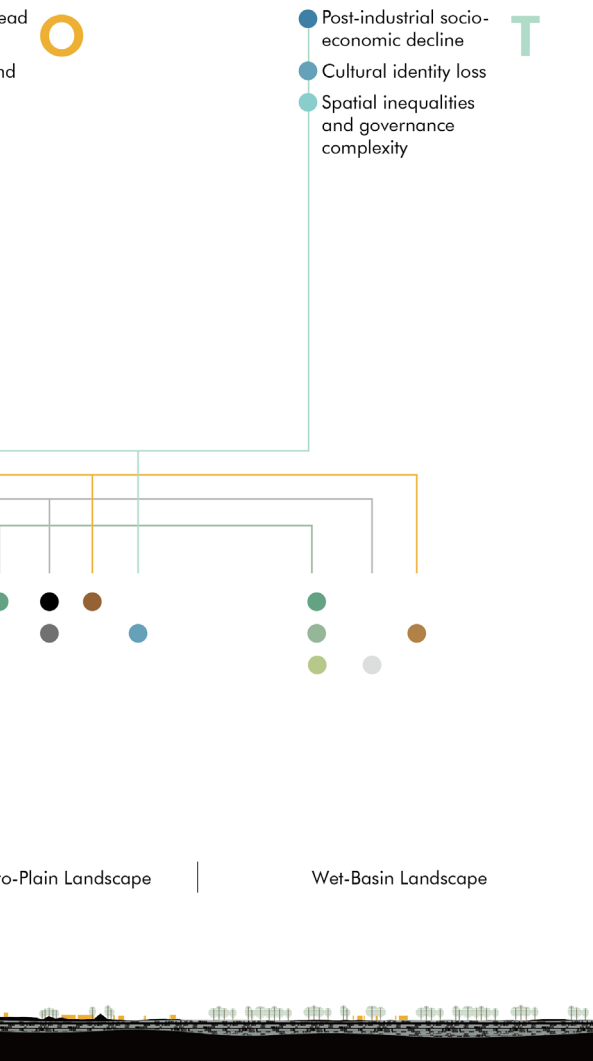


Figure 4.9
SWOT locates
at cross-section





SWOT analysis

Mapping the SWOT analysis onto spatial structure reveals a clearer territorial logic.

The central plain, shaped by flat terrain, fertile soils, and underground coal reserves, has long acted as the “initiator” and “catalyst” of human transformation. It was the birthplace of early settlements, agricultural intensification, and the rise of the mining industry – now a dense mosaic of cities, population, and cultural layers. Yet it also bears the heaviest social and environmental burdens of the past.

In contrast, the peripheral areas retain pastoral landscapes shaped by earlier agrarian rhythms. These less-urbanized zones preserve a distinct ecological and cultural character, suggesting an urgent need for restoration, protection, and integration within the broader territorial regeneration.

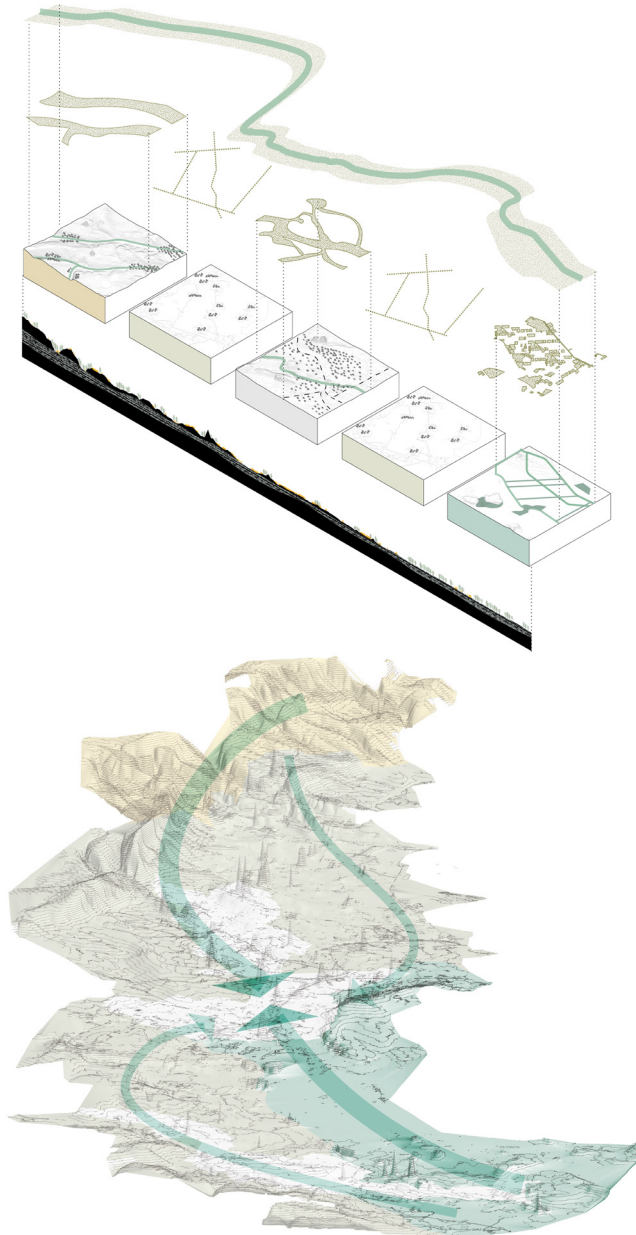


Figure 4.10
Conceptual
connections
through territory

Rewriting the Territory

Concept

The core vision of the territorial strategy is to integrate the ecological development of peripheral natural habitats with the agricultural and urban intensities of the central corridor into a unified framework of ecological sustainability. Through the implementation of urban forestry, the plan aims to foster synergy between distinct landscape zones and create a resilient and interconnected territorial system.

From a *landscape ecological perspective*, this project adopts the Supply-Demand-Flow model of ecosystem services (Serna-Chavez et al., 2014) as a theoretical framework. This model not only emphasizes the production and benefits of ecosystem services (Fisher et al., 2009), but also incorporates the spatial accessibility of service flows as a crucial factor in landscape design. Based on this, a forestry-based ecosystem service framework for the mining basin is developed.

The natural and semi-natural habitats located in the upland and basin zones serve as the primary supply areas, generating diverse ecosystem services such as water regulation, biodiversity support, and climate moderation. These zones form the core ecological foundation of the territory. Ecosystem services are then transmitted and distributed spatially through a network of blue-green infrastructure and ecological corridors, including rivers, greenways and wetland buffers, which act as flow pathways.

The urban agglomerations in the central corridor represent the primary demand areas, where ecological needs are most concentrated and varied, including air purification, microclimate regulation, heritage space shaping, and social commons network. Ensuring the effective flow and integration of services from supply to demand zones is thus essential to building a resilient and functional territorial ecosystem.

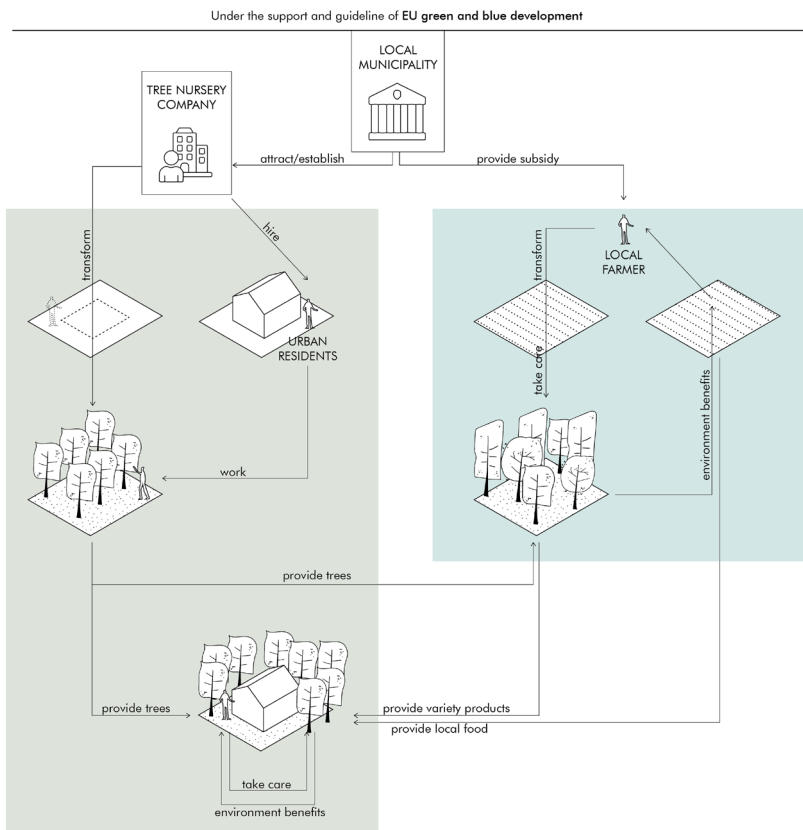


Figure 4.11
Conceptual
management
strategy

From a *socio-participatory perspective*, the concept envisions the development of interconnected project systems linking urban communities with rural farmers. As Liu et al. (2010) state in their theory of urban-rural coupling, urban and rural systems can achieve co-development through the dynamic circulation of resources, labor, capital, and ecosystem services. One practical scenario involves establishing urban nurseries — particularly near QPVs (Priority Urban Neighborhoods) — under the guidance of public policy and financial support. These nurseries would create employment opportunities while supplying material resources for regional forestry initiatives. Meanwhile, rural forestry projects could provide food and plant products directly to local urban markets. The ecosystem services generated by this interlinked system would circulate back to both sides: urban residents would benefit from improved living environments, healthier food, and new sources of income, while farmers would gain more sustainable land practices, reduced production risks through diversification, and increased profits. This reciprocal structure supports a resilient socio-ecological framework built on shared benefit and cooperation.

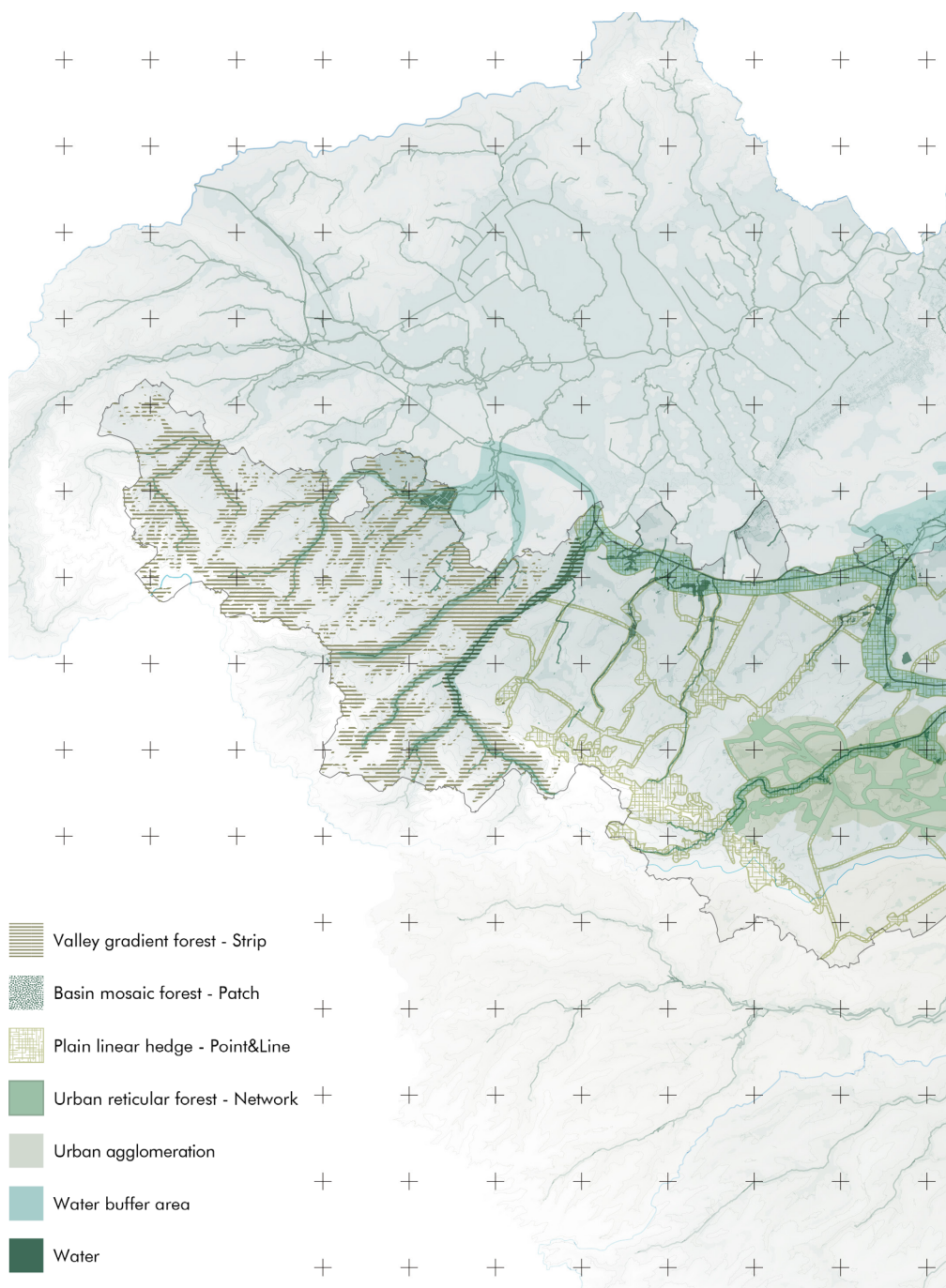
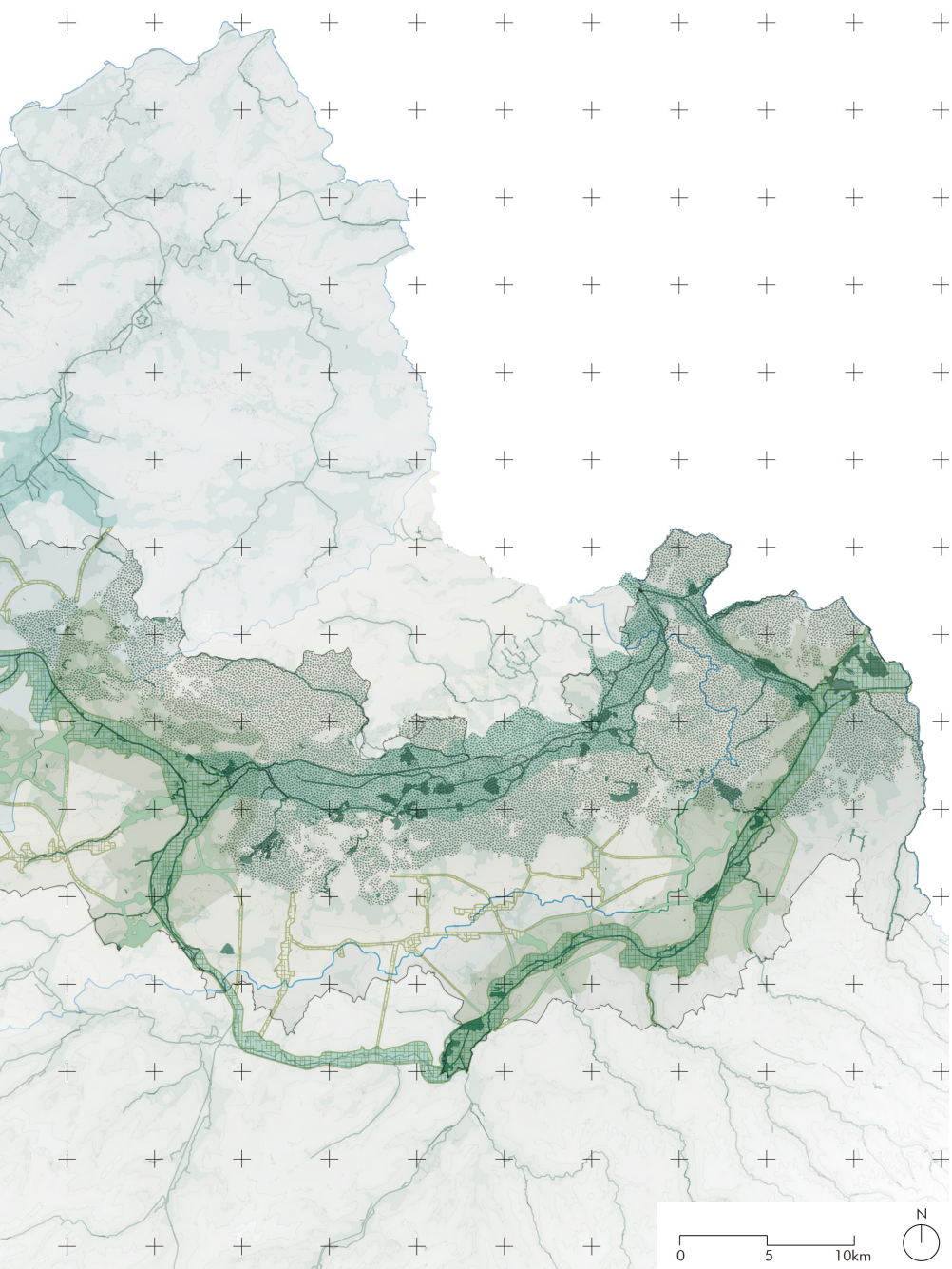


Figure 4.12
Territory
vision



Vision:

This vision divides the Nord-Pas-de-Calais mining basin into four strategic zones, each corresponding to specific geomorphological conditions, hydrological structures, ecological potentials, and socio-spatial dynamics. This territorial division not only reflects the natural distinctions across the landscape but also acknowledges the different historical trajectories and future transformation roles of each zone.

In parallel, a continuous Water Buffer Area is established along major rivers and wetland systems to serve as the backbone of a unified blue-green infrastructure network. This system enhances overall hydrological regulation and strengthens ecological connectivity across the territory.

Together, a territorial system is formed based on gradient-patch-line-network logic. This structure supports the full cycle of ecosystem services – from supply, to flow, to integration – while responding to geological, hydrological, land-use, and socio-political patterns. More than a forestry strategy, it is a declaration of ecological politics at the territorial scale: in the mining basin's fractured legacy and uncertain future, the forest becomes a bridge between memory, restoration, and hope.

Unifying Strategy: Water Buffer Area

A cross-cutting blue-green strategy overlays all four forest zones. Ecological buffers are installed along river systems and groundwater-sensitive zones to enhance regional hydrological regulation and system resilience.

Core strategies: Restore historical wetlands and floodplain dynamics; Implement riparian buffer forests and urban stormwater retention zones; Use the water buffer as the structural backbone of the blue-green network, ensuring connectivity among all forest types.

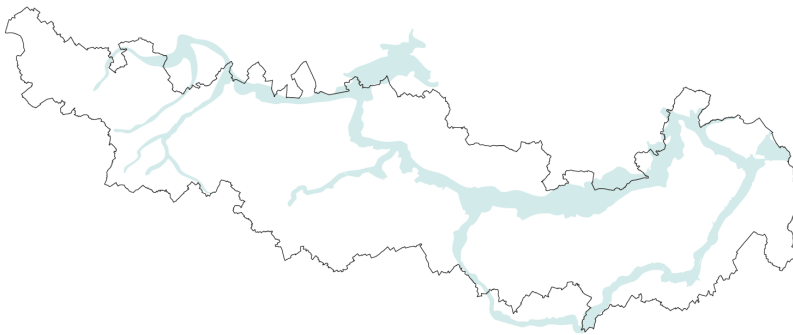


Figure 4.13
Structure of
water buffer

Strip-Valley Gradient Forest

Located in the southwestern Artois highlands and their deep valleys, this area features rolling terrain, abundant water sources, and relatively low land-use intensity. It is a key zone for mountain forest ecosystems with clear vertical gradients. This zone acts as a vital ecosystem service supply area, particularly in terms of water regulation, species refuge, and slope stability.

Core strategies: Construct slope-responsive forest gradients, cultivating multilayered vegetation structures to enhance microclimatic regulation and ecological shielding; Establish water buffer areas at valley bottoms to reinforce water storage and habitat functions; Connect existing pastures, woodland remnants, and abandoned sites to restore native forest assemblages and boost ecological connectivity.

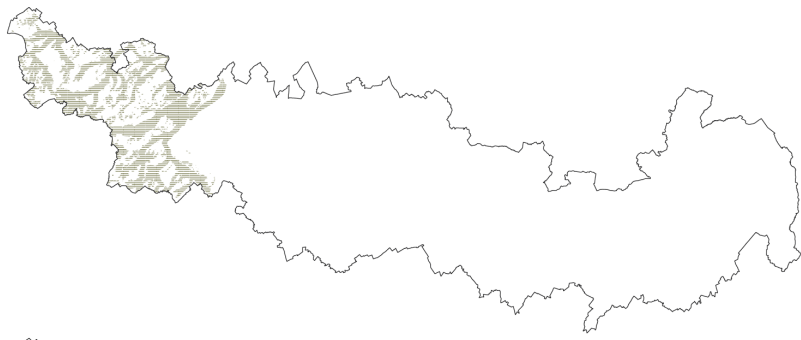


Figure 4.14
Structure of
valley gradient
forest

Patch-Basin Mosaic Forest

Located in the northeastern basin, this area is defined by flat terrain, complex hydrology, and a matrix of wetlands, grasslands, and agricultural plots. Natural and semi-natural habitats are abundant in parts of the region, making it ecologically sensitive yet full of regenerative potential. As a regulating core, this area plays a significant role in water purification and flood moderation.

Core strategies: Construct a mosaic of wetlands, woodlands, and grasslands to improve structural diversity; Promote ecological land-use transition in agriculture (e.g. agroforestry systems and hedgerows along pastures); Re-establish riparian wetland systems in flood zones to boost water retention and restore lost aquatic-edge habitats; Use terrils and degraded lands as ecological patches planted with hydrophilic and phytoremediative species.

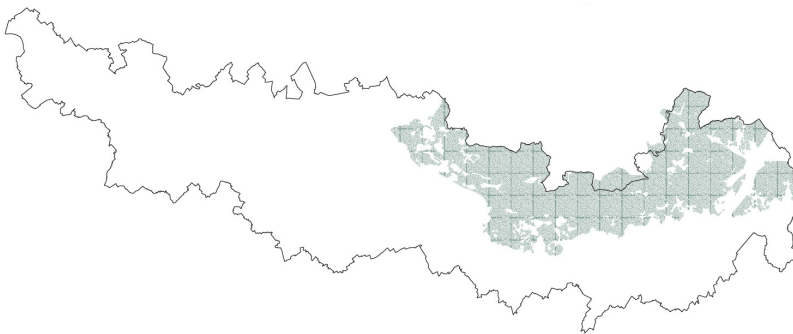


Figure 4.15
Structure of
basin mosaic
forest

Point&Line-Plain linear hedge

This zone covers the central agricultural plain. It is characterized by flat terrain and fertile soils, but intense agricultural use has led to highly fragmented habitats and weak ecological connectivity. As the pipeline for ecosystem service flows, this area is essential for transmitting services into urban zones.

Core strategies: Build linear green corridors through riparian buffers, hedgerow systems, and vegetated drainage lines; Guide the transition from conventional agriculture to ecological or agroforestry practices, enhancing soil functionality and biodiversity; Connect ecological corridors from uplands and wet basins through the plain to act as functional mediators for service delivery.



Figure 4.16
Structure of
plain linear
forest

Network–Urban Reticular

ForestConcentrated in urbanized hubs such as Lens–Douai and Valenciennes, this zone features high-intensity human activity, overlapping infrastructure, and mining heritage. It represents the primary ecosystem service demand area, marked by population density and social vulnerability. Here, internal ecological embedding must be paired with social engagement to create hybrid ecological–cultural–social spaces.

Core strategies: Construct an urban wooded commons network using micro-forests, pocket parks, and neighborhood green belts to improve ecological permeability; Develop community nurseries, educational forests, and shared woodlands in QPVs to encourage participatory stewardship; Transform mining relics into cultural-ecological nodes to foster place-based ecological awareness and collective memory.



Figure 4.17
Structure of
urban reticular
forest

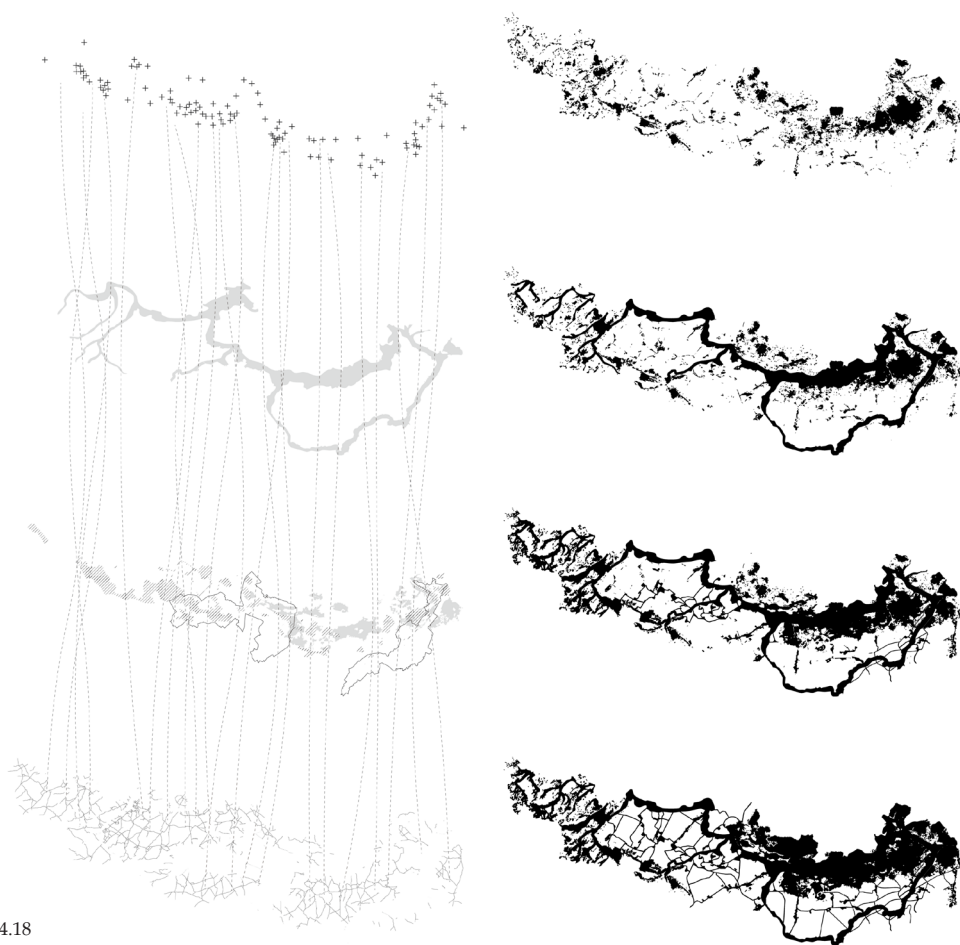


Figure 4.18
Layers and
successions

Strategic Succession

The implementation of the territorial forestry strategy follows a phased approach that mirrors both ecological processes and socio-political feasibility.

Phase 1: Initiation

Vacant urban plots and high-vacancy mining communities are transformed into nurseries, particularly near QPVs (Priority Urban Neighborhoods), creating jobs and supporting local engagement. Simultaneously, preparatory actions such as soil sampling, groundwater analysis, and native seed collection are carried out to identify appropriate species and strengthen nursery viability.

Phase 2: Establishing the Backbone

The forestry framework begins with the development of Water Buffer Areas—riparian and groundwater-sensitive zones that form the backbone of the blue-green infrastructure. Nurseries supply trees, while forest typologies are tested and refined across different zones.

Phase 3: System Expansion

Successful practices from the buffer areas are adapted and extended: wooded commons are developed in urban agglomerations; valley and hill corridors are reinforced; and agroforestry mosaics are introduced in basin landscapes. The forestry network now supports ecological flow, cultural identity, and spatial regeneration.

Phase 4: Consolidation

Connectivity is reinforced across all zones. Tree lines and hedgerows enhance structure in the central plain, while maturing forests in hills and basins provide resilience. As planting demand decreases, some nurseries are reprogrammed into parks or community assets, embedding forestry into everyday life.

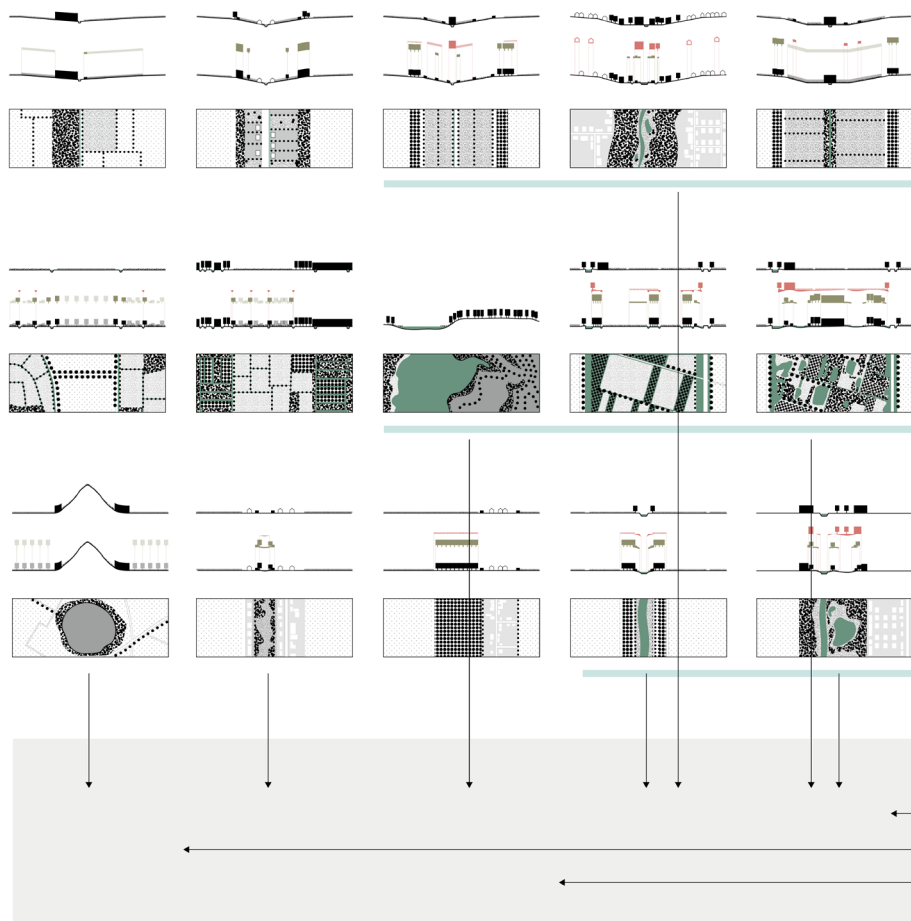
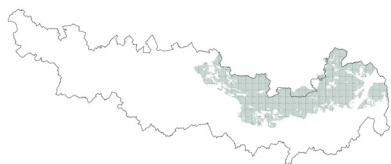


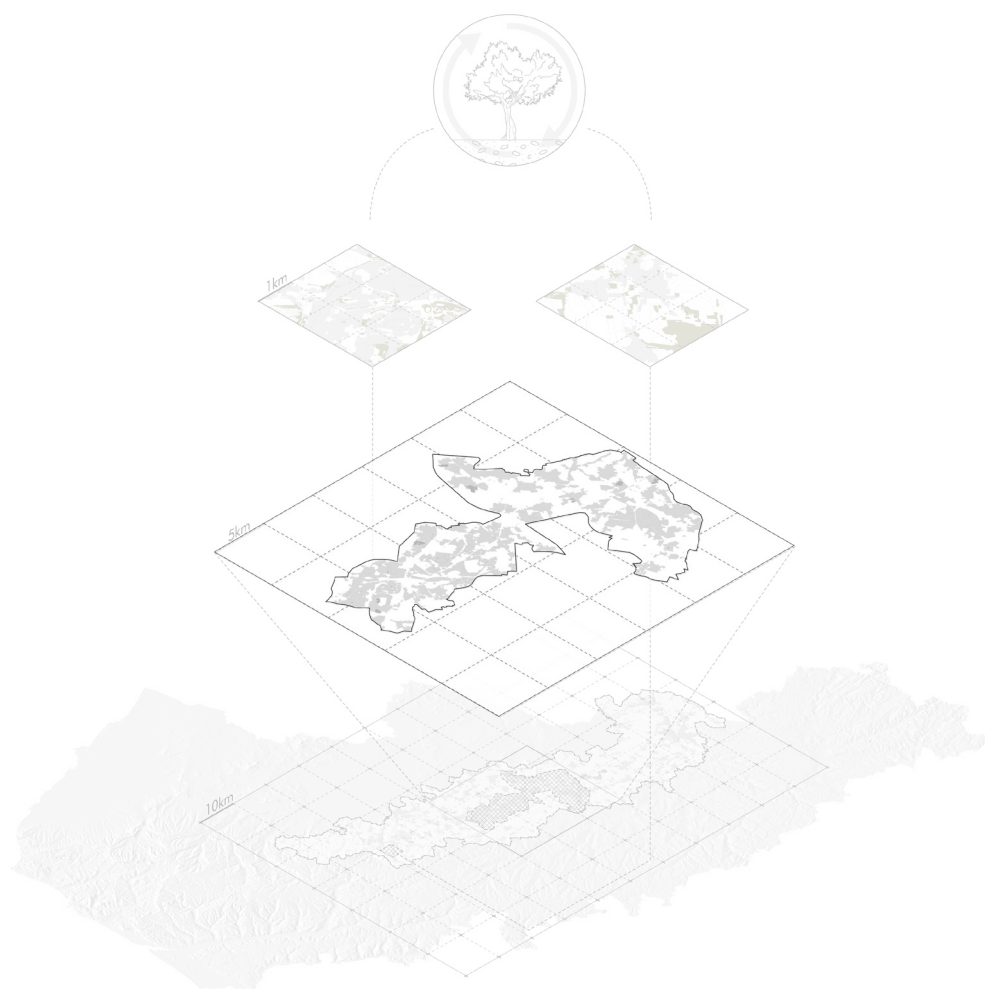
Figure 4.19
Territorial
strategic
toolbox



Toolbox:

Different forestry strategies are applied across valleys, basins, plains and urban agglomerations according to their specific spatial characteristics and ecological-social needs. These strategies are informed by both local practice observations and references to relevant landscape projects.

In the accompanying diagram, red areas indicate elements to be reduced or removed (e.g., ecological barriers, degraded patches, or overexploited zones), while green areas represent the structures or spatial qualities to be enhanced or introduced through design interventions – such as ecological corridors, habitat patches, or connective planting structures.



Urban Agglomeration - Meso Scale

Portraying the Urban Space

At the meso scale of urban agglomeration, spatial complexity emerges in its most tangible form. Though satellite imagery and plan drawings suggest a compact and orderly urban system, the experience on the ground tells another story – one marked by fragmentation, rupture, and uneven spatial rhythms. This section begins with a series of field photographs, capturing diverse spatial atmospheres across the Lens–Douai conurbation: from terrils viewed from surrounding neighborhoods, to forest barriers along highways and vacant plots bordering the urban core. These everyday scenes reveal not only the city’s material fabric but also its social tensions and latent ecological potential.

To move from perception to structure, the photos are followed by a set of spatial mappings that analyze urban space through multiple lenses. These include temporarial spatial evolutions, land use dynamics, vacancies, and layers of cultural and infrastructural presence. Together, they form a composite portrait of a shrinking urban landscape – one marked by contrast: density and void, enclosure and porosity, memory and discontinuity. This process of portraying aims not merely to describe the city’s current state, but to uncover sites of possibility where landscape intervention may heal spatial ruptures, strengthen ecological flows, and reweave urban life.



Figure 4.20
View of the terril
from surrounding
community.
Photographed by author.



Figure 4.21
View on the terril
*Photographed by
author.*



Figure 4.22
View of the forest barrier
besides highway.
Photographed by author.



Figure 4.23
View on the vacant plots
around city center
Photographed by author.



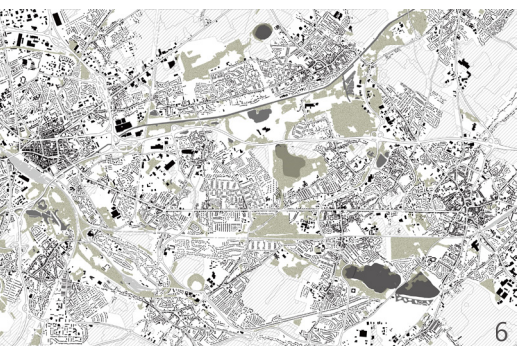
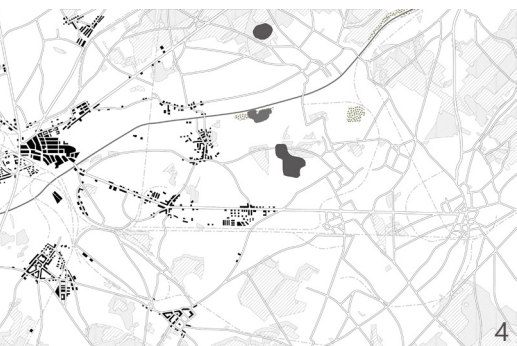
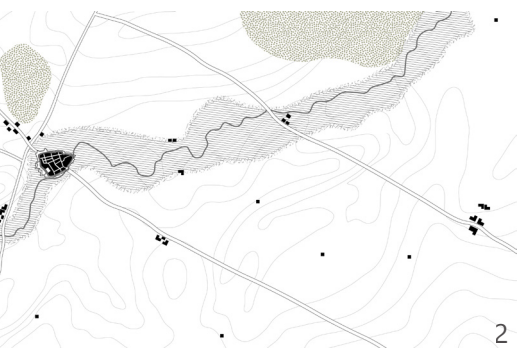
Figure 4.24
View of the miner's
resident district.
Photographed by author.



Figure 4.25
View of the terril and
the main street.
Photographed by author.



Figure 4.26
Landscape
development
through time



Temporal layers

Historical mapping shows that urban expansion in the mining basin occurred through shifting development poles across time, forming a relatively balanced but fragmented spatial structure. This growth pattern lacked strong internal connectivity, leading to spatial discontinuities where separate urban zones merged without integration. Post-industrial suburbanization and decentralization further deepened social fragmentation, undermining cultural identity and service efficiency. In this context, the urban forestry framework must extend beyond ecological functions. Forests can bridge territorial ruptures, offer new economic momentum, and support social resilience. Building a wooded commons network not only enhances cultural heritage but also promotes interaction, collective memory and cooperation.

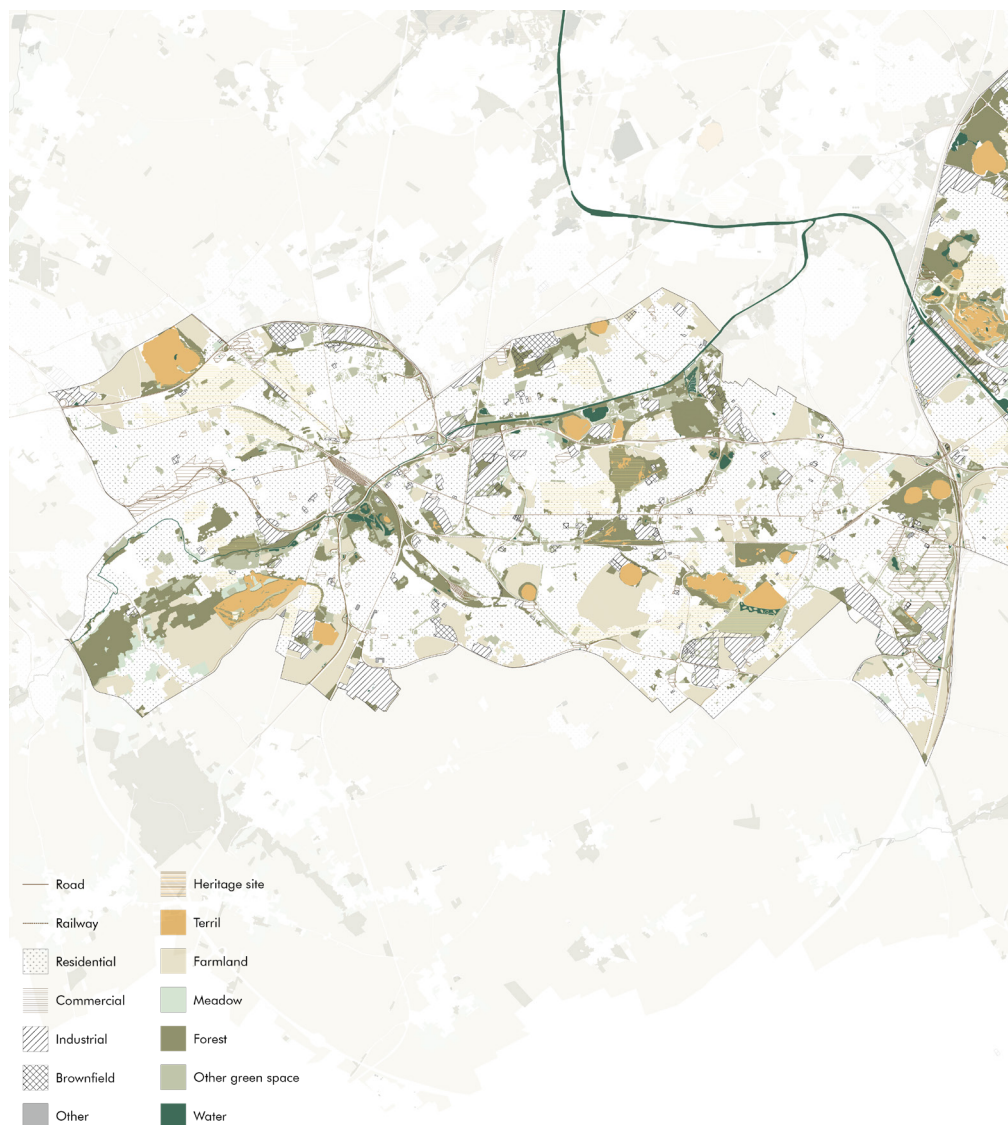
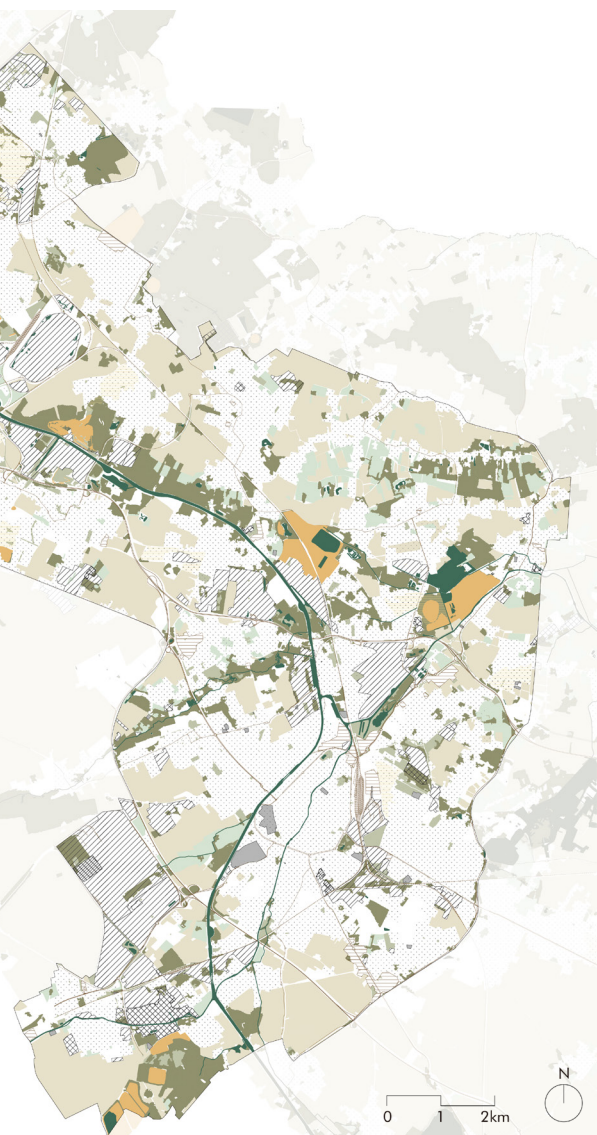


Figure 4.27
Landuse analysis



Land use layer

Through land use analysis, spatial fragments within the urban fabric can be identified: a mosaic of agricultural parcels and pockets of underutilized brownfields are embedded between dense residential zones.

Existing forestry patterns have also been observed – particularly along river corridors, infrastructure edges, and former mining sites – where their spatial logic aligns with the territorial vision. These overlaps suggest that the Lens-Douai urban agglomeration already possesses a promising forestry foundation, upon which more integrated and multifunctional woodland strategies can be developed.

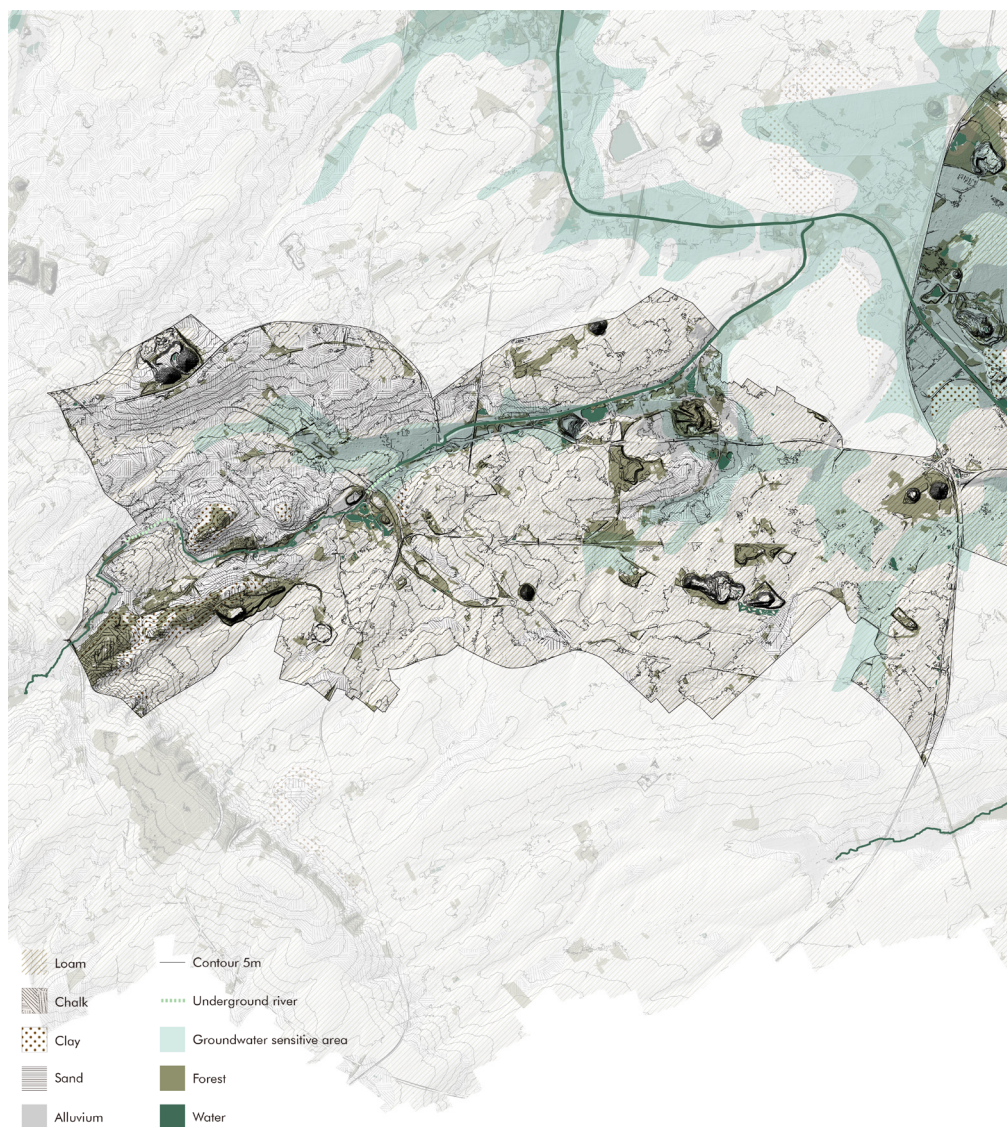


Figure 4.28
Biophysical
analysis



Physical environment layer

This analysis reveals key insights into topographic variation and zones at risk of groundwater rise, offering a spatial basis for precisely locating blue-green infrastructure. The region's terrain also highlights the distinctive presence of terrils, which, when combined with the "up and down" spatial experience observed during fieldwork, suggest strong potential for cultural landscape articulation. In addition, the analysis identifies a significant interruption in the river corridor within the center of Lens, which becomes a critical concern for the continuity of the forestry backbone. These elements collectively inform both ecological strategy and cultural spatial design.

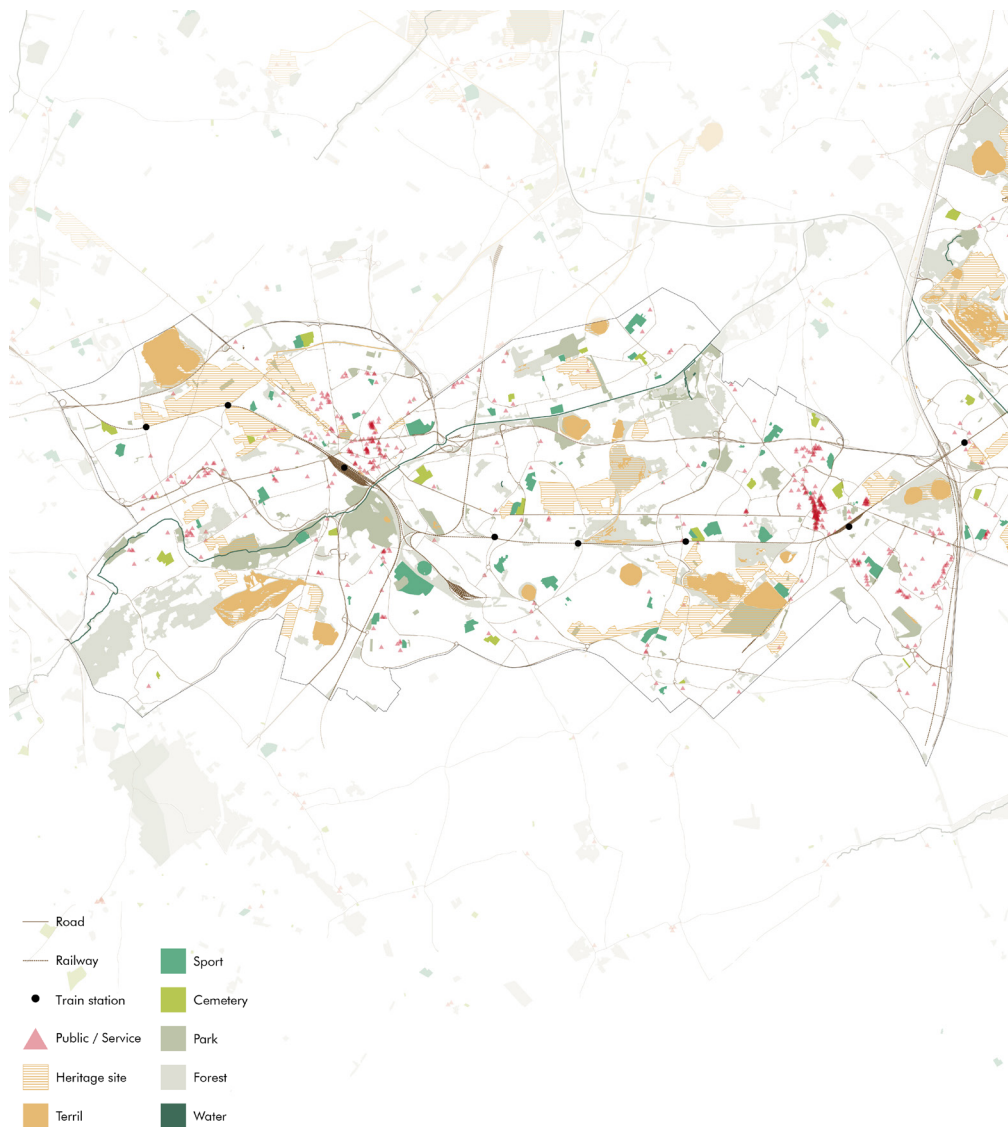


Figure 4.29
Cultural nodes
in urban area



Cultural layer

The mapping of the cultural layer highlights the spatial traces of former city centers, key mining heritage sites, and existing spaces of public activity and civic services. These elements reveal the historical structuring of the urban fabric, where cultural identity was once anchored in the proximity between industrial sites and working-class neighborhoods

While some heritage nodes (mainly miners' housing districts and terrils) retain symbolic significance, the overall fragmentation of the cultural network suggests a weakened sense of continuity and place-based memory.

This layered understanding informs the design of forestry interventions not only as ecological infrastructure, but as carriers of cultural resonance and memory restoration.

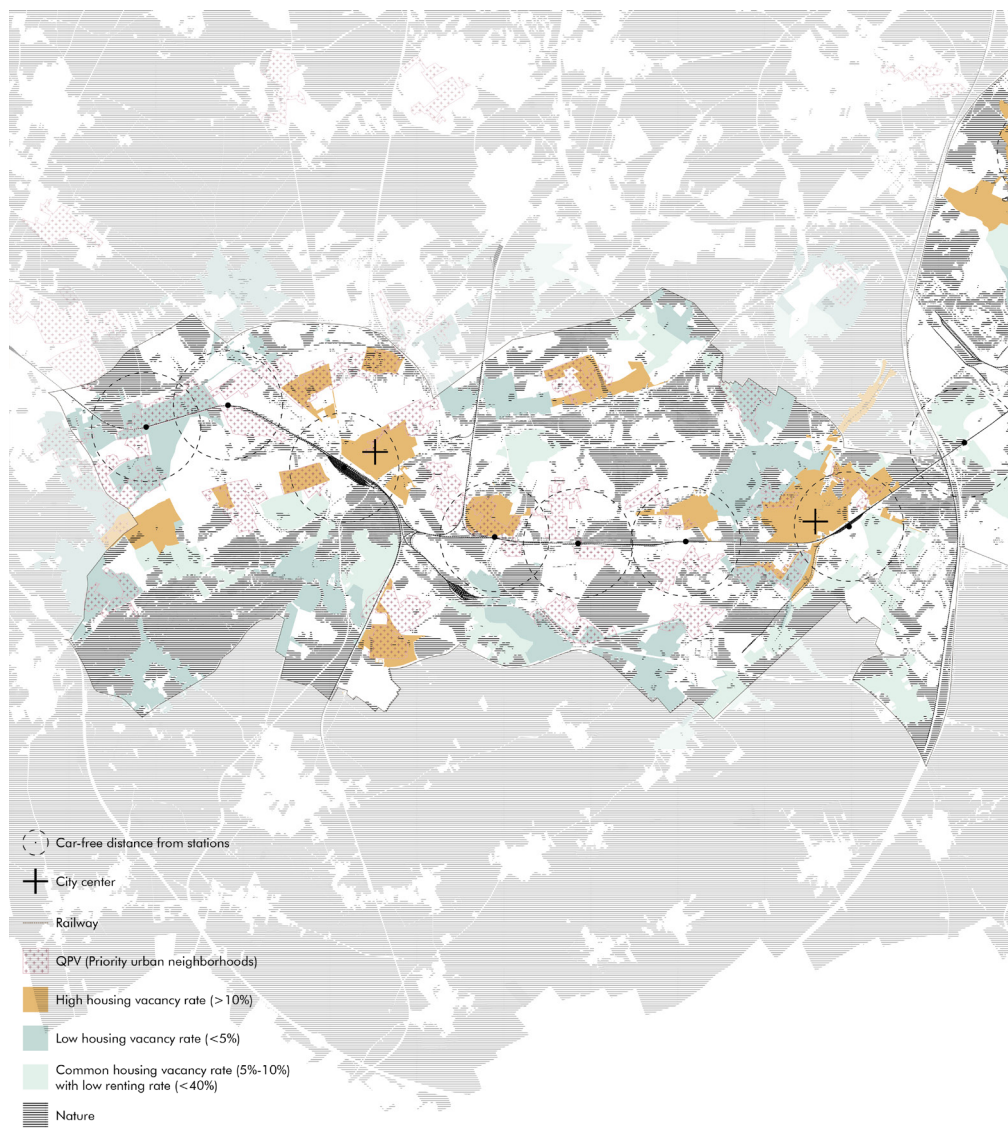
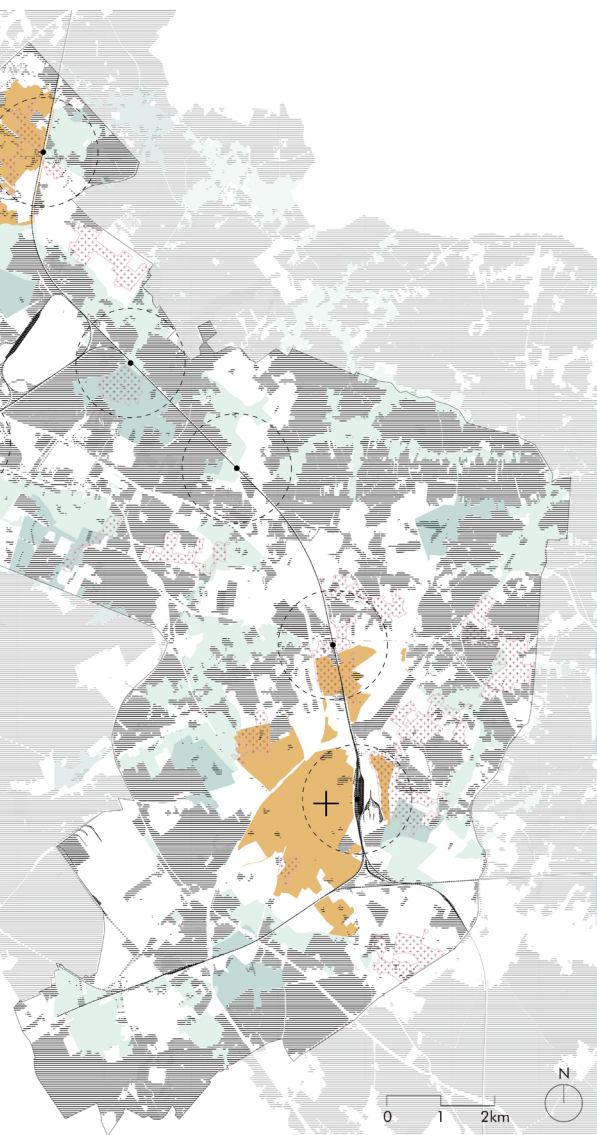


Figure 4.30
Vulnerable
communities and
residents' living
preferences



Community layer

Community analysis focuses on several key indicators. First, areas with high residential vacancy rates suggest a greater potential for spatial transformation. The “doughnut effect” is clearly visualized in this analysis. In contrast, zones with very low vacancy and low rental rates reflect a strong degree of residential stability and preference – often located in peri-urban areas close to nature. The distribution of QPV (Priority Urban Neighborhoods) highlights potential economic and labor resources within the region.

When overlaid with the public railway network, the analysis reveals that many of the most inhabited residential zones fall outside walkable access to stations, helping to explain the heavy dependence on private car travel. These spatial insights are key to shaping socially inclusive and mobility-sensitive urban forestry strategies.



Figure 4.31
Urban potential
space (white)



Potential space

Based on the preceding analyses, key spatial elements can be identified within each layer as having development potential. For example, transformable communities, brownfields, and vacant plots indicate spatial potential; existing forests and riparian zones represent ecological potential; catchment boundaries and infrastructure corridors show environmental potential (according to the territorial toolbox); and cultural heritage sites and historic city centers reflect cultural potential. Together, these insights inform the creation of a potential mapping diagram, outlining where urban forestry interventions could be most effective.

Reforming the Urban Life

Concept

The potential mapping reveals a clear structure for the future development of urban forestry. Two major spatial trajectories emerge as structural anchors. The first follows the riparian corridor, where, under the guidance of the territorial strategy, a continuous belt of woodlands and wetlands is planned along the riverside. The second trajectory aligns with the distribution of cultural heritage sites, located near or along the railway lines, forming a coherent point–line sequence. These two trajectories form the “two arms” of the Urban Particular Forest:

Mega Blue–Green Corridor connects with the large blue–green infrastructure, and links the territory’s two major ecological habitat zones. It is the main structural anchor for delivering ecosystem services at a macro scale. It provides hydrological regulation, biodiversity corridors, and climate mitigation functions for the urban area. Provisioning services are embedded along this structural element where appropriate.

The *Memorial Forest Path*, in addition to functioning as a cultural corridor, serves as a transmission route – carrying supporting and regulating ecosystem services from the territorial landscape into the meso-scale urban agglomeration. Here, cultural heritage is activated, and ecological functions are embedded into daily urban life. Together, these two lines form the supporting framework of urban forestry.

Beyond these 'two arms', and based on previous mappings, other transformable spaces are strategically reimagined as diverse or hybrid *Daily Woodland Commons*, each delivering one or more ecosystem services. These spaces act as the capillaries of the urban forestry system – ensuring the equitable distribution of ecological functions across communities.

Together they form a coherent and multifunctional woodland network that restructures the post-industrial landscape while redefining urban life.



Figure 4.32
Conceptual
structure



Figure 4.33
Master plan



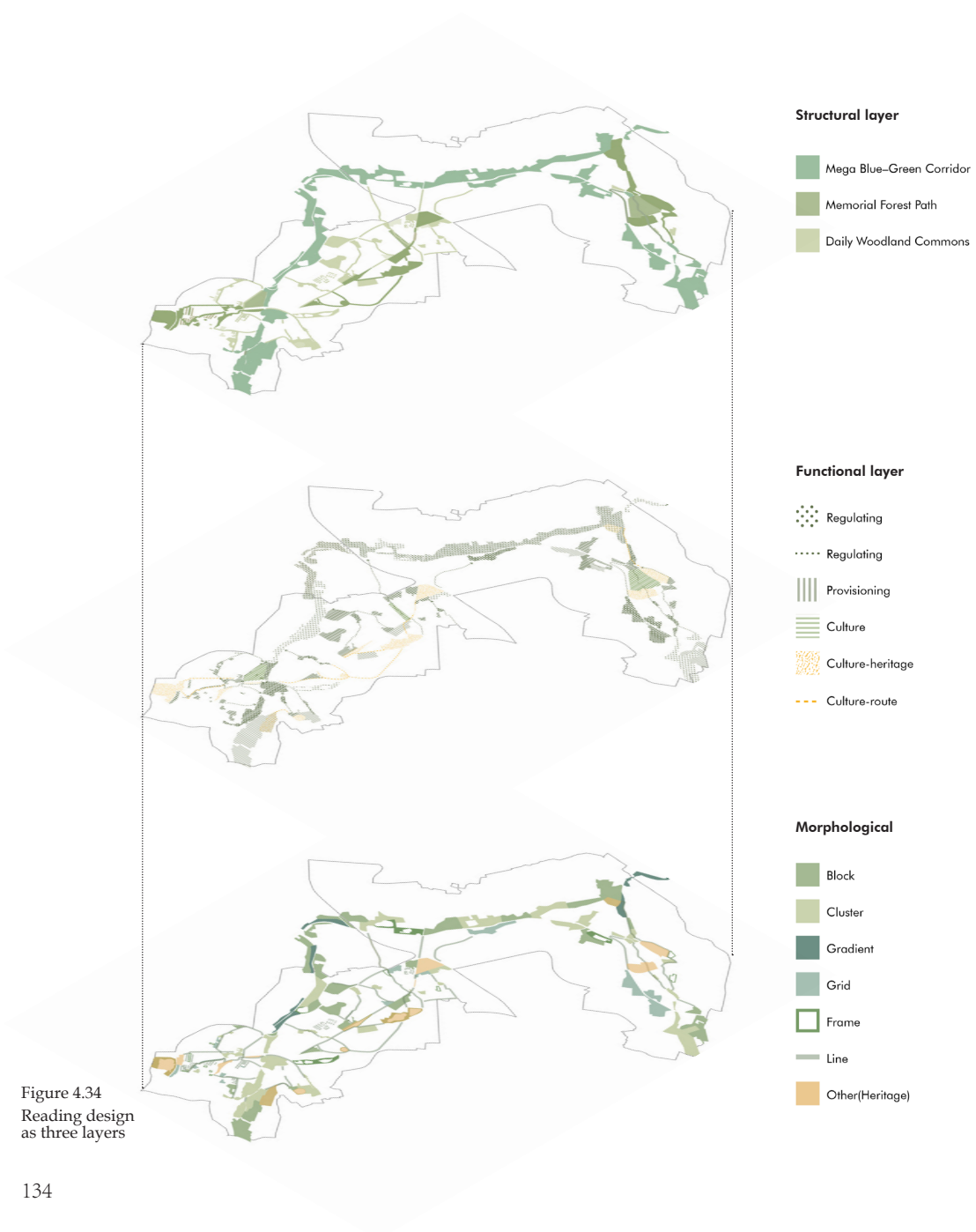


Figure 4.34
Reading design
as three layers

Master plan

The urban agglomeration planning framework is composed of three interrelated layers: the structural layer, the functional layer, and the morphological layer.

The structural layer refers to the forestry structure introduced in the conceptual strategy: an integrated urban woodland network composed of two major “arms” (the blue–green corridor and the cultural woodland path) and a network of capillary spaces (the daily woodland commons). Together, these elements aim to embed ecosystem services equitably within the urban context, forming the spatial backbone of the Urban Particular Forest.

The functional layer reflects the direct mapping of ecosystem services onto spatial interventions. While supporting services are inherently embedded in the woodland network itself, the other categories translate into the following design functions. Cultural services: Shaping cultural landscapes with memorial forest paths; Regulating services: Implementing stormwater collection and guidance landscapes along catchment corridors, integrating filtering and retention zones, and planting buffer woodlands along infrastructure edges. Provisioning services: Developing a nursery system, and in some areas, introducing edible forests and productive woodlands. These functions may overlap within certain spatial zones, necessitating a refined spatial coordination and design strategy to ensure complementarity and integration.

The morphological layer addresses the spatial forms of forests, which are closely linked to both existing land-use conditions and the intended service functions of forestry. In general, the urban woodland network can be categorized into six primary morphological types: Block, Cluster, Gradient, Grid, Frame and Line – each responding to different ecological, social, and urban spatial logics.

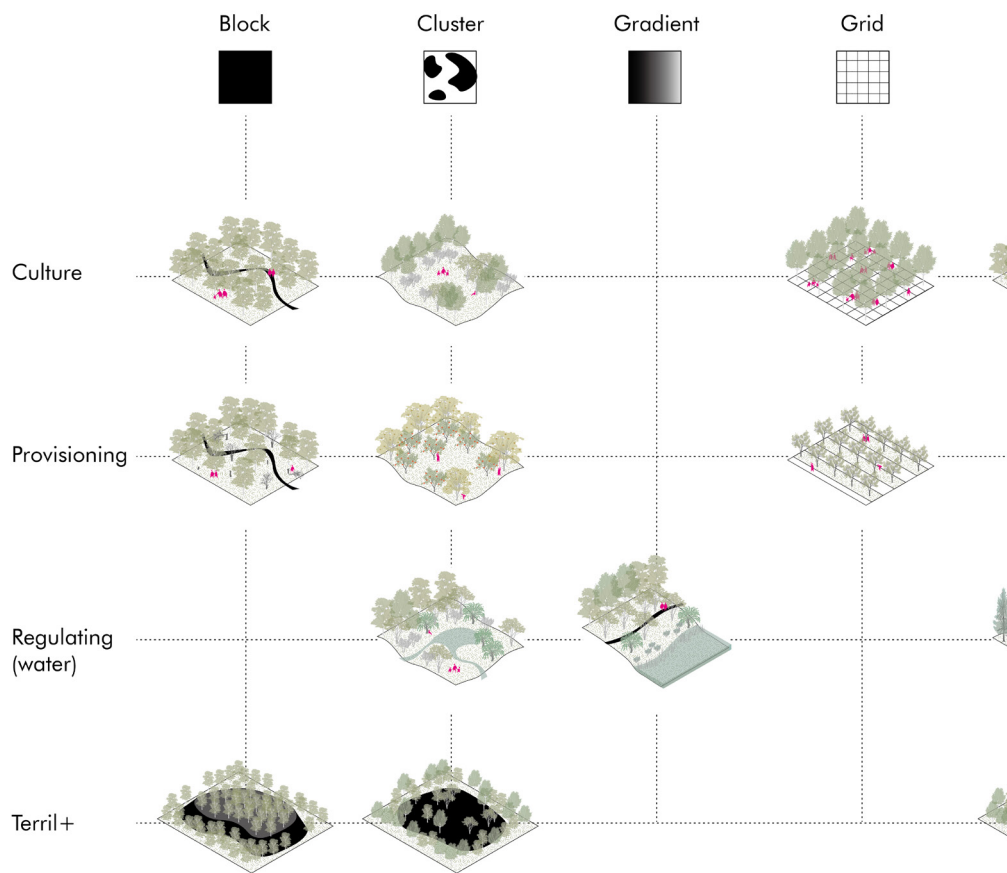
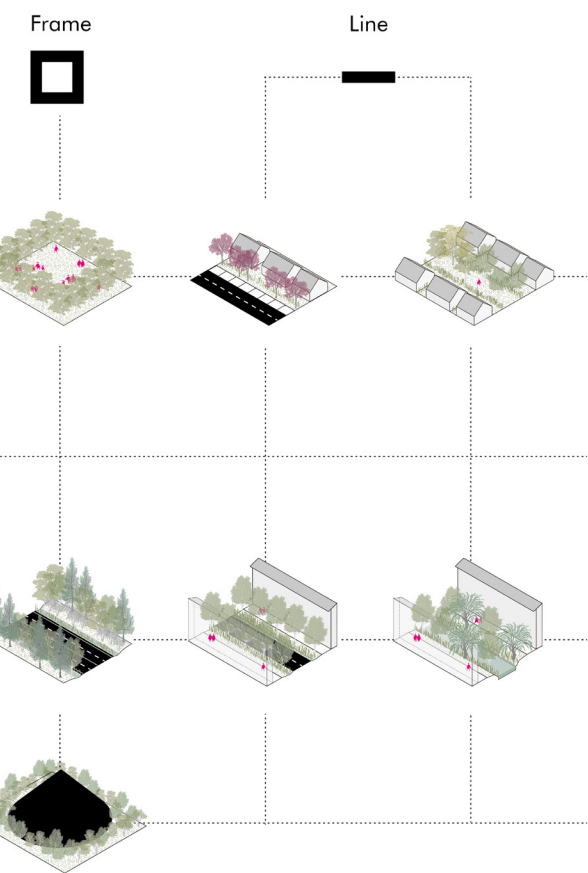


Figure 4.35
Ecosystem
services with
diverse forest
space



Tool box

A series of spatial scenarios are developed to establish concrete relationships between the morphological layer and the functional layer of the urban forestry system.

In parallel, particular attention is given to the integration of mining landscape heritage into the design process. The toolbox is extended to explore how forestry can interact with Terrils (spoil heaps) and Cités minières (miners' housing districts), shaping diverse hybrid spaces where woodland development becomes a medium for memory, regeneration, and transformation. These models reveal potential for forests to reinterpret and reframe the mining past, while simultaneously activating ecological and social functions in post-industrial urban fabric.

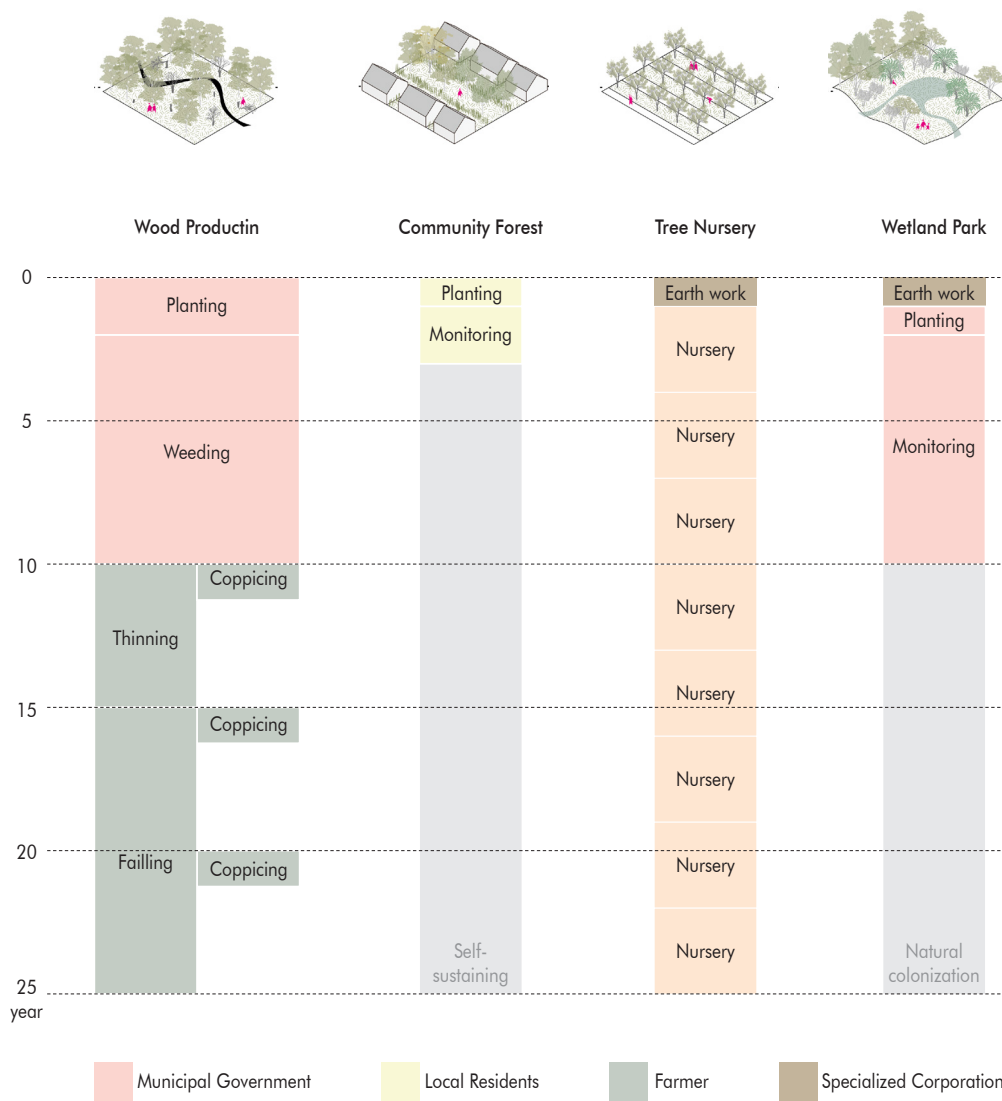
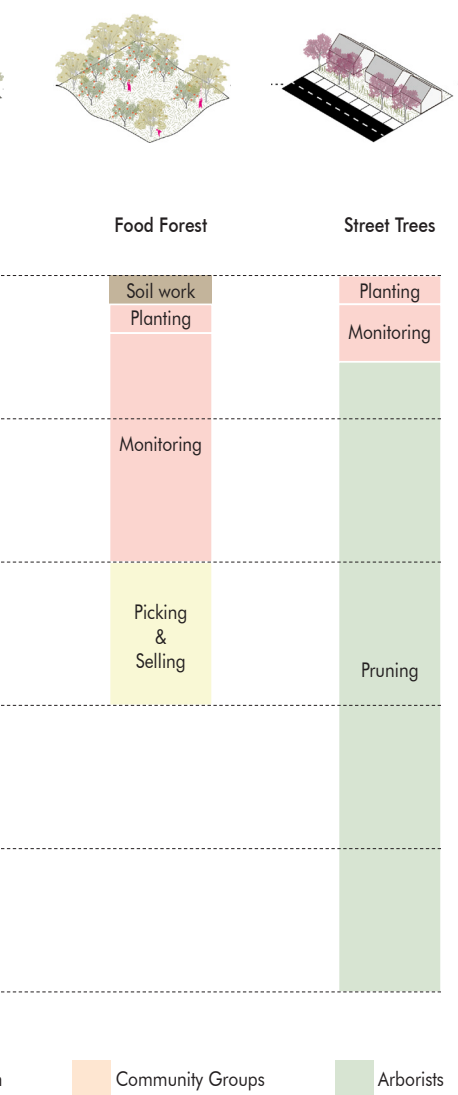


Figure 4.36
Local
management
of different
forest project



Actors and actions

Due to the diversity of urban forestry projects and their varying scales, it is difficult to represent the establishment of the urban woodland structure through a linear succession model. However, the actors and actions involved in different project types can be mapped along a temporal axis to better understand implementation dynamics.

Large-scale waterfront park forestry projects often involve earthworks for riverbank reshaping and, in some cases, minor infrastructure modifications. These projects typically require a long implementation period and involve a wide range of actors: multiple local government departments, construction companies, forestry professionals during the execution phase, and long-term maintenance personnel. Surrounding residents and farmers may also participate in use and

production activities associated with the project.

Cultural heritage landscape projects focus primarily on spatial design and place-making. While they require an initial phase of design and planning, key actors include cultural departments and design firms. Once implemented, local residents can engage in experiential use, and ongoing maintenance is typically handled by professional staff or community-based cultural organizations.

Small- and medium-scale community forestry projects are characterized by short preparation periods, low implementation difficulty, and high levels of public participation. Following land preparation led by the municipality, residents may be invited to join in tree planting and may take on responsibility for everyday maintenance through community management systems.

Nursery projects, seen as a key urban economic strategy, are often among the first forestry interventions to be implemented. After site preparation by the municipality and nursery companies, large numbers of employment opportunities are created for nearby residents. The business and operation system is co-managed by these three stakeholders. In terms of timing, the nursery model is cyclical in nature.

Street greening projects, such as guiding woodland corridors linked to cultural heritage and rainwater landscape systems within the blue-green infrastructure, are typically implemented first, followed by secondary connections. Similar to community forestry projects, these have short timeframes and are primarily executed by government departments and technical staff. Post-implementation observation and maintenance can be shared between professionals and community residents – daily tasks such as watering managed by locals, with periodic inspections and pruning carried out by staff.

Design validation

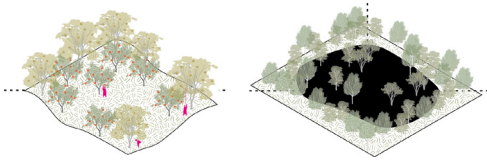
To test the applicability of the proposed strategies, a key intervention site is selected for design validation: the Mega Blue-Green Corridor in Lens. As a central component of the regional woodland network, this corridor plays a crucial role in restoring ecological connectivity. The validation focuses on three representative locations along the upper, middle, and lower reaches of the corridor. Through these design interventions, the process reveals how the toolbox is applied in practice, how different actors engage in each stage of transformation, and how the ecosystem services progressively develop over time.



Figure 4.37
Key points for
intervention
along river



Figure 4.38
Upstream
interventions,
successions
and services



Upstream - Terril Buffer Forest Intervention

In the upstream area, adjacent to the terril, the intervention focuses on enhancing riparian forest buffers to address legacy pollution and improve ecological function. Tree belts are reinforced with species adapted to acidic soils, contributing to water purification and microclimatic regulation.



The intervention also includes long-term maintenance strategies such as selective pruning and undergrowth management, ensuring the forest's adaptive renewal over time. This approach transforms a post-industrial margin into an active ecological buffer.

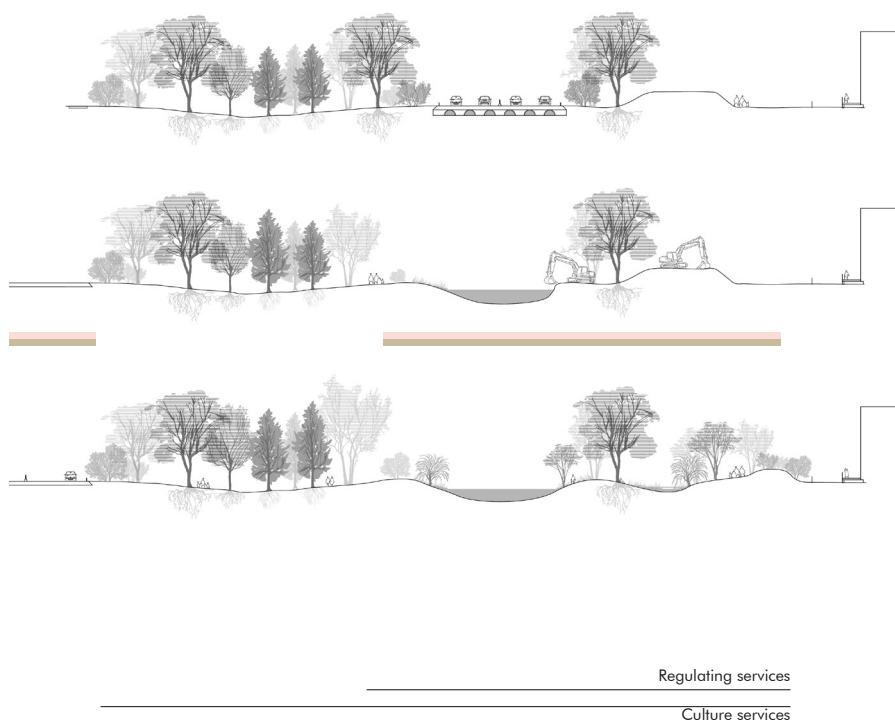
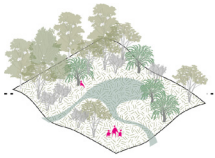


Figure 4.39
Midstream
interventions,
successions
and services



Midstream – Urban River Reconnection and Public Forest Park

At the midstream section, located in the Lens city center, the design re-establishes river connectivity by rerouting part of the road infrastructure and integrating a series of landscape interventions. A wetland park is introduced alongside tree-lined boulevards and forest-based public squares. These spatial strategies transform fragmented, car-dominated areas into socially inclusive and ecologically functional public spaces. They enhance both regulating and cultural ecosystem services, providing residents with a renewed urban-nature interface.

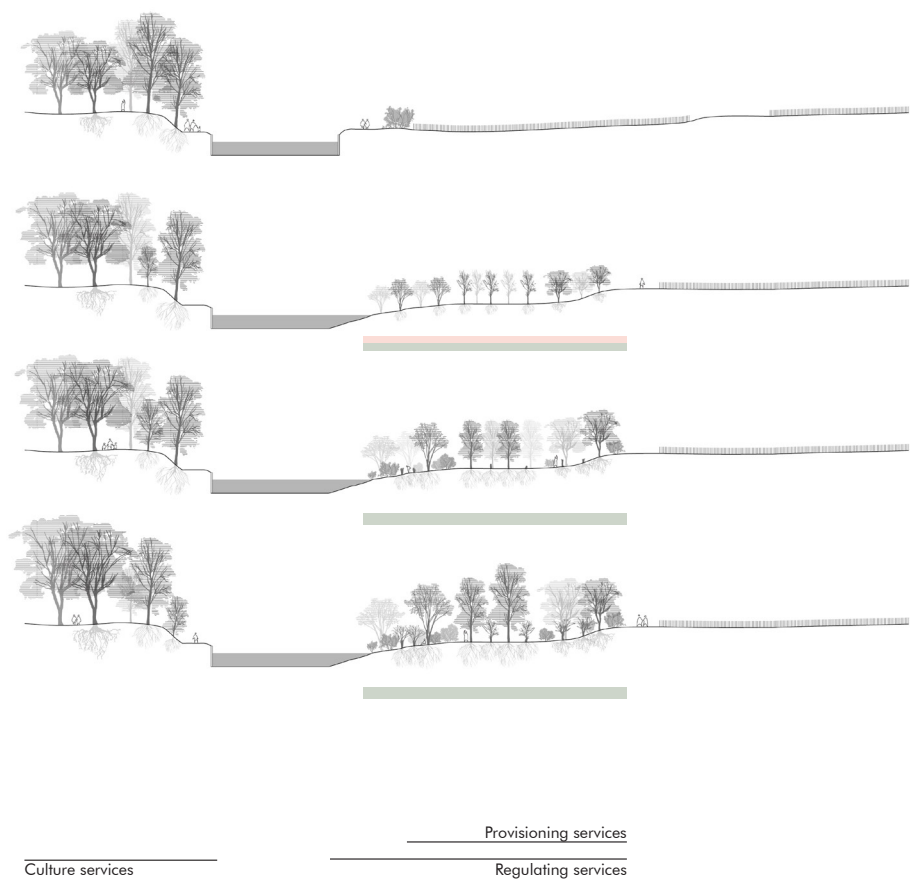
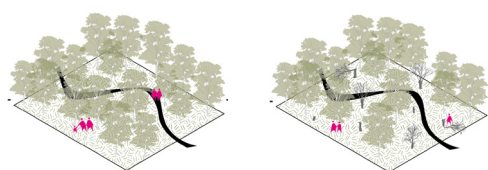


Figure 4.40
Downstream
interventions,
successions
and services



Downstream – Productive Forest Strip Adjacent to Farmland

In the downstream area, where the corridor borders agricultural land, a 30-meter-wide forest belt is established to act as a productive and ecological buffer. The woodland is managed through coppicing cycles, allowing for a balance between biomass production and ecological regulation. This multifunctional buffer reinforces riverbank stability, reduces runoff, and contributes to the local forestry economy, demonstrating how ecological infrastructure can be integrated into rural-urban interfaces.



Figure 4.41
Comparison
between before
and after





Figure 4.42
Wooded common
network

Network of 'wooded commons +'

The 'first, second, and third place' framework, introduced by Oldenburg (1998), categorizes everyday spaces into the home, the workplace, and informal social venues such as cafés or public squares, where community interaction and civic life take place. However, this theory has been primarily applied to built or commercial urban environments, with limited exploration of its relevance to green open spaces or landscape design. However, this theory has been primarily applied to built or commercial urban environments, with limited exploration of its relevance to green open spaces or landscape design.

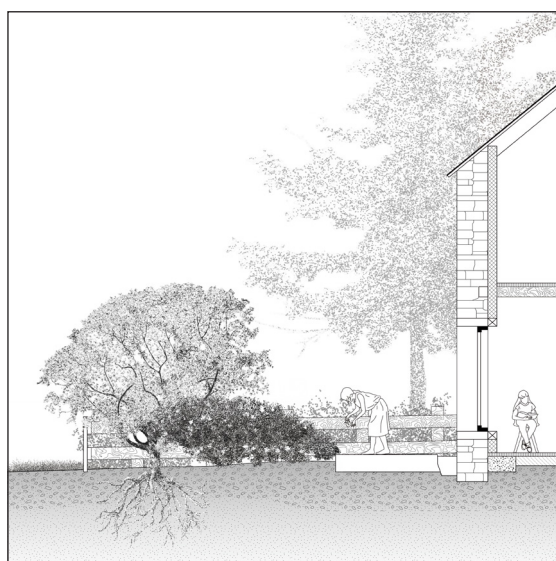
This research reinterprets the framework through a landscape lens, particularly within the context of post-industrial urban forestry in the Nord-Pas-de-Calais mining basin. It introduces the concept of a **Wooded Commons+ Network**, an expanded typology that integrates social function, ecological service provision, and shared spatial governance into a cohesive landscape infrastructure. This proposal situates wooded commons not just as ecological assets, but as evolving socio-spatial constructs grounded in both collective memory and contemporary community needs.

Three typologies form the basis of this network:

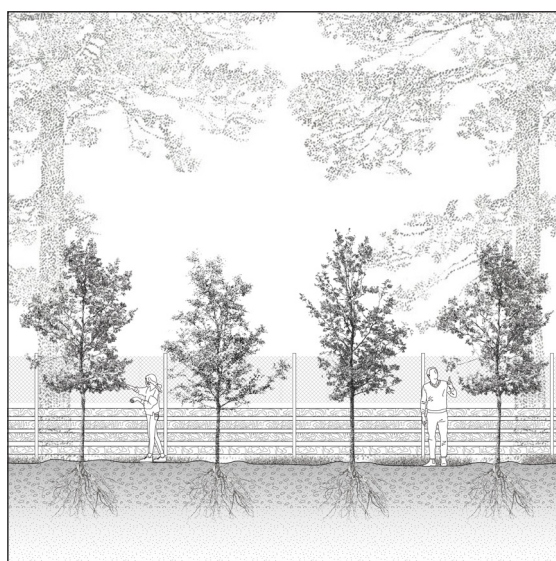
Second Place – Productive Forestry Spaces: Urban nurseries managed by residents function as shared infrastructures for ecological restoration and green economic participation.

2.5th Place – Backyard Woodland Gardens: Semi-public forested spaces embedded between residential units, mediating domestic life and neighborhood interaction. These sites reflect informal care practices and resonate with the notion of '*parochial realms*' (Lofland, 1998).

Third Place – Public Green Spaces: Parks, green corridors, and civic forests serve as accessible, multifunctional environments for leisure, cultural expression, and urban biodiversity.



First place - Personal backyard



Second place - Community tree nursery

Figure 4.43
Daily life in
'uncommon wood'
and 'wooded
commons' spaces

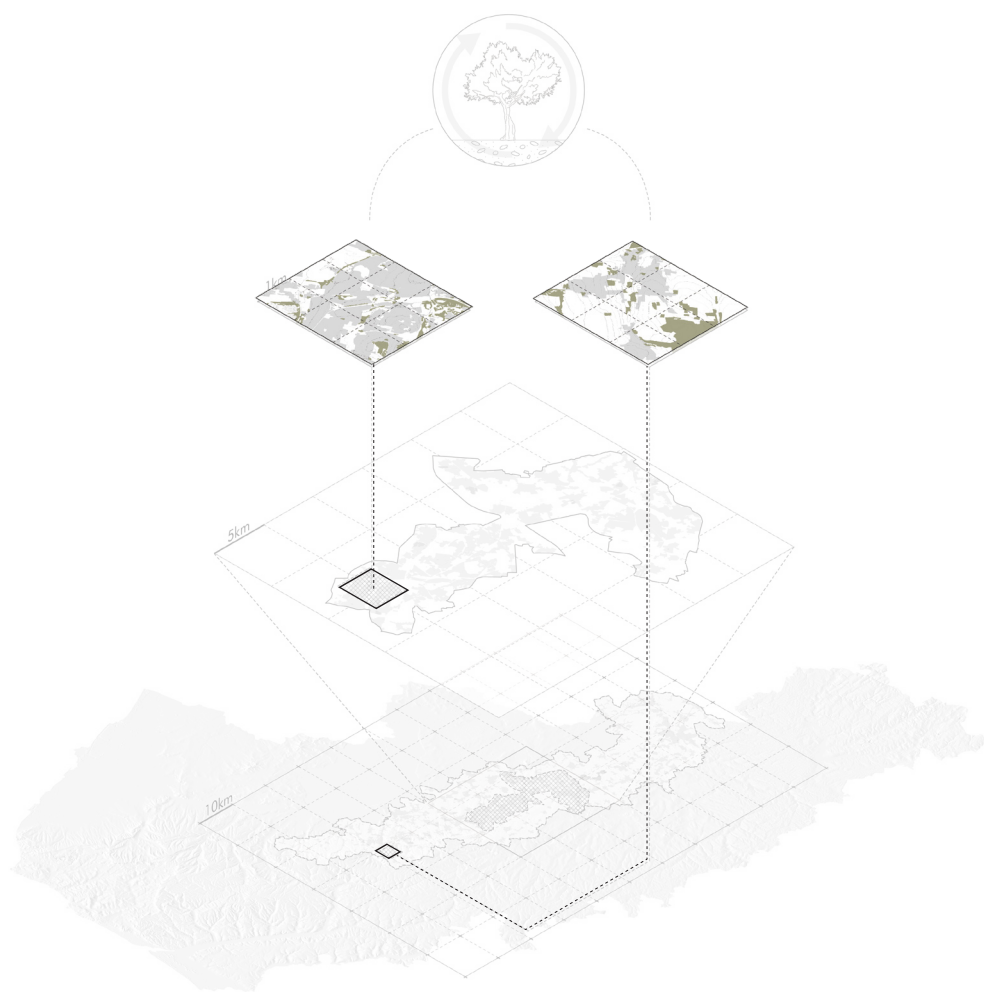


Third place - Public park



2.5 place - Backyard Woodland Garden

Local Projection - Micro Scale





Between the valleys

The valley extending southwest from Bruay-la-Buissière marks a transition from urban to agricultural landscape. Rows of willows and *Populus tremula* grow along the valley floor, while patches of vegetation are scattered across the slopes. The design focuses on expanding habitat coverage, developing sustainable silvopastoral practices, and enhancing surface water management. As a result, a belt of woodland emerges, transitioning from an urban forest park to a forest pasture, achieving ecosystem services while highlighting the valley's unique spatial character.

Beginning at the city's edge, the journey starts in a generic urban environment. Upon entering the forest park, the presence of water features and surrounding trees immediately introduces a natural ambiance, bringing softness and fluidity into the experience. Then it leads to a semi-open corridor, guiding people toward a wide grassland. After crossing a road, the path enters a dense forest area, where spatial compression can be strongly felt. Progressing further, the landscape opens into a forest pasture, where rows of trees, grazing fields, and cultivated edges follow a rhythmic arrangement, naturally emphasizing the concave form of the valley. Before the scenery opens once again toward scattered rural edges, one must pass through another corridor of woodland.

This continuous fluctuation between openness and enclosure, compression and release, combined with the vertical movement through the valley, generates a richly layered spatial experience and heightens one's perception of nature.

Figure 4.44
Zoom-in one
design plan





Figure 4.45
Zoom-in one
Axonometric
drawing

Figure 4.46
Zoom-in
one design
sections

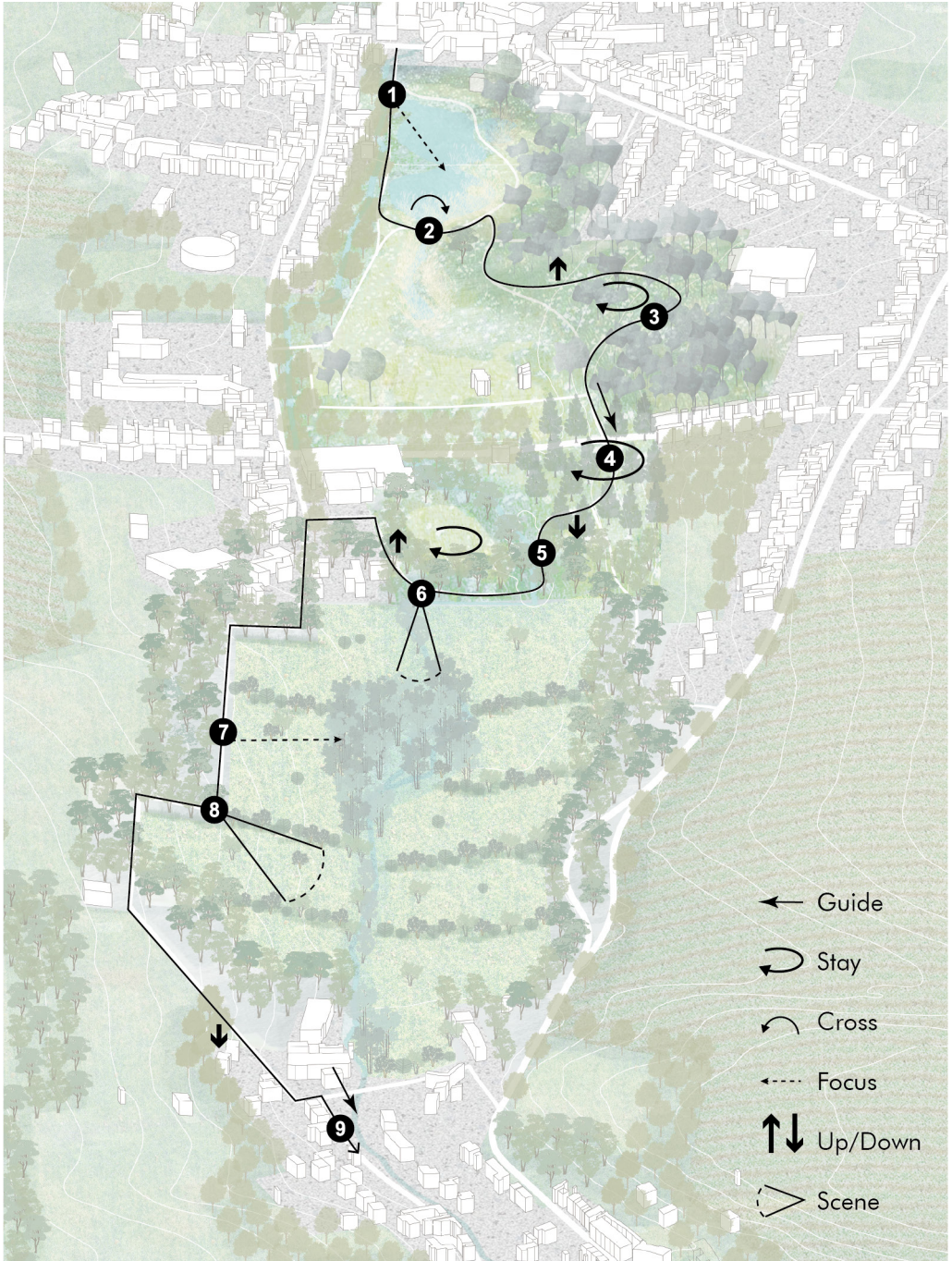




Figure 4.47
Zoom-in one
serial visions



Within the city

As the symbolic center of the mining basin, Lens reveals a post-industrial landscape where new forest frameworks are gradually emerging. Afforestation along rivers, expanding vegetation around Terrils, and linear woodland screens along highways and railways signal an ecological transition. This design segment traces a cultural woodland route, linking the iconic twin-peaked Terril with the city's cultural landmarks and everyday life. It demonstrates the spatial richness of urban forestry and the diverse forms of ecosystem services it offers.

The journey begins at the Louvre-Lens Museum, where rows of colorful deciduous trees trace the outlines of former mining communities. A linear urban park unfolds along the railway, offering glimpses of community gardens tucked between buildings. After crossing the tracks, the terrain rises and the Terril silhouette flickers behind rooftops. Hedges guide the path toward an industrial heritage park, where woodland screens obscure the Terril's form, building anticipation.

Ascending a footbridge over the highway, the spatial sequence tightens. Vertical layers and flanking trees create a cinematic moment. Entering the Terril park, the peaks vanish again as dense forest closes in. Only when ascending further does the view open. Between the two summits, a unique spatial tension arises, as if the peaks observe one another. At the top, the journey reaches its climax. From this elevated point, the entire city unfolds beneath, and the path taken becomes visible in retrospect.

Throughout this journey, a rhythm of transitions — guiding, crossing, climbing, shifting views — unfolds. This interplay between forest, infrastructure, and heritage sites forms a layered urban landscape, where forestry not only restores ecosystems but reshapes how the city is experienced and remembered.



Figure 4.48
Zoom-in two design plan

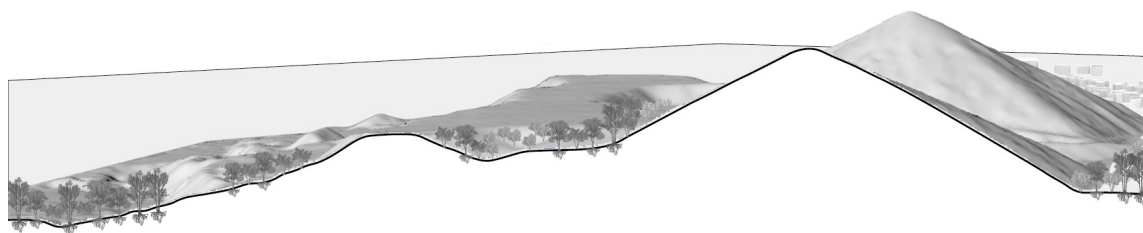
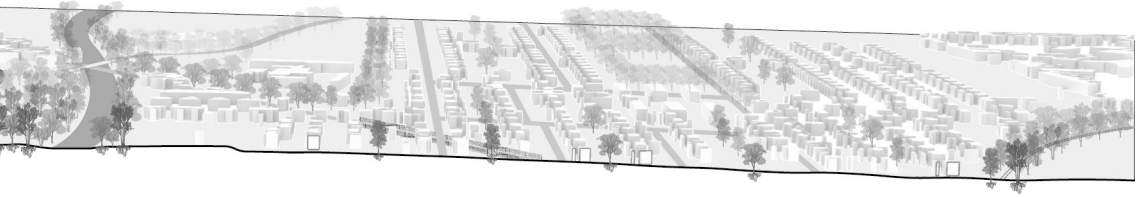
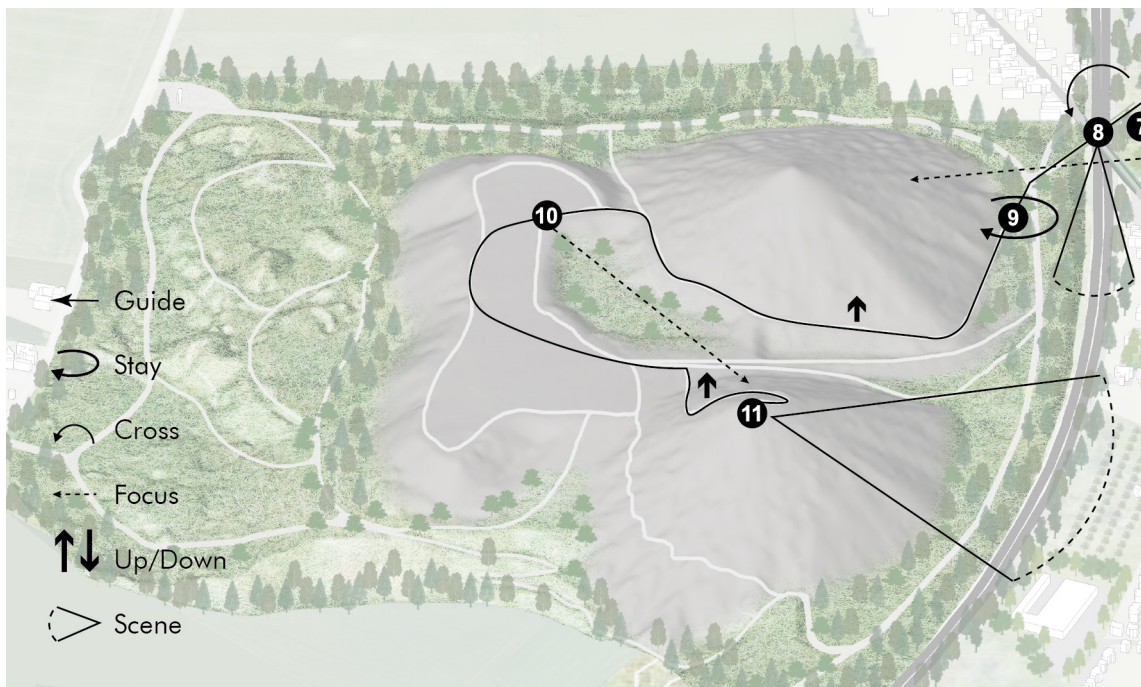
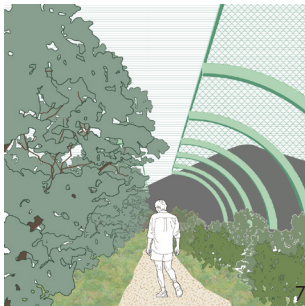


Figure 4.49
Zoom-in two
axonometric
drawing

Figure 4.50
Zoom-in two
cross-section





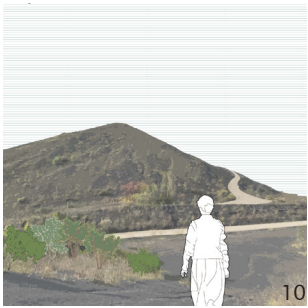
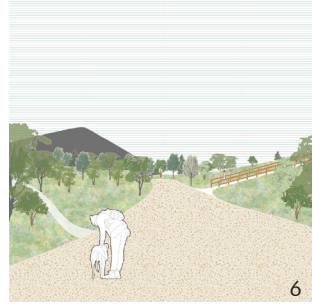
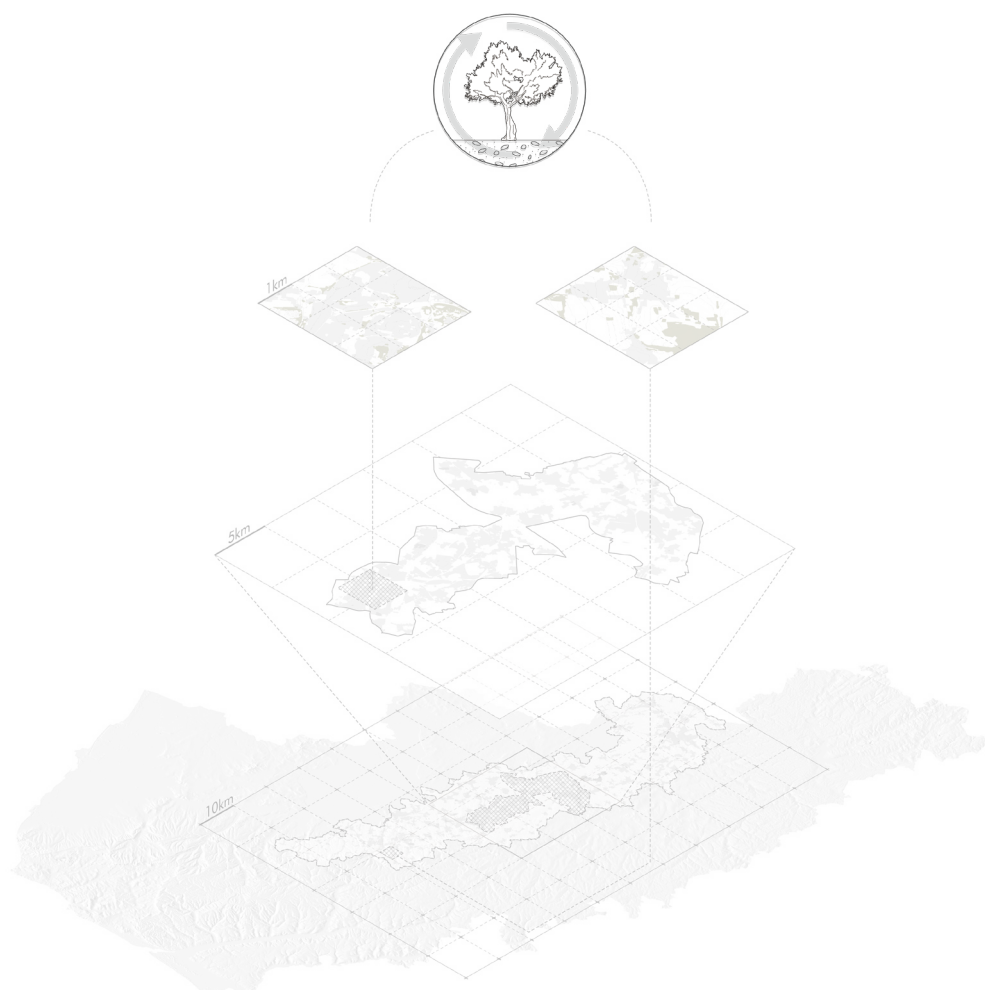


Figure 4.51
Zoom-in one
serial visions





Implementation - Process Scale

Manage the forest cycle

Effective forestry planning requires not only spatial design but also long-term thinking about ecological dynamics and landscape maintenance. As part of the territorial implementation strategy, this section introduces a forest cycle management framework that integrates ecological succession, human intervention, and local participation into a coherent operational model. While the spatial configurations of forestry vary across different contexts, forest systems inevitably evolve over time — through growth, adaptation, harvest, and renewal.

To support this process, three reference cycles are proposed: the forest cycle of silvopastorure, productive woodland parks, and urban tree nurseries. These cycles illustrate a range of interventions including protection of young trees, selective thinning, understory management, and biomass harvesting. Together, they form a practical guide for managing different types of forested spaces across the mining basin.

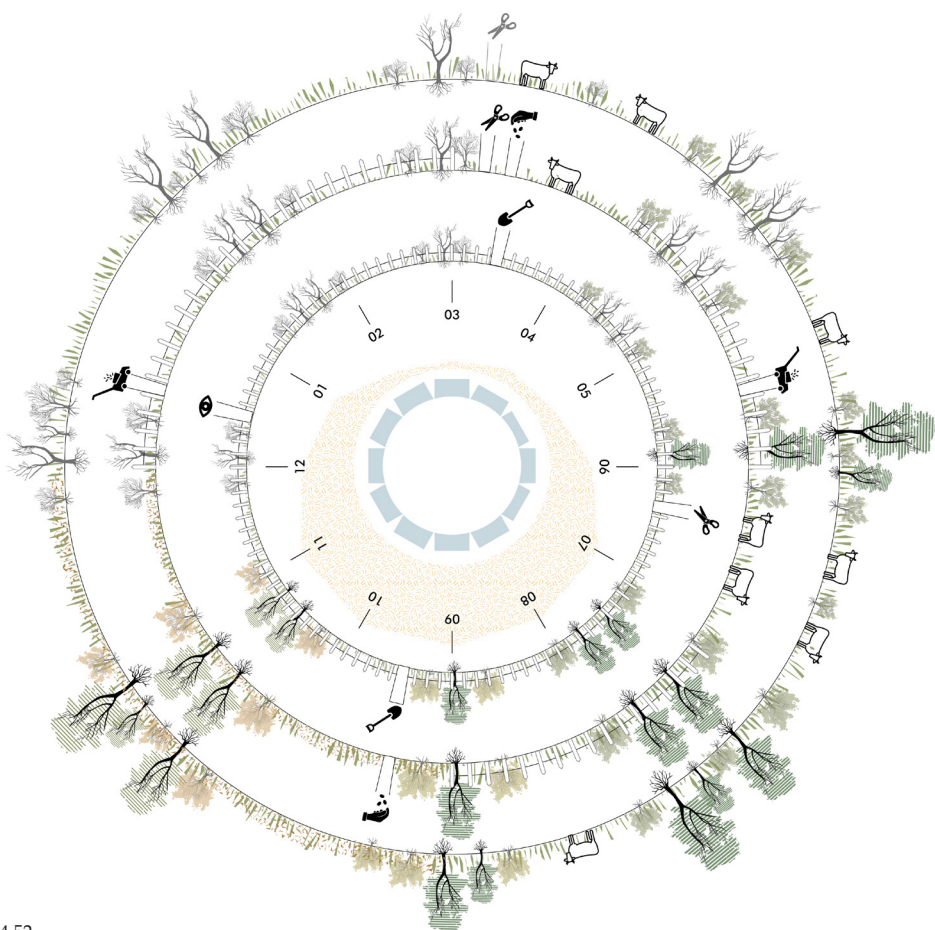


Figure 4.52
Tree cycle and
management in
silvopasture

Silvopasture

Silvopasture, as an integrated system of trees, forage, and grazing, represents a dynamic and adaptive model for landscape stewardship. It aligns ecological succession with productive land practices, gradually transforming the post-industrial terrain into a resilient mosaic of life cycles.

In this project, silvopasture evolves from existing grazing lands, embedding forestry within familiar agricultural routines rather than displacing them. The first stage focuses on careful introduction and protection of tree seedlings within active pastures. Given the pressures of grazing animals and open exposure, early interventions are essential: saplings are planted in clustered or hedgerow formations, each protected by individual fencing, mulch beds, and temporary exclusion zones to ensure survival and healthy root establishment. Fast-growing pioneer species such as *Populus* and *Alnus* are preferred to provide quick structural benefits and microclimate stabilization.

At the same time, the ground layer is enhanced with perennial grasses and legumes to support both forage productivity and soil enrichment. Grazing is either limited or practiced in rotation to prevent damage, allowing the system to settle into a balanced rhythm.

By years 5–10, the trees form an emerging structure, offering shade, shelter, and habitat. Selective thinning and pruning help shape canopy development, while grazing cycles adjust to the changing light and vegetation conditions. Biodiversity increases as new species colonize the understory.

Over the long term, the silvopasture landscape becomes semi-autonomous. Management intensity decreases, and the system regulates itself through established ecological feedbacks. Trees contribute to carbon storage, fodder supply, and wind buffering, while the land remains actively productive. Here, forestry is not an extractive act, but a process of regeneration—one that adapts, coexists, and evolves through time.

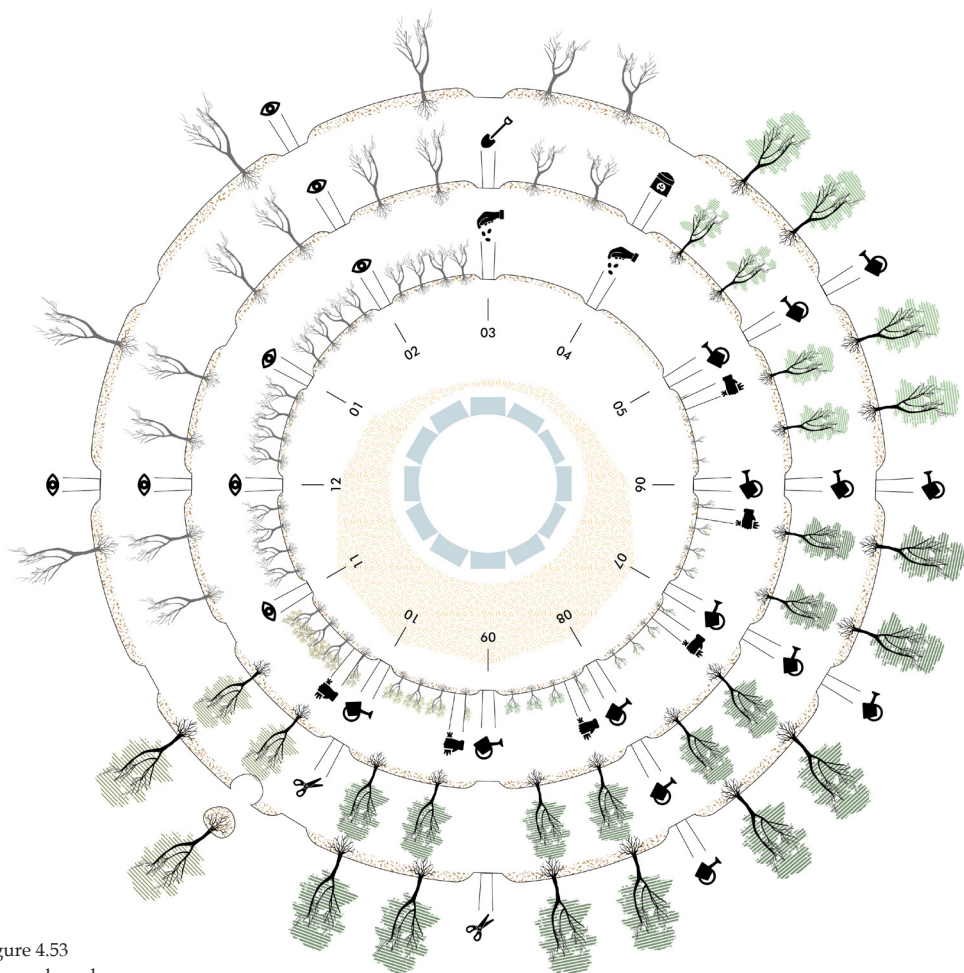


Figure 4.53
Tree cycle and
management in
tree nursery

Urban tree nursery

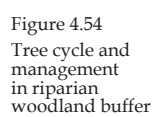
Urban tree nurseries play a critical role in supporting the broader forestry network by serving as sources of planting stock and as sites for community engagement. Situated on transitional lands, the nursery serves as a productive infrastructure, where care, timing, and observation form the foundation of forestry.

In the initial stage, the nursery is established through soil preparation, drainage improvement, and spatial zoning according to species and future function. Seeds or seedlings are sown directly into prepared beds or trays, often under partial shade structures to protect them from climatic extremes. Layering of species is intentional – canopy trees, understory shrubs, and groundcover herbs – mirroring eventual planting schemes and supporting biodiversity from the beginning.

The cultivation stage focuses on structured maintenance. This includes seasonal weeding, targeted watering, pest management, and root pruning to encourage strong, transplant-ready stock. Depending on species, some plants remain in place for several years to develop robust form, while others are rotated out more quickly. Interplanting of fast-growing nurse species may support microclimate moderation and soil vitality.

In the mature stage, selected plants are gradually moved out of the nursery and into the landscape. Some are destined for silvopasture, others for riverbanks or cultural corridors. Meanwhile, portions of the nursery remain active, creating a continuous cycle of propagation and regeneration. Over time, the nursery itself may evolve into a semi-natural forest patch or remain a multifunctional hub – part seed bank, part learning site, part productive landscape.

Thus, the tree nursery is not a background operation – it is a visible and evolving interface between human intention and forest emergence, where the forest is first imagined, nurtured, and set into motion.



Riparian woodland buffer

Riparian forest restoration redefines the relationship between water, land, and vegetation. In post-industrial valleys, where former agricultural lands meet river systems, a layered wetland-forest is gradually introduced. The goal is not to control water but to work with its seasonal rhythms, fostering a biodiverse and resilient ecosystem.

The process begins with constructing a hydrological foundation. Shallow depressions are excavated to retain water, while micro-topographies – ponds, swales, and saturated pockets – create a mosaic of wet conditions. Early planting focuses on soil-binding grasses and aquatic species like *Vallisneria* and reeds to purify water and stabilize sediment. Buffer zones near inlets guide inflows through dense vegetative filters.

In the next stage, water depth and flow are diversified to attract wildlife. Islands, sandbars, and braided channels form habitats for birds and amphibians. Flowering aquatic plants and shrubs enhance structure and ecological function. Water-tolerant trees such as willow and alder are planted to reinforce forest edges. Public access remains limited but guided – via trails, observation decks, and educational signs.

At the mature stage, the system becomes semi-autonomous. Management focuses on nutrient control and ecological balance. Retention zones intercept sediments and nutrients, while selected plant species absorb excess nitrogen and phosphorus. Vegetation structure is refined, balancing submerged, emergent, and canopy layers. Monitoring systems track water quality and ecosystem health.

Ultimately, the riparian woodland buffer becomes adaptive infrastructure – shaped by water, supported by design, and sustained through stewardship. It is no longer just green space, but a living continuum where hydrological, ecological, and social flows converge.

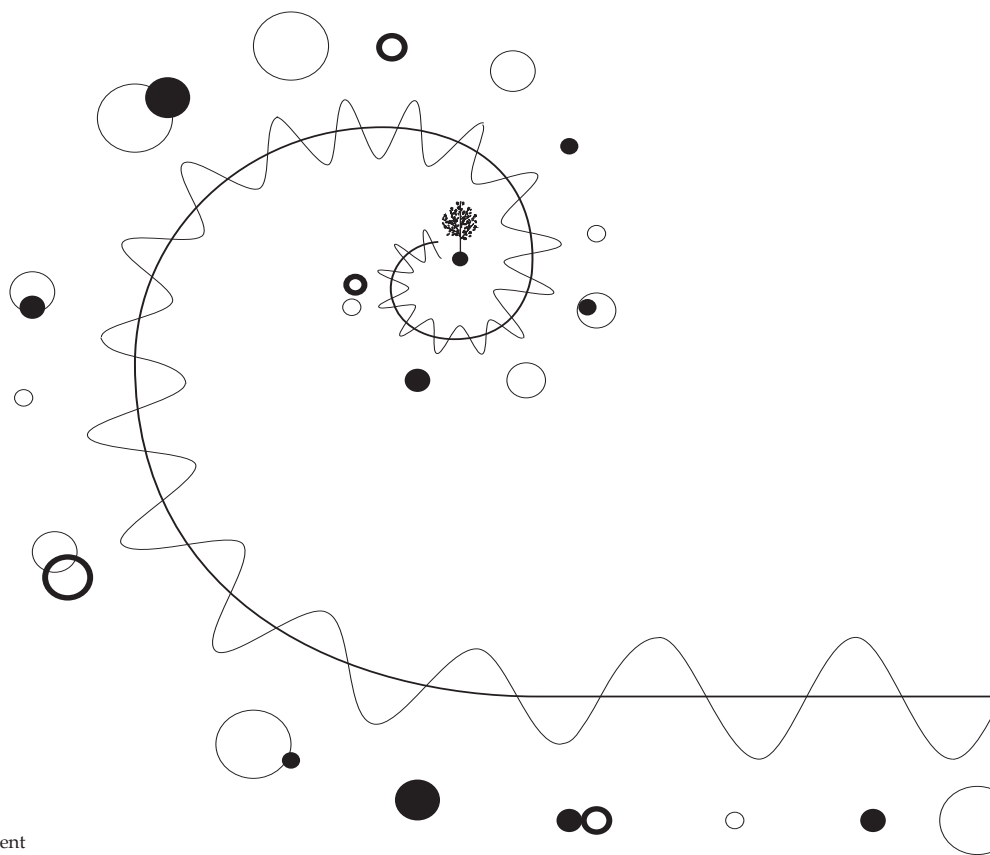
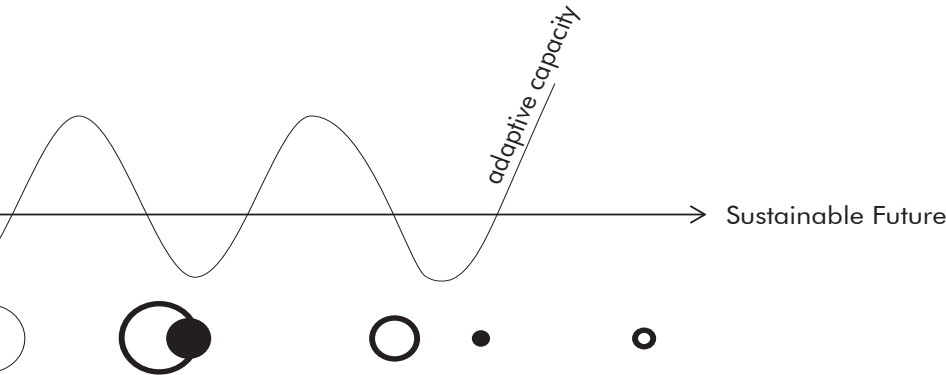


Figure 4.55
Conceptualizing
project development

From local to territory

The proposed forestry strategy is not only imposed as a top-down masterplan, but intends to emerge through incremental, locally grounded practices. It begins with small-scale, community-based interventions. These localized actions serve as initial nodes of activation, rooted in specific social contexts and ecological potentials. Over time, they generate visible effects: fostering care, building trust, and re-establishing relationships between people and land.

As these practices accumulate, they begin to extend spatially and deepen institutionally. Their effects ripple outward, connecting isolated green fragments into functional ecological corridors, and weaving scattered efforts into a broader system of wooded commons. Like a snowball gaining momentum, each new project adds not only trees but also knowledge, participation, and governance capacity to the system. This iterative, self-reinforcing process supports a bottom-up expansion from local initiative to territorial transformation. It is through this gradual accumulation of site-based actions that the territory as a whole becomes more capable of withstanding environmental pressures, negotiating social change, and recovering from its post-industrial past.



Chapter Five

Conclusion

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Conclusion

From Fossil to Forest

In the envisioned future of the Nord-Pas-de-Calais mining basin, trees will emerge from abandoned slags, plots, and memories. Forestry will take root in this post-industrial territory, cultivating new forms of remembrance and hope. From the valleys to the shrinking cities and to the basins, from degraded lands to narrow backyard paths, urban forestry provides not only ecosystem services but also a new syntax in the shrinking context.

This research has explored how urban forestry can serve as an ecosystem services tool to reshape both the spatial structure and social realities of the mining basin. Rather than proposing a blueprint for growth, it reimagines a framework for cooperation and adaptation to enhance the territory's socio-environmental resilience. In the Anthropocene — on this land of loss — the most fitting and powerful act of design may not be one of rebuilding or redeveloping, but of repairing and redefining relationships: between land, trees and people; between past and future; between fragmentation and continuity.

Figure 5.1
Conceptual
drawing of
fossil to forest
transformation
*Source: photoed
and adapted by
author*



Answers to Research Questions

How does forestry contribute to ecological regeneration in the Anthropocene?

Forestry contributes to the restoration of biophysical structures by reconnecting fragmented habitats and reactivating degraded soils and hydrological systems. Underpinned by the biophysical layer, forestry – when employed as a territorial landscape infrastructure – can fully mobilize supporting and regulating ecosystem services, forming the ecological backbone of a resilient post-industrial landscape.

How does forestry facilitate socio-economic transformation in post-industrial landscape?

Forestry promotes socio-economic transformation by repurposing urban vacancy – not as a sign of degrading, but as a latent resource. Productive uses such as urban nurseries, edible forests, and agroforestry generate employment, enhance the diversity and stability of agricultural systems, and reintroduce rhythms of care, harvest, and cooperation into shrinking urban contexts. In this way, newly developed woodlands provide provisioning services that are both ecological and socially embedded.

How does forestry improve the socio-cultural resilience in the context of urban shrinkage?

The development of a wooded commons network enhances socio-cultural resilience by offering spaces of collective identity, ritual, and shared memory. In the mining basin, the memory of industrial heritage is deeply rooted in these commons, allowing forests to act as bridges between communities and to reinvigorate urban life. Simultaneously, emerging forestry economies emphasize sustainability, reintroducing traditional spatial and productive practices – such as bocage landscapes and coppicing – thereby reclaiming the value of traditional culture landscapes long obscured by industrialization.

How does forestry balance between different roles in the new paradigm of adaptation?

Forestry achieves a dynamic balance between its multiple roles through both spatial and temporal differentiation. Across spatial scales, different ecosystem services are emphasized according to the logic and needs of each level. At the territorial scale, forestry planning is shaped by the construction of large-scale support systems – such as ecological corridors and watershed buffers – that strengthen regulating and supporting services. At the urban scale, the integration of forestry into built environments introduces a layering of regulating, cultural, and provisioning functions, often shaped by social infrastructure and spatial intensity. At the site scale, services become more tangible and experientially grounded, emphasizing daily interactions, sensory qualities, and productive uses.

Importantly, these functions do not operate in strict separation. In many cases, functions overlap, transform, or embed into one another across scales. For example, a supporting forest system defined at the territorial level may, at the urban or site level, become a composite space that delivers cultural or provisioning value depending on its context. This demonstrates not only a logic of spatial complementarity, but also the capacity of forestry to mediate diverse service needs through multiscale integration.

From a temporal perspective, different ecosystem services follow distinct trajectories over time. Supporting and regulating services tend to build incrementally and persist over longer durations. Cultural services require social engagement and collective memory, often unfolding over mid- to long-term horizons. Provisioning services, by contrast, are inherently constrained – not by time, but by spatial limits. Their output is capped by available convertible land and ecological thresholds, meaning that they cannot achieve continuous or scalable growth in the same way that regulating functions might. Recognizing this temporal asymmetry is essential; it does not indicate imbalance, but rather a necessary distribution

of emphasis over time, shaped by ecological and socio-political realities.

Ultimately, forestry does not resolve the competing demands of ecosystem services by flattening them into equivalence, but by offering a flexible spatial-temporal framework where these differences can be staged, negotiated, and adjusted. The result is not uniform balance, but adaptive equilibrium – an evolving alignment of functions that enhances the overall resilience and responsiveness of the post-industrial territory.

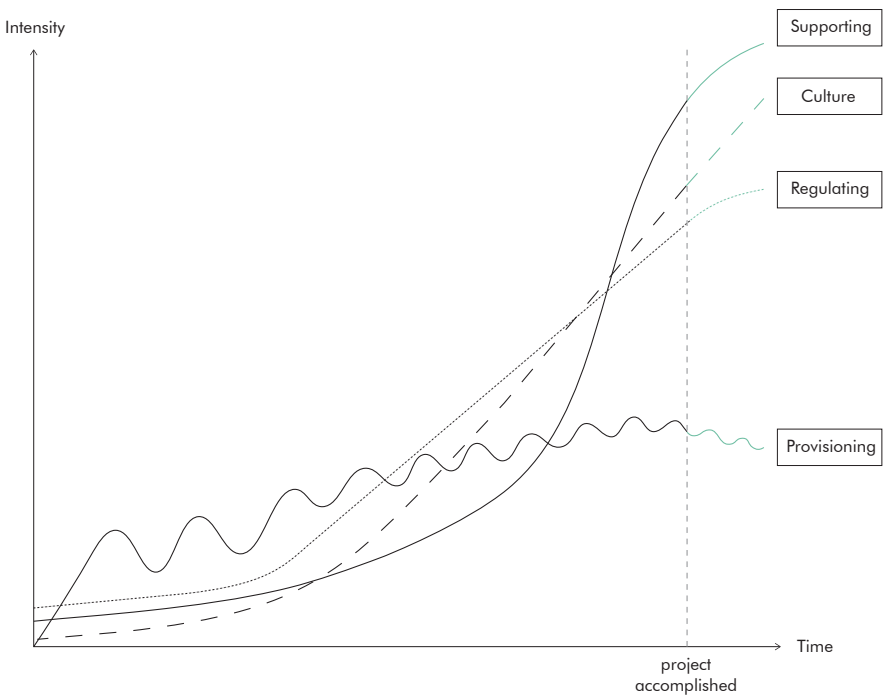


Figure 5.2
Services
development
through time
(an assumption)

Reflection

Check Academic Relevance

About post-industrial territory

The theory of ecosystem services, as an important strategy for socio-environmental adaptation, has been widely applied in growth-oriented cities or regions, but corresponding strategic design for post-industrial cities facing population decline remains scarce. This research connects ecosystem services with post-industrial territories, suggesting the possibility of understanding the ecological potential of shrinking cities from a territorial perspective. However, the general applicability of this approach may be subject to debate, as post-industrialization and urban shrinkage cannot always be interpreted from a territorial angle. The site of Nord-Pas-de-Calais mining basin is in many ways unique; comparable cases include the Ruhr region in Germany and the American Rust Belt.

Therefore, it is of significance to position this project within existing practices in other two context:

Comparison with Emscher Landschaftspark

Emscher Landschaftspark, as the most widely recognized case of post-industrial landscape transformation in Europe, shares with this study a territorial perspective that aims to reintegrate and reconfigure fragmented post-industrial areas to achieve large-scale ecological and cultural regeneration. At the design level, both projects emphasize the concept of “landscape as infrastructure”, treating landscape as a tool for adaptation in the Anthropocene. However, compared to Emscher Park's focus on cultural programs and public park systems, this research places greater emphasis on the locational strategy of forestry projects and the systemic operation of ecosystem services. This may relate to the characteristics of the site itself: while Emscher Park is situated in a river valley with a relatively ‘flat’ spatial rhythm, the mining basin exhibits more heterogeneous landscape structure.

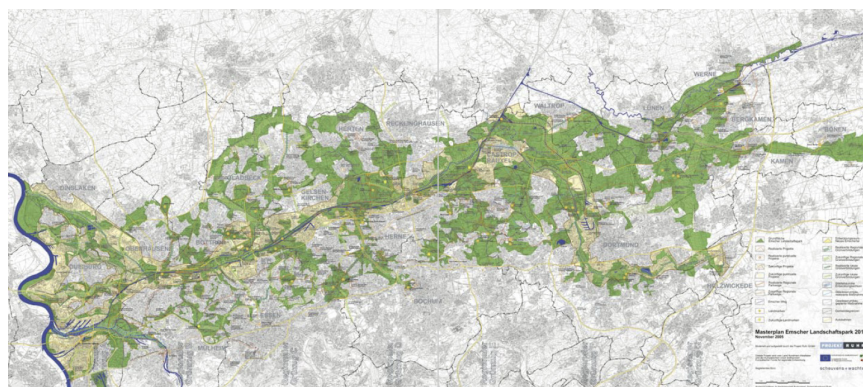
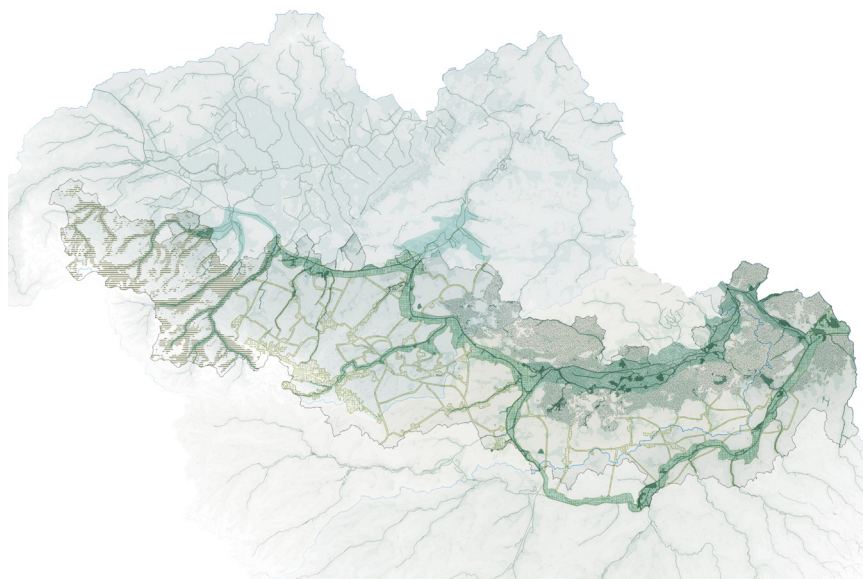


Figure 5.3
Comparison
with Emscher
Landschaftspark
Source:
MasterPlan
Emscher
Landschaftspark
2010. (2010).
Klartext.

In terms of design objectives, Emscher Park, as a project from the late 20th century, is inevitably guided by a logic of cultural and economic revitalization—an aim reflected in its realized outcomes. In contrast, this research takes urban shrinkage as its starting condition, viewing degraded urban space as experimental material, which aligns more closely with recent academic perspectives on “shrunk cities.”

At the level of spatial design, Emscher Park prioritizes the monumental reuse of industrial ruins to create cultural landmarks and event spaces. The strategy proposed in this thesis, however, lacks attention of the symbolic or touristic reuse of industrial heritage in favor of distributed and participatory memory sites. Rather than “commemorating the past,” it emphasizes “embedding memory in the everyday life.” This also relates to the material and symbolic characteristics of heritage: Emscher’s blast furnaces and factories possess a certain mechanical aesthetic, creating striking contrasts with restored vegetation and thus evoking a sense of modern artistic tension. By contrast, the terrils of Nord-Pas-de-Calais are composed of natural materials whose visual contrast with ecological elements is more subtle; additionally, the miners’ housing districts convey a more domestic and everyday character than industrial plants.

In terms of project implementation, Emscher Park was driven by top-down, long-term investment and strong financial support. This research proposes a more indirect model, attempting to mobilize and coordinate actors across different levels, rooting itself locally, and realizing a forestry vision that scales up from local practice to territorial planning through evolving spatial interventions.

Comparison with American Rust Belt projects

In the American Rust Belt, current planning practices often emphasize bottom-up, community-driven design strategies, which resonates with this project’s exploration of community-based forestry practices. The inspiration for transforming and adapting vacant lands in this study partly draws on projects like Detroit Future City and Re-Imagining Cleveland,

reflecting a shared perspective on the reuse of vacant urban space. However, Rust Belt projects typically focus on the replanning of individual cities, aiming for economic recovery and land reuse, and seldom attempt to interpret ecological potential from a territorial perspective. In contrast, this research seeks to connect local actions with macro-scale ecological processes, building a multi-scalar ecosystem services framework. Moreover, Rust Belt projects tend to lack engagement with landscape history, which diminishes their cultural depth. This study, by contrast, treats the landscape as a palimpsest, emphasizing the interweaving of cultural memory and ecological process.

About wooded commons

One of the key academic contributions of this research lies in the reinterpretation of the “first, second, and third place” framework through a landscape perspective. While traditional third place theory (Oldenburg, 1998) focuses on informal urban venues such as cafés, clubs, or coworking spaces, it rarely engages with urban green space as a social infrastructure. Drawing on theoretical work by Oldenburg, Lofland (1998), and Van der Velde (2018), and grounded in observations from the field, this thesis extends the idea of parochial realms – semi-public social spaces embedded in neighborhoods – into a landscape typology called the “2.5th place”: backyard woodland gardens that mediate between private and communal life.

This reinterpretation offers not only a spatial translation of third place theory, but also a conceptual expansion of wooded commons in the contemporary urban context. According to Short (2008), wooded commons refer to forested lands over which communities hold traditional shared rights. However, under the cooperative urban forestry framework proposed in this thesis, this definition broadens: community nurseries, though functionally “second places,” embody principles of shared governance and ecological reciprocity and thus may also be considered commons. Likewise, neighborhood woodland gardens and small civic forests operate as new commons, shaped by community use, care, and memory.

Together, these evolving typologies form a Wooded Commons+ Network, integrating ecological function, community engagement, and spatial diversity. Whether these spaces fit neatly into existing theoretical categories is less important than their ability to challenge disciplinary boundaries – between public and private, urban and rural, ecological and social. In doing so, this thesis contributes to expanding the academic discourse on commons, landscape infrastructure, and the adaptive agency of green space in post-industrial urbanism.

Cross-scale thinking

To explore how does forestry balance between different roles in the new paradigm of adaptation, this research has clearly articulated how a cross-scale design approach can be used to conceptualize the relationships among various ecosystem services. This contributes a new methodological framework to adaptation planning. Rather than viewing spatial scales as a simple linear hierarchy – where macro scales are associated with policy and ecology, and micro scales with form and details – this framework proposes a layered structure composed of overlapping design logics, in which the temporality, actors, and service priorities at each scale are incorporated into an integrated system.

At the territorial scale, the thinking is shaped by large-scale ecological system models. At the urban scale, social structures, urban services, and cultural dynamics are further integrated into spatial design considerations. At the site scale, design focuses on spatial articulation and sensory experience. At the process scale which cuts across all spatial levels, the biophysical life cycle of trees serves as a temporal scaffold for thinking through change and adaptation.

These shifting design logics are assembled into a coherent framework, revealing both the vertical relationships (such as ecological processes and governance structures) and horizontal interactions (among different actors and land uses) that shape socio-environmental adaptive capacity.

This cross-scale design methodology positions design as a tool to mediate between conflicting and complementary ecosystem services, and as a medium through which the interaction between ecosystem services and socio-cultural practices can be explored. It enables design to move beyond the binary of “vision and detail,” offering instead a relational mode of thinking that holds significant value for the design practice of the landscape discipline.

Think About Social Aspects

What does the territorial forestry strategy offer to society?

The most direct contribution of the territorial forestry strategy lies in its enhancement of socio-environmental adaptive capacity – this is also the core design assignment of the research. More specifically, it offers spatial infrastructures that support heritage preservation, shared memory, and neighborhood cohesion through the establishment of wooded commons network. These commons serve as foundations for collaboration and cultural continuity within a fragmented and post-industrial landscape.

However, beyond the logic of ecosystem services, one fundamental question arises: *Why is forest chosen as the core landscape strategy?*

Trees are among the most recognizable and emotionally resonant elements in the landscape. They are living beings that embody both form and temporality. Their growth is one of the most perceptible biological processes – slow yet visible, subtle yet constant. Each species possesses its own personality, seasonal rhythm, and spatial form. As such, trees hold not only ecological functions, but also symbolic and temporal meaning. They become part of the cultural fabric.

From this perspective, the forestry strategy is not only a territorial development vision, but also a landscape proposition that reimagines trees as members of the community – residents in their own right. Through daily interaction with trees across their life cycles, communities may experience healing, transformation, and a renewed sense of belonging. This embodied process of observation and participation may even serve as a quiet resistance to the alienation so common in postmodern societies.

What does the territorial forestry strategy ask from society?

Until it is implemented, a design remains an idealized blueprint. In practice, the strategy requires society to contribute and adapt—often in ways that are difficult and complex. It cannot operate in a vacuum. It demands active participation, not just in use, but in ongoing shaping, maintenance, and governance. This process implies the need for institutional support, negotiation, and even sacrifice.

Motivating local engagement may require the formation of new community organizations, the creation of knowledge-sharing platforms, and the support of public resources and governance mechanisms. In short, it depends on a broad and robust support system that extends well beyond the control of the landscape architect.

As the designer of this territorial forestry vision, what I can do is pose challenges and calls:

We challenge traditional notions of private land and individual ownership.

We challenge existing governance paradigms that isolate space from social responsibility.

We call for a redefinition of public space, for a form of collective imagination rooted not in profit, but in shared responsibility and care.

Above all, we call for a process in which design intention and social capacity can co-evolve—a process where landscape becomes not only a tool, but a partner in shaping a more resilient and just future.

Reflect On Design Practices

The initial decision to work with the theme of urban forestry stemmed from a personal interest in trees and tree space. However, when it came to choosing a site, the desire to challenge myself ultimately outweighed the original intent. This ambition led me into unfamiliar territory, requiring me to engage with large-scale and systems-oriented design approaches—areas in which I had little prior experience. As expected, challenges quickly surfaced. In the early stages of exploration, the large volume and complexity of information at the territorial scale left me struggling to organize my thinking. The disciplinary boundaries between landscape architecture and urbanism became increasingly blurred, making it difficult to locate my own position within the project. Fortunately, forestry remained a consistent and tangible element throughout the project, providing a fixed anchor that prevented me from becoming completely disoriented.

Reflecting on the lens of four essential perspectives on analysis and design: perception, palimpsest, process and scale continuum (Bobbink & De Wit, 2020), the most evident shortcoming lies in the underdevelopment of the *perception* aspect. Apart from some preliminary spatial perception documentation during site visits, the project did not return to questions of spatial experience until the final design phase, when I began working at the zoom-in scale. Only then did more concrete spatial arrangements and design compositions emerge. At the territorial and urban scales, the work leaned more toward planning and organizing, rather than designing space in its lived or experiential dimensions. While I found excitement in pushing the boundaries of the discipline, I also felt a sense of regret at not fully exploring the spatial value of cultural landscape design.

The concept of *palimpsest* was present across both historical investigations and multi-scalar design interventions. For instance, the forestry layer within the blue buffer zone can be interpreted as a contemporary rewriting

of the region's historical wetlands. Similarly, forestry overlays on heritage sites act as both ecological interventions and symbolic inscriptions. The agroforestry model for the basin is also grounded in this palimpsestic approach.

Process was thoroughly addressed across scales, from the strategic succession planning at the territorial level to discussions of project timelines and interventions at the urban scale. These processes were also reflected in the zoom-in scale, particularly through the consideration of tree life cycles, which served as one of the most important temporal design logics.

Lastly, the idea of a *scale continuum* was emphasized from the beginning in both methodology framework and the analytical and design framework. In both research and design, scale continuum was manifested through spatial relationships. The coexistence of spatial continuity across scales and heterogeneous thinking within each scale stands out as one of the more distinctive aspects of the methodology developed in this project.



Figure 5.4
A sketch from
my site visit

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Figure 4.32 Conceptual structure

Figure 4.33 Master plan

Figure 4.34 Reading design as three layers

Figure 4.35 Ecosystem services with diverse forest space

Figure 4.36 Local management of different forest project

Figure 4.37 Key points for intervention along river

Figure 4.38 Upstream interventions, successions and services

Figure 4.39 Midstream interventions, successions and services

Figure 4.40 Downstream interventions, successions and services

Figure 4.41 Comparison between before and after

Figure 4.42 Wooded common network

Figure 4.43 Daily life in 'uncommon wood' and 'wooded commons' spaces

Figure 4.44 Zoom-in one design plan

Figure 4.45 Zoom-in one Axonometric drawing

Figure 4.46 Zoom-in one design sections

Figure 4.47 Zoom-in one serial visions

Figure 4.48 Zoom-in two design plan

Figure 4.49 Zoom-in two axonometric drawing

Figure 4.50 Zoom-in two cross-section

Figure 4.51 Zoom-in one serial visions

Figure 4.52 Tree cycle and management in silvopasture

Figure 4.53 Tree cycle and management in tree nursery

Figure 4.54 Tree cycle and management in riparian woodland buffer

Figure 4.55 Conceptualizing project development

Figure 5.1 Conceptual drawing of fossil to forest transformation. *Source: photoed and adapted by author*

Figure 5.2 Services development through time (an assumption)

Figure 5.3 Comparison with Emscher Landschaftspark. *Source: MasterPlan Emscher Landschaftspark 2010. (2010). Klartext.*

Figure 5.4 A sketch from my site visit

