Unpacking Dresden

Alexandre Bry
MSc Geomatics

Alankrita Sharma
MSc Urbanism

Grase Stephanie
MSc Urbanism

Soroush Saffarzadeh
MSc Urbanism

Adriano Mancini
MSc Urbanism

2025-06-02

Table of contents

1. Introduction

1.a. Roles

The research group is a combination of five members taking the roles as follows:

- Alexandre Bry: Project Coordinator, Data Analyst
- Alankrita Sharma: Research Lead, Presentation Lead
- Grase Stephanie: Mapping Specialist
- Soroush Saffarzadeh: Writer/Editor, Presentation Lead
- Adriano Mancini: Design Lead

It should be mentioned that these roles are intended to allocate a leading responsibility over the defined roles but the each minor task is going to be distributed among the team members including helping and guiding each other on specific tasks.

2. Preliminary Maps and Research

In this chapter, we will introduce our research, possibly including a summary of our first brainstorming, and, more importantly, present the first descriptive maps and explain how they give us clues on how to approach the analytical core of this spatial analysis project.

2.a. Historical background

Dresden originated as a small settlement on the left bank of the Elbe and remained modest until the 16th century, when it became the capital of the Protestant Electorate of Saxony after the Schmalkaldic War. Under Elector Moritz, the city expanded rapidly with major architectural and urban developments. In the 18th century, it became a key cultural and political center as the royal residence of the Polish kings, marked by the construction of prominent monuments like the Zwinger and the Frauenkirche. Throughout the 19th century, Dresden continued to grow, becoming the capital of the Kingdom of Saxony and undergoing a major population boom.

The 20th century brought devastation with the Allied bombing in 1945, which destroyed much of the city, including the Frauenkirche. Following reunification, major reconstruction efforts began in the 2000s, including the faithful rebuilding of Neumarkt square and other historical landmarks, with a mix of traditional and modern residential architecture.

A key feature that emerged from historical photographs is the extensive use of the riverfront—large green meadows cutting through the urban fabric, which were historically used for social, economic, and cultural activities. These strips of grass, still visible today, offer clues to a spatial element that defines Dresden's atmosphere: **a city shaped not only by its architecture and history but also by its open, green relationship with the Elbe River.**

Dresden has also faced major ecological challenges, notably the catastrophic Elbe floods of 1845 and 2002—the latter setting a new record and causing severe damage, much of which has since been repaired. **These flood events highlight the importance of integrating ecosystem restoration and climate resilience into the city's spatial planning.**

2.b. Natural elements

Dresden is considered one of the greenest cities in Europe, with approximately 62% of its total area covered by forests, parks, and green spaces. This extensive green infrastructure includes the large woodland of the Dresdner Heide in the north and the Großer Garten in the city center, contributing to both ecological richness and urban quality of life. The city's location in the Elbe Valley, framed by vineyards and wooded hills, is defined by the Elbe River, which meanders through the urban fabric and is bordered by wide river meadows. **These meadows, cutting across the city, have historically hosted a variety of**

uses and activities—visible in old photographs—and remain a defining feature of Dresden's atmosphere and spatial identity.

The Environment Office, responsible for nature conservation, places great emphasis on the protection of biotopes within the city. **These areas not only serve as essential refuges for rare and endangered species, such as the beaver and corn crake, but also function as peaceful recreational spaces for residents.** The presence of such species within the urban core is seen as a significant achievement in local conservation efforts and a testament to the ecological quality of Dresden's landscape.

To further support the integration of nature into the city, Dresden's current landscape plan is guided by the concept "**Dresden—the compact city in the ecological network**" ("Dresden – die kompakte Stadt im ökologischen Netz"). **This approach emphasizes the need to balance urban density with ecological connectivity**. The plan divides the city into sub-areas and introduces an ecological network structured through both net elements (functional spaces, high-value areas, ecological corridors, and green axes) and cell elements (ranging from compact urban cells to flexible and rural ones). Rather than defining fixed protected zones, this framework serves as a planning tool that guides future land use and development while respecting the city's natural systems and polycentric structure.

The plan proposes 27 specific measures to guide future urban and landscape planning, aiming to protect, enhance, or restore ecological functions in different parts of the city. These measures provide orientation for decision-making across various departments and help ensure that Dresden continues to evolve as a resilient, biodiverse, and livable green city.

2.c. Built Environment

Dresden's built environment reflects a complex layering of historical reconstruction, post-war development, and more recent car-centric urban expansion. The city is most recognizably shaped by its flood control strategies, which have left a prominent mark in the form of the wide, grassy Elbe meadows that traverse the urban core. While these meadows serve as a natural buffer for high waters, they remain largely undeveloped green corridors with limited ecological or recreational diversity. Beyond these, Dresden's green spaces are relatively limited, with only a few notable urban parks and one major urban forest. Much of the city's later development—particularly in the post-war and post-reunification periods—has prioritized road infrastructure and low-density layouts, contributing to a fragmented urban fabric that often lacks pedestrian accessibility and integrated ecological planning. This context underscores the need for rethinking the relationship between the built environment and the landscape to better support both human and non-human life.

3. MCDA

3.a. Problem Statement, Objectives and Criteria

Here we talk about our understanding of the problem (both in a general sense and more specifically in our research goals), and the questions for each objective that brought us to choose the criteria.

3.a.i. Theoretical framework: The idea of Ecological Restoration

Our group's understanding of ecological restoration is reflected well in the evolution of debates and the resulting definition of the discipline, developed by the newly formed Society for Ecological Restoration (SER) in the 1980s and first published in 1990.

> Ecological Restoration is the process of intentionally altering a site to establish a defined, indigenous, historic ecosystem. The goal of this process is to emulate the structure, function, diversity and dynamics of the specified ecosystem. (Higgs, 1994)

What to leave behind —The emerging movement sought to move beyond human-centric notions that had shaped the goals and perspectives of restoration efforts. It aimed to reposition humans as part of complex ecosystems rather than the central focus of resource management. Terms like 'conservation' and 'preservation' were avoided, as they implied managing "natural resources" for human use or protecting wilderness for its scenic value. At the heart of earlier approaches was the objectification of nature as a resource to be used, enjoyed, and controlled: projects often sought to simplify streams and floodplains, eliminating ecological dynamics seen as barriers to flood control and land development. By the late 1990s, it was increasingly recognized that flood damage reduction and ecosystem protection could be achieved through the same project. This marked a shift in thinking among floodplain managers—**from single-purpose flood control to integrated river and floodplain interventions that mitigate flood impacts while providing ecological benefits.**

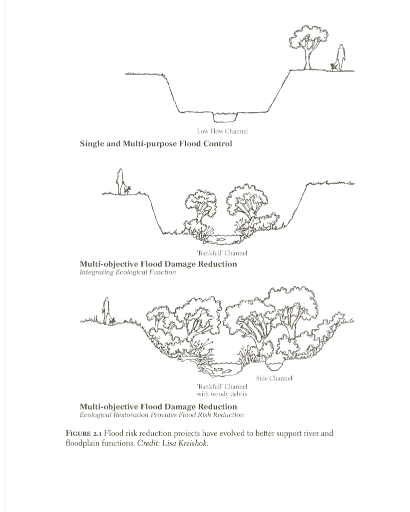


Figure 1: Lisa Kreishok [1]

Even the aforementioned definition of restoration sparked debates about how to define "indigenous" or "historic" ecosystems, given that ecological systems constantly evolve. This raises the question: which point in history should we aim to restore to? After all, there is a difference between restoring for maximum biodiversity and supporting the local dynamics of a functioning ecosystem. Especially in urban contexts, practitioners recognized that land use disturbances made it unrealistic to recreate indigenous or historic environments as they once were. This is why the new approaches to restorations were influenced by the imperative, already emerged in the 1930s, of repairing or reversing damage caused by human activity on ecosystems.

What makes an ecosystem and its restoration — What persists of these definitions are the core variables that should inform any restoration. First, the **structure of forms** composing an ecosystem — the spatial pattern or arrangement of landscape elements (patches, corridors, and matrices) which strongly controls movements, flows, and changes [2]. Second, the 'ecosystem functions', later redefined as 'ecological **processes**', intended as the "dynamic attributes of ecosystems, including interactions among organisms and interactions between organisms and their environments" or more simply put by W. Dramstad, J. D. Olson, and R. T. Forman [2], the **movements and flows** of animals, plants, water, wind, materials, and energy through the structure. Lastly, a restoration project should aim to provide **resiliency**, the ability of the ecosystem to sustain itself without regular maintenance or interventions: the native plants and animal species should thrive, sustain reproducing populations necessary for their stability, and be capable of enduring periodic environmental stress events (such as a fire or flood) that serve to maintain the integrity of the ecosystem.

Finally, a suggestive and far-reaching paradigm was provided by one of the founders of the movement, William Jordan, who argued that **individuals and communities must be active participants in ecological recovery, and that healing natural systems**

would also foster the recovery of human communities. The benefits would go beyond an economic view of the use and enjoyment of our collective natural resources, encompassing the **re-creation of a "sense of community" and a "sense of place."** Restoration should aim to create functioning **environments where diverse species can thrive while also restoring social and historical identity** in a generation increasingly disconnected from place by freeways, strip malls, and car-centric development.

3.a.ii. Problem Statement and Research Question

Along with the Elbe river, Dresden comprises a dense network of streams, which are spread out across its fabric. Presently, the streams are secluded from being a valuable part of the city. The problems are characterised by ecological issues, inappropriate land use by residents, and artificial channelling (Project case description). They, along with the Elbe river hold potential to become elements of integrating the ecological and social functions of the city by reclaiming the historical identity of waterfronts and restoring natural habitats. Therefore, there arises a need to understand how to integrate these streams into the network of protected green areas and public spaces, while maximising their contribution to biodiversity while adapting to the risk of flooding within and around the city.

These concerns and identified potentials beg the question that, **how can urban streams be restored and integrated in Dresden's fabric, such that there is a synergy between human activities and the natural environment?**

To articulate the challenges and identify the potentials to answer the question, the analysis is divided into three sub-research categories under the broad themes of biodiversity, climate adaptation and quality of life. Each theme has specific criteria with its attributes, which are analysed, measured and weighted against each other to arrive at the final decisions.

3.a.iii. Biodiversity: What are the potentials and current urgencies in the integration of the natural elements in the urban landscape of Dresden?

The criteria of **connectivity** and **quality** are chosen to improve the existing habitats and further expand them.

1. Connectivity — Aims to identify the the potential green corridors along the streams, using the following sub-criteria for measurement:
    1. Green-Blue connectivity
2. Quality — Aims to identify crucial areas which are important for ecological habitation but presently lack in quality. The following sub-criteria are measured:
    1. Water pollution
    2. Plant health
    3. Soil quality

3.a.iv. Climate Adaptation: What are the main challenges and the potential spatial interventions to adapt to climate change?

To address this question, we focused on identifying both the areas most vulnerable to climate-related hazards and those with potential for ecological intervention.

Flood exposure - For flood adaptation, our first step was to understand the severity and spatial extent of flood risk across the city. We wanted to identify which areas are most at risk under different flood scenarios (e.g. HQ20, HQ100, and extreme events), and how these risks are spatially distributed in relation to existing infrastructure and urban development. This required the use of high-resolution flood hazard maps and the creation of an 'exposure to floods' attribute, which allowed us to quantify and compare the vulnerability of different areas.

Soil infiltration - For soil infiltration, our interest shifted toward understanding the capacity of different soils—especially those in proximity to water bodies—to absorb and regulate rainwater. These areas can potentially act as buffers that mitigate surface runoff and reduce flood pressure. We therefore used the Soil Infiltration Capacity layer to assess which spatial units could support light ecological restoration and which would require more significant interventions, such as the removal of built surfaces or the reintroduction of native vegetation. Together, these two strands of analysis aimed to reveal where and how spatial interventions could be most effectively targeted to support climate adaptation.

3.a.v. Quality of Life: How accessible, inviting, and diverse is Dresden's public space, and how can it reach its full potential?

Urban stream restoration is increasingly used as a strategy for improving the physical and ecological conditions of degraded urban streams. Beyond ecological benefit, it also has a social impact for enhancing the quality of life for the residents living in urban areas.

Urban stream restoration, especially combined with green spaces, can provide amenities, recreational opportunities, and environmental health benefits that contribute directly to residents' well-being. Therefore, it is important to foster awareness and supportive attitudes toward stream restoration projects, while also addressing the issue of just distribution and equal access to streams.

Three important aspects of restoration projects relate to this benefit, they are attractiveness, accessibility, and diversity. Attractiveness is related to how inviting the streams are for residents, which can be assessed by analysing the use of the entire landscape, from riparian zones to uplands, to maximize ecological and societal benefits, and by evaluating how visible the streams are from urban areas. Accessibility ensures that people of all ages and backgrounds can physically reach the stream for walking and socializing. Meanwhile, diversity refers to the surrounding land uses that support multifunctionality.

When streams are embedded within a landscape with various uses, they become shared community assets rather than isolated environmental features.

References:

- E. Bernhardt and M. Palmer [3]
- M. Scoggins *et al.* [4]

1. Attractiveness — Aims to assess how inviting Dresden's stream corridors are as public spaces. It involves evaluating the following sub-criteria:
   1. Spatial openness (encasement)
   2. Visibility of the streams from surrounding urban areas
2. Accessibility — Aims to analyse how accessible Dresden's streams are to the public, especially within walking distance, using two sub-criteria:
   1. Distance of stream corridors and green spaces
   2. Proximity
3. Diversity — Aims to evaluate the diversity of land uses around the streams to support multifunctionality.

3.a.vi. Spatial Units and other notes

The spatial units used in this study are hexagons with a dimension of 300 meters. The study area of Dresden is divided using a complete surface of a hexagonal pattern. Then it is overlaid with the water stream network and river body from OpenStreetMap to keep only the hexagons that intersect with at least one stream. Finally, the isolated hexagons were removed.

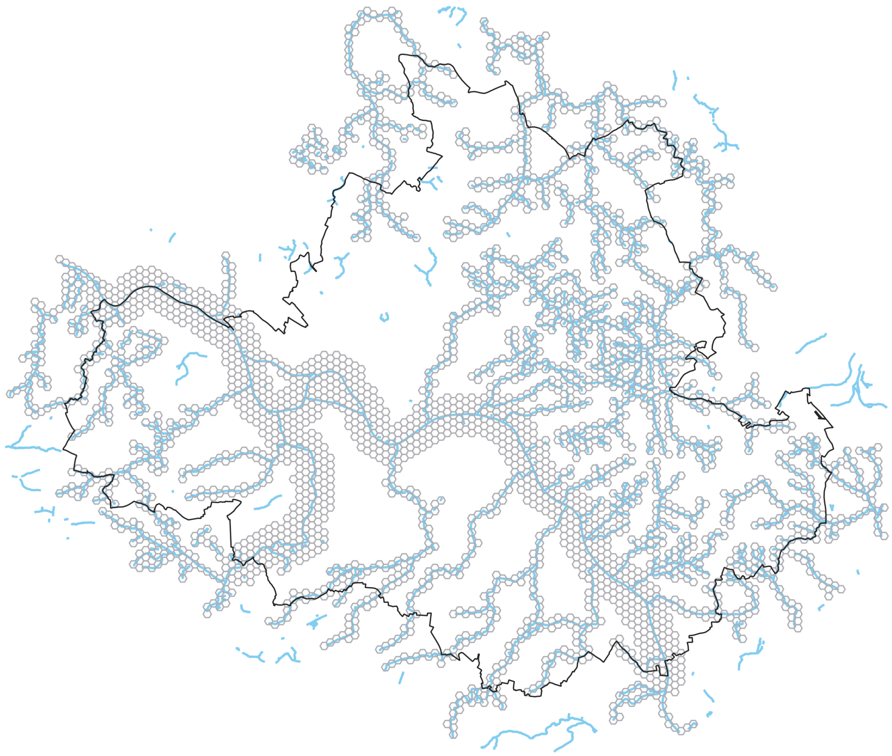


Figure 2: Spatial Units of waterbodies & streams across Dresden

The main reason behind picking the dimensions of 300 meters is based on two main reasons:

1. The walking/biking distance: the estimated radius is used to evaluate the spaces around the water stream within a low walking distance, as pedestrians or cyclists have the highest exposure and engagement with urban streams.
2. The space but not the line: the spatial units are also going to determine the probable area of intervention. Then the streams are not the only lines that need to be changed, but the space surrounding them is also affected in both ways. This space includes the buildings, facilities, and natural habitats that all have synergies along with their neighboring stream structure.

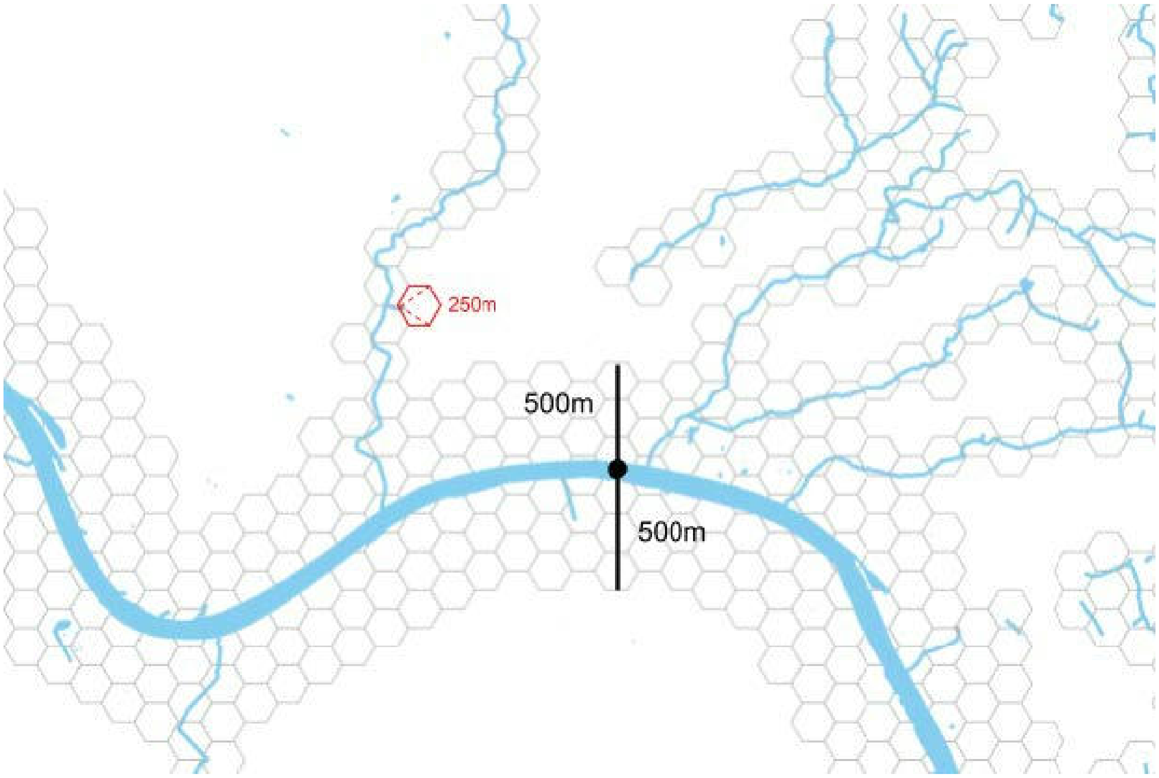


Figure 3: The Dimensions of spatial units and the river buffer radius

The spatial units are also filtered by a 500-meter buffer of the main river, Elde, as it is one of the key spatial elements that have shaped the city's form, functions, mobilities, and identity that cannot be overlooked. So, a larger buffer of hexagonal spatial units where divided in the buffer zone of the Elde river as it covers a larger area of the urban fabric in terms of biodiversity, morphology, climate adaptation, and quality of life.

3.b. Attributes and Layers

Based on the criteria that we decided to tackle, we had to come up with numerical indicators that we could use to evaluate them. These numerical indicators are called attributes and have to be normalised—in our case between 0 and 1—so that they can be compared and weighted properly depending on their relevance. In our case, 0 corresponds to an urgent need to perform urban stream restoration, while 1 corresponds to a situation that is currently very good, or at least the best in the area of interest.

In practice, these attributes also needed to be aggregable at the scale of the spatial units, so that we can assign one unique value to each spatial unit for each attribute. This can be an important limitation on the type of computations and therefore the type of attributes that we can use. We explain below the different attributes that we computed, how we computed them, which data we used and why we made these choices.

*(Attributes with an asterisk * are mentioned the 'Discussion' chapter at the end of the report)*

3.b.i. Biodiversity

Connectivity

Green-blue connectivity*

The aim to measure the blue-green connectivity was to identify the potential areas which can become green corridors along the lengths of the stream. To do that, the area of the vegetation layer from OpenStreetMap was quantified.

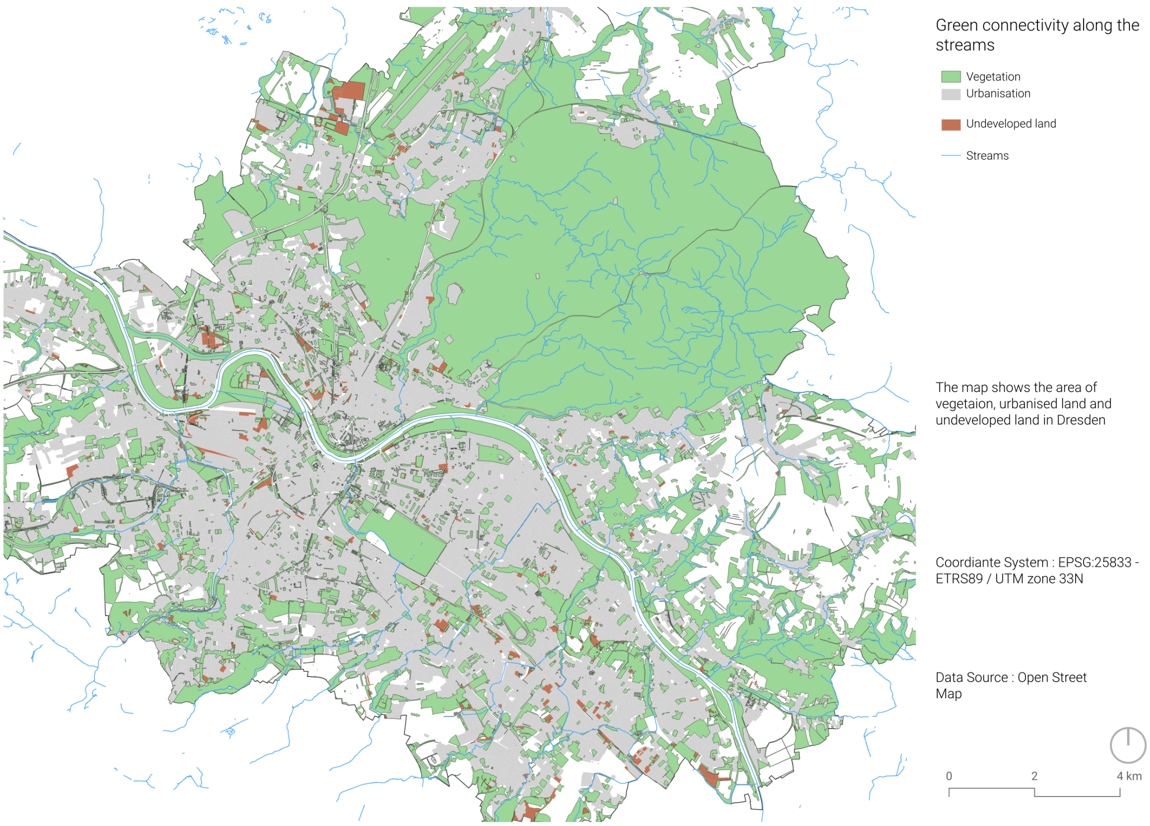


Figure 4: Mapping vegetation, urbanised areas, and undeveloped areas

This layer was then intersected with the spatial units to focus on the vegetation which is within a 250m radius from the streams. The values of the areas were then graduated to visualise the spatial units which lacked vegetation to those which were densely vegetated. These values were then normalised to make them comparable to other attributes. Here, 0 indicates the spaces which lack vegetation and 1 indicates dense vegetation, signalling at the potential spaces to add vegetation and form green corridors along the streams.

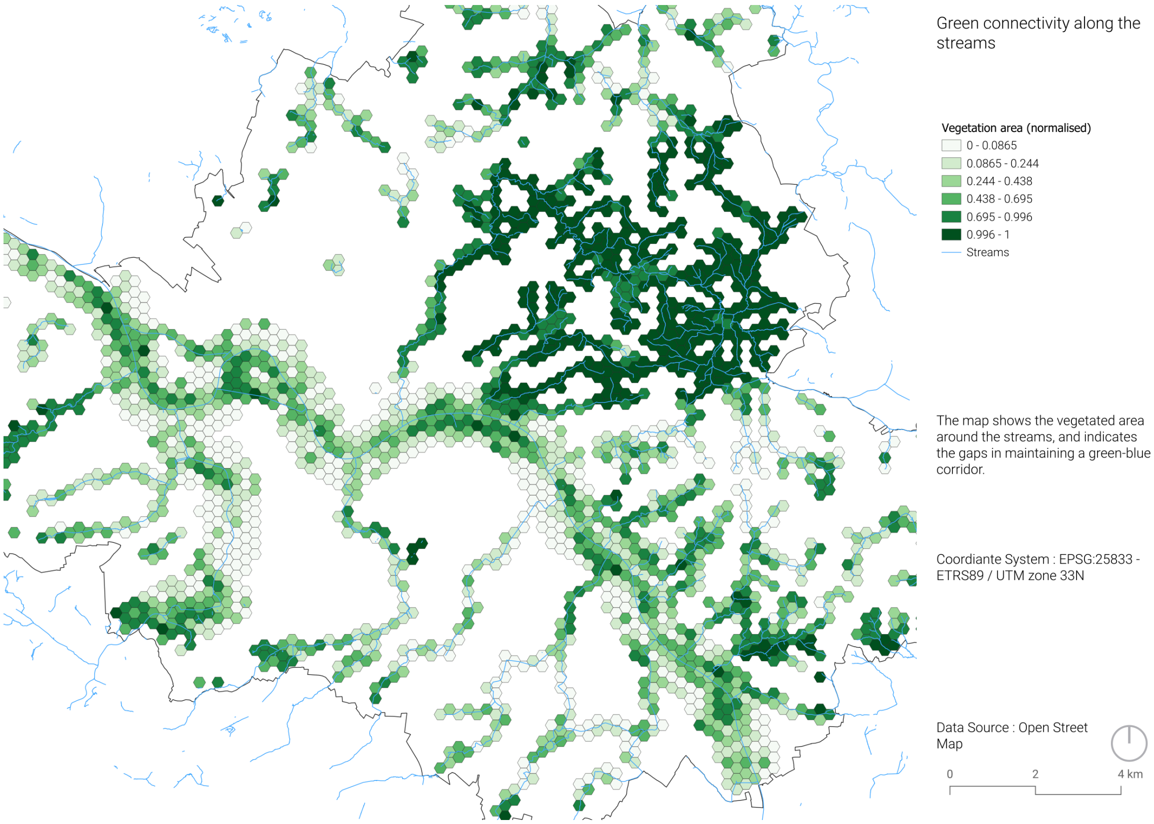


Figure 5: Identifying potential to establish green connectivity along the streams

Quality

Water pollution

We have not found the data yet.

Soil quality

The attribute is used to identify where the existing vegetation which has poor soil quality, as it signally at a degrading ecological habitat. Soil quality is measured as it is an integral measure of the ecological value of the soil. The layer used to compute the attribute were the vegetation layer from OpenStreetMap and the soil quality layer from Dresden OpenData.

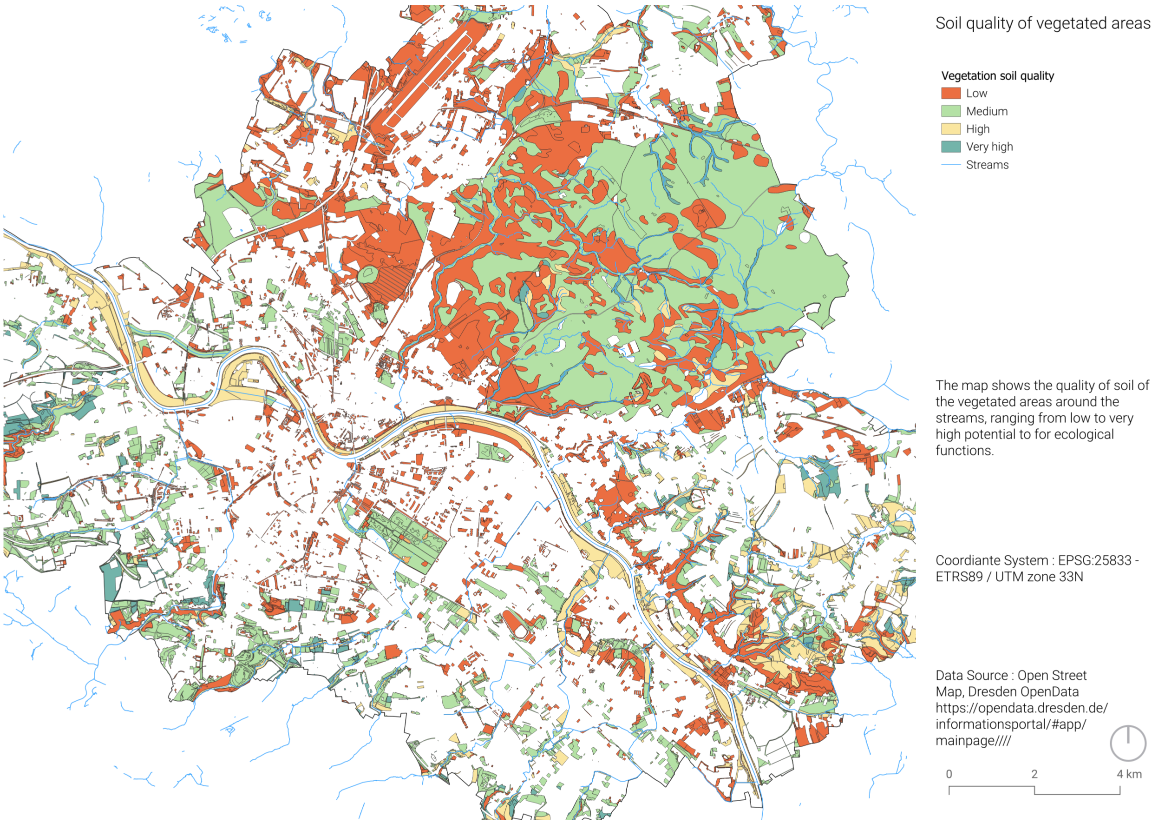


Figure 6: Mapping the soil quality of vegetation in Dresden

The two layers were intersected to see where the vegetation has poor soil quality. The resulting layer was intersected with the spatial units to focus on the vegetation near the streams. This helped us visualise the streams where the soil quality needed to be restored in order to restore natural habitats.

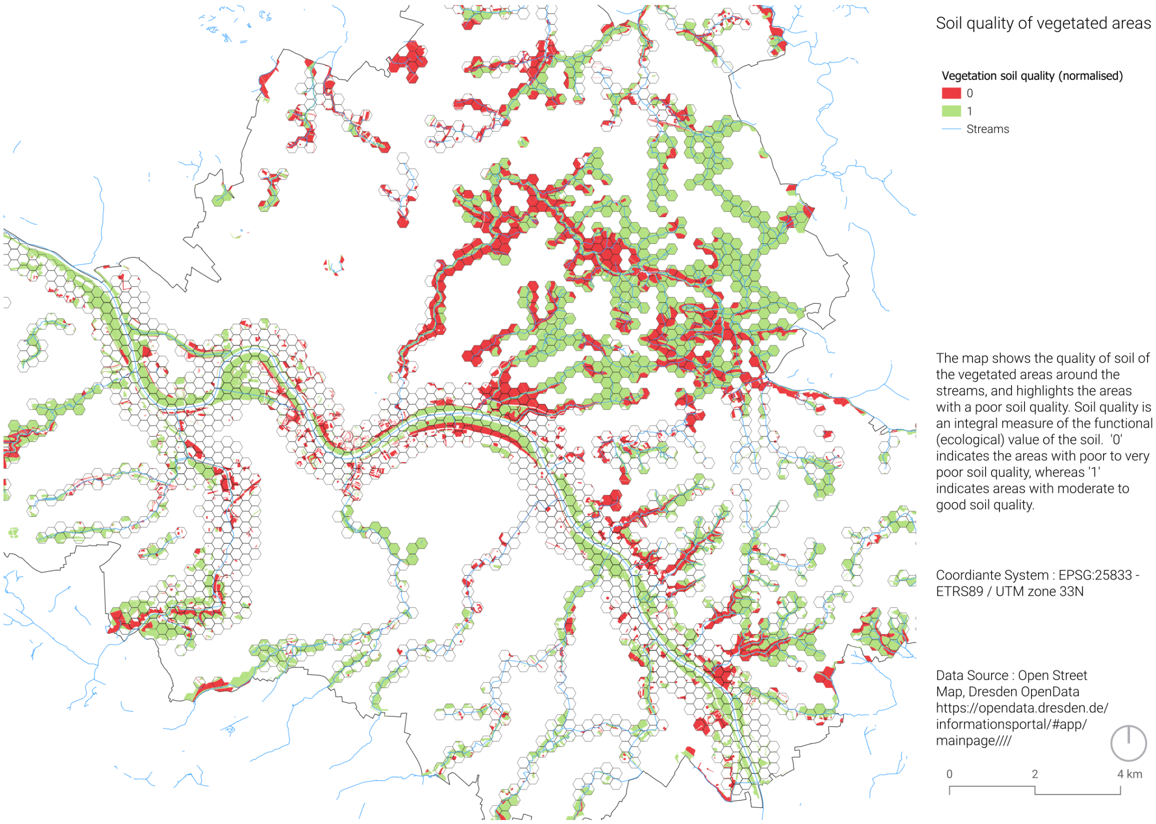


Figure 7: Identifying vegetation with good soil quality and poor soil quality along the streams

Plant health

Plant health is measured using the normalized difference vegetation index (NDVI), computed as an average of the values in June, July and August (when the vegetation is facing the most) over the five last available years. The values are computed on a 10 by 10 m raster (based on the values of Sentinel-2), and then averaged over the spatial units. Higher values correspond to healthier vegetation.

3.b.ii. Climate Adaptation

Resilience to flood risks

Available space near streams

The necessity of available open space along the streams and the water body will be a potential opportunity for design interventions to prevent, or at least reduce, the flood risk along the streams' banks. This can be achieved by calculating the available open space areas in the close proximity of the streams and rivers of Dresden.

Figure 8: Open grasslands and undeveloped lands as available spaces along the streams

This was assessed by using the land use ground layer collected from the [surfdrive] dataset and filtered based on the undeveloped land and grassland values. After that, the layer was intersected with the spatial units to calculate the coverage space of each land type within each spatial unit before being joined by attributes to the raw spatial units again.

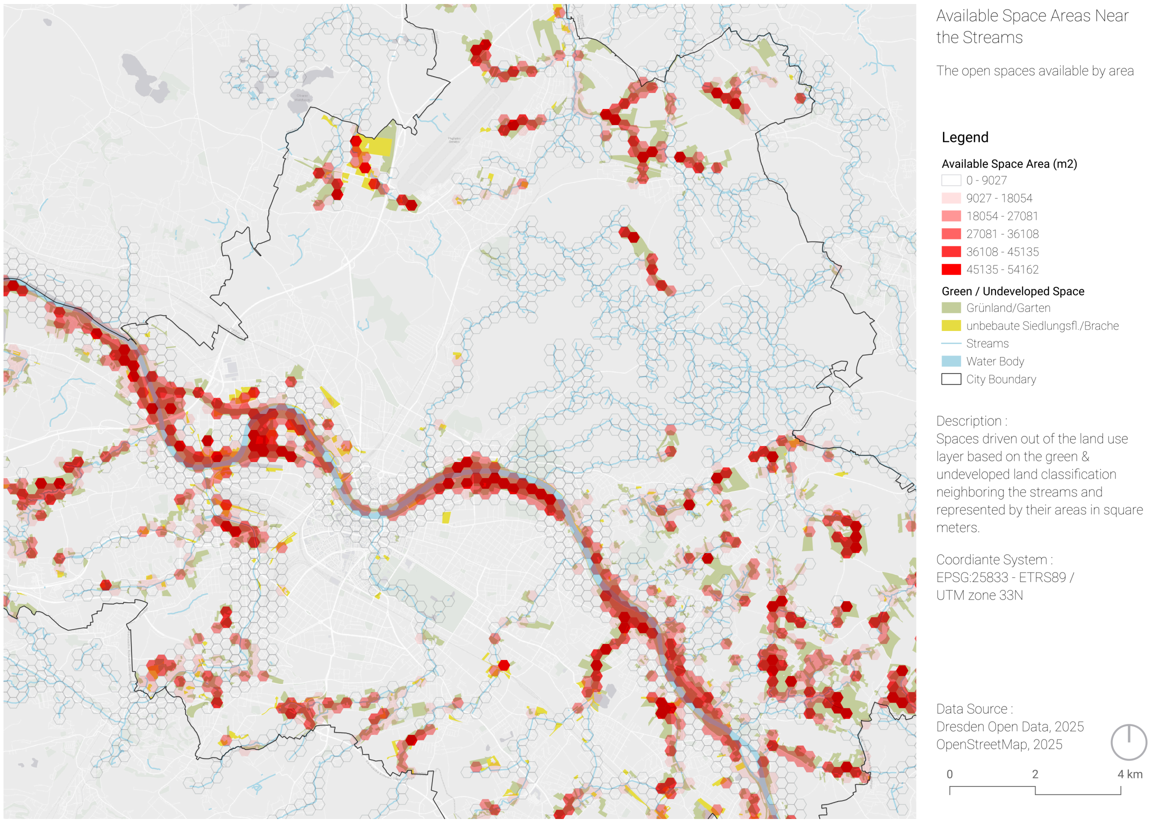


Figure 9: Available spaces along the streams by area

By joining the intersected layer to spatial units based on their join attributes, the available space within each spatial unit is already available. In order to normalize the values, the area values were all divided by the highest area number, and the new results were distributed between zero, as the lowest coverage or available area, and one, as the highest coverage and available area.

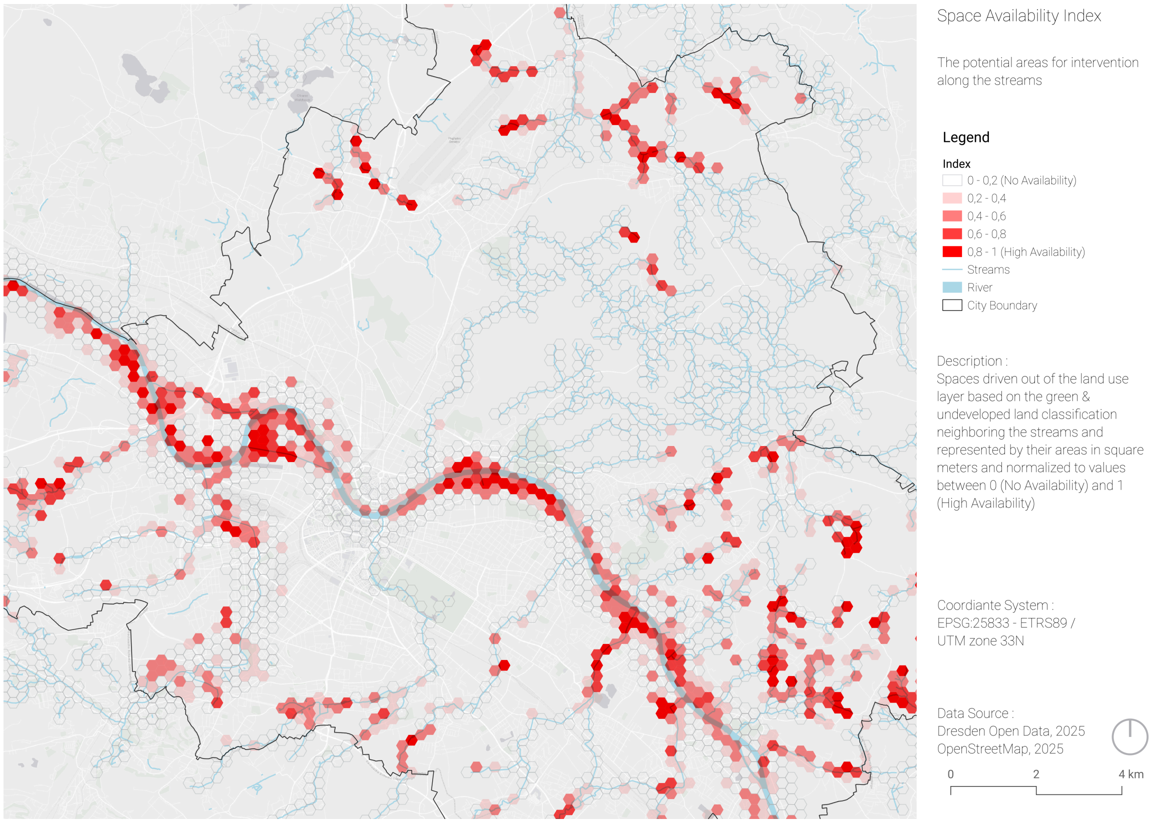


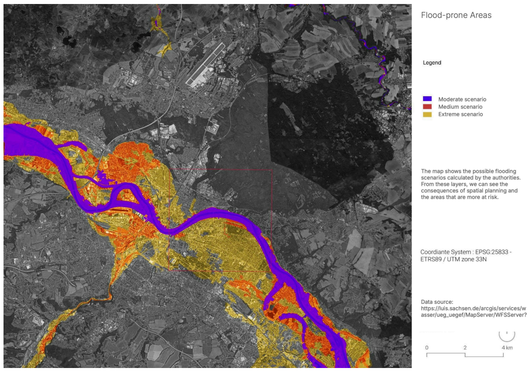
Figure 10: Normalized values of space availability along the streams

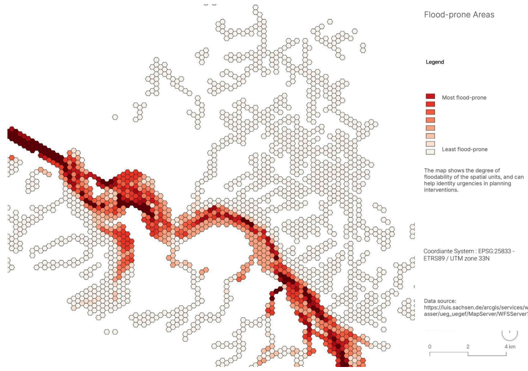
Exposure to floods

As part of a study commissioned by the Civil Engineering Office in 2020, following the introduction of a new flood protection law in the Saxony region, a new rainfall-runoff model was developed. Based on this model, working maps were created to show the areas that would be flooded during events expected to statistically occur once every 20 and 100 years, as well as under an additional extreme scenario.

Using the spatial layers from these scenarios, which indicated the areas affected by each flood event, we created an attribute for “exposure to floods.” Exposure to one or more flood risk areas was assigned a negative weight, with the severity increasing for each additional scenario to which an area was exposed.

The aggregation of this data into a single attribute was carried out by first creating separate polygons for areas where multiple flood scenarios overlapped. Then, a value between 0 and 1 was assigned to each layer, using percentage-based weighting to reflect the relative severity of each scenario. We were interested in answering the following question: which are the most flood-prone areas in Dresden?

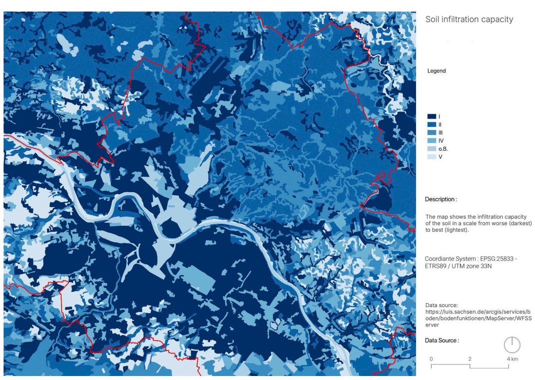


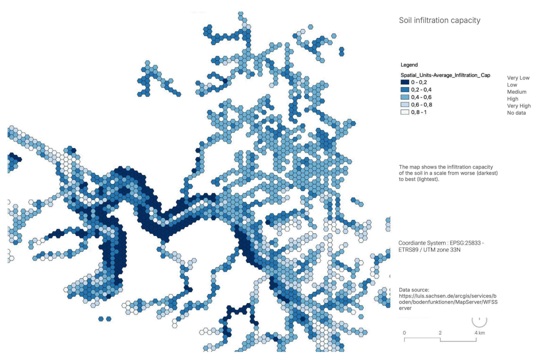


Soil infiltration capacity

Soil sealing caused by infrastructure prevents water from being absorbed into the ground, accelerates surface runoff, and reduces space for natural stream dynamics. Identifying areas most affected by man-made interventions was therefore a key priority. However, even in unsealed areas, not all soils absorb water equally. In the context of an analysis aimed at informing integrated, city-wide interventions, it is essential to consider the varying water absorption capacities of different soil types.

To address this, we used the Soil Infiltration Capacity layer to assign each spatial unit a degree of infiltration potential. This allowed us to distinguish between areas where water can be absorbed with minimal, 'light' ecological restoration and those that require more intensive interventions—such as the removal of built structures or the restoration of ecological processes specific to the local soil type and its characteristics.





Resilience to heat waves

Sealing

Not handled yet.

Surfaces reflection index

Not sure if we will use it.

Shade

By knowing the shade coverage of open spaces across the stream area networks, the potential areas for heat resilience can be spotted. Also, the open spaces that have the highest exposure to the heat waves can be recognised through the ground shadow analysis, especially during the peak time of warm periods in the area.

The DSM and DTM raster layers were needed to run the shadow analysis based on the building and vegetation heights. The raster layer was clipped out based on the dissolved layer of spatial units to limit the area of analysis. The buildings layer was also masked out from the DSM layer and patched with it again to represent the updated building heights. After that, the aspect and edge heights were calculated using the UMEP plugin to process the preliminary data for the shadow analysis. The shadow analysis is done based on three time intervals during the day within the peak times of warm periods in the area.

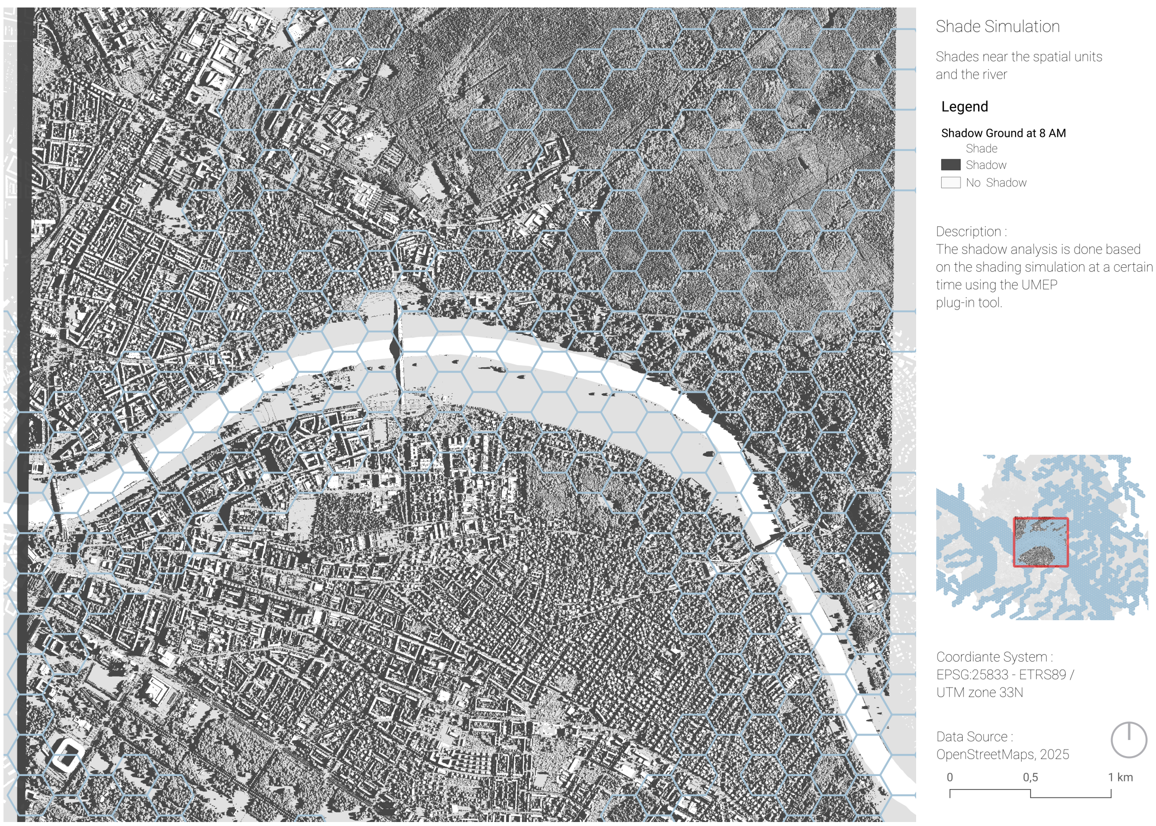


Figure 11: Shadow analysis done by the UMEP processing tool

The output layer with which was a raster layer, was then aggregated to the spatial units using the Zonal Statistics tool to translate the shading values to the polygon spatial units. The output values were the median (average) values contained within each spatial unit and were already distributed between zero (full shadow) and one (no shadow) values.

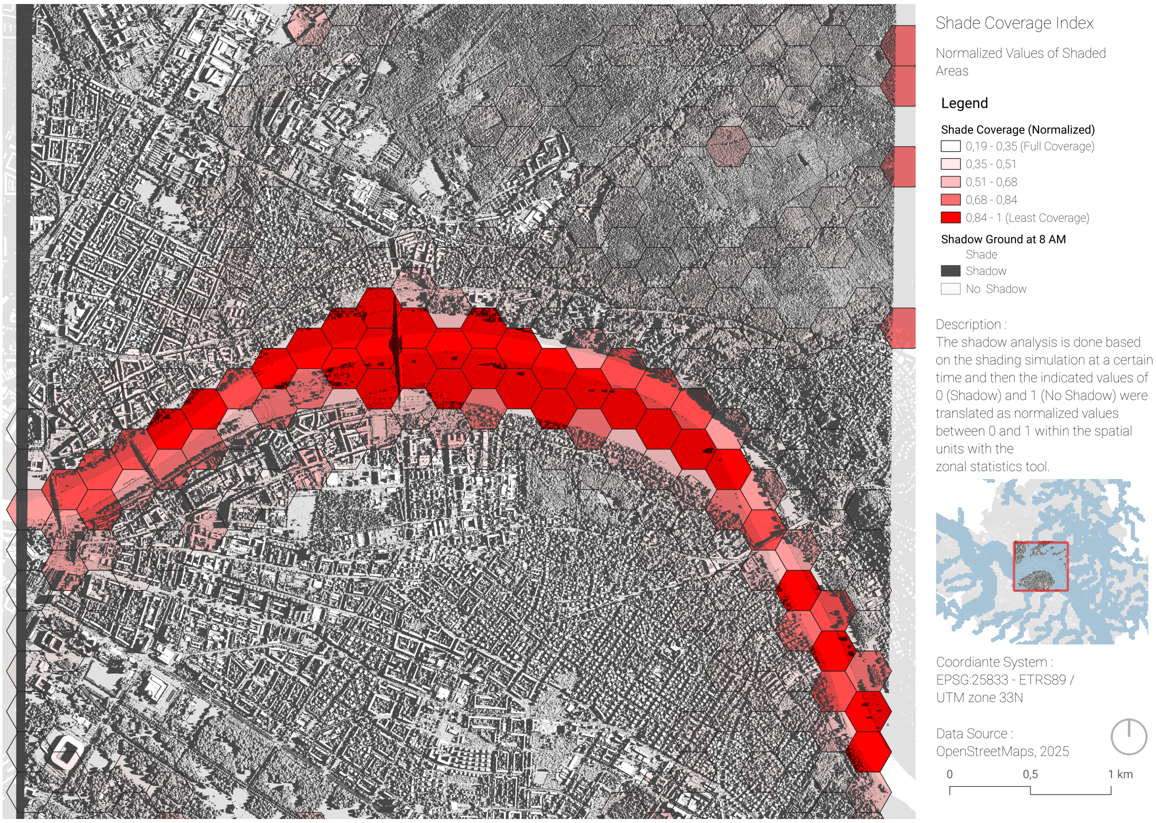


Figure 12: Normalizing the shadow analysis values between zero & one

3.b.iii. Quality of Life

Attractiveness

Encasement

The encasement factor reflects the amount of enclosure of a space along the water body. It can be analysed by calculating the ratio of the building height and the street width of the open space on the edge with the stream or river banks. This is a qualitative value that represents the openness of the neighbouring spaces of streams and water bodies through a quantitative method.

Visibility

The visibility factor refers to how visible the streams are from an urban area. The analysis is conducted by interpolating points from the streamline with a 500-meter radius of urban surroundings. This is also a qualitative value that reflects the visual openness of the streams through a quantitative method.

Accessibility

Connection of green space and streams

This layer shows how well green space and streams are connected. The analysis uses network PST analysis: Attraction Reach (AR) to evaluate how accessible streams are from green spaces within a 500-meter walking distance.

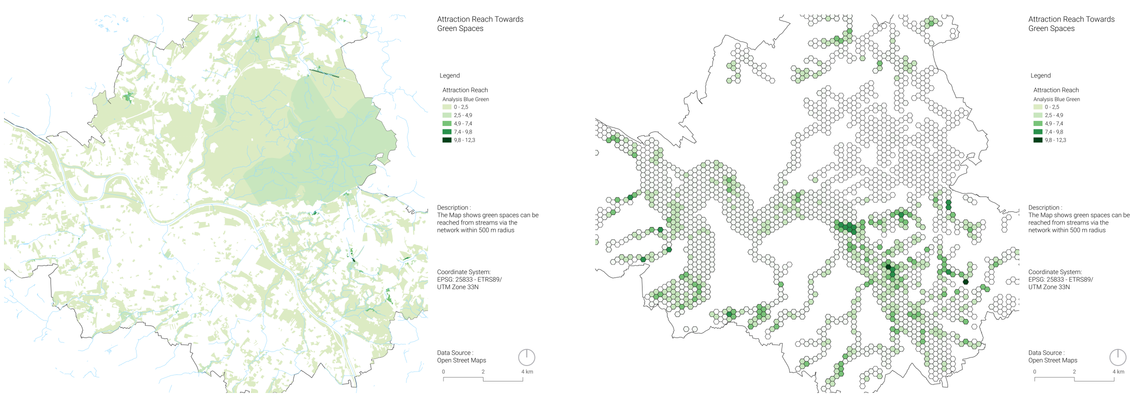


Figure 1: Attraction Reach Analysis

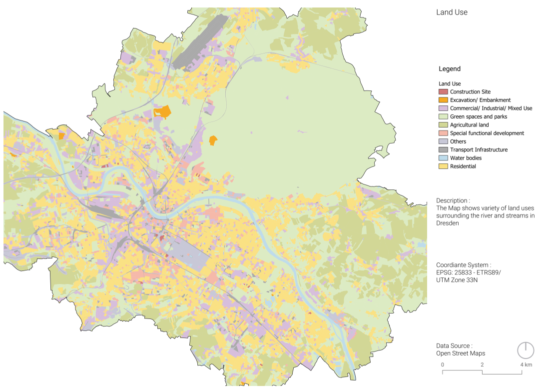
Proximity

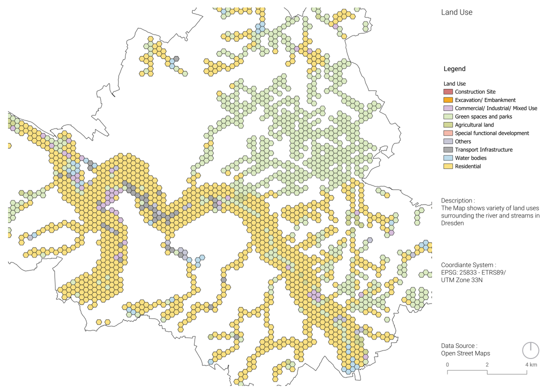
The analysis uses isochrone and isodistance methods to identify the areas that can be reached from the streams within 15 minutes or 500 minutes of walking distance. The result shows how reachable the stream corridors are from their surrounding context

Diversity

Land use variety

This analysis identifies the types of land use around the stream corridors, more variety of uses enhances the connectivity of streams with the current urban fabric. It is well connected if there are various public spaces and/ or amenities present.





3.c. Weighting of the Attributes

Once each attribute has produced a normalised value for each spatial unit, all the attributes need to be aggregated into one final value. Since all of them do not participate equally to the goals we mentioned earlier, we tried to weight them according to their relative importance in achieving our goals. These weights could then be used to compute a weighted average that is easier to use thanks to reducing the problem to one dimension instead of several dimensions.

To compute the weights, we made individual Saaty matrices for the attributes of each of the three objectives. Saaty matrices are square matrices that allow us to deduce weights from pairwise comparisons of the attributes [5]. In our case, we used the eigenvector method to calculate the weights. The matrices and weights are shown in Table 1 below.

Then, we divided them by 3 to assign the same weight to the three attributes, and got a final set of weights that summed to 1. We chose this method because it allowed us to assign more weights to the most reliable and pertinent attributes, while maintaining the balance between the three main objectives.

Table 1: Saaty matrix and weights for the three criteria

(a) Biodiversity

	Soil quality	Plant health	Water pollution	Green-blue connectivity	Green connectivity
Soil quality	1	3	1/3	2	2
Plant health	1/3	1	1/4	2	2
Water pollution	3	4	1	5	4
Green-blue connectivity	1/2	1/2	1/5	1	2
Green connectivity	1/2	1/2	1/4	1/2	1
Weights	**0.216**	**0.131**	**0.472**	**0.101**	**0.081**

(b) Climate Adaptation

	Available space near streams	Anticipated flood risk	Soil infiltration capacity	Sealing	Surfaces reflection index?	Shade
Available space near streams	1	1/2	1/3	3	4	2
Anticipated flood risk	2	1	3	4	5	3
Soil infiltration capacity	3	1/3	1	3	4	3
Sealing	1/3	1/4	1/3	1	2	2
Surfaces reflection index?	1/4	1/5	1/4	1/2	1	1
Shade	1/2	1/3	1/3	1/2	1	1

	Available space near streams	Anticipated flood risk	Soil infiltration capacity	Sealing	Surfaces reflection index?	Shade
Weights	**0.169**	**0.363**	**0.250**	**0.091**	**0.055**	**0.073**

(c) Quality of Life

	Encasement	Visibility	Walking/ biking accessibility to streams	Walking/ biking accessibility to green spaces	Land use variety
Encasement	1	2	1/3	1/3	1/2
Visibility	1/2	1	1/4	1/4	1/2
Walking/ biking accessibility to streams	3	4	1	1/2	3
Walking/ biking accessibility to green spaces	3	4	2	1	1
Land use variety	2	2	1/3	1	1
Weights	**0.105**	**0.071**	**0.309**	**0.330**	**0.184**

These weights were computed with respective consistency ratios of 0.053, 0.057, and 0.059 for Biodiversity, Climate Adaptation, and Quality of Life. These values are below the threshold of 0.1 prescribed by R. Saaty [5], which indicates that the pairwise comparisons were consistent enough to be used in the analysis.

3.d. Results of the Analysis

To write and organise.

4. Typology Construction

4.a. Results of the Analysis

5. Results

6. Discussion

Green-blue connectivity:* The attribute would be re-calculated using the Guido toolbox, to obtain a more precise analysis of the potential green corridors.

7. Conclusion

...

Bibliography

[1] A. Riley, *Restoring Neighborhood Streams: Planning, Design and Construction*. USA: Island Press, 2016.

[2] W. Dramstad, J. D. Olson, and R. T. Forman, *Landscape Ecology Principles in Landscape Architecture and Land-Use Planning*. Shearwater Books, 1996.

[3] E. Bernhardt and M. Palmer, 'Restoring streams in an urbanizing world', *Freshwater Biology*, vol. 52, pp. 738–751, 2007, doi: 10.1111/J.1365-2427.2006.01718.X.

[4] M. Scoggins *et al.*, 'Community-powered urban stream restoration: A vision for sustainable and resilient urban ecosystems', *Freshwater Science*, vol. 41, p. 404, 2022, doi: 10.1086/721150.

[5] R. Saaty, 'The analytic hierarchy process—what it is and how it is used', *Mathematical Modelling*, vol. 9, no. 3, pp. 161–176, 1987, doi: 10.1016/0270-0255(87)90473-8.