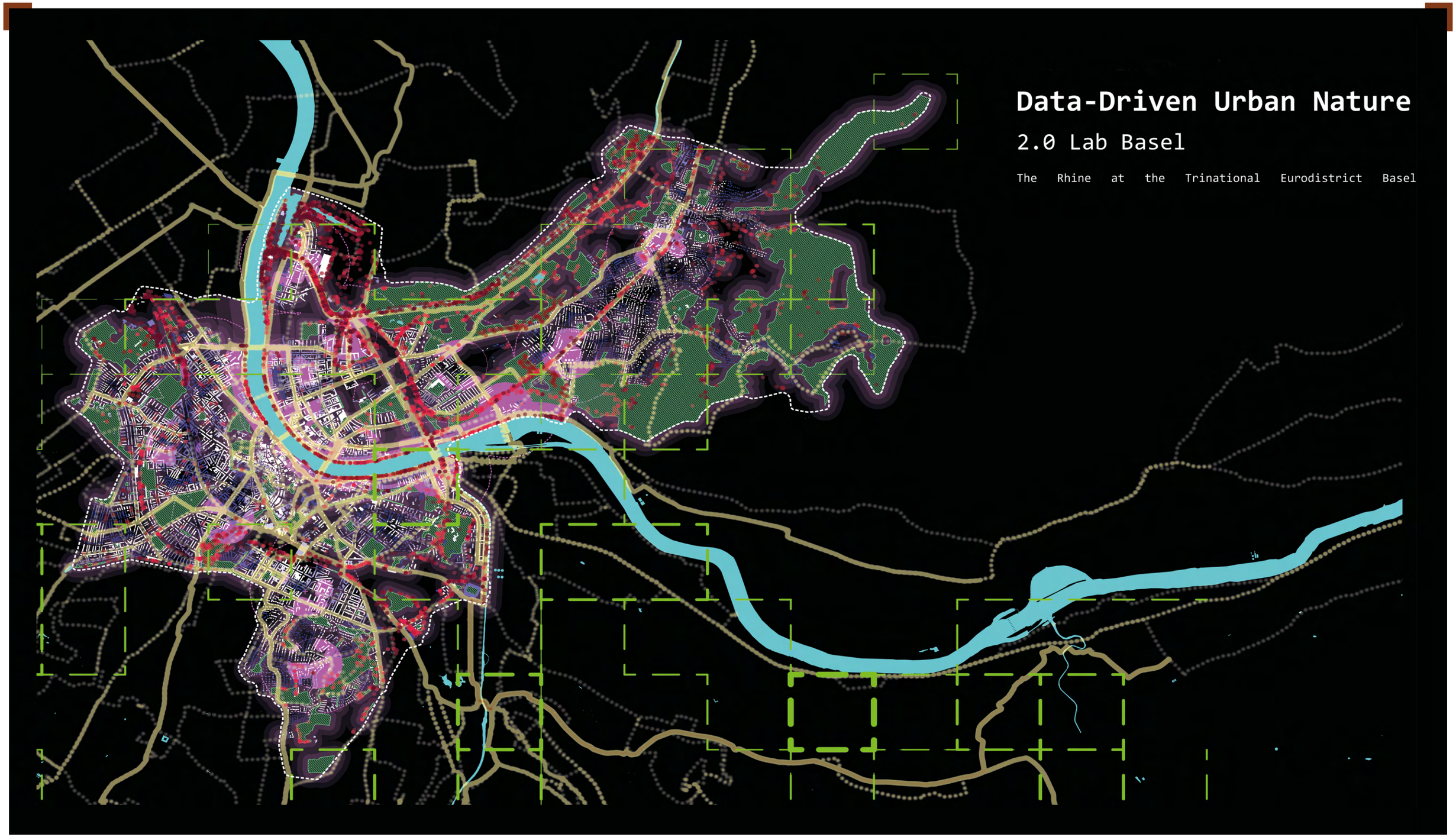

Data-Driven Urban Nature

2.0 Lab Basel

The Rhine at the Trinational Eurodistrict Basel

Country /City	Germany/ Karlsruhe
University / School	KIT - Karlsruhe Institute of Technology
Academic year	2022
Title of the project	Data-Driven Urban Nature - 2.0 Lab Basel, The Rhine at the Trinational Eurodistrict Basel
Authors	Alexander Born, Yannick Ehinger, Aleksandra Komina, Hendrick Schuetze, Gabriel Stark

TECHNICAL DOSSIER

Title of the project	The Rhine at the Trinational Eurodistrict Basel
Authors	Alexander Born, Yannick Ehinger, Aleksandra Komina, Hendrick Schuetze, Gabriel Stark
Title of the course	Data-Driven Urban Nature - 2.0 Lab Basel
Academic year	2022
Teaching Staff	Prof. Henri Bava , Arturo Romero Carnicero
Department / Section / Program of belonging	Landscape Architecture
University / School	KIT - Karlsruhe Institute of Technoloy

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Written statement, short description of the project in English, no more than 250 words

Urban challenges include traffic, Nature-Based Solutions, mixed land use, social integration, and healthy, equitable cities. GIS data aids in analyzing these complexities and presenting results graphically. The Trinational Eurodistrict Basel serves as an experimental site, examining cultural, natural, social, and built ecosystems for studying quality of life. Initially, quality of life indicators like Rhine access, parks, public transport, and meeting places were compared to population distribution. This determined favorable and unfavorable residential areas. The bicycle infrastructure in Basel was analyzed, comparing real user routes with the existing road network and proposed connections. Similarities and differences identified bicycle friendliness. Invasive Neophytes were studied to minimize their spread and integrate them into the local plant community. Threat levels and potential areas of spread were identified along the Rhine River and railroad tracks, along with causes of dispersal. The study on Tree Disservice mapped urban areas where severe allergies and respiratory problems are prevalent. Damage to trees within 100m of houses was assessed, categorizing areas from poor to poorly habitable. Tree diversity and nuisance for residents were also considered. Lastly, the relationship between tree age, environmental factors (e.g., nitrogen, ammonia), and urban influences (e.g., waste stations, land use) was explored. The attached maps illustrate the interconnected project stages, aiding the understanding of city development and the natural elements of quality of life.

For further information

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12th International Biennal Landscape Barcelona

Barcelona **November 2023**

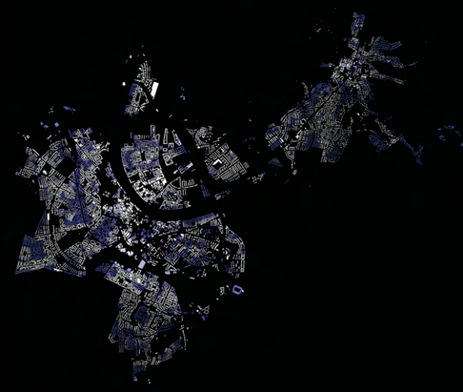
SCHOOL PRIZE

Basemap - Basel River and green spaces

Population and
popularity - The blocks of basel

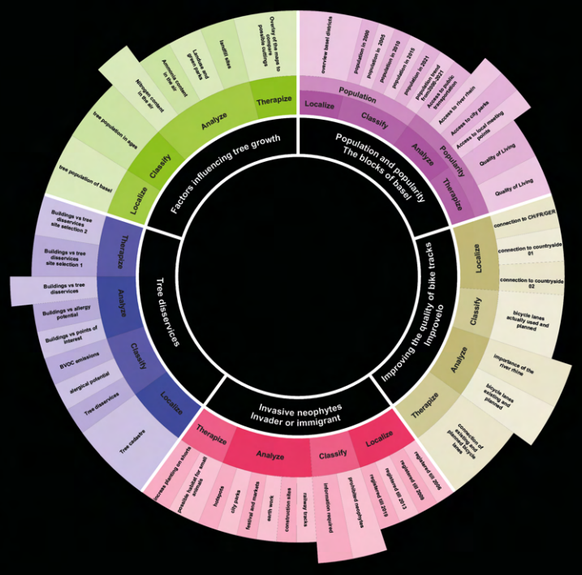
Overlapping map with all five narratives

Invasive neophytes - Invader or immigrant



Tree disservices

Improving the quality
of bike tracks-Improvelo



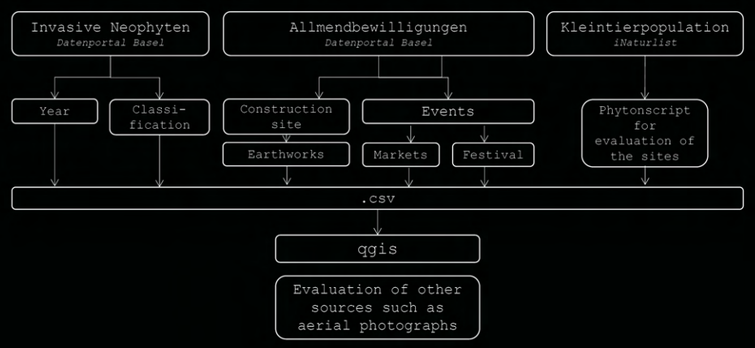
Overview of the five narratives that were processed in four project stages divided into various subtopics. The summary map above shows one map from each of the project stages classify or analyze

Factors influencing tree growth

Invasive neophytes - Invader or immigrant

This project addresses the use of GIS tools to find solutions to minimize the spread and integrate the invasive neophyte as part of our plant community.
Invasive neophytes are foreign plant species that readily proliferate and displace native plant species. They threaten biodiversity and are therefore dangerous.
There are currently about 600 neophytes registered in Switzerland. Only 58 of them are classified as invasive and dangerous. Due to increasing temperatures caused by climate change and globalization, this number will continue to rise in the future. The increase of foreign plant species is becoming a natural process. We need to learn how invasive neophytes behave and learn to deal with them.
Databases from the Basel data portal were used as a basis for researching the topic. These databases were filtered and processed according to the necessary categories. As an example, construction sites were filtered from approximately 170,400 general applications. These were progressively fine-tuned into earthworks to find possible interfaces between registered neophytes and construction sites. In the first stage, registered neophytes were located on a map using geo-coordinates. In the next stage, the neophytes were classified according to their threat level. Individual plants were filtered out and analyzed. After the analysis, an attempt was made to define possible sites of spread. Here, railroad tracks, construction sites, events and green spaces were compared with the locations where neophytes were found. This mapping yielded the result that invasive neophytes are mainly located on stream and river banks, railroad tracks and industrial sites. Contrary to the assumption, hardly any invasive plants were registered in public green spaces. Aerial photographs of hotspots on watersides were consulted for a detailed analysis. This revealed a similar picture: water bodies with a homogeneous, stony or sealed bank showed an increased occurrence of invasive neophytes. Only low levels were recorded in riparian areas with abundant plant cover.
With this analysis based on maps and aerial photographs, first regularities can be identified, which can be used to control the spread and to integrate neophytes.

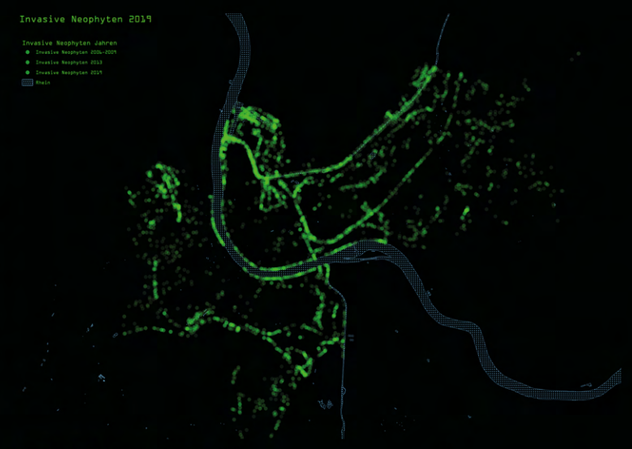
Process and Datamining

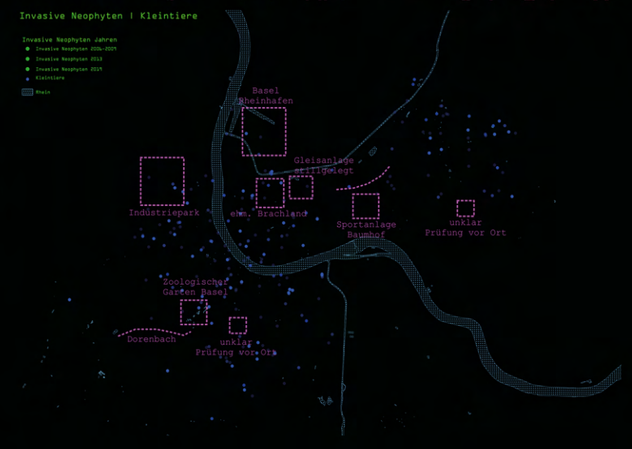


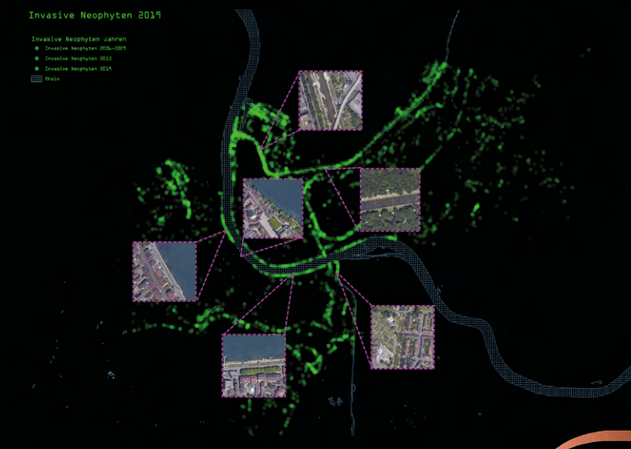
Localize / Classify

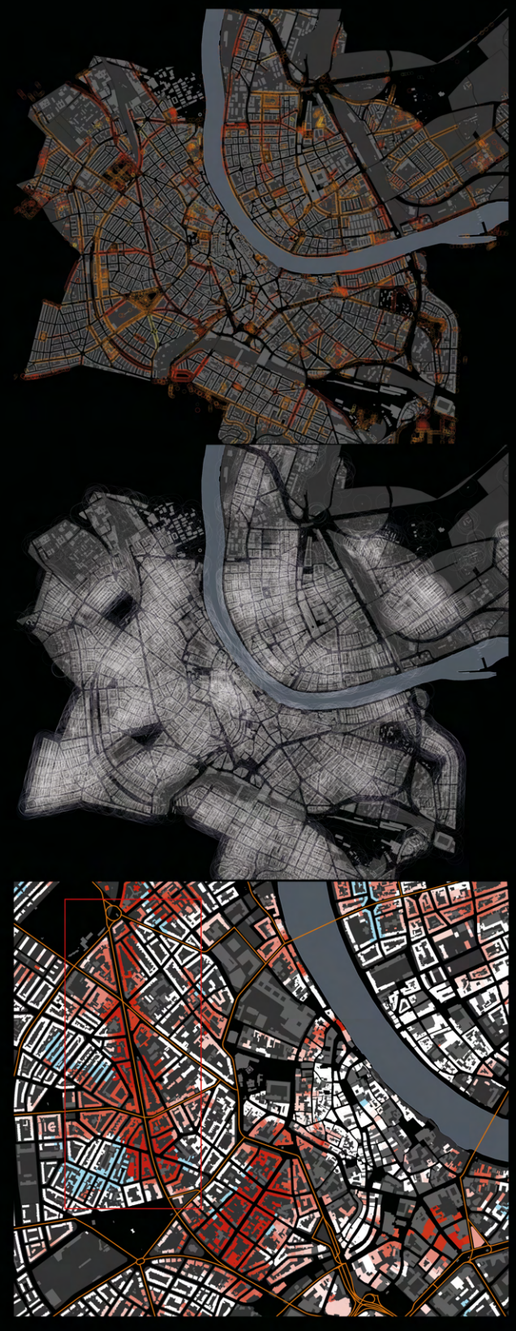
Analyze

Therapize









Localize / Classify

Analyze

Therapize

Tree disservices

For this project it was decided to map Trees. More specifically Tree disservice as discribed by Barcham in their tree selection guide.
The two disservices are mapped were allergy potential of trees aswell as their biogenic volatile organic compounds (CVOC) emissions, which are increased via temperature, air pollution and drought.
The main source of data was a combination of the tree cadastre of basel and the species data from Barcham.
To accompagny this, data from OSM and the Geodaten-shop from Basel for elements like streets, water, POIs were used.
GIS tools like Buffer, Clip, Extract, Merge, Count points in, and also Excel to manipulate the data were used. Using these tools, the main goal was to create a map of Basel which would shed light on urban Areas where life would be harder for people with intense allergies and respiratory problems.
This kind of mapping requires a lot of assumption and biases, so it cannot be described as scientifically accurate, but it still provides a different perspective on the matter.
It was decided to count the number of trees with different levels of disservices around every building in a 100m radius.
Using a first and simple excel formula (see Disservice Multiplier), buildings from bad to worse to live in in relation to totality of trees in the radius were mapped. The higher the value, the higher the overall disservice of trees in that range.
In a second formula (see Tree Nuisance Index) a narrowed it down a step more. The more the index approaches a value of 1, the more the totality of trees in a 100m Range around the building are of the highest disservice. This would then give Areas which present very little tree diversity and high nuisance for residents.
This method made it possible to create a more subtle map than in traditional urban analysis to understand the environment in a more precise and targeted way.