

GRAND
PARC
GARONNE

LIFE
GREEN
HEART



Landeshauptstadt
Düsseldorf



UNIVERSITÉ
CAEN
NORMANDIE



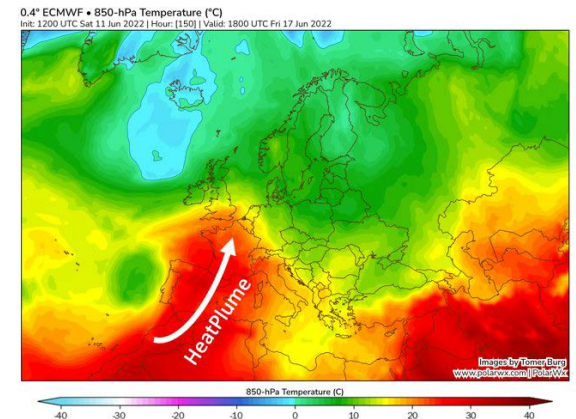
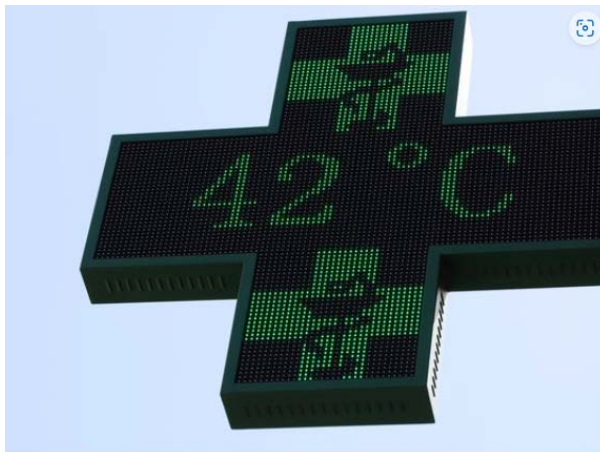
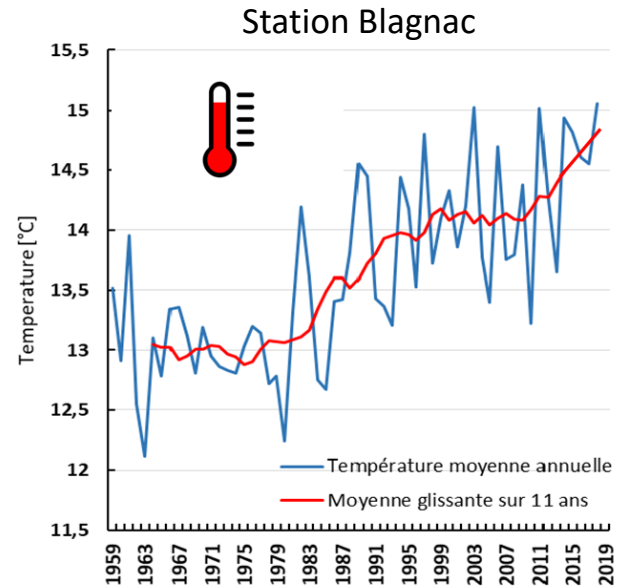
Toulouse : South-west of France



Toulouse, overheating city

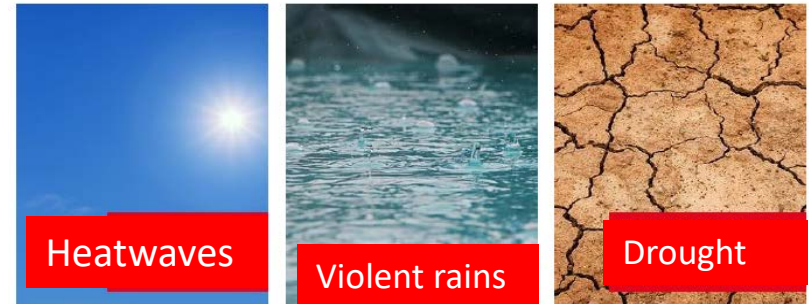
- The average annual temperature raised by **+1,8°C in 60 years** (1960-2020)
- Summer 2022 :
 - Average daily maximum temperatures : 31,5°C
 - 24 days (instead of 11 normally) beyond 35°C
- Summer 2023 records a new all-time high: 42,4°C

→ The summer in Toulouse is now similar to the normal summer in Athens !

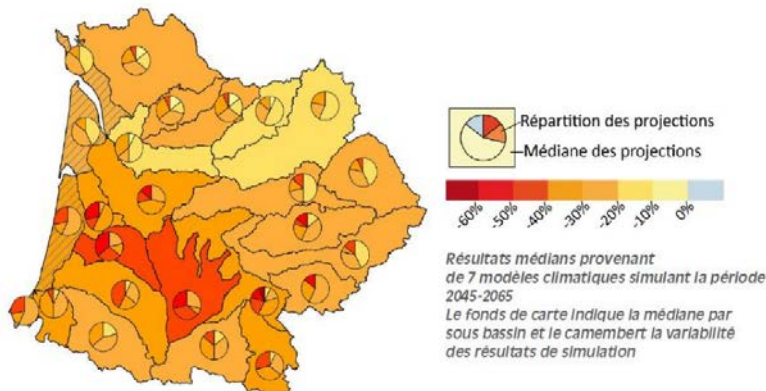


Climate projections (intermediate scenario RCP4.5)

- The rise of temperatures could reach +4°C in average by 2071-2100
- Heatwaves will be more frequent, and more intense
- An extension of the very dry period, which increases temperatures and limits evapotranspiration of vegetation



Evolution des débits en moyenne annuelle (Source : Agence de l'eau Adour-Garonne)



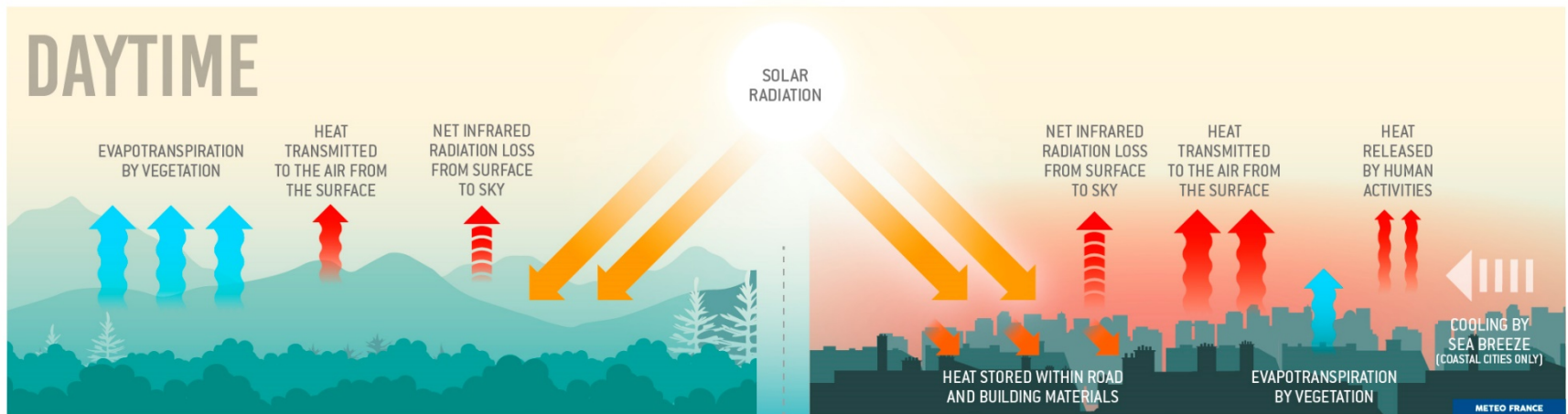
- A reduction of 50% of the low water level in the Garonne river basin



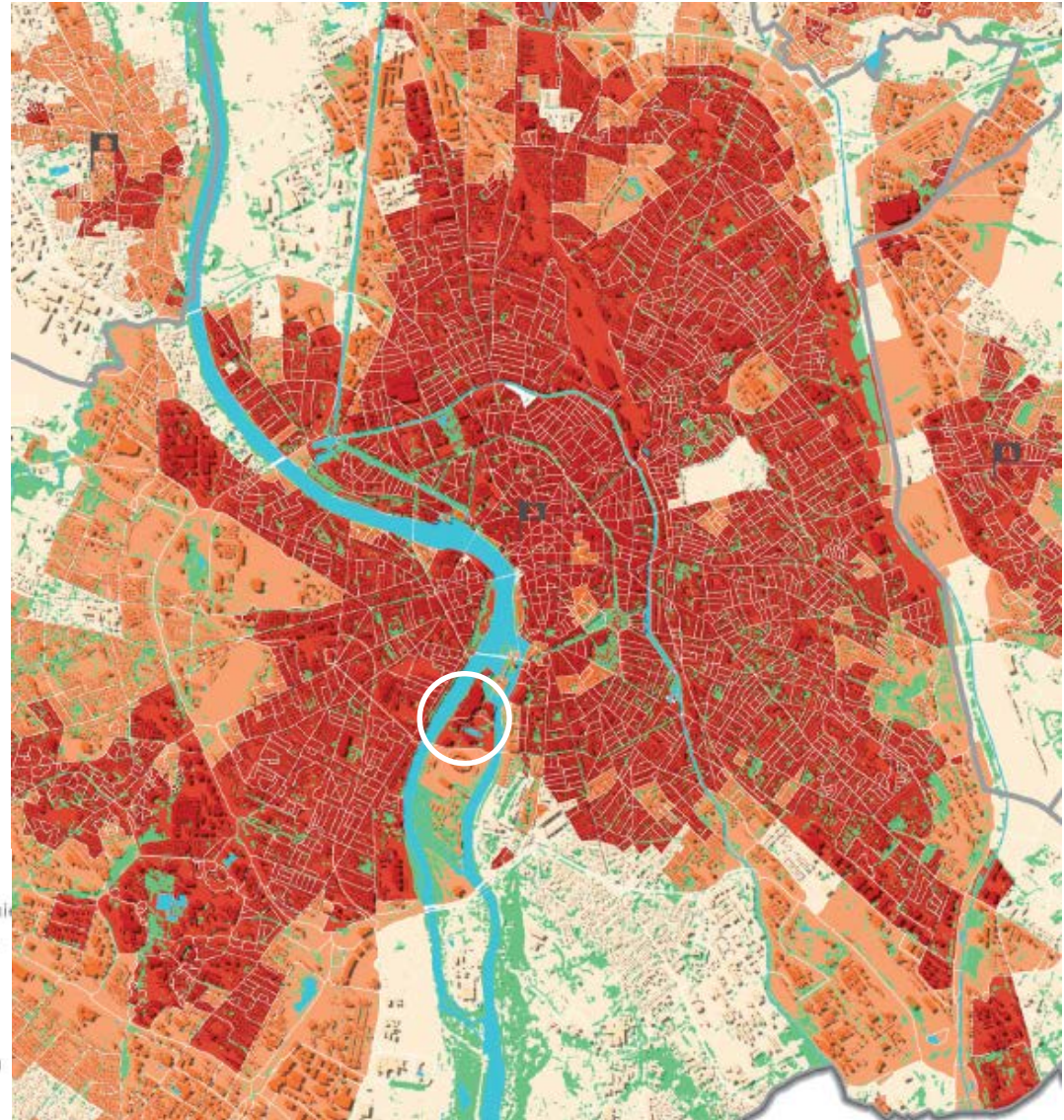
Global warming is accentuating the Urban Heat Island effect (UHI)

Heat islands are urbanized areas that experience higher temperatures than outlying areas.

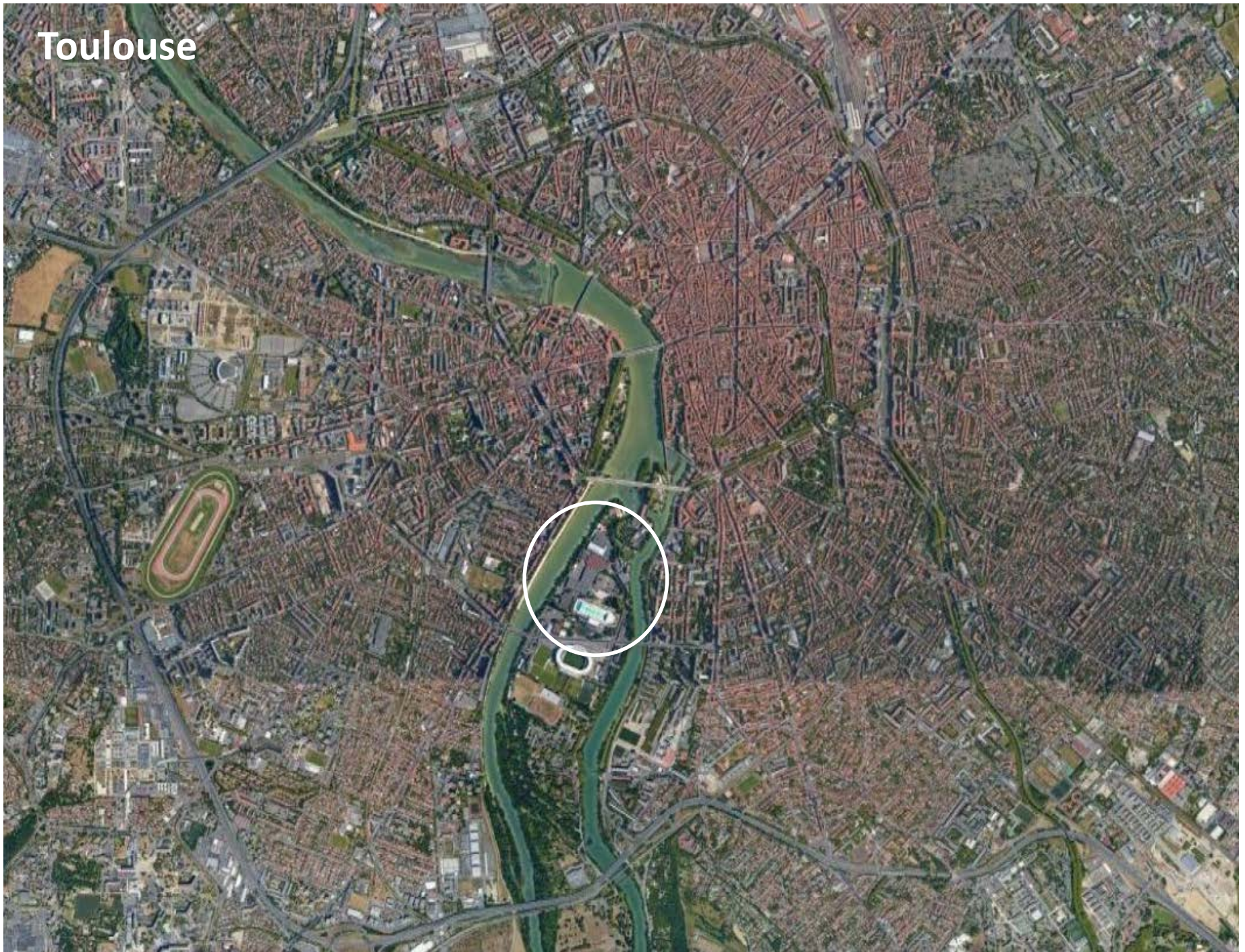
Structures such as buildings, roads, and other infrastructures absorb and re-emit the sun's heat, whereas natural landscapes such as forests and water bodies emit humidity.



In Toulouse, the measured nocturnal UHI is +4°C to +6°C



Toulouse





The island today

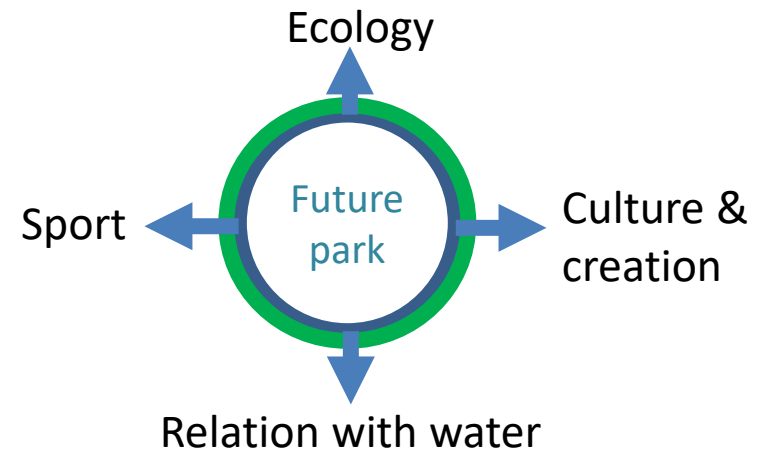
❖ Before project

An island saturated with its infrastructures

Despite the presence of a remarkable heritage, both natural and architectural, the island remains underestimated. The saturation and the fragmentation of spaces, the omnipresence of parking lots and roads, has marked the decline of nature in the past decades.

❖ After project

A great natural and leisure park, developed in the spirit of the past



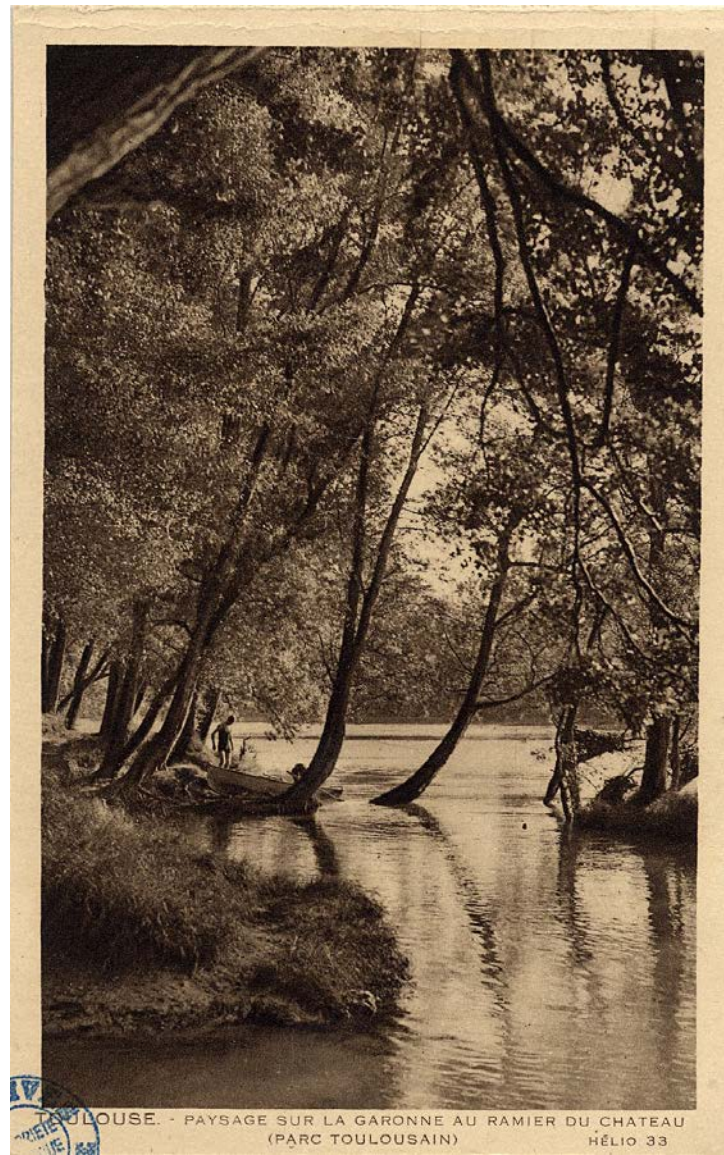
The « Parc Toulousain » , early 20th century



131 TOULOUSE. — *Le Parc Toulousain un jour de Fête.* — LL.



133 TOULOUSE. — Le Parc Toulousain. — Une Kermesse. — LL.



TOULOUSE. — PAYSAGE SUR LA GARONNE AU RAMIER DU CHATEAU
(PARC TOULOUSAIN) HÉLIO 33



LIFE Perimeter



2020

Total area = 25ha
In which 20ha are sealed



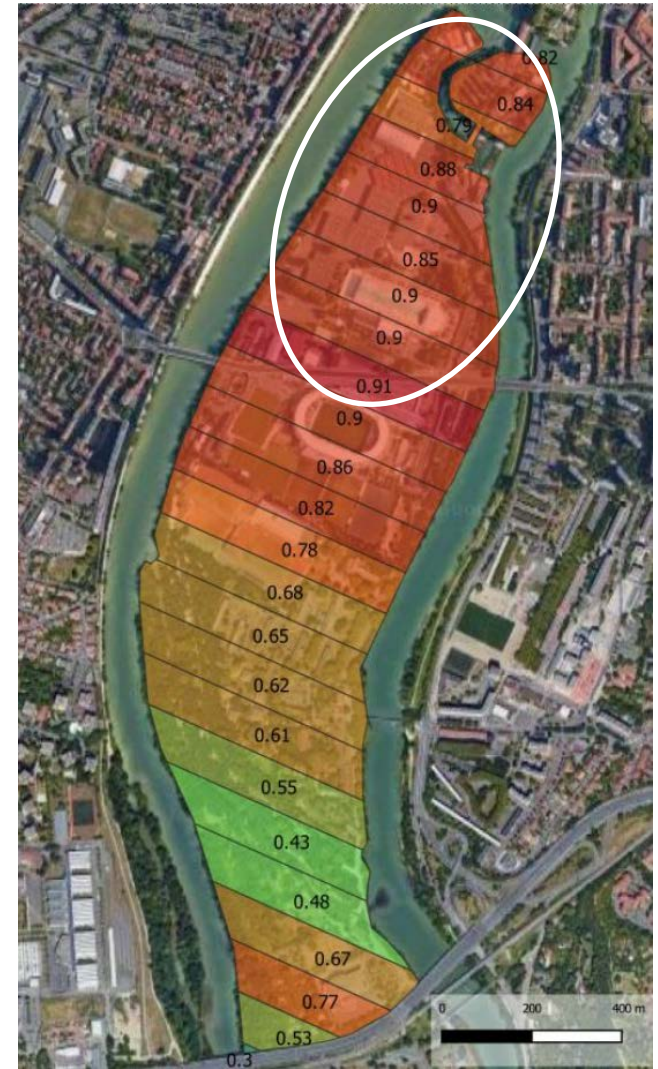
2025 projection

+10 ha renaturated

© Agence TER

Renaturation of artificialized areas

- **Main objective :**
Reduce the heat island effect by -2°C in 2025 and -3°C in 2030
- **Main actions implemented :**
 - Selective deconstruction of the exhibition parc (circular economy) and unsealing of **10 hectares**
 - Agronomic **restoration of degraded soils**
 - Plantations of **2500 trees** (local species adapted to climate change)



Artificialization ratio

Source : Hekladonia

Renaturation of artificialized areas

- **Indicators and expected impacts**
 - Heat island effect -3°C
 - Carbon Dioxide Emissions -15%
 - Fine Particules Emissions -25%
 - Carbon capture $4,7 \text{ t/ha/year}$ against 0.5 t/ha/year today



Expansion of the riverside vegetation

**Objective : Widening,
strengthening and protecting
the riverside vegetation, with
local riverside species of
Garonne river.**

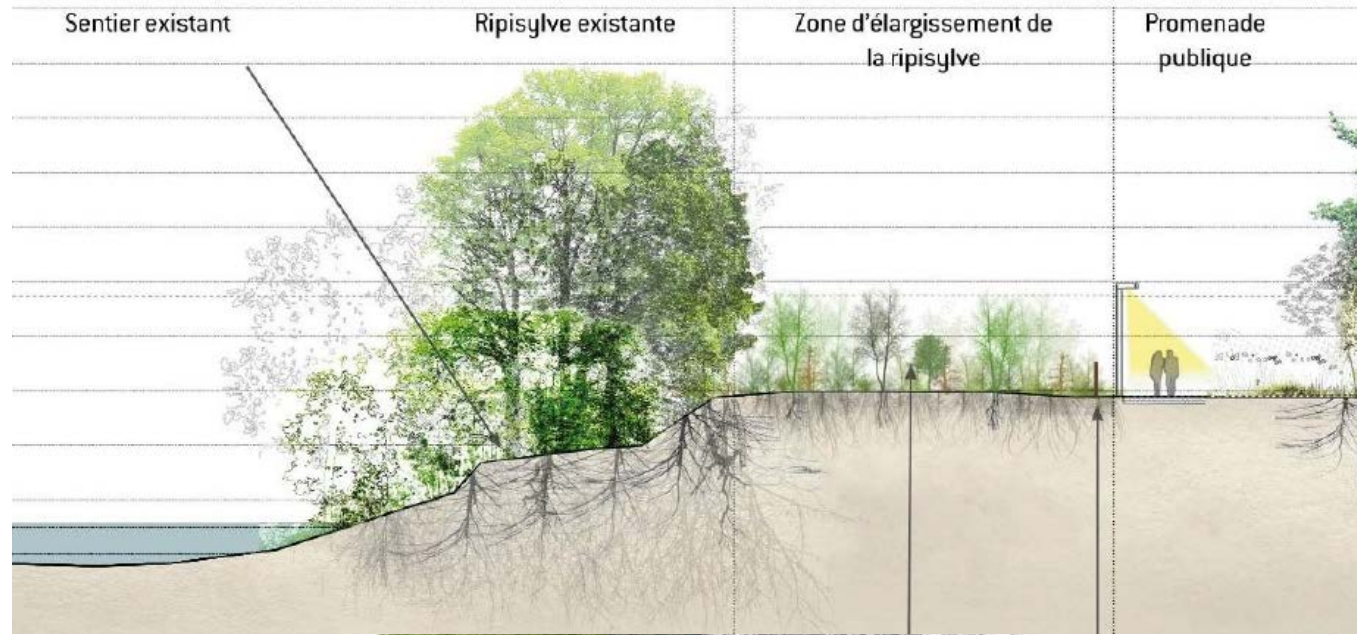
Foreseen in 2030
x3 compared with today



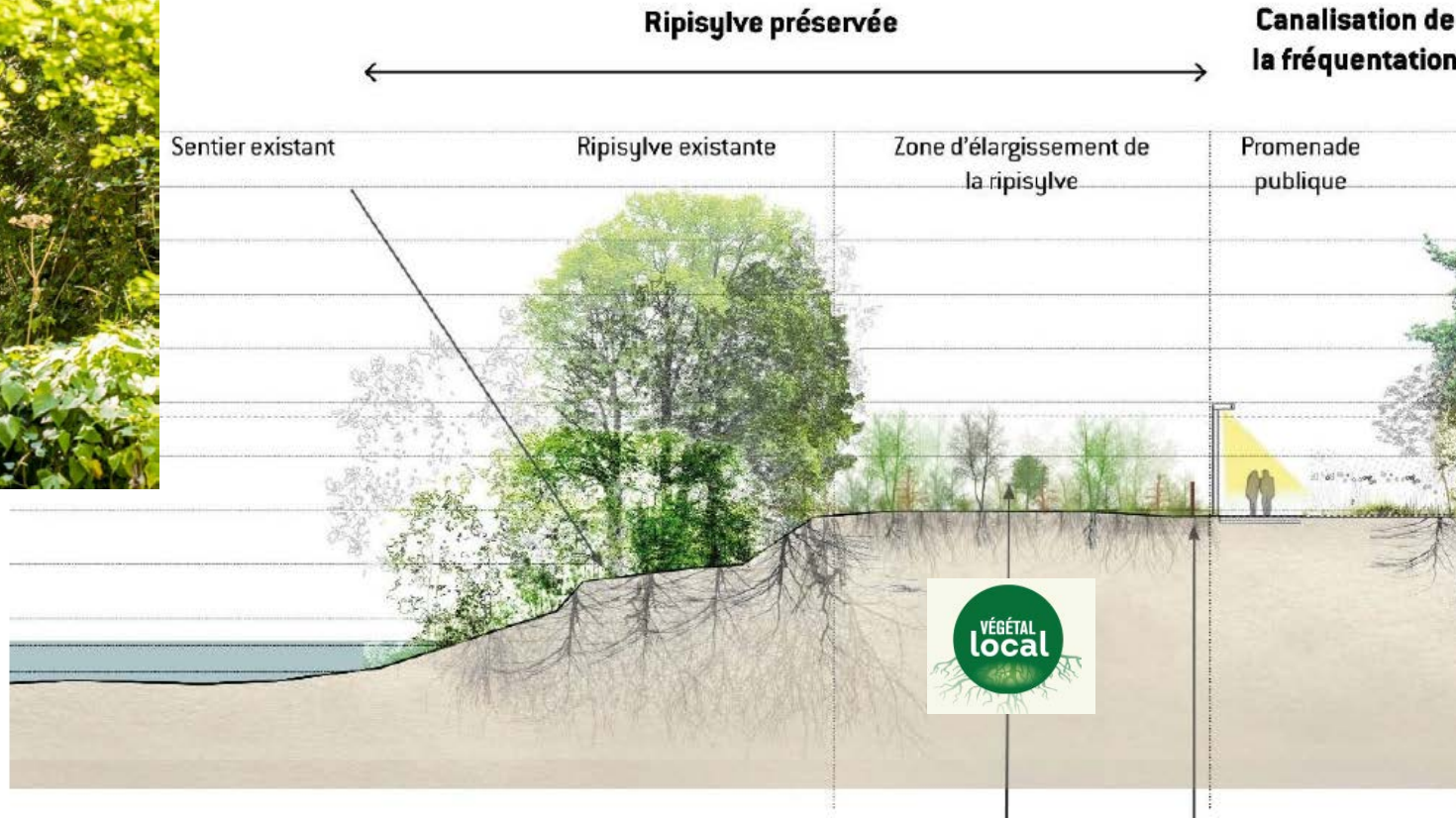
Expansion of the riverside vegetation

Impacts

- Restoration of the continuity and functionality of riparian forest
- Development of the aquatic and terrestrial biodiversity
- Decreasing of flood risks



Expansion of the riverside vegetation



Ashes, alders, hazels, willows, poplars, elms, maples...

Plantation of local and typical Garonne river vegetal species

Wooden fence + awareness sign => Restrict human visits



Fraxinus angustifolia - frêne oxyphylle



Alnus glutinosa - Aulne glutineux

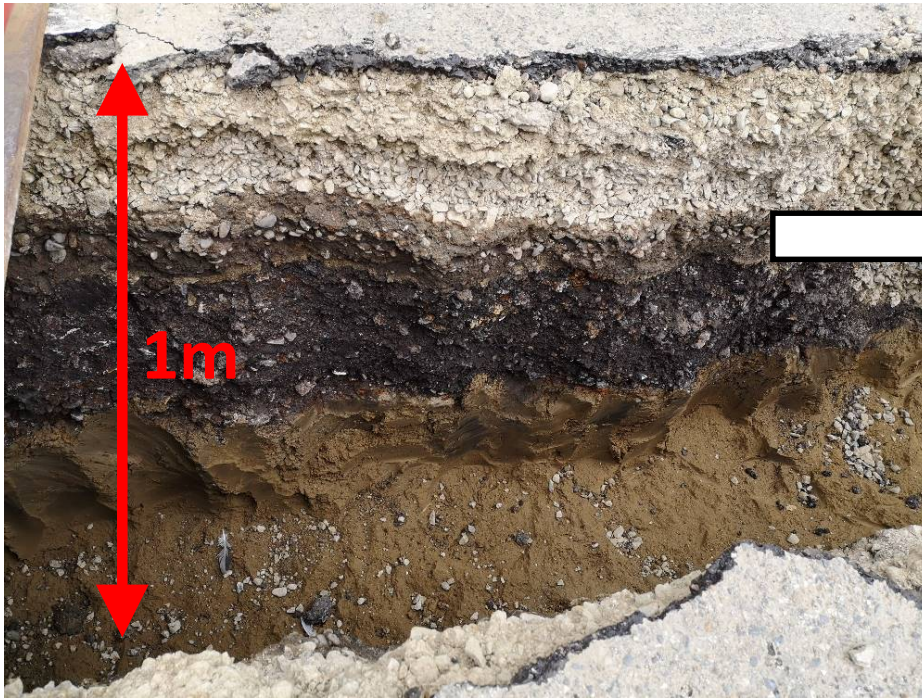


Corulus avellana - Noisetier

Restoration of degraded soils

Sealed soil for 70 years = very degraded and dead soils

- Revitalisation of soils to guarantee the longevity of the future plantations



Example of current soils,
composed with anthropic and
compact backfills over 60cm deep



Objective : rich soil with
humus, abundance and
diversity of micro-organisms...

Restoration of degraded soils

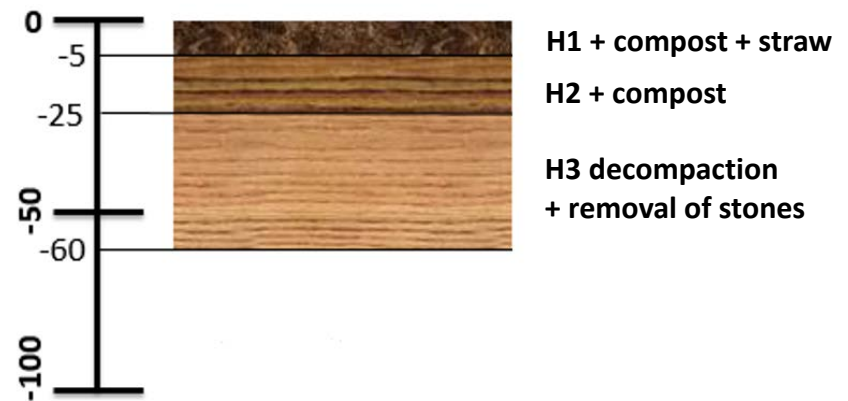
experimental plots



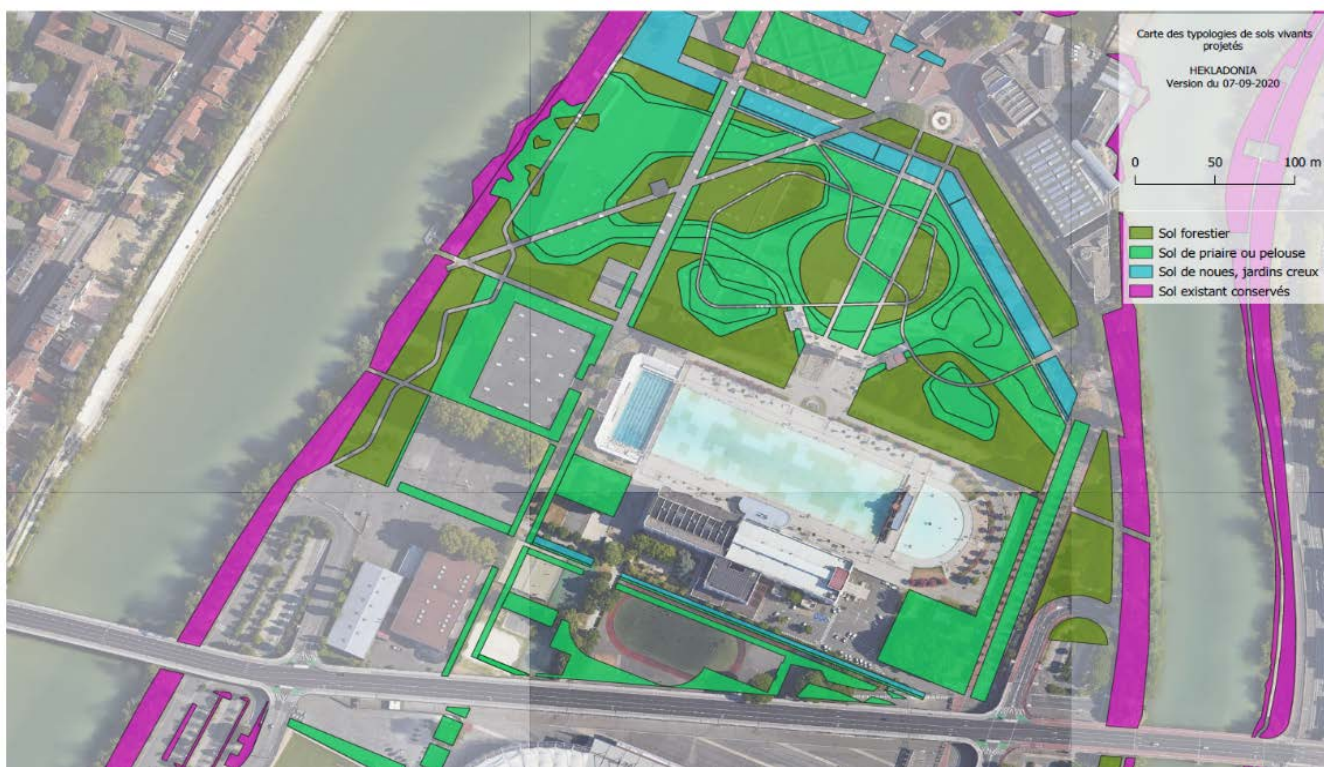
Implementation of 12 experimental plots testing various modalities of soil constructions and vegetation:

- ornamental grasslands
- mediterranean species
- Garonne alluvial woods

Example of experimental plot



Restoration of degraded soils



© Hekladonia

Rational utilization of imported topsoil :

- **Revitalization of existing soil** by decompaction, compost enrichment and inoculation of microorganisms
 - **Reducing the topsoil for tree pits** from 12m^3 to 6m^3
- **$47,000\text{m}^3$ needed instead of $93,000\text{m}^3$ (49% saved)**

Renaturation of Vallerey parking lot in 2021

January 2021



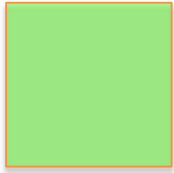
October 2021



Unsealing and sowing of leguminous and grass plants, Vallerey parking lot

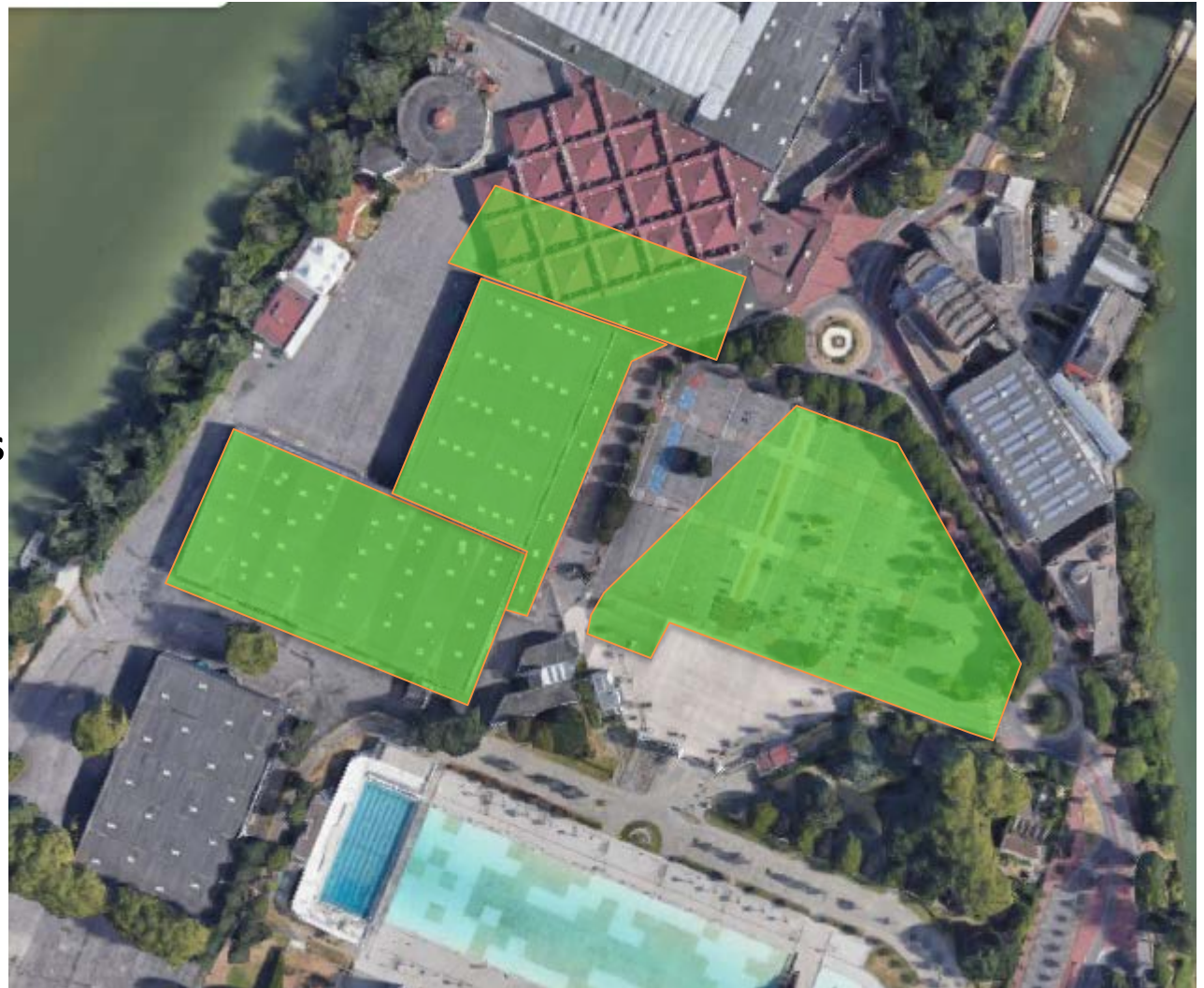


Today's progress of revegetation



Today
3,7 hectares

Unsealed soils are enriched with topsoil and compost, and sowed with leguminous and grass plants that fertilize the soil.



Circular economy approach : re-using and recycling

« Make the construction **wastes into resources** »

1. Integration of circular economy criteria into the public call for tender (20% of the final mark)



Recruiting a non-profit organization as consulting support, Synethic

2. Synethic organized field visits with invited stakeholders to identify all relevant resources on site before the demolition



Circular economy approach : re-using and recycling

- ✓ **98% of re-utilization in total** (instead of 70% required by the law)

Crushing and re-using of 100% asphalt and concrete, into sublayer and surface of other roads in the city (20km radius maximum)



Re-using of electric material by the NGO « Electriciens du Monde » to fully equip a new site for homeless persons



Associated beneficiaries



Scientific partnerships



MétéoFrance monitors and studies the impacts of renaturation over the urban local climate : 14 new sensors implemented



WaltR monitors and studies the air quality over the island and its neighborhood



The Museum for Natural History of Toulouse monitors the island's biodiversity evolution



The University of Caen Normandie is executing a sociological study on the project's perception by the residents

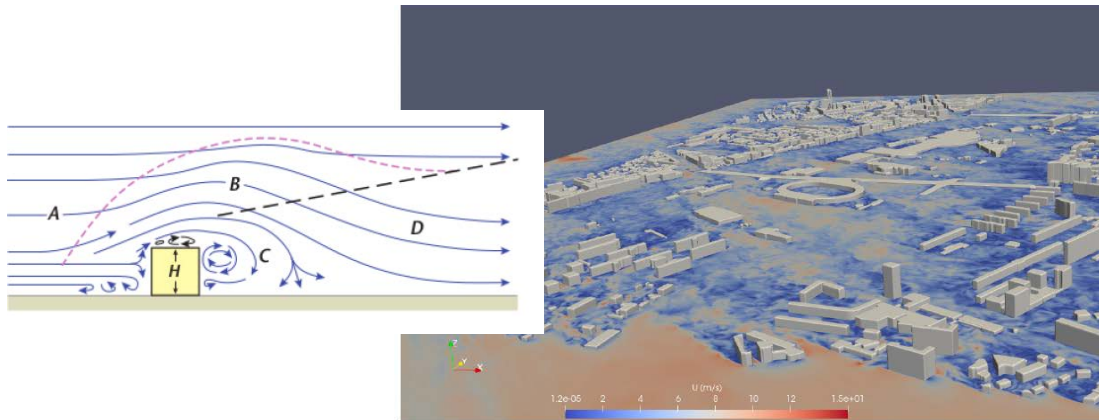
Institutional partnership



Landeshauptstadt
Düsseldorf

Dusseldorf city and Toulouse are partners since 2003 and share best practices and events within the frame of the LIFE project : renaturation of cities and heat island effect, circular economy, exchanges with the city of Tunis

- **Objectives**
 - Quantify the benefits of the park
 - Model the effects of vegetation
 - Add new stations for the climate monitoring of Toulouse
- **Implementation**
 - Installation of 14 new stations
 - Measures released on the OpenData
 - Meteorological modelling



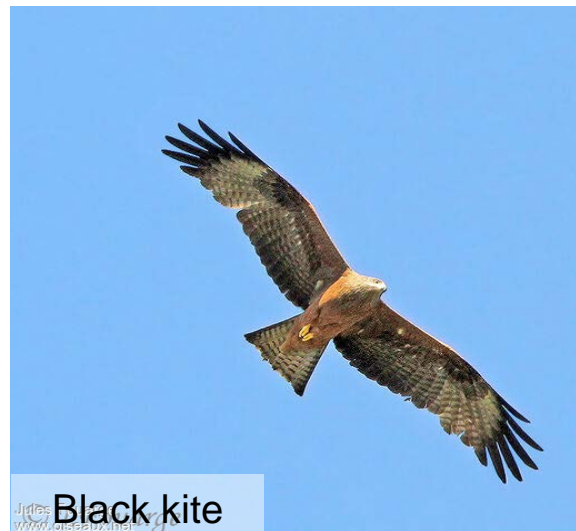
Museum for Natural History



- **Objectives**
 - Monitoring the evolution of birds and flora over the whole island
- **Implementation**
 - Birds inventories : 2 observations / year over 10 years
 - 3 flora inventories : 2020, 2022 and 2025 / 5 spots



In 2023, **36 bird species observed**, against 21 in 2019

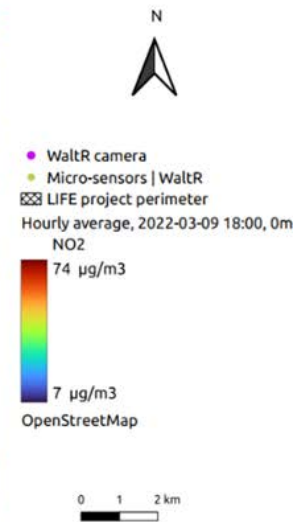
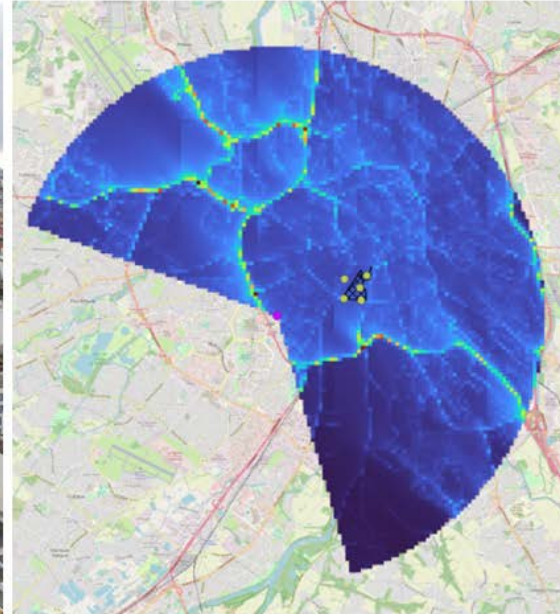


- **Objectives**

- Evaluate the evolution of air quality on the island and the whole city
- High resolution modelling (precision grid : 10m on the island)

- **Implementation**

- Installation of 6 micro-sensors on the island
- Installation of 1 multi-spectral imager camera on a high position
- Crossing data and build a prototype of fine scale modelling



Source: WaltR

University of Caen Normandie – Geography - sociology

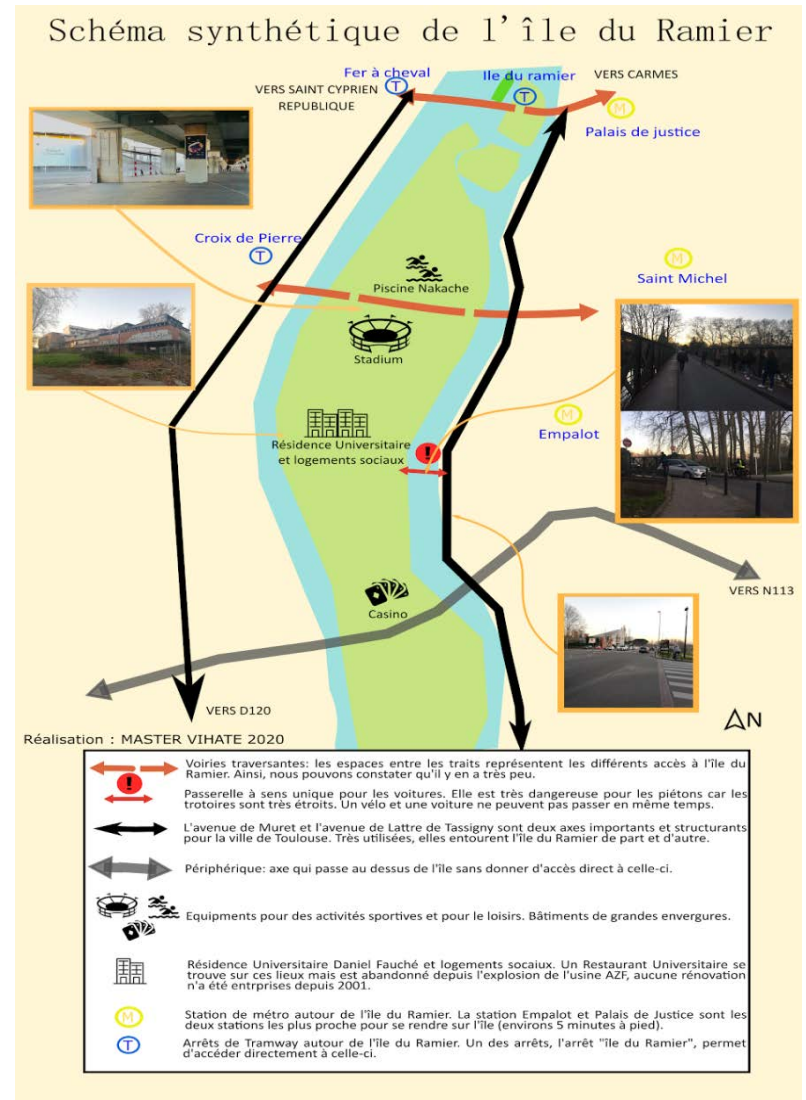


- **Objectives**

- Analyzing the evolution of the island's perception, appropriation and social representations before and after the project

- **Implementation**

- Qualitative studies with interviews
- Quantitative studies with surveys
- Research works, analyzes and reports

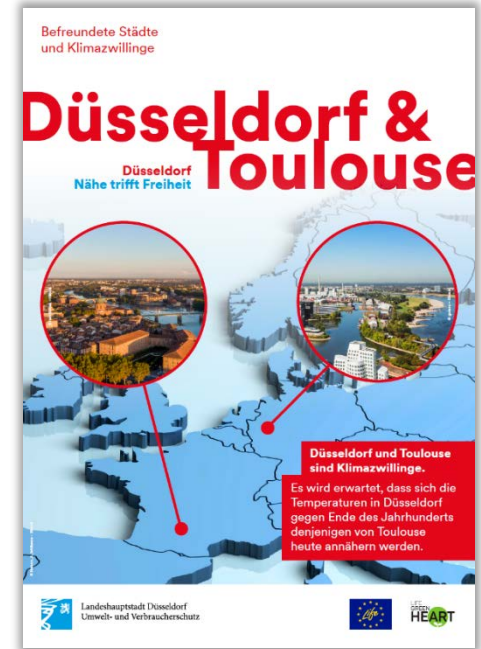


Düsseldorf City



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- Workshops on climate change adaptation of cities and sharing of good practices
- Simultaneous photo competition (Dussel / Garonne river landscaping projects)
- Seminars (Eurocities...)
- Partnership with Tunis and the Climate Twins project (Düsseldorf-Toulouse-Tunis)
- Development of the cooperation between Toulouse and Düsseldorf



Waldschule Dusseldorf

Some more elements of the project...

Walkway (South-East)



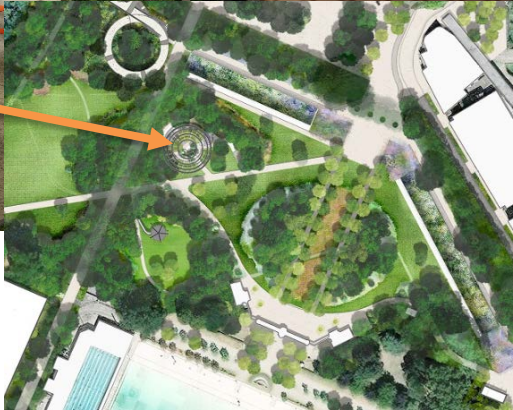
Walkway (North-west)



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Playground area



Thank you for your attention

