



Group work summary

# CITY AND BIODIVERSITY



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"Transforming our cities for a better urban future"





## Editorial

Cities have a real role to play as ambassadors of biodiversity, because they have important innovation resources and benefit from efficient governance means to perform rapid transformations at the local scale. Today, we have to improve cohabitation between urban spaces and the living by creating public policies that serve biodiversity and people's well-being. Challenges are happening now and as such we need, now more than ever, to operate a return to nature.

Although the scientific community has been foretelling the decline of biodiversity for a long time ago already, the COVID-19 pandemic and the repeated population lockdowns that followed, triggered new worldwide awareness about our need to connect cities and nature again. This time of growing awareness is an opportunity for us to re-create and reimagine urban spaces and to place nature at the center of our projects for the future, together with its benefits, its services and its solutions.

The World Urban Forum taking place in Katowice in June 2022 is the greatest international conference on the topic of urban planning. As a real place of collective brainstorm, this gathering will have to question the connection between biodiversity and urban lives. In the context of the framework for nature's future defined by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), three main pathways are to be considered: nature for nature, nature for culture, and nature for society. These principles are leading directions to keep in mind in order to include biodiversity to the scenarios we envision for the future.

During the World Urban Forum 2022, actors from multiples fields will be present to ensure the implementation of the 2050 Vision set by the Convention on Biological Diversity (CBD), by questioning the perspectives and policies we should use to create sustainable cities that serve nature and inhabitants. This impact of the conference should be taken seriously, because cities are significant platforms to tackle international biodiversity issues that also apply locally.

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# Introduction

Climate change and biodiversity are the main challenges of the century. It makes no doubt that many human activities contribute to the crisis situation but the ways we build cities and live in them are the main factors. According to UN-Habitat, cities are responsible for more than three quarters of global energy consumption (78%) and more than 60% of global greenhouse emissions.

Human activities are also the main reason behind biodiversity declining, a situation that keeps deteriorating. Throughout the past decade, 435 species became extinct and we now estimate to 28% the number of known animal species that may be threatened of extinction. This is caused by poaching, hunting, overexploitation of halieutic resources, and animal traffic.

Due to the tight interweaving of causes and consequences relating to these issues, we must answer these two crises jointly. They've always been tackled separately, resulting in unprecedented social, economic, health problems. It seems however that the current international agenda is taking into account the necessity to act holistically. The occurrence of several high level events came to prove it: COP15 in Kunming in 2021 and 2022, and COP21 in Glasgow collected and presented actions and agenda meant

to tackle issues nationally and internationally.

A big part of this fight will have to happen in cities. More than half of the world population lives in cities and this proportion is meant to reach 65% by 2050 according to the UN. Cities will therefore have to face new challenges. Demographic growth and sustainable development will have to be included to urban planning policies for these policies to address climate change and biodiversity loss. Being at the crossroad of nature and constructions, urban development plays an increasingly important role as well in discussions. Events such as the World Urban Forum highlights the importance of having urban planning strategies that align with biodiversity and that improve living conditions for urban populations.

This is why we must enable our urban models to evolve by making the preservation and valorization of biodiversity a priority when adapting the most energy-hungry sectors: urban development, housing and transportation.

This is also how we will be able to deal with challenges, perspectives and achievements relating to connecting cities and biodiversity. Particular attention should be paid to challenges and goals that cities should reach by 2050.

Concrete examples of cities that share their expertise will be highlighted below, together with other useful learnings on urban development, before summarizing

in the conclusion the challenges and pathways that we will have discussed in this booklet.



Adeline Faure





## CHALLENGES

Biodiversity or biologic diversity refers to:

- The genetic diversity of individuals within one species (intraspecific diversity). This one is less known but important to know in regard to the evolutive and adaptive capacities it implies for species to face changes, and climate change especially.
- The diversity of known, unknown or extinct species (micro-organisms, vegetal and animal)
- The diversity of ecosystems where these species live, and the diversity of connections they create

Fostering actions that support biodiversity in cities is therefore a priority. A city that has a lot of nature areas can be a heaven for some species, such as bees, and these nature areas can contribute as well to a city's social and economic development.

Transforming our ways to make a city will imply to:

- Tackle at once the issues related to building processes, transportation and ways of lives
- Make green areas a priority of urban development projects
- Ensure clean public transport for inhabitants and encourage them to use these transportation means
- Support citizens to learn about

eco-friendly behaviors in order to limit waste and grow awareness about their hardware's energy use for instance.

Cities are unique nests for biodiversity, with strong resources potential to preserve for the living to use and enjoy. In Paris, for instance, despite the constrained situation for nature at the heart of the the Île-de-France region's agglomeration area, 2800 species were spotted between 2010 and 2020, including 831 vegetal species, 250 fungus species, and 1618 animal species. This kind of urban biodiversity lives in urban reservoirs made of green spaces (parks, garden, woods and graveyards) and they move around thanks to ecologic corridors (tree-lined streets and alleys, train tracks, Seine river, canals and riverside), as mapped out by Nature Pathways (Chemins de la Nature), the Green and Blue Corridor in Paris (TVB – trame verte et bleue)

Paris is an example that shows what challenges great international cities face, and an example of how such cities can position themselves as actors of change by taking into account nature's potential and possibilities and the solutions they can bring.



# 2050 SCENARIO

## Cities implementing the 2050 Agenda Goals for 2050

The 2050 scenario has to rely on implementing the UN's Sustainable Development Goals (SDGs). Making sure to match that deadline, we will need to build cities with the goal in mind to improve society's social, health and economic situation and to promote biodiversity preservation as well as to fight climate change. Getting over the health crisis and over the loss of biodiversity will have implied to create freshness island, to re-establish nature and vegetation in and around water streams, to make buildings greener and to foster local and national projects that promote environmental protection –goals to be tackled jointly not separately. By 2050, international cooperation will still be happening, especially with COP15 in Kunming, meant to strengthen how local authorities commit to implementing cooperation. National and international exchanges will enable us to keep learning and enable regions to share their areas of expertise.

### Implementing a big scale Green and Blue Corridor

Green and Blue Corridor are created to preserve and recreate networks of exchanges called ecologic continuities, so that wild species of animals and plants of a given territory can go around, feed themselves, reproduce, rest and ensure their life cycles just like humans do. Ecologic continuities are made of species called biodiversity reservoirs, connected with one another thanks and through ecologic corridors.

Although they are usually developed on nature areas, Green and Blue Corridors can be created in a city or in the center of a metropolitan area. Green spaces, humid areas, paths (alleys, streets or road with trees, squares, courtyards, etc.) and construction areas are places that can be appropriated though wildlife, provided city management practices change and align with the will of its citizens and its users. Many animal species for instance use linear infrastructures to move around. The first thing, here, is therefore to know exactly what wild species lives on what territory and how they adapt to the urban environment or infrastructure where they go. The Petite Ceinture train tunnel in Paris, for instance, was acknowledged as a place where common pipistrelles hibernate.

## Focus

### "Natural sensitive gardens"

To compensate the lack of suitable habitat for vegetal and animal species in Essonne, the Department Council implemented the "natural sensitive gardens" operation to facilitate the development of a departmental network of gardens managed in a site-specific way, in complementary with the natural sensitive gardens of the Department and of other local authorities. The goal: to preserve (and improve) biodiversity in Essonne and to strengthen ecologic continuities with urban and suburban areas.

<https://tinyurl.com/363vvu4m>

### Green roofs in Malmö

Malmö, in Sweden, was one of the first cities to develop eco-neighborhoods, when it created the neighborhood of Augustenborg as early as 1998. Green canopies there make for a new ecosystem. The result: a 50% biodiversity increase and a 20% greenhouse emission decrease.

<https://tinyurl.com/5n7yjjb4>

### A green "forest" in Milan

Built on a former industrial wasteland, two housing buildings of 80 and 112 meters high each were created in 2007 and 2014 and wrapped with vegetation. Strong points: strong decrease of the temperature inside the building (-3° C) and 30% fine particles decrease. Cost: \$80 millions.

<https://tinyurl.com/2s59nuxv>

### Green corridors on the riverside of Amsterdam

When a green corridor is set in a place that gathers the right conditions for its growth, it can become the home of species and become a natural reserve. This is what happened in Amsterdam, where plants that were adapted to that environment were chosen to be grown on walls located along the riverside.

### The city of Stuttgart

To actively improve nature and vegetation in the city and fight heat-islands, Stuttgart (DE) imposed constraining building regulations to push for nature-based solutions. As a result, more than 60% of the city's surface is made of green areas today, of which 39% have a nature protection label.

<https://tinyurl.com/2xczkrue>

### Restoration and fight against the flood of the Gremillon stream, Nancy

Since 2017, the restoration of the Gremillon stream (6km long), which goes through the urban area of Great Nancy area, significantly improved the connection of this stream with its neighboring wet areas and it greatly benefited the life of local aquatic species.

<https://tinyurl.com/mr3mfjha>

### The city of Orleans

Orleans wants to push for an urban evolution that asserts its identity as a "city-garden". It created freshness islands by improving vegetation in public areas and on buildings, by growing local plant species that do not need a lot of water and can survive drought, and by creating soils that are less artificialized and more permeable.

<https://tinyurl.com/2xczkrue>



### Improving vegetation on buildings

Green urban Corridors can be improved at a local scale by developing biodiversity shelters located on buildings, like green canopies or green facades.

Improving vegetation on buildings can come however with some risks. The process requires to select plants that can adapt to the limiting environment where they will be grown and it requires also to have regular maintenance programs so that the structure where the plants are grown (a wall, a roof) doesn't deteriorate.

Developing biodiversity shouldn't just be just a quantitative process. It should also be qualitative: quality of species' source, and of the species living in the area, maintenance and management quality of biodiversity – in order to maximize environmental services, for instance in terms of public health and of resilience to climate change.

### The creation of green pathways

Even a minimal continuum of areas able to welcome and host biodiversity can enable the continuity of Green urban Corridors. Growing flowers, creating vegetal floats or developing pedestrian paths for instance are actions that foster the development of such corridors. The goal is to ensure that these continuums are connected with places located beyond their own limits.

### Renaturation and reopening of water streams

Re-creating economic continuities in aquatic environments is crucial to preserve Blue urban Corridors. Such corridors enable species to move around freely between their different habitat and to follow their life cycle (reproduction, food, growth, etc.). Making sure that water streams are well connected is essential to ensure that aquatic ecosystems which carry the sediments needed to create habitat and to treat wastewater function properly, and to ensure that they help dissipate water streams' energy, etc.

### Biodiversity to fight climate change

Redeveloping biodiversity is one of the solutions that exist to limit consequences of climate change. By 2050, climate change will have transformed our vegetal cover, which will have had to adapt to new climate conditions and constraints related to water and soil quantity and quality. This is why the evolution of biodiversity should happen in connection with the evolution of the vegetal pallet, especially with the pallet we choose to use to improve urban vegetation and farming production vegetation. This is why climate issues must be connected with biodiversity, and why it should be a priority for us to make biodiversity a condition of limitation and adaptation in the agendas we set to become resilient and to adapt to climate change.

The question will be to find tools that allow us to cohabit with nature serenely, and which enable for an equal balance of power. To do so we have to take into account the local flora and fauna contexts, as well as climate and the potential effects that biodiversity can have on inhabitants, if we want to avoid implementing projects that don't align with human life's needs.

### Focus

#### A rehabilitated water stream in Seoul

The Cheongyecheon river in Seoul (South Korea) was buried since the 60's and was rediscovered in 2005 in the context of a plan to revive the city center. Its implementation implied to reorganize road traffic, create bridges and develop riverside areas. As a result, the temperature decreased by 3 to 5 degrees, the river became a barrier against floods and more than 400 hectares of park areas were created, offering inhabitants a more serene living environment.

#### A restored river in Strasbourg Euro-metropole

Being more and more victim of floods of the Souffel river, the Euro-metropole of Strasbourg decided to divert that River's course and bring it back to its original bed. The project resulted also in the creation of a pond meant to diversify the environment and to grow trees and bushes on the riverside.

<https://tinyurl.com/mr3mfjha>

#### Superblocks in Barcelona

Started in 1993 but existing really since 2016 only, the transformation of Barcelona's avenues into "superblocks" was done to recreate green corridors in the city, despite its very dense and historical urban planning. Speed limit was brought down to 10km per hour on that bloc's streets, the number of roads was divided by two, a wide sidewalk was created with a long green pathway (trees, plants, grass). As a result, 92% of public space was freed up, leading to more people using bikes, to many shaded areas being created, and to city noise decreasing by 4 decibels.

<https://tinyurl.com/2p8w54w8>

#### Restoring nature in cities in the Seine-Saint-Denis department

Today, 93% of the Seine-Saint-Denis department is urban. It is exposed to flood risks in many places. To anticipate and prevent such risks, the departmental local authority decided in the 90s to have policies meant to preserve natural ecosystems, especially rivers. The progressive nature renewal that happened in the cities of that area enabled people to better enjoy the benefits induced by eco-systemic services provided by nature. It happened by supporting rain water infiltration especially and by using natural urban development projects to serve people's hobbies and well-being.

<https://tinyurl.com/2p93s6fm>



### Creating freshness islands

The city of tomorrow will be made of a lot of freshness islands, of places to welcome people, places for them to stop or rest, places available to everyone, and, at times of heat or heat waves, places recognized as refreshing areas in comparison to their surrounding environment.

### Some projects presenting climate change solutions that serve biodiversity

Climate change and biodiversity are tightly related because the way one changes directly impacts the other. This is why developing urban projects that help to adapt to climate change and to limit its impact is to be seen as an instrument to support biodiversity as well, because such projects provide ecological services and well-being in urban areas (draining and permeability of soil, air and health, freshness island). In some cities in the world, biodiversity systematically improved through the implementation projects initially meant to fight climate change.

### Preventing floods

Ecologic engineering is a necessary and complementary ally to building engineering when implementing actions that prevent natural risks. With flood hazards for instance, biodiversity can be a quick and easy action tool to activate, provided however that we're equipped with the right tools. Most importantly, that tool, biodiversity, is a sustainable one. And beyond a perspective than would be risk-focused only, choosing for biodiversity-based approaches enables us to grow awareness for instance about ecological matters and allows for a more global and systemic approach of a territory.

### Biodiversity to serve citizenship

#### The creation of shared gardens

The COVID-19 crisis triggered citizens to demand a return to more nature, to greenness – especially citizens living in urban areas. This growing demand turns diversity into a key element to support well-being in the cities, to support physical and mental health, as well as social and territorial cooperation. Biodiversity is thus to be seen as a real action mean able to serve citizenship and it relates to our capacity to co-create public life. Shared gardens have been multiplying and have shown their capacity to push for social pacification.

### Participation to urban development

Cities are places where ecologic, economic and social challenges cross. This is why co-citizenship has appeared as an entry point to connect political individuals to ecology and nature in their direct environment. In urban environments, this need seems even stronger because people's relation to nature is less granted. Beyond the ecologic goals they target, eco-citizenship projects aim to connect citizens with their environment and, as a direct consequence, with their urban environment and with the society where they belong. This is why this eco-citizenship- can really help promote citizen participation.

## Focus

### "Nutritious landscapes" in Nantes' city center

The city of Nantes promotes a strategy to improve vegetation in the city and to promote ambitious and exemplary urban farming projects through participative and solidary processes. After the COVID-19 pandemic, the idea arose to create solidary food gardens that would be flagships and singular places in the city center, relying on a mindset of cohesion and of problem solving. Young farmers were asked to participate and trained to ensure that these various places become places where citizen participation and nutritious productions work hand in hand. This is how organic food gardens were created, especially dedicated to populations in need.

<https://tinyurl.com/3ftc7w5y>

### Gardening areas in Portland, Oregon

The city of Portland (Oregon, USA) provides its inhabitant with gardening spaces under the condition that they respect certain rules; the city also provides websites (Portland Yard Sharing for instance) to connect landowners with gardeners in search of free spaces.

<https://tinyurl.com/5b4sfntt>

### Participatory redevelopment of an urban park in Perpignan

Saint Vincens park (10 hectares today), in Perpignan, is the result of a hydraulic and landscape strategy that was led by Perpignan Méditerranée Métropole and the city of Perpignan. Formerly a fruit growing place, this park was redeveloped through a participatory process that included neighboring populations, community organizations, school and green spaces service providers. The goal was to prevent flooding risks and create freshness islands. The park now hosts the yearly "fête de la Nature" (celebration of nature) and many other celebrations and events that promote biodiversity.

<https://tinyurl.com/mr3mfjha>

### Making nature a part of the city again through urban development in Bordeaux

Urban development policies led by the City of Bordeaux in the context of the BIODIVER'CITE contribute to fighting heat-islands and to improve vegetation in some urban areas connected with each other through ecological corridors. This project starts with identifying areas on the road network that concentrate too much heat and do not allow for water to flow properly. The project intends to enable new mobility practices and habits, improve life conditions and improve the living environment of people living nearby, and to create more cohesion between them thanks to green areas thought as factors of cohesion.

<https://tinyurl.com/yxcruhuy7>





## Focus

### Creation of "buffer zones" to mitigate the effects of global warming in Seine-et-Marne

The Department of Seine-et-Marne participates, in collaboration with local authorities and project owners with proficiency in Aquatic Environment Management and Flood Prevention (GeMAPI), in the identification and preservation of "buffer" aquatic areas to limit repetitive water runoff and flooding due to climate change. For example, and based on a hydro morphological diagnosis of the Ru d'Ancoeur, a small tributary of the Seine, projects to renature the river and restore ecological continuity were carried out in 2015, reconciling landscape and recreational issues. This work makes it possible to mitigate floods by capping floods and is valued by various educational projects involving schools and residents. The Department is also co-leader of a life artisan laureate project: "Ancoeur 2030", in conjunction with the AQUI'Brie Association, INRAE and the mixed syndicate of 4 Vallées de la Brie. The project foresees the creation of 10 "buffer zones" in central

Brie to demonstrate in the field and scientifically the effectiveness of nature-based solutions to adapt to the effects of climate change.

### Restoration of the alluvial forest Isère Amont

Led by the Symbhi (Mixed syndicate of the Isère river basins), the Isère upstream project was launched in 2004, with work starting in 2012, after a long and rich period of development and consultation. It covers the 29 municipalities located between Pontcharra and Grenoble, and therefore concerns more than 300,000 inhabitants. A budget of 135 million euros over 10 years was needed to redesign the dikes to best protect the territory from the floods of the Isère, and improve the ecological status of the rivers. The work is now in the completion phase. Thus, it is 10 km of dikes that are doomed to disappear on both sides of the river according to the floods to come, to feed 300 ha of alluvial forest, between Saint-Vincent-de-Mercuze and le Champ-près-Froges. This "disappearance" will be gradual and in the long term it will allow Isère to find more space, to

regain its space of freedom. The benefits will be diverse : reduction of the amplitude of floods and droughts, involvement in water purification and groundwater recharge, provision of habitat for plants and animals and a peaceful travel corridor for wildlife. Topographic and water locations and vertical connectivity will also provide ecological optimums for various terrestrial and underground species and communities.





# PATHWAYS

## Conserving the existing biodiversity

### Protecting eco-systems

Biodiversity entirely depends on the existence of functioning and well-connected ecosystems. The pre-condition to any action relating to biodiversity should be to start with checking how biodiversity is doing in that place and with identifying its potential destruction sources. Some of the sources, the main ones, are well known and they should be the priority target of public policy and of those who implement them:

- Limiting soil artificialization, and even restoring their permeability
- Limiting plastic pollutions
- Using nature-based solutions

### Local urban plan (plan local d'urbanisme – PLU)

PLU (or PLUi) are regulations in France written and voted by cities and towns, or by public organizations of inter-city cooperation (communities of cities or towns, metropolitan areas). The role of such regulations is to set up an urban planning framework that applies to a city's territory, and inter-city territory, outside of national regulations. Local urban plans include sustainable development projects (PADD) and development and programming directions (OAP). They also include rules of procedure.

Local urban plans:

- Are established after a diagnosis of the territory is done to acknowledge, among other things, the state of biodiversity in that place and to acknowledge the stakes related that its preservation.
- Include a map of the territory based on three main area types: nature, forest and urban areas. Nature and forest areas bring the best solutions to protect biodiversity because they forbid urban development, which is why these areas must be maintained
- Can include specific mechanisms, such as ensuring a minimal number of surfaces that can't be made impermeable or where constructions need to be eco-friendly when buildings get built. The local urban plan also enables the implementation of a preemption right on a land, to ensure specific protection for that land, for instance with preemption right applying to sensitive natural areas.

## Focus

### Sensitive natural areas in Côte d'or

This sensitive natural area is part of the Côte d'Or area's Departmental policy and is located on two neighboring towns near Dijon (Talent and Plombières-lès-Dijon). This sensitive natural area includes grass patches and valleys of the Ouche valley (200 ha) and is managed by the Conservatory of natural areas of Bourgogne. It is made of various environments and hosts 5 protected vegetal species and 9 threatened vegetal species. The fauna there is also remarkable. As a part of Dijon Metropole's local urban plan, the creation of this natural area helped to preserve, manage and discover local biodiversity.  
<https://tinyurl.com/2p8ckz4b>

### Convention of Nature in the City (CNV – convention de nature en ville), Essonne

The "nature in the city" convention is part of a program called "Foster and promote urban biodiversity" ("Favoriser et promouvoir la biodiversité urbaine"), itself part of the department's plan for sensitive natural areas in Essonne (2012-21). It has several goals: to preserve nature of proximity, to stop biodiversity destruction in urban and suburban areas, to support ecological networks of Essonne at the department scale, and to strengthen the Green and Blue Corridor on the territory. This convention sets and acknowledges commitments taken by the various parties involved (Department, a local authority that owns a sensitive natural area, and possibly a local community organization).  
<https://tinyurl.com/5e64tafx>

### Natural regional reserve in the region of Montbéliard

The natural reserve of the low valley of Savoureuse (located across three towns in Bourgogne-Franche-Comté) is locked within an urban area and it is composed of several natural ecosystems present in that area due to former material extractions and due to local water streams remaining natural in that reserve (erosion cliffs, gravel beach, dead wood, etc.). This made for one of the most beautiful pussy willow tree forest growing in that department.

<https://tinyurl.com/uabn5hu7>



### Nature areas and protected areas: sensitive natural areas and natural reserves

Sensitive natural areas (ENS, for Espaces Naturels Sensibles) and natural reserves (RN for Réserves naturelles) more traditionally relate to rural towns and they are more developed in those places; but they can be adapted to match the specificities of some suburban areas to enable sufficient biodiversity protection.

Since the law of July 18, 1985, Departments are equipped with the competence to implement policies that support sensitive natural areas. These areas can:

- Present significant importance or biologic and/or landscape function
- Be fragile and/or threatened, and as such they must be preserved
- Call for protection or management policies
- Become places to discover nature's richness

Sensitive natural areas have to:

- Preserve the quality of nature sites, landscape, natural environments and flood expansion fields and ensure the protection of natural habitat
- Be thought out to be open to the public, except in case of legitimate reason relating to this or that environment's fragility

For cities that wish to highlight and protect one or several of their ecosystems based on criterias defined by the departmental local authority, they can create sensitive natural areas, they manage these areas themselves or delegate to a third party organization, and they can receive part of the development tax money (collected by the Department's local authority).

A natural reserve is an instrument to protect areas, species and rare geological objects on the long term and to protect functioning natural ecosystems that represent biologic diversity in France.

These areas are managed by local organizations in collaboration with actors of the Department's authority. The organization in charge of managing the area writes up a 5 year plan that sets up goals and means to be implemented to maintain and restore ecosystems.

The limitation (or even prohibition) of certain activities, the absence of any artificialization and action likely to degrade them make nature reserves areas under strong protection. A city can, if it wishes, protect some of its environments and its biodiversity by committing to the creation of a nature reserve".

### Measure, assess, act

To protect biodiversity and to implement actions in its favor, it is necessary to take it out of its field by activating knowledge and information tools. Diagnosis, knowledge, representation, and evaluation tools, once pooled, can become real assets for actions that respond to a reality and a need adapted to the territory. These quantitative and qualitative tools can lead to diversified and integrated representations in territorial systems and in complex territorial planning.

## Focus

### Summary map of natural environment stakes in the city of Haguenau, Bas-Rhin (east of France)

Mapping ecosystems and species is the basic groundwork of any environmental analysis that wants to assess the ecologic value of a territory or a place. This is a mandatory step to locate spatial challenges and to create a hierarchy between them to define a plan's action priorities. <https://tinyurl.com/dhp3adup>

### Identifying urban tree cover: MIT Senseable City Lab (Treepedia)

MIT Senseable City Lab created a methodology to broaden the quantity of green canopies in cities and to diagnose them in order to track down the evolution of vegetal coverts through time. It was shown for instance that Paris only has 8,8% of tree covert on its streets, which is 4% less than London, 10% less than Frankfurt or Amsterdam and 15% less than Montreal.

### A tool to assess urban biodiversity: City biodiversity Index in Singapore (or Singapore Index - SI)

The Singapore Index is an instrument for local authorities to assess themselves their urban biodiversity by taking into consideration different components: the existence or not on their territory of places to can host nesting birds, of regulations on water quantity, of climate regulations, or the assessment of budget shares that should go to protecting biodiversity. Goals can then be defined with an action plan agenda and funding means, programmed to support biodiversity. The city of Paris joined the process and calculated its index twice, in 2015 and 2020, and observed a positive evolution between the two.

### Conservation easement , USA

The conservation easement is a tool created in America to involve public personas in preserving the heritage of private personas. It was reclaimed by French lawmakers and written in the article L132-3 of the code of the environment, noted as an "actual environmental obligation" – even though little use is made of it, still today. This legal instrument enables an owner to draw a contract with a city authority or with an organization that protects the environment, to ensure that his or her real estate remains in adequate condition to protect biodiversity. The goal is the preserve, manage or renew biodiversity elements, or their ecologic function.



### Innovative legal tools

The relation between lawmakers and nature was damaged, during decades, because nature was always considered as a thing (in the legal sense), meant to serve humans. Climate change and the environmental crisis has inverted this dynamic, because they highlight the need to include nature-related issues to laws and the need for lawmakers and juridic systems to act in the service of biodiversity. Article L132-3 of the Environmental Code known as 'real environmental obligation', but which is still little used today. An owner can sign a contract with a city or an environmental planning organization to ensure that his property continues to be biodiversity friendly despite a change in ownership. The objective is to conserve, manage or restore elements of biodiversity or ecological functions. Some instruments were therefore created (especially for local authorities) to ensure that biodiversity can be protected and can keep on evolving.

### Fighting pollution from land to sea

Waste causes significant pollution that impacts aquatic biodiversity. The Seine river is a striking example. Each year, more than 360 tons of waste are poured into the river. Some elected representative of the Île-de-France region are trying to make this topic a priority by calling for general estates to find a real strategy to fight floating waste. Being responsible for drinkable water, the city of Paris is also responsible for wastewater treatment, meaning responsible to prevent toxic spills from reaching streams. The city relies on phytoremediation among other things, a technic used in many countries (China, United States for instance) and now developing in small French towns. The process is simple: by going through areas developed using aquatic plants, water gets purified and treated by plant roots and microorganisms that act as living filters. We see three big advantages to this process: it avoids the contamination of water streams, it is cheaper than industrial processes, it supports biodiversity development. More direct measures can be taken to fight floating waste, for instance by creating floating dams with a system of vortex plastic, organizing cleaning operations and growing awareness among the public.

### Acceptability of policies

To promote biodiversity, we need to change our habits and behaviors. We also need to accept that we have to let go of some of our ways of doing or transform them deeply. This isn't easy and for it to happen, it needs to be accepted by the majority of people. But to protect biodiversity we also need to protect ourselves, because our health is connected with the health of the living. Our species cannot live properly among other beings if these beings aren't fine. In cities, more and more people demand for "nature spaces" to be created near their home. Biodiversity must be seen now by cities as an attractivity tool (targeting social inclusion, education, health, employment, ecotourism, hobbies, etc.)

### Transversality of challenges

Over the last years, cities have been getting involved with actions and initiatives that bring together various actors of a territory to promote biodiversity protection and include the topic to public policy or private territorial policy (as for instance with the creation of organizations or of dedicated governance and concertation tools,

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### Environmental convention with mandatory effects in Aisne (north of France)

The city of Laon agreed on an ORE (convention of environmental obligation) with a start-up called Trees-Everywhere (a company recognized as being "able to guarantee environment protection") to create a forest and biodiversity island of 10 000 trees on a 3400 sqm land in the Ardon neighborhood. Plans are made everywhere on that land to develop qualitative and playful landscape spaces (sensitive pathways, green theatres, conservatory fruit garden, food gardens). The townhall will set up an environmental learning program about the forest.  
<https://tinyurl.com/yxdbadpr>

### "Here starts the sea", or how to anticipate marine ecosystems pollution from Dijon

The city of Dijon has put up sign boards on his sidewalks that say, "Here starts the sea" ("Ici commence la mer"). In doing so, the city wants to grow awareness and recall that what we throw on the public space is likely to reach oceans and seas, travelling through sewers and small and bigger streams (rivers). Besides, the metropole of Dijon has set up particularly innovative technical means: capture of plastic and cans before they reach rivers, and filtering systems in water treatment plants to eliminate micropollutants and micro-plastic.  
<https://tinyurl.com/53tz697h>


### A "natural" graveyard in Niort (western France)

Breaking apart from graveyards which are usually very mineralized, the Souché graveyard in Niort provides 4000 sqm of natural space since 2014. Municipal services manage it in a way that respects vegetation growth and that respects the goal of not using phyto-sanitary products, based on an ecologic approach that goes beyond landscape elements solely.  
<https://tinyurl.com/5h7u6f9a>

### Mediation of a bat colony (greater mouse-ear bat) in Bas-Rhin, east of France

The inter-city organization of Sauer-Pechelbronn and the town of Niedersteinbach did a project to develop the space under its church's roof in 2011 to welcome bat populations better and promote the cohabitation between them and church goers. It was a French-German cross-border and concerted process, of which the main goal was to make the public aware of the importance to protect this species and to improve how people accept the local existence of this species.  
<https://tinyurl.com/uabn5hu7>





the creation of new partnerships, or of frameworks that get territorial actors active in implementing collective goals to protect nature, etc.). Given how broad that field of action is, cities must by all means make sure this acculturation process happens and ensure that biodiversity protection gets included to policy making in a transversal way – at all level of organization, all level of policies and all levels of action.

### **'Prevent-reduce-compensate' principle (ERC, 'éviter, réduire, compenser')**

The French Environmental Code asserts and confirms the ERC principle through project implementation. With this instrument, lawmakers want to limit the effects of urban development on the environment. Cities are responsible for granting building or development permits, and they are therefore responsible for ensuring that this principle gets respected.

#### **To prevent**

This is about trying to prevent natural areas or farming areas from being artificialized, and about using urban areas instead of nature or agricultural areas to develop projects - for instance using industrial wastelands. The Paris Region Institute estimates that wastelands and their surroundings in Paris cover close 776 hectares, making for significant and sufficient space to build infrastructures.

#### **To reduce**

While developing urban projects, we have to take into consideration the consequences its creation will have on the environment. This is a very important question for biodiversity, especially when it comes to the continuity of flora and fauna habitat.

#### **To compensate**

When a project doesn't manage to prevent and reduce its environmental impact, the law requires that the project holder gives a mandatory compensation at the time when he/she asks the local authority for a development permit. This compensation needs to be happen as close as possible to the place where the project develops, to make sure that we limit as much as possible the risks of biodiversity deterioration in the place where the project is set to happen.

### **Growing awareness about biodiversity challenges**

#### **Programs to grow awareness**

Growing awareness is essential to ensure a sustainably management of ecosystems. We can grow awareness through education, and by making populations aware, especially the youth, of the need for them to become the mediators of the necessary alliance between the human and urban societies, and the ecologic systems where biodiversity lives and evolves.

#### **The role of education**

Growing awareness among everyone and at all age is essential.

We have to explain what biodiversity is, explain that humans are a part of it, explain that they need other living beings to breath, eat, drink, get cured, ensure economic activities, as well as to dream, create, relax. Without biodiversity, we cannot live. We are the main responsible for its destruction but we are also able to take action to preserve it everywhere, including in cities.

### **Focus**

#### **Biodiversity Committee in Haut-Rhin (east of France)**

The city of Saint-Louis, being strongly involved with implementing the Agenda 21, wanted to strengthen citizen participation in environmental policy. To do so it brought together a group of "expert" citizens (entomologists, ornithologists, landscapers, beekeepers) within a Biodiversity Committee that seats with elected representatives and town inhabitants.

<https://tinyurl.com/pasypza9>

#### **Light Out in the USA**

The Light Out program was created under the impulse of several American cities – Chicago, New York and San Francisco - to prevent city lights from disorienting migratory birds. "Light Out" creates awareness about light pollution and about its impact and it enables authorities to take action, by turning off public lighting during migration periods to create a temporary dark corridor for those birds to pass through.

#### **In Marseille, cross-sector mobilization to promote biodiversity**

Looking for a framework meant to protect its biodiversity, the city of Marseille, supported by the French committee of IUCN (International Union for Conservation of Nature and of Natural resources) initiated in 2013 a local strategy to protect biodiversity, involving all territorial actors. The action plan that was developed relies on the participation of volunteering partners within their own project or organization framework, with contributions based on their own specific skills. This collaborative work led for instance to the creation of a panorama of biodiversity in Marseille and of its connections with socio-economic activities developing in the city. <https://tinyurl.com/uabn5hu7>

#### **A local urban plan (PLU) revised to serve biodiversity in Pas-de-Calais (North of France)**

In 2018, in the context of new housing development, the local urban plan (PLU) of the town of Fouquereuil predicted that more than 8 hectares of farming and nature areas would become artificialized, a situation likely to hamper the ecologic functionality of some wet areas. An ecologic diagnosis was done as part of an environmental assessment, and led to a process of (geographical) avoidance that prevented all negative effects for the areas with strong ecological elements at stake – without however preventing the projects to answer the urban development needs at stake too.

<https://tinyurl.com/2p89xtrm>



## Focus

### Butterflies returning to the city in Marseille

Resulting from a tight-knit collaboration between the city of Marseille, the Population Environment and Development Laboratory, and several citizens actors, the “Papillon” urban park is an experimental research framework meant to attract and host butterfly species at the heart of Marseille. The area is also a place to share naturalist researches about urban biodiversity, for school kids, students, professionals or the public to come and visit.

<https://tinyurl.com/uabn5hu7>

### Road project of the “Ring des Ulis” in the Department of Essonne

As part of the “Ring des Ulis” road project, the Department of Essonne is implementing ERC measures. To conduct an exemplary approach, the community has proposed additional support actions on the natural site of the Hundred Arpents: development of an ambitious management plan (whose content goes beyond the measures prescribed by the State), soil desartificialization work, experimentation with permeable materials, reception, and public awareness... A reflection on the long-term preservation of the site (beyond the duration of the compensation period) was also conducted.

The operation will make it possible to respond to the challenges of regaining biodiversity, soil quality, landscapes, and the living environment on the urban fringes of the city of Ulis. The project is part of the guidelines of the new departmental policy on the fight against soil artificialization (ZAN).

### The youth engaging to promote biodiversity in Bouches-du-Rhône (East of France)

Organized by the Youth and Environment services of the Department Council of Bouches-du-Rhône, the creation of a youth COP shows a will to grow awareness on the matter and to get various kinds of youth involve to preserve biodiversity. 200 young people took part to this simulation and negotiation exercise and called for the department’s authority to pay attention to reintroducing biodiversity in urban areas. This is why the topic of nature in the city now appears clearly in the Provence agreement, a text that sets directions and was written by the youth before being passed on to elected representatives of the Department at the end of the negotiations.

<https://tinyurl.com/yckradzp>

## Focus

### “Paris Oasis”

Laureate in 2018 of the European “Innovative urban action” project call, “Paris Oasis” focused on the renovation of 10 schoolyards and middle school yards during the Summer of 2020, to limit the effects of climate change and to provide children with more comfortable living spaces. The project currently contributes to spreading around locally the new Oasis renovation philosophy, as well as elsewhere, in France and internationally. The idea now is to slowly transform the yards of 760 schools and middle schools in Paris (73 hectares in total) and turn them into urban freshness islands by 2040. These new breathing areas are open to inhabitants outside school time.

<https://tinyurl.com/yc3uhu4h>

### The Sensitive Natural Area on the island of Herblay-sur-Seine

The Val-d'Oise Departmental Council is committed to creating a biodiversity sanctuary on the island of Herblay-sur-Seine. The unprecedented nature in Ile-de-France, and rare in metropolitan France, of a complete protection of a natural area is an opportunity to extend with contrast and complementarity a landscape and ecological project, that also questions our relationship with nature. Since 2019, the Departmental Council has acquired all the plots that make up this 11 ha island, thanks to its right of pre-emption under the Sensitive Natural Areas, and the revenues from the Development Tax. The site has been identified as preferred

to be left in free evolution due to its natural isolation and its location on a bird migration route. It is also home to floral and faunal processions subservient to wetlands. Several scenarios are being studied to convert a forest and grassy environment into a vast natural space composed of a mosaic of open and closed environments, from the most hygrophytic to the most aquatic, and of functional habitats. Experiments will be conducted in close collaboration with technical and scientific partners, in order to study the natural dynamics of an ecosystem in an urban context. If successful, two other islands could be renatured on the Oise, a tributary of the Seine.

<https://tinyurl.com/pasypza9>





## Focus

### Complementary compensatory measures and sensitive natural areas of the Department of Indre-et-Loire

As part of its policy in favor of Sensitive Natural Areas and in addition to compensatory measures related to the development of a section of the ring road of the Touraine agglomeration, the Department of Indre-et-Loire has created and developed a marsh. Agricultural plots in decline of valley bottom, in peri-urban context, have been redeveloped into artificial wetlands favorable to the capping of floods, the development of biodiversity and the depollution of urban rainwater that have been redirected to this basin. The Palluau marsh, with an area of 5 hectares, is now part of a 150-hectare natural site whose agricultural plots are managed by sheep grazing and mowing under an agreement with a neighboring agricultural high school. Parking areas and hiking trails have been set up to allow public access, and an interpretive trail coupled with nature activities allow the discovery of a rich biodiversity came to settle in the wetlands.

This space is now a real heart of nature in the Metropolis of Tours, appreciated by locals and naturalists.

### Territorial animation around the issue Nature in the city: the Departmental Water Plan of Seine-et-Marne

The Departmental Water Plan (PDE) is a tool for territorial coordination that has been deploying a policy for the protection of water and aquatic ecosystems in Seine-et-Marne, a territory populated by over 1.4 million inhabitants, for 15 years. The PDE is an agreement between the State, the Water Agency, the Departmental Council, the Regional Health Agency, the Union of Mayors, the Regional Chamber of Agriculture and the Chamber of Commerce and Industry, and it mobilizes many technical partners, experts and local authorities to develop action strategies throughout the territory, such as the animation of Thematic Working Groups (WGs). Thus the WG "Invasive and Impactful Species" limits the impacts and development of invasive alien species (IAS); the WG "Water and Nature in the City" relies on nature-based solu-

tions to optimize water management and regain biodiversity in communities, the WG "Rivers and Wetlands" is a tool for restoring the Green and Blue Grid

### Sparrow birds' neighborhoods in Paris

The "sparrow birds' neighborhoods" in Paris is a scientific process operated in three pilot sites, in partnership with the birds protection association (LPO – ligue de protection des oiseaux) through a series of actions, public meetings and exploratory promenades. It wants to enable existing but fragilized colonies of sparrows to nest in suitable places, adapted to their needs. Sparrow birds, although a symbol of Paris, lost 70% of their population since 2010.

<https://tinyurl.com/ycxea44c>





# Conclusion

The issues behind the decline of biodiversity in our cities are real but pathways also exist for us to face those issues in our cities, provided we choose for dynamic and innovative governance frameworks that make use of the living's resources and provide we put the living at the heart of our urban projects.

Although urbanization is the source of many threats looking over global biodiversity (due to massive soil artificialization and impermeabilization), urbanization can also, paradoxically, play a crucial role in preserving biodiversity.

There are several successful management examples of urban and suburban natural areas. Through brainstorming and development efforts, we can maintain and promote the existence of many indigenous vegetal and animal species in urban areas. This way, we can (re)create a broad diversity of habitat and food resources and make a lot of services available to serve the well-being of inhabitants.

Creating a positive impact on urban biodiversity basically relies on taking into consideration precise ecologic parameters such as the wealth of specific habitats, the connection between the different green spaces (ecological

corridors), the existence of indigenous vegetal species, etc.

**"Biodiversity in the city isn't the problem; it is one of the solutions."**

Cities must have strong-willed policies of which the impact and resonance have to go beyond those cities' administrative limits, in order to ensure biodiversity continuities. Such proactive policies must also go beyond the temporal scale of running political mandates, because this is too short a scale for impact and development to be truly sustainable and long-lasting. To achieve this, success will rely on unifying public actors, setting budgets that match the stakes, and professionalizing actors.

We must strengthen and develop all policies and measures that promote the preservation of urban and suburban ecosystems, so that nature becomes on the main components of our cities. COP15, from the biodiversity convention, set to happen in Kunming in China, will be a driver for post-2020 biodiversity, to promote the implementation of the 2050 Vision among other important things. This urgent need for commitment at the international scale is also written in

the Edinburgh declaration, which calls to reinforce the role of urban territories in preserving biodiversity. The connection between these two efforts has to find an echo in most of the conversations hosted about nature in the city during the World Urban Forum of Katowice in June 2022, an event that guarantees political impact.

"Healthy biodiversity and the ecosystem services that it provides are key for human well-being and to build the resilience of our cities and regions, both during and after the pandemic, and it should be central to our recovery." Excerpt of the Edinburgh Declaration on post-2020 global biodiversity framework.





Started in 2011, the **French partnership for cities and territories (PFVT – Partenariat Français pour la Ville et les Territoires)** is a platform meant for the exchange and valorization of the French urban actor's expertise at the international level. It is a multi-actor partnership headed by Hubert JulienLaferrière, Member of Parliament, supported by the Ministry of Europe and of foreign affairs, the Ministry of territorial cohesion, the Ministry of the ecologic and fair transition, and the Ministry of culture. It brings together close to 200 organizations representing the diversity of the French expertise, contributing to the construction of a shared French vision based on a capitalization of exchanges and of innovative and sustainable experiences. <https://www.pfvt.fr/>

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