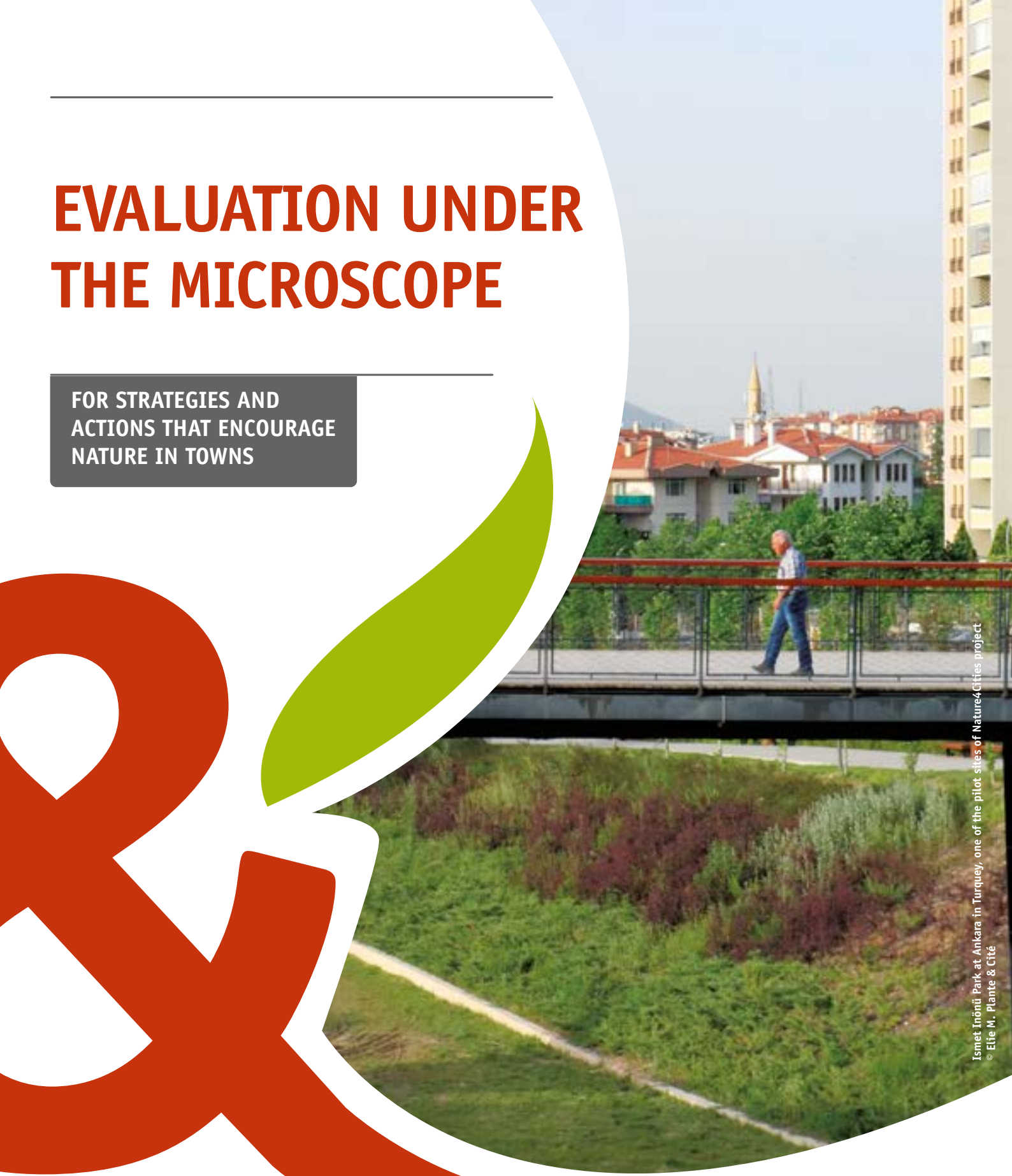
EVALUATION UNDER THE MICROSCOPE

FOR STRATEGIES AND ACTIONS THAT ENCOURAGE NATURE IN TOWNS



Ismet Inönü Park at Ankara in Turquey, one of the pilot sites of Nature4Cities project
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5

July 2019

EVALUATING **BIODIVERSITY** IN **URBAN PROJECTS**

Biodiversity is linked to such complex, dynamic processes that any biodiversity indicator is simplistic. The neighbourhood-scale self-evaluation proposed here enables urban planners to assess their actions with respect to biodiversity as part of a continuous improvement approach.

While biodiversity is most often associated with the variety of species present, it also includes their interactions and especially their food chains. Whether in a pond, urban woodland or flower-rich grassland, ecosystem functioning is always driven by this biodiversity. And the quality of the services nature provides in urban areas (for example, regulating rainwater run-off) depends on it. By fostering ecological processes as seen in natural open spaces (material cycles, food chains, etc.), planted areas become more able to respond to health or climate risks and to the constraints imposed by urban density.

To build this resilience, planning and management practices need to be evaluated to lock in biodiversity, particularly using indicators that incorporate measurement of ecosystem functioning. This was the aim of the biodiversity evaluation conducted in 2016 by Plante & Cité and CEREMA (the French public institution for developing and capitalising on public expertise in the fields of planning, regional cohesion, and ecological and energy transition), supported by the French Ministry for Territorial Cohesion as part of the evaluation of a sustainable neighbourhood (see box). An urban project biodiversity evaluation matrix was produced suitable for field use. The main objective of the proposed indicators is to allow local authorities and private sector developers to self-evaluate their activities in developing neighbourhoods. ■

OVERALL APPROACH TO EVALUATING A SUSTAINABLE NEIGHBOURHOOD

The Sustainable Neighbourhood accreditation highlights a progressive approach, rewarding local authority action in four stages:
- Origination and signature of the charter;
- Execution;
- Handover;
- Occupation.

Evaluation was carried out as part of the accreditation process at the *Ravine Blanche* Sustainable Neighbourhood in the town of Saint Pierre on La Réunion / Ministry for Territorial Cohesion and Relations with Local Government.

In 2015 the Ministry for Territorial Cohesion launched a collective process for the evaluation of Sustainable Neighbourhoods, run by CEREMA. The objective was to offer local authorities tools to help them perform self-evaluation of their urban project long-term. Building on the 20 commitments in the French Sustainable Neighbourhood standard, the working groups produced the national standard for Sustainable Neighbourhood evaluation. For each of the accreditation's commitments, this tool provides a set of evaluation indicators to assess a project with respect to all aspects of the accreditation (approach and process/ social environment and use/ regional development/ environment and climate). This evaluation phase is now part of the Sustainable Neighbourhood accreditation process: local authorities that monitor their projects for 3 years after handover can apply for stage 4 of the accreditation. The challenge is to continuously improve urban operations on the basis of quantitative and qualitative indicators. Successes are celebrated but attention is also drawn to points requiring improvement and adjustment.

Find out more: **www.ecoquartiers.logement.gouv.fr**
AD4 team from the Housing, Town Planning and Landscape Directorate (DHUP), French Ministry for Territorial Cohesion

20 INDICATORS FOR EVALUATING BIODIVERSITY

The 20 indicators have been developed to identify the levers for improving biodiversity quality.

They are based on three questions:

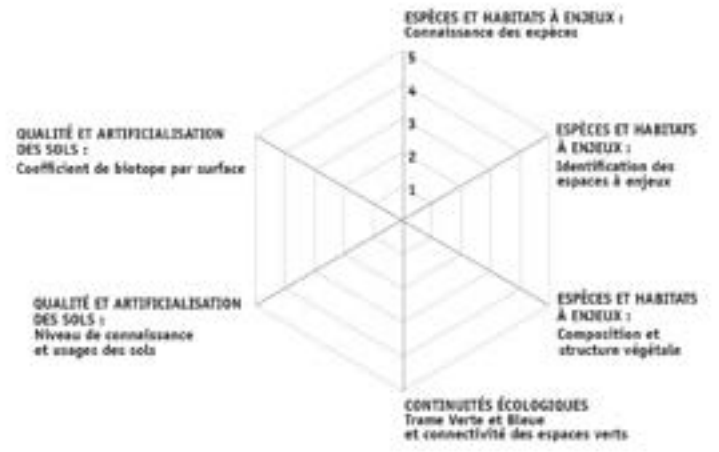
• **What do we know about the state of biodiversity on the site?** Knowledge of species, identification of vulnerable areas, composition of vegetation structure, connectivity of green spaces, level of knowledge about and usage of soils, biotope coefficient for each area.

• **What services does the site's biodiversity provide?** Influence of vegetation and water bodies on climate, rainwater management, diversity of urban agricultural forms, availability of natural open space, degradation of natural open space.

• **What responses are provided by the site's stakeholders?** Green space management plan, minimisation of inputs, differentiated management, diversification of habitats for flora and fauna, inclusion of biodiversity in action plans and other schemes, accreditation and other charters, diversity and operation of partnerships, training and awareness of participants and elected officials, actions to improve awareness and mobilisation, perception of nature within the urban context.

For each indicator, a number of questions are asked to guide the site manager in taking stock of the current level of knowledge or type of actions undertaken. This allows each indicator to be attributed a score between 1 (lowest) and 5 (optimal situation). For example, to assess usage and knowledge levels about the soil, the manager is asked to qualify their knowledge of soil properties and pollution levels by selecting from "no knowledge", "bibliographical resources", "occasional studies" and "preliminary study of the whole site".

Radar charts are used to display the values attributed to each indicator. This allows the neighbourhood's strengths and weaknesses to be captured in summary for each of the three types of indicator: state of biodiversity (see diagram below), services rendered, and responses provided. This method makes it easy to see where improvement is required. ■



Depiction of indicators for evaluating biodiversity knowledge on site / Plante & Cité

IMPROVING PLANNING AND MANAGEMENT PRACTICES

The matrix is designed to be analysed complete, with the results of the evaluation being shared within the management organisation. Several self-evaluation sessions, undertaken at three- or five-year intervals, will help validate or rectify the actions undertaken.

This evaluation matrix also provides a clear snapshot of the elements most important to biodiversity in the urban context. These indicators become inputs that may be employed upstream on the design and construction aspects of an urban project, readily shared between town planners, landscape architects and local authorities. ■

Marianne Hédont,
Plante & Cité

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PROTECTING TREES: THE NEW EIV SCALE FOR TREES

Ornamental trees are often mistreated: neglected, damaged in accidents, abused... These scales make it possible to improve awareness, expose, warn and penalise. An overview of "VIE Arbre" ("Tree EIV"), the result of a partnership between Copalme, CAUE 77 and Plant & Cité

TREE SCALES, TOOLS FOR PROTECTION AND COMMUNICATION

Employed by local authorities, experts and consultancies, tree scales are applied to individual trees and comprise two components:
• A valuation of the tree to determine its heritage value (in euros) based on its individual characteristics;
• An evaluation of any damage, to fix an amount of compensation in the case of loss or deterioration of the tree.
This tool is above all intended to be dissuasive: adopted by local authority regulations, mentioned in highways regulations, local plans and/or tree charters, it has a contractual value and is enforceable. Notified as from the planning permission and works preparation stages, site supervisors and private individuals are encouraged to protect trees in and around construction sites in order to avoid penalties. The damage assessment scale enables the setting of compensation based on the heritage value if damage is observed (tree cut down or knocked over, branches broken or severely cut back, bark loss or trunk damage, severing or compaction of the root system, etc.). Prior evaluation of a proposed development provides the developer with a basis for comparing trees, and a tool to help decide how to maintain or remove existing trees. The indicator also makes it possible to monitor the evaluated trees over time, justify budgets and assess maintenance priorities. The information collected can also be used for communication and improving public awareness. ■

Severe pruning damages trees. Using a scale quantifies their future and helps with their maintenance. / CAUE 77, A. Bonnardot.

A NEW SCALE THAT BETTER REFLECTS CURRENT ISSUES

Employed in France since the 1970s, historical scales took into account the tree's place within the landscape, its condition and its stage of development. Over recent years, it has proven necessary to update these in order to re-evaluate trees and better reflect the many issues affecting them: amenity, climate change, ecology, etc. A study co-financed by the VAL'HOR inter-professional organisation, and conducted by the Copalme association (which brings together tree specialists from the French-speaking world), CAUE 77 (Landscape, Planning and Environment Advisory Body for the Seine-et-Marne *département)* and Plante & Cité led to the new "VIE Arbre" (Tree EIV - Estimated Integrated Value). The partnership's objective is to produce a simple-to-use, open-access tool distributed in the form of a Web application. ■

TREE EIV: SIMPLE CRITERIA FOR AUTOMATED EVALUATION

Once the tree has been identified, its tree nursery sale price provides a starting point. Its characteristics are converted into multiplying factors, which are then applied to the reference price:
• **The evaluated tree**: its identification and location enable the application to find the necessary information. This section captures aspects absent from previous scales, such as the tree's potential in terms of nutrition, allergen or carbon sequestration.
• **Tree size and shape**: based on the tree's dimensions, the application estimates its development against its potential and differentiates large and small specimens. The reference price is increased if the tree has an architectural shape, likely to augment its heritage and/or landscape value.
• **Relationship to the landscape, site, and region**: several criteria are converted into monetary assets or liabilities. The heritage

value may be increased to reflect the tree's landscape role, any listings or protection measures which apply and its ecological value. It can increase or decrease depending on the maintenance required, how well maintenance has been done, and benefits or problems deriving from the tree.

• **Condition of the tree**: this evaluation requires real expertise, and is directly based on the methods established by the International Society of Arboriculture. The results are based on the tree's mechanical, physiological and health characteristics.

• **Exceptional individual**: this title must be based on documentary evidence that will be accepted as valid in court proceedings (on-site signage, citation in a text or inventory of exceptional trees, accreditation etc.). ■

Taxon	Pinus pinea	Platanus x hispanica	Taxus baccata
Location	La Rochelle (Charente Maritime)	Angers (Maine-et-Loire)	Orléans (Loiret)
Description	Young plantation (2012)	Structuring specimen at end of row	Exceptional tree near city hall
Dimensions	3.5 m high, 3 m diam.	33 m high, 15 m diam.	20 m high, 14 m diam.
Taxon Other criteria	Important landscape role, legal protection, of low ecological value and interest because of young age, safe and healthy tree, unexceptional	Listed wooded area, well-maintained, causes no inconvenience, high ecological value, safe and healthy tree, unexceptional	Located in an architectural, urban and landscape heritage zone, well-maintained, ornamental, locally exceptional
Heritage value*	€9,000	€20,000	€150,000

** These estimations were made during the test phase of the Tree EIV scale and are likely to change in the final version. The orders of size are given here for information*

Illustrations from tests of the Tree EIV scale. / 1 City of La Rochelle 2 City of Angers, P. Blanco 3 City of 'Orleans, P. Héry 4 CAUE 77, A. Bonnardot.

SCALES AS A TOOL FOR GUIDANCE

Tests of the "Tree EIV" scale show that the values obtained are higher than those from previous methods and really help to highlight the value of trees in a complex, sometimes hostile urban context. Since the evaluation is only valid at a given point in time, the evolution of the tree's cost-benefit relationship over its lifetime raises questions. A tree's value, like its cost price, increases throughout its life. This value disappears if the tree presents a risk: it is then felled and replaced.

This scale is one of many tools: its application will be enhanced by ambitious urban nature policies, translated into clear planning guidelines and enforcement of current regulations through urban planning documents.

The Tree EIV and its accompanying damage assessment scale will be widely available at the end of 2019 via the Plante & Cité website. ■

Pauline Laïlle,
Plante & Cité

Acknowledgements: François Freytet (Copalme, City of Toulouse), Augustin Bonnardot (Copalme, CAUE 77), Christian Riboulet (Riboulet Consultants).

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BIOLOGICAL QUALITY INDICATORS IN SOIL: TESTIMONY FROM THE LIFE BENEATH OUR FEET

Soils contain a vast diversity of living organisms. Analysis of bioindicators permits an evaluation of the soil's ability to function and its associated ecosystem services. How does this biodiversity and its evaluation work in the urban environment?

WHAT DO WE MEAN BY BIOLOGICAL QUALITY IN SOIL?

The "biological quality" of a soil is its capacity to provide services (soil fertility, production of vegetation, carbon storage and pollutant filtration or breakdown) thanks to the activity of its living organisms. This quality is evaluated using bioindicators: measurements providing information on the condition and functioning of the existing soil and the risk of contaminants being transferred into the ecosystem. ■

Earthworms are indicators for organic matter recycling and soil structuring. / Patricia Maine Degrave

EXAMPLES OF BIOINDICATORS

- Microbial biomass to evaluate nutrient regulation, transformation and storage.
- Enzyme activity to understand the soil's biological function.
- Bioaccumulation of metals in plant tissue to measure the quantity of bioavailable pollutants in the soils.
- DNA pyrosequencing to identify the composition of the soil's microbial population.

WHAT ARE THE SPECIFICS OF THE URBAN ENVIRONMENT?

In the urban environment, soils show a degree of perturbation following artificialization (change of use, excavation, pollution, surface sealing), which results in displacement of micro-organisms and changes their species composition and activity levels, thus modifying the range of functions and services provided by the soils. In some cases, greater diversity and activity is observed than in natural habitats. Direct transposition of knowledge from non-urban habitats is not therefore always appropriate and more research is needed on this subject (see box). In the meantime, it remains essential to understand the physical and biological characteristics of the site studied, its past history and its integration into a green or brown corridor. ■

PURSUING RESEARCH TO BETTER EVALUATE URBAN SOIL QUALITY

Soil's biological diversity is enormous and little understood. These organisms are highly varied, differing in size by many orders of magnitude, from several centimetres for the biggest invertebrates (snails, earthworms) to micrometres for bacteria. Beyond simple knowledge, the study of this biodiversity is essential because soil organism activity and interaction are responsible for soil functions (breakdown of organic matter, structuring, symbioses, drainage and water purification). Over the last 15 years, research has been concentrated on the biological characterisation of agricultural and forest soils, leading to the emergence of indicators and interpretative standards. Initial work using the same indicators on garden, urban and industrial soils indicate that their biodiversity is sometimes greater than in agricultural situations. This research should be expanded to yet more situations in order to provide characterisation tools and standards that can be used by planners.

Antonio Bispo, INRA, Orleans, InfoSol Unit

UNDERSTANDING SOIL ORGANISMS AND THEIR FUNCTIONS

Soils are teeming with organisms of widely varying nature and size. One gramme of soil contains up to 100 billion bacteria and 5 kilometres of fungal hyphae, while one square metre of soil can hold up to 400 earthworms. Although our knowledge of species diversity still remains patchy, the ecological role of each of the major classes is fairly well documented (see diagram opposite).

While each group of soil organisms has its own activities and specific characteristics, their complementarity is essential to fulfilling different ecological roles and thus contributing to soil biological quality.

As of today, there are over 100 bioindicators. Several research and study programmes (Bioindicators and Soil Quality, APPOLINE (Applicability of the plant lipid biomarker and the nematofaunal bioindicator to the study of polluted sites), GESSOL (Environmental Functions and Management of our Soil Heritage)) have inventoried and tested the majority. Technical datasheets are often available for these methods and give details of the issues, operating methods, advantages and disadvantages of each indicator (see examples on following page).

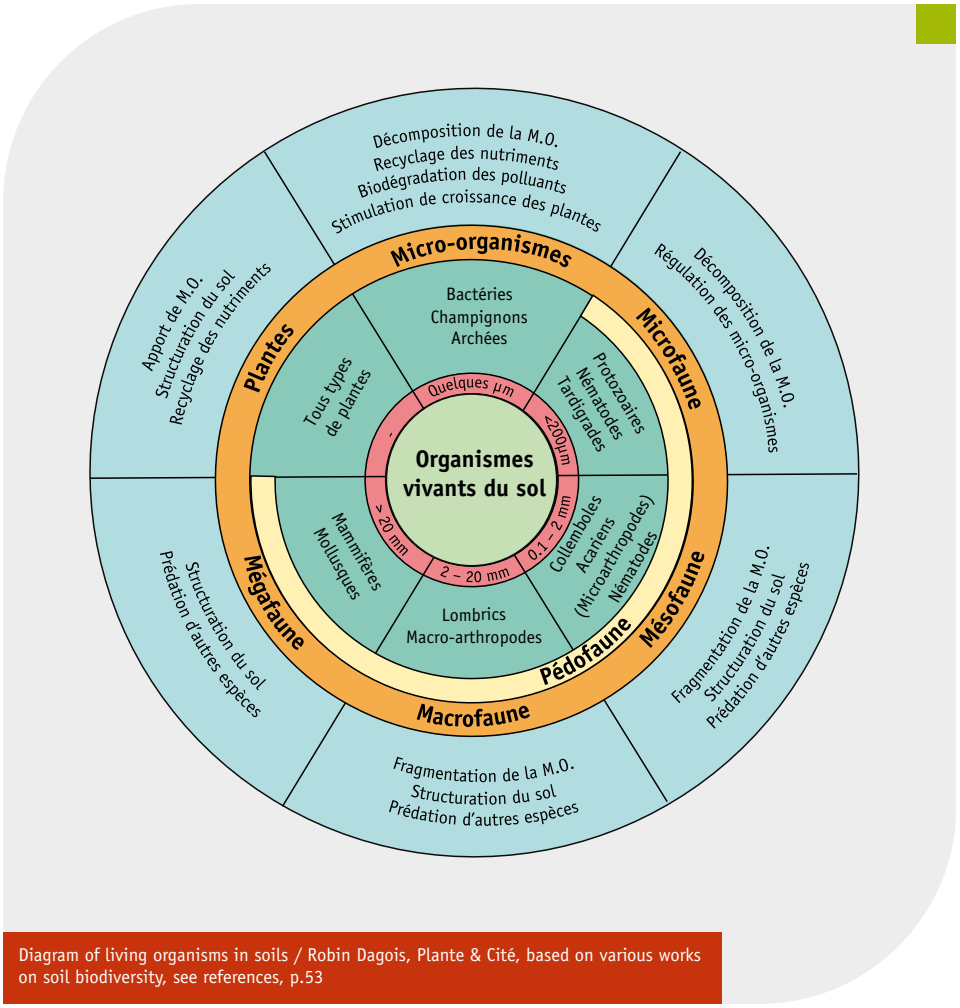

Diagram of living organisms in soils / Robin Dagois, Plante & Cité, based on various works on soil biodiversity, see references, p.53

These indicators can be divided into two main types: accumulation bioindicators, and impact bioindicators. The first provides information about the organism's exposure to the substances surrounding it, while the second reflects the consequences for the organism (e.g. development, reproduction, enzyme activity) of exposure to one or more substances in its environment. ■

CHOOSING THE RIGHT INDICATORS

When studying soil biological quality, the choice of indicators must be based on one initial question: "What are we trying to evaluate - and why?" Bioindicators can also influence the practices set out in management plans, trigger environmental impact studies or guide redevelopment programmes on impacted sites. With respect to methods, we can either seek to obtain complete biodiversity mapping of the soil profile and/or of a given area, or to identify activity/diversity indicators for certain organisms - for example those subject to particular disturbance. Several indicators may provide information on similar functions. Spatial and temporal scales should then be taken into account because some indicators are more sensitive than others. Site managers can also use ISO standards developed for these applications. It should be noted that is essential to couple the use of each bioindicator with other physical, chemical and biological measurements in order to understand how each particular soil functions. ■

FOUR PROTOCOLS TO EVALUATE SOIL QUALITY

Ecosystem services to be evaluated	Flood regulation Carbon storage Crop production Food supply	Nutrient cycling Carbon storage Crop production	Pollutant filter	Carbon storage Crop production Nutrient cycling
Soil function/parameter to be evaluated	Organic matter recycling and structuring	Organic matter recycling Habitat	Pollutant bioavailability	OM recycling Trophic chain Habitat
Bioindicator name	Earthworm index	Microarthropod index	SET snail index	Nematode index
Indicator type	Impact bioindicator	Impact bioindicator	Accumulation bioindicator	Impact bioindicator
Principles & Method	Be careful with sampling; refer to the laboratory/research body for the sequence of stages because this can influence how the results are interpreted.			
	↘ Extract the earthworms with a dilute mustard solution or with a spade ↘ Sort, count, weigh and measure the earthworms by species. ↘ Use descriptive sheets to identify the harvested individuals (anecic, epigeic, endogeic).	↘ Sample using a corer and extract by temperature gradient. ⚗ Count and identify functional groups of collembola and acarid mites. ⚗ Note abundance, specific diversity, evenness or concentration.	↘ Place the snails (of type *Helix aspersa*) in microcosms. ↘ Take them out after 28 days of exposure. ⚗ Extract and dry the soft tissue then measure the metal and/or organic pollutant content. ⚗ Calculate the SET (Sum of Excess Transfers) index and compare it with unexposed individuals.	↘ Sample nematodes using soil corers. ⚗ Extract the nematodes by immersion and filtration. ⚗ Count and identify the individuals using identification sheets. ⚗ Evaluate the abundance and structural indices.
Main advantages and limits	(+) Indicator responds rapidly to change in the habitat. (+) Indicator popular and easy to use. (-) Sampling period may affect final result. (-) Specialist knowledge required to identify certain species.	(+) Accessibility and ease of implementation. (+) Very wide spectrum of complementary measurements. (-) Expertise required for interpretation of results.	(+) Marker of pollutant availability. (+) Snail farms available throughout France. (-) Can only be used for non-degradable pollutants. (-) Difficult to estimate if the measurement has not reached an equilibrium threshold.	(+) Indicator provides information about a number of functions. (+) Ease of implementation. (-) Samples must be dealt with quickly (living nematodes). (-) Indicator sensitive to environmental stress (difficult to determine influencing factors).
Measurement cost and time	€ 🕘	€ 🕘🕘	€€ 🕘🕘🕘	€ 🕘🕘

Key:

↘ can be performed by site manager

⚗ requires a specialist service-provider

€ < 300 euros

€ 300 – 750 euros

🕘 1-2 days / 🕘🕘 2-5 days 🕘

🕘🕘 > 5 days

BETTER UNDERSTANDING OF URBAN SOILS FOR BETTER PLANNING

Some actors involved in urban planning are becoming more aware of the question of soil biological quality (e.g. re-use of impacted soils, evaluation of services rendered, studies of contaminant availability). Take-up and accessibility of methods for non-specialist users then becomes a real issue. It's now popular to produce analytical "kits" as a tools for analysing soil biological quality at differing levels of precision subject to available time and means. In addition, many characterisation methods offered by service-providers are now much cheaper than in the past.

There are many research perspectives on the question of urban soils. Firstly, many soil organisms remain to be characterised and identified and there are a number of research programmes with this objective, including Gessol at national level in France. Further, inter-species interaction (predation, competition, facilitation) needs to be better understood in order to include their specificities in the system functioning.
Finally, much work is focused on better operational retranscription of soil indicators both in terms of function and of services (e.g. the DESTISOL tool). The acquisition of studies from urban habitats thus enriches research and provides better understanding of the relationships between soil biodiversity, usages and functions. ■

Robin Dagois,
Plante & Cité

CONTRIBUTION OF EARTHWORM COMMUNITIES TO THE FUNCTIONING OF RECONSTITUTED ANTHROPOSOLS

Reconstituting fertile soils for long-term landscape development requires the achieving of ecological functionality objectives, in particular through the development of the biological communities living in them, including earthworms. Worms help create porosity, regulating rainwater run-off and stimulating plant growth. The presence and abundance of certain ecological categories of earthworm enables the characterisation of the level of functionality achieved – or to be achieved – in the soils. For this, Sol Paysage and the University of Rennes 1 have combined in the production of a thesis to understand the distribution of earthworms in urban soils and their contribution to their function as urban isolates (lines of trees). This new knowledge will provide the basis for modifying technical pathways for reconstituting soils that encourage biodiversity in which earthworm communities will have an important place.

Jeanne Maréchal, Sol Paysage

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MOWING AND SCYTHING GREEN COVER: HOW TO MANAGE WORKING TIME.

The maintenance of grassed areas accounts for between 15 and 25% of total green space services activity. As the area to be managed continues to increase, managers need hard facts to be able to optimise their approach. Review of Plante & Cité's survey of mowing and scything practices.

From 2015 to 2018, with financial support from the VAL'HOR inter-professional organisation, Plante & Cité ran a technical-economic study of technical maintenance approaches and the working time required for mowing and scything. Given the paucity of data and faced with the variety of practices and factors that can affect working time, the technical centre decided to set up a survey of practices drawn from a network of contributors. Forty-five local authorities and landscape management companies contributed to the study, meticulously noting over an entire year the nature of the tasks performed, the associated time and the equipments used for each intervention.
In total, 134 lawns, 58 meadows and 18 sports pitches were studied - representing over 10,000 hours of maintenance. ■

Mowing lawn grass around residential buildings. Immobilière Podeliha, Angers (Maine-et-Loire / Laïlle P., Plante & Cité.

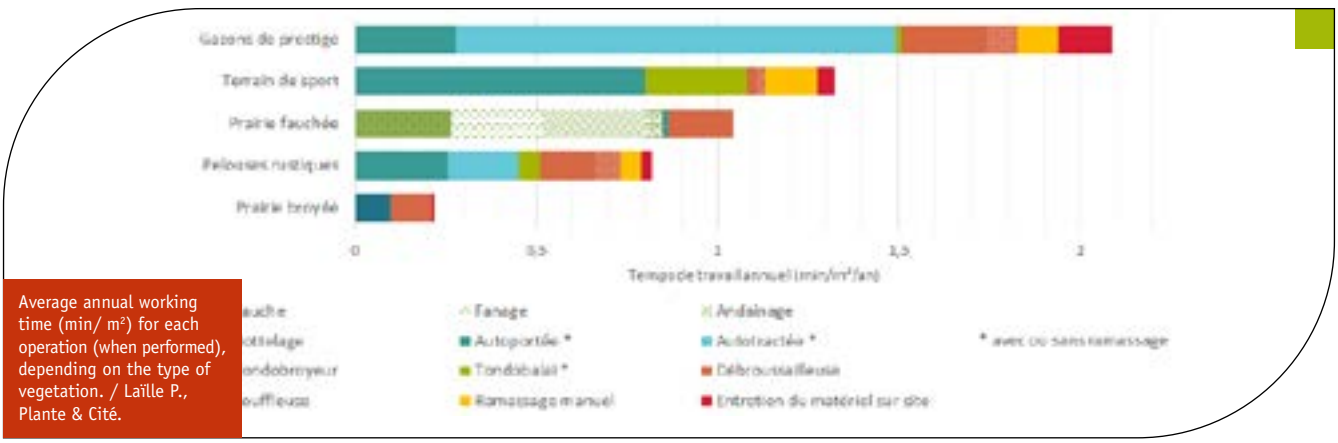
HARD FACTS TO BETTER ANTICIPATE CHANGES IN MANAGEMENT

Against a backdrop of continuously improving practices to meet budgetary constraints, technical-economic indicators for mowing and scything help green space management professionals position themselves, and adjust their management methods while anticipating costs.

What equipment for which objective and with how much yield? What frequency of intervention and how much working time per year for a desired objective?

Working time varies enormously depending on the equipment used...

Working time for an intervention depends firstly on the number, nature and characteristics of the equipments used. For mowing and scything operations, cutting width is the main yield indicator: the greater the width, the greater the yield. Sit-on mowers have an average yield four times greater than that of walk-behind mowers while towed power scythes have a yield 14 times greater than walk-behind power scythes. The cutting widths of the 222 models referenced in the study ranged from 49 to 320 cm. Although the choice of equipment is made according to site constraints, the very large variation seen appears to indicate that there is room for manoeuvre for green space managers. Additional operations, such as finishing with a brush-cutter and collecting grass cuttings, also considerably increase intervention time.



Average annual working time (min/ m²) for each operation (when performed), depending on the type of vegetation. / Laïlle P., Plante & Cité.

... and on varying management objectives

Over a year, the working time may also be explained by the frequency of interventions on the site which varies according to the objective in terms of usage and the desired landscape ambience. While meadows require cutting 1 to 6 times a year, lawns are cut between 6 and 39 times per year, and as many as 50 times for some sports pitches. There are also clear variations even within the same type of vegetation cover, between ornamental and rustic lawn, mulched and mown grassland... for example for mown grassland the production of hay often requires three further interventions after scything: tedding, raking and baling. Grassland maintenance and hay production can be subcontracted to a company (by tender) or to a farmer (by agreement). ■

NEW WAYS OF OPTIMISING WORKING TIME

With twin objectives of eco-friendly management and cost reduction, professional practices on grassed areas are changing, with larger areas being managed as grassland. Although the study confirms this strategy it also sheds light on other methods for optimising working time.

Dare to do less finishing

Site configurations (the foot of a tree or wall, edge of a pavement or rock face, street furniture, etc.) make many grassed areas inaccessible to machines with large cutting widths. To achieve uniform appearance, operators use other, lower-yield machines: small mowers or brushcutters, accompanied by leaf blowers. According to the survey data, these operations account for 40% of work time on average and sometimes up to 70%!

What options does the manager have to improve things? The frequency of these finishing touches can be reduced and adapted to the objective: every mowing (or every second mowing) for an ornamental finish, down to just once a year for a more rustic ambience. Apart from saving time, these changes diversify the landscapes offered to users and create nature refuges. Redevelopment can also reduce the demands of finishing work: remove signage that's of little interest, create a buffer zone at the edge of the wall to avoid mowing.

Design low-maintenance sites

While managers have some room for manoeuvre, they are also heavily constrained by a site's layout, which can considerably affect maintenance time. By way of illustration, mowing a 7,000 m² football pitch takes on average two-and-a-half hours, compared with 7 hours 20 minutes for a lawn of the same size. This difference can be explained by a different amount of constraints: site geometry, fragmentation, corners, obstacles, edges, slopes. While some constraints are part of the site's usage, others can be reduced without harming landscape quality. Over to the landscape designers! ■

Hélène Cheval,
Syrphea Conseil

Example of unmown foot of wall. Banks of the river Ill, Strasbourg (Bas-Rhin) / Coupey C., Plante & Cité.

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EVALUATING PRACTICES WITH PARTICIPATIVE SCIENCE: A SUCCESSFUL GAMBLE?

Florilèges-prairies and Propage are two participative science survey methods specially designed for green space managers. They provide support for changes in practices to encourage biodiversity.

BIODIVERSITY MONITORING DESIGNED FOR MANAGERS

In the context of herbicide-free and differentiated management, green space managers are changing how they handle spontaneous plant growth. Today, the reappearance of wild flowers is part of the drive to rewild public spaces and encourage biodiversity. Propage (*Protocole Papillons Gestionnaires* (Butterfly Survey for Managers)) and Florilèges-prairies (Grassland Survey) have been designed to help green space managers adapt their practices to the ecological functioning of habitats. By monitoring butterflies and urban grassland flora, these two survey methods help to evaluate habitat quality in comparison with other sites and monitor changes in the impact of practices over the years.

These professional surveys are now part of the Vigie Nature participative science programme. Run by the French National Natural History Museum (MNHN), the programme brings together nearly 20 surveys monitoring common species of plants and animals at national scale based on observations by voluntary amateur naturalists (entomologists, botanists, ornithologists, pupils and teachers, etc.) and professionals (green space managers, farmers). The Museum's teams thus have field data available for the whole country, helping to improve knowledge of "ordinary" biodiversity. ■

FLORILÈGES-PRAIRIES: A SIMPLE METHOD FOR EVALUATING GRASSLAND ECOLOGICAL QUALITY

Standardised monitoring of urban flora

The protocol is applied to cut or grazed grassland whose management can be monitored over several years. When choosing a grassland, it must be understood what management it requires and be able to develop this every year to apply it effectively to the flora on site. It is suggested that a survey be undertaken based around 60 common species found in northern French urban grassland, chosen on the basis of their ecology and ease of identification. Most of the species (32) are typical of grassland, with some more prevalent in close-mown grass (11) or in wasteland (17). A dedicated online data entry tool is used to record information from each site monitored. Centralising the data in a single database allows trends to be analysed at national level.

National ambition

Florilèges - Urban Prairies (urban grassland) has been co-developed by Plante & Cité, the MNHN, the Paris Region Biodiversity Agency, the Paris Basin Botanical Conservatory and Seine-Saint-Denis *département*. Since its creation in 2014, 320 grasslands have been surveyed at least once and 83 organisations have taken part, fielding 470 observers, the majority in Paris Region.

Taking the form of a standardised monitoring programme, Florilèges-prairies aims to reveal trends in the development of urban grassland flora at national level with respect to management practices (type, period and frequency). To obtain significant results the number of sites will need to be increased, and field data collection pursued over several more years. Site managers are therefore invited to contribute long-term to this collective field data recording effort.

Ecological quality indicators to evaluate management methods

Florilèges' tools allow site managers to easily monitor changes in the number of species recorded and assess how characteristic their grassland may be (number of typical grassland habitat species). They can thus evaluate the impact of their practices on the development of the grassland to then be able to better adapt these to optimise functioning of the plant cover. A range of indicators is available to site managers to help them interpret their records and evaluate the ecological quality of the habitat. These indicators enable each grassland to be characterised depending on the ecological characteristics of the species observed. For example, nectar availability can be evaluated, which determines how attractive the grassland is to pollinating species; the dominant pollination method, which can provide information on habitat

fragmentation, or on species lifespan which shows whether the site is a highly disturbed habitat and so favour annual species.
In the field, a number of site managers cross-reference Florilèges-prairies and Propage data (see boxes). The Propage method evaluates and monitors the impact of site design and management practices on butterflies. This method can be applied to various urban spaces: lawns, meadows, cemeteries, etc. Based on an indicator of habitat quality for butterflies, it looks to compare results obtained with different management methods for the same habitat type. It is run by the association Noé in conjunction with the MNHN. ■

BESANÇON: GARDENERS TRAINED IN BOTANICAL AND ZOOLOGICAL INVENTORIES

For the last two years, gardeners from the parks, woodland and sports grounds department have taken part in the Florilèges-prairies monitoring programme to evaluate the quality of the town's urban grassland flora to re-shape management practices to encourage biodiversity. The ten sites currently monitored cover the whole city. Initial results have confirmed what had been observed from botanical and visual viewpoints: extensive management practices in urban grassland and lawns, such as scything, help to bring back flora that had disappeared from the town.

The department's management team is currently drawing up a new differentiated management plan which aims to include management changes resulting from the previous years' Florilèges inventories. For example, the areas to be scythed for feed for the town's flock of goats and animal park are chosen on the basis of the plant diversity identified from the inventories.

The objective is that every year there should be an increase in the number of sites monitored and employees involved. Where possible, Florilèges recording is accompanied transecting Propage inventory.

Since June 2018, gardeners have also been able to record their nature observations on the Smart Faune (Smart Fauna) mobile application, specifically created for the town to perform participative surveys. In the long term, these data will also be used in the planning and management of the region's land.

Guy Longeard
Florilèges-Propage correspondent
Parks, woodlands and sports grounds department, Besançon

In Besançon, scything practices have led to the return of flora that had disappeared from the town. / Ville de Besançon – DEVSF.

LONG-TERM MONITORING IS ESSENTIAL

At the annual meetings of professional survey groups, participating local authorities agree: the main limitations on monitoring are freeing-up sufficient time for field staff, and keeping volunteers motivated long-term. These field survey methods nonetheless create effects that can justify the required investment in time, such as skills acquisition, better staff morale and joined-up change in management practices.
Moreover, investing in these monitoring programmes means becoming part of a network of actors tackling these matters at national level. Running networks such as Florilèges-prairies and Propage, today coordinated by the MNHN, is then essential to maintaining the collective dynamic and ensuring the long-term use of the survey methods in the field.

Regional organisations support these surveys in their areas, thus encouraging local authorities to commit to them, for example the Paris Region Region Biodiversity Agency, the Seine-Saint-Denis *Département* Urban Biodiversity Survey, and the Chico Mendes North Nature association (Hauts de France). Operating at regional scale facilitates analysis and interpretation of the inventory results from green spaces departments, for better adaptation of management practices to the functioning of the habitats, flora and fauna present on their own sites. ■

SAUSSET PARK: MANAGEMENT DECISIONS BASED ON FLORILÈGES-PROPAGES INDICATORS

Located in a densely-populated urban area in the north east of the Seine-Saint-Denis *département*, Sausset Park covers 200 hectares. Subject to differential management for nearly 30 years, today it has a diversity of landscapes and habitats that reconcile public use with the development of rich, varied urban biodiversity leading to its designation as a Natura 2000 site in 2006.

Wishing to better understand this biodiversity, park managers, with support from the Departmental Survey of Urban Biodiversity (ODBU), wanted to get involved in the participative surveys aiming to provide managers with information. Ten years' Involvement in Propage has permitted better understanding of the impact of scything practices on the park's grasslands: results show that scything too early (June) has a strongly negative impact on the abundance of butterflies, and to a lesser extent on their diversity.

Following the widespread introduction of environmentally-friendly grazing, in 2015 the park started using the Florilèges-prairies survey to better understand the impact of herbivores on the plant communities. Initial results suggest that grazing has a positive impact on species diversity, but is less favourable to the typicality of the grasslands.

The capitalisation of these results has led to enormous changes in management practices, with many areas of grassland now being left as refuges.

The *Départemental* Council has other reasons too for pursuing these survey methods, since they are powerful tools for team-building and for sending a common message to the general public.

Nicolas Buttazzoni
Florilèges-Propage correspondent
Parc du Sausset – Seine-Saint-Denis *département*

Flood-plain scythed grassland in Sausset Park: the park's technicians and wardens perform inventories annually using the Florilèges-Propage methods. / N. Buttazzoni.

Marianne Hédont,
Plante & Cité

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EVALUATION UNDER THE MICROSCOPE

Extract

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