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die Strategie

More Biodiversity

in Cities and Municipalities

A Guide for Creating Municipal Biodiversity Strategies

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A joint project of

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Photos on cover page: Top left: Rüdiger Becker, Heidelberg environment agency Top right, bottom left: Uwe Messer, Kommbio Bottom centre: Bielefeld environment agency. Bottom right: Stefanie Herbst, Kommbio

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Welcome

Cities and municipalities provide space for a wide range of species and habitats and thus bear a special responsibility for protecting and fostering biodiversity. The activities of local stakeholders play a decisive role in shaping urban nature and its positive effects on the quality of urban life. Through communication with local communities, municipalities make a significant contribution to people's appreciation and acceptance of biodiversity.

Prof. Beate Jessel, President of the Federal Agency for Nature Conservation
Photo: private

Since the National Biodiversity Strategy (NBS) was adopted by the German government in 2007, many municipalities have begun to actively play a role as key partners in the implementation of the NBS at local level. Although a diverse range of approaches for promoting biodiversity in cities and municipalities already exists, overarching strategies that focus on cities as a whole and include densely built-up and intensively used urban areas are often lacking. To date, only a small handful of municipalities throughout Germany have adopted their own municipal biodiversity strategies.

The Master Plan for Urban Nature ("Masterplan Stadtnatur") adopted by the German government in June 2019 gives municipalities more support to increase the diversity of species and biotopes in populated areas and, in the process, to create habitats that serve as recreational areas and also benefit people's health and experience of nature. One important measure was the establishment of the new "urban nature" funding priority as part of the Federal Programme for Biological Diversity, which can also be used to fund projects for the development and implementation of municipal biodiversity strategies.

One major advantage is the flexibility that municipalities have in shaping the process, setting the priorities of their biodiversity strategy and tailoring it to meet local conditions and needs. By involving key civil society actors, they can mobilise additional resources for local nature conservation and generate more acceptance for their activities.

The scope for action for integrating urban biodiversity issues into planning and practice was analysed in the research and implementation project "UrbanNBS – Urban Green Structures for Biodiversity – Integrated Strategies and Measures towards the Protection and Fostering of Biodiversity in Cities" (Städtische Grünstrukturen für biologische Vielfalt – Integrierte Strategien und Maßnahmen zum Schutz und zur Förderung von Biodiversität in Städten) – UrbanNBS for short – jointly funded by the Federal Ministry of Education and Research (BMBF) and the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU). The cities of Bielefeld and Heidelberg, which are participating in the project, developed cornerstones for their municipal biodiversity strategies and put them into practice in model projects.

This brochure presents the recommendations for action developed in the UrbanNBS project. They serve as guidelines for addressing the questions that arise from practical application in municipalities. How does a municipality start the process of creating a municipal biodiversity strategy? Who is responsible, who should be involved? What data is needed? How are the goals formulated?

The brochure clearly shows that there are different ways to reach the goal. I hope that many interested municipalities will benefit from the suggestions and guidelines and will boldly set out to develop their own municipal biodiversity strategy!

Prof. Dr. Beate Jessel

Foreword from the project team

Cities in particular have a wide variety of habitats and a high level of diversity in their flora and fauna. At the same time, the high density of use and the dynamics of urban development pose a threat to biodiversity. Municipalities therefore bear considerable responsibility for protecting and fostering biodiversity at local level. This challenge must be tackled systematically and with a view to the long term, i.e. strategically. Which raises the question: How can municipalities strategically protect and develop biodiversity within their scope of responsibility?

This guide is aimed at official and voluntary stakeholders involved in nature conservation and urban development, local policymakers and interested members of the general public. It contains background information, tips and practical examples for the creation of a municipal biodiversity strategy in your city or municipality. It aims to help you develop and implement a biodiversity strategy tailored to the needs of your municipality. The brochure shows how you can benefit from more biodiversity in your city, what you should consider when creating your strategy and how you can go about it. It also outlines possible approaches, also for smaller municipalities with limited resources, contains recommendations and suggestions and some minimum requirements that can help in strategy creation. If it is too complicated an undertaking for your municipality to draw up a comprehensive strategy, start small and develop the strategy in modules step by step. In this case, it is possible to start with a basic strategy that defines the framework for action and then gradually add individual modules.

The brochure is divided into four sections. In the first, introductory section, we highlight the advantages of municipal biodiversity strategies and unique features of biodiversity in cities and municipalities along with their benefits for local communities. The second section deals with the specific steps in the development of a municipal biodiversity strategy. It describes how to best implement a municipal biodiversity strategy in terms of goals and measures, their financing, as well as monitoring and evaluation. The third section puts the spotlight on stakeholders, participation and public outreach. In the fourth section, we outline possibilities for integrating municipal biodiversity strategies in overall urban planning.

This guide for drawing up municipal biodiversity strategies was developed as part of the joint project "Urban Green Structures for Biodiversity – Integrated Strategies and Measures towards the Protection and Fostering of Biodiversity in Cities (UrbanNBS)". The research and implementation project was jointly funded by the Federal Ministry of Education and Research (BMBF), the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) and the Federal Agency for Nature Conservation (BfN) as part of the Federal Programme for Biological Diversity. During the project, a team of scientists and practitioners addressed how to integrate local biodiversity issues into urban development. The research component analysed the existing knowledge on biodiversity in cities and municipalities and the requirements and possibilities for integrating biodiversity measures in urban planning as well as for promoting knowledge transfer between science and practice. Building on these results, concrete goals and measures of a municipal biodiversity strategy were developed and implemented in two pilot areas in the cities of Bielefeld and Heidelberg. The brochure presents selected findings from the project and reflects on the diverse experiences gained, especially in Bielefeld and Heidelberg.

This brochure shows how to successfully create a municipal biodiversity strategy. It is intended to inspire and support you in strategically addressing the promotion of biodiversity in your municipality. We wish you every success!

The UrbanNBS-Team

1. Why create a municipal biodiversity strategy

Schröder A., Arndt T., Mayer F. (2016): Naturschutz in der Stadt – Grundlagen, Ziele und Perspektiven. Natur und Landschaft 91 (7): 306-313.

Preserving and promoting the diversity of habitats, plants and animals is an overarching responsibility for society as a whole. Nature conservation in urban areas has already been enshrined in law for 40 years, which means that municipalities play an important role in these efforts. The best possible outcome can only be achieved if the various areas of administration, the general public and other stakeholders involved in urban development join forces. This is because decisions about what happens on individual sites and how their design and use affect biodiversity are made at local level. The challenges and goals vary from municipality to municipality. We recommend a strategic process to address these individual challenges and goals for each municipality. Strategies to protect and foster biodiversity are commonly referred to as local or municipal biodiversity strategies, based on international and national terminology.

Biodiversity

"Biodiversity" or "biological diversity" is defined as: "The variability among living organisms from all sources (...); this includes diversity within species, between species and of ecosystems".[1]

Based on this definition, biodiversity includes:
- Diversity of habitats (e.g. parks, gardens, urban forests, roadside greenery)
- Diversity of species (e.g. European beech tree or buff-tailed bumblebee)
- Genetic diversity (e.g. the differences between two different apple varieties)

One example of species diversity: 16 different species of hoverfly Source: Joaquim Alves GAspar, Wikimedia Commons CC BY-SA 3.0 Link to the license: https://creativecommons.org/licenses/by-sa/3.0/de/ for digital publications

[1] *UN (United Nations): Convention on Biological Diversity (CBD), Article 2. Use of Terms. Concluded at Rio de Janeiro on 5 June 1992 https://www.cbd.int/doc doc/legal/cbd-en.pdf*

What is a municipal biodiversity strategy?

A municipal biodiversity strategy aims to develop a planned and targeted approach to preserving and promoting biodiversity in a municipality. It is an informal approach with no legally defined framework, content or process - so there are no requirements set for the scope, content or measures. A municipal biodiversity strategy can therefore also be created with limited resources and initially focus on the most important core areas.

Examples of successful municipal biodiversity strategies. Sources: City of Bamberg, state capital Erfurt, Berlin Senate Department for Urban Development and the Environment

The development of a strategy usually begins with an analysis of the general conditions, the current state of biodiversity and past and present activities. The results are then used as a basis to define individual goals and measures for promoting biodiversity in the respective municipality. Biodiversity strategies often tie in with existing plans and activities, consolidate existing approaches and thus tap into new potential for protecting biodiversity. A municipal biodiversity strategy is well suited to raise awareness about biodiversity and create synergies with other urban development challenges, such as adaptation to climate change. Stakeholders from politics, administration, municipal enterprises, civil society and the private sector can be closely and directly involved in the entire process, making it possible to mobilise additional financial and personnel resources. A biodiversity strategy becomes binding when it is adopted by the municipal parliament.

Of course, it is a good idea for a biodiversity strategy to define goals and measures that are as comprehensive and concrete as possible. But even if the strategy initially only focuses on a few selected subareas, the mere fact that it is being developed and adopted is evidence of a clear commitment to fostering biodiversity in a city or municipality.

Background – where did the idea of municipal biodiversity strategies originate?

Biodiversity strategies can be traced back to the Convention on Biological Diversity (CBD), which was adopted at the United Nations Conference on Environment and Development in 1992 and ratified by the Federal Republic of Germany in 1993. Article 6 of the CBD stipulates that "each Contracting Party shall [...] develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity [...]."

With the adoption of the National Biodiversity Strategy (NBS) on 7 November 2007 (cabinet decision), the German government fulfilled this requirement and for the first time presented a comprehensive strategy for the conservation of biodiversity. As a result, nearly all of Germany's federal states (Länder) have created biodiversity strategies.

While the overarching regional strategies of the German federal and state governments focus on habitats in natural and cultural landscapes and treat urban areas as marginal, this is not the case at municipal level. Municipal biodiversity strategies specifically take into account the challenges in urban areas and within municipal administrative structures. The measures formulated in municipal biodiversity strategies are also usually much more detailed than in the higher-level concepts. Since 2008, more and more municipalities have been working on developing these strategies in Germany. An overview of selected strategies can be found at

https://kommbio.de/dokumente/jsf/jet-engine:dokumente-grid/tax/schlagworte-dokumente:724;herkunft-dokumente:659/pagenum/2/

Natural flower beds to promote biodiversity. Source: Martin Rudolph, Kommbio

The unique features of biodiversity in cities and municipalities

Most people associate nature in cities with parks and green spaces, plants, water bodies and gardens[2] – but urban nature is far more diverse.

The percentage of land covered by buildings and roads in Germany is now 14 percent.[3] More than 80 percent of Germany's population lives in cities. But it is not just people who live in urban spaces; they are also home to many other living creatures. In this context, nature in cities and municipalities has been and continues to be influenced by special factors:

- Cities form a patchwork made up of buildings, streets, green and unused spaces and urban trees. In some places, there are also remnants of originally cultural and natural landscapes. A high degree of habitat diversity and variation is a prerequisite for many different plants and animals to find suitable habitats.

- Cities are warmer than their surrounding areas and provide good habitats for thermophiles such as the rose-ringed parakeet, dovetail and summer lilac, which have found new homes in our cities.

- Cities often emerged in places with a high degree of biodiversity because in these spots nature provided many different resources across a small area.

- In the surrounding landscape, many habitats and habitat structures - such as low-nutrient meadows, hedges and cairns - have succumbed to intensive agriculture in recent decades. As a result, many animals and plants have lost their habitats in rural areas. Many species also suffer because of the high use of pesticides in the countryside. Cities serve as refuge for many of these species, as they find suitable nesting and habitats here.

For all these reasons, nature in urban areas is often richer and more diverse than in the surrounding countryside.

Did you know that ...?

- ... an evaluation of the lists of bird species from 54 cities in all regions of the world showed that 2,500 bird species are found in these cities alone? This is 20 percent of all known bird species.[4]

- ... Berlin's Tiergarten, a large park in the centre of the city, is home to more than 100 species of flora and fauna that are classified as endangered or threatened with extinction in the local Red Lists?[5]

- ... 51 percent of all ferns and flowering plants in North Rhine-Westphalia are found in the Bielefeld metropolitan region?[6]

[2] BMUB/Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit) (Ed.): Naturbewusstsein 2015 – Bevölkerungsumfrage zu Natur und biologischer Vielfalt. Bonn.

[3] Statistisches Bundesamt (2017): Bodenfläche nach Art der tatsächlichen Nutzung – Fachserie 3 Reihe 5.1. Wiesbaden.

[4] Aronson M.F., La Sorte F.A. et al. (2014): A global analysis of the impacts of urbanization on bird and plant diversity reveals key anthropogenic drivers. Proceedings of the Royal Society B 281: 20133330.

[5] Berlin.de (2020): Tiergarten park in Berlin. https://www.berlin.de/senuvk/berlin_tipps/grosser_tiergarten/de/natur/index.shtml (last access: 6 March 2020).

[6] Schumann K., Seiwert A. (2017): Documentation of the initial situation in Bielefeld. Internal milestone report 04 for the joint project "Urban Green Structures for Biodiversity – Integrated Strategies and Measures towards the Protection and Fostering of Biodiversity in Cities" (UrbanNBS).

Photos: Linaria simplex/ Heidelberg's Office for Environmental Protection, Trade Supervision and Energy, ragged-robin/Claudia Quirini Biostation Bielefeld, marsh ragwort/Claudia Quirini Biostation Bielefeld

People benefit from biodiversity

Nature provides what are known as ecosystem services in cities. For example, green spaces and urban trees create more pleasant temperatures on hot days through evaporation and shade. They produce oxygen and filter particulate matter out of the air. These effects are often intensified by a high level of plant diversity.[7] Food can be grown in gardens, and green spaces can often be used for playing, sport, recreation and social interaction.

Family cycling through the Bielefeld project area "Grünzug am Schloßhofbach". Source: Environmental Department of City of Bielefeld

Many people in cities experience nature in the city on a daily basis or seek out urban nature as a way to spend their free time. They drive along tree-lined avenues on their way to work, exercise in an urban forest or meet friends in the park. They prefer well-structured, semi-natural areas to monotonous, species-poor areas.[8] Studies show that people are healthier and happier when they live closer to green spaces.[9] A high degree of biodiversity enhances the effects on mental well-being.[10] In addition, parks and green spaces are the most important place for many urban children to experience nature.

New goals and approaches for more biodiversity

Human activities are changing the climate and altering habitats. Some plant and animal species proliferate across natural barriers, others become extinct. Some of these changes are permanent and irreversible. The habitats and biocenoses – plant and animal communities - that have been altered in this way cannot be returned

Ecosystem services [11]

Ecosystem services are defined as direct and indirect contributions made by ecosystems to human well-being, i.e. goods and services that provide direct or indirect economic, material, health or psychological benefits to humans. They form the basis for our economy and the well-being of every individual.

They include:

- **Basic services** (e.g. ensuring nutrient cycles, soil formation and primary production)
- **Provisioning services** (e.g. providing food, drinking water and fuels)
- **Regulating services** (e.g. climate regulation, flood regulation)
- **Cultural services** (e.g. aesthetics, education, recreation)

[7] *Weber F., Kowarik I., Säumel I. (2014): Herbaceous plants as filters: Immobilization of particulates along urban corridors. Environmental Pollution 186: 234-240.*

[8] *Ineichen S., Bontadina F. et al. (2010): Lebensqualität im Siedlungsraum. Ein Garten mit 1001 Tieren. Hotspot 21: 10-11.*

[9] *White P., Alcock I. et al. (2013): Would you be happier living in a greener urban area? Psychological Science 24(6): 920-928.*

[10] *Fuller R.A., Irvine K.N. et al. (2007): Psychological benefits of greenspace increase with biodiversity. Biological Letters 3(4): 390-394.*

[11] *TEEB DE (2016): Ökosystemleistungen in der Stadt – Gesundheit schützen und Lebensqualität erhöhen. Eds. Ingo Kowarik, Robert Bartz and Miriam Brenck. TU Berlin, Helmholtz- Zentrum für Umweltforschung – UFZ. Berlin, Leipzig.*

to a natural state12 [12,13] – even when humans intervene. They are therefore also called novel ecosystems and cities are typical examples. This affects the city's nature conservation goals, strategies and measures. [14,15]. This is because a wide range of research findings in recent years have underscored the fact that biodiversity and ecosystem services have also been shown to benefit significantly from novel ecosystems.

It is about emphasising relationships between people and nature and recognising that novel ecosystems and non-native species are a natural, indispensable part of biodiversity in our cities, which also play a crucial role in safeguarding ecosystem services in urban areas.

In individual cases, it may therefore make sense to protect these new ecosystems instead of working to restore them to their natural state, which can only be achieved at great expense or not at all. The resources that would be needed can be used much more efficiently in other projects.

Example of a new approach to urban nature conservation in Berlin

As early as 1987, the species protection programme of the federal state of Berlin made it clear that the goals for the biodiversity conservation and development in built-up areas cannot be based solely on the established goals of nature conservation for natural and cultural landscapes. In Berlin, for example, a small grove of black locust trees was placed under protection even though the tree species is actually considered an invasive species in Central Europe that needs to be contained. The officials responsible in the nature conservation administration recognised that the value of this grove in the urban environment is of paramount importance. It is therefore "...to be preserved as a recreational area and to revitalise the visual appearance of the city centre. It is also being protected to ensure the preservation of communities and habitats of wild plants and wildlife in the city centre." [16]

To foster biodiversity in the city, it is therefore important to distinguish between urban areas and semi-natural green spaces. The maintenance of semi-natural areas is based on the well-known models for semi-natural or historic landscapes. For the remaining areas - for example urban wastelands - new concepts need to be developed, tested and applied. Municipal biodiversity strategies can address this diversity of challenges and the specific approaches to taking action.

[12] Kowarik I. (2011): Novel urban ecosystems, biodiversity, and conservation. Environmental Pollution 159(8–9): 1974-1983.

[13] Truitt A.M., Granek E.F. et al. (2015): What is novel about novel ecosystems: Managing change in an everchanging world. Environmental Management 55(6): 1217-1226.

[14] Miller J.R., Bestelmeyer B.T. (2016): What's wrong with novel ecosystems, really? Restoration Ecology 24(5): 577-582.

[15] Ikin K., Beaty R.M. et al. (2013): Pocket parks in a compact city: How do birds respond to increasing residential density? Landscape Ecology 28(1): 45-56.

[16] Ordinance to preserve the protected landscape feature green space Hallesche Straße/Möckernstraße in the Kreuzberg district of Berlin, December 1987

Protected landscape components GLB-02 Hallesche Straße/Möckernstraße in Friedrichshain-Kreuzberg Source: commons.wikimedia.org/wiki/User:Polimorph - CC BY-SA 4.0

2. Steps toward the strategy and its implementation

The basic conditions for preparing a biodiversity strategy differ from municipality to municipality. The sets of species found in northern German villages, for example, differ from those occurring in southern German cities. Some of Germany's municipalities are large, while others are small. Some are growing, while others are shrinking, and some are prospering, while others are economically underdeveloped. In some municipalities, the local authorities cooperate fruitfully with relevant associations, while in others such cooperation still remains to be established. A biodiversity strategy's aims, content and mode of development will be influenced by such parameters. For this reason, it is useful to take a structured approach in developing a biodiversity strategy for a municipal region.

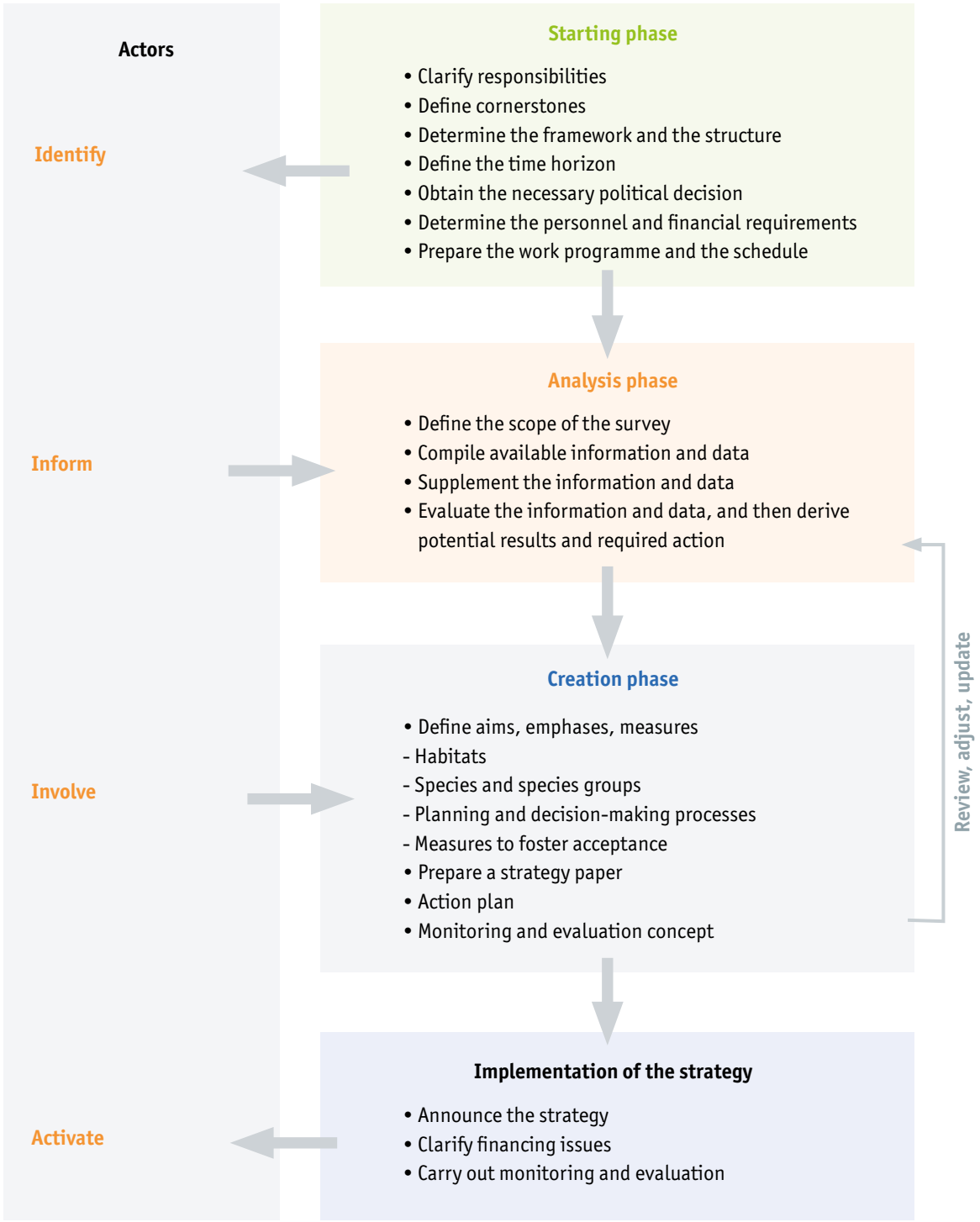
Municipal stream restored to a natural state. Photo: Janos Wieland

Once a strategy has been prepared, the next step is to implement it. The present brochure also includes some relevant information about implementation (→ The chapter on implementation).

The figure on page 13, a simplified overview of the phases that make up strategy development, is provided as an orientational aid for the following chapters in this brochure. It should be noted that the phases involved cannot normally be sharply differentiated in real-world situations. Often, they will overlap, take place in parallel or even be repeated.

Note: Efforts to involve various relevant actors, and to communicate effectively with the public, play an important role in all phases of strategy development. The questions of what actors should be brought aboard, and at what point, and of how the overall process can best be supported by public relations, are cross-cutting ones that are relevant in all phases. Information about this is available at → Focus on: "Stakeholders, participation, public outreach"

Developing a strategy



Overview of steps for a biodiversity strategy, from initial preparation of the strategy to its implementation (modified in keeping with the work of the GreenKeys Team) [17]

[17] *GreenKeys Team (2008) GreenKeys @ Your City – A Guide for Urban Green Quality. IOER Leibniz Institute of Ecological and Regional Development, Dresden.*

The starting phase – establishing the framework

Clarify responsibilities

Developing a biodiversity strategy is a multilayered task. For this reason, it is useful, in developing a strategy, to have one or more persons continually focus on organizing and refining the strategy. It is also a good idea to establish a "strategy team", a support group for the entire process. The members of such a group, for example, could consist of staff of relevant specialist administrations, of employees of municipal companies that coordinate the maintenance and management of green spaces (→ Focus on: “Stakeholders, public participation, public outreach”) and of other local experts. By enabling broad-based expertise to enter into the formulation of aims for the process, this approach facilitates the emergence of useful synergies and helps prevent planning errors.

Workshop on "Ecologically sound maintenance of green spaces." Source: Bielefeld environmental office

Define cornerstones

Before developing detailed aims, stakeholders need to define the cornerstones of the strategy. What are the strategy's key overall aims? What target group is the strategy aimed at? What topics and issues does the strategy emphasize? For example, is the strategy designed to a) establish overarching determinations (applying throughout all relevant administrations) for the protection and promotion of biological diversity and b) to implement pertinent measures? Or is it primarily aimed at informing the public about "biodiversity" and at raising awareness for the need to promote it? Ultimately, a biodiversity strategy's aims, and the target group at which it is directed, will shape the way the strategy is prepared. (→ Chapter on the preparation phase).

Determine the framework and the structure

Municipal biodiversity strategies can also differ strongly from one another in terms of the degree of detail they contain. Existing strategies define spatially and chronologically concrete aims, along with more-general aims such as "improving landscape permeability". The Erfurt Strategy[18], for example, includes a concrete aim calling for planting two kilometers of unbroken field hedges along pathways, within three years. The more concrete and detailed aims are, the better their successful achievement can be measured. On the other hand, concreteness and detail in aims can come at the cost of reduced thematic flexibility.

[18] *Landeshauptstadt Erfurt, – Stadtverwaltung (Ed.) (2012): Umsetzungsplan der Stadt Erfurt zur Deklaration „Biologische Vielfalt in Kommunen“. Erfurt: 10.*

Define the time horizon

For a biodiversity strategy, a time horizon of five to ten years – depending on the aims and scope involved – seems to be the most effective time framework for achieving measurable success and for providing sufficient latitude for municipal planning and decision-making. Strategy papers often contain aims reaching far into the future. The problem with such long-term aims is that they can lead participating actors to delay any concrete action and to lose some of their basic motivation. On the other hand, short- and medium-term objectives can facilitate success, throughout the entire implementation process, and thus constantly keep a strategy in the public eye[19].

A municipal biodiversity strategy can also be understood as a continuing or recurring task. When this is the case, actors can more easily highlight experience gained, adjust measures as necessary and respond to new requirements and parameters.

Newly created habitat structures in Heidelberg's Bahnstadt district. Source: Heidelberg's Office of Environmental Protection, Trade Supervision and Energy

Bring about a political decision, or adopt a suitable working paper within the relevant office

Municipal biodiversity strategies can also differ in terms of the degree to which they are formally binding. A municipal biodiversity strategy becomes politically binding especially when it is adopted by the municipality's own local council and is made mandatory for all of the municipal administration's offices. When a strategy is adopted by the local council, it is more likely to be taken into account in planning-related decision-making processes and to receive financial support. Papers formulated by government agencies, setting out guidelines for the competent specialist administration, or issuing overarching recommendations for all relevant offices, tend to be considerably less binding. Ideally, stakeholders reach a political agreement that includes commitments of financial or personnel support.

Also, stakeholders should aim, at the beginning of the process, to bring about a resolution of the municipality's local council that legitimates the development and establishment of a municipal biodiversity strategy; this will put the rest of the process on a stronger footing. In efforts to convince the relevant municipal bodies of the importance of establishing a municipal biodiversity strategy, it can also be useful to focus on current political trends and publicly discussed issues

Determine the personnel and financial requirements

The personnel and financial requirements for the strategy's development and preparation have to be determined. If it is not feasible to finance the strategy via the current budget, one has the option of raising additional funds. The "urban nature" ("Stadtnatur") funding priority planned for 2020 within the "Federal Programme for Biological Diversity" offers a good approach to this end, one that comprises projects for development and implementation of municipal concepts and strategies for enhancing biological diversity [20].

[19] Grün Stadt Zürich (2006): Grünbuch der Stadt Zürich. Zürich.

[20] BMU/Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit (Ed.) (2019): Masterplan Stadtnatur – Maßnahmenprogramm der Bundesregierung für eine lebendige Stadt. BMU. Berlin: 8–9. https://biologischevielfalt.bfn.de/bundesprogramm/bundesprogramm.html (last access: 1 October 2024).

Prepare the work programme and the schedule

As soon as the basic framework has been worked out, one needs to determine how the rest of the strategy development is to proceed; how the relevant process is to be organized; what actors should be brought aboard, and when and how this should take place; how the pertinent responsibilities should be assigned; and what communication channels should be used (→ Chap. 3). It is advisable to prepare a work programme that takes account of all important processes and stakeholders, and that outlines the strategy's scope, tasks, requirements and time framework. The schedule for preparation of the strategy should be realistic and feasible. As a rule, strategy preparation can be expected to take about 18 to 24 months. Apart from the available financial and personnel resources, the factors affecting the required time include the extent to which the necessary information and data are available, and the quality of such information and data.

Ecologically sound landscaping for roads and motorways. Source: Martin Rudolph

The analysis phase – collecting and evaluating data

The next step, once the work plan and the schedule are in place, is to determine and assess the current situation. What percentage of the municipality's land area is green space, and to what degree are green-space areas interconnected? What species are in decline, and what species are expanding their range? What specific factors are behind these trends? What activities of importance with regard to the local biodiversity are underway in the municipality, and what persons – including persons who are part of the local government as well as persons outside of the government – are participating in them? The biodiversity strategy's concrete objectives and focuses cannot be defined until these and other questions have been answered.

Consequently, a structured analysis has to be carried out, in defined steps:

1. Define the scope of the survey(s) (screening)

↓

2. Compile available information and data

↓

3. Supplement the information and data

↓

4. Evaluate the information and data, and derive potential results and required action

What data does one need in order to develop a municipal biodiversity strategy?

- **Data about the city as a habitat overall, and about the smaller habitats within the city**
  To be able to describe the quality of the overall municipality, as a potential habitat, one needs to have data that reflect the condition and diversity of its individual habitats and biotope types. Information about the urban area's overall coverage with green spaces and vegetation, about its interconnecting green spaces and biotopes, and about the ways in which the habitats in developed areas interconnect with the surrounding landscape can all play a useful role in this regard. Needless to say, one also requires data on habitats that are legally protected and especially valuable.

- **Data on the occurrence and distribution of plant and animal species in the city**
  The plant and animal species that occur in the area, and the trends in their populations, provide clear signals regarding the condition of a municipality's biological diversity. Collection of data on the occurrence and distribution of plants and animals, therefore, provides an important basis for a solid municipal biodiversity strategy.

- **The legal and planning-related framework: Information about plans, programmes and concepts**
  Any plans, programmes and concepts that relate to the topic of "urban biological diversity" should be reviewed to ensure that all relevant existing bases for planning are being taken into account. This also makes it possible to illuminate potential synergies in the municipal biodiversity strategy – as well as any conflicts of objectives with other planning processes and decisions.

- **Information about persons and institutions actively involved in protecting and promoting biological diversity**
  In addition to administrative staff, external stakeholders often play an important role, via efforts in nature conservation or environmental education that help to protect biological diversity. For the preparation and implementation of a municipal biodiversity strategy, it is important to gain the best-possible overview of the persons, associations and institutions active in relevant areas.

- **Information about projects and efforts aimed at protecting and enhancing biological diversity**
  Many municipalities conduct many different types of practically oriented activities for the protection and promotion of biological diversity, for environmental education and programmers for raising public awareness. A municipal biodiversity strategy should take account of such efforts. With a view to identifying any feasible forms of cooperation, and any concrete topics for such cooperation, one should determine what relevant activities are being carried out by associations, clubs, initiatives, educational institutions, private persons and other players.

Detailed information about the analysis phase is available at:
www.ioer.de/projekte/urban-nbs

1. Define the scope of the survey(s) (screening)

A screening process should be carried out prior to the actual analysis of the current situation. In it, one should determine what specific data and information are required, what persons and institutions should be made responsible for specific relevant tasks, and what amount of funding can be made available for supplementary information gathering.

2. Compile available information and data

While available data and information are normally compiled before the strategy itself is actually prepared, this step may be defined within the strategy as an objective in its own right. As a rule, local administrations will have significant quantities of relevant data, and such data are normally easy to access and compile. For example, municipal landscape plans, biotope-type maps and maps for certain species can serve as foundations for various types of work. Other "puzzle pieces" can be compiled via research at/by pertinent state offices, environmental associations and persons active in nature conservation as volunteers.

Numbers of species in relevant taxonomic groups in Heidelberg and its environs, and in comparison to the corresponding figures for all of Baden-Württemberg (BW)

	Species in Heidelberg	Species in BW
Plantae		
Vascular plants	**984**	**2140**
Mushrooms	**391**	**2480**
Fauna		
Vertebrates		
Bats	**15**	**20**
Birds	**131**	**198**
Amphibians	**15**	**19**
Reptiles	**6**	**11**
Selected Invertebrates		
Butterflies	**534**	**1170**
Dragonflies	**40**	**75**
Spiders	**413**	**772**
Beetles	**1481**	**4000**
Hymenoptera	**188**	**369**

Quelle: UrbanNBS (IWU), modified

The more comprehensive and systematic the resulting overview is, the more effectively one can identify the strengths and weaknesses of the municipality's existing biodiversity promotion, highlight current and future threats to local biological diversity and define possible requirements for future work.

Normally, little or no difficulty will be encountered in compiling existing findings regarding the condition and diversity of existing habitats, the applicable legal and planning-related framework and the pertinent activities being carried out by local actors. Obtaining the necessary data on plant and animal species can be a different matter altogether, however. Many municipalities have only a rough overview of the plants and animals that live within their borders. Even cities that have relatively good information about the plant and animal species that occur within their areas sometimes turn up significant gaps in pertinent data.

In sum, as much information as possible about habitats, existing plant and animal species and relevant activities needs to be systematically compiled and evaluated. In the interest of simplifying the task of information gathering, and of obtaining the most-complete information possible, for data surveys one should seek to

enlist the help of persons/institutions with access to data and knowledge about the municipality's biological diversity. Ideally, one should facilitate contacts between such persons/institutions, and organize regular exchanges regarding the available data and information – for example, in the context of a working group, advisory board or network.

3. Supplement the information and data

Compilations of the available data and information about the current state of local biological diversity may turn up gaps in the data. Such gaps can be closed via targeted surveys. Project staff can either gather the lacking data themselves (for example, data on such subjects as the percentage of green cover within the municipal area, the percentage of green spaces being managed in accordance with ecological principles, and the numbers and types of animals living in hollow-bearing trees) or can commission third parties to collect them, such as expert bureaus (for example, for mapping of bank/shoreline areas of water bodies, or mapping of bat habitats) or nature conservation associations (for example, for gathering data on toad migrations). Cooperative efforts involving higher education institutions have also proven to be useful. In addition, various types of lacking data and information can be collected and provided by persons writing theses/final papers on pertinent subjects. On the other hand, comprehensive data collection can be defined as a separate component of a municipal biodiversity strategy. This is relevant especially in cases in which biodiversity trends are to be monitored in future, via a dedicated monitoring programme (→ The chapter on monitoring). In such cases, the necessary personnel and financial resources should be allotted to the required surveys, such as surveys on certain species groups, or to the required biotope mapping.

4. Evaluate the information and data, and derive potential results and required action

Once the necessary information has been compiled on the various habitats, plants and animals occurring in the area, on the relevant plans, concepts and programmes, and on the relevant stakeholders and their activities, the information has to be properly evaluated. Such evaluation should clearly highlight the biodiversity existing in the area, and it should make it possible to assess the current condition of the diversity of the area's habitats and species. Then, the potential gains and opportunities that can be realized by promoting biological diversity need to be highlighted, and the potential actions and obstacles that could hamper biological diversity need to be identified, all with a view to developing and offering potential solutions and preparing the way for targeted efforts.

Assessments of the current local condition of the area's biological diversity should focus especially on habitats and species.

Surveys carried out in Bielefeld and Heidelberg in the framework of the "UrbanNBS" project

As part of the "UrbanNBS" project, the current situations in Heidelberg and Bielefeld were comprehensively analysed. This analysis focused especially on the following areas:

- **The current state of biological diversity**
- **Existing planning approaches and instruments**
- **Relevant actors in the area of nature conservation**
- **Nature conservation projects, including both current and completed projects**
- **Maintenance schemes for public green spaces**

The results were then used as a basis for deriving initial recommendations for the cities' biodiversity strategies. Heidelberg, for example, urgently needs to carry out formal biotope-network planning, in order to enable mixing of wild plant and animal populations. To this end, it needs to concentrate especially on its inner-city areas. Also, it needs to identify and promote biotope-network structures and "stepping-stone biotopes" (such as tree-lined avenues and grass verges) within its municipal boundaries.

The creation phase – defining objectives and measures

The content – Focuses of municipal biodiversity strategies

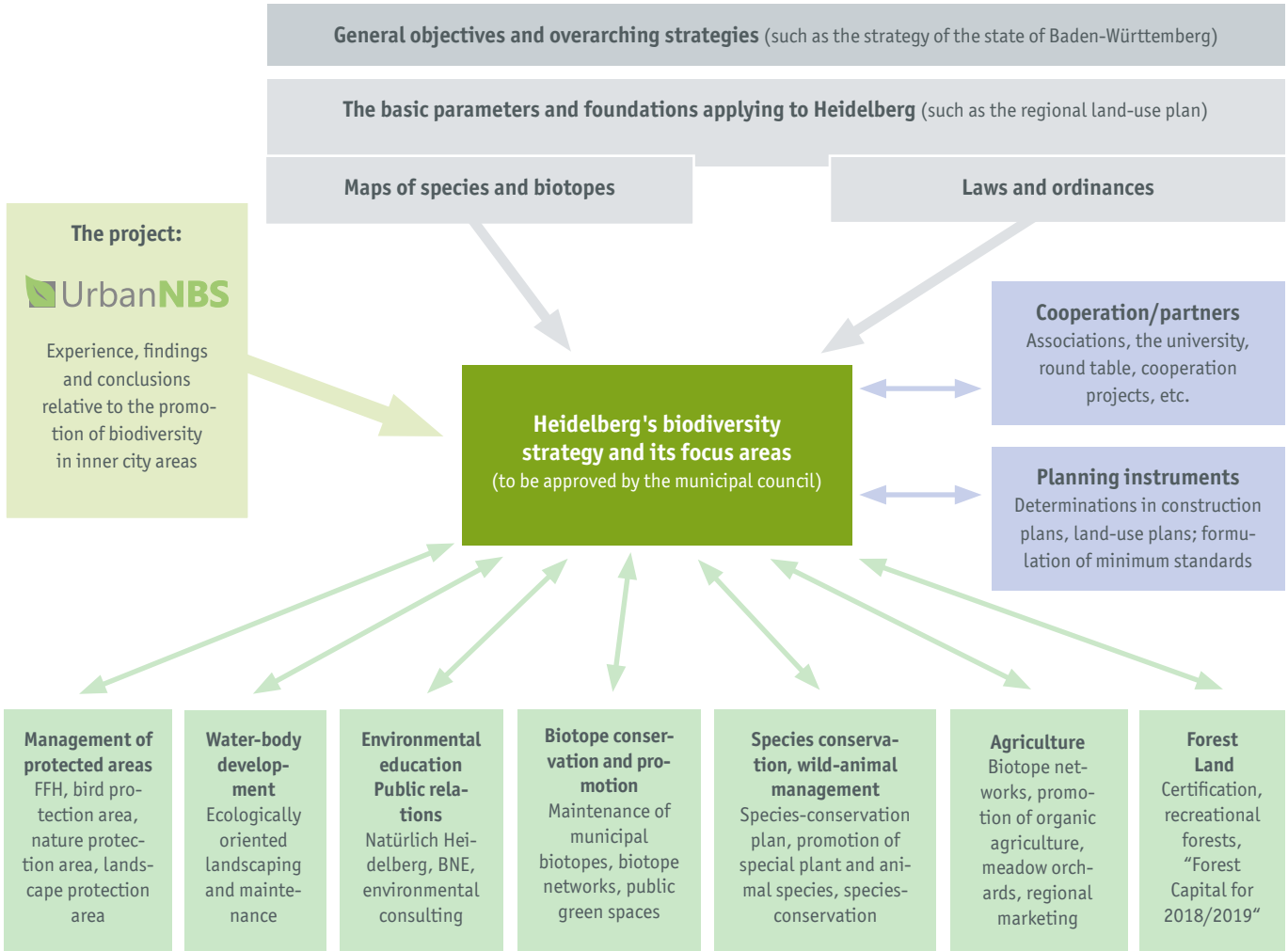
In a municipal biodiversity strategy, focus areas can be defined in keeping with the identified needs for action and latitude for action (→ Chapter on the analysis phase). Focus areas can be oriented to spatial criteria, to specific species, to aspects of planning or to thematic emphases, for example. They can also be designed especially around the interests of environmental education.

Possible focus areas:

- **Habitats**
- **Species and species groups**
- **Planning and decision-making processes**
- **Measures for environmental education and for enhancing acceptance**

As part of the "UrbanNBS" project, the city of Heidelberg has identified the cornerstones of its biodiversity strategy and defined various areas of needed action within each category: protected-area management, sustainable water-body development, environmental education/public relations, biotope conservation and promotion, species conservation/wild-animal management, agriculture and forests. In a next step, concrete measures are to be derived for these areas of activity.

Detailed information about selected areas of activity is available at **http://urban-nbs.de/index.html.**



Habitats

The key bases for biological diversity include sufficiently large areas in which plants, animals and other organisms find habitats suitable to their specific needs. Along with designation and management of protected areas, and protection of valuable biotope types – such as dry, oligotrophic (low-nutrient) locations and water-body ecosystems – key measures for promoting urban biodiversity include promoting a great diversity of habitats, throughout the entire urban area in question. Efforts to this end can usefully focus on such typical municipal habitats as parks, cemeteries and vegetation along roads and pathways. Such areas often hold great potential for promotion of urban biodiversity. Often, the potential is such that efforts can succeed without the use of additional areas. In yet another approach, one can concentrate on certain types of urban structures, such as areas characterized by certain typical types of construction and open spaces. For example, industrial parks at the periphery of municipalities often offer large open areas with few or no conflicting uses. In addition, it can be useful to focus on open spaces in residential areas, including front and back yards and allotments (garden plots), since such areas often account for large portions of a municipality's green spaces. Furthermore, special attention should be given to areas that have special characteristics and that, as a type, occur only rarely within the municipality – for example, areas in a semi-natural state, areas on which natural succession is occurring, or large, unfragmented areas. Needless to say, land used for agriculture or forestry must also be given careful consideration.

An example: Habitat-diversity promotion in Bielefeld

In Bielefeld's "Grünzug Schloßhofbach" area, measures were carried out in preparation for the biodiversity strategy that is to be developed:

- For meadow areas, optimisation of wet and moist meadows, to improve living conditions for butterflies and grasshoppers, has been defined as an objective. On various species-poor meadow areas, trials are underway with different mowing schedules and mowing regimes (mulching/mowing with removal of mowed material), along with sowing of four different regional seed mixtures.
- Achieving structural diversity in forest and forest-like areas is a special priority. To this end, old trees and hollow-bearing trees, and dead wood, are to be conserved and protected to the greatest possible extent. Special nesting boxes have been installed for bird species that nest in hollows – such as the Eurasian tawny owl (Strix aluco) and the common starling (Sturnus vulgaris) – and for bats. Along watercourses, special nesting boxes have been installed for the grey wagtail (Motacilla cinerea) and the white throated dipper (Cinclus cinclus).
- Hedges have been planted for birds that breed in hedges, and cairns and a nesting aid for insects have been put in place.
- A protection concept for mushroom sites has been prepared.
- Along watercourses, suitable trees and shrubs have been planted, and bank seams have been widened.

In inner-city locations, management of green spaces has a special role to play in promotion of biological diversity. The important factors to consider in such management include highlighting and encouraging key differences between different sites. Currently, such management is still often emphasising the goal of increasing biodiversity on individual land parcels. That approach, while basically laudable, can have the effect of reducing diversity within the municipal area as a whole. As a further management step, therefore, the local differences between individual areas should be highlighted and encouraged via individually adapted care.

As a rule, numerous options for promoting biological diversity are available in protection and improvement of existing land areas. Also, options for development of new areas tend to occur when a municipality opts for land-use changes that allow or even require active intervention. For example, measures for biodiversity protection can be integrated at early stages of the construction planning for efforts such as conversion projects, densification strategies, municipal expansions or brownfield revitalisation.

It can also be feasible to formulate city-wide objectives – for example, for the inclusion of animal-aided design (AAD) in the design of outdoor facilities and buildings in residential districts [21].

[21] *Apfelbeck B., Hauck T.E. et al. (2019): Animal-Aided Design im Wohnumfeld. Einbeziehung der Bedürfnisse von Tierarten in die Planung und Gestaltung städtischer Freiräume. Kassel, München.*

Species and species groups

Municipal biodiversity strategies normally include measures for the protection of certain species. As a rule, such measures focus especially on improving the specific site and living conditions for the species in question, sometimes with a special emphasis on protected or endangered species (such as Red List species). In some cases, a municipality will have special responsibility for individual plant or animal species, as a result of its good site conditions or its location within a regional centre of distribution of a particular species. For such species, protection programmes are often already in place that can be integrated into a biodiversity strategy.

Common wall lizard (Podarcis muralis) Photo: City of Heidelberg / R. Becker

"Flagship species", i.e. plants and animals that, either locally or regionally, are very much in the public eye, can also be useful focuses of a biodiversity strategy. These species can help make communication of nature conservation objectives more convincing and emotionally appealing, and thereby more able to mobilise support on the part of local residents. Specific highlighting of such species, along with formulation of measures for their protection and promotion, can have the added benefit of indirectly promoting other species.

Conservation of genetic diversity should also play an important role in a municipal biodiversity strategy. Many plants and animals thrive and multiply in specific locations for many generations. Depending on the local climate, soil conditions and other factors, a species found in one area may differ, in terms of its typical regional genetic makeup, from the same species found in a different area. Such genetic variation within species is a component of biological diversity. In the interest of protecting the regional gene pool, strategies should include measures designed to preserve species' specific adaptations to their sites. The focuses of such conservation, for example, can include the protection of specific genetic variants of wild plants that are adapted to their region (protection through use of seeds and seedlings originating in the local area) and the protection of heirloom varieties of crops and old breeds of household pets.

Planning and decision-making processes

Various instruments of spatial planning and nature conservation provide the basis for enshrining biological diversity in a municipality's development. The answer to the question of what instruments are best suited to the specific tasks and purposes involved will always depend on many different factors. For example, an instrument's scale level or legally binding nature can play an important role.

To enshrine a municipal biodiversity strategy's thematic emphases within the municipality's own development processes, one needs to make use of suitable spatial-planning and nature-conservation instruments, link the instruments with the strategy and define suitable benchmarks and standards (→ Focus on: Planning).

Measures to foster acceptance

In addition to concrete protection measures, municipal biodiversity strategies also include measures designed to promote understanding, appreciation, acceptance, support and commitment for the need to protect biological diversity within the local community and to promote useful initiatives on the part of local residents (→ Focus on: Stakeholders). Many different types of approaches can be suitable and useful in this regard, and many different stakeholders can be taken into consideration and integrated within the overall cause. For example, a strategy can focus strongly on promoting citizen science, on raising public awareness (→ Focus on: public outreach) or on encouraging private efforts and initiatives. Such focuses can then be translated into different types of measures at different locations throughout the municipal area.

Sign on a biotope tree in Hildesheim. Source: Martin Rudolph/kommbio

Environmental education also plays an important role in municipal biodiversity strategies. The term "environmental education" covers a broad spectrum of measures. To a good extent, the measures concerned are aimed at helping children and adolescents – who often grow up without experiencing much of nature in their urban environments – learn to appreciate their cities' own wild plants and animals and to support their protection. In addition, environmental education can help adults (re-)discover a love for nature and give greater consideration to biodiversity criteria in designing and caring for their own gardens and other private open spaces.

Measures in this context should also focus on city dwellers' immediate living environments, while also taking account of their cultural backgrounds and pertinent knowledge, as well as addressing any potential obstacles to their use of various offerings and services. It can often be necessary to reach out directly to different population groups, and to take account of their different options for participation in biodiversity projects. As a rule, measures succeed especially when people are able to directly apply the things they learn, through environmental education, to their own life situations. A strategy can include environmental education measures such as the following: provision of information – for example, via flyers, special pages on the municipality's website, or signs posted in relevant areas; excursions to relevant sites; establishment of nature trails, "green classrooms", environmental education facilities and nature-experience areas for children and adolescents. Ideally, such offerings should also reach people on an emotional level.

Nature-experience area at Berlin's Ostpark. Source: wikipedia.de, Lienhard Schulz, CC BY-SA 3.0

The strategy paper

A municipal biodiversity strategy should reflect the relevant municipality's specific parameters and conditions, emphases and intentions. Strategy papers for municipal biodiversity strategies can differ in terms of the topics they cover – and in terms of how they are developed, their structure, their scope and the presentation forms they use.

In general, there are two basic types of such papers, although intermediate forms are also possible:

Biodiversity strategies with a complete set of thematic emphases

Most of the existing biodiversity strategies cover all key topic areas in one fell swoop. In the process, they include measures covering all of the aforementioned basic topics. Such strategy papers have the advantage of directly providing a comprehensive overview. As a result, they provide an especially good basis for identifying possible synergies and conflicts of objectives. On the other hand, they have the disadvantage of tending to entail longer, and more-complicated, consultation processes. Updating and additions can necessitate partial or complete rewrites.

Modularly structured biodiversity strategies

Preparation of a modularly structured biodiversity strategy begins with the development of a "basic strategy" that defines the framework for action. Then, one develops strategies for individual topic areas that are especially important or that otherwise need to be given priority – such as especially important biotope types or species, or current focuses of the municipality's development. In a next step, additional topics are added, step by step. The advantage of this modular approach is that it enables the strategy to be developed over time, in keeping with the available resources. As a result, development of a municipal biodiversity strategy can begin right away even in cases of limited developmental resources; the strategy can then be gradually supplemented and refined. Another advantage of the modular approach is that it provides flexibility for updates. This makes it possible for the strategy to take account of current developments and of relevant discussion currently underway among policymakers and in the public sphere.

The structure and preparation of the city of Bielefeld's biodiversity strategy

Bielefeld's environmental office (Umweltamt) provided the impetus for preparation of a municipal biodiversity strategy and also assumed responsibility for coordinating the relevant process. The department in Bielefeld's environmental services enterprise that is responsible for the care and maintenance of the city's green spaces was brought into the project at an early phase. This enabled the formation of an expanded strategy team that included experts from the city's department for green-space management.

Following numerous preliminary internal discussions, an externally moderated workshop was held at which the biodiversity strategy's structure and thematic emphases were defined. In the discussion, it was agreed that the Bielefeld's biodiversity strategy should be modularly structured. Spatially, it will be oriented to the city as a whole, and it will extend to both developed areas and open spaces. Now, the current state of biological diversity in Bielefeld is to be determined, and a list of past and current relevant activities is to be drawn up. For the remaining process, both overarching objectives and specific measures are to be defined.

The work plan comprises the following steps:

1. **Workshop with local nature conservation actors**
2. **Provisional definition and prioritisation of the planned modules**
3. **Preparation and approval of the planned modules, in consultation with the affected stakeholders**
4. **Draft of a municipal biodiversity strategy for Bielefeld, with a general section and a first group of modules**
5. **Political consultations**
6. **Public event for presentation of the biodiversity strategy**

This initial process has led to an informational document for the city's environment and climate action committee (Ausschuss für Umwelt und Klimaschutz – AfUK). The document describes the planned biodiversity strategy's focus and structure, lists key stakeholders and outlines the steps to be taken in preparing the strategy.

In some cases, it can be useful to develop a municipal biodiversity strategy not as a separate document, but in the form of strategic guidelines, for the protection and promotion of biodiversity, tied to relevant municipal concepts, either existing or planned for development (such as an urban development concept, or a concept for the development of open spaces), or to existing planning instruments (such as a landscape plan). A disadvantage of this approach, however, is that it tends to have limited external visibility.

Action plan

The important components of municipal biodiversity strategy include an action plan for the integration and implementation of the strategy. An action plan should include a schedule indicating when – and by whom – planned measures are to be implemented, and how the measures are to be financed. Such an action plan can either be made part of the actual strategy paper itself, or it can be introduced as an additional step in connection with implementation

Monitoring and evaluation concept

A monitoring and evaluation concept, for reviewing achievement of the formulated objectives and measures, can also be included in a municipal biodiversity strategy. In addition to reviewing the success of relevant efforts, monitoring provides a solid basis for any planned updates of the municipal biodiversity strategy (→ Monitoring and evaluation).

Different means of preparing and describing a municipal biodiversity strategy can be appropriate, depending on the strategy's objectives, and on what target groups are to be reached. In any case, it is important to use appropriate language (style, formulations, etc.) and modes of description. A biodiversity strategy written solely for an administration's internal use, for example, will emphasise objective information, facts and concrete objectives. A strategy directed at the general public, and intended to inform city residents about biodiversity and its importance, should be written in clear, easily understandable language, and it should appeal to readers on an emotional level. Ideally, it will have an easily understood, positive sounding and catchy title, such as "More nature in our city"[22] or "Diversity connects – the local implementation strategy for the Vaterstetten model community"[23]. The strategy's intended audience, and its spatial references, should be clear in each case.

Title pages of successful biodiversity strategies. Sources: Hannover (state capital), the City of Nuremberg

[22] *Landeshauptstadt Hannover (2015): Programm zur Verbesserung der biologischen Vielfalt in Hannover 2014–2018 (Programme to improve biological diversity in Hannover in the period 2014-2018). Mehr Natur in der Stadt. Schriftenreihe kommunaler Umweltschutz 51.*

[23] *Gemeinde Vaterstetten (n.y.): Vielfalt verbindet – Modellgemeinde Vaterstetten Lokale Umsetzungsstrategie. (Local implementation strategy for the city of Vaterstetten)*

Implementation of a municipal biodiversity strategy

Communicating the strategy – public relations

Effective public relations can play a key role in communicating a biodiversity strategy's objectives, and thereby fostering acceptance and appreciation for its measures. Various different channels can be used for such communication, depending on the target groups and addressees involved. In many cases, special informational events are held, as a complement to media relations and online publicity. City festivals and town hall meetings can also serve as platforms for informing the public about a strategy. Other options for presenting information about biodiversity and a municipal biodiversity strategy include exhibitions, excursions, brochures, information boards and apps. Also, information can be communicated via multipliers (such as representatives of nature conservation associations, and teachers).

And the creation of a municipal biodiversity strategy offers many opportunities to make the subject more widely known. When a strategy is implemented, many opportunities will arise for sharing knowledge and cultivating a positive public image of biodiversity. These opportunities can present themselves, for example, when areas are being redesigned (→ Focus on: "Stakeholders, participation, public outreach").

Financing of measures

Many options are available for financing the implementation of specific measures. These options should be considered early on when a strategy is being defined and created.

First, the scope of the municipal budget must be used and the respective financing needs must be integrated into long-term planning. Furthermore, specific measures of a municipal biodiversity strategy in urban areas can also be financed with funds available from compensation for interventions in nature and landscapes (Eingriffs-Ausgleich-Regelung). Compensation measures can be implemented at an earlier stage and compensation funds can even be pooled. The prerequisite is that the areas are permanently secured, usually through municipal acquisition or contracts with private individuals.

Note: The German government's 2019 Master Plan for Urban Nature ("Stadtnatur") provides for a new "urban nature" funding priority within the Federal Programme for Biological Diversity. The new funding priority is to be established in the course of 2020. The funding priority, which is aimed at municipalities (inter alia), covers projects for development and implementation of municipal concepts and strategies for biological diversity, and it includes personnel-oriented funding for advising in connection with municipal open-space and biodiversity concepts.

Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit (Ed.) (2019): Masterplan Stadtnatur – Maßnahmenprogramm der Bundesre-gierung für eine lebe-ndige Stadt. Available online at: https://dserver.bundestag.de/btd/19/112/1911220.pdf (last access: 1 October 2024).

Cover pages: "Projekte des Bundesprogramms biologische Vielfalt" (Federal Agency for Nature Conservation (Ed.) (2016)) and Masterplan Stadtnatur (see above)

In addition to tapping into municipal budgets, biodiversity projects can avail themselves of funding provided by the EU, the German government or the Länder (German states). On the one hand, such funding is provided in connection with a) specific programmes oriented to biodiversity, open spaces and urban nature conservation or b) campaigns. On the other, funding is available from programmes for urban development promotion, for financing of measures that promote biodiversity [24].

How expensive is ecologically oriented management of meadows?

Determination of costs in the framework of the "UrbanNBS" project in Bielefeld
The department for green-space management and for training (Abteilung Grünunterhaltung und Ausbildung), within the city of Bielefeld's environmental services enterprise (Umweltbetrieb Bielefeld), has politically approved management plans for all of the city's green spaces and outdoor facilities. For each of the relevant 2000 spaces and facilities in Bielefeld – including green spaces, playgrounds, roadside greenery, sports fields and school outdoor areas – the management plans specify the specific locations where care is required (managed units such as lawns, meadows, paved areas) and the specific tasks that are to be carried out (such as mowing grass). In addition, for each individual task, the time required is specified, in minutes per work unit and year. By summing such time requirements, one can determine the annual time investment required to care for and maintain each managed unit.

Before the project began, Bielefeld had no such time-requirement data for ecologically sound management of open spaces. For this reason, the aims of the "UrbanNBS" project included generating such data, in order to provide a basis for calculating the costs of future adjustments in the management of outdoor spaces. The resulting calculations will provide a solid foundation for future political decisions.

To provide a means of obtaining the required data, a detailed data-collection system was introduced, and municipal staff were trained in its use. The new system recorded, in detail, the tasks carried out on each relevant area. The resulting detailed records, which covered a two-year period, then served as a basis for determining the required time investments. This has made it possible to calculate the time required – for example, for the planting of a wildflower meadow and for its mowing with grass collection (the future standard type of maintenance for [flowering] meadow areas).

Prior to the change of management procedures, management in the project area was carried out on the basis of two different types of management units:

Management units OLD

Level	Management unit	Total time, mins. / m² / a
L3Bi	1110 Functional turf / care of short-mown turfgrass	0,63
L3Bi	1130 Meadow / mulch mowing (2x/a)	0,08

Following the conversion to environmentally oriented area management, the units were re-subdivided, and new time-requirements data were determined:

Management units NEW

Level	Management unit	Total time, mins. / m² / a
L3Bi	N 1131 Meadow / mowing with collection (2x/a)	0,25
L3Bi	N 1143 Flowering meadow, perennial / oligotrophic (1x/a)	0,20
L3Bi	N 1144 Flowering meadow, perennial / high fertility (2x/a)	0,32
L3Bi	N 1141 Flowering meadow, annual / oligotrophic (1x/a)	0,38
L3Bi	N 1142 Flowering meadow, annual / high fertility (2x/a)	0,50

The data and calculations show that the total time required for an ecologically managed area (0.20 – 0.50 min./m²/a) ranges between that required for managing a meadow with mulch mowing (0.08 min./m²/a) and that required for caring for a functional turf area with short-mown turfgrass (0.63 min./m²/a). Plans call for use of this result, in preparation of a (flowering-) meadow concept calling for conversion of intensively used functional turf areas, as a means of determining compensation for ecologically oriented meadow management.

[24] Rößler S., Böhme E. et al. (2018): Biologische Vielfalt und Naturschutz im Förderprogramm Stadtumbau. BfN-Skripten 493. https://www.bfn.de/sites/default/files/2023-07/1_Skript493.pdf (last access: 1 October 2024).

Investments in green and open spaces, and efforts to protect biological diversity, are now being considered in the annual administrative agreements of the Federal Government and the Länder on urban development promotion.[25]

For many municipalities, long-term maintenance of ecologically oriented areas poses a challenge. The manner in which maintenance and care are organized and financed plays a decisive role in the success of such management measures. In relevant programmes, it needs to be given early consideration, since funding for this area is normally not available from subsidies. This is the case, for example, for measures that are applied to existing areas and that have the potential for increasing costs. In addition to requiring adequate financing, successful implementation depends on the availability of staff at the relevant offices and municipally owned companies. For this reason, it is important to convince associations, educational institutions and/or housing associations to support individual measures – either with funding or with personnel (→ Focus on: "Stakeholders, participation, public outreach").

Also, commitments by private individuals and companies can help fund implementation of individual measures for promotion of urban biodiversity (→ Focus on: "Stakeholders, participation, public outreach"). Such cooperation arrangements can open up unconventional funding and financing opportunities.

Note: Detailed information about options for funding and financing is available at:
www.ioer.de/projekte/urban-nbs

Monitoring and evaluation – assessing progressand adapting measures

Monitoring and evaluation make it possible to continuously review whether the planned measures are being successfully implemented and whether the goals and priorities of the strategy are still on target. While overall goals usually remain the same, more detailed goals can be successfully completed. New conditions or needs may arise as the project progresses. Measures that do not bring the hoped-for success may require changes. To monitor success and assess the need for future action, it is helpful to have a practical monitoring and evaluation concept, which should ideally be an integral part of a municipal biodiversity strategy.

Definitions: "Monitoring of biological diversity" means systematically recording, measuring and observing biotope structures and populations of plants and animals. "Evaluation" refers to the assessment and review of such information; it serves as a means of determining the success of measures in light of the defined objectives.

Through monitoring, changes are measured and recorded in light of specific criteria and indicators. Indicators are well suited when they highlight changes in a representative manner and are relatively easy to measure. Through evaluation, indicator-related information is assessed and analysed. Monitoring and evaluation for a biodiversity strategy should consider both the process level and the impacts level. In carrying them out, stakeholders seek to identify the concrete impacts that have been achieved, the measures that have contributed especially effectively to such achievement and the process obstacles that have arisen. Monitoring and evaluation, therefore, identify weaknesses in the overall process and make it possible to adjust measures accordingly. At the same time, they highlight successes, and document them concretely on the basis of facts and figures.

Ideally, monitoring and evaluation concepts should provide for continual collection, updating and assessment of suitable information and data. It is recommended that concepts cover the following topic areas: important biotope structures and habitats; biodiversity, in light of selected indicator species; activities that promote biological diversity.

[25] *Bundesministerium des Inneren, für Bau und Heimat: Städtebauförderung des Bundes und der Länder. www.staedtebaufoerderung.info/DE/Startseite/startseite_node.html (last access 1 October 2024).*

Monitoring of important biotope structures and habitats

Indicators for important biotope structures that are characteristic for the city in question, and that are of central importance with respect to promotion of biological diversity, should be chosen with a view to their measurement and assessment at acceptable costs and with relatively simple means. For analysis purposes, for example, aerial photographs and satellite images can be used. In some cases, such images can be analysed via inexpensive, automated procedures. Planning offices often have the requisite tools for such analysis.

Aerial photograph of the Bielefeld city centre. Source: Geobasis NRW - Datenlizenz "Deutschland - Zero" (https://www.govda-ta.de/dl-de/zero-2-0)

Monitoring of species diversity on the basis of selected indicator species

While many types of data on biotope structures and habitats can be gathered with relatively simple methods, monitoring of plant and animal species tends to be more involved and time-consuming, and it not infrequently calls for special expertise. Since monitoring includes regular inventories, to make it possible to observe current and continuing trends, the species that are to be monitored, and the monitoring resources to be devoted to those species, should be chosen carefully. Selections in this regard should be based on the objectives of the relevant municipal biodiversity strategy and on the local conditions and circumstances. To determine the effectiveness of a municipal biodiversity strategy, one does not need to count every single animal and plant in the relevant area. Instead, one should compile a set of "observation species" that, in its composition, reflects the various different aspects of the municipality's biodiversity trends, and the interrelationships prevailing within those trends. For example, one can select certain areas, spread throughout the entire municipal area, that represent different pertinent ecological conditions. Detailed surveys, at suitable and acceptable cost, can then be carried out on such areas. In some cases, universities (persons writing final papers or degree theses), nature conservation associations and/or volunteers (citizen scientists) will be able to provide support for mapping of areas and biotopes. For some groups of species, automated identification apps can also be used.

Note: Pertinent explanations, and an overview of the types of information/indicators and data that monitoring should cover, are available at: **www.ioer.de/projekte/urban-nbs**.

Monitoring of activities that promote biological diversity

Monitoring can cover activities such as planning measures, local nature/species conservation measures, management measures, public relations, environmental education, control of measures and participation in them, financing, data collection and research. In favorable cases, indicators used for biotope-structure and species monitoring will indirectly reveal the extent to which activities/measures are succeeding. That said, it can often be important to determine the costs for different types of monitoring in advance. Furthermore, in most cases it will not be possible to correlate trends in habitats, and in plant and animal populations, with individual measures. It is not necessary to collect data on all such indicators, in all cases. The indicators to be highlighted should be selected in keeping with the objectives of the relevant municipal biodiversity strategy and the circumstances prevailing in the municipality. In the interest of effective implementation, the persons and roles responsible for the various required monitoring tasks should be clearly defined. In the case of modularly structured biodiversity strategies, it is useful to orient the monitoring and evaluation concept to the strategy's modules.

Example of a monitoring concept: Gütersloh

To ensure that good overviews can be obtained in spite of the limited available personnel, the city of Gütersloh's biodiversity strategy[26] proposes the following plan for population surveys:

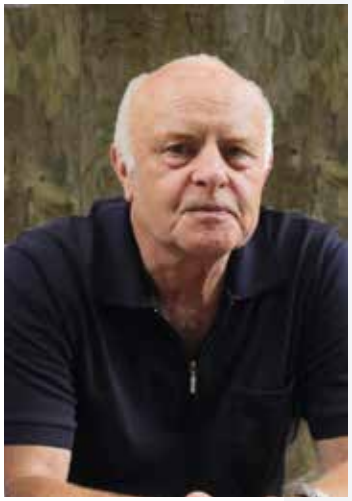
- **Year 1:** Small water bodies, amphibians and reptiles, meadow bird species: northern lapwing (Vanellus vanellus)
- **Year 2:** Trees with cavities and nest/aeries, forest birds (including the responsibility species Eurasian jackdaw (Corvus monedula), stock dove (Columba oenas), Eurasian tawny owl (Strix aluco)); meadow bird species: little owl (Athene noctua)
- **Year 3:** Epiphytic mosses and lichens, field birds (including the responsibility species grey partridge (Perdix perdix), meadow bird species: Eurasian curlew (Numenius arquata)
- **Year 4:** Aquatic birds; meadow bird species: northern lapwing (Vanellus vanellus)
- **Year 5:** Bat roosts (call to action) and bird species that nest on buildings west of the railway line (including the responsibility species Eurasian swift (Apus apus), common barn owl (Tyto alba)); meadow bird species: little owl (Athene noctua)
- **Year 6:** Bird species that nest on buildings east of the railway line (including the responsibility species Eurasian swift (Apus apus), common barn own (Tyto alba), meadow bird species: Eurasian curlew (Numenius arquata)
- **Year 7:** Biotopes (legally protected biotopes, and others); meadow bird species: northern lapwing (Vanellus vanellus)
- **Year 8:** Village flora; meadow bird species: little owl (Athene noctua)
- **Year 9:** Field flora, flora and fauna (birds, dragonflies, butterflies, grasshoppers) of the riparian strips and field margins, meadow bird species: Eurasian curlew (Numenius arquata)
- **Year 10:** Flora and fauna (bats, birds, dragonflies, butterflies, grasshoppers) of parks and green spaces, meadow bird species: northern lapwing (Vanellus vanellus)

The remaining indicators for biological diversity are to be updated at the following intervals:

- **Land use: 5-year intervals**
- **Areas of intervention: 2-year intervals**
- **Protected areas: 5-year intervals**
- **Groundwater protection: annually**
- **Riparian strips: 5-year intervals**
- **Ecological quality of water bodies: 6-year intervals**
- **Local unfragmented areas with little traffic: 5-year intervals (or when changes occur)**

[26] *Stadt Gütersloh – Fachbereich Umweltschutz (2015): Lebendiges Gütersloh: Pflanzen, Tiere, Biotope – Das Programm zur Bewahrung der Biologischen Vielfalt in der Stadt Gütersloh (Biodiversitätsprogramm Gütersloh). Gütersloh: 82.*

Interview with Rüdiger Becker, Heidelberg's Office for Environmental Protection, Trade Supervision and Energy



Rüdiger Becker
Source: Rüdiger Becker

Mr. Becker, in your former role as the head of the nature and landscape conservation department within the Office for Environmental Protection, Trade Supervision and Energy, you were responsible for Heidelberg's "UrbanNBS" project. What led you to want a biodiversity strategy for Heidelberg, and how did you think the city would profit from such a strategy?

Heidelberg is still at a very early phase in its efforts to prepare a biodiversity strategy. So far, we have defined the strategy's cornerstones, meaning we have identified the subject areas that the strategy should focus on. In July 2019, we held an event for the purpose of working out the initial details of those cornerstones. That event was also a kick-off event for subsequent working-group meetings held between August and the end of October 2019. The participants in these events included representatives of various bodies, including municipal offices, the University of Heidelberg, the local University of Education, churches and nature conservation associations, and various farmers and nature conservation commissioners. In a total of five meetings, participants were called on to jointly define measures and objectives categories for the cornerstones.

We have long wanted to prepare a biodiversity strategy. Our "UrbanNBS" project reminded us of how useful it is to have such a strategy in place. Our hope for the resulting biodiversity strategy is that our administrative departments will view it as binding with respect to all the projects they deal with. If that can happen, our nature conservation administration will no longer have to explain the value of nature conservation and species protection measures, and specify how and to what extent they are to be carried out, every time a new project is planned. What we want is for all actors, in the interest of protecting our local biodiversity, to give due consideration to nature conservation and species protection during planning phases. This is because, as experience has shown, the further along planning – and implementation – for a project gets, the more difficult it becomes to carry out useful and effective biodiversity measures. As a result, we consider a biodiversity strategy the right way to improve our efforts to counter the declines in our species.

In addition, we want to raise public awareness of the need for biodiversity – with communication, for example, through measures carried out in the framework of the biodiversity strategy, through press releases and through information boards. With such efforts, we want to encourage local residents to take their own measures in their own gardens and balconies.

What advice would you give to other cities seeking to put a municipal biodiversity strategy in place? What are the largest obstacles involved?

I would advise them to get in touch with key players and stakeholders – such as nature conservation associations – as early as possible, meaning as soon as preparation of the relevant cornerstones begins. Also, they should inform their local administrations about the planned strategy, and they should arrange early consultations, regarding objectives and measures, with the affected government offices.

While one cannot expect all concerned parties to welcome such projects unconditionally, early provision of information improves opportunities for fostering acceptance. In addition, it certainly makes sense for such information to be communicated to the heads of the administrations. In ideal cases, one will be able to enlist administrative heads to communicate the information to their staffs.

… and how have local policymakers been reacting?

We in Heidelberg tend to be very open to the whole subject of sustainability, and to the types of objectives and measures that go with it. Therefore, I am optimistic that a strategy agreed by consensus with all stakeholders will meet with acceptance, especially since issues and subjects such as land consumption, green spaces and the decline of insect populations have been playing an important role in connection with many projects.

Has the strategy-preparation process in itself enhanced awareness for the subject matter on the part of policymakers, administrations and the local citizens? Have people been responding positively?

It's still too early to tell. We won't know until the strategy has been agreed and then approved by our municipal council. That said, in projects for biodiversity, such as the UrbanNBS project, I found that participating stakeholders –schools, allotment gardeners' associations, sports clubs, government offices, private individuals and others – were generally mostly in favour of the project even if it was ultimately not possible to implement all the measures.

The word "biodiversity" now comes up more and more often in interactions with government offices, and in current planning, and the efforts now being made give reason to hope for added cooperation in this area in the future.

Mr. Becker, thank you for this interview!

* In the meantime, the Biodiversity Strategy Heidelberg – Cornerstones – Goals – Measures is finished and was adopted in March 2021.

3. Focus on: “Stakeholders, participation, public outreach"

If a municipal biodiversity strategy is to be successfully implemented, it has to meet with acceptance and appreciation on the part of the local government and the local residents. When plans call for the preparation of a municipal biodiversity strategy, stakeholders should be informed promptly, in the interest of successful later implementation. Early information enables stakeholders to be given roles in strategy preparation at the right times. Significantly, the topics of "acceptance" and "appreciation" of biological diversity can be included as separate objectives or emphases of a municipal biodiversity strategy.

Important actors

Municipalities normally have a wide range of actors who can participate in both the development and the implementation of a municipal biodiversity strategy. As the numbers of qualified persons and groups who can be included in the project grows, so does the breadth of expertise that can flow into the effort. For this reason, it is a good idea to bring key actors aboard as soon as strategy preparation gets underway. Also, persons who will later carry out tasks for implementation of the biodiversity strategy should also be enabled to participate early on. The overall aim should be to enable relevant persons and groups who are already playing an active role in the municipality to take part in the effort. The persons and groups to consider include personnel at various administrative departments and other municipal institutions; civil society actors, such as associations and clubs; as well as companies and/or private individuals. In some cases, it may be advisable to bring in additional experts.

To determine whether this is necessary, one should answer questions such as the following: Does the project call for experts with special types of knowledge? Should existing "round table" groups, or other, similar existing platforms for discussion, be brought aboard for the duration of the strategy-preparation period? Should associations and clubs be encouraged to participate in implementation later on? The participating persons and groups should be kept regularly informed, even when they are actively involved only occasionally or only at intervals.

Cooperation with farmers, like that here in Bielefeld, often benefits all sides. Source: Bielefeld environmental agency (Umweltamt Bielefeld)

Municipal administrations and municipal companies

Administrations for such areas as real estate, cemeteries, forests and schools play an important role with regard to the availability of land areas and to responsibilities for the areas. Also, cooperation with the local parks department, and the various municipal companies, plays a key role in the success of diversity strategies, especially with regard to the management of municipally owned green spaces. Along with parks and green corridors, such spaces normally also include roadside trees, numerous areas within roadside greenery, perennial flower beds and other plantings. All in all, such green spaces hold great potential for the promotion of biological diversity – for example, via selection of suitable plant species and through modification of management and care regimens. Consequently, municipal enterprises are important partners for implementation of concrete measures. Even small changes in management and care regimens can have significant positive impacts, especially when the personnel involved can be convinced of the benefits of such changes. In addition, the local offices for municipal planning and construction should also be brought on board and made aware of the value of a biodiversity strategy. This helps ensure that biodiversity criteria are taken into account in preparation of integrated urban development concepts, land-use plans, zoning plans and urban renewal concepts.

Changes in tree-care regimens can allow old trees to remain available as habitats for many extra years. Source: Martin Rudolph, Kommbio

Municipal facilities – educational facilities, housing associations

Municipal facilities play an important role in this context, in two different ways. On the one hand, they are often located on properties that they themselves own. Municipal residential developers, for example, can help promote biodiversity in the ways they manage and landscape their grounds. Also, they can install nesting aids for animals that breed in or on buildings (such as swifts and bats). On the other hand, public-sector institutions often function as important multipliers. Schools and kindergartens can be enlisted in nature-experience and environmental education measures, and can be encouraged to create suitable small biotopes on their properties. Higher education institutions can be given a role in data collection. Surveys and mapping – for example, in connection with students' field work and/or final papers/theses – can provide useful foundations for the preparation of a municipal biodiversity strategy and for the monitoring it requires later on.

Civil society – clubs and associations, private individuals

In addition to full-time nature conservation staff, many municipalities have clubs, associations and/or private individuals who voluntarily – and often, over long periods – help protect and care for biotopes, plants and animals and develop new habitats. It is important to identify such actors, to learn about their skills, knowledge and interests and, where possible or necessary, to engage them in preparing and implementing the strategy. As a rule, local nature conservation associations prove to be highly motivated partners, with high levels of expertise, with regard to the protection of special species, the care and management of special biotopes and efforts to raise public awareness via events such as excursions or guided tours.

Cooperative efforts in which the municipality partners with clubs or associations are also an option. Management agreements can be reached with clubs or associations calling for the groups to carry out concrete tasks in protection of valuable habitats, with the municipality taking a complementary role. For example, an association might assume responsibility for mowing a meadow, and the municipality would assume responsibility for removing the mowed material.

Also, it is important to remember that each individual citizen has an important role to play in the implementation of a biodiversity strategy. Efforts need to reach the public, therefore. If a strategy is to meet with long-term acceptance, and if residents are to be convinced – in ideal cases – to actively support individual measures to promote urban biodiversity, private individuals need to be educated and made aware of the value of biodiversity in their urban locale. Private individuals also become important actors when they carry out concrete, useful measures at their own initiative and under their own responsibility. For example, private gardens will often account for a large percentage of a municipality's green and open spaces. In British cities, for example (unfortunately, no precise figures are available for German cities), private gardens have been calculated to account for a 19-27% share of the relevant cities' total areas[27]. Quantitatively, therefore, such gardens hold great potential for implementation of biodiversity-promoting measures.

Urban garden with rich structures and high biodiversity. Photo: Janos Wieland

The business sector

Commercial and industrial enterprises also often have large properties, especially on the edges of urban areas where they transition to open countryside. Car parks, clearance zones, storage areas, areas for expansion, but also the sometimes large surfaces of buildings offer great potential for implementing measures to foster biodiversity. At the same time, the locations become more attractive for employees and visitors. Furthermore, companies can also be recruited as active sponsors for specific measures and activities[28].

[27] Smith R.M., Warren P.H. et al. (2006): Urban domestic gardens (VI): Environmental correlates of invertebrate species richness. Biodiversity and Conservation 15: 2415-2438.

[28] Bayerische Akademie für Naturschutz und Landschaftspflege (Ed.) (2018): Unternehmen Natur. Naturnahe Gestaltung von Firmenflächen – Worin liegt der Mehrwert für Natur und Wirtschaft? Von der Idee bis zur Umsetzung. Laufen. https://www.anl.bayern.de/projekte/unternehmen_natur/doc/unternehmen_natur_broschuere_screen.pdf#:~:text=Durch%20die%20naturnahe%20Gestaltung%20von%20Firmengel%C3%A4nden%20kann%20jedes%20Unternehmen%20einen (last access: 1 October 2024).

Agriculture and forestry

In light of the large areas they manage, the agriculture, horticulture and forestry sectors are also important partners to consider in the framework of a municipal biodiversity strategy. Growing numbers of municipal forests now contain natural forest parcels and are being ecologically certified. In one relevant example for the agriculture sector, the city of Frankfurt has added a biodiversity clause to its lease agreements with farmers[29]. In another, the city of Hannover has launched a special programme for urban agriculture[30].

Citizens' participation in strategy development

Whether a municipality's local residents can be given a role in the strategy-development process – and when, in what form and to what extent – will always depend on the municipality's own objectives and circumstances. Procedures for citizens' participation can be carried out in the framework of strategy preparation. Participation procedures generate added value (for example, with regard to the acceptance of measures), when their objectives, scope and methods are clearly defined in advance, and when adequate personnel, funding, and time are available to enable the procedures to be carried out professionally. Poorly executed participation procedures lead to frustration on all sides and add to the complexity of the processes related to strategy development. It is thus vital to ensure they are carried out well.

Forms of participation for the preparation of municipal biodiversity strategies

- **Workshops to inform local residents and enable them to contribute their own ideas to the municipal biodiversity strategy**
- **Round table formats to which selected groups of persons (such as experts for certain subject areas) are invited for discussion and presentations on various topics**
- **Online platforms that provide information and allow posting of comments**
- **Surveys of specific groups such as internet users, households or users of public parks**

Information on organizing of public participation procedures, including their opportunities and risks, are provided in the "Handbuch Bürgerbeteiligung"[31] ("Public participation manual") issued by the Federal Agency for Civic Education (Bundeszentrale für politische Bildung) and in the brochure" Umweltgerechtigkeit durch Partizipation auf Augenhöhe"[32] ("Environmental justice via participation on an equal footing") issued by Deutsche Umwelthilfe.

Also, ideas for handling participation processes, in both internal and external frameworks, are available at: **http://urban-nbs.de/veranstaltungen/berichte/2-fachtagung-mehr-natur-in-der-stadt-neue-ziele-neue-wege/labor-3-beteiligen**

Public relations

Public relations plays a key role in fostering public acceptance and support for promotion of biodiversity, and in keeping the topics and visions associated with a biodiversity strategy in the public eye. The factors that determine the success of a biodiversity strategy include confident, active, ongoing communication. The channels and formats chosen for such communication can and will vary in keeping with the occasion and the target group in each case; there are no hard and fast selection rules in this regard. A steady stream of information can be provided via press releases, short communications in the local official journal and posts to social media. Park festivals, district festivals and open-air markets can all serve as venues for provision of information and practical tips about biological diversity, via stands/tables or special promotions. Advising services available from allotment gardeners' associations; publicly available lists of recommended trees and shrubs; distribution of special, regionally adapted seed mixtures and plants at cost; and excursions and exhibitions, often receive enthusiastic receptions from local populations.

Implementing measures – such as planting of wildflower meadows and flower strips – is also an outstanding way of fostering a positive response. In addition, having associations and private individuals "adopt" (sponsor) trees and green spaces is also an excellent way to keep the topic of "biodiversity in the city" in the public eye. Finally, in efforts to convince the public of the importance of a municipal biodiversity strategy, it can be useful to focus on current political trends and topics under public debate – such as the decline of insect populations and the best way to deal with the pesticide glyphosate ("Pesticide-free municipality").

[29] *Stadt Frankfurt – Umweltamt (2014): Biodiversitätsklausel im Pachtvertrag der Stadt Frankfurt am Main ein Beispiel zur kommunalen Biodiversitätssicherung. Lecture by Peter Dommermuth, head of Frankfurt's environmental office, at the expert conference "Natur in der Stadt – Stand und Perspektiven zur ökologischen Funktion des kommunalen Grüns" June 26, 2014. Heilbronn. https://www.bbn-online.de/ fileadmin/Service/8_2%20Veroeffentlichungen/Natur_in_der_Stadt_2014/8_0_Biodiversitaetsklausel_Frankfurt_a_M_Dommermuth.pdf#:~:text=Die%20Klausel%20gilt%20seit%202012%2%C3%BCber%20den%20st%C3%A4dtischen%20Pacht-vertrag%20f%C3%BCr (last access: 1 October 2024).*

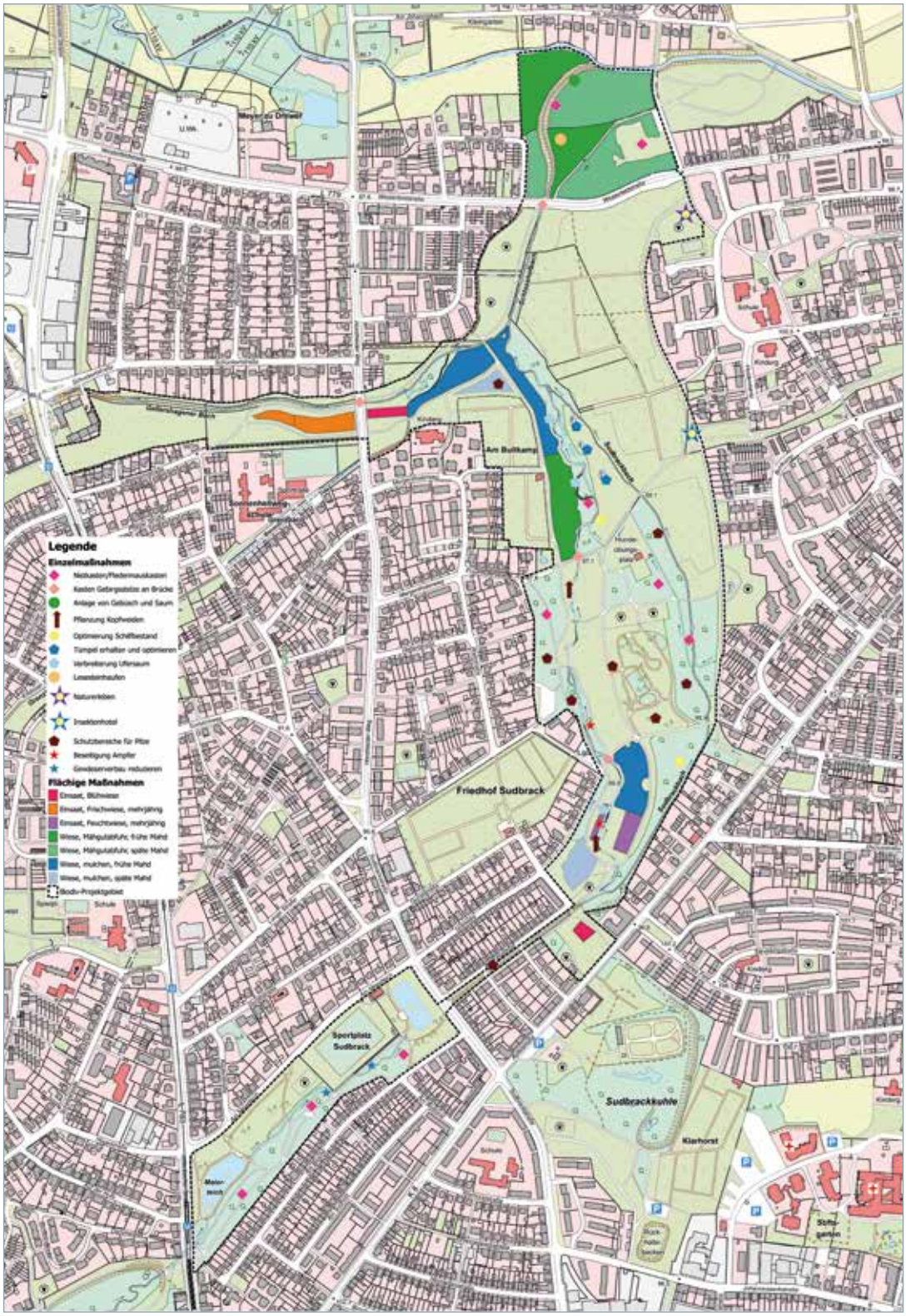
[30] *Landeshauptstadt Hannover (Ed.) (2017): Agrikulturprogramm 2017 für Hannover (2017 agriculture programme for Hannover). https://www.hannover.de/Leben-in-der-Region-Hannover/Umwelt-Nachhaltigkeit/Naturschutz/Aufgaben-Projekte/Das-Agrikulturprogramm-f%C3%BCr-Hannover (last access: 1 October 2024).*

[31] *Nanz P., Fritsche M. (2012): Handbuch Bürger-beteiligung. Verfahren und Akteure, Chancen und Grenzen. Bundeszentrale für politische Bildung. Bonn*

[32] *Partzsch K., Wissel J., Spreter R. (2014): Umweltgerechtigkeit durch Partizipation auf Augenhöhe. Strategien und Empfehlungen für Grünprojekte in Stadtquartieren. Deutsche Umwelthilfe. Radolfzell. https://www.duh.de/uploads/tx_duhdownloads/Partizipation-auf-Augenh%C3%B6he_web.pdf#:~:text=Die%20Inhalte%20der%20vorliegenden%20Brosch%C3%BCre%20beruhen%20auf%20dem%20Projekt%2%E2%80%9EUmweltgerechtigkeit (last access: 1 October 2024).*

4. Focus on: Integrating a municipal biodiversity strategy in planning

Spatial planning and nature conservation instruments provide the basis for integrating goals and measures to promote biodiversity into urban development. Which instruments are suitable for which purpose depends on many factors. For example, the scale level (regional, city as a whole, district level or an individual building or plot) or the binding nature of the instrument play an important role.



Map showing various measures in the Bielefeld project area. Source: City of Bielefeld

The **formal spatial planning instruments and the corresponding landscape planning instruments** must first be considered:

- Regional measures - such as urban-rural networking beyond municipal boundaries - should be supported by regional planning requirements defined by landscape master plans.

- In almost every federal state (except North Rhine-Westphalia), the landscape plan for the municipal area offers a comprehensive technical basis for a municipal biodiversity strategy. The goals and assertions outlined in the strategy can in turn be improved by integrating measures into a municipal landscape plan, as its contents are incorporated into urban land use planning through a formal assessment and prioritisation process. Green spaces can be permanently secured and new areas can be designated through corresponding descriptions and maps in the land use plan.

- The landscape plan is also an important basis for the implementation of the intervention regulation, i.e. the assessment and compensation of any building interventions in the municipality.

- Open space structure plans or green space regulations in zoning plans make it possible to establish specific measures for the promotion of biodiversity as binding for new, large-scale construction projects.

Instrument portfolios

The potential for integrating and taking into account individual aspects of biodiversity promotion are summarised in detail in instrument portfolios. The suitability of individual instruments can be assessed more easily on a case-by-case basis using these portfolios. They can be accessed at **www.ioer.de/projekte/urban-nbs.**

- **Regional plan**
- **Landscape master plan**
- **Land use plan**
- **Landscape plan**
- **Zoning plan**
- **Open space structure plan**
- **Intervention regulation**

In order to harness the available potential for promoting biodiversity in **existing urban environments**, urban regeneration areas with the associated urban development concepts and the frameworks of urban development funding[33] are good starting points. This allows measures to promote species and biotopes to be integrated on site.[34]

For concrete building projects or planning of green spaces, specifications for **tenders** or urban planning or green space planning **competitions** or assessment procedures can also be used to specifically take biodiversity issues into account. Technical expertise and clear criteria should be integrated into the tender and assessment process to ensure that biodiversity issues are adequately taken into account.

Species protection measures can also be taken when **buildings are constructed or renovated**. Species diversity can be specifically improved by targeting buildings as habitats for nesting birds or greening buildings in urban land-use planning specifications or in the context of building permit procedures[35].

[33] Bundesministerium des Inneren für Bau und Heimat: Städtebauförderung des Bundes und der Länder. https://www.staedtebaufoerderung.info/ (last access: 1 October2024).
Rößler S., Böhme E., Arndt T. (2019): Biologische Vielfalt und Naturschutz im Förderprogramm Stadtumbau. Natur und Landschaft 94(12): 517-523.

[34] Rößler S., Böhme E. et al. (2018): Biologische Vielfalt und Naturschutz im Förderprogramm Stadtumbau. BfN-Skripten 493.
Arndt T., Werner P. (2017): Möglichkeiten zum Schutz und zur Weiterentwicklung der biologischen Vielfalt in der Stadt im Rahmen der integrierten Stadtentwicklung. Natur und Landschaft 92(6): 245-250.

[35] Schmauck, S. (2019): Dach- und Fassadenbegrünung – neue Lebensräume im Siedlungsbereich. Fakten, Argumente und Empfehlungen. BfN-Skripten 538.
BfN/Bundesamt für Naturschiutz (2016): Schutz gebäudebewohnender Tierarten vor dem Hintergrund energetischer Gebäudesanierung in Städten und Gemeinden. Hintergründe, Argumente, Positionen. Bonn.

It is also possible to define **baseline values and standards.** Standards for other areas of urban development already apply under the Federal Building Code (Baugesetzbuch), the Federal Land Utilisation Ordinance (Baunutzungsverordnung) and the state-level building codes (Landesbauordnungen). These include, for example, the extent of building use or the number of parking spaces. Similar specifications are generally possible for the protection of species and biotopes. A municipality can also define specific standards based on generally applicable baseline values. The baseline values and standards can become binding, for example through independent statutes or as stipulations in zoning plans, in landscape planning, but also as part of urban development contracts or as a mandatory component in the allocation of funding. For new building projects, zoning planning in particular offers many starting points. It may therefore make sense to adapt individual proposals for measures in a municipal biodiversity strategy to the possible designations under Section 9 of the Federal Building Code.

Possible baseline values and standards that benefit the promotion of species and biotope diversity

- **Green roofs and green façades:** In some cities, green roofs are already mandatory for new buildings. For example, the City of Heidelberg has stipulated in the zoning plans for the new Heidelberg Bahnstadt project that 66 percent of flat roofs must be planted with extensive greenery.[36] Just as with green roofs, mandatory baseline values for green façades in a city or a (new) residential area could be considered. The legal basis for a designation in a development plan is Section 9 (1) nos. 2 and 25 of the Federal Building Code.

- **Canopy cover:** Studies have shown that at least 30 percent canopy cover is needed to benefit the bird population in a city.[37] This target could be used at district level in development plans or urban development concepts for urban renewal areas.

- **Use of trees and shrubs suitable for the location, if possible of regional origin:** Distribution areas were identified on the basis of the six basic ecological units present in Germany. For each of these areas, lists of species of trees and shrubs frequently used throughout Germany were compiled; these lists can be used to help in the planning and tendering of planting measures for indigenous woody plants.[38]

- **Green space provision:** Green spaces are one of the basic prerequisites for biotope and species diversity in urban areas. This is why orienting urban and green space planning around baseline values for different types, sizes and distances of green spaces in residential areas can be a starting point for first determining the quantity and, in a further step, also the quality of green spaces.[39]

- **Biotope area factor:** The biotope area factor - similar to the floor area ratio in urban land use planning and zoning - is an environmental planning parameter.[40] The biotope area factor, developed by the City of Berlin, formulates minimum environmental standards for the housing, commercial and infrastructure forms of urban use, which take effect in the case of building alterations and the construction of new buildings. The biotope area factor specifies the ratio of areas with an impact on the natural environment to the total area of the site[41] and can be defined in Berlin as an ordinance in a landscape plan.

- **Nesting boxes on buildings:** Nesting, stopover and roosting sites for birds and bats can be provided proactively using baseline values that, for example, specify a concrete number of new sites to be established, regardless of how many exist now.[42]

- **Water-permeable surfaces:** The use of water-permeable pavement to cover walkways, cycle paths and other surfaces can reduce surface sealing, which also benefits organisms living in the soil. This can be considered, for example, when creating or redesigning car parks, pathways and squares, and can also be stipulated in zoning plans.

[36] *Stadt Heidelberg (2011): "Heidelberger Dach(g)arten" - Handlungsleitfaden zur extensiven Dachbegrünung in Heidelberg. – p. 7*

[37] *Taylor, J.J.; Lepczyk, C.A.; Brown; D.G. (2016): Patch and matrix level influences on forest birds at the rural–urban interface. Landscape Ecology 31, 1005-1020.*

[38] *Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (2012): Leitfaden zur Verwendung gebietseigener Gehölze. - 32 p.*

[39] *Bundesinstitut für Bau-, Stadt- und Regionalforschung (2017): Handlungsziele für Stadtgrün und deren empirische Evidenz. Indikatoren, Kenn- und Orientierungswerte. Bonn: Bundesinstitut für Bau-, Stadt- und Raumforschung.*

[40] *berlin.de (o. J.): Der Biotopflächenfaktor BFF. Themen - Landschaft/Stadtgrün/Forsten. https://www.berlin.de/umwelt/themen/landschaft-stadtgruen-forsten/artikel.143512.php (last access: 1 October 2024).*

[41] *Bcker, C., Hübner, S. and BGMR Landschaftsarchitekten GmbH (2017): Urbane Freiräume - Qualifizierung, Rückgewinnung und Sicherung urbaner Frei- und Grünräume. Final report. Material volume. Case study profiles. - p. 75*

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Links

You can find more information about the issues listed below at www.ioer.de/projekte/urban-nbs:

- Surveying and analysing the initial situation (p. 17)

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