

INFORMATION LEAFLET

# BIODIVERSITY AND HABITAT NETWORKS

## *in public greenery*



### Why biodiversity matters so much.

**Biodiversity means diversity of living organisms across three levels:**

**Level 1:** Diversity of **ecosystems**, which means cohabitation of species and their interaction with the surrounding non-living environment.

Example: Meadow vegetation diversity

**Level 2:** Diversity of living **species**.

Example: Diversity of various cornflower species

**Level 3: Genetic diversity** within one species.

Example: Meadow cornflower from Central Alps carries different “external and internal characteristics” than a meadow cornflower from the Weinviertel region. Species adapt to conditions of their surrounding environment, which, over the course of evolution, has led to the emergence of regional genetically encoded differences.



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A network of habitats is essential for genetic exchange between living organisms.

### Why do we need a habitat network?

**The aim of the habitat network system is to interconnect individual near-nature elements of landscape. Living organisms should be able to move about this network, to reproduce, and to exchange genetic information. The most important aim of the habitat network is to support biodiversity.**

#### Benefits for municipalities:

+ Migration of plant and animal species increases their number in individual public green areas, which makes them more ecologically stable. Diverse natural areas of public greenery thus remain resilient and “attractive” even under extreme weather events.

+ Landscapes that are interwoven and divided by a dense network of habitats are perceived by people as more attractive. Individual elements of the habitat network are often used also as local recreational areas. This is beneficial to the development of the population and tourism in the municipality.

+ Migration of plant and animal species allows for an exchange of their genetic information. Their populations get a chance to adapt to the changing climate conditions. This, in the long term, supports diversity and variety of regional cultural landscape.



## WHAT IS A HABITAT NETWORK MADE OF?

### Elements

In a habitat network, core areas are interlinked with wildlife corridors and biocentres.

#### Core areas

These include **protected areas** and other **ecologically valuable areas** that provide sufficient resources for permanent survival of populations of various species. Just like our urban networks offer everything people need for their living, core areas with their elements provide all that is necessary for the life of animal and plant species.

#### Wildlife corridors

They serve as **“roads”, both terrestrial and aerial, interconnecting individual core areas.** If certain values are present, migrating species may also temporarily live in wildlife corridors. If ecological quality is insufficient, but still more accommodating to life than the surrounding landscape, animal species would just quickly pass through them. Wildlife corridors are like highways that we use for quickly getting from A to B, but do not wish to spend a lot of time there.

#### Useful tip: Woody structures as corridors

Hedges make ideal corridors in green spaces and in the cultural landscape. The “varied native hedge” will offer a lot of opportunities for indigenous animal species to find shelter, food, and space for living. More details on: [www.naturimgarten.at/heimische-vielfaltshecke](http://www.naturimgarten.at/heimische-vielfaltshecke)

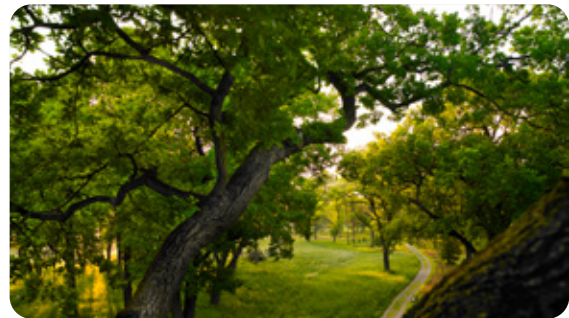
#### Biocentres

For migratory species, biocentres are something like rest stations along the road, i.e. the wildlife corridor. Individuals of various species may stay there for a while, but the quality of their stay is not sufficient for establishing a permanent population. Just some of these rest areas may turn into permanently inhabited sites. However, it is still important to have them along the way, otherwise the “fuel”, in this case pollen, nectar, or other sources of energy might not suffice for reaching the final destination, which can be a structurally diverse and large protected area.



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A network of habitats is the first step towards renaturation. Core areas are sites necessary for the target species.



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The interlinked green areas form wildlife corridors that enable migration of species.



© Natur im Garten/D. Tuchler

Extensively managed natural meadows serve as biocentres and bio corridors, while providing food and habitat for many species of insects, birds, and mammals.



## GREENERY AREAS WITHIN MUNICIPALITIES AND THEIR POTENTIAL AS ELEMENTS OF HABITAT NETWORKS

### Non-intensively managed areas of greenery

Green areas that are designed and established in order to be managed in a non-intensive way may serve mainly as wildlife corridors and further develop their potential towards becoming biocentres. These areas include:

#### Non-intensive perennial plantings with high percentage of wildflowers:

Perennial plantings introduce a **natural diversity of colours and shapes** into greenery areas while requiring relatively **little care** in the long term. For them to function as ecologically valuable corridors or biocentres, care should be taken while selecting ornamental plants, preferring exclusively those without double-flowered species and varieties. Using as much indigenous wildflower species is one of the ways how to reduce maintenance costs, as these species are best-suited to the local conditions. Also adaptation to the local fauna is typical for a high ecological quality of non-intensive perennial borders. In terms of biodiversity, wild perennial borders planted under and around groups of trees and shrubs are of particular importance. They act as a link between areas of greenery with tree clumps, providing habitats for even more species within a single site. Just like other perennial plantings, they require just one round of pruning per year – in early spring, before the new shoots begin to sprout.



Planting schemes for perennial borders with wildflower species in municipalities can be found on [www.naturimgarten.at/projekt-symbio.html](http://www.naturimgarten.at/projekt-symbio.html)

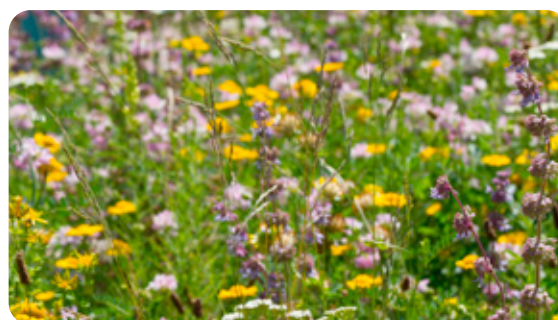
#### Regionally typical meadows :

In Central Europe, **one third of all flowering species and ferns** grow mainly on meadows and pastures. They are a home for thousands of wildlife species. However, since the 1950s the share of grassland on fresh, nutrient-deficient sites in lowland areas, dropped by more than 90 %, and therefore this type of habitat belongs to the most

endangered ones in Austria, and not just there. Every square metre of a near-nature meadow with regionally typical wild species counts, whether it is in private gardens, public greenery, or in the green belts alongside roads.

#### Useful tip: “Wildflower meadow” Wikipedia

Find all about wildflower meadows on [www.naturimgarten.at/blumenwiesen-anlegen](http://www.naturimgarten.at/blumenwiesen-anlegen)



© J. Brooks

Large meadows can be mown in stages. One half is mown once per year, the other half in the second year, therefore one half always serves as wildlife shelter and habitat.

#### Species-rich areas of herbaceous lawns:

A diverse, species-rich herbaceous lawn demands **less maintenance** than a high-impact lawn dominated by grasses; it is also **much more resistant to extreme weather**. If there are few flowering species around, these areas serve as reliable sources of nectar and pollen for non-specialised species of insects, like the honeybee. Compared to standard lawns they are used as small “rest stations” or walk-through wildlife corridors for various small animals. Their value in the habitat network increases if they are situated directly next to fields of meadows, as they may serve as additional exit areas for insects during the mowing cycles.

#### Near-nature planted swales:

In public greenery, these areas help us to **retain rainwater** as long as possible and through this to **alleviate the drainage system**. If they are planted or sown with wildflower species typical for the given region, ideally such that thrive in alternately water-logged and draining conditions, these areas are easy to maintain while serving as “recharging stations” for many domestic wildlife species. Besides that, vertical structures of those plants that remain standing throughout winter, may also serve as shelter for overwintering species of insects. In urban areas, these linear elements may serve as wildlife corridors, and some wildlife species use them also as biocentres.







© J. Brooks

Each area suitable for a meadow turns into a biocentre in the cultural landscape, allows for exchange and migration of indigenous species of plants and insects.

### Near-nature groups of trees and shrubs

**Groups consisting of indigenous wild species of trees and shrubs serve as biocentres in the cultural landscape. If it is possible to connect them to surrounding windbreaker zones, they may also act as wildlife corridors.**

This is beneficial for various species of insects, such as butterfly species whose caterpillars require specific domestic woody species as their food. Many bird species use dense hedges planted with wild shrub species as a source of food, but mainly for nesting. Many mammals also depend on these elements in urban areas and in cultural landscape to find **shelter, food, or raise their offspring.**

#### Useful tip: Planting a hedge

Check [www.keredozivychplotu.cz](http://www.keredozivychplotu.cz) to find information and help for planning biodiversity-enhancing hedges.

Existing old tree stands should be also included under groups of trees in the biocentre system, as their ecosystem value is irreplaceable from a certain age up; the ecosystem services they provide are invaluable.

#### Useful tip: Ecological value of trees

Information about ecological value of trees can be found in the „Climate tree“ booklet and on the „The value of a tree“ poster.



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Besides creating new habitats, climbing plants also cool down and insulate buildings.

### Green flat roofs and façades

**Greening of facades and flat roofs transforms “grey infrastructure” into “green infrastructure.”**

These elements may become useful habitats for plants and animals in areas formerly covered with vast concrete desert. So-called “biodiversity roofs” can be made from various flat roofs and sheds. Shaping of the substrate layer, inclusion of dead wood or retaining of bare sand areas will support a variety of texture and therefore also biodiversity. Indigenous wildflowers are the best species for planting, especially those adapted to nutrient-deficient, sunny and dry conditions. After planting, care should be taken mainly to eliminate self-seeding trees, and also other unwanted “air-mail deliveries” such as airborne weeds, which need to be removed if necessary. Drainage should be regularly checked as well.

Although greening of façades provides food and shelter to somewhat less species, it is still much better than purely inorganically designed façade.

#### Useful tip: Greening of façades

Get our „Greening of façades“ (in German language) booklet to find out which plants to use to make facades green and blooming (in German language).



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Climber plants growing on supports.

## Special sites and development zones

**Special sites, such as wet biotopes, piles of stones, dry retaining walls, or areas of bare exposed topsoil, provide conditions for the emergence of biocentres for highly specialised plants and animal species.**

For species demanding little space, **special habitats** serve also as core areas. As many plant and animal inhabitants of these sites are strongly dependent on them, it is essential to provide proper care and maintenance once a habitat has been established. Small biotopes need to be protected from silting, dry retaining walls must be regularly maintained, bare ground should be kept free of vegetation, etc.

The opposite are **development zones**, such as e.g. piles of dead wood or “wild corners”.

“Wild corners”, in which plants, such as the stinging nettle, may thrive, serve as development zones not receiving any intervention after the site has been established.

## Supporting near-nature gardens

**All the aforementioned elements, as well as other elements of natural gardens, may be found also in private greenery.**

Due to the high number of square metres of land used as private gardens in urban areas, supporting near-nature garden design as well as environment-friendly garden maintenance is an essential piece of puzzle for building a **continuous system of habitat network in the public space**. Each garden is an island in itself, but still these many islands together, inserted into the large whole of a city and interlinked, may create a varied range of habitats and serve as a broad wildlife corridor or grand biocentres.

### Useful tip: Supporting natural elements in gardens

- Check our booklet **“Creating a near-nature garden”** (in German language) at [www.naturimgarten.at/naturnahe-gartengestaltung](http://www.naturimgarten.at/naturnahe-gartengestaltung)
- **“How to get the badge”** [www.naturimgarten.at/plakette](http://www.naturimgarten.at/plakette)



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Piles of dead wood or pruned branches, natural stone walls, sand bunkers or wild corners allow countless animals to develop: beetles, butterflies, or lizards.



© Natur im Garten / T. Steiner

Holes and cracks provide shelter for many living creatures.



© A. Haiden

Wet biotopes in gardens attract many living organisms.



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Varied plantings protect the natural equilibrium.



## DISTURBING FACTORS FOR HABITAT NETWORKS

When municipalities make an effort to create wildlife corridors that interconnect biocentres and strives to seek connections to nearby core areas, such as protected areas of nature, they invest in the resilience of their green areas. In the long run, the success of these efforts depends on the limiting of certain disturbing factors that have a negative impact on biodiversity. All factors that interfere with species migration within a habitat network reduce the positive impact of a habitat network on the local biological diversity. These factors include:



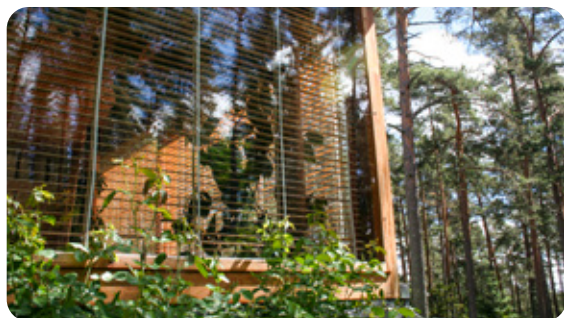
© V. Lanc

Artificial lighting has serious impact on living organisms.

### Bird traps

**Birds often don't perceive shiny surfaces as obstacles and collisions with them may be fatal. Possible countermeasures include:**

- Avoiding holes and gaps when planning buildings in public areas. Glass with low degree of external reflection should be used. Insect nets reduce reflection too. Marking of glass panes, protective bands or blinds also reduce reflection.
- Indoor plants should not be placed right behind window panes.
- No trees or shrubs should be planted in front of highly reflective surfaces, bird feeders and nesting boxes should not be installed near windows.



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Colour marking, bands of opaque glass, patterns, or blinds on the window serve as effective means of protection for birds.

### Insect-unfriendly lighting

**Street lamps usually emit cool white light, which is similar to the colour spectrum of the Moon. It attracts insects that fly under these lamps for long hours before dying of exhaustion or burning.**

Lighting disrupts also migratory birds' sense of orientation. Light pollution must be limited.

Here are some ways how to do it:

- Sources of artificial light should only be used for safety reasons.
- Use nature-friendly lamps, such as warm white LED (with light warmth up to 3000 Kelvin, max. light flux 1000 lm).
- Use only luminaries facing straight down and not emitting any diffused light.
- Restrict the time and intensity of lighting by dimming or motion detectors, reduced number of lamps, or shorter hours of lighting.



© V. Lanc

Lamps emitting light upwards are wasting energy and kill billions of insects every day. On the other hand, lamps shining straight down illuminate only the designated area or footpath, and reduce glare. Late at night, all lights should be off.



## Invasive neophytes

Large-scale spreading of invasive species may push out and endanger populations of indigenous species. The spreading of invasive species must be controlled and professionally eliminated.

### Useful tip: Neophytes in public greenery

Information on the most common invasive species and how to control them is available in our information leaflet “Neophytes in public greenery” (in German language): [www.naturimgarten.at/neophyten](http://www.naturimgarten.at/neophyten)

## Use of non-selective pesticides

Excessive application of harmful plant-protection agents on “non-target organisms” may be detrimental to local diversity of species and number of individuals. Even biologically compatible pesticides should be used competently and as a last-resort solution.

## A care that damages diversity

Many ways of greenery maintenance have direct negative impacts on animal populations. The following means of maintenance should be avoided at all costs:

- mulching of meadows
- mowing of meadows using machines with fast-rotating cutter bars or with suction
- use of artificial fertilizers
- too frequent mowing of meadows and herbaceous lawns, or incorrect time of mowing
- too frequent or too intensive pruning of hedges
- incompetent and non-proportional pruning of trees

### Useful tip: Partners of “Natur im Garten”

You can find our partner companies and affiliated garden designers at [www.naturimgarten.at/partnerbetriebe](http://www.naturimgarten.at/partnerbetriebe)

## METHODS FOR DESIGNING REGIONAL HABITAT NETWORKS

Just like the actual habitat network, initiatives supporting them work through interaction of various bodies and authorities.

In an ideal situation, all stakeholders and competent authorities should be involved in the planning and future management of a regional habitat network. It is therefore very important to communicate with all concerned bodies using the land, such as agricultural enterprises, road and highway maintenance service bodies, forest enterprises, railway authorities, water management and waste water authorities.

All together, they can develop various measures for designing a regional habitat network:

### Local habitat network plan:

If all elements present within the municipality are identified and mapped, and if core areas neighbouring with the municipal land are known, it is possible to design corridors that will link these elements. When planning public greenery systems, this method of designing regional habitat networks should definitely be applied.



© Christine Rottenbacher

Connecting municipalities and landscape via green infrastructure systems.

### Management plan:

Success of near-nature design is directly linked to management supporting diversity. A management plan should therefore be developed for each type of greenery, and be available in a way that is comprehensible for all workers.

**„Natur im Garten“ will be happy to assist you with any queries regarding management and maintenance supporting diversity in public greenery!**

### Use of regional species

When planting new elements of greenery, wildflower species typical for the given region should be preferred. Evolutionary biological adaptations between indigenous wildflowers and local fauna create a closely knitted network of mutual interactions, so genetic diversity within species may be supported as well.

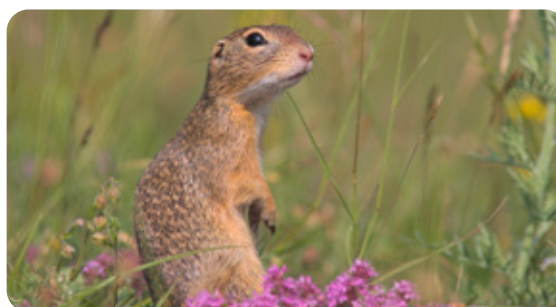
### Raising awareness of the public

Just like in all projects involving the public space it is essential to inform the public about all details and planned steps. A mascot can become a symbol of a joint effort in the region, such as the sword lily in the Rheintal area, or the ground squirrel in Perchtoldsdorf. In the Czech Republic they have a cute otter as a mascot in T ebo , and other mascots elsewhere. Local communities may participate e.g. by adopting flower beds or trees. Articles in regional and local papers may continuously inform about animal or plant “inhabitants” that benefit from the adopted measures.



© Natur im Garten / J. Brocks

Burnets and moths love the scabious.



© Hartmut Schäfer

Ground squirrel is an example of a friendly mascot communicating the efforts and support for regional biodiversity. The “Friends of Perchtoldsdorf Steppe” (Freunde der Perchtoldsdorfer Heide) are tirelessly active in their education and nature protection efforts.

## SYM:BIO-Projekt

**The Interreg SYM:BIO (ATCZ234) cross-border association connects and mobilizes stakeholders in the Czech Republic, Vienna and Lower Austria, and demonstrates the great potential of public greenery and near-nature gardens for climate adaptation.**

More information can be found on the following websites:

- [www.naturimgarten.at/projekt-symbio.html](http://www.naturimgarten.at/projekt-symbio.html)
- [www.at-cz.eu/at/ibox/pa-4-nachhaltige-netzwerke-und-institutionelle-kooperation/atcz234\\_symbio](http://www.at-cz.eu/at/ibox/pa-4-nachhaltige-netzwerke-und-institutionelle-kooperation/atcz234_symbio)

The team of partners of the Bio Forschung Austria project, including Mendel University in Brno, ZERA Agency, NÖ ABB, and association “Natur im Garten” GmbH, investigates, tests, and facilitates strategies for adaptation to climate change, as well as methods of management and maintenance of public greenery aimed at supporting biodiversity and adaptation to drought.

*At the end of the project period, the experiences and strategies of all the project partners will be summarized in a SYM:BIO handbook on supporting biodiversity and measures for adaptation to drought in public greenery and gardens.*

**Contact:** „Natur im Garten“ GmbH, Am Wasserpark 1, 3430 Tulln, gartentelefon@naturimgarten.at, www.naturimgarten.at, +43 (0)2742/74 333

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