



# CBI-

City Biodiversity Index

# Report 2012

 **Stadt Heidelberg**

 **BUNDESHAUPTSTADT** | 2007  
**im NATURSCHUTZ**

# City Biodiversity Index Report 2012

---

## **PART I: PROFILE OF THE CITY**

### **Location**

Heidelberg is located in a scenic location on the banks of the river Neckar where it leaves the Forest of Odes and enters the Rhine valley, at an altitude of 116 meters above sea level. Besides Mannheim and Ludwigshafen Heidelberg is one of the three main centers in the Metropolitan Region Rhine-Neckar with approximately 2.36 million inhabitants.

(See also map1).

### **Geographical coordinates**

Latitude 49.4167

Longitudes: 8.7

### **Natural site conditions**

Altitude: 100 to 568 meters above sea level. The highest elevation is the Königstuhl with 568 meters.

### **Climate**

Heidelberg has a mild climate (e.g. convenient for viticulture). The annual mean temperature is 10.2 degrees Celsius (level land) and 7.3 degrees Celsius (mountain region at Königstuhl)

### **Precipitation**

Level land: about 670 mm, mountain region (Königstuhl): about 920 mm

## City Biodiversity Index Report 2012

---

### Geology

The geological site conditions in the east of the old town are determined by red sandstone, subjacent granite and interjacent layers of Upper Permian and New Red Conglomerate are found. The hillsides of the Odenwald are characterized by an overlay of original loess. In the west quaternary sands of the river Rhine and in the north rhyolite of volcanic origin occur.

### Population and Size (see also map)

Heidelberg has about 143 000 inhabitants (2011).

Heidelberg covers an area of about 109 km<sup>2</sup>; therefrom some 29.6 percent (32.2 km<sup>2</sup>) are used for settlement. The population density is about 1 336 inhabitants/km<sup>2</sup>. The settlement density is approx. 4,504 inhabitants /km<sup>2</sup> settlement area, rural areas account for about 5.3 are/inhabitant.

The total area of the city owned forest is 3 329 hectares, covered with trees are 3 171.2 hectares, without trees (e.g. meadows inside the forest) are 137.4 hectares and other areas (e.g. forest roads) are 22.1 hectares. Moreover there are 944 hectares of forest owned by government of the "Land Baden-Württemberg" and about 150 hectares of private forest.

### Number of administrative units in cities

The administration of the city of Heidelberg consists of about 42 different units or offices.

### Economic parameters of the city of Heidelberg

Gross Domestic Product (GDP) 2009: 6 399 Mill. €

Gross National Product (GNP): not known

Per capita income (primary income): 26 500 € per year (2009)

### Physical features of the city

Area of impermeable surface please see indicator 11.

# City Biodiversity Index Report 2012

## Biodiversity features and characteristics

### Ecosystems found in the city

The city of Heidelberg has part in four different natural units (see map below):

1. The plain of the rivers Neckar and Rhine  
The flat lowland is characterized by artificial landscape: Most of the settled area and intensively cultivated farmland. The river Neckar is canalized or widely influenced by men. Only a distance of about 4 km the river shows its quite original dynamic character with natural banks, gravel banks and floodplain forest.
2. The so called Bergstraße (Mountain road)  
It is a small stripe along the hillsides of the Forest of Odes (Odenwald). Here you find predominantly garden plots and vineyards.
3. The crystalline forest of Odes  
It concludes only a small area at the northern city limits.
4. The Red Sandstone Odenwald  
It takes about 40 % of the complete municipal area and is mostly covered with wood. The subatlantic beech forest is the original vegetation.

Abb. 1: Naturräumliche Gliederung der Gemarkung Heidelberg



- ① Neckar-Rheinebene
- ② Bergstraße
- ③ Kristalliner Odenwald
- ④ Buntsandsteinodenwald

--- Grenze der Gemarkung Heidelberg

Kartengrundlage: LESER, H. (1984): Geographisch-Landeskundliche Erläuterungen der Topographischen Karte 1 : 100.000 des Raumordnungsverbandes Rhein-Neckar (verkl. Ausschnitt).

(The IUCN Habitat Authority File is not available.)

## City Biodiversity Index Report 2012

---

### Species found in the city

- Number of species of vascular plants: 1054
- Number of species of birds: 130
- Number of species of butterflies: 98
- Number of species of bats: 15
- Number of species of fishes: 32

Please see also indicators 4 - 8

### Administration of biodiversity

The theme *Biodiversity* is managed by some agencies and departments within the administration of the city of Heidelberg.

The office for environmental protection, trade supervision and energy is responsible for legal formalities as well as for voluntary duties.

The office for landscape and forestry is responsible for the green areas inside the city, parks and the forest.

The office for children and youth is responsible for the education in kindergartens and free time offers. It is not responsible for the curriculum at schools.

The city of Heidelberg has different kinds of natural areas that are protected.

We taking part in the EU-wide NATURA 2000 system: large parts of our forest are protected as Flora-Fauna-Habitat-Area. The protected biotope types are the typical beech forest and the running waters and the banks of the natural part of the river Neckar.

Heidelberg also has some nature areas protected by national law. Each of them comprises more than 5 hectares. The responsibility for the designation and the management is up to the higher administration at the regional council.

## City Biodiversity Index Report 2012

---

### Links to relevant websites

<http://www.heidelberg.de>

<http://www.nabu-heidelberg.de/startseite.html>

<http://www.bund-heidelberg.de/>

## City Biodiversity Index Report 2012

---

### Indicator 1: Proportion of natural areas in city

#### Annotations concerning practicability of data assessment

Meadows and orchards are cultural landscape and completely man-made but they host a marked and typical biodiversity. This applies also to subareas of nature reserves, protected biotopes and areas of the biotope linking system. They are very relevant for our nature protection. Even most of the forest in Central Europe is influenced by a high degree by man. For that reason we include/define all this areas as "natural areas".

Not only "natural ecosystems" but also semi- or nearly natural ecosystems and areas should be included in this indicator.

#### Database for scoring

(Total area or natural areas, restored and naturalized areas) / (Total area of the city) x 100 %

$$4808 \text{ ha} \quad / \quad 10\,883 \text{ ha} \quad \times \quad 100 \%$$

$$= \quad 44 \%$$

>20%: **4 points**

## City Biodiversity Index Report 2012

---

### Indicator 2:

### Connectivity measures or ecological networks to counter fragmentation

#### Annotations concerning practicability of data assessment

We are not able to calculate the indicator regarding all notes.

Our natural areas are composed of two big areas and a very large number of small ones. We would have to analyse distances and sizes manually. We have not the knowledge to do this automatically. So it would mean an enormous amount of time.

#### Database for scoring

See files:       indicator\_2.dbf  
                  Indicator\_2.shp  
                  Indicator\_2.shx

## City Biodiversity Index Report 2012

---

### Indicator 3

### Native biodiversity in built-up areas (bird species)

#### Annotations concerning practicability of data assessment

We include all birds observed in built-up areas.

#### Database for scoring

Mean of the birds species found in our built-up areas: **68 species**

For the complete list see file: indicator 3 \_ native biodiversity in built-up areas \_ bird species.xls

# City Biodiversity Index Report 2012

---

## Indicator 4 - 8

### Change in numbers of native species

Indicator 4 – vascular plants

Indicator 5 – birds

Indicator 6 – butterflies

Indicator 7 – bats

Indicator 8 - fishes

### Annotations concerning practicability of data assessment

Number of species underlies a natural fluctuation. Especially for groups like birds it is normal for our city that climate influences the annual number of species. It is not possible to collect new data for every application of the index. Lists will be only currently adjusted when new information is available.

So that the “lost” or the “increase” of species cannot be related with the local environmental activities.

### Database for scoring

#### Indicator 4

Baseline: **1054 species (30 Pteridophyta, 1005 Angiospermae, 19 Gymnospermae)**

For the complete list see file: [indicator 4 \\_ vascular plants.xls](#)

#### Indicator 5

Baseline: **130 species**

For the complete list see file: [indicator 5 \\_ birds.xls](#)

#### Indicator 6

Baseline: **98 species**

For the complete list see file: [indicator 6 \\_ butterflies.xls](#)

#### Indicator 7

Baseline: **15 species**

For the complete list see file: [indicator 7 \\_ mammals bats.xls](#)

#### Indicator 8

Baseline: **32 species**

For the complete list see file: [indicator 8 \\_ fishes.xls](#)

## City Biodiversity Index Report 2012

---

### Indicator 9: Proportion of protected natural areas

#### Annotations concerning practicability of data assessment

We include protected cultural landscape.

#### Database for scoring

(Area of protected or secured natural areas) / (Total area of the city) x 100 %

$$\begin{array}{rclclcl} 5\,879 \text{ ha} & / & 10\,883 \text{ ha} & \times & 100\% \\ & & = & & \mathbf{54\ \%} \end{array}$$

## City Biodiversity Index Report 2012

---

### Indicator 10:

### Proportion of invasive alien species (as opposed to native species)

#### Annotations concerning practicability of data assessment

To ensure the comparison we choose the vascular plants for this indicator.

#### Database for scoring

Baseline: 1054 species

Invasive species : 14 species

$$\left( \frac{\text{Number of invasive alien species}}{\text{Number of natural species}} \right) * 100\% = \left( \frac{14}{1054} \right) * 100\% = \mathbf{1,33\%}$$

For the complete list see file: indicator 10 \_ invasive alien species\_vascular plants.xls

## City Biodiversity Index Report 2012

---

### Indicator 11: Regulation for selection of quantity of water

#### Annotations concerning practicability of data assessment

#### Database for scoring

Permeable area: 94 065 375 m<sup>2</sup>

Total terrestrial area: 108 831 618 m<sup>2</sup>

Result of indicator calculation: **86.43**

## City Biodiversity Index Report 2012

---

### Indicator 12:

### Climate regulation: Carbon storage and cooling effect of vegetation

#### Annotations concerning practicability of data assessment

It is very difficult to obtain data to the total canopy cover because in the city there are an enormous number of single trees which have a cooling effect. Actually there are about 50.000 trees growing on public ground. Furthermore there is an equal number of private trees. For us it's not possible to calculate the canopy cover of all these trees.

#### Database for scoring

We are interested in practicable and economic solving to get a database.

## City Biodiversity Index Report 2012

---

### Indicator 13- 14: Recreational and educational services

#### Annotations concerning practicability of data assessment

There are no formal educational visits (indicator 14). Also it cannot be influenced by the city. Schools and kindergartens are not obliged to elevate data. We consider indicator 14 as not applicable.

#### Database for scoring

### Indicator 13

(Area of parks with natural areas and protected or secured natural areas) per 1000 persons

$$4\,854 \text{ ha} / 150\,000 \text{ persons} * 1000 = 32.36 \text{ ha}/1000 \text{ persons}$$

$$>0.9 \text{ ha}/1000 \text{ persons} = \mathbf{4 \text{ points}}$$

### Indicator 14

Not applicable.

## City Biodiversity Index Report 2012

---

### Indicator 15: Budget allocated to biodiversity

#### Annotations concerning practicability of data assessment

There are a lot of offices involved in the maintenance of biodiversity. But most of them have also other tasks to do. It is extremely difficult to appropriate funds which refer to the measurements for biodiversity.

Therefore we only use the budget of the Division of Nature Protection within the Office of Environmental Protection.

For the calculation we use the cash-flow budget and ignored the capital budget of the city.

Moreover the budget for the welfare bills is about 30% of the total budget of the city.

#### Database for scoring

Budget for biodiversity related administration:	638 000 Euro
Total budget of the city:	455 900 000 Euro

$638\,000\text{ €} : 455\,900\,00\text{ €} \times 100\% = \mathbf{0.14\%}$

## City Biodiversity Index Report 2012

---

### Indicator 16:

## Number of Biodiversity Projects implemented by the city annually

### Annotations concerning practicability of data assessment

The classification into „biodiversity related“ and „ecosystem services related“ seems to be unrewarding for this indicator. We propose to not classify the programmes and projects.

A database in relation to the number of inhabitants would be more convincing (possibly also considering the total area of the city)

### Database for scoring

Number of programmes and projects: **64**

#### 1. Biodiversity related

- 1.1. Conservation programme campion (*Lychnis/Silene viscaria*)
- 1.2. Conservation programme orchids
- 1.3. Conservation programme reptiles
- 1.4. Conservation programme peregrine falcon (*Falco peregrinus*)
- 1.5. Conservation programme common swift (*Apus apus*)
- 1.6. Conservation programme bats
- 1.7. Programme for nesting boxes
- 1.8. Programme for biotope linking system
- 1.9. Programme for renaturation of waterbodies
- 1.10. Species protection plan
- 1.11. Conservation project orchards
- 1.12. Conservation programme meadows
- 1.13. Programme for conservation of specific forest habitats (matured stand, deadwood, etc.)
- 1.14. Conservation programme medlar (*Mespilus germanica*)
- 1.15. Conservation programme amphibians
- 1.16. Species Protection Plan

Additional:

Programmes Zoological Garden Heidelberg

37 zoo species conservation projects (EEP: 17; ESB: 20)

1 resettlement project

10 cooperation in international species conservation programmes

#### 2. Ecosystems services related

- 2.1. See 1.9. programme for restoration of waterbodies

## City Biodiversity Index Report 2012

### Indicator 17:

## Policy, rules and regulations – Existence of local biodiversity strategy and action plan

### Annotations concerning practicability of data assessment

In comparison with the national wide strategy on biological diversity the city of Heidelberg has many identical or similar programmes and projects. Heidelberg introduced e.g. a biotope linking system and a species protection plan already in the 1990<sup>th</sup>. Therefore it is not difficult for us to achieve the scoring.

### Database for scoring

NBSAP	LBSAP
Concretization of regional-specific minimum densities of link elements (fringe structures and stepping-stone biotopes, such as hedges and field boundaries)	Biotope linking system since 1992, long-term contracts with farmers, monitoring
Support of zoos and botanical gardens, as well as other players involved in zoological and botanical nature conservation, and the conservation of genetic resources during the implementation of ex situ measures	The Heidelberg Zoological Garden supports several conservation programmes and breeding projects (e.g. Rolloway long tailed monkey –in West-Africa, <i>Cercopithecus diana roloway</i> )
Avoidance of the entrainment and release of non-native species in the wild	Measurements to control neophytes together with NGOs
The creation of nature experience sites in the countryside, preferably in areas accessible on foot, in order to encourage children's understanding of nature	Creation of the <i>via naturae</i> and <i>forest-adventure-path</i> , Establishment of an educational center for children und school classes
Formulation and implementation of species conservation programmes to conserve and rehabilitate specific species and species groups	Species protection Plan since 1997, definition of priority areas and species of special interest
Promotion of rare tree and bush varieties such as the True Service tree ( <i>Sorbus domestica</i> ), the yew ( <i>Taxus baccata</i> ) etc. in their original native regions and within the context of semi-natural forest management	Promotional project for medlar ( <i>Mespula germanica</i> )
Drafting of programmes for the naturalistic development of waterbodies, renaturation of waterbodies	It exists an water body-development-action plan, several watercourses have been open up and restored to near-natural conditions
Effective involvement of NGOs in the conception and implementation of relevant programmes at local authority level	Implementation of a roundtable meeting with the NGO, university etc. to discuss nature protection projects
Forest owners, forest associations and wood associations follow the principles of sustainable and near-natural forest management	The city owned forest is PEFC- and FSC-certificated.

LBSAP incorporates elements of NBSAP, and includes 4 or more CBD initiatives

Basis of scoring: **4 points**

## City Biodiversity Index Report 2012

---

### Indicator 18 - 19: Institutional capacity

#### Annotations concerning practicability of data assessment

A database in relation to the number of inhabitants would be more convincing (possibly taking into consideration the total area of the city).

#### Database for scoring

### Indicator 18

Number of essential biodiversity-related functions that the city uses: 3

1. Botanical garden
2. Zoological garden
3. Arboretum

Basis of scoring: **3 points**

### Indicator 19

Number of city or local government agencies involved in inter-agency cooperation pertaining to biodiversity matters: 6

1. Office of Environmental Protection, Trade Supervision and Energy
2. Landscape Architects and Forestry Office
3. City Planning office
4. Regional Office for agriculture
5. Rhine-Neckar Regional Association
6. Vicinity Association Heidelberg-Mannheim

Basis of scoring: **4 points**

## City Biodiversity Index Report 2012

---

### Indicator 20 - 21: Participation and partnership

#### Annotations concerning practicability of data assessment

A database in relation to the number of inhabitants would be more convincing (possibly taking into consideration the total area of the city).

Indicator 21 is similar to the indicator 16.

#### Database for scoring

##### Indicator 20

Formal or informal process exists as part of the routine process

Basis of scoring: **4 points**

##### Indicator 21

Number of agencies/private companies/NGOs/academic institutions/international organisations with which the city is partnering in biodiversity activities, projects and programmes: 19

Basis of scoring: **3 points**

## City Biodiversity Index Report 2012

---

### Indicator 22 - 23: Education and awareness

#### Annotations concerning practicability of data assessment

Indicator 22:

The school curricula are specified by the states "Land Baden-Württemberg". The city has no influence. Anyway biodiversity and nature awareness is included in the school curriculum but it depends on the individual teacher if the educational offers made by local government and NGO's are accepted.

Therefore we don't consider this indicator as useful.

Indicator 23: A database in relation to the number of inhabitants would be more convincing (possibly considering the total area of the city). Information on how many people attended the events is not easy to get. So Heidelberg will try to gather them in our second application of the index.

#### Database for scoring

### Indicator 22

Biodiversity or elements of it are included in the school curriculum.

Basis of scoring: **(4 points)**

### Indicator 23

Number of outreach or public awareness events held in the city per year (year 2011): **182**

Participants: 7041

Basis of scoring: **3 points**

For the full list of the events see file: indicator\_23 list of events.pdf