

## 05.08 Biotope Types (Edition 2014)

### Overview

The word **biotope** derives from the Greek words *bíos* (*life*) and *tópos* (*space*). A biotope is a habitat in which certain plants and animals form a long-term association. Its composition depends primarily on the site conditions necessary for the existence and the flourishing of certain organisms. By virtue of its typical site and structural features, each biotope has its own potential, including its characteristic array of species. While the term “biotope” always refers to a concrete place, the term “biotope type” refers to biotopes within a definitive natural area which have the same characteristics.

Over the past three to four decades, the conditions of life for plants and animals have continued to deteriorate. The most important causes are the destruction and dismemberment of natural habitats by construction and impermeable coverage of the soil, as well as changes in the biotopes, e.g. due to fertiliser and pollutant input, extensive drops in the groundwater, and intensive agricultural and recreational use. While previously, only those species were affected which were by nature rare and strongly specialised in their needs, we today increasingly see a deterioration process which endangers the stock even of those species which were still very common during the 1950s.

Since there is a very complex relationship between particular plants and animals in nature, this development must be considered extremely dangerous. Complex food chains and communities of species have taken shape in a development process which has lasted for millennia, so that the loss of a single plant species means, on average, the loss of the basic conditions of life of between 10 and 20 species of animals. In extreme cases, several hundred species may be affected.

This development is demonstrated by an analysis of the [Red Lists](#) of endangered plant and animal species in Berlin. The Red Lists include 7,087 species, of which 13% are considered extinct or lost, and 31% as endangered. The share of Red List species in the overall species stock is 44%, or almost half of all wild plant and animal species. Broken down by species groups, the percentage of endangered species reaches values of around 40% among most invertebrates; for plants, fungi, and vertebrates, it is often considerably higher. (For detailed accounts and information, see [Species Protection](#), only in German).

An assessment with reference to the *Red List of Endangered Biotope Types in Germany* (Riecken et al. 2006) yields a hardly less alarming picture for the biotope areas in Berlin. Approx. 10% of the area of Berlin contains biotopes which are endangered nation-wide. Berlin has a special responsibility for the protection and preservation of these biotopes.

Endangering status: Red List of endangered biotope types in Germany		Total, biotopes in Berlin, in hectares	Share of the surface area of Berlin
R	Rare/restricted geographic distribution	0	0%
-0	Completely eliminated	0	0%
1	Threatened by complete elimination	66	0.08%
1-2	Tendency toward threat of complete destruction	509	0.6%
2	Strongly endangered	2,791	3.2%
2-3	Tendency toward strong endangerment	3,679	4.2%
3	Endangered	2,267	2.6%

**Tab. 1: Endangered status, Berlin biotope types, from the Red List of Endangered Biotope Types in Germany ( Riecken et al. 2006 )**

## Biotope Protection as a Supplement to the Certification of Protected Areas

Even the certification of protected areas has been unable to arrest this development.

For in spite of the supposedly larger number of **nature and landscape protection areas**, as well as other protected areas, valuable areas are still being lost.

An important instrument for the protection of the rarest and most strongly endangered biotopes, mostly involving near-natural habitats, is direct legal biotope protection.

In Berlin, 19 habitats particularly worthy of protection have been nominated as [legally protected biotopes](#). The legal protection status requires no formal procedure, as in the case of the certification of protected areas. Legal protection is designed to preserve the protected biotopes completely and intact, and protect them from adverse changes. All actions and measures which could cause considerable or permanent damage are strictly forbidden and punishable by law. Exceptions apply only for overriding reasons of public interest, or if compensation is provided elsewhere in the form of the creation of similar biotopes. The certification requires examination and a decision by the locally responsible conservation authority of the boroughs.

See here for a detailed depiction of the legally protected biotopes in Berlin.

The Berlin Conservation Law §29-32 moreover provides special regulations for the protection of shore cane brakes.

The European Community has also recognised how necessary the direct legal protection of certain biotopes is. Many biotopes which are rare and endangered Europe-wide are placed under protected status in the context of the programme **NATURA 2000** as [habitat types](#) as specified by the Habitats Directive. Some of these rare and endangered biotopes are also found in Berlin.

The protection and the sustainable use of the municipal nature and landscape can only be successful with adequate knowledge of the conditions. A serious and up-to-date **stock-taking** is therefore indispensable if urban development plans are to be connected to nature and the landscape in accordance with the principle of sustainability. Thus, knowledge about the composition and spatial distribution of the culturally shaped near-natural biotopes in Berlin is an essential basis for urban and regional planning, for landscape planning, and for the conservation-appropriate development of spatial utilisation, such as forestry.

## Biotope mapping

Biotope mapping was initiated some 30 years ago in several German states. Its goal is to describe the composition of the landscape on the basis of delimitable biotope types.

The methods used can be assigned to any of three categories (Sukopp & Wittig, 1993). **Selective mapping** covers only protected biotopes, or those worthy of protection. It requires an assessment framework which is already applied during the mapping process. With **representative mapping**, typical areas of all relevant biotope types or biotope type complexes are examined, and the results are then transferred to the other areas of the same biotope structure. With **area-wide mapping**, all biotope types of an examination area are covered, and delimited sharply from one another.

Berlin, Munich and Augsburg were among the first cities to carry out urban ecological investigations. In Berlin, the Species Protection Programme working group described the biotope type complexes in West Berlin by evaluation of extensive ecological investigations of the municipal area. This representative mapping project was the basis for West Berlin's [Landscape and Species Protection Programme](#) in 1984, the first landscape and species protection programme for any municipal area in West Germany.

In 1986, a map of urban ecological spatial units in West Berlin was also published in the Environmental Atlas.

## Biotope Type Mapping in Berlin

In order to create a **current and full-coverage database**, the **Berlin Full-Coverage Biotope Type Mapping** project was initiated in 2003 by the [State Commissioner for Conservation and Landscape Management](#) and the State Forestry Office.

The biotope type mapping system documents the current distribution and condition of the particularly valuable biotopes, and is thus an important basis for the prioritisation of conservation in the state of Berlin.

The data of the Biotope Type Map, which is now available as a full-coverage instrument, can be used not only for conservation tasks, but also for urban and regional planning, environmental analyses, environmental impact assessments, mandatory reports and forest development planning. In addition to other environmental data, the biotope type data are also to be used in a digital procedure for the strategic environmental assessment (SEA).

## Statistical Base

### Surface mapping and aerial image evaluation (primary data)

Between 2001 and 2013, the Senate Department for Urban Development and the Environment contracted for 64 landscape mapping projects.

All forest areas, Natura 2000 areas, nature protection areas and other areas of Berlin particularly valuable for conservation were covered by surface biotope mapping (inspection of the areas). The non-wooded landscapes were covered by aerial image biotope type mapping; particularly protected or valuable biotopes were then checked by surface mapping.

The following sources were used for the collection of primary data:

- Map of Berlin 1 : 5,000 (K5), Borough offices of Berlin, Surveying Office and Senate Department for Urban Development, Sect. III, GeoDatenService
- Automated Property Land Register (ALK), Senate Department for Urban Development, Sect. III
- Analogue CIR aerial image slides, 2000 and 2005 and Color aerial images, 2004, 2006, 2007, Digital Orthophotos 1998-2009, Senate Department for Urban Development, Sect. III, Aerial Image Archive
- Basic Forestry Maps, Berlin Forests, as of 1995-2000.

### Secondary data

For a part of the area of Berlin, existing data sources were used, and these data were recoded to biotope types. The following data sources were used for secondary data:

- Berlin Environmental Atlas, Map 06.07 Urban Structure, 2011 Edition, Senate Department for Urban Development and the Environment, Sect. III
- Land Register of Green Spaces, Cemeteries and Allotment Gardens, Senate Department for Urban Development and the Environment, Sect. I, 2001-2012
- Map of Bodies of Water of the Senate Department for Urban Development, Sect. X; 2000-2007
- Block map 1 : 5,000 (ISU5 Environmental Atlas) as of 2010, Senate Department for Urban Development, Sect. III, City and Environment Information System

The information displayed is as of **August 2014**.

## Methodology

The methodological specifications were developed in a preliminary study in 2002. The goal was to use a mapping key compatible with the biotope type keys (Auhagen 1994), used up to that time for auditing interventions in Berlin, and with the biotope type list used in Brandenburg (Zimmermann et al. 1994/2003). The Berlin biotope type list is based on the Brandenburg list. In the context of the cooperation with the State Environmental Agency in Brandenburg, the Brandenburg biotope type list was revised and extended, primarily to include urban biotope types. The Berlin Biotope Type List (Köstler et al. 2003) contains **7483 biotope types**, and was published on [CD-ROM](#) in 2005.

The "tools" for biotope mapping necessary for a scientifically certified and methodologically comprehensible procedure were thus established. The CD includes a **list of Berlin biotope types**, mapping instructions, and a description of the **legally protected biotopes**. In addition, information on **endangerment** and on the protection and care of various biotopes was provided. The more detailed

information at the same time provides scientifically certified access for **recognising** and **assessing** biotopes.

In order to provide an adequately detailed biotope type map, the scale of 1:5000 was selected.

Three methods of data collection were used:

1. **Surface mapping (primary data):** For forest areas, Natura2000 areas, and the majority of protected areas, as well as major parks, the data was gathered by field inspection and then digitised. Supplementary information for particularly protected biotopes and Habitats Directive habitat types was recorded on a terrain mapping sheet.
2. **Aerial Image evaluation (primary data):** Non-built-up areas, such as major lakes, former sewage farms, open landscapes, airports and railway areas were mapped with colour infrared (CIR) aerial photography. The particularly protected biotopes and the areas suspected of being worthy of protection were then checked locally.
3. **Secondary data:** For residential and commercial areas, streets, allotment gardens and green spaces, current digitalised data was already available for the biotope type map in the Urban Structure map of the Environmental Atlas and the Green Space Land Register. It was possible to save costs by using secondary data recoded to the biotope types. In the secondary data, which is based on the colation of predominant use types at block segment level, no examination of particularly protected biotopes could be carried out. This must, if necessary, be carried out on the spot afterwards. **An examination as to whether a particularly protected biotope as per §30 Federal Conservation Law and §28 Berlin Conservation Law or a habitat type as per the Habitats Directive is present was accomplished only via surface and aerial photography mapping. There is a good chance that further protected biotopes will be ascertained on the basis of the secondary data.**

Table: Secondary data transcoded to biotope types			
Area Types and Structure Types UIS		BT-Code	Name of the biotope type
Structure Type	Area Type		
<b>Structure Types with Predominantly Residential Use</b>			
(1) Late 19th-century block development with wings and rear buildings	(1) Closed courtyard	12221	Closed block development (entirely enclosed courtyards)
	(2) Courtyard	12221	Closed block development (entirely enclosed courtyards)
	(5) Preservation-oriented reconstruction	12222	Closed and semi-open block development (not entirely enclosed courtyards)
(2) Late 19th-century block-edge development with few wings / rear buildings	(3) Decorative and garden court	12222	Closed and semi-open block development (not entirely enclosed courtyards)
	(6) Shed court	12222	Closed and semi-open block development (not entirely enclosed courtyards)
(3) Late 19th-century block-edge development with major changes	(7) Postwar block-edge	12222	Closed and semi-open block development (not entirely enclosed courtyards)
	(4) Reconstruction by de-coring	12222	Closed and semi-open block development (not entirely enclosed courtyards)
(4) Twenties and thirties block-edge and row development	(10) Large court and twenties and thirties row (in east-Berlin only large court)	12230	Block-edge development
	(72) Twenties and thirties row	12240	Row development
(5) Fifties and later row development	(11) Fifties and later row	12240	Row development
(6) Postwar high-rise development	(8) Unplanned reconstruction	12250	Construction by industrial prefabrication, high-rise residential areas
	(9) High-rise	12250	Construction by industrial prefabrication, high-rise residential areas
(7) Eighties and nineties block-edge or row development	(71) Eighties and nineties pre-fab high-rise, settlement area of the nineties compact, $\geq 4$ floors	12250	Construction by industrial prefabrication, high-rise residential areas
(8) compact high urban living development of the nineties	(73) settlement area (row, single and double houses) of the nineties with low density, $< 4$ floors	12250	Construction by industrial prefabrication, high-rise residential areas
(9) urban living development of the nineties with low density	(74) settlement area (row, single and double houses) of the nineties with low density, $< 4$ floors	12240	Row development
(10) Low buildings with yards	(22) Row yard	12260	Single and row house development
	(23) Yard	12260	Single and row house development
	(26) Open settlement development	12260	Single and row house development
	(59) Weekend cottages	12280	Small residential areas and similar structures
(11) Villa development with park-like gardens	(24) Park-like garden	12271	Old villa development with park-like gardens
(12) Development with yards and semi-private re-greening	(25) Yards and semi-private re-greening	12260	Single and row house development
(13) Village-like development	(21) Village	12290	Village-like development / village cores
<b>Structure Types with Predominantly Commercial, Service, Small Business and Industrial Use</b>			
(14) Development with predominantly commercial and service use	(29) Core area	12210	Core area (city)
	(39) Excursion restaurant	12310	Industrial, commercial, small business and service areas (in use)
(15) Low development with predominantly small business and industrial use	(33) Mixed area II with low development	12310	Industrial, commercial, small business and service areas (in use)
	(30) Small business area with low development	12310	Industrial, commercial, small business and service areas (in use)
	(32) Utilities area	12500	Utilities areas
(16) Dense development with predominantly small business and industrial use	(38) Mixed area II with dense development	12310	Industrial, commercial, small business and service areas (in use)
	(31) Small business area with dense development	12312	Industrial, commercial, small business and service areas (in use), with low part of open spaces
<b>Structure Types with Other Uses (Public facilities, Traffic Areas, Construction Sites or Green and Open Spaces)</b>			
(17) Development with predominantly Public facilities / special use, non-street traffic areas, or construction sites	(42) Postal	12330	Public facilities
	(41) Law-enforcement	12330	Public facilities
	(43) Administrative	12330	Public facilities
	(45) Cultural	12330	Public facilities
	(12) School (building before 1945)	12330	Public facilities
	(13) School (building after 1945)	12330	Public facilities
	(14) School	12330	Public facilities
	(44) University and research	12330	Public facilities
	(49) Church	12330	Public facilities
	(50) Retirement home	12330	Public facilities
	(46) Hospital	12330	Public facilities
	(47) Child day care center	12330	Public facilities
	(51) Youth center	12330	Public facilities
	(60) Public facilities, misc.	12330	Public facilities
	(93) Airport	12670	Airports
	(91) Parking lot	12640	Parking lots
	(92) Railroad property		
	(99) Railroad embankment		
	(94) Other traffic area		
	(98) Construction site		
(18) Little or non-built-up green and open spaces	(55) Forest		
	(56) Agriculture		
	(53) Green space / park	10101	Parks, open spaces
	(54) City square / promenade	12620	Predominantly paved city squares and promenades
	(27) Cemetery	10102	Cemeteries
	(34) Low-development allotment garden area	10150	Allotment gardens
	(35) High-development allotment garden area	10150	Allotment gardens
	(37) Allotment garden area, misc.	10150	Allotment gardens
	(57) Vacant area		
	(58) Campground	10180	Campgrounds
	(28) Sports facility	10170	Public sports and recreation facilities
	(15) Water sports	12680	Harbour and lock facilities (incl. pleasure craft docks)
	(36) Tree nursery / horticulture	11250	Tree nurseries / horticulture
	= Additional Code		

**Tab. 2: Secondary data transcoded to biotope types**

Between 2001 and 2013, 64 mapping projects were carried out to gather primary data.

The digital data were processed with the especially developed YADE GIS® specialised application BTK. Here, the data of the mapping projects are imported, the complete map is prepared, and the results are evaluated and audited. The mapping data based on surface surveying and aerial images, the so-called **primary data**, have substantive priority, and are combined with the **secondary data** to produce the **full-coverage biotope type map**.

The material stipulated to be used as the **base for the mapping** are the Map of Berlin, 1: 5000 (K5) and/or the ALK. It is recommended that current ortho-aerial photos be used for better delimitation of the areas. For biotope type mapping in forest areas, the geometries of the Basic Forestry Map must be adopted (sub-divisible). The surface biotope mappings were produced in scales of 1000 to 5000, depending on function and area size; the aerial image mappings were carried out for output scales of 3000 or 5000.

At a mapping scale of 2000 to 5000, the **minimum size** of biotopes which can be shown two-dimensionally is 500 to 1000 sq. m. Areas narrower than 10 m are shown as linear biotopes. The minimum length of a linear biotope is 30 to 50 m. Biotopes below the indicated minimum sizes are as a

rule shown as points. If they are of conservation relevance, these minimum sizes/lengths may also be subdivided in particular cases.

Biotope mappings are carried out in the terrain on work maps prepared from the base maps with at least the scale of the mapping process. For all factual data gathered, a mapping list is maintained, in which the main biotope, and if appropriate, accompanying and additional biotopes, are entered, together with the reference to the work map (recording number).

For especially protected and other biotopes valuable for conservation, such as forest biotopes, a terrain sheet is filled out containing the following further-reaching information about the biotope:

- Name of biotope type
- Description of biotope type
- Identification of the sub-types
- Distinctive vegetation/mapping indicators (delimitation criteria)
- Distinctive plant species
- Fauna
- Value defining parameters for fauna
- Common/typical species
- Lead species
- Target species
- Species groups to be examined
- Mapping instructions
- Information on endangerment and protected status
- Instructions on other mapping keys
- Instructions regarding the Habitats Directive.

If a biotope cannot be described exclusively by one biotope type, **additional and accompanying biotope types** may be assigned. "Additional biotopes" are defined as biotope types additionally possible throughout the area of the main biotope, e.g. uses. "Accompanying biotopes" are associated biotopes which cannot be mapped due to their small scale; they do not exist throughout the spatial extent of the main biotope, e.g. wooded islands in a cane brake.

**Access** to the desired biotope class (01 -12) is accomplished first of all by assignment to more or less easily delimitable habitat types (e.g., streams, standing waters, bogs, woodlands etc.). Within these biotope classes, the biotope groups are structured according to certain characteristics (e.g., streams, lakes), according to the manner of their creation (e.g. artificial waters), or according to rough plant-community units (mostly classes or associations). The particular biotope types and their sub-units are delimited from each other in the same manner, according to plant-sociological aspects, or to certain forms of anthropogenic use.

In some cases, the **assignment of biotope types** according to plant sociological criteria is preferred over other criteria. Thus for example, the alder, pine and birch bog woods, which, on the basis of habitat type might more likely be assigned to the Bogs and marshes class, are here rather assigned to Forests (08), due to their plant-sociological association.

In biotope classes 10 through 12 (anthropogenic biotopes, special biotopes, residential areas, etc.), plant-sociological criteria understandably play hardly any role at all. Here, the structure is therefore oriented largely towards the manner of use, and phaeological characteristics. Numerous complex biotope types, e.g. inland dunes, osers, and dry valleys, have been incorporated into the Special Biotopes class (11). For **detailed mapping**, the breakdown into single biotope types of other classes is possible here, but due to their mostly well-developed structuring, it is not always appropriate.

If a biotope cannot be assigned to a certain grouping, or in case of richly structured biotope complexes, the assignment to a group (e.g. 0512 = Dry meadow) is sufficient. In the mapping key, a short description of the biotope class (e.g. 01 Streams) is generally followed by a description of the biotope groups (e.g. 01100 Springs and spring swamps, 01110 Creeks and small rivers, etc.).

The **biotope groups** are further subdivided into **biotope types**, according to particular characteristics. Generally, a description, particulars on vegetation, on characteristic plant species, on the fauna, and on

endangerment and protection are provided for the biotope groups. If the vegetation has diagnostic value for some biotope types (e.g. 051 Moist meadows, with the sub-groups 05101 through 05106), the information on every single biotope type is specified. The indicated distinctive plant species need not exist in all assessment areas; they serve merely as a supporting indicator for the classification of the biotopes mapped. Many plant species can be found more or less regularly in various biotopes. These species include not only the actual characteristic or identifying species of the plant communities occurring in the biotopes in question, but also common **ancillary species**.

The assignment of a legal protected status as per **§30 Federal Conservation Law and §28 Berlin Conservation Law** is carried out on the basis of the technical assessment of the mapper. The probable protected status is usually indicated via aerial image biotope type mapping (provided there is no surface investigation). The decision on the application of the stipulation "Legally protected biotopes" in particular cases is provided by the responsible subordinate conservation authorities of the boroughs. In the map 05.08.2 "Biotope types - legally protected biotopes" areas with unclear or not yet indicated status by the responsible subordinate conservation authorities are marked with the symbol §? (F=areas, L= lines, P= points). These are areas where the mapper supposed a legal status (because of e.g. cane brakes) but because of damages or untypical occurrences a clear indication by airborne photos was not possible. These damages can be a high degree of neophytes, waste or depletion. In these cases the user should understand that an actual legally protected biotope do not have the necessary quality for a legally protected biotope at the moment.

To ascertain the mapping methodology and data quality, please also use the data source in the factual data.

The **habitat type or complex under the Habitats Directive** is determined exclusively by the terrain mapper. This indicates whether the biotope corresponds to a Natura 2000 habitat type or is part of a complex of habitat types ("LRT complex"). Biotopes are considered part of an LRT complex if they either correspond to the definitions of the habitat type as per the Habitats Directive manual, but in the assessment under the ABC scheme receive a lower classification in at least one category (so-called "degenerate" or D-areas) or have the potential for development to a habitat type, an LRT (a so-called "development" or E-areas); or if they are listed in the Habitats Directive manual as forming a close ecological complex with such an LRT (so-called complex or biotope association areas).

An example of the procedure of mapping via aerial images is documented [here](#).

## Biotope Values

The evaluation and assessment of biotopes is important for the evaluation and auditing of interventions in nature and the landscape and the associated planning process, as per §14 of the Berlin Conservation of Nature Law. The [Procedure for the Evaluation and Auditing of Impacts in Nature and the Landscape in the state of Berlin](#) has been developed in order to provide the responsible authorities, especially at the borough level, with a uniform basis for assessment.

All biotopes mapped in Berlin have been subjected to a uniform evaluation process under this procedure, as represented in the Biotope Values Map (05.08.5). The purpose of this map is to use **biotope values** in order to demonstrate the **conflict potentials** of interventions in nature and the landscape.

Biotope values are ascertained according to a differentiated point-count process. Details of this method are explained in the [guideline](#).

The total point count of a biotope value consists of the sum of the base and risk values. The base value consists of the value criteria: hemeroby ("naturalness"), occurrence of endangered species, rarity/endangerment of the biotope, and diversity of plant and animal species. The risk value is derived from the length of time needed to re-create the community of species, and the recreatability of the abiotic site conditions.

The specific point values of all biotopes evaluated are available in a [biotope list](#).

For representation in the map, the total point count (biotope value) ascertained for each biotope type was broken down into eight biotope value classes. Here, a biotope value (BW) of 0 corresponds to BW Class 1, i.e. a small conflict potential; the scale goes up to BW Class 8, with an extremely high conflict potential. The eight biotope value classes are not shown in colour on the map, but rather are differentiated by the shading, according to primary and secondary data.

## Factual data

All maps from the Berlin Biotope Type Mapping Project include uniform factual data.

The following factual data exist for all areas, lines and points shown on the map (the fields marked with \* contain data only in the primary data base):

The data survey method employed is noted for every data set, in the data field "Methodology".

Field name	Meaning of field	Description of field
BIOTOP_ID	<b>Key field</b>	The key consists of: Projekt_ID, then a letter: F for "area", L for "linear", P for "point" biotopes; then a four-digit number of the biotope ID for each project; For secondary data, the letters "SD" are the project ID
BT_CODE	<b>Main biotope code</b>	Coding of the main biotope as per the Berlin biotope type list; this is the characteristic biotope type; the map is oriented only towards the main biotope type, and the code is shown as text.
BT_NAME	<b>Biotope name</b>	Complete biotope type designation
BFN_CODE	<b>Federal biotope code</b>	The corresponding biotope type code of the Federal Agency for Nature Conservation is assigned to every biotope type of the Berlin list in the biotope type catalogue. As a rule, this is considerably less differentiated.
ZBT_CODE*	<b>Additional biotope code</b>	Coding of the additional biotope as per the Berlin Biotope Type List (provided it has been assigned) <b>Additional biotopes</b> are defined as biotope types additionally possible throughout the area of the main biotope, e.g. uses.
BBT_CODE*	<b>Accompanying biotope code</b>	Coding of the accompanying biotope as per the Berlin Biotope Type List (provided it has been assigned); <b>Accompanying biotopes</b> are associated biotopes which cannot be mapped due to their small scale; they do not exist throughout the spatial extent of the main biotope
SCHUTZ_P26*	<b>legally protected biotopes</b>	Protected status of the biotope according to § 30 BNatSchG and § 28 NatSchGBIn, Indicator according to the assessment of the mappers: 0: no; 1: yes; 2: unclear
LRT_CODE*	<b>LRT coding</b>	Coding of the habitat type as per the Habitats Directive. Generally assigned only for surface mapping.
LRT_KOMPLEX*	<b>Part of which LRT complex</b>	Assignment of the biotope to a LRT complex as per the Habitats Directive manual (SSYMANK et al. 1998) and the Catalogue of Natural Habitats and Species of Appendices I and II of the Habitats Directive (LUA 2002) (provided Habitats Directive mapping was carried out)
BT_WERT	<b>Biotop value</b>	Evaluation of Biotops using the "proceeding for the evaluation of impacts for the state of Berlin"
KART_JAHR	<b>Mapping year</b>	Year of mapping
KART_METH	<b>Data collection method</b>	Aerial image mapping (L) or surface mapping (T), or composite mapping, or secondary data
DAT_QUELLE	<b>Data source</b>	P: Primary data/true biotope mapping S: Secondary data (recoded urban structure data)
BOGEN_ID*	<b>Sheet number</b>	If a number is shown here, a detailed mapping sheet exists on this data set. This is maintained by the project coordinator in a database.
PROJ_ID	<b>Project ID</b>	Four-digit key of the mapping projects. This consists of the first two digits for the calendar year (02 = 2002) and two subsequent digits. The expert assigned to the respective mapping project can be queried via the project coordinator using the project ID.



PRJ_TIETEL	<b>Project title</b>	Name of the mapping project
BT_LEG	<b>Legend</b>	Number of legend

**Tab. 3: Factual data structure**

## Map Description

### Biotope types

After the initial ascertainment of the biotopes in Berlin (primary data) was completed, the results were combined with the secondary data to produce a full-coverage map of biotope types. Information is available for over 80,000 biotopes.

The GIS and factual data can be used for a wide variety of auditing queries. They provide the following overview of Berlin, compiled in 12 classes of the most important biotope types:

Biotope type classes		Area in hectares	Proportion of the total area of Berlin
01	Flowing waters	969.48	1.1 %
02	Standing waters (including shore area, cane brakes etc.)	4,547.07	5.1 %
03	Anthropogenic regosol sites and ruderal fields	2,063.92	2.3 %
04	Bogs and marshes	167.31	0.2 %
05	Green spaces, herb fringe fields and grassland communities	4,104.54	4.6 %
06	Dwarf shrub heaths	17.63	0.0 %
07	Bushes, tree rows and groves	1,907.89	2.1 %
08	Forests	16,868.57	18.9 %
09	Fields	2,074.05	2.3 %
10	Green and open spaces	8,723.16	9.8 %
11	Special biotopes	300.11	0.3 %
12	Built-up areas, traffic facilities and special areas	47,287.04	53.1 %
	<b>BERLIN</b>	<b>89,030.77</b>	<b>100.0 %</b>

**Tab. 4: Break-down of biotope type classes, as of 2013**

Bogs, marshes, cane brakes, and wet meadows rich in rushes and sedge, spring areas, near-natural non-built-up stream sections, land-forming areas of stationary waters, open inland dunes, dwarf shrub heaths, marsh and flood-plain forests, pine-oak woods, oak-beech woods, oak-hornbeam woods, lean and dry grasslands, wet meadows, near-natural fresh meadows, gravel, sand and marl quarries, country hedges and fruit trees and shrubs in open landscape are all [legally protected biotopes](#) in Berlin. These are the most important, but also the most endangered biotope types.

The existing areas are described in detail on the basis of their habitats, their existing flora and fauna, and their endangerment and impairments. Moreover, instruction for care and biotope preservation are provided.

### Map “Biotope types - legally protected biotopes”

The **map of the legally protected biotopes** includes only data for the areas investigated as primary data. It shows all biotopes which, in the professional opinion of the expert (mapper), fall under the legal protection of § 30 of the BNatSchG and the § 28 of the NatSchGBln. Whether or not this expert

assessment is actually to be used however, is a matter to be decided by the locally responsible conservation authority. In cases of non-absolute legal assignment by the mapper/expert, or if biotopes have not been locally investigated, the uncertain protected status is indicated by the symbol §?.

There are 4.000 cases. Marking these areas, there still existing potentials should be shown.

The colours and markings used here correspond to those of the "Map of Biotope Types". Areas that were classified as biotopes with no legal protected status in the biotope type mapping are shown as uncoloured areas with their biotope type code. Areas for which only secondary data exist and are not present/shown in the map.

An audit of the primary data yields the following result for legally protected biotope areas. Additional legally protected biotopes are to be expected in the areas covered by secondary data.

Biotope type classes		Legally protected biotopes in hectares	Proportion of legally protected biotopes in the biotope class in %
01	Flowing waters	29.35	3.0 %
02	Standing waters (including shore areas, cane brakes etc.)	739.59	16.3 %
03	Anthropogenic regosol sites and ruderal fields	16.90	0.8 %
04	Bogs and marshes	167.10	99.9 %
05	Meadows, herb fringe fields and grassland communities	1,029.60	25.1 %
06	Dwarf shrub heaths	17.58	99.7 %
07	Bushes, tree rows and groves	183.28	9.6 %
08	Forests	2,830.94	16.8 %
09	Fields	0.00	0.0 %
10	Green and open spaces	0.09	0.0 %
11	Special biotopes	0.00	0.0 %
12	Built-up areas, traffic facilities and special areas	2.24	0.0 %
<b>BERLIN</b>		<b>5,016.67</b>	<b>5.6 %</b>

**Tab. 5: Biotope types with legal protected status, as of 2013**

## Habitat types under the Habitats Directive

The **map of habitat types under the Habitats Directive** shows all biotopes which, in the professional opinion of the expert (mapper), correspond to a habitat type under the Habitats Directive, or are to be classed in a complex with an LRT, on the basis of the *Manual for the Implementation of the Habitats Directive* (Ssymank et al. 1998) or the *Catalogue of Natural Habitats and Species of Appendices I and II of the Habitats Directive in Brandenburg* (LUA 2002). **Habitat types are shown in solid colours, and LRT complexes in coloured cross-hatching.** Biotopes which do not fall under the Habitats Directive are shown on this map in off-white (area) or grey (lines and points). Areas for which only secondary data are available are not included on the map.

LRT complexes are biotope types which constitute contexts ("complexes") together with the actual Habitats Directive habitat types, but which do not exhibit the required quality. The goal is to improve the complexes to the level of habitat types; hence, they are also subject to the goals of the Habitats Directive.

In order to ensure better distinction of the Habitats Directive habitat types, a special colour and marking system has been developed which compiles the biotope type occurrence in Berlin in groups, to each of which a colour marking is assigned in accordance with the legend of the Habitats Directive LRTs. Biotopes classed as part of an LRT complex are shown as cross-hatched areas, dotted lines, or circled points. For area-wide biotopes, the respective LRT code is given in red, permitting each biotope type to be identified.

## Data sources on biotope types

For the maps of the Full-Coverage Biotope Type Mapping project to be interpreted, it is indispensable to provide the method of data collection for every single area. The Biotope Type Map data source serves this purpose. It identifies the delimitation and classification of the biotope types as per the Berlin Biotope Type List, listing the primary and secondary data by method of collection. Primary data are collected based on surface and aerial image mapping. Secondary data are recoded data from the Environmental Atlas (Urban Structure), the Green Space, Cemetery and Allotment Garden land registers, and the Map of Bodies of Water (Small Waters).

1. Biotope mapping (primary data, surface collection): All forests, Natura 2000 areas, nature and landscape protection areas and valuable conservation areas (outlying areas)
2. Biotope types (primary data, aerial image collection): Collected using recent aerial photography
3. Urban structure data from the Berlin Environmental Atlas, recoded to biotope types (secondary data): particularly built-up areas, industrial and commercial areas
4. Recoding of existing data from the Green Space, Cemetery and Allotment Garden land registers.

Approx. 38,500 hectares of area of the Berlin Biotope Type Map have been mapped on the basis of primary data, and 50,500 hectares ascertained on the basis of secondary data.

## Biotope Types Biotope Values

As expected, those areas shown on the Biotope Values Map as having the highest values (extremely high) depict the legally protected biotopes and the areas certified under the Habitat Directive. Since these are in most cases still relatively near-natural areas in forest, water body and shoreline areas, the vast majority of them are in areas of the boroughs of Charlottenburg-Wilmersdorf, Reinickendorf and Treptow-Köpenick remote from the city centre. Areas with very high or high biotope values are however also present in more heavily used areas, such as Tegel Airport, the Charlottenburg Palace Park, Jungfernheide or Wuhlheide.

By accessing the factual data display for any selected area, the point count for the biotope evaluation, and hence the conflict potential in case of possible change of use, can be ascertained.

## Literature

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