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“Cities and Biodiversity: Achieving the 2010 Biodiversity Target”

Distinctive characteristics of urban biodiversity

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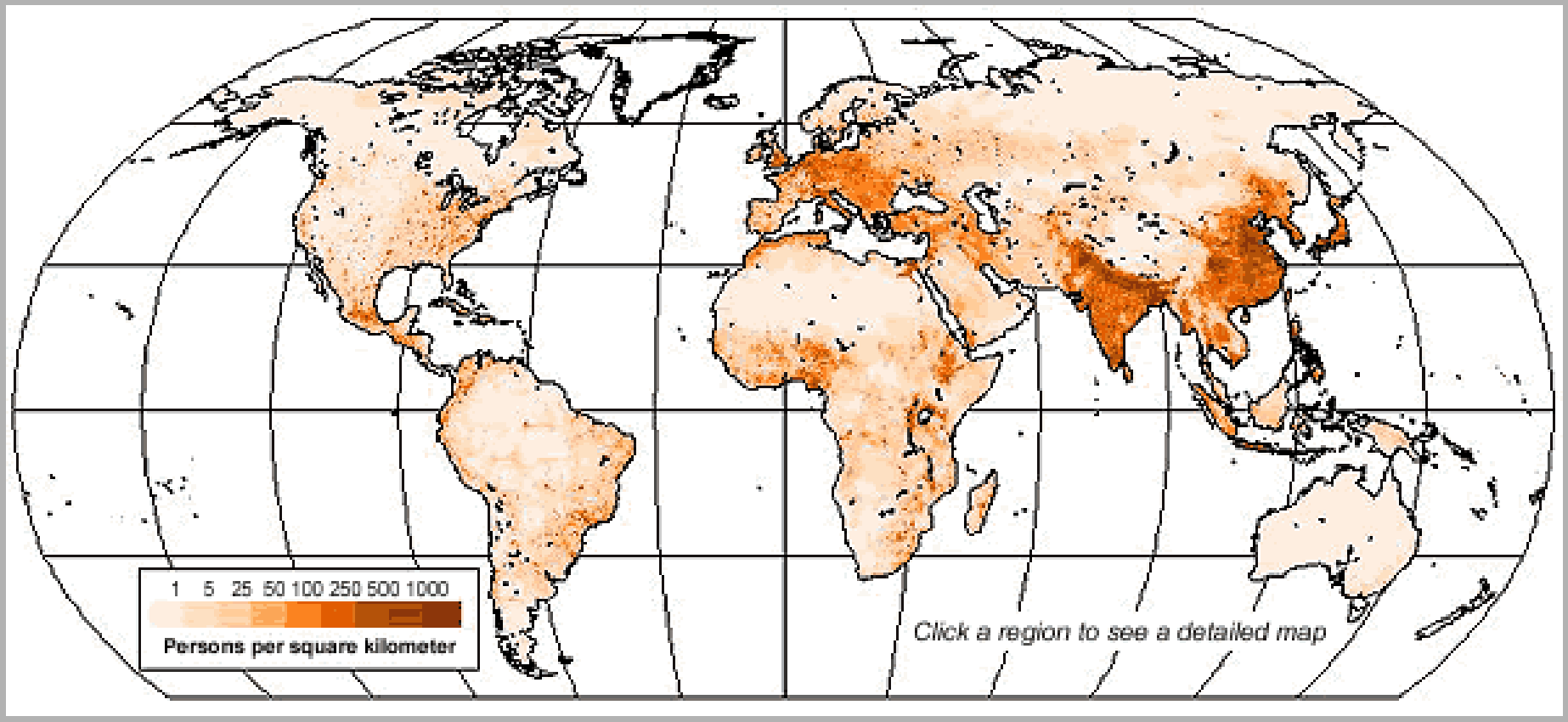
CONTUREC - COmpetence NeTwork URban ECology

Urban dwellers, Praca Osorio, Curitiba

World population density



Ref.: CIESIN 2006

Distinctive characteristics of urban biodiversity

1. Cities - complex hotspots and melting pots for biodiversity
2. Cities - centers of evolution and adaptation
3. Cities - simulating the effects of climate change on biodiversity
4. Distinctive characteristics of urban biodiversity - examples
5. Challenges and chances in context with ”Cities and Biological Diversity”


NASA: Europe by night

1. Cities - complex hotspots & melting pots for biodiversity

Cities are ecosystems with a high biodiversity

Ref.: Vascular plants: Central Europe (Pysek 1989), North America (Clemants & Moore 2002), Fauna: (Klausnitzer 1993)

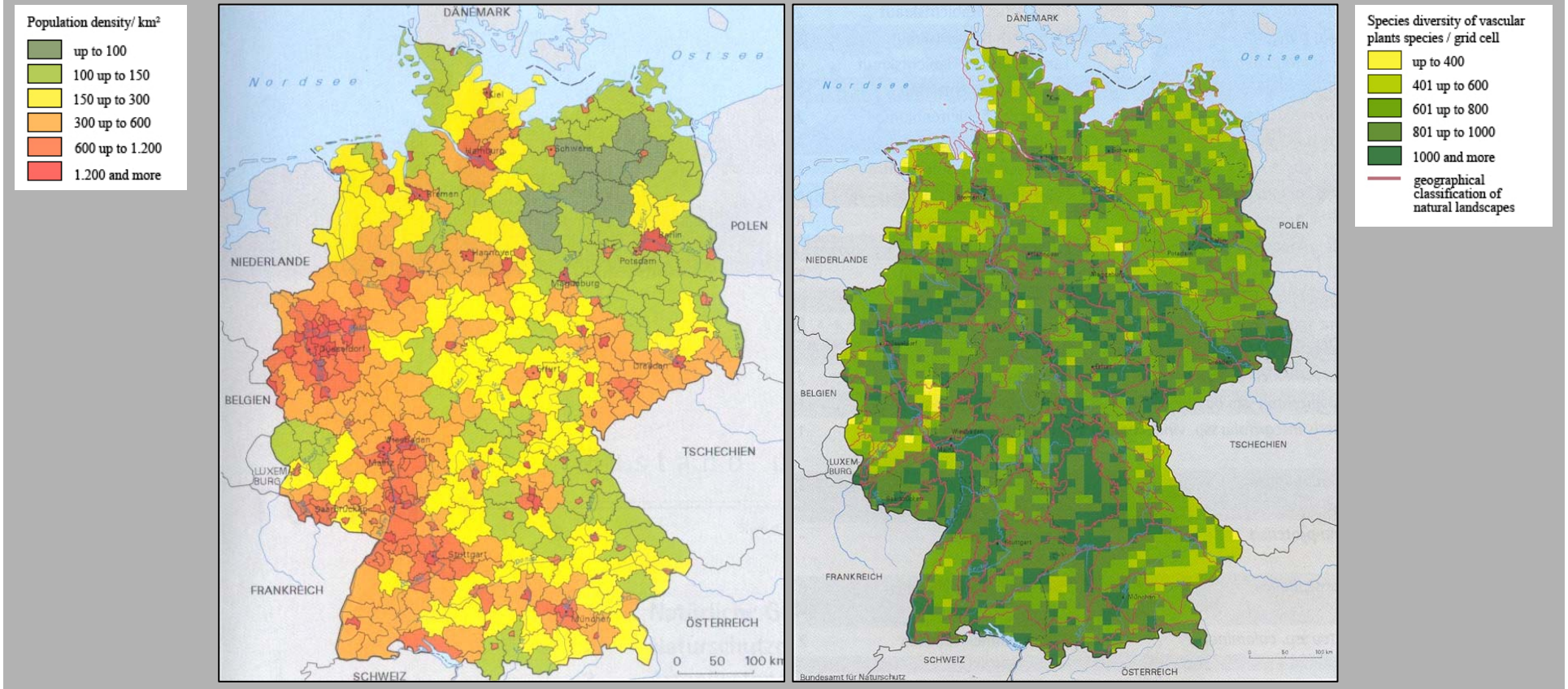
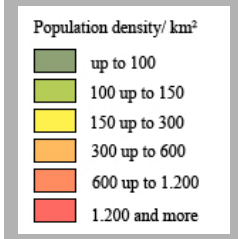
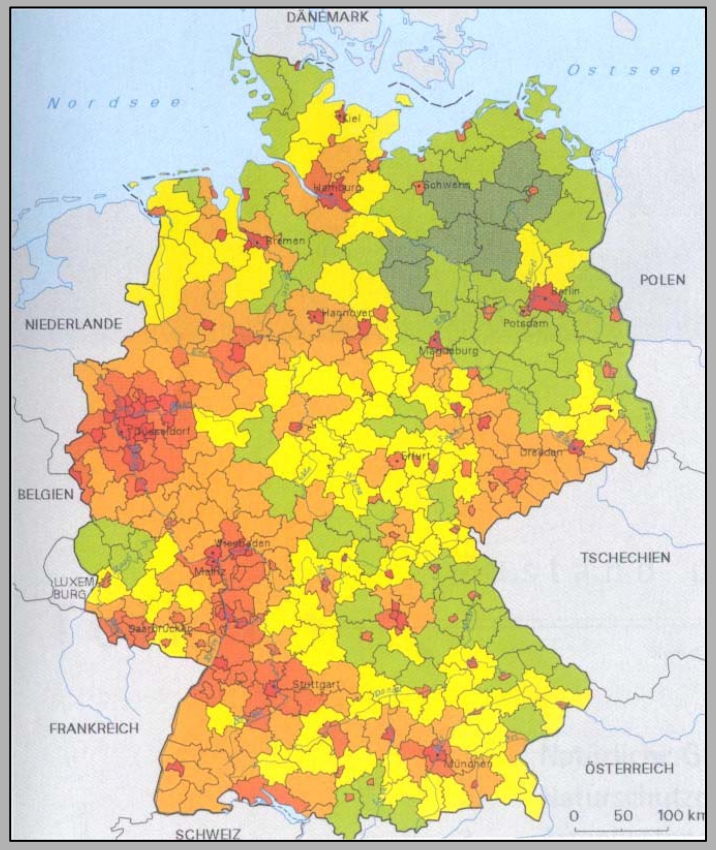


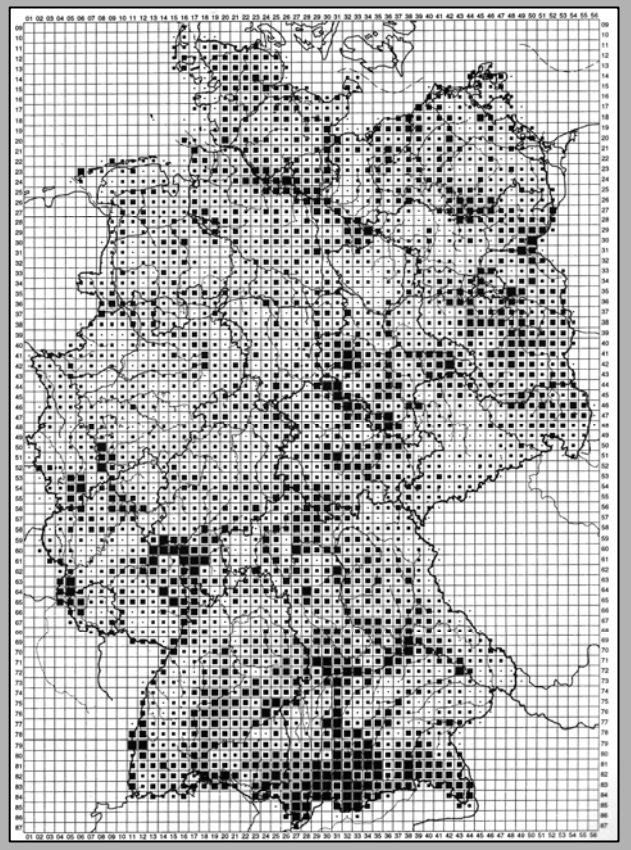
Fig.: Population density/km² and vascular plants species/grid cell in Germany (BfN 2004)

1. Cities - complex hotspots & melting pots for biodiversity

Cities are ecosystems with a high biodiversity







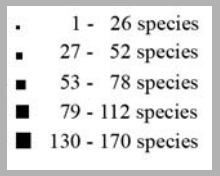


Fig.: Population density/km² (BfN 2004) and density of Red Data species (plants) in Germany (Schönfelder 1997)

What are the reasons for the high biodiversity in cities

1.1 Cities often include relics of **natural habitats**

- forests, rivers,…

1.2 Cities often include relics of **semi-natural habitats**

- meadows, arable fields,…

Rio de Janeiro, Rain forest National Park Tijuca (J. Breuste)

What are the reasons for the high biodiversity in cities

1.3 The variety and distinctness of **urban habitats**

- residential areas, gardens, parks, industrial areas, railway areas, brownfields…

Ref.: Gilbert 1989: Ecology of urban habitats

Aerial photo Berlin

Residential areas, Peterborough


Residential areas, Erfurt

Residential areas, San Francisco

Main road, Curitiba

Downtown, Las Vegas


Central Park, New York

Railway area, Augsburg

Industrial areas, Los Angeles

Brownfields, abandoned railway area, Berlin

What are the reasons for the high biodiversity in cities

1.4 Cities are centers of immigration

Ref.: Birds (Kelcey & Rheinwald 2004), Bats (Geiger 2004)

Pigeons

What are the reasons for the high biodiversity in cities

1.5 Cities are centers of importation, naturalization and spread of exotic species

Ref.: Plants and animals (Kowarik 2003) - v. d. Lippe & al. 2005, McKinney 2006

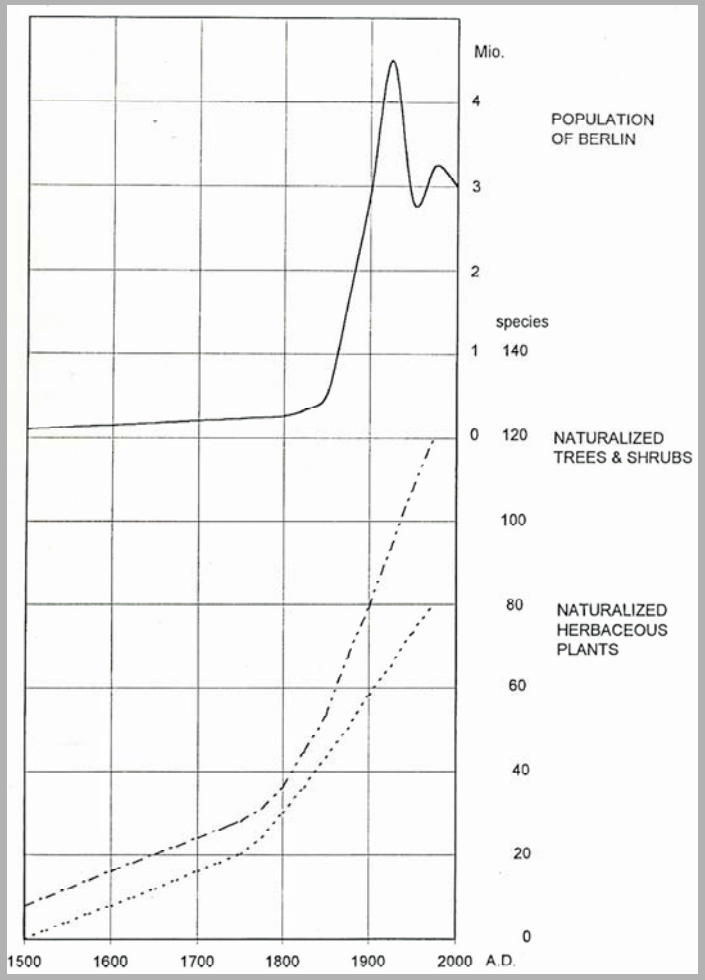


Fig.: Correspondence between human population growth in Berlin and naturalized exotic plants (from Sukopp & Wurzel 2003)

Butterfly Bush *Buddleija davidii*, London

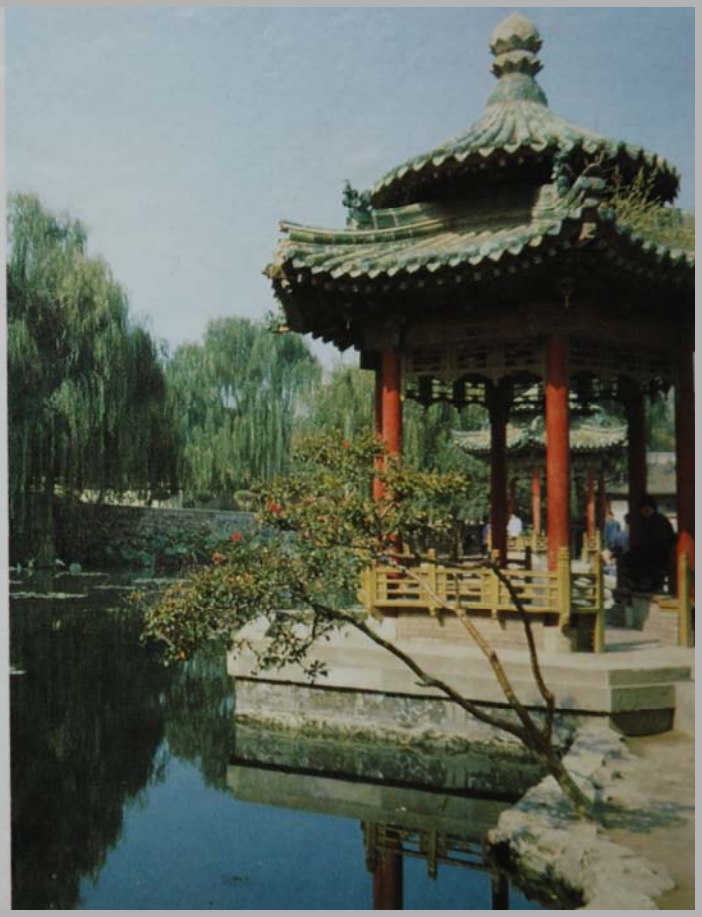
2. Cities are centers of evolution and adaptation

2.1 Ornamental plants

- result from cultivation & selection of native and exotic plants

Ref.: Krausch 2005

Imperial garden (China)



2. Cities are centers of evolution and adaptation

2.1 Spontaneous plants - new taxa are appearing in urban areas

- adapted to the special ecological conditions in urban habitats (e. g. air pollution, soil contamination…)

Ref.: Keil & Loos 2005, Müller 2005, Wittig 2003, 2004

Fig.: *Aster* ssp.

Fig.: *Oenothera* ssp.

and new interactions (biocoenoses) develop between animals and plants

3. Cities - simulating the effects of climate change on biodiversity

Cities are “heat islands” (annual temp. 2° C higher)

Ref.: Sukopp & Wurzel 2003

Fig.: Distribution of Tree of Heaven (*Ailanthus ailtissima*) in Berlin and the warmest areas

4. Distinctive characteristics of urban biodiversity - examples

4.1 A variety of species only occur in cities

- example black redstart

Black redstart

(*Phoenicurus ochruros*) breeds in Britain only on buildings and other structures in cities.

Ref.: Knight 2007

4. Distinctive characteristics of urban biodiversity - examples

4.2 Urban habitats have their distinctive biodiversity

- example brownfields

Nature Reserve “Schöneberger Südgelände”, Berlin

4. Distinctive characteristics of urban biodiversity - examples

4.3 The species diversity of urban habitats is different

Ref.: Gilbert 1989, Müller 1990

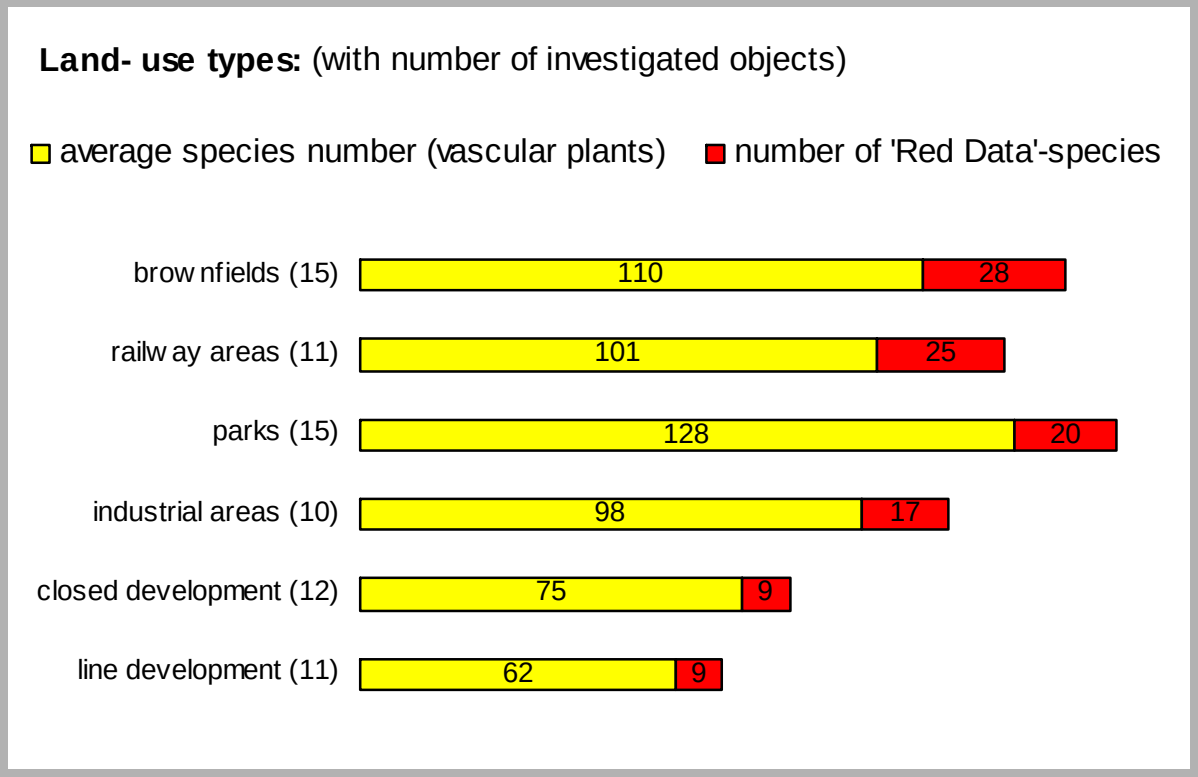


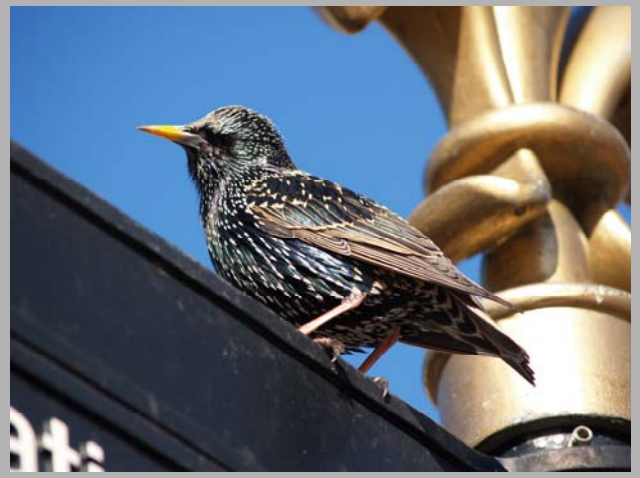
Fig.: Vascular plant species diversity and endangered species of different land use types in Augsburg, Germany (from Müller 1990)

Historic parks, Peterborough (D. Knight)

4. Distinctive characteristics of urban biodiversity - examples

4.4 Urban biodiversity is endangered

- e. g. due to standardized landscaping against nature



Starling
(*Sternus vulgaris*)

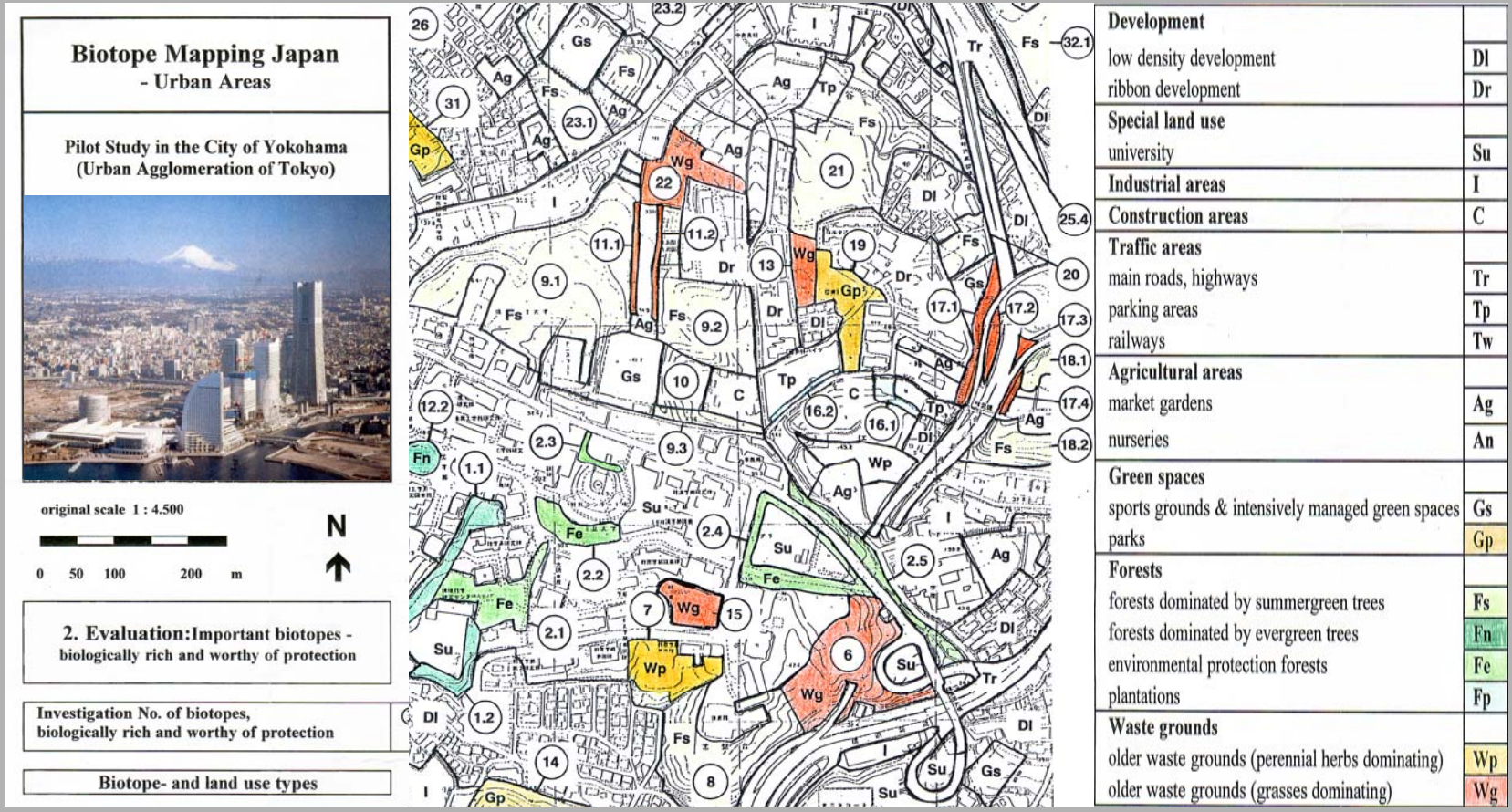
In Britain, 50% decline in population over 30 years

Ref.: Knight 2007

5. Challenges and chances in context with cities and biodiversity

5.1 Evaluation and integration of urban biodiversity in urban development

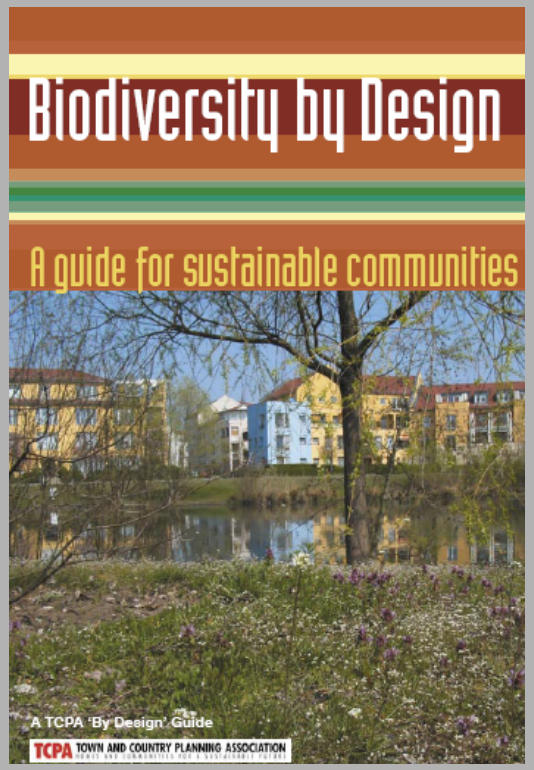
Ref.: Müller 1998, Kuehn & Klotz 2006



5. Challenges and chances in context with cities and biodiversity

5.2 Design and future of urban biodiversity

5.2.1 Master planning for biodiversity



http://www.tcpa.org.uk/downloads/TCPA_biodiversity_guide_lowres.pdf

http://www.cabe.org.uk/default.aspx?contentitemid=1328

5. Challenges and chances in context with cities and biodiversity

5.2 Design and future of urban biodiversity

5.2.2 The only biodiversity that many people experience

Children playing on abandoned railway area, Erfurt

5. Challenges and chances in context with cities and biodiversity

5.2 Design and future of urban biodiversity

5.2.3 Contributing to the quality of life in an increasing global society

Example: “Ecocycles” in S-Africa (S. Cilliers)

5. Challenges and chances in context with cities and biodiversity

5.3 Consequences for the Convention on Biological Diversity

“Cities and Biodiversity” is a key matter of relevance according the aims of the Convention on Biological Diversity

therefore an own program

“Cities and Biodiversity” is necessary!!!

Acknowledgements

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Main Organizer
Int. Conference: www.urban-biodiversity-erfurt-2008.de

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Urban Biodiversity & Design

Implementing the Convention on Biological Diversity in towns and cities

International Conference Erfurt, Germany, 21. - 24. May 2008