



BRUXELLES ENVIRONNEMENT
LEEFMILIEU BRUSSEL
- IBGE·BIM -

WORKSHOP CBI

City Biodiversity Index Results for Brussels - Belgium

21 May 2010



Dr. MACHTELD GRYSEELS – Brussels Environment

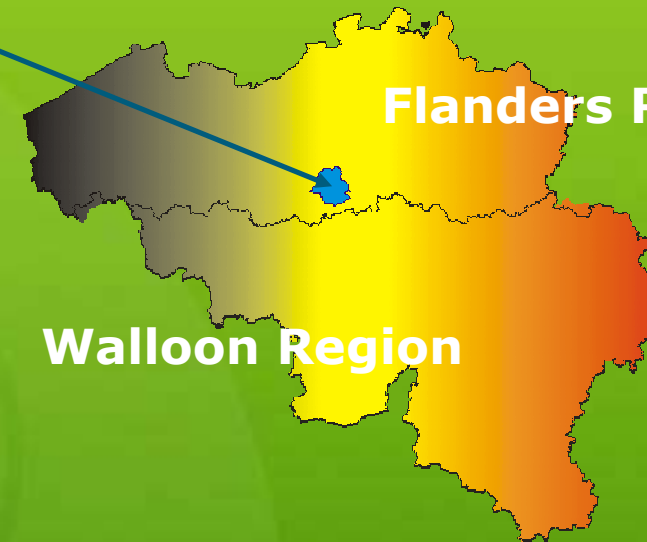
Director of the Division Nature, Water and Forest

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Europe



- 160 km² (0,5 % of Belgium)
- 19 municipalities
- 1.000.000 inhabitants
- 350.000 commuters
- dense traffic infrastructure



**Brussels Environmental
Administration :**

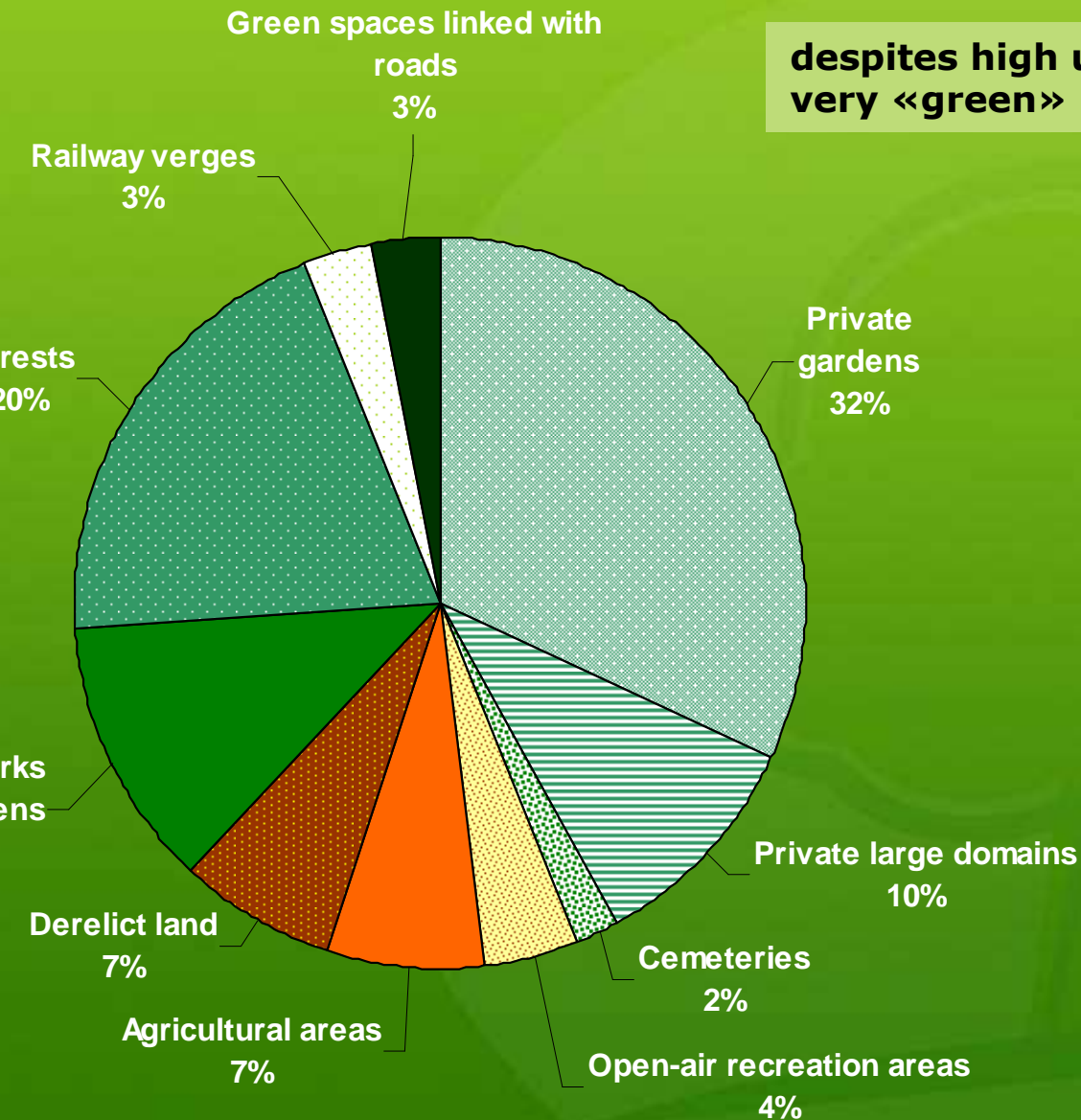
***Brussels Institute for
Management of the
Environment (BE)***

**→ Division Nature, Water &
Forest**

→ Division Green Spaces



**despite high urbanization,
very «green» region, green belt**

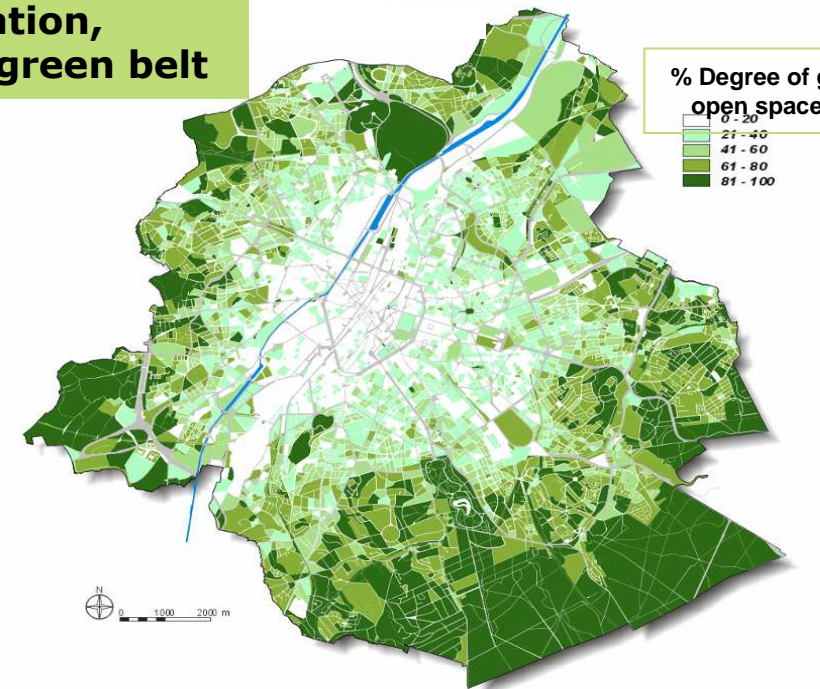


Management :

- Regional spaces

- Nature Reserves: 150 ha
- Forests: 1750 ha
- Parks: 350 ha

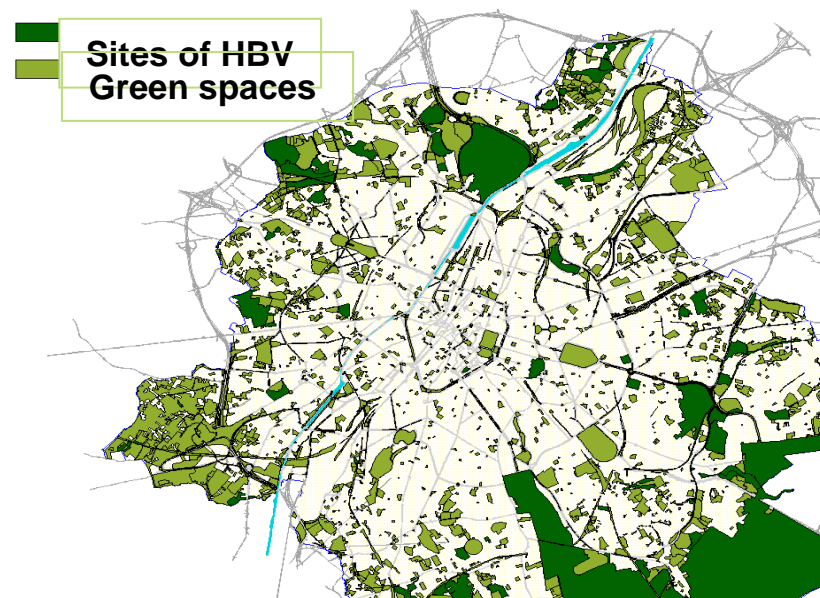
- Other spaces : local municipalities



Sites of High Biological Value: merely at the periphery (green belt)

± 50 % not build

± 15 %: sites of HBV (excl. Private green)





($\pm 20\%$ surf. BO)



Sint-Lambrechts-Woluwe
Woluwe-Saint-Lambert



→Elsene



UN
Uc

Urban parks



ruin
ique



Jub
Cinquent



Kleine Zavel

Landscape parks

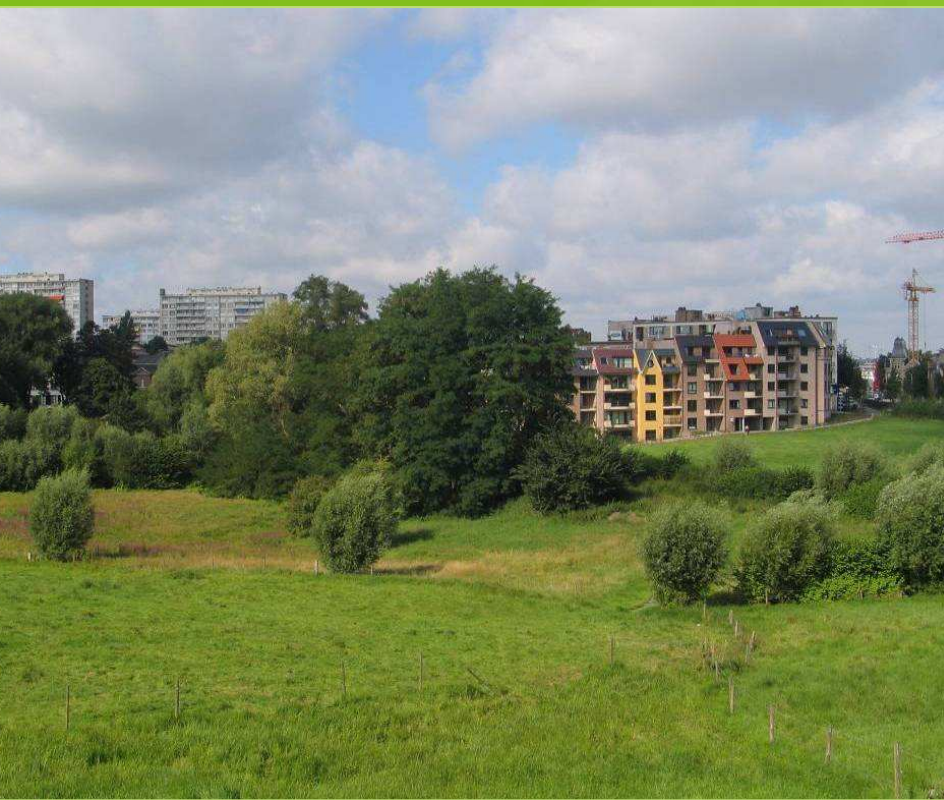
**Ecological
(differentiated)
management**



luwepark



capsulated in the urban environment



→ Zavelenberg

**Woodlands, marshes
grasslands**



← r-Musschen



Railway verges



Schaarbeek ←

Derelict land

ledelle



unexpected flora & fauna-richness



Peregrine
on on
medial



orchid on
ict land

GROUPS	TOTAL	EXOTIC	ENDANGERED
Mammalia	44 species	• 17 species chiroptera (total 21 sp. in Belgium) • 3 exotic	7 species
Avifauna	± 100 species breeding birds	• 11 exotic	8 species
Herpetofauna	10 species (3 reptiels, 7 amphibians)	• 1 exotic	2 species
Higher plants	± 793 species (50% Belgian Flore)	• 27% exotic • 50sp./km ² (center) → 300 sp./km ² (periphery)	66 species
Bryophyta	± 223 species		49 species
Macrofungi	± 913 species	• 1 exotic	± 748 species
Lichens	36 species epiphytic macrolichens on trees	?	?
Dragonflies	23 species	0	9 species
Orthoptera	26 species	• 1 exotic	
Butterflies	29 species	• 1 exotic	14 species



Old W
Swallow



Vespertilion

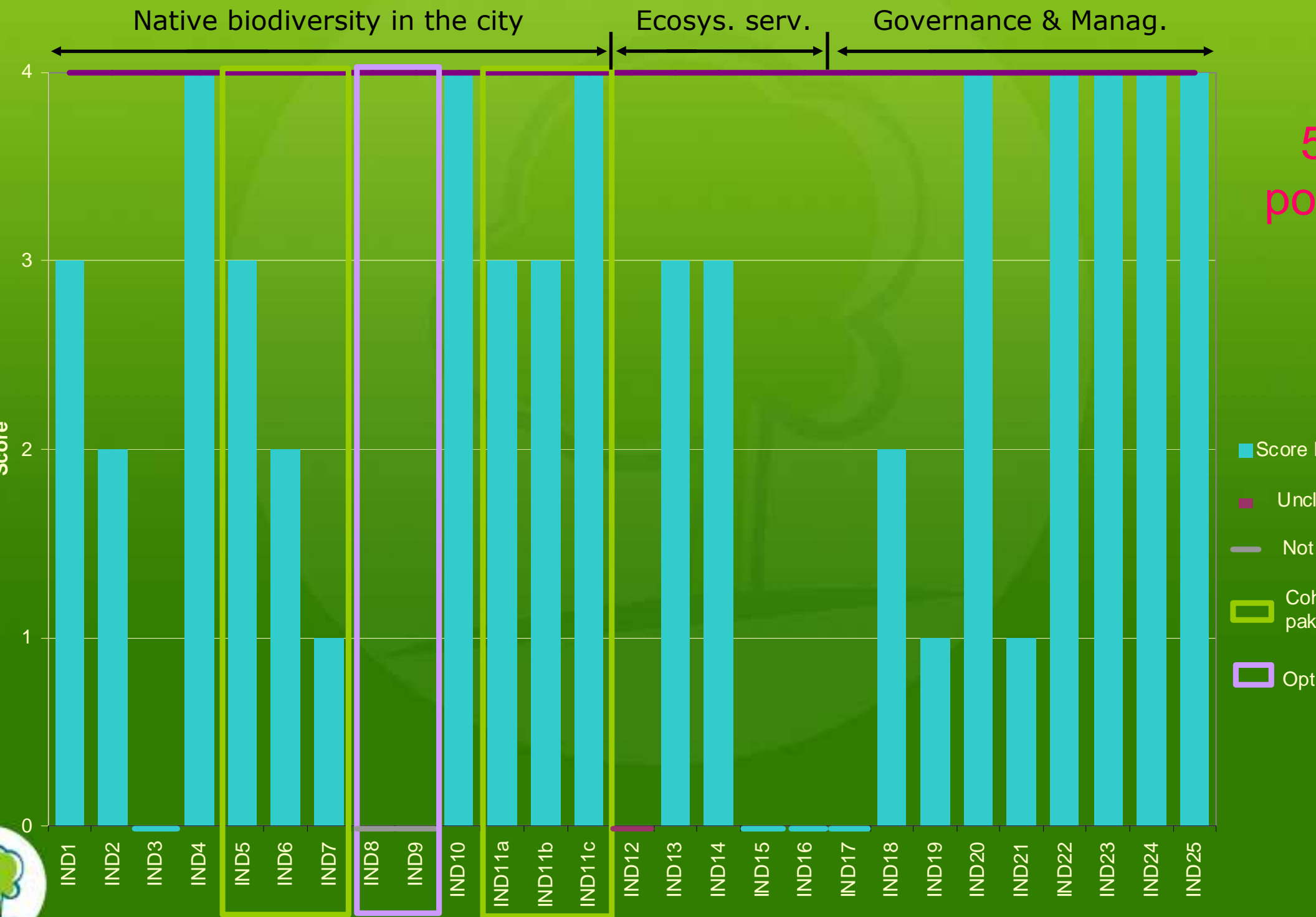


↗diversity in biotopes → ↗diversity of species

A wide range of high - to low quality biotopes



CBI Index - Brussels 2010



Brussels results (1/7)

Components	Indicators	score
Native Biodiversity in the city	Ind. 1 : % of natural/semi-natural areas	3
Native Biodiversity in the city	Ind. 2 : Diversity of ecosystems	2
Native Biodiversity in the city	Ind. 3 : Fragmentation Measures	0
Native Biodiversity in the city	Ind. 4 : Native biodiversity in built-up areas (birds)	4



Brussels results (2/7)

Components	Indicators	Score
Native Biodiversity in the city	Ind. 5 : Number of native plant species	3
Native Biodiversity in the city	Ind. 6 : Number of native bird species	2
Native Biodiversity in the city	Ind. 7 : Number of native butterfly species	1
Native Biodiversity in the city	Ind. 8 : Number of native species (others)	-



Brussels results (3/7)

Components	Indicators	Score
Native Biodiversity in the city	Ind. 9 : Number of native species (others)	-
Native Biodiversity in the city	Ind. 10 : % of protected areas	4
Native Biodiversity in the city	Ind. 11a : Proportion of native plant species	3
Native Biodiversity in the city	Ind. 11b : Proportion of native bird species	3



Brussels results (4/7)

Components	Indicators	Score
Native Biodiversity in the city	Ind. 11c : Proportion of native butterfly species	4
Ecosystem services	Ind. 12 : Freshwater Services	?
Ecosystem services	Ind. 13 : Carbon storage	3
Ecosystem services	Ind. 14 : Visits to parks & nature reserves	3



Brussels results (5/7)

Components	Indicators	Score
Ecosystem services	Ind. 15 : Accessible park area and nature reserves	0
Ecosystem services	Ind. 16 : No. of educational visits	0
Governance & Management of Biodiversity	Ind. 17 : Budget allocated to biodiversity projects	0
Governance & Management of Biodiversity	Ind. 18 : Number of biodiversity projects and programs	2



Brussels results (6/7)

Components	Indicators	Score
Governance & Management of Biodiversity	Ind. 19 : Rules, Regulations & Policy	1
Governance & Management of Biodiversity	Ind. 20 : No. of institutions	4(
Governance & Management of Biodiversity	Ind. 21 : No. of inter-agency co-ordination initiatives	1
Governance & Management of Biodiversity	Ind. 22 : Existence of a consultation process	4



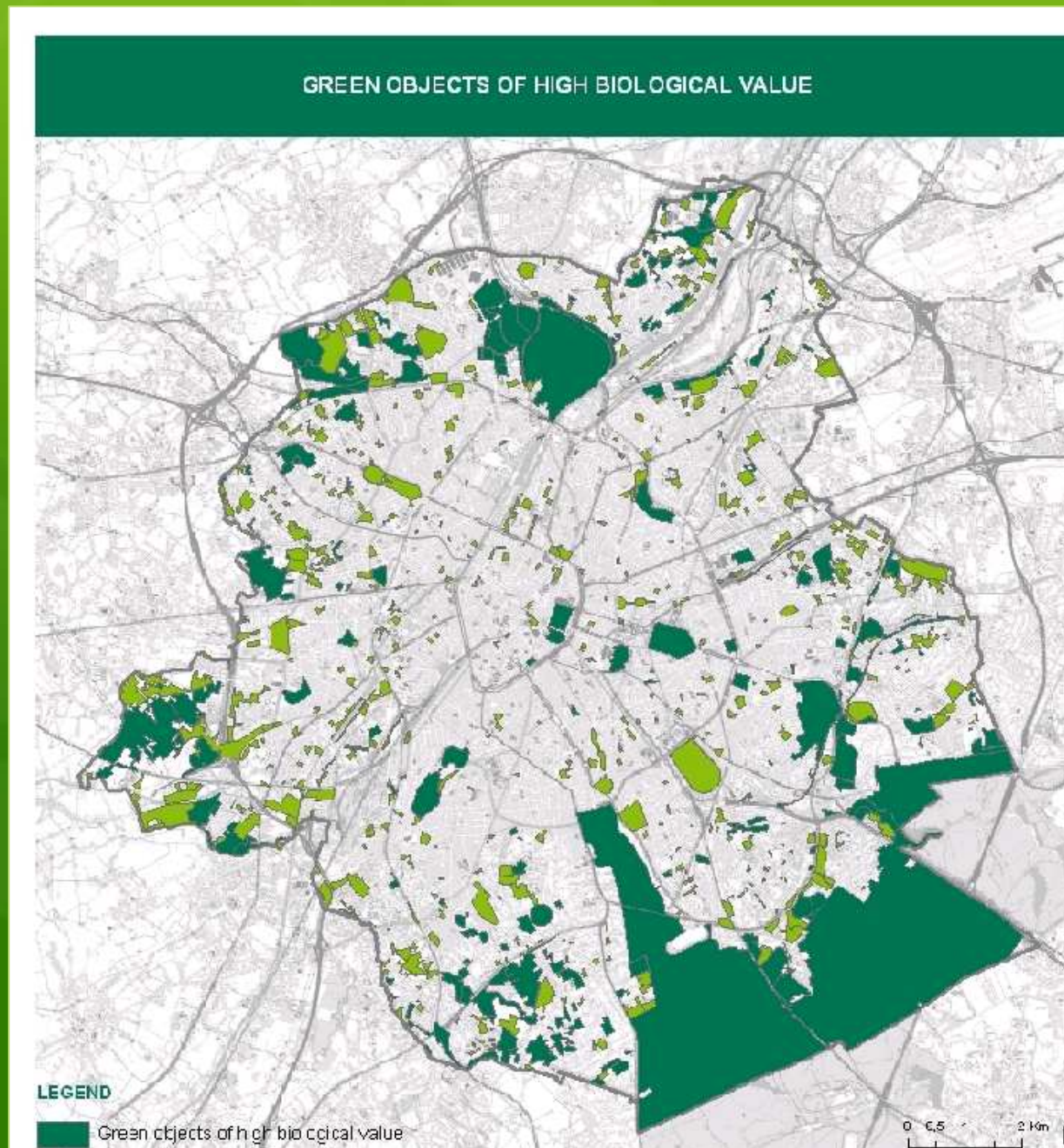
Brussels results (7/7)

Components	Indicators	score
Governance & Management of Biodiversity	Ind. 23 : Existence of partnerships	4
Governance & Management of Biodiversity	Ind. 24 : Biodiversity into the school curriculum	4
Governance & Management of Biodiversity	Ind. 25 : Public awareness events	4



Brussels strenght (1/2)

- Brussels shows good results for presence and protection of natural areas indicators



Brussels strenght (2/2)

- Brussels shows also some good results for **Governance and Management of Biodiversity** indicators : 20, 22-25
- Indicator 20 should however be put into perspective with the population size and the statute of the city : Brussels is a Capital → a lot of institutional actors are present but only working for Brussels if special financing
- Lack of precise definition of the indicators :
 - What is a biodiversity project/program? (ind. 18 could be better ?)
 - Do informal partnership/coordination initiatives count? (ind. 23)



Brussels apparent discrepancies (1/2)

- Brussels shows good results for Number of native plant species and Native biodiversity in built-up areas (birds) while weak results for Diversity of ecosystems and Number of native birds and butterfly species →
 - Low score for biodiversity and ecosystems and no. of native species is linked with biogeographical situation of Brussels : not tropical, not coastal
 - Plants suffer less than birds and butterfly from fragmentation and/or human perturbations (light, noise...) ?
 - Unadapted thresholds ? Thresholds to be adapted to biogeographical conditions? Thresholds to be put into perspective with the age of the city (more stabilized communities) ?

Brussels apparent discrepancies (2/2)

- Brussels shows good results for presence of natural areas (18% - 20%) while score bad for accessible park area and nature reserves (0,003 ha/pers)
 - Accessible green spaces : +/- 30m²/pers = high for an European city (litterature recommandation = min. 10m²/pers)
 - ➔ Unadapted thresholds ? Thresholds to be put into perspective with the density of the city (density in Brussels is about $1\,048\,491 / 161,38 = 6500 \text{ p/km}^2$)

Brussels main weaknesses

- Budget allocated to biodiversity (0,95 €/inh)
- Fragmentation : Brussels is very urbanized. Note however that results strongly depends on the minimum mapping unit.
- Lack of official inter-agencies coordination and partnerships for action on the field
 - ➔ Necessity of a coordinating BAP (in prep.)



Unclear indicator

- Only 2,7% of freshwater is produced in Brussels (ground water under forest cover)
 - ➔ adapt the indicator to correctly reflect the intern situation of the city ?



Brussels proposition to adapt CBI

- Take regional particularities better into account (biogeographical conditions, age of the city, population density)
- Be more accurate with indicators definitions (IND 3, 12, 20, 23)
- Propose coherent indicators for IND 5, 6, 7 and 11
 - Limit at 3 the indicators about the number of native species (IND 5-7)
 - Split indicator about the proportion of native species (IND 11) and take non invasive exotic species into account
 - Consider the same groups in both situation : plants, birds, butterflies
 - What about rare/endangered species ?



4	3	18,0 - 20,4	%	<p>This indicator is based on a database of green objects in the Brussels Capital Region. Approximately 3000 objects were identified. Each of them has been given a score of biological value between 5 (no biological value) and 15 (very high biological value). Biological value is based on (1) structural diversity, (2) rarity of present species, (3) presence of typical/rare habitats, (4) naturalness, (5) replacability; maximum score for each factor = 3 points. This interval represents the calculation of areas with a minimum score of 9/15 (146 patches, 3308 ha) and 10/15 (94 patches, 2924 ha) respectively. Regional area = 16245 ha</p>	<p>Semi-natural areas include relics of natural areas (forests, marshes, grasslands, ...) but also parks and wastelands. Earlier calculations of Brussels surface as sites of high biological value (excluding private gardens). Further refinement will be done based on an 2000 image classification of urban green space</p>
4	2	5	#	<p>Temperate forest (could be further subdivided) Freshwater marshes Rivers and waterflows Wasteland habitats (spontaneous vegetation development on urban derelict land) Natural Grasslands</p>	<p>Brussels is not a tropical nor a coastal city. big difference. Please, make a list of ecozones from which to choose</p>
4	0	0,23 - 0,31	km²	<p>This indicator is based on a database of green objects in the Brussels Capital Region. Approximately 3000 objects were identified. Each of them has been given a score of biological value between 5 (no biological value) and 15 (very high biological value). Biological value is based on (1) structural diversity, (2) rarity of present species, (3) presence of typical/rare habitats, (4) naturalness, (5) replacability; maximum score for each factor = 3 points. This interval represents the calculation of areas with a minimum score of 9/15 (146 patches, 3308 ha) and 10/15 (94 patches, 2924 ha) respectively. Regional area = 16245 ha</p>	<p>Results strongly depends on the minimum mapping unit. Fragmentation measures will be calculated as far as possible with a more appropriated method: 1. Mean patch size (based on a map with a mapping unit of +600m² = smallest patch) 2. isolation of patches through minimum distance approach (minimum mapping unit of 0,5 ha) Define standards ?</p>
				<p>31 species were minimum 10 times mentionned in grid cells (1km²) that are fully included in the BCR and fully excluded of natural and semi-natural areas (see IND1). Among those species, 3 are non breeding birds in the</p>	

					Acceding maximum score not possible. C Angiosperma are present in Belgium, inc zones en zones under other biogeograph (continental). Nearly 800 higher plant spe exotic species) are present in Brussels, v the Belgian flora (1500 higher plkant spe
4	3	578	#	Atlas Flora 2003-2005	
4	2	92	#	Breeding birds 2000-2004	Total number of bird species in Belgium :
4	1	28	#	Breeding butterflies 1998-2008	Total number of butterfly species in Belgi
4	n.p.				No coastal zones in Brussels. Hard coral in the Atlantic biogeographical region
4	n.p.				Other groups could be mammals and/or r but see proposal for indicator 11
4	4	15	%	The Natura 2000 network covers about 14% of the area	
4	3	6,16	%	793 species are present in Brussels (2003-2005). Of which 225 are new plants species for Brussels. Of which 35 are describe as IAS (Belgian Biodiversity Platform lists - all categories)	The way of calculation is a little bit curiou exotic species that are not (yet) invasive
4	3	4,35	%	103 breeding birds are present in brussels (2000-2004). Of which 11 are exotic species. Of which 4 are invasive species (Belgian Biodiversity Platform lists - all categories)	The way of calculation is a little bit curiou exotic species that are not (yet) invasive
4	4	0	%	No exotic butterflies species are present in Brussels	The way of calculation is a little bit curiou exotic species that are not (yet) invasive

4	?????	?????	%	Belgian water product, provided 67 Mm³ to Brussels. Total Brussel water supply budget is 210 M€. This means a real cost of 3,13€/m³, however water is provided to user at a net price of 0,57 €/m³. Under hypothesis that 100% of the price cover cleaning cost, this means total cleaning cost = 38,2 M€. Only 2,7% of the production is coming from catchment in natural forest in Brussels, so total cleaning cost in Brussels should be only 1 M€. Total Brussels water supply budget	only 2,7% of freshwater is produced in Br explains that the indicator is so low. Indicator depends on costs of other water services. This could lead to bias in the interpretation. Indeed, costs of distribution treatment could be very high, offsetting a water cleaning and therefore, increasing water catchement services which would be coming from an other area.
4	3	520.000	#	Tree > 40cm circumference. Result managing unit 4 (200ha Sonian Forest) = 295a/ha; Result managing unit 8 (212ha Sonian Forest) = 324a/ha. Extrapolation for the hole forest (1655ha) + buffer for streets and parks trees	10% of the BCR is covered by wooded land evolve due to distant thresholds.
4	3	95	#/pers/y	Estimation based on two surveys. A survey of Dedicated Research conducted in 2007 tells us that 93% of the population visits parks or forests more than once a year; 2% once a year; 5% never. An inquiry (thesis VUB 1998) of visitors of the Sonian Forest and Laarbeekbos (n=243) tells us that about 26% of forest visitors come about once a day; 32% come about once a month; 41% come less than once a month. For this indicator we assume (1) that 95% of the population adopt the same visiting pattern as the people that where questionned in the inquiry and (2) that the people that go less than once a month but more than once a year visit parks and forests 3 times a year. Population in 2007 = 1 031 215	
4	0	0,003	ha/pers	Both legitimately and effectively accessible parks and nature areas cover 2824,41ha (source = study BRAT; espaces publics majoritairement végétalisés + bois + friches). Population in 2008 = 1 048 491	Accesible green spaces in Brussels are : which is being condiderd as high. In the l recommendation for accessible green sp minimum 10m²/person. Important to density of the city. Density in Brussels is : 491 / 161,38) 6500p/km²

4	0	0,04	%	Budget DNF = 1M€; Budget MRBC = 2.787M€	
4	2	11	#/y	Annual survey birds, bats, other (3) ; Natura 2000 (1) ; Maillage écologique dont gestion différenciée, actions espèces, maillage bleu, éco-construction, jardins nature (5), gestion des réserves naturelles (1), gestion des bois et forêts (1)	Indicator is not so clear : what is a project?
4	1		-	Orientations pour une promotion du patrimoine biologique en Région de Bruxelles-Capitale	A new one is in process due to LAB project
4	4	5	#	Jardin Massart, KBIN, VUB, ULB, INBO	Most of those institutions are financed by local authorities but are present in Brussels. They are working for biodiversity in Brussels, unless in Brussels. So should they be considered ?
4	1	2	#	Water authority + Infrabel	
4	4		#	Consultation process exists	
4	4	27	#	NGOs, Infrabel, SDRB, IRSCNB, VUB, ULB, INBO, Jardin Massart, communities (19)	Should we consider the different NGOs separately ? Should we consider study/research partnerships ? Only the partnership with Infrabel is a real one that concerns action on the field.
4	4		-	Biodiversity is included in school curriculum, but is not always considered as very important and thus few supported.	Depends on other authorities
4	4	576	#/y	Based on the agenda of the NOGs (Tournesol - Zonnebloem), about 182 particular activities (average of 15 per month) and 394 regular activities (11 different types) were planned in 2009 in the BCR	Should be put into perspective with the previous