

# STATE AND DEVELOPMENT OF THE ENVIRONMENTAL COMPARTMENTS



AIR

WATER

LANDSCAPE

WASTE

NOISE





## B3 LANDSCAPE

### B3.1 LAND BALANCE AND REGISTRATION OF GREENERY – THE REGISTER OF LANDS AND GREENERY

In 1995 as a part of the database of the Prague Environmental Information System (IOŽIP) the Register of Lands and Greenery was developed, which includes data on particular plots and aggregated data on cadastral districts. These data were presented in the publication Lands and Greenery – Balance by Cadastral Districts (IMIP, 1995), which is already sold out. The Register has not been further updated mostly due to factual and financial demands thereof.

At present there are only updated data of the cadastre of real estates available. The following tables contain summaries on land types (ÚHDP) over the entire territory of Prague for 1998–2006. The categorisation of land resources is made according to individual categories of land type of the cadastre of real estates.

**Tab. B3.1 Aggregate areas of land types [ha]**

Land type	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Agricultural land	21,352	21,382	21,287	21,221	21,155	21,110	21,047	20,985	20,870	20,788
– Arable land	15,727	15,766	15,686	15,616	15,569	15,534	15,484	15,430	15,329	15,269
– Vineyards	10	10	10	10	10	10	10	11	11	11
– Hop-fields							1	1	0	0
– Gardens	4,004	4,012	4,002	4,001	4,000	4,002	3,997	3,996	3,992	3,978
– Orchards	729	725	723	718	703	692	687	680	672	664
– Permanent grassland	882	869	866	876	873	872	868	868	866	866
Forest land	4,866	4,893	4,893	4,878	4,878	4,886	4,911	4,920	4,927	4,960
Water bodies	1,066	1,080	1,057	1,057	1,080	1,080	1,080	1,079	1,079	1,079
Built-up areas	4,611	4,683	4,719	4,766	4,807	4,837	4,854	4,871	4,884	4,907
Other lands**	17,745	17,549	17,628	17,667	17,669	17,677	17,698	17,753	17,853	17,876
Total area*	49,640	49,587	49,584	49,589	49,589	49,590	49,590	49,608	49,613	49,610

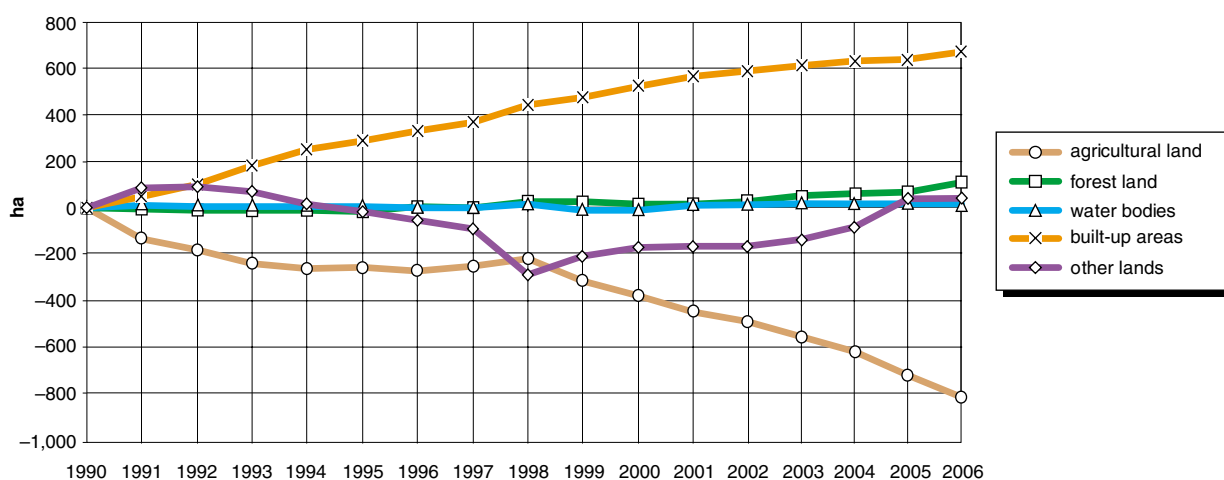
**Note:**

\* Differences in total area are caused by rounding.

\*\* Other lands also include construction sites.

Source: ČÚZK

**Fig. B3.1 Decrements and increments of aggregate areas of different land types**



Source: ČÚZK

Fig. B3.2 Overview of cadastral districts in the City of Prague



Source: MHMP, ČÚZK



**B3.2 NATURE CONSERVATION AND LANDSCAPE PROTECTION**

The Department of the Environment of the Prague City Hall, within the agenda established by the Act No. 114/1992 Code, on nature conservation and landscape protection as amended, implemented measures for nature conservation and landscape protection and significant events as follows:

- In 2007 initial activities started, which should lead to publish the Prague memorial tree book. The fundamental texts were written, original illustrations and photos were prepared. The publishing is planned in 2008.
- In 2007 eleven memorial trees were established, including one alley. Trees have undergone professional treatment continuously. Trees have been marking with the small national emblem of the Czech Republic, too.
- There was developed the proposal on treatment for Nature Reservation Podhoří. Discussing and approval is planned in the half of 2008.
- The proposal on treatment was worked out for the Nature Monument of the Wetlands at the Blatovský Creek in the Klánovický Forest. Discussions, which are about to establishing the Wetlands new especially protected area, are planned in 2008.
- By the end of the year there was submitted to work out the plan on treatment of the Nature Monument - Cihelna in the pheasantry. The construction is planned in spring 2008 therewithal the discussing and establishing will follow.
- Multimedia project, on the Nature and Landscape Protection in the City of Prague, was enlarged with part intended in carabidean beetles. This part consists of information on this significant bio-indicating group from 200 year long observing and mapping. Except aforementioned part, the project includes also the vegetation map, information on birds, butterflies and memorial trees. Outputs are available on DVD and web pages [www.wmap.cz/opk](http://www.wmap.cz/opk).

**Tab. B3.2 Memorial trees established by the Department of Environmental protection of the Prague City Hall (state to 31<sup>st</sup> October 2007)**

OOP	Orientation name	Species	Cad. Distr.	Plot	Girth [cm]	Height [m]	Number
1	Hungarian oak in Italská Street	<i>Quercus frainetto</i> Ten.	Vinohrady	2267/5	265	20	1
2	Maiden hair tree in Royal Game Preserve	<i>Ginkgo biloba</i> L.	Bubeneč	1772/1	350	22	1
3	Common yew in the Paradise Court at the Franciscans	<i>Taxus baccata</i> L.	Staré Město	663	3 x 80	6.5	1
4	Common oak in Dolní Chabry	<i>Quercus robur</i> L.	Dolní Chabry	541	350	24	1
5	Lime-alley in Gagarin Street	<i>Tilia cordata</i> L.	Suchdol	2383	120–220	11–13	19
6	Two common oaks in Točná	<i>Quercus robur</i> L.	Točná	409	320, 260	21, 20	2
7	Common oak in Klánovice	<i>Quercus robur</i> L.	Klánovice	677	345	24	1
8	Common oak Nad Výšinkou	<i>Quercus robur</i> L.	Smíchov	3690	345	23	1
9	Atlas cedar Na Balkáně	<i>Cedrus atlantica</i> Manetti ex Carr.	Vysočany	1919/1	200	14	1
10	Small-leaved lime Na Šabatce	<i>Tilia cordata</i> L.	Komořany	687/1	360	16	1
11	Plane tree at Velkopřevorský Palace	<i>Platanus x acerifolia</i> (Ait.) Willd.	Malá Strana	249	670	32	1
12	Plane tree in Kinský Garden	<i>Platanus x acerifolia</i> (Ait.) Willd.	Smíchov	3134	485	24	1
13	Common oak in Nedvězí	<i>Quercus robur</i> L.	Nedvězí	245	335	17	1
14	European ash at the school in Bártlova Street	<i>Fraxinus excelsior</i> L.	Horní Počernice	192	340	20	1
15	Plane tree at Karlovo Square	<i>Platanus x acerifolia</i> (Ait.) Willd.	Nové Město	2418/1	300	14	1
16	Common oak in Kunratice	<i>Quercus robur</i> L.	Kunratice	862	410	16	1
17	Small-leaved lime in Vídeňská Street	<i>Tilia cordata</i> L.	Krč	2998	330	18	1
20	Plane tree in Kampa	<i>Platanus x acerifolia</i> (Ait.) Willd.	Malá Strana	778/1	450	30	1

OOP	Orientation name	Species	Cad. Distr.	Plot	Girth [cm]	Height [m]	Number
21	Small-leaved lime in Vnoř	<i>Tilia cordata</i> L.	Vnoř	309	405	18	1
22	Common oak in Kunratice “U Vesteckých”	<i>Quercus robur</i> L.	Kunratice	2362/1	360	17	1
23	Small-leaved lime in Přední Kopanina	<i>Tilia cordata</i> L.	Přední Kopanina	725	250	15	1
24	Small-leaved lime at the gate to the chateau park	<i>Tilia cordata</i> L.	Kunratice	11/1	370	24	1
25	Small-leaved lime in Krnská Street	<i>Tilia cordata</i> L.	Kbely	1771/1	330	19	1
26	European ash at the St. Peter’s Church	<i>Fraxinus excelsior</i> L.	Dubeč	2	350	21	1
27	Small-leaved lime Na Cikánc	<i>Tilia cordata</i> L.	Radotín	2911	320	20	1
28	Common oak at the village green in Hostavice	<i>Quercus robur</i> L.	Hostavice	941	340	19	1
29	Common oaks Na Jelenách at Kunratice Forest	<i>Quercus robur</i> L.	Kunratice	862, 863/1	315–350	15–20	3
30	Common oaks at Paví Hill	<i>Quercus robur</i> L.	Smíchov	1487/1	280–400	13–18	3
31	Large-leaved lime and small-leaved lime in Satalice	<i>T. cordata</i> L. + <i>T. platyphylla</i> Scop.	Satalice	76	300–510	18–21	4
32	Common oaks in the belt along Říčanka	<i>Quercus robur</i> L.	Uhříněves	1756/1	220–400	20–28	6
33	Common oak in the Střelničná Street	<i>Quercus robur</i> L.	Kobylisy	2364/1	380	27	1
34	Common oaks in the Farská Street	<i>Quercus robur</i> L.	Hostavice	8/1	300, 360	18, 20	2
35	Common oak near the Nouzov settlement	<i>Quercus robur</i> L.	Točná	845	320	20	1
36	Pear-tree at the Zdíkovská Street	<i>Pyrus communis</i> L.	Smíchov	4221/1	295	16	1
37	Plane tree in the Jezerka Park	<i>Platanus x acerifolia</i> (Ait.) Willd.	Nusle	2387	460	29	1
38	Common oak in the orchard – K Horkám Street	<i>Quercus robur</i> L.	Hostivař	2241/1	390	22	1
39	Common oak in the Street U Malvazinky	<i>Quercus robur</i> L.	Smíchov	1813/1	265	15	1
40	Common oaks in the Ctěnický Grove	<i>Quercus robur</i> L.	Vnoř	704/1	260–425	30–35	11
41	Common oaks in the Cholupice Pheasantry	<i>Quercus robur</i> L.	Cholupice	342	420, 435	25	2
42	Large-leaved lime in the Street Krčská 205/24I	<i>Tilia platyphylla</i> Scop.	Krč	1451	235	22	1
43	Common oak in the Street Řásnovka	<i>Quercus robur</i> L.	Staré Město	1027	265	23	1
44	Small-leaved lime in Chaby	<i>Tilia cordata</i> L.	Třebonice	339	485	22	1
45	A large common oak on the Císařský Island	<i>Quercus robur</i> L.	Bubeneč	1893/9	410	18	1
46	Common oak in Modřany	<i>Quercus robur</i> L.	Modřany	4400/152	308	20	1
47	Common oak in Záběhllice	<i>Quercus robur</i> L.	Záběhllice	22/1	460	26	1
48	Plane tree at 20/2523 Podbaba	<i>Platanus acerifolia</i> (Ait.) Willd.	Dejvice	4838	405	18	1
49	Common oak in Dolní Počernice	<i>Quercus robur</i> L.	Dolní Počernice	303	550	25	1
50	European beeches in the Hvězda Game Preserve	<i>Fagus sylvatica</i> L.	Liboc	1244, 1245	350, 475	30, 32	2
51	Common oak near park in Březiněves	<i>Quercus robur</i> L.	Březiněves	7	395	26	1
52	Common oak behind bří. Jandusů Square	<i>Quercus robur</i> L.	Uhříněves	169/1	410	25	1
54	Plane tree at St. Clement Church	<i>Platanus acerifolia</i> (Ait.) Willd.	Nové město	322	335	28	1
55	Pear tree at Braník	<i>Pyrus communis</i> L.	Braník	170	189	15	1
56	Borderline common oak of the Uhříněves Manor	<i>Quercus robur</i> L.	Uhříněves	1758/1, 1758/2	505	20	1
57	Common oaks at the dam of Lake Homolka	<i>Quercus robur</i> L.	Újezd u Průhon.	650, 653, 654/1, 654/2, 651/2	232–505	11–27	12
58	A group of horse chestnut trees in the Game Preserve Hvězda	<i>Aesculus hippocastanum</i> L.	Liboc	1227/1	202–296	22	5
59	Common oak at north-west connection in the Game Preserve Hvězda	<i>Quercus petraea</i> (Matt)	Liboc	1227/5	345	22	1

## B3 LANDSCAPE

OOP	Orientation name	Species	Cad. Distr.	Plot	Girth [cm]	Height [m]	Number
60	European beech at the north-west connection in the Game Preserve Hvězda	<i>Fagus sylvatica</i> L.	Liboc	1227/1	373	33	1
61	European beech opposite to the Ruzyně Gate of the Game Preserve Hvězda	<i>Fagus sylvatica</i> L.	Liboc	1227/1	306	37	1
62	Lime near the St. Procopius Churých in Hrnčíře	<i>Tilia cordata</i> L.	Šeberov	862	375	12	1
63	Oak in front of the Lišovická St. in the Kunratice Pheasantry	<i>Quercus robur</i> L.	Kunratice	1660/1	380	30	1
64	Oak in front of the garden house in the Kunratice Pheasantry	<i>Quercus robur</i> L.	Kunratice	1660/1	360	28	1
65	Black alder in Sobín	<i>Alnus glutinosa</i> (L.) Gaertn.	Sobín	272/1	270	12	1
66	Common oak below the farm	<i>Quercus robur</i> L.	Nedvězí	171/1	357	23	1
67	European beech in front of the summer house Hvězda	<i>Fagus sylvatica</i>	Liboc	1239	325	27	1
68	Oak above the arbour in the Satalice Pheasantry	<i>Quercus robur</i> L.	Satalice	924	680	32	1
69	Oak behind the former blacksmithery in Pitkovice	<i>Quercus robur</i> L.	Pitkovice	112/1	342	19	1
70	Oaks near Lake Podleský	<i>Quercus robur</i> L.	Uhříněves	1674	257–565	15–23	8
71	Oak at the Municipal Authorities of the CD Prague - Křeslice	<i>Quercus robur</i> L.	Křeslice	4/4	349	22	1
72	Common oak at the dam of Lake Libocký	<i>Quercus robur</i> L.	Liboc	329	398	25	1
73	Common oak at the Gamekeeper's Lodge in the Čimický Grove	<i>Quercus robur</i> L.	Bohnice	607, 613	355, 493	32.5, 28	2
74	Common oak in Hroby	<i>Quercus robur</i> L.	Kamýk	1858/1, 890/2	346	18	1
75	Oak in Branišovská	<i>Quercus robur</i>	Točná	866/2	411	21	1
76	Lime in Nedvězí	<i>Tilia cordata</i> L.	Nedvězí	162/1	497	23	1
77	Common oak in Dienzenhofer park	<i>Quercus robur</i> L.	Smíchov	31	350	17	1
78	Oak Karel	<i>Quercus robur</i> L.	Koloděje	32	710	12.5	1
79	Oaks in the Na Cibulkách forest park	<i>Quercus robur</i> L.	Košíře	1863/2, 2142/1, 1868/1	108–161	16–18	3
80	Common oak in the Na Cibulkách forest park	<i>Quercus robur</i> L.	Košíře	1872/1	394	19	1
81	Common oak in Klánovice	<i>Quercus robur</i> L.	Klánovice	320/1	299	25	1
82	Common oak in Horní Počernice	<i>Quercus robur</i> L.	Horní Počernice	2078/2	330	24	1
83	Common ash in the Strahovská Garden	<i>Fraxinus excelsior</i> L.	Hradčany	255/1	510	37	1
84	Maiden hair tree in Nové Město	<i>Ginkgo biloba</i> L.	Nové Město	562	246	25	1
85	Ash alley in Chodov	<i>Fraxinus excelsior</i> L.	Chodov	391/1, 251/5, 245/2, 251/5	202–254	16.5–22	9
86	Group of common oaks in the Satalická Game Preserve	<i>Quercus robur</i> L.	Satalice	924	502, 327	26, 24	2

Source: OOP MHMP



Tab. B3.3 Overview of registered significant landscape elements

No.	Name	Registration		Cadastral district	Plot No.
		notice	confirmation		
1.	Devil's Hill	Ref. No. MHMP-24283/ OŽP/V-489/99/St from 16 <sup>th</sup> Feb. 1999	Ref. No. MHMP-24283/ OŽP/V-489/99/St from 27 <sup>th</sup> Sept. 1999	Libeň	1999 (the belt to the distance of 20 metres from the limit of plots No. 2098/1 and 2097/1 C.D. Libeň along the limit length) 2097/1 (the belt to the distance of 10 metres from the limit of plots No. 2098/1 C.D. Libeň along the limit length) 2098/1, 2447/1
2.	Botanical Garden of the Charles University	Ref. No. OŽP/17626/V/ 379/99/Pra from 21 <sup>st</sup> April 1999		Nové Město	1580, 1582, 1584, 1586, 1590, 1579/1
3.	Service centre Hostivař	Ref. No. OŽP-15982/98/ V-1678/99/St from 28 <sup>th</sup> Sept. 1999		Hostivař	1780/2
4.	K Vrtilce	Ref. No. MHMP-5480/ OŽP/V-61/00/St from 21 <sup>st</sup> Jan. 2000		Písnice	55
5.	Cretaceous outlier Na vrchách	Ref. No. MHMP-7328/ OŽP/V-112/00/Pra from 26 <sup>th</sup> April 2000		Běchovice	1402
6.	Waterlogged meadow near Golf	Ref. No. MHMP-7329/ OŽP/V-113/00/Pra from 19 <sup>th</sup> April 2000		Běchovice	1408
7.	Fallow land at Stach	Ref. No. MHMP-7330/ OŽP/V-114/00/Pra from 19 <sup>th</sup> April 2000		Běchovice	1442, 1443
8.	Steppe above a golf course	Ref. No. MHMP-23112/ 00/OŽP/V-2014/99/Pra from 13 <sup>rd</sup> Sept. 2000		Jinonice	1353/2 (a part of), 1353/3 (a part of)
9.	Wetlands U Paloučku	Ref. No. MHMP-54745/ OŽP/V-949/00/Blh from 14 <sup>th</sup> Aug. 2000		Stodůlky	1177/34, 117746, 1177/47
10.	Poplar trees along Červenomlýnský Creek	Ref. No. MHMP-57138/ OŽP/V-1004/00/Blh from 14 <sup>th</sup> Aug. 2000	Ref. No. MHMP-57138/ OŽP/V-1004/00/Blh from 17 <sup>th</sup> Oct. 2000	Miškovice	324/1 except for a narrow projection on the East 324/3, 324/4 (a part of), 327/1, 327/2, 327/3, 327/4, 327/5, 327/6, 327/7 (a part of), 327/8, 329/1
11.	Rock formation near Podolí Profile	Ref. No. MHMP-23114/ 00/OŽP/V-2014/99/Pra from 12 <sup>nd</sup> April 2000		Podolí	1093/3 (a part of), 1093/2 (a part of), 1094/1 (a part of), 1120/4 (a part of)
12.	Communities of cretaceous springs Pod Spiritkou	Ref. No. MHMP-33173/ OŽP/V-136/00/Pra from 8 <sup>th</sup> Nov. 2000		Smíchov	4221/1 (a part of)
13.	Communities of cretaceous springs Pod Císařkou	Ref. No. MHMP-33173/ OŽP/V-1362/00/Pra from 8 <sup>th</sup> Nov. 2000	from 31 <sup>st</sup> Jan. 2001	Smíchov	4672/1 (a part of)
14.	Wetlands Triangl	Ref. No. MHMP-40050/ OŽP/V-710/00/Blh from 29 <sup>th</sup> Sept. 2000	from 20 <sup>th</sup> Feb. 2001	Hostivař	1712 (a part of), 1717/1 (a part of), 1719/2 (a part of), 1725 (a part of), 1744, 1745, 1746, 1747, 1748, 1751/2, 1752/1, 1752/2, 1754, 1755, 1756, 1757, 1758, 2725/1 (a part of)
				Strašnice	4499 (a part of), 4501/1 (a part of)
15.	Growths of alluvial plains V Dubinách	Ref. No. MHMP-70878/ OŽP/V-1272/00/Blh from 6 <sup>th</sup> Nov. 2000	from 26 <sup>th</sup> March 2001	Kunratice	in Cadastre of Real Estates: 2361/1 (a part of) 2361/3, 2361/4, 2361/5, 2361/6, 2361/12, 2361/15, 2361/16, 2522/1 (a part of), 2522/4 in Land Cadastre (simplified registry): 494, 495, 496, 497, 498/1, 498/2, 499, 542, 543, 576, 581, 582, 583, 589/1, 590/2, 591

## B3 LANDSCAPE

No.	Name	Registration		Cadastral district	Plot No.
		notice	confirmation		
16.	Steppe in Řepy	Ref. No. MHMP-63633/00/OŽP/V-1110/00/Pra from 6 <sup>th</sup> Aug. 2001		Řepy	1504/1 (a part of)
17.	Waterlogged meadows in Kolovraty	Ref. No. MHMP-80883/OŽP/V-1403/00/Blh from 17 <sup>th</sup> Jan. 2001	Ref. No. MHMP-80883/OŽP/V-1403/00/Blh from 16 <sup>th</sup> Jan. 2002	Kolovraty	in Cadastre of Real Estates: 310/6, 310/4, 310/2, 324 in Land Cadastre (simplified registry): 168/1, 169/1, 170, 171/1, 177/4, 177/5, 177/6, 177/7, 177/9, 177/10, 177/11, 177/12, 177/13, 177/14, 177/16, 177/17, 177/18, 177/19, 177/20, 177/21, 177/22, 177/23, 177/24, 177/25, 177/26, 177/27, 177/28, 177/29, 177/30, 177/31, 177/32, 177/34, 177/35, 177/37, 177/38, 177/39, 189, 191, 193/1, 193/2
18.	Community of waterlogged meadows in Písnice U Safiny	Ref. No. MHMP-060957/2003/OŽP-VII-372/J from 17 <sup>th</sup> April 2003		Písnice	1008, 1009, 1010, 1011, 1012
19.	Forest-steppe Pod Kuliškou	Ref. No. 175816/2003/OŽP-VII-1046/J from 8 <sup>th</sup> Dec. 2003	Ref. No. MHMP-175816/2003/OŽP-VII-1046/J from 14 <sup>th</sup> May 2004	Dejvice	4669 (a part of), 4683, 4684, 4685 (a part of), 4686, 4702 (a part of)
20.	Rock outlier in Dolní Chabry with occurrence of early star-of-Bethlehem		4 <sup>th</sup> July 2005	Dolní Chabry	348/1 (a part of), 348/7
21.	Forest-steppe Na Farkáně	SZn. S-MHMP-415039/2007/OOP-V-744/R-157/Pra from 15 <sup>th</sup> Nov. 2007	legal validit 7 <sup>th</sup> Dec. 2007	Radlice	316/1

Source: OOP MHMP

**Tab. B3.4 List of nature parks on the City territory**

	Name	Established by	Area [ha]
1.	Botič - Milíčov	Order No. 3/1984 Code NVP	824.00
2.	Říčanka	Order No. 3/1984 Code NVP	407.70
3.	Radotínsko - Chuchelský Grove	Order No. 8/1990 Code NVP	1,392.40
4.	Šárka - Lysolaje	Order No. 8/1990 Code NVP	1,005.00
5.	Drahaň - Troja	Order No. 8/1990 Code NVP	578.80
6.	Hostivař - Záběhlíce	Order No. 8/1990 Code NVP	423.10
7.	Rokytká	Order No. 8/1990 Code NVP	136.50
8.	Modřanská Gullet - Cholupice	Order No. 3/1991 Code HMP	1,707.50
9.	Košíře - Motol	Order No. 3/1991 Code HMP	354.40
10.	Klánovice - Čihadla	Order No. 3/1991 Code HMP	2,222.80
11.	Valleys Prokopské and Dalejské	Order No. 7/1993 Code HMP	652.50

Source: OOP MHMP

Tab. B3.5 Overview of areas of special protection of the City

	Name	Category	Protection zone	Established by	Area [ha]
1.	Baba	PP	V	Order No. 4/1982 Code NVP (of the National Committee of Prague)	5.99
2.	Barrandovské Rocks	NPP	V	Order No. 4/1982 Code NVP	11.38
3.	Pheasantry in Satalice	PP	Z	Decree of Ministry of Education (MŠVU) No. 91:629/51-IV/5, amended Decree of Ministry of Culture of Czechoslovakia (MK ČSR) No. 14.200/88 – SÚOP	15.90
4.	White Rocks	PP	Z	Order No. 5/1988 Code NVP	6.40
5.	Bohnické Valley	PP	V	Order No. 4/1982 Code NVP	5.11
6.	Branické Rocks	PP	Z	Order No. 5/1968 Code NVP	8.17
7.	Brickworks in Pheasantry	PP	Z	Order No. 5/1988 Code NVP	5.31
8.	Cikánka I.	NPP	Z	Order No. 5/1988 Code NVP	4.54
9.	Cikánka II.	PP	Z	Order No. 5/1988 Code NVP	0.39
10.	Ctirad	PP	Z	Order No. 5/1988 Code NVP	6.53
11.	Čimické Valley	PP	V	Order No. 5/1968 Code NVP	8.42
12.	Dalejský Profile	NPP	Z	Order No. 3/1982 Code NVP	23.66
13.	Divoká Šárka	PR	V	Order No. 12/1964 Code NVP	25.22
14.	Dolní Šárka	PP	V	Order No. 4/1982 Code NVP	6.15
15.	Havránka	PP	Z	Order No. 4/1982 Code NVP and No. 17/2002 Code, Prague City Hall	4.34
16.	Homolka	PR	Z	Order No. 1/1982 Code NVP	13.35
17.	Housle	PP	V	Order No. 3/1982 Code NVP	3.71
18.	Hrnčířské Meadows	PP	V	Order No. 5/1988 Code NVP	29.30
19.	Hvíždalka	PP	Z	Order No. 5/1988 Code NVP	1.48
20.	Cholupická Pheasantry	PP	V	Order No. 1/1982 Code NVP	14.43
21.	Chuchelský Grove	PR	V	Order No. 3/1982 Code NVP	18.00
22.	Chvalseký Quarry	PP	Z	Order No. 5/1988 Code NVP	1.70
23.	Jabloňka	PP	Z	Order No. 5/1968 Code NVP	1.25
24.	Jenerálka	PP	V	Order No. 5/1968 Code NVP	1.43
25.	Kalvárie in Motol	PP	V	Order No. 4/1982 Code NVP	3.67
26.	Klánovický Forest - Cyrilov	PR	Z - Kl.I. V - Cy.	Order No. 1/1982, 5/1988 Code NVP and Order of ONV Prague – East from 16 <sup>th</sup> February 1990	364.91
27.	Klapice	PR	Z	Order No. 5/1988 Code NVP	18.16
28.	Royal Game Preserve	PP	Z	Order No. 5/1988 Code NVP and Reg. No. 4/2006 Code, Prague City Hall	90.89
29.	Krňák	PP	Z	Order No. 5/1988 Code NVP	27.60
30.	Ládví	PP	V	Order No. 3/1982 Code NVP	0.62
31.	Letenský Profile	PP	Z	Order No. 5/1988 Code NVP	1.47
32.	Airport Letňany	NPP	V	Order of the Ministry of Environment No. 184/2005 Code	50.98
33.	Lítoznice	PP	Z	Order No. 5/1988 Code NVP	29.30
34.	Lochkovský Profile	NPP	Z	Order No. 5/1988 Code NVP	35.50
35.	Meanders of Botič Creek	PP	V	Order No. 5/1968 Code NVP	4.31
36.	Milíčovský Forest and Ponds	PP	Z	Order No. 5/1988 Code NVP	93.36
37.	Modřanská Gullet	PP	Z	Order No. 5/1988 Code NVP	122.75
38.	Motolský ordovik	PP	Z	Order No. 5/1988 Code NVP	1.90
39.	Mýto	PR	Z	Order No. 5/1988 Code NVP	18.60
40.	Nad Mlýnem	PP	V	Order No. 5/1968 Code NVP	3.89
41.	Nad Závodištěm	PP	Z	Order No. 5/1988 Code NVP	22.85
42.	Hvězda Game Preserve	PP	Z	Order No. 5/1988 Code NVP	85.90
43.	Game Preserve in Uhříněves	PP	V	Order No. 3/1982 Code NVP	34.56
44.	Okrouhlík	PP	V	Order No. 3/1982 Code NVP	0.66
45.	Opatřilka - Červený Quarry	PP	Z	Order No. 3/1982 Code NVP	5.52
46.	Opukový Quarry Přední Kopanina	PP	Z	Order No. 5/1988 Code NVP and Reg. No. 13/2006 Code, Prague City Hall	1.94
47.	Ortocérový Little Quarry	PP	Z	Decree of MK ČSR No. 9.861/76	0.48
48.	Pecka	PP	Z	Order No. 5/1988 Code NVP	1.90
49.	Petřínské Rocks	PP	V	Order No. 5/1988 Code NVP and Order No. 23/91 MHMP	8.80
50.	Pitkovická Slope	PP	Z	Decree of MK ČSR No. 13360/68-II/2	0.55
51.	Počernický Pond	PP	Z	Order No. 5/1988 Code NVP	41.10

## B3 LANDSCAPE

	Name	Category	Protection zone	Established by	Area [ha]
52.	Podbabské Rocks	PP	V	Order No. 4/1982 Code NVP	0.84
53.	Podhoří	PR	V	Order No. 4/1982 Code NVP and No. 17/2002 Code HMP	8.43
54.	Podolský Profile	PP	Z	Order No. 5/1988 Code NVP	2.70
55.	Pod školou	PP	Z	Order No. 5/1988 Code NVP	2.58
56.	Pod Žvahovem	PP	Z	Order No. 5/1968 Code NVP	0.50
57.	Požáry	NPP	Z	Order No. 3/1982 Code NVP	4.31
58.	Prague Shift	PP	Z	Order No. 5/1988 Code NVP	0.35
59.	Prokopské Valley	PR	V	Decree of MK ČSR No. 25.533/78	101.00
60.	Prosecké Rocks	PP	V	Order No. 5/1968 Code NVP	1.67
61.	Radotínské Rocks	PP	Z	Order No. 5/1988 Code NVP	27.64
62.	Radotínské Valley	PR	Z	Decree of MK ČSR No. 8.200/75	98.52
63.	Rohožník - Quarry in Dubeč	PP	V	Order No. 5/1988 Code NVP	3.37
64.	Salabka	PP	Z	Order No. 4/1982 Code NVP and No. 17/2002 Code HMP	0.85
65.	Sedlecké Rocks	PP	V	Order No. 4/1982 Code NVP	8.75
66.	Skalka	PP	Z	Order No. 5/1968 Code NVP	10.60
67.	Slavičí Valley	PR	Z	Order No. 5/1988 Code NVP	38.00
68.	Staňkovka	PR	Z	Order No. 5/1988 Code NVP	4.70
69.	Střešovické Rocks	PP	Z	Order No. 5/1968 Code NVP	1.45
70.	Šance	PR	Z	Order No. 1/1982 Code NVP	123.00
71.	Trojská	PP	V	Order No. 4/1982 Code NVP	1.30
72.	U Branického pivovaru	PP	V	Order No. 5/1988 Code NVP	1.66
73.	Valley of Kunratický Creek	PP	Z	Order No. 5/1988 Code NVP	150.20
74.	Valley of Únětický Creek	PR	Z	Order No. 5/1988 Code NVP	59.60
75.	U Hájů	PP	Z	Order No. 1/1982 Code NVP	6.60
76.	U Nového mlýna	NPP	Z	Order No. 3/1982 Code NVP	12.30
77.	U Závisti	PP	Z	Order No. 5/1988 Code NVP	0.70
78.	Big Rock	PP	Z	Order No. 5/1968 Code NVP	1.80
79.	V Hrobech	PP	Z	Order No. 5/1988 Code NVP	1.30
80.	Vidoule	PP	Z	Order No. 5/1988 Code NVP	8.65
81.	Vinořský Park	PR	V	Order No. 3/1982 Code NVP	37.35
82.	Vizerka	PP	V	Order No. 5/1988 Code NVP	3.10
83.	V Pískovně	PR	V	Order No. 5/1988 Code NVP	7.73
84.	Xaverovský Háj	PP	Z	Order No. 1/1982 Code NVP	97.30
85.	Zámky	PP	V	Order No. 4/1982 Code NVP	5.05
86.	Zlatnice	PP	Z	Order No. 5/1968 Code NVP	3.26
87.	Zmrzlík	PP	V	Order No. 5/1988 Code NVP	16.10
88.	Railroad Shift	PP	Z	Order No. 5/1988 Code NVP	0.55
	Roztocký Grove - Silent Valley	PR	Z	Decree of MŠVU No. 100.988/51-IV/5, amended Decree of MK ČSR No. 14.200/88-SÚOP except the City of Prague, only a part of Protection zone (50 m)	

### Key:

**PP** Nature Monument

**PR** Nature Reserve

**NPP** National Nature Monument

**OP** Protection zone

**Z** Protection zone pursuant to the Act, i.e. 50 m wide

**V** Established protection zone

In total there are **88** areas of special protection on the City territory.

Category **NM** – **66**

Category **NR** – **15**

Category **NNM** – **7**

Source: OOP MHMP



### B3.3 CITY GREENERY – RECOVERY

#### B3.3.1 Recovery of Prague's Parks and Alleys of Extraordinary Importance

In accordance with the Decision of the Assembly of the City of Prague “Principles of the care for greenery in the Capital City of Prague” the Department of Environmental Protection of the Prague City Hall continues (within the self-government activities) in the inevitable recovery of the parks, street alleys, and in the providing of the greenery development projects, except for the regular maintenance thereof. Gardens and parks have been under gradual recovery on the basis of the approved project documentation as follows: **Letenské Orchards, Kinských Garden, Complex of the Petřín Hill, Royal Game Preserve, and the Park atop the Vítkov Mountain.**

##### Letenské Orchards

In 2007 the phase II of the renewal of section the Letenský Chateaux to Fr. Křížka Str. proceeded. This part of the park recovery included the pavement renovation, where asphalt paving was replaced with granite pavers, there was also arranged the flower-beds surrounding with cast-iron fencing. New flower-bed was planted at the beginning of plane tree alley near entrance from Fr. Křížka Street. The recovery of vegetation of the so-called Thomayer's historic parterre will be under construction in the spring 2008. The project includes bush planting, grass plots recovery and tree plantations. In 2007 the weather-stained stone wall near the cycling-route below the Havanský Pavilion was being repaired, the old functionless public toilets were replaced with new building of the social facilities for park visitors. This building is situated near much-frequented children play ground “U hrocha”. This year the small refreshment facility with a summer terrace will be put into service. New equipments and new fencing were installed to children playground. The park was fitted with small mobile equipment, new lighting and drinking fountain.

The revitalization of south slopes of Letenské Orchards, which are part of local and supra-regional ecological corridors and a part of local ecological centre. Dead trees were cut down, locusts' sprout shoots were removed and some sections were being prepared for new planting of native tree species. Taking up the historical tree species composition the grape vine, which was typical for every Prague slope in past, will be planted along the slope under the building EXPO 58. The extension of rare insect species and bird species was achieved by patient demanding work on slopes' revitalization.

In spring of 2007 the salutary and security cuts were realized by professional arborists in plane tree alley, 29 of security bindings were applied on trees with stability deterioration.

Further more in 2007 the construction of urban ring, which is situated at Letenská Plain, has been launched.

##### Royal Game Preserve

In 2007 the flood damages were still being removed. To ensure visitors' security arborists passed judgment on tree condition in the major part of park. About 1,500 trees were treated by security cuts eventually by tree top bindings. Further more during the 2007 the rosary had been misplaced near planetarium. The former terminal tramway station, which shall serve to the public as a social facility, including refreshment opportunity, had been under construction during the year 2007. Final building approval should take a place at the end of January 2008. In 2007 the reconstruction of communications destined for both pedestrians and skaters was launched in the park. Within the frame work of the flood damage renewal huge areas were reclaimed, where the recreational meadows have served for taking rest since 2006. Consequently the huge planting of new woody plants, as a compensation for trees dead by floods, was launched. In 2007 there were planted about 500 specimen of trees and bushes and another min. 500 specimen will be plant in 2008.

##### Vítkov

During 2006 and 2007 the renewal of the park atop the Vítkov Mountain was concentrated mostly on the improvement of the vegetation state (especially on the troubled parts on slopes). In order to increase the recreational potential of lawns the automated irrigation system was built as well.

At the end of the year 2007 a vast project of the reconstruction of central section of the park was set to work. It should include the construction of new paths, so that the new park circle should be originated in the future (including garden restaurant with view, and increasing points of view and rest). The first phase of the project is building the children playgrounds, which is planned in March 2008.

At these days two important building actions are in progress within the frame work of the Vítkov Mountain: firstly construction of Vítkovský Train Tunnels, which are part of “New connection” construction, and secondly reconstruction of the “National Cultural Memorial”.

### Complex of the Petřín Hill and the Kinských Garden

#### Complex of the Petřín Hill

Recently several important constructions were completed on the premises of gardens on the Petřín Hill, the most important is the completion of the reconstruction of the Hunger Wall and the “Dahlia Garden”. Few years ago complete reconstruction of walls of the Lobkowitz Garden including adjacent staircases, were approved. The new children play ground was build in the Seminary Garden and the gradual renewal of fruit trees in the Seminary Garden, that had been insisted since 1981, was finished. 650 shrubs of vine were planted in the Strahov Garden.

In the close future the project of the overall reconstruction of the Lobkowitz Garden according the historical base is being planned. Out of the long-term view the reconstruction of the Park near the Watchtower and the Rose Garden at the top of Petřín Mountain is being developed.

#### Kinských Garden

The Project on the Kinských Garden was worked out conceptually for several years and according this concept the realization is provided also. The Kinských Garden renewal started with the capital reconstruction of the children playground at the entrance from the Kinských Square. The children playground includes also premises of social facilities. The playground reconstruction was followed with the reconstruction of the Garden historic parterre, which included also the construction of new utility networks for objects that belong to Ethnology Museum. At the same time the original water motifs renewal was made (within the parterre there were two fountains). Thus ponds with waterfalls, fountain with water jet were reconstructed and a new “water staircase” were built. Part of road network was reconstructed, included installing new public lighting, benches, dust bins and plantings perennial. At the entrance from Šermířská Street new facilities of the gardening service was build up. Further more the reconstruction of perimeter and retaining walls, which divide the south-western part of garden, has been finished. After the planned reconstruction of gate and wall along the Šermířská Street is finished, garden will be prepared for night locking. This should prevent vandalism in park.

One of the planned actions is the reconstruction of the original Orange Garden, of which, unfortunately, solely foundations can now be noticed.

### B3.3.2 Alleys

Since 1995 when the City of Prague launched *the project Prague for Tress – Trees for Prague*, in which street and road alleys became to be recovered and revitalized, it was managed to **plant over 2,880 new tree specimens** in the alleys falling under the I category of the alley classification system.

In 2007 the gradual recovery of street alleys has been continuing. The Prague City Hall concluded the agreement on “Provision of services for the care of selected roadside vegetation“ with the Technical Administration of Roads, in which subject matter is to provide for regular management of **alleys of I category**. The management shall mean the recovery of alleys, i.e. inevitable felling, replacement of removed specimens, and additional plantation of trees to alleys (in the current as well as newly built niches) and the care of the existing tress as well as new plantations. At first of all the accent is put on enlargement of existing number of trees particularly at places, where there are no trees now.





**The number of newly planted trees in street alleys always significantly outnumbers the number of the felled trees!**

Alleys of I category renewal in 2007:

- Felled – 85 specimen;
- Planted – 182 specimen.

**Bří. Dohalských Street – Prague 9**

In autumn 2007 seven specimens of limes *Tilia cordata* “Greenspire” (girth 18–20 cm) were planted instead of dead or missing trees.

**Evropská Street in area of Vítězné Square – Prague 6**

In autumn 2006 the alleys in the green belt in the area of Vítězné Square were recovered. Five specimens of London plane (*Platanus acerifolia* ‘Tremonii’) were planted with planting size of the girth of 35–40 cm. In 2007 the plantation was eked out with relentless grass plantation (*Deschampsia caespitosa*) in line of existing alley.

**Hořejší Embankment – Prague 5**

In autumn 2007 the first phase on project gradual alley revitalization was carried out in the Hořejší Embankment. In section between streets Na Valentince and Vltavská the project on plantation of extensive underplanting phytocoenose of perennials and bulbous flowers into existing alley was realized in places, where at present is not possible to plant trees (f.e. because of overtopped street network). The objective of this project is presentation as well as eventual further development of perennials plantations into selected less frequented sections in downtown.

About 1,595 specimens of perennials and 4,356 specimens of bulbous flowers were planted into selected section with area of 198 m<sup>2</sup>.

**Janáčkovo Embankment – Prague 5**

In autumn 2007 the first phase of gradual alley revitalization was carried out in this locality. The alley was enlarged by 19 new planting places, where 19 specimens of pagoda tree (*Sophora japonica*) were planted with size of girth 16–18 cm.

**Jaromírova Street – Prague 2**

In autumn 2007 dead trees were replaced with total 8 specimens of rowan (*Sorbus intermedia*) with size of girth 16–18 cm.

**Jičínská Street – Prague 3**

In autumn 2007 the project on plantation of extensive underplanting phytocoenose of perennials and bulbous was realized into newly dig plantation places in selected less frequented sections in downtown.

Four from six existing trees fell and were replaced with 14 specimens of spinous-less and fruitful-less honey locust cultivar of *Gleditsia traicanthos* “Skyline” (girth 18–20 cm). The wide plantation was given to rise under the trees, perennials and bulbous flowers was set up as under-planting at the same time.

**Kostelní Street – Prague 7**

The first phase of alley revitalization was carried out in cooperation with TSK in the end of 2007. Alley revitalization is linked to total reconstruction of the road in section between streets Dukelských hrdinů–Fr. Křížka and in section between streets Kamenická–U letenského sadu.

Out of 28 existing trees were 12 specimens cut down, and 30 specimens of narrow tree-topped ashes *Fraxinus angustifolia* “Raywood” (girth 18–20 cm) were planted. The second phase of alley revitalization (it means planting another 12 specimens) will carry out just after finishing the construction works in section between streets Kamenická–Fr. Křížka.

### **Kubelíkova Street – Prague 3**

In autumn 2007 the first phase of gradual alley revitalization was carried out in this locality. Cultivar of ash tree with narrow tree-top has been chosen, because this street is quite bad lighted and narrow. This tree is fruitful-less and is well adapted to city conditions.

Out of 70 trees were 24 specimens cut down on basis of expert's report in first phase of revitalization. Additional planting was performed into vacant positions and ten new positions were created for trees. In total 37 specimens of narrow tree-topped ashes (*Fraxinus excelsior* "Atlas") (girth 18–20 cm) were planted at the street.

### **Míru Square – Prague 2**

Out of 12 trees were 10 specimens cut down within complete revitalization of this alley due to significantly bad conditions in the end of the year 2007. The alley was enlarged consequently with 5 new trees, therefore 15 specimens of robinia (*Robinia pseudoacacia*) (girth 20–25 cm) were planted in total. Newly planted trees are protected by the walk-on gate and a tall metallic trunk cover.

### **Pod kaštany Street – Prague 6**

In spring 2007 additional planting and alley revitalization were completed with plantation of 7 specimens of *Aesculus hippocastanum* (girth 16–18 cm) and setting up the new grass bend along the road.

### **Šmilovského Street – Prague 2**

During 2007 the part of alley revitalization was realized gradually in two phases (spring, autumn). Out of 30 trees were eleven trees cut down due to bad health condition and thirteen specimens of *Koelreuteria paniculata* (girth 18–20 cm) were newly planted.

### **U Rajské zahrady Street – Prague 3**

In autumn 2007 the complete revitalization and enlargement of alley was realized in this locality. Out of 12 trees were seven trees cut down and 32 trees were newly planted (in exposed parts of street the trees are protected by the walk-on gate and a tall metallic trunk cover). Dutch elm tree (*Ulmus × hollandica* "Lobel") (girth 20–25 cm) had been chosen for plantation due to pursuit to put the native species back. Because of this Dutch elm tree, which is resistant against Dutch elm disease, was given back to this alley.

### **Vinohradská Street – Prague 2 and 3**

At the end of the year 2007 the complete revitalization of alley in the Vinohradská Street was launched in section between streets Jana Masaryka and Legerova. The newly planted trees, whose number will exceed 150 specimens, will be protected by the walk-on gate and a tall metallic trunk cover. The reconstruction will have been finished in the first half of 2008.

All new plantations remain under the care of the Department of Environmental Protection of the Prague City Hall, which shall provide for the implementation of follow-up intensive care for the trees planted.

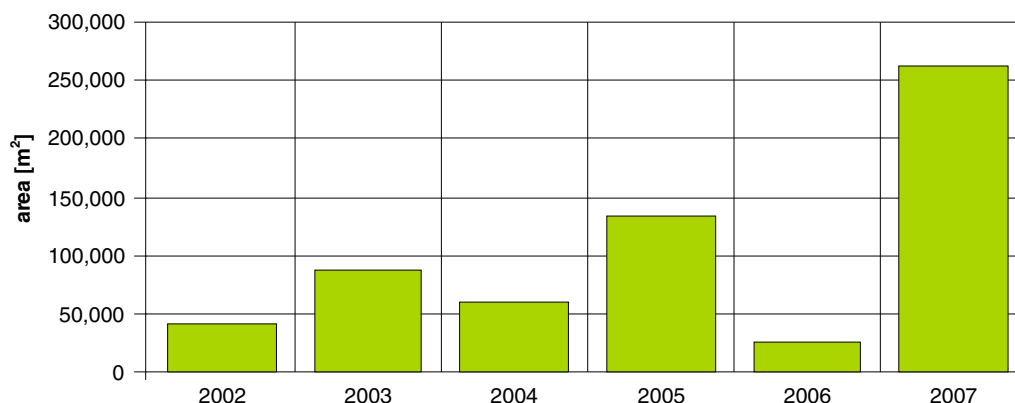
In 2007 the resources spent on the recovery and renewal of the Prague alleys of I category accounted for approx. CZK 19 million and their maintenance required approx. CZK 6 million.

## **B3.3.3 Forests**

### **A) New forest areas**

**261,700 m<sup>2</sup>** of agricultural land was afforested in 2007, this is the highest number in last few decades. There were used 198,300 seedlings of 12 woody species in total. Plantations were situated particularly to locality of forest-park Vinice (cadastral district Běchovice and Dolní Počernice) – the area of 18.31 ha was planted, also meadow grass of area 2 ha was launched. Another important new forest area was originated by enlarging the forest at locality Dívčí Hrady (c. d. Radlice) – the area of 5.28 ha was planted. Woody species were chosen due to their native shares: 75 % of deciduous trees, and 25 % of coniferous trees. Next plantations were carried out in Řeporyje, Jinonice, Kolovraty and Újezd nad Lesy.

Fig. B3.6 Development of newly forested areas, 2002–2007



Source: OOP MHMP

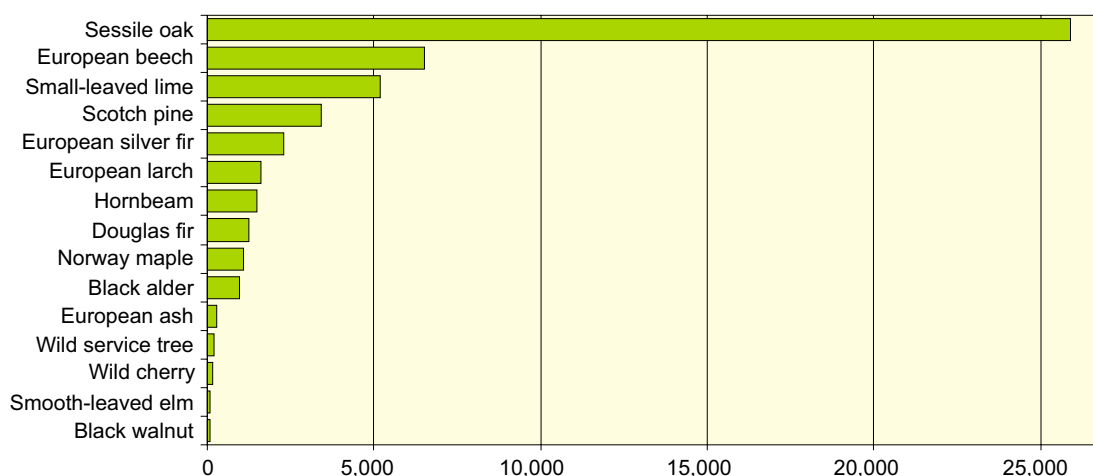
**B) Forest renewal**

In the existing forests the area of 65,300 m<sup>2</sup> was newly planted within the forest recovery, tree species composition (in total fifteen tree species) was as follows:

Scotch pine	<i>Pinus sylvestris</i>	3,400
European larch	<i>Larix decidua</i>	1,590
European silver fir	<i>Abies alba</i>	2,300
Douglas fir	<i>Pseudotsuga manziesii</i>	1,250
Sessile oak	<i>Quercus petraea</i>	25,900
European beech	<i>Fagus sylvatica</i>	6,500
Hornbeam	<i>Carpinus betulus</i>	1,500
Small-leaved lime	<i>Tilia cordata</i>	5,200
Norway maple	<i>Acer plananoides</i>	1,100
European ash	<i>Fraxinus excelsior</i>	300
Black alder	<i>Alnus glutinosa</i>	950
Wild service tree (checker tree)	<i>Sorbus torminalis</i>	200
Black walnut	<i>Junglas nigra</i>	100
Smooth-leaved elm	<i>Ulmus carpinifolia</i>	100
Wild cherry	<i>Cerasus avium</i>	150

In total there were 50,540 specimens of tree species planted, out of that 17 % coniferous trees and 83 % deciduous trees.

Fig. B3.7 Tree species composition at forest renewal



Source: OOP MHMP

### C) Forest management

Forest management was carried out pursuant to the approved management plan and in accordance with principles of sustainable forestry. Due to the adverse weather conditions (high temperature, low precipitation) the so-called accidental felling are still represented at high percentage. That means of trees, which are ill or dying, are felled, in total dead trees accounted for 50 % of the felled volume, of course in older stands (over approx. 100 years) this share was 60 %. Majority of dead trees were spruces and pines. Forest renewal is strictly small-scale – average size of renewal area was 0.09 ha in 2007 (Wood Act permits 1 ha). 65 alley trees were planted from esthetical reasons into forest meadows in autumn. In the framework of the support to non-production function of forests the system of regular supervision maintenance, and revisions of children playgrounds and small movable equipment in forests (there are 2,585 elements installed in total). Two new garden houses were supplemented to park Hostivař: in the place of children playground in locality Háje and near way along the dam. In the area of Okrouhlík Forest (Kobylisy) the new small children playground was build up. The old playing equipment and fragments of concrete benches were removed as well. New incident areas were realized at 16 toboggans and hanging swings according the valid regulations. In the framework of the forest roads reparations (out of ordinary servicing) two larger projects were completed – reparation of forest road in emergency condition in Modřanská Gullet and reparation of selected section of asphalt roads in forest-park Hostivař.

### B3.3.4 Project for the renewal and revitalization of Prague's reservoirs

#### Project objectives:

#### 1. Environmental objectives

To provide for environmental protection and increasing number of species of fauna and flora bound to aquatic ecosystems – improvement in biodiversity in the City of Prague, protection of protected species, increased purity of water in Prague's watercourses and lakes.

- In this year the biological survey and assessment of further six Prague's lakes, which are in the possession of the Prague City Hall, was completed. In total thirty-six lakes have been documented.
- In the revitalization and repair of lakes additions to shore vegetation, creation of the littoral and shore belts of vegetation, including the construction of little islands for the waterfowl nesting and for other aquatic animals are much accentuated.

#### 2. Technical objectives

To provide for safety and security of water works at floods, to carry out reconstruction and repair of all functional structures of water reservoirs.

- In the renewal of technical elements especially natural materials are utilised (as stone and wood).

#### 3. Cultural, historical, and social objectives

Increased awareness of the Prague inhabitants on Prague's lakes, on their importance in urban landscape, and on their history. The renewal of historical lakes and monuments related to them.

- A unified information system on the Prague's lakes and protected areas was created and is gradually deployed in relation to the project.

#### The ongoing at present:

2007/2008

- sludge removal from the Kyjský Pond;
- revitalization of the Rokytká river-basin in area of the dry polder Čihadla;
- revitalization of the Kančík Pond;
- sludge removal from the Retention Reservoirs R3 and R4 Košík.

**Lakes and reservoirs were repaired within the project as follows:**

2007

- repair of the Retention Reservoir Černý Bridge;
- sludge removal from the Strnad Pond;
- revitalization of the Retention Reservoir Brouček; and
- sludge removal from the Malá Markéta Pond.

2006

- reconstruction of Lake Velký Počernický;
- repair of Lake U Vodotoku;
- revitalization of the Panský Pond in Jinonice;
- reconstruction of a small lake in the Forest-Park Na Cibulce; and
- revitalization of Lake Čimický.

2005

- renewal of the original lake in the Game Preserve Hvězda;
- revitalization of the Retention Reservoir N1 Stodůlky.

2004

- reconstruction of Lake Střední in Dolní Chabry.

2003

- Small Stream – repair and cleaning of the water management system in Stromovka.

**Under preparation is:**

One of most important projects, which the City of Prague is preparing at present, is sludge removal from hydraulic structure Džbán.

Repairs of lakes Chvalka, Hájecký and Práčský are also planned.

**1. Revitalization of Retention Reservoir Brouček**

RR Háje is situated at the area of former pond, which was rebuilt to retention reservoir in 1960's. This should fasten rain water from large area of Mototechna, that built above pond, and moderate the flood situations on the Větvený Creek.

The sludge was removed from the RR Brouček within revitalization of Prague's reservoirs and entire repair of all the objects was carried out in March 2007. Over 200 m<sup>3</sup> of sludge was removed from retention, stone pavement was repaired at water side face of the reservoir, and the ugly concrete parts of retention overflow were replaced with stone. Gaps between the stones were filled with humus and planted with grass so the functional structures will assume natural effect. The integrated part of the repair was to replace damaged concrete feed-pipe with wooden one. This was the first time ever the wooden feed-pipe has been used at the dam In Prague. Easy exchange, low acquisition costs are the advantage of this wooden feed-pipe, the wooden fee-pipe is much more suitable for smaller dams from esthetical view especially in protected localities.

The water work was ensured by cleaning the dam and by repairing the functional structures. The project should contribute to increase the water quality at the Větvený Creek. The water quality is very important for the Nature Monument U Hájů, because waterlogged meadows and wetland coenosis are the subject of protection.

The construction was performed by Lesy hl. m. Prahy, for the price of approx. CZK 1.45 mill.

**2. Repair of Retention Reservoir Černý Most**

In 2006 the complete revitalization of the Retention Reservoir Černý Most (Aloisov) was launched. The revitalization was finished in April 2007. The most important part of the project was to ensure



constant water inflow. It was succeeded by stuffing the drainage modulus of rainwater sewerage and by putting this water back to dam. This new source, approx.  $0.5 \text{ l.s}^{-1}$ , should stop dam's drying and it can also evoke slight increase of water level. Nevertheless the saturation will take couple of months. The period of saturation will be circumstanced on the rainfalls amount in next years. At present the water level is increasing approx. of 2 cm per week and is now about 20 cm higher than the former water level (before the construction was launched).

Next step was to complete reconstruction of all structures, including unsightly concrete fortification removal. This fortification was replaced with stone-pitched facing at the dam. The right bank was entirely reshaped. The former steep slopes are softer today. Several stone terraces were built up for fishing and for sitting at the water. Former vegetation was replaced with newly planted trees and bushes as beech, maple, alder or cornel. The banks will be plant with hygrophilous wetland vegetation after the retention is saturated and the water level is stable. Except of reed and reed-mace there will be a wide range of blooming plants as yellow iris or violet loosestrife. The small island was created because of large amount of free-running dogs. The island should serve as a silence area for water birds and amphibians. The peace of nature and beautiful lake will arise instead of former unsightly retention reservoir after the complete saturation. The lake will dominate to park.

The construction was performed by Lesy hl. m. Prahy, for the price of approx. CZK 12.5 mill. The project was co-financed by the European Union within the programme JPD2.

### 3. Sludge removal from the Lake Strnad

Reservoir Strnad was finished in about 1958 and in its beginning it served only as dry reservoir to retain flood flow. After 1969 the reservoir was modified and saturated. The reservoir should serve particularly for increasing the water quality of the Litovický Creek upstream the recreational dam Džbán now. The sludge removal from the Strnad Lake was induced by its substantial silting especially at its stock inlet, where the water depth reached about 20 cm.  $30,000 \text{ m}^3$  of sediment was measured in the lake.

This silting caused significant decrease of water quality during the summer months. The water from the Strnad Lake flows into the natural swimming baths, where the water evokes excessive increase of alga and blue-greens. The lake stayed sewed after the autumn fishing in November 2006, and the drain was ditched there. Works on sludge removal began in January 2007, the lake had been cleaned up till the end of April.

Sediment was brought to semi stockpile above the lake, where it was drying. The sediment was brought out to final storage after drying it properly and the whole area was put to its former state. The dam fortification and security overflow were repaired within the sludge removal. The unsuitable tree species were removed out from bank vegetation and new plantations of trees and bushes were realized at the banks and at the dam.

The construction was performed by Lesy hl. m. Prahy, for the price of approx. CZK 13.2 mill.

### 4. Sludge removal from the Lake Malá Markéta

The Lake Malá Markéta was silted with  $500 \text{ m}^3$  of sludge that was mainly organic in origin. Silting is caused particularly by fallen leaves from trees around. In the frame work that the lake is situated in newly reconstructed part of park and that large amount of rare water lily growths there, the classic sludge digging from the lake would be really problematic. For this reason the Department of the Environmental Protection approached innovative solution – sludge removal with using the Drausy system.

This technology uses biological and chemical procedures, which are activated by air oxygen saturation. Videlicet, air is being sent to bottom, where it starts procedures helping to decompose organic sludge in natural way. The whole procedure of sludge removal lasts six months. After it finishes just modicum of non-biodegradable sediment stays at the bottom. The water quality increases simultaneously, because the organic component of sludge causes pollution and excessive occurrence of algae in summer.

Sediment aeration lasted from April to September 2007. Significant increase of water quality was monitored in a lake as well as improvement of aeration attributes within the procedure. The lake was emptied and the whole action was evaluated in November. Sediment was removed from major part of interior deeper part of the lake, just fallen leaves left. Sediment decrease was not perceptible at upper part of

the lake, where the water depth is about 40 cm. One of the reasons is that water column is not so much aerated in fleet water. But the freshly fallen leaves had crucial influence. Leaves, fallen from surrounding trees, appear in the back part of the lake every autumn and make layer of even 20 cm high. Aeration reduced just the amount of the fallen leaves not the sediment.

After the action was evaluated and on the basis of new skills it was decided, that sludge removal will continue next year, but only at the back part of lake. The lake will be emptied in spring and aeration tubes will be placed directly into sludge so the aeration will carry out from bottom. The action will have been evaluated in autumn 2008.

The sludge removal was performed by company of Oko servis Anders, for the price of approx. CZK 130,000.

**The activities carried out within the framework of regular maintenance are as follows:**

- regular grass cutting on the lake and reservoir dams;
- maintenance of shore vegetation;
- cleaning of the water level and surroundings of the reservoirs;
- regular checks of technical shape of all structures and elements; and
- regular monitoring of the water level.

### REVITALIZATION OF PRAGUE CREEKS – CREEKS FOR LIFE

Technical modifications of small watercourses were carried out with the aid of concrete prefabricates. Stream-beds were straightened to the short lines. Stream-bed lines were shaped into trapeze with slope deceases. Then the whole watercourse and its surrounding were negatively influenced. Valuable circum-littoral zone of fleet water is considerably reduced at these creeks. The stream-bed is demoted to drain with the only function – fast water drain. Stream-bed lacks segmentation and the minimal water depth does not offer the environment for fish and other water organisms.

Natural stream-beds are in the form of wide fleet fryer in the Czech creeks at lower localities. Stream-bed is billowy to different directions so called “winding stream”. The natural stream-bed is subdivided, creek arches alternates fleet wades between creek arches at pools. Pools represent important environment for fish and other water organisms. The water is aerated at wades. Bare roots and dead wood serve as lurking places in stream-bed.

It is important for environmental protection to revitalize the technically modified stream-beds into nature area in urban conglomerations. Revitalization restores nature life and beauty in creeks.

#### 1. Revitalization of the bed of Botič Creek before Fidlovačka

Botič is the biggest and the best-known Prague creek. It springs south-western from Prague, near Čenětice village. The Botič Creek flows to the Vltava River near railroad bridge at Výtoň under the Vyšehrad Castle. The upstream bed of Botič Creek is in nature condition (except the fortification at places, where the creek flows through several villages). Botič has nature appearance of winding stream with lots of pools in its central part (under the Dam Hostivař). This area, with occurrence of protected and endangered bird species and water zoocenosis, is established as the Nature Monument “Meandry Botiče”. But the downstream of Botič Creek is strongly influenced by housing estate, and the bed of creek is continuously modified and fortified in this section.

The fortification of bed of the Botič Creek had been in emergency condition in the section before Fidlovačka for the long time. Aforementioned part of bed, which begins neat bridge in the Závěšova Street before Fidlovačka and ends near bridge in the Na Folimance Street, is 183 m long. The bed of Botič Creek was overall broken in its central concrete part, the rest of bed was fortified with disrupted stone-ditch and broken concrete. Tree of heaven and scorpion shell occurred among others on the bed slopes. These are not native plants, which are unfortunately in plenty broaden in Prague – especially along the watercourse.

Not only camp-shedding of creek bed even its restoration was provided within the revitalization of creek bed. Former pitching concrete remains were pulled down and the whole creek bed was cleaned out.





New shape of bed was modeled, so the creek would not create only direct drain, but the creek could billow from one bank to another. Five arches were created in this section. Former hard concrete fortification was replaced with stone-pitch, which was put onto gravel sand and nipped. These stream-bed's modifications were used at the beginning of 20<sup>th</sup> century. These beds have preserved to these days at several places.

So the modification of bed would not look so technically, green fortification was used next to stone-pitch. This green fortification uses wetland plants in variety of colours and species planted on coconut matting. These matting are put into prepared cassettes. The bed is then stabilized without remaindership. Because of high flow rate matting was saddled with stone rollers at sides and covered with hard rush in Botič Creek. This vegetation cassette should create compact island of greenery in pitched bed in 2008.

The construction was performed by Lesy hl. m. Prahy, for the price of approx. CZK 7 mill.

### 2. Revitalization of the Košíkovský Creek

The Košíkovský Creek is a left-side tributary of the Botič Creek under the Hostivařská Dam. In upper area the Košíkovský Creek, within the development of housing estate, was taken into underground pipes and rainwater drainage was connected to housing estate's drainage. The bed was pitched with stone and put into the concrete in section between the Mírového hnutí Street and the retention reservoir. After some time the bed was being gradually encrusted with vegetation (self-revitalization), which gave a bit nature character to the Košíkovský Creek. In spite of relatively massive fortification of creek bed, the extreme flow-rates repeated and the reconstruction of the fortification was not done properly – at the outflow of underground pipes and at fortification rate. That led to destruction of not only fortification rates but bed surrounding as well. The range of damage had been rising constantly.

The watercourse manager provided the bed repair using revitalization subjects due to stability provision. The outfall area of a part of bed, where underground pipes are laid, was newly pitched with stone and pegging. The whole upper stage was completely removed and replaced with boulder chute. Lower stage was removed also and the creek bed was modeled and enlarged so the flowing pools arose. Small plantations of hygrophytes will be supplied in spring months. Subjects like these have significant importance for watercourse articulation, which is of straighten trapeze shape, and increase the ecological and esthetical value of the Košíkovský Creek.

This part of the creek revitalization included cleaning both dams in the Košíkovský Creek. There will be, except sludge removal, provided little plantation of hygrophytes, repairs of subjects and repair of the bed of the Košíkovský Creek upstream its inflow to the Botič Creek.

Despite the all precaution and the protector's effort to make the Košíkovský Creek more natural and more attractive for visitors, water is being polluted constantly by irresponsible citizens and companies. Those emit waste water into the rain sewage, which flows directly into the Košíkovský Creek and influence negatively its ecological and recreational function.

The construction was performed by Lesy hl. m. Prahy, for the price of approx. CZK 3.4 mill.

### 3. Revitalization of the Krutecký Creek

The Krutecký Creek is a right-side tributary of the Litvicko-Šárecký Creek. Creek basin spreads to southern slope of the Šárecké Valley. This section between the Džbán swimming bath and the Vltava River is deeply cut into massive rock, which came from proteozoic period. Entire locality is a part of the Šárka-Lysolaje Nature Park, whose most valuable parts are established as protected nature areas of small extent.

Krutecký Creek can be divided into two distinguishing parts:

- **First designed section** (from up the stream view) began with sluice under the local road between gardening colony and the Horoměřická Street, further it continued to a concrete creek bed of 100 m long, which is situated at the margin of oak grove between forest footpath and the Horoměřická Street.
- **Second section** is about 160 m long. Again it led through the concrete creek bed between the Na krutci Street and meadow with ruderal plants, where wild dump often occurred.

In the framework of this unpleasant statement the Department of Environmental Protection of the City of Prague in cooperation with Lesy hl. m. Prahy (Forests of the City of Prague) approached to revitalize the bed of the Krutecký Creek in section of 260 m long.

All concrete cork-mouth finishes were removed within the first section. The creek bed had been slightly billowed in the section between forest footpath and the road.

The creek lane was changed within the second section, thus the Krutecký Creek could billow down the valley again. Creek bed was diverted from mouth of creek, where the underground pipes had been laid, to the middle of meadow, so the creek could billow in its natural way. Little swamp with pool (of about 90 m<sup>2</sup>, and max. depth of 0.5 m) was created in the middle of the creek. The plenty of ash and maple self-seeding were found at the meadow. The new creek lane was conformed to existing young perspective trees.

The creek bed was fortified with stone pit at the creek arches, thus new creek bed destructions would not happen. The creek crossing was built from stone blocks at the crossing of forest footpath and the creek. A matter of interest is, that designer of this solution kept to the stone way crossings in ancient Pomp.

Embankment of the new creek were planted with wetland vegetation and gravel wades were built at arch transitions.

The reparation of the mouth of underground piped subject was a part of the project as well as drainage of the road. Former bed of the Krutecký Creek was left in this section, thus it could serve as road ditch mouthed into the water course. This revitalization has been the first of revitalization carried out in Prague. The construction was performed by Lesy hl. m. Prahy, for the price of approx. CZK 650,000.

#### 4. Revitalization of the Baňský Creek – damming renewal

The Baňský Creek springs in Prague 16 - Zbraslav na Baních, is about 700 m long and passes difference in altitude of 80 m. Seven small stone damming are built at its watercourse. Three bottom small damming were in very bad condition. The Baňský Creek is shooting flow, whose bed is cut into narrow ravine and passes big difference in altitude. The aquosity of watercourse depends on climatic rainfalls especially on rainstorms. The upper half of the watercourse stays without constant rate flow for the major of year. Constant significant rate flow does not appear till the mid-part of the watercourse, where water from left-bank spring flows into the creek.

Revitalization of the Baňský Creek included: reparation of three small bottom dams, cleaning up the first damming basin, reparation of the inflow subjects and revitalization of the creek bed.

The original statement of damming from the beginning of 20<sup>th</sup> century was renewed within the reparation of damming and pitching. Damming were rebuilt including stilling basin. The missing stones were jogged in. The creek bed was cleaned out of mudflat and vegetation.

The first damming basin was cleaned out of sediment (mudflat and gravel bar, fallen branches) – so the area of accumulation (before the gill falls out of the forest, where the creek clogged in its underground piped part) was restored.

Unsuitable inflow to pipes was replaced with capacitive inflow equipment.

The construction was performed by Lesy hl. m. Prahy, for the price of approx. CZK 1.6 mill.

#### 5. Renewal of the Čimický Creek

The Čimický Creek used to spring above the Čimický Lake and flew through the entire Čimické Valley. But the springs were pulled down and the creek dried out, because of the urbanization expansion of Čimice and building the underground network. Within the revitalization of Čimický Lake there was managed to put the majority of original water back. The water began to stream back to the Čimické Valley from fully saturated lake. In 2007 the cleaning of creek bed was provided in those days completely loaded and here and there lost. It took nearly a year till the water found the way to the bottom of the Kostoprďák Lake. In autumn the water regime was stabilized, so the creek bed was enlarged at few places. Then several small pools were created for little animals. Pools will be planted with wetland vegetation in spring. In the framework of revitalization the renewal of the Čimický Lake was an important action returning creeks to their native conditions.

The renewal was carried out within the framework of regular maintenance of watercourses.

**The activities carried out within the framework of regular maintenance are as follows:**

- regular grass cutting on the lake and reservoir dams;
- maintenance of shore vegetation;

- cleaning of the water level and surroundings of the reservoirs;
- regular checks of technical shape of all structures and elements; and
- regular monitoring of the water level.

### B3.3.5 Care of specially protected areas in Prague in 2007

Elements of nature landscape, which have been preserved in the urban structure till these days and which represent valuable heritage from our ancestors from the relatively near times, before the human started to extradite themselves, either deliberately or accidentally, from nature and landscape, are even more precious now.

The protected areas in Prague were created by human activities, which for centuries, and somewhere even for millennia, affected landscape, which is now called culture landscape.

We can state that certain locations, as for instance in the Nature Reserve of Divoká Šárka, Prokopské Valley, specially protected areas on the territory of Troja, or the Nature Monument Hrnčířské Meadows the management of protected areas can be called management of the natural environment of the City by traditional methods leading towards the renewal and preservation of historical landscape. Here, the inappropriate and aggressive tree species are suppressed and conditions for the return re-spreading of plant communities yet also appropriate species composition of forest stands are created.

The Capital City of the Czech Republic Prague realizes the value and importance of its preserved nature localities. Without the way towards preservation of specially protected areas in Prague will lead to irretrievable loss.

In June 2007 the new Nature Trail **Oborou Hvězda** (Through the Game Preserve Hvězda) was opened. Creating of web address [www.prazskestezky.cz](http://www.prazskestezky.cz) continued. The complete reparation of the Nature Trail **Povodím Botiče** is being prepared. Total new cyclo-route **from Satalice to Vinoř** and through the Nature Reserve of **Divoká Šárka** is also being prepared.

- The regular maintenance of nature trails is being constantly provided, because the trails in City often labour with vandalism.
- The traces of nature trails were located by GPS and FieldMap methodology, thus the data would serve for trails management and as base for creating city maps.
- The revitalization of selected wells is carried out at localities Divoká Šárka, Dolní Šárka and the Chuchelský Grove.
- The information about **Prague wells** has been constantly increasing on city web sites.
- The work on study, whose objective is to recommend establishing watercourse protected area around some of Prague wells, is in progress.
- In progress is the consecutive placing of information tables, about particular specially protected areas, directly to terrain and simultaneously to web sites.
- Except the regular forest management the species conversion continue. Derived locust specimens are being replaced with origin species composition with oak superiority. Similarly in the Protected Park Prokopské Valley the part of derived black pine scrub was cleared and replaced with oak again. The renewal of oak scrub with cornel undergrowth is being made in environmental friendly way in the Protected Reservation Chuchelský Grove.
- The manner of management of damp and wet meadows, in the Protected Park Hrnčířské Meadows, was significantly modified with special regard to spineless animals. The ranges of insect phytophagous species are attached to specific herbs or grasses. When the herb level is left un-mowed for a particular part of the year, the aforementioned species can finish their genesis. The other grass communities are treated similarly (for example Protected Park V hrobech, Protected Park Trojská, Protected Reservation Divoká Šárka, Protected Park Dolní Šárka, Protected Reservation Prokopské Valley etc.)
- In 2007 the maintenance of formerly not mowed meadows, which started to be overgrowth with undesirable herbs tied up on nitrogen, as nettle or goutweed, continued. The aforementioned meadows

are in the PP Čimické Valley and the PP Lítožnice. Regular mowing of large areas, in protected zones of the PR Prokopské Valley (the Butovické hradiště and areas under the Zlíchov) or the PP Vidoule, has been continuing for five years.

- The original stream of the Čimický Creek was renewed and pools were created in the Čimické Valley.
- Pasture of a flock of goats and sheep has been provided on selected localities for eighth consecutive year. This year the pasture was enlarged to other precious localities, where this kind of cultivation is desired (as for example in the PR Prokopské Valley, the PP Čimické Valley and newly in the PP Zámky and the PP V hrobech).
- The bushes removing continue especially at localities, where the precious botanical and entomological steppe areas exist (as for example the PP Sedlecké Rocks, PP Baba, PP Bohnické Valley, PP Zámky, or PP Branické Rocks, PR Prokopské Valley and PP Dolní Šárka).
- Except the long-term maintained cane growth they began to mow cane growth in the PP Milíčovský Forest, around the lakes, and mowed area in the PP Lítožnice became larger as well.
- The maintenance of long-term slovenly fruit orchards continues in the PR Divoká Šárka, the PR Prokopské Valley, the PP Lítožnice and the PP Čimické Valley and also in the orchard in protected zone of the PR Divoká Šárka – former summer scene of the National Theatre. Further pomological researches on orchards were completed. The objective of the research was to determine and put back to nature historical high-trunk fruit tree species, thus the landscape feature would be preserved.
- There was also progress in cleaning out the rock profiles from undesirable bushes, which corrode the rocks by their roots. Somewhere the bushes also cover the subject of protection, the specific geological profile (as for example the PR Divoká Šárka, the PR Prokopské Valley, the PP Pecka etc.).
- Regular removing of illegal dumps continued.

(PP – protected park, PR – protected reservation)

## B3.4 BIOMONITORING OF THE ENVIRONMENT

### B3.4.1 Monitoring of Lyme borreliosis and meningoencephalitis agents in ticks in 2007

In 2007 the monitoring of up-to-date percentage of ticks infected with the aetiological agents of Lyme borreliosis and meningoencephalitis in the selected areas on the territory of Prague continued.

The tick specimens collecting was performed by flagging at the selected localities by workers of the Department of Epidemiology of the Public Health Authority of the City of Prague in the co-operation with personnel of the Municipal Public Health Authority, branches of Centre, South, West, East, and North. Testing was carried out by the Reference Laboratory for Lyme borreliosis of the SZÚ, Prague and the Reference Laboratory for Arboviruses of the Regional Public Health Authority in Ostrava.

Climatic conditions – exceedingly warm winter, fair weather and temperatures in spring in 2007 again affected the biological development cycle of ticks. The temperatures in the period of collecting were between 20–30 °C (cloudless or somewhat cloudy). The laboratories received the required number of tick specimens in every stadium of their development to carry out examination.

The results of the examinations (see the table bellow) for the presence of aetiological agent of Lyme borreliosis in ticks acquired by microscopic investigation showed average presence in 11.21 % and the maximum presence 23 % pursuant to the written report of the National Reference Laboratory for Lyme borreliosis of the SZÚ, Prague.

Results of the continuous examination of ticks for the presence of tick-transmitted meningoencephalitis virus were negative at all localities.

The results demonstrate the prevention is necessary (as wearing suitable clothes, applying repellents, early removal of sucking ticks, including disinfection of the sucking place, and vaccination) if aforementioned localities are visited. The vaccination is carried out by the National Institute for Public Health or primary care physicians and the autumn season is the best time to get the first dose of the vaccine administered.

## B3 LANDSCAPE

**Tab. B3.6 Percentage of ticks infected with aetiological agent of meningoencephalitis – localities provided by the Department of Epidemiology of the Public Health Authority of Prague in 2007**

Locality	Date	Females	Males	Nymphs	Total
Satalická Game Preserve, Prague 9	14 <sup>th</sup> April 2007 results	22 1x 10-neg. 12-neg.	25 25-neg.	12 12-neg.	59 59
Kunratický Forest, Prague 4	23 <sup>rd</sup> April 2007 results	40 2x 10-neg. 9-neg. 11-neg.	34 27-neg.	29 29-neg.	103 96
Točná, airport, Prague 12	26 <sup>th</sup> April 2007 results	10 1x 10-neg.	25 25-neg.	73 33-neg. 40-neg.	108 108
Milíčovský Forest, Prague 11	3 <sup>rd</sup> May 2007 results	18 1x 10-neg. 8-neg.	20 2x 10-neg.	67 4x 10-neg. 27-neg.	105 105
Kunratický Forest, U Labutě, Prague 4	14 <sup>th</sup> May 2007 results	34 1x 10-neg. 1x 10-neg. 14-neg.	45 25-neg. 2x 10-neg.	59 4x 10-neg. 19-neg.	138 138
Park near Krč. Railway Station, Prague 4	24 <sup>th</sup> May 2007 results	47 4x 10-neg. 7-neg.	54 2x 20-neg. 9-neg.	41 41-neg.	142 137
Habrovka, Prague 4	28 <sup>th</sup> May 2007 results	18 1x 10-neg. 8-neg.	33 2x 10-neg. 13-neg.	42 42-neg.	93 93
Kunratický Forest, Globus, Prague 4	5 <sup>th</sup> June 2007 results	14 14-neg.	31 2x 10-neg. 11-neg.	91 11-neg. 4x 10-neg. 4x 10-neg.	136 136
Olšanské Cemeteries, Prague 3	6 <sup>th</sup> June 2007 result	34 3x 10-neg. 4-neg.	31 11-neg. 2x 10-neg.	61 4x 10-neg. 21-neg.	126 126
Modřanská Gullet, Prague 12	7 <sup>th</sup> June 2007 result	36 3x 10-neg. 6-neg.	42 2-neg. 2x 10-neg. 2x 10-neg.	39 39-neg.	117 117
Hostivař Forest-park, Prague 15	12 <sup>th</sup> June 2007 result	25 2x 10-neg. 5-neg.	30 1x 10-neg.	60 3x 10-neg. 3x 10-neg.	115 95
Divoká Šárka, Prague 6	12 <sup>th</sup> June 2007 result	14 14-neg.	15 15-neg.	100 4x 10-neg. 4x 10-neg. 2x 10-neg.	129 129
Malá and Velká Chuchle, Forest-park, Prague 16	13 <sup>th</sup> June 2007 result	16 1x 10-neg. 6-neg.	8 8-neg.	49 49-neg.	73 73
Divoká Šárka, beside the swimming-pool, Prague 6	25 <sup>th</sup> July 2007 result	8 8-neg.	6 6-neg.	270 4x 10-neg. 4x 10-neg. 4x 10-neg. 4x 10-neg.	284 174

Source: HS HMP (Public Health Authority of Prague)

**Tab. B3.7 Percentage of ticks infected with aetiological agent of Lymes borreliosis – localities provided by the Department of Epidemiology of the Public Health Authority of Prague in 2007**

Locality	Date	Number of collections	Females	Males	Nymphs	Total
Ďáblický Grove, Prague 8	23 <sup>rd</sup> April 2007 results	1	15 3 pos.	20 neg.	6 neg.	41 7.3 %
Klánovice beside the swimming-pool, Prague 21	25 <sup>th</sup> April 2007 results	1	4 1 pos.	12 2 pos.	50 3 pos.	66 9.0 %
Točná, airport, Prague 12	26 <sup>th</sup> April 2007 results	1	12 1 pos.	0	42 4 pos.	54 9.22 %
Horní Počernice, Svěpravický Lake, Prague 20	26 <sup>th</sup> April 2007 results	1	4 neg.	8 1 pos.	12 2 pos.	24 12.5 %
Kunratický Forest, U Václava, Prague 4	7 <sup>th</sup> May 2007 results	1	65 5 pos.	64 6 pos.	107 11 pos.	236 9.3 %
Kunratický Forest, Zelené domky, Prague 4	21 <sup>st</sup> May 2007 results	1	22 5 pos.	10 1 pos.	82 8 pos.	114 12.2 %
Petřín, Prague 1	31 <sup>st</sup> May 2007 results	1	14 1 pos.	20 2 pos.	17 2 pos.	51 9.8 %
Game Preserve Hvězda, Prague 6	7 <sup>th</sup> June 2007 results	1	6 1 pos.	5 neg.	47 4 pos.	58 8.6 %
Olšanské Cemeteries, Prague 3	11 <sup>th</sup> June 2007 results	1	5 2 pos.	2 neg.	6 1 pos.	13 23.0 %
Divoká Šárka, Prague 6	12 <sup>th</sup> June 2007 results	1	0	0	42 5 pos.	42 11.9 %
Kamýk, Modřanské Housing Estate, Prague 12	19 <sup>th</sup> June 2007 results	1	7 1 pos.	7 1 pos.	58 6 pos.	82 11.1 %
Prokopské Valley, Prague 5	20 <sup>th</sup> June 2007 raw data	1	0	1	1	2
Stromovka, Prague 7	25 <sup>th</sup> June 2007 results	1	5 1 pos.	3 neg.	58 6 pos.	66 10.6 %

Source: HS HMP (Public Health Authority of Prague)

### B3.4.2 Aerobiological monitoring of air in Prague

Since the 1960s the network of monitoring stations, enabling on the basis of mutual results comparison to make the predictions of the pollen season more precise, become to grow fast in Europe. The pollen season course is slightly different every year. The reason for is the various weather conditions and so phenological conditions in respective year, namely the development in average daily temperature and humidity. Furthermore, in respective years the intensity of pollen season is different in various species of flora, that the amount of pollen, which certain plant species growing over the area release into air and which thus may affect the level of troubles to an allergic person. Czechoslovakia joined the network of the European Pollen Information Service in 1992. In 2007 there were in total eleven monitoring stations of the Pollen Information Service operated on the territory of the Czech Republic.

The Prague Pollen Monitoring Station was put into operation in March 1993. Till June 1995 the Monitoring Station was located on the premises or the Policlinic at Karlovo Square, and then due to operational reasons it was moved into the premises of the National Institute for Public Health (SZÚ) in Šrobárova Street, Prague 10. In 2007 it was under operation from 26<sup>th</sup> February till the end of October (in time when this paper is being prepared, i.e. at the beginning of October 2007, it is still working).

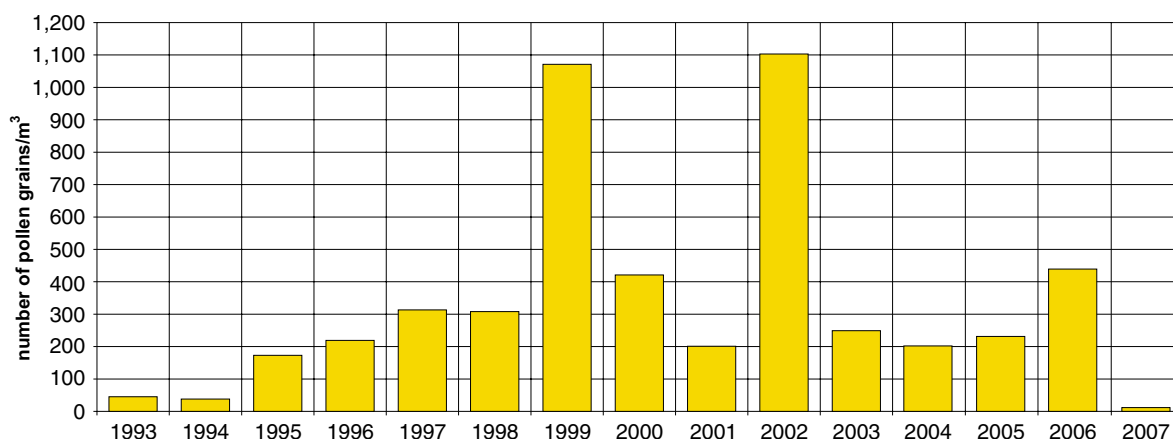
During the spring period (when tree species pollen dominates) pollen grains of birch (*Betula*) belong to the most important aeroallergens in Prague and generally in the Czech Republic as well. Taken in a broader sense this means entire family of *Betulaceae*. Pollen of single species of this family feature

significant cross-reactivity. Therefore, an individual allergic to one genus of this group can show clinical problems when put into contact with other members of this family. During the summer period grass (*Poaceae*) pollen form the most important group of aeroallergens. They also display a significant cross-reactivity among single members. Concentration of mould spores usually increases in this period too. This applies most significantly to *Cladosporium* and *Alternaria* genera. For the autumn period the dominance of weed pollen is typical, mostly mugwort (*Artemisia*). Pollen grains of ragweed (*Ambrosia*), which are important aeroallergens in Hungary, Slovakia and in part in south Moravia, have been regularly occurring in the spectrum of aeroallergens found in Prague at the end of summer and brink of autumn (see graph). With respect to the explosive spreading of ragweed throughout Europe observed during the last decades this allergen monitoring of is of prime importance. What is also necessary is to promptly implement preventive measures to eradicate ragweed from the Prague region. In August a peak concentration of mould spores usually occurs being an order of magnitude higher than concentration of all other pollen allergens.

The pollen season 2007 in Prague started extra soon – in half of January was not strong and lasted approximately for the same time as in the previous years till the end of September and the beginning of October. As usual the season started by blooming of hazel (*Corylus*) and alder (*Alnus*) (see graph). The tree species (*Alnus*) were finishing their blooming in the period of measuring. The birch (*Betula*) season is usually simultaneous with that of ash (*Fraxinus*). Birch bloomed a bit earlier than in the previous year, at the end of March, and its season was of average strength. It has its peak at the beginning of April 2007, then the airborne allergen concentration quickly decreased (see graph). In 2007 the grass (*Poaceae*) season started at the break of April and May, which is about two weeks earlier than the long-term average, and was average. The main peak of the concentration of this pollen appeared from the half of May till the half of July, and grass pollen grain maximum was at the beginning of June. In July there was average amount of grass pollen in the Prague air. Passing through several smaller peaks the air concentration of this pollen remained at the allergologically significant level till the end of July. Then the amount of airborne grass pollen was negligible (see graph). The occurrence of mugwort (*Artemisia*) began to appear regularly in air in the last decade of July. Its season was quite strong and attained its peak in period from 5<sup>th</sup> to 15<sup>th</sup> August (see graph). On the contrary, the ragweed (*Ambrosia*) season in 2007 was really weak, it was caused by rainy and calm weather in the second half of September. This allergen appeared sporadically in the air of Prague. At the time of this overview preparation (beginning of October) the ragweed season has been slowly fading (see graph). Since the beginning of September the overall airborne pollen concentration was very low only.

The graphs presented demonstrate concentrations of the most significant airborne pollen allergens in Prague air during the last six years that is since 2002 till the end of September 2007.

**Fig. B3.10 The ragweed pollen concentration in Prague, 1993–2007**



Source: PIS







### B3.4.3 Bioindication environmental monitoring – regular monitoring of living organisms at selected localities

Chemical and physical factors, which affect the territory population and health risks, is being managed to measure exactly, but the problem is still the objective interpretation and evaluating what the acquired numbers mean for public health. In order to evaluate their values measured can be compared to public health standards, which represent virtually contractual values that may often widely differ in various countries.

Contrary the bioindication monitoring gives the opportunity, by watching the organism reactions, contribute to the evaluation of effects of local conditions also on human population and some of which more sensitive than human organism may in advance indicate hygiene risks to the population in the given environment.

**The methodology applied:** Repeated inventory taking is carried out of selected groups of plants and animals having significant ability to indicate in five model natural sites in Prague. Results are either descriptions of the actual status either finding of time series (trends) through the benchmarking with the previous monitoring periods.

Territories investigated:

Divoká Šárka Valley	– 1984, 1988, 1993, 1998, 2003
Prokopské Valley	– 1984, 1989, 1994, 1999, 2004
Pitkovice Valley and Uhříněves Game Preserve	– 1985, 1990, 1995, 2000, 2005
Confluence of the Vltava River and the Berounka River	– 1986, 1991, 1996, 2001, 2006
Trojská Fold	– 1987, 1992, 1997, 2002, 2007.

#### Actually in 2007 the Trojská Fold was investigated with following results:

Bioindication monitoring of Trojská Fold is being provided for twenty years with this fifth investigation. Thanks to scientists' interest are the data from 1987 and even older available in range of investigated groups. Not just actual state and quality of the environment can be described by this methodology, but we can also compare the development trend with past and we can estimate the extrapolation in future.

The special action was recorded in the area of the Vltava River alluvium – return of natural succession. This area was involved with catastrophic flood in 2002 and the landscape relief as well as substrate, which was swept away or deposited, was almost changed.

Surprisingly fast natural succession of these denatured emplacements was discovered in group of liverworts. Twenty-three species of liverwort has returned to the locality of the Vltava River alluvium. Despite the negative impact of developing tourism the increase of the number of liverworts was recorded at some more places (Salabka, Trojská, Velká skála). The highest and constantly increasing diversity has been found in the Protected Park Velká skála, where the increased concentration of pollution almost does not reach. But acid-philous toxi-tolerant *Lecanora conizaeoides*, which used to be dominant, is still plentiful here too. But the sensitive species increase, what indicates the sulphur-removal. Even the most sensitive species of liverworts started to rejoin.

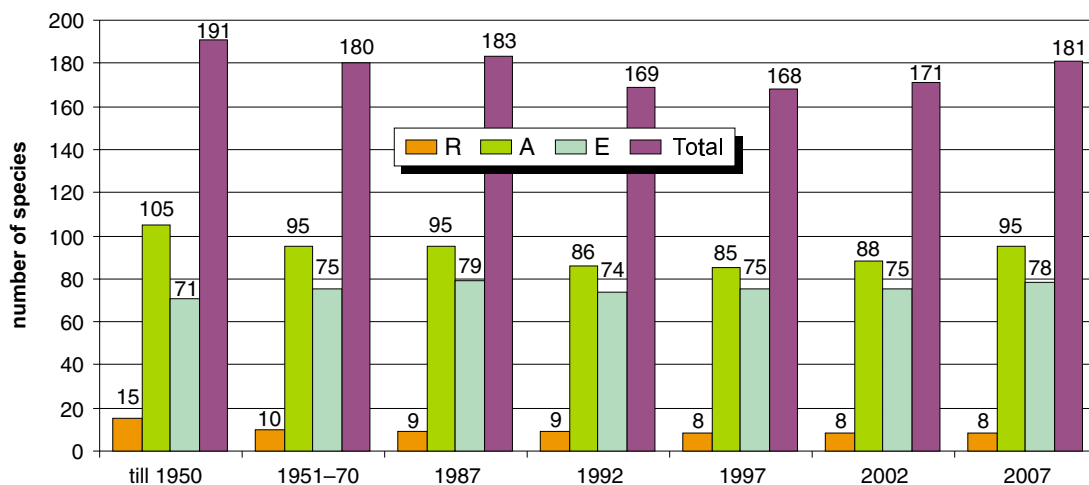
Any of species did not become extinct in the group of bryoflora (mosses and liverworts) at the entire locality. Only decrease in quantity was recognized at several species. On the other side three new species of bryoflora accrued. The highest diversity development was recognized in the Bohnická Plateau (nine species, formerly known only from other parts of the Trojská Fold) and in Sklenářka (six species).

Recorded changes are evoked mainly by ruderalization and nitrification (the other pollutants simultaneously decrease). This provokes the invasion of adaptable species on these conditions. The changes of oro-climate add to this.

The results of botanical research were compared with older data, from last 30 years. So called “Ellenberger’s numbers” methodology, which expresses ecological demands of species, has been used to evaluate the results of bioindication monitoring.

Actual comparison with year 2002 indicates decrease of 38 species unknown. Contrary to this there were found 111 new species. So generally there are 73 species more than five years ago. Unfortunately among the increasing number of species are mainly undesirable invasive species and derived species, which compete with origin species and objective species on disturbed surface. Slight increase of number of threatened species has been monitored thanks to improvement of the environment and thanks to management of certain localities.

**Fig. B3.13 Overview of founded species and predicted species according to bioindicating groups and seasons**



Source: ČSOP

Modification analysis does not indicate significant changes of pollutant impact. Decreased number of heliophyte species is evoked by ingrowing and extinguishing of particular localities.

Quotient of derived and invasive species, archeophytes, neophytes, temporarily escape species and naturalized species are defined graphically in long-term overview. All the curves of the graph have derivative deviations (extremes) around 1990 (influenced by the economic and politic changes) and around 2002 (flood exposure).

Small fauna survey was concentrated especially on flooding area. In the framework the significant changes were not monitored in other parts, except the gradual ingrowing or the moisture decreasing tendency and other impacts that are not directly caused by anthropogenic pollution sources.

Fierce degradation of this fauna branch by floods in alluvial area of the Vltava River recedes very slowly. It does not proceed to, thanks to unpropitious management of Povodí Vltavy company, renewal of former treasury of flood-plain communities. But the alluvial soil carbon enrichment should on contrary support molluscous expansion.

**Butterflies:** Contrary to 2002 when the number of butterflies slightly descended, it was followed by increase of not only the number of species but with spread of sensitive relicts as well. So the established bioindication index increased from 41.55 in 2002 to 44.10 in 2007. The value 45.60 (before flood in 1997) was almost reached. The most remarkable change is *Zygaena Laeta*'s comeback. This specie was frequent to the half of 20<sup>th</sup> century and then became extinct.

**Carabidae beetles:** The year 2007 was climatically very kind to this group – exceedingly warm winter, warm and dry spring until June. As lately as August the temperatures returned to normal. The carabidae beetles were discovered especially at locality up the botanical garden, thanks to optimal management and positive environmental changes. Quality maintenance took similar effect in Salabky and Havránky. Rudelization and ingrowing continue in other localities (for example in Haltýře). It is important that results of floods, which happened on 14<sup>th</sup> August 2002, die away consequently. Water level of the Vltava River raised up of almost ten meters in the time of floods.

In total 224 species of Carabidae beetles has been monitored in Prague since 1984 (research utilized the extensive archive materials). 158 species of Carabidae beetles were found in 2007, that is 10 species more than in 2002 – but 15 species found in 2002 were not find this year.

Coastal zone brought the most remarkable change in fractional areas. Not only total renewal befall but there were two times more species of Carabidae beetles than used to be before floods (!!!). In spite of that local surfaces are more favourable after floods, it is surprising that process of natural succession is so fast. 11 new species has occurred here.

**Amphibians, reptiles, birds:** This group indicates adverse effects, in this case negative factors effective here are the growing frequency in visits and number of visitors, invasive area development in the vicinity after floods.

Only quantitative decrease was found in the group of amphibians, any of species became extinct. On the contrary three from five reptile species (slow-worm, smooth snake, green lizard) could not been found at all. Dominant group of birds (71 species) is specified in this survey with reference to their requirements for food and nesting. The comparison with former data could not been accomplished, because this progressive methodology has been used for first time here. The enunciation value of actual trend will not come out till repeating the inventory.

The situation is indicated as stabilized with tendency to slight improvement within the attack of atmospheric pollution transfer. This is caused (judging by liver-worth) by moving the dominant component of atmospheric pollution from noxious sulphur dioxide elements to less dangerous nitrogen oxides and ammonia, which support eutrophication growth of invasive ruderals. Also increasing gradient pollution has been indicated from upper edge of Bohnická Plateau down to less self-ventilated valley of the Vltava River meander.

Monitoring of succession on denatured flood surface brought very interesting results, which are described at particular process groups in survey.



