

Appendix

Table I. Metropolitan area. Land use change matrices (ha)

1984 \ 1999	Artificial surfaces	Water bodies / wetlands	Agricultural areas	Natural areas	Total (1984)
Artificial surfaces	20152.4	11.96	119.19	164.95	20448.50
Water bod. / wetl.	34.54	31477.21	1409.75	2373.34	35294.84
Agricultural areas	6209.93	266.44	350421.22	4472.17	361369.76
Natural areas	1614.81	282.65	6689.00	65556.61	74143.07
Total (1999)	28011.68	32038.26	358639.16	72567.07	491256.17

1999 \ 2007	Artificial surfaces	Water bodies / wetlands	Agricultural areas	Natural areas	Total (1999)
Artificial surfaces	27542.06	28.34	270.42	170.86	28011.68
Water bod. / wetl.	2.89	31882.30	109.58	43.49	32038.26
Agricultural areas	6555.87	1100.02	349084.06	1899.21	358639.16
Natural areas	2300.65	137.45	3039.00	67089.97	72567.07
Total (2007)	36401.47	33148.11	352503.06	69203.53	491256.17

Table 2. Unit A. Land use change matrices (ha)

1984 \ 1999	Artificial surfaces	Water bodies / wetlands	Agricultural areas	Natural areas	Total (1984)
Artificial surfaces	8465.68	11.96	9.46	62.24	8549.34
Water bod. / wetl.	31.59	1267.89	12.66	89.18	1401.32
Agricultural areas	2137.71	183.57	40359.95	1022.58	43703.81
Natural areas	494.85	38.22	273.03	2085.01	2891.11
Total (1999)	11129.83	1501.64	40655.10	3259.01	56545.58

1999 \ 2007	Artificial surfaces	Water bodies / wetlands	Agricultural areas	Natural areas	Total (1999)
Artificial surfaces	10969.07	0.29	149.14	11.33	11129.83
Water bod. / wetl.	2.46	1495.94	3.24	0.00	1501.64
Agricultural areas	1470.05	151.97	38729.05	304.03	40655.10
Natural areas	723.59	3.71	268.51	2263.20	3259.01
Total (2007)	13165.17	1651.91	39149.94	2578.56	56545.58

Table 3. Unit B. Land use change matrices (ha)

1984 \ 1999	Artificial surfaces	Water bodies / wetlands	Agricultural areas	Natural areas	Total (1984)
Artificial surfaces	3836.70	0.00	41.65	25.68	3904.03
Water bod. / wetl.	2.85	11.15	48.54	0.00	62.54
Agricultural areas	1835.06	25.75	66458.92	1439.51	69759.24
Natural areas	299.50	76.99	3377.86	14556.63	18310.98
Total (1999)	5974.11	113.89	69926.97	16021.82	92036.79

1999 \ 2007	Artificial surfaces	Water bodies / wetlands	Agricultural areas	Natural areas	Total (1999)
Artificial surfaces	5823.07	21.75	0.36	128.93	5974.11
Water bod. / wetl.	0.43	112.51	0.00	0.95	113.89
Agricultural areas	2960.56	110.65	66245.74	610.02	69926.97
Natural areas	485.41	42.22	541.41	14952.78	16021.82
Total (2007)	9269.47	287.13	66787.51	15692.68	92036.79

Table 4. Metropolitan Area. Level I Metrics

2007								
CLASS	PLAND	LPI	LPI/PLAND	NP	AREA MN	AREA SD	ENN MN	RGYR AM
Artificial surfaces	7.41	4.34	58.59	1099	33.12	645.08	412.94	5675.80
Water bod. / wet.	6.75	5.46	80.91	521	63.62	1175.27	835.36	7212.85
Agricultural areas	71.76	16.29	22.69	449	785.09	5740.12	121.93	8769.51
Natural areas	14.09	4.71	33.43	1592	43.47	741.97	253.97	4620.27
1999								
CLASS	PLAND	LPI	LPI/PLAND	NP	AREA MN	AREA SD	ENN MN	RGYR AM
Artificial surfaces	5.70	2.95	51.72	1112	25.19	436.28	433.70	4066.50
Water bod. / wetl.	6.52	5.46	83.69	284	112.81	1589.26	1092.72	7475.56
Agricultural areas	73.01	16.83	23.06	385	931.54	6621.17	104.02	9319.19
Natural areas	14.77	8.37	56.68	1563	46.43	1067.27	249.05	6889.57
1984								
CLASS	PLAND	LPI	LPI/PLAND	NP	AREA MN	AREA SD	ENN MN	RGYR AM
Artificial surfaces	4.16	1.28	30.85	1035	19.72	206.28	467.89	2177.20
Water bod. / wetl.	7.19	6.25	87.01	126	280.12	2724.22	1394.10	8180.80
Agricultural areas	73.57	18.83	25.60	458	789.02	6593.74	129.22	9670.74
Natural areas	15.09	7.62	50.46	1706	43.46	960.57	244.21	6569.03

Units: PLAND: percentage; LPI: percentage; NP: none; AREA MN: hectares; AREA SD: hectares; ENN MN: meters; RGYR AM: meters.

Table 5. Metropolitan Area. Level 2 Metrics

2007								
CLASS	PLAND	LPI	LPI/PLAND	NP	AREA MN	AREA SD	ENN MN	RGYR AM
Cont. urban fabric	2.44	0.53	21.72	145	82.67	238.49	985.63	1039.07
Disc. urban fabric	1.50	0.04	2.64	754	9.79	21.85	624.76	330.75
Other art. surfaces	3.34	1.21	36.32	854	19.20	215.38	436.10	4104.62
Urban green areas	0.13	0.02	14.78	57	11.19	18.47	2192.36	294.33
Water bod. / wetl.	6.75	5.46	80.91	521	63.62	1175.27	835.36	7212.85
Irr. agric. areas	41.96	8.66	20.64	780	264.27	2545.05	195.77	6692.49
Non-irr. agric. ar.	27.52	6.97	25.34	984	137.40	1421.65	247.01	4936.10
Heter. agric. areas	2.27	0.35	15.34	381	29.33	122.27	651.64	981.21
Forest / woodland	8.01	1.02	12.71	1164	33.82	247.01	282.15	1754.81
Scrub / herb. veg.	4.82	0.17	3.62	1785	13.25	55.00	248.40	1032.66
Forest plantations	0.24	0.03	14.24	81	14.27	23.06	1050.34	306.47
No vegetation	1.02	0.25	24.49	248	20.27	115.40	854.71	1706.18
1999								
CLASS	PLAND	LPI	LPI/PLAND	NP	AREA MN	AREA SD	ENN MN	RGYR AM
Cont. urban fabric	2.16	0.51	23.73	152	69.88	222.45	994.12	1030.79
Disc. urban fabric	1.24	0.04	3.18	677	9.01	20.63	705.24	319.07
Other art. surfaces	2.19	0.91	41.65	711	15.14	173.79	525.23	3957.05
Urban green areas	0.11	0.02	17.94	42	12.51	19.76	2613.48	307.18
Water bod. / wetl.	6.52	5.46	83.69	284	112.81	1589.26	1092.72	7475.56
Irr. agric. areas	44.10	8.88	20.15	654	331.25	2978.99	174.06	7025.08
Non-irr. agric. ar.	26.35	6.63	25.17	800	161.82	1526.45	279.32	4855.59
Heter. agric. areas	2.55	0.34	13.49	321	39.09	146.12	695.25	1054.71
Forest / woodland	9.20	1.52	16.53	1063	42.52	375.95	300.42	2420.53
Scrub / herb. veg.	5.17	0.19	3.67	1691	15.03	58.68	259.58	951.72
Forest plantations	0.19	0.03	18.11	65	14.10	24.15	635.90	346.31
No vegetation	0.21	0.04	19.28	154	6.73	19.96	1244.78	926.97
1984								
CLASS	PLAND	LPI	LPI/PLAND	NP	AREA MN	AREA SD	ENN MN	RGYR AM
Cont. urban fabric	1.43	0.45	31.73	160	43.78	181.96	699.58	1002.94
Disc. urban fabric	0.84	0.03	3.70	599	6.89	16.72	811.23	284.91
Other art. surfaces	1.84	0.46	24.97	719	12.60	93.09	522.36	1999.78
Urban green areas	0.04	0.01	19.46	27	8.13	11.60	4079.75	197.58
Water bod. / wetl.	7.19	6.25	87.01	126	280.12	2724.22	1394.10	8180.80
Irr. agric. areas	46.82	15.83	33.81	1029	223.49	3032.98	196.24	8116.72
Non-irr. agric. ar.	24.79	6.51	26.26	794	153.36	1481.50	295.84	4757.55
Heter. agric. areas	1.96	0.15	7.79	471	20.45	72.58	648.49	735.95
Forest / woodland	10.06	1.24	12.33	1147	43.07	350.64	304.59	2318.93
Scrub / herb. veg.	4.55	0.17	3.79	2018	11.08	41.89	235.36	863.81
Forest plantations	0.32	0.03	10.33	177	8.81	20.55	706.45	324.55
No vegetation	0.17	0.04	25.72	145	5.66	20.26	1407.86	688.10

Units: PLAND: percentage; LPI: percentage; NP: none; AREA MN: hectares; AREA SD: hectares; ENN MN: meters; RGYR AM: meters.

Table 6. Unit A. Level I Metrics

2007								
CLASS	PLAND	LPI	LPI/PLAND	NP	AREA MN	AREA SD	ENN MN	RGYR AM
Artificial surfaces	23.28	18.27	78.47	213	61.80	705.81	301.68	4304.76
Water bod. / wetl.	2.92	0.98	33.41	122	13.54	67.97	613.42	3355.62
Agricultural areas	69.23	19.67	28.42	100	391.49	1578.78	109.35	3917.91
Natural areas	4.56	0.78	16.99	253	10.20	37.67	237.21	993.64
1999								
CLASS	PLAND	LPI	LPI/PLAND	NP	AREA MN	AREA SD	ENN MN	RGYR AM
Artificial surfaces	19.68	14.10	71.65	233	47.76	522.02	315.70	3255.15
Water bod. / wetl.	2.66	0.98	36.75	78	19.26	86.49	760.94	3837.20
Agricultural areas	71.90	20.58	28.63	90	451.72	1714.12	92.12	3897.83
Natural areas	5.77	0.64	11.09	271	12.03	35.06	221.89	752.20
1984								
CLASS	PLAND	LPI	LPI/PLAND	NP	AREA MN	AREA SD	ENN MN	RGYR AM
Artificial surfaces	15.08	8.24	54.67	242	35.23	302.92	330.10	2045.79
Water bod. / wetl.	2.48	1.10	44.51	21	66.75	166.19	1021.85	4732.49
Agricultural areas	77.32	21.70	28.07	102	428.45	1679.40	97.50	3811.89
Natural areas	5.12	0.72	13.97	340	8.51	28.24	214.28	769.52

Units: PLAND: percentage; LPI: percentage; NP: none; AREA MN: hectares; AREA SD: hectares; ENN MN: meters; RGYR AM: meters.

Table 7. Unit A. Level 2. Metrics

2007								
CLASS	PLAND	LPI	LPI/PLAND	NP	AREA MN	AREA SD	ENN MN	RGYRAM
Cont. urban fabric	9.29	4.60	49.56	57	92.14	348.00	611.79	1458.04
Disc. urban fabric	2.41	0.25	10.31	134	10.19	21.76	559.58	311.94
Other art. surfaces	10.70	5.76	53.83	178	34.00	250.82	371.87	3733.76
Urban green areas	0.88	0.17	18.97	27	18.37	23.88	1531.55	335.58
Water bod. / wetl.	2.92	0.98	33.41	122	13.54	67.97	613.42	3355.62
Irr. agric. areas	7.75	1.07	13.75	122	35.92	96.13	421.76	884.52
Non-irr. agric. ar.	60.39	19.03	31.51	117	291.85	1323.11	119.01	3924.69
Heter. agric. areas	1.10	0.20	18.42	49	12.65	21.81	1096.88	327.42
Forest / woodland	0.81	0.04	5.14	147	3.12	4.04	331.03	341.83
Scrub / herb. veg.	3.54	0.77	21.82	150	13.33	46.20	405.10	1019.59
Forest plantations	0.22	0.04	17.40	32	3.83	4.95	1015.65	129.55
No vegetation	9.29	4.60	49.56	57	92.14	348.00	611.79	1458.04
1999								
CLASS	PLAND	LPI	LPI/PLAND	NP	AREA MN	AREA SD	ENN MN	RGYRAM
Cont. urban fabric	8.58	4.46	51.97	64	75.78	318.65	590.08	1461.16
Disc. urban fabric	2.20	0.25	11.32	123	10.10	22.23	638.86	321.63
Other art. surfaces	8.15	4.19	51.40	187	24.64	175.98	385.87	3090.95
Urban green areas	0.76	0.17	21.99	23	18.60	23.73	1283.35	339.05
Water bod. / wetl.	2.66	0.98	36.75	78	19.26	86.49	760.94	3837.20
Irr. agric. areas	8.63	2.31	26.79	126	38.71	135.56	287.76	1095.56
Non-irr. agric. ar.	61.70	20.47	33.18	88	396.47	1564.34	166.53	3884.68
Heter. agric. areas	1.57	0.57	36.50	31	28.64	67.03	1142.02	544.52
Forest / woodland	1.01	0.14	13.97	156	3.65	7.23	307.45	343.17
Scrub / herb. veg.	4.66	0.61	13.01	171	15.41	40.77	412.60	732.51
Forest plantations	0.10	0.02	18.76	24	2.29	2.96	1802.92	114.94
No vegetation	8.58	4.46	51.97	64	75.78	318.65	590.08	1461.16
1984								
CLASS	PLAND	LPI	LPI/PLAND	NP	AREA MN	AREA SD	ENN MN	RGYRAM
Cont. urban fabric	6.38	3.93	61.61	58	62.20	289.55	569.24	1462.67
Disc. urban fabric	1.71	0.22	12.77	114	8.46	20.39	750.30	314.38
Other art. surfaces	6.73	2.78	41.32	209	18.20	112.21	377.22	1482.04
Urban green areas	0.26	0.07	27.21	12	12.33	12.03	2229.13	203.48
Water bod. / wetl.	2.48	1.10	44.51	21	66.75	166.19	1021.85	4732.49
Irr. agric. areas	16.40	3.71	22.64	282	32.88	163.89	295.41	1258.42
Non-irr. agric. ar.	58.24	20.72	35.58	146	225.46	1183.89	151.57	3684.77
Heter. agric. areas	2.68	0.77	28.79	73	20.73	56.34	872.99	618.91
Forest / woodland	1.04	0.14	13.53	144	4.08	7.97	327.77	349.29
Scrub / herb. veg.	3.91	0.71	18.23	244	9.06	30.61	289.09	774.99
Forest plantations	0.09	0.05	49.84	17	3.13	5.95	1523.89	144.82
No vegetation	0.07	0.01	20.82	16	2.50	2.31	2545.12	95.00

Units: PLAND: percentage; LPI: percentage; NP: none; AREA MN: hectares; AREA SD: hectares; ENN MN: meters; RGYR AM: meters.

Table 8. Unit B. Level I Metrics

2007								
CLASS	PLAND	LPI	LPI/PLAND	NP	AREA MN	AREA SD	ENN MN	RGYRAM
Artificial surfaces	10.07	3.39	33.66	259	35.79	203.48	268.87	2209.41
Water bod. / wetl.	0.31	0.07	21.17	71	4.05	7.92	1145.30	165.84
Agricultural areas	72.56	24.54	33.82	194	344.26	2222.58	134.23	4947.00
Natural areas	17.05	8.43	49.44	412	38.09	400.11	223.96	2959.81
1999								
CLASS	PLAND	LPI	LPI/PLAND	NP	AREA MN	AREA SD	ENN MN	RGYRAM
Artificial surfaces	6.49	2.07	31.91	252	23.71	127.37	320.73	1474.23
Water bod. / wetl.	0.12	0.05	36.84	32	3.55	7.81	2012.94	180.93
Agricultural areas	75.97	28.20	37.12	172	406.54	2616.92	125.06	5397.53
Natural areas	17.41	7.96	45.71	400	40.06	389.10	204.19	2757.50
1984								
CLASS	PLAND	LPI	LPI/PLAND	NP	AREA MN	AREA SD	ENN MN	RGYRAM
Artificial surfaces	4.24	1.06	24.94	221	17.67	72.02	310.74	1274.34
Water bod. / wetl.	0.07	0.05	77.50	12	5.22	13.07	4427.14	231.21
Agricultural areas	75.79	30.26	39.93	208	335.37	2479.35	117.26	5592.63
Natural areas	19.90	9.15	45.99	383	47.81	476.79	231.27	3023.07

Units: PLAND: percentage; LPI: percentage; NP: none; AREA MN: hectares; AREA SD: hectares; ENN MN: meters; RGYR AM: meters.

Table 9. Unit B. Level 2 Metrics

2007								
CLASS	PLAND	LPI	LPI/PLAND	NP	AREA MN	AREA SD	ENN MN	RGYR AM
Cont. urban fabric	3.68	0.61	16.52	59	57.37	101.22	664.87	717.10
Disc. urban fabric	2.19	0.14	6.32	178	11.35	21.82	460.85	327.31
Other art. surfaces	4.15	0.52	12.65	279	13.68	48.46	308.59	1383.78
Urban green areas	0.05	0.02	45.27	10	4.96	6.35	4709.93	155.57
Water bod. / wetl.	0.31	0.07	21.17	71	4.05	7.92	1145.30	165.84
Irr. agric. areas	60.79	21.05	34.63	247	226.53	1696.38	134.47	4782.76
Non-irr. agric. ar.	9.43	1.57	16.68	268	32.38	121.67	349.67	904.09
Heter. agric. areas	2.34	0.80	34.11	108	19.94	77.43	588.87	758.10
Forest / woodland	10.30	3.02	29.28	284	33.38	184.00	229.07	1366.07
Scrub / herb. veg.	5.89	0.63	10.65	436	12.43	51.45	264.30	979.88
Forest plantations	0.52	0.18	34.15	26	18.58	33.35	1077.72	358.41
No vegetation	0.34	0.06	18.71	59	5.29	9.16	1073.27	501.79
1999								
CLASS	PLAND	LPI	LPI/PLAND	NP	AREA MN	AREA SD	ENN MN	RGYR AM
Cont. urban fabric	2.94	0.44	15.05	62	43.61	80.59	826.11	647.83
Disc. urban fabric	1.59	0.13	7.98	140	10.43	19.33	571.89	292.35
Other art. surfaces	1.92	0.59	30.64	177	10.00	45.28	442.09	1451.94
Urban green areas	0.05	0.03	63.52	6	6.98	9.23	7795.82	175.27
Water bod. / wetl.	0.12	0.05	36.84	32	3.55	7.81	2012.94	180.93
Irr. agric. areas	66.30	24.29	36.64	226	270.00	1972.39	105.61	5025.05
Non-irr. agric. ar.	6.28	0.77	12.29	228	25.34	73.22	414.45	654.17
Heter. agric. areas	3.40	0.81	23.91	94	33.26	101.05	788.44	798.92
Forest / woodland	11.40	5.21	45.73	285	36.80	291.40	224.19	1894.01
Scrub / herb. veg.	5.67	0.55	9.65	447	11.67	42.41	241.98	851.36
Forest plantations	0.10	0.06	66.74	5	17.54	20.78	3457.69	251.51
No vegetation	0.25	0.13	51.27	24	9.62	25.53	2734.51	751.40
1984								
CLASS	PLAND	LPI	LPI/PLAND	NP	AREA MN	AREA SD	ENN MN	RGYR AM
Cont. urban fabric	1.44	0.16	10.80	63	21.07	31.87	846.35	400.77
Disc. urban fabric	0.88	0.12	13.44	110	7.38	15.41	777.82	265.30
Other art. surfaces	1.88	0.36	19.34	193	8.97	35.14	380.29	1593.99
Urban green areas	0.04	0.03	80.06	4	8.31	10.72	12650.35	194.49
Water bod. / wetl.	0.07	0.05	77.50	12	5.22	13.07	4427.14	231.21
Irr. agric. areas	68.49	26.18	38.22	292	215.88	1779.76	102.76	4952.20
Non-irr. agric. ar.	4.13	0.43	10.34	223	17.04	43.11	444.55	426.32
Heter. agric. areas	3.18	0.82	25.67	131	22.31	93.40	610.56	908.27
Forest / woodland	14.58	6.08	41.73	292	45.96	350.38	230.45	2155.24
Scrub / herb. veg.	4.80	0.39	8.20	481	9.19	28.76	241.18	557.34
Forest plantations	0.24	0.04	18.65	43	5.15	8.84	1002.82	200.80
No vegetation	0.27	0.12	44.76	24	10.54	24.05	2102.84	622.01

Units: PLAND: percentage; LPI: percentage; NP: none; AREA MN: hectares; AREA SD: hectares; ENN MN: meters; RGYR AM: meters.