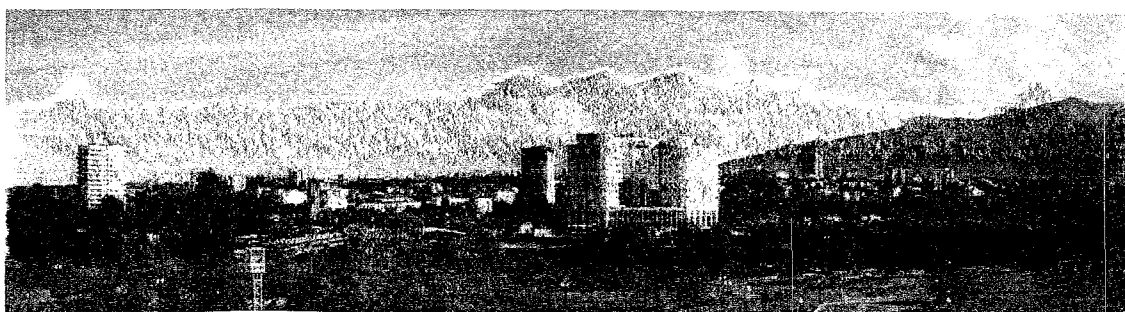


URBAN GREEN SPACES - A KEY FOR SUSTAINABLE CITIES

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Urban green spaces: natural and usable?

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Executive Summary

This paper investigates the potential of urban green spaces in socially excluded areas of Greater Manchester, UK to simultaneously support biodiversity and provide usable space for people. The results, based on a survey of 80 sites, indicate that the examined sites range from habitat-rich and natural to intensely managed and monotonous. They do not provide sufficient recreational facilities, in particular for the most vulnerable groups: children, elderly and teenagers. The facilities are clustered in several sites and associated with good maintenance, reflecting a growing discrepancy between excellent parks and sites of poor quality, prone to neglect and vandalism. Furthermore, negative correlations between the naturalness of sites and their maintenance and presence of facilities imply the separation of recreational activities from contact with nature. The authors propose actions that could help bring nature closer to people and people closer to nature.

1 Introduction

Traditionally urban green spaces were planned and managed for their recreational and aesthetic value. However, a considerable body of research has recently proven the potential of green sites in cities to sustain biodiversity and to contribute to wider human well-being.

Two factors influence the biodiversity in urban green sites: 1) habitat diversity (Sandström et al., 2006), which provides ecological niches for different animals (Livingston et al., 2003); and 2) the naturalness of habitats, allowing for specialist species' presence (Aivey, 2006).

Green spaces have also been proven vital to the physical and mental health of the main urban species: humans (e.g. Kaplan and Kaplan, 1989; Takano et al., 2002). Predominantly free and accessible, they also improve social well-being, providing room for informal interaction of people from different backgrounds (Gehl, 1987). Green spaces' potential to deliver these benefits is the greatest when they are "usable": clean, well maintained, safe and equipped with facilities meeting the needs of all age groups (Green Flag Award, nd).

This paper reports on one aspect of wider investigation into green spaces' characteristics in the socially excluded areas of Greater Manchester, UK in order to investigate, whether the benefits for nature and people can be delivered simultaneously by urban green spaces.

2 Methodology

Greater Manchester, covering 276 km², is a conurbation of over 2.5 million people in the northwest of England. After the collapse of the manufacturing industries the area has suffered from high levels of unemployment and income

inequality, followed by community disintegration manifested by, for example, high levels of crime (Ravetz, 2000). This research focuses on the "socially excluded" areas where such problems are concentrated.

A random ten per cent sample of all formal and informal green spaces (identified on aerial photographs; Gill et al., 2007) located within a "walkable" 300 metre distance from these areas (Handley et al., 2003) was selected. The resultant 80 sites were surveyed in order to address their potential to support biodiversity and usability to people.

Twenty-one habitat types were recorded and assigned a naturalness value (n) between 1 and 6 (considering management intensity and freedom of succession) (Table 1). Habitat diversity was calculated using standard formula for the Shannon index. Naturalness index was calculated as the sum of multiplying the proportion of a given habitat type by its naturalness (n); therefore ranging between 1 and 6.

The usability of sites for people was assessed

n	Habitat
1	Bare ground; Sport field grass; Mown grass; Arable
2	Pastoral; Horticulture
3	Long grass; Park landscape - scattered trees; Park landscape - dense trees
4	Wall communities; Standing water; Running water
5	Long grass and herbs; Shrubs; Floating leaf plants
6	Pioneer pioneer grassland colonised by shrubs; Forest; Well-structured woodland; Semi-structured woodland; Dead wood; Reedbeds

Source: Kazmierczak and James (2008) modified from Gill et al. (2007)

based on 1) presence of 23 types of recreational facilities, as a total sum and divided according to the use by three age groups (Table 2), and 2) as-

	Playground	Football pitch	Bowling green	Running track	Rugby pitch	Golf course	Skatepark	Tennis court	Cricket pitch	Basketball	Boule	Picnic area	Benches	Toilets	Car park	Work of art	Historic object	Flowerbeds	Fountains	Minigolf	Cafe	Good paths	Youth pavilion	Sum
Ch	x											x	x	x	x				x		x			7
Te		x					x			x		x	x							x			x	7
El			x			x						x	x	x	x			x	x		x	x		10

Tab. 2: Recreational facilities and their relevance to user groups (Ch – children; Te – teenagers; El – Elderly). In bold – facilities specific for only one age group.

assessment of the maintenance of sites, using seven indicators: presence of streetlamps and litterbins, absence of graffiti, litter, dog fouling, fly-tipping and vandalism. Each of elements was scored as 0, 1 or 2 according to its condition; the maximum maintenance score was 14. The associations between variables were analysed using Spearman's Rank Correlation (R_s).

3 Results

Of the 80 sites selected for the survey only 58 sites were accessible to the public; these were analysed. Their size varied from 0.4 ha (small park) to over 280 ha (accessible countryside). The total area of accessible sites was 1642.5 ha.

3.1 Biodiversity

The dominant habitat, due to the presence of several large accessible agricultural areas, was pasture (40.0%), followed by mown grass (7.9%), shrub (7.6%), tall grasses and herbs (7.0%), well-structured woodland (6.4%), semi-structured woodland (5.4%) and arable habitat (5.3%). The most widespread habitat was shrubs, present in 52 of the 58 sites, followed by tall grasses and herbs (48 sites), mown grass (40 sites), grasses, herbs and colonising shrubs (39 sites), well-structured woodland (38), semi-structured woodland and dead wood (37 sites). Remaining habitats were present in less than half of the sites.

The number of habitats per site varied between 2 and 16. The mean number of habitats was 8.05 (SD=3.29). The median was 8. There was a significant positive correlation between the site area and the habitat number ($R_s=0.324$, $p<0.05$). The Shannon diversity index ranged 0.021–2.31 and was weakly correlated with the site area ($R_s=0.221$, $p>0.05$).

The most intensively managed habitats ($n=1$) constituted 14.4% of the total surveyed area; as the second naturalness category amounted to 40.9%, over 55% of the total sites' area was in-

tensively managed. Categories 3 and 4 constituted respectively 5.8% and 5.5% of the total area. The most natural two categories constituted 14.4% ($n=5$) and 18.9% ($n=6$), therefore one third of the total area of sites can be seen as very natural. The naturalness index varied between 1.22 and 5.79, the mean being 3.52 (SD=1.24) and the median 3.69, indicating the high average naturalness of the assessed sites. Naturalness of sites was positively associated with the Shannon diversity index ($R_s=0.440$, $p<0.01$), yet there was only weak positive correlation between naturalness index and the site area ($R_s=0.112$, $p>0.05$).

3.2 Usability

No recreational facilities were recorded on 36% of sites and another 24% of sites had only one such facility. Only three sites have more than ten different facilities. The mean number of facilities was 2.67 (SD=3.38), the median was 1 which indicates a right-skewed distribution of the number of facilities. There was no significant correlation between the number of facilities and the site area. The most common facilities were benches (present in 23 out of 58 sites), football pitches and good quality paths (19 sites) and playgrounds (15) followed by bowling greens (12).

Only in the case of teenagers did the number of sites providing facilities exceed 50% of the total site number; however, if football pitches are excluded, this number falls down to 25. Low mean and median values of facilities for all investigated age groups indicate a strongly right-skewed distribution (Table 3). There were strong and significant correlations ($R_s>0.715$, $p<0.01$) between the number of facilities directed specifically at all the groups, therefore while some sites had no facilities, other provided for all age groups.

The mean maintenance score was 7.86 (SD=2.17) and the median was 8, indicating a left skewed distribution of results and, therefore, implying the overall good state of the surveyed sites. Fly-tipping and graffiti seriously affected only 5

	No. of sites with facilities	Mean no. of facilities	Median	Standard deviation
Children	25	1.52	0	2.07
Teenagers	33	1.03	1	1.21
Elderly	31	1.29	0	1.72

Tab. 3: Provision of facilities for different age groups.

sites, and vandalism and severe dog fouling were even rarer. Litter in moderate amounts was present on majority of sites, and the litter bins were present on only 29 sites. Streetlamps were present on 12 of the 58 sites, and on only four were they in a good state of repair, therefore potentially affecting the perception of site safety at night. The maintenance of sites was positively correlated with the number of facilities ($R_s = 0.363$, $p < 0.05$).

3.3 Association between usability and biodiversity

There were significant negative associations between the naturalness of sites and their maintenance ($R_s = -0.411$; $p < 0.01$) and between naturalness and the recreational facilities number ($R_s = -0.228$; $p > 0.05$). Habitats diversity was negatively associated with maintenance ($R_s = -0.147$; $p > 0.05$) and positively with the facilities number ($R_s = 0.089$; $p > 0.05$).

4 Discussion

The surveyed sites in this study are a balanced mixture of very intensely managed and semi-natural habitats; the most natural ones, while not dominant in coverage, are actually the most widespread. While these results only partly correspond with McKinney's (2006) theory of homogenisation of urban habitats promoting generalists worldwide, the positive correlation between diversity and naturalness of habitats indicates a large discrepancy between individual sites in terms of their potential to support biodiversity.

The results show positive correlation between presence of facilities and the maintenance of sites. This can be explained by more frequent or intense use of the well-equipped areas what discourages antisocial behaviour. The results also confirm the findings of the Urban Parks Forum (2001) stating that in the UK good parks are becoming fewer and fewer sites are getting worse. In addition, the negative correlation between naturalness and usability of sites indicates that more natural areas are potentially visited less often (often "nothing to do"); the lack of use attracts vandalism and fly-tipping (here confirmed by the negative correlation between naturalness and maintenance). Consequently, there are few opportunities for contact

with nature in an environment that is clean, well maintained and offers "something to do"; conversely, the spaces managed for recreation have little biodiversity potential.

The ageing demographic trend, increasing income inequality and further ethnic and cultural diversification of society indicate a growing need for such "excluded groups" to be integrated into society (Ward Thompson, 2002). One way to achieve this is by provision of good quality green spaces. Yet the results presented here indicate that the recreational facilities' provision, in the areas of Greater Manchester where the "excluded" people reside, is not satisfactory, especially for the most vulnerable age groups. For example, the presence of teenagers on streets is penalised, yet in some areas they have simply nowhere else to go. While provision of teenagers' facilities in green spaces may put off other, easily intimidated, users such as elderly (Burgess, 1995), co-presence of different age groups, facilitated by appropriate equipment and design of green spaces, can help them to de-mystify each other and build stronger community ties (Owens, 1997).

In light of these findings the management practice should, firstly, focus on increasing biodiversity in all green spaces in a manner compatible with their function for humans (Alvey, 2006) by the introduction or expansion of more natural habitats, e.g. shrubs, tall grasses and herbs, and allowing for succession processes to take place. Some of the parks in Greater Manchester have already set aside small proportions of their areas for wildflower meadows. Secondly, the more natural areas can be "tamed" by placing some recreational facilities there (e.g. benches and playgrounds, accompanied by streetlamps and litter bins) and improving safety by providing warden or citizen patrols (Loewen et al., 1993). Above all, the local residents need to be involved in the changes; even the best designed and managed green space is worthless if it does not reflect the wants and needs of their users.

5 Conclusion

The results indicate large discrepancies within potential to support biodiversity as well as usability of sites. Furthermore, the nature- and people-related values are spatially separated. As the urban areas spread and development intensifies, it is crucial to improve the quality of remaining green spaces, while in the UK provision of local semi-natural green spaces is already advocated by the accessible Natural Greenspaces Standard (Handley et al., 2003), a coherent response is needed from local planners, green space designers and managers, as well as local communities, aiming

at joint delivery of usability and biodiversity targets.

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