Park Land

How open data can improve our urban green spaces

Dr. Katherine Drayson
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Policy Exchange

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Any errors that remain, and the conclusions of the report, are the author's own.

Executive Summary

> *"The measure of any great civilisation is its cities and a measure of a city's greatness is to be found in the quality of its public spaces, its parks and squares"*
> (commonly attributed to John Ruskin)

The UK's parks and green spaces are central to the success of our cities. They provide a refuge from the bustle of city life. They are places to exercise, to socialise and to relax. They support our wildlife, clean our air, reduce flooding and even cool our cities down. The future attractiveness of our cities as great places to live depends on finding new ways to protect and improve urban green spaces.

The pressure on the UK's urban green spaces is increasing. This is due to a combination of growing urban populations across the UK, a restricted supply of urban land for development due to green belt policy, and reduced public sector spending on green space. Policymakers need to find new ways to ensure our green spaces thrive. This means taking advantage of new technology, pushing for more data about our urban spaces to be released, and harnessing the appetite of civil society to improve urban spaces.

This report – the first of two – considers how we can improve our urban green spaces. It calls for the establishment of a new national urban green space map. Such a map should be sufficiently detailed and comprehensive, be freely available to the public, include a consistent classification system, and be able to take advantage of advances in technology and geographical software. A national urban green space map would provide the foundation for future efforts to improve public urban green spaces. It could also unleash creativity and activity from volunteers and NGOs to businesses and the public sector. Without it, efforts to improve the UK's urban green spaces will likely continue to be piecemeal, poorly-directed, insufficient and more expensive than they need to be.

Background

The UK is one of the most densely populated countries in Europe. Approximately 80 per cent of the UK population live in urban areas. The urban population has increased by almost a fifth in some cities over the past decade. This makes it all the more important to make sure that our cities are good places to live in. Urban green spaces provide many important benefits to society, the economy and the environment. One of the factors that make cities great places to live in is their green spaces:[1] 93 per cent of people in England consider that it is very or fairly important to have public green spaces nearby and 92 per cent of people in England visit public green spaces. Indeed, we have calculated that, relative to their size, some urban parks can out-compete theme parks in visitor numbers.

Britain has traditionally been at the forefront of creating urban green spaces. In terms of parks, Birkenhead Park on the Wirral Peninsula was the world's first publicly

1 Within this report, urban green space is considered to be any publicly accessible open space containing ground-level vegetation, such as grass (for example, including parks, allotments, cemeteries and community gardens, but excluding street trees and domestic gardens) within urban areas (as defined by the Office for National Statistics).

funded and fully accessible park and provided part of the inspiration for New York's Central Park. Birkenhead Park was only the beginning, with more than 180 municipal parks created by 1885. Other parks were created by public subscription, such as Alexandra Park in Manchester and Heaton Norris Park in Stockport. A 2001 national survey estimated that there were more than 27,000 urban parks (although this was only calculated based on limited survey data). However, the Victorian and Edwardian heyday of park creation gave way to rapid decline from the 1970s onwards.

At the turn of the 21st Century, the poor state of urban green spaces was brought to public attention: a 2001 national survey found that more than a third of local authorities across the UK reported their total open space quality as "poor" or "declining". Many once-loved public spaces had fallen into disrepair and had become a haven for crime. This led to increased government funding and support for urban green spaces. Lottery funding also played an important role. Despite this, there is some evidence that the overall area of urban green space may have declined, partly due to planning policies that support building on brownfield land.

The recession will inevitably have affected urban green spaces. They are often the responsibility of local authorities, where spending has been squeezed in efforts to reduce the UK's deficit. There are some indications that urban green space quantity and quality have been affected by the reduced funding and staff. Policy Exchange has found that urban local authority spending on open spaces in England has decreased by 10.5 per cent between 2010/11 and 2012/13. The greatest reductions were in the north-east (38.7 per cent) and the smallest reductions were in the south-east (3.4 per cent). At the same time, national not-for-profit organisations with responsibility for urban green spaces, such as CABE Space and GreenSpace, have closed because of a lack of funding, creating a risk that leadership and expertise will be lost. New organisations, such as the Parks Alliance, created to at least partially fill this gap, have yet to source funding and will require time to develop fully. However, assessing the full impact of these pressures (as well as an assessment of whether money spent to improve green spaces is well-directed) is impossible because of the lack of data about our urban green spaces.

"The recession will inevitably have affected urban green spaces. They are often the responsibility of local authorities, where spending has been squeezed in efforts to reduce the UK's deficit"

A National Urban Green Space Map

Several earlier investigations into the UK's urban green spaces identified a lack of data and the large number of data owners as major barriers to making improvements. A comprehensive answer to these issues is still no closer. Without a detailed, accessible map, it remains very difficult to target interventions where they are most needed. It is impossible, or expensive, to assess whether interventions have made a difference and should be replicated (or avoided) elsewhere. As a result, it is not clear that public money is being spent effectively. Moreover, the ability to encourage and harness action by civil society to protect and improve the UK's urban green spaces is limited. To deliver the full benefits, this report argues that an ideal urban green space map should meet all of the following criteria (these are explored in greater detail in Chapter 2):

- full public access;
- freely available;
- compatible with Geographic Information System (GIS) software;
- consistent typology;
- links to wider information, such as quality;
- detailed enough to include even small urban green spaces; and
- cover the whole of the UK.

Our analysis of existing urban green space maps and datasets revealed that none fully meet all seven of these criteria (see Table 3, p.38). Several of the most detailed existing urban green space maps are funded at least partly with public money and yet are prohibitively expensive for the public to obtain. They are also insufficient for detailed analysis of urban green space. These include Ordnance Survey's MasterMap (more than £40,000 a year to access just for the London area) and the Centre for Ecology and Hydrology's Land Cover Map (more than £15,000 a year for England). This runs counter to the Government's Open Data strategy. Largely publicly funded data should be made publicly available, either at marginal cost or for free.

The coverage of those datasets that are freely available is poor. For example, our analysis of existing publicly and freely available urban green space GIS datasets revealed that they underestimated the area of urban green space in the City of Westminster by 40 per cent. This is likely to be repeated on a national scale. Put simply, without an idea what green space we have or what state it is in, our ability to spend money on it wisely is greatly reduced.

This report argues that a national urban green space map, which meets the seven criteria outlined earlier, could be transformative, and repeat many of the successes that an open data policy has already demonstrated, both in terms of urban green space and in other sectors. The potential benefits would include:

- **Increasing public engagement.** A national urban green space map would raise public awareness of urban green space and its deficiencies. This could then act as a stimulus for individuals or groups to take action on areas requiring improvement. For example, New Yorkers for Parks' work on assessing park quality has generated civil society action to improve the worst quality parks. In a related sector, the free Love Lewisham app allows the public to photograph graffiti or fly-tipped waste and immediately report it to the Council. Within two years, the number of complaints about graffiti has fallen by almost a third. The VisitWoods website create by the Woodland Trust has generated more than 2 million hits since its launch, reflecting the large public appetite for green space information.
- **Improved decision-making.** With trade-offs in land use required due to increasing populations and urbanisation, a good evidence base is critical, for example, to determine whether urban green spaces should be developed for housing, and whether private gardens would be more suitable for residents than a public park. London's (paywalled) urban green space map has improved public access through the cost-effective intervention of increasing the number of access points to green spaces, rather than having to increase the number of green spaces. Scotland's urban green space map

has also helped identify areas in the Glasgow and Clyde Valley area where urban green space improvements could most cost-effectively deliver health improvements, build stronger communities, increase wildlife, and attract enterprise development.

- **Testing interventions.** Currently, there is no robust way of testing the effect of different interventions on individual, or groups of, urban green spaces. A national urban green space map that contains some form of outcome measurement (whether quality, asset value, health savings delivered or environmental value), would allow us to determine which interventions have the greatest impact and so should be replicated, and which interventions should be modified or scrapped.
- **Stimulating innovation.** The release of previously expensive or inaccessible data can help generate novel products, services and business opportunities. This has been most clearly seen with the explosion of smartphone apps that use Google Maps. In addition, innovative uses of Transport for London's open data have been calculated to be worth £15-58 million each year in time savings alone. While impossible to predict what innovations will occur with the release of an urban green space map, the opportunities could be huge.
- **Cost-effective problem solving.** Releasing data to the public can help harness greater resources (e.g. time, expertise, etc.) than would otherwise be possible through the public sector alone. A good example is the British Library releasing its historic maps and subsequent request to the public for their help in matching them to existing locations. More than 2,300 maps have now been 'georeferenced' and online access has increased by 500 per cent.
- **Accurate research.** Releasing previously inaccessible datasets can help generate novel and high impact research. An urban green space map could help researchers calculate public access (not only in terms of travel distance but also in terms of green space quality) to urban green spaces across the UK and explore links to this, such as deprivation. It could also help assist in the design of randomised controlled trials to help establish causation (e.g. the impact of urban green spaces on health and well-being) rather than simply correlation. The map would also allow us to re-visit existing research. For example, a study investigating the amenity value of English nature relied on an out of date dataset with only one green space category, which includes agricultural land that is unlikely to be accessible to the public. Its results are therefore unsatisfactory.

Making it Happen

The first step is to make existing publicly supported data freely-available. However, even if policymakers made the most detailed maps that are currently trapped behind expensive paywalls (such as OS MasterMap and the CEH Land Cover Map) available immediately, they would still not allow the necessary in-depth analysis of urban green space. Whilst detailed, the maps do not distinguish between different categories of urban green space (OS MasterMap, for example, combines urban green spaces with agricultural land in a broad 'general surface' category). As a result, what is required is a new urban green space map with a consistent typology that meets all seven of the criteria outlined above. How can such a map be delivered? There are two main, complementary options:

1. The first is the creation of an urban green space map by Ordnance Survey or other organisation. This has been delivered in Scotland at an estimated cost of £2 million. However, the underlying data behind the map is still not downloadable, because of OS licence agreements (despite being largely taxpayer funded). The advantage of such a map is that it would use OS's expertise and extensive data resources to produce a reliable map. However, it would not include information on ownership or quality. It could also be expensive. We estimate that it would cost up to £14 million, plus the cost of making the data freely available (see Recommendations). Natural England is currently in discussions with Ordnance Survey and other partners, considering the feasibility of developing such a map for England and this report supports such an initiative. If it goes ahead, it is essential such a funded map is made fully publicly available.
2. The second option, which would complement the first, is the creation of a crowd-sourced urban green space map. This could even be done without making OS data publicly available. The Government could work with existing open-access online maps, such as OpenStreetMap, and develop a consistent typology (i.e. what type of green space it is), as well as identify other information that should be recorded (e.g. whether it is open to the public and what quality condition the space is in). A ratings system could even be developed, similar to that used on the TripAdvisor website. The Government could then encourage civil society, in particular Friends Groups, Wildlife Trusts and others to mark local urban green spaces and assess them for quality, accessibility and other information. There would also be potential to link the online urban green space map to existing websites and apps that allow users to report environmental issues to the appropriate council, such as the LoveCleanStreets app and website. There are many other examples of civil society acting as a cost-effective means of collecting data, partly as a result of cheap access to information created by the Internet. This would have the further knock-on beneficial effect of engaging with the very people with the greatest direct knowledge of the green spaces in their area.

Urban green space forms a critical part of urban life that, despite improvements in recent years, remains under-resourced and under-supported, particularly given current budget cuts. The single most important step that can be taken to help remedy this is the provision of accurate and detailed urban green space data. Without this, efforts to improve urban green spaces and make cities more liveable will continue to be chaotic and poorly directed.

Detailed Recommendations

Existing Urban Green Space Data

- The Government should abolish the Trading Fund model for Ordnance Survey and ensure that all OS data is freely available for use and re-use.
- The existing CABE Space / GreenSpace urban green space dataset that is currently held by GreenSpace's administrators should be obtained by central government and as much of it made publicly available as possible, for example via data.gov.uk.

- Green Flag data (including score sheets for individual green spaces and site boundary data) should be made freely available online for the public to view and download, as part of a revised Green Flag licence agreement with DCLG.
- The Generalised Land Use Database should be updated and released every ten years to act as a census for land use changes over time. There are no accurate estimates for the cost of this, but with improvements in OS MasterMap and technology, the cost should not be prohibitive.

A New Urban Green Space Map

- The Government should facilitate the development of an urban green space map that meets the seven criteria listed in Chapter 2 (e.g. freely and publicly available and sufficiently detailed). This map should be created either by OS or another suitable organisation.
- The Government should also explore setting up a crowd-sourced urban green space map. Relevant NGOs and those with proven experience of engaging the public in environmental data collection should be consulted (e.g. to determine what information the map should include, such as green space quality and reviews) and involved in promoting it.
- Government and relevant stakeholders should collaborate to organise a competition that would encourage participation in a crowd-sourced urban green space mapping project.

Data Standardisation

- As part of the mapping process, a co-ordinated approach to develop a UK-wide urban green space classification system (typology) is required. This should be initiated by Defra, DCLG and Natural England, and agreed with local authorities and other stakeholders. The respective government departments and other stakeholders in Wales, Scotland and Northern Ireland should also be included in the process, to ensure a consistent approach across the UK.
- Defra and Natural England should collaborate with local authorities and relevant NGOs to develop and pilot a simple national urban green space quality rating system to allow the public to rate their urban green spaces. This could resemble the rating system found on the TripAdvisor website. This should be made available online, preferably alongside an urban green space map, and allow the public to contribute their own ratings for different quality criteria, such as safety and cleanliness. The results should be fully accessible to the public (e.g. national results should be downloadable in a spreadsheet). Whilst the Green Flag scheme would remain the gold standard of quality assessment, an online ratings system would allow a larger number of urban green spaces to be rated more quickly.
- Local authorities must record and provide data on green space that is not currently publicly accessible (such as urban green space asset value) in a standard format so that comparisons can be more readily made.

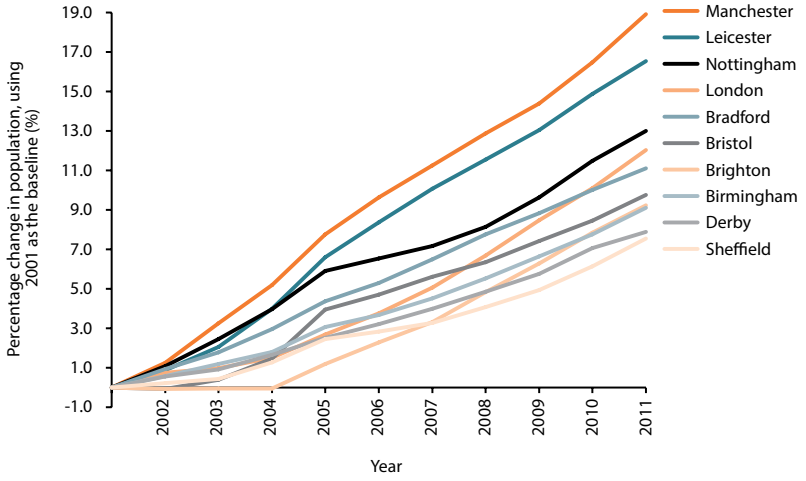
National Indicators

- Once available, public access to urban green space calculations should be included as a national indicator, for example in Defra's 'England Natural Environment Indicators' set, or in the English Indices of Deprivation.

1
Background and Context

The UK is the most densely populated major country in Europe, with 80 per cent of the UK population living in urban areas.[2, 3] After the Second World War, cities experienced decades of slow population growth, and in some cases decline.[4] However, the decade between 2001 and 2011 saw the largest increase in the population of England and Wales since the census began in 1801.[5] This change is reflected in the population statistics of our largest cities, which show population increases of up to 19 per cent (Figure 1). With this increasing population pressure, it is all the more important that we ensure the UK's cities are great places to live, both now and in the future.

Figure 1: The percentage change in population of the 10 most populous cities in England, using 2001 as the baseline.[6]



Cities and their green spaces are inextricably linked. All cities contain at least some element of public green space, even cities in deserts, such as Riyadh, Saudi Arabia or highly environmentally degraded cities, such as Linfen, China. They are places where we play, exercise, relax, think and socialise. Urban green spaces matter to people:

2 Richard A Fuller and Kevin J Gaston, 2009, "The Scaling of Green Space Coverage in European Cities.," *Biology Letters* 5, no. 3: 352–5.
3 Tim Pateman, 2011, "Rural and Urban Areas : Comparing Lives Using Rural / Urban Classifications," *Regional Trends* 43: 1–77.
4 A Morton, 2011, *Cities for Growth - Solutions to Our Planning Problems* (Policy Exchange).
5 Office for National Statistics, 2012, *Statistical Bulletin: 2011 Census - Population and Household Estimates for England and Wales, March 2011*.
6 Office for National Statistics, 2013, "Mid-2002 to Mid-2010 Subnational Population Estimates Revised in Light of the 2011 Census".

- 93 per cent of people in England consider that it is very or fairly important to have public green spaces nearby.[7]
- 97 per cent of respondents to a park satisfaction survey stated that green spaces help improve their local environment.[8]
- 92 per cent of people in England visit public green spaces.[9]
- More than 40 per cent of all green space visits by urban residents in England involve travelling less than one mile (i.e. likely within their home city).[10]

In this first of two reports, we will be exploring two themes: the condition of urban green space in Britain and specifically, the state of the available data. The second report will focus on how policy can help get more people involved in using and improving urban green space. Within these reports, urban green space is considered to be any publicly accessible open space containing ground-level vegetation, such as grass (for example, including parks, allotments, cemeteries and community gardens, but excluding street trees and domestic gardens) within urban areas (as defined by the Office for National Statistics).[11, 12]

To investigate the state of urban green space, a literature review and stakeholder interviews were conducted. Since the majority of urban green spaces are owned by local authorities or other public bodies, a Freedom of Information (FoI) request containing 15 questions was also sent to the 336 local authorities across England that contained urban areas.[13] Of these, 241 (71.7%) provided answers to at least some of the questions (a copy of our FoI request can be found in Appendix 1). This aimed to establish what changes have occurred in the state of urban green space since the last major reviews were conducted in 2001 and 2006.[14, 15]

Benefits Provided by Urban Green Space

Many of our cities face increasing pressures for housing and infrastructure. This risks putting pressure on urban green space. However, the importance of urban green space cannot be underestimated. Over the past thirty years, hundreds of studies have demonstrated the many and varied economic and environmental benefits that urban green spaces provide. A brief snapshot of these is provided in the next section of this report, together with the economic cost of maintaining urban green spaces.

Economic Benefits

A recent study conducted for Natural England and Defra attempted to evaluate the evidence of the economic contribution provided by urban green infrastructure (comprising street trees, gardens, rivers and canals, as well as urban green spaces). The report found good evidence for local economic growth as a result of improvements in green infrastructure, although estimating the national effect of green infrastructure was not straightforward.[16]

House prices are higher close to green spaces

A global meta-analysis found that, on average, house prices increased by 0.1 per cent for each 10m decrease in distance to open space.[17] A London-based study found a 0.3 to 0.5 per cent average house price increase with a one per cent increase in a typical ward's green space.[18] The precise value of the price increase will depend on factors such as the size, quality and facilities of the green space.[19]

7 Defra, 2011, "Public Attitudes and Behaviours Towards the Environment - Lifestyle Omnibus Survey."
8 GreenSpace, 2007, *The Park Life Report*.
9 Defra, "Public Attitudes and Behaviours Towards the Environment - Lifestyle Omnibus Survey."
10 Natural England, 2012, "MENE Year 1 - 4 Visit & Respondent Based File for LA" (Natural England).
11 Office for National Statistics, 2009, "Local Authority Classification Post-2009."
12 Office for National Statistics, 2005, "Rural and Urban Area Definition for Lower Layer Super Output Areas."
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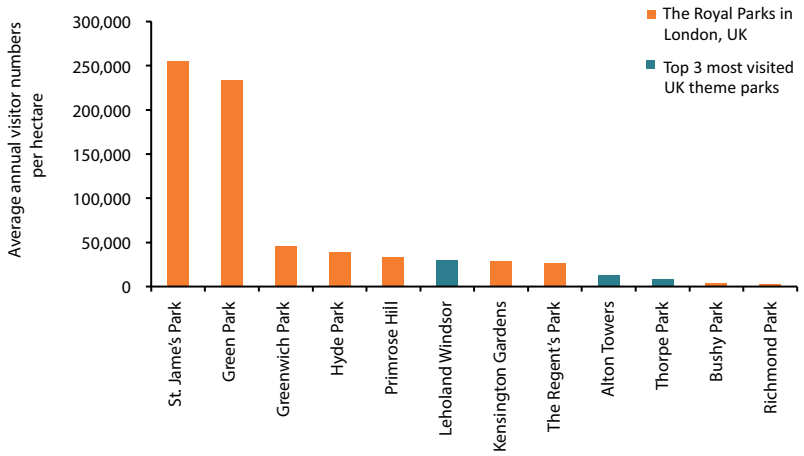
15 National Audit Office, 2006, *Enhancing Urban Green Space* (London, UK: The Stationery Office).
16 Eftec, 2013, *Green Infrastructure's Contribution to Economic Growth: A Review*.
17 Luke M Brander and Mark J Koetse, 2011, "The Value of Urban Open Space: Meta-analyses of Contingent Valuation and Hedonic Pricing Results.," *Journal of Environmental Management* 92, no. 10: 2763–73.
18 GLA Economics, 2003, *Valuing Greenness: Green Spaces, House Prices and Londoners' Priorities*.
19 BOP Consulting, 2013, *Green Spaces: The Benefits for London*.

In contrast, another study found that locations adjacent to derelict land suffered from a 15 per cent reduction in property prices.[20]

Urban green spaces are important visitor attractions

Five of the Royal Parks attract more visitors for their size than the top three UK theme parks (Figure 2).[21, 22] Visit Britain also found that approximately a third of the 31 million people who visit Britain each year visit parks or gardens (more than those who visit museums, castles, historic houses or art galleries) and spend approximately £7.8 billion.[23]

Figure 2: Relative popularity of theme parks and the Royal Parks in the UK.



Urban green spaces are good for business

There is some tentative evidence that good quality parks attract business.[24] For example, a 2007 park satisfaction survey found that 82 per cent of respondents stated that high quality green spaces encourage businesses and people to locate in an urban area.[25] In addition, within 10 years of New York's Bryant park re-opening, commercial rents in adjacent streets increased by up to 225 per cent. Importantly, the rate of increase was higher than for similar properties close, but not adjacent, to the park.[26] There are also indications that higher levels of street greenery increase the prices people are willing to pay for goods, whether convenience or luxury items, by 9-12 per cent, although this requires further research.[27]

Environmental Benefits

In addition to economic benefits, urban green spaces also provide crucial environmental benefits, which themselves deliver cost savings (Table 1).

20 CABE Space, 2003, *Wasted Space?*
21 Michael Hitchcock, Tony Curson, and Paola Parravicini, 2008, *Visitors to the Royal Parks: Results of Steady State Count (August 2007 - July 2008).*
22 TEA and AECOM, 2011, *The Global Attractions Attendance Report* (Themed Entertainment Association.
23 VisitBritain, 2013, "Overseas Visitors to Britain's Parks and Gardens Spend £7.8 Billion," http://media.visitbritain.com/News-Releases/OVERSEAS-VISITORS-TO-BRITAIN-S-PARKS-AND-GARDENS-SPEND-7-8-BILLION-dbd6.aspx.
24 BOP Consulting, *Green Spaces: The Benefits for London*.
25 GreenSpace, *The Park Life Report*. (N.B. this study suffers from participant self-selection: people more likely to visit and value parks are those more likely to complete surveys about them positively)
26 Ernst & Young, 2003, *How Smart Parks Investment Pays Its Way* (New Yorkers for Parks).
27 Kathleen L Wolf, 2001, "Business District Streetscapes, Trees, and Consumer Response," *Journal of Forestry* 103, no. 8: 396–400.

Table 1: Environmental benefits provided by urban green space (based on the ecosystem services outlined in the Millennium Ecosystem Assessment).[28]

Supporting	Provisioning	Regulating
Photosynthesis	Food	Carbon sequestration
Soil formation	Wood & Fibre	Flood regulation
Nutrient cycling	Fuel	Water purification
Water cycling		Air quality
		Pollination

Urban green spaces reduce air pollution and can reduce carbon emissions

Several studies have investigated the air pollution removal of urban green spaces. For example, a study of Edinburgh's 600,000 trees found that their air pollution removal function alone (at 100 metric tonnes per year) was worth more than £2.3 million in 2011.[29] There is also potential for urban green spaces to act as carbon sinks (this is highly dependent on how they are managed and designed).[30]

Urban green spaces cool cities down

Urban areas act as 'heat islands', with air temperatures up to 10 degrees Celsius higher than the surrounding landscape.[31] Parks limit this effect. A study on the energy saving potential of one forested public park in Toronto, Canada, found that its shading and microclimate benefits alone saved the City of Toronto $11,104 in electricity and natural gas in 2008 ($36 per tree).[32] This ignores the potential savings as a result of avoided heat-related mortality and other environmental benefits.[33]

Urban green spaces help reduce flooding

The Victoria Business Improvement District estimated that its urban green spaces (covering approximately 3.5 per cent of a 125 hectare area) provided £20,638-£29,006 in energy savings and reduced carbon dioxide emissions each year as a result of diverting 112,400 cubic metres of storm water runoff away from local sewer systems.[34] This becomes increasingly important in the context of climate change impacts, from sea level rise to extreme weather events.

Urban green spaces help conserve biodiversity

The UK has committed to halt biodiversity loss by 2020.[35] Urban green spaces can support large numbers of species: for example, during just a one-day community survey event in 2012, Oxford's 20 hectare South Park was found to support 312 species.[36] Our cities and their green spaces can also play an important role for many rare or notable species. More than a quarter of the 658 species that are listed as occurring in urban areas are designated in some way for nature conservation, such as house sparrows, starlings and stag beetles. However, 59 per cent of these are declining.[37,38] This is largely as a result of urban densification ('town cramming') policies (including current green belt policy) causing the loss of urban brownfield and greenfield sites.

28 Millennium Ecosystem Assessment, 2005, *Ecosystems and Human Well-being: Biodiversity Synthesis*.
29 Tony Hutchings, Vicki Lawrence, and Andy Brunt, 2012, *Estimating the Ecosystem Services Value of Edinburgh's Trees*.
30 Michael W. Strohbach, Eric Arnold, and Dagmar Haase, 2012, "The Carbon Footprint of Urban Green Space - A Life Cycle Approach," *Landscape and Urban Planning* 104, no. 2: 220–229.
31 J. Marshall Shepherd, 2005, "A Review of Current Investigations of Urban-Induced Rainfall and Recommendations for the Future," *Earth Interactions* 9, no. 12: 1–27.
32 Andrew a. Millward and Senna Sabir, 2011, "Benefits of a Forested Urban Park: What Is the Value of Allan Gardens to the City of Toronto, Canada?," *Landscape and Urban Planning* 100, no. 3: 177–188.
33 H Akbari, 2002, "Shade Trees Reduce Building Energy Use and CO2 Emissions from Power Plants.," *Environmental Pollution* 116 Suppl: S119–S126.
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36 Science Oxford Live, 2013, "Oxford BioBlitz 2012," *E-Newsletter*, http://www.scienceoxford.com/live/bioblitz.
37 F Burns et al., 2013, *State of Nature Report* (The State of Nature Partnership).
38 Fiona Burns, n.d., "State of Nature Report: Urban Species List" (RSPB).

Economic Cost

Comprehensive and up to date information on how much the UK's urban green spaces cost to maintain amongst the different local authorities does not exist. However, various estimates to estimate the total cost have been made:

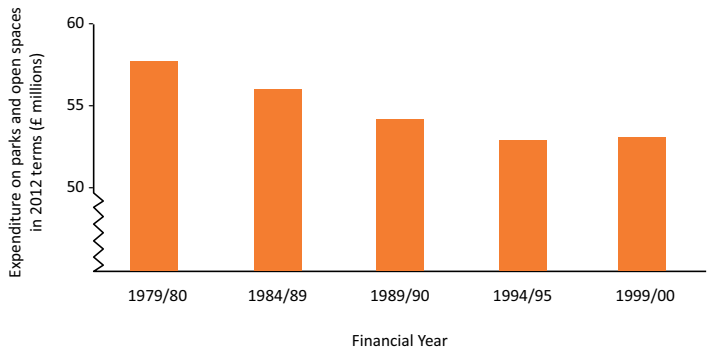
- A 1988 Audit Commission report quoted the total cost of horticultural services for parks and recreation across all local authorities in England and Wales as being approximately £460 million (£1 billion in 2012 terms).[39, 40]
- A more recent National Audit Office (NAO) report on urban local authorities found that they spent £481.5 million on urban green spaces in 2004/05 (£604.5 million in 2012 terms).[41, 42] Combined with Lottery funding and other sources, total expenditure on urban green spaces was calculated to be £692.7 million (£869.6 million in 2012 terms).

Taking the NAO total expenditure estimate, if all urban green space visits (conservatively estimated at 2.5 billion per year) are factored in, we calculate that this equates to approximately £0.35 per visit in 2012 terms.[43] Whilst not directly comparable, since considerable non-government funding is excluded from this analysis, the cost per visit of DCMS-sponsored museums in England is in the region of £12 (in 2010-11 DCMS spent £538 million on museums, which received approximately 44 million visits).[44, 45]

The only long term historical expenditure data that is publicly available comes from the 2001 Public Park Assessment report, which was unable to gather full financial information from all the local authorities it surveyed. However, it found that investment in green spaces by 24 local authorities, both urban and rural, between 1979/80 and 1999/00 had declined almost continuously once inflation had been taken into account (see Figure 3).[46] Further information is collected by the Association for Public Service Excellence (APSE), which provides a benchmarking service for participating local authorities, including data on expenditure on parks and open spaces since 1999/00.[47] However, as with the Public Park Assessment this does not cover all local authorities, and the raw data is not publicly available (only summary graphs are provided).

To explain this pattern of decline in urban green space expenditure until 2000 seen in Figure 3, it is vital to understand the history of urban green spaces.

Figure 3: Public Park Assessment results from 24 local authorities on their total expenditure on parks and open spaces.[48]



39 Audit Commission, 1988, *Competitive Management of Parks and Green Spaces*.
40 Bank of England, "Inflation Calculator," accessed May 16, 2013, http://www.bankofengland.co.uk/education/Pages/inflation/calculator/index1.aspx.
41 National Audit Office, *Enhancing Urban Green Space*.
42 Office for National Statistics, 2013, "Consumer Price Inflation Detailed Reference Tables".
43 N Dunnett, C Swanwick, and H Woolley, 2002, *Improving Urban Parks, Play Areas and Green Spaces* (Department for Transport, Local Government and the Regions).
44 Department for Culture, Media and Sport, 2011, *Department for Culture, Media and Sport Annual Report and Accounts 2011-12*.
45 DCMS, 2012, "Sponsored Museums: Performance Indicators 2011-12 Data Spreadsheet".
46 Urban Parks Forum, *Public Park Assessment: A Survey of Local Authority Owned Parks*.
47 Helen Burkhalter, 2013, *Cost and Service Quality Trends in the Parks, Open Spaces and Horticultural Service*.
48 Urban Parks Forum, *Public Park Assessment: A Survey of Local Authority Owned Parks*.

History of Urban Green Space

Britain has traditionally been an innovative creator of urban green space and has exported many of its ideas abroad.[49] Whilst there are many different kinds of urban green space, parks provide a useful illustration of urban green space history.

Public Access to Private Parks

Private parks have a long history in the UK. The majority were established by large landowners in their estates. A few of these were located in urban areas, but the public only had access to them at the discretion of the owner.[50] The first legal protection of public urban green spaces in England and Wales was a 1593 Act of Parliament, which prohibited the enclosure of commons or waste grounds within three miles of London.[51] However, it was the industrial revolution that triggered further interest in urban green spaces. Urban areas with high population densities suffered from poor public health (as a result of poor quality housing and inadequate sanitation), lower than average life expectancies and rising inequality in living standards until the 1870s.[52,53] These factors contributed to the idea that publicly accessible parks could help make cities liveable by providing access to the natural world.[54] Parks and other public spaces were also used for "working out major class tensions in the struggles over public and private rights".[55]

Regent's Park (a Royal Park of London owned by the Crown) demonstrates the gradual opening of privately-owned urban green spaces to the public. Originally "a medieval royal forest, then a royal hunting preserve, then a private park," Regent's Park eventually became "a public park open to all".[56] In the early 19th century, the Prince Regent commissioned the architect John Nash to transform Regent's Park (at that point leased as agricultural grazing land) into an exclusive residential development with no access from the surrounding poorer areas. This fifteen-year project was completed in 1826 at a cost of £53,000 (approximately £4.5 million in 2012 terms) with classical residential terraces encircling the park. Residents paid an annual fee of £2 (£168 in 2012 terms) for a key to the park and further revenue was generated by the value of housing and ground rents, which were increased by proximity to the park. Eight years later, approximately 36 hectares of the park were opened to public access and by 1841, there was "substantial public access".[57] Partly in response to London's population pressure, all of the Royal Parks of London were amongst those privately owned urban parks in which the public were allowed to walk freely in by the 1820s and 1830s, although Hyde Park was opened to the public much earlier, in 1635.[58,59]

Public Parks

Britain is credited with being the first country in the world to develop municipal parks.[60] The world's first publicly funded and fully accessible green space was Birkenhead Park on the Wirral Peninsula. The Birkenhead commissioners followed a similar model to that used for Regent's Park: using residential development to pay for park creation and maintenance. They purchased 225 acres of land in 1843, using a £60,000 (£6.5 million in 2012 terms) central government loan. 100 acres were then sold for private residential development. This sale not only recouped the initial purchase price of the land but also paid for the creation of a 125 acre public park that would go on to form part of the inspiration for Central Park in New York.[61,62] The creation of Birkenhead Park ensured both that higher prices

49 Peter Clark and Jussi S. Jauhiainen, 2006, "Introduction," in *The European City and Green Space*, ed. Peter Clark, vol. 5 (Aldershot, UK: Ashgate Publishing Ltd.), 1–29.
50 John L. Crompton, 2007, "The Role of the Proximate Principle in the Emergence of Urban Parks in the United Kingdom and in the United States," *Leisure Studies* 26, no. 2: 213–234.
51 London Green Belt Council, 2012, "The History of the London Green Belt," http://londongreenbeltcouncil.org.uk/lgbc website/pdf/THE HISTORY OF THE LONDON GREEN BELT.pdf.
52 Tim Leunig and James Swaffield, 2007, *Cities Limited*.
53 Ş Pamuk and Jan Luiten Van Zanden, 2007, "Standards of Living 1700-1870," in *Third Marie Curie Research Training Network Summer Symposium: "Unifying the European Experience: Historical Lessons of Pan-European Development,"* (Center for Economic Policy Research).
54 Thomas Michael Power, 2002, "The Economic Foundations of Public Parks," *The George Wright Forum* 19, no. 2: 31–38.
55 John W Henneberger, 2002, "Origins of Fully Funded Public Parks," *The George Wright Forum* 19, no. 2: 13–20.
56 Ibid.
57 Crompton, "The Role of the Proximate Principle in the Emergence of Urban Parks in the United Kingdom and in the United States."
58 Ibid.
59 Henneberger, "Origins of Fully Funded Public Parks."
60 Hazel Conway and David Lambert, 1993, *Public Prospects: Historic Urban Parks Under Threat* (The Garden History Society & The Victorian Society).
61 Crompton, "The Role of the Proximate Principle in the Emergence of Urban Parks in the United Kingdom and in the United States."
62 Wirral Council, 2012, "Birkenhead Park," *Visit Wirral*, http://www.visitwirral.com/attractions-and-activities/birkenhead-park-p44211.

were commanded for the land that was sold for housing, and that the houses built generated a steady stream of property taxes. As a result, Birkenhead Park was considered as an investment, rather than as a cost.[63] Birkenhead Park was only the beginning, with more than 180 municipal parks created by 1885.[64] Other parks were created by public subscription, such as Alexandra Park in Manchester and Heaton Norris Park in Stockport. By the outbreak of the Second World War, "every large town had not just one park, but a range of them".[65]

Post-War Parks

However, the heyday of public park creation came to an end with the Second World War. The removal of park railings for the war effort may have opened up parks to the public but they also reduced security.[66] This meant that access was easier for vandals. Together with local authorities that could not deal with vandalism promptly and the loss of park keepers, this helped contribute to a spiral of decline. According to The Garden History Society and The Victorian Society, "severe and persistent vandalism turns a park into a problem rather than a source of pride".[67]

The reorganisation of local government in the 1970s created further problems. The inclusion of parks services in larger leisure services departments, in combination with overall budget cuts, saw the previously separate parks departments competing more directly for more limited funds with other services, such as theatres and sports centres, for funding.[68, 69] According to the Public Park Assessment, the proportion of leisure services spending on parks declined between 1976/77 and 1996/97 from 44% to 31%, resulting in an estimated underspend of £126 million (approximately £176.5 million in 2012 terms) per year.[70, 71] In addition, the number of skilled staff declined, likely due to a combination of budget cuts and Compulsory Competitive Tendering, which often saw unskilled contractors become responsible for green space maintenance.[72, 73]

Perhaps inevitably, given the lack of a statutory requirement for maintenance, many urban green spaces therefore experienced a decline in quality.[74,75] An Environment, Transport and Regional Affairs Committee investigation and report on Town and Country Parks in 1999 painted a bleak picture of the state of public parks. Notwithstanding the "statistical vacuum" that existed with regard to data on urban green spaces, the Committee found that approximately a quarter of municipal parks and gardens were in "poor" condition and that "many parks have now deteriorated and become unsightly, even dangerous, places".[76]

This dire situation was also reflected in a 2001 survey of 405 local authorities across the UK, which was conducted by the Institute of Leisure and Amenity Management and the Urban Parks Forum. This Public Park Assessment found that just 18% of open spaces were reported by local authorities as being in "good" condition and more than a third of local authorities reported their total open space quality as "poor" or "declining".[77] Critically, the survey also identified a two-tier park system, with good parks getting better and poor parks getting worse.

In addition to declines in quality, there may also have been declines in the quantity of urban green spaces:

- in London during the post-war decade more open land was built on, mainly for housing, than was created;[78]

63 Crompton, "The Role of the Proximate Principle in the Emergence of Urban Parks in the United Kingdom and in the United States."
64 Alan Barber, 1993, "Law, Money & Management."
65 Conway and Lambert, *Public Prospects: Historic Urban Parks Under Threat*.
66 The Victorian Society, 1999, "Memorandum by the Victorian Society (TCP 18)," *Select Committee on Environment, Transport and Regional Affairs Memoranda*, http://www.publications.parliament.uk/pa/cm199899/cmselect/cmenvtra/477/477mem22.htm.
67 Conway and Lambert, *Public Prospects: Historic Urban Parks Under Threat*.
68 Ibid.
69 Ibid.
70 Urban Parks Forum, *Public Park Assessment: A Survey of Local Authority Owned Parks*.
71 The Urban Green Spaces Taskforce, 2002, *Green Spaces, Better Places*.
72 Stewart Harding, 1999, "Towards a Renaissance in Urban Parks," *Cultural Trends* 9, no. 35: 1–20.
73 CABE Space, 2004, *Parks Need People*.
74 Conway and Lambert, *Public Prospects: Historic Urban Parks Under Threat*.
75 Harding, "Towards a Renaissance in Urban Parks."
76 Transport and Regional Affairs Select Committee on Environment, 1999, *Twentieth Report: Town and Country Parks* (House of Commons).
77 Urban Parks Forum, *Public Park Assessment: A Survey of Local Authority Owned Parks*.
78 Patricia L. Garside, 2000, "Politics, Ideology and Open Space in London, 1939-2000," in *The European City And Green Space: London, Stockholm, Helsinki And St Petersburg, 1850-2000*, ed. Peter Clark (Aldershot, UK: Ashgate Publishing Ltd.), 81.

- 10,000 school playing fields in England were estimated to have been sold between 1979 and 1997;[79],[80] and
- between 1948 and 1978 there was a 57 per cent reduction in the total number of allotment plots in England and Wales.[81]

Responses to the Declining State of UK Parks

The declining state of the UK's parks led to action by both government and non-government actors.

- In 1996, the Heritage Lottery Fund launched its Urban Parks Programme, which offered £50 million over three years to fund "repair, restoration and re-creation historic features and the addition of sympathetically designed and located new features". Ongoing management and maintenance was included within these grants.[82] This programme was succeeded by the Public Parks Initiative and subsequently the current Parks for People programme. Since 1996, the Heritage Lottery Fund has provided approximately £650 million of funding to more than 770 parks across the UK.[83]
- An Urban White Paper was published in 2000, which recognised that "Well-managed public open spaces such as greens, squares, parks, children's play areas, allotments, woodlands and recreational and sporting areas… are…vital to enhancing the quality of urban environments and the quality of our lives." Three main strands for further work were identified:
  - developing a vision for the sorts of urban green spaces to be created in the future and how they should be managed;
  - improving information on the quality and quantity of urban green spaces, as well as the way they are used and maintained; and
  - improving the way new urban green spaces are planned and design, as well as the way existing spaces are managed and maintained.[84]

  However, whilst an evaluation strategy was produced, it is not clear if a full evaluation of the success of these proposals was ever conducted. This reflects the poor state of urban green space data.
- The Urban Green Spaces Taskforce was an independent research team set up by the Government in 2001, following the Environment, Transport and Regional Affairs Committee's investigation. Its final report in 2002 made 52 recommendations. The Government's response set out a commitment to improving public space, which also included the creation of a new unit for urban spaces within the existing Commission for Architecture and the Built Environment (CABE).[85] This new unit, rather confusingly called CABE Space, was formed in 2003 with an annual budget of approximately £3 million.[86, 87, 88]
- The Government's commitment was backed by an action programme, which set aside an £89 million 'Liveability Fund' over three years from 2003 for improving urban green spaces. This was awarded to 27 local authorities involving 75 projects.[89, 90] In addition, a £30 million Living Spaces scheme ran between 2003 and 2006 and offered small grants (between £1,000 and £100,000) to communities wanting to improve local urban green spaces. The scheme was partnered and supported by non-governmental organisations, such as Groundwork and the Wildlife Trusts. An evaluation of this scheme was produced but the hosting website is no longer publicly available. This

79 DCMS, 2008, "The Number of School Playing Fields - Case 101795," http://webarchive.nationalarchives.gov.uk/20121204113822/http://www.culture.gov.uk/about_us/freedom_of_information/foi_requests/5523.aspx.

80 Christopher Barclay, 2012, *Playing Fields and Public Open Spaces* (House of Commons Library).

81 Select Committee on Environment, Transport and Rural Affairs, 1998, *The Future for Allotments - Minutes of Evidence*.

82 Harding, "Towards a Renaissance in Urban Parks."

83 Ed Vaizey, 2013, *Hansard Written Answers to Questions: Business, Innovation and Skills - Heritage Lottery Fund (147199)* (House of Commons).

84 ODPM, 2000, *Our Towns and Cities: The Future - Full Report*.

85 ODPM, 2002, *Living Places: Cleaner, Safer, Greener* (London, UK).

86 ODPM, 2003, *Sustainable Communities: Building for the Future*.

87 CABE, 2003, *Corporate Strategy: 2003-04 to 2005-06*.

88 CABE, 2005, *Whose Place Is It Anyway? Annual Report and Accounts 2004/05*.

89 ODPM, *Sustainable Communities: Building for the Future*.

90 Horticulture Week, 2004, "Liveability Fund Gives £89m for Green Space Regeneration," *Horticulture Week*.

highlights the importance of maintaining publicly accessible green space data over the long term. However, a copy of the Living Spaces evaluation, obtained from Groundwork, stated that 1,087 projects were completed involving 95,812 people. Of the groups that bid for funding, 34 per cent mentioned a current lack of public open space as a motivating factor.[91]

The extra funding and new institutions resulted in considerable progress in urban green space quality, satisfaction, research and awareness. The 2006 successor to the Public Park Assessment survey, conducted by the National Audit Office, identified that:

> *In 2005 84 per cent of urban local authorities believe the quality of their parks is stable or improving. This compares to less than 44 per cent in 2000. In 2000 55 per cent of urban local authorities considered their green spaces were declining in quality.We found that this had fallen to 16 per cent in 2005.*[92]

Because of a lack of comprehensive, nation-wide urban green space data, both the Urban Green Spaces Taskforce's 2002 report and the National Audit Office's 2006 follow-up report relied heavily on questionnaires sent out to local authorities. This makes it difficult to assess how cost-effective the new initiatives were. Nevertheless, the turnaround was attributed partly to increased local authority and Heritage Lottery Fund spending on parks but also due to community action.[93] There is no long term data on the economic value of volunteering in urban green spaces, but it was estimated to be worth £22-28 million in 2009 (in comparison with local authority spending on urban green space of almost £700 million in 2004/05).[94, 95]

Whilst improvements in quality were seen during this period, this was not spread equally. The 2006 successor to the Public Park Assessment found that "resident satisfaction has risen faster in authorities where satisfaction levels were already relatively high in 2000". There are also indications that the quantity of urban green space declined. Labour introduced a strengthened policy in the 2000 Urban White Paper of building preferentially on brownfield (i.e. previously developed land), rather than greenfield land.[96] Brownfield land not only includes land that is currently built on, but also land where structures have been demolished. If left derelict, such land can be quickly colonised by plants, and even become valuable areas of green space to local residents, yet still be classified as brownfield.[97] A recent study of 13 English cities based on detailed analysis of satellite imagery found that between 1991 and 2001 (prior to the brownfield policy), urban green space increased in 12 cities, which was attributed to the abandonment of large areas of industrial land in the 1980s and 1990s. However, between 2001 and 2006 (after Labour's strengthened brownfield policy) urban green space decreased in nine cities.[98]

Post- Financial Crisis

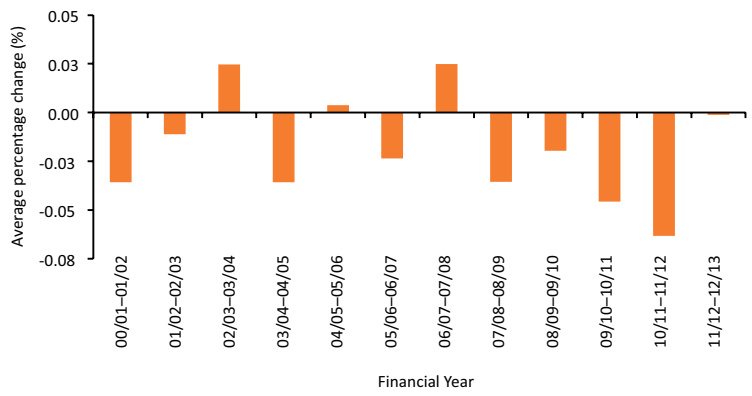
Since coming to power, the Coalition has introduced significant cuts to local government spending.[99] This has the potential to reverse the trend of improving urban green space quality seen since the Urban Green Spaces Taskforce was set up in 2001. Our calculations from DCLG figures show that average local

91 DCLG, 2006, *Living Spaces Evaluation*.
92 National Audit Office, *Enhancing Urban Green Space*.
93 Committee of Public Accounts, 2006, *Enhancing Urban Green Space: Fifty-eighth Report of Session 2005-06*.
94 National Audit Office, *Enhancing Urban Green Space*.
95 CABE Space, 2010, *Green Space Skills 2009: National Employer Survey Findings*.
96 ODPM, "Our Towns and Cities: The Future - Full Report."
97 London Wildlife Trust, 2002, *Brownfield? Greenfield? The Threat to London's Unofficial Countryside* (London Brownfields Forum).
98 Martin Dallimer et al., 2011, "Temporal Changes in Greenspace in a Highly Urbanized Region.," *Biology Letters* 7, no. 5: 763–6.
99 David Cameron, 2013, "David Cameron: The Age of Austerity," *The Conservative Party*, http://www.conservatives.com/News/Speeches/2009/04/The_age_of_austerity_speech_to_the_2009_Spring_Forum.aspx.

authority spending (excluding the shire counties and the Greater London Authority) has decreased by 10.5 per cent in predominantly urban local authorities between 2010/11 and 2012/13 (this may not necessarily only be green spaces). The greatest reductions were in the north-east (38.7 per cent) and the smallest reductions were in the south-east (3.4 per cent).[100]

A Freedom of Information (FoI) request to local authorities asked for staff numbers in Parks Services departments (or their equivalent). Of the 158 that responded, only 17 urban local authorities provided annual data on staff numbers from 2000/01 to 2012/13. Two of these were excluded from analysis. In 2006/07, Reading merged two grounds maintenance teams in different departments, which artificially inflated Parks Services staff numbers. In the same year, the City of London ended an outsourcing arrangement and consequently brought almost 20 jobs in-house. Excluding these two local authorities, Figure 4 illustrates the general decline in staff numbers over the past 13 years. This picture is reflected in Keep Britain Tidy's 2011/12 survey, which found that 50 per cent of local authorities had reduced frontline grounds maintenance staff.[101]

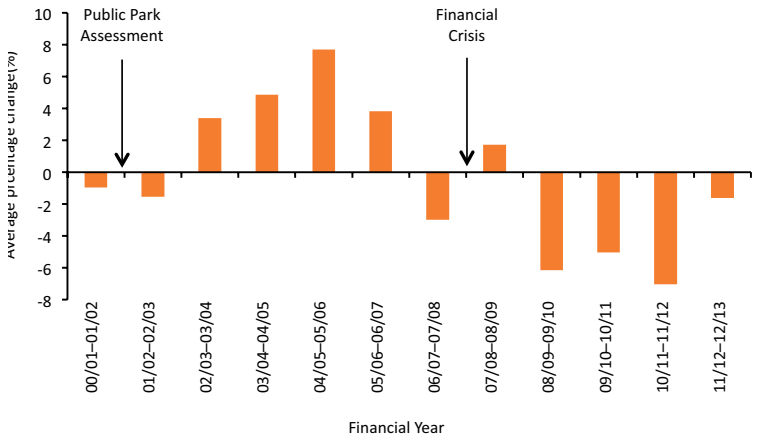
Figure 4: Results from the Policy Exchange 2013 Freedom of Information request, showing the average percentage change in Parks Services (or equivalent) staff numbers of 15 urban local authorities.



The FoI request also asked for local authority budgets for horticultural services for green spaces between 2000/01 and 2012/13. Only 12 local authorities classified as urban by the Office for National Statistics provided annual data for the whole of that time period.[102] The expenditure data for each year was converted to 2012 terms and divided by the area of the local authority.[103, 104] Figure 5 shows increases in average urban green space horticulture expenditure between 2002/03 and 2006/07 but the general pattern since then has been a decline in expenditure.

100 DCLG, 2010, "Local Authority Revenue Expenditure and Financing England: 2010 to 2011"; DCLG, 2011, "Local Authority Revenue Expenditure and Financing England: 2011 to 2012"; DCLG, 2012, "Local Authority Revenue Expenditure and Financing England: 2012 to 2013".
101 Keep Britain Tidy, 2012, *The View from the Street*.
102 ONS, "Local Authority Classification Post-2009."
103 ONS, "Consumer Price Inflation Detailed Reference Tables."
104 Office for National Statistics, 2011, "Standard Area Measurement: Local Authority Districts".

Figure 5: Results from the Policy Exchange 2013 Freedom of Information request, showing the average percentage change in annual expenditure (converted to 2012 terms and divided by local authority area) of 12 urban local authorities on horticulture services for green spaces.



Quality of Urban Green Space

The full effects of these budget cuts are not yet known, partly because of the lag time before effects are seen on the ground and partly because we lack the data from which to make a comparison. We also have no means of determining whether budget cuts and staff losses have created a more efficient service or have had a negative impact on urban green spaces. However, the Keep Britain Tidy survey found that 60 per cent of surveyed local authorities had reduced grass cutting frequency and 45 per cent had reduced planting or bedding.[105] In addition, a 2011/12 survey of 52 local authority parks services anticipating budget cuts revealed that over three quarters of respondents felt their ability to maintain high quality standards would be "slightly reduced" (58 per cent) or "significantly reduced" (22 per cent).[106] The challenge for policymakers is how they can use innovative approaches to try and overcome the risks created by reduced budgets.

Quantity of Urban Green Space

There are also some signs that budgetary pressures are leading to a loss of green space:

- The NHS has been asked to raise £2.5 billion by selling its green spaces for development.[107] Springfield Hospital in Wandsworth, London, won a planning appeal to build 839 homes, a care home, a school, office and retail space and 952 parking spaces on urban green space that was designated as Metropolitan Open Land (this London-specific designation is granted the same protection as the Green Belt).[108]
- Local authorities are also allowing housing development on some urban green space. A 2012 survey of local authority parks services revealed that more than a

105 Keep Britain Tidy, *The View from the Street*.
106 GreenSpace, 2011, *GreenSpace: Comprehensive Spending Review Impact Survey 2011 Interim Report*.
107 The Conservative Party, 2013, "NHS Land Sale: £2.5bn Savings Target," http://www.conservatives.com/News/News_stories/2011/07/NHS_land_sale_25_bn_savings_target.aspx.
108 Wandsworth Borough Council, 2013, "Disappointment at Springfield Decision," http://www.wandsworth.gov.uk/news/article/11279/disappointment_at_springfield_decision.

third expected the total number of parks (including playgrounds) to "decrease slightly".[109]

- Crystal Palace Park in London is designated as Metropolitan Open Land, yet outline planning permission has been granted for 180 residential units, student accommodation, a children's nursery and a new regional sports centre. In return, the new housing will help fund improvement works for the park.[110]
- Farm Terrace Allotments in Watford are to be the site of new housing to support the redevelopment of Watford General Hospital.[111]
- Approximately a quarter of Liverpool's 40-hectare Festival Gardens will be built on to provide 1,300 homes, as well as retail and commercial units.[112] This will help fund the restoration of the remaining site.
- Liverpool City Council plans to sell Sefton Park Meadows, adjacent to Sefton Park, in order to build new housing.[113]

With the combined effects of population growth, increasing urbanisation, and reduced local authority budgets, trade-offs in land use will inevitably be required. For example, under-used and low-quality urban green space may be more suitable for housing, and residents in some cases may in turn be better served by private gardens than public parks. Currently, with a restricted supply of urban land available for development due to green belt policy and consequently higher land prices, there is a risk that high quality urban green spaces will be developed. It is therefore crucial to have an adequate evidence base to inform these important decisions. In the absence of this data, we cannot know whether urban green spaces proposed for development in fact play a crucial role in maintaining public access to green space.

Institutions and Public Bodies

CABE Space, set up in 2003 with responsibility for promoting the benefits of public spaces, was disbanded in 2011. Some of CABE Space's data and activities were picked up by the charity GreenSpace, but this went into administration in March 2013.[114] There is potential for two new organisations known as the Parks Alliance and the Love Parks Alliance to take up some of GreenSpace's responsibilities and activities. However, there is, at present, considerable uncertainty as to their funding, remits and strategies for co-operation.[115] As a result, there is no third sector organisation with sufficient resources to act in an advisory capacity or to co-ordinate urban green space research and training. There is also no clear direction provided by central government, with responsibility for urban green space scattered amongst three government departments (DCLG, DCMS and Defra) and no single unit in any of these departments dedicated (even partially) to urban green space.

With no leadership from the public or third sectors, combined with restricted budgets that are likely to last for the next 10 years, urban green space is in danger of declining in both area and quality.[116] In order for the resurgence of urban green space to be continued, any policy innovations are likely to have to satisfy four criteria:

- the use of comprehensive and detailed urban green space data (to enable long-term planning, targeted interventions, and civil society action);
- cost effectiveness (with budget restrictions across all sectors, all measures must demonstrate their cost-effectiveness);

109 Debbie Johns, 2012, *State of the Market Survey 2012: Local Authority Parks Services* (Manchester, UK).
110 Latz + Partner and Gerald Eve, 2008, *Crystal Palace Park Masterplan Planning Statement*.
111 John Harris, 2013, "Turf Wars Escalate in the Battle for Britain's Allotments," *The Guardian*.
112 Langtree McLean Ltd, 2006, *Festival Gardens Liverpool: Vision Statement*.
113 Liverpool City Council, 2013, *Mayoral Recommendation: Greenbank Ward*.
114 Michael Rowan and Paul Bramhill, 2013, "GreenSpace Official Stakeholder Statement."
115 Sarah Cosgrove, 2013, "Parks Alliance Formed to Stand up for Sector," *Horticulture Week*.
116 Nicola Dempsey, Mel Burton, and Alice Mathers, 2012, "Place-keeping - Responsive, Long-term Open Space Management," *Town & Country Planning*: 431–436.

- the use of new technology (this will not only help engage the public, but also enable the sharing of data and best practice information); and
- the inclusion of civil society (this will, in the long term, help to reduce costs and deliver multiple benefits that will be explored in the next report).

This report will explore the potential for innovative, cost-effective ways of continuing to improve our urban green spaces. This report will argue that without good data and the use of technology, the ability to identify cost-effective approaches and to harness civil society, will be severely limited.

2
Existing Urban Green Space Data and Maps

The previous chapter outlined the main economic and environmental benefits of urban green space, before investigating the history of parks, including policy and funding. Several earlier investigations into the UK's urban green spaces identified the lack of data about the UK's urban green spaces as a major barrier to making improvements.[117, 118] Despite this, a lack of data and, in particular, useful maps of urban green space, remains a major problem. This chapter considers the key characteristics that an ideal urban green space map should possess. It then assesses current datasets and maps against these criteria.

Key criteria for an urban green space map

An urban green space map is not a new idea. Many cities have created such maps (see the examples of London and Berlin in Chapter 4) and various fragmented datasets exist at a national level across the UK. Scotland has already created a national map of urban green space. However, all of these maps suffer from various restrictions or flaws that curtail their potential as important and useful data sources. As a result, their usefulness as a cost-effective spur for improvements is extremely limited.

If money was no object, what would an ideal urban green space map look like? This section considers the seven key criteria that a useful and informative urban green space map should meet (Chapter 4 considers the main benefits of such a map):

1. **Full public access**. An ideal urban green space map would be available for the public to access. Without such open access the full benefits of such a map, including civil society scrutiny and inspiring civil society action is far less likely to take place. Some urban green space datasets are not currently available to the public. These include datasets funded with public money. In addition, many existing urban green space maps can only be viewed in simplified form (e.g. the sites are marked by pinpoints rather than boundaries) by the public online; the underlying geographic data exists but has not been made available to the public for download.
2. **Freely available**. Many of the most detailed existing urban green space maps are available to the public, but are expensive to purchase, effectively limiting public access. The potential benefits of opening data for commercial and non-commercial use are described in Chapter 3, including improvements in decision-making through civil society engagement.
3. **Compatible with GIS**. To allow effective analysis of the map, including comparisons with other datasets, the format of the map should be compatible

117 Select Committee on Environment, *Twentieth Report: Town and Country Parks*.
118 CABE Space, 2009, *The Green Information Gap: Mapping the Nation's Green Spaces*.

for use within Geographic Information System (GIS) software (GIS software allows easy visualisation and statistical analysis of digital geographic data and is available either commercially or as open source software). Without this capability, we will not be able to accurately calculate the most fundamental urban green space statistic: area. It also limits researchers ability to identify establish the effect of changes to green space, i.e. to determine whether policy interventions actually made a difference.

4. **Consistent typology**. To enable comparisons between areas (such as local authorities and regions), a standard set of detailed urban green space categories should be used (that allow, for example, differentiation between allotments and community gardens). Without this, we would only be able to make general conclusions about urban green space as a whole, when it could be that one type of urban green space is more abundant or threatened than another.
5. **Links to wider information**. In addition, further urban green space information, such as quality, whether it is open to the public, ownership, opening hours, or whether there is a Friends group associated with it, should also be included in the map. This would allow extra levels of analysis that are not currently possible, but have been successful internationally.
6. **Detailed**. Since many urban green spaces are small, the resolution and scale of the map should be sufficient to be able to distinguish even small (e.g. $500m_2$) urban green spaces from each other. Without this, we would potentially ignore many small but locally important green spaces.
7. **Full coverage of the UK.** This would be a world-first in terms of being able to accurately compare urban green space between countries.

An exploration of existing urban green space datasets and whether they meet these seven criteria is provided below. The findings are summarised in Table 3, together with an indication of the usefulness of these datasets for estimating national urban green space area in Box 1.

Existing Urban Green Space Data

European Commission

The European Environment Agency conducts the Corine programme. This includes the creation and maintenance of a Europe-wide land use map that is free for the public to download and analyse within GIS software. The advantage is that this map has been released several times since the project's inception, making it possible to analyse changes over time across the whole of the UK. However, because of the large area covered, the smallest map units are 25 hectares (the size of approximately 35 football pitches).[119] As a result, a huge number of urban green spaces do not appear. In addition, whilst there is a 'Green Urban Areas' category, this includes "a wide variety of surfaces: public parks, private green areas, cemeteries with vegetation", rather than separating different categories of urban green space. It does not include any further information about the urban green spaces, such as ownership, or whether they are open to the public.

Ordnance Survey (OS)

OS is a government department established in the late 18th century and responsible for the definitive surveying and mapping of Great Britain. It was granted Trading

119 Commission of the European Communities, 1995, *CORINE Land Cover*.

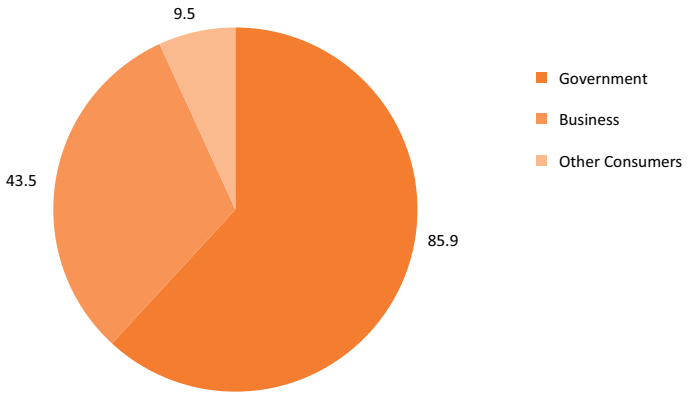
Fund status in 1999 (joining, for example, HM Land Registry and the Meteorological Office). This means that OS covers its costs by selling its data, including its maps. As part of efforts to open up public data (see Chapter 3 for the UK government's open data policy), 11 of the OS's maps and datasets were made freely available to the public in April 2010 under its OpenData licence (one further map, OS Terrain 50 was added in August this year).[120] However, many of OS's most detailed map products, such as OS MasterMap, remain subject to licence charges.

In 2011/12, OS had trading revenues of £139 million. Of this, 62 per cent came from government contracts (see Figure 6). The three main government contracts comprise the:

- Public Sector Mapping Agreement (PSMA) for England and Wales
- One Scotland Mapping Agreement (OSMA)
- OpenData products for the public

The PSMA and OSMA enable public sector organisations (including local authorities, emergency services and the NHS), to freely use almost all of OS's mapping products.[121] The UK government also pays for public access to OS's OpenData products (this cost the UK Government £20 million in 2010).[122] The rest of OS's income comes from businesses and other customers, such as members of the public. Last year, OS recorded profits of more than £30 million, £17 million of which was returned to government in the form of dividends.[123]

Figure 6: Ordnance Survey's trading revenues by customer type (amounts in £ million).[124]



One of the most detailed digital land use maps of Great Britain is created and maintained by OS. The OS MasterMap Topography Layer can be analysed using GIS software and contains more than 400 million unique features classified into nine themes (including 'water', 'buildings' and 'rail'). However, OS MasterMap does not allow any distinction to be made between, for example, parks and allotments: they are both classified as 'general surface' under the 'land' theme, together with agricultural land. There is also no further urban green space information, such as ownership. This means that we could gain a general picture of how green a

120 Paul, 2010, "OS OpenData Goes Live!," *Ordnance Survey Blog*, http://blog.ordnancesurvey.co.uk/2010/04/os-opendata-goes-live/.
121 Ordnance Survey, 2011, *Annual Report and Accounts 2011–12*.
122 Ordnance Survey, 2011, *Annual Report and Accounts 2010–11* (Ordnance Survey).
123 Ordnance Survey, *Annual Report and Accounts 2011–12*.
124 Ibid.

city is, but could not conduct detailed analysis of urban green space. The cost to access OS MasterMap is also prohibitive. A quote obtained for a licence to access OS MasterMap just for London for a single year was more than £40,000, and the OS MasterMap topography layer for the whole of Great Britain for a year costs businesses between £562,500 and £4,500,000, depending on the number of computers that will have access to it.[125]

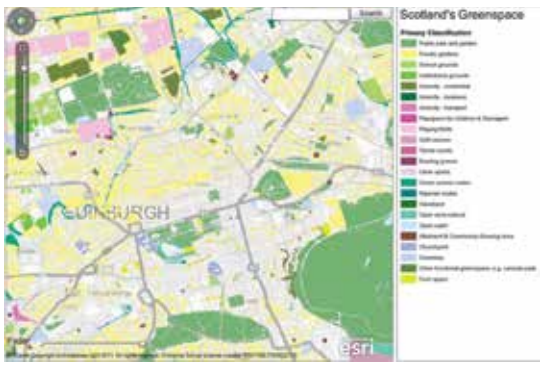
The most fine scale digital map freely available to the public under OS's OpenData licence (OS Street View) is not in a format that allows GIS analyses to be conducted: it is only a map image.[126] The most useful OpenData map that allows for analysis with GIS software is OS VectorMap District, which is at a coarser scale than OS MasterMap and can only distinguish 'woodland' as a separate urban green space category. As with OS MasterMap, no further information on urban green space, such as ownership, is provided.

Scotland's Urban Green Space Map

In 2011, Scotland was reported to be the world's first country to release a national urban green space map (see Figure 7 for a screenshot).[127] This followed two pilot studies in 2004 and 2007, and a case presented in 2010 by greenspace scotland (a registered charity) to Scottish government and agencies for the benefits the map would provide. Data was collected from 32 local authorities. Crucially, all local authorities submitted data using the same set categories for urban green space, in collaboration with a private sector partner. In comparison to Planning Policy Guidance 17 (PPG17) in England and Wales, which states that variations of the proposed typology can be used, Planning Advice Note 65 provides both a basic and an expanded typology that local authorities should use.[128]

The main and unanticipated difficulty of the project was that the mapping data was derived from OS MasterMap. This means that only users with licensing agreements (e.g. local authorities via the One Scotland Mapping Agreement, or OSMA) are able to access the full geographic data via a CD: the public are only able to view the map online.[129] Discussions are on-going with OS to maintain the dataset via the OSMA.[130] There is no definitive cost for the project, partly due to the use of existing resources and infrastructure. However, using available information from greenspace scotland and Scottish Natural Heritage, we estimate that this project cost a maximum of £2 million.[131, 132]

Figure 7: Screenshot of Scotland's Greenspace map.[133]



125 Ordnance Survey, 2013, *Business Portfolio Price List 2013–14* (Ordnance Survey).
126 OS, 2011, *OS Street View: User Guide and Technical Specification*.
127 BBC News, 2011, "*Map of Scotland's Urban Green Space is World First*," http://www.bbc.co.uk/news/uk-scotland-14898280.
128 The Scottish Government, 2008, *Planning Advice Note 65: Planning and Open Space*.
129 Julie Procter and Abigail Page, 2011, *Developing and Using Scotland's National Greenspace Map*, vol. 65 (Association for Geographic Information).
130 Julie Procter, 2013, "Personal Communication" (greenspace scotland).
131 Ibid.
132 Lachlan Renwick, 2013, "Personal Communication."
133 Scottish Natural Heritage, 2012, "Scotland's Greenspace Map," http://www.snh.gov.uk/planning-and-development/advice-for-planners-and-developers/greenspace-and-outdoor-access/open-space-audits-and-strategies/dataset/.

Government Departments and Statutory Agencies

DCLG

The Generalised Land Use Database (GLUD) was compiled in 2001 and 2005 by DCLG on behalf of ONS, using OS data. This free and publicly available spreadsheet-based dataset provides estimates of the area of different categories of land use, to a fine geographic scale across England. These categories include 'domestic gardens' and 'green space'. This allows us to establish and compare the proportion of land used as domestic gardens across England with, for example, different local authorities or even within different areas within the same local authority. However, the 'green space' category is extremely broad, not differentiating between different types of urban green spaces and including agricultural land. As a result, this database does not allow for detailed analysis of urban green space. The GLUD also does not include any other information than area. In addition, differences in methodology mean the 2001 and 2005 data cannot be compared meaningfully. Moreover, the database is no longer maintained due to the "costs and resources associated with it".[134] A DCLG representative has revealed that there are no accurate estimates for the cost of the GLUD.[135] However, with a methodology already developed and improvements in technology and OS MasterMap, the cost should not be prohibitive. The difficulty is in making sure that results are comparable over time. However, so long as limitations, such as changes in methodology, are clearly stated, "the perfect should not be the enemy of the good".[136]

Recommendation: The Generalised Land Use Database should be updated and released every ten years to act as a census for land use changes over time. There are no accurate estimates for the cost of this, but with improvements in OS MasterMap and technology, the cost should not be prohibitive.

Defra

Defra's MAGIC website (http://magic.defra.gov.uk/home.htm) is a publicly accessible and interactive mapping site supporting more than 200 environmental data sets, including some categories of green spaces. Most datasets are restricted to England, although some include Scotland and Wales. It cost less than £500,000 to develop over a period of three years, and costs £163,630 per year to run. The full benefits of this website have not yet been calculated. However, the cost saving to Defra alone because of the centralised negotiation of data licences is estimated at £2.5 million per year.[137] Nevertheless, not all of the datasets are free to download by the public for use within GIS software, and green space coverage is more complete in rural than in urban areas.[138] In addition, not all of the datasets provide further green space information, such as ownership.

Defra's Survey of Public Attitudes and Behaviours towards the Environment has been conducted in various forms and at various intervals between 1986 and 2011. Some of these surveys included questions on green spaces, such as the 2011 survey, which asked "How important is it for you to have public gardens, parks, commons or other green spaces nearby?"[139] The results of these surveys are freely available online but they have now been discontinued. Whilst there is no way to map responses to particular green spaces (the responses are split only to regional level), this survey does provide a high-level indication of public satisfaction and use of green spaces.

134 Simon Roberts, 2013, "Personal Communication."
135 Simon Roberts, 2013, "Personal Communication."
136 Stephan Shakespeare, 2013, *An Independent Review of Public Sector Information*.
137 NAO, 2012, *Department for Environment, Food and Rural Affairs: Geographic Information Strategy*.
138 CABE Space, 2010, *Urban Green Nation: Building the Evidence Base*.
139 Defra, "Public Attitudes and Behaviours Towards the Environment - Lifestyle Omnibus Survey."

Natural England

Natural England has made its GIS Digital Boundary Datasets freely available to download from their website under the Open Government Licence: they are also included in the MAGIC website.[140] These datasets include the boundaries of statutory designated sites in England, such as Local Nature Reserves and some non-statutory designated sites, such as Millennium Greens and Ancient Woodlands. However, whilst useful, they are far from comprehensive (for example, they don't include most public parks) and are better for rural green space data than urban.[141] They also lack any information other than designation category and area.

Natural England and Defra have filled some of the gaps left by the end of Defra's Public Attitudes survey with their Monitoring Engagement with the Natural Environment (MENE) survey. This began in 2009/10 and records green space visit data, visitor attitudes to the environment and respondents' geographic information. The survey responses have been made freely available online and responses can be mapped to individual green spaces using longitude and latitude coordinates in GIS software. However, in Spring 2014, Natural England plans to add a map-based data visualisation tool (also publicly available) so that MENE responses can be analysed visually for many different geographical areas (e.g. Local Authority area, National Park, etc.). One of the questions in this survey has been included as one of the measures within ONS's National Well-being measurement programme.[142] MENE data also contributes to a Defra indicator set developed in response to the Natural Environment White Paper in 2011, providing information on public engagement with the natural environment.[143] Defra has also indicated that there is potential for MENE to contribute to a proposed Defra indicator, called "Ease of Access to Local Woodland, Green Space and Countryside".[144]

Forestry Commission

The Forestry Commission has also made their National Forest Inventory, based on aerial photography and in a format suitable for analysis in GIS, freely available to download via a third-party website.[145] This dataset is useful but limited by the definition of woodland: a minimum area of 0.5 hectares and minimum width of 20m. This may affect the estimate of coverage in urban areas, where many woodlands are likely to be small. There is also limited information available on the type of woodland and its location context, such as whether it is in an agricultural setting but no further information, such as ownership.

Online Maps

Google Maps

Google Maps is a free, online and searchable worldwide map (comprising satellite imagery and a streetmap layer, with options to add, for example, topographical, traffic and cycling information). Many urban green spaces are marked and can be searched for by name. In addition, the larger urban green spaces contain further information, such as opening times, website links and reviews. However, neither the map nor the underlying geographic data can be downloaded. This means it is of little use in gaining an idea of urban green space across England and Wales.

A new tool, known as Google Map Maker was made available to the UK public in April 2013 and has the potential to improve our knowledge of urban green spaces.[146] This tool allows the public to add and edit features on Google Maps

140 Natural England, 2012, "GIS Digital Boundary Datasets," http://www.gis.naturalengland.org.uk/pubs/gis/GIS_register.asp.
141 Rachel Penny and Nick Dales, 2012, *Natural England Discussion Paper: Mapping the Accessible Natural Environment Evidence Project (draft)*.
142 Office for National Statistics, 2012, *Measures of National Well-being*.
143 Defra, 2011, "The Natural Choice: Securing the Value of Nature. CM 8082".
144 Defra, 2013, *England Natural Environment Indicators*.
145 Forestry Commission, 2010, "National Forest Inventory" (Forestry Commission), http://www.forestry.gov.uk/website/forestry.nsf/byunique/INFD-8EYJWF.
146 Satish Mavuri, 2013, "Welcoming the United Kingdom to Google Map Maker," *Google Maps Blog*, http://google-latlong.blogspot.co.uk/2013/04/welcoming-united-kingdom-to-google-map.html.

and add information about them. Edits are approved by trusted mappers before becoming public, which can take several months. However, in the UK, these publicly edited maps cannot be downloaded for use within GIS software.

Google Earth is free desktop software based on Google Maps but with slightly different capabilities.[147] It also allows users to 'draw' features on top of the provided basemaps, such as satellite imagery. Crucially, Google Earth does allow the export of these created features as a file type that can be readily converted for use in GIS. However, it is not possible for multiple users to work on the same map at the same time. This limits the ability to harness civil society action to create comprehensive maps, including an urban green space map. Moreover, copyright restrictions mean that these personalised maps cannot be used in commercial products.[148]

The new Google Maps Engine is a limited online GIS platform that allows users to upload spreadsheets and other data formats to be displayed on a map, as well as allowing users to draw on maps. There are both free and business versions. Importantly, there is the option to allow the public to view not only the map but the data behind it. However, there are considerable limitations on the complexity and size of the data can be imported into the free version and its data export capabilities are limited to just one format.

OpenStreetMap

OpenStreetMap is to maps what Wikipedia is to encyclopaedias. It is an open source, worldwide online mapping platform that allows members of the public to add, modify and remove features, as well as export data for use in GIS.[149] It was set up in the UK in 2004 and is supported by the OpenStreetMap Foundation, a UK-registered non-profit organisation (with a 2011/12 income of just under £129,000). The map is entirely user-policed and the user base is large, at over 1.2 million registered worldwide users, although not all of these will be contributors to the map.[150]

Importantly, the licence allows free use of the underlying geographic data and the map for any purpose, whether commercial or non-profit.[151] Much urban green space has already been mapped in OpenStreetMap. However, the currently available data is, at present, rather unreliable. For example, coverage is incomplete and spelling mistakes are frequent, which means that a simple GIS analysis would classify 'allotments' as separate from 'alotments'. In addition, not all urban green space categories are represented, including community gardens and commons (such as Clapham Common, London). Despite this, there is potential for this resource to be improved over time, particularly with the introduction of a new map editor, which simplifies the editing process to reduce errors, such as labelling spelling mistakes.

Other National Data

CABE Space Dataset

An alternative is an incomplete inventory of more than 16,000 urban green spaces in England compiled by CABE Space in 2010 from datasets held by various government agencies and NGOs.[152] Aside from its incompleteness, many spaces had names but no boundary data attached to them because this information was not recorded by the original data collectors, and so they could not be accurately mapped. Despite this limitation, it remains one of the most comprehensive sources of urban green space data available. However, despite being paid for by public money, it was never made publicly available, likely due to the different

147 Google Earth, 2006, "Google Earth".
148 Google, 2013, "Google Maps / Earth Terms of Service," http://earth.google.com/intl/en-US/license.html.
149 OpenStreetMap Foundation, 2013, "OpenStreetMap," http://www.openstreetmap.org/.
150 OpenStreetMap Foundation, 2013, "OpenStreetMap Stats Report," http://www.openstreetmap.org/stats/data_stats.html.
151 OpenStreetMap Foundation, 2013, "OpenStreetMap Foundation License," http://www.osmfoundation.org/wiki/License.
152 CABE Space, *Urban Green Nation: Building the Evidence Base*.

licence restrictions on the different datasets. On the dissolution of CABE Space in 2011, it is understood from CABE that the rights to the dataset were passed to GreenSpace, the national charity. Now that GreenSpace has entered into administration, the owner of the rights to the dataset is as yet unknown.

Recommendation: The existing CABE Space / GreenSpace urban green space dataset that is currently held by GreenSpace's administrators should be obtained by central government and as much of it made publicly available as possible, for example via data.gov.uk.

CEH Land Cover Map

The Centre for Ecology and Hydrology's (CEH's) 2007 Land Cover Map is a publicly funded digital map of different habitat types (such as coniferous woodland and acid grassland) across the UK.[153] However, there is no distinction made between different categories of urban green space or whether sites are open to the public. In addition, a quote for access to their map of England was more than £15,000, making it inaccessible to most members of the public.

Woodland Trust VisitWoods Database

The Woodland Trust led the five-year VisitWoods project, which aimed to raise the profile of woodlands across Britain. The project was a partnership amongst Natural England, the Forestry Commission, various NGOs and private organisations (including a law firm). Natural England was the main funder, providing £1.2 million from the Big Lottery's Changing Spaces fund.

Part of the project involved the creation of the highly interactive VisitWoods website, which allows the public to search for woodlands that are open to the public.[154] This includes woodlands owned by NGOS, such as the National Trust, but also private landowners. The maps provided display woodland boundaries and further information, such as visitors' photographs and videos, comments, visitor ratings, and features and facilities. In addition, different basemaps can be viewed, including OS, Microsoft's bing and aerial photography. Since its creation in late 2010/early 2011, the website has generated 2 million visits, illustrating the demand for high quality information on local green spaces.

However, the limitations of this website are that the dataset is only updated four times a year, and so additions or changes are slow to be seen. Part of the reason for this delay is that the public cannot add woodlands themselves; a table of information has to be fully completed and sent to the Woodland Trust. In addition, the underlying geographic data cannot be downloaded, possibly due to licence restrictions.

Private Sector

Private organisations also provide mapping products suitable for use in GIS software. For example, The GeoInformation Group offers several map products of different specifications. One of the most suitable for urban green space is UKMap. This contains extremely detailed categories of urban green space but no further information about them, such as whether they are open to the public. Since the geographic data is entirely owned by The GeoInformation Group, there is considerable flexibility in pricing to suit individual needs, although costs remain high. For example, a quote obtained for use of UKMap for London for one year was £75,000.

153 Centre for Ecology and Hydrology, 2011, "New UK Land Cover Map Launched This Week," http://www.ceh.ac.uk/news/news_archive/uk-land-cover-map_2011_44.html; Countryside Survey, 2007, "Partners and People," http://www.countrysidesurvey.org.uk/about/partners-and-people.

154 Woodland Trust, 2013, "VisitWoods," http://visitwoods.org.uk/en/visit-woods/Pages/get-involved.aspx#.Unpt2fnIaaI

Box 1: Analysis of existing free and publicly available urban green space datasets.

To provide an indication of just how divergent urban green space datasets are, Table 2 shows the proportion of Greater London's (almost 160,000 hectare) area that each free and publicly available dataset that can be downloaded into GIS software considers as urban green space (or the closest category possible). Where a dataset includes many different categories of green space, such as Natural England's GIS boundaries, these are merged so that there is no double-counting (for example many sites have more than one nature conservation designation).

Table 2: Estimations of the proportion of Greater London covered by green spaces according to existing free and publicly available datasets.

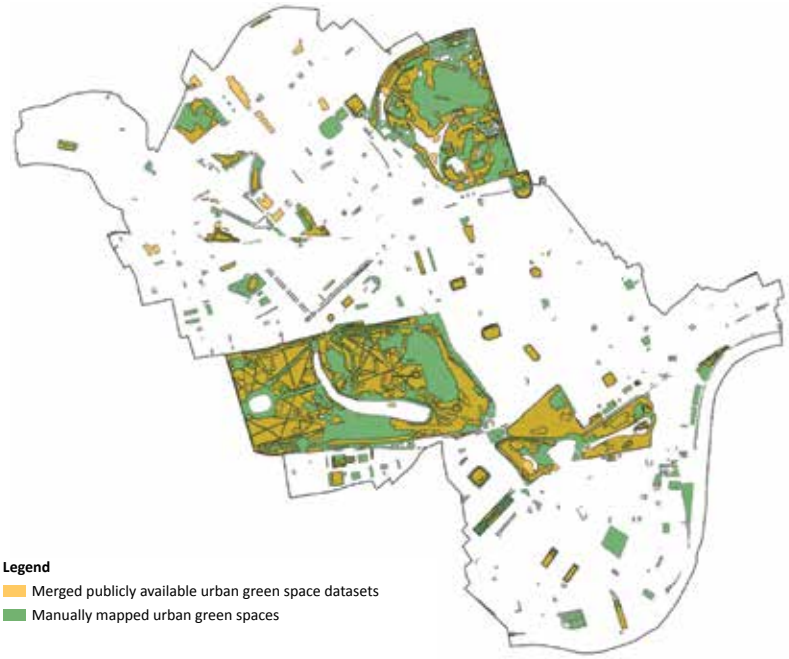
Organisation	Data Name	Land category closest to urban green space	Area (hectares)	Proportion of Greater London's area (per cent)
European Environment Agency	Corine land use map	Green urban Areas	11566.26	7.25
Ordnance Survey	VectorMap District	Woodland	8994.56	5.64
DCLG	Generalised Land Use Database	Green space	11574.16	7.26
Natural England	Designated site GIS Boundaries	All datasets combined	13934.10	8.74
Forestry Commission	National Forest Inventory	Woodland	13217.56	8.29
English Heritage	Registered Parks & Gardens	Registered parks and gardens	5761.01	3.61

The Corine, Generalised Land Use Database, National Forest Inventory and the combined Natural England datasets provide similar estimates of urban green space, despite considering different categories at different scales. However, this should not be considered as a measure of confidence in the data. To investigate this, we have conducted our own analysis. Our research manually mapped all the green spaces visible in the City of Westminster (excluding large bodies of water and buildings within the urban green spaces) using a free topographic base map provided in commercially available GIS software. It should be noted that this topographic base map tended not to include private gardens and may not have included some smaller public urban green spaces, and so this mapping exercise will not be fully accurate. We then merged all of the publicly and freely available GIS datasets included in Table 2, with the exception of English Heritage's Registered Parks and Gardens dataset. This dataset inflates the urban green space area estimate by including urban spaces with no vegetation, such as Trafalgar Square, as well as large bodies of water, such as the Serpentine in Hyde Park.

Combined, the publicly available datasets suggest that there are 295 hectares of urban green space in the City of Westminster. However, we have calculated that this is at least a 40 per cent underestimate, with approximately 511 hectares of urban green

space visible from the topographic map (see Figure 8). Interestingly, the Corine Green Urban Areas dataset, which picks up areas of at least 25 hectares, did not include Hyde Park or Regent's Park: these are classified under the Sport and Leisure Facilities category, which also includes racecourses and horse-riding centres.

Figure 8: Results of our analysis of the City of Westminster's urban green space.



Local Authorities

GIS Maps

The FoI request of local authorities found that most (89 per cent) local authorities have mapped at least some of their green spaces using GIS, although it is not known how complete, detailed or up to date these GIS datasets are. Three of the 241 local authorities that responded still rely entirely on paper maps. Only 15 local authorities (6 per cent) provided the geographic data for their green spaces, likely due to OS licence restrictions. The widespread use of GIS is encouraging, particularly given the results of earlier work on urban green space. For example, in 2008 less than a fifth of local authorities accurately recorded the percentage area covered by their trees and woodlands, whilst only eight per cent accurately recorded whether the trees and woodlands were on private or public land.[155] The use of GIS raises the possibility that collating local authority urban green space spatial data could form a national map. However, a recent four year Natural England project failed to fully achieve this ambition because of variable typologies, data quality, licensing and coverage amongst more than 400 local authorities. It was also found that budget cuts limited the capacity for local authorities to keep their maps up to date.[156] There are also issues with OS licence restrictions in terms of making a national map based on local authority datasets publicly available, since local authorities will likely be using OS MasterMap under the PSMA.

155 Chris Britt and Mark Johnston, 2008, *Trees in Towns II: A New Survey of Urban Trees in England and Their Condition and Management* (Department for Communities and Local Government).
156 Penny and Dales, *Natural England Discussion Paper: Mapping the Accessible Natural Environment Evidence Project (draft).*

A further issue in local authority GIS mapping is the lack of a consistent urban green space classification system, or typology.[157] If one local authority classifies an area as a park but another local authority decides that a similar space is a recreation ground, then only general conclusions about urban green space can be made. In 2002, England's (PPG17) provided a basic typology of urban green space but no firm recommendation for local authorities to use it (variations were considered acceptable).[158] PPG17 was subsequently replaced in 2012 by the National Planning Policy Framework, which does not include a typology.[159] Northern Ireland's Planning Policy Statement 8 (PPS8) provides an illustrative typology but does not set out a requirement for local authorities to follow it.[160] Whilst a set typology inevitably means that some detail may be lost, particularly if the categories are broad, the benefit of being able to compare data across the UK and over time far outweighs this (see Chapter 4 for the benefits of being able to compare data).

Recommendation: A co-ordinated approach to develop a UK-wide urban green space classification system (typology) is required. This should be initiated by Defra, DCLG and Natural England, and agreed with local authorities and other stakeholders. The respective government departments and other stakeholders in Wales, Scotland and Northern Ireland should also be included in the process, to ensure a consistent approach across the UK.

Other Local Authority Urban Green Space Data

Prior to 2007, local authorities were obliged to provide data on up to 1,200 national indicators, including Best Value Performance Indicators (BVPIs).[161] These were meant to be tools to monitor outcomes of local authority activity. The BVPIs did not include data on urban green spaces. However, local authorities were required to conduct Best Value User Satisfaction Surveys every three years to obtain the views of local people. This was replaced by the Place Survey in 2008, which was in turn scrapped in 2010. The results of these publicly available surveys included useful data on public satisfaction with parks and open spaces and the local environment, as well as other public services.

The approximately 1,200 national indicators were replaced in 2007 by a National Indicator Set (fewer than 200 indicators), which was itself replaced in 2012 by the Single Data List (approximately 150 data collections).[162, 163] Both the National Indicator Set and the Single Data List include submissions of local nature conservation site data to Defra; however, such sites are only one type of green space that can be found in urban areas and, as the data required is a proportion (the proportion of Local Sites where positive conservation management is being achieved), the results cannot be mapped to individual green spaces in GIS software.[164]

Local Records Centres

Local Records Centres (LRCs) are not-for-profit organisations that collect, collate, manage and disseminate information relating to the biodiversity and geodiversity of a region.[165] There are more than 50 LRCs covering across the UK, releasing data in varying formats and at different prices. Many have developed close links with the local authorities in their area. Some have collated urban green space data.

Greenspace Information for Greater London

Greenspace Information for Greater London (GiGL) is the local records centre for London. GiGL is funded partly through partnerships with organisations that enter

157 CABE Space, *Urban Green Nation: Building the Evidence Base.*
158 ODPM, 2002, "Planning Policy Guidance 17 : Planning for Open Space , Sport and Recreation".
159 DCLG, 2012, "National Planning Policy Framework," ed. Department for Communities and Local Government.
160 The Planning Service, 2004, *Planning Policy Statement 8: Open Space, Sport and Outdoor Recreation.*
161 Audit Commission, 2013, "Best Value Performance Indicators," http://archive.audit-commission.gov.uk/auditcommission/performance-information/performance-data-collections-and-guidance/Pages/best-value-performance-indicators.aspx.html.
162 DCLG, 2008, *National Indicators for Local Authorities and Local Authority Partnerships - Handbook of Definitions Annex 4: Local Economy and Environmental Sustainability.*
163 Eric Pickles, 2010, "Written Statement to Parliament: Local Government Accountability," https://www.gov.uk/government/speeches/local-government-accountability--2; DCLG, 2012, "Single Data List.pdf".
164 DCLG, "Single Data List.pdf."
165 Association of Local Environmental Records Centres, 2013, "Home," http://www.alerc.org.uk/.

into service level agreements in order to obtain GiGL's data, such as London borough councils, environment NGOs, Natural England, and Thames Water. Further funding comes from private requests for data, such as from environmental consultants and developers. In July 2013, GiGL released an online map, known as iGiGL, which allows the public to view certain categories of urban green space, using OS MasterMap as the basemap (see Figure 9). Importantly, clicking on a site reveals a pop-up balloon with a link to further information about the site, such as its facilities. However, the underlying geographic data still cannot be downloaded by the public and not all categories of urban green space, such as allotments, are included.

Figure 9: Screenshot of iGiGL, the urban green space map for London.[166]

Other Urban Green Space Data

There are also other sources of mapping data in GIS format. However, these tend to cover small categories of green space, such as National Trust land holdings, English Heritage's Registered Parks and Gardens, and the Woodland Trust's Woods for People dataset. In addition, in some cases the maps containing the boundary data tend not to be publicly available, either online or to download (e.g. National Trust properties). Instead, simplified maps are available to view online that only have pinpoints to mark the centre of sites. As a result, they do not come close to filling in the large gaps in our knowledge base.

Except for the Royal Parks and Heritage Lottery funded green spaces, surveys of visitor numbers to urban green spaces are rare. For allotments, plot holder data is available at local authority level but does not accurately reflect total visitors (plot holders may, for example regularly bring family or friends). It is also difficult to accurately assess visitor numbers, as urban green spaces may have several access points, numbers are likely to be higher during periods of good weather, and thorough studies to overcome these issues are expensive.

There is also little data available on urban green space quality. This is likely due to there being no statutory requirement to do so unless they have a statutory designation (for example, if they are Sites of Special Scientific Interest). In these special cases, the assessment is based around the biological or geological features of the site, rather than whether the site is a safe, clean and welcoming place for people. Our FoI request found that of the 241 local authorities that responded with at least some of the data requested, less than a quarter (57, or 23.7%) have assessed

166 Senatsverwaltung für Stadtentwicklung und Umwelt, 2013, "Öffentliche Grün- Und Erholungsanlagen: Grünanlagenkarte Online," http://www.stadtentwicklung.berlin.de/umwelt/stadtgruen/gruenanlagen/de/karte/index.shtml.

the quality of their green spaces. Of these, 27 provided details of their assessments. The most notable finding is the number of different assessment systems and criteria used. For example, systems ranged from Green Flag (see Box 2) to bespoke systems that resulted in either a Pass or Fail score or a numerical score. This makes it impossible to compare urban green space quality between local authorities.

The Green Flag award is a voluntary standard available for parks and other green spaces (see Box 2), although detailed data on changes over time in the numbers of green spaces being put forward and receiving the Green Flag award are not publicly available from their website. However, relatively few urban green spaces are assessed and awarded Green Flag status: in 2012, 1,424 sites (out of 1,508 applications) across the UK were awarded Green Flag status.[167,168] This is in comparison to the estimated 27,000 urban public parks (not including any other type of urban green space) estimated to be located in England alone.[169] As a result, even were the data available, it would only provide a limited picture of urban green space quality. There is a map pinpointing the locations of Green Flag awarded sites available to view online. However, the green space boundaries are not marked, and the map can only be viewed one region at a time.

Recommendation: Green Flag data (including score sheets for individual green spaces and site boundary data) should be made freely available online for the public to view and download, as part of a revised Green Flag licence agreement with DCLG.

Box 2: Green Flag

The Green Flag Award scheme was set up in 1996 by people from a variety of organisations interested in park quality and management. The scheme was managed by the Civic Trust in 2000, was gifted to the ODPM in 2003, and is currently owned by DCLG and licensed (with no government funding) to Keep Britain Tidy.[170]

The award must be applied for each year and application fees range from £200 to £400 for publicly managed sites, with no charge for voluntary or community managed sites. Importantly, sites are required to demonstrate improvements over previous years to gain subsequent awards. The sites are judged by 800 trained volunteer judges against eight criteria, including community involvement, sustainability and safety.[171] Judging alternates between a scheduled visit by two judges in one year, and a "mystery shopper" visit in the next to ensure that standards are consistently high.[172]

Some attempt to harness citizen feedback on park quality was made in 2010 by GreenSpace in the form of GreenSTAT.[173] This online visitor survey tool was intended to provide an evidence base for strategic planning. The data was never made publicly available (and is now held by GreenSpace's administrators), though its popularity among local authorities provides a useful indicator of just how important public feedback is to green space managers: 76 local authorities across the UK paid between £500 and £5,000 per year for the data.[174] Assuming that all 76 local authorities that signed up to GreenSTAT paid £2,500 per year (the median price for GreenSpace members), the amount spent on accessing public

167 Keep Britain Tidy, 2012, "Greenest Year Yet," http://greenflag.keepbritaintidy.org/news/2012/05/greenest-year-yet/.
168 Keep Britain Tidy, 2012, "A Record Number of 1424 Green Flag Awards Announced Today," http://greenflag.keepbritaintidy.org/news/2012/07/2012-a-record-breaking-green-flag-award-year!/.
169 Urban Parks Forum, *Public Park Assessment: A Survey of Local Authority Owned Parks*.
170 Michael Gwilliam, 2013, "Green Flag for Go!," http://www.pan-uk.org/pestnews/Issue/pn46/pn46p15.htm.
171 Keep Britain Tidy, "Green Flag Award," accessed May 10, 2013, http://greenflag.keepbritaintidy.org/.
172 Jez Abbott, 2013, "Green Flag Awards - Standard Bearer," *Horticulture Week*.
173 GreenSpace, 2010, "GreenSTAT."
174 GreenSpace, 2010, "Current GreenSTAT Clients," http://www.green-space.org.uk/greenstat/clients.php.

feedback on park quality across England was £190,000 per year. Similarly, the online 'Park Health Check' survey run by GreenSpace as part of Love Parks Week in 2010 sought to gain public views on their local green space, but the data generated was never made publicly available.[175]

The limitations and advantages of each of the different data sources, according to whether they meet the seven criteria outlined at the beginning of this chapter, is summarised in Table 3.

175 GreenSpace, 2013, "Love Parks Week," http://loveparksweek.org.uk/node/26.

Table 3: Summary of current data for UK urban green space against our criteria for a national urban green space map.

Key: ✓ = Yes, × = No, ✓/× = Partly, N/A = Not Applicable

Organisation	Data Name	Data Type	Fully available to the public?	Free or cheaply available to the public?	Compatible with GIS?	Detailed urban green space categories?	Other relevant urban green space information?	Sufficient scale and resolution?	UK countries covered
European Environment Agency	Corine land use map	Map	✓	✓	✓	×	×	×	UK
Ordnance Survey	MasterMap	Map	✓	×	✓	×	×	✓	Great Britain
	VectorMap District	Map	✓	✓	✓	×	×	×	
	StreetMap	Map	×	✓	×	×	×	✓	
greenspace scotland	Scotland's urban greenspace map	Map	✓	×	✓	✓	×	✓	Scotland
DCLG	Generalised Land Use Database	Spreadsheet	✓	✓	✓	×	×	×	England
Defra	MAGIC	Map	✓/× Some datasets cannot be downloaded	✓	✓/×	✓	×	✓	Mostly England only
	Survey of Public Attitudes and Behaviours towards the Environment	Spreadsheet	✓	✓	✓	N/A	✓	×	England
GiGL	iGIGL	Map	×	×	✓	✓	✓	✓	Within-country areas
Natural England	Designated site GIS Boundaries	Map	✓	✓	✓	✓ Though incomplete	×	✓	England
	MENE	Spreadsheet	✓	✓	✓	✓	✓	×	England
Forestry Commission	National Forest Inventory	Map	✓	✓	✓	×	×	✓	Great Britain
CABE Space	Urban green space inventory	Map	×	N/A	✓	✓	Unknown	Unknown	England
CEH	Land Cover Map	Map	×	×	✓	×	✓	✓	UK
Woodland Trust	VisitWoods	Map	×	✓	✓	×	✓	✓	UK
Keep Britain Tidy	Green Flag	Map	✓	✓	×	Unknown	✓	×	UK
National Trust	National Trust properties	Map	×	N/A	✓	Unknown	Unknown	✓	England, Wales & Northern Ireland
English Heritage	Registered Parks & Gardens	Map	✓	✓	✓	×	×	✓	England
Green Flag	Green Flag	Map	✓	✓	×	×	✓	×	UK
The GeoInformation Group	UKMap	Map	✓	×	✓	✓	×	✓	UK
Google	Google Maps	Map	×	✓	×	Unknown	✓	✓	UK
OpenStreetMap Foundation	OpenStreetMap	Map	✓	✓	✓	✓	✓	✓	UK, although coverage is incomplete

In conclusion, none of the existing urban green space datasets meets all seven of our criteria for a national urban green space map. The datasets are inconsistent, fragmented, often expensive to access and/or unable to take advantage of the huge potential of GIS software. The effect is that policymakers, and crucially the public and civil society, at a local and national level do not have a clear idea of the quantity and quality of urban green space. This matters if we want to identify how public and private money can be best spent in improving our urban green space.

The next two chapters will consider the potential of an open, fully accessible, detailed national green space map, and what benefits it could deliver to maintaining and improving the quality of our cherished green spaces. Chapter Five will then consider further policy steps that could create such a map.

3
Why Open Geographic Data?

> *"Knowledge is a source of competitive advantage in the 'information economy', and for this reason alone it is economically important that public information is widely diffused."*
> (Graham Vickery, 2011, Review of Recent Studies on PSI Re-use and Related Market Developments)

In the previous chapter, we identified the main existing sources of urban green space information. Several of these were prohibitively expensive for the public to purchase. Of these, some were partially or entirely funded with public money (e.g. OS MasterMap and CEH's Land Cover Map). This chapter describes the UK's open data policy before considering why the opening up of public sector data is a good idea, using successful examples of geographic data that has been made publicly available as case studies.

Open Data Policy

The World Bank defines open data as being both legally and technically open. That is, it must be licensed for free and unrestricted use and re-use, whether commercial or non-commercial, and it must be available in a standard machine-readable format.[176] The UK government also defines it as being freely accessible to the public at no more than the cost of reproduction.[177] As holders and generators of considerable amounts of data, the public sector (e.g. central and local government, the NHS and the police) have an important role to play in making data open to the public.[178]

The UK has been active in releasing public sector data. For example, the online government data portal data.gov.uk was launched in 2010 (including social, economic and environmental data). The Coalition government has made even more progress. In June 2012, the Government released its Open Data White Paper. This aimed to increase transparency in government and encourage the release of public sector datasets: "We will be unrelenting in our efforts to get more data out".[179] This was closely followed by the introduction of the Open Government Licence by the Coalition government in September 2010, allowing the public to use and re-use released public sector data for commercial or non-commercial purposes without payment or asking for permission.[180, 181] In addition, the draft UK National Action Plan aims to "support a culture of open-by-default" in order to allow "individuals and organisations to have the information they need to understand what happens in their community and be empowered to get involved".[182]

In parallel with this trend for opening up public sector data to the public, there is increasing use of powerful software to interpret data by government, businesses and the public. A major innovation in the analysis of geographic data,

176 World Bank, 2013, "Open Data Essentials," http://data.worldbank.org/about/open-government-data-toolkit/knowledge-repository.
177 HMG, 2012, *Open Data White Paper: Unleashing the Potential*.
178 Cabinet Office, 2013, *Open Data Charter and Technical Annex*.
179 HMG, *Open Data White Paper: Unleashing the Potential*.
180 Nigel Shadbolt, 2013, "New Open Government License," http://data.gov.uk/blog/new-open-government-license.
181 HMG, 2013, "Open Government Licence for Public Sector Information," http://www.nationalarchives.gov.uk/doc/open-government-licence/open-government-licence.htm.
182 Open Government Partnership, 2013, *UK 2013 Draft National Action Plan "From Open Data to Open Government"*.

for example, was the creation of Geographic Information Systems (GIS) software, which allows us to not only view but statistically analyse data such as digital maps. GIS has historically been an expensive tool, but is now considered indispensable for many organisations, whether private (such as insurance companies) or public sector (such as local authorities).[183] In addition, public use of GIS and GIS-like services on the internet (such as Google Maps) is increasing.[184]

Why Open Data?

The opening of public sector data has several benefits to society. The current Government's open data policy provides a useful signal that the benefits of open data are considered to outweigh the barriers to implementation. In addition, a study conducted by Deloitte as part of the Shakespeare Review of Public Service Information found that:

- the use of UK public sector information in 2011/12 was valued at approximately £1.8 billion in 2011 terms;
- there is a link between economic growth and the availability of public sector information;
- geo-spatial and environmental datasets are amongst the most popular and therefore potentially the most valuable.[185]

A summary of the main benefits of open public sector data can be found in Table 4. Examples of open geographic data (including Transport for London's open data) that demonstrate five of the most important benefits of open data are provided below.

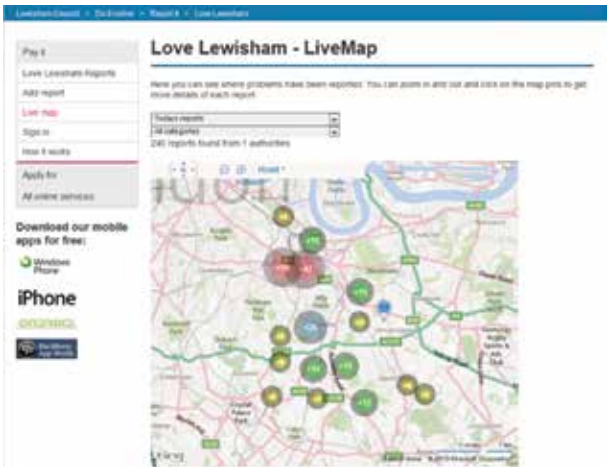
1. Public Engagement

Effective public engagement with government is seen as having several important benefits, including more effective targeting of resources, increasing public confidence in government, providing an evidence base for decision-making and giving a voice to society.[186] Open data can help improve and increase public engagement, for example, by giving the public the information and capacity to change their local environment. A successful example of this is the Love Lewisham app.

Initially developed in 2004 by Lewisham Borough Council, the free Love Lewisham app allows members of the public to take photographs of graffiti, fly-tipping or other environmental problems in their area using their phone and send them immediately to the Council (see Figure 10). Location data can be either typed in by hand (e.g. a postcode) or included from the phone's global positioning system (GPS). Users can also track the progress of any reports they have sent in using the Love Lewisham website. Within two years the number of complaints about graffiti had fallen by almost a third and resident satisfaction with the street cleaning service had improved.[187] The advantage to the local authority of having the public submit photographs of environmental problems is that teams do not have to undertake preliminary investigations to determine the appropriate level of response, saving both time and money. The success of the Love Lewisham scheme inspired the Love Clean Streets app, which covers all of England and automatically sends reports to the correct local authority. Similar systems, such as the SeeClickFix app, have also been developed in the US, allowing citizens to report local environmental issues, such as potholes and blocked bicycle lanes.[188]

183 Nancy J. Obermeyer, 1998, "The Evolution of Public Participation GIS," *Cartography and Geographic Information Science* 25, no. 2: 65–66.
184 C. E. Dunn, 2007, "Participatory GIS - A People's GIS?," *Progress in Human Geography* 31, no. 5: 616–637.
185 Deloitte, 2013, *Market Assessment of Public Sector Information* (Department for Business Innovation and Skills).
186 Huw Vaughan Thomas et al., 2012, *Public Engagement in Local Government* (Wales Audit Office).
187 Love Clean Streets, 2013, "Love Clean Streets - About," http://lovecleanstreets.org/help/about.
188 http://www.seeclickfix.com/

Figure 10: Screenshot of the Love Lewisham live map, showing the locations and numbers of the day's reports.[189]



2. Cost-effective Problem Solving

A key area of development for open data is in harnessing the public to solve time-consuming or complex problems that would otherwise be too resource-intensive for the public sector to attempt. A good example of this is the British Library's crowd-sourced mapping scheme. The British Library hosts one of the largest map collections in the world, with approximately 4.5 million maps. However, they are currently of limited use to the public as paper maps. To make this valuable resource more accessible, the British Library aim to make the maps available digitally, so that they can be searched by place name and integrated with current online maps. To do this, each paper map has to be 'georeferenced', or matched with an existing location or locations (see Figure 11). This exercise would have been extremely time-consuming for staff, and so public time, effort and expertise (crowd-sourcing) was used.

Figure 11: Screenshot of the British Library's georeferencing tool, showing a Dutch map of the City of London after the Great Fire of 1666, overlaid on a Google Maps backdrop.[190]

189 Lewisham Borough Council, 2012, "Love Lewisham: Live Map," http://www.lovelewisham.org/Reports/LiveMap.

190 Kimberley Kowal, 2013, "On the Map," *RICS Land Journal*: July/August, 8–10.

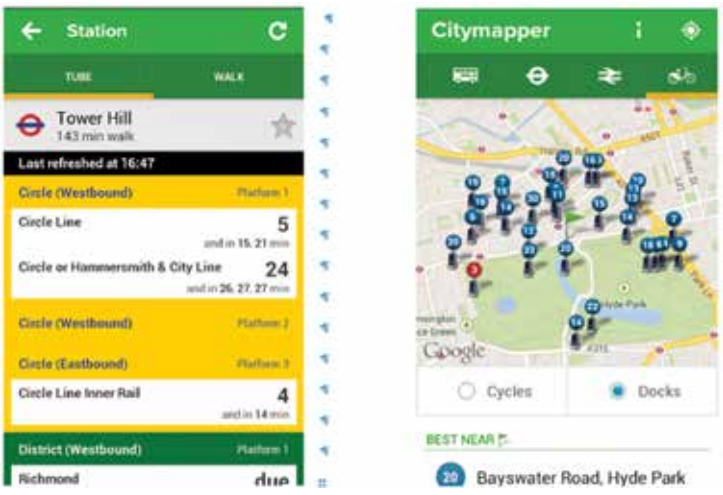
A selection of scanned maps was made available online and a bespoke online georeferencing tool was designed to allow the public to match landmarks on the scanned maps with those on current maps. To help promote participation in the project, the British Library ensured that "Widgets illustrating overall project progress, personal recognition of contributors and competitive rankings" were available. Since the launch of the project in February 2012, more than 2,300 maps have been georeferenced and the results can be viewed on http://www.bl.uk/maps/georeferencingmap.html. Importantly, while some of the maps have been available online as scanned images for more than 10 years, online access since georeferencing has increased by 500 per cent, illustrating the considerable value added to geographic data once they become more accessible to the public.[191]

3. Efficiency

Efficiency can be achieved in many different ways for different open data users. For example, a local authority could use open data from similar local authorities across the country to determine whether their services are being delivered effectively and constitute good value for money. Efficiency can also be achieved for the public and businesses in terms of time saved. For example, since Transport for London (TfL) released some of its data to the public in 2010, Deloitte calculated that there have been "nearly four million downloads of apps using TfL data". Deloitte also calculated that the time saved by their use is worth between £15 and £58 million each year.[192],[193] This does not include the additional benefits achieved through, for example, reduced air pollution and carbon dioxide emissions.

One example of the apps using TfL data is Citymapper, which provides a comprehensive and easy-to-use journey planner for London. The app includes timetables, live departure and arrival data, along with bus and railway station locations, cycle hire docking station locations and bike availability, with Google Maps as a basemap (see Figure 12). It also incorporates travel cost data (including for taxi options), calorie data for walking and cycling, and weather information.

Figure 12: Screenshots of Citymapper.[194]



191 British Library, 2012, "Online Gallery," http://www.bl.uk/maps/index.html.
192 Deloitte, *Market Assessment of Public Sector Information*.
193 Charles Arthur, 2010, "Another Data Win: TfL Opens up Bus and Tube Timetables for Developers," *The Guardian*.
194 Citymapper Ltd., 2013, "Citymapper," http://citymapper.com/.

4. Innovation

A closed system of data collection and provision, or data that is expensive to access, limits the capacity for innovation, simply by restricting data access to the public sector. One important (though by no means the only) area that open data can positively influence is the creation of new data and services through the innovative combination of public sector and private sector information. In some cases the private sector may charge for the use of these new data or services, in which case there is an economic benefit to the UK government in terms of tax revenue and job creation.

One example of this form of innovation is the FindProperly website. This free online tool uses TfL's open data to determine the shortest commuting routes to and from a given area in London. Users can input the locations within London that they visit the most (such as workplaces or university) and set their maximum commuting time. Areas that are within that commuting time of those locations are highlighted. This is useful in itself, but the site is also linked with Zoopla, a property listings website. This allows users to find homes for sale or rent within the area set by Find Properly, with additional filters including, for example maximum distance to a park (Find Properly conducted a labour-intensive exercise of mapping all of London's public green spaces larger than 10 hectares in size but this map has not been made publicly available other than as a low resolution image. Of course, such an exercise would be straightforward if good quality urban green space data were publicly available.[195]

5. Decision-making

As with efficiency, improvements in decision-making can be made for many different open data users, from the public sector to the private sector. However, given recent local authority budget cuts, perhaps some of the greatest improvements in decision-making could be made at the local government level. This can be aided not only by the availability of data across different local authorities, but also by harnessing the public.

Figure 13: Screenshot of the Min Stad website.[196]

195 Find Properly, 2013, "Check Yourself Before You … End up Living a Long Way from a Park," http://findproperly.wordpress.com/2013/07/17/check-yourself-before-you-end-up-living-a-long-way-from-a-park/.

196 City Planning Office of the City of Göteborg, 2013, "Welcome to Min Stad," http://minstad.goteborg.se/minstad/index.do.

The Swedish city of Gothenburg launched the Min Stad (My City) web portal in 2012 to improve public participation in planning.[197] The website allows the public to zoom in and out of a 3D map of the city and add comments about their ideas, create 3D models of objects such as buildings, remove buildings, and change the landscape (see Figure 13). In its first year, Min Stad recorded more than 11,000 unique users and more than 500 comments and suggestions, and the City Planning Office's aim is that "Min Stad will be used as inspiration in our mission to build a sustainable and secure city".[198, 199]

Table 4: Benefits of open public sector data.[200, 201]

Category	Benefit
Political & Social	More transparency and visibility for both data providers and users
	Democratic accountability and creation of trust in government
	More participation (public engagement) and self-empowerment of citizens
	Greater scrutiny of data (may help identify corruption, waste, etc.)
	Measuring performance, and performance benchmarking
	Equal access to data
	New governmental and other services for citizens and society
	Improvement of public satisfaction with government
	Improvement of policy-making processes
	Improvements in knowledge and new insights
Economic	Contribution toward the improvement of processes, products and/or services
	Innovation and development of new products and services
	Use of the wisdom of the crowds: tapping into the intelligence of the collective
	Creation of a new sector adding value and competitiveness to the economy
	Availability of information for investors and companies
	Help private sector suppliers of public services
	Increase choice for consumers
Operational & Technical	Data re-use and avoidance of duplication
	More efficient administrative processes (improving productivity)
	Improvement of public policies (strategic decision-making)
	Access to additional problem-solving capacity (e.g. the public)
	Fairer decision-making by enabling comparison
	Easier access to, and discovery of, data
	Creation of new data based on combining data
	External quality checks of data (validation)
	Reduced data loss
	Integration of public and private data

Opposition to Open Geographic Data

Given these arguments in favour of releasing public sector information, particularly geographic data, why are we still unable to freely access all of OS's data? Whilst OS MasterMap would not be sufficient to give us a clear picture of the state of urban green space across the country, it would be a useful first step.

In 2013, Deloitte calculated that the cost to government of opening up all the data belonging to the four Public Data Group Trading Funds (Ordnance Survey, the Meteorological Office, Land Registry and Companies House) to be in the

197 Erik Tellden and Eric Jeansson, 2013, "Crowd Puller," *RICS Land Journal* July/Augus.
198 City Planning Office of the City of Göteborg, "Welcome to Min Stad."
199 Ibid.
200 Marijn Janssen, Yannis Charalabidis, and Anneke Zuiderwijk, 2012, "Benefits, Adoption Barriers and Myths of Open Data and Open Government," *Information Systems Management* 29, no. 4: 258–268.
201 Deloitte Analytics, 2012, *Open Data: Driving Growth, Ingenuity and Innovation* (Deloitte).

region of £143 million per year (there is no breakdown provided to estimate the cost for OS alone). Deloitte also anticipated that the cost would be reduced both through the increased economic activity and consequent taxation resulting from the open data, and by the Trading Funds reducing their sales and marketing teams. The social value of releasing public sector information was conservatively estimated at approximately £5 billion.[202] A Policy Exchange report on opening public data found that the net direct cost of providing map and postcode data to the public would be approximately £50 million per year but that the potential benefits would likely be orders of magnitude greater.[203]

In June 2013, the Government's response to the Shakespeare Review was not encouraging in relation to opening up data from Trading Funds. The argument made was that the datasets collected by OS are high value, involving high collection and maintenance costs, as well as costs in ensuring data quality. The Government considered that the current method of charging for OS licences offers "the best value for money for the tax-payer".[204] This position was reiterated in the June 2013 draft UK National Action Plan: "our default position is for data to become open where it represents value for money for taxpayers".[205]

Such an approach appears to contradict the Coalition government's declarations in the Open Data White Paper.[206] Indeed, the Shakespeare Review recognised this, stating that "the current Trading Fund model is now out of step with the Government's open data aspirations".[207] It went on: "One would be hard-pressed to find any expert who, asked to create new structures for core reference data from scratch, would advocate the current Trading Fund model".[208]

The potential economic benefits of opening up this data are likely of an order of magnitude greater than the additional costs to the public sector. It seems short-sighted of the Government to restrict such a release of data and contradicts their stated commitment to open data. Importantly, this does not mean that Ordnance Survey cannot charge for high value services, such as business support.

Recommendation: The Government should abolish the Trading Fund model for Ordnance Survey and ensure that all OS data is freely available for use and re-use (this would cost approximately £50 million per year).

202 Deloitte, *Market Assessment of Public Sector Information*.
203 Chris Yiu, 2012, *A Right to Data Fulfilling the Promise of Open Public Data in the UK*.
204 HMG, 2013, *The Government Response to Shakespeare Review of Public Sector Information*.
205 Open Government Partnership, *UK 2013 Draft National Action Plan "From Open Data to Open Government."*
206 HMG, *Open Data White Paper: Unleashing the Potential*.
207 Stephan Shakespeare, 2013, *An Independent Review of Public Sector Information*.
208 Ibid.

4
National Urban Green Space Map Benefits

The previous chapter examined the economic benefits of open data and provided examples of how open geographic data can be used, with their consequent benefits. Chapter 2 identified problems related to the lack of a national picture of urban green space access, type and ownership. These are all categories of information that should be included in a national urban green space map that is freely available to the public.

There is a national need for even the most basic information about urban green spaces, such as location. Several NGOs have attempted to create their own urban green space maps at different geographic scales but mainly based on Google maps. Examples include:

- The City Bridge Trust funded the Parklife website (http://parklifelondon.org/), which aims to provide information about London's parks and gardens, including photos.
- Groundwork's My Urban Oasis map (http://www.groundwork.org.uk/get-involved/urban-oasis/mobile-volunteering/urban-oasis-map.aspx) allows the public to add green spaces within the UK and submit photos via a smartphone app.
- Green Map System has produced an international Open Green Map (http://www.opengreenmap.org/greenmap), which allows the public to add sites, photos and videos, as well as descriptions. UK coverage is currently limited.

In many cases, efforts to map urban green spaces have been duplicated (for example, for London). In addition, because all of these maps are based on Google maps, the underlying geographic data cannot be downloaded and the site boundaries are not mapped (there is only a pinpoint in the centre of the site). This chapter considers some of the potential uses and benefits of a fully publicly accessible urban green space map that contains this information.

1. Assessing Access

Adequate access to urban green space has five main components; green space area, travel distance, barriers to travel (such as rivers), quality, and whether a site is open to the public. The lack of existing urban green space data with this information will be explored below, before exploring the importance of this information and the potential benefits this information could generate.

Standards for Area and Travel Distance

In terms of urban green space area and the time it takes to travel to green spaces, standards have been used in an attempt to assess community access to green space. There are good case studies of the use of standards, both internationally (see Box 3) and in the UK.

London's local records centre, GiGL (see Local Records Centres) used standards set out in the London Plan and its own data holdings to map "areas of deficiency in access to public open space". Whilst the underlying geographic data is not available to the public, it is available to GiGL's partner organisations. In 2011, a report on the state of London's environment was published, using some of GiGL's data. This study found that areas of London defined as "deficient in access to nature" had fallen by over a quarter in just four years, from 34,240 hectares in 2006 to 24,816 hectares in 2010. This was attributed to the creation of new or additional access points to existing green spaces, which is a more cost-effective solution to the problem of access than the creation of new sites.[209] This highlights how good quality mapping, even if compromised by not being fully available, leads to sensible, cheap answers to green space problems.

Natural England has developed a measure known as the Accessible Natural Greenspace Standard, or ANGSt. This was based on research on the minimum distance people would travel to green spaces of different sizes. ANGSt analyses have only been conducted at the county or district/borough level to help inform Green Infrastructure Strategies of Local Development Frameworks. However, there is no consistent ANGSt analaysis or a central location for completed local analyses.[e.g.210] The current lack of urban green space data makes ANGSt analysis particularly challenging in urban areas. For example, loading OpenStreetMap or OS MasterMap into GIS software will only allow users to approximate community green space provision in terms of area and distance of travel. This is because neither map specifies whether spaces are open to the public. Whilst OpenStreetMap differentiates between most categories of urban green space, not all green spaces will be accessible to the public, such as some sports fields or private parks. In addition, OS MasterMap's 'land' theme is broad and includes agricultural land, much of which is unlikely to be open to the public.

Quality and Maintenance

Importantly, neither OS MasterMap nor OpenStreetMap currently include any indication of urban green space quality. This is a crucial aspect of access, as spaces may not be used to their full capacity due to issues with vandalism, litter and graffiti. As outlined in Chapter 2, there is a voluntary standard for green space quality: the Green Flag award scheme. In addition to the small number of spaces judged each year, the underlying scores are not made publicly available. This makes the Green Flag scheme the equivalent of the Michelin Star system for restaurants: all the public can see is whether or not a site has a Green Flag. However, what is needed in addition is a more detailed breakdown of urban green space quality, including maintenance.

New Yorkers for Parks (an independent, not-for-profit, research-based advocacy organisation that was initially established in 1908) has attempted to address this lack of quality information for New York's parks system. They produce Report Cards on the maintenance of different types of open spaces, such as beaches and parks. Depending on the type of open space, particular features are scored for their maintenance,

209 Greater London Authority et al., 2011, *London's Environment Revealed*.

210 The Landscape Partnership, 2010, *Analysis of Accessible Natural Greenspace Provision for Suffolk* (Natural England).

cleanliness, safety and structural integrity and each open space is assigned a grade from A to F. The 2012 results of the large parks Report Card were compared with the results of a 2010 survey to identify changes over time, both in terms of individual parks' overall scores and in terms of feature scores across the entire city. Each borough is also given an average score of its open spaces. The Report Cards provide extremely useful information, but are only delivered as reports in pdf format.

Even a simple ratings system, like that used on the TripAdvisor website, allowing the public to score urban green spaces according to various categories, such as cleanliness and safety, would be of considerable use in allowing owners and managers to more effectively target interventions. More subjective quality data, such as how places make people feel, could also be considered for inclusion. This type of assessment is already being used, for example in the Commonplace smartphone app, which allows neighbourhood groups and developers to assess the needs of particular areas by crowd-sourcing public opinions in a structured way.[211]

The ability to view changes over time in this quality data on a national urban green space map, as well as to be able to download the raw data for more detailed analysis (for example, the dataset could be linked with expenditure data to determine the most cost-effective management regimes), would be an important addition to a national urban green space map.

Recommendation: Defra and Natural England should collaborate with local authorities and relevant NGOs to develop and pilot a simple national urban green space quality rating system to allow the public to rate their urban green spaces. This could resemble the rating system found on the TripAdvisor website. This should be made available online, preferably alongside an urban green space map, and allow the public to contribute their own ratings for different quality criteria, such as safety and cleanliness. The results should be fully accessible to the public (e.g. national results should be downloadable in a spreadsheet). Whilst the Green Flag scheme would remain the gold standard of quality assessment, an online ratings system would allow a larger number of urban green spaces to be rated more quickly.

Deprivation

Adequate access to green space has been linked with numerous social benefits, including improved physical health, mental well-being and community cohesion (these will be discussed in greater detail our next report).[e.g.212] There are indications that deprived communities have low access to urban green space.[213] This in turn is linked to reduced physical and mental health and community cohesion.[214] However, whilst England's national indicator of deprivation (the Index of Multiple Deprivation) does include a natural environment component, this is limited to air quality. Yet access to green space could be a useful addition to the Index of Multiple Deprivation due to the multiple social benefits it provides.

Recommendation: Once available, public access to urban green space data calculations should be included as a national indicator, for example in Defra's England Natural Environment Indicators set or in the English Indices of Deprivation.[215, 216]

211 Commonplace Digital Ltd., 2013, "Commonplace," http://commonplace.is/wp/.
212 CABE Space, 2010, *Community Green: Using Local Spaces to Tackle Inequality and Improve Health.*
213 CABE Space, *Urban Green Nation: Building the Evidence Base.*
214 CABE Space, *Community Green: Using Local Spaces to Tackle Inequality and Improve Health.*
215 Defra, *England Natural Environment Indicators.*
216 David Mclennan et al., 2010, *The English Indices of Deprivation 2010* (Department for Communities and Local Government).

What are the Possibilities?

As shown previously, there is currently no national map that allows assessment of urban green space access in terms of area or travel distance, and there is no map that allows any analysis of urban green space ownership or quality. Without an accurate and comprehensive analysis of access, we cannot accurately determine which areas are most deprived of urban green spaces. This means that we are unable to determine which interventions result in improved access, or to what extent budgets and services can be cut without having a significant impact on urban green space access.[217]

An accurate national urban green space map that includes quality and ownership information would allow us to conduct the world's first fully comprehensive national analysis of public access to urban green space. In terms of travel distance, the Center for City Park Excellence's sophisticated GIS methodology (see Box 3) could be replicated to ensure that entrances and physical barriers to entry (such as motorways and rivers) are included. The benefit of being able to accurately identify where urban green space access is lacking is in being able to strategically target interventions (such as green space improvement, creation or protection) to those areas that need it most. This is particularly important given currently reduced local authority budgets.

One example of where this has already happened is Scotland's urban green space map (see Chapter 2). This map has been used to identify "Green Network Spatial Priorities". These are areas where improvements to urban green space will deliver the greatest social and environmental benefits for the least resources. Fourteen such areas were found using the national greenspace map using GIS software.[218]

2. Testing Interventions

An important challenge policy makers face is determining the effect that different policies and interventions have on urban green space provision over time and in different areas. Some policies and interventions intended to improve urban green space provision may have no effect, whilst other policies to improve other aspects of city life may have unintended consequences on urban green space. Academics using satellite imagery found that the Labour government's policy of building on brownfield land to reduce urban sprawl and encroachment into the countryside was linked to the loss of urban green spaces in nine out of the 13 English cities studied.[219] Current maps do not allow for sophisticated analysis of policy impacts on urban green space, as they do not differentiate spaces that are or are not open to the public: the loss of green space that is not open to the public is less controversial.

In the US, the Center for City Park Excellence is helping to address this issue with its City Park Facts reports and ParkScore system (see Box 3). Whilst not available as part of a US-wide urban green space map, these data tools enable civil society and the public sector to identify changes in urban green space over time in particular cities, and potentially link these to particular policies or interventions. This analytical capability could be strengthened by adding this data to a national urban green space map.

217 Helen Woolley et al., 2006, *Urban Parks: Do You Know What You're Getting for Your Money?* (Commission for Architecture and the Built Environment).
218 Glasgow and the Clyde Valley Strategic Development Planning Authority, 2012, *Glasgow and the Clyde Valley Strategic Development Plan*.
219 Dallimer et al., "Temporal Changes in Greenspace in a Highly Urbanized Region."

Box 3: The Center for City Park Excellence

Founded in 1972, the not-for-profit Trust for Public Land aims to apply a business approach to park and conservation projects across the USA.[220] With total expenditure of approximately $120 million in 2012 (£78 million) and 75 per cent of its funds sourced from donations (from individuals, foundations and corporations) and other gifts, the Trust for Public Land is a large and well supported organisation.[221] In 1991, it created a Center for City Park Excellence (CCPE), which "leads our research on parks and works to create, improve, and promote urban parks."[222]

Whilst the USA does not have a national urban green space map, CCPE produces an annual report based on surveys of city park agencies called City Park Facts. This report provides a city by city breakdown and analysis of public urban parks in the 40 largest cities in the USA. Topics include expenditure, public access, visitor numbers and area of parks by total city area and population. Importantly, the rankings in each topic provide a benchmark, which can be used by cities to target financial or other assistance more appropriately.

CCPE also provides a further level of analysis, based on its annual surveys, with its ParkScore index, which ranks 50 cities according to the success of their park systems. The criteria used are area, services and investment, and access. For the access criterion, GIS software is used to calculate how many people are able to reach a park within a 10 minute walk, by taking into account park entrances and barriers to access, such as rivers. This can then be mapped against demographic data to identify areas where park access needs to be improved.

In this snapshot of its ParkScore city profile (Figure 14), New York City scores 4.5 out of five benches, indicating a close to outstanding parks system. Whilst New York has relatively small parks (scoring 1 out of a possible 20 for median park size), the city does have a large number of them (scoring full marks for the percentage of the city designated as public park), which may also explain the high access score. Its spending per resident is high but New York scores poorly on the number of playgrounds per 10,000 residents, highlighting an important area for future improvement.

Figure 14: Snapshot of the ParkScore city profile for New York City.[223]

220 The Trust for Public Land, 2013, "Mission & History," http://www.tpl.org/about/mission/.
221 The Trust for Public Land, December 2012, *Annual Report 2012*, vol. 42 (Trust for Public Land).
222 The Trust for Public Land, 2013, "Center for City Park Excellence," http://www.tpl.org/research/parks/ccpe.html.
223 The Trust for Public Land, 2013, "ParkScore Index," http://parkscore.tpl.org/city.php?city=New%20York

The majority of the data used to compile the City Park Facts reports and the ParkScore index are unavailable in the UK at present, which restricts our ability to spot important trends. Local authorities are not required to conduct audits of their green spaces, and even where data collection has occurred, it is often incompatible with efforts made by different local authorities so that comparisons cannot be made. For example, our FoI request found that several local authorities were only able to provide total expenditure on green spaces, being unable to split expenditure down to different services such as horticulture.

Reflecting findings from CABE Space in 2009, only 25 of the 241 local authorities that responded at least partially to our FoI request had conducted some form of asset value calculation on at least some of their green spaces. [224] Of these, 13 provided indications of asset value. Three of these local authorities are classified as 'Predominantly Urban' according to ONS and provide a useful illustration of the variability of asset value calculations. Asset value calculations for 241 green spaces (parks & gardens, woodlands & landscaping and allotments) were provided by Rossendale Borough Council. Of these, 220 (91 per cent) were calculated to have a value of £1 or less. Basildon District Council provided details of seven green spaces, of which one 93ha site was valued at £1. Crawley Borough Council provided details of 103 green spaces, of which 65 were considered to be either of nil or minimal value. This reflects the historical and current under-valuing of urban green spaces, which is likely to contribute to reduced interest and funding. The valuation methods used varied, from applying a standard value per hectare to using the Royal Institute of Chartered Surveyors' Red Book standards. The benefit of a standard approach to urban green space valuation is in providing an evidence base to help to make the case for funding.

Recommendation: Local authorities must record and provide data on green space that is not currently publicly accessible (such as urban green space asset value) in a standard format so that comparisons can be more readily made.

3. Civil Society Scrutiny, Action and Awareness

A crucial impact of any form of open data is the capacity for civil society scrutiny, which can raise awareness of issues and initiate action. Members of the public, NGOs (such as the Wildlife Trusts) and the media could conduct their own analyses and novel comparisons. This is particularly important in cases (such as Scotland's urban green space map) where the only raw data available to the public is in summary reports released by NGOs and the public sector, both of which are dependent on funding that can vary from year to year.

A good example of the capacity for urban green space data to initiate community action is the New Yorkers for Parks Report Card. One of these report cards assesses large parks based on surveys conducted in 2010. This identified that Claremont Park in the Bronx was the second lowest scoring park of the 45 large parks included in the study, scoring a D.[225] This led to greater action from a dedicated community advocacy group, as well as efforts from corporate and other non-profit groups, which helped take the park's grade from a D to a B two years later.[226] Another example is the New Yorkers for Parks Open Space Index, which

224 CABE Space, 2009, *Making the Invisible Visible: The Real Value of Park Assets*.
225 New Yorkers for Parks, 2012, *The Report Card on Large Parks 2011*.
226 New Yorkers for Parks, 2013, *The 2012 Report Card on Large Parks*.

provides a framework of 15 standards against which public open space provision can be assessed and compared across different areas of New York.[227] The standards include certain levels of maintenance, access (e.g. 100 per cent of citizens within a 10 minute walk of a large park) and amount of open space (e.g. one playground per 1,250 children). In Jackson Heights, Queens, "a coalition of neighborhood civic groups successfully worked with the City to purchase private property for parkland conversion" partly in response to the index's finding of insufficient open space in the area.[228]

The value of being able to compare urban green space data between, as well as within, cities is enormous. For example, the ParkScore ranking system has generated attention in the local and national media, which in turn may galvanise citizens to lobby for change.[e.g. 229, 230] A national urban green space map could also be used as an evidence base to support community, NGO and public sector funding applications to improve urban green spaces. Secondary effects of increased public awareness of urban green spaces could include greater levels of physical activity, volunteering and community activities. An example of the potential for this to happen is Edinburgh's off-street cycle map, inspired by the London underground map, which was published in February 2011. Known as the Innertube map, the "Inflating the Innertube" project has attracted funding and now organises events and repairs to the cycle network.[231] Although it is not possible to directly determine the root causes, it is likely that the Innertube map contributed to increases of up to 36 per cent in cyclists on certain routes in an annual survey of cycle commuters.[232]

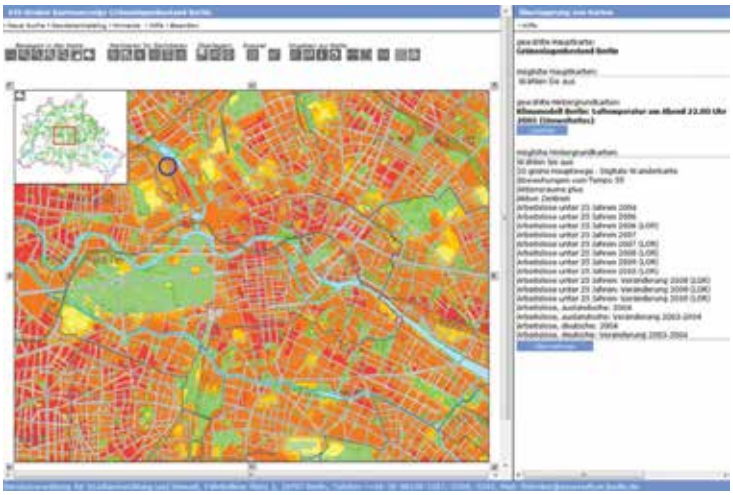
4. Answering Research Questions

Current data on urban green space access (i.e. area, whether it is open to the public, travel distance and quality) is extremely limited, affecting the confidence we can place in urban green space research. For example, a recent study used CEH's land cover map and the Generalised Land Use database to determine the effects of different habitats and categories of natural space on house prices.[233] However, as discussed in Chapter 2, both of these data sources fail to distinguish between different categories of urban green space, such as cemeteries and allotments, and whether or not sites are accessible to the public. As a result, we cannot be confident about the findings of urban green space research (whether conducted by academic, the public sector, the private sector or civil society).

The city of Berlin hosts an online and interactive map that allows the public to view an urban green space layer, along with other information, such as detailed population data, air quality and temperature data. The screenshot in figure 15 shows the locations of green space in comparison with air temperature at 10pm in 2005. At a glance, it can be seen that temperatures are generally lower (orange rather than red) surrounding the green spaces. Such visualisations can trigger, for example, further research or changes to planning policy. However, the underlying data is not available for the public to download, partly because the data is stored in many different formats. As a result, only simple analyses (such as area calculations) can be made.[234] This highlights the limitations of an urban green space map for which the underlying geographic data are not publicly accessible.

227 New Yorkers for Parks, 2010, *The Open Space Index*.
228 New Yorkers for Parks, 2013, *Manhattan's East Side: Open Space Index*.
229 Whitney Radley, 2013, "Yearning for Green Space: Houston Ranks a Woeful 39th Out of 50 Cities in Parks," *CultureMap Houston*.
230 Lisa W. Foderaro, 2013, "New York Parks Rank No. 2 in a Survey of 50 U.S. Cities," *The New York Times*.
231 The Bike Station, 2011, "Edinburgh Innertube Map: About Us." www.thebikestation.org.uk
232 Mark Sydenham, 2011, "Cycling up 26% on Edinburgh Cycle Path Network," *The Bike Station*, http://www.thebikestation.org.uk/blog/2011/11/15/cycling-up-26-on-edinburgh-cycle-path-network.html.
233 Steve Gibbons, Susana Mourato, and Guilherme M. Resende, 2011, *The Amenity Value of English Nature: A Hedonic Price Approach*.
234 Thomas Schneider, Manfred Goedecke, and Tobia Lakes, 2007, "Berlin (Germany) Urban and Environmental Information System: Application of Remote Sensing for Planning and Governance - Potentials and Problems," in *Applied Remote Sensing for Urban Planning, Governance and Sustainability*, ed. Maik Netzband, William L. Stefanov, and Charles Redman (Springer), 199–219.

Figure 15: Screenshot of Berlin's green space map compared with 2005 night time temperatures.[235]



A few of the many possible research questions that could be accurately answered with a comprehensive urban green space map include:

- to what extent does proximity to urban green space affect house prices and businesses;
- to what extent does proximity to urban green space affect health and well-being;
- to what extent does urban green space provide environmental services, such as cooling, reducing flooding, and supporting biodiversity; and
- how would changes in urban green space access, quality or area affect all of the above?

5. Innovation

As highlighted in the previous chapter, release of public sector geographic data (including transport geographic data) to the public has helped generate unexpected innovations, such as the CityMapper application. These have delivered benefits including tax revenues, time-savings, public services, and reduced environmental damage. Although it is impossible to predict future innovations based on open urban green space data, there is potential for a similar impact, with consequent benefits to society, the environment and the public sector (for an existing example, see the FindProperly app description in Chapter 2).

6. Local Authority Time and Money-Savings

There are currently no figures available for the amount of time and money saved by Scottish local authorities through access to the Scotland urban green space map (for example in responding to Freedom of Information requests). However, they were considered to be sufficiently large to be included as a key argument in favour of the map's development.[236]

235 Senatsverwaltung für Stadtentwicklung und Umwelt, "Öffentliche Grün- Und Erholungsanlagen: Grünanlagenkarte Online."
236 Procter and Page, *Developing and Using Scotland's National Greenspace Map*.

Conclusion

This chapter has outlined some of the main benefits that would be generated by the release of a national urban green space map containing information on quality, ownership and type. Perhaps the most important advantages would be the ability to spot large-scale gaps in urban green space provision, access and quality, the ability to link changes over time with different policies, and greater engagement of civil society with urban green spaces. This would allow us to target interventions to where they are most needed, modify policies depending on their impact, and increase civil society's role in urban green space management. In addition, there is the potential, through innovation, for a national urban green space map to deliver unanticipated benefits.

Many of the case studies used to illustrate the benefits of urban green space maps and data highlight that, without full public access to data, many of the potential benefits will be limited if not impossible (such as civil society scrutiny and innovation). In addition, data such as urban green space quality and ownership should not be standalone datasets (like the Center for City Park Excellence's ParkScore), but incorporated within a national urban green space map to allow more complete analysis and visualisation of trends. The next chapter will discuss what options are available to deliver a national urban green space map containing information on quality, ownership and type.

5
Policy Options

There are important arguments in favour of the creation of a fully publicly accessible national urban green space map for England and Wales. These include long term top-down benefits, such as strategic planning and evidence-based prioritisation of resources, as well as shorter term bottom-up benefits, such as improved community cohesion and skills development. In Chapter 2, we outlined seven criteria that an urban green space map must meet to maximise its usefulness and the benefits that could be derived from it:

1. Full public access;
2. Freely available;
3. Compatible with GIS software;
4. Consistent typology;
5. Links to wider information;
6. Detailed; and
7. UK coverage.

The method used to produce such a map should also meet the three criteria detailed in Chapter 1: cost-effectiveness, use of new technology, and the inclusion of civil society.

There are two main options for the creation of an urban green space map. These are a map created by Ordnance Survey or other organisation, and a crowd-sourced urban green space map. Both of these maps could complement each other.

Ordnance Survey or Other Organisation

The first option is the creation of a national urban green space map via Ordnance Survey or other organisation (such as a private mapping company). Following the success of Scotland's urban green space map, Natural England is currently in discussions with OS and other partners, considering the feasibility of developing an urban and rural green space map for England, ideally as part of a consistent Britain-wide map and delivered through the Public Sector Mapping Agreement (PSMA). This approach would have the advantage of being able to draw on more than two centuries of OS's mapping experience and extensive data resources. This would enable the map to be of sufficient resolution and scale and for it to be available in a GIS-compatible format.

It is not yet known what the scope of this product is likely to be.[237] As a result, it is not clear what green space typology would be used and agreed by all stakeholders. It is also unknown what further urban green space information,

237 Rachel Penny (Natural England), 2013, Personal Communication.

such as ownership or quality could be included. There would also be important issues with the accessibility, or openness, of data collected by OS or any other mapping organisation. As previously discussed, one of the major problems Scotland faced in the development of its urban green space map was that the green space boundaries were based on OS MasterMap data. This means that although the mapping can be viewed publicly online, only those with a licence to use OS MasterMap are allowed to download the underlying urban green space geographic data, restricting users to those covered by the OSMA (such as local authorities), and organisations that have paid for the licence. Such a situation is also likely to exist for any OS urban green space map for England, which would make the underlying geographic data unaffordable (a quote for access to OS MasterMap for London for one year was more than £40,000). This is likely to restrict the benefits that could be derived from an urban green space map, particularly the inclusion of civil society (see Chapter 4 for a description of these benefits).

In terms of the cost to develop, if the specification and mapping process were to be similar to Scotland's urban green space map, a UK version would likely cost considerably more for the following reasons:

- the map would cover more than twice the geographic area (England, Wales and Northern Ireland have a combined area of approximately 165,000km^2 compared to Scotland's 78,387km^2);
- the UK, particularly England, contains a greater proportion of urban areas than Scotland (although definitions vary, approximately 5.7% of Scotland is urban, 6.3% of Northern Ireland, 13.0% of Wales and 20.9% of England);[238] and
- unlike Scotland, local authorities in England, Wales and Northern Ireland have not used a consistent urban green space typology (though many follow the former Planning Policy Guidance 17 typology) and so a baseline and detailed specification would first have to be established.

Whilst a total figure is not available, from figures provided by greenspace scotland and Scottish Natural Heritage, we estimate that Scotland's urban green space project cost a maximum of £2 million. In comparison with Scotland, approximately 8 times as much of the UK's land is classified as urban. Assuming that Scotland's map would require no additional work to make it compatible with the rest of the UK, the total cost would be a maximum of £14 million.[239]

It is also unclear when such a map product would become available. Scotland's map took seven years from initial pilot project to final product. Even assuming that lessons can be learned from Scotland's experience, it could still be several years before an urban green space map product would become available. In the meantime, the Government should consider the second option for a national urban green space, which is discussed next.

Recommendation: The Government should facilitate the development of an urban green space map that meets the seven criteria listed in Chapter 2 (e.g. freely and publicly available and sufficiently detailed). This map should be created either by OS or another suitable organisation.

238 Tim Pateman, 2011, "Rural and Urban Areas: Comparing Lives using Rural / Urban Classifications," *Regional Trends*: 43, 1–77.

239 This figure is based on an estimate of the cost of Scotland's green space map (£2 million) multiplied by eight (the UK contains eight times as much urban area as Scotland), before subtracting the cost of the Scotland map. This figure does not take into account the use of existing resources and knowledge and so may be an over-estimate.

Crowd-sourced Mapping

The second option for a national urban green space map is crowd-sourcing (see the British Library example in Chapter 4 as an illustration of a successful crowd-sourced mapping project). The public could play an important role in developing our understanding of urban green space access by contributing to a national urban green space mapping effort. Public contributions could, for example, include marking entrances to urban green spaces that are not included on existing maps and rapidly assessing urban green space quality. The benefit of this approach is that other categories of green space, such as private gardens, and even green spaces at the urban fringe or in rural areas could subsequently be added, if necessary. In addition, by using a ratings system, like that used on the TripAdvisor website, information that would otherwise not be included on an OS map, such as cleanliness and safety, could be recorded. It would also be possible to link to existing websites and apps (for example, LoveCleanStreets) that allow users to report environmental issues, such as graffiti and dog fouling. There are two main potential platforms for the creation of a crowdsourced urban green space map that avoid the expense of setting up a new mapping platform: Google Maps and OpenStreetMap.

Google Maps

As described in Chapter 2, using Google Maps' Map Maker tool has one major flaw as a platform for a crowd-sourced urban green space map of the UK: its data cannot be downloaded, even by the people who input it. This is due to Google Maps' copyright restrictions. As a result, an urban green space map created using Google Map Maker would simply be a cheaper equivalent of an OS urban green space map that was not part of the OpenData suite of products (i.e. only viewable online). To fully realise the benefits of an urban green space map, we argue that full access to the geographic data is required. The free version of Google Maps Engine is an improvement, in that data can be downloaded. However, there are restrictions to the data than can be uploaded (in terms of its size and complexity) and data can only be downloaded in one file format.

OpenStreetMap

OpenStreetMap has two major advantages: it is both fully and freely accessible to the public (i.e. it can be viewed online and the underlying geographic data can be downloaded for use within GIS software). Unlike the proposed OS urban green space map, it could cover the entirety of the UK and contain more detailed urban green space information, such as opening times, the existence of a Friends group, etc. The existing urban green space typology is relatively detailed but there is capacity for more categories to be added (see Chapter 2). If the OS urban green space map is created and becomes publicly available, this data could be easily added to OpenStreetMap, further improving its reliability.

OpenStreetMap has a large membership base that has the potential to grow. OpenStreetMap is also already being used in several popular apps, such as Foursquare (https://foursquare.com/), which has 30 million users. This, and similar apps, will likely lead to increased public interest in OpenStreetMap and potentially greater public data contributions. This means that it could potentially be more responsive to changes in urban green spaces than an OS, or other commercially produced map. In addition, there are indications that urban areas may receive greater attention from

the public, as they contain the majority of the population and so will consequently be more detailed than, for example, rural areas.[240]

There are two main difficulties that need to be overcome before an OpenStreetMap urban green space map can become reality. It is in overcoming these difficulties that central government funding and its role as a facilitator will be required, although the resource outlay will be minimal.

The first difficulty is the OpenStreetMap basic editor (known as iD). Currently, when you draw the boundaries of an urban green space on OpenStreetMap, you can include certain information about the site using the online editor, such as a website link, a phone number and whether the site has wheelchair access. However, to make this map more useful, further information, such as opening hours, reviews, photos and more than one website link would be needed. The online editor is open source software and so can be modified to allow this extra information to be stored. Alternatively, a bespoke urban green space editor could be created.

Recommendation: The Government should also explore setting up a crowd-sourced urban green space map. Relevant NGOs and those with proven experience of engaging the public in environmental data collection should be consulted (e.g. to determine what information the map should include, such as quality) and involved in promoting it.

The second difficulty is in mobilising the public to contribute their urban green space knowledge to OpenStreetMap. This could be achieved through central government promotion of the project (via Defra and Natural England) as well as local authority support. Collaboration with relevant non-governmental organisations (NGOs), such as environmental charities, in particular Wildlife Trusts, would be critically important, as they have considerable experience of running prominent campaigns to engage the public in environmental data collection (using a variety of data recording and submission methods) and many have large memberships (the RSPB, for example, has more than 1 million members). Such schemes include:

- RSPB's Big Garden Birdwatch, which has been running for more than 30 years and results can be submitted via an iPhone app or the website.[241]
- Butterfly Conservation's Big Butterfly Count, which is sponsored by Marks & Spencer and allows the public to submit records via the website or a free smartphone app (currently iPhone only but an Android version is being developed).[242]
- The Open Air Laboratories (OPAL) network, which is a Lottery funded partnership that aims to improve environmental knowledge and education amongst the public and runs several environmental surveys, such as a tree health survey and a soil and earthworm survey.[243]

To further encourage participation, lessons from the British Library's mapping exercise can be learned: competitions and widgets to allow the public to view progress would help stimulate mapping activity.

240 Dennis Zielstra and Alexander Zipf, 2010, "A Comparative Study of Proprietary Geodata and Volunteered Geographic Information for Germany," in *13th AGILE International Conference on Geographic Information Science*, vol. 1 (Guimarães, Portugal).
241 RSPB, 2013, "Big Garden Birdwatch," http://www.rspb.org.uk/birdwatch/index.aspx.
242 Butterfly Conservation, 2013, "Big Butterfly Count," www.bigbutterflycount.org.
243 Linda Davies et al., 2013, *OPAL Community Environment Report: Exploring Nature Together* (Open Air Laboratories (OPAL)).

Recommendation: Government and relevant stakeholders should collaborate to organise a competition that would encourage participation in a crowd-sourced urban green space mapping project.

Neither of these difficulties would be costly to overcome. The creation of a crowd-sourced urban green space map of England and Wales would be an example of a small government intervention potentially creating a considerable impact.

Table 5: Summary of policy options for a future urban green space map.

Key: ✓ = Yes, × = No, ✓/× = Partly, N/A = Not Applicable

Criteria	Policy Option 1	Policy Option 2	Policy Option 3
Organisation	Ordnance Survey	Google	OpenStreetMap Foundation
Data Name	Urban Green Space Map	Google Maps	OpenStreetMap
Available to the public?	✓	✓	✓
Free or cheaply available to the public?	×	✓	✓
Usable in GIS? (critical for analysis)	✓	×	✓
Detailed urban green space categories?	Unknown (the specification has not yet been determined)	Unknown (the underlying geographic data cannot be downloaded and checked)	✓ (with potential for more to be added)
Other relevant urban green space information?	×	✓	✓
Sufficient scale and resolution?	✓	✓	✓
UK countries covered	England	UK	UK

6
Conclusions and Summary of Recommendations

Urban green space forms a critical part of the life of our cities. Despite efforts in the 2000s to help reverse the rapid decline in urban green space quality seen from the 1970s onwards, there are indications that the overall quantity of urban green space declined. In addition, there are signs that improvements in quality were not spread evenly: a 2006 report found that resident satisfaction rose faster in local authorities where satisfaction levels were already relatively high in 2000. With local authority budget cuts resulting in reductions in urban green space spending and staff, and in the absence of co-ordinated civil society (including NGOs and the public) action, there is potential for a repeat of the decline seen in the 1970s.

One of the major limiting factors in improving urban green space management and maintenance is lack of data. This may help to explain the inequality in urban green space improvements seen in the 2000s. Local authorities may simply have found it difficult to identify the locations of greatest need and, as a result, were more likely to support the projects with the most vocal, existing lobbies. This report therefore proposes that the single most important step that can be taken to help remedy this is the provision of accurate and detailed urban green space data.

Summary of Recommendations

Existing Urban Green Space Data

- The Government should abolish the Trading Fund model for Ordnance Survey and ensure that all OS data is freely available for use and re-use (this would cost approximately £50 million per year).
- The existing CABE Space/GreenSpace urban green space dataset that is currently held by GreenSpace's administrators should be obtained by central government and as much of it made publicly available as possible, for example via data.gov.uk.
- Green Flag data (including score sheets for individual green spaces and site boundary data) should be made freely available online for the public to view and download, as part of a revised Green Flag licence agreement with DCLG.
- The Generalised Land Use Database should be updated and released every ten years to act as a census for land use changes over time. There are no accurate estimates for the cost of this, but with improvements in OS MasterMap and technology, the cost should not be prohibitive.

A New Urban Green Space Map

- The Government should facilitate the development of an urban green space map that meets the seven criteria listed in Chapter 2 (e.g. freely and publicly

available and sufficiently detailed). This map should be created either by OS or another suitable organisation.

- The Government should also explore setting up a crowd-sourced urban green space map. Relevant NGOs and those with proven experience of engaging the public in environmental data collection should be consulted (e.g. to determine what information the map should include, such as green space quality and reviews) and involved in promoting it.
- Government and relevant stakeholders should collaborate to organise a competition that would encourage participation in a crowd-sourced urban green space mapping project.

Data Standardisation

- As part of the mapping process, a co-ordinated approach to develop a UK-wide urban green space classification system (typology) is required. This should be initiated by Defra, DCLG and Natural England, and agreed with local authorities and other stakeholders. The respective government departments and other stakeholders in Wales, Scotland and Northern Ireland should also be included in the process, to ensure a consistent approach across the UK.
- Defra and Natural England should collaborate with local authorities and relevant NGOs to develop and pilot a simple national urban green space quality rating system to allow the public to rate their urban green spaces. This could resemble the rating system found on the TripAdvisor website. This should be made available online, preferably alongside an urban green space map, and allow the public to contribute their own ratings for different quality criteria, such as safety and cleanliness. The results should be fully accessible to the public (e.g. national results should be downloadable in a spreadsheet). Whilst the Green Flag scheme would remain the gold standard of quality assessment, an online ratings system would allow a larger number of urban green spaces to be rated more quickly.
- Local authorities must record and provide data on green space that is not currently publicly accessible (such as urban green space asset value) in a standard format so that comparisons can be more readily made.

National Indicators

- Once available, public access to urban green space calculations should be included as a national indicator, for example in Defra's 'England Natural Environment Indicators' set, or in the English Indices of Deprivation.

Appendix 1: Freedom of Information Request Questions

1. How is geographic data (location, size, etc.) for the LA's urban green space stored?

a.	Geographic Information System (e.g. Arc, MapInfo, etc.)	❑
b.	Database (e.g. Access, Excel, etc.)	❑
c.	Paper maps	❑
d.	Other (please specify)	❑

2. Does the LA regularly and formally assess the quality of urban green space?

a.	Yes	❑
b.	No	❑
c.	Partially (please expand)	❑
d.	Other (please specify)	❑

3. If the answer to Question 2 is 'Yes', please provide this quality information using the attached spreadsheet, as well as location data of the assessed spaces (e.g. as a shapefile or equivalent) where available.

4. If the quality of urban green space is assessed, what criteria are used?

a.	Green Flag	❑
b.	Other (please specify)	❑
c.	Not applicable (if the answer to Question 2 was 'No')	❑

5. Has an asset value calculation been made for any urban green spaces within the LA (for further information see CABE Space's report "Making the Invisible Visible: The Real Value of Park Assets")?

a.	Yes	❑
b.	No	❑
c.	Partially (please expand)	❑
d.	Other (please specify)	❑

6. If an asset value calculation of one or more urban green spaces has been made, what are these values and what size are the green spaces? Please provide this information using the attached Excel spreadsheet, as well as location data of the assessed spaces (e.g. as a shapefile or equivalent) where available.

7. What are the criteria on which the asset value calculation/s was/were based upon (e.g. hard landscaping, soft landscaping, buildings, art/sculpture, visitor numbers, contribution to air quality, etc.)? If the answer to Question 5 is No, please complete this table as 'N/A'.

Asset value calculation criteria	Explanation / comment (if necessary)

8. Has an Open Space Strategy for the LA been prepared? If the answer to this question is 'Yes', please attach the document to the response e-mail.

a.	Yes	❑
b.	No	❑
c.	Partially (please expand)	❑
d.	Unfamiliar with this term	❑
e.	Other (please specify)	❑

9. If an Open Space Strategy has been prepared, was it in collaboration with CABE Space?

a.	Yes	❑
b.	No	❑
c.	Other (please specify)	❑
d.	Not applicable (if the answer to Question 8 is 'No')	❑

10. If an Open Space Strategy has been prepared, is it currently in use?

a.	Yes	❑
b.	No	❑
c.	Partially (please expand)	❑
d.	Other (please specify)	❑
e.	Not applicable (if the answer to Question 8 is 'No')	❑

11. Which teams and their departments are directly involved in the management and maintenance of urban green space and what are their main responsibilities with regard to urban green space (please list, e.g. streetscene, waste, environment, parks, leisure, etc.)? Further rows can be added to the table, as required.

Department	Team / Unit	Main urban green space responsibilities
e.g. Environment	e.g. Parks Services	e.g. horticultural maintenance

12. How has expenditure on maintenance of horticulture (e.g. mowing, pruning, planting, etc.) in urban green space changed annually since financial year 2000/01? This should include budgets for both external contractors and in-house teams. Please also provide the main reasons for changes, e.g. sales of green space, staff reductions, etc.

Year	Expenditure on urban green space horticulture maintenance (£)	Main reasons for change
2000/01		
2001/02		
2002/03		
2003/04		
2004/05		
2005/06		
2006/07		
2007/08		
2008/09		
2009/10		
2010/11		
2011/12		
2012/13		

13. How has expenditure on maintenance of children's play areas in urban green space changed annually since financial year 2000/01? This should include budgets for both external contractors and in-house teams. Please also provide the main reasons for changes, e.g. site sales, staff reductions, etc.

Year	Expenditure on urban play area maintenance (£)	Main reasons for change
2000/01		
2001/02		
2002/03		
2003/04		
2004/05		
2005/06		
2006/07		
2007/08		
2008/09		
2009/10		
2010/11		
2011/12		
2012/13		

14. Please provide the headcount of persons employed, and their position (e.g. manager, groundsman, etc.), in the Parks Service (or equivalent) annually since financial year 2000/01? Please also provide the main reasons for changes, e.g. redundancies, retirement, etc.

Year	Number of staff (or FTE) in the Parks Service (or equivalent)	Position	Main reasons for change
2000/01			
2001/02			
2002/03			
2003/04			
2004/05			
2005/06			
2006/07			
2007/08			
2008/09			
2009/10			
2010/11			
2011/12			
2012/13			

15. Please provide the number and size of allotments within the Local Authority (please insert more rows where necessary).

Number	Allotment name	Size of allotment (hectares)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Urban green spaces, such as parks and community gardens, are crucial to the success of our cities as great places to live. They help clean our air, reduce flooding, support biodiversity, attract tourists, and increase the prices of houses near them.

However, the financial crisis has meant that many of our urban green spaces are under threat: budget cuts and the loss of institutions that represented urban green spaces are two major threats. Compounding the potential effects of these is the absence of a UK-wide picture of urban green spaces. Currently, we cannot answer even the simplest questions about urban green spaces, such as who owns them, who has access to them, what state are they in, how many are there, or where are they?

This report explores the implications of these threats to urban green space quantity and quality. It proposes not only the release of existing urban green space datasets from expensive paywalls, but also the creation of a new UK-wide crowd-sourced urban green space map that the public can contribute to and freely access. The results will include increased public engagement in urban green spaces, improved civil society scrutiny, better decision-making, more accurate research and improved urban green space provision across the UK.

"Policy Exchange has just published an excellent report on Britain's urban green spaces… Any initiative that encourages people to take more responsibility for public spaces should be encouraged."
Toby Young, Associate Editor of The Spectator

"…We warmly welcome the many creative ideas within this Policy Exchange report, particularly any which offer opportunities for communities themselves to help identify valuable community green space…"
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