what if...

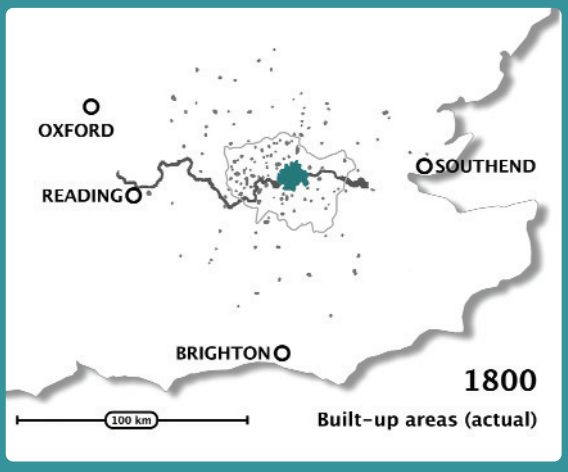
...there had been no 1947 Act or comparable measure to restrain development in the UK? Nick Green explains how 'sprawl maps' produced from an extrapolation of pre-war growth rates show that without post-war development restrictions London would now occupy nearly twice its current land area

The 60th anniversary of the 1947 Town and Country Planning Act has, unsurprisingly, been the spur for some reflection on the role of planning today and its past and continuing impact on the UK. In an attempt to contribute quantitative evaluation to such discussion, the set of maps reproduced here show how London could have grown had there been none of the restrictions on development embodied in the 1947 and subsequent legislation (the green belt, for example).

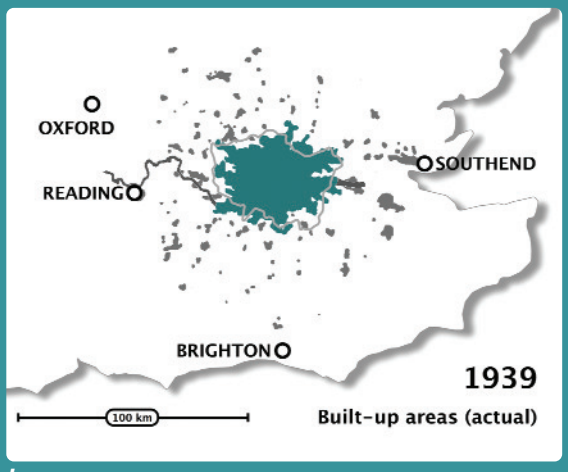
These 'sprawl maps', shown in Figs 1 and 2 , below and overleaf, are based on a series of eight small maps giving snapshots of the growth of London between 1800 and 2000[1] originally published in the Fourth Edition of *Urban and Regional Planning* by Professor Sir Peter Hall.[2] The maps were scanned at high resolution and imported into a geographical information system (GRASS GIS), where they were then geocoded, i.e. manipulated so that they were properly to scale.

For the purpose of the exercise, the maps were considered as showing a 'core area' (shown in dark green in Fig. 1) comprising London itself and a number of 'outlying settlements', some of which have been absorbed into London over time.

The unrestrained growth of London (shown in Fig. 2) was then extrapolated as a continuation of its pre-1939 growth trajectory. First, the approximate areas of the core areas in 1850, 1880, 1914 and 1939 were calculated using the GIS. These figures were then used as input into the Mathematica CalcCenter® software to generate an equation for the trajectory, relating the size of the 'core area' to



a

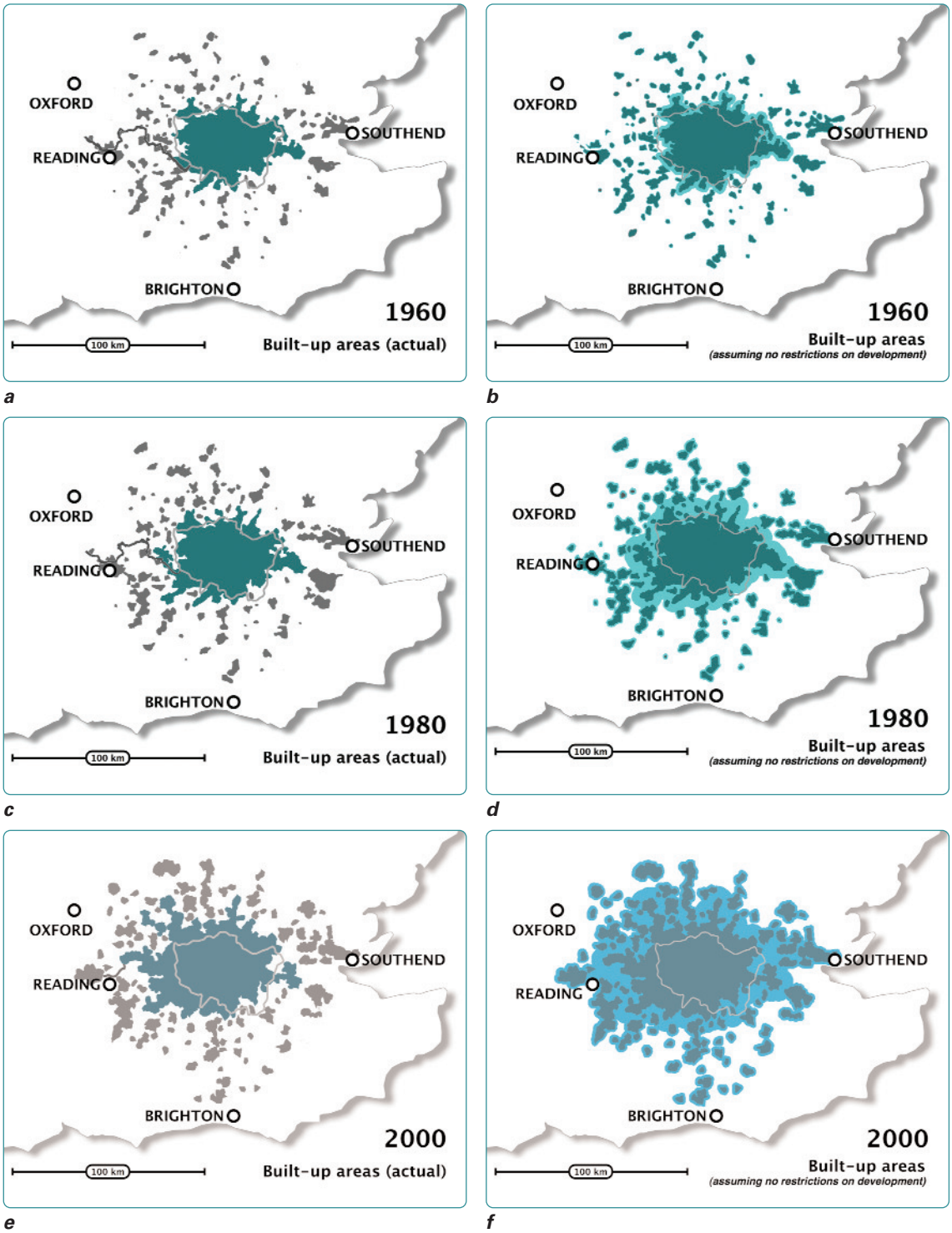


b

Above

Fig. 1 Built-up area – London and surrounding area
a 1800 actual *b* 1939 actual

Core area shown in dark green



Above

Fig. 2 Built-up area – London and surrounding area
a 1960 actual *b* 1960 projected *c* 1980 actual *d* 1980 projected *e* 2000 actual *f* 2000 projected

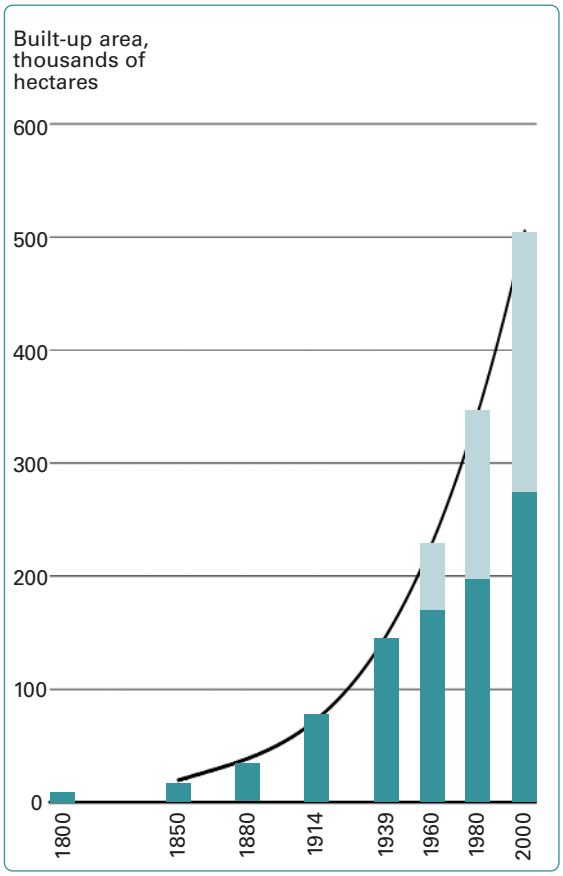
Acutual development: Core area

Projected development: Actual built-up area; Extra built-up area

the date as an integer (which increases linearly). The equation used is:

$$y = 4.74 \times 10^{-5} x^4 - 0.234 x^3 + 324.43 x^2 - (1.85 \times 10^8)$$

where y is the area in hectares and x is a year between 1850 and 2000. This produces the results shown in the bar graph shown in Fig. 3. The figures produced by the equation for 1850, 1880, 1914 and 1939 match the measured figures exactly; those for 1960, 1980 and 2000 have been used for the 'what if?' maps. For example, in 2000, the actual (approximate) size of the 'core area' was just over 275,000 hectares. Using the Mathematica CalcCenter®-generated equation gives us an extrapolated figure of just over 0.5 million hectares.



Above

Fig. 3 Growth of London, 1800-2000

Curve of equation used to estimate extra built-up area

Core area (actual built-up area)

Estimated extra built-up area assuming no restrictions on development

Source: Estimated figures derived from maps showing the growth of London in *Urban and Regional Planning* (Fourth Edition), by Peter Hall[2]

To produce the 'what if?' maps, the extra growth had there been no restrictions on development (the extrapolated value minus the actual value) has been distributed equally around the periphery of the core area – a band approximately 5.5 kilometres wide in 2000 – to produce a new core area with a total area equal to that generated by the above equation for the year 2000.

A more difficult issue is how to handle the outlying settlements. Here, they have been assumed to grow at a similar rate to the growth of the core area. In those instances where the projected core area growth subsumes an outlying settlement, the projected growth of that outlying settlement has been redistributed evenly around outlying settlements, not absorbed within the core area. Where extrapolated growth meets between two outlying settlements, there has been no attempt to distribute the 'overlap growth' elsewhere, since this would require speculation as to just where that 'where' would be. The extrapolated growth is shown in pale green in Fig. 2.

An exercise such as this needs caveats. The key one is that, following Peter Hall's observation that the motor car has resulted in a tendency to more uniform growth, rather than the 'fingers' typical of growth due to new radial public transport routes,[3] it has been assumed in producing the maps that any projected settlement growth would be evenly distributed around the periphery. The Restriction of Ribbon Development Act 1935 would also have encouraged more even growth.

The trajectory has been extrapolated from four figures, giving an exponential curve. The scanned maps are based on very small originals, so pinpoint accuracy is not claimed for this exercise. However, the relative values are as much of interest here as absolute ones.

These maps show that if we assume that there had been no restrictions on development since 1939 and we extrapolate the approximate pre-war 'development trajectory', London in 2000 would have occupied nearly twice the area that it currently does.

• ***Dr Nick Green*** *is with the Centre for Urban and Regional Ecology at the University of Manchester, and is a member of the TCPA Policy Council. Colour versions of the London 'sprawl maps' are available within a PDF file that may be downloaded free from the TCPA website, at www.tcpa.org.uk/downloads/20070531_greenbelts.pdf*

Notes

1 Showing built-up areas in 1800, 1850, 1880, 1914, 1939, 1960, 1980 and 2000

2 P. Hall: *Urban and Regional Planning*. Routledge, 2002 (Fourth Edition)

3 P. Hall: *The Containment of Urban England*. Weidenfeld & Nicolson, 1973