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# Twenty Years on. The 1987 Storm and Managing Future Climate Change Impacts in Historic Parks and Gardens in England

*Whole Parks ruin'd*
*Fine Walks defac'd*
*And Orchards laid flat.*
Daniel Defoe on the 1703 Great Storm
(Countryside Commission, 1988)

Climate change, and its potential impacts, is on everyone's agenda. Turbulent weather in the United Kingdom this summer reminded all of the havoc generated by floods and storms, and the mild weather seems to have enabled new pathogens to spread. The newspapers in the UK have carried a succession of stories about exceptionally early flowers such as spring bulbs, new records for butterflies and tree pathogens such as the leaf miner and the damage caused to a highly valued amenity and historic parkland tree, the Horse Chestnut (*Aesculus hippocastanum*), and more recently the arrival of the blue tongue disease in livestock. An analysis of records shows that the growing season for plants in central England has lengthened by about one month since 1900.[1]

Owners and managers of parks and gardens are observing and tracking changes in climate and how it affects their conservation, presentation and maintenance work from tree planting, to summer bedding schemes, the welfare of park livestock, and changes in patterns of visitor numbers. Climate change potentially opens up new opportunities but also heralds challenging long term conservation decisions. There are likely to be cost and resource implications, and owners and managers are seeking guidance on how landscape management should be adapting and responding to climate change.

On the night of 16 October 1987 15 million trees—or the equivalent to 3.9 million cubic metres or 5 years' cut timber—were lost across a great swathe of southern England stretching from the Dorset coast, across London, to East Anglia.[2] The storm was described as a once in three hundred years event. The Forestry Commission's Director General, G. J. Francis, wrote that the 1987 storm was »the worst damage to trees ever recorded … Not only was the storm of October 1987 unique for the sheer volume of timber blown down, but it occurred in a highly populated part of the country and in one not noted for its extremes of climate.«[3] This part of the country is one of the most wooded areas; approximately one quarter of the south east is protected as Areas of Outstanding Natural Beauty, a national landscape designation of equivalent scenic interest to national parks. As well as wrecking woodlands, the damage to trees in parks, streets, gardens and orchards was dramatic as shown in the table below. The town of Sevenoaks lost all bar one of its seven oaks. Hundreds of London streets were blocked by fallen trees. Close to the capital, there is also a concentration of parks, gardens and historic estates. Nearly fifty per cent of the parks and gardens registered as being of special historic interest lay in the zone of the storm and at least half of these were badly damaged. A second wave of storms at the beginning of 1990 created further damage.

Table 1: The Department of the Environment's Joint Technical Coordination Committee's 1988 estimated numbers of non-woodland trees blown down or damaged.[4]

| Type of location | Trees blown | Trees damaged |
|---|---|---|
| Non-woodland rural landscape | 200,000 | 500,000 |
| London Borough street trees | 55,000 | 35,000 |
| Roads and/or railways | 7,000 | |
| Royal Parks | 3,540 | |
| Other parks and gardens | 3,000 to 4,000 | |
| Royal Botanic Gardens, Kew | 500 | 500 |

1 See www.ukcip.org.uk

2 A. J. Grayson (ed.): The 1987 Storm. Impacts and Responses, Forestry Commission Bulletin 87, Edinburgh 1989.

3 Ibid.

4 Ibid.

The storm was followed by a year of extreme weather with a very cold winter, hot spring and summer floods. Twenty years on it is now seen as an example of the types of events we might experience as climate changes, and it is timely to reflect on the lessons learnt and the opportunities that arose for historic park and garden conservation.

The scale of damage to historic parks and gardens necessitated special publicly funded programmes to restore these devastated landscapes. Ten million pounds were spent in clearance, ground preparation, replanting, restoration and repairs.[5] There was a need to develop strategies for targeting grants and organising programmes of restoration work. How to identify which features should be repaired or renewed, and what was practical in relation to modern use? A plan-led approach to planning and conservation of landscapes was beginning to become established prior to the storm and was adopted for the storm damaged historic parks and gardens. These plans included a suite of site specific conservation policies and detailed programmes based on research of the historic designs and conservation interests, and a review of the business operation needs of the estate. Many of these sites had been at a critical stage of neglect. Their lack of active conservation management over many decades had made them vulnerable to the winds. The storm and the grant programmes that followed enabled forgotten vistas to be revealed, designs to be rejuvenated with new planting, and new public access to be negotiated. As John Watkins, Head of Gardens and Landscapes at English Heritage, points out twenty years on, the 1987 storm was »… a critical moment and hugely important … Grants stimulated research because you had to understand the landscape before replanting.«[6] Used effectively, the plan provides a means of testing past management decisions, integrating any new evidence, and, most importantly, ensuring continuity of the design and its aesthetics. The plan could be a useful tool for monitoring and responding to climate change impacts too.

The scale of restoration work demanded principles for restoration. David Jacques' 1995 paper summarises the approach he developed for English Heritage and its storm damage work:

- » Historical survey of surviving features, and analysis with the help of documentary sources, are the essential precursors to any form of treatment of historic parks and gardens, since they define the nature and degree of historical interest of the various parts of the site.
- A management policy and plan incorporating historical objectives into the overall aims is desirable at every site so that its historic interest may be given adequate weight.
- The conservation priorities for parks and gardens are (in order): protection of the historic fabric of surviving features, recording of fabric, and repairs to conserve the design.«[7]

Jacques also includes guidelines relating to historically important fabric, repairs and restoration:

- »The fabric of important surviving features should be protected for as long as feasible. Maintenance is thus essential to avoid rapid deterioration. Continuity of maintenance is preferable to premature decay followed by reconstruction.
- The aim of protecting fabric need not extend to ill-advised recent repair, or works resulting from mere short-sightedness, financial pragmatism or neglect, and eroding a planned ornamental design.
- Maintenance plans, which specify achievable and sustainable levels of care, are desirable.
- The fabric of surviving features should be recorded sufficiently for future repairs to be accurate.
- Once the historic fabric is so decayed that it is dangerous or has failed the emphasis of treatment shifts to the recovery of the design.
- A detailed record and substantial survival of fabric are preconditions to repairs that seek to replicate it accurately.
- Repairing the layout and content resulting from the last significant and deliberate change should normally be the aim of restoration.
- Replacement of plants and some other forms of fabric will be necessary at intervals, and a restoration strategy should anticipate and harmonise the processes of vegetative change and replacement as far as possible.
- Conjectural detailing, especially of planting, may have to accompany true repairs in order to recover a design. Research on authentic style, detailing and materials should be a precondition to conjectural detailing.
- The reasons for, and process of, any repairs or reconstruction should be fully recorded. A graphic or photographic record should be undertaken during and after.
- Reconstruction is where a feature that has largely or wholly disappeared is replaced. Often reconstruction involves removal of sound, more recent, fabric, and substitution by invented detail. It can thus be destructive as well as of dubious historical value.
- Consideration should be given to whether interpretation can satisfy presentation aims, and prove a satisfactory alternative to reconstruction.

5 English Heritage: After the Storms, London 1997, also: www.english-heritage.org.uk

6 Jez Abbott: A sense of history, in: Horticulture Week (6 September 2007), p. 13.

7 David Jacques: The treatment of historic parks and gardens, in: Journal of Architectural Conservation, vol. II (July 1995).

- The preconditions to reconstruction should be that a detailed record of the original is available, and that the work is consistent with the treatment of associated buildings, or allows recovery of the design as a whole.
- Restoration-in-spirit (i. e. re-creating the general spirit of the layout without attention to accuracy) erodes a site's genuine historical interest; straightforward maintenance and repair is nearly always preferable.
- New work in a historic style should not attempt to give the impression that it is authentic historic fabric.
- All new or reconstructed fabric, except that which can be classed as repair, should be designed so that it can be installed and removed with no alteration to historic fabric.«[8]

John Sales, the National Trust's former Head of Gardens, says that conservation and management principles should »guide every aspect of management, upkeep, repair, adaptation, renewal, access, interpretation, opportunity and constraint.«[9] In 2007, English Heritage issued a consultation document on its own conservation principles, policies and guidance to develop a consistent approach to making decisions affecting the historic environment and balancing protection with economic and social needs. The new guidance reflects the evolution of other guidance such as UK planning policy but also international conventions such as The World Heritage Convention, Granada Convention, Valetta Convention and the European Landscape Convention. The plan is now to revise and update Jacques' principles for historic parks and gardens within the framework provided by the new English Heritage principles for the historic environment as a whole.

The storm damage also opened up opportunities for new research. Forestry Commission surveys looked at the frequency of failure and types of failures in common species. Poplars (Populus spp) were the most frequently damaged trees, whereas species such as Scots Pine (Pinus sylvestris), London Planes (Palatanus x acerifolia) and Atlantic Cedars (Cedrus atlantica) were at the other end of the scale; branch damage was frequent in Horse Chestnuts (Aesculus hippocastanum) and root damage in Beeches (Fagus sylvatica).[10] Led by David Cutler, the Royal Botanic Gardens Kew used the exposed root plates to study root system development and develop advice about trees. The Nature Conservancy Council set up ecological monitoring of storm damage sites and their natural regeneration.

The chaos of the night of 16 October 1987 had to be sorted out. Streets were blocked and many homes were without power. Perhaps only naturally, people wanted to clear the fallen trees and to repair the damage, but some of the woodland operations were large scale and intensive. As noted in the English Heritage publication, »The ecologist and landscape historian, Oliver Rackham, pointed out that in ecological terms it was not the storm itself which was the catastrophe, but the panic invasion of chainsaws which followed.«[11] Sixty-five per cent of the blown volume of trees had been cleared 21 months later.[12] In order to restore many historic parks and gardens, some clearance work was needed on these sites too. Ecologists challenged the extent of the clearance work, and their research has shown that gaps opened up by the storm allowed trees and shrubs to naturally regenerate and created new warm and sunny habitats that allowed flowers, butterflies and other insects to flourish, and that dead wood was itself a valuable habitat. Indeed the important collections of rhododendrons and azaleas like those at Leonardslee Gardens (West Sussex) and vistas were restored at other parks.

The need to resolve apparently clashing historic restoration and nature conservation objectives pushed greater understanding of the interrelationship of these features at many sites. The plan offered an approach to integrating management for both historic and wildlife interests. Important habitats have evolved from the historic management of sites and the wildlife interest is intertwined in the appeal of many places. One example is the veteran tree. These ancient trees are a feature of many historic parks and their wildlife significance is now highlighted in the national priority action plan for wood, pasture and parkland developed by both historic and nature conservation specialists.[13] The rejuvenation of derelict avenues often provokes debate. Replanting solutions need to be site specific and respond to the form, design and historic and nature conservation values of the avenue. The restorations of the storm damaged avenues, shown in figures 1 and 2, illustrate two of many possible solutions. At Melbury Park (Dorset) a new row of trees was planted and at Brockenhurst (Hampshire) the wind blown trees were re-erected and pollarded. Avenues emphasise the need for well researched and holistic conservation management plans.

The storm and the huge work programmes also in turn stimulated a review of the *Register of Historic Parks and Gardens of Special Historic Interest in England* and development of more detailed designation entries and maps that have since proved invaluable in considering planning applications and changes, and indeed have contributed to the model being developed for the proposed new single

8 Ibid.

9 John Sales: Landscape, History, Nature and Aesthetics, Views 38, Cirencester 2003, pp. 16–17.

10 Grayson (note 2).

11 English Heritage (note 5).

12 Grayson (note 2).

13 English Nature UK Biodiversity Action Plan. Lowland Wood Pasture and Parkland in English Nature: UK Biodiversity Group Tranche 2 Action Plan Terrestrial and Freshwater Habitats, Peterborough 1998, vol. II, p. 63, also: www.ukbap.org.uk

Fig. 1 Melbury Park (photograph © English Heritage Library)

Fig. 2 Brockenhurst Park (photograph © English Heritage Library)

heritage protection designation system, the *Register of Historic Buildings and Sites in England*.[14]

Whilst the 1987 and 1990 storms cannot be directly linked to climate change, the scientific evidence does indicate accelerating climate change, and storm events will become increasingly likely. The UK government's Stern Review stresses the importance of investing to both reduce impacts and to adapt to climate change. David Milliband, as Secretary of State for the Environment, Food and Rural Affairs, saw climate change not as an environmental issue but an economic, moral (past and present), political, national security, social and cultural issue. As well as conservation of historic properties, the historic environment sector will need to engage in these wider issues too.

UKCIP (United Kingdom Climate Impacts Programme) provides scenarios that show how the country's climate might change and co-ordinates research on dealing with our future climate. The scenarios have been developed using the latest global climate model from the Hadley Centre for Climate Prediction and Research. They can be distilled to three main types of change: temperature, rainfall and precipitation, and sea level rise:

- The UK climate will become warmer.
- The temperature of coastal waters will also increase, although not as rapidly as over land.
- High summer temperatures will become more frequent, whilst very cold winters will become increasingly rare.
- Winters will become wetter and summers may become drier throughout the UK.
- Snowfall amounts will decrease throughout the UK.
- Heavy winter precipitation will become more frequent.
- Relative sea level will continue to rise around most of the UK's shoreline.
- Extreme sea levels will be experienced more frequently.[15]

The initial work concentrated on scoping studies for both themes such as gardens and wildlife, and UK geographical regions. The *Gardening in the Global Greenhouse* report[16] is an example of 10 organisations, ranging from property owners like the National Trust, advisory bodies such as English Heritage, and industry and scientists, working together to understand the impacts on plant growth, garden design, conservation and management, and areas needing research.

Gardens are an important visitor attraction in the UK. In 2004 10.6 million people visited gardens.[17] In a changing climate new opportunities may open up as cool and refreshing gardens grow in appeal and potentially the visitor season extends at both ends. Garden design often aims to adjust microclimates.[18] Features like grottoes, pergolas, calm lakes, bosky walks and the like are designed to create cool escapes, fountains refresh the atmosphere, and terraces, courtyards and sheltered seats offer warmth and shelter. Historic gardens potentially offer many ready made refuges in a changing climate. The ASCCUE modelling research project based on Manchester, in north west England, has shown the importance of green spaces as a

14 Department for Environment, Food and Rural Affairs (Defra): Draft Climate Change Bill. Consultation document, London 2007, www.defra.gov.uk/corporate/consult/climatechange-bill/consultation.pdf

15 From UKCIP www.ukcip.org.uk/climate_change/uk_future.asp

16 Richard Bisgrove/Paul Hadley: Gardening in the Global Greenhouse. The impacts of climate change on gardens in the UK, Oxford 2002, also: www.ukcip.org.uk

17 English Heritage personal communication.

18 Chip Sullivan: Garden and climate, New York 2002.

group in tempering urban heat island effects.[19] Of course, these parks and gardens need to be well managed and kept verdant if they are to help manage city temperatures. Such well managed green spaces will also have a role in managing heavy rainfall run off.

There are of course many challenges too. The National Trust is faced with possible saline inundation of its rare 17th century Westbury Court garden which sits on the tidal River Severn, and with the question of whether to replant beech in south east England with its increasingly drought conditions. The Trust's Council has agreed upon a Statement of Intent with eight guiding principles such as minimising risks, taking innovative approaches to adaptation where appropriate, and being proactive in raising awareness; and a campaign was launched to involve its 3.5 million members and 13 million visitors (including school children) in these issues. One example in the campaign is a Green Solutions Fund that was set up to help raise money for renewable energy technology solutions for its properties. The Trust has also stated that »it will not always be possible to preserve our properties and contents entirely unchanged; unless critical interests require intervention we should seek to work with the grain of natural processes.«[20]

One of the problems for historic park and garden owners and managers is translating the climate change scenarios for their own property, and over time, and looking at cumulative impact of changes rather than just one aspect. It is also worth stressing that the climate change scenarios are not yet predictions. The science is developing all the time and there is a need to keep abreast of climate change advice and guidance. It is perhaps easier to focus on the extreme long term climate change scenarios and large scale or high impact adaptation measures and overlook immediate action needed to both improve environmental performance through good horticultural practice such as mulching, and mitigation measures such as recycling and changing to more sustainable buying practices. The potential enormity of the long term climate changes seems to have resulted in inertia yet there is much that is achievable and incrementally can help make a difference.

Landscapes are dynamic, constantly changing, and the essence of horticulture and landscape management is about managing change. Skilled and well resourced professional gardeners and landscape managers are well placed to take historic parks and gardens through many early stages of progressive climate change without costly, possibly invasive and irreversible adaptation measures. Adaptation is likely to involve many stages with many incremental changes; and new technologies will also come on stream. The Royal Parks in London are looking at water conservation and landscape design. In addition to making new bore holes they are looking at their water consumption from irrigation to sanitation. New building development offers opportunities to integrate climate change adaptations.

Whilst the potential need for major scale changes needs to be recognised, immediate term planning should develop better understanding about the scale and rate of changes and the range and time scale of mitigation and adaptation measures that might be practical and appropriate for special landscapes like parks and gardens of historic interest. Mitigation and adaptation measures will need to be site specific and will depend on a thorough understanding of the property and its environment. Many longer term adaptation measures such as managing water catchment are likely to involve collaboration with other landowners and agencies. The English Heritage conservation principles (2007) offer a basis for making such decisions and plans are a tool for tracking climate change impacts and programming adaptation work.

The new English Heritage handbook[21] reflects the progress in researching, conserving and managing the historic parks and gardens in England over the last 20 years and provides guidance for students. The public bodies responsible for managing the landscape rehabilitation programmes published reports and these should perhaps now be revisited and the storm damage advice drawn out for future use. Similarly there are probably lessons to be learnt and shared from the recent floods. New guidance on adaptation such as the TCPA's one on design which looks at adaptation options for conurbations, neighbourhoods and individual buildings is coming on stream.[22] At this early stage of understanding and planning for climate change and its potential impacts on historic parks and gardens, the focus should be on:

- Ensuring each historic park and garden has a conservation management plan
- All conservation management plans should be revised to consider climate change risks and mitigation and adaptation needs and related timescales
- Monitoring sites, tracking climate change effects, and reviewing plans to consider mitigation and adaptation strategies are needed
- Minimising risks and adaptation needs through high quality maintenance
- Securing, training and retaining skilled personnel to ensure high quality maintenance
- Establishing a historic park and garden sector forum to

19 www.sed.manchester.ac.uk/research/cure/research/asccue/

20 National Trust: Forecast?—Changeable!—examples of climate change impacts around the National Trust, Swindon 2007, also: www.nationaltrust.org.uk/main/w-climate_change-forecast_changeable.pdf

21 John Watkins/Tom Wright: The management and maintenance of historic parks, gardens and landscapes. The English Heritage handbook, London 2007.

22 R. Shaw/M. Colley/R. Connell: Climate change adaptation by design. A guide for sustainable communities, London 2007.

discuss, develop and evolve mitigation and adaptation strategies and share best practice
- Developing a climate change research strategy for the sector
- Working closely with other land management sectors to share expertise and develop new management techniques
- Involving visitors and the wider public in historic park and garden mitigation and adaptation work through interpretation and promoting good practice such as offering recycling facilities for visitors to use on site
- Seeking future fiscal support through public grant schemes to assist mitigation and adaptation work, and
- Where climate change extremes lead to decisions to abandon historically important gardens, sites should be fully recorded before damaged or lost.

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