



London's Geodiversity Action Plan 2009 – 2013

A framework for understanding, conserving and using the unique wealth of geodiversity resources found within our capital, so that social, economic and environmental benefits are provided to London's urban communities and many visitors.





London's Geodiversity Action Plan 2009 - 2013

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2011 Update

This revised version of the original London Geodiversity Action Plan was produced after a review of progress during February 2011. The action boxes on pages 11-17 have been updated to indicate progress during 2010/11



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What is Geodiversity and Why is it Important?

The diversity of geological and geomorphological heritage across London provides an invaluable natural resource that underpins many aspects of not only London's natural environment, but of society, economy and where and how people live. 'Geodiversity' is found beneath our feet and within the built environment, shapes the landscape around us, contributed to our industrial past, underpins biodiversity and influences art and design.

Geodiversity has been defined as: *'The natural range (diversity) of geological (rocks, minerals, fossils), geomorphological (landform and processes), and soil features. It includes their assemblages, relationships, properties, interpretations and systems'¹.*

Amongst the wider services that geodiversity provides are: training, education and lifelong learning; a contribution to 'sense of place'; recreation and geo-tourism; aesthetic qualities and well-being.

Developing a good understanding of London's geodiversity and the services it provides also contributes to the sustainable management of natural resources (such as groundwater, brick clay, chalk for cement and gravel for aggregates) and the earth's changing natural systems (such as mitigating against natural subsidence, unstable ground and responding to climate change).

It is for all these reasons that the geodiversity of London should be understood, managed and used for the benefit of the present generation and conserved for future generations.

What is special about London's Geodiversity?

London has a large population, receives many visitors and is linked together by a dense transport network. In this way it is very unlike a rural regional area. The 'rocks' may be less evident, but there is nevertheless a unique wealth of geodiversity resources. These resources are also available and accessible to a large number of people, including local communities, tourists and those travelling for business purposes.

The continual evolution of the city means that there are ongoing opportunities to view and understand the geology beneath our feet and identify the influence of natural processes. Where appropriate a geodiversity focus may also be included within the final design of a new development.

London's Geodiversity:

- is available and accessible to a large number of people;
- comprises a unique wealth of resources; and,
- has shaped the development of a major world city.

Museum and art collections in London are vast and internationally outstanding and contain artefacts and images of relevance to geodiversity that can be promoted and used for life-long learning.

Greenspace is exceedingly important within an urban area and the underlying geology has shaped many of the open places of London (such as Hampstead Heath). In addition, Geodiversity activities (such as geo-walks, building stone trails and 'hands-on' experiences for children) provide one way of experiencing the 'outdoors' and contributing to health and well-being.

Just some of the many other contributions geodiversity has made to London are described on the following page.

¹Gray, M. (2004) *Geodiversity: Valuing and Conserving Abiotic Nature*, Wiley & Sons.



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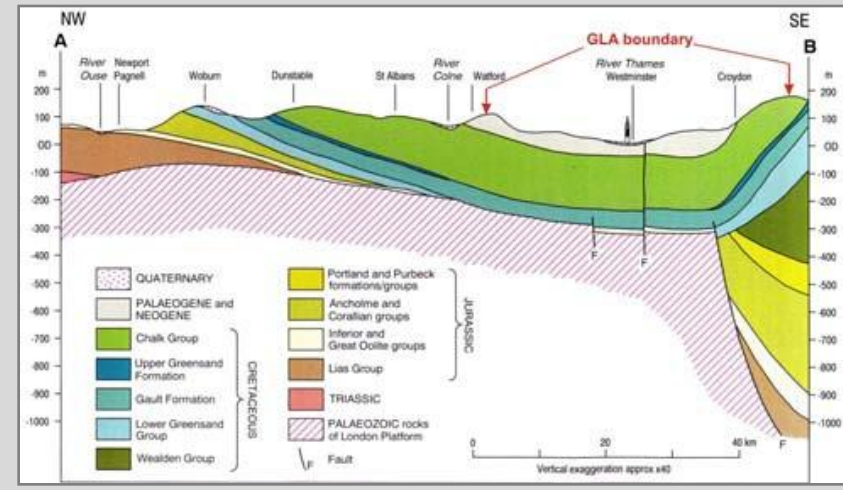
How has Geodiversity influenced the development of London?

The geodiversity of London has greatly contributed to its development, providing both opportunities and constraints that need to be understood and managed. The list below identifies just some of these. More detailed descriptions of London's geodiversity heritage is found within the 'London's Foundations' report² and the publication: 'Geology of London'³.

- The River Thames and associated gravels provided the initial focus for the developing City of London, supplying water and forming a major route-way;
- The Chalk aquifer at depth beneath London, controlled by the structural geology of the region, now provides much of the population's water supply and has allowed for the greater expansion of the city;
- Mineral springs formerly existed in London, derived in gravels but absorbing salts when passing through the underlying London Clay. Springs at Epsom gave rise to the term 'Epsom Salts';
- The structure and wide presence at depth of the London Clay Formation has contributed to the development of the London Underground;
- The presence of the River Thames and the low-lying basin of London, again controlled by the structural geology contributes to the need to protect London from sea level rise;
- Characteristic landscapes are shaped by the underlying geology and subsequent geomorphological processes. These include dry valleys within chalk downlands (particularly in south London) and river terraces, forming long flat areas, separated by steeper slopes (particularly in North London);
- Chalk for cement, clay for bricks, glass sand and flint for building have all been extracted in London and evidence of past and current industry remains today;

- Most aggregate and building stone resources have been supplied from elsewhere, meaning London now contains a wider geodiversity than that simply found *in situ*. The building stone resource in London is vast – Kentish Ragstone and Reigate Stone have been used since Roman times and London as redesigned by Wren shipped in Portland Stone from Dorset. The Victorians used granite from Scotland and the south-west of England. Today cladding techniques have greatly increased the range of rock types utilised with sources now from across the world. Leicestershire and the Mendips provide two major sources of aggregates and have greatly contributed to the economic development of London.

Geological section showing the London Basin syncline⁴



²British Geological Survey (March 2009) *London's Foundations: Protecting the Geodiversity of the Capital*, The London Plan (Spatial Development Strategy for Greater London) London Plan Implementation Report, Greater London Authority, ISBN: 978 1 84781 250 6.
³Ellison, R. A. et al. (2004) *Geology of London*, Special Memoir for 1:50 000 Geological sheets 256 (North London), 257 (Romford), 270 (South London) and 271 (Dartford) (England and Wales), British Geological Survey, ISBN: 0 85272 478 0.
⁴After Sumbler, M. G. (1996) *British regional geology: London and the Thames Valley*, 4th Edition, British Geological Survey (Reproduced as Figure 8 in the 'London's Foundations' Report)



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What recognition is given to Geodiversity?

Geodiversity is recognised as an important aspect of nature conservation in its own right and it is a material consideration within planning decisions. This is reflected in national planning policy (*PPS9: Biodiversity and Geological Conservation*⁵) and related legislation (*Wildlife & Countryside Act 1981, Countryside & Rights of Way Act 2000*).

Recognition for Sites of Importance for Geodiversity

In Great Britain, key sites of national geological importance were identified through the Geological Conservation Review (GCR), an audit mainly completed between 1977 – 1990 to provide a representation of the great diversity of British geology. GCR sites were selected on the basis of their scientific value and the majority of these sites have since been designated SSSIs by the relevant country statutory nature conservation agency and receive legal protection. The *Countryside & Rights of Way Act* (2000) strengthened existing

SSSIs in London:

- Abbey Wood (Bexley)
- Gilberts Pit (Greenwich)
- Harrow Weald (Harrow)
- Hornchurch Cutting (Havering)
- Elmstead Pit (Bromley)
- Harefield Pit (Hillingdon)
- Wansunt Pit (Bexley)

More information on these SSSIs is found within the 'London's Foundations' Report

protection for SSSIs with a stronger emphasis on management as well as conservation and with third party damage to such sites now being a prosecutable offence. Natural England is responsible for the network of SSSIs in England. The 'best' SSSIs for public enjoyment may also be designated National Natures Reserves (NNRs). 7 SSSIs are found within London and a complete list of these is shown on the insert.

Non-statutory designations currently include Regionally Important Geological or Geomorphological Sites (RIGS) and other terms used to describe local sites (increasingly known as Local Geological Sites to follow the recommendations within Defra guidance⁶). Significantly, the guidance produced by Defra on local sites gives the same weighting to geological and geomorphological sites as it does to wildlife (species and habitats) sites. In contrast to GCR sites, there is a

wider range of criteria to be taken into consideration in selecting RIGS and other local sites, including the value of the site for education, life-long learning, history and aesthetics; with consideration also given to access and safety issues. Defra guidance indicates that: '*local site systems should select all areas of substantive value including both the most important and the most distinctive*'. Local sites with a high degree of natural interest and / or of a high value for education may also be declared and managed as Local Nature Reserves (LNRs) by local authorities and are then afforded legal protection (as amended by the *Natural Environment and Rural Communities Act 2006*).

In London, a unique two tier system distinguishes wildlife sites of importance for the London Region from wildlife sites of local borough importance. The designation of geological sites in London mirrors this approach. RIGS have importance at the London region level and Locally Important Geological and Geomorphological Sites (LIGS) have importance at the borough level.

Candidate RIGS* in London:

- Beckenham Place Park (Lewisham)
- Chelsfield Gravel (Bromley)
- Croham Hurst (Croydon)
- Crystal Palace Dinosaurs (Bromley)
- Dog Rocks (Greenwich)
- Happy Valley (Croydon)
- Horsenden Hill (Ealing)
- Keston Common (Bromley)
- Rose and Crown Pit (Croydon)
- The Gravel Pits (Hillingdon)
- Cray Valley Golf Course Sand Pit (Bromley)
- North End Pit (Bexley)
- High Elms Dene Hole (Bromley)
- Pinner Chalk Mines (Harrow)

Candidate LIGS* in London:

- Avenue House (Barnet)
- Chingford Hatch (Waltham Forest)
- Dry Valley (Sutton)
- Dulwich Mill Pond (Southwark)
- Finchley Till (Barnet)
- Finsbury Gravel (Islington)
- Friday Hill (Waltham Forest)
- Hainault Forest Country Park (Redbridge)
- Hale End London Clay Hillock (Waltham Forest)
- Islington Terrace Gravels (Islington)
- Loats Pit (Lewisham)
- Old Gravel Pit (Lewisham)
- Putney Heath (Wandsworth)
- Sundridge Park Golf Course 1 (Bromley)
- Sundridge Park Gold Course 2 (Bromley)

* Identified 2009. A further 95 sites have been identified as potential additional RIGS and LIGS.

⁵ODPM (2005) *Planning Policy Statement 9 (PPS9): Biodiversity and Geological Conservation*, HMSO.

⁶Defra (2006) *Local Sites Guidance on their Identification, Selection and Management*.



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Local site systems are managed by local partnerships and the London Geodiversity Partnership has responsibility for the identification, designation and promotion of management of London's RIGS and LIGS. 'London's Foundations' reports on an initial geodiversity audit for London, with 14 candidate RIGS and 15 candidate LIGS identified (see insert on page 5 above for a complete list). Further potential sites have also been identified. This London GAP suggests a process (see in particular page 12, Actions 2.1a - 2.1c) for designating these sites, enabling them to be formally recognised by the local boroughs and become a material consideration in planning decisions.

The set of *National Indicators for Local Authorities*⁷ includes NI 197 (*Improved Local Biodiversity – proportion of Local Sites where positive conservation management has been or is being implemented*). Whilst not explicitly included in the title, this indicator does include the identification of positive management at geological sites. Therefore, once RIGS and LIGS are designated in London, there is a mechanism in place for assessing the performance of the local boroughs in managing these sites.

Recognition for Geodiversity within the Wider Environment

Whilst identifying key sites is important, the concept of geodiversity is much broader in its application. PPS9 notes that appropriate weight should be attached (by planners) to 'geological interests in the wider environment' as well as to 'designated sites of international, national and local importance' and that opportunities for the incorporation of beneficial geological features within the design of development should be promoted, together with those for biodiversity. The accompanying *Guide to Good Practice*⁸ explains how this can be delivered through Regional Spatial Strategies (RSS), Local Development Frameworks (LDFs) and through development control procedures. Local Geodiversity Action Plans are also recognised as an appropriate framework for the management and promotion of geodiversity within a particular region.

Recognition for Geodiversity within London

In London, PPS9 has informed the development of Policy 3D.16 (see insert below) in the *London Plan*⁹ which underlines the need to protect and promote London's geodiversity and sets the strategic context for the local boroughs.

London Plan⁹ - Improving London's open environment

Policy 3D.16 Geological Conservation

The Mayor will work with partners to ensure the protection and promotion of geodiversity. Boroughs should:

- accord the highest protection to nationally designated sites (SSSIs) in accordance with Government guidance
- give strong protection in their DPDs (*Development Plan Documents*) to Regionally Important Geological Sites (RIGS) which, in addition to nationally designated sites, includes sites of strategic importance for geodiversity across London
- identify additional sites which are of value at the local level and should accord them a level of protection commensurate with their local significance

Currently Policy 3D.16 deals with designated sites only, although accompanying text in the London Plan states: '*the planning of new development and regeneration should have regard to the conservation of geological features and opportunities should be taken to achieve positive gains for conservation through the form and design of development*' and '*where only temporary sections are available opportunities should be provided for geological recording and sampling during development.*' Responses from the London Geodiversity Partnership on the current Consultation Draft Replacement London Plan include the need to retain protection of regionally and locally significant sites as well as to recognise the wider value of geodiversity within the revised policy¹⁰.

⁷CLG (2009) *National Indicators for Local Authorities Local Authority Partnerships: Updated National Indicator Definitions*.

⁸ODPM (2006) *Planning for Biodiversity and Geological Conservation: A Guide to Good Practice*, HMSO.

⁹Greater London Authority (2008) *The London Plan Spatial Development Strategy for Greater London (Consolidated with Alterations since 2004)*.

¹⁰Policy 7.20 within: Greater London Authority (October 2009) *Consultation Draft Replacement London Plan – Planning Decisions*: A. Development proposals should ensure the protection and enhancement of geodiversity. The highest level of protection should be given to nationally designated sites of special scientific interest (SSSIs) in accordance with Government guidance. 32 Regionally Important Geological Sites (RIGS) are also of strategic importance for geodiversity across London and should also be protected. **LDF preparation:** B. Boroughs should: a. establish clear goals for the management of identified sites to promote public access, appreciation and the interpretation of geodiversity b. use the guidance set out in London's Foundations (2009) to investigate additional sites that maybe of value in the local area and afford them the appropriate level of protection in LDFs.



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What is a Local Geodiversity Action Plan (LGAP)?

An action plan breaks down large complex initiatives into an aim, objectives, targets and achievable actions. It assists in focussing on tasks that matter; in the case of a LGAP, on activities that are going to assist with understanding, conserving and sustainably using the geodiversity resource. Partnership working, including a lead organisation, is critical to the success of a LGAP. An English Nature research report¹¹ provides the rationale for LGAPs, drawing on the experience of Local Biodiversity Action Plans and suggesting models for LGAPs. A guidance note has subsequently been produced, drawing on this earlier work¹².

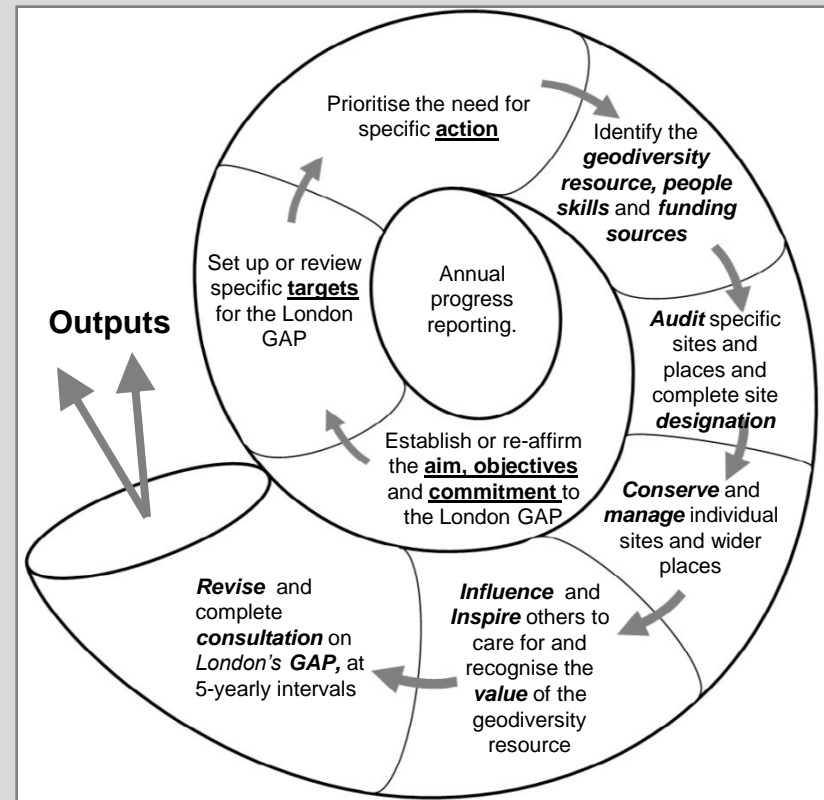
Whilst it is important to set targets and actions within a timeframe (see pages 8 – 15), many actions form part of ongoing activities, such as: auditing geodiversity sites and places; designating sites; contributing to management plans; undertaking management and conservation activity; and influencing and inspiring others to value, care for and make use of the geodiversity resource. The diagram opposite illustrates this cyclical nature of a LGAP and the need to monitor progress, report on activity and revise the LGAP at suitable intervals. An annual report on progress is suggested with a complete review of the London GAP taking place at 5-yearly intervals. **This revised version of the original plan was produced after a review of progress during February 2011. The action boxes on pages 11-17 have been updated to indicate progress during 2010/11.**

Why develop an London GAP?

There is a need to raise the value placed on the geodiversity resource in London and ensure its sustainable use in keeping with policy. In addition, a national 'driver' is being developed – the UK Geodiversity Action Plan (the UKGAP)¹³ provides a shared context and direction for geodiversity action and a means of celebrating success.

Stages in process of a Local Geodiversity Action Plan (LGAP)

The diagram below illustrates the cyclical nature of a LGAP and the way many actions form part of ongoing activities



¹¹Burek, C. and Potter, J. (2004) *Local Geodiversity Action Plans: Setting the Context for Geological Conservation*, English Nature Research Report 560, ISSN 0967-876X.

¹²English Nature (2004) *LGAPs: Sharing Good Practice*, ISSN 1 85716 839 9. Available to download at: www.mineralsandnature.org.uk/downloads/localgeodiversity.pdf

¹³The latest draft of the UKGAP is available to view at: www.geoconservation.com/GCCdocs/UKGAP/UKGAP1Oct08.doc



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What is the role of the London Geodiversity Partnership?

The London Geodiversity Partnership is taking a lead in developing and co-ordinating the London GAP. However, delivering the London GAP across a broad spatial scale cannot be achieved without the collaborative work of stakeholder organisations. Geodiversity partnerships seek to share good geodiversity practice, influence regional policy and establish cross-regional working for geodiversity. Whilst the geodiversity partnerships are all developing their own ways of working, they do have a number of common functions which are:

- To provide a regional network for organisations, groups and individuals involved in geodiversity;
- To provide a regional voice and profile for geodiversity;
- To influence regional planning, policy development and practice;
- To share good practice; and,
- To work to find opportunities for cross-regional activities.

Who can we contact to find out more?

For further information, please contact:

Jane Wilson,
 Landscape and Geodiversity Delivery Leader
 Natural England
 London and South East Region
 Floor 7, Hercules House
 Hercules Road
 London
 SE1 7DU
 Tel: 0300 060 2773
 Email: jane.wilson@naturalengland.org.uk

The boundary of the London GAP (the City of London and the London Boroughs) within the context of the surrounding areas.

1 BARKING & DAGENHAM	18 HILLINGDON
2 BARNET	19 HOUNSLOW
3 BEXLEY	20 ISLINGTON
4 BRENT	21 LAMBETH
5 BROMLEY	22 LEWISHAM
6 CAMDEN	23 MERTON
7 CITY OF WESTMINSTER	24 NEWHAM
8 CITY OF LONDON	25 REDBRIDGE
9 CROYDON	26 RICHMOND UPON THAMES
10 EALING	27 ROYAL BOROUGH OF KENSINGTON & CHELSEA
11 ENFIELD	28 ROYAL BOROUGH OF KINGSTON UPON THAMES
12 GREENWICH	29 SOUTHWARK
13 HACKNEY	30 SUTTON
14 HAMMERSMITH & FULHAM	31 TOWER HAMLETS
15 HARINGEY	32 WALTHAM FOREST
16 HARROW	33 WANDSWORTH
17 HAVERING	



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The Aim of the London GAP:

To provide a framework for understanding, conserving and using the unique wealth of geodiversity resources found within our capital, so that social, economic and environmental benefits are provided to London's urban communities and many visitors.

The Objectives of the London GAP

The draft UKGAP provides six objectives which between them set the focus for all the actions generally undertaken as part of an LGAP. These UKGAP objectives can be tailored to the requirements of the London Region. In this way, the contribution the London GAP makes to the national understanding and sustainable use of geodiversity can be directly measured and successes easily identified.

Targets and actions within this first edition of the London GAP (shown on pages 11- 17) were grouped under these six objectives which are described below:

Objective 1: Increase our Understanding of the Geodiversity of London

To encourage a better understanding of geodiversity and the wider role that geodiversity plays in our environment, through research, audit and review.

Objective 2: Manage and Conserve the Geodiversity of London

To support the identification and designation of geodiversity places and to support the management and conservation of geodiversity within the context of the wider environment.

Objective 3: Deliver sustainable social, economic and environmental benefits for London

To encourage better utilisation and understanding of geodiversity benefits, widening the value and relevance people place on geodiversity. To encourage the better use of geodiversity in understanding natural processes and helping make decisions on future environmental management.

Objective 4: Promote and Care for London's Geodiversity

To support the wider involvement of people in geodiversity through accessible life-long learning, geo-tourism and conservation activities.

Objective 5: Sustain Geodiversity activities

To increase the resources available to support geodiversity related activities and encourage the development of LGAPs.

Objective 6: Influence London-wide and London Borough Planning and Environmental Policies

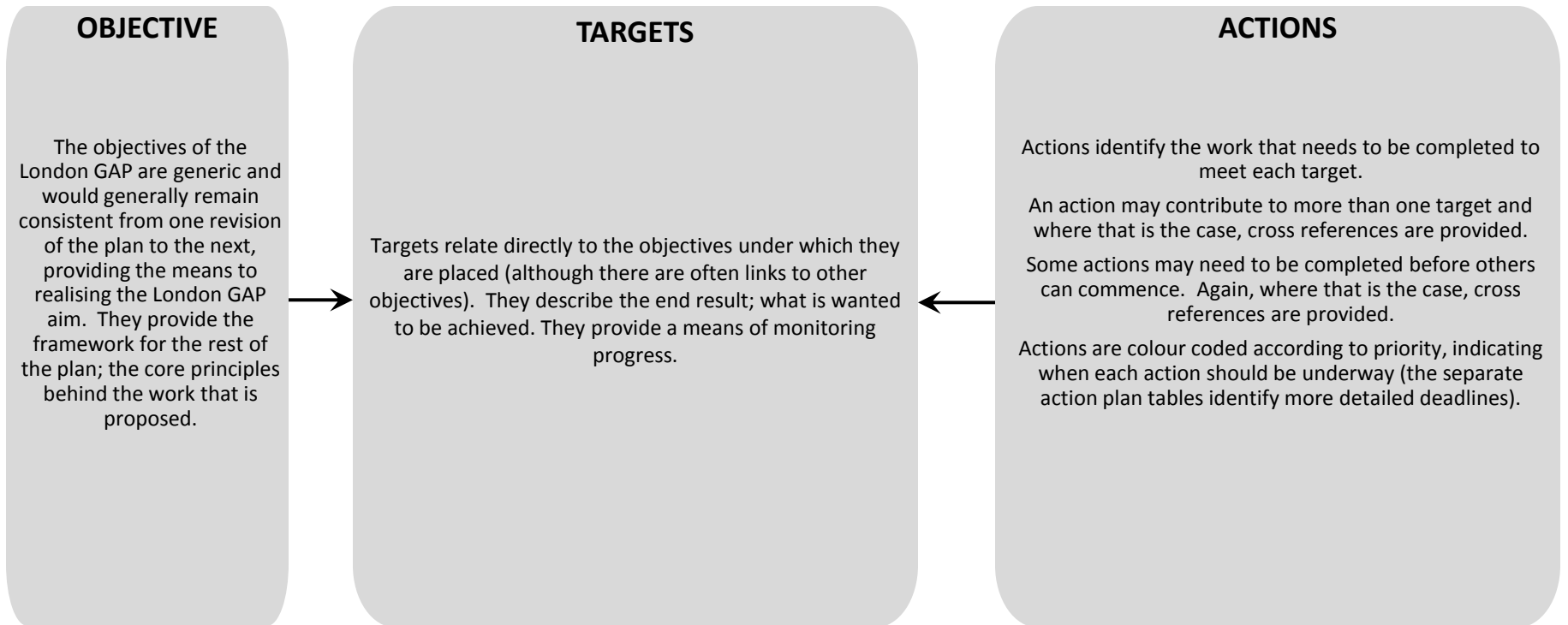
To encourage the development, implementation and sharing of geodiversity policies at all levels and to achieve much greater integration of geodiversity into existing policies.



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How to Read this Action Plan

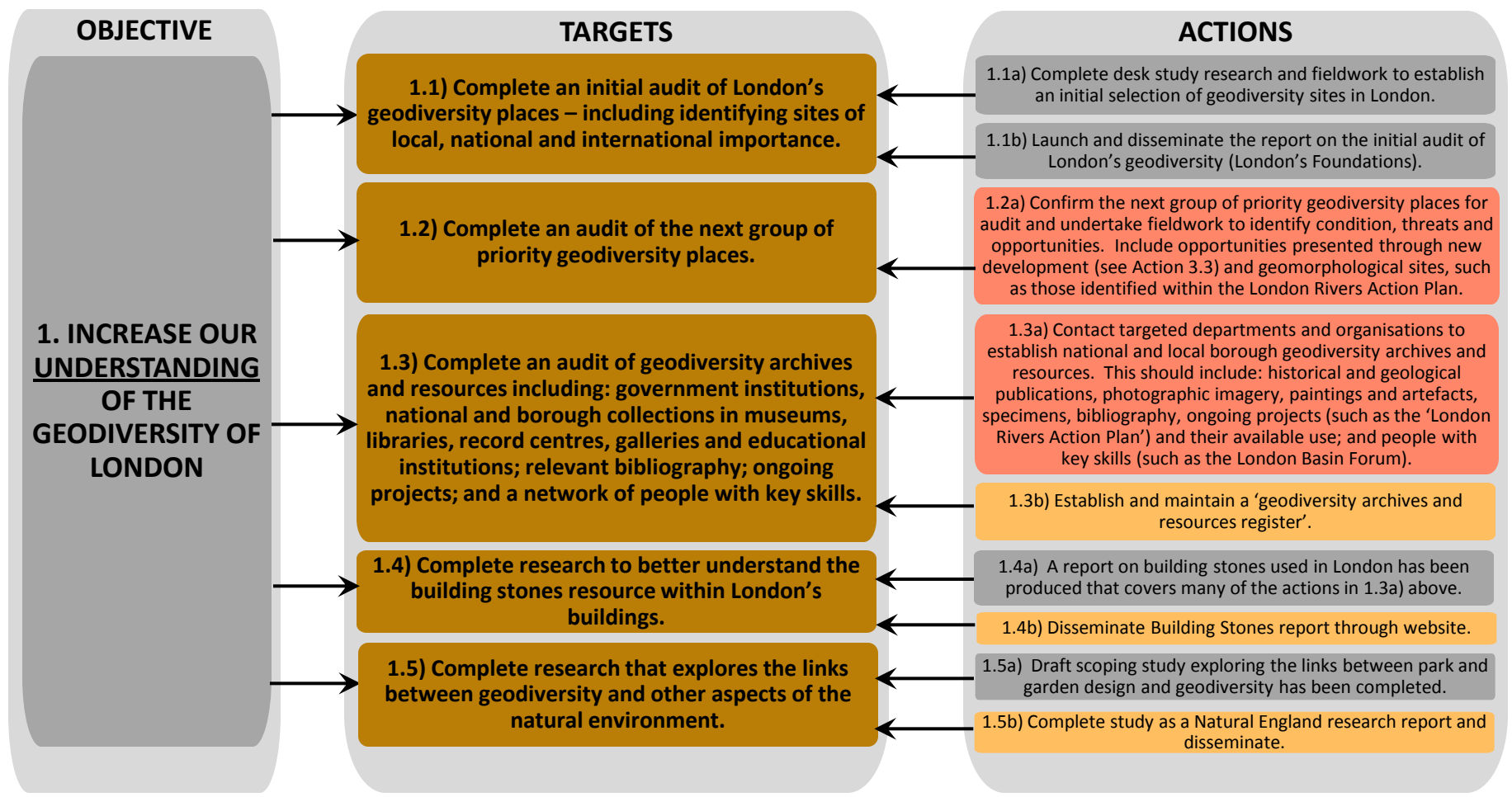
The plan is presented as a flow diagram (see below), showing the targets that have been set under each of the six objectives and the corresponding actions. Additional details are shown in separate Action Plan Tables¹⁴ and are used by the London Geodiversity Partnership to identify lead individuals, other partners, deadlines and provide a means of monitoring progress.



¹⁴Further details on the separate Action Plan Tables can be obtained from: Jane Wilson, Senior Specialist, Landscape and Geodiversity, Natural England, London Region
 Tel: 0300 060 2773
 Email: jane.wilson@naturalengland.org.uk



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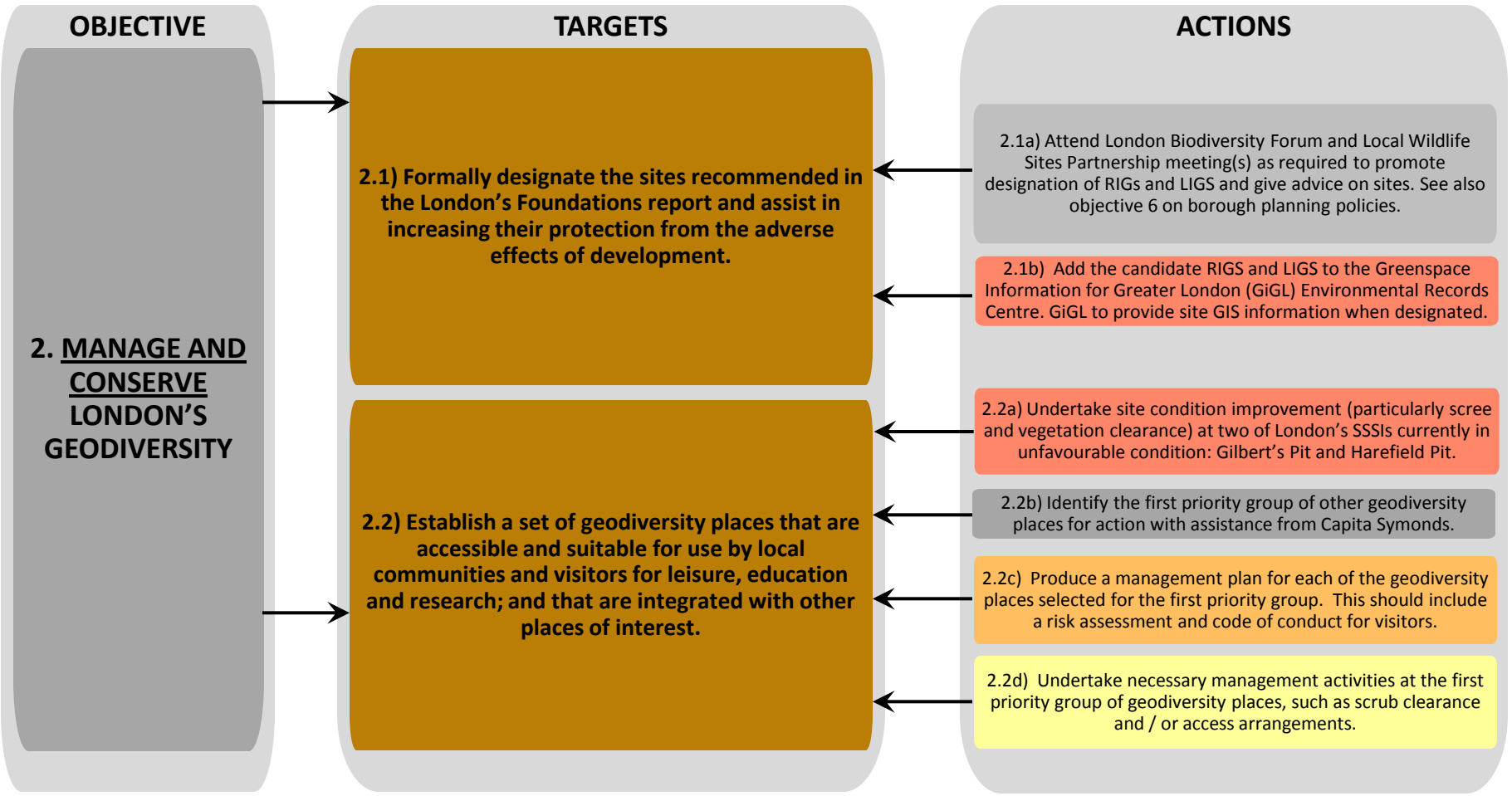
Key to Colour Coding of the Identified Actions

- Completed Action
- High Priority: to be underway by end 2010
- Medium Priority: to be underway by 2011 - 2012
- Lower Priority: to be underway by 2013

Additional details are shown in separate Action Plan Tables – these identify deadlines, lead partners, other partners and monitor progress.



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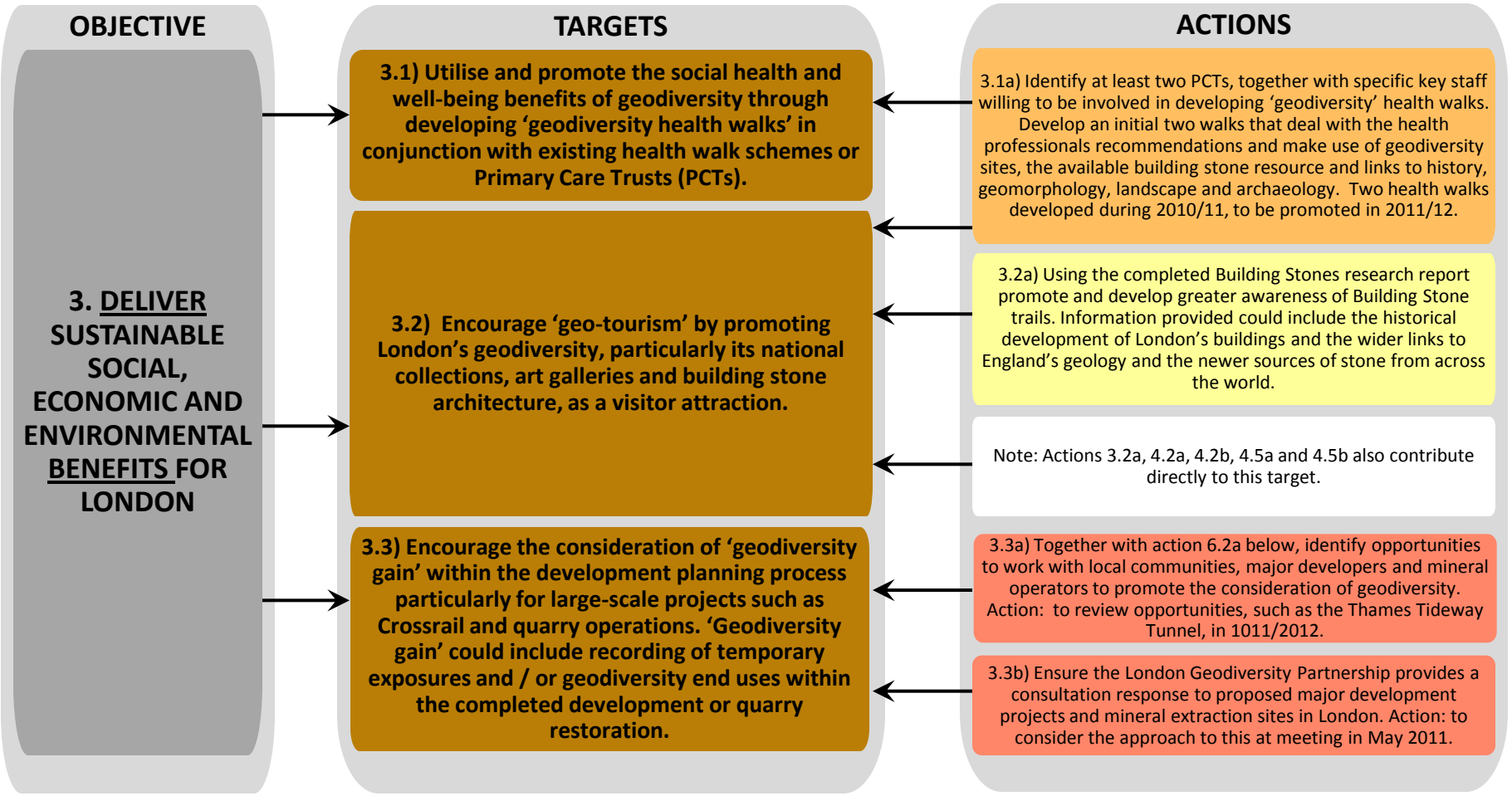
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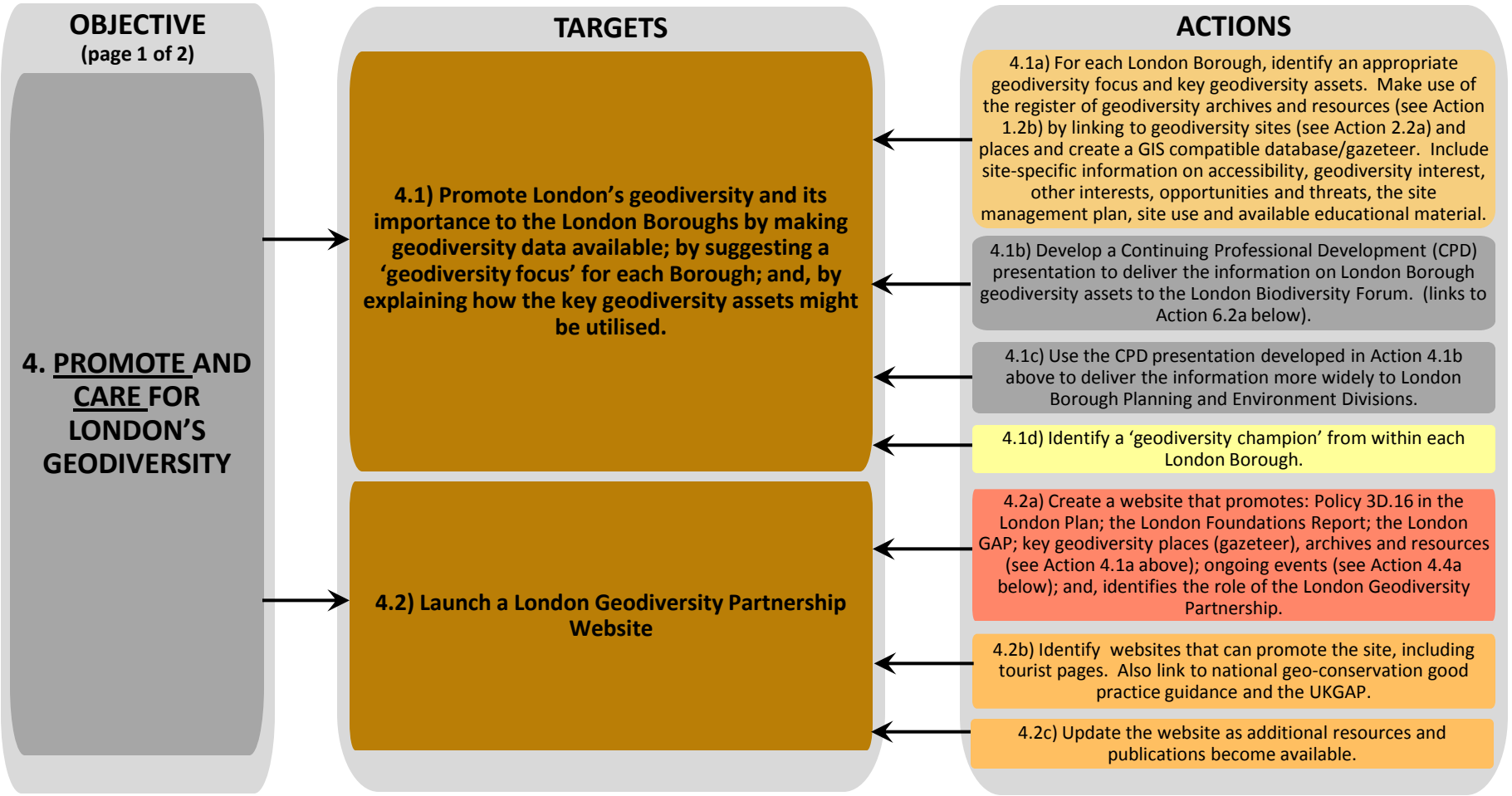
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- Lower Priority: to be underway by 2013
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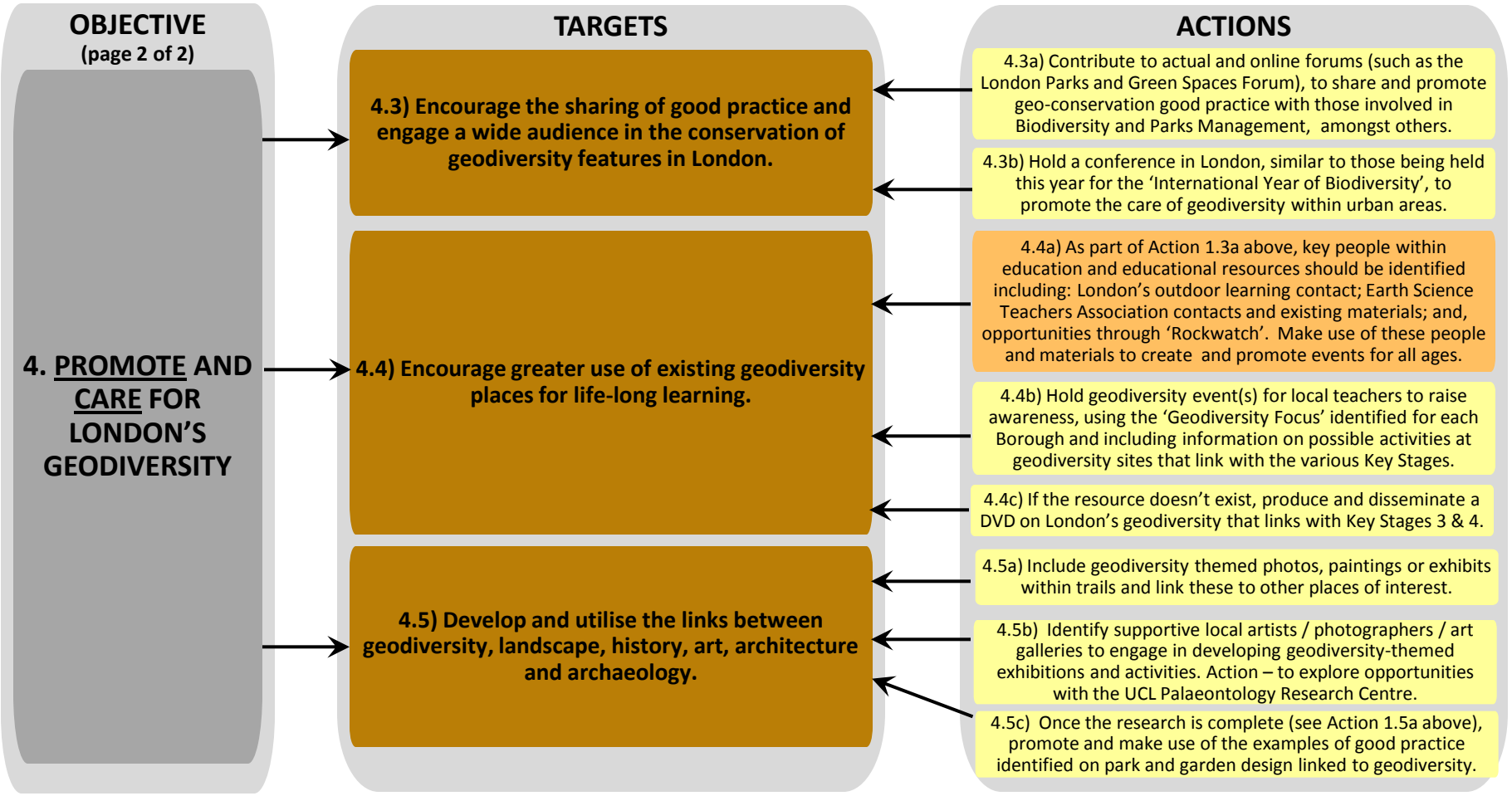
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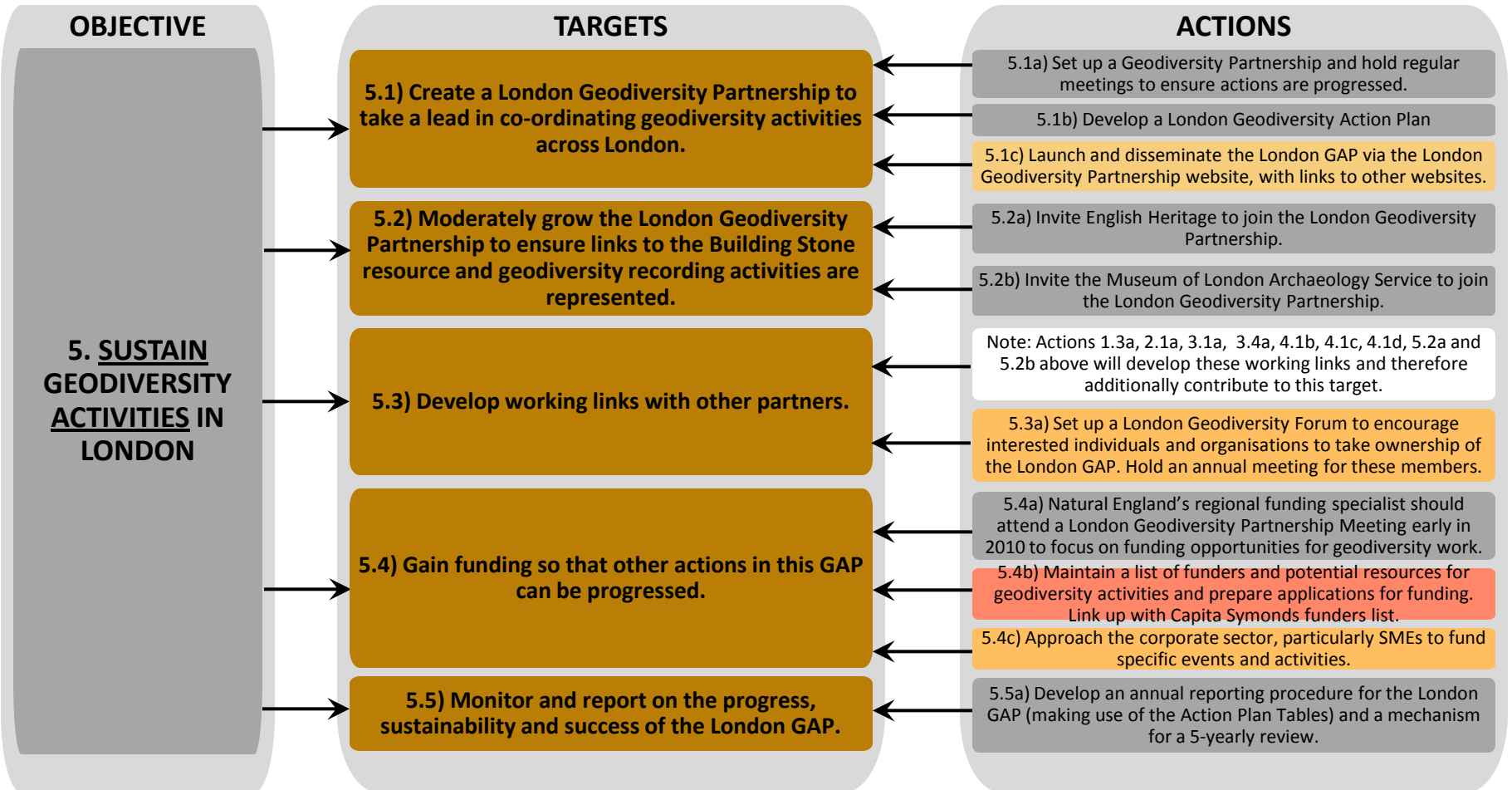
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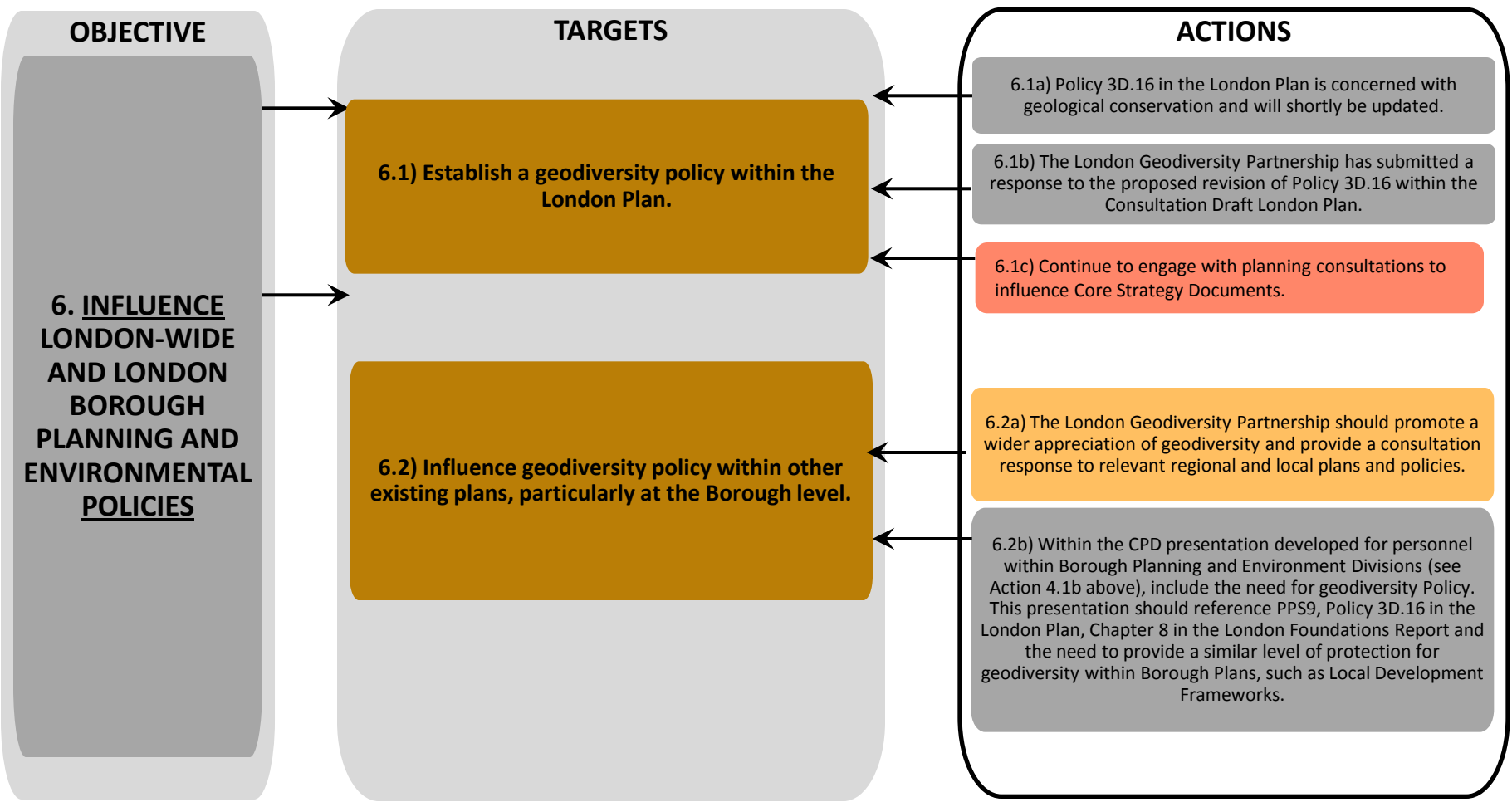
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London's Geodiversity Action Plan 2009 - 2013

Consultation on the London Geodiversity Action Plan

Consultation on this plan was carried out between June and August 2010. A wide range of organisations responded including London Borough of Southwark, London Borough of Greenwich, GeoEssex, City of London, Geologists' Association, British Geological Survey, First Steps Limited, Geo-East and Brent Council and the comments received have been reflected in this final plan.

The London Geodiversity Partnership

The London Geodiversity Partnership includes representatives of the Greater London Authority, Natural England, British Geological Survey, London Biodiversity Partnership, London Boroughs of Lambeth and Hillingdon, Geologists' Association, Harrow and Hillingdon Geological Society, South London RIGS Group, London Open University Geological Society, GeoEssex, Greenspace Information for Greater London, Queen Mary College and University of London, English Heritage and Museum of London Archaeology.

Images used in the plan

The iconic image of London on the Front Cover and range of images within the Banner have been used to illustrate the wealth of London's geodiversity (including the range of underlying rocks and deposits, recent 'finds' *in situ* and within museum collections, London-based geological resources, together with imported aggregates and building stones, geomorphological features, significant publications and engagement with people). Descriptions of these images and credits are given below.

Front Cover Image: City of London Skyline, including St Pauls, the newer buildings of London's City and the River Thames, the focus for London's initial development (Alan Thompson)

Banner Images: Cemented pebbles at Dog Rocks (Diana Clements); Front cover of the 'London's Foundations' Report, a geodiversity audit of London (British Geological Survey); Erith Fossil Forest (Diana Clements); Aggregates Wharf alongside the River Thames (Alan Thompson); Big Ben (Alan Thompson); Ilford Mammoth (Natural History Museum); Pupils of Thorntree Primary School enjoying 'hands-on' activities at Gilbert's Pit (Sheppy Shepherd); Aerial view of the River Thames (Alan Thompson); Riddlesdown Chalk Quarry (Barry Gutteridge); Front Cover of the Geological Memoir for London (British Geological Survey); London Stock brick and a road sign indicating the presence of a former spring (Diana Clements)

Poole, J.S., Higgs, J., Harris, K. E. and Birch, J. L. (February 2010) *London's Geodiversity Action Plan 2009 – 2013*. Co-ordinated by Capita Symonds with assistance from the London Geodiversity Partnership. Funded by Natural England.