Assessing Opportunity and Sensitivity

using Historic Landscape Characterisation

Pete Herring

February 2025

Summary

This guidance is for all those considering, planning or responsible for large-scale change in the British landscape and seascape. They include government, industry, planners, agencies, landowners and land managers, or representatives of communities and those campaigning for urgently needed change, as well as heritage professionals responding to proposals for large-scale change.

It helps them identify places, rural, urban or marine, where specific types of change might best occur, where historic fabric, patterns and character suggest there are opportunities for it. It also enables them to better understand historic landscape's vulnerability or sensitivity to types of change, the types of place that might be best avoided.

It uses the comprehensive and systematic map-based datasets of Historic Characterisation as the reliable proxy for our historic landscape that can be examined to identify such affordances and vulnerabilities.

Historic England is committed to the development of opportunity and sensitivity mapping and related approaches, of which this guidance forms a key part.

‘All landscape is historic, all is of interest and value, and all can be managed appropriately’ (Historic England website, Historic Landscape Characterisation).

‘Understanding past change offers a vital mode of imagining possible futures. The long timeframes of human and environmental interactions seen in the archaeological record also allow people to understand broader perspectives of change, thus making nature recovery projects [and other forms of urgently needed change] seem less frightening and more positive and acceptable’ (Ferraby et al 2023)

1 Introduction

1.1 About this guidance

This guidance helps developers, planners, environmentalists and communities use an understanding of landscape's historic character to take opportunities to ensure positive outcomes and reduce harm when considering the forms of change we want and need.

It also supports those, including Historic England, who champion the historic environment when working with government, agencies, developers, landscape managers, planners and wider society. It takes heritage engagement and influence beyond heritage assets and the small number of 'priority places' that Historic England and Natural England and their partners can put resource into and extends it to extensive areas including whole catchments, counties and regions.

1.2 Environment, landscape and wellbeing

The **historic environment** includes 'all aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past human activity, whether visible, buried or submerged, and landscaped and planted or managed flora' (National Planning Policy Framework; MHCLG 2024, Glossary).

An important element of the historic environment is the **historic landscape**, all the historical tangible and intangible elements of landscape, which is 'an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors' (European Landscape Convention; Council of Europe 2000, Article 1).

The historic environment and the historic landscape are fundamental elements of our world. They depend upon and are interwoven with geology and soils, and also with the semi-natural environment that includes habitats and biodiversity, all of which in Britain was either created by human activities or has been maintained or altered by them. The historic environment and historic landscape contribute greatly to individual and communal senses of wellbeing (Historic England 2024). So, they serve society best when considered early in the design or consideration of change.

1.3 Strategic and early involvement in the design of change

Identifying the ways our historic landscape provides opportunities for beneficial forms of change or is vulnerable to damaging ones helps decision-makers when they consider strategically and in timely ways where to either encourage or discourage particular types of change.

Early opportunity and sensitivity assessment can help minimise conflict and cost further downstream for all parties, including developers and authorities. It provides greater clarity on where schemes are more likely to be acceptable. As well as reducing disturbance of important remains (which can be expected to survive better in some historic landscape types than in others) or avoiding negative impacts on

character, this can minimise costs to industry of archaeological interventions and other forms of mitigation.

Under many current processes of strategic decision-making the historic environment and the historic landscape are turned to late, resulting in concerns being addressed in challenging ways in catch-up situations. Opportunities to draw from historical patterns and ways are often missed.

By identifying opportunities and issues early, benefits can be maximised and investment of time and resources in schemes that disturb sensitive historic landscape or run into time-consuming and expensive difficulties can be minimised. Opportunity and sensitivity assessment therefore serves as a form of screening and helps set parameters for master planning and design.

Assessment of opportunity and sensitivity using historic landscape characterisation (HLC) is an efficient and effective way of considering character and distinctiveness in the design of change, as recommended or required by numerous policies, including the National Planning Policy Framework. It may be expected that future iterations of such policies will recommend use of the method as one of the means to support good strategic decision making.

Scenario-led opportunity and sensitivity assessment is akin to Environmental Impact Assessment (EIA) except that it addresses a form of change – a change scenario – at a strategic level rather than through examining the details of specific proposed projects. Undertaking opportunity and sensitivity assessment would not affect the need to undertake EIA, or Environmental Outcomes Reports (DLUHC 2023), prepare Environmental Statements, and undertake development management for specific projects further down the line in the design and execution of change.

The initial broad-brush opportunity and sensitivity assessment of large areas considered here should not be confused with processes like preparation of heritage statements, which deal with specific places and draw on a range of evidence and are often based on identifying and protecting significance.

Opportunity and sensitivity assessment can reach far beyond formal development planning processes, to include climate change mitigation/responses and consequent large-scale strategic planning for coastlines, flood management, etc. The physical works here may be delivered through other mechanisms than through planning.

The use of opportunity and sensitivity assessment is still in early stages of development. Separate guidance may be developed to indicate how to adapt it for use in the different processes involved in designing particular types of change. These might include the more formal planning for infrastructural, residential and other forms of development, and more wide-ranging strategies, like ‘adaptive pathways’ (Environment Agency 2022), for environmental growth and for addressing climate change and nature recovery.

Opportunity and sensitivity assessment can, if required or if considered useful, be undertaken at each stage when scoping and guiding change. Scale and granularity can be adjusted according to requirements and according to the resolution of the base historic landscape data. Opportunity and sensitivity assessment can also be

supported by separate assessment of particular defined areas (like 'Historic Environment Character Areas', as explored in the Oxford to Cambridge Arc; Conway 2023) and by archaeological sensitivity mapping (Last 2023; Last and Kidd 2023).

Rigidly fixing the moments when opportunity and sensitivity assessment should or should not be used risks stifling continued development of the method. Many of those who would benefit from it have not yet established ideal points in their processes when it should be used.

1.4 Change in the British historic landscape

Heraclitus two and a half thousand years ago noted that 'nothing endures but change'. The European Landscape Convention (below), guiding most strategic work with landscape in the first decades of the 21st century, also recognises that landscape is dynamic, and will always evolve, physically and perceptually.

The British historic landscape is both persistent and transitory, never fixed and ever-changing, though the pace, form and effects of change are highly variable. Some parts of our landscape have fabric and character that have survived or are still legible after hundreds, even thousands of years. Others have changed substantially numerous times in the last half century. Our appreciation of landscape and the ways we value it as experts or as people with other interests in it – including as property-owners or managers – are also continually evolving.

The whole British landscape, urban, peri-urban, rural and marine, is therefore filled with the patterns of past change and is noisy with conflicting stories and opposed opinions. It challenges us to plan carefully for the future, recognising that change can be enhancing and positive as well as unsettling or damaging.

Carefully designed change improves our environment and lives. Its outcomes deliver and accommodate what our society needs – social and economic security while tackling the climate and biodiversity crises and ensuring the wellbeing of individuals and communities. Such change can often be designed so that it retains or improves those aspects of the historic environment and landscape we value most highly.

Those who care for the historic environment have for some time been adapting their approaches to accommodate this more holistic, open and positive view of change. They do this through various forms of constructive conservation. This passes on 'legibility' of the past, the landscape's time-depth, to allow our successors to build narratives, sense of place and identity from the landscape they inherit from us. It considers the interests of all those with a stake in it, so that the outcomes of change are those that society and the wider environment need or desire most (Clark et al 2004).

1.5 Fuller involvement in designing change

Government, the historic environment sector, communities and individuals can all become involved in caring and campaigning for the most sustainable and respectful future of all parts of the historic landscape.

Historic environmentalists and archaeologists have developed numerous ways of recognising, recording and evaluating things and places. They also help society draw inspiration from the historic landscape and environment when designing and locating other forms of change, including its responses to the climate and biodiversity crises. The historic environmentalist helps the natural environmentalist see and work with the historical and landscape aspects of nature, including our changing perceptions of it. It strengthens commitment to the inclusive definition of nature developed by Natural England (see Glossary).

- Opportunity and sensitivity assessments inform the scoping of environmental growth (e.g. Cornwall and Isles of Scilly Local Nature Partnership 2020) and nature recovery (2021 Environment Act), like woodland creation, biodiversity enrichment and sustainable land use and sea use, as well as responses to climate change.
- They also help guide the location and form of major industry, power generation, infrastructure and house-building initiatives.

By providing appropriate and in-scale historic environment critique and support, opportunity and sensitivity assessment enables the historic environment sector to contribute to selection of areas for development and other forms of change.

As early as 1994 authorities were required to develop policies that 'take account of the historical dimension of the landscape as a whole ... Adequate understanding is an essential preliminary, and authorities should assess the wider historic landscape at an early stage in development plan preparation' (DNH 1994 (PPG15), para 2.26). The broad approach is continued in the National Planning Policy Framework (MHCLG 2024, 203e, f and g).

1.6 The historic landscape and its characterisation

Historic landscape has been the subject of numerous and various studies in the last century. These include prospection, recording, analytical survey, experiential modelling, and several forms of characterisation. Increasingly interactive and inclusive forms of interpretation have improved engagement with and between communities of interest and place.

It was in part because of this diversity of approaches and interests that Historic England (then as English Heritage) moved in the early 1990s towards characterisation of the whole historic landscape rather than establishing protective designations for selected portions that have some significance.

A selective approach would have run counter to the holistic and inclusive principles that would in 2000 be built into the European Landscape Convention (below). Selection would also have brought small parts of historic landscape within the red lines of protection rather than enabling an understanding of all of it to be available to those caring for the natural environment and other landscape interests.

Historic characterisation places the historic environment beside the natural environment as a provider of social and economic benefits. This enables the historic

environment sector to take part in local, regional and national debates on sustainable change.

As the historic landscape is all-encompassing, characterisations of it and of historic seascape can be deployed alongside landscape character assessments, 'the process of identifying and describing variation in the character of the landscape and using this information to assist in managing change in the landscape' (Landscape Institute 2013, 157), and mappings of geology and soils and the *Living England* representation of semi-natural habitats (Natural England 2023a). Historic Landscape Characterisation (HLC) and Landscape Character Assessment (LCA) are each strengthened when used alongside each other and alongside those other mappings.

Extensive historic characterisations have been made of counties, cities, towns and seascape as HLC, urban characterisation, Historic Seascape Characterisation (HSC) and assessment frameworks of heritage asset types. This work has largely been funded and guided by Historic England but mainly delivered by or for planning authorities, usually via their Historic Environment Record (HER). The characterisations themselves (shapefiles, associated databases and project reports, including Types texts) are normally held as part of the HERs, and many are also available from the Archaeological Data Service (ADS).

Amongst other applications, historic characterisations were intended to be used as spatial frameworks for analyses of past and future change, the latter largely via assessing the sensitivity and capacity of the historic landscape.

Historic England therefore invested in a tool and an approach, built upon inclusive principles, which can help improve engagement of heritage practitioners in strategic planning and strategic management (See Appendices 2, 3, 4 and 5; Clark et al 2004; Herring et al 2021).

Guidance on the development and use of HLC and other forms of characterisation was last reviewed over 20 years ago (Aldred and Fairclough 2003; Clark et al 2004). Any refresh of that guidance should include opportunity and sensitivity assessment, and the review of data quality of individual HLCs that will often be required to facilitate such assessment and most other applications.

1.7 Supporting the European Landscape Convention

Historic characterisation and opportunity and sensitivity assessment support commitments taken on by the UK government as a signatory and ratifier of the European Landscape Convention (ELC). (The ELC is a convention of the Council of Europe (2000), not the European Union, and the UK is still a signatory.)

The aims of Historic England's landscape strategy include the following, all supporting the ELC and all relevant to assessment of opportunity and sensitivity (Historic England 2010).

- Establishing and maintaining links to partner organisations' landscape activity, for example Natural England's Landscape Advisory Group.
- Understanding the pressures for change on the historic landscape and how to respond to them.

- Extending the use of Historic Landscape Characterisation (HLC).
- Developing appropriate guidance, training and educational resources.

The ELC expects all places to be addressed in protection and management measures.

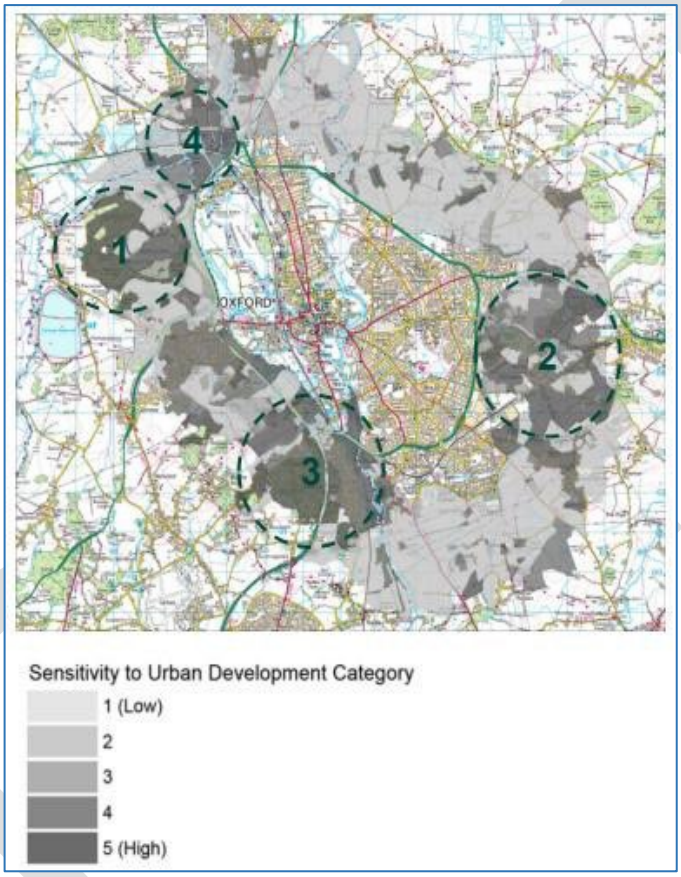
- This includes natural, rural, urban and peri-urban areas, and inland water and marine areas, and ‘landscapes that might be considered outstanding as well as everyday or degraded landscapes’ (Council of Europe 2000, Article 2).

It helps us move away from approaches that leave areas between significant heritage assets blank on the map and thus appear to be places where any kind of change may be considered acceptable.

2 Development of opportunity and sensitivity assessment

2.1 Reviews and pilots

Many exercises in using Historic Landscape Characterisation (HLC) when assessing sensitivity of the historic landscape to change have been undertaken since the early 2000s. A Historic England review of those exercises identified common methods that support a clear and simple approach, the basis of good practice (Herring 2022).



Sensitivity of hinterland of Oxford to urban extension (Tompkins 2017; Oxon CC)

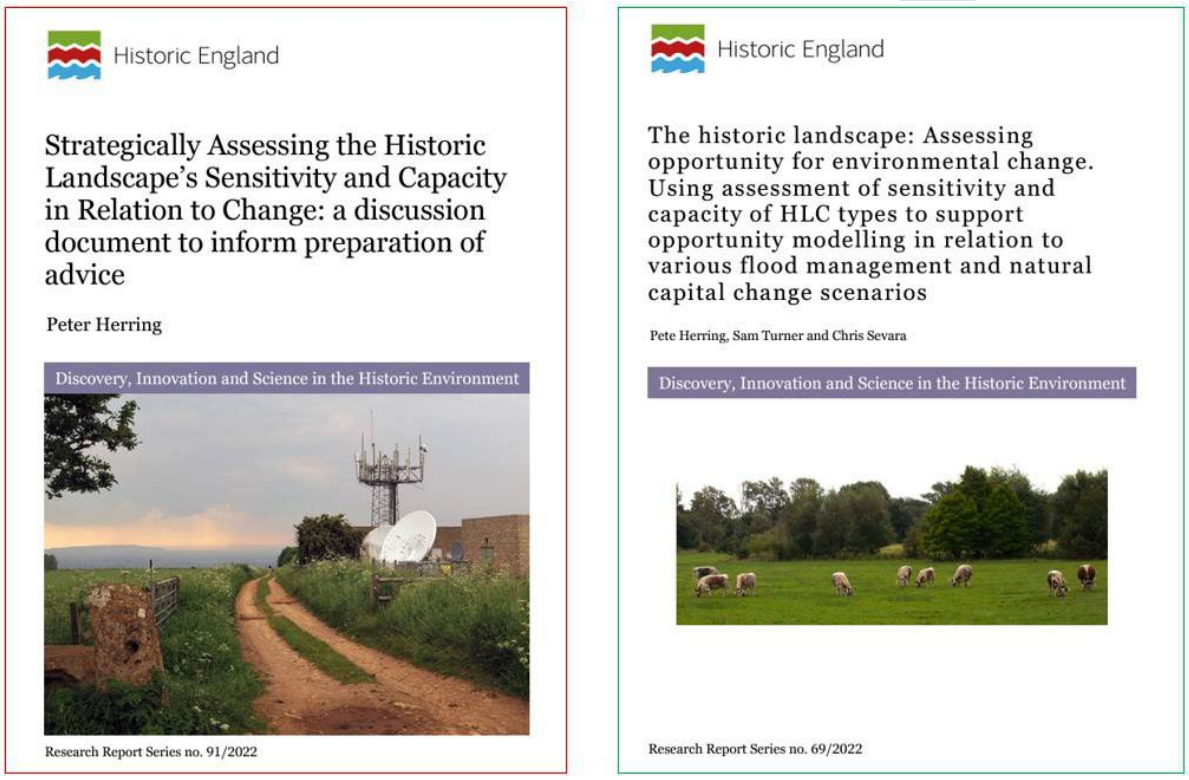
To identify good practice, the review examined methods, principles and sources used, issues encountered, and benefits obtained. It identified key concepts and compared historic environment sector approaches to sensitivity to those developed in the allied discipline of landscape character assessment (Natural England 2019).

A key principle upon which the method depends is that sensitivity is not inherent, that is fixed, regardless of the form of change being considered.

To assume that a place, or a type of place, or a type of landscape, is equally sensitive to any type of change, or has identical capacity to accommodate or benefit from any type of change, can rarely usefully inform complex design and planning decisions.

A separate pilot study commissioned by Historic England and the Environment Agency examined the use of HLC when identifying opportunities for certain types of

change that society largely welcomes, like those addressing climate change and its effects, or those addressing losses in biodiversity (Herring et al 2022). Opportunity assessment helps agencies and other decision-makers make heritage 'part of the solution' to climate change challenges (Historic England 2022a) and ecological crises. The study considered the requirements and effects of flood-response scenarios presented in the Thames Valley Flood Scheme (Environment Agency 2021) as well as several nature recovery scenarios.



Covers of the two Historic England Research Reports whose conclusions form the basis of this guidance

Opportunity assessments identify the historical attributes or qualities of a place that provide 'affordances' for the type of change being considered, or they identify the opportunities that accompany forms of change that are normally regarded as threats.

Patterns and attributes of historic landscape and historic land use can be reused and adapted when designing nature recovery and environmental growth strategies or responding to damaging processes, like coastal and riverine flooding. Affordances – qualities and attributes that can facilitate wished-for change – are established first through exploration of the requirements of change scenarios and then through the ways that attributes of Historic Characterisation Types match those.

Opportunity assessment can also be used when identifying the types of place that are most suitable for all other forms of change or development.

2.2 Combining opportunity and sensitivity assessment

The review, and discussions with the Historic England steering group and external stakeholders, concluded that assessments of opportunity and sensitivity can and should be undertaken together, to maximise the benefits of change as well as to

minimise its negative impacts. Consideration of the effects of a change scenario on the fabric and character of places or types of place should therefore identify both affordances and vulnerabilities.

Definitions of opportunity and sensitivity recognise that each is scenario-specific.

> **Opportunity** draws on a place's inherited attributes, when recognising the 'affordances' it has for certain types of change.
>
> **Sensitivity** reflects the vulnerability of the historic landscape and seascape in relation to the effects of a specified form of change.

3 Beneficiaries of opportunity and sensitivity assessment

3.1 Those engaged in large-scale and long-term change

Opportunity and sensitivity assessment supports those considering the effects of all forms of large-scale change, including the following. Each draws from the past when recognising that designing the future of places, at sea as well as on land, can be actively linked to and inspired by inherited patterns and attributes (Ferraby et al 2023; Sunley and Robertson 2023).

- Strategic planning.
- Strategic design of change that addresses climate and biodiversity crises.
- Policy development.
- Specific large-scale development proposals.
- Addressing urgent national and local needs for the following
    - Housing
    - Infrastructure
    - Sustainable transport
    - Energy generation and distribution
    - Sustainable agriculture
    - Mineral extraction.

3.2 Those tackling climate and biodiversity crises

By employing opportunity and sensitivity assessment, the historic environment sector helps all interested parties better understand an area's 'adaptive capacity', its ability to accommodate change, and the potential for nature recovery including extending or creating habitats (woodlands, wetlands, rough lands, the coast, the sea and its floor, 're-wildings' etc). Attempts to tackle the climate change emergency and biodiversity crises can be informed by the heritage sector's understanding of alternative approaches to change.

Opportunities can be taken to engage with partners in the natural environment sector and those dealing with environmental change on a huge scale, like Defra, Natural England, Forest Research and the Environment Agency and other bodies responsible for taking major landscape and environment decisions to address climate change and land use strategies, including National Park Authorities and the local authorities that oversee National Landscapes (formerly Areas of Outstanding Natural Beauty).

With Historic Characterisation, and with approaches like opportunity assessment, the historic environment sector finds itself better equipped than most others to feed into initiatives like the following. All of these can help reinforce valued patterns or recreate recently lost semi-natural environment.

- Strategic environmental policy (biodiversity, natural capital, ecosystem services).
- Extensive land and sea management.

- Offsetting of environmental impacts of development.
    - Planting as carbon offsetting and securing Biodiversity Net Gain.
    - Nature Recovery initiatives also reach into the sea, extending to low water, as does the need to ensure Biodiversity Net Gain.
    - A form of Marine Net Gain is under development.
- Structural responses to climate change.
- Extending renewable energy.
- Designing Nature Recovery Networks and other large-scale plans for landscape and environment.
- Targeting of environmental programmes.
    - Targeting or prioritisation of government-supported land use change like woodland and forest creation.
    - Agri-environmental scheme targeting.
- Environmental growth.
    - 'Not just protecting but also enhancing nature – ensuring that there is more of it, and that it is bigger, better, more diverse and more joined up' (Cornwall and Isles of Scilly Local Nature Partnership 2021, 9).
- Development of Historic Environment Action Plans (HEAPs) which may include semi-natural environmental growth initiatives.
- Woodland planting and other land use change, including re-wilding.

3.3 Those involved with strategic planning

As noted, opportunity and sensitivity assessment fit better with strategic planning rather than more detailed stages of design though it may feed into master planning and parameter planning. The following are some of the types of strategies, plans and policies such assessments can contribute to.

- Strategic landscape planning policy.
- Modelling areas that may be suitable for inclusion in Local Plans and Neighbourhood Development Plans.
- Nationally Significant Infrastructure Projects (NSIPs), at sea as well as on land.
- Marine Plans, prepared by the Marine Management Organisation.
- Strategic landscape management policy.
- Strategic Environmental Assessment as conducted by government departments for defined plans and programmes, such as any expansion of renewable power infrastructure.
- There are also strategic marine spatial planning exercises including Marine Spatial Prioritisation and the Crown Estate's Whole of Seabed approach.
- Environmental Impact Assessments.
- Environmental Statements.
- Sustainability Appraisals in plan formulation.
- Nature recovery plans and networks, including Local Nature Recovery and Landscape Recovery schemes in Environmental Land Management (see Natural England 2023b).

All these applications are generally deployed at early stages in designing and effecting change. More detailed work would normally be undertaken later in development, usually using finer grained characterisations, such as the deepening undertaken in urban landscape, rather than the 'county' level HLCs.

Historic Characterisation and opportunity and sensitivity assessment also enable the historic environment sector to collaborate with partners in other disciplines when they deploy Landscape Character Assessment, Seascape Character Assessment, Landscape and Visual Impact Assessment and the like.

3.4 Partnership building

Partnership working can be expected to be a rapidly growing area for the historic environment sector. Historic characterisation and opportunity assessment enable it to work alongside landscape and natural environment sectors including when they work on ecosystem and natural capital analyses. They can support the UK Natural Capital and Ecosystem Assessment in reviewing its understanding of the role of historic communities in creating the patterns of land cover it seeks to sustain, and improve, including in both Enclosed and Unenclosed Land.

Partners benefiting from opportunity assessment include DEFRA, Ministry of Housing, Communities and Local Government (MHCLG), Natural England, Environment Agency, National Trust, CPRE, and all those who develop equivalent means of assessing effects of change on other aspects of landscape and environment.

3.5 Those concerned with individual and societal wellbeing

Opportunity and sensitivity assessment will also be of interest to the wider community, in all its diversity of identity and interest in and commitment to places, and their past and future.

Historic Characterisation's inclusive and comprehensive approach to landscape and the whole historic environment, and to the diverse communities and individuals who enjoy, value and gain wellbeing from them, supports Historic England's strategic aims. These include those set out in its Corporate Plan, its *Places Strategy* (Historic England 2018), *Research Strategy* (Historic England 2016), *Research Agenda* (Historic England 2017), *Strategy for Wellbeing and Heritage* (Historic England 2022b) and other means by which it directs and influences its and its partners' activities and resources.

Opportunity and sensitivity assessment using Historic Characterisation also meets the requirements of the European Landscape Convention. Ratifying governments, such as the UK, should manage all landscape, including the everyday and degraded (Council of Europe 2000, Article 2).

Historic England and wider society expect that our improved understanding of the fabric, character and significance of England's historic landscape and historic environment will be taken into account in upstream strategic planning at the national, regional, city and planning authority levels. This would involve assessment of

opportunities and threats across whole counties, cities and planning authority areas, including, when appropriate, across the whole country.

4 Three-stage method of opportunity and sensitivity assessment

Agencies, authorities, developers and communities require opportunity and sensitivity assessment to be consistent and to have authority. They need this when supporting integration of the historic landscape with the natural environment when addressing land use change and when responding to climate change. It also needs it when addressing the requirements of the NPPF, its marine equivalent the UK Marine Policy Statement (HM Government 2011) and other formal planning processes.

To ensure such consistency, it is expected that the simple three-stage assessment method presented here will be specified and deployed. The method is supported by broad principles and ground rules. (See Section 5, 'Practical matters' for further advice and for things to bear in mind when undertaking assessments.)

The approach has also to be sufficiently flexible that each stage can be adapted to accommodate differences in magnitude and complexity of change scenarios, and variations in extent, scale and granularity of the existing historic characterisations.

The reviews and discussions culminated in a scenario-led approach that has opportunity and sensitivity assessment progressing through three stages, the second in three connected parts.

1 Critical consideration of the change scenario, identifying its particular requirements and effects.

2 Working with Historic Character Types, consider how those requirements and effects can both draw from and impact the historic landscape (2a and 2b respectively), and then consider how the historic landscape's significance may influence the conclusions drawn (2c).

2a Assessment of the affordances of each Type in relation to the scenario's requirements.

2b Assessment of the vulnerabilities of each Type in relation to the scenario's effects.

2c Assessment of the significance of those affordances and vulnerabilities by considering how the scenario draws on or affects the heritage values of each Type and its attributes.

3 Drawing together assessments of effects, affordances, vulnerabilities and significance and presenting opportunity and sensitivity in the form of maps and associated commentary, including recommendations.

Attributes assessed for affordances and vulnerabilities also contribute to significance. Use of the broadly-based Heritage Values allows the more formally recognised and more narrowly defined 'importance' of heritage assets and local places to be called upon later in decision-making, within planning management processes or when prioritising funding.

Care needs to be taken to employ closely defined terms for effects, impacts, sensitivities and opportunities so that qualitative judgements are undertaken systematically and transparently.

4.1 Stage 1 Examine the change scenario and ensure the Historic Characterisation is fit for purpose

Change scenarios may be grouped into broad types (Appendix 1), including the following.

- Major development (settlement, industry, infrastructure, etc).
- Climate change and natural processes, and responses to them, including changes to hydrology (river and moorland restoration, etc.) and other nature-based solutions.
- Changes in land use and practices.
- Tall structures.
- Proactive environmental management, including nature recovery.
- Continuance of established ways.
- Neglect.

Gather together understanding of the range of known or predictable effects of the change scenario. Consider their likelihood, scale and adjustability. The design of change can often be adjusted to minimise negative effects and increase or accentuate positive ones. Extent, height, density, spacing and form of the features that it will introduce into an area may all be adjustable.

The following are headings of groupings of effects considered in pilot opportunity assessments (Herring et al 2022). Others may be developed according to need and those introduced here can be refined as the understanding of a particular change scenario develops.

Alignment with the four Heritage Values (Aesthetic, Communal, Evidential and Historical, as set out in *Conservation Principles*; English Heritage 2008) and other values (such as Semi-natural Values) is highlighted here to ensure that assessments are carried out with awareness of how changes affect those factors that also contribute to significance.

Historic landscape character: how the change scenario affects or draws upon the ways the landscape's character has been created by historic activities and processes. *Consider Historical, Evidential and Aesthetic and Semi-natural Values.*

- Affecting landscape coherence and legibility. *Consider Historical, Evidential, Aesthetic and Semi-natural Values.*
- Changing landscape's distinctiveness, narrative and meanings. *Consider Aesthetic, Historical and Communal Values.*

Time-depth legibility: how it affects visible evidence that shows past changes in land management or land organisation. *Consider Evidential Value*.

- Revealing or disturbing archaeological remains and built structures. *Consider Evidential, Historical and Aesthetic Values*.

- Introducing eye-catching features and distracting attention from other aspects of the historic environment. *Consider Aesthetic and Historical Values*.

Historical land use and land cover: how it affects or draws upon semi-natural vegetation communities (like grass, scrub or wooded land) that developed under different land uses. *Consider Historical, Evidential and Semi-natural Values*.

- Affecting landscape connectivity and operation. *Consider Aesthetic, Communal and Semi-natural Values*.

Natural capital and ecosystem services: how it affects or draws upon the ways that structures, earthworks and land cover support biodiversity enrichment, and carbon sequestration and storage. *Consider Semi-natural value.*

- Enhancing or degrading semi-natural communities. *Consider Aesthetic and Semi-natural Values*.

Recreational amenity: how it contributes to 'Cultural Services', especially as it invites physical and mental engagement with place. *Consider Aesthetic and Communal Values*.

- Affecting senses of tranquillity and activity. *Consider Aesthetic Values*.
- Affecting senses of place and identity. *Consider Communal Values*.

Identify the 'affordances' that each change scenario requires and that types of places might possess. Then consider what historic landscape attributes are likely to provide such affordances.

Those Historic Character Types most likely to be affected by the scenario are identified during this stage. Most forms of change can be expected to affect only a fraction of the range of ~~HLC~~ Types. Set out which attributes of the identified Historic Character Types can be expected to be affected by the scenario. See Appendix 4 for typical attributes recorded in HLCs.

Bear in mind that opportunity and sensitivity assessment using HLC should be confined to large-scale strategic planning and not used for site-specific decision-making on particular site-based proposals (see Section 1, Introduction). The level of detail and accuracy (that is, map resolution) of sensitivity and opportunity assessment should therefore reflect data source quality and use an appropriate map scale. Preferred scale cannot be stated here in absolute terms as assessments might range from Britain-wide to a portion of a county, but it may be expected that scale of mapping would never be greater than 1:25,000, and more usually be 1:50,000 or smaller.

The map resolution used for opportunity and sensitivity assessment should also correspond with that used for HLC. Where the HLC, or several HLCs, lack appropriate detail and accuracy, it may be necessary to adjust the granularity of the recording of those HLC Types that are most relevant to the study. Their description and interpretation may require refinement and may extend to subdivision into more useful sub-types. For example, if the change scenario is expected to especially affect areas of woodland, then it would make the assessment most useful if the polygons

and associated databases for various Woodland HLC Types were systematically reviewed and, if necessary, Types were broken into more subtle subtypes.

Such deepening exercises should be undertaken using established HLC procedures. All new data should adhere to FAIR principles, that it is Findable, Accessible, Interoperable and Reusable (Wilkinson et al 2016) and be shared with the data owner for the host HLC, so that others are able to use it in future.

4.2 Stage 2 Assess Historic Character Types

The positive and negative effects of the scenario on historic landscape and historic environment (as set out in stage 1), are then systematically assessed and either scored or graded for each Historic Character Type affected. The significance of the Type in relation to those effects is also assessed and graded.

This stage is therefore in three parts: assessment of opportunity, sensitivity and significance of Historic Character Types in relation to the specific change scenario. This is achieved through evaluating the relevant affordances, vulnerabilities and values.

- Before starting this stage, familiarise yourself with the Historic Character Types that will be assessed. Set out the rarity, distribution and principal historical and landscape attributes of each Type. Use the databases associated with the GIS mapping, and existing Historic Character Types texts (see Appendix 5).

Stage 2a Assess affordances in relation to the scenario

Consider how the Historic Character Type's typical land use and land cover, earthworks, patterns, etc., lend themselves to the scenario's opportunities for historically appropriate change, either through their inherent affordances or through the ways these may be adapted. The affordances required of a change scenario have been drawn out in Stage 1.

Align the affordances with each Type's attributes as recorded in the Historic Characterisation database.

Scoring or grading of affordances for each Type can include assessment of the following.

- Degree to which the framework (boundaries, built environment, roads and pathways, etc) and the grain of the historic landscape as represented in the Historic Characterisation Type can be drawn upon and reinforced or enhanced by the proposed change.
- Degree to which the legibility of time-depth in the landscape can be improved by the proposed change.
- Degree to which historic land use and land cover can be restored without compromising other high-value natural capital.
- Degree to which historic land use can inspire either reversions or similar new uses.

- Degree to which the public amenity potential of the Historic Characterisation Type can be realised.
- Degree to which individual and community wellbeing can be enhanced.

The most efficient method of ascribing scores when undertaking opportunity and sensitivity assessments would be through a binary yes-no recognition of affordances. More subtle judgments about scale may involve generating grades or scores for Historic Characterisation Types (typically 0 to 5) for each affordance analysis. Simple schemes of weighting can also be deployed to reflect likely variability in the scale of effects. These may be imposed as maximum scores that any Type could be given for each form of affordance.

To help users understand how scores were arrived at, it is important to include commentary summarising basic presumptions about the scenario's scale and nature, and thus weighting schemes.

Scores may be combined to indicate overall capacity or opportunity, or they may be used separately to inform the design of particular aspects of the proposed change.

Stage 2b Assess vulnerabilities in relation to the scenario

Consider how each Historic Characterisation Type expected to be affected by the change scenario is vulnerable to the predictable effects identified in Stage 1.

The ways that historic landscape and seascape are vulnerable to the effects of change include the following.

- Alterations to distinguishing features, such as
    - built environment,
    - archaeological remains,
    - land use,
    - semi-natural components and patterns.
- Alterations to the legibility of narratives in the historic landscape.
- Alterations to the contribution historic features and aspects make to overall landscape character.
- Reduction or increase in enjoyment of historic landscape as an amenity.

Scores (typically 0 to 5) or grades reflect judgments about scale of vulnerability. Again, weighting schemes can reflect the likely scale of effects, expressed as maximum scores that any Historic Characterisation Type could be given for each form of vulnerability.

To help users understand scorings, summarise basic presumptions about the scenario's scale and nature.

Again, scores may be combined to reflect overall vulnerability, or they may be used separately to inform design particular aspects of the proposed change.

Stage 2c Assess significance in relation to the scenario

Consider how much the significance of the Historic Character Type matters in relation to the opportunities and vulnerabilities of a change scenario.

> ‘The significance of a place embraces all the diverse cultural and natural heritage values that people associate with it, or which prompt them to respond to it. These values tend to grow in strength and complexity over time, as understanding deepens and people’s perceptions of a place evolve’ (English Heritage 2008, 21).

That definition of significance, drawn from *Conservation Principles*, is the most appropriate when considering the all-encompassing historic landscape and historic seascape. Like Historic Characterisation itself, it extends interest beyond the heritage asset to include the whole of an area and to address its complex, swirling, historical meaning and value, varying according to who is relating to it, and when and why they are doing so. It enables links to be made to people’s senses of place and identity and shows how these contribute to health and wellbeing.

Historic Characterisations do not ascribe a fixed value to character types. However, the recorded attributes of each character type enable values to be assessed when required. This follows the Historic Characterisation principle that the basic characterisation itself is done even-handedly and that assessments of significance or value are undertaken at a later stage when a particular application (such as opportunity and sensitivity assessment) requires it (See Appendix 3). This separation recognises that the qualities contributing to a place’s significance are affected differently in different scenarios.

As noted, care needs to be taken to ensure that criteria for scoring or grading significance or value are kept separate from those for vulnerability and affordances, to reduce double-counting. It is best, therefore, to apply judgements regarding significance to an Historic Character Type as a whole, rather than to the more granular attributes that are assessed when scoring or grading affordances and vulnerabilities.

Early exercises in assessing sensitivity of the historic landscape to particular forms of change considered variables derived from criteria used when assessing individual heritage assets. These include the following.

- **Time depth**; an area’s temporal diversity and its main periods.
- **Rarity and special interest** of the Historic Character Type or of key components of it.
- A **measure of landscape dynamism or stasis**, including the degree to which it forms a palimpsest of layers of change, or is a simple coherent landscape.
- **Legibility**, or the ways that earlier layers can be understood and appreciated in the present-day landscape.
- **Survival** of the Historic Character Type in the wider area.
- Typical **Condition** of the Historic Character Type’s typical components.
- Local character, **distinctiveness** and local perceptions and values. Also cast as ‘representativeness’ or ‘essence’.
- **Intangible heritage** including traditional ecological knowledge.
- Cultural (including artistic or literary) **associations**.
- **Biodiversity**, current (i.e. inherited) and potential.

- **Research potential**.
- **Amenity** potential.

Overlaps with the criteria used when assessing affordances and vulnerability will be apparent. Sensitivity assessments developed after 2008 extended and rationalised consideration of significance by replacing the criteria listed above with the four Heritage Values introduced then in *Conservation Principles*. By putting greater emphasis on peoples' responses to place they reach further into the concept of landscape as something perceived (by senses and by understanding).

They are also more broad-brush and so better suit the broad-brush representation of historical understanding encapsulated in Historic Characterisation.

- **Aesthetic Value**: 'Value deriving from the ways in which people draw sensory and intellectual stimulation from a place'.
- **Community Value** 'Value deriving from the meanings of a place for the people who relate to it, or for whom it figures in their collective experience or memory'.
- **Evidential Value** 'Value deriving from the potential of a place to yield evidence about past human activity'.
- **Historical Value** 'Value deriving from the ways in which past people, events and aspects of life can be connected through a place to the present' (English Heritage 2008, 71-72).

The Heritage Values depend on recognising that all landscape has value and that perceptions of it are variable as local context, distinctiveness and contribution to local identity are all relevant.

Heritage Values have also been incorporated into assessments of the cultural distinctiveness of places (e.g. Cornwall Council 2019).

The DCMS is developing means of valuing Culture and Heritage Capital (Sagger et al 2021). While early iterations are focussed on heritage assets and objects, it may be expected that it will expand its range and provide a useful framework for applying aspects like condition, services and benefits, and Use and Non-Use Values to the whole historic landscape and historic environment. These too may be of interest to those undertaking opportunity and sensitivity assessments.

4.3 Stage 3 Present results

Presentation of the results of assessments of opportunity and sensitivity includes maps, associated databases, and commentary, including recommendations.

The analyses of affordances, vulnerability and significance that underpin opportunity and sensitivity assessment must be performed in GIS, and results presented visually by mappings generated within GIS. This will drive greater use of such assessments and of HLC more generally. Following the FAIR principles (Findable, Accessible, Interoperable and Reusable) enables consistency of approach, transparency in the use of base datasets, and efficiency in the handling of data. The use of controlled terminology and taxonomies is essential for data quality.

GIS enables multiple presentations of results of opportunity and sensitivity assessment to be made. Decision-makers may find totalised scores for affordances, vulnerability and values useful when requiring an overview. They can also draw out finer-grained component scores, or permutations of combinations of these, as their work on design and detail requires.

Use map visibility controls (you can set these in GIS environments) so that results of assessments can only be viewed at their resolution scale or higher (i.e. not allowing people to zoom in and use the material inappropriately).

Opportunity and sensitivity assessments are often presented as traffic-light maps (red for high, green for low sensitivity or vice versa for opportunity). Such outputs are readily understandable, visually and conceptually. Such colour-coded maps and tables can, however, give a false impression of precision, objectivity and certainty when the material is derived from characterisations of landscape. More nuanced (and more certain) mapping and interpretation will be facilitated by higher quality Historic Characterisation attribute data. Certainty or confidence levels can be conveyed using geospatial techniques.

Other ways of presenting scorings on GIS may include assessing clustering of polygons that have high scores for affordances / opportunity or vulnerability / sensitivity for a particular change scenario. Such hot-spots or cold-spots could inform coordinated action.

Because assumptions and simplifications are embedded in Historic Characterisation, as well as in the scoring or grading process, an accompanying narrative is essential. It should set out the parameters and tolerances of the method and the results, and thus the potential variability within assessments of sensitivity. Mapping of grading or scoring should therefore always be presented as 'workings' from which the more nuanced narrative conclusions are drawn.

The aim of assessment is to inform more thoughtful consideration of change: it does not provide 'off the shelf' answers but does allow decision-makers to better understand the effects of particular forms of change on particular types of place.

Text should also set out how the outputs can be used (in developing strategies and policies, informing management, etc), by whom, and how they will access them. This text should be embedded in the geospatial dataset derived from the assessment. It should clearly set out cautions and caveats regarding use of the material and should bear in mind again that use of Historic Characterisation to model sensitivity is an early stage in engaging with proposed change.

Text should be clearly structured, be in plain English, and include reasoned narrative, conclusions and recommendations. The latter would normally be at the level of prompts for location and design. The aim is to guide initial decisions regarding whether to proceed in a general area, or type of place, and in what general form, not to inform detailed final decision-making about individual proposals for change.

The approach to reporting and using sensitivity assessment therefore adopts principles developed for Natural England's approach to landscape sensitivity assessment (Natural England 2019).

- Be as straightforward as possible: 'clear, concise, proportionate, and transparent… [and] for the sake of consistency, use appropriate definitions associated with good practice.' Use controlled terminologies, but create and use new terms as required.
- Recognise that sensitivity assessment is flexible and can be accommodated to different situations by varying scales and units (types, areas, etc.) as appropriate and by adapting to the resource available, and to current knowledge of the scenario and characterisation of the area.

It cannot be stressed too firmly that the high-level assessment of opportunity and sensitivity using Historic Characterisation↑ is intended for use strategically and early in the consideration and design of large-scale change. It is not expected to inform decision-makers operating further along the process of planning and designing change who deal with specific proposals in specific places.

Stage 1 Think through the change scenario and prepare for the assessment

- Understand the change scenario:
    - its requirements and thus the affordances to look out for to identify opportunities.
    - its effects and thus the expected vulnerabilities of Types of historic places which enable us to identify sensitivities.
- Establish the assessment scale (1:25,000 or smaller) and ensure the Historic Characterisation is fit for purpose.
- Consider how to reflect levels of effects and needs through weighting schemes. Undertake all work in GIS.

Stage 2 Assess Historic Character Types

2A Opportunity How does each Type match the scenario's needs, or affordances? Use simple scoring scheme. Weightings introduce maximum and minimum scores.

2B Sensitivity How is each Type vulnerable to the expected effects of the scenario? Use simple scoring with weightings as above.

2C Significance How much does the Type's significance or value matter in relation to both opportunity and sensitivity?

Stage 3 Present results and make recommendations

GIS enables mappings of scores for Historic Character Types for Opportunity, Sensitivity, and then Significance in relation to both Opportunity and Sensitivity.

Because the base data is characterisation, maps are presented as initial workings and accompanied by a reasoned narrative drawing conclusions, setting out caveats and making recommendations.

Recommendations should be strategic, such as prompts for location and design.

5 Practical matters

5.1 Alternative and overlapping terms

Consideration of the ways that other terms overlap the meanings of opportunity and sensitivity helps when drawing conclusions or presenting them, and when preparing recommendations or making decisions.

Capability, potential, and capacity work well as aspects of opportunity; they reflect a place's openness to change and enhancement. Acceptability indicates the tolerance of change by communities of place or interest. Acceptability also informs our understanding of risk, harm, robustness, vulnerability and resilience. They in turn reflect how a place can recover from change, whether physically or within peoples' perception.

Most assessments of sensitivity to a particular form of change can be expected to also include assessments of susceptibility and capacity. An assessment of 'high' sensitivity 'does not necessarily mean that there is no ability to accommodate development and "low" sensitivity does not necessarily mean that there is definitely scope for particular development' (NatureScot 2020, 6).

5.2 Accommodating variability in HLCs

There is variability between England's HLCs because Historic England encouraged each to explore and improve a basic method and make use of rapidly developing digital technologies. They were also encouraged to develop characterisations that most faithfully and usefully reflect the history and character of their part of England. Types identified in the original HLC, in Cornwall, would be a poor fit in Suffolk, Staffordshire or Northumberland. See Appendix 2 for an introduction to HLC and the principles guiding its creation and use.

Creation of a National HLC, which can be used in very high-level assessments of opportunity and sensitivity, demonstrated that differences between HLCs can be resolved when working at the smaller, simplified scale needed for regional and national characterisations (Exegesis and Locus 2017). Concordances of HLC Types and Historic England's thesaurus for Historic Characterisation (Herring et al 2015) enable combination and translation to produce material that can be assessed at regional and national levels.

Note too that opportunity and sensitivity assessment might also require the commissioning of a review of the attributes in the HLCs ~~and HSC~~ to be deployed, providing the opportunity to ameliorate differences between them, and to ensure that the data being used is as fit for the particular purpose as possible. This would follow on from establishing which attributes are the most susceptible to damaging change or provide the greatest opportunities for desired change. Then a rapid review of the sources used in the original HLC would ensure the variability in those attributes has been captured in the HLC's relational dataset as reasonably as it can.

5.3 Highest standard data and assessment

All assessments should be undertaken carefully and thoughtfully. The data on which they are based need to be sound so that decision-makers have confidence in results. It is in the interest of the developer or proposer of change that this is so – the better to identify both risks and opportunities. It should therefore be for them to ensure that the process and the material deployed are of the highest standard. For this reason, it should be them that provides resource for all aspects of the assessment of opportunity or sensitivity, including any necessary enhancement of the Historic Characterisation (see above, Stage 1 of the method, Section 4).

Such enhancements should follow established HLC procedures, and all new data should adhere to FAIR principles, that it is Findable, Accessible, Interoperable and Reusable, and should be made available for others to use in the future, as appropriate.

5.4 Scale and resolution

The scale and resolution of analysis and then the mapping of results should reflect that Historic Characterisation, covering enormous areas, can only be a high-level spatial representation of summary interpretations of history. As noted (Section 4), opportunity and sensitivity assessments should therefore not be undertaken at scales greater than 1:25,000. This will ensure that such assessment is confined to large-area strategic planning.

5.5 Using HLC alongside other historic environment information

Complementary sources of historic landscape information include distributions of point data (such as those indicating designated heritage assets or Historic Environment Record items) or summaries of delineated areas (with unique narratives, descriptions and interpretations) such as designated areas or Historic Environment Character Areas. The latter have been deployed in south-east England and used in work on the Oxford-Cambridge Arc (Conway 2023) and in the archaeological sensitivity work recently undertaken for Historic England (Last and Kidd 2023). Each brings benefits, but each also has shortcomings, especially around uneven-ness and partiality, when the aim is to apply an even-handed and systematic approach to an extensive area (regional or national).

Point and area data can be used in ways that are complementary to types-based characterisation approaches to assessment.

5.6 Assessing each aspect of landscape separately

Preparation of assessments for each form of landscape (visual/aesthetic and historic) and environment (natural and historic) are best kept separate so that decision-makers are able to compare and if appropriate integrate their outputs. Melding the material into combined characterisations is seldom useful (Fairclough and Herring 2016). Melding disparate qualities can offset or neutralise the affordances, vulnerability and significance of each, diminishing the usefulness of opportunity and sensitivity assessments.

There would also be problems when simplifying the results of opportunity and sensitivity assessment, from fine-grained mappings based on Types and Sub-Types to broader areas. The aim would be to make the material appear less complex for users and decision makers. However, such combination and simplification again tend towards neutralisation as merging high and low sensitivities creates large tracts of medium sensitivity, leaving decision-makers working with greater uncertainty.

5.7 Working with local and distinctive character

Opportunity and sensitivity assessment reflect local or regional variability in historic landscape character. Scorings, narratives and recommendations would not be expected to be the same in Kent, Cornwall and Cumbria, given their very different histories and characters. In some circumstances, such as in types of change overseen by the Planning Inspectorate, assessment schemes might be expected to be consistent across the country, to maintain methodological transparency. But in most other applications, such as those concerning locally distinctive land uses or semi-natural communities, then recognition of local distinctions requires the method to be appropriately flexible.

5.8 A method that continues to develop

Well-defined ground rules based on shared principles should allow variability in opportunity and sensitivity assessment according to specific needs and available resource. Principles and good practice can then be allowed to continue to develop as changing needs and resources determine and as developing technologies require and allow.

Historic England will share case studies on its website.

5.9 Transparent and even-handed method

Care should always be taken to ensure the process is transparent, even-handed and involves logical justifications of procedures to ensure it produces material that all users can accept is robust and credible. This should extend to keeping language clear and jargon-free. It is important that local and non-specialist communities can understand and contribute to the evaluations being made about places they know and care about.

Creation of new geospatial datasets should adhere to specific, clear standards. High-quality metadata should document this process in detail. All metadata should be embedded in the geospatial files. Assessments of sensitivity or opportunity will produce metadata that should be made available to later users, provided it is relevant to their needs. GIS tools can be used to help drive development of best practice, like embedded terminologies via drop-down menus and automated attributes where appropriate and relevant. Use existing standards for date formatting etc.

It may be expected that the HLC datasets curated by HERs will be supplemented by the derived datasets created during sensitivity and capacity assessments. When doing so, care should be taken to ensure that the scope and limitations of such derived datasets are made clear, including in their metadata, to avoid the risk of

datasets prepared in relation to specific change scenarios being regarded as another set of baseline data. This is to avoid the material generated from assessments being perceived as a form of 'inherent' opportunity or sensitivity mapping.

5.10 Narrative approach to presentation

Given complex and ever-changing contexts for decision-making, a narrative approach supported by carefully critiqued scoring or grading is considered the best to adopt for communication of assessment results.

As noted, scoring suggests an objectivity that is difficult to justify when using characterisation. However, scoring and grading create intelligible frameworks within which professional judgements can be exercised. They are then one early phase in a process of thinking through all aspects of a change scenario. They help assessors and users judge criteria in consistent and comparable ways, and marshal and refine those judgements.

It may be noted that scores in opportunity and sensitivity assessments are normally on interval scales, not ratio scales. A score of 2 is more sensitive than a score of 1, but not necessarily twice as sensitive.

Differences in the scale or probability of the effects of change scenarios can be accommodated by adjusting weightings in any grading or scoring.

Scores or grades given to opportunity and sensitivity can counteract and neutralise each other so it is clearer and more useful for decision-makers if they are treated separately. Separate scoring also enables useful discussion of each and requires assessors to think constructively about opportunities and benefits of change, as well as how to avoid, reduce or mitigate the negative impacts.

As there is a risk of double counting within decision-making processes, designation (Scheduled Monuments, Conservation Areas, Listed Buildings, etc) should not be included as a criterion in sensitivity or opportunity assessment.

5.11 Addressing Historic Seascape Character

Historic Seascape Characterisation's principles and basic method were developed from those of HLC. There are three differences in method which those using HSC need to be aware of.

1 Mapping and other spatial sources employed by Historic Seascape Characterisation (HSC) are resolved into grid-based polygons rather than free-drawn polygons (partly to create distance from copyrighted source material), but these are then treated essentially as polygons are in HLC. (Note that the National HLC was also based on a grid.)

2 HSC is not single layered as HLC is (which deals only with the surface of the land) but instead considers four layers of the seascape (surface, water column, sea floor and sub-sea floor).

3 HSC relies on proxy data (such as solid geology, sediments, etc) more than HLC typically does (though much of HLC is also based on interpretation of fairly restricted sources).

Much past marine activity only informs perceptions in a cognitive sense, that is by knowing, thinking and reasoning, not as visibly legible features of the present-day seascape. Material remains from much of that past activity (which took place mainly on the surface or in the water column) now usually only lie on, in or under the seafloor. Other remains on the seafloor may be derived from periods when these areas were either dry land or inter-tidal.

HSC addresses coastal landscape from a marine perspective, the texts prepared for HSC Types emphasise the ways that the fabric, history and character of such landscape can have quite different meanings and values when regarded as parts of the maritime realm. Assessment of the interface of land and sea, using HLC and HSC, needs to recognise both coastal and terrestrial aspects.

5.12 Complementing other landscape and environmental interests

Care needs to be taken when assessing historic character to acknowledge overlap with other areas of interest, like landscape and natural environment. Overlap is impossible to avoid as all landscape is also historic landscape, and all nature in the British Isles is semi-natural, and thus semi-cultural. To rigidly separate interests from each other would be artificial and unhelpful, as much of the potential for good partnership working and good decision-making depends on the dynamic relationships that exist between the overlapping spheres of landscape and environment, each with natural and historical dimensions.

However, those dealing with historic environment interests should be aware of when and how their assessments overlap with those done by others.

Glossary

Acceptability

The degree to which change may be tolerated by communities of place or interest.

Adaptive pathway

'A decision-making approach, that allows decision-makers to take actions under uncertainty' (Environment Agency 2024, 1).

Affordance

'Affordance: typically used to describe the range of potential uses made available to the user. This term is often used in contrast to "constraint"' (McArthur 2018).

Assessment Framework

A simple generalised process of assessing how best to care for a type of heritage asset. It draws on the comprehensive and inclusive principles of historic characterisation and typically involve four stages of assessment. 1) summarise the type's history and character, 2) assess its significances, 3) consider its needs and potential in relation to change, 4) consider siting and design issues. For an example, see Lake 2015.

Attribute

The base data of historic characterisations; morphology, pattern, date, form, material, etc. Usually recorded via drop-down menus according to the broad character type. So, different attributes are recorded for broad types like Industry, Farmland, Ornamental, etc. Held within a database attached to GIS. Attributes can be queried in analyses. They can also be mapped to emphasise certain aspects of historical character.

Biodiversity Net Gain (BNG)

An approach to development that ensures that habitats for wildlife are left in a measurably better state than they were before a development. In England, BNG is mandatory under Schedule 7A of the Town and Country Planning Act 1990 (as inserted by Schedule 14 of the Environment Act 2021). Developers must deliver a BNG of 10%.

Capability

Capable of being used or developed in a specific way. Similar to susceptibility, but rather more positive.

Capacity

'The amount of change of a particular type that can be accommodated without having unacceptable adverse effects on the character of the landscape, or the way that it is perceived, and without compromising the values attached to it' (Swanwick 2004).

Change scenario

The form of change whose predictable effects are being assessed.

Character

‘Landscape character. A distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse’ (Natural England 2019, Glossary).

Characterisation

‘The identification and interpretation of distinctive and critical aspects, in HLC usually by rapid assessment of attributes of patterns or complexes as portrayed in selected comprehensive sources, typically maps (current and historical) and aerial photos coupled with area-wide analyses of relevant features, like place-names.’ (Herring et al 2021)

Conservation Principles

Influential publication setting out a logical approach to making decisions about all aspects of the historic environment. Introduces the four Heritage Values (English Heritage 2008).

Constructive Conservation

‘A positive and collaborative approach to conservation that focuses on actively managing change. The aim is to recognise and reinforce the historic significance of places, while accommodating the changes necessary to ensure their continued use and enjoyment’ (Historic England 2008).

Cultural Services

‘Goods and services produced by culture and heritage assets provide benefits to people, for example improving wellbeing, and create spillovers to the wider population such as a more productive workforce’ (Sagger et al 2021).

Distinctiveness

‘Key characteristics. Those combinations of elements which are particularly important to the current character of the landscape and help to give an area its particularly distinctive sense of place’ (Landscape Institute 2013, 156-157).

In a project studying distinctiveness in Cornwall, part funded by Historic England, two forms of distinctiveness were identified: those types or qualities that are Particular (or peculiar) to an area, and those that are Typical of an area (Cornwall Council 2019).

Ecosystem Services

‘The benefits provided by ecosystems that contribute to making human life both possible and worth living**.** The Millennium Ecosystem Assessment grouped ecosystem services into four broad categories:

- Supporting services, such as nutrient cycling, oxygen production and soil formation. These underpin the provision of the other 'service' categories.
- Provisioning services, such as food, fibre, fuel and water.
- Regulating services, such as climate regulation, water purification and flood protection.
- Cultural services, such as education, recreation, and aesthetic value (Landscape Institute 2013, 155-156).

Effects

The range of negative and positive changes, temporary, permanent, and cumulative, that can be expected to result from a change scenario.

Environmental Growth

'Environmental growth is about not just protecting but also enhancing nature – ensuring that there is more of it, and that it is bigger, better, more diverse and more joined up' (Cornwall and Isles of Scilly Local Nature Partnership 2021, 9)

Environmental Impact Assessment (EIA)

'EIA is a way of ensuring that significant environmental effects are taken into account in decision making' about a proposed development (Landscape Institute 2013, 5).

It is 'the process of gathering environmental information; describing a development; identifying and describing the likely significant environmental effects of the project; defining ways of preventing/avoiding, reducing or offsetting or compensating for any adverse effects; consulting the general public and specific bodies with responsibilities for the environment; and presenting the results to the competent authority to inform the decision on whether the project should proceed' (Landscape Institute 2013, 156).

The topics that require investigation in EIA include cultural heritage (including architectural and archaeological heritage) and landscape and their inter-relationships with other topics (like flora and fauna, soil, water, air, climate, noise, human beings and material assets) (Landscape Institute 2013, 6).

There are 5 main stages to EIA: screening, scoping, preparing an Environmental Statement, making a planning application, and decision making.

'The real benefit of EIA … is not that it is a passive instrument simply informing decision-makers; rather it is a tool that leads to design changes to improve environmental outcomes to increase the likelihood of a positive decision. This contribution is intangible and overlooked by many' (Bond 2020).

Environmental Improvement Plan (EIP)

Government plan to help the natural world regain and retain good health whose goals include 'Enhanced beauty, heritage and engagement with the natural environment' and 'Using resources from nature sustainably' (DEFRA 2023).

Environmental Land Management

The Environmental Land Management (ELM) agri-environmental schemes operated by DEFRA will support the rural economy while achieving the goals of the 25 Year Environment Plan and a commitment to net zero carbon emissions by 2050.

Environmental Statement

'A statement that includes the information that is reasonably required to assess the environmental effects of [a] development and which the applicant can, having regard in particular to current knowledge and methods of assessment, reasonably be required to compile, but that includes at least the information referred to in the EIA regulations' (Landscape Institute 2013, 156).

Extensive Urban Survey

'County-by-county surveys of the smaller towns of England. Since about 2000, projects have included a strong characterisation element, drawing on the methodology of Historic Characterisation but adapting it to a level of detail suitable for urban areas … each project results in improved coverage in the Historic Environment Record, and in an 'assessment report' which sets out a summary of the town's archaeology, historical development and historic environment. This includes the definition of character areas covering the whole town. These reports are available online through the Archaeology Data Service.' https://historicengland.org.uk/research/methods/characterisation/urban-characterisation/ [accessed 19 December 2024]

Geographical Information System (GIS)

'A system that captures, stores analyses, manages and presents data linked to location. It links spatial information to a digital database' (Landscape Institute 2013, 156).

Harm

'Change for the worse, here primarily referring to the effect of inappropriate interventions on the heritage values of a place' (English Heritage 2008, 71).

Heritage Asset

'A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest. It includes designated heritage assets and assets identified by the local planning authority (including local listing)' (MHCLG 2024, Glossary).

Heritage impact assessment (HIA)

A structured assessment of the significance of heritage assets likely to be affected by proposed change. It outlines the historic or archaeological significance of a building or landscape, summarises proposed works, and assesses their impact on the building or landscape, and proposes a mitigation strategy. An output may be a Heritage Impact Statement.

Heritage Value

‘An aspect of the worth or importance attached by people to qualities of places, categorised as aesthetic, evidential, communal or historical value’ (English Heritage 2008).

- Aesthetic Value: ‘Value deriving from the ways in which people draw sensory and intellectual stimulation from a place’ (English Heritage 2008, 72).
- Evidential Value ‘Value deriving from the potential of a place to yield evidence about past human activity’ (English Heritage 2008, 71).
- Communal Value ‘Value deriving from the meanings of a place for the people who relate to it, or for whom it figures in their collective experience or memory’ (English Heritage 2008, 71).
- Historical Value ‘Value deriving from the ways in which past people, events and aspects of life can be connected through a place to the present’ (English Heritage 2008, 72).

Historic England

Officially the Historic Buildings and Monuments Commission for England, an executive non-departmental public body sponsored by the Department for Digital, Culture, Media and Sport. The public body that looks after England's historic environment. It champions historic places to help people understand, value and care for them.

Historic Environment

Includes ‘all aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past human activity, whether visible, buried or submerged, and landscaped and planted or managed flora’ (MHCLG 2024).

Historic Environment Action Plan

Introduced in the early 2000s as historic environment equivalents of the Biodiversity Action Plans (BAPs). An approach to the historic environment not centred solely on protection and conservation in the face of threats but more proactively involving local people in taking positive actions to better understand it, and to manage it in ways that enhance its condition and increase recognition of its significance (Herring 2007, 24).

Historic Environment Record

Comprehensive and dynamic resource, regularly updated, relating to the archaeology and historic environment (including built) of a defined geographic area. Usually held in a database attached to a GIS. Contains details on sites, finds, buildings and historical landscape. Most HERs are online and are also accessible via the Heritage Gateway website. Most Historic Landscape Characterisations are lodged in their area’s HER.

Historic Landscape Characterisation

‘Historic landscape characterisation (HLC) can be used to help secure good quality, well designed and sustainable places. (Historic England website; https://historicengland.org.uk/research/methods/characterisation/historic-landscape-characterisation/) [accessed 19 December 2024]

Historic Landscape Character Type

In a historic landscape characterisation, ‘each polygon is assigned to a Broad Type, a high-level categorisation of the historic landscape and a narrower HLC Type, a subdivision of the Broad Type, and usually a sub-Type. HLC Types used across England have been gathered [by Historic England] into a Historic Characterisation Thesaurus and new HLCs typically draw their types from this. Broad Types are known in the thesaurus as Classes’ (Historic England website; https://historicengland.org.uk/research/methods/characterisation/historic-landscape-characterisation/)[accessed 19 December 2024]

Historic Seascape Characterisation

‘HSC provides an archaeological understanding of time depth in the present seascape. It draws on a breadth of sources to assess the dominant cultural processes that shape the present. Many sources are map-based with national coverage, others include documentary and artistic references’ (Historic England website, https://historicengland.org.uk/research/methods/characterisation/historic-seascapes/). [accessed 19 December 2024]

HSC extends to the coastal and marine zones the principles of Historic Landscape Characterisation (HLC) that are applied to England's land area.

Mapping of HSC recognises the multi-layered quality of the sea so normally has separate layers for the surface, the water column, the seafloor and the sub-seafloor. It also recognises that the land adjacent to the sea, while also subjected to HLC can be revisited in HSC to emphasise its maritime aspects.

Many of the sources employed in HSC are mappings and records of physical and semi-natural aspects from which the cultural meanings require abstraction. To gather such varied material together and to use mappings that are subject to copyright a gridding system has been adopted through which precise boundaries become fuzzy. Basic gridding has 250m boundaries, so HSC mapping has an imprecision that emphasises that seascape is a form of landscape and thus a matter of perception as well as of fact.

Impacts

The narrow range of effects that are primarily negative; the established pool of issues that heritage impact assessments address.

Landscape

‘An area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors’ (European Landscape Convention; Council of Europe 2000).

Landscape and Visual Impact Assessment (LVIA)

‘A tool used to identify and assess the likely significance of the effects of change resulting from development on both the landscape as an environmental resource in its own right and on people’s views and visual amenity’ (Landscape Institute 2013, 157).

Landscape Character Assessment

‘The process of identifying and describing variation in the character of the landscape and using this information to assist in managing change in the landscape. It seeks to identify and explain the unique combination of elements and features that make landscapes distinctive. The process results in the production of a Landscape Character Assessment’ (Landscape Institute 2013, 157).

Landscape Recovery scheme

One of the Environmental Land Management schemes. It funds bespoke, long-term agreements that extend beyond twenty years and support large-scale land-use change for the long-term with funding from public and private sources, producing sustainable food production and environmental and climate outcomes through habitat and ecosystem restoration.

Land use

‘What land is used for, based on broad categories of functional land cover such as urban and industrial use and the different types of agriculture and forestry’ (Landscape Institute 2013, 157).

Legibility

In HLC, databases ‘explicitly record the current legibility of specific historic components or episodes within a particular present-day character type. Legibility is non-binary because residues of past character types can be preserved in the current landscapes. Therefore, nuanced categorisation and definitions are necessary, to record how much of past or lost landscape character remains intelligible – ‘visible’ – in current landscapes’ (Dabaut and Carrer 2020, 158-159).

Local plan

‘A plan for the future development of a local area, drawn up by the local planning authority in consultation with the community, under the Town and Country Planning (Local Planning) (England) Regulations 2012. A local plan can consist of either strategic or nonstrategic policies, or a combination of the two.’ (MHCLG 2024, Glossary).

Metropolitan Historic Landscape Characterisation (HLC)

‘The major conurbations of England (those formerly covered by ‘metropolitan’ county councils) have been covered by a form of Historic Landscape Characterisation. The methods is exactly the same as for rural landscapes, but the projects use character types which are appropriate to the urban character of the area and are at a larger scale that reflects the complexity of urban development…. reports and data are available on-line through the Archaeology Data Service.’ https://historicengland.org.uk/research/methods/characterisation/urban-characterisation/ [accessed 19 December 2024]

National Planning Policy Framework (NPPF)

‘The National Planning Policy Framework sets out the Government’s planning policies for England and how these should be applied1. It provides a framework within which locally-prepared plans can provide for housing and other development in a sustainable manner’ (MHCLG 2024, para 1).

National Policy Statement

‘A policy statement relating to Nationally Significant Infrastructure Projects that has been designated as such by the relevant Secretary of State. There are a number of existing and proposed National Policy Statements relating to particular types of infrastructure project’ (Section 5 Planning Act 2008).

The ten NPSs cover areas like forms of energy (fossil fuel, renewable, nuclear, etc), electricity networks, transport (including ports and airports), water and waste.

Natural Capital

‘Natural capital is the sum of our ecosystems, species, freshwater, land, soils, minerals, our air and our seas. These are all elements of nature that either directly or indirectly bring value to people and the country at large. They do this in many ways but chiefly by providing us with food, clean air and water, wildlife, energy, wood, recreation and protection from hazards’ (HM Government 2018, 19).

Natural England

The government’s adviser for the natural environment in England. Established by an Act of Parliament in 2006. Its purpose is to help conserve, enhance and manage the natural environment for the benefit of present and future generations, thereby contributing to sustainable development. https://www.gov.uk/government/organisations/natural-england/about [accessed 19 December 2024]

Natural Heritage

‘Inherited habitats, species, ecosystems, geology and landforms, including those in and under water, to which people attach value’ (English Heritage 2008, 71).

Nature

‘For us (and as defined in the legislation that founded Natural England), nature encompasses not only natural beauty, wildlife and the geology that underpins

landscape character and the habitats on which our most precious species depend but also our historic and cultural connections with nature, for example through art and literature, and the opportunities we have to connect with the environment. Our understanding of nature covers the whole natural world on earth and at sea and encompasses the natural environment in our towns and cities as well as the countryside.'

'Our focus on people reflects the health and well-being benefits of contact with nature and also the opportunities for people to get involved in caring for their environment. By "planet", we mean the need for resilient ecosystems contribute to sustainability in the UK and across the globe and to use nature-based solutions as a major part of the answer to achieving net zero' (Spain 2019).

Opportunity

A favourable combination of circumstances that make it possible and beneficial to do something. Opportunity assessment draws on a place's inherited attributes, including its 'affordances' for certain types of change.

Place

'Any part of the historic environment, of any scale, that has a distinctive identity perceived by people' (English Heritage 2008, 72).

Polygon

'HLC's basic unit is the polygon, an area with relatively uniformly shared characteristics. Polygons are mapped across the whole of the county or area. To create units of a size appropriate for meeting a project's scope and of a granularity suitable for county-wide analysis, minimum polygon sizes are usually 2 hectares in rural areas and 1 hectare in settlements and complex areas. The generalisation this requires is the essence of characterisation; it is the dominant landscape character that is recorded in each polygon.'

'For each polygon, which is mapped in a GIS, there is a record in an attached database, which captures various attributes including the Broad and Narrow HLC Types and Sub-types that the polygon is assigned to. The link between GIS and database enables queries to be made on any combination of attributes to display myriad aspects of the landscape's history' https://historicengland.org.uk/research/methods/characterisation/historic-landscape-characterisation/ [accessed 19 December 2024]

Sensitivity

Sensitivity reflects the vulnerability of the historic landscape and seascape in relation to the effects of a specified form of change.

Significance

'The sum of the cultural and natural heritage values of a place, often set out in a statement of significance' (English Heritage 2008, 72).

Strategic Environmental Assessment

'The process of considering the environmental effects of certain public plans, programmes or strategies at a strategic level' (Landscape Institute 2013, 158). That is, going beyond the level of individual projects.

Susceptibility

'The degree to which a defined landscape and its associated visual qualities and attributes might respond to the specific development type / development scenario or other change without undue negative effects on landscape character and the visual resource' (Natural England 2019).

Sustainable

'Capable of meeting present needs without compromising ability to meet future needs' (English Heritage 2008, 72).

Time-depth

'Historical layering - the idea of landscape as a 'palimpsest', a much written over manuscript' (Landscape Institute 2013, 158).

Tranquillity

'Described not as a characteristic of the environment itself, but as a 'state of mind,' a perception by the observer. The presence or absence of factors influencing tranquillity must therefore be considered against people's experience of these factors. Previous research confirmed that a large proportion of respondents identified hearing and seeing natural features when asked to describe what tranquillity was, while manmade infrastructure and noise, and the presence of other people were identified as not tranquil' (LUC 2019b).

Type

In a historic landscape characterisation, 'each polygon is assigned to a Broad Type, a high-level categorisation of the historic landscape and a narrower HLC Type, a subdivision of the Broad Type, and usually a sub-Type. HLC Types used across England have been gathered [by Historic England] into a Historic Characterisation Thesaurus and new HLCs typically draw their types from this. Broad Types are known in the thesaurus as Classes.'
https://historicengland.org.uk/research/methods/characterisation/historic-landscape-characterisation/ [accessed 19 December 2024]

UK Natural Capital and Ecosystem Assessment

'Natural Capital and Ecosystem Assessment (NCEA) is a science innovation and transformation programme, which spans across land and water environments. It has been set up to collect data on the extent, condition and change over time of England's ecosystems and natural capital, and the benefits to society. This will underpin the immense value of managing our natural capital, transform the way we make decisions and policy and ensure we invest in environmental reforms that

achieve maximum benefit.' https://www.gov.uk/government/publications/natural-capital-and-ecosystem-assessment-programme/natural-capital-and-ecosystem-assessment-programme [accessed 19 December 2024]

Urban Archaeological Database

'A form of detailed Historic Environment Record coverage, carried out in about 30 selected historic towns and cities which have rich and complex below-ground archaeology. Most UADs now form part of the Historic Environment Record which covers the town or city in question. UADs provide a record (and maps) of all the individual pieces of archaeological work ('events') which have taken place, along with a summary of all the 'monuments' which have been identified in this work.'

'In some cases, such as Chester the UAD has been used to define archaeological character areas. For these, the general principles of historic characterisation are used, but applied to complex below-ground archaeological remains.'

'Most UADs can be searched through the Heritage Gateway' https://historicengland.org.uk/research/methods/characterisation/urban-characterisation/ [accessed 19 December 2024]

Urban characterisation

Since the early 1990s, Historic England (and its predecessor English Heritage) has been supporting a wide range of survey work in historical towns, cities and suburbs. Three approaches involve historic characterisation: Extensive Urban Survey, Metropolitan Historic Landscape Characterisation, Urban Archaeological Databases.

Value

'An aspect of worth or importance, here attached by people to qualities of places' (English Heritage 2008, 72).

Vulnerability

The extent to which valued qualities of a place, or type of place, are placed at risk by the expected effects of a type of change.

Abbreviations

ALGAO Association of Local Government Archaeological Officers

BNG Biodiversity Net Gain

CPRE (Formerly) Council for the Preservation of Rural England

DBEIS Department for Business, Energy and Industrial Strategy

DCMS Department for Digital, Culture, Media & Sport

DEFRA Department for Environment, Food & Rural Affairs

EIA Environmental Impact Assessment

ELC European Landscape Convention

ELM Environmental Land Management

EUS Extensive Urban Survey

GIS Geographic Information System (the basis of computerised mapping)

HE Historic England

HEAP Historic Environment Action Plan

HER Historic Environment Record

HLC Historic Landscape Characterisation

HSC Historic Seascape Characterisation

LUC (Formerly) Land Use Consultants

MHCLG Ministry of Housing, Communities and Local Government

MLUHC Ministry for Levelling Up, Housing and Communities

MLW Mean Low Water

NHLC National Historic Landscape Characterisation

NPPF National Planning Policy Framework

PPG Planning Policy Guidance

References

Aldred, O, and Fairclough, G, 2003 *Historic Landscape Characterisation: Taking Stock of the Method*, London, English Heritage Taking Stock [accessed 28 February 2025]

Bannister, N, 2011 *The Hoo Peninsula Historic Landscape Project, Historic Landscape Characterisation and Historic Seascape Characterisation modules*, Ashenden, Kent, N Bannister,

Clark, J, Darlington, J, and Fairclough, G, 2004. *Using Historic Landscape Characterisation*, London, English Heritage and Lancashire County Council Using HLC [accessed 28 February 2025]

Conway, M, 2023 Measuring Impact and Managing Change in the Oxford to Cambridge Arc, *Historic England Research, vol 25, Landscape level Change* Landscape level change [accessed 28 February 2025]

Cornwall and Isles of Scilly Local Nature Partnership, 2021 *Environmental Growth Strategy 2020-2065, natural foundations for a green recovery* https://letstalk.cornwall.gov.uk/environmentalgrowth [accessed 19 December 2024]

Cornwall Council, 2019 *Distinctively Cornish: Valuing what makes Cornwall Cornish*, Truro, Cornwall Council Distinctively Cornish [accessed 28 February 2025]

Council of Europe, 2000 *European Landscape Convention*, Florence, Council of Europe ELC

Crow, P, 2004 Trees and Forestry on Archaeological Sites in the UK: A review document. *Forest Research*, 7-35 Trees and Forestry [accessed 28 February 2025]

Dabaut, N, and Carrer, F, 2020 Historic Landscape Characterisation: Technical Approaches Beyond Theory, *Landscapes*, **21.2**, 152-167 HLC technical approaches [accessed 28 February 2025]

Department for Business, Energy and Industrial Strategy, 2020 *Policy Paper: Offshore Wind Sector Deal*, London, DBEIS

Department for Communities and Local Government, 2010 *PPS 5: Planning for the Historic Environment, Impact Assessment*, London, DCLG PPS 5 [accessed 28 February 2025]

Department for Environment, Food & Rural Affairs, 2023 *Environmental Improvement Plan 2023*, London, DEFRA EIP [accessed 28 February 2025]

Department for Levelling Up, Housing & Communities, 2023 *Environmental Outcomes Report: a new approach to environmental assessment*, London, DLUHC Environmental Outcomes [accessed 28 February 2025]

Department of National Heritage, 1994 *Planning Policy Guidance 15: Planning and the Historic Environment*, London, DNH

English Heritage, 2008 *Conservation Principles, Policies and Guidance*, Swindon, English Heritage Conservation Principles [accessed 28 February 2025]

Environment Agency, 2021 *Thames Valley Flood Scheme*, public consultation

Environment Agency 2022 *Flood and Coastal Erosion Risk management Strategy Roadmap to 2026* FCERM-Strategy-Roadmap-to-2026-FINAL.pdf (publishing.service.gov.uk) [accessed 19 December 2024]

Environment Agency 2024 *Adaptive Pathways programme*, London, DEFRA Adaptive Pathways [accessed 28 February 2025]

Exegesis and Locus, 2017 *National HLC Stage 5: Final Report* National HLC [accessed 19 December 2024]

Fairclough, G and Herring, P, 2016 Lens, mirror, window: interactions between Historic Landscape Characterisation and Landscape Character Assessment, *Landscape Research*, **41.2**, 186-198 https://doi.org/10.1080/01426397.2015.1135318

Fairclough, G, Lambrick, G and McNab, A, 1999 *Yesterday's World, Tomorrow's Landscape*, London, English Heritage

Ferraby, R, DeSilvey, C, Fluck, H and Samuel, I, 2023 Landscape histories for landscape futures, *Historic England Research, vol 25, Landscape level Change* Landscape level change [accessed 28 February 2025]

Fluck, H and Holyoak, V 2017 *Natural capital, Ecosystem Services and the Historic Environment*, Research Report Series 19/2017, Swindon, Historic England Natural Capital and Historic Environment [accessed 28 February 2025]

Forestry Commission, 2017 *United Kingdom Forestry Standard*. Fourth Edition, 88-94

Her Majesty's Government, 2011 *UK Marine Policy Statement*, London, HMSO

Herring, P, 1998 *Cornwall's historic landscape, presenting a method of historic landscape character assessment*, Truro, Cornwall County Council Cornwall HLC Method [accessed 28 February 2025]

Herring, P, 2007 Historic Landscape Characterisation in an ever-changing Cornwall, *Landscapes*, **8.2**, 15-27 Ever-changing Cornwall [accessed 28 February 2025]

Herring, P, 2022 *Strategically assessing the historic landscape's sensitivity and capacity in relation to change*, Research Report Series no.91/2022, Swindon, Historic England Sensitivity Research Report [accessed 28 February 2025]

Herring, P, Dabaut, N and Last, J, 2021 Where Next for Historic Landscape Characterisation (HLC)? *Landscapes*, **21.2**, 98-112 Where next for HLC? [accessed 28 February 2025]

Herring, P, Hooley, D, and Adams, P, 2015 *Historic Characterisation Thesaurus*, Forum on Information Standards in Heritage, Swindon, Historic England Historic Characterisation Thesaurus

Herring, P, Turner, S, and Sevara, C, 2022 *The historic landscape: assessing opportunity for change*, Research Report Series no.69/2022, Swindon, Historic England Opportunity Research Report

Historic England 2008 *Constructive Conservation in Practice* Constructive Conservation [accessed 19 December 2024. NB Originally created by English Heritage]

Historic England, 2010 Landscapes & Areas, Landscape and Areas [accessed 19 December 2024. NB Originally created by English Heritage]

Historic England, 2016 *Research Strategy*, Swindon, Historic England HE Research Strategy [accessed 28 February 2025]

Historic England, 2017 *Historic England Research Agenda*, Swindon, Historic England HE Research Agenda [accessed 28 February 2025]

Historic England, 2018 *Places Strategy*, Swindon, Historic England Places Strategy [accessed 28 February 2025]

Historic England, 2022a *Our Climate Change Strategy*, March 2022 Climate Change Strategy [accessed 19 December 2024]

Historic England, 2022b A Strategy for Wellbeing and Heritage, Wellbeing Strategy [accessed 22 January 2025]

Historic England, 2023 *Corporate Plan, 2023-2026* Corporate Plan 2023-26 [accessed 19 December 2024]

Historic England, 2024 *The Wellbeing Impact of Cultural Heritage on England's Economy*, Wellbeing Impact [accessed 19 December 2024]

HM Government, 2018 *A Green Future: Our 25 Year Plan to Improve the Environment*, London, HM Government A Green Future [accessed 28 February 2025]

Lake, J, 2015 *National Farmstead Assessment Framework*, Swindon, Historic England Farmstead Assessment Framework [accessed 19 December 2024]

Landscape Institute, 2013 *Guidelines for Landscape and Visual Impact Assessment 3rd edition*, Landscape Institute and Institute of Environmental Management and Assessment

Last, J, 2023 Mapping and modelling the Historic Landscape, *Historic England Research, vol 25, Landscape level Change* Landscape level change [accessed 28 February 2025]

Last, J and Kidd, S, 2023 Archaeological sensitivity mapping, *Historic England Research, vol 25, Landscape level Change* Landscape level change [accessed 28 February 2025]

LUC, 2017 Historic Seascape Characterisation (HSC): Consolidating the National HSC Database, Bristol, LUC National HSC

LUC, 2018 *Historic Characterisation of Weston-super-Mare*, Bristol, LUC Weston [accessed 28 February 2025]

LUC, 2019a *Historic Characterisation of Ramsgate*, Bristol, LUC Ramsgate [accessed 28 February 2025]

LUC, 2019b *Tranquillity Assessment: The Way is Out There*, Bristol, LUC

Mansfield, L, 2021 *Multi capitals conceptual framework development key findings and proof of concept*, unpublished research report to Natural England, Multi capitals [accessed 19 December 2024]

McArthur, T, 2018 *The Oxford Companion to the English Language*, Oxford University Press

Ministry of Housing, Communities and Local Government, 2024 *National Planning Policy Framework*, London, MHCLG NPPF 2024 [accessed 28 February 2025]

Mulholland, B, Abdel-Aziz, I, Lindsay, R, McNamara, N, Keith, A, Page, S, Clough, J, Freeman, B and Evans, C, 2020 *An assessment of the potential for paludiculture in England and Wales*, London, DEFRA Paludiculture [accessed 19 December 2024]

Natural England, 2019 *An approach to landscape sensitivity assessment – to inform spatial planning and land management*, London, Natural England Landscape Sensitivity [accessed 28 February 2025]

Natural England, 2023a *Living England Habitat Map* Living England Habitat Map [accessed 19 December 2024]

Natural England 2023b *Nature recovery and the historic environment*, London, Natural England Nature Recovery [accessed 28 February 2025]

NatureScot, 2020 *Draft Landscape Sensitivity Assessment Guidance*, NatureScot

Newman, C, 2017 *Woodland futures. Assessing impacts of forestry strategies on the historic environment*, McCord Centre for Landscape, Newcastle University Woodland Futures [accessed 28 February 2025]

Sagger, H, Philips, J and Haque, M 2021 *Valuing culture and heritage capital: a framework towards informing decision making*, London, DCMS Valuing Culture and Heritage Capital [accessed 28 February 2025]

Spain, M, 2019 *Thriving nature for people and planet*, Natural England blog, Thriving nature for people and planet – Natural England (blog.gov.uk) [accessed 19 December 2024]

Sunley, T and Roberston, D, 2023 Planting trees for the future whilst protecting the past, *Historic England Research, vol 25, Landscape level Change* Landscape level change [accessed 28 February 2025]

Swanwick, C, 2004 *Landscape Character Assessment Topic Paper 6 Techniques and Criteria for Judging Sensitivity and capacity*, Scottish Natural Heritage and The Countryside Agency Topic Paper 6 [accessed 28 February 2025]

Tapper, B, 2010 *HLC and sensitivity mapping for Photo-Voltaic (Solar Farm) installations in Cornwall*, Cornwall Council, Truro

Thomas, H, Guest, K, Carlisle, P, Guiden, N and Orr, SC, 2024 *Creating a vocabulary of climate change hazards for heritage*, Research Report Series no.13/2024, Swindon, Historic England Climate Change vocabulary [accessed 28 February 2025]

Tompkins, A, 2017 *Oxfordshire Historic Landscape Characterisation, Full Report*, Oxfordshire County Council, Oxford Oxon HLC [accessed 28 February 2025]

West Berkshire District Council, 2011 *Historic Landscape Characterisation Sensitivity, The Assessment Methodology*, WBDC, Newbury Method Map

Wilkinson, M, Dumontier, M, Aalbersberg, I et al., 2016 The FAIR Guiding Principles for scientific data management and stewardship. *Scientific Data* **3**, 160018. FAIR principles [accessed 19 December 2024]

Wylie, J, 2007 *Landscape*, Routledge

Acknowledgements

This draft, and the two Historic England Research Reports that underpin it, were read, commented on and discussed at workshops involving a wide range of expertise from within Historic England and among a stakeholder group drawn from heritage sector and landscape bodies: the Association of Local Government Archaeological Officers (ALGAO), the Chartered Institute for Archaeologists, Environment Agency, LUC, McCord Centre for Landscape (Newcastle University), National Trust, and Natural England.

This version is clearer and more straightforward as a result. Thank you to all who commented.

Case studies

These will also be loaded onto an associated website. Further examples of the use of Historic Characterisation in assessing opportunity and sensitivity will be welcome.

Case Study 1: Solar farms in Cornwall

In 2010 numerous planning applications for photo voltaic (PV) solar power installations in Cornwall were being determined by Cornwall Council's Natural Resources team. Solar power installations supported by financial incentives, typically extending to around 15 hectares, made physical and visual impacts on the landscape. Government guidance on planning for the historic environment set out how developers and planners should treat historic environment assets, which include the historic landscape, as well as structures and archaeological remains (DCLG 2010, HE6.1 and HE6.2).

In partnership with English Heritage (EH), the HES produced a GIS-based assessment of the sensitivity of Cornwall's historic environment and landscape to PV installations. The sensitivity assessment followed the four distinct stages then being explored by English Heritage, as follows.

1. Assess the negative and positive effects of the change scenario
2. Assess the vulnerability or openness of a place to those effects
3. Assess the degree to which the place's significance will influence consequent decisions
4. Draw conclusions and make recommendations

Stage 1. Scenario Assessment

The main effects on the historic environment of installing arrays of PV inverters was established.

- Substantial physical impacts if anchor bases were used but considerably reduced if piling for stanchions was employed. It was noted that removal of stanchions/anchor bases at the closure of solar farms may cause more physical disturbance than during erection.
- Potentially large-scale effects on landscape coherence and legibility (though level sites are usually less visible than sloping ground). Includes site preparation works like access provision and removing hedgerow trees to minimise shading.
- Some potential for improving semi-natural communities if land use beneath installations became less intensive, e.g. through sheep grazing.

These effects were then weighted to guide assessment of the historic environment's vulnerability to them, its capacity to accommodate them, and its significance in relation to them.

Stage 2: Assessment of Vulnerability and Capability

Vulnerability and capacity of the historic environment to PBV installations were classified and weighted as follows.

Vulnerability or Capability	(Weighted ranges / least impact to most)	Threats

Vul 1. Physical effects on predictable remains – **PV installations fitted to stanchions**. Piles driven through surviving layers. Often numerous. Typically, no opportunity to 'rescue' archaeological material and information.	(0 to -2)	Damage to below-ground archaeological remains
Vul 2. Physical effects on predictable remains – **PV installations fitted to anchor bases.** More extensive impact than Vul 1.	(0 to -5)	Substantial damage to below-ground archaeological remains
Vul 3. Landscape coherence & legibility How PV installations affect the coherence of the historic landscape the ways that history can be easily 'read' from its patterns.	(0 to -5)	Reduction in coherence; reduction in completeness
Vul 4. Contribution to overall landscape character (visual) The effect on the historical aspect of overall landscape character.	(0 to -5)	Reduction of visibility/contribution to landscape character
Vul 5. Changes to Semi-natural Environment The extent to which PV installations either disturb or enhance semi-natural communities, recognising that location, form and biodiversity of such communities have been determined by human action.	(+1 to -3)	Loss, disturbance of historical importance of semi-natural components

Stage 3: Assessment of Significance

Criteria representing significance were identified and weighted in relation to the predicted effects of the PV scenario, to help judge the degree to which vulnerability or capability matters. Care was again taken to avoid double counting of criteria already covered in vulnerability or capability assessment.

Significance	**(Weighted ranges / Least to most)**	**Criteria**
Sig 1. Rarity in the Region/Survival	(0 to -2)	HLC type's regional rarity and typical survival and condition of components
Sig 2. Characteristic of the region/area	(0 to -2)	Whether the HLC Type is especially characteristic of the region/area
Sig 3. Amenity Potential & Community Values	(0 to -4)	Amenity potential

Stage 4: Conclusions and decision-making

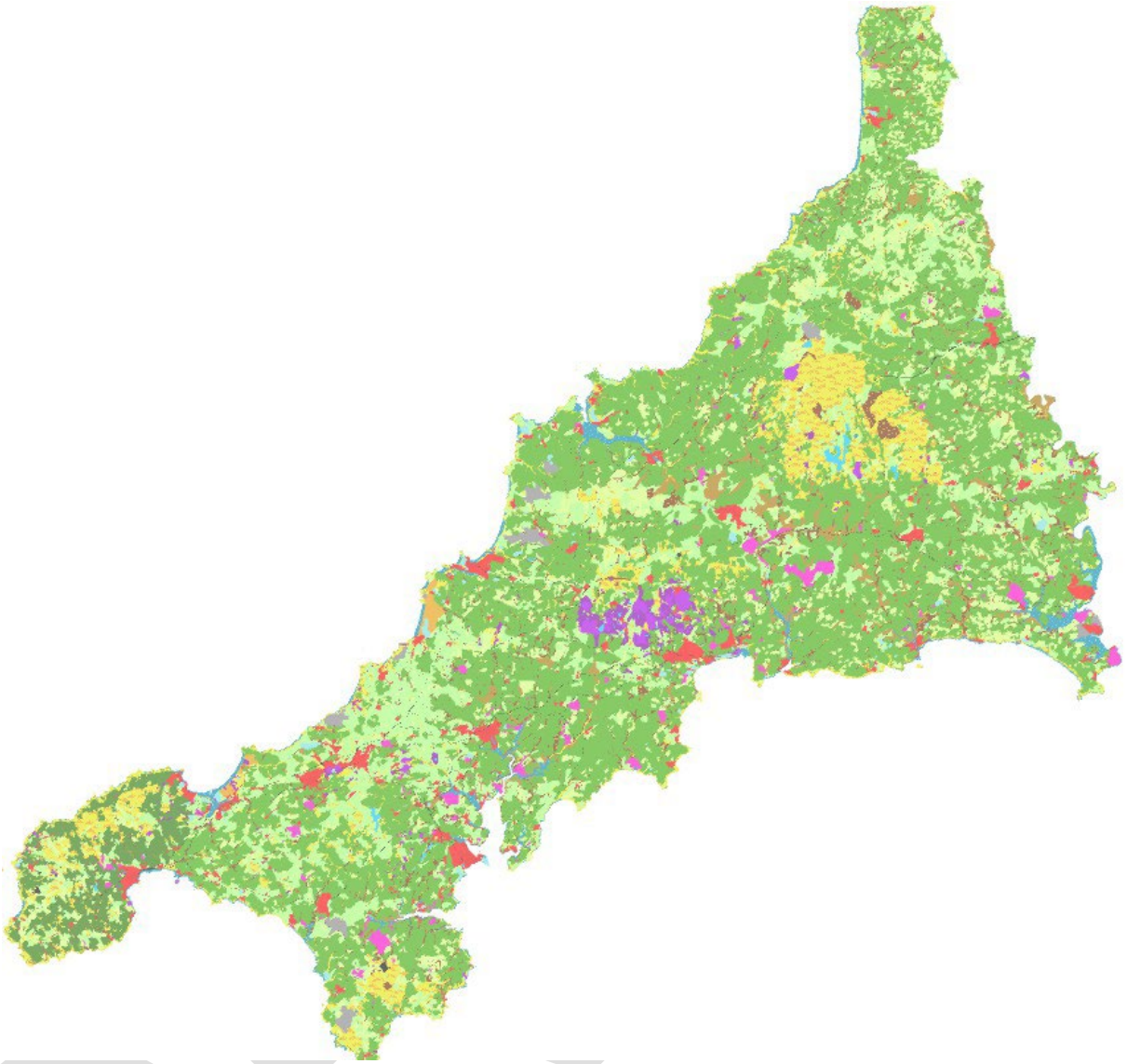
Combining the Vulnerability/Capability and Significance scores produced sensitivity scores for HLC Types (see Table). These were ranked and then grouped into sextiles for display using the 1994 HLC GIS database (see Maps).

As well as minimising the negative effects of solar farms on the Cornish historic landscape and environment, the method also benefits energy developers.

- HLC types particularly sensitive to solar farms require time-consuming and costly further assessment before determination and are more likely to require mitigation works during installation.

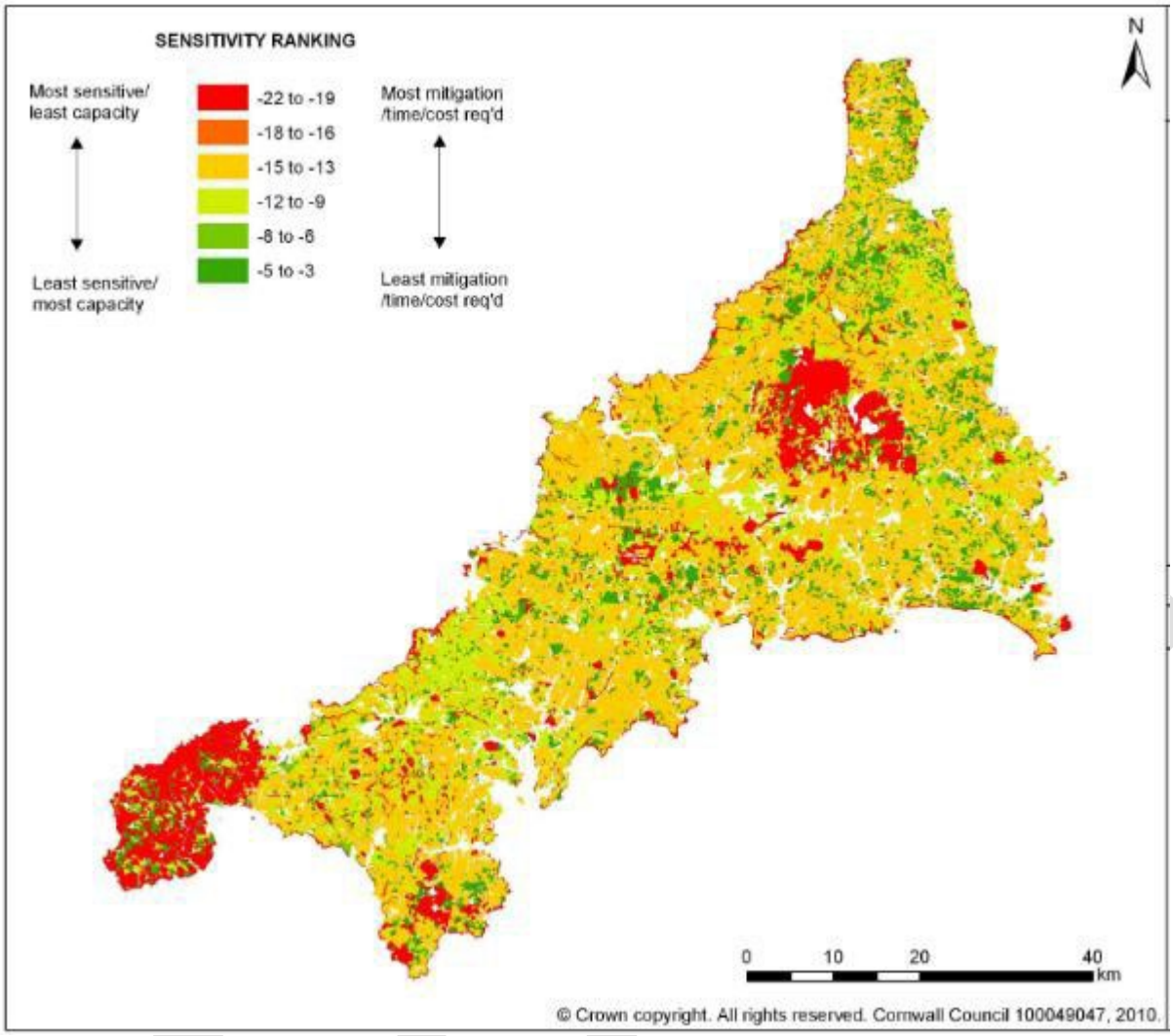
The results support considered decision-making when dealing with planning applications, such as requiring further assessment, or refusal, or changes in design to reduce negative effects. Strategically, when considering all of Cornwall in relation to PV installation, the assessment can guide developers towards areas where they may be expected (but not guaranteed) to encounter fewer issues with the historic environment.

HLC Types	Rough Ground	AEL: Prehistoric Enclosures	AEL: Medieval enclosures	Post-Medieval Enclosures (Intakes)	Post-Medieval Enclosures (Re-organised AEL)	Modern Enclosures (Intakes)	Modern Enclosures (Amalgamations of earlier fields)	Industrial relict	Industrial active	Recreation	Military	Ornamental
Vulnerability (weighted ranges / least to most)												
Vul 1. Conservation of HE Physical Remains - stanchions (0 to -2)	-1	-2	-2	-1	-2	-1	-2	-2	0	-2	-2	-2
Vul 2. Conservation of HE Physical Remains - anchor bases (0 to -5)	-3	-5	-5	-3	-5	-1	-2	-3	0	-3	-3	-4
Vul 3. Conservation of HE Unknown Physical remains - stanchions (0 to -1)	0	-1	-1	0	-1	0	-1	-3	0	-1	-1	-1
Vul 4. Conservation of HE Unknown Physical remains - anchor bases (0 to -2)	-1	-2	-2	-1	-2	-1	-2	-2	0	-1	-1	-2
Vul 5. Contribution to Landscape coherence & legibility (0 to -5)	-5	-5	-4	-3	-3	-2	-1	-3	-1	-2	-3	-5
Vul 6. Contribution to Overall Landscape Character (visual) (0 to -5)	-5	-5	-4	-2	-1	-1	-1	-1	0	-3	-2	-3
Vul 7. Changes to Semi-natural Environment (+1 to -3)	-3	-1	-1	0	0	0	1	-2	1	-1	-2	-3
Total vulnerability score to stanchions	**-14**	**-14**	**-12**	**-6**	**-7**	**-4**	**-4**	**-11**	**0**	**-9**	**-10**	**-14**
Total vulnerability score to anchor bases	**-17**	**-18**	**-16**	**-9**	**-11**	**-5**	**-5**	**-11**	**0**	**-10**	**-11**	**-17**
Significance (weighted ranges / least to most))												
Sig 1. Time-depth, Rarity in region/area, Survival & Arch. potential (0 to -2)	-2	-2	0	-1	0	-1	-1	-1	-1	-1	-2	-2
Sig 2. Visibility, Characteristic of the region/area & Coherence (0 to -2)	-2	-2	-2	-2	-2	0	0	-2	-1	-2	-1	-2
Sig 3. Amenity potential & community values (0 to -4)	-4	-2	-1	-2	-1	0	0	-4	-1	-4	-3	-4
Total significance score	***-8***	***-6***	***-3***	***-5***	***-3***	***-1***	***-1***	***-7***	***-3***	***-7***	***-6***	***-8***
Significance (weighted ranges / least to most))												
Total sensitivity to pile-driven stanchions	**-22**	**-20**	**-15**	**-11**	**-10**	**-5**	**-5**	**-18**	**-3**	**-16**	**-16**	**-22**
Total sensitivity to concrete-block anchor bases	**-25**	**-24**	**-19**	**-14**	**-14**	**-6**	**-6**	**-18**	**-3**	**-17**	**-17**	**-25**

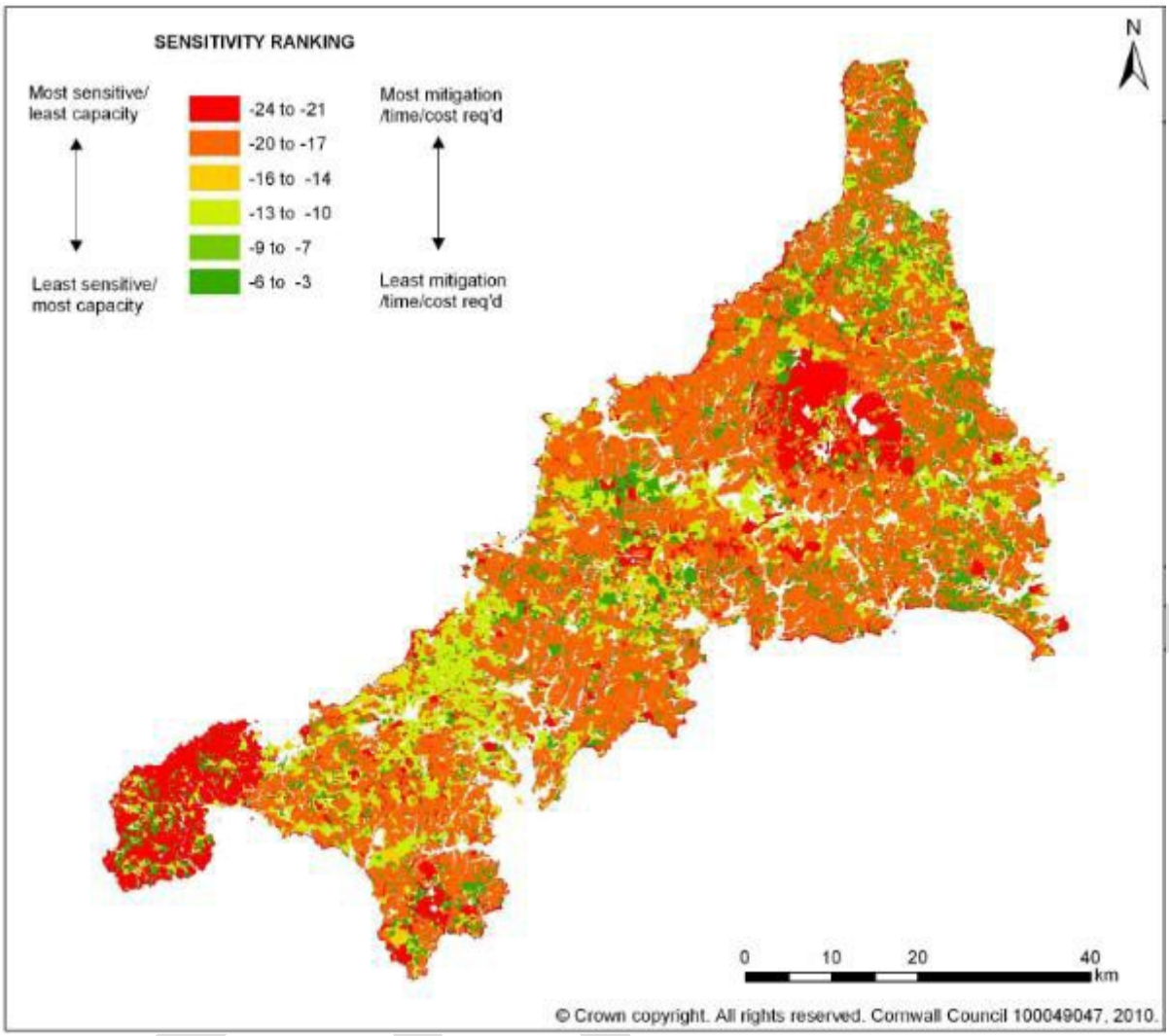


Cornwall Historic Landscape Characterisation, 1994


Coastal Rough Ground
Communications
Dunes
Farmland: Prehistoric
Farmland: Medieval
Farmland: Post Medieval
Farmland: C20
Industrial: Disused
Industrial: Working
Intertidal and inshore water
Military
Ornamental
Plantations and Scrub
Recreational
Reservoirs
Settlement: C20
Settlement: older core (pre-1907)
Upland Rough Ground
Upland Rough Ground (relict industry)
Woodland (deciduous)



*Map of HLC Types showing overall Sensitivity to PV installations using **stanchions.** The key emphasises not just relative sensitivity but also the likely differences in costs and delays to prospective developers.*



Map of HLC Types showing overall Sensitivity scores to PV installations using ***anchor bases.*** *The most extensive HLC Type, Farmland Medieval, has a high sensitivity score because of the effects of anchor bases on below ground remains.*

Case Study 2 Opportunity assessment for hedgerow planting

The value of hedgerows

Hedgerows are living or green enclosure boundaries. In central England enclosures of formerly open fields in the 17th to 19th centuries created hundreds of thousands of miles of hedgerow: planted and managed mixes of trees and shrubs in which hawthorn, oak, ash, elm, beech, hazel, and field maple were especially important. Elsewhere, hedgerows have been either planted or allowed to grow on partially or wholly built boundaries, like the Devon bank.

Their value lies in their semi-natural and cultural properties.

Biodiversity

Some are many hundreds of years old (especially away from the central English area of late enclosure) and have developed complex ecosystems in which trees and shrubs form frameworks colonised by fungi, flora and fauna. As linear and interconnected elements of field patterns, hedgerows are valuable corridors and connectors, significant for maintaining and extending biodiversity.

Flood management

Hedgerows and hedges intercept and slow the flow of run-off rainwater, reduce the loss of soils held in suspension during run-off episodes, and so reduce siltation and pollution of streams and rivers. These provide considerable benefits to the water quality and biodiversity of rivers, as well as reducing the volumes and destructiveness of their flow at times of spate.

Culture

Patterns formed by hedgerows and built field boundaries contribute greatly to the historic character of the rural landscape and also to the legibility of its economic and social narratives (communal farming being replaced by individualised farming, and mixed farming by more specialised farming).

Local forms of hedgerow management, especially hedge laying, and local types of hand tools used for this, developed and contributed to local identities.

Change in Britain's hedgerows

Enormous lengths of field boundaries, mainly hedgerows but also walls and banks, were lost in the later 20th century, much of the work government funded, as farms and fields were amalgamated and mechanised farming made simpler and more efficient. This greatly reduced the semi-natural, cultural and landscape character values of large parts of rural England and made those areas more vulnerable to soil loss and flooding, as well as diminishing public appreciation and enjoyment of the countryside.

The 1997 Hedgerow Regulations have been effective in largely halting hedgerow removal in many parts of England, but by 1997 considerable damage had already

been done. Now, the imperatives that drive rural change include tackling flooding, biodiversity enrichment and public enjoyment, so the reinstatement of old hedgerows and hedges and creation of new ones is encouraged and supported.

Stage 1 Identify effects and opportunities and establish weighting ranges

Change scenarios at the scale that would be informed by opportunity assessment using HLC include government support (such as through Countryside Stewardship and ELM targeting) include the following.

- Re-creation and repair of lost and damaged historic field patterns.
- Creation of wholly new field patterns designed, in part, to maximise flood defence and natural capital benefits or maintaining or regaining historic landscape legibility.
- Encouraging some flailed hedge-top trees to grow on.

Scale: Often significant, changing the grain and form of extensive field patterns.

Integration: Can expect much to be fitted into existing frameworks of enclosures, lanes, etc, with some reinstatements of lost patterns but new hedges, located to serve modern needs, like flood and soil loss control, may also run against the inherited grain.

Permanence: Presumed to be long-term

The review of the scenario separates effects and provides weightings for positive scoring of affordances (or opportunities) for the desired outcomes of hedgerow planting and negative scoring of threats and impacts (set out above).

Effects and opportunities

Historic landscape character

Can expect much to be fitted into existing frameworks of enclosures, lanes, etc, with some reinstatements of lost patterns but new hedges, located to serve modern needs, may also run against the inherited grain.

Weightings: Negative impacts to a maximum of 2 and positive opportunities to a maximum of 5

Time-depth legibility

Many hedges may be fitted into existing frameworks but those that are not integrated into existing patterns will alter landscape's narratives.

Weightings: Negative opportunities to a maximum of 3 and positive opportunities to a maximum of 5

Historical land use and land cover / vegetation

Hedges subdividing larger spaces provide opportunities for greater variety of land use in the smaller fields created.

Can expect some reversion to historical land use but also some wholly new land uses, meeting modern needs.

Weightings: Negative opportunities to a maximum of 1 and positive opportunities to a maximum of 5

Natural capital opportunities

Can expect greater volumes and complexity of biodiversity and increased connectivity of habitats.

Weightings: Negative opportunities to a maximum of 1 and positive opportunities to a maximum of 5

Historic landscape opportunities

If care is taken to understand historic field patterns, then this can be positive, recreating legible historic patterns where lost and establishing new ones that have high environmental and social value where not.

Weightings: Negative opportunities to a maximum of 1 and positive opportunities to a maximum of 5

Flood management opportunities

Intercepting run-off; stopping or diverting soil run-off; trees and shrubs arresting some rainfall.

Weightings: Positive opportunities to a maximum of 5.

Stage 2 Assess and score those HLC Types where hedgerow planting is feasible

Professional knowledge was deployed in assessing and scoring HLC Types in relation to the affordances (opportunity; positive) and impacts (sensitivity; negative).

Presumptions were set out to help users understand the thinking behind scorings.

- New hedgerow lines would adhere to inherited patterns in Ancient Enclosure but would be more flexibly designed in later types of enclosure.
- For bedwork water meadows, it was presumed that new hedgerows would not cut across earthworks but be integrated with them.
- New hedgerows would be integrated into parkland and golf courses in ways that did not compromise design and effectiveness, respectively.
- For orchards and woodlands, it is presumed that hedgerows would have functions that did not compromise character and use.

Stage 3 Draw together and present results and discuss implications and recommendations

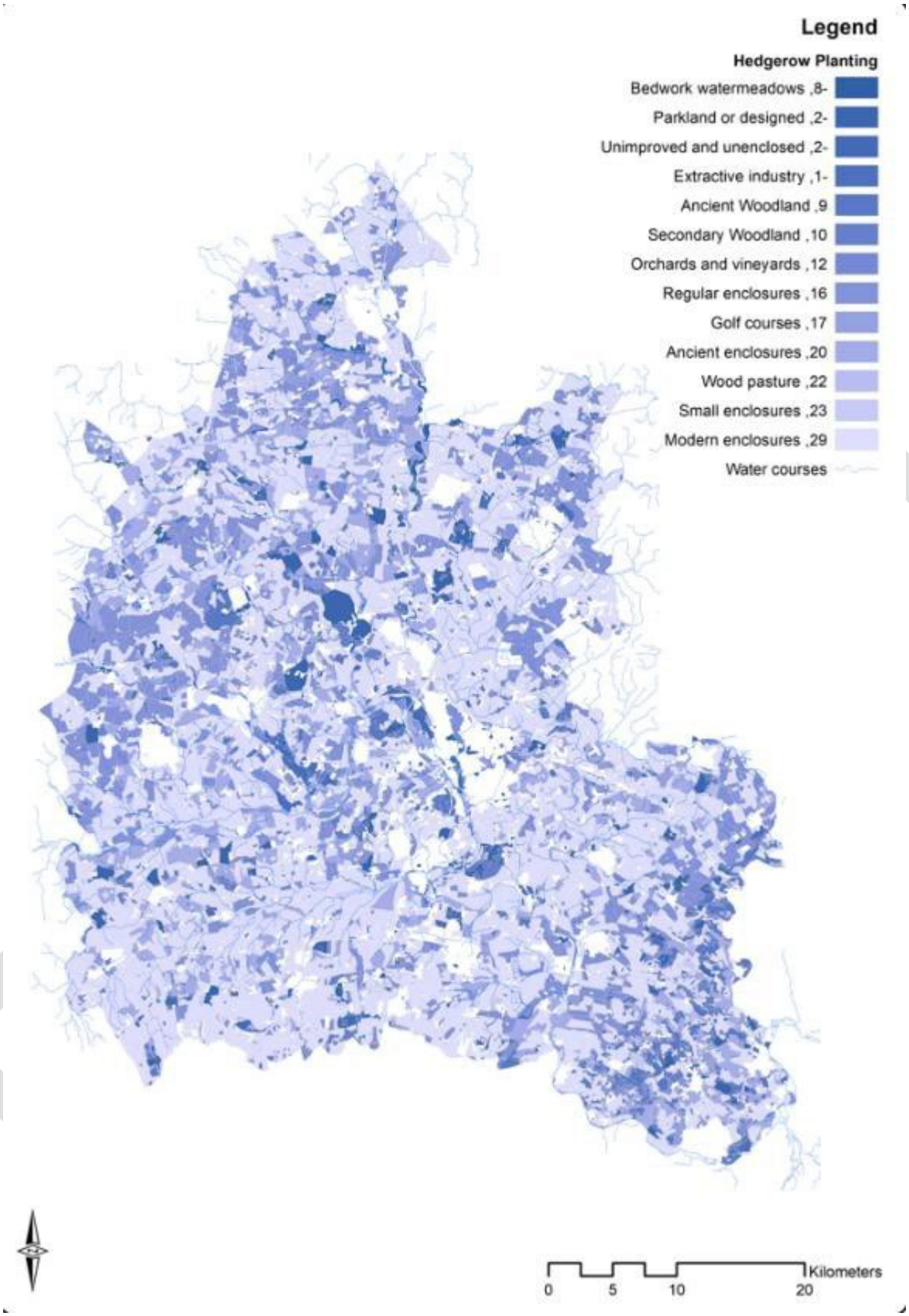
Scores from stage 2 were tabulated, added to the GIS's database, and then queried to plot patterns as required. These included totalised scores for each HLC Type as well as scores for positive opportunities or for negative effects.

Observations on opportunity scorings

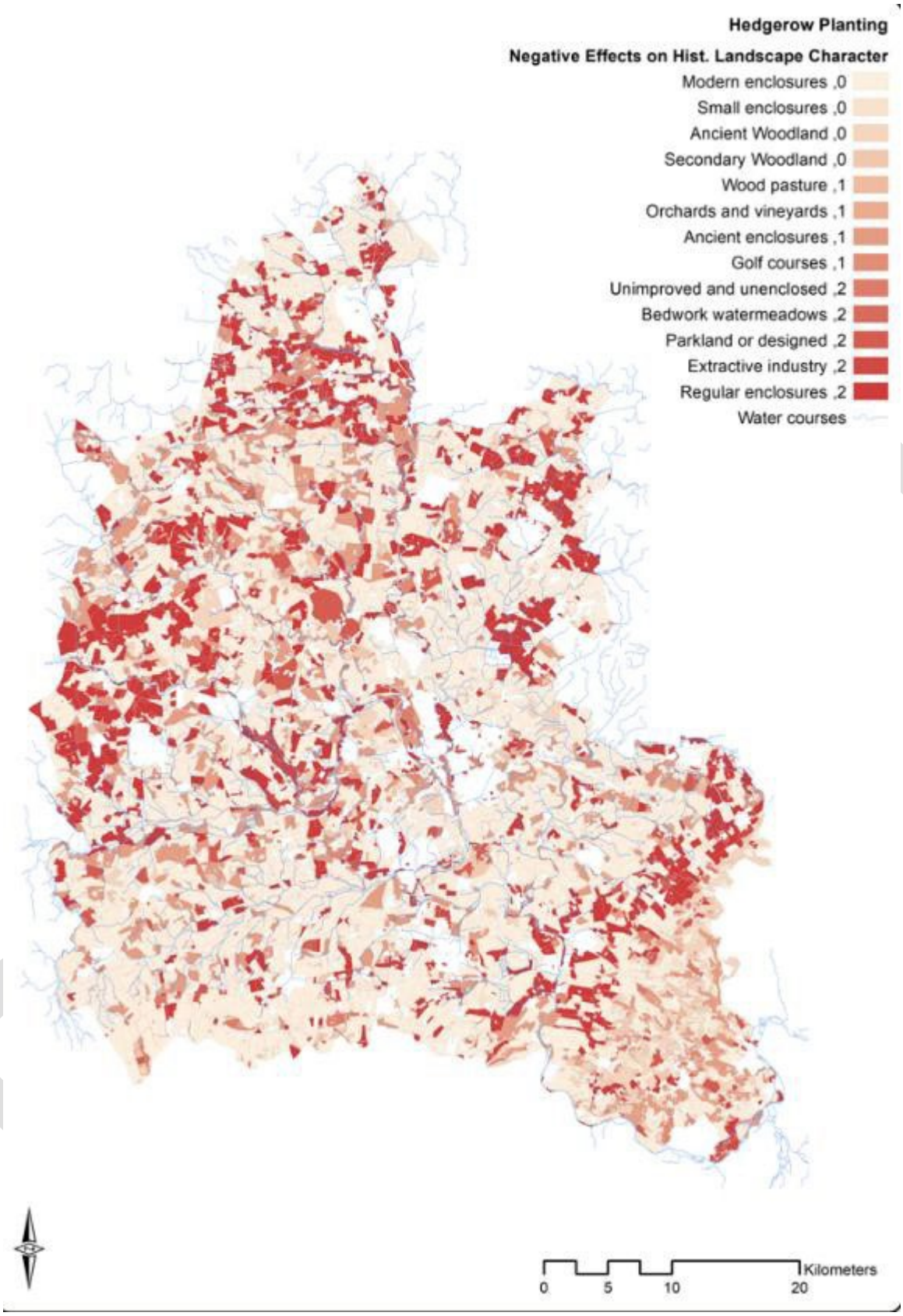
Highest positive scores for Hedgerow Planting were for Enclosure HLC Types, especially Modern and Small Enclosures where new lines can reinstate much of the character reduced by earlier episodes of boundary removal.

Negative scores occurred where new boundaries would diminish historic landscape character and reduce legibility of time-depth, particularly for the following HLC Types: Bedwork Water Meadows, Unimproved Land (usually open, unenclosed), Parkland (where views and vistas are important elements of original designs) and Extractive Industry.

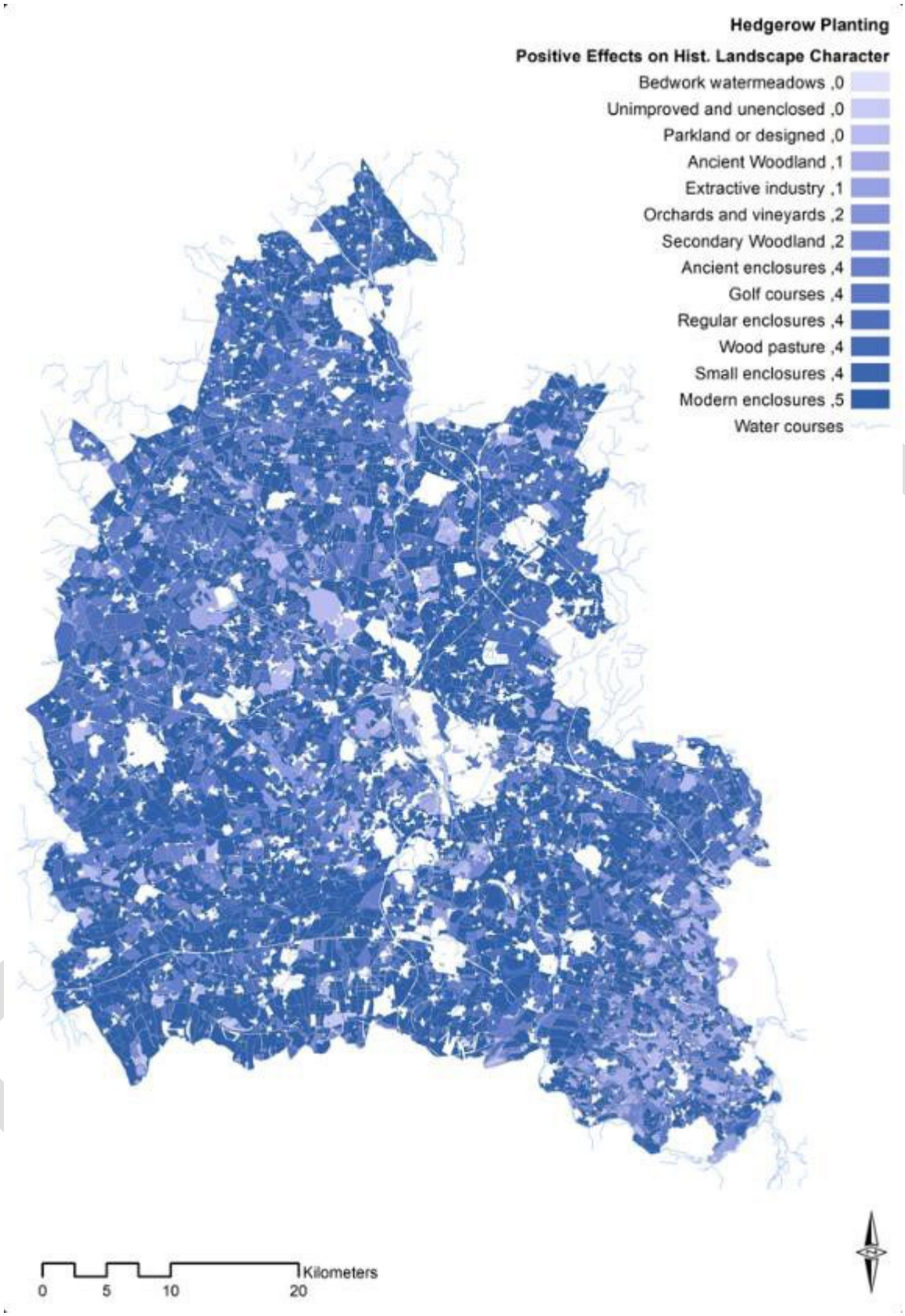
Hedgerow planting	Totals if scores are at max ; range if wholly pos or wholly neg.	Effects on historic landscape character		Effects on time-depth legibility		Effects on historical land use and land cover / veg		Natural capital opportunities		Historic landscape opportunities		Recreational Amenity (Cultural Services)		Flood Management opportunities	
Approaches /change scenarios		Negative	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative	Positive
Weightings	20; 28 to -8	2	5	3	5	1	5	1	5	1	5				3
	Totalised scores														
Ancient Enclosure Types	20	1	4	1	3	1	4	0	5	1	5				3
Small Enclosure Types	23	0	4	0	3	0	4	0	5	0	4				3
Regular Enclosure Types	15	2	4	1	2	1	3	0	5	1	3				3
Modern Enclosure Types	26	0	5	1	5	1	5	0	5	0	5				3
Water Meadows, Bedworks	-8	2	0	3	0	1	0	1	0	1	0				0
Water Meadows, Catchworks	1	2	1	2	1	1	2	1	2	1	1				1
Marshland	7	1	3	1	3	1	1	1	1	1	1				3
Unimproved Land	-2	2	0	3	0	1	1	1	2	1	2				1
Parkland or Designed Landscape	-2	2	0	3	0	1	0	0	2	1	1				2
Golf courses	17	1	4	2	3	0	3	0	5	1	3				3
Orchards and vineyards	12	1	2	1	2	1	3	1	4	1	3				3
Ancient Woodland	7	0	1	0	1	0	1	0	2	1	1				2
Secondary Woodland	8	0	2	0	1	0	1	0	2	1	1				2
Wood Pasture	20	1	4	1	3	1	4	0	5	1	5				3
Extractive Industry	-1	2	1	3	0	1	1	1	5	1	0				2
Totalised scores are displayed as quintiles:		21 to 31	11 to 20	1 to 10	-9 to 0	-20 to -10									



Oxfordshire: Hedgerow Planting: mapping of totalised scores. Paler shades represent greater opportunities. (From Herring et al 2022, fig 34; base map from Tompkins 2017).



Oxfordshire: Negative effects on historic landscape character of Hedgerow Planting. (From Herring et al 2022, fig 46; base map from Tompkins 2017).



Oxfordshire: Positive effects on historic landscape character of Hedgerow Planting. (From Herring et al 2022, fig 47; base map from Tompkins 2017).

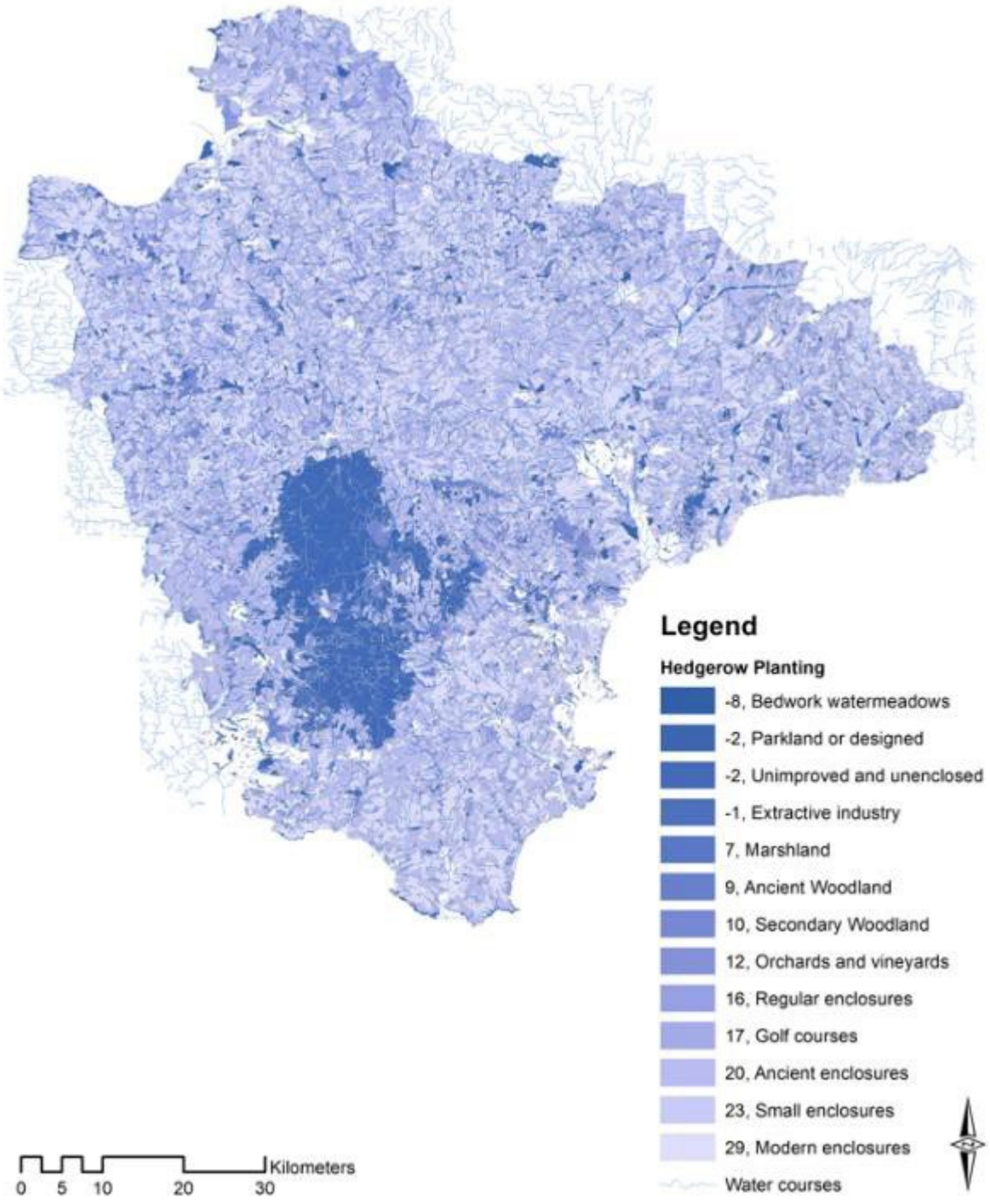


Figure 41: Devon: Hedgerow Planting: paler shades represent greater opportunities. (From Herring et al 2022, fig 41; base map from Devon CC).

Appendix 1 Examples of change scenarios

Opportunity and sensitivity assessment requires close examination of the effects and opportunities associated with particular scenarios. Change scenarios will repeat across the country, and it is reasonable to develop a shared understanding of typical effects. Care is required to avoid too tightly defining theoretical or typical scenarios and their effects as assessors will need to extend or adjust them when responding to real-world scenarios.

Major development (settlement, industry, infrastructure, etc).

In practice, most forms of major development will be separated out as their effects are distinct. For example, undertake separate opportunity and sensitivity assessments for the following.

- Large-scale new or extended settlement.
- Transport infrastructure, broken into types – rail, road, airport, port, etc.
- Other large-scale infrastructure (energy, telecommunications, etc).
- Large-scale extractive industry, again subdivided by type.
- Large-scale processing and manufacturing industry.

Major developments are often interconnected and cumulative and can generate unplanned (or initially unconsidered) consequences.

Major development affects many aspects of historic landscape and seascape:

- Physically impacting known and predicted archaeological remains, built environment, and semi-natural communities.
- Obscuring or revealing historic narratives.
- Altering general landscape character.
- Changing opportunities for public amenity, etc.

Effects are often irreversible. There is, however, usually variability in scale, and in the numbers and forms of features, providing scope for opportunity and sensitivity assessment to inform location and design. Existing or previous structures may be incorporated within new developments and so conserve fabric and contribute to a more historically interesting character.

Climate change and natural processes.

Climate change may initiate, accelerate or exacerbate processes like the following, each of which will have a range of effects on the historic environment, particularly on archaeological remains, palaeo-environmental material, and historic character.

- Erosion, especially riverine and coastal.
- Deposition of eroding and slumping material.
- Vegetation change, and the effects of that on.

Modelling the effects will contextualise consideration of responses (flood defences, fire breaks, dredging, etc).

Some responses to climate change and natural processes can be as substantial as major development and should be assessed as such (Thomas et al 2024).

Changes in land use and practices.

These may involve intensification or extensification.

Semi-natural components, historic landscape legibility, general landscape character and amenity may be particularly affected, especially if boundary patterns are altered.

Some aspects may be reversible, but others, like effects on biodiversity, may result in permanent changes to ecosystem trajectories.

HLC-based sensitivity assessment can guide design and implementation of agri-environment schemes.

Extensive plantings.

Long-term (like woodland; Newman 2017) or short-term (like biomass and paludiculture; Mulholland et al 2020), and impacts may include aesthetics: broadleaf or coniferous trees; local or alien species. Some effects, especially on historic landscape legibility and character are variably transitory. Others, like the effects of root systems or mechanised planting and harvesting on buried remains, may be permanent.

Tall structures (pylons, wind turbines etc).

Vary in scale (especially height) and numbers. Flexibility in location and arrangement enables sensitivity studies to influence location and design. Physical impacts may be minimised, but effects on landscape character, including distraction from enjoyment of legible historic landscape, can be more challenging.

Proactive environmental management.

Managed delivery of ecosystem and cultural services, guided by Biodiversity or Historic Environment Action Plans, often supported by agri-environmental initiatives. Unplanned consequences can be substantial, especially if restoration is based on misperceptions (e.g. regarding locations and forms of wilderness). Sensitivity assessment that raises awareness of past management practices in shaping inherited biodiversity should help those designing such works to avoid unwanted (and preventable) outcomes. It should also support the sharing of objectives through partnership working including through ‘multiple capitals’ approaches (Fluck and Holyoak 2017; Mansfield 2021).

Continuance of established ways.

Reviewing the sustainability of current ways of using places can assess ongoing effects and inform plans for changing established ways of managing places by identifying opportunities to reduce negative effects and enhance positive ones.

Neglect.

Sensitivity to the effects of suspensions of established land uses can be usefully assessed if there are opportunities for reversing the neglect. Neglect, being unplanned can be highly variable in its effects.

Appendix 2 Introducing Historic Landscape Characterisation

As all of Britain's landscape is historical, Historic Landscape Characterisation's comprehensive representation of current understanding of its attributes, character and narratives is the most useful tool for use in opportunity and sensitivity assessment.

The systematically recorded attributes of discrete historical places, delineated as polygons on a GIS, allow them to be interpreted, classified and ascribed to one of a suite of HLC Types.

First a polygon's Broad Type, or basic historical character, is established (Enclosure, Settlement, Ornamental, Industrial, etc) and then detailed attributes are recorded, tailored to that Broad Type. So, attributes recorded for Enclosure (which for most of England is the most extensive Broad Type) typically include the following, the example being drawn from the Oxfordshire HLC (Tompkins 2017).

- Enclosure Size (Small, Medium and Large)
- Enclosure Type (including Parliamentary Enclosure, Enclosed Strips, Cleared Woodland, Enclosure of Parkland, etc)
- Perimeter Morphology (Curvilinear, Sinuous, Rectilinear, Irregular, etc)
- Internal Morphology (Curvilinear, Sinuous, Rectilinear, Irregular, Mixed, etc)
- Boundary Loss (No loss, Minimal Loss (less than 40%), Major Loss, Minimal Gain, Major Gain)
- Ridge and Furrow (Reversed-S shaped, Straight, Dogleg, etc)

Different suites of attributes are recorded for each other Broad Type.

To be systematic and comprehensive, characterisation is desk-based, using maps and aerial photographs (current and historical) as primary sources for mapping and identifying attributes. Gathering together results of archaeological, historical and landscape history research enables meaning (period, function, status, etc) to be ascribed to each Broad Type, Type or Subtype.

Typologies are as hierarchical as is useful. So, Oxfordshire has Enclosure as a Broad Type, and thirteen Narrow Types beneath it (including Open Fields, Ancient Enclosures, Crofts, Squatter Enclosure, Assarted Enclosure, Planned Enclosure, Prairie/Amalgamated Enclosure, and Paddocks). Each narrow type is displayed in the GIS and on maps prepared from it through distinctive colours and symbologies.

The research-based understanding enables associated texts to suggest what other attributes (archaeological remains, types of structures, etc) are known or may be expected to exist in each Type.

Polygons are mapped across the whole of an area, usually a county for HLC. To retain a granularity suitable for county-wide or area-wide analysis, minimum polygon sizes are usually 2 hectares in rural areas and 1 hectare in settlements and complex areas. The generalisation this requires is part of the essence of characterisation; it is

the dominant historic landscape character that is recorded in each polygon. Polygons are derived from 250m-sided grid squares in the National HSC for areas below MLW; 50m grids have been used for more detailed HSC work (e.g. at Ramsgate, Weston-Super-Mare and the Hoo peninsula).

A grid framework was also deployed in the National HLC on land (see below). It enabled the variability in the granularity of the many English HLCs to be resolved via an algorithm that attributed each square to the predominant HLC Type.

Each polygon mapped in a GIS has a record in an attached and relational database, capturing attributes and the HLC Types and Sub-Types it is assigned to. The link between GIS and database enables queries to be made on any combination of attributes to display myriad aspects of the landscape's history. Myriad queries can also be made concerning opportunity and sensitivity in relation to change. Attributes most likely to be affected by the change scenario being assessed can be given particular attention.

Guiding principles have shaped the creation and application of historic characterisation since the 1990s (Herring 1998; Fairclough et al 1999; Clark et al 2004). Each principle (set out below) is relevant when HLC is used when guiding change anywhere and especially when assessing opportunity and sensitivity.

These 'foundational principles … were designed to enable all members of a diverse society to undertake and make use of characterisation'. They 'accommodate plural perceptions of landscape and its characterisation'. They allow plurality of valuing and facilitate that by not applying a fixed expert value to character types. 'This enables each type and each polygon to be valued anew whenever and however required, just as we might do with mappings of landscape character, geology, soils, climate, settlements, roads, and administrative areas' (Herring et al 2021, 1 and 9).

The HLC needs to be in a state fit for the purpose required of it. This may involve upgrading aspects of an existing characterisation, such as its granularity, or the appropriate record of the metadata that supports the characterisation.

Any application, including for assessment of opportunity and sensitivity, needs to understand and reflect their quality. This includes their granularity, the sources drawn upon, and the time that has elapsed since characterisation (as a guide to later changes in landscape and in methods of characterisation). This should guide the form of any review of the material to be undertaken ahead of any assessment.

Updating of the 2004 guidance '*Using Historic Landscape Characterisation*' should be a priority for HE. Other applications of HLC and HSC should also be developed that feed into and improve the ways that historic landscape is managed.

Historic England and the wider historic environment sector, including Natural England, need to develop 'minimum standards' for HLC and HSC quality and metadata to establish and maintain confidence in the characterisations that those undertaking assessments are employing.

The need for this was recognised in the development of a National HLC, but there is as yet no guidance 'on metadata standards, mechanisms to share best practice

across England or a vision for how spatial datasets should be documented as they are enhanced. There is also no detailed understanding of current user experiences, professional and non-professional, or desired outcomes. All these areas should be equal priorities that sit alongside new guidance for sensitivity and capacity modelling' (Exegesis and Locus 2017).

The National HLC (NHLC) was prepared for Natural England and could be employed in very high-level assessment of the whole of England or large parts of it. However, for most applications, within a county or covering a small number of them, then the local or base HLCs should be used, to draw on local landscape history and character and the expertise of those who curate the HLCs as part of the HERs.

Earlier exercises in 'deepening' parts of individual HLCs to support management of change in the historic landscape may provide models for how this may be undertaken. Several parts of the Cornwall HLC have been recast to support assessments of the following.

- Potential for rough ground management.
- Guiding land use change intended to secure higher water quality.
- Guiding understanding of the Anciently Enclosed Land broad type when responding to planning applications that involve breaking the ground where vulnerable archaeological remains may be expected.
- Guiding urban regeneration opportunities.

Historic England engaged in deepening both HLC and HSC in the Hoo Peninsula in Kent (Bannister 2011), and the Weston-Super-Mare and Ramsgate Heritage Action Zones (LUC 2018; 2019a).

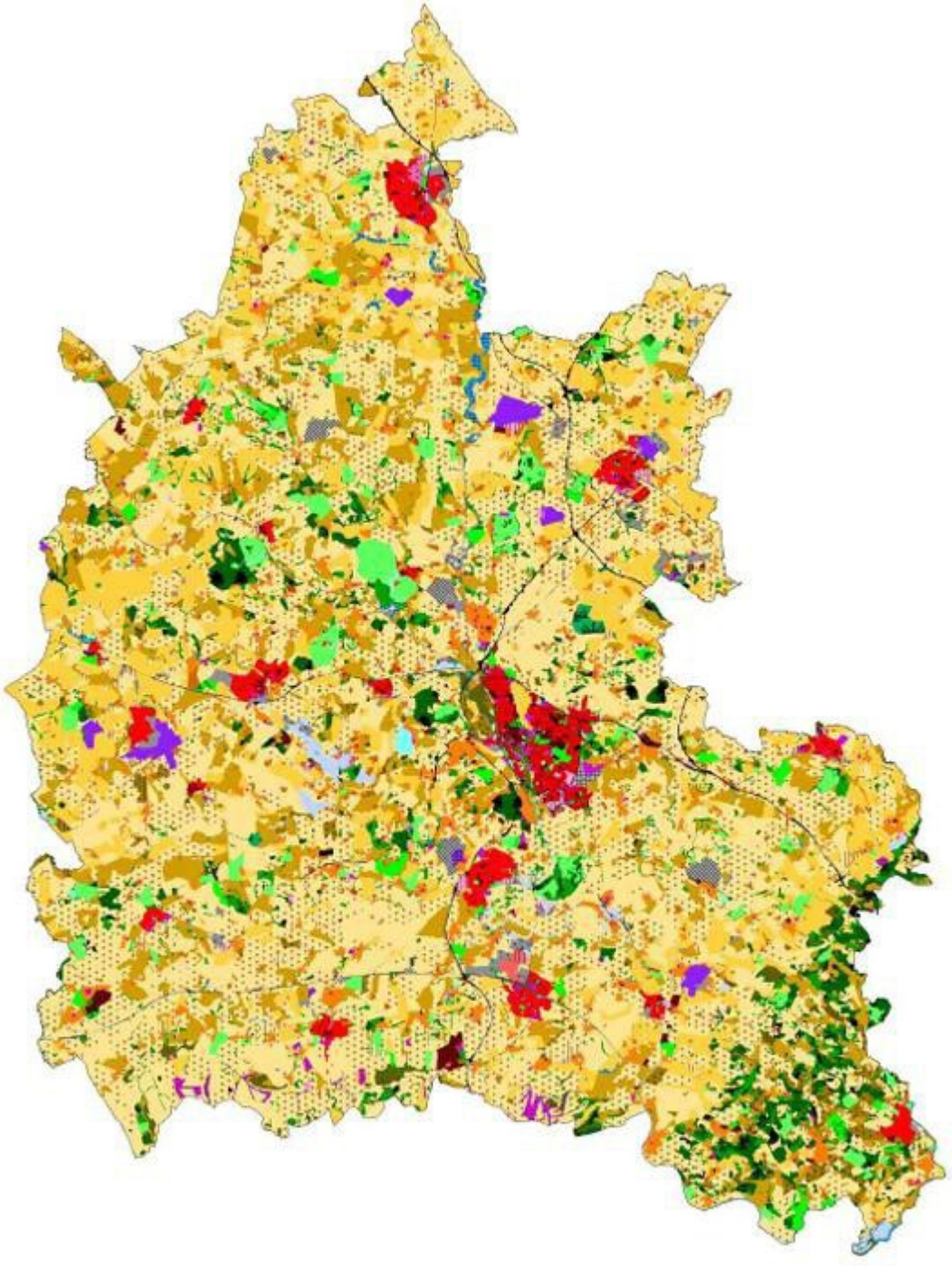
The resources needed for such deepening and improvement in quality and metadata would be expected to be provided by proposers of the change. Where such change is at the scale of major infrastructural projects and programmes then the funder might be expected to be the government.

The scalability of historic characterisation is a strength, with the National HLC at one end of a spectrum, and fine-grained characterisations of towns or quarters of them, or parishes and estates at the other. Opportunity and sensitivity assessment can be applied to all.

As scalability can be an issue for other environmental specialisms, HLC and HSC can help them understand their material. For example, Natural England (rather than Historic England) led on development of the National HLC to support their national-level work on targeting and prioritising initiatives (like agri-environmental schemes) in the whole of England's landscape and natural environment. Natural England also recognised the value of having National HLC as a layer on the Defra family of GIS mappings to underline that landscape is a cultural construct, with nature and culture indivisible, as per the European Landscape Convention. The NHLC therefore has an important influence on policy.

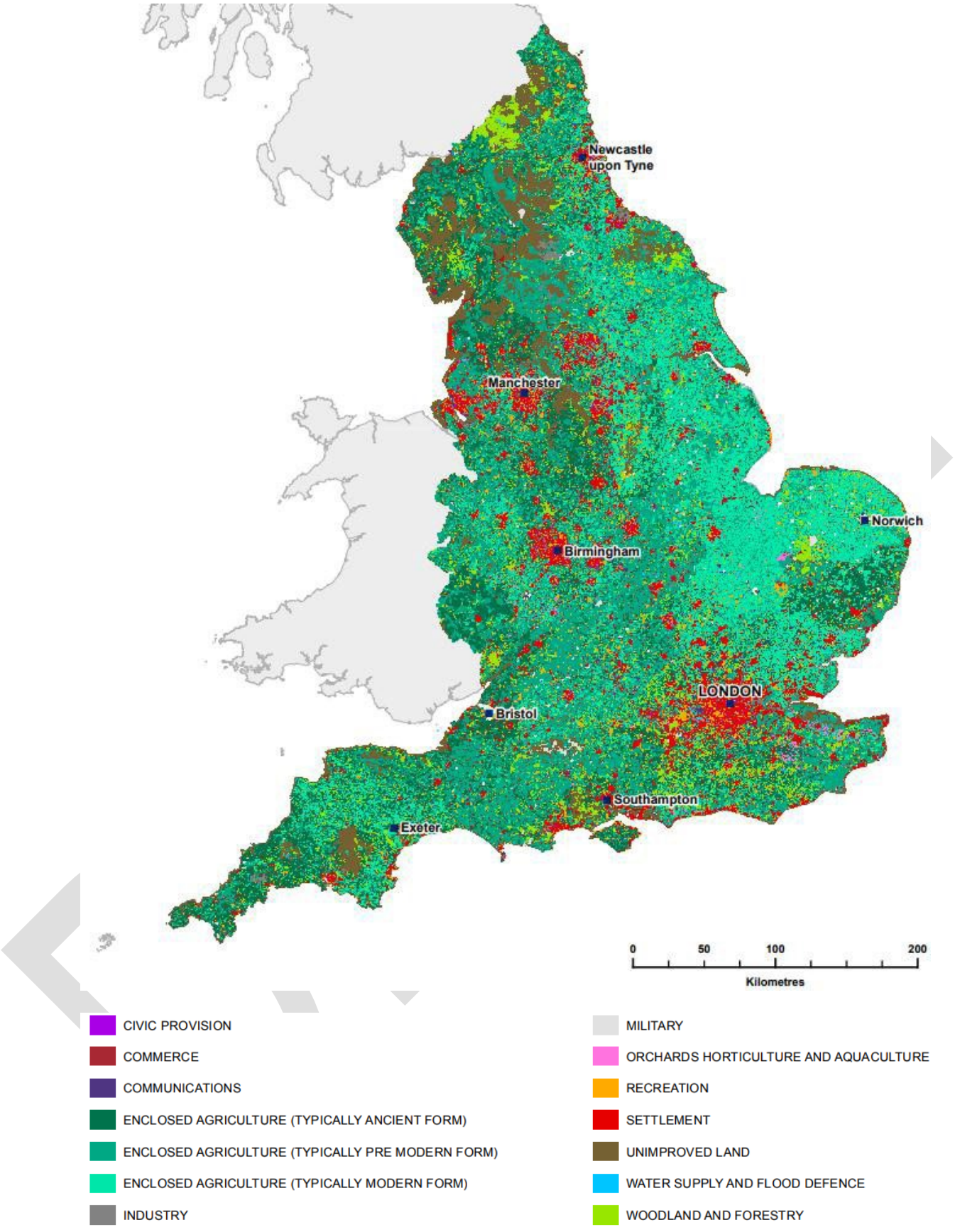
Historic Seascape Characterisations were undertaken with the support of Historic England. Reports are available online through the Archaeological Data Service and

the associated GISs can be obtained directly from Historic England's Listing Information Services. They include the gathering together of the results of the several regional HSC projects into a single National HSC.

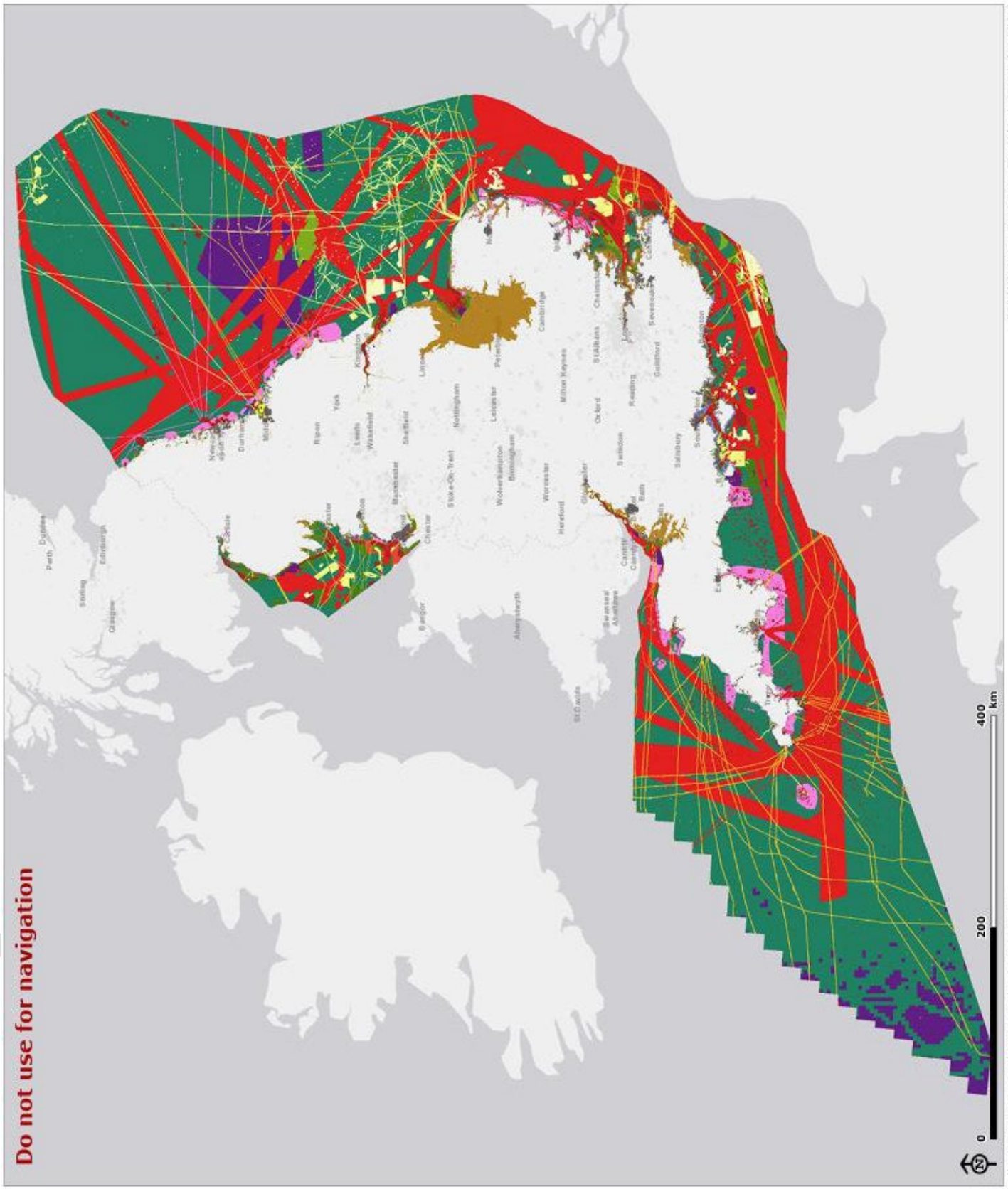


A typical county HLC. The Distribution of HLC Types in Oxfordshire (from Tompkins 2017, 78).

Oxfordshire HLC, Types Legend (from Tompkins 2017, 79).



The National HLC (via MAGIC; base map Crown Copyright; data used is copyright of its providers, mainly individual local authority Historic Environment Records).



National Historic Seascape Characterisation, conflated seascape and coastal mapping (from LUC 2017).

Legend for National Historic Seascape Characterisation, conflated seascape and coastal mapping (from LUC 2017).

Appendix 3 Principles supporting creation and use of HLC

The present landscape is historic landscape

Historic Characterisation represents how past processes have shaped the present-day character of landscape. Characterisation identifies legible time-depth in landscape, the evidence for change, and continuity.

- While the fabric and character of today's landscape were formed in the past, and our judgements concerning significance are coloured by views and opinions about aspects of that past, HLC is based on the present-day landscape being the one that we manage and plan a future for.
- Also, it is only the present-day landscape that we can perceive and characterise in its entirety.

All aspects and parts contribute to historic landscape character, not just 'special' areas

- Much heritage practice and decision-making hinges on significance, usually as judged by heritage experts. Other place-based sectors (those addressing geology, soils, ecology, landscape character, etc.) also recognise significance, but complement it by characterising all parts of an area.
    - They identify and interpret the variability in its character as expressed through its fabric or other qualities.
    - This allows them to be engaged in the design of change in all areas.
- HLC provides an equivalent comprehensive mapping and interpretation by working even-handedly across the whole historic landscape, including the commonplace**,** no matter how modern, alongside the nationally important and special. It is comprehensive and leaves no blank areas.
- Individuals and groups ascribe value to places and to landscape character in diverse ways, so HLC does not include ascription by heritage experts of a fixed scoring of value. Its mapping and associated text are open not closed, a framework inviting input from others.

There are two clearly distinguished stages in characterisation

- In the first, the landscape or townscape is identified, mapped, described and interpreted.
- The second stage occurs when forms of change are being considered. It involves assessment and the making of judgements about value or practical priorities in order to recommend or agree particular objectives.

This two-staged approach makes HLC and other forms of historic characterisation well-suited for strategic assessment of opportunity and sensitivity for change.

Landscape as well as sites

HLC is principally concerned with area data.

- Historic environment sector engagement with guiding change traditionally focusses on point data like 'heritage assets': discrete sites, monuments or

structures, or closely delineated designated zones like Conservation Areas, World Heritage Sites, Archaeological Notification Areas, etc.

- HLC enables all historic landscape, continuous and unbroken though variable in character, to be considered when advising on and making decisions regarding change.
- This comprehensive approach enables work on individual heritage assets to be contextualised and allows all parts to be valued and cared for.

Historic landscape is intertwined with the natural environment

- HLC incorporates semi-natural and living features (land cover, woodland, hedges etc.), enabling those working with the historic environment to collaborate closely with those representing the natural environment.
- Management of those large areas whose principal character derives from semi-natural vegetation communities (grasslands, woodland, rough ground, sediments, dunes, kelp-fields, etc) is more effective when historic environment knowledge and expertise is combined with that in the ecological and earth sciences sectors.
    - A is gained by including the historical understanding of past and ongoing transformations.
- This allows better understanding of the trajectories of human influence on natural communities and thus more comprehensive and subtle modelling of opportunity and sensitivity.

As landscape involves perceptions, ideas and meanings, its characterisation involves interpretation as well as record

- The European Landscape Convention definition of landscape has perception at its heart. Other definitions also recognise that landscape is in part constructed in our heads as we see, hear, smell and think about a place and recognise that it is in myriad ways continually changing. ‘Landscape as the world we live in, a constantly emergent perceptual and material milieu’ (Wylie 2007, 2).
- While there is often broad agreement over the nature and history of the attributes of place, perceptions and values vary between people, change as relationships with place develop or deteriorate, and alter as we think about associations, memories, positive and negative meanings.
- Assessment and evaluation, such as in modelling opportunity and sensitivity, must therefore allow for diverse views.

HLC therefore recognises the importance of collective, public and individual or personal perceptions and evaluations of landscape

- Characterisation involves subjective decision-making at numerous points. It can be systematic but not entirely objective.
- Society’s diverse ways of valuing places have been codified most comprehensively as the four Heritage Values (Aesthetic, Communal, Evidential and Historical) (English Heritage 2008). These can be construed and applied in ways that are open and inclusive.

As landscape has always been dynamic, aim to engage with and influence change

- the historic environment sector can use HLC when engaging with all other actors in the ongoing planning, design and management of the environment and landscape of Britain.
- The historic environment sector has become less defensive when dealing with change. It has shifted from protectionist approaches to involvement in all stages of decision-making, strategic and tactical, from identification of preferred locations or routes to the design of forms, scale and detail.
- This enables the sector to lobby with authority when arguing for retention of character and fabric. Reasonable flexibility leads to conservation gains, especially through constructive conservation.

Creation and use of HLC should be as transparent as possible

Data sources and interpretative assumptions should be clearly articulated.

- HLC is as comprehensive as resources allow.
- It is 'characterisation': relatively rapid assignment of places to HLC Types based on present understanding and identification of selected historical attributes regarded as indicators of principal historical processes.
- More detailed examination, such as through the more resource hungry Historic Area Assessment or landscape archaeology, cannot normally be applied to whole regions like HLC can.
- HLC does, however, use interpretations from detailed studies of selected parts of the region under consideration. It extends the understanding gained from them to other places that share similar historical attributes.
- For users to have confidence in HLC's outputs (mapping, datasets and text), its sources (mainly area-wide systematic and consistent mappings) are set out in metadata.
- HLC also usually indicates degrees of confidence in the interpretations underpinning characterisation. Interpretative assumptions are also made evident through the texts prepared for each HLC Type.

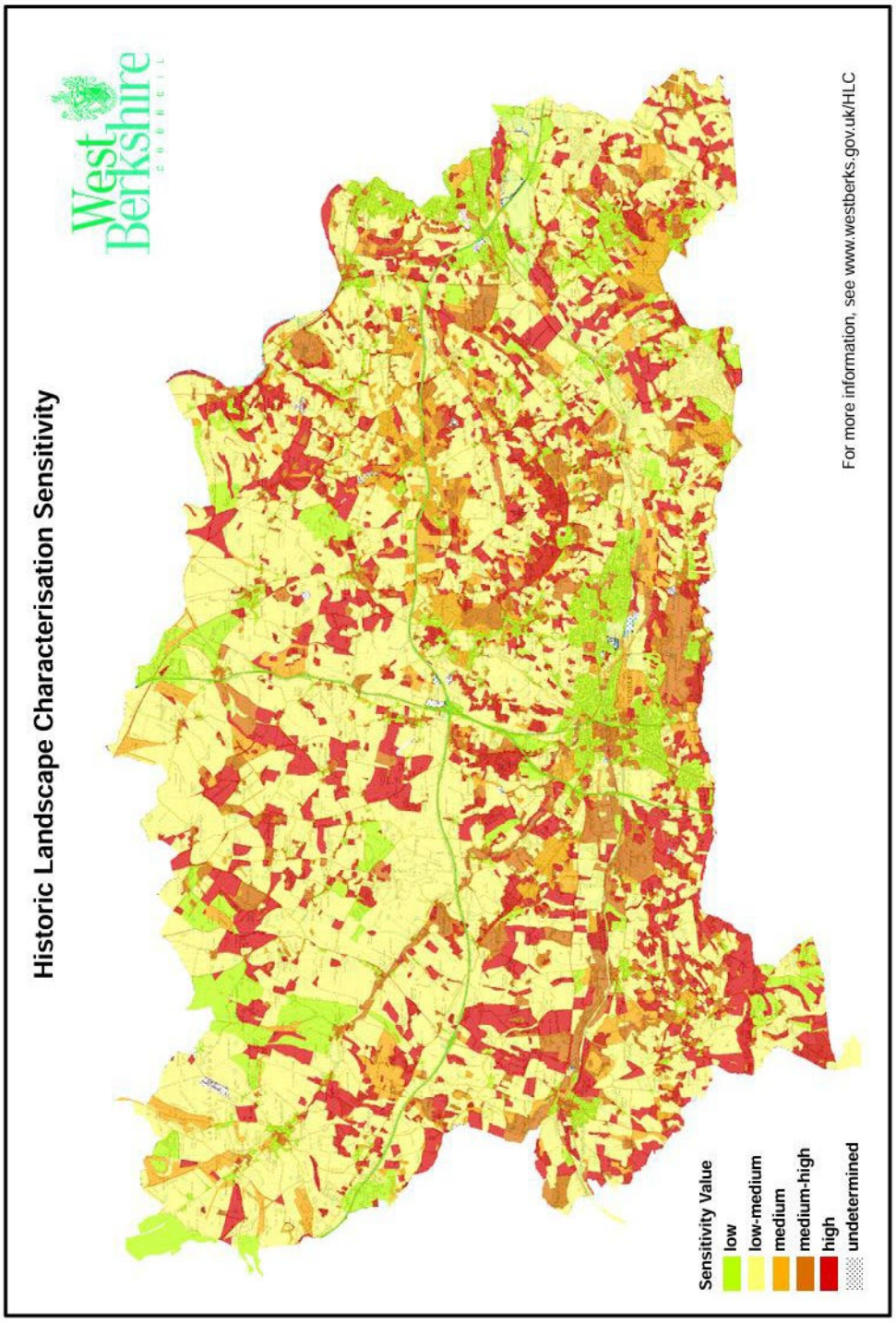
Historic Characterisation maps and text should be understandable, jargon free and easily accessible

- As HLC is not only used by the heritage sector, its terminologies and language need to be carefully composed to avoid creating barriers to use by those others who have responsibility for management of landscape.
- HLC is normally undertaken within a GIS. An attached systematically organised database sets out the historic landscape's attributes.
- Those assessing opportunity or sensitivity use queries and algorithms to emphasise, grade or score attributes and polygons of particular interest.
- HLCs also have jargon-free descriptive and interpretative texts.

HLCs are integrated into other environmental and heritage management records

Most HLCs, as well as urban characterisations and assessment frameworks of heritage asset types, are developed by local authority HERs with funding and advice from Historic England. They are now available online as part of the relevant HER.

- The National HLC mapping is available online at the data.gov website.



West Berkshire; sensitivity to large-scale residential, infrastructural and industrial development (West Berkshire District Council 2011).

Appendix 4 Introducing HLC and HSC Types and attributes

A Historic Characterisation thesaurus has been prepared by Historic England. Broad Types, Types and Sub-types are introduced by brief scope notes (Historic Characterisation Thesaurus). The following are brief introductions to the Broad Types, termed Classes in the thesaurus.

Civic Amenities

Large-scale public amenities, usually grouped into three main types: water supply, waste disposal and flood and sea defence. In all HLCs, these Types and those within all the Broad Types noted below, are usually themselves divided into sub-types.

Civic Provision

Services provided to individuals by national or local government, other public bodies, organised religions, etc. Usually grouped into six main types: civil, education, health, prison, religion and funerary.

Commerce

Transferring goods and services from producers to consumers. Usually grouped into three main types: business, retail and storage.

Communications & Movement

Movement of people, information and freight by land, air and water. Often linear or nodal. Usually grouped into four main types: road, water, railway and air.

Cultural Topography

Topographical forms made cultural by perceptions and use by people. On land, usually grouped into four main types: coast and foreshore, water body, wetland and bog. At sea, includes muds, sandbanks and bedrock.

Enclosure

This is usually the most extensive HLC type. Also, one of those most particular or distinctive to place. Numerous economic, social, agricultural, topographical and cultural factors were involved in the creation, maintenance and change of fields. HLC usually corrals this into a scheme that works at two levels. Ancient, recent and modern field patterns are distinguished first. Then these are divided between fields derived from new enclosure of land previously used for different purposes and farmland organised into various forms of field system designed to serve particular functions (like equitable sharing of land). Age and detail of field form and boundary type are recorded in a polygon's attributes.

Fisheries & Aquaculture

Coastal and estuarine harvesting of fish and shellfish from either the wild or farms. Usually grouped into two main types: fishing and aquaculture. At sea it affects the surface, water column, floor and sub-floor levels.

Industry

Large-scale creation of material, goods or energy. Usually grouped into five main types: extractive, manufacturing, processing, repair and energy.

Military

Society's sanctioned use of lethal force to either defend or extend its territory or interests. Usually grouped into seven main types: fortification, defences, transport, depot, installation, practice area, residence.

Orchards and Horticulture

Extensive and systematic commercial cultivation of crops. Usually grouped into four main types: orchard, flower farm, market garden, glasshouses.

Ornamental

Land deliberately designed to be beautiful, picturesque or sublime. Usually grouped into two main types: park and pleasure grounds.

Recreation and Leisure

Complexes and areas set aside for leisure, sport and other recreation. Usually grouped into six main types: country sport, open space, recreation, sports, events and managed heritage asset.

Rural Settlement

Particular settlements, not patterns like nucleated or dispersed. Usually grouped into five main types: isolated dwelling, farmstead, hamlet, village, housing estate.

Unimproved Land

Relatively open land with semi-natural vegetation created and maintained by extensive land management, such as seasonal grazing and the cutting of fuel. Usually grouped into five main types: rough ground, unimproved grassland, marsh, scrub and dunes.

Urban Settlement

The urban residential elements expected in county-level HLC. Note that urban areas typically also include other HLC types, such as civic provision, commerce, communications, industry, ornamental and recreation and leisure. Separation on the basis of broad periods (usually by map regression) is common practice, but the type is usually grouped into four main types: historic urban core, residential area, urban extension and dwelling, the latter having subtypes like terraced, semi-detached and detached housing.

Valley Floor and Wetland

Partly land use, partly topography, but dominated by meadow. Usually grouped into five main types: meadow, water meadow, willow garden, water cress bed and mill water system.

Woodland

Usually grouped into four main types: regularly harvested ancient woodland (pre-17 century by Natural England criteria), more recent plantations for timber or pulp, secondary woodland on land formerly used for other purposes and wood pasture, land where agriculture is at least equal to silviculture.

Broad Types, Types and Sub-Types

Each Broad Type or class is subdivided into suites of Types and Sub-Types, illustrated here by the thesaurus's hierarchy for the Enclosure Broad Type, normally the most extensive in an HLC. Types are those justified to the left and subtypes are those indented to the right.

ANCIENT ENCLOSURE
- **BRICK SHAPED FIELDS**
- **COAXIAL FIELD SYSTEM**
  - **DUAL AXIS COAXIAL FIELD SYSTEM**
  - **IRREGULAR COAXIAL FIELD SYSTEM**
  - **REGULAR COAXIAL FIELD SYSTEM**
- **IRREGULAR ANCIENT ENCLOSURE ANCIENTLY ENCLOSED LAND**

ASSART
CROFT
ENCLOSURE OF PARKLAND
FIELD SYSTEM
- **ALLOTMENTS**
- **AMALGAMATED FIELDS**
- **BARTON DEMESNE FIELDS**
- **COAXIAL FIELD SYSTEM**
  - **DUAL AXIS COAXIAL FIELD SYSTEM**
  - **IRREGULAR COAXIAL FIELD SYSTEM**
  - **REGULAR COAXIAL FIELD SYSTEM**
- **GRANGE FIELDS**
- **INFIELDS**
- **OPEN FIELD SYSTEM**
  - **FURLONG**
- **OUTFIELDS**
- **PADDOCKS**
- **PIECEMEAL ENCLOSURE**
  - **FURLONG**
  - **STRIP FIELDS**
- **PLANNED FIELD SYSTEM**
  - **LADDER FIELD SYSTEM**
- **PRAIRIE FIELDS**
- **REORGANISED FIELD SYSTEM**

INTAKE FROM ROUGH GROUND
MEADOW
MODERN ENCLOSED LAND
PLANNED ENCLOSURE
- **PARLIAMENTARY ENCLOSURE**

RECENTLY ENCLOSED LAND
RECLAIMED LAND

RECLAMATION FROM SEA
RECLAMATION FROM TIDAL MARSH
RECLAMATION FROM WETLAND
RESTORED FIELDS
SMALLHOLDING
SQUATTER ENCLOSURE

Attributes

The Oxfordshire HLC was one of the last to be created. Its attribute structure had therefore been developed from review of many earlier HLCs (Tompkin 2017).

Opportunity and sensitivity assessments can query all attributes and score them against positive or negative effects of change or against the affordances they may offer to change. These are the Oxon HLC attributes for Enclosed Land, as an example. Similarly detailed sets of attributes were recorded for all other Broad Types.

Broad Type	Attribute Parent Group	Attribute
Enclosure	Boundary Loss	Major Gain (>40%)
		Minimal Gain (<40%)
		Major Loss (>40%)
		Minimal Loss (<40%)
		No Loss
	Period	(Historic England Period List)
	Size	Small (<2ha)
		Medium (2-10ha)
		Large (>10ha)
	Enclosure Type	Parliamentary Enclosure
		Enclosed Furlong
		Enclosed Strip
		Flood Plain/Enclosure of River Meadow
		Enclosure of Open Field
		Pre-18th Century Enclosure
		Reorganised Planned Enclosure
		Reordered Enclosure
		Filled Extractive Pit
		Cleared Woodland
		Enclosure of Parkland/Woodland Pasture
	Degree of Subdivision	Enclosed

		Partially Enclosed
		Unenclosed
		Defined by Surrounding Enclosures
	Perimeter Morphology	Curvilinear
		Not Applicable
		Rectilinear
		Straight
		Irregular
		Mixed
		Regular
		Sinuous
	Internal Morphology	Semi-Straight
		Straight
		Curving
		Rectilinear
		Sinuous
		Not Applicable
		Irregular
	Ridge and Furrow	Dog Leg Morphology
		Earthwork of Reversed S-Shape Ridge and Furrow
		Earthwork of Straight Ridge and Furrow
		Not Applicable/Absent
		Reversed S-Shape Ridge and Furrow
		Straight Ridge and Furrow

Appendix 5 Supporting texts for HLC Types

Descriptive and interpretative texts were prepared for the first HLC (Cornwall in 1994). Texts derived from these have been prepared for all later HLCs. They will be relevant to those assessing opportunity or sensitivity in relation to particular forms of change.

Defining and distinguishing attributes. The character, qualities and attributes that enabled the characteriser to distinguish this Type.

Principal historical processes. Overview of current knowledge of the historical developments that produced surviving historical and semi-natural features.

Typical components. Elaborates on the defining attributes, and draws in distinctive landscape features, including building or monument types.

Principal locations. Summary of the Type's distribution.

Variability. Identifies where Types have distinctive local character.

Past relationships with other HLC Types. Typical historical relationships, like upland/lowland interconnections, or urban areas and their hinterlands.

Evidential Value. Potential for improving understanding of the Type by further archaeological and historical research.

Historical Value. Evidence for time-depth typically visible within the HLC Type.

Communal Value. Range of perceptions that communities and individuals typically have of the HLC Type.

Aesthetic Value. How the Type's historic character contributes to overall landscape character.

Potential for amenity and education. How communities, visitors and educators may draw interest from the Type's history and character.

Survival. How the Type has diminished or grown in recent times (using map regression and other sources).

Vulnerability. Extent of statutory or customary protection the Type receives.

Forces for change. Influences currently affecting the Type. Not just negative ones.

Safeguarding the type. Simple recommendations made in light of the foregoing subsections and with the intention of managing and conserving the Type, its components and its character.

Most HLCs created within GIS also provide summary statistics for each Type: numbers of polygons, percentage coverage of study area, usually accompanied by small-scale distribution maps.