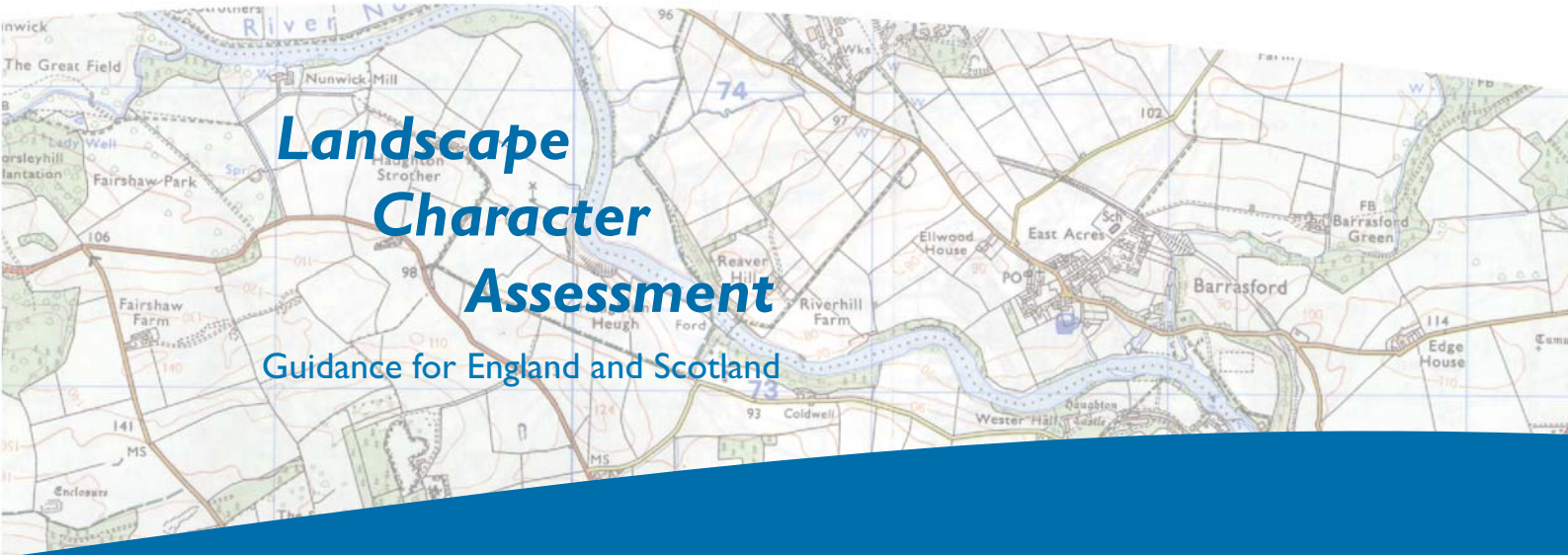


Landscape and Ecology Study of Greenfield Sites in Worthing Borough
November 2015

Appendix D: Extract from Natural England's Topic Paper 6



**Landscape
Character
Assessment**
Guidance for England and Scotland

**TOPIC PAPER 6:
Techniques and Criteria
for Judging Capacity and Sensitivity**

An exploration of current thinking about landscape sensitivity and landscape capacity, to stimulate debate and encourage the development of common approaches.

I. INTRODUCTION

1.1 The Countryside Agency has recently published a report [1] that looks forward to the way that the countryside might evolve up to the year 2020. It makes it clear that change in English rural landscapes is inevitable in the next 20 years, as a result of a variety of social and economic forces, including food production, housing needs, transport issues, and energy requirements. At the same time the Agency published the results of a public opinion survey suggesting that 91% of English people want to keep the countryside exactly as it is today. Clearly the two are not compatible and hard decisions are inevitably required about how the many different demands that society makes on the land can be accommodated while also retaining the aspects of the environment that we place such high value on. Although there have been no exactly parallel studies of future landscapes in Scotland and of attitudes to them, the recent report on change in Scotland's rural environment [2] shows that similar issues also arise there. Indeed Scotland has been at the forefront of efforts to consider the capacity of Scotland's landscapes to accommodate change of various types.

1.2 In both England and Scotland, Landscape Character Assessment is being widely employed as a tool to help guide decisions about the allocation and management of land for different types of development. It is being used particularly to contribute to sensitivity or capacity studies dealing with the ability of the landscape to accommodate new housing, wind turbines and other forms of renewable energy, and new woodlands and forests, as well as locally significant types of development such as, for example, aquaculture schemes in Scotland. Work of this type inevitably involves consideration of the sensitivity of different types and areas of landscape and of their capacity to accommodate change and development of particular types. If carried out effectively, Landscape Character Assessment can, in these circumstances, make an important contribution to finding solutions that allow essential development to take place while at the same time helping to maintain the diverse character and valued qualities of the countryside. Making decisions based on sensitivity and capacity is a difficult and challenging area of work and also one that is developing rapidly as more and more studies of this type are carried out. The terms themselves are difficult to define accurately in a way that would be widely accepted.

1.3 This Topic Paper provides an overview of current thinking about landscape sensitivity and landscape capacity in terms of both the concepts involved and the practical techniques that are being used. It is not intended to provide a definitive method for assessing sensitivity and capacity but rather to help those involved in such work by setting out some of the key principles, clarifying some of the issues, helping with definitions of key terms and providing examples of the approaches that are currently being used. In this way the intention is to encourage greater transparency in the thinking applied to these issues and to promote consistency and rigour in such work. The content of the paper is based on a workshop involving a small group of practitioners involved in work of this type and review of a small selection of recent studies. It was not the intention, and nor were the resources available, to carry out a comprehensive review of published reports or work in progress in this area, or a wide ranging consultation exercise.

2. WHAT EXISTING GUIDANCE DOCUMENTS SAY ABOUT SENSITIVITY AND CAPACITY

2.1 The topic of landscape sensitivity and capacity proved one of the most difficult to deal with in the main Landscape Character Assessment (LCA) guidance. This was due to both the new and rapidly developing nature of much of this work and also to the great variation in the approaches being applied and the terminology being used. In addition there were some concerns about the need for compatibility with the definitions of sensitivity being developed in the separate 'Guidelines for Landscape and Visual Impact Assessment' [3] which was due to be published at the same time. As a result the published version of the LCA guidance omitted specific reference to landscape sensitivity and instead contained only a few short paragraphs on the topic of landscape capacity on the basis that the issues would be dealt with more fully in a later Topic Paper. For convenience, the current wording of the LCA guidance is summarised in Box 1.

Box 1: What the existing guidance says about capacity

"Landscape capacity refers to the degree to which a particular landscape character type or area is able to accommodate change without significant effects on its character, or overall change of landscape character type. Capacity is likely to vary according to the type and nature of change being proposed"

"Many Landscape Character Assessments will be used to help in decisions about the ability of an area to accommodate change, either as a result of new development or some other form of land use change, such as the introduction of new features, or major change in land cover such as new woodland planting. In these circumstances judgement must be based on an understanding of the ability of the landscape to accommodate change without significant effects on its character. Criteria for what constitutes significant change need to be identified in planning policies or landscape strategies, and will usually be informed by potential effects on character and/or particular features and elements"

Carys Swanwick and Land Use Consultants. Landscape Character Assessment Guidance. Countryside Agency and Scottish Natural Heritage. 2002.

2.2 The published Guidelines on Landscape and Visual Impact Assessment [3] tackle the subject of sensitivity at some length, but do not deal specifically with the topic of landscape capacity. It is, however, clear that there is much common ground between the thinking that is emerging on landscape sensitivity and capacity in Landscape Character Assessment work and the approach that is taken in Britain to Landscape and Visual Impact Assessment. It is therefore particularly important to understand the links between the two and to try, as far as possible, to achieve consistency in the approaches used and particularly in the terms and definitions used. On the other hand it must also be recognised that LCA and LVIA are not the same processes and there must also be clarity about the differences between them.

3. CONCEPTS OF SENSITIVITY AND CAPACITY

3.1 The terms sensitivity and capacity are often used more or less interchangeably. Others treat them as opposites, in the sense that low sensitivity is taken to mean high capacity and vice versa. Indeed the earlier versions of the Landscape Character Assessment guidance used the term sensitivity in the definition given above but this was changed to capacity in the published version to avoid confusion with the guidance on landscape and visual impact assessment. However, as experience of the issues involved has developed, it has become clearer that the two are not the same and are not necessarily directly related. A clearer distinction therefore needs to be drawn between them. Definitions vary among those actively engaged in this work and opinions vary about the acceptability and utility of different definitions. The box below contains just two examples of current ideas of sensitivity, in the words of the authors.

Box 2 : Examples of definitions of landscape sensitivity in current use

"Landscape sensitivity... relates to the stability of character, the degree to which that character is robust enough to continue and to be able to recuperate from loss or damage. A landscape with a character of high sensitivity is one that, once lost, would be difficult to restore; a character that, if valued, must be afforded particular care and consideration in order for it to survive."

The model for analysing landscape character sensitivity is based on the following assumptions:

- i) Within each landscape type certain attributes may play a more significant role than others in defining the character of that landscape.
- ii) Within each landscape type, certain attributes may be more vulnerable to change than others.
- iii) Within each landscape type, the degree to which different attributes are replaceable, or may be restored, may vary.

- iv) The condition of the landscape - the degree to which the described character of a particular landscape type is actually present 'on the ground' - will vary within a given area of that landscape type.

By being able to appreciate and assess the significance, vulnerability and replaceability of different attributes, the relative stability or resilience of the various attributes within given landscape types can be assessed. Then, taking into account condition, or representation of character, the sensitivity of a particular area of landscape can be determined.

Chris Bray. Worcestershire County Council. Unpublished paper on a County Wide Assessment of Landscape Sensitivity. 2003.

Landscape sensitivity... is a property of a thing that can be described and assessed. It signifies something about the behaviour of a system subjected to pressures or stimuli. One system, when stimulated might be robust and insensitive to the pressure, whilst another may be easily perturbed. The system might also be thought of in a dynamic way - the pressure could send the system off into a new state or the system might be resilient and bounce back rapidly and be relatively insensitive to disturbance. Sensitivity is related here to landscape character and how vulnerable this is to change. In this project change relates to wind energy development and any findings on landscape sensitivity are restricted to this (landscapes may have different sensitivities to other forms of change or development). Landscapes which are highly sensitive are at risk of having their key characteristics fundamentally altered by development, leading to a change to a different landscape character i.e. one with a different set of key characteristics. Sensitivity is assessed by considering the physical characteristics and the perceptual characteristics of landscapes in the light of particular forms of development.

John Benson et al. University of Newcastle. Landscape Capacity Study for Wind Energy Development in the Western Isles. Report commissioned by Scottish Natural Heritage for the Western Isles Alternative Renewable Energy Project. 2003

3.2 These two examples highlight one of the main debates about landscape sensitivity, namely whether it is realistic to consider landscapes to be inherently sensitive or whether they can only be sensitive to a specific external pressure. This paper argues that both are valid and useful in different circumstances. Looking at the way that the word sensitivity is used in other contexts, for example in describing the character of people, it is common and seems quite acceptable to describe someone as 'a sensitive person', without necessarily specifying what they are sensitive to. Landscape can quite reasonably be treated in the same way.

3.3 There is a greater degree of agreement about definitions of capacity with broad acceptance that it is concerned with the amount of change or pressure that can be accommodated. There is therefore a quantitative dimension to it and it needs to reflect the idea of the limits to acceptable change. The main debate here is about whether aspects of landscape value should or should not be incorporated into considerations of capacity. In general there appears to be some acceptance that it should, although some argue that this is a retrograde step and could lead to an over reliance on existing designations, which is widely recognised as an overly simplistic approach. There is also some disagreement about where visual aspects should be considered, whether as a component of landscape sensitivity, or wholly as a contributor to landscape capacity, or both.

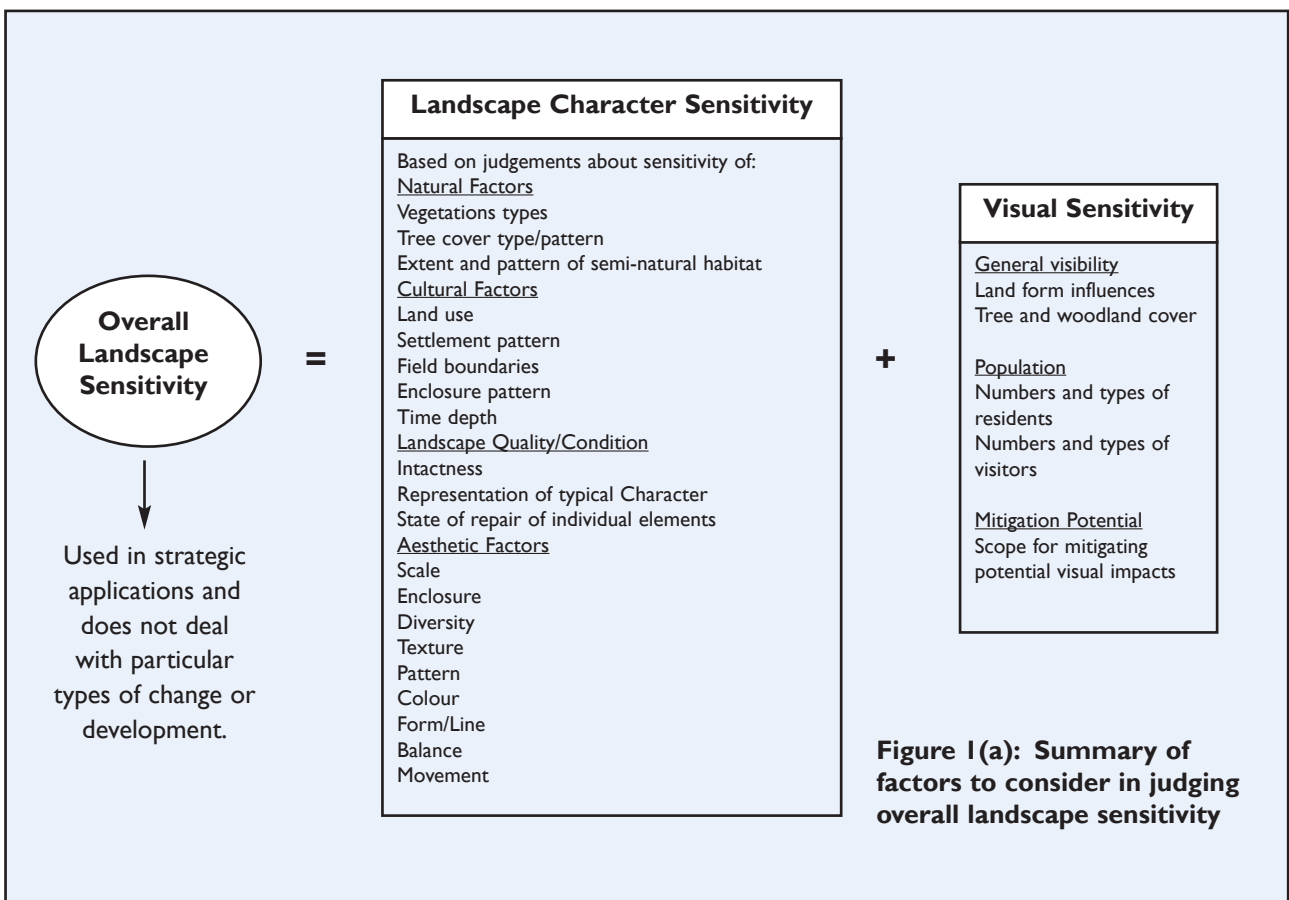
3.4 In this paper an attempt has been made to weigh up the different arguments and as a result it is suggested that three terms can usefully be adopted as shown below. Further details of the definition and use of these terms are in the later sections of this paper.

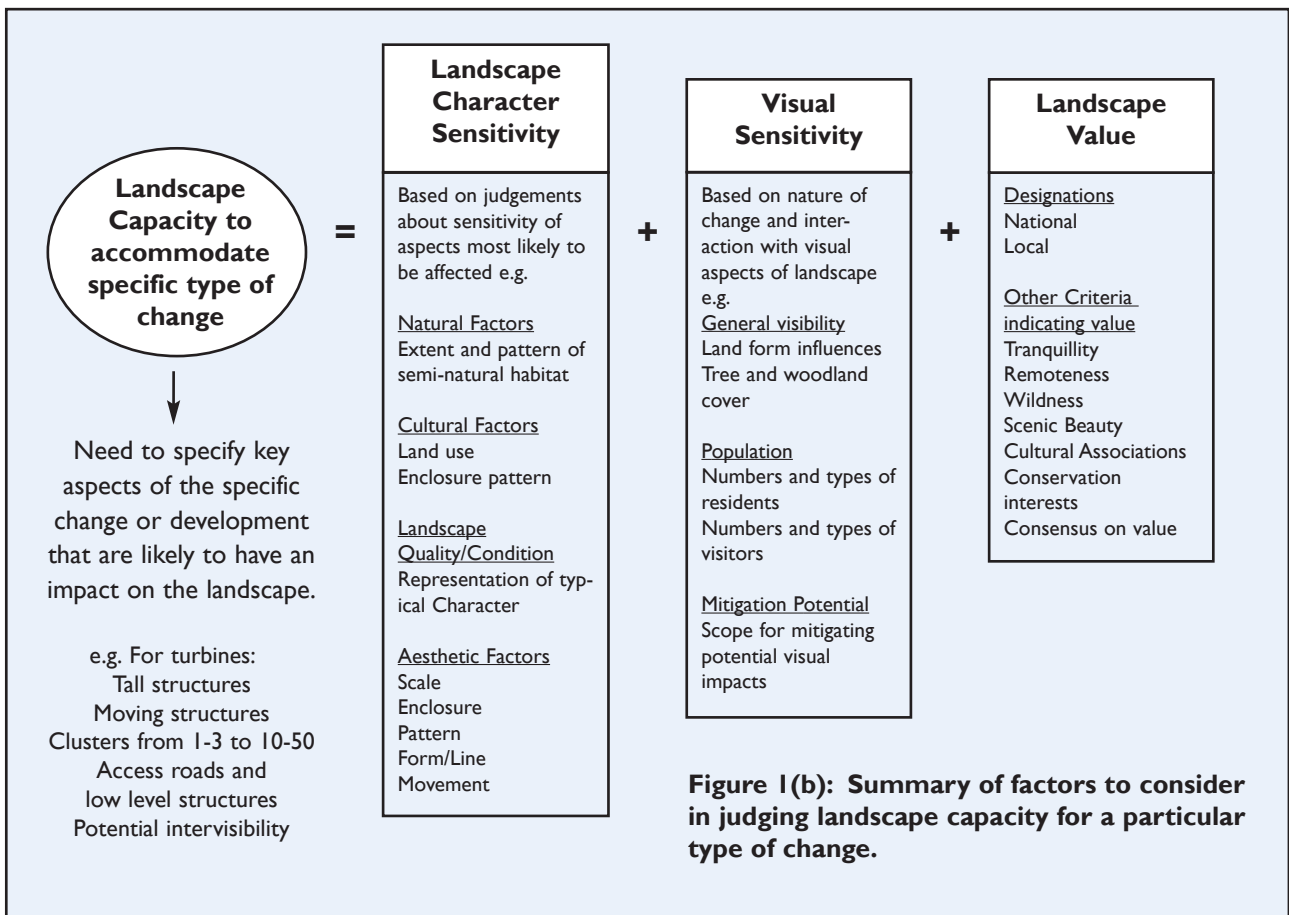
- i) **Overall landscape sensitivity:** This term should be used to refer primarily to the inherent sensitivity of the landscape itself, irrespective of the type of change that may be under consideration. It is likely to be most relevant in work at the strategic level, for example in preparation of regional and sub-regional spatial strategies.

Relating it to the definitions used in Landscape and Visual Impact Assessment, landscape sensitivity can be defined as embracing a combination of:

- the sensitivity of the landscape resource (in terms of both its character as a whole and the individual elements contributing to character);
 - the visual sensitivity of the landscape, assessed in terms of a combination of factors such as views, visibility, the number and nature of people perceiving the landscape and the scope to mitigate visual impact.
- ii) **Landscape sensitivity to a specific type of change:** This term should be used where it is necessary to assess the sensitivity of the landscape to a particular type of change or development. It should be defined in terms of the interactions between the landscape itself, the way that it is perceived and the particular nature of the type of change or development in question.
- iii) **Landscape capacity:** This term should be used to describe the ability of a landscape to accommodate different amounts of change or development of a specific type. This should reflect:
- the inherent sensitivity of the landscape itself, but more specifically its sensitivity to the particular type of development in question, as in (i) and (ii). This means that capacity will reflect both the sensitivity of the landscape resource and its visual sensitivity;
 - the value attached to the landscape or to specific elements in it.

The meanings of these terms and the types of factors that need to be considered in each case are summarised in Figure 1 (a) and (b).





3.5 The implication of this is that capacity studies must be specific to a particular type of change or development. At a strategic level, for example in work relating to regional and sub-regional spatial strategies, this means that it might be appropriate to produce a single map of general landscape sensitivity. Maps of landscape capacity, however, need to be specific so that, for example, a map showing an assessment of wind turbine capacity could be produced but would almost certainly be different from a map showing capacity for housing development or for new woodland and forestry planting. Some capacity studies are very specific in their purpose, seeking for example to assess capacity to accommodate a 1000 home settlement at a particular density of development.

4. JUDGING OVERALL LANDSCAPE SENSITIVITY

4.1 In making judgements about the overall landscape sensitivity of different landscape types or areas, without reference to any specific change or type of development (for example in work relating to regional and sub-regional spatial strategies), careful consideration needs to be given to two aspects:

- Judging the sensitivity of the landscape as a whole, in terms of its overall character, its quality and condition, the aesthetic aspects of its character, and also the sensitivity of individual elements contributing to the landscape. This can be usefully referred to as **landscape character sensitivity**;
- Judging the **visual sensitivity** of the landscape, in terms of its general visibility and the potential scope to mitigate the visual effects of any change that might take place. Visibility will be a function particularly of the landform of a particular type of landscape and of the presence of potentially screening land cover, especially trees and woodland. It will also be a reflection of the numbers of people who are likely to perceive the landscape and any changes that occur in it, whether they are residents or visitors.

Landscape character sensitivity

4.2 Judging landscape character sensitivity requires professional judgement about the degree to which the landscape in question is robust, in that it is able to accommodate change without adverse impacts on character. This means

making decisions about whether or not significant characteristic elements of the landscape will be liable to loss through disturbance, whether or not they could easily be restored, and whether important aesthetic aspects of character will be liable to change. Equally, consideration must be given to the addition of new elements, which may also have a significant influence on character. These decisions need clear and consistent thought about three factors:

- the individual elements that contribute to character, their significance and their vulnerability to change;
- the overall quality and condition of the landscape in terms of its intactness, representation of typical character and condition or state of repair of individual elements contributing to character;
- the aesthetic aspects of landscape character, noting that in Scotland these are usually referred to as the 'landscape experience' or the 'scenic qualities' of the landscape. As indicated in the LCA Guidance, aesthetic factors/scenic qualities can still be "recorded in a rational, rigorous and standardised, if not wholly objective way". They include for example the scale, level of enclosure, diversity, colour, form, line, pattern and texture of the landscape. All of these aesthetic dimensions of landscape character may have significance for judgements about sensitivity. They are also distinct from the perceptual aspects of landscape character, which are much more subjective and where responses to them will be more personal and coloured by the experience and the preferences of the individual. These are also important dimensions of character and influence the ability of landscapes to accommodate change but they are best dealt with as part of the consideration of value to be incorporated in the final step of assessing capacity, as discussed in **Section 7**.

4.3 Different methods have been used to judge landscape character sensitivity in recent work. Each has its merits and it is not the role of this topic paper to advocate one approach or another. There is also much common ground between them and they are not therefore alternatives but rather different explorations of a similar approach. A common feature of these approaches in England is the analysis of landscape character in terms of firstly the natural and ecological, and secondly the cultural attributes of the landscape. Landscape sensitivity is in these cases equated broadly with ideas of ecological and cultural sensitivity and deliberately does not embrace either aesthetic aspects of character or visual sensitivity. Three recent examples illustrating this approach are summarised in Boxes 3 and 4.

4.4 There are few if any examples of studies of overall landscape sensitivity that incorporate assessment of the aesthetic dimensions of landscape character, although it would be technically possible to do this. Such considerations are more likely to be found in studies of sensitivity to particular forms of change or development and are discussed in **Section 5**.

Box 3: An approach based on ecological and cultural sensitivity

The Countryside Agency's work on traffic impacts on the landscape required a desk based rather than a field assessment using Staffordshire as the test area. The main concern was with the impact of the road network on landscape character. The Countryside Agency's National Landscape Character Types, and the Land Description Units (LDUs) on which they are based, both derived from the National Landscape Typology, were used as reporting units. The attribute maps from the national typology also provided much of the source data for the analysis. In this work landscape sensitivity is defined as the degree to which the character of the landscape is likely to be adversely affected or changed by traffic levels and network use. It is considered to consist of a combination of ecological sensitivity and cultural sensitivity where:

- **ecological sensitivity** is based on identification of areas where there are ecologically significant habitats likely to be at risk, reflecting combinations of agricultural potential, related to ground type, together with agricultural use and woodland pattern;
- **cultural sensitivity** is based on identification of areas where culturally significant elements of the landscape will be at risk, reflecting a combination of settlement pattern, land cover and the origins of the landscape in terms of whether it is 'planned' or 'organic'.

These two aspects of sensitivity are mapped using GIS and combined into an overall sensitivity matrix. Data on

the road hierarchy and road 'windy-ness' was then combined with the sensitivity classes to give an overall assessment. This desk study proves successful in highlighting areas of concern that could then be examined in more detail if required.

Babtie Group and Mark Diacono. Assessing Traffic Impacts on the Countryside. Unpublished Report to the Countryside Agency. 2003.

Box 4 : Approaches based on vulnerability, tolerance and resilience to change

Work carried out recently for structure plan purposes by Herefordshire and Worcestershire County Councils working in partnership, focuses on landscape character sensitivity rather than visual sensitivity. The work is at the detailed level of Land Description Units (the constituent parts or building blocks of Landscape Character Types and Areas). These studies also focus on individual landscape indicators and attributes - meaning the factors that contribute to character, grouped together under the headings of ground vegetation, land use, field boundaries, tree cover character, tree cover pattern, enclosure pattern, settlement pattern, spatial character and additional characteristic features, such as parkland or rivers.

These studies use a combination of several different aspects of the character of the landscape to reach an assessment of overall sensitivity, based on analysis of these attributes. The definitions of the component parts can be summarised as follows:

Vulnerability: This is a measure of the significance of the attributes that define character, in relation to the likelihood of their loss or demise. This combines assessment of the significance of an attribute with assessment of its functionality and of the likelihood of future change based on apparent trends.

Tolerance: This can be defined as the degree to which change is likely to cause irreparable damage to the essential components that contribute to landscape character. It is a measure of the impacts on character of the loss of attributes, reflecting the timescale needed for their contribution to character to be restored. This combines assessment of the replaceability of individual attributes with their overall significance in the landscape and also takes account of the potential for future change based on apparent trends.

Resilience: This combines tolerance with vulnerability to change. It is a measure of the endurance of landscape character, representing the likelihood of change in relation to the degree to which the landscape is able to tolerate that change.

Sensitivity: Relates to the resilience of a particular area of landscape to its condition.

Each of these aspects of sensitivity is assessed from a combination of desk and fieldwork. The assessments of each factor are then progressively combined in pairs using matrices, until the final assessment of individual areas emerges. In general three point numerical scores are used to combine the various aspects in pairs.

The published Herefordshire work focuses on landscape resilience, which is mapped for landscape types and forms the key summary map in the published Supplementary Planning Guidance document, leaving a final assessment of sensitivity to a more detailed stage based on individual land cover parcels, which is the fine grain at which condition has been assessed in this work. The Worcestershire work is not yet published but will take a similar approach once the County survey of condition has been completed.

Worcestershire County Council. Unpublished paper on a County Wide Assessment of Landscape Sensitivity. 2003.
Herefordshire Council. Landscape Character Assessment. Supplementary Planning Guidance. 2002.

Visual sensitivity

4.5 In a comprehensive study of landscape sensitivity account would ideally also be taken of the visual sensitivity of the landscape. This requires careful thinking about the way that people see the landscape. This depends on:

- the probability of change in the landscape being highly visible, based particularly on the nature of the landform and the extent of tree cover both of which have a major bearing on visibility;
- the numbers of people likely to perceive any changes and their reasons for being in the landscape, for example as residents, as residents staying in the area, as travellers passing through, as visitors engaged in recreation or as people working there;
- the likelihood that change could be mitigated, without the mitigation measures in themselves having an adverse effect (for example, planting trees to screen development in an open, upland landscape could have as great an effect as the development itself).

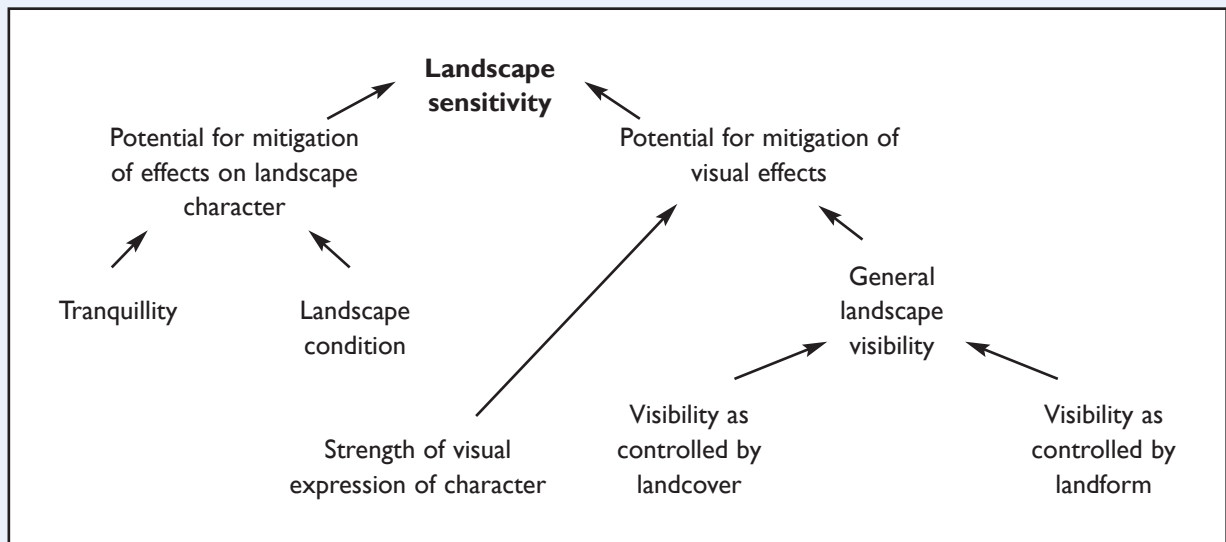
4.6 In practice visual sensitivity can be difficult to judge without reference to a specific form of change or development and that is no doubt why there are few examples of strategic assessments that incorporate this dimension. Herefordshire and Worcestershire initially intended to incorporate such considerations into their strategic work but abandoned the attempt on the basis that it was more realistically considered for specific proposed developments or change. Work by Staffordshire County Council does, however, provide a working example of an approach that combines judgements about landscape character sensitivity (as outlined above) with consideration of the issue of visual sensitivity. It is summarised in **Box 5**.

Box 5: Staffordshire County - An approach that combines landscape character sensitivity and visual sensitivity

Work carried out by Staffordshire County Council, published as Supplementary Planning Guidance to the Staffordshire and Stoke on Trent Structure Plan, approaches landscape sensitivity by working at the Land Description Unit level and addressing the three aspects of landscape character listed below. In this work the first stage in addressing landscape sensitivity is to consider the quality (as defined in the LCA guidance, meaning condition and expression of typical character in specific areas) of individual areas of landscape in relation to their character. This is achieved by asking a series of questions about the three aspects of character:

- **Visual aspects**, dealing with the spatial distribution, pattern and condition of landscape elements. The questions cover: the presence of characteristic features for the landscape type; the absence of incongruous features for the type; and the visual and functional condition of the elements contributing to character of that particular type.
- **Cultural aspects**, which are determined by the history of human activity and are reflected in the patterns of settlement, land use, field enclosure and communications. The questions cover: demonstration of a clear and consistent pattern of landscape elements resulting from a particular course of historical development contributing to character; and the extent to which the area exhibits chronological continuity or 'time depth' in the landscape.
- **Ecological aspects**, relating to the pattern and extent of survival of the typical semi-natural vegetation and related fauna. The questions cover the presence and frequency of semi-natural vegetation characteristic of the landscape type; and the degree of fragmentation and the pattern of the semi-natural habitats.

The Staffordshire approach notes the strong relationship between the quality and sensitivity of the landscape in that one of the effects of disturbance can be the removal of characteristic landscape features. In dealing with the potential impacts of change on landscape character it asks how likely it is that significant features or characteristics of the landscape that contribute to its quality will be lost through disturbance. It also asks whether perception of landscape quality will be adversely affected.



The Staffordshire example is one of the few cases where landscape character sensitivity and visual sensitivity have been combined in an integrated approach. In terms of visual impact this work asks two questions:

- How likely is it that the effects of a given amount of disturbance will be visible?
- What is the potential for negating or minimising adverse visual impacts of disturbance through mitigation and compensation measures?

The idea of general visibility is used and is defined in terms of the likelihood that a given feature, randomly located, will be visible from a given viewpoint, also randomly located. It was determined in this case by theoretical and field based analysis of landform and tree and woodland cover and the way that they interact.

All these different factors, relating to both landscape character sensitivity and visual sensitivity are then combined by judging each on a 5 level scale and combining them sequentially, in map form, through the use of GIS, to produce a final map of landscape sensitivity.

Staffordshire County Council 1999. Planning for Landscape Change. Supplementary Planning Guidance to the Stoke on Trent and Staffordshire Structure Plan. 1996-2011

5. JUDGING LANDSCAPE SENSITIVITY TO A SPECIFIC TYPE OF CHANGE

5.1 In many studies judgements must be made about the ability of the landscape to accommodate particular types of change or development. This is where sensitivity and capacity are most often used interchangeably but it is suggested that, in line with the definitions set out above, sensitivity is the most appropriate word to use. When judging how sensitive a landscape is to some specified type of change it is essential to think in an integrated way about:

- The exact form and nature of the change that is proposed to take place;
- The particular aspects of the landscape likely to be affected by the change, including aspects of both landscape character sensitivity and visual sensitivity, as described in **Section 4**.

5.2 Understanding the nature of the agent of change is like specifying or describing the development project in an Environmental Impact Assessment, except that it is a generic rather than a project-specific form of change. The focus must be on identifying key aspects of the change that are likely to affect the landscape.

5.3 Defining the particular aspects of the character of the landscape that are likely to be affected by a particular type of change (landscape character sensitivity) means careful analysis of the potential interactions. These might include: impacts upon particular aspects of landscape character including landform, land cover, enclosure and settlement pattern; and impacts on aesthetic aspects such as the scale, pattern, movement and complexity of the landscape. In Scotland, for example, the wide range of capacity studies that have been carried out, although varying in their approach, usually incorporate consideration of the key physical, natural and cultural characteristics of the landscape, but also take into account the aesthetic/scenic dimensions of the landscape in judgements about the ability of different landscapes to accommodate change. So, for example, the Stirling Landscape Character Assessment, which includes consideration of a locational strategy for new development, includes criteria related to the 'landscape experience'. It considers that scale, openness, diversity, form and or line, and pattern are the most relevant aspects for this task (see **Box 6** in Section 7 for fuller examples).

5.4 Similarly the visual sensitivity of the landscape with respect to the specific type of change or development needs to be assessed. This means that the potential visibility of the development must be considered, together with the number of people of different types who are likely to see it and the scope to modify visual impacts by various appropriate forms of mitigation measures.

5.5 An overall assessment of sensitivity to the specific form of change or development requires that the four sets of considerations summarised above should be brought together so that the sensitivity of individual types or areas of landscape to that particular form of development can be judged and mapped. They are:

- impacts upon particular aspects of landscape character including landform, land cover, enclosure and settlement pattern;
- impacts on aesthetic aspects such as the scale, pattern, movement and complexity of the landscape;
- potential visibility of the development and the number of people of different types who are likely to see it;
- scope to modify visual impacts by various appropriate forms of mitigation measures.

In most cases, this is likely to be a precursor to further judgements about capacity. Studies specifically of sensitivity to a particular type of development, without proceeding to an assessment of capacity, are not likely to be common.

5.6 The outcome of a study of landscape sensitivity to a specific type of change or development would usually be a map of different categories of sensitivity, usually with either three (for example low, medium and high) or five (for example very low, low, medium, high, very high) categories of sensitivity. Such a map provides an overview of areas where there is relatively low sensitivity to the particular type of change or development but does not indicate whether and to what extent such change or development would be acceptable in these areas. This requires consideration of other factors and is best tackled through a landscape capacity study.

BOX 5: South West Region Renewable Energy Strategy - an example of using landscape sensitivity to forms of renewable energy development to inform draft targets

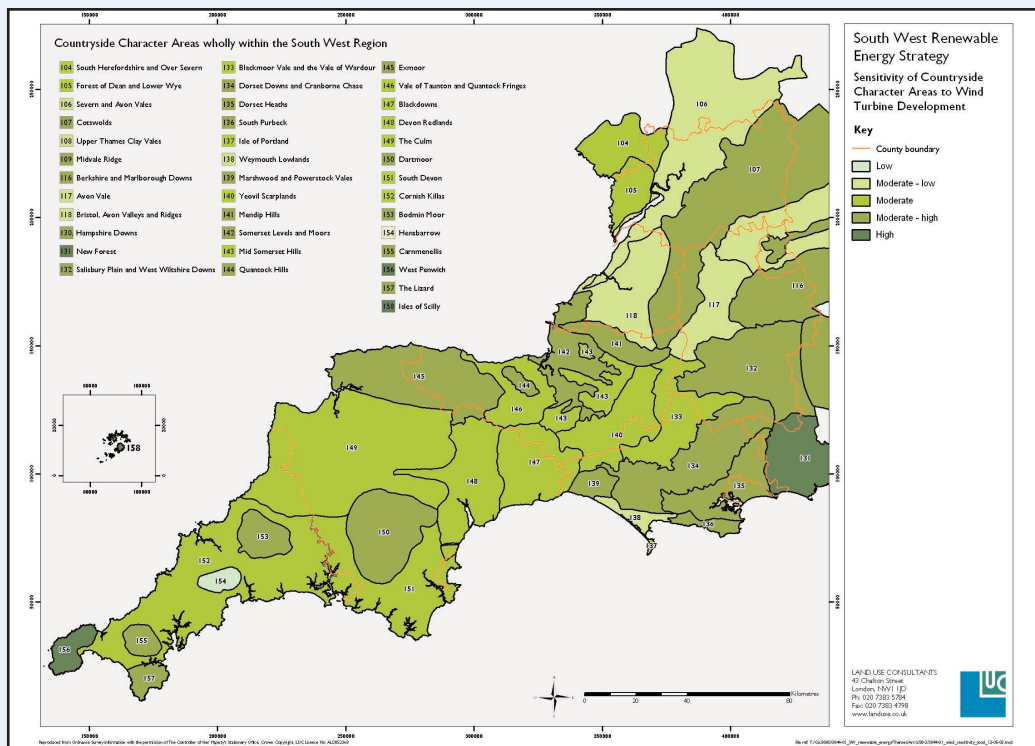
This is a consultant's study, carried out by Land Use Consultants for the Government Office for the South West. It focussed on providing information on the sensitivity of different landscape character areas to wind turbines but also assessed whether a similar approach could be used for biomass crops. Key features of this work, which is still in progress, are:

- It is a strategic study of landscape sensitivity to a specific type of change/development. The Countryside Character Area framework is adopted as suited to the needs of regional scale work, though there has also been subsequent discussion of the scope to use the new National Landscape Typology to provide a more refined level of assessment.
- A range of attributes contributing to landscape character are identified as likely to indicate suitability to accommodate wind turbines. Scale and form of the landscape, landscape pattern, settlement pattern and

transport network relate to the elements and attributes giving character to the landscape; skylines and inter-visibility relate to the visual sensitivity of the landscape; sense of enclosure, sense of tranquillity and remoteness relate to perceptual aspects and value; while sensitive/rare landscape features relates to aspects of landscape value. These distinctions are not referred to in the study where all are referred to simply as 'landscape attributes'.

- A shorter list of attributes is considered to indicate suitability of a landscape to accommodate biomass crops. They are: landscape pattern, land cover/land use, sense of enclosure and settlement pattern/transport network.
- Using these attributes, a series of sensitivity classes are defined in relation to both wind turbines and biomass crops. In each case a five level verbal scale of sensitivity is used - low, moderate/low, moderate, moderate/high and high.
- For each level of sensitivity the influence of the landscape attributes in relation to that type of development is summarised. For example, landscapes judged to be of low sensitivity to wind turbines are "likely to have strong landform, a strong sense of enclosure that reduces visual sensitivity, to be already affected by man made features, to have reduced tranquillity, little inter-visibility with adjacent landscapes and a low density of sensitive landscape features. Similarly, for biomass crops, areas of high sensitivity are defined as those where monocultures of biomass crops would prejudice landscape pattern, where transport infra structure is dominated by narrow rural lanes (or is absent), and where buildings are uncharacteristic of the landscape (e.g. moorland). The scale of possible wind turbine development is considered, predominantly in relation to landform scale, though it is acknowledged that at more detailed levels of assessment other factors such as landscape pattern and enclosure will also be relevant.

Overall the assessment of landscape sensitivity is considered to provide just one 'layer' of information relevant to the process of regional target setting. The study is clearly based on professional judgement within a clear and reasonably transparent framework. There is no explicit scoring or use of matrices but rather a common sense approach to combining the nature of the landscape with the nature of the development to derive sensitivity classes.



Land Use Consultants. South West Renewable Energy Strategy: Using Landscape Sensitivity to set Draft Targets for Wind Energy. Unpublished report to the Government Office for the South West. 2003.

6. JUDGING LANDSCAPE CAPACITY

6.1 Turning a sensitivity study into an assessment of capacity to accommodate a particular type of change means taking a further step. The assessment of the sensitivity of different types or areas of landscape to the type of change in question must be combined with an assessment of the more subjective, experiential or perceptual aspects of the landscape and of the value attached to the landscape. There are, perhaps inevitably, some reservations amongst practitioners about the incorporation of value in work on landscape sensitivity and capacity because this is seen as the return to the now largely discredited thinking about landscape evaluation. It cannot be denied, however, that society does value certain landscapes for a variety of different reasons and this has, in some way, to be reflected in decision making about capacity to accept change.

6.2 As the Landscape Character Assessment guidance indicates (**Paragraph 9.5**), value may be formally recognised through the application of some form of national landscape designation. Where this is the case the implications of the designation need to be taken into account. This means, in particular, understanding what aspects of the landscape led to its designation and how these might be affected by the proposed change. The consultation draft of Planning Policy Statement 7, which is due to replace Planning Policy Guidance Note 7, requires that Local Planning Authorities no longer refer to local landscape designations in Development Plans. Local landscape designations are proposed to be replaced by criteria-based policies, underpinned by robust Landscape Character Assessments.

6.3 The absence of designation does not mean that landscapes are not valued by different communities of interest. This means that in such cases other indicators of value will need to be considered to help in thinking about capacity. Judgements about value in such cases may be based on two main approaches. One is to address value by means of the Quality of Life Assessment approach, seeking to address the question of 'What Matters and Why?' (see Topic Paper 2 - 'Links to Other Sustainability Tools'). In this approach value will be judged in an integrated way, with considerations of landscape and sense of place set alongside other matters such as biodiversity, historic and cultural aspects, access and broader social, economic and environmental benefits.

6.4 Alternatively judgements can be made in terms of the relative value attached to different landscapes by a range of different communities of interest. This can be based on the range of criteria set out in the Landscape Character Assessment guidance (**Paragraphs 7.8 and 7.22**). These include landscape quality and condition; perceptual aspects such as scenic beauty, tranquillity, rurality, remoteness or wildness; special cultural associations; the presence and influence of other conservation interests. There may also be a long established consensus about the importance of particular areas. Weighing up all these factors may allow the relative value of particular landscapes to be assessed as an input to judgements about capacity.

6.5 Reaching conclusions about capacity means making a judgement about 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. This step must clearly recognise that a valued landscape, whether nationally designated or not, does not automatically, and by definition, have high sensitivity. Similarly and as already argued in Section 3, landscapes with high sensitivity do not automatically have no, or low capacity to accommodate change, and landscapes of low sensitivity do not automatically have high capacity to accept change. Capacity is all a question of the interaction between the sensitivity of the landscape, the type and amount of change, and the way that the landscape is valued.

6.6 It is entirely possible for a valued landscape to be relatively insensitive to the particular type of development in question because of both the characteristics of the landscape itself and the nature of the development. It may also be the case that the reasons why value is attached to the landscape are not compromised by the particular form of change. Such a landscape may therefore have some capacity to accommodate change, especially if the appropriate, and hopefully standard, steps are taken in terms of siting, layout and design of the change or development in question. For example, a capacity study may show that a certain specified amount of appropriately located and well-designed housing may be quite acceptable even in a highly valued and moderately sensitive landscape. This is why capacity is such a complex issue and why most capacity studies need to be accompanied by guidelines about the ways in which certain types of change or development can best be accommodated without unacceptable adverse effects.

6.7 Clearly at this stage of making judgements about capacity there can be considerable benefit in involving a wide range of stakeholders in the discussions since there is likely to be a strong political dimension to such judgements. On the other hand clear and transparent arguments are vital if decisions are to be well founded and this is where well constructed professional judgements about both sensitivity and capacity are extremely important.

6.8 In Scotland a wide range of capacity studies have been carried out to look at the ability of different areas to accept development of different types. They have covered housing and built development in general, as well as wind turbines and aquaculture. The detailed approach taken varies as the studies have been carried out by different individuals or consultancies working to different briefs for different clients. Box 6 contains a summary of the approach taken in a recent example.

BOX 6 : Stirling Landscape Capacity Assessment for Housing and Small-scale Industrial, Retail and Business Development

Carried out by David Tyldesley Associates for Scottish Natural Heritage and Stirling Council in 1999, this study seeks to ensure that development around Stirling is directed towards those landscapes which can best accommodate it. The work developed an approach pioneered at St Andrews in 1996 and also ran in parallel with a settlement capacity evaluation in the neighbouring area of Clackmannanshire. The Stirling study assessed 15 specific locations of settlements and their settings and three larger general areas of search. The purpose of the study was to define: settlements and areas of high landscape sensitivity judged to have little capacity to accommodate growth; settlements and areas judged to be able to accommodate minor growth and settlements or areas judged to be suitable for major settlement expansion or new settlement. The work assumed that the buildings in question would be well-designed and would use traditional building techniques and materials. It also assumed that it would include a strong framework of structural landscape treatment including ground modelling where appropriate and tree planting of appropriate scale, area, design and species composition to ensure that the development achieves a good fit in the landscape. This study embraces both sensitivity and capacity, as defined in this Topic Paper, although they are not separately considered. The assessment is clearly made with respect to particular specified forms of development. The assessment is based on five criteria which are applied to the landscape types previously identified in a Landscape Character Assessment. The five criteria address aspects of Landscape Character Sensitivity, Visual Sensitivity and Landscape Value, as discussed in this topic paper. The criteria are derived from the key characteristics and features of the landscape character types and can be grouped as follows in relation to the structure of this Topic paper:

Related to Landscape Character Sensitivity

Effects on the Landscape Resource: examines the effects of development on the key physical features and characteristics and judges whether that development of the kind described could be accommodated and whether the character of the landscape would be sustained, enhanced or diminished. Only the important characteristics relevant to the type of development are assessed.

Effects on the landscape experience: assesses the potential effects of development on aspects of landscape experience relating to scale, openness, diversity, form and/or line and pattern and makes an overall assessment of whether these aspects would be affected positively or negatively.

Related to Visual Sensitivity

Visual effects: considers possible visual effects of the forms of development on: views and approaches to the settlements from the principal approach roads; possible effects on strategically significant outward views from the settlements; potential effects on distinctive skylines; and potential effects on visually conspicuous locations such as open, flat ground or open, high or rising ground.

Mitigation: considers whether the development would require long-term mitigation to reduce the effects of the development. It also considers how feasible any desirable mitigation would be and whether the mitigation itself would be appropriate.

Related to Landscape Value

Other Important Effects: considers whether the development would affect the integrity of an important designed landscape or its setting and whether the development would affect the amenity of other important cultural or historical elements or features of the landscape, including their settings.

The criteria under these five categories are applied systematically to each settlement and area of search in terms of the different landscape character types that occur. Professional judgments are made and for each criteria a three point graphical scale is used to express the findings. An overview is taken of the judgments for each of the criteria for each landscape type, and an overview assessment is made of the whole. The three point scale applied to each criteria covers: no impact or positive enhancement; neutral or average effect; and significant negative effect or diminishing of landscape character. An overall judgment is then made based on the profile of the area/settlements and relevant landscape type based on a table of judgments under each criteria.

David Tyldesley Associates. Stirling Landscape Character Assessment. Report for Scottish Natural Heritage and Stirling Council. 1999

7. RECORDING AND PRESENTING INFORMATION

7.1 Approaches to judging sensitivity and capacity can be made at different levels of detail. Much depends on the time and resources available and on the problem to be addressed. For example, capacity studies for housing may need a finer grain of assessment because of the particular nature of the development. Where time and resources are limited quick assessments are needed and it is likely that overall judgements will need to be made about the whole of a landscape type or area without necessarily making individual assessments of the constituent aspects of sensitivity or capacity. Consultants working to tight timescales and with limited budgets often carry out short sharp studies of this type. In such cases it is rarely possible to assess each of the relevant factors individually in great detail and the emphasis is often on overall judgement of sensitivity. It is nevertheless still extremely important that the thinking that underpins these judgements is clear and consistent, that records of the field judgements are kept in a consistent form and that the decisions reached can be explained easily to an audience of non-experts.

7.2 Local authorities carrying out such work in house are likely to work in a different way and may sometimes have longer periods of time for desk study, survey and analysis. Permanent staff can be more fully involved in such studies and have a greater opportunity to become familiar with and to understand their landscapes and to develop real ownership of the work. In these cases it may be possible to take a much more detailed and transparent step-by-step approach to assembling the judgements that ultimately leads to an overall assessment of landscape sensitivity or capacity. The Staffordshire, Worcestershire and Herefordshire studies, for example, provide demonstrations of what can be achieved by officers working on assessing their own areas, often over a reasonably long period of time.

7.3 Whoever carries them out, all assessments of sensitivity and capacity inevitably rely primarily on professional judgements, although wherever practically possible they should also include input from stakeholders. The temptation to suggest objectivity in such professional judgements, by resorting to quantitative methods of recording them is generally to be avoided. Nevertheless dealing with such a wide range of factors, as outlined in the paragraphs above, does usually require some sort of codification of the judgements that are made at each stage as well as a way of combining layers of judgements together to arrive at a final conclusion.

7.4 The first step is to decide on the factors or criteria that are to be used in making the judgement and to prepare a clear summary of what they are and what they mean. The second step is to design record sheets that

allow the different judgements that need to be made to be recorded clearly, whether they are to be based on desk study or field survey. The time and resources available will influence the level of detail of this record sheet and the level of detail required of the work. Ideally separate records should be made of each component aspect of the final judgement. So for example in the case of a comprehensive capacity study for a particular type of change or development, a record should be made of the judgements made about:

- i) **the Landscape Character Sensitivity** of each landscape type or area to that type of change, which will reflect the sensitivity of individual aspects of landscape character including landform, land cover, enclosure form and pattern, tree cover, settlement form and pattern, and other characteristic elements, and the aesthetic aspects of landscape character, including for example, its scale, complexity, and diversity;
- ii) **the Visual Sensitivity** to that type of change, which will reflect, for each landscape type or area; general visibility, influenced by landform and tree and woodland cover, the presence and size of populations of different types, and potential for mitigation of visual impacts, without the mitigation in itself causing unacceptable effects.
- iii) the **Value** attached to each landscape, which will reflect:
 - national designations based on landscape value;
 - other judgements about value based either on a 'Quality of Life Assessment', or on consideration of a range of appropriate criteria relating to landscape value.

7.5 These different aspects need to be judged on a simple verbal scale, either of three points - high, medium or low, or of five points - for example very high, high, medium/average, low and very low, or equivalents. A three point scale is much easier to use but a five point scale allows greater differentiation between areas. These scales can easily be translated into shades or colours for graphic display and are well suited to use as layers within a GIS of the type now widely employed in landscape character work.

7.6 The question remains of how layers of information can then be combined to arrive at a final assessment of either sensitivity or capacity, depending on which is required. There are three possible methods: firstly the construction of an overall profile combined into an overall assessment of sensitivity and capacity; secondly the cumulative assessment of sensitivity and capacity by sequential combination of judgements; and thirdly a scoring approach. They are briefly outlined below.

An overall profile

7.7 In the first approach individual assessments are made of the constituent aspects of sensitivity or capacity using a three or five point verbal scale, as outlined above. The amount of detailed assessment that goes into the judgements of each of these factors will depend on the time and resources available and the overall approach taken. These assessments are arranged in a table or matrix to provide a profile of that particular landscape type or area. An overview is then taken of the distribution of the assessments of each aspect and this is used to make an informed judgement about the overall assessment of sensitivity or capacity. **Figure 2** gives a hypothetical example:

Figure 2: Building up the overall profile

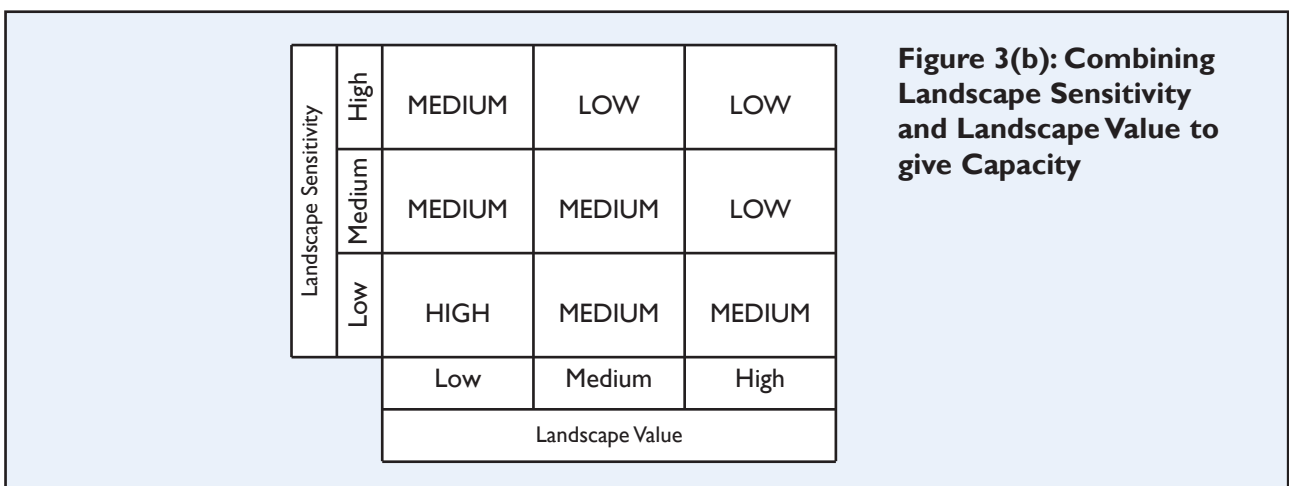
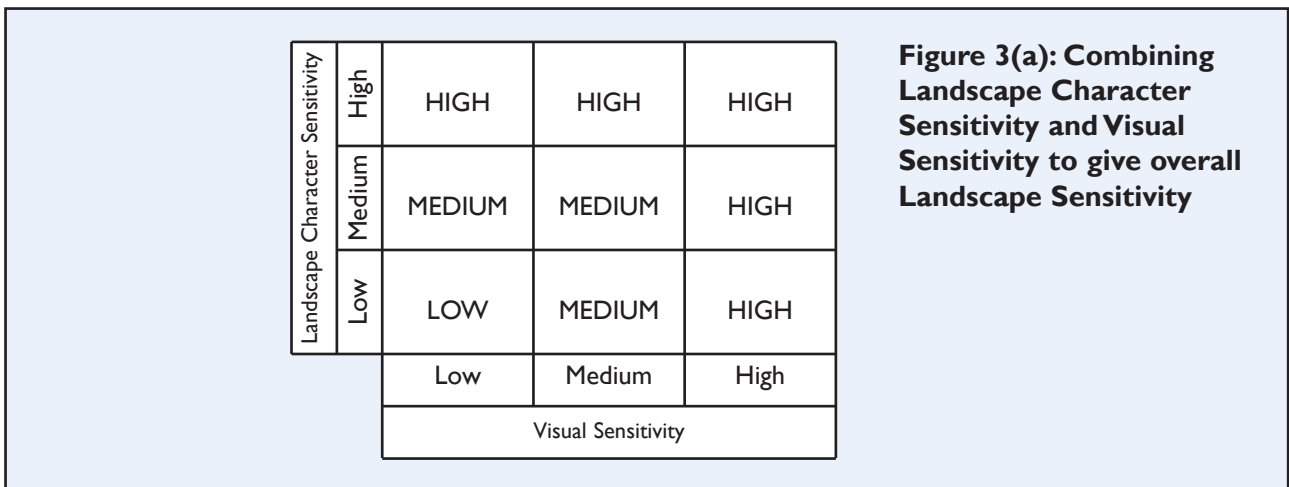
Landscape Type/Area	Landscape Character Sensitivity	Sensitivity of Individual Elements	Sensitivity of Aesthetic Aspects	Visual Sensitivity	LANDSCAPE SENSITIVITY	Value of Landscape	LANDSCAPE CAPACITY
Type 1	High	Medium	Medium	High	HIGH	Low	MEDIUM
Type 2	Low	Medium	Low	Low	LOW	Low	HIGH
Type 3	High	High	High	Medium	HIGH	High	LOW
etc							

Cumulative assessment

7.8 In the second approach individual assessments are similarly made but in this case the more detailed lower-level assessments are combined in pairs sequentially until an overall assessment is reached. The number of layers combined in this way depends upon the level of detailed information collected in the survey. This must of course be done for each landscape type or area being assessed. Based on the framework and definitions set out in this paper some simplified and purely illustrative possible combinations (and there are of course others) might be:

- Sensitivity of ecological components + Sensitivity of cultural components = Landscape character sensitivity
- General visibility (related to land form and land cover) + Level and significance of populations = Visual sensitivity
- Landscape character sensitivity + Visual sensitivity = Overall landscape sensitivity
- Presence of designations + Overall assessment of value against criteria = Landscape value
- Overall landscape sensitivity + Landscape value = Landscape capacity

7.9 The difficulties with this approach are that it may be somewhat cumbersome and time consuming to apply, especially for large areas, and that decisions must be made about how the individual assessments are to be combined. So, for example, while two HIGHS clearly give a HIGH in the matrix, what about a HIGH and a MEDIUM? Is the highest level used in which case the answer is also HIGH, or is a judgement made on the combinations? There is no single answer but again the emphasis must be on transparency. **Figure 3** illustrates this process for two hypothetical combinations. Both could also be shown with a five point scale, as discussed above, to give a more refined assessment.



Scoring

7.10 In this type of approach the word scales must be combined in a consistent way with appropriate rules applied as to how the combined layers are further classified. This may require that they are converted into numerical equivalents for ease of manipulation. Shown graphically, these 'scores' will take the form of different colours or shades, which is generally preferable to presenting the numerical figures themselves. There are certainly examples of work that do take a scoring approach to the layers of information in the assessment, although they may not appear in the final published material.

7.11 While scoring overcomes the difficulty of how individual assessments of each aspect are combined (for example by multiplication within matrices and by adding different matrices) and makes the process transparent, it does lead to a greater emphasis on quantitative aspects of such work. If overemphasised as an end in itself rather than as a means to an end, numerical representation may run the risk of generating adverse reactions because it suggests something other than professional judgement and can suggest a spurious scientific rigour in the process. It was, after all, the overly quantitative nature of landscape evaluation in the 1970s that led to a move away from that approach.

The role of Geographic Information Systems

7.12 Today most sensitivity and capacity studies, whichever approach they take, are likely to rely on Geographic Information Systems (GIS) to manipulate the layers of information. This brings several advantages and notably:

- Consistency of approach, in that appropriate matrices or algorithms can be defined once and then applied consistently throughout a study;
- Transparency, in that it is easy to interrogate the base datasets used and also to visualise and communicate intermediate stages of the process if required;
- Efficiency and effectiveness in the handling of data, allowing explorations of the information and alternative approaches to combining it which would simply not be achievable in a manual paper based exercise.

8. CURRENT PRACTICE AND ISSUES IN ASSESSING SENSITIVITY AND CAPACITY

8.1 There is a wide range of work, either in progress or completed, which tackles the issues of landscape sensitivity and capacity. Most of it is quite complex and difficult to summarise meaningfully in a short paper like this and there are few if any examples as yet which demonstrate all the principles set out here. Where possible examples have been included in the boxes in the text to illustrate particular aspects of such work, including examples of overall landscape sensitivity studies carried out by local authorities, studies to assess sensitivity to particular types of change or development and capacity studies aimed, for example, at exploring wind turbines or housing, among other types of development. It is hoped that more examples may be available in future and may be included on the Countryside Character Network website (www.ccnetwork.org.uk).

Transparency and Presentation

8.2 It is clear from examination of the strategic studies of overall landscape sensitivity, such as those conducted by Herefordshire, Worcestershire and Staffordshire, that they are enormously detailed and very transparent in describing the approach to analysis and judgements. It is also apparent that they are very detailed and demanding of time and resources, and also quite complex because of the desire to explain each step in the process. However, even experienced practitioners who have not been involved in this work may struggle to understand fully the terminology used, the subtleties of the definitions and the judgements that are made at every level of the assessment, as well as the way that the different factors are combined. They may also disagree with some of those definitions - replaceability, for example, is in itself a very complex term open to different interpretations, especially when used in relation to ecological habitats. A lay audience could well be completely baffled by the complexity of the whole process. So although the arguments are logical, consistent and fully explained this can in itself open up potentially important areas of misunderstanding or debate.

8.3 On the other hand some of the consultants' studies of sensitivity and capacity are often short on transparency and rely on professional judgements, the basis of which is often not clear. It could be argued that there has to be a trade-off between complete transparency in the methods used and the accessibility of the findings to a non-specialist

audience. Reasoning must always be documented as clearly as possible and the reader of any document should be able to see where and how decisions have been made. Different content and presentation techniques may be needed to tailor the findings of studies for particular audiences. Officers of Worcestershire County Council, for example, intend ultimately to produce the findings of their overall sensitivity analysis in a more accessible form for a wider audience. The complexities in the full explanation of the method are considered necessary to provide the essential degree of transparency and justification but it is recognised that this is only likely to be suited to a specialist audience.

Continuing debates and questions

8.4 Whatever the approach adopted there are likely to be continuing debates on several questions. The main ones that require further exploration as experience grows are:

- a) Is it reasonable to make assessments of overall landscape sensitivity without considering sensitivity to a specific type of change? In what circumstances will this approach work?
- b) To what extent should considerations of 'value', as discussed in Section 6 of this paper, be taken into account in landscape capacity studies? This paper argues that they should be, provided that these considerations are clearly thought through and appropriately incorporated in the judgements that are made. Simply relying on designations is to be avoided as this is an oversimplification of complex issues but the issue remains of whether there is agreement about the way that value can be defined. At present it seems that this approach to defining capacity, by combining sensitivity and aspects of value, is reasonably well accepted in Scotland, particularly in recent wind farm capacity studies, but less so in England.
- c) How can transparency about the approach to making judgements be achieved without the explanations becoming unnecessarily complex and inaccessible?
- d) To what extent is quantification of assessments of sensitivity or capacity either necessary or desirable, as discussed in Paragraph 7.11? Both quantification and consideration of value suffer from the spectre of the 1970s approaches to landscape evaluation which hangs over them. This needs to be recognised when deciding on and presenting an appropriate approach, in order to avoid unnecessary arguments about its suitability.

Future developments

8.6 This Topic Paper is not intended to be a definitive statement about issues of landscape sensitivity and capacity. Nor is it the intention to recommend or promote a single method. This is a rapidly developing field in which practitioners are actively exploring different approaches in different circumstances. The Topic Paper may be amended in future as experience accumulates and the strengths and weaknesses of different approaches become more apparent as they are applied in practice. In the meantime comments on the content of the Topic Paper are invited to assist in this evolutionary process. The discussion forum on the Countryside Character Network website should be used for this purpose if you want to share your views with the wider practitioner community. Alternatively you can send your views by post to the coordinators of the network. Web site address and network contact details are provided in the 'Further Information' section.

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REFERENCES AND FURTHER INFORMATION

[1] Countryside Agency (2003) *The State of The Countryside 2020*. CA 138. Countryside Agency. Cheltenham.

[2] Scottish Natural Heritage (2001) *Natural Heritage Trends - Scotland 2001*. Scottish Natural Heritage. Battleby, Perth.

[3] Landscape Institute and Institute of Environmental Management and Assessment (2002) *Guidelines for Landscape and Visual Impact Assessment*. Spon Press, London.

USEFUL WEBSITES

Countryside Character Network
www.ccnetwork.org.uk

Landscape Character Assessment Guidance (available on line)
www.countryside.gov.uk/LivingLandscapes/countryside_character
 or www.snh.org.uk/strategy/LCA



The full *Landscape Character Assessment: Guidance for England and Scotland* and related topic papers can be viewed and downloaded from www.countryside.gov.uk/LivingLandscapes/countryside_character and www.snh.org.uk/strategy/LCA

Free copies of the guidance are also available from:

Countryside Agency Publications
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