



**YORKSHIRE DALES**  
National Park Authority

**SENSITIVITY ASSESSMENT  
AND THE PRIORITISATION OF UNSEALED  
ROUTES  
IN THE YORKSHIRE DALES NATIONAL PARK**

**(with possible or proven public mechanically  
propelled vehicular rights)**

**Yorkshire Dales National Park Authority  
November 2006**



# 1. Introduction to vulnerability mapping

## 1.1 Background

Vulnerability mapping is a method of providing an objective assessment of the sensitivity to a particular feature to a particular activity or group of activities. In the North Pennines, this approach was applied to the impact of motorised vehicles on byways on the natural and historic environment, and on the routes themselves.

The Countryside Agency and its partners English Nature, the Rural Development Service and the North Pennines AONB Partnership worked together to develop an objective assessment whereby potential problems with the use of byways open to all traffic by motor vehicles can be identified. The aim was to enable these organisations to work in closer partnership, with the highway authorities and others, towards identifying achievable management solutions.

The methodology was developed for the Countryside Agency, by JMP Consulting, Lydia Speakman Associates and TFL. The information below is taken from the report Vulnerability mapping – creating a sustainable byways network, JMP Consulting, 2006. The full report can be found at:

[www.countryside.gov.uk/LAR/Regions/NorthEast/activities/recreation/countrysiderecreation/vulnerability-mapping.asp](http://www.countryside.gov.uk/LAR/Regions/NorthEast/activities/recreation/countrysiderecreation/vulnerability-mapping.asp)

## 1.2 Introduction to the Methodology

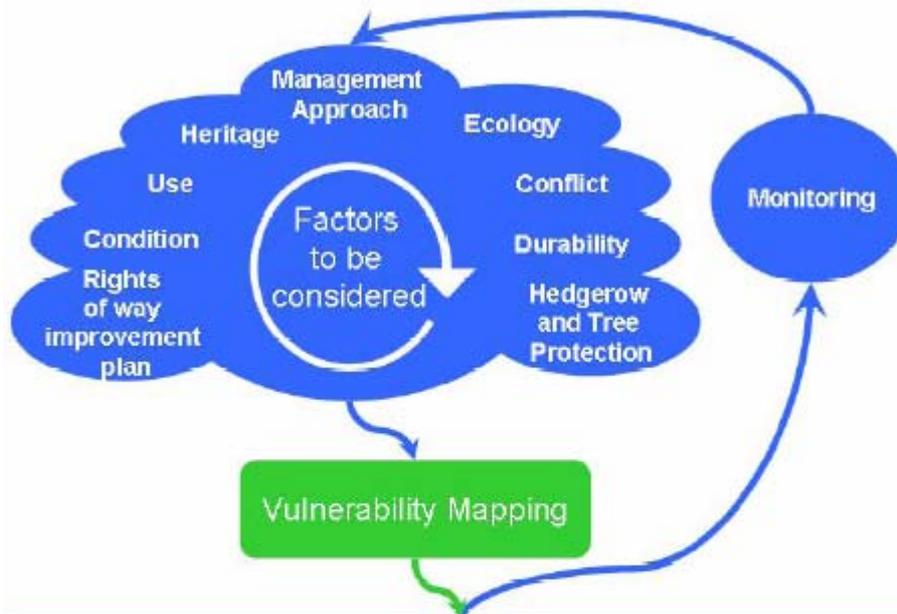
The Vulnerability Mapping methodology is designed to be robust and transparent for use both with professionals concerned with landscape and nature conservation protection, and those involved with management of the highways and rights of way network. It seeks to provide an objective assessment, which is built on an evidence base that can be clearly communicated to stakeholders and interest groups. Importantly, it enables the relative sensitivity of different routes to be compared, so that wider network considerations can be taken into account.

A key feature of the methodology is that it is built on data which is relatively easy to access, much of which already exists within the public domain and is compatible with geographic information system (GIS) formats. The GIS maps are underpinned by an evidence base for each route.

The GIS results have to be investigated further in a ‘ground truthing’ exercise. In the North Pennines this resulted in revisions of the vulnerability assessments with over half the routes receiving a different level of vulnerability.

**Vulnerability mapping can only provide a strategic overview of a network to help inform management decisions and prioritise resources; more detailed analysis will still be required on a route by route basis. This is usually carried out once an individual route has been identified as ‘highly sensitive’ based on any of the assessment criteria.**

## Vulnerability Mapping – How it fits with ‘Making the Best of Byways’<sup>1</sup> Approach



based on the factors outlined in ‘Making the Best of Byways’



based on the possible management solution outlined in ‘Making the Best of Byways’

### 1.3 Overview of the methodology and outputs

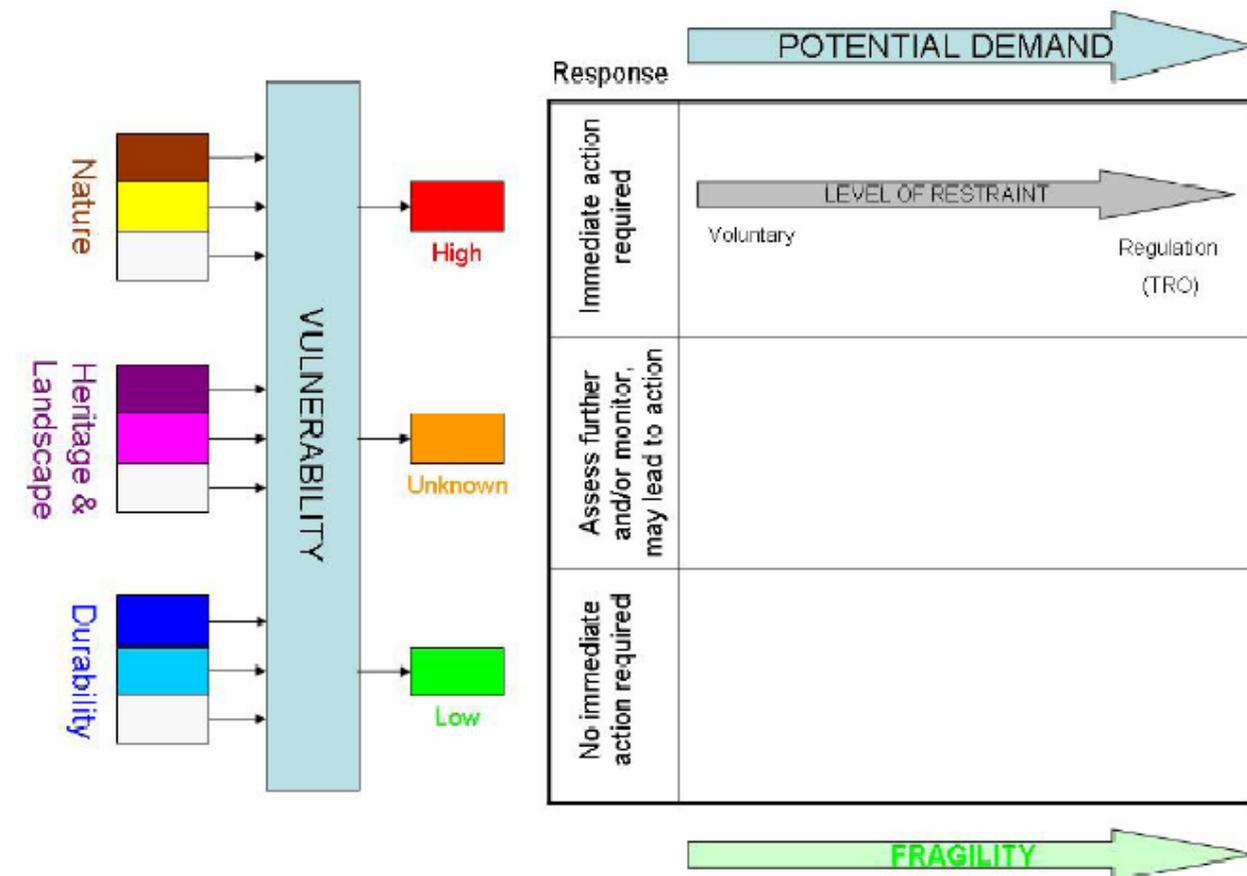
The vulnerability mapping of routes, as developed in the North Pennines, is built upon the creation of three independent maps. Each of which classify individual routes in relation to a set of related sensitivity criteria, which are:

- Nature conservation (ecology)
- Heritage and landscape features
- Durability of the route

To assist the assessment of nature, heritage and landscape, an initial map is drawn showing connectivity of the byway to the remainder of the road and rights of way networks. The result of the combination of these maps results in an overall vulnerability map being produced – this shows a network in which individual byways or sections of byways (where they link to junctions with the road network) are classed in accordance with their overall vulnerability to motorised usage, based on a red, amber, green - traffic light system.

<sup>1</sup> ‘Making the best of byways.’ Defra (2005) see <http://www.defra.gov.uk/wildlife-countryside/cl/mpv/pdf/bestofbyways.pdf>

## 1.4 The Assessment Process



The Vulnerability Assessment, assesses three categories of sensitivity which are:

High vulnerability (coded RED) – highly sensitive requiring immediate action;

Unknown vulnerability (coded AMBER) – potential for damage which requires more detailed assessment and/or monitoring;

Low vulnerability (coded GREEN) – relatively robust and able to withstand current usage by users.

**Importantly, any one factor can trigger a route being coded red = ‘high vulnerability’ / highly sensitive.**

The connectivity map (classifying sections of the network according to potential demand by both motorised users and non-motorised users) is used not only to help the assessment of individual factors but also designed to help inform the management response in regard to the sensitivity of individual routes. For example, a route identified as highly sensitive, but with low potential demand by motorised users because of poor connectivity to the local road network, will trigger a very different management response to a highly sensitive route with high existing and potential demand by motorised users.

Where there are unknown or missing data, as is often the case with the vulnerability of heritage features, these routes have been scored 'unknown' for this theme.

## **1.5 Strengths and weakness of the vulnerability mapping approach**

The vulnerability mapping methodology has a number of key strengths. These are:

- it applies a systematic and transparent methodology for identifying special/unique features that are triggering concern.
- It is a relatively straight forward exercise to carry out which draws on readily available information, and it leads to a simple red, amber, green categorisation which any one factor can trigger.

The methodology also has a number of weaknesses: These are:

- Fundamentally the methodology, applied in the North Pennines, does not look at the impact of motor vehicles on one of the key special qualities of the National Park, namely the large areas of tranquillity that can be found here. Tranquillity is a recognised special quality important to the recreational experience found in the Yorkshire Dales National Park.
- It uses a simple analysis of the connectivity of a route to the wider road network to assess potential demand which does not necessarily reflect the actual level of use of a route by motor vehicles or other users.
- It also needs to be remembered that this is a desktop exercise and that the ground truthing, carried out in 2006, led to a revision in the vulnerability assessment in over half the routes being considered in the North Pennines AONB (17 routes receiving a lower assessment of vulnerability and 6 receiving a higher assessment).

## 2. A Yorkshire Dales approach – sensitivity assessment

Overall the vulnerability mapping approach fits well with the approach outlined in the framework document on the ‘Management of the Use of Green Lanes (Unsealed Routes) In the Yorkshire Dales National Park’, November 2006, which emphasises an evidence based approach, looking at a range of factors including:

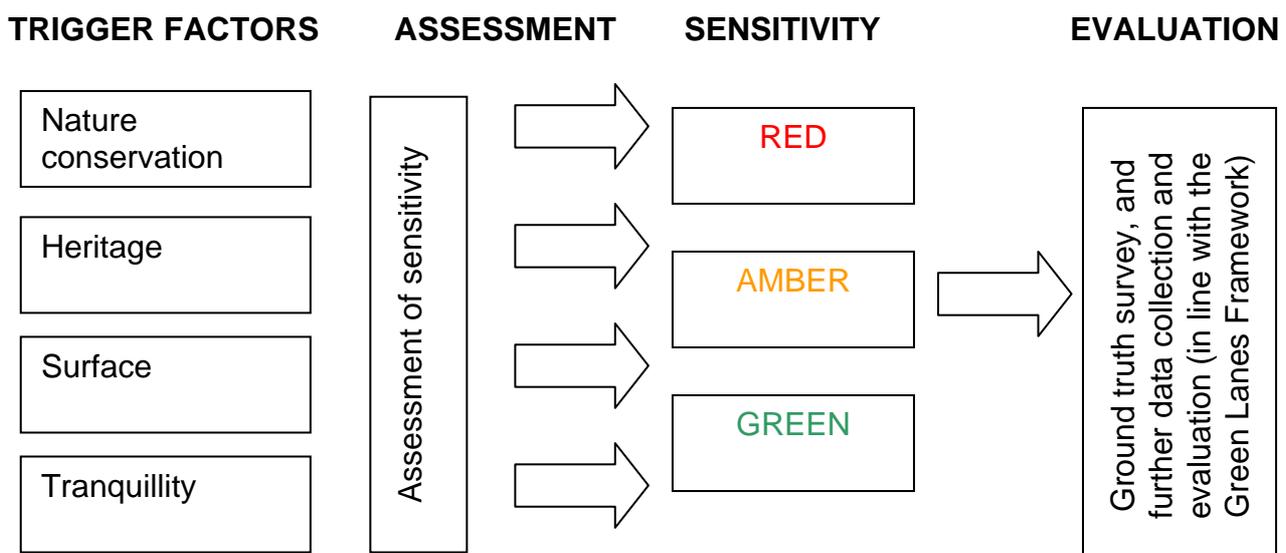
- The ecological sensitivity of the route
- The heritage of the route and its surroundings
- The landscape impact of use particularly in relation to tranquillity
- Conflicts between recreational user groups
- Concerns raised by local residents and land managers and owners
- The surface sensitivity of the route
- The use of routes

### 2.1 Adaptation of North Pennine AONB approach to the Yorkshire Dales

The methodology, piloted in the North Pennines AONB, was designed so that its principles could be applied in other parts of the country. It also recognises that other areas will be different with different vulnerable species or features and different landscape character.

This has led to the National Park Authority adapting the methodology to suit the circumstances found in the Yorkshire Dales National Park. The most significant adaptation is the inclusion of an additional factor ‘tranquillity’.

The methodology has also been extended to cover not just the byway network but all routes with possible or proven rights for motor vehicles. This includes routes with a BOAT application received before 20<sup>th</sup> January 2005 and unsurfaced unclassified county roads not shown on the Definitive Map.



## 2.2 Why a sensitivity assessment?

Carrying out a vulnerability mapping exercise for the Yorkshire Dales National Park will produce a number of key outputs. Firstly it will identify which routes can be considered 'sensitive' with regard to their use by recreational motor vehicles. This is important as many of the Authority's aims and targets surrounding 'green lanes' talk about management of 'sensitive' routes.

For example in the Best Value Performance Plan 2006/7 has an objective to:

*Ensure that the National Park is accessible and provides a diverse range of recreational experiences for the public based on the special qualities of the area:*

- *Putting in place management plans for 75% of sensitive routes by 2008*

With the specific identified action for 2006/7 as:

*Further to the Authority's aims in managing use of sensitive routes by recreational motor vehicles:*

- *Identify sensitive routes and appropriate management techniques*

The other key output of a sensitivity assessment is that it will allow the Authority to prioritise its time and resources towards the most sensitive routes. This is necessary because of the considerable time and commitment required to compile the detailed evidence needed to underpin any decisions on management techniques to be used.

### 3. Methodology used for the Yorkshire Dales National Park assessment of unsealed routes

#### 3.1 Demand for the use of the route

Mapping potential demand of individual routes is important to ensure that management decisions take into account wider network considerations. Long routes with good links into other parts of the network of unsurfaced routes and the wider road network are likely to have a high potential demand for recreational motor vehicle users, whereas short isolated routes or ones that are effectively dead ends for motor vehicles would be expected to attract little use.

The level of potential demand will therefore inform appropriate management responses. A popular route in a highly sensitive area is likely to require a different approach to management than a route, in the same area, which is a short dead-end not used by motorised vehicle users. In some cases data from automatic traffic counters is available and this provides a more robust assessment of the level of motorised vehicle use. Where this isn't available, at this stage, anecdotal information on route usage has been provided by the area rangers.

In considering this factor the level of use of a route by walkers, cyclists, horse riders and carriage drivers is also taken into account, together with use as part of a promoted recreational route.

The potential demand/level of use of a route is also necessary to inform the sensitivity of a route with the different factors to be considered. Clearly the impact of motor vehicles on nature conservation, heritage, the route surface and tranquillity is likely to depend on the number of motor vehicles using the route. Routes which are unattractive to recreational motor vehicle users and have low levels of use/potential demand, are likely to be less sensitive.

Potential route demand has been assessed using the criteria in the table below.

Evidence potential demand/level of use	Potential Demand
Route with poor connectivity to the rest of the network with little value to recreational motor vehicle users (eg. joins road link to a footpath). Routes with little history of use by recreational motor vehicles.	LOW
Routes with moderate connectivity and/or moderate potential demand. Includes short linking routes and long no through routes for motor vehicles.	MODERATE
Route with high levels of connectivity, and/or high appeal to motorised users and/or other non-motorised users (joins two road links or joins road link to another unsurfaced route).	HIGH

### 3.2 Ecological sensitivity of the route

Nature designations provide useful initial criteria for assessing the sensitivity of a habitat to the potential physical impacts of motorised vehicles. National Nature Reserve and Sites of Special Scientific Interest (SSSI) carry the highest national designations for nature conservation with international designations Special Areas of Conservation (SACs) and Specially Protected Areas (SPAs) carrying even higher protection. In addition nature designations including and Local Nature Reserve could provide important information on the relative sensitivity of these sites to pressure from users. In the National Park there are also areas with a high ecological sensitivity that are not covered by local, national or international designations but are still important habitats and have sensitive species particularly of breeding birds.

Where a route passes through a designated area, it does not automatically mean that the presence of motor vehicles will damage the wildlife of the site. This would depend on the reasons for the designation, or wildlife interest, the level of use, and the nature of the route surface. In addition areas where there is no formal wildlife designation, can have ecological sensitivity eg because of the numbers of national important breeding birds. Advice from Natural England staff, and wildlife conservation officers of the Yorkshire Dales National Park Authority have provided a starting point in assessing the level of ecological sensitivity a route has, and the likely impact on wildlife. In some situations this can only be determined, thoroughly, by fieldwork.

Ecological sensitivity has been assessed using the criteria in the table below.

Evidence on ecological sensitivity	Ecological sensitivity
Low sensitivity.	GREEN
Moderate or unknown. Land in ESA agreements or of botanical interest. May have national or European designations but not thought to have highly sensitive features.	AMBER
High sensitivity. National or European designations which may have vulnerable features. Highly sensitive features such as blanket bog or flushes. Important and sensitive species.	RED

### 3.3 Heritage sensitivity of a route

Assessment of the sensitivity of heritage features along a route relates directly to the records of ancient monuments and scheduled monuments. In developing the criteria for heritage features, proximity to the route is an important factor, together with the potential sensitivity of the feature to disturbance through the impacts of motor vehicles.

The sensitivity of heritage features has been assessed through advice from the Senior Conservation Archaeologist of the Yorkshire Dales National Park Authority. This advice

considered heritage features such as scheduled monuments and sites of archaeological excavation within 300m of a route as well as the features potential sensitivity.

The North Pennines Vulnerability Mapping considered ‘heritage’ and ‘landscape’ together. This is in recognition of the historical nature of routes themselves and their importance as landscape features as well as the potential impact of any works, above and beyond the formal landscape designation the area has as a national park or AONB. However, landscape character assessment does not lend itself to a desk top appraisal and so the ‘landscape’ and visual aspects of a route will be considered at the stage of individual route evaluation.

Heritage sensitivity has been assessed using the criteria in the table below.

Heritage sensitivity	Heritage sensitivity
Low sensitivity. No vulnerable heritage features identified.	GREEN
Moderate or unknown sensitivity.	AMBER
High sensitivity. sensitivity heritage features along route, or in close proximity.	RED

### 3.4 Surface sensitivity of a route

The ability of a route to sustain use by motor vehicles is considered to largely dependent on the existing route surface, topography and drainage of the route. The route surface can vary from deep peat, through grassland on top of limestone, to a stony track. On some routes, extensive changes have been made to the drainage and surface through engineering works. On many routes existing route surface, topography and drainage have been assessed through conducting condition surveys, which have been completed by rights of way staff at North Yorkshire County Council and Yorkshire Dales National Park Authority. Where a condition survey has not been carried out recently then information from the Area Ranger has been used for the assessment.

The Surface sensitivity of the routes was then scored according to the following criteria:

Evidence of surface sensitivity	Surface sensitivity
Good quality surface and drainage eg stone track with good surface water run-off.	GREEN
Moderate quality surface with good drainage and topography, or good quality surface but the drainage is a significant factor. Routes where extensive engineering work has been carried out.	AMBER
Vegetation surface eg acid grassland over peat, or moderate quality surface where drainage and/or topography are significant factors.	RED

(NB It should be noted that any visual impact of damage or erosion is not considered at this point – this will be considered as part of the detailed route assessment if necessary).

### 3.5 Tranquil area assessment

Tranquillity has been identified as one of the key special qualities that affect the recreational experience in the National Park. An assessment of the tranquil areas of the National Park was carried out using a model developed by the Council for the Protection of Rural England (CPRE). This involves identifying major sources of noise generation in and around the National Park such as major roads, quarries and railways and mapping these. Buffers are then drawn around these noise sources which will then show the parts of the National Park expected to have the highest levels of tranquillity. Details of the features that were identified are in Appendix 1.

This technique has now been further refined by the CPRE to take into account what people believe adds to and detracts from tranquillity, weighted according to how important those factors are and taking into account the country's topography. This mapping work is currently not available as a geographical information system (GIS) layer and so has not been used for this assessment.

In addition the mere fact that a route is in a tranquil area, is not in itself sufficient to say that it is highly sensitive. This has to be combined with the level of use a route receives, in the same way that the impact on nature conservation, heritage or surface condition would be dependant on level of use. Clearly one motor bike a month using a route, will have much less effect on tranquillity than 5 a day. The key issue is determining what 'threshold', of recreational motor vehicle use, disturbs tranquillity.

The DEFRA and Countryside Agency, 'Report of a research project on motor vehicles on byways open to all traffic - Defra (2005)<sup>2</sup>, found that the average daily flow of motor vehicles across all BOATS studied was 4.2 motor vehicles (see page 103). This figure must be treated with caution as it includes motor vehicular use to access property or for land management along the routes. This research quantified, light, moderate and heavy use:

- 5% of byways carried no motor vehicle traffic;
- 35% of byways carried **light traffic**, and had an average daily flow of 0.6 [0.2] motor vehicles which varied from 0.1 to 1.1 motor vehicles. The highest recorded daily flows averaged 11 [4] motor vehicles;
- 50% of byways carried **moderate traffic**, and had an average daily flow of 5.0 [1.9] motor vehicles which varied from 1.5 to 11.4 motor vehicles. The highest recorded daily flows averaged 37 [14] motor vehicles; and
- 10% of byways carried **heavy traffic**, and had an average daily flow of 13.4 [5.1] motor vehicles which varied from 11.9 to 14.9 motor vehicles. The highest recorded daily flows averaged 82 [31] motor vehicles.

These figures are for all motor vehicle traffic, and only 38% of the vehicular traffic recorded was believed to be recreational in nature (see page 111). So the figures above, shown in square brackets, are to show the proportion of recreational motor vehicles.

---

<sup>2</sup> Report of a research project on motor vehicles on byways open to all traffic - Defra (2005)  
See <http://www.defra.gov.uk/wildlife-countryside/cl/mpv/pdf/researchrep-veh.pdf>

In addition the research also found, that on average there was no motorised traffic on 40% of days. The National Park Authority has 20 counters on unsealed routes across the National Park, where counters are not currently on a route, the assessment of use has been based on anecdotal evidence and the knowledge of the area ranger. The first step of any detailed assessment of a route will be to place a counter on the route to find exactly the number and type of vehicles using it.

The tranquillity of the routes is assessed according to the following criteria:

Evidence on tranquillity	Tranquillity sensitivity
Route close to significant noise sources with less than 30% of the route in tranquil area and moderate use/potential demand, or 30% to 80% of route in tranquil area with light use/potential demand.	GREEN
30% to 80% of route in tranquil area with moderate use/potential demand, or less than 30% in tranquil area with heavy levels of use/potential demand, or more than 80% of route in tranquil area and with light level of use/potential demand.	AMBER
30% to 80% of route in tranquil area with heavy use/potential demand or more than 80% of route in tranquil area and with moderate or heavy level of use/potential demand.	RED

### 3.6 How the sensitivity assessment is being used to prioritise

All the routes that are assessed as having a high vulnerability (RED) in one of the four areas of nature conservation, heritage, surface condition and tranquillity will be considered to be a potentially 'sensitive' route. Based on the experience in the North Pennines detailed fieldwork may of course lead to this assessment changing.

It is not possible to gather detailed information and undertake an in-depth evaluation on all the sensitive routes at the same time, and so further prioritisation will be needed. To decide priorities two factors may need to be considered. Firstly whether a route is sensitive in more than one of the four areas, and secondly what the potential demand/use level is of an individual route. Clearly a route could be sensitive due to a number of factors but if use levels are low, or non-existent, then it may not be a good use of resources to look at this route, over and above a sensitive route with high levels of use to begin with.

#### **4. Next steps and the need for regular up-dating**

It is recognised that this sensitivity assessment may change over time and that even those routes evaluated as having a low sensitivity may still need management, as other considerations, which have not been part of this initial 'sensitivity' assessment eg public safety may be relevant. The purpose of this 'sensitivity' assessment is simply to determine which priority routes, which should be looked at in more detail, with a view to considering what management measures they require.



# **APPENDIX 1**

## **Methodology used for Yorkshire Dales National Park Authority Tranquil Areas Assessment**

## **Methodology used for Yorkshire Dales National Park Authority Tranquil Areas Assessment**

### **Background**

This document briefly outlines the methodology adopted by Yorkshire Dales National Park in performing the Campaign to Protect Rural England (CPRE) tranquillity indicators, and is in line with that adopted by Dartmoor National Park.

### **The indicators**

The following indicators can be viewed at <http://www.cpre.org.uk/campaigns/landscape-and-beauty/tranquil-areas/tranquil-area-criteria.htm>

### **Tranquil Area criteria**

Tranquil Areas are places that are sufficiently far away from the visual or noise intrusion of development or traffic to be considered unspoilt by urban influences. They are determined by distances from the various disturbing factors listed below. Deciding on the distances has been an iterative process of comparison between each type of disturbance in the field.

The maps provide a broad brush picture of areas in the countryside that are free from urban intrusion.

A Tranquil Area lies:

- 4 km from the largest power stations
- 3 km from the most highly trafficked roads such as the M1/M6; from large towns (e.g. towns the size of Leicester and larger); and from major industrial areas
- 2 km from most other motorways and major trunk roads, such as the M4 and A1, and from the edge of smaller towns
- 1 km from medium disturbance roads, i.e. roads that are difficult to cross in peak hours (taken to be roughly equivalent to greater than 10,000 vehicles per day) and some main line railways
- Beyond military and civil airfield/airport noise lozenges as defined by published noise data (where available) and beyond very extensive opencast mining

Tranquil Areas are drawn with a minimum radius of 1 km. This criterion eliminates local effects.

Within Tranquil Areas, the following linear elements are shown as creating a lower level of disturbance 1 km wide:

- low disturbance roads
- 400KV and 275KV power lines
- some well-trafficked railways

Within Tranquil Areas, various sites also fall into this lower level of disturbance category, including large mining or processing operations, groups of pylons or masts, settlements greater than 2,500 in population, some half-abandoned airfields and most windpower developments.

**What does this mean for the Yorkshire Dales?**

<b>Disturbance feature</b>	<b>Buffer size</b>	<b>Features effecting the Yorkshire Dales National Park</b>
Power stations	4km	not applicable to the Yorkshire Dales
Largest towns e.g. Leicester	3km	not applicable to the Yorkshire Dales
Military and Civil airfields and large scale opencast mining		not applicable to the Yorkshire Dales
Highest trafficked routes	3km	M6
Other motorways and major Trunk roads	2km	A66
Medium disturbance roads	1 km	Category 1 roads in the Road Hierarchy: <ul style="list-style-type: none"> <li>• A65</li> <li>• A59</li> </ul>
Lower disturbance roads	1/2km	Category 2 of the Road Hierarchy: <ul style="list-style-type: none"> <li>• A684 through the Park</li> <li>• B6255 between Hawes and Ingleton</li> <li>• B6265 Skipton to Threshfield</li> <li>• B6479 Settle to Horton</li> <li>• A6108 Richmond to Masham via Leyburn</li> </ul>
Settlements greater than 2500 population	1km	<ul style="list-style-type: none"> <li>• Skipton</li> <li>• Richmond</li> </ul>

Active quarries	1 km	<ul style="list-style-type: none"> <li>• Giggleswick</li> <li>• Horton-in-Ribblesdale</li> <li>• Helwith Bridge (Dry Rigg/Arcow)</li> <li>• Swinden Quarry, Cracoe</li> <li>• Greenhow</li> <li>• Skipton Rock south of Embsay</li> <li>• Hartley Quarry near Kirby Stephen</li> <li>• Leyburn</li> <li>• Threshfield Quarry is dormant in 2005</li> </ul>
Medium use railway	0.5km	<ul style="list-style-type: none"> <li>• Skipton – Settle – Carlisle line</li> </ul>