

# Planning Approaches to Achieve a More Sustainable Travel Industry for Tourism in the UK - a Case Study

**Derek Robbins<sup>1</sup>**

School of Tourism, Bournemouth University

**John Brackstone<sup>2</sup>**

Market Research Group, Bournemouth University

**Janet Dickinson<sup>3</sup>**

School of Tourism, Bournemouth University

---

Transport is tourism's largest contributor to greenhouse gas (GHG) emissions. In the UK domestic tourism is dominated by car. The UK government is committed to a decrease in carbon emissions and to growing its tourism industry simultaneously. This paper explores the potential conflicts between the transport and tourism policy objectives and evaluates current policies. One obvious approach is to achieve a modal shift away from car to more sustainable public transport. The National Trust operates a large number of tourist attractions in the UK and has attempted to reduce the share of arrivals by car. The paper uses a large sample of visitors to National Trust properties as a case study to measure modal share and identify recent trends. The paper identifies those factors which have the greatest impact on modal choice and evaluates the effectiveness of policies aimed at achieving modal shift. The paper concludes with a discussion outlining the need for a co-ordinated, integrated approach to tourism mobility, highlighting the limitations arising from stakeholders, such as visitor attractions, operating in isolation.

*Keywords:* car dominance, day visits, National Trust

---

## 1. Introduction

Transport is clearly tourism's largest contributor to greenhouse gas (GHG) emissions (see Peeters et al., 2007; UNWTO-UNEP-WTO, 2008) and generates significant environmental impacts. This applies to tourism in the UK, where international arrivals and departures are dominated by air and domestic tourism by car. Although the UK government has committed to an 80% decrease in carbon emissions over 1990 levels by 2050 (DECC, 2008) it is also committed to growing its tourism industry as reflected in policy documents issued by the Department for Culture, Media and Sport (DCMS, 2004).

---

1 Poole, United Kingdom. BH12 5BB, T: +441202965171, F: +441202515707, E: [drobbins@bournemouth.ac.uk](mailto:d Robbins@bournemouth.ac.uk)

2 Poole, United Kingdom. BH12 5BB, T: +441202524111, F: +441202962736, E: [jbrackst@bournemouth.ac.uk](mailto:jbrackst@bournemouth.ac.uk)

3 Poole, United Kingdom. BH12 5BB, T: +441202965853, F: +441202515707, E: [jdickinson@bournemouth.ac.uk](mailto:jdickinson@bournemouth.ac.uk)

This paper focuses on domestic tourism and day visits, which is a significant component of UK travel accounting for 12.5% of all UK passenger kilometres or 3.7% of all trips (DfT, 2006). This segment of travel, like all elements of UK domestic transport, is dominated by the car, which accounts for around 74% of all trips to and from holiday destinations (VisitBritain, 2009) and around 68% of day visits (Natural England, 2006).

UK government transport policy aims to reduce the dependency on the car for all domestic travel. The origins of this policy can be traced back to the publication of a White Paper 'A New Deal for Transport: Better for Everyone' (DETR, 1998). Previous work by the authors has focused on the potential conflicts between these transport policy objectives and tourism policy objectives (Robbins and Dickinson, 2007). Whilst the dual aims of increasing the economic benefits from UK domestic tourism and a more sustainable, less car dominated transport policy, do not have to be contradictory, there is significant potential for conflict, particularly given the current dominance of the car for leisure and tourism travel.

A growing body of research is addressing the compatibility, or otherwise, of growing international tourism while implementing policy to reduce GHG emissions (see for example, Bows et al., 2009), however, much less empirical study addresses the compatibility of domestic transport and tourism objectives. Studies of sustainable tourism transport initiatives tend to be case specific with few wider policy relevant findings (Dickinson and Robbins, 2008). The evidence suggests many initiatives lack clear objectives and specific targets (Dickinson and Dickinson, 2006) therefore there is considerable scope for detailed analysis of policy directions. In the first instance the paper will discuss what is gained by a modal shift from car to alternative modes of transport. A decreasing car share has emerged in a number of Government policy documents as the objective (see for example DETR, 1998; DCMS, 1999), although clearly it also is a means to achieve wider environmental and planning objectives such as reduced congestion, pollution and visual intrusion. The paper will discuss the desirability of using a reduced car share for tourism transport as a principle objective and compare and contrast the environmental, economic and planning objectives of key stakeholders and review them for consistency.

The paper will then present substantial empirical evidence from a case study of travel to 150 National Trust (NT) properties. The NT is a UK charity which protects and opens to the public a variety of natural and cultural heritage sites throughout England, Wales and Northern Ireland. The NT was selected for the case study for several reasons. The NT operates a wide range of visitor attractions (see Table 2) which are a major component of the UK tourist industry, attracting around 14 million visitors to pay for entry properties per annum. The NT undertakes a large annual visitor survey to its properties, providing a readily available source of primary data. The wide range of properties operated enabled comparisons to be made between different destination contexts. Finally, of significance to this study, the NT has sought to reduce its dependence on arrivals by car for several years (Dickinson et al., 2004; National Trust, 2005).

The paper uses a case study of visitors to 150 NT properties to measure current modal share, observe time series trends and evaluate policy approaches by one stakeholder. It identifies those factors which have the greatest impact on reducing car dominance and considers the effectiveness of specific policies to achieve modal shift. The paper concludes with a discussion outlining the need for a co-ordinated, integrated approach to tourism mobility, highlighting the limitations arising from stakeholders operating policies in isolation.

## **2. Limitations of modal shift as a measure of sustainable tourism**

One obvious approach to achieve tourism growth whilst meeting environmental objectives is through a modal shift away from car to more sustainable public transport for domestic tourism. However does an increase in the public transport share automatically meet environmental

targets, including a reduction of Greenhouse Gas (GHG) emissions? Table 1 shows the estimated carbon emissions per passenger kilometre for different modes of surface transport from a variety of sources. This shows that average emissions from car transport are far higher than other surface modes. However, the figures per passenger km are averages and dependent on the number of passengers carried in the vehicle. The average figure of 0.121 kg per passenger km for car is a little on the high side. It reflects an average load factor for a car of around 1.5 to 1.6 occupants, and although a low vehicle occupancy of 1.2 is achieved for commuting and business trips (DfT, 2010), leisure and tourism journeys by car tend to carry more passengers resulting in lower emissions per passenger km. Taking into account empirical evidence, the National Travel Survey shows an average occupancy of 2.0 people per trip for holidays and daytrips in 2008 (DfT, 2010), a figure of around 0.09 kg per passenger km is more appropriate, still well in excess of alternative modes. If cars were used more efficiently with 4 or 5 occupants per passenger trip, then GHG emissions could be brought more in line with coach and rail (with 5 occupants emissions are around 0.036 kg per km), but as the National Travel survey shows, this is far from being achieved.

Bus services on thinly trafficked routes in rural areas carry fewer passengers per vehicle and can also have much higher emissions per passenger km than shown in Table 1. In extreme circumstances where buses are virtually empty, it is possible for the emissions per passenger km to be higher by bus than by car, although such a scenario is highly unlikely in the deregulated UK bus market where privatised bus operators have to operate profitably. Overall, a modal shift away from car is certainly strongly indicative of a reduction in GHG emissions.

**Table 1. Mode Specific CO<sub>2</sub> Emission Factors for Transport (kg/passenger km)**

	A	B	C	D	E	Average
Rail	0.027	0.052	0.011	0.024	0.052	0.033
Car	0.133	0.114	0.14	0.129	(0.180 v/km)	
Coach	0.022	0.029			0.026	

Notes:

A. This emission factor measures tourism transport in Europe and therefore higher load factors for tourist journeys, especially by car are reflected in these figures (Peeters et al. 2007).

B. Assumes average load for coach passengers (not specified) and an average of 1.6 passengers per car journey. Calculations were undertaken by the Edinburgh Centre for Carbon Management (National Express 2010).

C. Comparisons between Eurostar and Air for a return trip between London and Paris. Calculations undertaken by Paul Watkiss Associates and AEA Technology Environment (Eurostar 2008).

D. Comparisons between Eurostar and Air for a return trip between London Brussels (Eurostar 2008).

E. Comparisons for a short journey under 500km such as between London and Amsterdam (Friends of the Earth 2010)

However a focus solely on modal shift is too narrow. The desired objectives from achieving a modal shift may vary between government, local government, tourist boards and visitor attractions.

Furthermore, what does an increase in the share of arrivals by public transport represent? Certainly it will result in a decrease in GHG emissions, where visitor numbers or visitor nights have been retained or even increased, and the arrivals by public transport have substituted arrivals by car. However it is equally possible for the rise in the public transport share to

represent a more or less static number of arrivals by public transport in a declining tourism industry, brought about by a decline in arrivals by car. Although this scenario also results in a decrease in GHG emissions, it is also clearly in breach of the government's twin objectives of reducing GHG emissions whilst UK tourism grows faster than the rate of global tourism growth, which is around 4% per annum (DCMS, 1999; DCMS, 2004). However for other stakeholders, such a decline may not seem so negative. For instance, if a rural destination suffers from congestion, noise pollution and visual intrusion, an absolute decline in car visitors can bring about solutions to these issues and improve visitor satisfaction. Indeed, whilst in the short term visitor numbers, visitor nights and visitor spend will decrease, it is not impossible to envisage how such a strategy may well preserve the longer term viability of the area as a tourist destination, by improving its conservation and thus retaining its attractiveness.

Finally an increased public transport share can result from an increase in arrivals by public transport, with arrivals by car remaining fairly static. This scenario will not see a fall in GHG emissions, indeed they are likely to increase, albeit not as much as they would be if visitor growth was fuelled by car arrivals. However such a scenario can meet two specific policy objectives, namely a growth in visitor numbers and also objectives of social inclusion. Around 24% of households in the UK do not have access to a car (DfT, 2008) and an improved public transport network allowing them to visit attractions they could not previously access meets a range of governmental social policies.

Therefore an increase in the share of arrivals by public transport should not be the sole, or indeed principal policy objective. It is indicative of success and progress towards sustainable access, but there needs to be a much more integrated approach to tourism planning with the key policy objectives established, whether they are social, environmental, economic or GHG emissions, and measurable targets set.

### 3. The National Trust

The National Trust was founded in 1895 during a period of industrialisation and uncontrolled development in the UK, with the mission to act as a guardian for the nation in the acquisition and protection of threatened coastline, countryside and buildings. It is perhaps best known for owning, restoring and operating over 200 stately homes and gardens, but as Table 2 shows it has a wide variety of interests and is a major UK landowner looking after 627,000 acres of countryside, moorland, beaches and coastline.

The NT is a registered charity that remains completely independent of Government. From modest beginnings of a membership of 100 in 1895, the trust now has around 3.6 million members, and membership fees are a major source of income along with legacies and donations.

**Table 2. National Trust Portfolio**

707 miles of coastline	611,300 acres of countryside	5,150 pre-historic sites
215 houses and gardens	149 museums	57 villages
6 World Heritage Sites	2 gold mines	25 medieval barns
40 castles	400 factories and mines	51 dovecotes
206 mills	43 pubs	12 lighthouses
76 nature reserves		

Source: National Trust 2009.

The NT attracts around 14 million visitors to paying attractions per annum, the majority of whom (around 70%) are members, although it is estimated that as many as 50 million visitors are

attracted to the open areas and countryside that it is responsible for, making it a major player in the tourism industry. It relies heavily on its 55,000 volunteers to supplement its full time staff. Nevertheless the NT claims that 80% of its properties run at an operating loss.

## 4. Methodology

The National Trust undertakes an annual visitor survey of its properties between April and September, which is administered on their behalf by Bournemouth University. This annual survey provides a wealth of data on a wide range of visitor characteristics such as length of stay, spend, and mode of transport used to access the property, and makes available a time series data set, enabling comparisons to be made and trends over time to be identified. A sample of around 150 properties which charge a fee for admission are included each year. The Trust's most visited properties are included in every annual survey whilst smaller properties are included periodically, so the sample of surveyed properties consists of a substantial permanent core, although no two surveys are identical in their composition.

The 2008 survey was conducted between 1<sup>st</sup> April to 30<sup>th</sup> September. Self-completion questionnaires with pre-paid envelopes were distributed by National Trust staff and volunteers to visitors leaving each property. Each property follows a set of guidelines which are designed to ensure that the sample has good representation of seasonal flow and an appropriate split between members and non-members. Instructions also aim to achieve an appropriate balance of visitors between weekdays and weekends and for each month.

A total of 235,000 surveys were printed and distributed to the properties and 79,308 completed questionnaires were returned, representing a 34% response rate and a very large sample of visitors. There is a possibility that the sample is to some degree self selecting, and one might predict an over representation of NT members, as they are likely to be more supportive of the NT. However the quality of the survey methodology is checked every three years through a 'control' sample, using face-to-face interviews, to ensure that the sample is representative.

This annual Visitor Survey includes a relatively small number of questions on transport used for the visit, and analysis of this data has been used in this paper.

## 5. Findings

The 2008 National Trust (NT) visitor survey is dominated by NT members, who make up over three quarters of the sample, which closely represents the member / non member split of visitors nationally. The sample is virtually evenly divided between day visits from home and staying visitors, although a minority of the staying visitors stayed with friends and relatives (see Table 3).

**Table 3. Where have you travelled from today?**

Location	Frequency	%
Home	41191	52.3
Friends/ relatives	6426	8.2
Holiday accommodation	29533	37.5
Other	1545	2.0
Total	78695	100.0

### 5.1 Modal Split

Travel to NT properties is dominated by car travel (see Table 4). Despite the development of a green transport plan by the NT over recent years, with an objective of reducing dependence on arrivals by car, (Dickenson et al., 2004; National Trust, 2005), the car share remains stubbornly high at around 90% and has remained fairly constant since 2002.

**Table 4. Methods of Transport to NT Properties 2002 - 2008 (%)**

	2002	2003	2004	2005	2006	2007	2008
Public transport	1.5	1.9	0.8	1.6	3.8	2.6	2.8
Coach (organised group)	5.4	3.9	3.9	5.6	5.9	5.1	5.1
Bicycle	0.2	0.4	0.3	0.4	1.5	0.6	0.5
Motorbike	0.2	0.2	0.2	0.3	1.5	0.7	1.5
Walked	1.8	1.6	1.2	2.3	3.6	3.2	3.7
Car	89.7	91.5	91.7	90.2	95.0	90.8	90.7
Other	0.1	0.1	0.7	0.0	0.0	2.3	1.3
	99.0	99.7	98.7	100.4	111.3	105.3	105.6

<sup>o</sup> The wording on the questionnaire was changed in 2006 making direct comparisons with data before 2006 more difficult. Prior to 2006, respondents were asked their main mode of transport. Since 2006 they are asked to list all modes of transport used to reach the property. Respondents may give two or more responses since 2006 so totals exceed 100%. Nevertheless the data does demonstrate a stable car share over a 7 year period, although the very high car share for 2006 is unexplained.

The 90% share of arrivals by car at NT properties is at the high end of the UK spectrum. An analysis of UK tourism statistics shows the car dominates domestic tourism travel accounting for around 74% of all trips to and from holiday destinations (VisitBritain, 2009) whereas the day visits share by car is 68%, but at its highest for day visits to rural areas (82%) and National Parks (91%) (Natural England, 2006). The NT share is on a par with the share for trips to National Parks, which perhaps reflects the remote and inaccessible location of many National Trust properties.

NT members who constituted the majority of the sample, are more car dependent than non members. Around 92% of members arrive by car compared with only 83% of non members. This difference was significant at the 99.9% level ( $\chi^2=994.620$ ,  $df=1$ ,  $p<0.001$ ). NT attractions have the added disadvantage that members see free admission and access to parking as a component of their membership that they actually pay for, which potentially makes it difficult to impose some measures of car constraint to this important group of visitors.

Interestingly, and in contrast to the national statistics, there was very little difference in the proportion of arrivals by car from day visits compared to those travelling from holiday accommodation (Table 5). The higher number of car arrivals for the relatively small number of visitors travelling from friends and relatives, and the smaller car share from those travelling from other locations were significant ( $\chi^2=438.772$ ,  $df=3$ ,  $p<0.001$ ).

**Table 5. Main Methods of Transport to the NT Property by where respondents travelled from (%)**

Travelled From	Public transport	Coach	Car	Other
Home	2.9	6.1	90.7	4.9
Friends & Relatives	3.4	0.8	95.2	6.5
Holiday Accommodation	2.9	3.9	90.1	9.9
Other	1.9	1.5	78.3	16.8

## 5.2 Location

Although the overall public transport share of visits to NT properties is low, there are much higher public transport shares for specific properties. The properties were categorised into rural locations and more 'built up' urban locations. The vast majority of properties were, not surprisingly, classified as rural and these attracted most of the visitors. However location influences the public transport share significantly (Table 6). The difference between the car share of travel to NT properties in urban and rural areas is significant at the 99.9% level. Likewise the much higher public transport share in urban locations is also significant.

**Table 6. Mode of Transport Used to Access NT Properties by Location of Property.**

Mode	Built - Up Area % N = 7291	Rural Area % N = 70867	Pearson Square	Chi- Square	Asymp. Sig. (2- sided)
Car	75.2	92.1	2214.88		.000
Coach	5.2	5.1	.15		.700
Public Transport	17.6	1.5	5985.68		.000
Other*	19.4	5.9	1934.27		.000

\* There is a large share for walk in urban areas (13.4%) not replicated in rural areas.

A total of 6 properties attracted over 20% of arrivals by public transport (Table 7) and the location of the property was clearly a decisive factor. Properties situated in major cities, or even in the centre of towns large enough to support rail services and frequent bus services such as Bath and Salisbury, attracted the largest public transport shares.

**Table 7. Properties with a high percentage of arrivals by public transport (%)**

Property	Public Transport	Car	Coach	Other	Comment
Birmingham Back to Backs	52.5	48.5	2.0	4.2	Inner City Location
Prior Park	42.6	55.9	4.2	38.8*	Central Bath. Subject to Green Transport Plan
Treasurer's House	37.8	43.0	6.8	7.2	Central York
Mompeson House	27.6	56.9	11.0	5.9	Central Salisbury
Osterley Park	25.3	68.4	4.8	5.2	Greater London Large PT share despite bus service over 15 min walk
Ham House	21.8	72.3	2.8	9.2	Greater London Bus service 15 min walk

\*A very large walk share of 37.6% generated by parking the car elsewhere in Bath (see section 5.5)

### 5.3 Access to Public Transport

It is perhaps too easy to accept that a high share of arrivals by car is inevitable due to the difficult or inaccessible location of NT properties. Analysis of the 150 properties included in the 2008 NT survey, using information from the NT website and the on line travel information service TransportDirect.com, established that the majority of these properties (63%), attracting 61% of visits, were accessible by public transport. For the purposes of this study access was defined as having a public transport service, most commonly a bus service, within a 15 minute walk of the property.

In addition, there were a small number of properties (6%) with partial public transport access. This usually constituted services on Sunday or Bank holidays only, although some services demonstrated other limitations including a pre-booking requirement with at least 24 hours notice. A decision was taken that this level of service severely limited the potential public transport share of visitors to these properties and they were most appropriately classified as not having public transport access. Indeed none of these properties attracted more than 3% of visitors arriving by public transport and most had a share of under 1%, with the exception of Sissinghurst Castle, whose bus service on three days of the week attracted a 6.4% share.

Further research on public transport access to NT properties is being undertaken. A limitation of the analysis for this paper was the exclusion of data on the frequency of the public transport service and this will be explored in the next stage of the research. However there is clearly a significant difference between infrequent rural services, where frequencies can be as low as 2 or 3 buses per day, and frequent services with headways of once an hour or better. Indeed Table 7 demonstrates that access to a frequent and extensive public transport network, even if the stop is over a 15 minute walk away, can achieve high public transport shares (Osterley Park). This supports the findings of Gronau and Kagermeier (2007) who found an increased number of people using public transport to access leisure facilities in Germany in relation to increased frequency of provision. Initial analysis indicates a number of NT properties with public transport access had services less frequently than hourly, and none of these properties attracted a public transport share of above 7%. A more comprehensive database of services to NT properties is currently under construction.

There was only a slight difference, but significant at the 99.9% level ( $\chi^2=292.742$ ,  $df=1$ ,  $p<0.001$ ), between the share of car arrivals to properties classified as having public transport access (89%) and those classified as not having public transport access (93%), so the existence of a public transport service marginally reduces the car share. More unexpected was the fact that 26% of all public transport arrivals were at properties classified as not having public transport access, in other words the nearest service was over a 15 minute walk away, confirming that frequency of service is also a key influence as well as proximity of the service. These properties collectively attract 39% of all visits in the survey, so 74% of public transport arrivals are at properties with public transport access which attract 61% of all visits. The public transport share of arrivals at properties with public transport access is marginally higher (3.4%) compared to the 2.8% of all arrivals (Table 4). Nevertheless, the existence of a public transport service does little on its own, to reduce the car share and increase the public transport share.

### 5.4 Distance

Data on distance travelled to the NT property was collected from a closed question and the majority of visitors travelled between 5 and 50 miles (Figure 1). Using this grouped frequency data, the authors have also estimated a crude average distance travelled to NT properties at around 46.4 kms (29 miles). This is a longer average distance than that travelled for UK leisure daytrips generally which ranges from 23 kms (14.3 miles) (DfT, 2006) to 27.4 kms (17.1 miles) (Natural England, 2006) in two different surveys.



Those travelling to a NT property on a day trip from home travelled significantly further than those travelling to a NT property from holiday accommodation (Table 8). Nevertheless, long distances are being travelled to visitor attractions like NT properties by tourists in the destination area (37 kms or 23 miles), and these journeys are being made predominantly by car (90.1% as shown in Table 5). This clearly shows the potential benefits that could be gained if more tourists are encouraged to travel to and from their holiday destination by public transport, therefore not having a car available for journeys in the destination area.

Coach passengers on an organised trip travelled the furthest (approximately 86.5 kms or 54 miles). As expected, there was a significant difference ( $t = 10.28, p < 0.001$ ) in the distance travelled by car users (44.8 kms or 28 miles) compared to those arriving by public transport (41.6 kms or 26 miles) although it was somewhat smaller than expected by the authors. The car offers much greater flexibility, both in time of departure and of route and will be significantly quicker on door to door journey times for day visits to NT properties, leading the authors to expect a smaller local catchment population using public transport.

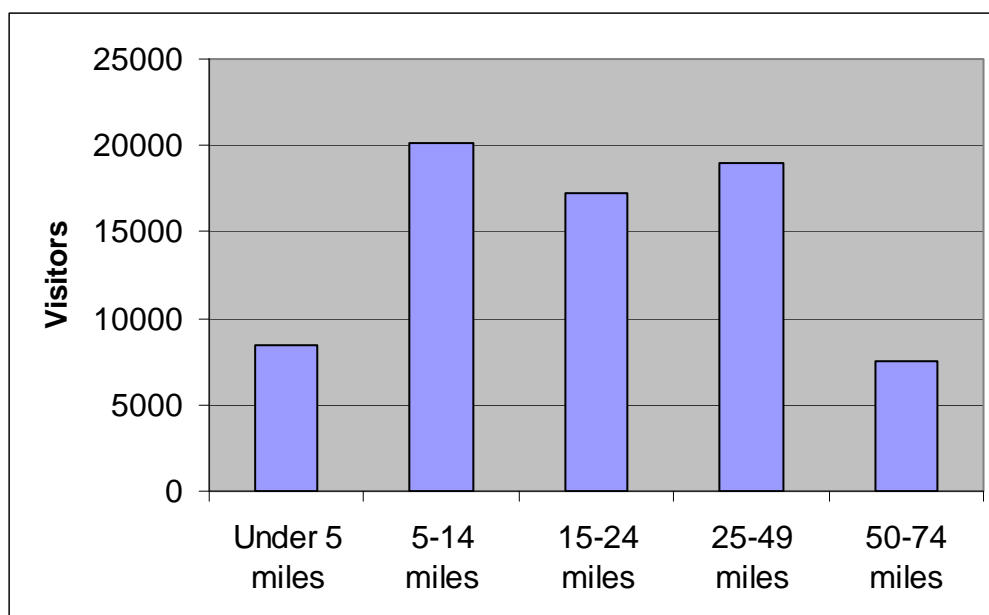


Figure 1: How far have you travelled to get to this property?

Table 8. How far have you travelled to get to this property?

Where have you travelled from today?	Mean	N	Std. Deviation
Home	33.48	40875	25.25
Friends / relatives	26.35	6378	22.96
Holiday accommodation	22.76	29342	20.90
Other	31.05	1527	28.57
Total	28.83	78122	24.13

$f=1205, p < 0.001$

The average distance travelled to urban properties was less than to rural properties (Table 9). However with an average distance of approximately 40 kms (25 miles), it is clear that urban properties are not merely attracting visitors from the immediate vicinity.

There is virtually no difference in the average distance travelled by NT members and non members.

**Table 9. How far have you travelled to get to this property?**

	Mean	N	Std. Deviation
Rural	29.25	70488	24.06
Urban	24.78	7252	24.35
Total	28.83	77740	24.13

t=15.04, p<0.001

### 5.5 Specific Measures

As stated earlier (section 4.1), the NT has been developing green transport plans over recent years, with an objective of reducing dependence on arrivals by car, (Dickinson et al., 2004; National Trust, 2005). This strategy has included pilot schemes and experimental approaches at some attractions, including four at properties that were in the 2008 visitor survey. The impact of these pilot schemes is explored. The modal split for arrivals at these properties is shown in Table 10.

**Table 10. Mode of Transport Used to Access NT Properties adopting Specific Measures to Reduce Car Dependency (%)**

Property	Sample N	Public Transport	Car	Coach	Walk	Boat	Cycle	Sig.
Prior Park	479	42.6	55.9	4.2	37.5	0.4	0.8	p<0.001
Greenways	400	9.3	71.3	6.8	19.0	36.3	1.3	p<0.001
Gibson Mill	49	16.3	71.4	11.0	38.8	2.0	0	p<0.001
Fountain Abbey	835	0.7	97.4	4.8	1.1	0.6	0.4	p<0.004
All NT properties	79308	2.8	90.7	5.1	3.9	1.3	0.5	

### *Prior Park*

One of the highest profile attempts to reduce the car domination of visits to an NT property is Prior Park, situated in the south of Bath about 30 minutes walk from the city centre. It has been designated a 'Green Tourism Site' and when the NT took over the management and operation of these gardens it entered into an agreement with the local authority to operate the attraction as a 'non car' attraction. Limited car parking is provided for the disabled, which must be booked in advance, and there is some cycle parking, but the remainder of visitors are encouraged to arrive by public transport. As part of an integrated strategy the NT subsidises established bus services, most notably on a Sunday, and also has negotiated an appropriate additional bus stop with an open-top tour bus company. There is also a £1.00 discount on the £5.50 admission price on production of a bus ticket.

Clearly, this strategy has had an impact with over 40% of arrivals by public transport (Table 10). However there are still significant numbers of visitors who arrive in Bath by car and park

elsewhere in the city. This is reflected in Table 10 where many visitors record multiple modes of transport to produce a total in excess of 140%. Many car passengers have listed walk as an additional mode they used to access the property. The high public transport share and the lower car share are statistically significant at the 95% level. The high walk share is also statistically significant.

However, the policy has also clearly had an impact on the visitor profile, most notably attracting many more visitors from a very local catchment area. Over 60% of visitors travel under 14 miles to Prior Park and the estimated mean distance is approximately 19 miles, shorter than the average distance of 29 miles travelled to NT properties and significant at the 95% level ( $t = 114.2$ ,  $p < 0.001$ ). This smaller catchment area may also result in lower than expected visitor numbers.

### *Greenway House and Gardens*

Greenway House has also developed environmental policies, having been awarded the South Hams Green Tourism award (Gold). The transport strategy has a twin approach of a carrot and a stick. There is a traffic management system with the declared aim of relieving traffic pressure on the local village. Visitors wishing to park their car at Greenway must pre book a parking space with at least 24 hours notice. Furthermore, arrival and departure is relatively inflexible as the booking sets out both arrival and departure time. Operating in parallel with this policy of car restraint is the carrot of encouraging arrival by 'green ways'. Transport to the property has been incorporated into the leisure experience with ferry services operating to the property (within 800 yards) along the River Dart from Dartmouth, Brixham and Torquay. Visitors arriving by 'green ways' also benefit from a reduced admissions charge. The success of this approach is reflected in Table 10, where over a third of passengers arrived by boat. The share of arrivals by car is 71%, which is lower than for NT properties as a whole (significant at the 95% level) although the average distance travelled by visitors is approximately 16 miles, so again the catchment area appears to be smaller.

### *Gibson Mill*

Gibson Mill is also designated 'a model vision of sustainability'. Whilst this designation predominantly governs the way the mill is operated, the website also claims to promote sustainable transport. 'As part of our sustainable strategy for the Mill we are promoting the use of green transport such as public transport, walking and cycling, to reach Hardcastle Crags and Gibson Mill' (National Trust, 2010) although interestingly there is little detail of how green transport is promoted and the nearest bus service is approximately 1 mile away. Analysis of travel to Gibson Mill should be treated with caution. As one of the NT's smaller attractions the sample size is also small. Nevertheless, whilst the impact is less marked than for Prior Park, the car share of 71.4% compares favourably to the overall car share of visits to NT properties and the public transport share of 16.3% is impressively high, given the distance to the nearest service. There is a large walk share (38.8%), although clearly a number of public transport users have also answered walk as the responses total well in excess of 100%. Despite the small sample size, these differences are large enough to prove statistically significant. The average distance travelled is again low, at approximately 16 miles.

### *Fountains Abbey*

Fountains Abbey has attempted to increase the arrivals by public transport by publicising half price admission for those arriving by bus. This is not the first attempt at using a ticket price to influence travel decisions. Oswin (1999) cites a trial at Legoland, with a dedicated bus service from the rail station to the theme park and the approach has also been used by the Eden project

(Robbins and Dickinson, 2008). However a policy of reduced admissions has been ineffectual at Fountains Abbey with over 97% of arrivals by car and under a 1% share of arrivals by public transport. A Pearson chi sq test reveals this very low public transport share is statistically significant at the 95% level, compared with the overall public transport share to NT properties. The logic for the choice of this property for a pricing promotion for those accessing by public transport is not immediately apparent.

## 6. Discussion

This case study does not initially give rise to optimism. The overall picture of travel to NT properties is one of car dominance, with little evidence of a reduction in the car share over time, despite the NT's efforts to develop green transport policies. The dominance of the car share is a wider societal problem beyond the scope of a single stakeholder to tackle as the cost of using a car for leisure journeys is low. Once a car has been purchased or acquired, although it may be predominantly used for other journey purposes such as the journey to work, the marginal cost of using that car for additional discretionary leisure trips is little more than the cost of fuel, (see Robbins and Dickinson, 2007 for a more detailed discussion), so the continued choice of the car for visits to NT properties, particularly in rural locations, is predictable.

Furthermore, although there is public transport access available to the majority of properties included in the survey, and information on public transport services to NT properties is now easily available, the existence of a public transport service and easy access to information on that service is not sufficient to overcome the cost and convenience advantages of the car and achieve a significant modal shift away from car. This perhaps suggests that the use of scarce resources to provide special services to inaccessible NT properties, such as subsidising a bus link from the nearest railhead is not the best use of scarce resources to achieve either significant modal shift or a reduction of GHG emissions, especially if the frequency of the service is low. Services restricted to weekends only also appear to be ineffective. However it is important to establish what the objectives of such services are, as they clearly have scope to meet social inclusion objectives of improving access to remote attractions for members of households who do not have access to a car, although this aspect is rarely monitored accurately.

However further analysis of the data shows that within the overall picture there are NT properties which achieve much higher public transport shares. Several factors contribute to a higher public transport share, of which location of the visitor attraction in an urban area is the most critical. Efforts to further reduce the overall share of arrivals by car will be most successful, if in the first instance, effort and resources are concentrated on the minority of properties in urban locations. There are urban locations with relatively low access by public transport (for example Speke Hall in Merseyside) which would appear to have the greatest scope for a reduction in access by car. Frequency of service would also appear to be an important consideration.

Policies of car restraint (the stick), limiting access to parking are clearly very effective (Prior Park and Greenway House), whereas attempts to offer incentives to encourage increased public transport use (the carrot) appear to remain ineffective, unless, as in the case of Greenway House, they are combined with a measure of constraint.

Attempts have been made to ensure that the main stakeholders, local government, tourist boards, visitor attractions and public transport operators coordinate their efforts. The NT for instance cite 28 schemes to provide car free leisure access where they operate in partnership (National Trust, 2005). However such schemes tend to be opportunistic and piecemeal, with the potential for differing policy objectives. There is also a history of schemes being temporary, when local

authority funding runs out or short term revenue objectives are not met (Dickinson and Robbins, 2007).

The government needs to take a lead by setting national policy objectives, prioritising between social, economic and environmental objectives and coordinating and funding a more structured integrated transport and tourism policy in consultation with the main stakeholders. Only when such a policy framework is established, can the merits of individual policies be evaluated. Car use can be influenced by a number of planning tools ranging from parking or car restraint in destination areas to more radical solutions, such as road pricing, which will narrow the cost differentials between car and the alternatives. However effectiveness is dependent on what the policies are trying to achieve. For instance, local policies aimed at reducing visual intrusion or congestion, perhaps using parking capacity or price to reduce car arrivals or park and ride to remove cars from a fragile environment, may benefit the local environment but will have a negligible effect on GHG emissions.

A steering committee with stakeholder representation, to advise government and develop evidence based proposals, and to integrate tourism and transport objectives would be an important first step.

## Acknowledgements

The authors gratefully acknowledge the National Trust for access to the 2008 annual visitor survey, and permission to undertake additional analysis on it, to develop this case study.

## References

- Bows, A., Anderson, K. and Peeters, P. (2009). Air Transport, Climate Change and Tourism. *Tourism and Hospitality Planning & Development*, Vol. 6, no. 1, pp 7-20.
- Department for Culture, Media and Sport (1999). *Tomorrow's Tourism - A growth industry for the new Millennium*, The Stationary Office, London.
- Department for Culture, Media and Sport (2004). *Tomorrow's Tourism - Today*, The Stationary Office, London.
- Department of Energy and Climate Change (DECC) (2008). Climate Change Act 2008 Available from [http://www.opsi.gov.uk/acts/acts2008/ukpga\\_20080027\\_en\\_1](http://www.opsi.gov.uk/acts/acts2008/ukpga_20080027_en_1) (Last access 24-07-2010)
- Department of the Environment, Transport and the Regions (DETR) (1998). *A New Deal for Transport: Better for Everyone*, Cm 3950, The Stationary Office, London.
- Department for Transport. (2006). *Transport Statistics Bulletin National Travel Survey: 2005*, The Stationary Office, London.
- Department for Transport. (2008). *Transport Statistics Great Britain 2008*, The Stationary Office, London.
- Department for Transport. (2010). Vehicles Factsheet - March 2010 Available from <http://www.dft.gov.uk/pgr/statistics/datatablespublications/personal/ntsfactsheets/NTSVehiclesFactsheet.pdf> (Last access 24-05-2010)
- Dickinson, J. Calver, S. Watters, K. & Wilkes, K. (2004). Journeys to heritage attraction in the UK: a Case Study of National Trust property visitors in the South West. *Journal of Transport Geography*, Vol. 12, no. 2, pp 103-113.

Dickinson, J.E. & Dickinson, J.A. (2006). Local transport and social representations: challenging the assumptions for sustainable tourism. *Journal of Sustainable Tourism*, Vol 14, pp 192-208.

Dickinson, J.E. & Robbins, D.K. (2007). Using the car in a fragile rural tourist destination: a social representations perspective. *Journal of Transport Geography*, Vol. 15. No. 2, pp 116 – 126.

Dickinson, J.E & Robbins, D.K. (2008) Representations of tourism transport problems in a rural destination. *Tourism Management*, Vol. 29, pp 1110-1121.

Eurostar, (2008) Greener than flying. Available from [http://www.eurostar.com/UK/uk/leisure/about\\_eurostar/environment/greener\\_than\\_flying.jsp](http://www.eurostar.com/UK/uk/leisure/about_eurostar/environment/greener_than_flying.jsp) (Last access 19 -06-2008).

Friends of the Earth (2010) Aviation and Global Climate Change. Available from [http://www.foe.co.uk/resource/reports/aviation\\_climate\\_change.pdf](http://www.foe.co.uk/resource/reports/aviation_climate_change.pdf) (Last access 24-07-2010)

Gronau, W. & Kagermeier, A. (2007). Key factors for Successful Leisure and Tourism Public Transport Provision. *Journal of Transport Geography*, Vol. 15 No. 2, pp 127 – 135.

National Express, (2010). National Express, Carbon Calculator. Available from <http://www.nationalexpress.com/coach/OurService/CarbonEmissionsCalculator.cfm> (Last access 14-02-2010).

National Trust (2005). Visitor Travel – Policy from Practice. Available from [http://www.nationaltrust.org.uk/main/w-visitor\\_transport\\_policy\\_from\\_practice.pdf](http://www.nationaltrust.org.uk/main/w-visitor_transport_policy_from_practice.pdf) (Last access 24-07-2010).

National Trust (2009). Current Members. Available from <http://www.nationaltrust.org.uk/main/w-trust/w-support/w-currentmembers.htm> (Last access 16-11-2009).

National Trust (2010). Gibson Mill – Sustainability. Available from [http://www.nationaltrust.org.uk/main/w-vh/w-visits/w-findaplace/w-hardcastlecrags/w-hardcastlecrags-gibsonmill\\_project/w-hardcastlecrags-gibsonmill\\_project-sustainability.htm](http://www.nationaltrust.org.uk/main/w-vh/w-visits/w-findaplace/w-hardcastlecrags/w-hardcastlecrags-gibsonmill_project/w-hardcastlecrags-gibsonmill_project-sustainability.htm) (Last access 20-05-2010)

Natural England (2006). *England Leisure Visits – Report of the 2005 Survey*, Research International Ltd, London.

Oswin, J. (1999). The Role of Tourism Operators in Increasing Public Transport Use, Paper presented at the Journey to Success, *English Tourist Board Conference*. London.

Peeters, P., Szimba, E. & Duijnisveld, M. (2007). European Tourism Transport and the Main Environmental Impacts. *Journal of Transport Geography*, Vol. 15. No.2, pp 83 – 93.

Robbins, D.K. & Dickinson, J.E. (2007). Can Domestic Tourism Growth and Reduced Car Dependency be Achieved Simultaneously in the UK, in Peeters, P. (Ed) *Tourism and Climate Change and Mitigation: Methods, greenhouse gas reductions and policies*, NHTV, Breda.

Robbins, D.K. & Dickinson, J.E. (2008). Transport to visitor attractions, in Fyall, A., Garrod. B., Leask., A. & Wanhill, S. (Eds.), *Managing Visitor Attractions: New Directions*, Butterworth Heinemann, Oxford

UNWTO-UNEP-WTO (2008). *Climate change and tourism: Responding to global challenges*, UNWTO, Madrid

VisitBritain, (2009). *The UK Tourist – Statistics 2008*, TNS Travel and Tourism, Edinburgh.