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Research paper

Broadly engaging with tranquillity in protected landscapes: A matter of perspective identified in GIS

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HIGHLIGHTS

- Tranquillity has a meaning that varies at both group and individual level.
- Views distinguished between policy makers, the public and visitors.
- Political perspective on audibility, whereas visibility is prioritised.
- Objectives of related policies conflict.
- Issue raised on how distinct views might be reconciled in planning practice.

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ABSTRACT

References to the subjective notion of tranquillity have long been extensively deployed in marketing literature and in planning policy in relation to both its promotion and its protection, particularly in protected areas. Whilst a liberal use of the term has ensued, a plethora of research interprets tranquillity primarily with noise, and where broader interpretations are progressed, traditional, directional questioning techniques are evident in attempts to understand tranquillity and quantify its features. Surprisingly, few enquiries have taken a broader, inductive approach to determining the range of stakeholders' views and of these even fewer have engaged specifically with local residents and particularly those classed as hard-to-reach. Using these latter approaches, of the few and most recent studies conducted, the Broadly Engaging with Tranquillity project provides a replicable framework for determining and mapping tranquillity. An extensive community engagement process launched the study, using participatory principles from which stakeholders' views were modelled using Geographical Information Systems. Results of this research are reported together with an interpretation of the models created according to four distinct groups representing views of institutions and members of the public. Similar views are identified amongst the groups with tranquillity commonly related to natural environments, whereas nontranquillity was primarily equated to seeing and hearing people and the products of human activity. Yet distinctions are identified between the four groups that have important implications for who should be involved in determining local characteristics of tranquillity and for how protected area managers might include nonexpert views in their understanding and conservation of tranquillity.

1. Introduction

Tranquillity is a frequently occurring term in protected area, tourism, and marketing literature where it is used synonymously with subjective descriptors such as *solitude*, *remoteness*, *calm*, *peace, and quiet*, to recount both a state of mind and to describe a quality of experience that is commonly perceived to be found in certain locations. These areas tend to be associated with relatively undisturbed environments, are hence often related to rural locations and especially to protected areas valued for their landscapes, seascapes, and biodiversity. However, a review of international conventions and standards relevant to these areas demonstrates that the concept of tranquillity is very much open to interpretation. For example the United Nations Educational Scientific and Cultural Organisation's (UNESCO) World Heritage Convention focusses on tranquil

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qualities, related to cultural and spiritual features found in many World Heritage Sites (WHS), but especially in relation to aesthetics enhanced or pejoratively affected by what can be seen and/or heard (International Council On Monuments and Sites [ICOMOS], 2011). A similar interpretation is also found in the International Union for the Conservation of Nature's (IUCN), categorisation of protected areas. As with WHS, the IUCN do not specifically report tranquillity to be a management indicator per se, but qualities relating to tranquillity are identified in the organisation's standards and guidance for management. These assert for example, varying degrees of remoteness, the ability to see and hear features of environments in their natural state and where mankind's impacts are minimised (Dudley, Stolton, & Shadie, 2008).

Understandably, the contents of such international agreements on protected area management are reflected at a national level in policies relating to environmental conservation, planning, development control, and at the local level in the emphasis of environmental protection through statutory management plans (Powell, Selman, & Wragg, 2002). Such documents equally report on the importance of enhancing and maintaining tranquil qualities as beneficial for not only contributing to biodiversity and landscape conservation but also, in recognition of the many communities residing in these areas, to positively enhancing individuals' physical health, social, psychological, and ultimately economic wellbeing (e.g. Berto, 2014; Department Environment Food & Rural Affairs [DEFRA], 2000; Herzog & Barnes, 1999; Kaplan, 2001; Ulrich et al., 1991). Consequently, tranquillity and the range of interpretations it attracts are often cited as key economic and social considerations in sustainable development strategies. In the latter cases, the most liberal use of tranquillity, its synonyms, and its inference through what are commonly interpreted as indicative features of protected areas, are promoted, particularly given these are regularly demonstrated to be a key motive for visiting these locations. For example, in a 1990s survey of United States National Parks, 72% of respondents suggested that a key purpose of such areas was to provide opportunities for experiencing natural peace and the sounds of nature (Haas & Wakefield, 1998). In the UK, tranquillity and the synonym, peace, are cited as a key motive for visitors to rural areas (Campaign Protection Rural England [CPRE], 2015), while views of open rural and natural landscapes are often seen as a secondary priority (cf. CPRE, 2006; National Parks UK, [NPPUK] 2015).

A wealth of literature exists on the benefits of tranquillity, amongst which qualities of particularly sound, have gained increasing political attention and subsequently academic interest in the US since the 1980s (Miller, 2008; Shannon et al., 2015) and in Europe, especially since 2000 (e.g., Gidlöf-Gunnarsson & Öhrström, 2007; Watts & Pheasant, 2015). Much of this research has taken the traditional, directional questioning approach in consulting with the public on landscape qualities and particularly so on noise factors. Subsequently research has been primarily positivist in nature and often conducted through applied acoustics to the modelling, and even the prediction of tranquillity in both urban and rural locations (e.g. Pheasant, Horshonekov, & Watts, 2010). Yet, while such attempts to objectivise the subjective nature of tranquillity may prove attractive in practice, in theory the scientific ability to accurately and appropriately predetermine just how people may interpret tranquillity is questioned. For example, in applied acoustics, questions arise as to how natural and contextual aspects of tranquillity are calculated given views on tranquillity are socially and geographically constructed and informed at the least, by an individual's cultural, social and environmental preferences (e.g. Hague & Jenkins, 2005; Pheasant, Horshonekov et al., 2010; Selman & Swanwick, 2010).

Concurrently, a far broader perspective on the meaning of landscapes for the wider public has been emphasised in landscape planning policy. For example, in Europe, the most comprehensive vision for landscape planning derives from the European Landscape Convention (ELC, 2012). This treaty emphasises "a holistic understanding of the landscape" informed through public participation that combines the physical with the aesthetic for which tranquillity is emphasised as a key characteristic (Natural England, 2009, p.6). Conversely, the EU Environmental Noise Directive END (OJEC, 2002) encourages the much-researched and narrower interpretation of tranquillity, as primarily related to sounds. Furthermore implementation of END 2002 in EU member states means that a statutory obligation is placed on local administrations to identify tranquil zones in their areas. In the UK, both urban and rural areas are incorporated in the Government's first official recognition of tranquillity as a public asset through its National Planning Policy Framework (NPPF) (DCLG, 2012). As with the END, (OJEC, 2002), noise is emphasised, yet importantly NPPF recognises that tranquil spaces may also be determined as "demonstrably special to a local community . . . holding a particularly local significance . . ." due to their "beauty, historic significance, recreational value. . ..tranquillity or richness of [their] wildlife." (Department Communities & Local Government [DCLG], 2012, p.18). Consequently, an additional obligation is placed on local administrations to not only consider tranquillity when determining planning applications but also to identify, in consultation with local communities, tranquil zones within their jurisdictions.

Given the benefits of tranquillity together with both its increasing presence in international conventions and the political attention it receives in the EU and the UK, it is surprising to note the lack of practical guidance on just how tranquillity might be determined in such a way that it is sufficiently representative of the range of public views held. In this paper we report results of the Broadly Engaging with Tranquillity (BET) project, which used an inclusive, inductive and comparative approach comprising institutions', visitors' and residents' views on determining characteristics of tranquillity. Our aims are threefold: firstly to consider how various organisations, residents, and visitors variously view tranquillity, secondly to test an investigative framework on how to collate these views and thirdly, to evaluate how tranquillity is best represented spatially for use in protected area management. We address these aims with reference to a study area in the Dorset Area of Outstanding Natural Beauty (AONB), central southern England (Fig. 1).

2. Protected areas, tranquillity, and tranquillity mapping

Protected areas are defined by IUCN as "a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long term conservation of nature with associated ecosystem services and cultural values" (Dudley et al., 2008, p2; Shadie & Dudley, 2013). Organisations managing such areas will usually have some degree of responsibility in respect of planning and development. In England, Wales and Northern Ireland for example there are various protected area designations, the two at landscape scale being National Parks and AONBs. Both designations share a primary purpose, to conserve and enhance their natural beauty. They are distinguished by an additional purpose in the case of National Parks: to promote enjoyment and understanding of the area's special qualities. They also differ in their governance structures: National Parks' Administrations are separate legal entities with full planning powers while AONB partnerships work on an advisory basis with their relevant planning authority. Nevertheless, the management authorities for both designations must ensure that development opportunities are progressed in consultation with their local residents, that they do not adversely affect nature conservation or the quality of life of their local communities, while they should also not affect tranquil-

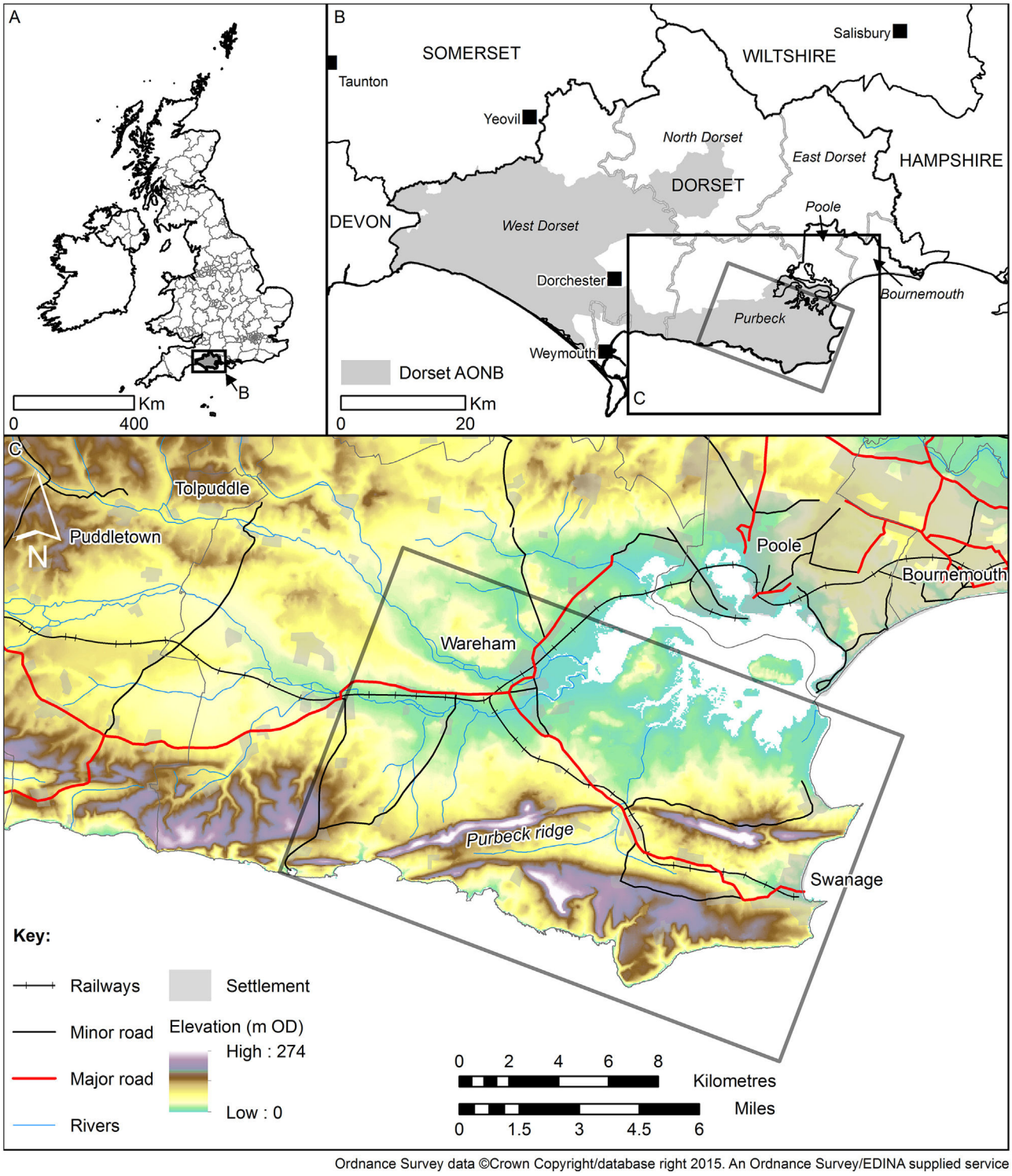

Fig. 1. Location of the study area with a. the UK, b. southern England, and c. Dorset Area of Outstanding Natural Beauty.

lity where it is identified as a *Special Quality* of the area (National Association Area Outstanding Natural Beauty [NAAONB], 2012). Therefore, it is clear that of all public bodies, organisations managing protected areas have the most conceptual and practical capital invested in the concept of tranquillity.

As previously discussed outputs of quantitative research are available that primarily reflect aural-visual aspects of tranquillity, albeit that there are limitations to such studies. Perhaps such concerns contribute in practice to reasoning why tranquillity, is most usually explained – rather than determined – either by reference to various abstract nouns or related to commonly perceived, indicative characteristics of protected areas, all of which imply, to various degrees, the absence of mankind's presence. Given that such terms are themselves nebulous and highly subjective, we contend that tranquillity is a phenomenon that is in the eye – or indeed ear, nose, hands, and mind – of the beholder.

A similar viewpoint was taken to a minority of previous studies that ensued on tranquillity mapping. These were progressed by

various constituencies being asked to list and quantify factors that they consider to positively and negatively affect tranquillity. For example MacFarlane, Haggett, Dunsford, & Carlisle, (2004) sought a broad understanding for how tranquillity could be interpreted through a form of Participatory Appraisal (*sensu* Chambers, 1994), for two contrasting areas of north-east England, the Northumberland National Park and the West Durham Coalfield. The approach taken meant that no form of predetermined questioning was progressed, rather individuals were asked to both describe and draw situations that they considered tranquil and nontranquil. Participants could also comment on the ideas of others and vote for the ones they preferred, the latter element providing a basis for quantifying the relative importance of 44 factors identified as enhancing or detracting from the participants' notions of tranquillity. Twenty-one GIS models were then produced to represent the various factors contributing to tranquillity and then combined in proportion to the votes to produce a single tranquillity map. A similar approach was later employed in assessing the tranquillity of the Chiltern Hills AONB (Fuller, 2005). Views of the participants in both studies then contributed to the production of a national tranquillity map for the whole of England (CPRE, 2007; Jackson et al., 2008).

As with all proof-of-concept projects there are limitations. Firstly, whilst the breadth of stakeholders engaged in these two previous studies marked a key milestone in engaging with countryside user groups, the works did not extend specifically to the views of the wider community of local residents. Secondly, a combination of the limited technology and nature of digital cartography of the day, meant that model outputs had a relatively coarse resolution (500 m and later, 250 m cells) (CPRE, 2007; MacFarlane et al., 2004). The latter, combined with the conceptual uncertainty of extrapolating views of tranquillity originally collected in North-east England to the rest of England has produced both anomalies (e.g. the absence of key infrastructure of <250 m size in models) and problems of validity (e.g. the extent to which the views of tranquillity by inhabitants of Dorset in southern England coincide with those held by residents in Northumberland in North-east England).

3. Broadly engaging with tranquillity (BET) project: study area and methodology

In order to maintain compatibility with existing models, BET was designed to adhere to the general approach of the North-east England and Chiltern case studies, and therefore the Tranquillity Map of England discussed above (CPRE, 2007; MacFarlane et al., 2004). However, the intention was to address the limitations of those studies in respect of breadth of public involvement and resolution.

The study area selected for BET was a 301 km^2 rectangle, encompassing the Purbeck Hills and is completely contained within the Dorset AONB in central southern England (Fig. 1a–b). It is situated immediately west of the Bournemouth-Poole conurbation of 465,000 people, but nevertheless it is a predominantly rural area and is the hinterland of just two settlements with >5000 inhabitants: Swanage and Wareham (Fig. 1c). The area contains numerous cultural and natural features that are protected under national, EU and international legislation and directives. Furthermore the majority of the 76 km coastline of the study area is part of the Dorset and East Devon Coast World Heritage Site. As a result the area is a major tourist destination that in 2014 attracted 2,132,000 overnight stays, 434,000 day trippers, who spent £113 million (South West Research Company Ltd., 2014).

As with all AONBs, Dorset's designation is under the National Parks and Access to the Countryside Act 1949. Its management is further covered by the Countryside and Rights of Way Act, 2000 and its landscape is protected in the national interest with the expectation that Special Qualities (Phillips, 2002), inclusive of tranquillity are conserved and enhanced. In fulfilling this purpose, the management bodies must take account of the needs of local communities and rural businesses, (Countryside Commission, 1991). Management of the Dorset AONB is carried out by a team working within the offices of the regional government, Dorset County Council (DCC), with whom BET collaborated in carrying out the present research.

The BET enquiry had three objectives: (a) to capture not only the views of institutions, but to additionally include the views of local residents, inclusive of those classed as the hard to reach, and of visitors to the area; (b) to understand what meaning tranquillity held for these constituencies; and (c) to ensure that the project framework and models would be of practical use to the Dorset AONB team. A pragmatic design, informed by principles of participatory research and phenomenology was adopted (*sensu* Dennett, 1998; James, 1995), while the project was conducted in partnership with Dorset AONB and Dorset County Council. The result was a design progressed through mixed methods (Creswell & Plano Clark, 2007) that comprised seven stages (Fig. 2).

The first stage comprised eight participatory action consultations (PACs) (*sensu* Bradbury Huang, 2010; Chambers, 1994; Reason, 2006) attended by representatives of local government, managing agencies, commercial companies and those with community interests in the Dorset AONB (hereafter referred to as institutions). Participants worked in groups and were tasked to consensually agree on key factors that they considered enhanced or detracted from their perceptions on tranquillity. Each group was then allocated a set number of votes which they could assign amongst characteristics considered to contribute to or detract from tranquillity in proportion to the importance that they attributed to a factor.

The second research stage focused on the collation of the wider community of householders' views for which a household survey was distributed to 2,100 addresses within the study area, i.e. 15% of the total study area population. Selection was on the basis of a stratified random sample of all residential addresses within the study area. Stratification was firstly on geographic zone, i.e. north and south of the crest of the Purbeck Hills (see Fig. 1c), thereby separating the study area into 'coastal' and 'inland' populations, and secondly on the settlement status of an address, i.e. whether it was in a town (i.e. Swanage and Wareham), village or a rural setting. This survey included 10 structured statements, the design of which was provided by the top 5 factors previously conveyed by PAC participants on tranquillity and a further 5 on nontranquillity from which householders were asked to select which ones they felt most represented their views. A total of 457 questionnaires were returned, a 21.9% response rate of which more than half (55.3%) were from those classed as the hard to reach (Hewlett & Harding, 2015).

A key question on the survey invited householders to convey their personal contact details if they were interested in being further involved in the BET. Those that expressed interest were invited to the third research stage of 3 PAC events at which a total of 20 local residents participated. As with institutions, residents were also tasked to consensually agree on a prioritisation of factors they considered to most/least represent their collective views on tranquillity.

The fourth and final stage of field research comprised a series of onsite surveys with visitors to the study area. These were carried out over a four day interval in August 2014 at six venues known to be popular with tourists. It comprised three activities: firstly, recording up to five features considered by visitors to most represent their ideas of tranquillity, second recording a further five features they considered negatively impact on tranquillity. Finally, visitors were asked to rank their views in order of importance.

Analyses of the qualitative data identified a number of broad topics and themes associated with tranquillity as shown in Table 1,

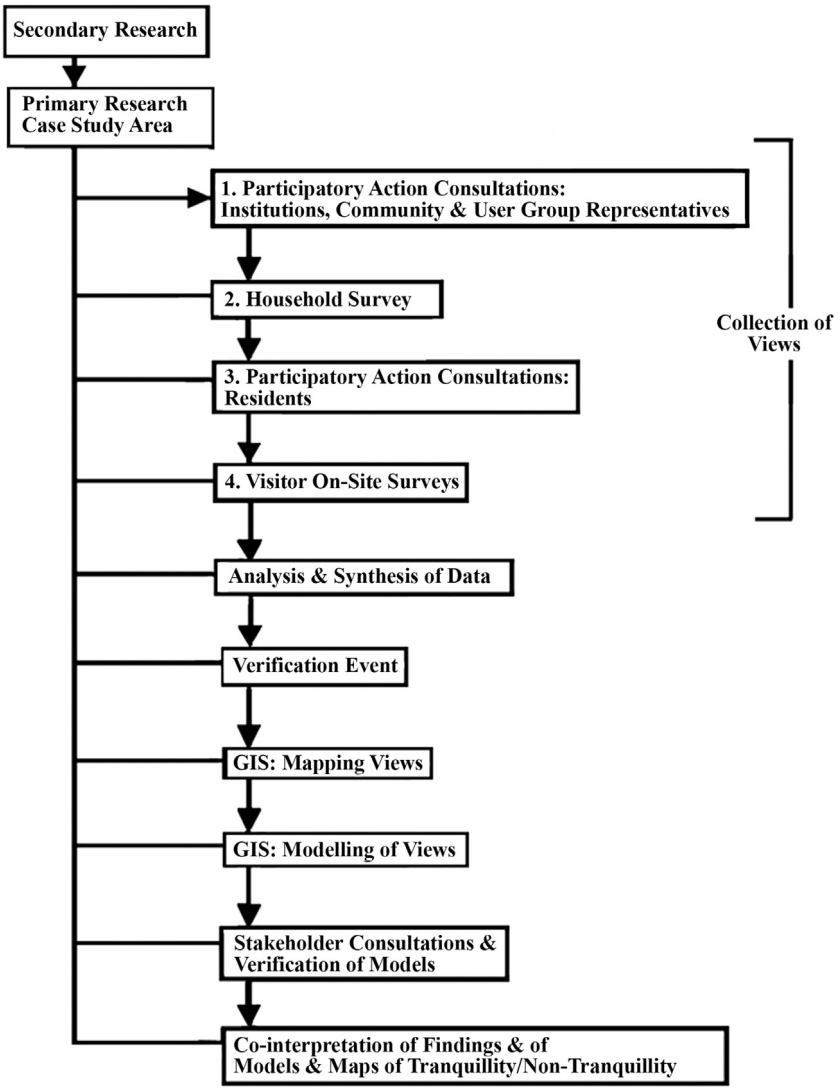

Fig. 2. Stages of Research.

Table 1
Thematic categories associated with tranquillity.

Step 1. Topics	Step 2. Thematic categories	
Natural	Activity (participant or of others)	Sight
	Auditory	Smell
	Behaviour (linked to mankind)	Space: Open/cramped
Human/Mankind	Coastal (seascape and resorts)	Spiritual
	Cognitive (inclusive of values, judgements & memories)	State of Mind
	Time of day	Touch
Natural and Human/ Mankind	Mankind	Water (natural)
	Natural Environment (landscape and nature reserves)	Weather/climate
	Rural Environment (pastoral landscape)	Wildlife
	Seasons	

(*sensu* Braun & Clark, 2008), to which views, collated throughout the study, be they qualitatively or quantitatively informed, could be categorised. Views and their respective rankings were counted, totalled according to topics and themes then calculated as percentages to aid interpretations of the models.

The results of the questionnaires were analysed using SPSS statistical software Version 21. Relationships between categorical variables consisting of nominal and ordinal data were explored using Pearson's chi-squared test for independence. In cases where the variables consisted of only two categories, Yates' correction for continuity was used as this compensates for overestimation of the chi-squared value. An association between variables was considered significant when the significance value was ≤ 0.05. The strength of the relationship between the two variables was further tested using the phi co-efficient or Cramer's V, depending on the number of categories within each variable.

To facilitate a comparison of views amongst each of the four research groups, each stage was analysed as a discrete data unit. This comparative process ultimately identified a similarity of views being repeated which in turn, enabled us to confirm that theoretical saturation of the data had been reached (Glaser & Strauss, 1967). The corpus of data derived from the multiple sources of qualitative and quantitative data were comparable to previous research conducted, contributing to convergent validation (Campbell & Fiske, 1959; Fielding, 2012).

The findings from each stage of data collection together with the GIS models created (see below), were verified directly with participants. This resulted in participants being able to question and/or validate the findings and the models produced subsequently

Table 2
GIS models and routines.

Type	Approach	Examples
Being in	Query existing geodatabases to extract polygons with the desired property. Rasterise the polygons	Woodland, Urban areas, Beaches, River banks, Military areas
Seeing	Either query existing geodatabases to extract polygons with the desired property, sow the polygons with a regular grid or random points and carrying out a viewshed analysis using the points as targets and a 5 m resolution digital surface model (DSM). Or extract point and line data from existing geodatabases or digitise such information, and carry out a viewshed analysis of the point/line nodes as outlined above. The resultant viewshed is then multiplied by the following index by means of a rasterized multiple ring buffer placed around each target:	Visibility of Roads, Coastline, Wind turbines, Quarries, the Sea, Campsites
	Distance (m) / Index	
	5 / 100	
	50 / 70	
	100 / 50	
	200 / 35	
	500 / 25	
	1000 / 100	
	1500 / 15	
	2000 / 10	
	4000 / 5	
	6000 / 1	
	>6000 / 0	
Hearing	Query existing geodatabases to extract polygons with the desired property, sow the polygons with a regular grid or random points and carrying out a viewshed analysis using the points as targets and a 5 m resolution digital surface model (DSM). Employ the algorithms of Piercy and Daigle (1991) and MacFarlane et al. (2004. pp.140–161) to model noise attenuation and frequency	Noise of Roads, Mainline railways, Quarries, Civilian aircraft, Church bells, Steam trains
Other	Many models did not fall into the above categories and for which bespoke approaches had to be developed. They are described on the project archive (Terradillos & Wilkinson, 2015)	Skyglow, Isolation, Crime

thereby contributing to the credibility and quality of the research (Reason, 2006; Tashakkori & Teddlie, 2005).

GIS study was undertaken of views collected from all stages of survey, and which were both able to be mapped and that were quantifiable. In the first case this meant factors that had both a geographic expression and are manifested in sensory perception (sight, sound, touch or smell), while the latter related to the number of votes cast (in the case of PACs held with both institutions and residents), occurrences (householder questionnaires) and ranking of views (visitor survey). This sifting process resulted for example in c.72% of the views of PAC participants going forward to GIS model production. Full details of the GIS workflow to create the tranquillity models for the BET study area are outlined elsewhere (Terradillos & Wilkinson, 2015), and therefore only a summary of the general process is provided below.

The ArcGIS 10.1 package was used for data integration and modelling, while cartographic resources on which the models were based were accessed from Digimap (University of Edinburgh, 2014); databases made available to the project (under a licence agreement) by DCC and by researching open source archives available on the internet. Three broad types of model were constructed using the GIS routines outlined in Table 2, while bespoke models were built for factors that did not fit within these three categories. Once complete and in order to reduce models to the same scale and hence importance, each was re-classed using a Jenks natural breaks algorithm to a common 10 point scale. A total of 70 such intermediate models were developed, each reflecting one or more tranquillity factors. Their resolution is 5 m, a product of the resolution of the digital surface model (DSM) that was utilised in the analyses to determine line-of-sight and audibility.

The intermediate models were thereafter combined in order to build four separate integrated tranquillity models representing the views expressed in each survey mode. In the case of the PACs, each model representing a factor that was seen to promote tranquillity (henceforth 'positive factor') [P] was multiplied by the number of votes cast for it [VP]. Then models built for factors detracting from tranquillity ('negative factors') [N] were similarly treated, i.e. by multiplying the number of votes given to each during the PAC events [VN]. The final PAC tranquillity models (separate models were built for organisations and residents) is therefore described by:

$$\text{PAC models} = [(\text{P1xVP1}) + (\text{P2xVP2}) + (\text{P3xVP3})\text{etc.}] - [(\text{N1xVN1}) + (\text{N2xVN2}) + (\text{N3xVN3})\text{etc.}].$$

For the householder survey the single integrated model was based on the number of questionnaires in which particular tranquillity factor was selected [X] (as discussed above, the survey did not ask participants to rank or grade the relative importance of different tranquillity factors, but rather just to list them):

$$\text{Household model} = [(\text{P1xXP1}) + (\text{P2xXP2}) + (\text{P3xXP3})\text{etc.}] - [(\text{N1xXN1}) + (\text{N2xXN2}) + (\text{N3xXN3})\text{etc.}].$$

The visitor on-site survey model was built from models developed for individual questionnaires [Q] on basis of the ranking [from 5 (most positive or negative) to 1 (least positive or negative)] of tranquillity factors [Y] provided by each responder:

$$\text{Tranquillity Q} = [(\text{P1xYP1}) + (\text{P2xYP2}) + \ldots.(\text{P5xYP5})] - [(\text{N1xYN1}) + (\text{N2xYN2}) + \ldots.(\text{N5xNP5})]$$

The integrated visitor model was then:

$$\text{Visitor model} = \text{sum(Q1–Q3etc.)}$$

To facilitate comparative discussions amongst the research groups, models based on views collected using compatible research tools (i.e. institutions and residents' views expressed at PACs, and householder and visitor surveys) were compared by: (a). separating out cells indicating positive tranquillity from those suggesting negative

Table 3
Views on tranquillity and nontranquillity by group.

Mode of data collection	Total participants/ respondents	Total views according to themes identified.	Tranquil		Nontranquil	
			Views	% of Total views	Views	% of total views
PACs						
Institutions	30	*1,308*	741	56.7	567	43.3
Residents	20	*318*	216	67.9	102	32.1
Sub Total	*50*	*1,626*	*957*	*58.9*	*669*	*41.1*
Household Survey	457	*4,130*	2,132	51.6	1,998	48.4
Visitor On-site Survey	309	*2,469*	1,341	54.3	1,128	45.7
Verification events	80					
Totals	896	*8,225*	4,430	53.9	3,795	46.1

tranquillity for each group, (b). reclassifying each of the resultant model extracts (i.e. files containing cells representing only positive or negative tranquillity) using a Jenks Natural Breaks algorithm to a consistent scale (1–10), and then (c) subtracting one of the model extract pairs from the other. The result is two model comparisons, one examining the spatial differences in modelled tranquillity between members of institutions working in the area and local residents, and the other expressing the same for householders compared to visitors to the study area.

4. Results

In total, 896 people participated in the BET project and 8225 views on what participants considered to comprise tranquillity were identified for analysis. Whilst overall distinctions in the design of the research tools make direct comparison of views challenging, patterns amongst the data are evident. Of these, as shown in Table 3, more views were conveyed on factors contributing to tranquillity than on nontranquillity. This is particularly notable with views collated during the PAC events in contrasting total positive views conveyed by residents (67.9%) compared with institutions (56.7%).

Further analysis, identified three broad categories to which views could be allocated. In terms of tranquillity, the most overt concerned natural environment, attracting more than a third of PAC participants, over half of householders and a quarter of visitors' views on tranquillity. As shown in Table 4, all participants, throughout each research stage tended to relate their nontranquil views to all things human in origin except features associated with cultural heritage.

On examining votes allocated to the themes, less than a quarter (22%) of the PAC participants placed their votes on tranquillity on *sight* (Fig. 3). Of these, institutions emphasised tranquillity in relation to seeing natural environments, especially open landscapes, which attracted more than half of their votes allocated to sight (53%). Residents' prioritised "simply not being able to see mankind's presence", including factors such as "traffic, manmade structures, jet skis and festivals" demonstrated by fewer than 55% of their total votes on sight: second to which, as with institutions, natural environments were favoured. Sounds were also selected by institutions and residents alike although in both cases, was ranked, albeit marginally, of third importance (Hewlett, 2015).

In relation to nontranquillity, the theme attracting the most votes allocated by PAC participants (29%) concerned mankind's presence (Fig. 3). Of these, both institutions and residents prioritise what can be seen, and subsequently heard, particularly in relation to the holiday season. Yet distinctions amongst votes can be discerned. Institutions placed a fifth (21%) of their votes on sight and fewer than 15% of their votes on noise (14.7%): in both cases emphasising, 'traffic, cars, busy roads & caravans. Residents, placed almost a quarter of their votes on sight (23%) of which 40% (40.4%) of these concern the "sheer quantity of people attracted to the area" and in coastal locations, the use of "jet skis racing through the swimming areas!". As with institutions, traffic was emphasised by residents with a fifth of their votes on sight. However, an additional third (36%) of their votes were allocated to being able to see infrastructure i.e. urban landscapes, mobile phone masts, and "anything considered being out of the AONB context". Residents used a fifth of their total votes (21.3%) on noise. emphasising "mechanical noise and traffic", second to which, a sense of "overwhelming noise from people", was reported especially considered in coastal areas. (Hewlett, 2015).

Responses to the household survey produced a total of 4981 views. Of these, 1726 resulted from 5 options on tranquillity and another 1588 were conveyed through 5 options on non-tranquillity that were put to respondents to select which of the options they felt most represented their views. Of these, being able to see and hear the natural environment, view open spaces, and see/hear few people especially in the open countryside took the top 3 positions on tranquillity (88%, 76% and 71% respectively) (Fig. 4). In relation to what was considered as non-tranquil, manmade noise pollution, especially in relation to traffic in the holiday season,- a sense of being overcrowded, and seeing man-made infrastructure were emphasised (74%, 68% and 67% respectively) (Fig. 5). These opinions were further reflected in the 96 views householders conveyed in free responses which primarily emphasised views on non-tranquillity for which the sheer presence of people, particularly of cyclists attracted to the area during the holiday season was identified as a key issue resulting in the "abuse of the countryside as a playground!" (Hewlett & Harding, 2015a).

This concern for the holiday season was additionally identified in outputs of statistical analyses. Statistical significance, albeit small, redirected our attention from the countryside to coastal areas where distinctions amongst views were noted according to gender. In these cases, more males than females (64.4% of males compared to 54.8% of female respondents) were noted to report on the coastline as being noisy, contributing to their conceptions of nontranquillity (x^2 *(1) = 3.60, p < 0.05, phi = 0.10*). Conversely, being able to see the coastline and hear the sea was indicated by more female than male respondents (54.3% compared to male respondents 45.7%) in relation to what they considered as a (x^2 (1) = 4.11, p < 0.04, phi = 0.10).

Unlike the householder survey, no statistical significance of relevance to this paper could be identified in terms of the visitor on-site surveys. Yet of 309 participants who shared and ranked their views on tranquillity/nontranquillity over 4 days, tranquillity was most commonly perceived by visitors to concern views and open landscapes ranked in number one position (15%), subsequent to which peace and quiet and sea & seascape equally attracted 13% of factors ranked most highly. In relation to nontranquillity, 100% of their views could be related to anything human in origin amongst which traffic was ranked the highest (35%), second to which with 15% of

Table 4
Views by group according to topics identified.

Mode of Data collection	Total in group	Tranquil topics			Total	Nontranquil topics			Total
		Human %	Natural %	Human & Natural %		Human %	Natural %	Human & Natural %	
PACs		260	305	303	868	553	14	44	611
Institutions	30								
Residents	20								
	30.0	*35.1*		*34.9*	*90.5*	*2.3*		*7.2*	
Household survey	457	*80*	95	4	179	176	1	7	184
responses to open questions		*44.7*	53.1	2.2		95.7	0.5	3.8	
Visitor on-site survey–priority factor	309	*65*	81	159	305	302	1	3	306
		21.3	26.6	52.1		98.7	0.3	.1.0	
Totals	*866*								

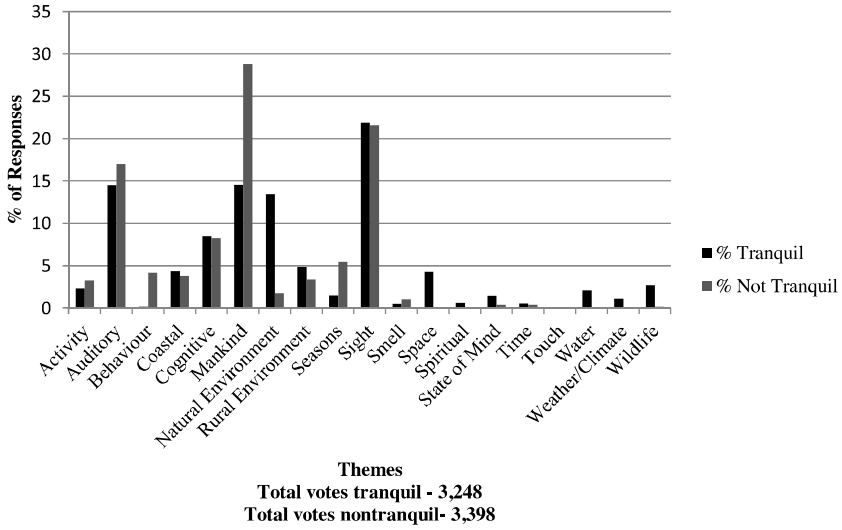

Fig. 3. Tranquil and nontranquil voting allocations – PACs: Institutions & residents.

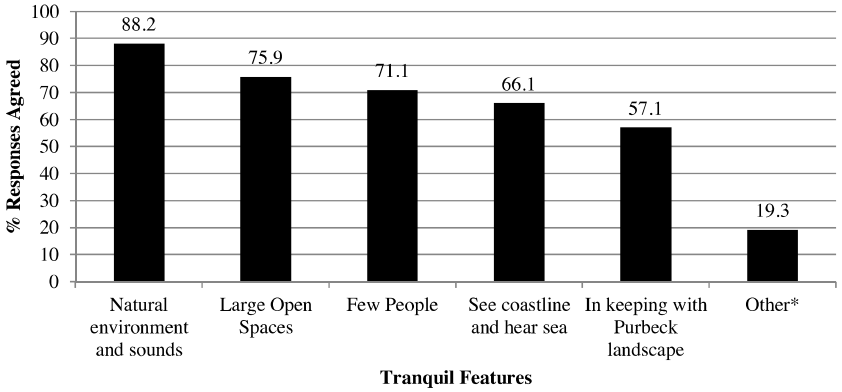

Fig. 4. Options provided to householders and their responses: Tranquil.

the ranked views concerned seeing crowds of people and thirdly, with 14% any form of man-made noise. (Fig. 6) (Hewlett & Harding, 2015b).

Four GIS models summarise the views of residents, institutions (both from views acquired at PAC events), householders (questionnaire) and visitors (on site survey) (Figs. 7–10). Models based on data collected by compatible methods were also compared using routines in the Spatial Analyst module of ArcGIS (Figs. 11 and 12). Examining the models, it is immediately clear that there is a considerable similarity. The fact that all groups identify any manifestation of humanity as detracting from tranquillity means that settlements are modelled as the most nontranquil areas. Furthermore both noise resulting from human activity and seeing traffic are also key negative tranquillity factors and therefore areas adjacent to roads (traffic is the main constituent of 'noise pollution' in the area), particularly the arterial routes through the study area, appear as nontranquil. Conversely areas far removed from roads appear to be beacons of tranquillity, both because of their distance from people, but also as factors associated with isolation and wilderness were seen as important promoters of tranquillity. Nevertheless there are, as previously stated, differences in the models which are highlighted in the model comparisons (Figs. 11 and 12). For example

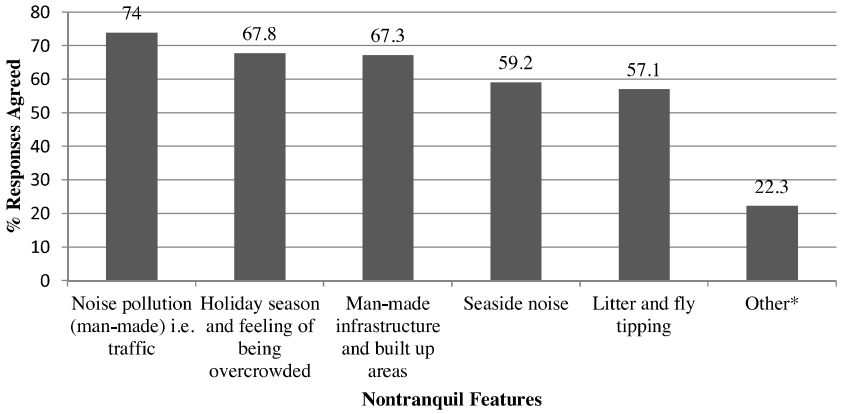

Fig. 5. Options provided to householders and their responses: Nontranquil.

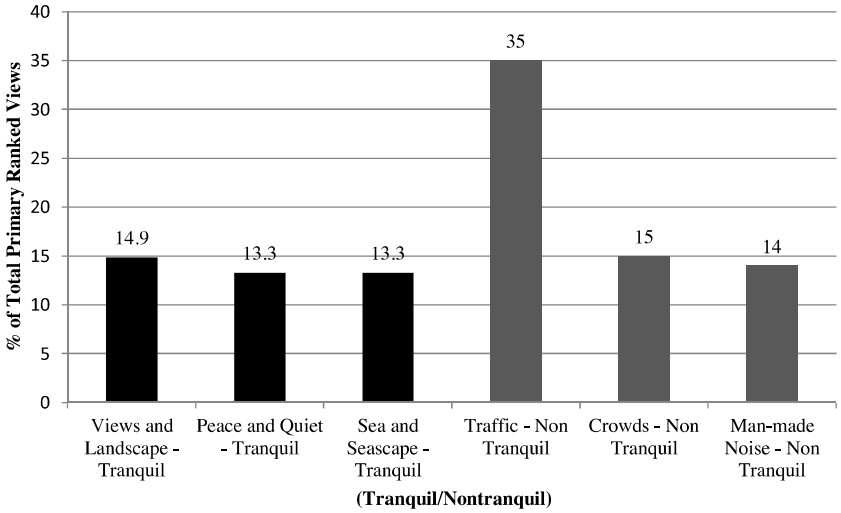

Fig. 6. Visitors' views ranked as most important: Tranquil and nontranquil.

because residents valued remoteness as a greater positive tranquillity factor than institutions, the resultant model suggests there to be more tranquil space in the study area in the former case than the latter (Figs. 7 and 8). Furthermore the comparison of these two models shows that for most relevant areas the residents' model outputs a higher positive tranquillity factor than that for institutions (Fig. 11a). The converse is also true as the two groups ranked factors of nontranquillity rather differently and therefore most areas modelled as nontranquil for both groups are shown as being even less tranquil for institutions than for residents (Fig. 11b).

Examining the householder model against that generated for visitors shows that the former models a greater part of the area as tranquil (Figs. 9 and 10). Furthermore a direct comparison of the models shows that in the majority of cases a higher positive score is recorded for cells modelled as having positive tranquillity for householders when compared to visitors (Fig. 12a). It is also notable that visitors considered traffic to be the most significant detractor from tranquillity. Thus the model constructed for this group emphasises to an even greater extent the negative impact of the road network on tranquillity when compared to householders' perspectives (Figs. 9, 10 and 12b).

These and other differences in the detail of the models produced for each group prompt an important question: which constituency's view should be prioritised in local government's consideration of tranquillity?

5. Discussion

This study aimed to enhance the approach of previous tranquillity studies by developing methods for evaluating how organisations, local residents, and visitors perceive tranquillity and then test that approach in part of the Dorset AONB. As previously discussed, views can most conveniently be considered in terms of the group that provided them, namely institutions, residents, householders, and visitors. Similarities amongst these groups demonstrate tranquil experiences and spaces tend to be associated with what are commonly conceived as natural, relatively remote environments and as a result the most tranquil areas in all models often coincide with nature reserves (e.g. the Arne peninsula in the northern part of the study area). Nature reserves appear relatively tranquil areas in the models because wildlife (another factor that was frequently cited as contributing positively to tranquillity) tends to be both more diverse and present in higher frequencies in such zones compared to the surrounding areas. Furthermore as has been highlighted above, what was modelled as 'isolation' is considered to be the most important factor contributing to tranquillity. Following the lead from MacFarlane et al. (2004) this factor was modelled in terms of ease of access, i.e. if an area is close to roads it is more easily entered into than otherwise, while the higher grade of the road, the less difficult the access. Footpaths were modelled as providing a lesser ease of access than roads, but areas lacking footpaths are rated the most difficult to access and therefore mod-

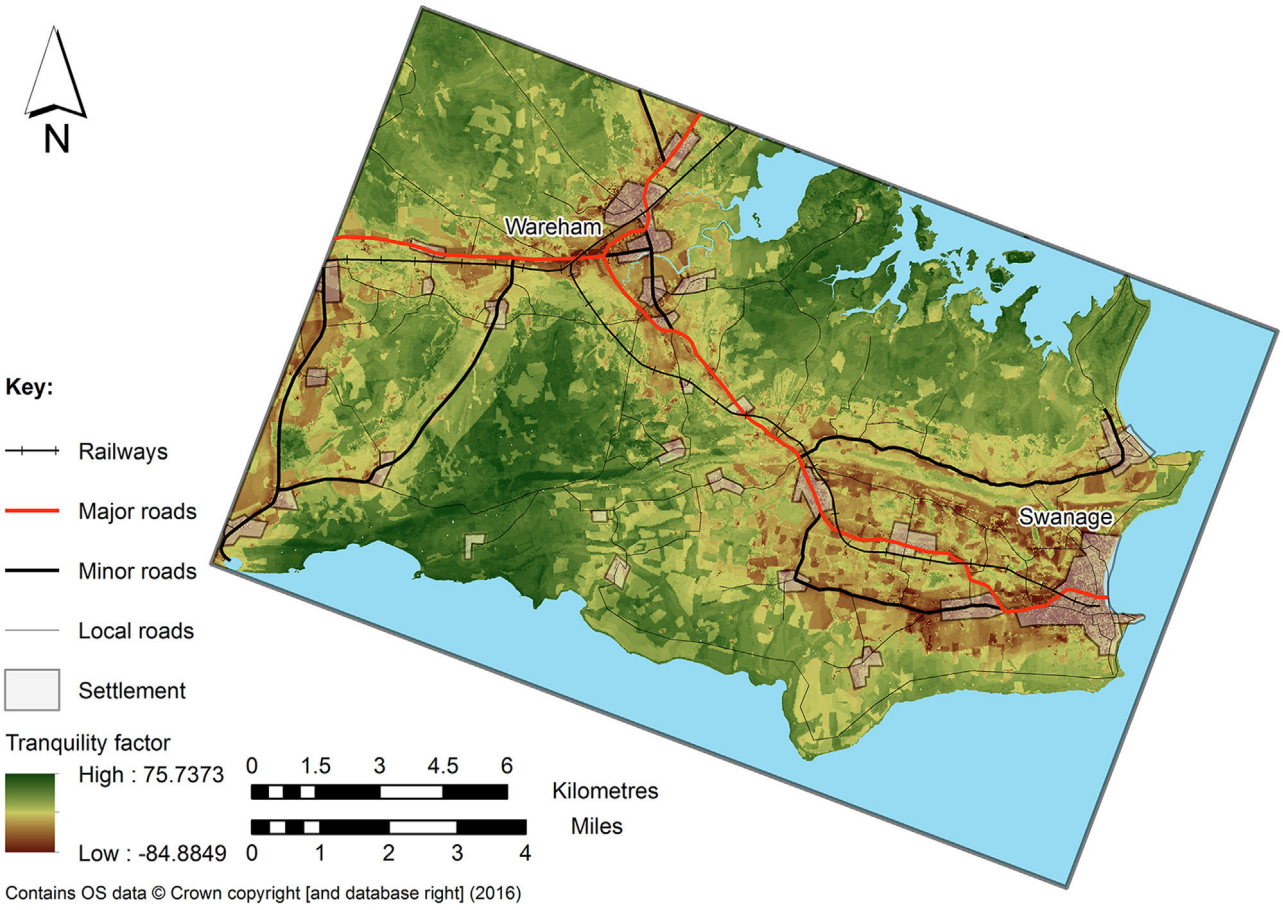

Fig. 7. GIS Model: Residents.

elled as the most isolated. It is therefore the case that the latter areas also coincide with locations that are privately owned and/or those that have no/restricted public access. The implications are significant as a dichotomy. The most tranquil areas and therefore those which the public would most want to travel to are frequently those to which they are either not permitted, or which are the most difficult to access (particularly for those with mobility disabilities).

Unsurprisingly, the major detractor to tranquillity is seen as humanity in all its manifestations barring cultural heritage. As a result those areas modelled as being the least tranquil despite, but also a consequence of where people are present in the greatest numbers, are towns of which the coastal resort of Swanage is for example, modelled as being particularly nontranquil. Other infrastructure such as pylons and mobile phone masts appear in the models, but the relative lack of importance assigned specifically to these factors means that they are only represented as minor components that detract from tranquillity. On the other hand traffic in all its forms and as it affects both sight and sound, are the most important factors considered by participants to detract from tranquillity: a finding that was similarly reported by MacFarlane et al. (2004) in their study of North-east England.

Whilst similarities amongst the groups are apparent, distinctions are equally evident. The most overt of these suggests that institutions consider a wider range of factors to inhibit tranquillity than residents. Consequentially as a result of the methodology, institutions present a greater degree of nontranquillity in their respective model to that conveyed by residents (Fig. 11b). Indeed on comparing the models created from each of the four groups involved in the study, the institutions' perspectives on nontranquillity represents the greatest reach across the case study area and is also of the greatest magnitude. This outcome may simply have been informed by their heightened awareness of the area, inclusive of those spaces that are in private ownership and as a consequence are closed to public access. Nonetheless, further distinctions can equally be discerned amongst residents, visitors, and householders' models. For example, in comparing visitors with householders, the former's emphasis on noise and people, mean that roads and settlements are particularly highlighted as nontranquil whereas householders emphasise elements of nature more heavily than visitors resulting in a greater proportion of the relevant plot being modelled as tranquil (Fig. 12b). There are further distinctions evident in the model comparisons that will be reported in future publications, but what is notable for the purpose of this current review is that there are key differences by constituencies. The implication of this finding is also a key challenge for local planning administrations, charged with identifying tranquil spaces in consultation with the public as expected in EU and national planning policy. In other words how can these distinctions be reconciled into workable plans for development and conservation, particularly in a study area such as the present which is a key tourist destination comprising areas awarded varied national, EU and international protected status?

This problem is exacerbated by the political interpretation taken on tranquillity as evidenced in EU and UK planning related policies. Unlike the ELC that provides a broad, and we would contend, comprehensive understanding for how tranquillity might be determined, the END and – albeit to a lesser degree – the UK's NPPF, emphasise noise as the only factor in the former case and in the

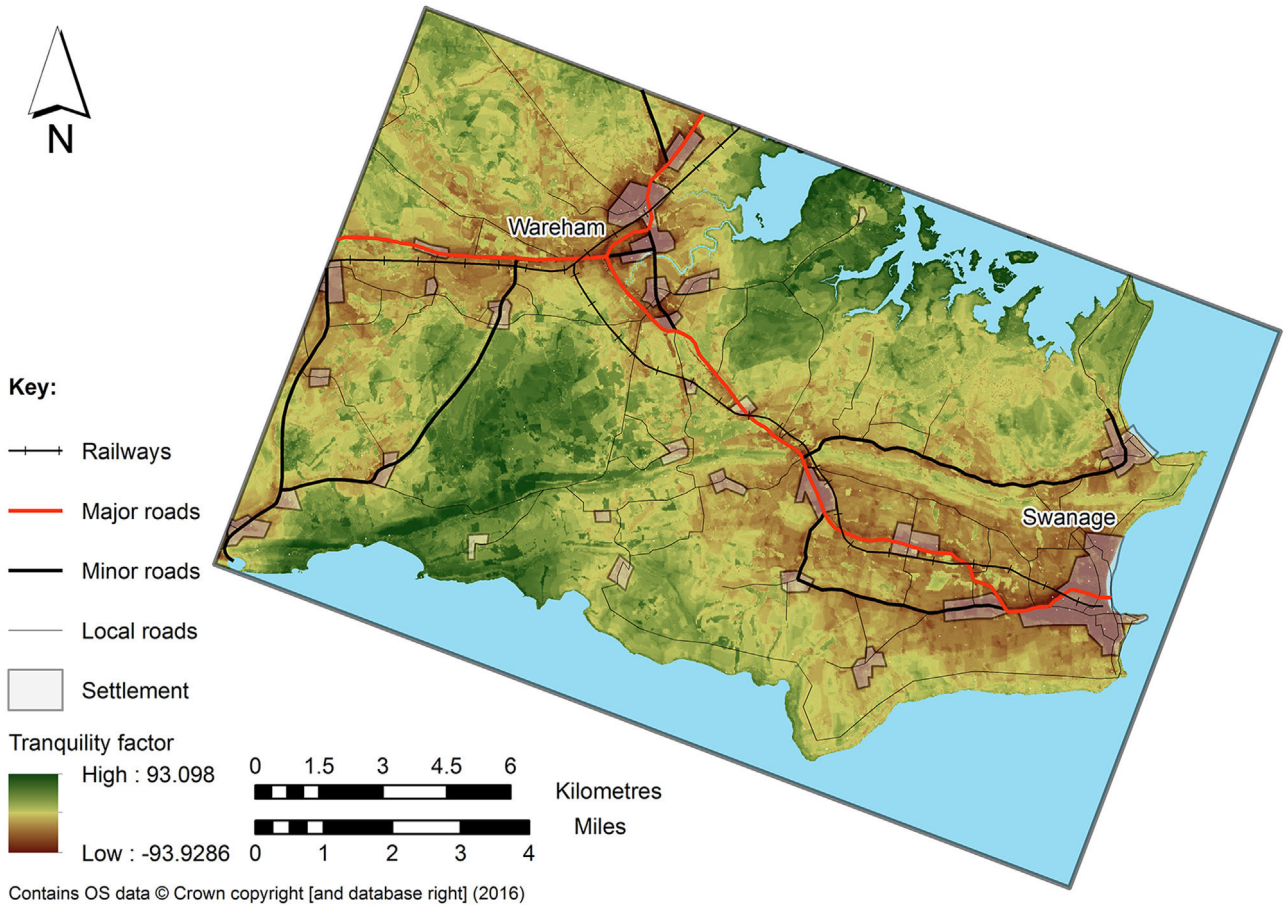

Fig. 8. GIS Model: Institutions.

latter policy, a primary aspect that needs to be determined by government officials in consultation with the public. Implementation of these policies means that factors associated with other senses (including emotion) have the strong potential to be disregarded. It is notable in the BET's findings that whilst 'sight' was the key factor for most participants ('sound' only ranked third in order of importance), a further 17 factors that are not associated with sight or sound were identified, and therefore – together with sight – would not need to be considered under the current policy framework [NB: a similar outcome can be construed in the 44 factors previously identified by MacFarlane et al. (2004)].

Unlike the two key inductive approaches taken to tranquillity mapping (BET and MacFarlane et al., 2004), the vast majority of academic studies, have reflected the foci of the END and NPPF thus primarily focused on factors of 'sound' and subsequently, on 'sight'. These auditory-visual relationships affecting perceptions of the landscape (cf. Pheasant, Fisher, Watts, Whitaker, & Horshonekov et al., 2010), are absolutely not in themselves questioned. Indeed, other than the BET raising questions as to how noise might be distinguished by gender and tranquillity by constituency, albeit distinct approaches and methods are used, the broad findings resulting from these studies are comparable to those produced through the BET. Furthermore, 'sound' is unquestionably relevant and sight is fundamental to simply experiencing the concept of landscape! Yet such highly quantitative studies, much of which are related to applied acoustics (i.e. Watts & Pheasant, 2015), are fundamentally expert-led, require equally expert interpretation, and founded primarily on directional approaches of investigation. What results is an exclusive rather than an inclusive forum of discussants being engaged in these studies and in their subsequent applications. Nevertheless, the outputs of such research in planning practice are attractive: planners have long-held a linear and rational approach to informing their decisions (Graham & Healey, 1999; Legacy, 2010), requiring "inquiry-proof' investigations" (Selman, 2002. p.3.) considered to be achieved through positivist/post-positivist constructions that demand "objective, measurable bases to [the] production" of in this case, tranquillity maps (Bell, 1999 p.1).

Whilst the principle of objectivity is absolutely not contested, we question in this research the sole use of positivist orientations and traditional, directional, and predetermined forms of questioning in determining tranquillity as it is fundamentally, a subjective, value-laden concept which, as demonstrated in BET, can be distinguished by constituency. Consequently we assert the use of a participatory and inductive mixed methods approach that is able to capture both the "tangible and intangible meanings imbued" (Kil, Holland, & Stein, 2013 p.478) on an area – many of which, as shown in BET, will overlap and will be context dependent (Van Wyk, Breen, & Freimund, 2014). Through using an extensive and inclusive framework such as the BET means that real-world perspectives on the effect of policies i.e. END and the NPPF, might also be obtained and where transferred into policy formulation or its implementation, can feasibly result in enhancing if not legitimising policy-makers decisions (Fielding, 2012). Thus, where views are used to inform planning decisions, a further potential to enhance the social, psychological, and even economic wellbeing of an area, might be achieved (Ledwith, 2005). In this sense it follows that rather than tranquillity and its qualities being defined as the right

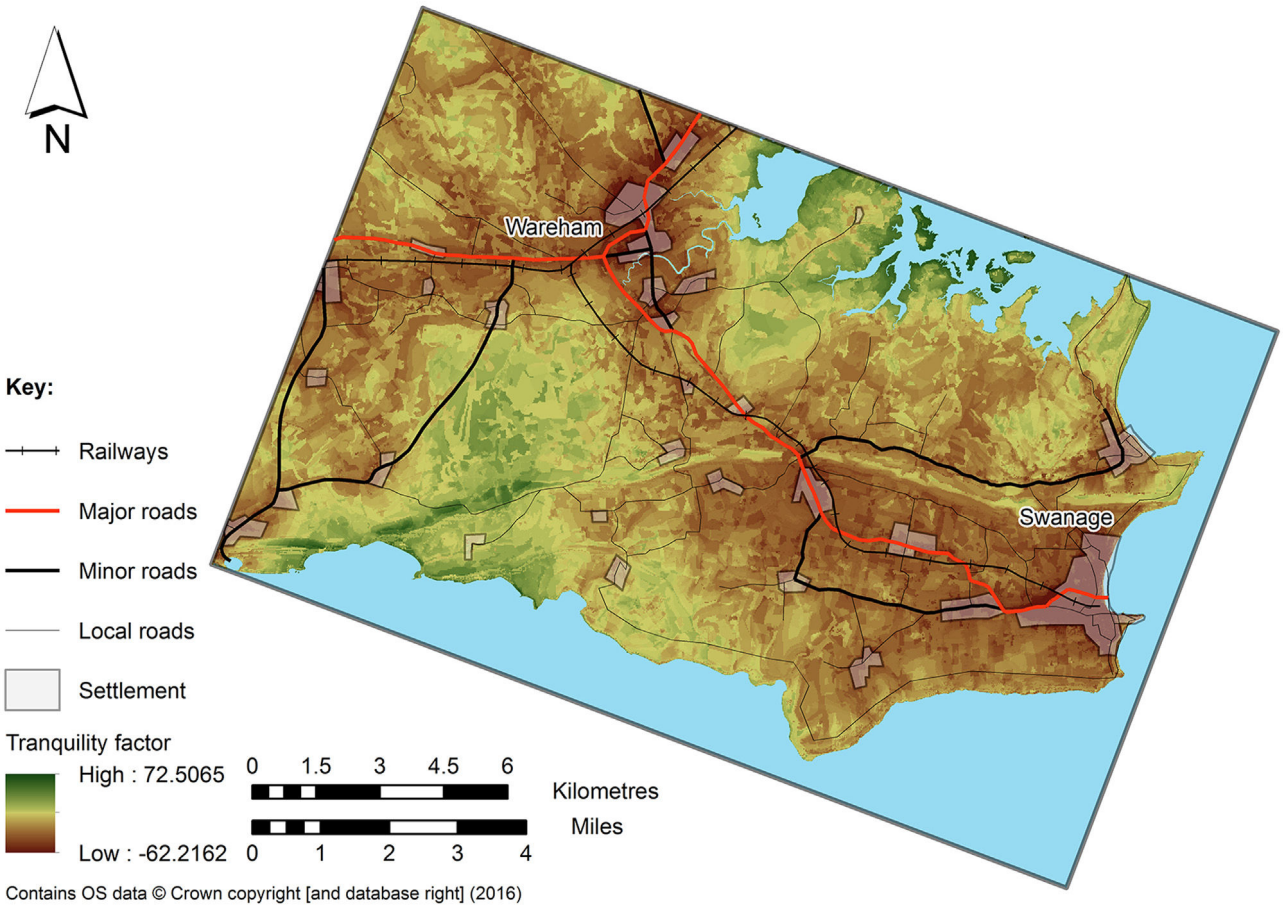

Fig. 9. GIS Model: Householders.

of the State, that tranquillity could be conceived as a common good, produced in and contributing to enhancing protected area environments that in themselves are considered as a new commons, (Pieraccini, 2015), requiring cooperation amongst a wide range of stakeholders on "their protection, management and planning" (ELC, 2012, p.4). Thus to dilute the inclusion of the public's views on determining tranquillity holds the risk of a potential loss of legitimacy of any plan, policy formulation or strategy defined by institutions on behalf of those members of the lay public, who quite simply, are not traditionally nor adequately engaged (Hewlett & Edwards, 2013; Legacy, 2010).

Yet the integration of marrying expert with nonexpert views in expert and perceptual approaches to landscape management (Daniel, 2001) and especially in planning and environmental contexts has long been notoriously acrimonious. Tensions "between positivist views of planning as an expert discipline and pubic expectations of democracy" (Conrad, Christie, & Fazey, 2011, p.761) are all too apparent and are exacerbated by "legal and policy constraints in the British planning system, prevent[ing] community discourses transferring into policy development" (Tewdwr-Jones & Thomas, 1998, p.127): all of which emphasises a prevailing political "predict and provide culture" (Weldon, 2004, p.23).

Nevertheless, activities to extend the breadth and through discursive public consultations, the depth of civic engagement are considered absolutely critical in protected area management (Beirle & Konisky, 2001), as whilst the concept of protected areas is supported at an international level, there are numerous risks to their future status. These derive from political, economic, social, and cultural imperatives (Borrini-Feyerabend et al., 2013) for which it is considered likely that business values will increasingly determine decisions (Phillips, 2001). Yet through community engagement and their effective deliberation with institutions, rural protected environments may not only survive but flourish. As numerous researchers have argued, through community ownership of a project, not only captures local knowledge and interest, but ultimately increases awareness amongst local people and visitors as to the value of protecting the area. (Borrini-Feyerabend et al., 2013; Dudley et al.,1999; IUCN, 2003; Phillips, 2001, 2002; Pimbert & Pretty, 1997). Subsequently, the process of deliberation and consultation on in this case, tranquillity mapping, is as important as the outputs (Ledwith, 2005) for which public participation in determining tranquil attributes is just one way of taking these opportunities forward, particularly given that in a UK setting, local government officers are being asked to determine tranquil zones (DCLG, 2012).

The power of using GIS in modelling tranquillity includes its graphic outputs creating visual benchmarks of a geographic space that makes for immediate impact and making sense of sophisticated technology into what can result as easily communicated maps to a wide range of audiences (Pavloskaya, 2009). However, the models produced are only as useful as the data available. This issue in the BET primarily concerns a lack of traffic volume data meaning, as was the case with previous studies (MacFarlane et al., 2004), that road classifications had to be used as a surrogate. Secondly, the use of qualitative designs and highly subjective data might always be questioned in the political context, particularly with regards to a nebulous concept such as tranquillity. Thirdly, the quantification of qualitative data is always a challenge, albeit results of BET are comparable with results of alternative approaches. Nevertheless,

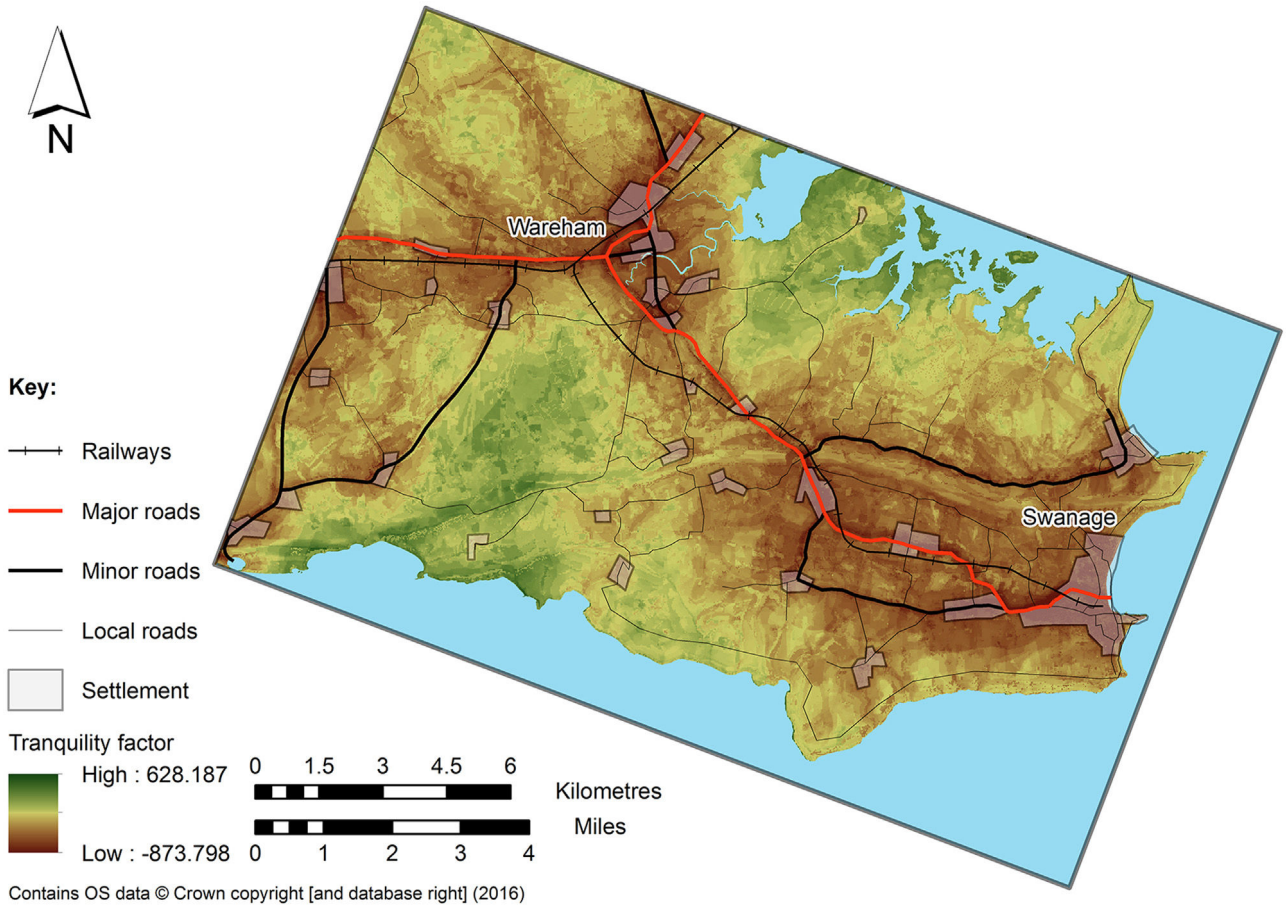

Fig. 10. GIS Model: Visitors.

through using a design of multiple methods in the research, not only are strengths and weaknesses of each single method addressed (Yin, 2003), but also the credibility and validity of the study is increased through the free and open nature of the consultation, the triangulating of the methods, identifying convergences and ultimately though corroborating the data (Koc & Boz, 2014). In so doing, the findings derived from the BET, were identified as being similar to those reported from other tranquillity studies. Thus whilst we contend that views on tranquillity are relative to an area and to individuals' subjectively informed opinions, the overall results on how tranquillity and nontranquillity are perceived could feasibly be considered in and thus transferred to alternative locations.

6. Conclusion

BET has shown that tranquillity has a meaning that varies at both a group and individual level. These opinions incorporate references to physical characteristics indicative of rural and especially of protected areas, but which are also expressed in terms of aesthetic values: factors that by their very nature will be informed subjectively will be context dependent and therefore would not, we assert, be able to be identified by just one constituency. Yet EU directives and hence national planning policies do just this in directing local administrations to identify tranquil areas based on the key criterion of 'noise' for which its very use, semantically, infers nontranquil contexts. Noise is unquestionably important, especially in relation to nontranquillity and as reported in BET raises questions as to how it may even be distinguished by gender. Yet as BET has also demonstrated, it is not the only factor considered comprising tranquillity, nor that can be measured and therefore modelled. Thus noise alone cannot feasibly be considered synonymous with tranquillity. However, the utility of 'noise' means it can be measured quantitatively and therefore meets the positivist preferences of planners and ultimately of politicians. Nonetheless, to do so, means that an exclusive process is created that effectively demands the inclusion of expert led definitions of tranquillity that equally require expert led interpretations on just how tranquillity, conceived primarily as noise, might be determined.

BET has proven to be a useful inclusionary framework for inductively capturing and mapping numerous and broad stakeholder views on tranquillity and can easily and feasibly be transferred to alternative locations. Yet there are limitations. Case study findings cannot in themselves be universally applied (Yin, 2003), and should they be utilised elsewhere – regardless of how robust the outputs of mixed methods and of the calculations – they could easily attract claims of a study not being democratically informed through public consultation processes. Moreover, the unique nature of protected areas and in particular of World Heritage locations, demands contextually based studies. Finally, policy makers and planners should only consider tranquillity (and indeed noise) models as general guides, even when they are constructed of a seemingly high resolution. Models are only as good as their underpinning data and in the BET, the poorest dataset concerned one of the most important factors contributing to nontranquillity, traffic noise.

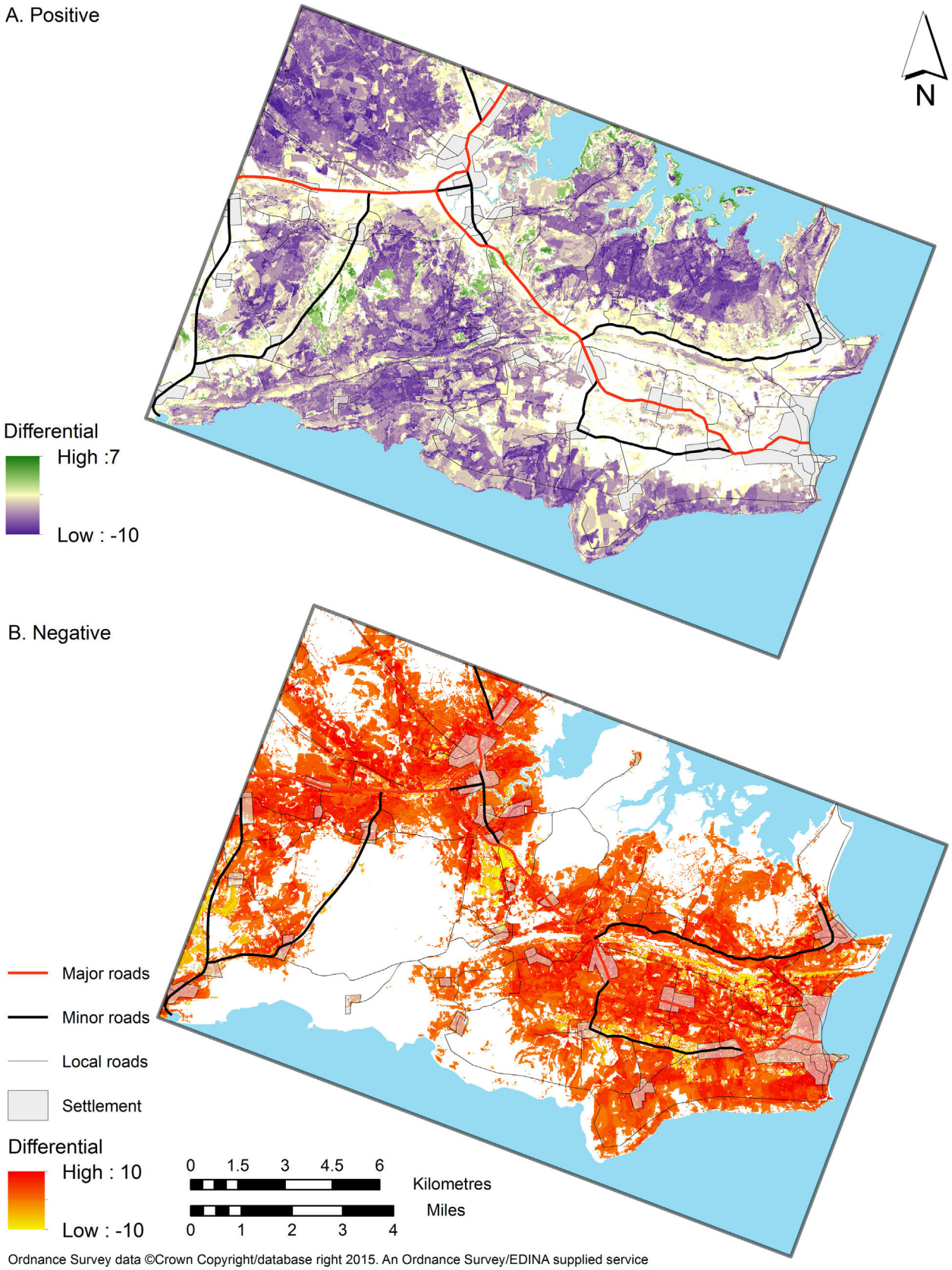

Fig. 11. Results of a GIS comparison of views expressed by institutions and residents at participatory action consultation meetings. The upper image (A) shows differences in views of tranquillity in which numbers on the scale > 0 express increasingly positive views of tranquillity by institutions compared to residents. Numbers < 0 indicate increasingly positive views of tranquillity by residents compared to institutions). The lower image (B) shows differences in views on non- tranquillity amongst institutions and residents in which numbers on the scale > 0 express increasingly non-tranquil views by institutions compared to residents. Numbers <0 indicate increasingly non-tranquil views of tranquillity by residents compared to institutions).

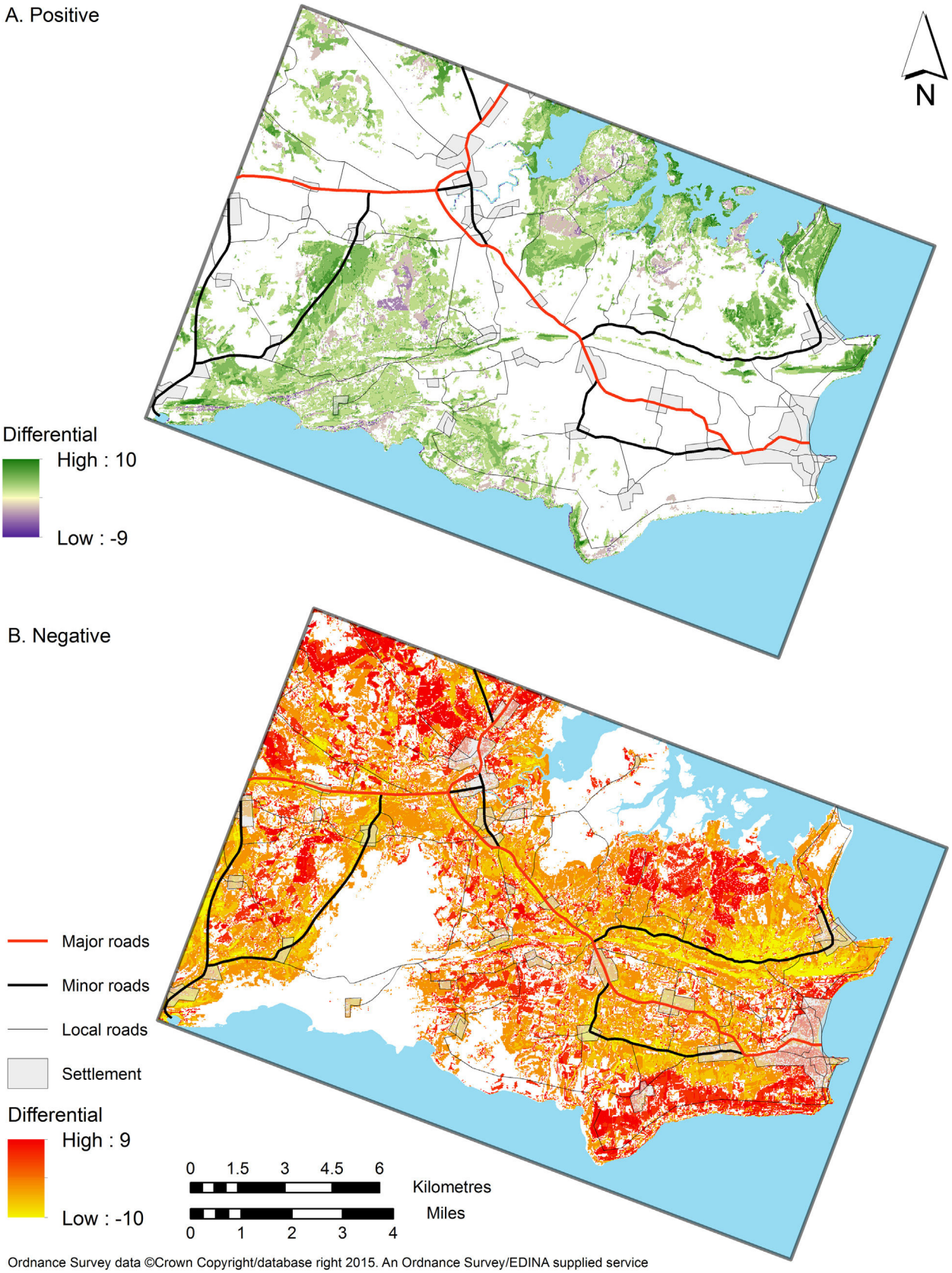

Fig. 12. Results of a GIS comparison of views expressed by householders (postal survey) and visitors (on site survey). The upper image (A) shows differences in positive views of tranquillity in which numbers on the scale > 0 express increasingly positive views of tranquillity by householders compared to visitors. Numbers <0 indicate increasingly positive views of tranquillity by visitors compared to householders. The lower image (B) shows differences in views on non-tranquillity in which numbers on the scale >0 express increasingly non-tranquil views by householders compared to visitors. Numbers <0 indicate increasingly nontranquil views of tranquillity by visitors compared to householders.

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