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South Sandlings Living Landscape Project

Visitor Survey Report

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Summary

This report sets out the results of the on-site visitor survey component of the South Sandlings Living Landscape Project. The work was commissioned by a partnership led by the Suffolk Wildlife Trust and including the Forestry Commission and the Suffolk Coast and Heaths AONB. The study was commissioned to understand current recreational use in the area in order to better manage the sites with consideration to future pressure on features of the Sandlings SPA. Of particular relevance are the cumulative impacts of recreational use arising from potential new housing developments in the Haven Gateway region.

The visitor surveys were conducted during the winter 2009/2010 and again through the spring/summer 2010 to assess the level and type of visitor use at selected locations within Tunstall and Rendlesham Forests. Survey effort differed between the two periods with 17 sites monitored for 16 hours (8 hours on a weekend and 8 hours on a week day) in the winter (with some variation in effort due to weather conditions) and at least 12 hours (6 hours on a weekend and 6 hours on a week day) at eight locations in the summer (seven from the winter survey plus Tangham). In total 3252 people and 1543 dogs were counted over 382 hours of surveys. The average group size was 1.65 in the winter surveys and 2.46 in the spring/summer surveys.

There were differences in visitor numbers between survey locations, 53% of the total visitor counts entering the study area were at just three locations: opposite the Sutton Heath Estate, Sutton Heath car park and Iken. Visitor numbers per day were typically highest on weekend compared to weekdays. Holiday makers accounted for 6% of the total number of visitors recorded in the winter surveys but this rose to 19% in the summer surveys. From the 596 groups interviewed 63% had dogs with them and this increased to 67% when looking at the winter surveys only and decreased to 55% when considering the spring/summer period alone.

Visitors undertook a wide range of activities and across the whole survey period, dog walking was by far the most popular activity (52.8% of people interviewed), followed by walking (22% of interviews). Dog walking and walking levels were similar between the two periods whereas people who said that they were undertaking exercise doubled in the summer, there was tenfold increase in the proportion of responses for 'outings with family/children' compared to the winter, responses for cycling doubled in the summer period and 60% more responses for birdwatching were received in the winter surveys. More people were irregular visitors to the Sandlings in the spring/summer period compared to the winter due to the increase in holiday makers. Seasonality seemed not to be an issue for visitors with 70% stating that they visit the site consistently throughout the year. People stating that they usually visit the Sandlings after 5pm increased by a factor of five in the spring/summer (although winter surveys stopped at 5pm).

Certain locations stood out as popular for certain activities. In the spring/summer Tangham was popular for family outings whilst the highest number of cyclists was encountered on the roaming surveys of Rendlesham Forest. In the winter 60% of responses quoted dog walking whilst this declined to 42% in the summer surveys. Across all sites and activities, visits were typically short, with 80% lasting less than two hours. The main mode of transport used to reach the Sandlings was by car and across all sites (and taking

the data for non-holiday makers only), 80% of interviewees arrived by car. A further 17% arrived on foot mainly from the Sutton Heath Estate.

Home postcodes were used to identify the distance between interviewee's home and the location where interviewed. The median travel distance was greater in the spring/summer period due to increased holiday makers. Some sites attracted visitors from further afield such as Tangham and Iken and others have a very local catchment such as opposite the Sutton Heath Estate entrance. Half of all visitors arriving on foot lived within 0.42km, while half of all visitors arriving by car live more than 8km away. Just over 75% of all dog walkers lived within 10km.

Linear regressions using housing numbers within different distance bands of a location as a predictor of visitor numbers for each location only shows a positive relationship between the number of houses within 5km and number of visitors entering each survey location due to the low population density adjacent to the site. However a high proportion of local residents use the site regularly despite the low population since the most common reason given for visiting the area was closeness to home followed by enjoyment for dogs. The majority of visitors to the Sandlings visit a range of sites within and around the study area with 59% also visiting local coastal and estuary locations.

Route data were also collected for each interview, with hand held GPS units or lines drawn directly on maps during the survey. These route data were analysed to assess differences in route length between activities and sites. Family outings involved the shortest routes whereas cyclists undertook the longest routes which coincided with the longest routes recorded within Rendlesham Forest. Route choice was most heavily influenced by the time available followed by muddy tracks/suitability of tracks.

The visitor data were combined to generate a single GIS layer showing the intensity of visitor use across the area. The layer was built using grid cells of 25x25m and for each cell we predicted the number of visitors per hour through each cell and also the number of visitors (per hour) within 100m of each grid cell. The resulting GIS layer shows that the Rendlesham area (i.e. southern half of the study area) is much more heavily visited than the north and that the visitor use is particularly concentrated at a few locations. In particular Sutton Heath and the area around Tangham were busy compared to other areas.

We used these predictions of visitor intensity to explore the effect of the intensity of recreational use on the spatial distribution of a selection of Annex I birds and silver-studded blues within the study area. Looking across suitable habitat only, there was evidence that the distribution of nightjar and (in particular) Dartford warbler was related to visitor levels.

The implications of the results for site management and management of access within the area are discussed.

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The majority of the visitor survey fieldwork and data entry was conducted by Maureen Gibson and Flavia Moreschini. Maureen and Flavia spent long hours in often very cold weather and interviewed hundreds of visitors over a number of months. Additional data entry and route digitisation was undertaken by Sarah Atkinson. Philip Harvell undertook GIS data analysis and completion of the path network to produce the visitor model. We are grateful to Mary Liley for carrying out additional car transect surveys.

Bird data and other ecological data sets were provided by the Suffolk Biological Records Centre. Ben Heather (SBRC) collated much of the data. The 2010 nightjar data was collated by Neal Armour-chelu (FC).

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1. Introduction

Overview

1.1 The South Suffolk Living Landscape Project sets out to develop a vision for management of 3,000ha of the south Suffolk Sandlings, identifying how a large area of predominantly commercial forestry and heathland habitats at Rendlesham and Tunstall can be managed in the future to provide a recreational resource for increasing numbers of visitors while preserving the sensitive landscapes and biodiversity.

1.2 This report provides results of on-site visitor surveys conducted over the winter 2009/10 and the spring/summer of 2010 across survey locations within and around both Tunstall and Rendlesham Forests. The visitor survey is intended to provide baseline information relating to recreational use and impacts of recreation to the nature conservation interest of the sites. The results form an important part of a wider project which includes the production of a grazing plan, development of a recreation strategy, and a strategic delivery plan for the area.

Study Area

1.3 The study area falls within the jurisdiction of Haven Gateway, a partnership that promotes economic opportunities and the future prosperity of an area centred around the ports of Harwich, Felixstowe, Ipswich and Mistley. The Gateway area has growth point status and the housing allocation for the area over the period 2001-2021 was 65,100[1] homes. This scale of growth sets the need and context for this work.

1.4 The South Suffolk Sandlings provide an extensive tract of semi-natural habitats and commercial forestry with considerable access and recreational opportunities. The area sits within the Suffolk Coasts and Heaths AONB (Map 1) and is an obvious potential destination for a range of recreational activities, likely to draw residents from Essex, Suffolk and further afield, as well as more local residents and holiday makers. The area is also of international importance for wildlife. There is therefore a clear need to ensure that the future recreational use of the area ensures visitors can continue to enjoy the area in a way that enhances and protects the ecological importance of the area.

1.5 The study area essentially covers the block of land between the River Alde / Ore and the Deben (Map 1). The area holds nine different SSSIs, a number of which are internationally important (Table 1). The international designations predominantly relate to the heathland and estuarine habitats and associated species (Map 2). Staverton Park and the Thicks is ancient woodland (Map 2). The heaths support both acid grassland and heather-dominated plant communities with dependent invertebrate and bird communities of conservation value.

[1] Figure taken from Haven Gateway state of the sub-region report – it is the sum from the 6 district council areas. Note since July 2010 Regional Spatial Strategies have been abolished.

Woodlark *Lullula arborea* and Nightjar *Caprimulgus europaeus* occur within both the heaths and also within the large blocks of conifer forest, using areas that have recently been felled and recent plantation, as well as areas managed as open ground. Dartford Warblers *Sylvia undulata* have recently re-colonised the heaths after decades of absence.

1.6 The estuarine sites just clip the study area – the Deben (at Wilford Bridge) and very top part of Butley Creek are within the study boundary. The estuaries hold a variety of habitats including mud-flats, saltmarsh, vegetated shingle (including the second-largest and best-preserved area in Britain at Orfordness), saline lagoons and coastal grazing marsh. They are important for a range of wintering waders and wildfowl, breeding waders and terns. The Staverton SAC is an amazing acidophilous oak wood; its ancient oaks have rich invertebrate and epiphytic lichen assemblages.

Table 1: Key nationally and internationally designated sites within or adjacent to the study area (within 5km). Sites in italics and bold are, at least in part, within the study area.

SSSI	SPA	SAC	Ramsar
Alde-Ore Estuary	***Alde-Ore Estuary***	***Alde-Ore & Butley Estuaries***	***Alde-Ore Estuary***
Blaxhall Heath	***Deben Estuary***	Orfordness-Shingle Street	***Deben Estuary***
Deben Estuary	***Sandlings***	***Staverton Park & The Thicks, Wantisden***	
Gromford Meadow			
Iken Wood			
Sandlings Forest			
Snape Warren			
Staverton Park & The Thicks, Wantisden			
Sutton & Hollesley Heaths			
Tunstall Common			

Recreational use in the study area

1.7 Current recreational use of the Sandlings is varied. The area is used extensively by local residents for dog walking, family walks etc. Dog walkers tend to favour sites such as Sutton Heath, Hollesley Common and also use many of the lay-bys and track entrances. The area draws people from further afield for horse riding, mountain biking, and various organised events such as husky events, motorbike events and orienteering, which are largely centred around the forest estate. Other visitors are drawn to the scenery and natural history, and the area is popular with bird watchers in particular. Many visitors are day visitors, but a considerable proportion are also staying tourists. Previous visitor work includes the Rendlesham Visitor Survey (Balachandran & West 2000) which showed that just over half (57 %) of respondents at Rendlesham were locals (i.e. had travelled less than 15 miles from home that day), 20 % were day-trippers, and 23 % were holiday-makers.

1.8 Within the study area the main visitor facilities are provided by the Forestry Commission at their Rendlesham Centre, where there are playgrounds, a bike park, a campsite and various trails including the UFO trail, which allows people to visit areas connected to a famous UFO sighting in December 1980.

1.9 There are a number of honeypot sites just outside the study area, such as Aldeburgh, Minsmere (RSPB), Orford, Orfordness (National Trust), Snape Maltings, Suffolk Punch Trust, Sutton Hoo (National Trust), and Woodbridge.

Access and wildlife

1.10 Access to the countryside is important to society and has widespread benefits. Access to the countryside has health benefits (e.g. English Nature 2002; Morris 2003; Bird 2004; Pretty et al. 2005) can provide inspiration (e.g. Tansley 1945; Snyder 1990; Hammond 1998; Saunders 2005) and is important in generating understanding and awareness of countryside issues and conservation (e.g. Miller & Hobbs 2002; Thompson 2005; Robinson 2006). Access can also, in some instances, be beneficial in terms of the management of sites. Regular visitors can often become attached to local sites and help management through volunteering, promoting responsible access through word of mouth or reporting incidents such as illegal activity or fires. Recreational access can however also have detrimental effects on the nature conservation interest of sites (for reviews see Goldsmith 1983; Kuss 1986; Hill et al. 1997; Liddle 1997; Saunders et al. 2000; Woodfield & Langston 2004; Underhill-day 2005; Davenport & Davenport 2006; Lowen et al. 2008). On both estuarine and heathland habitats, disturbance to birds is a particular issue. There is a strong evidence-base showing impacts of recreational access on the three Annex I breeding bird species associated with lowland heathland, Nightjar, Woodlark and Dartford warbler. The Sandlings SPA is designated for the presence of Nightjar and Woodlark, and as such recreation impacts to these species may have particular implications.

1.11 European sites are protected through the provisions of the Conservation of Natural Habitats and Species Regulations 2010 (SI no. 490), which transpose the requirements both the Habitats Directive (Council Directive 92/43/EEC) and the Wild Birds Directive (Council Directive 2009/147/EC) into UK law. Article 6(2) of the Habitats Directive relates to SPAs (through the provisions of Article 7) and requires Member States to take appropriate steps to avoid the deterioration of natural habitats and the habitats of species as well as disturbance of the species for which the areas have been designated.

1.12 For nightjars, several recent studies have demonstrated clear links between human disturbance and both density and breeding success (Liley & Clarke 2002a, b, 2003; Murison 2002; Clarke et al. 2006; Langston et al. 2007; Langston et al. 2007; Clarke, Liley, & Sharp 2008). Modelling using data from the last national survey (in 2004) for two southern SPAs suggests that the nightjar population would be 14% higher were there no nearby housing or visitor pressure (Clarke et al. 2008). Studies have shown a general preference by nightjars for areas away from access points and site edges and a trend for nightjar density to decline with increasing visitor pressure, with nightjars appearing to avoid highly disturbed areas within sites (Liley & Clarke 2002b; Langston et al. 2007).

1.13 Across 16 sites in southern England, woodlark population density was found to be significantly lower at sites with higher disturbance levels (Mallord et al. 2006, 2007). This supported

previous findings that density of woodlark territories is significantly reduced on sites with open access compared to those with restricted access (Liley & Clarke 2002a). Mallord's work resulted in a model to predict the consequences for the woodlark population of a range of visitor access levels (Mallord et al. 2006). Under current access arrangements, a doubling of visitor numbers was predicted to reduce population size by 15%.

1.14 It is not just birds for which there are potential conflicts with access. Bare ground and early successional habitats are a very important for a suite of plants, invertebrates and reptiles on heaths(Byfield & Pearman 1996; Lake & Underhill-Day 1999; Moulton & Corbett 1999; Key 2000; Kirby 2001). Localised erosion, the creation of new routes and ground disturbance may all contribute to the maintenance of habitat diversity within sites. However, the level of disturbance required is difficult to define and is likely to vary between sites (Lake, Bullock, & Hartley 2001). There are likely to be optimum levels of use that maintain the bare ground habitats but do not continually disturb the substrate. Unfortunately such levels of use have never been quantified, nor is it known whether sporadic use is likely to be better at maintaining bare ground habitats than low level, continuous use. Heavy use of sandy tracks, particularly by horses or mountain bikes, causes the sand to be loose and continually disturbed, rendering the habitat of low value to many invertebrates (Symes & Day 2003).

Aim of this report

1.15 In this report we set out the results of on-site visitor surveys that involve direct counts of visitors and interviews with samples of visitors at a range of locations within the south Sandlings. Given the conservation importance of the South Suffolk Sandlings and the proximity to the Haven Gateway it is important to understand current visitor levels, what factors underlie the visitor patterns observed and how these may link to housing in the wider area.

1.16 Given that there is potential for an increase in recreation levels it is clearly important for robust baseline work to inform future recreation and conservation management. Visitor data are necessary not only to assess visitor pressure in relation to the distribution of Annex I birds but also to understand visitor patterns and motivations of individuals visiting this large area of heathland and forest to inform a recreational strategy for the area.

1.17 The information gathered from the visitor survey will allow us to identify the locations with the greatest pressures from different types of visitors undertaking a range of activities at different times of day and over the course of a year. We will also be able to determine how far visitors are travelling to visit the south Sandlings, how long they spend and their motivation for the visit. This visitor information will allow us to evaluate how the study area is currently used by local residents and visitors on holiday, providing the information necessary to inform long term management of recreation and to determine how the area functions as a centre for recreation within the wider context of south east Suffolk.

2. Methods

Mapping of access points and other infrastructure

2.1 All formal and informal car parks and foot only access points were mapped using aerial photographs, OS 1:10000 raster data and on the ground checks. Access points were mapped as point data, each point reflecting a potential entry point from a road or similar, with or without parking. The points therefore encompassed gateways, informal lay-bys, track entrances, public rights of way. All points were given a unique reference ID (numbered sequentially from south to north). Each access point was categorised as formal parking (car-parks etc.), informal (lay-bys etc.) or foot access only. Parking capacity was estimated from aerial photographs and then ground-truthed. Other information collected for each point included whether interpretation etc. was present, presence of other facilities and the name of the location (if any).

2.2 A map of the path network for the entire area was generated by digitising paths and tracks, plotted using aerial photographs and the OS 1:10000 raster and based on site knowledge (Map 16). All Public Rights of Way and main Forestry Tracks as well as a large selection of informal paths were mapped

Face to Face visitor work: Winter

2.3 Visitor surveys were conducted at a selection of access point locations between 4th December 2009 and 28th February 2010 (Map 3). The survey points were selected to give a stratified sample according to parking capacity. Eight formal car-parks and seven informal car-parks were selected, chosen by ranking each category according to parking capacity and then by northing, and selecting so as to achieve an even spread from large to small capacity. Only informal car-parks with at least 3 parking spaces were included. An additional two survey locations were subsequently selected, within the centre of the forest blocks (i.e. one within Tunstall Forest and one within Rendlesham). This gave a total of 17 winter survey locations (Map 3). One location (site 14) was later removed due to the presence of travellers and an abandoned car which were thought to potentially influence visitor use. Some additional survey time was carried out at Iken (site 121) where the initial survey coincided with snow over the winter which made the car park relatively inaccessible to visitors. At some survey locations there were directly adjacent access points (for example on the other side of the road), and in these cases the sample size (number of interviews) was boosted by conducting interviews at the adjacent location if there were no visitors at the original location. This occurred at three locations (locations 18 and 21 near to interview location 20, 92 opposite 91 and 54 opposite 55). For the purposes of describing the visitor data these additional interviews have been combined and the sites named 20, 54/55 and 91/92.

2.4 At each survey location standardised counts and interviews were conducted in two-hour sessions, spread over a day (4 sessions, each of 2 hours: 07:30-09:30; 10:00-12:00; 12:30-

14:30; 15:00-17:00), to provide eight hours of survey on each day. Surveys were conducted on one weekday and one weekend day per survey location resulting in 16 survey hours per location (272 hours of counts/interviews in total) (Table 2).

2.5 During each two hour period the surveyor recorded the number of people (and the number of groups) passing them (i.e. entering and leaving if at an access point). Separate totals for people, groups and dogs were recorded for entering and leaving.

2.6 A subset of visitors were interviewed, with the surveyor targeting groups leaving the site and approaching every group (if not already interviewing). Only one person (selected at random) from each group was interviewed.

2.7 The interview was designed to gather information on transport, activities undertaken, frequency of visits, seasonality of visits, other locations used, visitor profile, opinions on management, issues with management/other users and home postcodes of visitors. Route information was gathered from each interview using hand held GPS units (handed out as people started their walk/ride) or paper maps. The paper maps were used when it had not been possible to hand out a GPS unit, and the route was ascertained by the surveyor probing the interviewee about the route taken and prompting as required with a map. The maps used by the interviewee showed the path network surrounding each access point and each surveyor had a range of different scale maps and aerial photographs asking the interviewee about the route walked (see the questionnaire 1 in appendix 1).

Table 2: The number of 2 hour interview sessions undertaken at each interview location in each survey period.

ID	Interview location	Winter surveys					Spring/summer surveys				
		07:30-09:30	10:00-12:00	12:30-14:30	15:00-17:00	Total	07.00-09.00	10.00-12.00	13.00-15.00	17.00-19.00	Total
14	South of Scotland Fens		1	1	1	3					
20	Upper Hollesley Common	2	2	2	2	8					
30	Sutton Heath Car Park	2	2	2	2	8	2	1	1	2	6
31	Opposite Sutton Heath Estate	2	2	2	2	8	1	1	2	2	6
35	Tangham						2	2	2	2	8
41	Runway car park	2	2	2	2	8					
45	Woodbridge Golf Club	2	2	2	2	8					
54/55	Rendlesham (north), on B1084	2	2	2	2	8	2	2	1	1	6
72	Friday Street	2	2	2	2	8					
86	Captains Wood parking	2	2	2	2	8					
91/92	On the B1078, Tunstall Forest	2	2	2	2	8					
102	Tunstall Common	2	2	2	2	8	1	2	2	1	6
111	South of Sandgalls Plantation	2	2	2	2	8					
116	Tunstall Forest (north)	2	2	2	2	8					
121	Iken	3	3	3	4	13	2	1	1	2	6
128	Blaxhall Common	2	2	2	2	8					
R1	Roaming Tunstall Forest	2	2	2	2	8	1	2	2	1	6
R2	Roaming Rendlesham forest	2	2	2	2	8	1	2	2	1	6
	Total	**33**	**34**	**34**	**35**	**136**	**13**	**15**	**14**	**12**	**54**

Face to face visitor work: Spring and Summer

2.9 The winter work was extended to cover the spring and summer between late April and mid August. The visitor fieldwork was conducted at seven of the locations (Map 3) that were covered over the winter. The resource implications were such that it was not possible to resurvey all locations and therefore the seven sites were selected to give both spatial coverage and to also encompass sites where there may be differences in use between the summer and winter. The locations are listed below:

- Iken (121)
- centre of rendlesham forest (1000)
- centre of tunstall forest (500)
- Sutton Heath Estate entrance (31)
- Sutton Heath (main car-park) (30)
- Rendlesham (north), on Orford Road (B1084) (54/55)
- Tunstall Common (102)

2.10 A new location was also added at the Rendlesham at the FC centre / main car park (Tangham, location 35). The reason for the inclusion of this additional location was to enable campers and holiday makers to be interviewed and to gain visitor survey data relating to the function of this location as a gateway.

2.11 The spring/ summer fieldwork therefore involved counts of people and interviews at eight locations, with 12 hours survey work undertaken at each location with the exception of Tangham where two 8 hour survey days (one weekend and one week day) were completed to maximise the number of visitors interviewed. The spring / summer work represents a reduction in survey coverage compared to the winter work (17 locations each with 16 survey hours) but the aim was to maintain a level of recording and ensure a sample of summer visitors. The summer sample therefore enables us to check how the proportion of holiday makers varies and gather information on other sites visited, routes etc from visitors in the summer.

2.12 The temporal coverage was varied between sites in the summer survey, using the following time periods: 0700-0900; 1000-1200; 1300-1500; 1700-1900, with three periods done at each of the seven sites on a weekday and three periods on a weekend day and at Tangham the survey covered all four sessions (Table 2). The precise methodology was the same as described for the winter surveys but slightly different questions were asked at Tangham to find out specific information about the location as a potential gateway (see questionnaire 1 and 2 in appendix 2). Opinions of visitors to Tangham on the future of the site were also gathered through informal conversation.

Visitor postcodes

2.13 The distance between each visitor's home postcode and the access point of the site they visited was analysed to provide an indication of the spatial distribution of visitors. The visitor data consists of the group size of each interviewee reflecting the true number of individuals

represented by the visitor surveys. Each interviewed visitor was asked for the full postcode from which they had travelled. GIS (MapInfo Professional v10.0) was used to geocode (plot) each postcode location so the distance each group of visitors travelled to the access points could be calculated. Postcodes from the interview data were geocoded using a standard Royal Mail postcode database (Postzon™ 100 data).

Driving transects

2.14 Over the winter (December – February), 20 driving transects were undertaken to count all cars parked in all car parking locations to give a study site wide assessment of visitor numbers arriving by car. Driving transects were repeated in the spring/summer (April – August) with 21 further transects completed during this period. Each transect took around three hours to complete. The time of day, day and routes of the transects were varied, ensuring that the coverage of the transects included a range of times of day, weekdays, weekends and holiday periods.

2.15 Dividing this period into winter (December-February) and spring/summer (May-August) we have calculated the average number of cars per hour per vehicle access point. We have described the snapshot car park count as an hourly rate as the modal length of time spent by visitors across the whole survey was 1-2 hours. This figure was then converted into the number of people per vehicle access point by calculating the average group size of visitors travelling by car for each survey period across all access points with interview data.

Automated Counters

2.16 Automated beam counters (Trailmaster active infrared monitors [2]) were placed at nine locations for around a week each (i.e. to provide data on weekends and weekdays) over the period 8th December 2009 to 21st February 2010 (Map 4). These locations were typically relatively quiet foot only access points, often close to housing where it was thought that there may be visitor flows on foot that would be missed from the driving transect. Three counters were placed in the Rendlesham Forest area at Sutton Heath estate entrance, between Capel St Andrew and Tangham and at Hollesley Village. Six counters were placed in Tunstall where it was deemed there were more quiet foot access locations and covered Chillesford Wood, Chillesford Village, Sandgalls Plantation, Sudbourne, Blaxhall Common and Blaxhall Village (Map 4).

[2] Trailmaster TM1050 active infrared trail monitors: http://www.alanaecology.com/acatalog/TM1050.pdf

Predicting visitor numbers for all access points

2.17 The visitor survey, car park counts and automated counter data spread across the site resulted in different data types available for each access point:

Table 3: Data types available across the study area foot and car access points.

Type of access point	Data available					
	No data	Automated counter data only	Questionnaire and tally data only	Automated counter data and questionnaire/tally data	Car park transect count only	Car park transect count and questionnaire/tally data
Foot access only	✓	✓	✓	✓		
Access point with car park					✓	✓

2.18 This combination of data types has been specifically designed to enable the interpretation of visitor rates across all access points using the methodology outlined below. For visitors arriving by foot we used the data from locations with automated counters (Map 4) to generate a regression equation between the hourly visitor rate and the number of residential properties within 400m and 800m. This equation was used to derive predictions of visitor rates at all access points based on the level of housing within 400m and 800m. For visitors arriving by car we have used the data for all access points (car transect counts) which have been scaled up to the number of visitors by using the average group size for visitors arriving by car in each survey period from the interview data. These data together- visitor rates by foot and by car- have been used together to generate a spatial model of visitor use.

Spatial Distribution of People

2.19 The visitor data were used to generate a GIS layer that showed visitor density – i.e. visitor footfall – over the study area. The visitor model is based on a grid (25m x 25m) and for each grid cell we have derived a prediction of a comparable visitor rate (i.e. footfall through the cell).

2.20 The grid was initially drawn to cover the entire study area. Any cells that fell entirely within agricultural land (as defined in a land use dataset provided by the Suffolk Biological Records Centre) were removed. All MOD land, Bentwaters and the area around Sutton Hoo were also removed (the latter because the visitor survey had been focussed on the heaths and forestry and had not included the National Trust car-park and visitor facilities).

2.21 The predictions for each cell were generated by using the predictions of visitor numbers to each access point and the route data generated from the interviews. Within the GIS all cells that touched the path network were identified and a matrix was derived whereby the travel distance (along the path network) for each cell to each access point was recorded (using the Routefinder software add-on for MapInfo). We then used the actual route data to determine, across all surveyed access points, how the number of people declined with distance from the access point. This frequency distribution was

derived by combining all the route data (all activities, all access points across both summer and winter) and extracting the total distance travelled. The value for each route was divided by 2 (i.e. assuming all visitors return to the starting point) and the proportion of visitors reaching distance x (25m intervals) plotted. This frequency distribution was then applied to the predicted total number of visitors for each access point and the matrix showing the distance of each cell to each access point. Where there were multiple cells at a given distance from an access point, the apportioned visitors were split equally between those cells. Values (number of people per hour) were thereby calculated for each cell from each access point and these values totalled for each cell to give the number of people, per hour, for each 25x25m cell.

2.22 The resulting visitor model therefore assigned a value to all cells within the path network. Any cell that was directly adjacent, but not touching the path network was assigned a value of 0 people. People, and particularly their dogs, will of course stray from the path network, and many little paths and desire lines, particularly in wooded areas, were not mapped. Therefore simply assuming all visitor use, and the effect of visitors, is limited to the path network as mapped is unrealistic. We therefore calculated the predicted number of visitors per hour within 100m of each cell. This value was chosen to capture the 'spread' of people and pets away from paths and also as a better measure with which to analyse the distribution of the birds. The bird data in the GIS was provided as point data, i.e. a single point representing a territory. Bird territories will of course actually encompass an area of suitable habitat, and therefore it is necessary to consider in our analysis the area around each point, rather than simply the point itself. Detailed mapping of male nightjar territories in Suffolk has indicated that birds defend a mean area of 8.2ha (Cadbury 1981), which equates to a circle with a radius of 91m. The choice of 100m is therefore reasonable.

Analysis of biological data in relation to visitor data

2.23 Having constructed the visitor models we then analysed the bird and invertebrate species data in relation to habitat data and visitor data. A selection of data was provided by the Suffolk Biological Records Centre for key species within the area. Bird data were taken from the most recent national surveys for nightjar (surveyed in 2004) and from data provided by the Forestry Commission from surveys in 2007, 2008, 2009 and 2010, woodlark (national survey in 2006) plus additional data provided for years between 2007 and 2010 and Dartford warbler (national survey in 2006) with additional data provided for 2009. The data were provided by the Forestry Commission and Suffolk Biological Records Centre as point data with each point representing the approximate centre of each species' territory. Invertebrate data was also provided, with point data showing records of silver-studded blue and ant lion.

2.24 Habitat data were provided by the Forestry Commission and Suffolk Biological Records Centre, with polygon data capturing broad habitat types. In order to explore the distribution of relevant species in relation to access levels it is necessary to control for variations in habitat. Species data was therefore first extracted in relation to habitat, and the relevant habitats determined for each species. Habitat types with the highest densities were then selected and only species records from these habitats used in

subsequent analyses. Initially for each species we simply extracted all cells (within the suitable habitat type) within which the species had been recorded (data from all years) and we compared these to all other cells. In order to explore the effect of access in more detail we then selected data for a single year (selecting the year as the one with the best coverage and most recent). All cells within the grid were categorised according to the level of access, assigning cells to one of four categories, each approximately equal in area. If species distribution was related to access it would be expected that the proportion of the species in each of the four categories would not be evenly distributed, and a decline in density would be apparent from low levels of access to high levels of access.

Data and Analysis

2.25 Data analysis was conducted using Minitab (v14). Unless otherwise stated all errors are standard errors. Box plots are used throughout the report to graphically present data for different groups. These plots show the median (i.e. the mid point – represented by a horizontal line), and the interquartile range (i.e. 25 – 75% of the data – represented by a box), while the vertical lines show the upper and lower limits of the data, with outlying values represented by asterisks. When comparing the number of responses to any question between the two survey periods, counts have been standardised for survey effort by dividing the frequencies by the number of survey hours divided by ten i.e. 272 survey hours in the winter means that counts were multiplied by 2.72.

3. Results: face to face visitor surveys

Visitor numbers at survey locations

3.1 In total 3252 people and 1543 dogs were counted, over 382 hours of surveys, spread over the seventeen locations (with additional single interviews conducted at locations 18 and 21 during quiet periods). The time spent interviewing visitors was split 29% in the spring/summer period (110 hours) and 71% in the winter period (272 hours). The count data is summarised in Table 4, which gives the total numbers of people counted at each survey location entering and leaving the site by the two survey periods (winter and spring/summer).

3.2 The busiest sites accounting for 53% of the total visitor counts entering the study area over the survey period were opposite the Sutton Heath Estate (356 people entering), Sutton Heath car park (311 people entering but the surveyor believes this was an underestimate due to the volume of people making it difficult to count them) and Iken (245 people entering[3]). Similarly, of the 760 dogs counted entering the study area, 46% arrived via Sutton Heath car park (235 dogs, 31%) and opposite the Sutton Heath Estate (127 dogs, 15%). The focal area for cyclists was the Tangham area and within Rendlesham forest on the roaming survey (roaming around routes from the Tangham car park) where 57% of cyclists were recorded. The tally figures for counts of people at Tangham was also an underestimate as the site became so busy at times during the summer survey that a tally could not be kept whilst conducting interviews.

Face to face visitor work summary

3.3 Interviews were conducted over 50 days between 4th December 2009 and 14th August 2010. 596 groups were interviewed (376 in the winter and 220 in the spring/summer period) which included 1301 people and 583 dogs, the equivalent of one dog to every 2.23 people (Table 5). Significantly more holiday makers were interviewed in the spring/summer period (19% on holiday) compared to the winter period (6% on holiday) when accounting for the difference in survey effort between the two periods (χ^2_2= 13.7, p=0.001). Excluding Tangham, where a complete tally of visitors could not be kept, the visitor monitoring interviewed approximately 37% of the total number of visitors to the sampled locations.

3.4 Half of all interviews were carried out at just four sites; Sutton Heath Car Park (100 interviews, 17%), Iken (84 interviews, 14%), opposite the Sutton Heath Estate (66 interviews, 11%) and Tangham (which was only surveyed in the summer; 51 interviews, 8.6%). There was a significant strong correlation between the number of visitors to a location and the number of interviews conducted (Pearson's correlation co-efficient, r= 0.926, P<0.001) which confirms that more interviews were conducted at sites with higher numbers of visitors indicating a good level of monitoring consistency between surveyors and also between sites.

[3] Five additional 2 hour sessions were surveyed at Iken although these were carried out in the place of unrepresentative session when the weather was cold and there were no visitors.

3.5 Over the whole survey only 56 groups refused to be interviewed which is only 8.6% of all groups approached. The highest number of refusals was at Sutton Heath Car Park in the winter survey period where nine groups refused out of 109 groups approached (8.3%).

Table 4: Summary of visitor numbers at interview locations for each category of visitor recording (G=groups, P=people, H=horses, C=cyclists, D=dogs). The site with the highest count in each category and survey period is shown in bold.

ID	Interview location	Winter										Spring/Summer										Total									
		Entering					Leaving					Entering					Leaving					Entering					Leaving				
		G	P	H	C	D	G	P	H	C	D	G	P	H	C	D	G	P	H	C	D	G	P	H	C	D	G	P	H	C	D
14	South of Scotland Fens	3	8			1	4	10			2											3	8			1	4	10			4
20	Upper Hollesley Common	1	9			7	1	8			5											1	9			7	1	8			7
30	Sutton Heath Car Park	**99**	155	**6**		**139**	**115**	169	6		8	**69**	**156**			**96**	**84**	**134**		1	6	**168**	311	6		**235**	**199**	**303**	6	1	**270**
31	Opposite Sutton Heath Estate	79	**264**			76	76	**245**			8	51	92		11	51	40	54		3	6	130	**356**		11	127	116	299		3	125
35	Tangham											46	152	0	**61**	21	19	69	0	24	5	46	152	0	**61**	21	19	69	0	**24**	8
41	Runway car park	45	114	2	9	47	52	126		9	6											45	114	2	9	47	52	126		9	46
45	Woodbridge Golf Club	4	11	2		4	3	11			3											4	11	2		4	3	11			7
54/55	Rendlesham (north), on B1084	29	48			30	29	54			7	24	37		7	18	18	26		7	6	53	85		7	48	47	80		7	50
72	Friday Street	17	63	2	4	48	17	67	3	4	8											17	63	2	4	48	17	67	3	4	48
86	Captains Wood parking	13	18			16	11	19			6											13	18			16	11	19			9
91/92	On the B1078, Tunstall Forest	2	12	1	3	11	2	10	1	2	6											2	12	1	3	11	2	10	1	2	7
102	Tunstall Common	12	21	2		7	8	12	2		5	11	19	4	4	4	9	14	4	3	2	23	40	6	4	11	17	26	6	3	9
111	South of Sandgalls Plantation	17	45		**10**	32	20	65		12	8											17	45		10	32	20	65		12	50
116	Tunstall Forest (north)	25	47		4	27	25	49			7											25	47		4	27	25	49			28
121	Iken	47	146		2	25	49	155			8	37	99			13	40	112			4	84	245		2	38	89	267			51
128	Blaxhall Common	18	38	3		27	17	31			6											18	38	3		27	17	31			24
R1	Roaming Tunstall Forest	22	68	6	17	20	2	4			1	19	26	2	2	14	19	26	2	2	4	41	94	**8**	19	34	21	30	2	2	15
R2	Roaming Rendlesham forest	26	54			19	27	52			7	22	14	**5**	35	7	22	14	**5**	**35**	4	48	68	5	35	26	49	66	5	35	25
	Total	**459**	**1121**	**24**	**49**	**536**	**458**	**1087**	**12**	**27**	**101**	**279**	**595**	**11**	**120**	**224**	**251**	**449**	**11**	**75**	**37**	**738**	**1716**	**35**	**169**	**760**	**709**	**1536**	**23**	**102**	**783**

Table 5: Summary interview data by location with the highest numbers of groups, visitors and dogs for each period shown in bold.

ID	Interview location	Formal parking	Number of parking spaces	Winter			Spring/Summer			Total		
				Number of groups interviewed	Number of visitors (in the groups interviewed)	Number of dogs	Number of groups interviewed	Number of visitors (in the groups interviewed)	Number of dogs	Number of groups interviewed	Number of visitors (in the groups interviewed)	Number of dogs
14	South of Scotland Fens	Informal	4	3	7	5				3	7	5
20	Upper Hollesley Common	Formal	4	10	11	10				10	11	10
30	Sutton Heath Car Park	Formal	20	**55**	86	**74**	45	68	**65**	**100**	154	**139**
31	Opposite Sutton Heath Estate	Informal	2	34	50	52	32	48	34	66	98	86
35	Tangham	Formal	100				**51**	**259**	25	51	**259**	25
41	Runway car park	Formal	25	36	79	36				36	79	36
45	Woodbridge Golf Club	Informal	11	6	8	6				6	8	6
54/55	Rendlesham (north), on B1084	Informal	3	26	52	29	21	39	22	47	91	51
72	Friday Street	Formal	5	32	47	32				32	47	32
86	Captains Wood parking	Formal	4	12	17	9				12	17	9
91/92	On the B1078, Tunstall Forest	Informal	7	8	10	9				8	10	9
102	Tunstall Common	Informal	6	8	15	4	8	18	4	16	33	8
111	South of Sandgalls Plantation	Formal	10	23	53	40				23	53	40
116	Tunstall Forest (north)	Informal	4	17	39	20				17	39	20
121	Iken	Formal	90	50	**130**	19	34	93	19	84	223	38
128	Blaxhall Common	Formal	4	18	40	26				18	40	26
R1	Roaming Tunstall Forest	N/A	N/A	22	42	15	15	21	12	37	63	27
R2	Roaming Rendlesham forest	N/A	N/A	16	36	9	14	33	7	30	69	16
	Total		**302**	**376**	**722**	**395**	**220**	**579**	**188**	**596**	**1301**	**583**

Group size

3.6 The size of the groups interviewed was significantly different between the winter and spring/summer period (Kruskal Wallis; H=7.79, 1df, P<0.01). Although the median group size in both periods was two, group sizes were generally larger in the spring/summer period. However, excluding the data from Tangham, there is no significant difference between the group sizes during the two survey periods. This is because the extra surveys at Tangham during August picked up a high proportion of families and larger groups and the median group size was 4 (Table 6).

Table 6: Median group size by survey location and survey period.

Survey location	Winter survey					Spring/summer survey				
	25%	Median	75%	Minimum	Maximum	25%	Median	75%	Minimum	Maximum
14	2	2	3	2	3					
20	1	1	1	1	2					
30	1	1	2	1	3	1	1	2	1	5
31	1	1	2	1	3	1	1	2	1	4
35						2	4	6	1	29
41	2	2	3	1	4					
45	1	1	2	1	2					
54/55	1	2	3	1	4	1	2	2	1	5
72	1	1	2	1	3					
86	1	1	1.75	1	4					
91/92	1	1	1.75	1	2					
102	1	1.5	2	1	5	1.25	2	2.75	1	5
111	1	2	2	1	8					
116	1	2	3	1	5					
121	2	2	3	1	13	2	2	4	1	7
128	1	2	3	1	6					
R1	1	2	2	1	6	1	1	2	1	3
R2	1.25	2	2	1	9	1.75	2	3.25	1	5

3.7 The highest group sizes were recorded at Tangham in the summer with 29 people in a large family party camping at Tangham and the next largest was a walking group with 20 in the party (Figure 1). The most frequently encountered group size was two people accounting for 40% of the groups. This was closely followed by individual visitors which formed 39% of the groups interviewed. The two survey locations at Sutton Heath (30 and 31) had the highest number of single visitors which made up 57% of all visitors to these two locations.

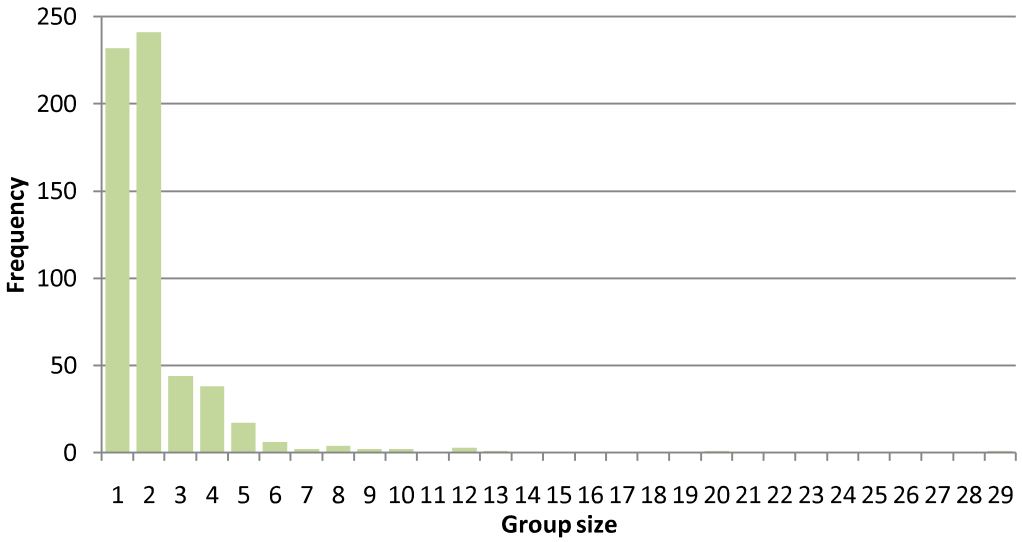

Figure 1: Frequency distribution of group sizes across the whole survey.

Dogs

3.8 The monitoring revealed the importance of the Suffolk Sandlings as a place for visitors to take and exercise their dogs. From the 596 groups interviewed 63% had dogs with them and this increased to 67% when looking at the winter surveys only and decreased to 55% when considering the spring/summer period alone. Of those groups with dogs, the average number of dogs was 1.56 and the number of dogs distributed across all the groups interviewed equates to 0.98 dogs per group. Across the whole survey period 76% of groups with dogs were seen with their dogs off the lead, this rose to 77% in the winter and fell to 74% in the spring/summer period.

Temporal variation in visitor patterns

3.9 The frequency with which people visited the Sandlings differed significantly between survey periods when standardised for survey effort (χ^2_6= 14.7, p=0.023). Across the whole survey period most people visited the interview sites often with 64.4% of people visiting at least once a week and of these 34.9% visited the sites daily (Table 7). A far higher proportion of people were irregular visitors to the site in the spring/summer period due to the increase in holiday makers. Many visitors to Tangham in the spring/summer period commented that they had either not been to the Sandlings before or had not visited for many years and thought they would see what it was like.

Table 7: The percentage of people that visit survey locations with different frequencies by survey period.

Frequency of visit	Winter	Spring/Summer	Whole period
Daily	36.7	31.8	34.9
Weekly	33.0	23.6	29.5
Monthly	10.9	10.0	10.6
Less than once per month	13.6	16.8	14.8
Less than once per year	0.3	6.8	2.7
Don't know/first time	4.8	9.1	6.4
No answer given	0.8	1.8	1.2

3.10 Visitors were questioned as to whether they preferred to visit an area at a certain time of day and were given the choice of six categories where multiple answers were acceptable. Each visitor responded with an average of 1.1 categories providing 661 responses from 596 questionnaires.

3.11 There was a significant difference between the two survey periods in the time of day that people visit the interview locations, when standardised for survey effort (χ^2_5= 29.561, p<0.001). The highest percentage of responses fell into the category 'No particular time/don't know/first time' (Table 8). Looking at the other categories (before 9am through to after 5pm), there was no obvious preferred time to visit sites throughout the day (Table 8). Although combining the categories before 3pm, over half of all responses from winter visitors fell into these categories whereas less than a third of responses from summer visitors were for visits before 3pm. Additionally, nearly five times as many responses fell into the 'after 5pm' category in the spring/summer period due to the lighter evenings.

Table 8: The percentage of responses given for each category of visit rate by survey period and for the two periods together.

Time of visit	Winter	Spring/Summer	Whole period
Before 9am	14.5	14.2	14.4
9am-12pm	21.1	7.5	15.9
12pm-3pm	14.7	8.3	12.3
3pm-5pm	7.6	5.5	6.8
After 5pm	2.0	10.6	5.3
No/don't know/first visit	40.0	53.9	45.4

3.12 Survey effort across the study area was split equally between weekdays and weekends. Therefore if visitor usage was consistent the same number of people would expect to be recorded on weekdays as on weekends. Of the 596 groups interviewed across the region 351 were interviewed over the weekend (58.9%) and 245 during the weekdays (41.1%). For those sites where full interviews were conducted at both the weekend and during the week (i.e. all excluding site number 14 which was abandoned), there was significantly more visitors at weekends in comparison to week days (χ^2_1= 5.39, p=0.02). There were only three locations where more interviews were conducted on a week day compared to a weekend and these were Iken and 91/ 92, on the road through Tunstall Forest although the differences in interview numbers were all less than 3. Counts of the total number of visitors observed entering a survey location also reflect the same pattern with 921 (53.7%) people recorded over the weekend and 795 (46.3%) over the week day. Overall the week day to weekend ratio for the total number of visitors entering is very similar to the week day to weekend ratio noted in other visitor surveys (Clarke et al. 2006; Liley, Jackson, & Underhill-Day 2006).

3.13 Analysis of the tally counts of visitors entering each site revealed that 55.6% of the total number of visitors at interview location 20 (Upper Hollesley Common) were recorded during the week. Furthermore at Sutton Heath, 58.8% of people entering at the car park and 78.9% arriving opposite the Sutton Heath Estate entrance were counted during the

week. Excluding these three sites, plus 91/92 where very few people were seen (less than 100) or interviewed, more visitors were counted at weekends than during the week days.

3.14 Visitors were also asked whether seasonality influenced how frequently they visit the sites. Again the interviewees were able to select multiple answers and a total of 631 responses were noted from the 596 interviews. The visitors interviewed do not appear to be heavily influenced by seasonality with 69.4% of the responses stating they visit the site consistently through the year. There was no significant difference between the time of year that winter visitors said they came to the sites compared to visitors interviewed in the summer. However, the highest single category selected was a preference to visit in the summer by visitors interviewed in the spring/summer which accounted for 23% of the responses – most likely from holiday makers particularly at Tangham where 45% of responses were in the summer visit category.

Activities

3.15 Visitors were also asked about the main activity or activities undertaken during the visit (note that users can undertake more than one activity, for example jogging and exercising the dog). From 596 interviews, 695 activity responses were categorised (by the surveyor). Across the whole survey period, dog walking was by far the most popular activity (52.8% of people interviewed), followed by walking (22% of interviews). Frequencies of responses for different activity categories were significantly different between the two survey periods when standardised for sampling effort (χ^2_6=30.44, p<0.001). The frequencies of responses for dog walking and walking were similar between the two periods whereas people who said that they were undertaking exercise doubled in the summer, there was tenfold increase in the proportion of responses for 'outings with family/children' compared to the winter, responses for cycling doubled in the summer period and 60% more responses for birdwatching were received in the winter surveys (Table 9 and Map 5).

Activities carried out by winter visitors

3.16 Activities undertaken by visitors in the winter are displayed in Table 9 and Map 5. Dog walkers and walkers constituted 83.4% of all responses in the winter and dog walking was the only activity which was recorded at all sites (Table 9). Of the interviewed groups that were visiting from home in the local area, 70.2% had dogs with them. Of the 59.7% of people dog walking in the winter survey, 82% were local residents that visited the sites either daily or weekly compared to 37% of walkers. Over 30% of groups undertaking dog walking were interviewed at the two Sutton Heath locations (30 and 31). Similarly 32% of responses from visitors who stated walking as a main activity were interviewed at Iken. Birdwatching was also most popular at Iken with 60% of birdwatchers interviewed at this location (Map 5). Cycling intensity was distributed across ten interview locations in the winter with the greatest number recorded at Sandgalls picnic site (22%). Proportions of responses for different activities can be seen in Map 5.

Table 9: Range of activities undertaken at each site from interview responses of visitors during the winter survey. Visitors were able to select more than one activity.

ID	Interview locations	Dog walking	Walking	Exercise	Family/ children	Cycling	Birdwatching	Other
14	South of Scotland Fens	2	1		1			
20	Upper Hollesley Common	9	2					
30	Sutton Heath Car Park	47	9	1	2			1
31	Opposite Sutton Heath Estate	30	1	2		1		1
41	Runway car park	21	11	2		4		
45	Woodbridge Golf Club	4	2					
54/55	Rendlesham (north), on B1084	20	5	1	1	3	2	1
72	Friday Street	25	6	1		1		
86	Captains Wood parking	7	5				2	1
91/92	On the B1078, Tunstall Forest	6				1		1
102	Tunstall Common	4	2	1	1	2		1
111	South of Sandgalls Plantation	16	3	1		5		
116	Tunstall Forest (north)	12	3			2		
121	Iken	16	32				9	5
128	Blaxhall Common	13	4				1	2
R1	Roaming Tunstall Forest	10	7	1		2	1	1
R2	Roaming Rendlesham Forest	7	6	1		2		1
	Total	**249**	**99**	**11**	**5**	**23**	**15**	**15**
	Percentage of responses	**59.7**	**23.7**	**2.6**	**1.2**	**5.5**	**3.6**	**3.6**

Activities carried out by spring/summer visitors

3.17 Activities undertaken by visitors in the winter are displayed in Table 10 and Map 6. The percentage of responses for dog walking in the spring/summer surveys declined to 42.4%. Of the groups who said they were out walking dogs, 77% were local (i.e. visiting from home) and visited daily or weekly. Over 60% of responses for 'an outing with family or children' were recorded at Tangham (Map 6; Table 10). This highlights Tangham as an attraction for families with children as opposed to location 102 in Tunstall Forest, the roaming interviews in Tunstall and also at Sutton Heath where no groups listed their main activity as a family outing in the summer survey. Rendlesham forest came out as a hotspot for cyclists in the spring/summer survey with 77% of responses for this activity recorded at Tangham and the roaming interviews in the adjacent forestry paths. Some cycling occurred in Tunstall forest but here dog walking and walking were equally popular (Map 6).

3.18 Overall there is a clear trend for dog walking to be the most popular activity as in the winter surveys but a higher proportion of sites have a greater diversity of activities compared to the winter survey. Dog walking is still the main activity in the Rendlesham Forest area around Sutton Heath and location 54/55 at the top of the Forest (Map 6).

Table 10: Range of activities undertaken at each site from interview responses of visitors during the spring/summer survey. Visitors were able to select more than one activity.

ID	Interview locations	Dog walking	Walking	Exercise	Family/ children	Cycling	Birdwatching	Other
30	Sutton Heath Car Park	41	4	1				
31	Opposite Sutton Heath Estate	22	3	6	3	1		
35	Tangham	15	14	1	20	11		17
54/55	Rendlesham (north), on	14	4	1	1	2	1	2
102	Tunstall Common	3	4	1		1		
121	Iken	10	20	2	4		5	8
R1	Roaming Tunstall Forest	9	3	1		2		1
R2	Roaming Rendlesham Forest	4	2		4	9		1
	Total	**118**	**54**	**13**	**32**	**26**	**6**	**29**
	Percentage	**42.4**	**19.4**	**4.7**	**11.5**	**9.4**	**2.2**	**10.4**

Time spent at the interview location

3.19 Visitors were asked how long they spent / will they spend in the area during their visit and across the whole survey 44% responded between 1 and 2 hours and 36.2% spent less than an hour. Of the remaining responses 11.4% spent between 2 and 3 hours and 8.4% spent more than 3 hours on site. There is a significant difference between the two survey periods (standardised by survey effort) in terms of the time spent whilst visiting the Sandlings (χ^2_3=18.053, p<0.001). Specifically only 11% of all winter visits lasted more than 2 hours whereas twice as many groups (22%) spent more than 2 hours in the spring/summer period (Table 11).

3.20 The amount of time spent on the site varied according to the activity undertaken (Table 11). Few dog walks appear to last more than two hours with only 4% exceeding 2 hours in the winter and 9% in the spring/summer. Activities such as cycling and time spent with the family/children showed a more even range of visit lengths, for example 54% of cyclists and 48% of family groups spent more than 2 hours on site in the spring/summer period (Table 11).

Table 11: Numbers (%) of groups and the amount of time spent on site by survey period. Figures in bold highlight the time period with the highest number of groups for each activity.

	Winter (time spent)					Spring/summer (time spent)				
Activity	less than 1 hour	1-2 hours	2-3 hours	more than 3 hours	Total	less than 1 hour	1-2 hours	2-3 hours	more than 3 hours	Total
Birdwatching	**2 (50)**		1 (25)	1 (25)	4		1 (100)			1
Cycling	2 (9)	**14 (67)**	4 (19)	1 (5)	21	1 (7)	**6 (40)**	4 (27)	4 (27)	15
Dog walking	**125 (50)**	114 (46)	6 (2)	4 (2)	249	**65 (55)**	43 (36)	8 (7)	2 (2)	118
Exercise	4 (44)	**5 (56)**			9	**6 (67)**	2 (22)	1 (11)		9
Family/Children	1 (100)				1	3 (14)	**8 (38)**	6 (29)	4 (19)	21
Horse Riding	1 (25)	**3 (75)**			4	1 (50)	1 (50)			2
Walking	10 (12)	**50 (58)**	19 (22)	7 (8)	86	15 (30)	**17 (34)**	6 (12)	12 (24)	50
Other	1 (50)	1 (50)			2			1 (33)	**2 (67)**	3
Total (% by period)	**146 (39)**	**187 (50)**	**30 (8)**	**13 (3)**		**91 (42)**	**78 (36)**	**26 (12)**	**24 (10)**	

3.21 There were three interview locations out of 17 in the winter where all visits were less than 2 hours (excluding locations where individual interviews took place in quiet periods). These locations were Upper Hollesley Common, near Woodbridge Golf Club and at location 91/92 on the road through Tunstall Forest. At Sutton Heath in the winter, 96% of visitors interviewed at the car park and 97% of visitors interviewed opposite the estate entrance stayed for less than 2 hours. In the spring/summer survey

period only visitors to Sutton Heath via the estate entrance stayed no longer than two hours, further exemplifying the use of this site by regular dog walkers on short visits.

3.22 In the summer the surveys picked up locations that were used for more substantial recreational activities i.e. a family day out or cycling. At Tangham 38% of people stayed longer than 2 hours, 41% at Iken and the roaming surveys in Rendlesham Forest picked up 43% of people spending longer in the area.

Mode of transport used by visitors

3.23 Looking at visitors arriving by bicycle, car and foot only across the two survey periods, there is no significant difference between the types of transport used when counts are standardised for survey effort. Therefore we have considered both survey periods together in further analysis on transport to the study area. In total 79% of visitors arrived by car. Across the whole survey period, 80% of visitors coming from home and 73% of visitors on holiday arrived by car and a consistent level of around 17% of visitors arrived on foot irrespective of whether they were on holiday or visiting from home. The high percentage of local visitors arriving by car is most likely due to the low level of housing within walking distance of the busiest areas in the Sandlings. A further 2% arrived by bicycle and 1% arrived by horse.

3.24 High percentages of visitors (groups) arriving by foot (i.e. sites used by local residents) were recorded at Sutton Heath Estate entrance (97%) and Captains Wood parking (67%) (Table 12). Considering sites for which full surveys were completed, there were five locations out of 17 where all groups arrived by car and a further three locations where more than 90% of groups arrived by car. Across the whole survey of the Sandlings 81% of visitors walking dogs arrived at the site by car and 19% by foot

Table 12: The mode of transport used by visitors to each interview location. Percentages expressed as the total number of groups visiting a site from the interview data.

ID	Interview location	Sample size	Mode of transport				
			Bicycle	Car	Foot	Horse	Other
14	South of Scotland Fens	3	0	100	0	0	0
20	Upper Hollesley Common	10	0	100	0	0	0
30	Sutton Heath Car Park	100	0	100	0	0	0
31	Opposite Sutton Heath Estate	66	3	0	97	0	0
35	Tangham	51	0	70.6	21.6	0	7.8
41	Runway car park	36	0	100	0	0	0
45	Woodbridge Golf Club	6	0	100	0	0	0
54/55	Rendlesham (north), on B1084	47	4.3	91.5	4.3	0	0
72	Friday Street	32	0	87.5	12.5	0	0
86	Captains Wood parking	12	0	33.3	66.7	0	0
91/92	On the B1078, Tunstall Forest	8	12.5	75	0	12.5	0
102	Tunstall Common	16	0	87.5	12.5	4	0
111	South of Sandgalls Plantation	23	0	100	0	0	0
116	Tunstall Forest (north)	17	5.9	94.1	0	0	0
121	Iken	84	0	92.9	7.14	0	0
128	Blaxhall Common	18	0	83.3	11.1	5.6	0
R1	Roaming Tunstall Forest	37	8.1	81.1	5.4	5.4	0
R2	Roaming Rendlesham forest	30	13.3	73.3	10	3.3	0
	Total (%)		**13 (2.2)**	**470 (78.9)**	**104 (17.5)**	**5 (0.8)**	**4 (0.7)**

Distances travelled to access points

3.25 From the 596 groups interviewed only 24 (4%) either were not willing or provided incomplete/invalid postcode information. Of these 24, one was an overseas visitor, 18 provided postcodes that could not be geocoded and 4 provided no postcode or just the first part of their postcode. Overall the visitor monitoring captured the home postcode location of 572 interviewees (96%).

3.26 Map 7 shows the home postcode locations of all interviewed groups. Visitors have travelled from Devon, Merseyside, East Sussex and Durham, but the majority of visitors come from Suffolk, Norfolk and Essex with a number from Greater London and also a distinct line of postcodes following the M1 corridor.

3.27 The median straight line distance travelled by the groups interviewed differed significantly between the two survey periods (Kruskal Wallis; $H=4.45$, 1df, $P<0.05$), with the winter median distance at 6.71km and the spring/summer median being 8.18km. The difference in

travel distances between the two periods can be seen from Map 7 where a greater proportion of summer visitors come from the West Country, Midlands, Yorkshire and the M1 corridor.

3.28 As well as considering the distance and transport methods between the home postcode and the Sandlings, the visitor patterns should also be considered on a site by site basis (Table 13 and Figure 2) as the distribution of visitors across the sampled sites was not even (Table 4).

Table 13: Median travel distances from interview locations to home postcodes of visitors interviewed in each period (based on 572 geocoded postcodes).

Interview location	Interview location	Median travel distance (km)	
		Winter	Spring/Summer
14	South of Scotland Fens	3.03	
20	Upper Hollesley Common	3.65	
30	Sutton Heath Car Park	4.55	4.68
31	Opposite Sutton Heath Estate	0.39	0.4
35	Tangham		16.75
41	Runway car park	14.06	
45	Woodbridge Golf Club	2.99	
54/55	Rendlesham (north), on B1084	10.08	8.52
72	Friday Street	1.61	
86	Captains Wood parking	0.61	
91/92	On the B1078, Tunstall Forest	4.88	
102	Tunstall Common	11.27	19.54
111	South of Sandgalls Plantation	7.62	
116	Tunstall Forest (north)	8.08	
121	Iken	24.28	18
128	Blaxhall Common	6.71	
R1	Roaming Tunstall Forest	8.08	5.86
R2	Roaming Rendlesham forest	12.51	17.36

3.29 The facilities at Tangham (site 35) and the surrounding attractions at Iken (site 121) mean that visitors to these sites will travel from a much wider catchment area (Figure 2). Furthermore interviews at Tangham were only conducted in the summer therefore a higher proportion of holiday makers were encountered. The large ranges observed in the distances travelled at Iken and Tangham indicates that they are used by both local residents and visitors from further afield. The smallest median distance travelled was at Site 31 (opposite the Sutton Heath Estate entrance) where all groups interviewed lived in the Sutton Heath Estate.

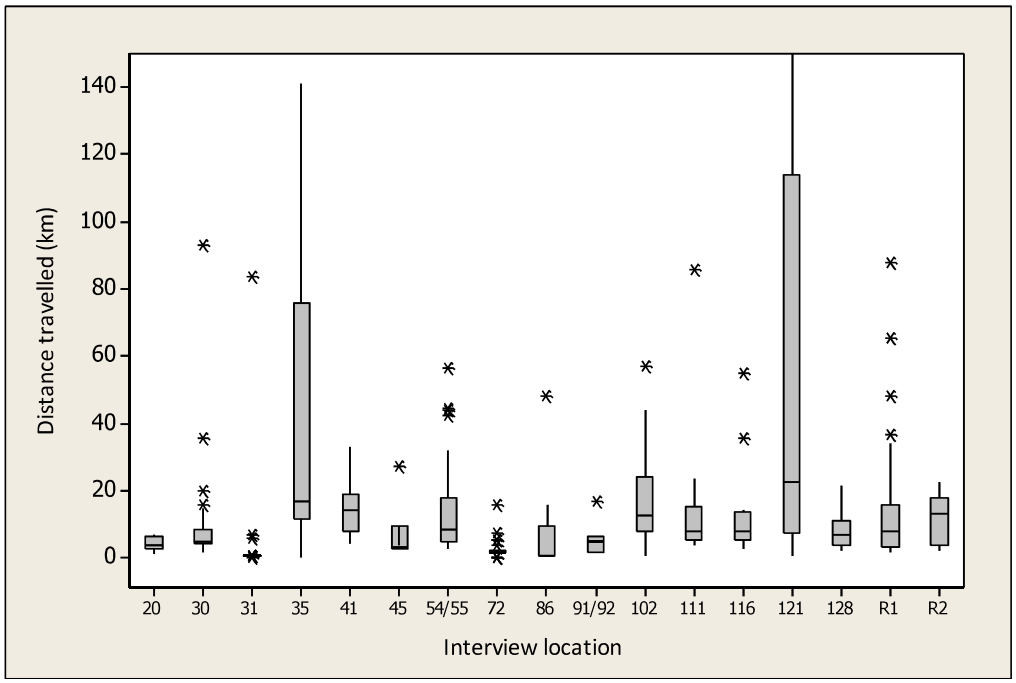

Figure 2: Distance of the visitors' home postcode to each interview location for all sampled sites (truncated at 150km).

3.30 The home postcode of visitors not on holiday is illustrated in Map 8 and shows the localised use of the Sandlings. This is further demonstrated in Map 9 showing the immediate local area around the Sandlings and the home postcodes of visitors coming from Leiston, Saxmundham, Wickham Market, Rendlesham, Woodbridge, Martlesham and the eastern side of Ipswich. The median travel distance for visitors who were not on holiday was 6.17km from the area they visited.

3.31 Visitors also appeared to travel various distances to undertake different activities (Map 10). Just over three quarters of the 356 visitors that listed dog walking as an activity lived within a distance of 10km and half lived within 5km. In contrast, visitors who listed walking as an activity were much more likely to travel greater distances and only 35% lived within 10km.

3.32 From Table 14 and Figure 3 we can infer that visitors out walking, wildlife and birdwatching, taking an outing with children/family, taking exercise and cycling generally travel further to undertake these activities than dog walkers.

Table 14: Distance from the visitor's home postcode to site by the activity undertaken by the visitor at the interview site from all interview responses split by winter and spring/summer survey periods.

	Winter		Spring/summer	
Activity	**Median distance (km)**	**Number of responses**	**Median distance (km)**	**Number of responses**
Dog walking	4.9	239	4.7	117
Walking	13.5	93	19.54	53
Exercise	8	8	8.28	11
Family children	10.6	5	16.75	31
Cycling	12.1	22	18.19	24
Birdwatching	21.1	14	38.21	7

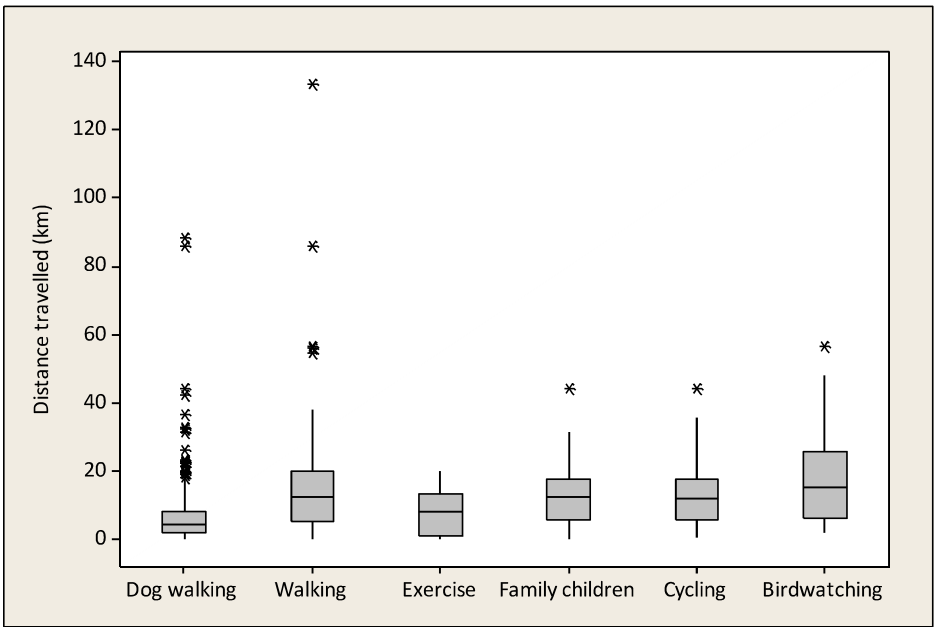

Figure 3: The distance between interview location and the visitors' home postcode for activities undertaken during a visit.

Transport mode and distance to site

3.33 The methods of transport used to travel to the interview location and the distance of the visitors' home postcode was investigated for local visitors.

3.34 Figure 4 shows the distance between the visitor's home postcode and the interview location by the mode of transport. Half of all visitors arriving on foot lived within 0.42km, while half of all visitors arriving by car live more than 8km away (Table 15; Figure 5).

Table 15: Distance (km) from the home postcodes of visitors excluding those on holiday according to the mode of transport used to travel.

Transport	Number of respondents (not on holiday)	25%	Median (50%)	75%	Minimum	Maximum
Bicycle	10	2.57	3.19	7.68	0.47	16.10
Car	403	4.41	7.53	14.30	1.04	88.05
Foot	83	0.34	0.42	0.50	0.11	17.94
Horse	5	2.59	4.96	12.12	1.51	16.50

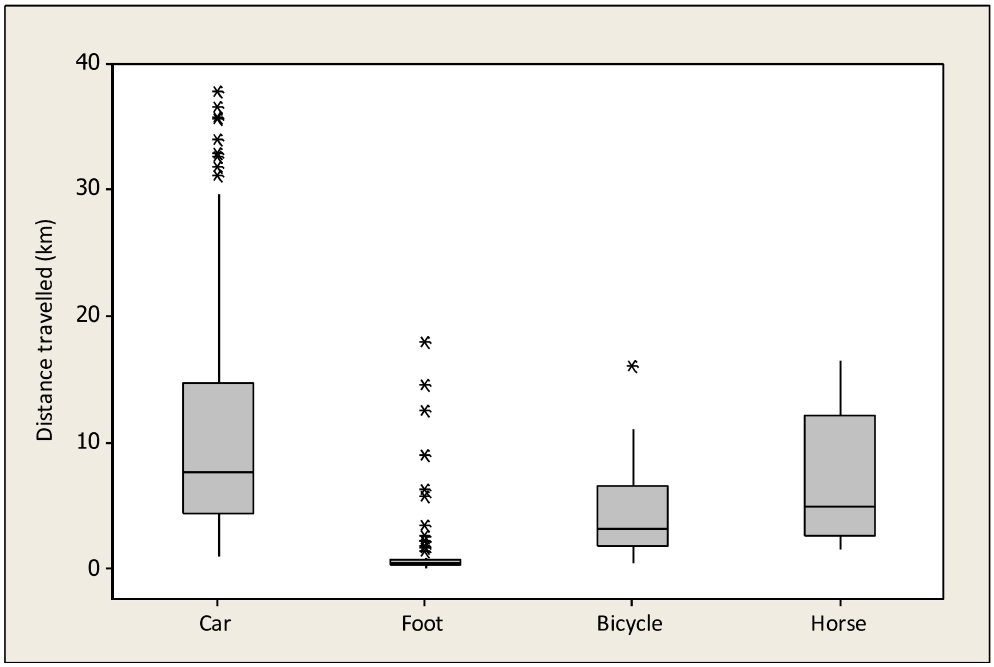

Figure 4: The distance and method of transport used to travel from the home postcode of the interviewed visitor to the access point of the interview location. The figure excludes data from interviewed visitors who were on holiday in the area so represents the movements of local residents only. The figure was truncated at 40 km to easily identify the median differences between the transportation categories.

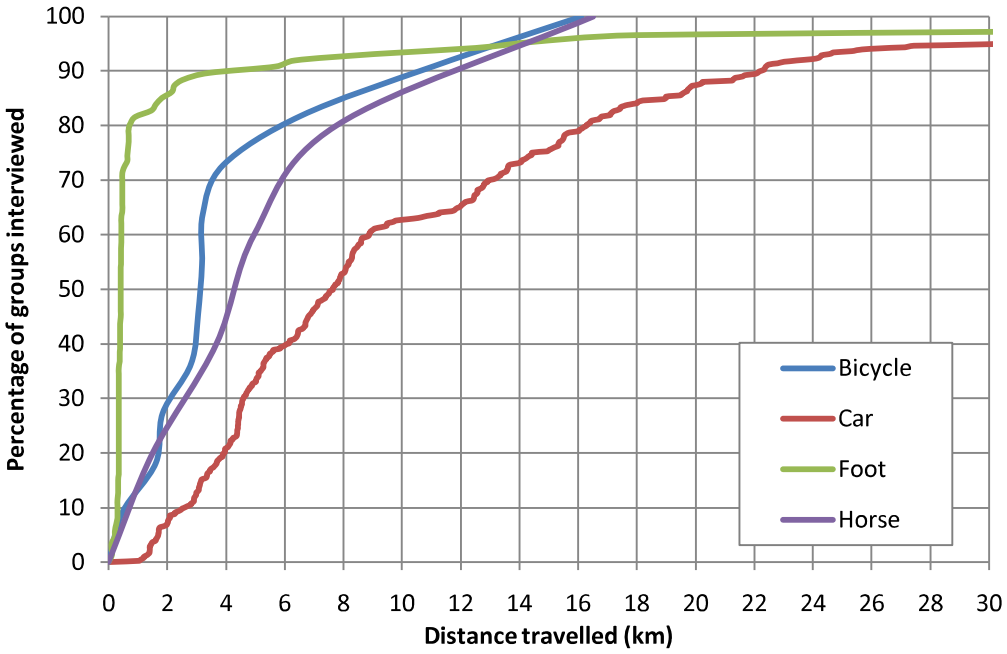

Figure 5: Cumulative frequency distribution of the linear distance from the interviewed visitors' home postcode to the interview location by mode of transport. The figure was truncated at 30km. (Curves show percentage of visitors travelling this distance or less).

Activities undertaken by day visitors travelling from south of Woodbridge

3.35 It is expected that future housing will be centred around existing large settlements such as Ipswich and Felixstowe. It is therefore interesting to look at the activities undertaken by day visitors travelling from the area south of Woodbridge (Map 10). From the 94 groups interviewed that live south of Woodbridge and travelled to the Sandlings for a day trip, 43% were walking their dogs and a further 36% were walking. The most popular form of transport from south of Woodbridge was by car (95% of respondents). The median group size from this selection of day trippers was two, whilst the median time spent at the Sandlings was 1-2 hours with 85% of dog walkers staying less than 2 hours.

Relationship between housing density and visitor numbers

3.36 To investigate possible relationships between housing levels and visitation rates, the number of visitors who lived within different buffer zones around all the surveyed sites was identified using postcode data from the questionnaires (Figure 6). The actual number of houses was extracted for the same distance bands.

3.37 Overall visitors to the Sandlings are very local with 85% of all geocoded postcodes falling within 20km radius of the survey locations. The highest number of visitor postcodes fell within the first 500m buffer around the survey locations. Housing density is relatively low within the study area except for the Sutton Heath Estate which is home to 80% of the visitors interviewed that lived within 500m of the Sandlings. Indeed there were eighteen visitors from one single postcode on the estate and a further nine from another individual postcode. There are relatively few visitors from the next distance band (500-1000m) but

beyond this the numbers increase steadily to another peak at 2km which can be accounted for by visitors from the north east of Rendlesham, Melton and the eastern edge of Woodbridge. Numbers stay relatively high spanning these settlements and then they fall until there is a much smaller peak at around 7km covering visitors from Saxmundham and Martlesham. Numbers begin to tail off again until around 12.5km when numbers increase due to visitors travelling from the eastern side of Ipswich, Framlingham and Felixstowe.

3.38 The number of residential dwellings adjacent to the sampled sites is relatively low but tracks the same pattern as the visitor data whereby there are peaks at Woodbridge, Ipswich and then unlike the visitor data, there is a significant level of housing further out at Colchester and Lowestoft (Figure 6). This figure further demonstrates the local 'pull' of the Sandlings whereby a high proportion of visitors living around the study area actually use the sites even though the housing level is quite low (Figure 7).

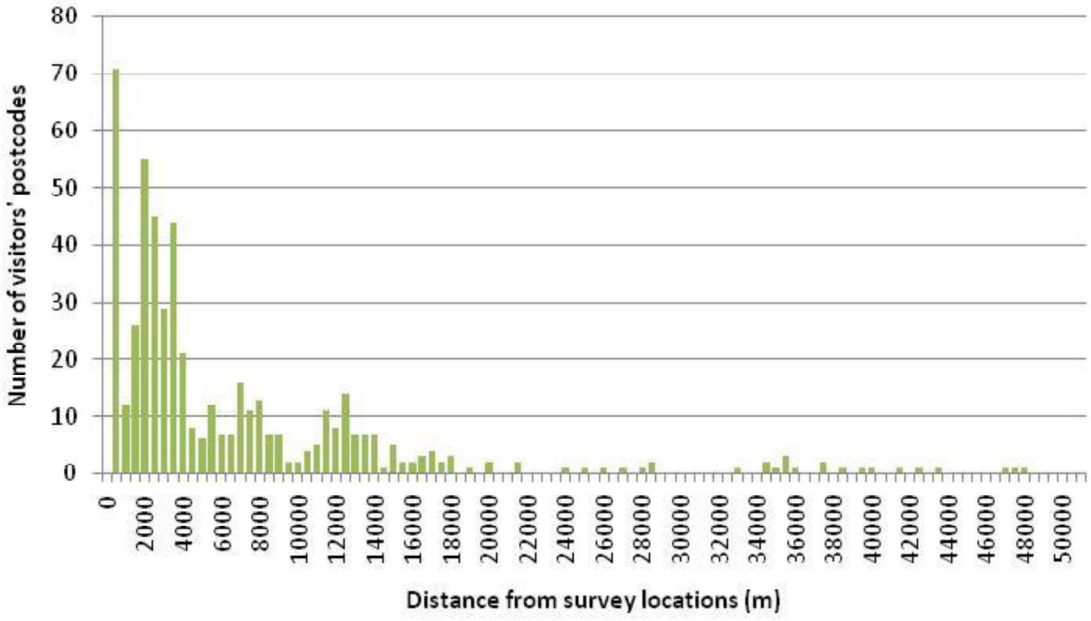

Figure 6: The number of visitors recorded at the interview locations categorised by the distance from their home postcode to the site they visited.

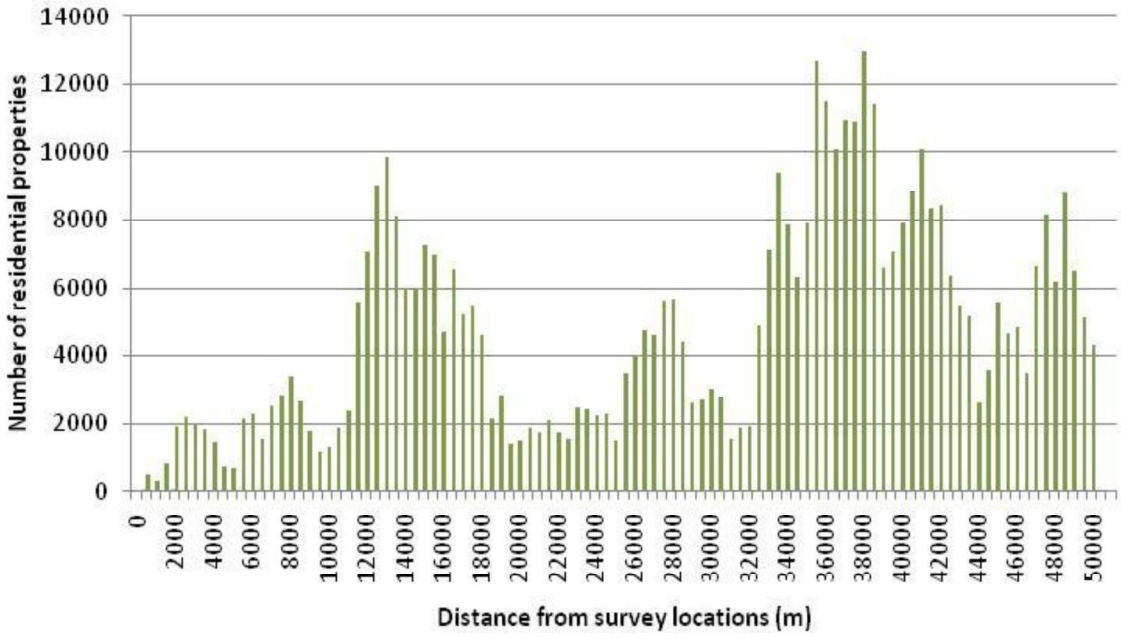

Figure 7: The number of residential dwellings within fixed distance bands of all sampled locations in the Sandlings area.

Visitor numbers and housing density within fixed distances of access points

3.39 The tally totals of visitors to each location were compared to the number of houses within different distance bands of each access point to investigate potential relationships between visitor numbers and housing densities. The tally totals were counts of people entering and leaving each site or recorded using the sites. These values will inevitably include some counts of visitors who were on holiday. Linear regressions were used to determine the significance of the relationships between the total tally counts at each location and the number of houses within selected distance bands of the access points. Looking at 1km, 3km, 5km, 10km, 15km and 30km distance bands (Table 16). There was a significant relationship between the number of houses within 1km and 5km of a survey location and the number of visitors (Figure 8; Table 16)

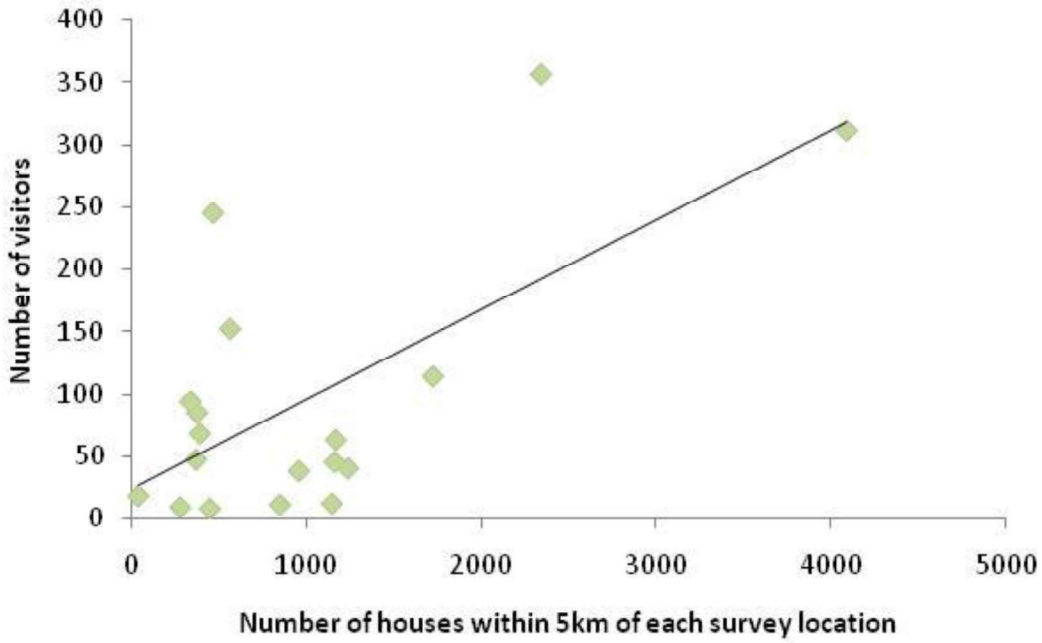

Figure 8: The number of houses within 5km of each access point in comparison to the number of visitors recorded entering each survey area (y=0.0719x+23.722, % variation explained R^2 = 43.5%).

3.40 However, the relationship is no longer significant at 1km if the survey location opposite the Sutton Heath Estate (number 31) is removed. This is because this location is heavily used by residents from the estate whereas for all other survey locations visitors travel from locations beyond 1km. At 5km the housing levels explain 43.5% of the variation in visitor numbers and this relationship will mainly be driven by the settlements of Woodbridge, Rendlesham and the surrounding villages. At distances of 10km and over the relations (Table 16).

Table 16: Outputs of linear regression models using the number of houses within fixed distance bands as a predictor of visitor numbers to sites. Significant results displayed in bold (* there is no significant relationship between housing at 1km if the survey location opposite the estate entrance at Sutton Heath is removed).

Fixed distance	R^2 (%)	P value
1km	31.2	**0016***
3km	7.9	0.259
5km	43.5	**0.003**
10km	0.1	0.139
15km	16	0.1
30km	2.2	0.554

Factors influencing choice of site

3.41 In question nine visitors were asked for reasons why they visited the interview location instead of another local site. Answers were coded, where possible, into 16 categories in the winter surveys and 18 categories in the summer survey by the surveyor. Out of 596 interviews, 404 provided at least one reason that could be coded. Many interviewees gave multiple responses for their choice of location; for 93 interviewees there was a second reason coded, for 16 interviewees there was a third reason and for five there was a fourth. Only four interviewees did not respond to the question at all and a further 188 provided answers which could not be immediately coded but have been subsequently categorised (see below). Due to the high number of uncoded responses there were only 544 coded reasons for choosing a particular site from 596 interviews.

3.42 There was no significant difference between the frequency of the types of responses recorded between the two periods, therefore further analysis on reasons for visiting sites has been carried out on the whole data set. Map 11 shows the range of reasons given by visitors at each interview location and a clear theme from responses is that people visit sites as they are close to home. This total of 544 is summarised in Table 17, which also provides a breakdown by activity. The most common reason given by interviewees was proximity of the sites to where they live with 181 (33.3%) of the responses given being coded in this category. The second most common reason related to enjoyment for dogs, which relates to the fact that over half of visitors to the Sandlings are dog walkers. Features of the Sandlings landscape including the habitat and attractive scenery jointly contribute 16.7% of the responses from interviewees.

Table 17: Reason for visiting the Sandlings rather than other local sites by activity. The total number of responses for each category and the percentage of responses within each survey period are also shown. Numbers in bold highlight the most frequently cited reason within each column.

Reason for visiting	Main activity								Total responses	Winter (% responses n=309)	Spring/summer (% responses n=236)
	Birdwatching	Cycling	Dog walking	Exercise	Family/ Children	Horse Riding	Walking	Other			
Close to home	0	**9**	**131**	**11**	**7**	**2**	**21**	0	**181**	**34.7**	**31.6**
Good for dog/dog enjoys it	0	0	64	0	0	0	1	0	65	11.7	12.4
Habitat (e.g. amount of tree cover/open habitat)	0	0	27	3	1	0	16	0	47	10.4	6.4
Attractive scenery/views	0	1	30	0	3	0	9	**1**	44	7.1	9.4
Familiarity (with tracks/site etc)	0	3	23	1	0	0	5	0	32	6.5	5.1
Safe for dog to run off lead	0	0	32	0	0	0	0	0	32	4.9	7.3
Choice of routes/ability to do different circuits	0	5	19	1	0	0	4	0	29	7.1	3.0
Short travel time from home	0	0	20	0	0	0	4	0	24	3.9	5.1
Don't know / others in party chose	0	2	8	0	3	0	5	0	18	3.2	3.4
Particular facilities at site	0	1	4	0	1	1	9	0	16	3.6	2.1
Particular wildlife interest	**1**	0	7	0	0	0	5	0	13	2.9	1.7
Feel safe here/safety issues	0	0	7	0	3	0	2	0	12	0.6	4.3
Good /easy parking	0	0	7	1	0	0	2	0	10	2.3	1.3
Outdoor play area	0	0	0	0	5	0	4	0	9	-	3.8
Suitable for specific activity	0	1	2	0	2	0	3	0	8	-	2.6
Presence of livestock	0	0	2	0	0	0	0	0	2	0.3	0.4
Mountain bike/cycle skills area	0	0	1	0	0	0	1	0	2	-	0.6
Presence of water	0		1				1		2	0.6	-
Total	**1**	**22**	**385**	**17**	**25**	**3**	**92**	**1**	**544**		

3.43 Additional reasons for visiting the Sandlings totalled 293 and these have been placed into 16 further categories. The most popular response was 'convenience' and these responses often involved visitors stopping off on their way to do something else. Visiting for peace and quiet was also popular, with some visitors choosing other locations if there were too many cars in the car park that they had intended to visit. Visitors often remarked that they liked to vary where they went in the area and had decided upon their particular location as they 'fancied a change'. Particular features of the paths and routes were often quoted as reasons for visiting sites. In particular the dryness of the heath and easy terrain were attractive to a number of people. Weather also featured highly with the sheltered nature of the forest meaning that it is an attractive location when the coast is too windy, wet or cold. A number of features of the site which benefit dogs were also recorded including the enclosure at Sutton Heath, the end of the bird nesting season, lack of deer and the ability to do long circular walks.

Table 18: Additional reasons for visiting sites given by interviewees undertaking different activities across the whole survey period.

Reason for visiting	Main activity						Total
	Dog walking	Walking	Exercise	Family/children	Cycling	Birdwatching	
Convenience	24	14	1	2	2	2	45
Peaceful/quiet	20	7	3	4	3	4	41
Change of scene	15	17		3	3	2	40
Paths/routes	20	11	2		4	1	38
Specific activity/purpose	8	10	1	2	8		29
Weather	6	11		5	2	2	26
Routine	12	4					16
Dog likes it/safe for dog	14						14
Snape Maltings	4	9				1	14
Other- unclassified	5	6			1	1	13
Meeting people	8	1		1	2		12
Recommendation	3	4			2	1	10
Just like it here	2	3		2	2		9
Children		2		5	1		8
Habitat	4	1	1				6
Safety				1	1		2

Other locations visited

3.44 Visitors were asked to list which other local places they visit for similar purposes, with a focus on the two or three that they visit most often. In total 1076 responses were received from 596 interviews which could be coded into 18 location categories. Only 43 interviews yielded no coded locations. Single locations were given by 217 groups whereas two locations were listed by 171 interviewees, three locations by 147 interviewees, four locations by 12 interviewees and five locations by five interviewees.

Table 19: Other local sites visited by interviewees and the total number and percentage of responses for each location. Numbers in bold highlight the most frequently cited location within each activity group.

Locations	Main activity								Total responses (%)
	Birdwatching	Cycling	Dog walking	Exercise	Family/ Children	Horse Riding	Walking	Other	
Other Rendlesham Forest location	0	**15**	**147**	**4**	2	1	34	0	203 (19)
Tunstall Forest	0	5	93	3	1	2	37	0	14 (13)
Aldeburgh	2	2	40	1	3	0	**42**	2	92 (9)
Minsmere /Dunwich	**4**	5	41	3	2	0	32	2	89 (8)
Woodbridge /Melton (river wall)	1	0	48	1	4	1	26	2	83 (8)
Sutton Heath	0	1	54	2	1	2	14	0	74 (7)
Coast at Shingle Street / Bawdsey	0	2	48	0	**5**	0	8	0	63 (6)
Orford	0	4	29	0	1	0	22	1	57 (5)
Snape Maltings	0	4	24	1	1	0	21	0	51 (5)
Thorpeness	0	1	19	1	2	0	14	0	37 (3)
Blaxhall Heath	0	1	26	0	0	1	2	0	30 (3)
Hollesley Common	0	1	13	0	0	**3**	8	0	25 (2)
Sutton Hoo	0	0	8	0	3	0	6	0	17 (2)
Friday Street	0	0	12	0	0	0	4	0	16 (2)
Hollesley Common	0	0	9	0	0	1	4	0	14 (1)
Iken	0	2	8	0	0	0	4	0	14 (1)
Havergate /Orfordness	0	0	0	0	0	0	0	0	0
No other sites	1	7	45	9	3	0	6	0	71 (7)

3.45 A further 183 free text descriptions of additional locations were received. Of the 183 additional un-coded location responses, 96 could be classified as Coast and Estuary and 132 could be further grouped and are displayed, by the activity undertaken by the visitor, in Table 20. There were 51 further location responses which were not grouped.

Table 20: Additional locations visited which have been further coded into 18 locations and displayed by activity. Coastal/estuary locations shown in bold.

Locations	Birdwatching	Cycling	Dog walking	Family/ Children	Horse Riding	Walking	Other	Total
Sizewell			16			7		**23**
Felixstowe			8	2		11		**21**
River Deben			9	1	1	3		**14**
Southwold			4			6	1	**11**
Thetford forest		5	2	2		2		**11**
Stour and Orwell			4			4		**8**
Alton Water		1	5	1				**7**
Walberswick	1		3			1		**5**
Eyke			4					**4**
Martlesham			3			1		**4**
Boyton / Butley Creek			2			1		**3**
Leiston			3					**3**
Woodbridge Golf Course			3					**3**
Framlingham						2		**2**
Melton Woods			1					**1**
Tunstall						1		**1**
Total	**1**	**6**	**75**	**8**	**1**	**40**	**1**	**132**

3.46 The majority of visitors to the Sandlings visit a range of sites within and around the study area. Visitors also visit locations further afield to Sizewell to the north and Felixstowe in the south. Looking across all other sites visited (coded and un-coded), 59% of visitors to the Sandlings also stated that they visit coastal and estuary sites in the local area demonstrating the extent to which visitors make use of the different locations available.

Opinions on management

3.47 Apart from people interviewed at Tangham, all visitors were asked whether they supported four specific management practices in the Sandlings area (tree clearance, grazing with ponies or sheep and fencing). Responses were received from 543 interviews and the results are displayed in Table 21 by visitor type (e.g. holiday maker, local visitor, other). Most reactions to the management suggestions were positive with the exception of tree clearance which received roughly the same number of positive and negative responses. The differences between the frequencies of responses were tested using Chi-square and although slightly more negative responses to tree clearance were received from local visitors, this difference was not significant. There was also no significant difference in the responses by different visitors to sheep grazing whereas significantly more visitors were positive about ponies (χ^2_4=298.2, p<0.001) and also fencing (χ^2_4=19.71, p=0.001).

Table 21: Number of responses to management practices by different types of visitors. The highest number of responses by category (positive, negative, neither/don't know) are in bold.

Management	Type of visitor	Response		
		Positive	Negative	Neither/don't know
Tree clearance to create more open heathland	On holiday	15	15	9
	Visiting from home	197	**211**	84
	Other	5	**6**	1
Grazing with ponies	On holiday	**27**	6	6
	Visiting from home	**375**	60	55
	Other	8		4
Grazing with sheep	On holiday	**26**	4	9
	Visiting from home	**336**	98	56
	Other	**7**	2	3
Fencing	On holiday	**17**	12	10
	Visiting from home	**239**	176	73
	Other	1	4	**7**

Problems with other user groups

3.50 All visitors, except those interviewed at Tangham, were asked whether they had experienced any problems with other users whilst visiting the Sandlings. Specific details were asked about motorbikes, dog walkers, horse riders, cyclists and other users. Multiple responses were accepted and 289 responses were received from 221 visitors (96% of whom were local residents). The most frequently recorded problem activity was motorbikes with 36% responses rate and within activity groups this was the category with the highest response rate from dog walkers and horse riders (Table 22). Interestingly, the highest number of responses received by birdwatchers, cyclists, people undertaking exercise and walkers was for problems with dog walkers.

Table 22: Number (%) of positive responses by visitors undertaking different activities when asked if they had encountered problems wth different activities/groups in the Sandlings.

Problem	Main activity							Total
	Birdwatching	Cycling	Dog walking	Exercise	Family/ Children	Horse Riding	Walking	
Motorbikes	1 (33.3)	3 (21.4)	**82 (39.2)**	1 (10)	1 (50)	**4 (80)**	12 (26.1)	**104 (36)**
Other users		4 (28.6)	57 (27.3)	4 (40)		1 (20)	10 (21.7)	**76 (26.2)**
Dog walkers	**2 (66.7)**	**5 (35.7)**	41 (19.6)	**4 (40)**	1 (50)		**19 (41.3)**	**72 (25)**
Horse riders		2 (14.3)	15 (7.2)	1 (10)			1 (2.2)	**19 (6.6)**
Cyclists			14 (6.7)				4 (8.7)	**18 (6.2)**
Total	**3**	**14**	**209**	**10**	**2**	**5**	**46**	**289**

3.53 The comments associated to motorbikes relate most frequently to damage to the paths but other issues raised include noise, safety, speed, pollution and the illegal nature of the activity. Nearly all of the responses to problems with dog walkers could be classified into issues relating to the behaviour of dogs and owners who do not have control of their dogs

(68% of responses) and also the failure of owners to pick up after their dogs (25%). Five interviewees commented on the same issue with intimidating dogs off the lead at Friday Street. The most frequently described problem with horse riders was that they may cause damage to the paths and secondly that they can alarm and intimidate walkers and dogs. Negative responses about cyclists were mainly intimidation and domination of the paths and that cyclists approach without warning. Damage to paths was also an issue raised about cyclists.

3.54 In terms of problems with other user groups, there was large response to travellers (64.6% of responses). Issues raised by visitors included that they didn't feel safe, that travellers dogs were potentially dangerous and out of control and also that the camps are unsightly and noisy in the forest. Other user groups mentioned included husky racing, fly tipping and 4x4 vehicles in the forest.

Responses from visitors to Tangham

3.55 The 51 groups interviewed at Tangham in August were asked how they planned their trip to the area. Multiple responses were accepted and 47 responses were coded and a further nine responses were received as free text descriptions (Table 23). For both local visitors and visitors on holiday the most popular response was 'previous or local knowledge of the area' (69.6% of responses overall).

Table 23: Methods of planning their trip given by local and holiday visitors to Tangham (means of planning given in italics were from free text responses).

Planning method	On holiday	Visiting from home	Total (%)
Previous visit/ local knowledge	16	23	39 (69.6)
Recommendation from friends	*3*	*1*	*4 (7.1)*
Recommendation by accommodation	3		3 (5.4)
Website	2		2 (3.6)
Forest leaflet	*2*		*2 (3.6)*
Saw it on a map /OS Map	1		1 (1.8)
General guide book	1		1 (1.8)
Childrens party		*1*	*1 (1.8)*
Didn't plan the trip	*1*		*1 (1.8)*
Particular planning for a group activity		*1*	*1 (1.8)*
Weather		*1*	*1 (1.8)*
Total	**29**	**27**	**56**

3.56 Visitors were also asked whether they had visited any specific tourist attractions from a list of 12. From 51 interviews, 75 responses were received and coded (Table 24). The most popular location for local visitors was Snape Maltings whereas the highest number of responses from holiday makers was for Sutton Hoo. Snape Maltings, Sutton Hoo and Aldeburgh and Thorpeness beaches were at the top of the list for most visited attractions

overall. Visits to SWT reserves included Foxborough Farm and Trimley Marshes. Nine other attractions were listed by visitors: the British Larder Pub, Easton Farm Park, Felixstowe Beach, Framlingham Castle, Lowestoft air show, Sizewell beach, Southwold and Walberswick for crabbing.

Table 24: Tourist attractions visited by local and holiday visitors to Tangham within one month of the interview.

Tourist attraction	On holiday	Visiting from home	Total
Sutton Hoo	7	5	12
Aldeburgh and Thorpeness beaches	5	7	12
Snape Maltings	4	8	12
Orford Castle	5	6	11
Orford Ness National Trust	3	4	7
RSPB reserve (Minsmere)	1	6	7
Tangham adventure play area	4	2	6
Dunwich Forest / cliffs	1	4	5
Suffolk Punch Centre		4	4
Suffolk Wildlife Trust Reserve		4	4
Rendlesham Forest Cycle Hire	2	1	3

3.57 Opinions on additional facilities and improvements were asked as part of the summer survey at Tangham. Only 18 coded responses were received from 51 interviews and the most popular suggestion was for a cafe where visitors could sit indoors (over 60% of responses). Other responses (all with 1 or 2 responses) included better provision of toilets, free parking, a shop, staffed information point and improved wildlife viewing. Uncoded comments on improvements came mainly in the form of people actually liking Tangham as it is (42%) and that more facilities would ruin the location. More bins formed 15% of the additional responses and other improvements raised included more benches along the routes for elderly visitors, improved marked routes, more diverse childrens facilities, an information centre that was open when visitors were around and more shelter for bad weather days.

3.58 As well as the formal interview, the surveyor spent some time with each group and asked them about their general feelings and opinions on the area. A common theme was that they like the area as it is and wouldn't want it to become too commercial however many liked the idea of more shelter and a better cafe but this may have been influenced by the weather at the time because it was raining heavily. Rubbish bins and a slightly larger cafe with more choice were often mentioned as possible changes. None of the visitors said that they would like a large visitor centre when asked informally in conversation. It was also apparent that first time visitors found it hard to find their way around and know where the routes started. People said that they often got lost in the forest and that better maps would be helpful.

3.59 From conversations with local visitors it was apparent that the ten properties adjacent to the site are not particularly keen on a visitor centre at the car park due to noise and disturbance. They are also concerned about the disturbance impacts for wildlife.

Routes

3.60 Visitors' routes were collected as part of the interviews using hand drawn maps in the field and also hand held GPS units. Over the whole survey period 31% of the interviews used GPS units to collect route information (35% in the winter and 23% in the spring/summer period). A total of 561 routes were representing 94% of all interviews. The routes were mapped as polylines within the GIS and the total length of each route calculated. These data are summarised in Figure 9 and Table 25. There were significant differences between the different activities in the length of their routes (Kruskal-Wallis H = 111.43, 7 df, $p < 0.001$), with family outings involving the shortest routes (median 2347m) and cyclists travelling the furthest (median = 10340m).

Table 25: Summary statistics relating to route length for each activity type.

Activity	Number of routes	Route length (m)			
		Mean (SE)	Minimum	Maximum	Median
Birdwatching	5	2981 (996)	916	6408	2934
Cycling	32	12350 (1422)	2321	38564	10340
Dog walking	354	3297 (118)	35	23669	2932
Exercise	17	7403 (1373)	1571	21513	5827
Family/Children	17	3527 (882)	230	12694	2347
Horse Riding	6	6965 (835)	5206	10733	6321
Other	3	2200 (381)	1439	2600	2561
Walking	127	4854 (290)	210	20645	3932

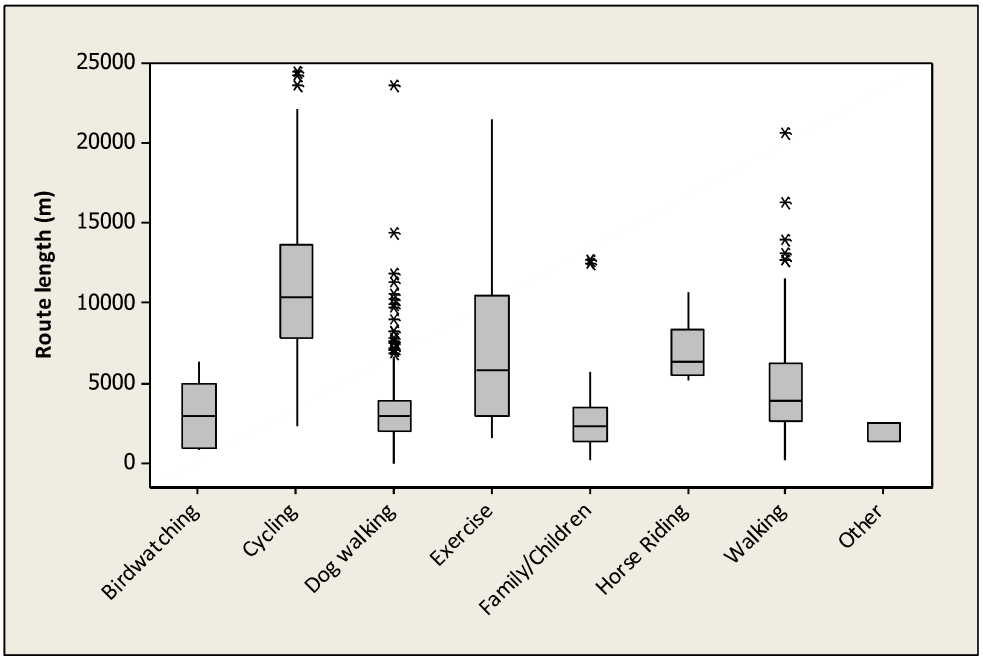

Figure 9: Boxplots showing route length data for each activity. Note that the y axis is truncated at 25km.

3.61 Across all survey locations (excluding 14 due to a low number of routes collected), there were significant differences between route lengths (Kruskal-Wallis H = 90.19, 16 df, $p < 0.001$). Across all activities, the longest routes were recorded whilst interviewing visitors within Rendlesham Forest (roaming 2), which is most likely due to the popularity of this location for cycling. The greatest difference in route length by activity was recorded at Iken (121) with the shortest median route length at 1,107m for bird watching and 21,513m for exercise. Routes collected from visitors to Sutton Heath via the entrance opposite the estate and also for visitors to Tangham are shown below as examples (Map 12 and Map 13). Although Tangham was only sampled in the summer, the median route is nearly double the length of routes at Sutton Heath demonstrating the use of Tangham for more extensive visits compared to Sutton Heath which is used for regular short activities such as dog walking (Table 21).

Table 26: Median route length (m) for each activity by survey location with the site with the longest average route length for each activity shown in bold.

ID	Interview location	Main activity							
		Birdwatching	Cycling	Dog walking	Exercise	Family/ Children	Horse Riding	Walking	Other	All activities
14	South of Scotland Fens			1519				3091		2055
20	Upper Hollesley Common			2349				6395		2379
30	Sutton Heath Car Park			2388		1150		3499		2595
31	Opposite Sutton Heath Estate		12329	2609	4544	**3738**		3814		2784
35	Tangham		11338	**4926**	**16685**	2247		4141	**2600**	4402
41	Runway car park		4689	4115	2543			5099		4138
45	Woodbridge Golf Club			2705				5415		3498
54/55	Rendlesham (north), on B1084		17369	3355	1571			3161		3476
72	Friday Street		10279	2884				3095		2990
86	Captains Wood parking	3539		1630				3118		2877
91/92	On the B1078, Tunstall Forest		9064	1699			7642			2023
102	Tunstall Common		3437	3130	6830			7669		3437
111	South of Sandgalls Plantation		11252	2087	10882			**10750**		3352
116	Tunstall Forest (north)		7466	2460				8684		3205
121	Iken	1107		2995	21513	2600		3616	2000	3257
128	Blaxhall Common			2043			5568	3455		2357
R1	Roaming Tunstall Forest	**6408**	12049	3691	8072		5982	8848		5636
R2	Roaming Rendlesham forest		**13631**	4873	14773	2634	**8309**	4487		**5649**

Factors influencing visitors' choice of route

3.62 Visitors were asked what factors had affected their choice of route taken during their visit. Multiple responses were accepted and 177 responses were given which could be coded into eight categories (Table 27). Across all responses the most popular factor influencing the choice of route was the time available (40.1%) followed by muddy tracks/suitability of tracks (18.6%) and then the presence of other users (15.3%). More than half of dog walkers stated that the time available influenced their choice of route. Time available was also popular with walkers but this was equally rated alongside the suitability of the tracks ('Muddy tracks').

Table 27: Numbers (%) of responses for each category of factor influencing the choice of route taken during the visit as coded into eight categories and displayed by activity type undertaken. The most common factor influencing the choice of route for each activity are shown in bold.

Factors influencing route	Main activity								Total
	Birdwatching	Cycling	Dog walking	Exercise	Family/ Children	Horse Riding	Other	Walking	
Rainfall			7 (5.8)		**2 (40)**			5 (15.6)	**14 (7.9)**
Daylight			1 (0.8)					3 (9.4)	**4 (2.3)**
Cold			9 (7.4)					3 (9.4)	**12 (6.8)**
Other users		**2 (28.6)**	19 (15.7)	**3 (60)**	1 (20)	1 (20)		1 (3.1)	**27 (15.3)**
Time	**1 (100)**	1 (14.3)	**54 (44.6)**	2 (40)	1 (20)	1 (20)	**1 (100)**	**10 (31.3)**	**71 (40.1)**
Muddy tracks		**2 (28.6)**	19 (15.7)			**2 (40)**		**10 (31.3)**	**33 (18.6)**
Livestock		1 (14.3)	4 (3.3)			1 (20)			**6 (3.4)**
Management		1 (14.3)	8 (6.6)		1 (20)				**10 (5.6)**
Total	**1**	**7**	**121**	**5**	**5**	**5**	**1**	**32**	**177**

3.65 A further 290 uncoded responses were received which have been further categorised into 24 categories and are shown by main activity undertaken during the visit in Table 28. Across all activities the most common factor given in the free text option was whether or not the tracks were dry and/or suitable for their activity/needs (21.7%). Familiarity and routine was the second most popular reason given for route choice (17.9%) and this figure increases to 21.5% when considering dog walkers alone and 37.5% for visitors undertaking exercise. Unsurprisingly 85.7% of visitors undertaking activities with the family or children were influenced by the needs of children including the play areas and how far they can walk

Table 28: Number (%) of responses given in the free text option for additional factors influencing the choice of route. The free text responses have been categorised into 24 categories and are displayed by activity undertaken. The most common factor influencing the choice of route for each activity are shown in bold.

Additional factors influencing route choice	Main activity								
	Birdwatching	Cycling	Dog walking	Exercise	Family/ Children	Horse Riding	Other	Walking	Total
Birdwatching								2 (2.5)	**2 (0.7)**
Children		1 (4.3)	2 (1.3)		**12 (85.7)**		1 (33.3)	6 (7.6)	**22 (7.6)**
Cycling		2 (8.7)	2 (1.3)					3 (3.8)	**7 (2.4)**
Dog		1 (4.3)	29 (18.4)						**30 (10.3)**
Horse riding						1 (33.3)			**1 (0.3)**
Other users			1 (0.6)						**1 (0.3)**
Photography			1 (0.6)				1 (33.3)		**2 (0.7)**
Recommendation		1 (4.3)	2 (1.3)					4 (5.1)	**7 (2.4)**
Visit Snape Maltings			4 (2.5)					5 (6.3)	**9 (3.1)**
Specific activity/purpose		2 (8.7)	3 (1.9)					7 (8.9)	**12 (4.1)**
Avoiding travellers			3 (1.9)	1 (12.5)					**4 (1.4)**
Habitat/shelter		1 (4.3)	11 (7)				1 (33.3)	6 (7.6)	**18 (6.2)**
Weather			5 (3.2)					2 (2.5)	**7 (2.4)**
Wildlife			1 (0.6)					1 (1.3)	**2 (0.7)**
Convenience		1 (4.3)	1 (0.6)					1 (1.3)	**3 (1)**
Dry paths/appropriate routes	1 (50)	**5 (21.7)**	32 (20.3)	2 (25)	2 (14.3)	1 (33.3)		**20 (25.3)**	**63 (21.7)**
Got lost			1 (0.6)						**1 (0.3)**
Length of route		2 (8.7)	1 (0.6)					2 (2.5)	**5 (1.7)**
Quiet			5 (3.2)	1 (12.5)				3 (3.8)	**9 (3.1)**
Random choice	1 (50)	2 (8.7)	3 (1.9)					1 (1.3)	**7 (2.4)**
Routine/ familiarity		2 (8.7)	**34 (21.5)**	**3 (37.5)**				13 (16.5)	**52 (17.9)**
Time available			2 (1.3)						**2 (0.7)**
Variety			8 (5.1)	1 (12.5)		1 (33.3)		3 (3.8)	**13 (4.5)**
Other- uncategorised		3 (13)	7 (4.4)					1 (1.3)	**11 (3.8)**
Total	**2**	**23**	**158**	**8**	**14**	**3**	**3**	**79**	**290**

4. Results: car park transects and automated counters

Visitor numbers in relation to car-parking

4.1 Across the study area there 16 formal car-parks were mapped, providing a combined total of 261 parking spaces. There were 106 locations with informal parking (providing a total of 256 parking spaces) and there were nine foot-only access points.

4.2 Car park transect counts were carried out 41 times covering 131 access points with formal and informal parking, 20 in the winter and 21 in the spring/summer. Map 14 and Map 15 show the total count of cars for all 41 car park counts across both survey periods split by the two forests, Tunstall and Rendlesham. Overall the car park data demonstrates greater visitor pressure at Rendlesham. In terms of capacity, Map 14 shows the greater provision of larger car parks within and around Rendlesham forest

compared to Tunstall (Map 15) where there is a higher density of smaller car parks including on road parking and lay bys.

4.3 The car park count data was used to calculate an hourly rate of visitors arriving by car to all car parks. Firstly the questionnaire data was used to calculate the mean group size per period for groups arriving by car. The mean car park count for each car park per period was then multiplied by the average group size to estimate the number of visitors arriving by car per hour based on the fact that average length of visit was 1-2 hours. These figures were used in conjunction with data from visitors arriving by foot and route lengths within the site to estimate visitor pressure across the study area (see section 5).

Automated counter data

4.4 Data from automated counters is summarised in (Table 29). A total of 922 beam-breaks were recorded at nine locations over 75 days between 8th December 2009 and 21st February 2010 using two automated counters (Table 29). The busiest location was on the western side of Sudbourne (number 85) with 366 (183 x 2 assuming people are passing both in and out of the site) beam-breaks in 13 days. This was closely followed by the north eastern access point to Sutton Heath (number 31) with 190 in seven days around Christmas and New Year. These totals have not been filtered to discount night-time data (for example deer etc).

4.5 The data have been scaled up to generate visitor rates to access points for each survey period (Table 29). The total number of beam-breaks was divided by two assuming that visitors arriving by foot will have entered and exited the site at the same point. This is an assumption but it is more likely that people entered and exited the site at the same point rather than exiting elsewhere. A beam-break can only be assumed to count as one group as people often walk abreast rather than in a line. Therefore we converted this figure to the total number of visitors by multiplying the beam-break rate entering the site by the average group size, derived from questionnaire data, for groups arriving by foot to each interview location during each survey period.

4.6 For spring/summer visitor rates to these access points we multiplied by 2.46 (average foot only group size from interview locations) and by 1.64 for the winter period. A daily rate was then derived by dividing by the total number of visitors per period by the number of days that the automated counters were in place. Given that the counters were only used in the winter, all figures for the spring/summer period are estimated using the larger group size figure and winter beam-break rates. The daily rate for each period was then divided by an estimate of daylight hours to calculate an hourly rate based on 10 hours in the winter period and 14 hours during the spring/summer period.

Table 29: Automated counter data derived from nine foot only access points. The data have been scaled up to produce visitor rates for each survey period using questionnaire data to determine average groups size of foot only visitors.

ID	Location	Number of groups entering (beam-break count / 2)	Winter total people	Spring/summer total people	Number of days surveyed	Average people per day winter	Average people per hour winter (10 hrs)	Average people per day summer	Average people per hour summer (14 hrs)
31	Sutton Heath	95	155.8	233.7	7	22.3	2.2	33.4	2.4
34	Between Tangham and Capel St Andrew	26.5	43.5	65.2	9	4.8	0.5	7.2	0.5
69	Chillesford Wood	25	41	61.5	5	8.2	0.8	12.3	0.9
85	Sudbourne	183	300.1	450.2	13	23.1	2.3	34.6	2.5
120	Sandgalls Plantation	20	32.8	49.2	8	4.1	0.4	6.2	0.4
129	Blaxhall Common	28.5	46.7	70.1	6	7.8	0.8	11.7	0.8
130	Blaxhall Village	54.5	89.4	134.1	13	6.9	0.7	10.3	0.7
133	Sandlings Walk	23.5	38.5	57.8	8	4.8	0.5	7.2	0.5
132	Hollesley Village	5	8.2	12.3	6	1.4	0.1	2.1	0.2

4.7 Hourly visitor rates for the nine locations were plotted against the number of residential properties within 400m and 800m of the access point. There was a significant relationship between hourly visitor rates and housing within 400m for both survey periods (R^2= 50.8%, p= 0.031) but no significant relationship was found for housing within 800m. The pattern was driven very much by the high visitor rates at Sudbourne and there was no significant relationship if this site was excluded. The regression equation for housing within 400m was used to derive foot visitor rates for all access points as part of the visitor model (see section 5). The results for each survey period are very similar as the same automated counter data was used and the only difference between the data sets is the average group size of foot visitors recorded from the visitor surveys in each period (1.64 in the winter versus 2.46 in the spring/summer).

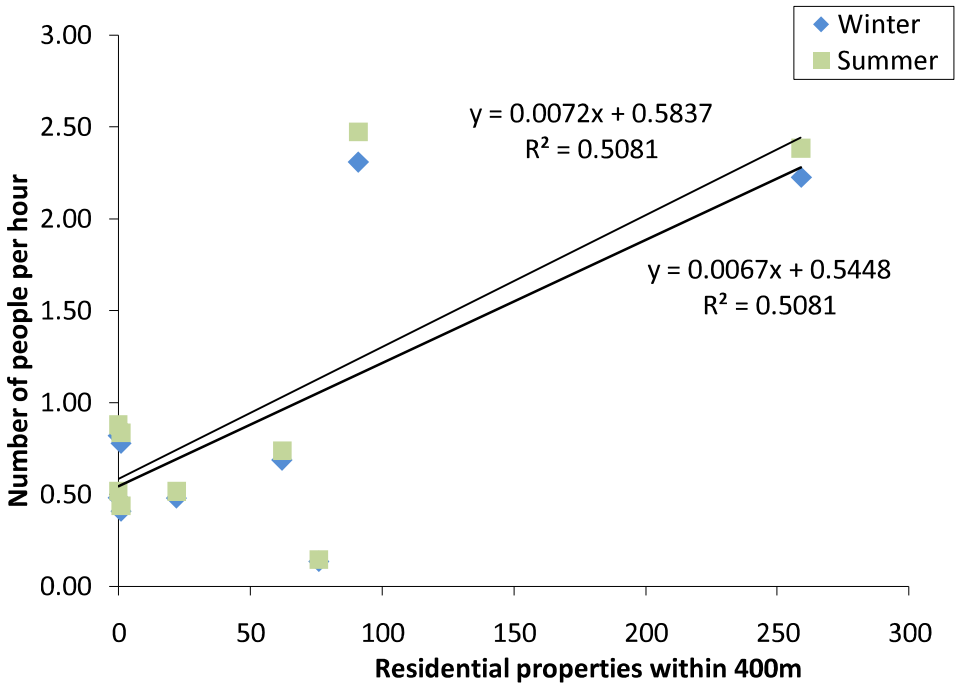

Figure 10: Regression of the hourly foot visitor rates against the number of residential properties within 400m of the access point for nine locations with automated counter data. The regression is significant for both survey periods (R2= 50.8%, p= 0.031).

5. Spatial Distribution of People

5.1 The total number of people arriving by car at each access point was determined from the car-park counts (Maps 13 and 14). Visitor numbers arriving on foot for each access point were predicted from the number of houses surrounding each access point (Figure 10). We assumed car-visitors typically stayed for one hour and used the average group size for car-borne visitors (1.59 for winter and 2.16 for summer) to give a prediction for the total number of visitors per day per access point.

5.2 In total 334km of paths and tracks were digitised within the study area; this path network is shown in Map 16. The frequency distribution used to generate predictions of visitor use for each 25m cell on the path network is shown in Figure 11. A matrix was derived and the distance (along the path network) from each access point to each cell was determined. The total number of people predicted at each access point was then spread across cells according to the proportion of people expected at that given distance (extracted from Figure 11 in 25m bands).

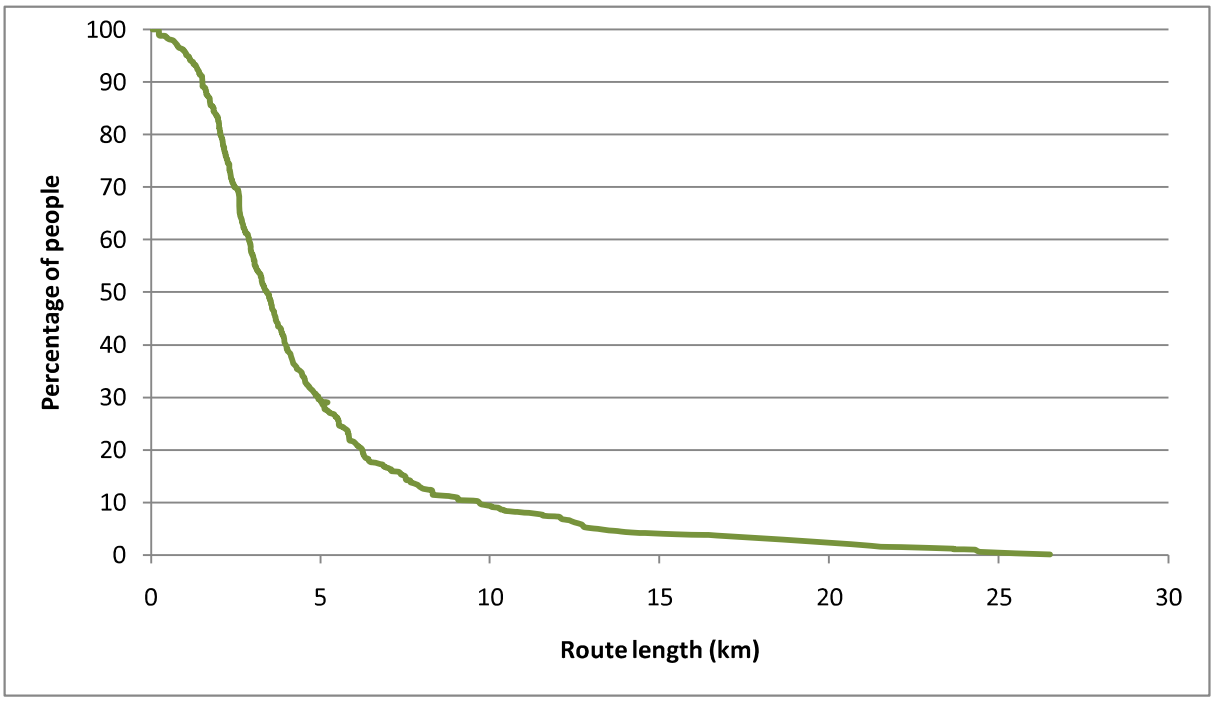

Figure 11: Frequency distribution showing total route length in relation to distance, from all routes combined.

5.3 In total there were 73,536 cells. The predicted number of people per hour per cell varied from 0 to 12, and when mapped showed a marked concentration of visitor pressure at a limited number of sites, particularly Sutton Heath, Rendlesham FC Centre, Daisy's Walk and to some extent Blaxhall and Tunstall Common. The median value across all cells was 0, and the skew in visitor numbers (i.e. most cells having low visitor levels and few cells with high visitor levels) highlighted in Table 30 with 12% of the study area was predicted to have more than 1 person per hour per 25m cell.

Table 30: Frequency distribution of visitor pressure per cell.

Number of people per hour	Number of cells	Percentage
0	56829	77
1	7691	10
2	7383	10
3	1328	2
4	188	0
5	66	0
6	36	0
7	2	0
8	4	0
9	3	0
10	0	0
11	0	0
12	4	0
Total	73,536	100

5.4 Map 17 shows the spatial distribution of people, summarised as the total number of people per hour within 100m of each cell. Maps 18 and 19 show habitat and SSSIs at the same scale. It can be seen that:

- Rendlesham Forest is busier than Tunstall Forest
- With the exception of the Rendlesham / Tangham Centre (UFO trail etc.) the Forestry Plantations are relatively under-visited compared to the heaths
- Sutton Heath in particular receives high visitor use compared to other sites

5.5 These differences can be seen when data is compared between SSSIs (Table 31). Categorising cells as to whether they occurred in one of the main SSSIs, there were significant differences between sites; Blaxhall Heath, Sutton & Hollesley Heaths and Tunstall Common SSSIs were predicted to have higher visitor pressure when compared to the Sandlings Forest SSSI, Staverton Park and the Thicks SSSI and the remaining land outside these sites (Kruskal-Wallis H (adjusted for ties = 599.99; 5df, $p<0.001$).

Table 31: Descriptive statistics for the number of visitors per hour per cell for a selection of SSSIs and the remaining part of the study area, outside the selected SSSIs.

	No. cells	Mean	SE	Min	Max	Median
Blaxhall Heath	734	0.60	0.3403	0	4.46	0
Sandlings Forest	41206	0.29	0.00	0	11.29	0
Staverton Park and the Thicks	1469	0.11	0.01	0	2.81	0
Sutton & Hollesley Commons	8207	0.38	0.01	0	12.09	0
Tunstall Common	659	0.57	0. 03	0	4.46	0
All others	21261	0.21	0.00	0	4.54	0

6. Analysis of Visitor Data with Biological Data

6.1 Data relating to the following species were plotted in relation to the visitor data (Map 17):

- Nightjar
- Woodlark
- Dartford warbler
- Ant Lion
- Silver-studded Blue

6.2 The distribution of these species in relation to the spatial distribution of people are shown in Maps 20-23 and are discussed in more detail below.

Selection of suitable habitat and species data for subsequent analysis

6.3 Land-use data were provided by the Suffolk Biological Records Centre, for both Forestry Commission (FC) and non-FC land. These data are shown in Map 18. In Table 32 we summarise the number of each Annex I bird species within each land use category type. The table is also repeated in Appendix 3, which gives the density (rather than number) of each species within each land use type.

6.4 For nightjar, woodlark and Dartford warbler, three main land use categories are clearly important, holding comparatively high densities compared to other habitats. These are:

- Other/Open (Non-FC land)
- Mixed Trees (Non-FC land)
- Open (FC Land)

6.5 The three land-use categories were merged into a single layer within the GIS, in order to generate a single layer of relatively uniform habitat. This layer – of suitable habitat – was then checked using aerial photographs and site knowledge. During this checking process some polygons were removed, these were patches of habitat that were considered otherwise unsuitable or atypical, for example patches of grassland along the edge of Butley Creek and small patches of heathland within the Woodbridge Golf Course. This revised GIS layer was then used in subsequent analyses.

6.6 We also generated a single heathland layer within the GIS. This layer was essentially an amalgamation of habitat data provided by FC and data provided by the Suffolk Biological Records Centre. As with the landuse data, this single heathland layer was also checked against aerial photographs and atypical sites, such as Woodbridge Golf Course, were deleted. The heathland layer had considerable overlap with the layer derived from land-use categories, but essentially omitted some of the open areas within the FC Land and some areas of grassland. The heathland habitat data was thought to be particularly relevant for Dartford warbler and the two invertebrate species. The two habitat layers we refer to subsequently as ‘All Open’ and ‘Heathland only’.

6.7 The polygons used to derive the heathland only layer were considerably simpler than the land use data (which were split into many small polygons, often directly abutting each

other). For the Annex I birds it was recognised that patch size might also be important; birds are likely to use patches of suitable habitat above a given size threshold. We therefore checked for an effect of patch size in each heathland polygon by plotting the number of birds in each patch in relation to the patch size. This was not possible with the All Open data.

6.8 Both the All Open and the Heathland Only data were used within the GIS to select a subset of cells from our grid, cells that intersected the respective land use/habitat types. Using this subset of cells it was possible to identify cells that had records of each species and cells within no records. This subset of grid cells was then divided them into roughly equal categories of visitor use (within 100m of the cell), such that the area of cells was approximately the same in each category. For each category the number of each species was then extracted.

Table 32: Numbers of Annex I bird species by year and habitat

		Nightjar					Woodlark					Dartford warbler		
	Habitat Type	**2004**	**2007**	**2008**	**2009**	**2010**	**2006**	**2007**	**2008**	**2009**	**2010**	**2006**	**2009**	**TOTAL AREA (ha)**
Non Forestry Commission	Agricultural Land						8	3		2				1876
	Residential (Houses and Gardens)						1							131
	Recreation						1							76
	Inland water													26
	Coniferous Trees	1				1	2			2		2		187
	Mixed Trees	5				4	7	2		7	2	4	1	258
	Non coniferous Trees					1	2	1	1		2			348
	Other Built	1					2	4	1	1				212
	Paddocks/Equine													26
	Other/Open	10		2		18	35	14	11	30	4	18	46	820
	Marsh reeds or saltmarsh													28
	Foreshore													23
	Non Forestry Commission total	**17**	**0**	**2**	**0**	**24**	**58**	**24**	**13**	**42**	**8**	**24**	**47**	**2504**
FC Land	High Forest	36	5	9	7	11	5	9	2	4	1			2037
	Open	4	11	11	8	13	9	6	8	5	3			330
	Partially Intruded Broadleaves (High Forest)	2		1						1				71
	Felled				1					1	1			39
	Residential													2
	Agricultural Land													1
	Other Built Facility													1
	Christmas Trees													8
	Research Plantation													2
	Unplantable or Bare													1
	Campsite													4
	Car Parks/Picnic Areas													6
	Burnt													2
	Forestry Commission total	**42**	**16**	**21**	**16**	**24**	**14**	**15**	**10**	**11**	**5**	**0**	**0**	**4011**
	Overall total	**59**	**16**	**23**	**16**	**48**	**72**	**39**	**23**	**53**	**13**	**24**	**47**	**6515**

Nightjar

6.9 There was a positive correlation between the numbers of nightjars on a heathland patch and the patch size (Figure 12) and the heathland data was therefore filtered to remove all patches smaller than 1.8ha (the smallest size occupied by any nightjars).

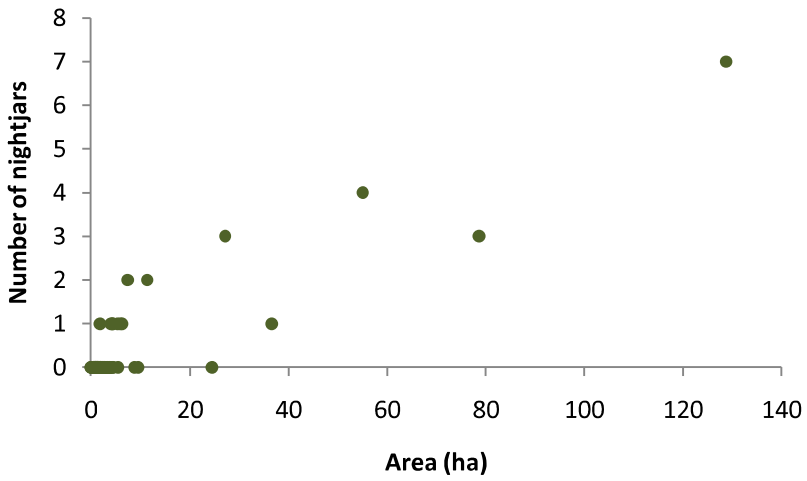

Figure 12: Heathland patch size and number of nightjars per patch. Data from 108 patches, 2010 only. Correlation is significant: Rank Spearman Correlation coefficient = 0.641; p<0.01.

6.10 Taking records from all years, the visitor intensity (people per hour within 100m of each grid cell) was significantly higher for cells without nightjar records compared to those with records. This was the case for both all open habitats (median for cells with nightjars = 14.50 (n=104); median for cells without nightjars = 17.31 (n=18,225), Mann-Whitney W=3834714, p=0.03) and for heathland only (median for cells with nightjars = 13.79 (n=84); median for cells without nightjars = 17.12 (n=11,008), Mann-Whitney W=391708, p=0.01).

6.11 Using data from 2010 only, we compared nightjar density across both all open habitats and heathland patches only (Table 33). With both data sets there was a higher density of nightjars in the areas with lower visitor numbers, and this was particularly marked with the heathland only data. Looking across all four categories however there was no clear pattern that density decreased steadily with access, and across both habitat types there was no significant difference in the proportion of nightjars occupying each category of visitor intensity (for all open habitats, χ^2_3= 3.59, p=0.31; for heathland habitats χ^2_3= 2.44, p=0.48). The densities in relation to visitor pressure are shown in Figure 15, which provides comparable plots for all three Annex I species. The plots show the higher densities of nightjar in the categories with low visitor intensity for nightjar; yet there is no clear pattern across the other three categories, all of which have lower levels of access.

Table 33: Nightjar density in relation to access levels across all open habitats and across heathland patches only. Data for 2010 only.

	Visitor intensity (categorised; people per hour)	Nightjar numbers	Number of cells	Area (ha)	Birds per ha
All open	<11	15	4872	305	0.05
	11-18	8	4679	292	0.03
	18-28	7	4872	305	0.02
	28-212	10	4476	280	0.04
	Total	40	18899	1181	0.03
Heathland only	<11	13	3108	194	0.067
	11-18	7	3199	200	0.035
	18-29	6	3242	203	0.030
	29-212	8	3276	205	0.039
	Total	34	12825	802	0.042

Woodlark

6.12 There was a positive correlation between the numbers of woodlarks on a heathland patch and the patch size (Figure 13) and the heathland data was therefore filtered to remove all patches smaller than 1.8ha (the smallest size occupied by any woodlarks).

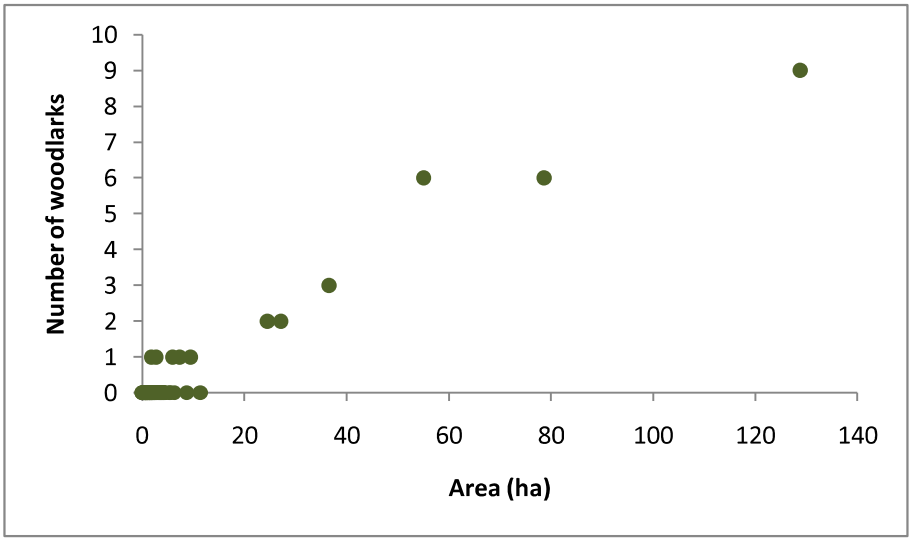

Figure 13: Heathland patch size and number of woodlarks per patch. Data from 108 patches, 2009 only. Correlation is significant: Rank Spearman Correlation coefficient = 0.606; p<0.01.

6.13 Taking records from all years, the visitor intensity (people per hour within 100m of each grid cell) was not significantly higher for cells with woodlark records compared to those without. This was the case for both all open habitats (median for cells with woodlarks =

16.94 (n=130); median for cells without woodlarks = 17.31 (n=18,199), Mann-Whitney W=1116360, p=0.2) and for heathland only (median for cells with woodlarks = 17.25 (n=114); median for cells without woodlarks = 17.10 (n=10,978), Mann-Whitney W=606118, p=0.44).

6.14 Comparing the density (using data from 2009 only) across both all open habitats and heathland patches only there was higher density in the areas with lower visitor numbers, however there was no clear pattern that density decreased steadily with access, and across both habitat types there was no significant difference in the proportion of woodlarks occupying each category of visitor intensity (for all open habitats, χ^2_3= 1.54, p=0.67; for heathland habitats χ^2_3= 2.32, p=0.51). The densities in relation to visitor pressure are shown in Figure 15, which provides comparable plots for all three Annex I species. It appears for woodlark there is no apparent effect of access on the current distribution of birds.

Table 34: Woodlark density in relation to access levels across all open habitats and across heathland patches only. Data for 2009 only.

	Visitor intensity (categorised; people per hour)	Woodlark numbers	Number of cells	Area (ha)	Birds per ha
All open	<11	14	4872	305	0.05
	11-18	8	4679	292	0.03
	18-28	10	4872	305	0.03
	28-212	10	4476	280	0.04
	Total	42	18899	1181	0.04
Heathland only	<11	12	2994	187	0.06
	11-18	5	2510	157	0.03
	18-29	11	2781	174	0.06
	29-212	8	2807	175	0.05
	Total	36	11092	693	0.05

Dartford warbler

6.15 Dartford warblers showed a restricted distribution within the study area, present only on the larger heathland patches (above 20ha); the number of birds per patch positively correlated to patch size (Figure 14). Dartford warbler density was therefore extracted in relation to visitor levels using the heathland data only, and all patches smaller than 20ha were excluded.

6.16 Taking the data from all years and comparing grid cells with records of Dartford warbler to those cells without Dartford warblers there was a highly significant different in the numbers of people (predicted per hour within 100m of the grid cell) (median for cells

with Dartford warblers = 9.42 (n=67); median for cells without Dartford warblers = 16.26 (n=6735), Mann-Whitney W=158143, p<0.01).

6.17 Dartford warbler density (data from 2009) declined across all categories of visitor intensity, from high to low, and the proportion of Dartford warblers occupying each category of visitor intensity was significant (χ^2_3= 15.33, p=0.002). The densities in relation to visitor pressure are shown in Figure 15, which provides comparable plots for all three Annex I species. There is good evidence to suggest that the distribution of Dartford warblers within the study area is related to the distribution and numbers of visitors.

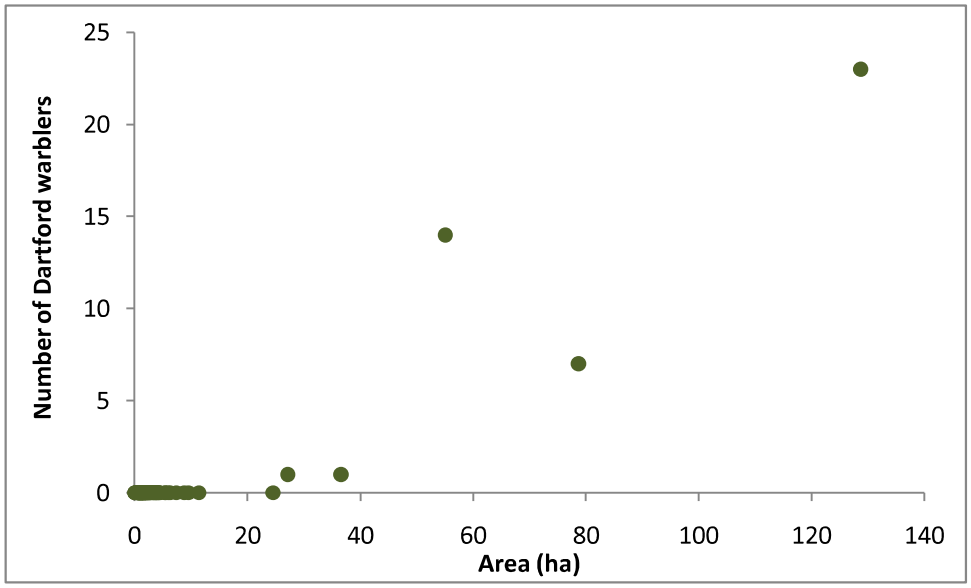

Figure 14: Heathland patch size and number of Dartford Warbler per patch. Data from 108 patches. Correlation is significant: Rank Spearman Correlation coefficient = 0.566; p<0.01.

Table 35: Dartford warbler density in relation to access levels across all open habitats and across heathland patches only. Data for 2009 only.

	Visitor intensity (categorised; people per hour)	Dartford warbler numbers	Number of cells	Area (ha)	Birds per ha
Heathland only	<9	22	1711	107	0.21
	9-16	13	1665	104	0.13
	16-33	8	1738	109	0.07
	33-212	4	1688	106	0.04
	Total	47	6802	425	0.11

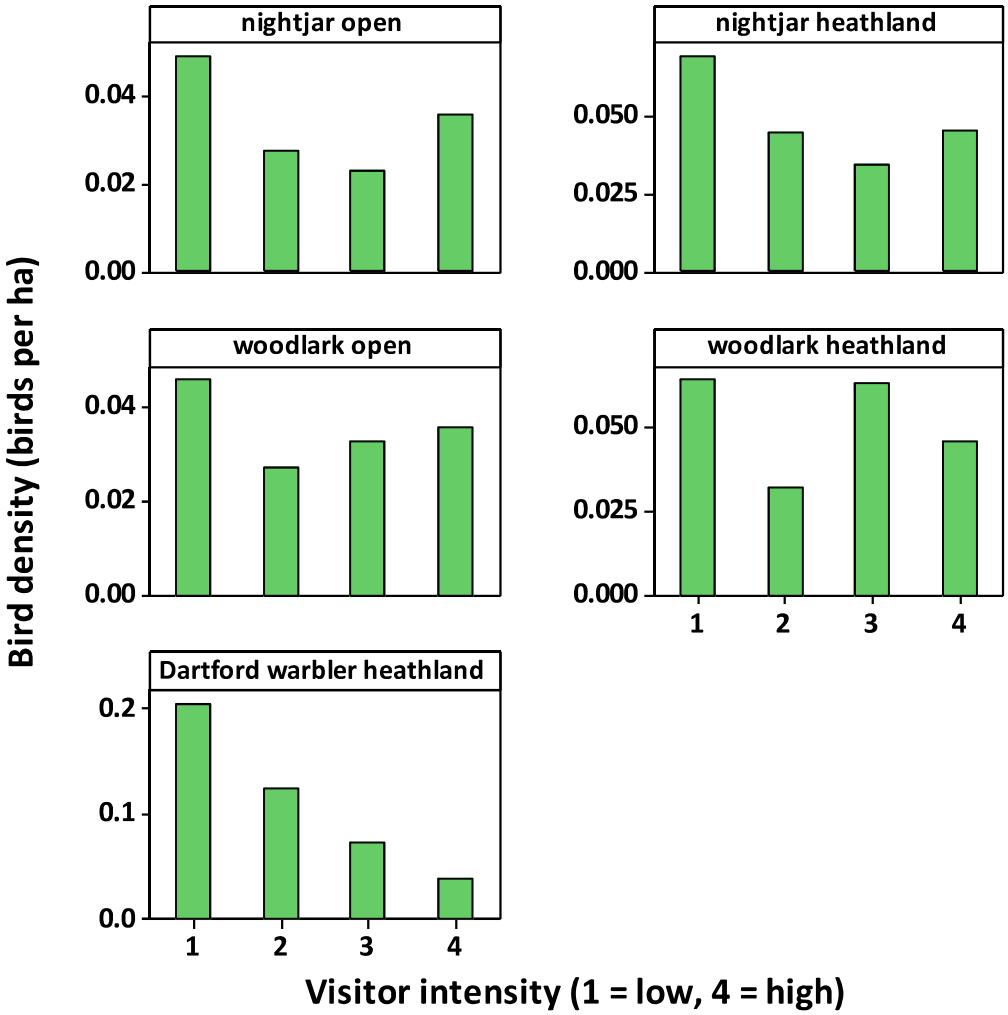

Figure 15: Bird density in relation to visitor intensity for nightjar, woodlark and Dartford warbler

Invertebrates

6.18 The distribution of ant lion and silver-studded blue are shown in relation to visitor intensity in Map 23. There were just four widely scattered records of ant lion. Silver-studded blue records showed a marked concentration in the southern part of the study area. The number of records by year and land use is shown in Table 36. Only one record was on FC land. Most records (67 out of 111) fell within the Other/Open landuse category on land outside the FC holding.

Table 36: Numbers of silver-studded blues by year and land use categories

	FC Land	Non FC Land					
Land Use	Felled	Agricultural Land	Coniferous Trees	Mixed Trees	Non coniferous Trees	Other/Open	Total
1983		1					1
1984						1	1
1994			3	1		1	5
1995			1				1
1996			1			1	2
1997					1		1
1999						1	1
2000			1		1		2
2001			2		1		3
2002		2			1	1	4
2003			5		4	27	36
2004			2		2	6	10
2005			4		4	12	20
2006			2		2	7	11
2007						2	2
2008	1		1		1	8	11
Total	1	3	22	1	17	67	111

6.20 A total of 66 of the silver-studded blue records fell within the heathland only habitat layer. Taking records from all years, there was no significant difference in the median number of visitors per hour predicted within each cell, for cells with silver-studded blue records compared to those without (Median value for both = 0, Mann- Whitney W=83001437, p=0.89). Taking the number of visitors per hour within 100m of each cell, there were more visitors predicted for those cells with no silver-studded blues recorded (median of 18.12 compared to 14.95), but the differences were not significant (Mann-Whitney W = 83057126, p = 0.064).

6.21 The year with the most records was 2003; a total of 38 records are mapped for this year, of these 37 were within grid cells extracted from the heathland only layer. Taking these records and calculating the number of records in each of the four categories of visitor intensity (Table 37), the highest number of records were in the cells with lowest visitor intensity. The proportion of records in each category was significantly different (χ^2_3= 10.00, p=0.019), this is mainly because relatively few records were in one of the

categories with an intermediate level of disturbance and there was no actual pattern of decreasing numbers across successive categories of visitor intensity.

Table 37: Silver-studded blue numbers in relation to access levels on heathland patches only.

	Visitor intensity (categorised; people per hour)	Number of S-s blues	Number of cells	Area (ha)
Heathland only	<11	14	3184	199
	11-18	13	3236	202
	18-29	2	3231	202
	29-212	8	3262	204
	Total	37	6802	425

7. Discussion

7.1 Developing an understanding of visitor use and access patterns is critically important to underpin land management, both in terms of management of visitor flows and also in terms of management for nature conservation. In this report we present a snapshot of visitor use, collected over three seasons, for a large area of forestry, heathland and associated habitats in the south Sandlings. The results provide a baseline dataset and also have implications for future management of the area, for both access and nature conservation. We highlight the following:

- Most visitors arrive by car and most of the parking provision is informal parking (such as gateways and lay-bys), mostly providing space for small numbers of cars.
- Visitor use occurs all year round, but certain activities such as family outings increase in the summer.
- The main activity that visitors were undertaking was dog walking, (e.g. 67% of groups interviewed in the winter were visiting with a dog). There were also a wide variety of other activities recorded such as family outings, cycling, bird watching and jogging.
- The proportion of visitors undertaking different activities varied across the area, e.g. Tangham was popular for family outings, Sutton Heath was popular for dog walking.
- Access levels are concentrated in particular areas, with Rendlesham notably busier than Tunstall.
- In general the heaths are more heavily visited than the forestry areas; there are notable 'hotspots' at Sutton Heath and at Tangham.
- The higher levels of use at Rendlesham are partially explained by the proximity of higher numbers of housing, in particular the estate at Sutton (Woodbridge Air Base) and Woodbridge itself.
- Most visits were relatively short (around an hour) and were made by people local to the site – for example 75% of dog walkers travelled from within a 10km radius of the interview location.
- Visitors were travelling to visit the area from a wide geographic area, maps of visitors home postcodes highlight visitors travelling from Woodbridge, Martlesham, Kesgrave, the eastern edge of Ipswich, Saxmundham, Wickham Market, Leiston, Snape and Orford.
- Looking at the distribution of birds and other wildlife there was some indication that nightjar distribution is related to intensity of visitor use and strong evidence that Dartford warblers occurred at lower densities in areas of high visitor use. Nightjar are an interest feature of the SPA.

Approach

7.2 Our approach has involved visitor questionnaires and car-park counts spread over three seasons. This timing and seasonal spread was chosen so as to ensure that both regular use and holiday-makers were interviewed and to ensure that the car-park counts included a wide range of dates and times. Car-park counts included bank holiday weekends, the summer holiday period, Easter, Christmas and the winter period either side of Christmas. This gives a good temporal coverage and given how the recreational use of the area is so linked to car-use, means the data relating to car-visitors is robust.

7.3 The automated counters were used to supplement the car data and quantify access levels on foot. Their use provided a cost effective means of gaining visitor counts in areas that potentially received relatively low levels of use. In practice it was often difficult to site the counters and to find suitable fence posts, trees or equivalent fixing points where the beam was at the correct height and at ninety-degrees to the path/track. The counters can be triggered by animals such as deer or by vehicles and another issue is that the site specific behaviour of people (i.e. whether individuals within groups tend to be spread out or tightly bunched or whether dogs are off leads or not) will influence whether a groups triggers a counter once or more than once. The automated counter data is therefore potentially less robust than the actual counts (a common problem, see: Gardiner 2000; Scottish Natural Heritage 2002; Johnston & Tyrrell 2003; Dixon 2004; Ross 2005)

7.4 Route data were collected using GPS units and paper maps. Within the forest blocks and at sites such as Sutton Heath, where a very dense network of paths exists, both approaches have their limitations. With paper maps interviewees potentially struggle to indicate their route, or even describe their route when paths are potentially similar. Locating specific tracks or paths can be difficult, particularly so when visitors are unfamiliar with the site. The GPS units clearly provide a better record of the track and routes taken, but there were issues with the units occasionally being accidentally switched off while in a pocket.

7.5 In order to derive the spatial maps of visitor use, a number of generalisations were made. Data were combined for the summer and winter and a single distance-decay function was generated for all users, to spread people out from access points along the path network. As the visitor data shows, different activities occur at different levels at each access point, but without data from all access points it is impossible to split the data into different activity types. We also assumed that visitor use is even across all paths within the area. This again is potentially slightly unrealistic as visitors will be likely to favour particular tracks and routes at particular locations (for example the UFO trail). The resulting spatial model is therefore a generalisation, and should be interpreted as such. It provides an appealing and easy to interpret visual overlay, providing a perspective of the whole study area and visitor intensity.

7.6 Using the spatial model to explore distributions of key species is useful, as it can potentially highlight issues relating to access and the SPA designation. It is important to recognise that this analysis has simply focused on distributions, and we have not

considered breeding success in relation to access. It is also important to recognise that the analysis is complex. Small sample sizes (relatively few bird territories), and the confounding effect of habitat mean that it is potentially difficult to determine a significant effect. We have attempted to control for habitat by limiting the analysis to areas of similar habitat suitable for each species. Without detailed fieldwork it is difficult to account for habitat quality; factors such as prey density or detailed habitat structure (sward height for example) may all be important, unmeasured factors. Habitat quality is a particular issue where species data shows a marked clumping in terms of its spatial distribution. We have not addressed spatial autocorrelation within our analysis, and where clumped distributions occur (this would appear to occur with silver-studded blues) then variations in density may be particularly likely to relate to unmeasured factors specific to a limited number of locations. In all species we limited the analysis to particular years, partially to reduce the effect of spatial effects.

Ecological Context

7.7 Despite the complexities in the analysis there is strong evidence that Dartford warblers appear to avoid areas of high visitor use. Work in Dorset has found no effect of disturbance levels on distribution (Liley & Clarke 2002), yet disturbance has been shown to have a marked effect on breeding success (Murison et al. 2007). Suffolk has only relatively recently been re-colonised by Dartford warblers (Black 2004; Wotton et al. 2009) and there is the likelihood that there is space and therefore only the best sites will be occupied (Black 2004). In Dorset birds have been spreading off the heaths and nesting in gorse scrub on chalk and limestone grassland (D. Liley, *pers. obs*), implying that there is perhaps much greater competition for sites in Dorset.

7.8 Although not as clear, there also appeared to be an effect for nightjar, but no indication of any effect for woodlark. Both these species have been increasing in the UK in recent years (Conway et al. 2007, 2009; Langston et al. 2007), yet there have been declines in the number of both species within the Suffolk Sandlings (Conway et al. 2007, 2009). For both species the major storm event in 1987 resulted in large areas of open habitat being available in the early and mid 1990s, when bird numbers peaked (Morris et al. 1994; Brown & Grice 2005; Langston et al. 2007). For both these species it is therefore potentially possible that there is competition for territories and a relative lack of suitable habitat. The fact that there is evidence of significant effects of access levels on nightjar distribution is therefore of particular interest, and is relevant to the SPA designation and the management of visitors as the aspirations for the Haven Gateway Growth Point are realised.

Implications of results in terms of SPA designation

7.9 The Sandlings SPA is classified for its breeding populations of nightjar and woodlark. Dartford warbler is not included within the SPA citation as a site interest feature. At the time of classification, populations of this species, although listed on Annex 1 of the Birds Directive, did not meet the required criteria for SPA classification. However, Dartford warbler has increased within the Sandlings area over the last decade, and it is therefore possible that this species could be included in a future review of the Sandlings SPA, if populations continue to increase.

7.10 Ensuring the continued ecological viability of the bird interest features for the Sandlings SPA is a duty placed upon all European member states by Article 6(2) of the Habitats Directive (92/43/EEC). Article 6(2) applies to both SPA and SAC designations and requires the following:

Member States shall take appropriate steps to avoid, in the special areas of conservation, the deterioration of natural habitats and the habitats of species as well as disturbance of the species for which the areas have been designated, in so far as such disturbance could be significant in relation to the objectives of this Directive.

7.11 There are further requirements within the Habitats Directive at Article 6(3) that relate to ensuring that new plans and projects do not adversely affect a European site. These additional duties will become relevant when consideration is given to new development coming forward within the Haven Gateway, and evidence to show that the SPA bird interest features are already being affected by recreational pressure will be critical to the assessment of future impacts.

7.12 Duties set out within Article 6(2) are therefore taken to relate to impacts that are not recognised as part of the assessment of new plans and projects, i.e. they relate to the existing situation and also any future impacts that cannot be attributed to any future plan or project.

7.13 The duty placed upon Member States as part of Article 6(2) is therefore clearly relevant to the findings of the Sandlings visitor survey work, where an avoidance of areas with high recreational pressure by the SPA bird interest features is occurring. There is disturbance to species for which the SPA has been classified, and additionally, if birds are avoiding areas that could otherwise function as breeding habitat, there is deterioration in the functionality of that habitat. If birds are not able to use areas of habitat within the SPA, then there is a net loss in suitable breeding territory, which leads to the conclusion that the recreational pressure currently being exerted may be adversely affecting the ecological integrity of the interest features for which the Sandlings SPA was classified.

7.14 Managing recreational pressure should therefore be a key priority, in order for duties under Article 6(2) to be fulfilled. The forthcoming recreational strategy and delivery plan provide opportunities for potential measures to rectify current recreation impacts to be considered by all partners, and for appropriate measures to be built into the strategic recreational strategy and then developed for implementation through the delivery plan.

7.15 Although the impact of future plans and projects is the responsibility of the plan maker or project promoter, the need for management of recreational pressure from future growth, and the requirements of Article 6(3) of the Habitats Directive should inform the consideration of appropriate measures to rectify the current recreational impacts. The success of measures to prevent adverse effects upon the Sandlings SPA, whether to meet the requirements of Article 6(2) or 6(3), will be dependent upon a co-ordinated and multi-partner approach to enable the recreational strategy and delivery plan to be fit for purpose as new growth comes forward.

7.16 With respect to woodlark, they do not appear to be avoiding areas of greater recreational pressure. Based upon the extensive range of research from other parts of the UK that the distribution of birds are negatively affected by disturbance (Mallord et al. 2007), it could be possible that the distribution of people in the south Sandlings is such that there is space for the people and the birds. The level at which recreational pressure will be such that birds will begin to be show a change in distribution as a result of visitor use is not known. Article 6(2) requires Member States to avoid deterioration of habitats and disturbance to species for which a European site has been classified or designated. The implementation of suitable measures to avoid such effects, prior to any critical threshold being reached, is a wholly appropriate response to this duty.

7.17 In any event, Article 6(2) sets out a clear requirement to avoid disturbance. There is no evidence to indicate that woodlark are not already being disturbed by recreational pressure, for example by reduced breeding success in territories close to recreational pressure, but disturbance has not yet reached a critical point at which actual avoidance of otherwise suitable habitat starts to occur. A precautionary approach is therefore necessary in recognising existing impacts and implementing measures accordingly.

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9. Appendices

Appendix 1: Questionnaire 1 – used at 17 sites in the winter and 7 sites in the spring/summer

S. Sandlings Visitor Survey

footprint ECOLOGY

Good am / pm. Please could you spare me some time to take part in a short survey about your visit today. The survey is being conducted for Suffolk Wildlife Trust and the Forestry Commission.

Q1 Are you on holiday and staying in this area or visiting from your home? *Tick closest, single answer only*

	1 On holiday
	2 Visiting from home
	3 Other: note details below:

Q2 On average, over the past year, how often have you visited this area? By "this area" we mean Rendlesham / Tunstall Forests and adjacent heaths? *Tick closest answer. Single answer only.*

	1 Daily
	2 Weekly
	3 Monthly
	4 Less than once a month
	5 Less than once per year
	6 Don't know / first time

Q3 Do you tend to visit this area at a certain time of day? *Tick closest, multiple answers ok*

	1 Before 9am
	2 Between 9am and 12
	3 Between 12 and 3pm
	4 Between 3 and 5pm
	5 After 5pm
	6 No / Don't know / first visit

Q4 How did you get here? *single answer only. Add if necessary:* **What form of transport did you use?**

	1 Car
	2 on Foot
	3 Other (write in)

Q5 How long have you spent / will you spend in the area ? *Tick closest, single answer only.*

	1 Less than 1 hour
	2 1 - 2 hours
	3 2 - 3 hours
	4 More than 3 hours

Q6 Do you tend to visit this area more at a particular time of year? *Multiple answers ok*

	1 Spring			4 Winter
	2 Summer			5 Don't know / 1st visit
	3 Autumn			6 Same all year

If same: **Does the area tend to be busier in the summer or the winter?**

	7 Summer			8 Winter
	9 Neither			10 Don't know

Q7 What is the main activity you are undertaking today? *No prompt. Multiple answers ok, tick as appropriate*

	1 Dog walking
	2 Walking
	3 Exercise (inc jogging)
	4 Outing with children/family
	5 Cycling
	6 Birdwatching / wildlife watching
	7 Other (write in):

Q8 Aside from this location, do you visit any other places locally for similar purposes as you visited here today? *IF YES:* **which two or three do you use most often?** *Multiple answers ok. Do not prompt. Tick closest answers and add additional details at end. Max 3 ticks.*

	1 No other sites			10 Orford
	2 Sutton Heath			11 Aldeburgh
	3 Hollesley Common (Upper)			12 Coast at shingle st. / Bawdsey
	4 Hollesley Common (Lower)			13 Thorpeness
	5 Blaxhall Heath			14 Minsmere / Dunwich
	6 Tunstall Forest			15 Havergate / Orfordness
	7 Snape Maltings			16 Sutton Hoo
	8 Other Rendlesham Forest (inc Tangham)			17 Woodbridge / Melton (inc river wall)
	9 Friday Street			18 Iken

Additional details / sites / specific location:

Q9 What made you come here, specifically, rather than other local sites? *Multiple answers ok. Do not prompt. Tick closest answers as appropriate. Use free text box for reasons that didn't fit with categories/extra detail.*

	1 Don't know / others in party chose		9 Particular wildlife interest
	2 Close to home		10 No livestock
	3 Short travel time from home		11 Presence of livestock
	4 Good /easy parking		12 Safe for dog to run off lead
	5 Feel safe here/safety issues		13 Good for dog/dog enjoys it
	6 Familiarity (with tracks/site etc)		14 Particular facilities at site
	7 Choice of routes/ability to do different circuits		15 Habitat (e.g. amount of tree cover/open habitat)
	8 Attractive scenery/views		16 Presence of water (e.g. for dogs to drink)

Free Text: other reasons / detail. Draw out site specific features and note details here.

Now I'd like to ask you about your route today. Looking at the area shown on this map, can you show me where you parked (if travelling by car) and where you started your walk or visit today. And the finish point. And your route please ? *Probe to ensure route accurately documented. Use* **P** *to indicate parking,* **E** *to indicate start point and* **X** *to mark exit and mark route with a line. Use solid line for actual route and dotted line for expected / remaining route.*

TICK IF GPS USED INSTEAD: *GPS NO:* *START TIME:*

Q10 Was your route today a typical length for you? *Single tick only*

	1 Yes, normal			3 Shorter than normal
	2 Longer than normal			4 Not sure/visit erratically /first visit/no typical visit

Q11 What (if anything) influenced your choice of route today? *Multiple answers ok. Do not prompt. Tick closest answers as appropriate. Use free text box for reasons that didn't fit with categories/extra detail.*

	1 Rainfall			5 Time available
	2 Daylight			6 Muddy tracks/paths
	3 Cold			7 Presence of livestock
	4 Other users			8 Forestry Operations / Management

Free Text: other reasons / detail:

Q12 I'd now like to ask you more about how this general area is looked after. Do you feel supportive or opposed to the following taking place in the general area? *Tick as appropriate.*

	+ve	-ve	Neither / don't know	Comment
Tree clearance to create more open heathland				
Grazing with ponies				
Grazing with sheep				
Fencing				

Q13 Have you experienced any problems, in this general area, with the following user groups ? *Read out list, insert "other" to match interviewee. If problem, tick and then say:* **Please give details.**

		Details
	1 Motorbikes	
	2 Dog walkers	
	3 Horse Riders	
	4 Cyclists	
	5 Other Users	

Notes:

Q14 Do you have any other comments about this area?

Finally, so that we can check whether we have a representative sample, please answer the following questions. This information will not be used for anything else.

Q15 What is your full home postcode?
If unable/refusal to give postcode: **What is the name of the nearest village/town?**

Q16 How many of your party fall into the following age categories? *Enter number*

	1 Under 18			4 41-65
	2 18-40			5 Older than 65

Q17 Do you or any of your party have any mobility difficulties? *Single tick only*

	1 Yes			2 No		3 Don't know / refusal

THAT IS THE END. THANK YOU VERY MUCH FOR YOUR TIME

SURVEYOR TO COMPLETE AFTER INTERVIEW FINISHED:

Questionnaire No.:	Gender of respondent (M / F):	Group size (total people):
Date:	Number of dogs:	Surveyor:
Time:	Dog(s) seen off leads? Y/N	Interview location
Location:	Interview conducted part way through route (tick if yes)	Accompanying map? (tick for yes, x for no):

Appendix 2: Questionnaire 2 - used at Tangham only in the summer

S. Sandlings Visitor Survey

footprint ECOLOGY

Good am / pm. Please could you spare me some time to take part in a short survey about your visit today. The survey is being conducted for Suffolk Wildlife Trust and the Forestry Commission.

Q1 Are you on holiday and staying in this area or visiting from your home? *Tick closest, single answer only*

	1 On holiday
	2 Visiting from home
	3 Other: note details below:

If you are on holiday where are you staying?

	1 Camping at Tangham Forest Campsite
	2 Camping elsewhere
	3 Bed and breakfast
	4 Hotel
	5 Self catering
	6 Staying with friends/relatives
	7 Other: note details below (including town or village if provided):

Q3 Do you tend to visit this area at a certain time of day? *Tick closest, multiple answers ok*

	1 Before 9am
	2 Between 9am and 12
	3 Between 12 and 3pm
	4 Between 3 and 5pm
	5 After 5pm
	6 No / Don't know / first visit

Q4 How did you get here today? *single answer only. Add if necessary:* **What form of transport did you use?**

	1 Car
	2 on Foot
	3 By bike
	4 Other (write in)

Q5 How long have you spent / will you spend in the area ? *Tick closest, single answer only.*

	1 Less than 1 hour
	2 1 - 2 hours
	3 2 - 3 hours
	4 More than 3 hours

Q6 Do you tend to visit this area more at a particular time of year? *Multiple answers ok*

	1 Spring		4 Winter
	2 Summer		5 Don't know / 1st visit
	3 Autumn		6 Same all year

If same: **Does the area tend to be busier in the summer or the winter?**

	7 Summer		8 Winter
	9 Neither		10 Don't know

Q7 On average, over the past year, how often have you visited this area? By "this area" we mean Rendlesham / Tunstall Forests and adjacent heaths? *Tick closest answer. Single answer only.*

	1 Daily
	2 Weekly
	3 Monthly
	4 Less than once a month
	5 Less than once per year
	6 Don't know / first time

Q7 What is the main activity you are undertaking today? *NPt Multiple answers ok,*

	1 Dog walking		6 Horse riding
	2 Walking		7 Birdwatching / wildlife watching
	3 Exercise (inc jogging)		8 Other (write in):
	4 Outing with children/family		
	5 Cycling		

Q8 Aside from this location, do you visit any other places locally for similar purposes as you visited here today? *IF YES:* **which two or three do you use most often?** *Multiple answers ok. Do not prompt. Tick closest answers and add additional details at end. Max 3 ticks.*

	1 No other sites			10 Orford
	2 Sutton Heath			11 Aldeburgh
	3 Hollesley Common (Upper)			12 Coast at shingle st. / Bawdsey
	4 Hollesley Common (Lower)			13 Thorpeness
	5 Blaxhall Heath			14 Minsmere / Dunwich
	6 Tunstall Forest			15 Havergate / Orfordness
	7 Snape Maltings			16 Sutton Hoo
	8 Other Rendlesham Forest			17 Woodbridge / Melton (inc river wall)
	9 Friday Street			18 Iken

Additional details / sites / specific location:

Q9 *If on holiday*: **Whilst you have been staying in Suffolk, have you visited any of the following?** *If local:* **Have you visited any of the following in the last month? (read out the list)**

	1 Suffolk Punch Centre			7A tourist information centre (*name below*)
	2 Orford Ness National Trust			8 Aldeburgh and Thorpeness beaches
	3 Sutton Hoo			9 Snape Maltings
	4 Rendlesham Forest Cycle hire			10 An RSPB Reserve (*name below*)
	5 Tangham adventure play area			11 A Suffolk Wildlife Trust reserve (*name below*)
	6 Orford Castle			12 Dunwich Forest / Dunwich Cliffs

Free Text: other reasons / detail:

Now I'd like to ask you about your route today. Looking at the area shown on this map, can you show me where you parked (if travelling by car) and where you started your walk or visit today. And the finish point. And your route please ? **P** *= parking,* **E** *= start point and* **X** *= exit*

TICK IF GPS USED INSTEAD: *GPS NO:* *START TIME:*

Q11 What (if anything) influenced your choice of route today? *Multiple answers ok. Do not prompt.*

	1 Rainfall			5 Time available	
	2 Daylight			6 Muddy tracks/paths	
	3 Cold			7 Presence of livestock	
	4 Other users			8 Forestry Operations / Management	

Free Text: other reasons / detail:

Q12 What made you come here, specifically, rather than other local sites? *Multiple answers ok. NPt.*

	1 Don't know / others chose			10 No livestock
	2 Close to home/accom			11 Presence of livestock
	3 Short travel time from home/accom			12 Safe for dog to run off lead
	4 Good /easy parking			13 Good for dog/dog enjoys it
	5 Feel safe here/safety issues			14 Particular facilities at site
	6 Familiarity (with tracks/site etc)			15 Habitat (e.g. amount of tree cover/open habitat)
	7 Choice of routes/different circuits			16 Suitable for specific activity
	8 Attractive scenery/views			17 Mountain bike/cycle skills area
	9 Particular wildlife interest			18 Outdoor play area

Free Text: other reasons / detail.

Q13 How did you plan your trip today? *Multiple answers ok. Categorise as appropriate, do not prompt.*

	1 Website (*list websites below*)			5 Recommendation by accommodation
	2 Tourist Information Centre			6 General guide book (list below)
	3 Specialist magazine (list below)			7 Previous visit / local knowledge
	4 Saw it on map / OS Map			8 Information from other local attraction

Free Text / detail:

Q14 Are there additional facilities you would like to see here? *Don't prompt, categorise as appropriate and probe for more info where relevant*

	1 Educational facilities		6 Courses–forest skills etc		11 Free parking
	2 Cafe		7 WC/showers/first aid		12 Wildlife viewing
	3 Shop		8 Exhibitions art/history		13 More demanding mountain bike trails
	4 Arts / music performances		9 Go Ape!		
	5 Children / Family events		10 Staffed information point		

Other (please state):

Q15 What, if anything, would improve your visit here? ***Free text.***

If suggestions made ask: i**f these changes were made would you be more likely to come here more often?** *Categorise as appropriate. Multiple answers ok.*

	1 No change / wouldn't come back		2 Would visit again or visit more often		3 Would spend longer when here

Finally, so that we can check whether we have a representative sample, please answer the following questions. This information will not be used for anything else.

Q16 What is your full home postcode?
If unable/refusal to give postcode: **What is the name of the nearest village/town?**

Q17 How many of your party fall into the following age categories? *Enter number*

	1 Under 18			4 41-65	
	2 18-40			5 Older than 65	

THAT IS THE END. THANK YOU VERY MUCH FOR YOUR TIME

SURVEYOR TO COMPLETE AFTER INTERVIEW FINISHED:

Questionnaire No.:	Gender of respondent (M / F):	**Group size—** Adults: Children under 16:
Date:	Number of dogs:	Surveyor:
Time:	Dog(s) seen off leads? Y/N	Interview location
Location:	Interview conducted part way through route (tick if yes)	Accompanying map? (tick for yes, x for no):

Appendix 3: Density of Annex 1 bird species per hectare by habitat type with values greater than 0.01 highlighted in red.

		Nightjar (individuals per ha)					Woodlark (individuals per ha)					Dartford Warbler (individuals per ha)	
Habitat Type	**Area (ha)**	**2004**	**2007**	**2008**	**2009**	**2010**	**2006**	**2007**	**2008**	**2009**	**2010**	**2006**	**2009**
Agricultural Land	1876	0	0	0	0	0	0.004	0.002	0	0.001	0	0	0
Residential (Houses and Gardens)	131	0	0	0	0	0	0.008	0	0	0	0	0	0
Recreation	76	0	0	0	0	0	0.013	0	0	0	0	0	0
Inland water	26	0	0	0	0	0	0	0	0	0	0	0	0
Coniferous Trees	187	0.005	0	0	0	0.005	0.011	0	0	0.011	0	0.011	0
Mixed Trees	258	0.019	0	0	0	0.015	0.027	0.008	0	0.027	0.008	0.015	0.004
Nonconiferous Trees	348	0	0	0	0	0.003	0.006	0.003	0.003	0	0.006	0	0
Other Built	212	0.005	0	0	0	0	0.009	0.019	0.005	0.005	0	0	0
Paddocks/Equine	26	0	0	0	0	0	0	0	0	0	0	0	0
Other/Open	820	0.012	0	0.002	0	0.022	0.043	0.017	0.013	0.037	0.005	0.022	0.056
Marsh reeds or saltmarsh	28	0	0	0	0	0	0	0	0	0	0	0	0
Foreshore	23	0	0	0	0	0	0	0	0	0	0	0	0
High Forest	2037	0.018	0.002	0.004	0.003	0.005	0.002	0.004	0.001	0.002	0	0	0
Open	330	0.012	0.033	0.033	0.024	0.039	0.027	0.018	0.024	0.015	0.009	0	0
Partially Intruded Broadleaves (High Forest)	71	0.028	0	0.014	0	0	0	0	0	0.014	0	0	0
Felled	39	0	0	0	0.026	0	0	0	0	0.026	0.026	0	0
Residential	2	0	0	0	0	0	0	0	0	0	0	0	0
Agricultural Land	1	0	0	0	0	0	0	0	0	0	0	0	0
Other Built Facility	1	0	0	0	0	0	0	0	0	0	0	0	0
Christmas Trees	8	0	0	0	0	0	0	0	0	0	0	0	0
Research Plantation	2	0	0	0	0	0	0	0	0	0	0	0	0
Unplantable or Bare	1	0	0	0	0	0	0	0	0	0	0	0	0
Campsite	4	0	0	0	0	0	0	0	0	0	0	0	0
Car Parks/Picnic Areas	6	0	0	0	0	0	0	0	0	0	0	0	0
Burnt	2	0	0	0	0	0	0	0	0	0	0	0	0
Forestry Commission total	**2504**	**0.017**	**0.006**	**0.008**	**0.006**	**0.01**	**0.006**	**0.006**	**0.004**	**0.004**	**0.002**	**0**	**0**
Non Forestry Commission total	**4011**	**0.004**	**0**	**0**	**0**	**0.006**	**0.014**	**0.006**	**0.003**	**0.01**	**0.002**	**0.006**	**0.012**
Overall total	**6515**	**0.009**	**0.002**	**0.004**	**0.002**	**0.007**	**0.011**	**0.006**	**0.004**	**0.008**	**0.002**	**0.004**	**0.007**