FOOTPRINT ECOLOGY

Visitor surveys at European protected sites across Norfolk during 2015 and 2016

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Cover image: Walkers at Holkham.

Summary

This report provides a comprehensive analysis of current and projected visitor patterns to European protected sites across Norfolk. Visitor surveys were undertaken across Norfolk. The report is novel in that it combines data from multiple local authorities to predict changes in recreation use as a result of new housing planned across Norfolk. It also provides recommendations for mitigation and monitoring.

The work was commissioned by Norfolk County Council/the Norfolk Biodiversity Partnership (NBP) on behalf of all local planning authorities across Norfolk. The surveyed locations covered a range of European Protected sites, locations that are afforded strict protection within the planning system due to their importance for nature conservation. All the locations are also sites with public access and a potential risk whereby increased recreation levels could be damaging.

The work was carried out during 2015 and 2016 at 35 agreed sites. Analysis also drew on other data, for example planned residential growth (as allocated in current plans), provided by Norfolk County Council. The locations encompassed estuary, coast, heathland, wetland, grassland and woodland habitats. We grouped the points into seven broad geographic areas: the Brecks, the Broads, The East Coast, the North Coast, Roydon & Dersingham, the Valley Fens and the Wash. Surveys at each point involved 16 hours of survey work split evenly between weekdays and weekends and spread across daylight hours. As such fieldwork was standardised and broadly comparable.

Surveys took place at different times of year at different locations, with the timing targeted to coincide with times when wildlife interest (e.g. designated features of European Protected sites) was present and access was likely to be high. Fieldwork involved counts of people and interviews with a random sample of visitors.

Key findings relating to housing change, links to allocated new housing and implications include:

- A predicted 14% increase in access by Norfolk residents to the sites surveyed (in the absence of any mitigation), as a result of new housing during the current plan period.
- The increase will be most marked in the Brecks, where we predict an increase of around 30%. For the Broads the figure is 14%; 11% for the East Coast; 9% for North Norfolk; 15% for Roydon & Dersingham; 28% for the Valley Fens and 6% for the Wash (note these figures relate to the surveyed access points only and to visits by Norfolk residents).
- For parts of the North Coast, the Broads, and parts of the East Coast, the links between an increase in local housing and recreation impacts are less clear as these sites attract a high number of visitors coming from a wide geographical area, both inside and outside Norfolk. There are therefore likely to be pressures from overall population growth both from within the county and further afield.
- Potential/recommendations for mitigation and monitoring at all sites; in particular green infrastructure such as Suitable Alternative Natural Greenspace ('SANGs'); better signage; mobile warden teams and awareness raising campaigns.

Key findings from the visitor survey results include:

- Over half (52%) of interviewees were visiting from home and resident within Norfolk. Some 16% of interviewees had travelled from home on a short visit/day trip and lived outside Norfolk.
- In total 6,096 groups were estimated entering or leaving sites across all survey points. These groups consisted of 13,842 adults, 2,616 minors and 3,466 dogs.

- Dog walking (41%) and walking (26%) were the most popular activities overall, but with big variations depending on the sites. Within individual areas this first and second ranking of dog walking and walking was consistent for the East Coast, Roydon & Dersingham, the Valley Fens, the Wash and the North Coast.
- Two thirds (66%) of interviewees were on a short trip from home and around a third (32%) of interviewees were on holiday. Holiday-makers accounted for nearly half of all visitors interviewed at the North Coast and Broads.
- Holiday-makers were typically staying in self-catering accommodation (31%) or campsite/caravan sites (29%). In the Broads over half (59%) of the holiday makers interviewed were staying on a boat.
- The most commonly reported duration on site was 1 to 2 hours (31%), closely followed by between 30 and 60 minutes (27%). Key differences were the large proportion of interviewees visiting for more than 4 hours in the Broads (29% of interviewees) and conversely at Roydon, the large proportion visiting for less than 30 minutes (36%).
- Across all interviewees (including holiday makers), 31% of those interviewed were visiting the site for the first time. For those interviewees travelling from home on a short visit/day trip, over a quarter (27%) indicated they visited the site at least daily, reflecting high frequencies of use by local residents.
- Over three quarters (77%) of all interviewees had arrived at the interview location by car. Most of the remaining interviewees (18%) had arrived on foot.
- 'Close to home' was one of the main reasons people gave for choosing the site where interviewed that day. Scenery was particularly important for those visiting the North Coast.
- Just over a third (36%) of interviewees were aware of a designation/ environmental protection that applied to the site they were visiting.
- A total of 1,314 routes were mapped from the interviews, showing where people had walked during their visit. Median route length across all sites and all activities was 3.18km. Across all sites the typical (median) dog walk was 2.93km. Walkers covered a median distance of 3.7km while activities such as boating (median 7.64km) covered longer distances.

The results provide local authorities in Norfolk with information to underpin future reviews of local plans, Habitats Regulations Assessments and potential mitigation approaches. The results highlight how recreation change (particularly at the North Coast, the Broads and the Valley Fens) will be linked to development across multiple local authorities and solutions are likely to be most effective if delivered and funded in partnership. In other parts of the country strategic mitigation schemes have been established involving partnerships of local authorities delivering mitigation funded through developer contribution schemes. Such approaches would provide Norfolk authorities with an effective way of delivering mitigation and some recommendations for mitigation approaches are given.

Contents

Acknowledgements

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Survey work was undertaken by Sharon Lowen, Jack Rawlings, Chris Sadler & Doug Whyte. Data entry (route digitising) was undertaken by Zoe Chappell and Jack Rawlings.

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1. Introduction

Overview

1.1 The specific aims of this report are to improve understanding of the links between where people live in Norfolk and how they use the countryside – focussing on some of the most important sites for nature conservation in the county. The results have implications for future spatial planning in the county.

1.2 This report presents a comprehensive analysis of the results of visitor survey work at a range of sites across Norfolk. All the survey locations are internationally important wildlife sites, subject to strict national and international protections. An analysis of visitor patterns, including visitor numbers, access and use of such sites, can help inform how visitors impact on the landscape and the wildlife. Planners can then make evidence based decisions on the mitigation required to facilitate new development whilst ensuring protected areas are not adversely impacted. Results will also be useful to organisations and individual site managers responsible for managing access on the surveyed sites.

Background

1.3 A critical issue for UK nature conservation is how to accommodate increasing demand for new homes and other development without compromising the integrity of protected wildlife sites. Development around sites designated for nature conservation can bring particular issues, such as increasing the isolation and fragmentation of individual sites, and increasing levels of recreation. As the surrounding development increases the number of local residents rises, and areas that are important for nature conservation can fulfil a range of other services. This can include providing space for contemplation and recreation activities, ranging from the daily dog walk to extreme sports.

1.4 There is now a strong body of evidence showing how increasing levels of development, even when some distance away, can have negative impacts on protected wildlife sites. The issues are summarised in general reviews (e.g. Saunders *et al.* 2000; Lowen *et al.* 2008; Liley *et al.* 2010). A number of studies have provided compelling indications of the links between housing, development and nature conservation impacts, particularly on heathlands (Mallord 2005; Underhill-Day 2005; Liley & Clarke 2006; Clarke, Sharp & Liley 2008; Sharp *et al.* 2008) and coastal sites (Saunders *et al.* 2000; Randall 2004; Liley & Sutherland 2007; Clarke, Sharp & Liley 2008; Liley 2008; Stillman *et al.* 2009, 2012).

1.5 The sites selected for this project are all designated as European Protected sites. This means they have a high level of conservation protection and stringent restrictions on development activity. European Protected sites are known as Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). European sites are protected through the provisions of the Conservation of Natural Habitats and Species Regulations 2010 (SI no. 490), as amended, which transpose both the Habitats Directive (Council Directive 92/43/EEC) and the Wild Birds Directive (Council Directive 79/409/EEC) into

UK law. These regulations are henceforth referred to as the "Habitats Regulations". Sites listed as Ramsar sites are afforded the same level of protection as a matter of government policy[1].

1.6 SPA, SAC and Ramsar sites are covered by the Habitats Regulations, which transpose the EU level Habitats Directive. The protections provided by the Regulations mean that the competent authorities can only agree to development which is likely to have a significant effect if it will not adversely impact on the integrity of the site (subject to imperative reasons of over-riding public interest and consideration of alternative solutions). Any new local development or strategic development plan must therefore address the potential impact of any expected increase in recreational activities.

1.7 The competent authorities must adhere to these strict protections. However, they also need to take into account that there is an increasing understanding and acceptance in the conservation sector of the multiple roles played by nature reserves and designated sites, and an increased willingness to take into account the desires and needs of different user groups.

1.8 In the past, access and nature conservation have been viewed as opposing goals and (Adams 1996; Bathe 2007) nature reserves often restricted visitor numbers and access (e.g. through permits, fencing and restrictive routes). While this continues to be the case in certain areas which warrant such measures, generally access is being improved. For example, the current Government policy to increase access around the English coast.

1.9 There is also a growing recognition that people need nature for their physical, mental and spiritual wellbeing (Tansley 1945; Snyder 1990; Hammond 1998; English Nature 2002; Miller & Hobbs 2002; Alessa, Bennett & Kliskey 2003; Morris 2003; Pretty *et al.* 2005; Saunders 2005; Robinson 2006). Furthermore, visiting a nature reserve can play a positive role in engendering support and awareness of nature conservation; and there is evidence to suggest that an emotional affinity with nature plays a role in individuals' motivation to protect nature (Kals, Schumacher & Montada 1999). Increasing peoples' connection to the natural environment may therefore be more effective than establishing laws and rules (Kaplan 2000).

Norfolk Sites

1.10 Within Norfolk there are a range of European Protected sites encompassing estuary, coast, heathland, wetland, grassland and woodland habitats and designated for a range of species. The sites include extensive areas such as the Broads, the North Norfolk Coast, the Wash and the Brecks. Smaller sites include Roydon and Dersingham Bog, and the Norfolk Valley Fens. Some of these sites support multiple designations. SAC and SPA designations often overlap and many are also Ramsar sites. Maps 1 and 2 show the range of sites, with Map 1 showing all the SAC sites and Map 2 the SPAs (for simplicity we have omitted mapping the Ramsar sites).

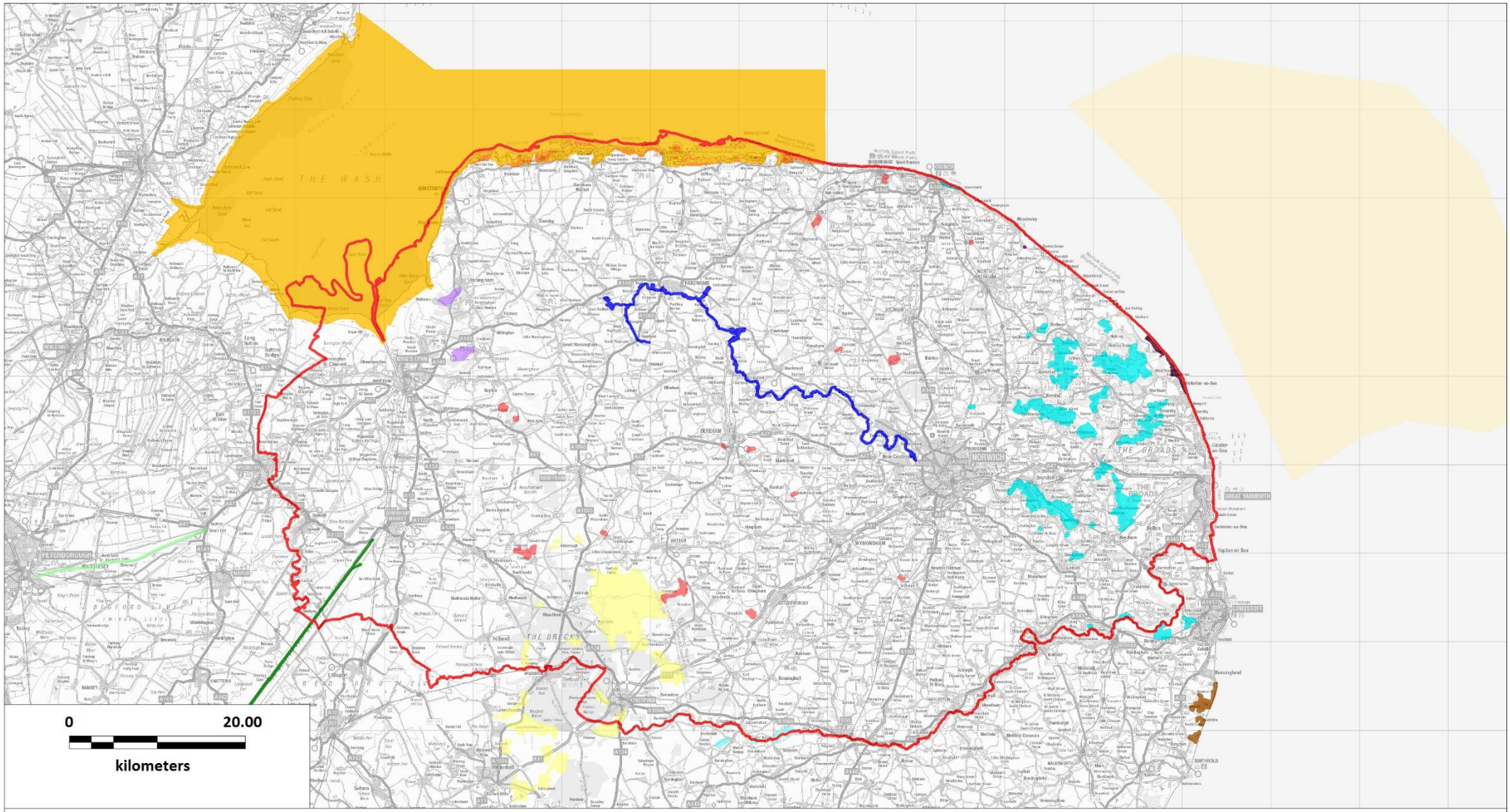
[1] see Section 118 of the National Planning Policy Framework.

1.11 Most of the European Protected sites have varying levels of public access, ranging from a simple network of public footpaths to nature reserves with marked trails and hides. Some sites are open access land, with a right of access on foot across the site under the CRoW Act (2000). Some sites have extensive tourist infrastructure. At the Broads and along the North Norfolk Coast, much access is on the water (boating and water-sports) as well as the land.

1.12 There are a wide range of interest features for the various sites. We summarise these in Table 1 and list some of the possible impacts from recreation. More detailed assessment may identify additional factors and, as such, the table is not intended to be comprehensive, but it broadly indicates how changes in recreation use may have likely significant effects on the relevant sites.

1.13 Across Norfolk, new housing development will lead to an increase in the number of people living near some of these European Protected sites. This will lead to increasing levels of recreational visitors to the sites. Given these issues, we were commissioned to produce this report to provide local authorities with the information they need to be able to work together to balance growth and the nature conservation issues, in particular ensuring compliance with the Habitat Regulations. We make predictions of the changes in recreational use (in the absence of mitigation) which will allow local authorities to understand the potential impacts of growth and target mitigation where it is necessary.

Map 1: SAC sites in and around Norfolk



Map 2: SPA sites in and around Norfolk

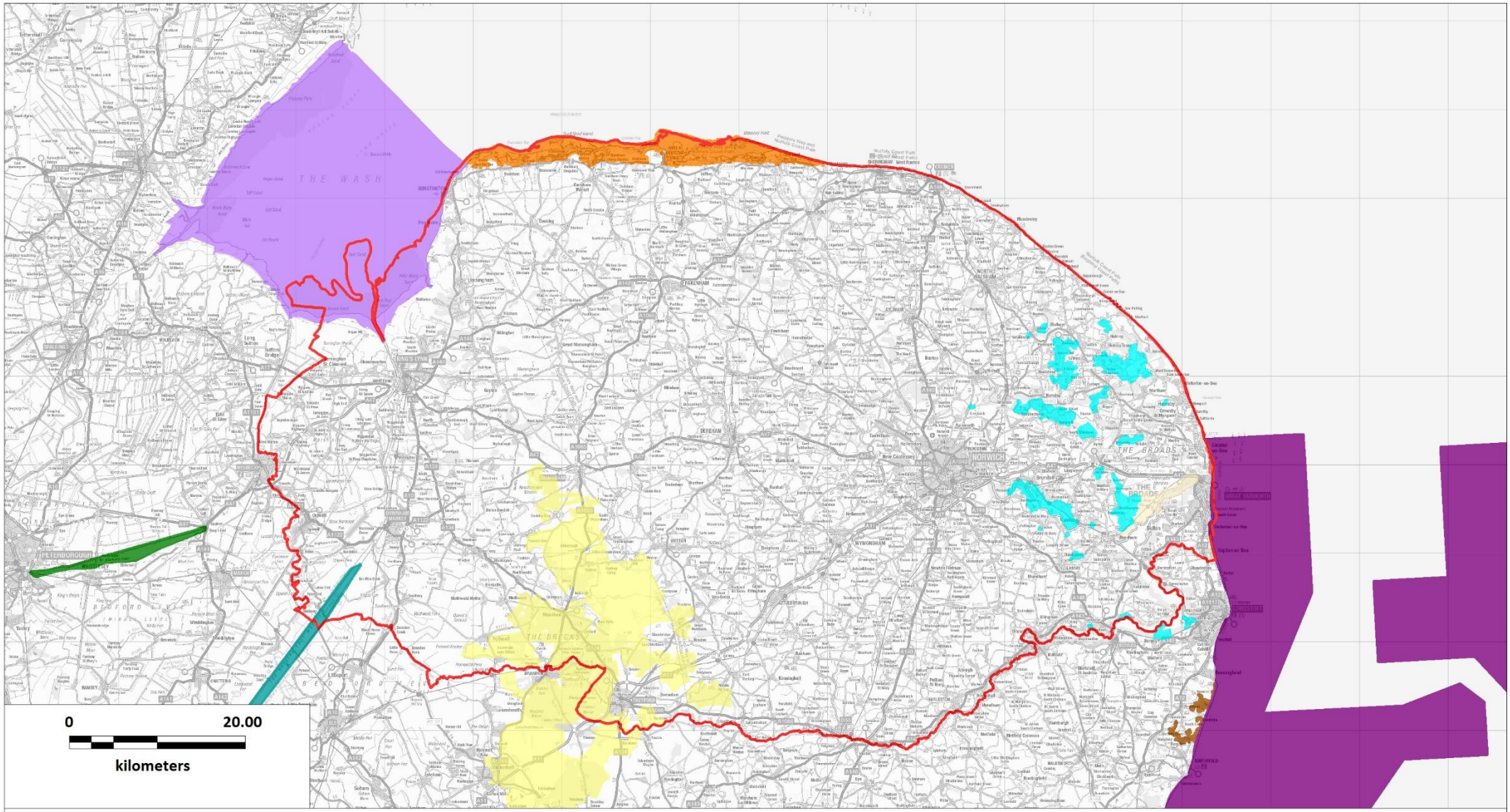


Table 1: Broad summary of key sites and some of the potential general impacts from recreation to the European Site interest features. Trampling/erosion covers loss of vegetation cover, wear, soil compaction, run-off etc; eutrophication covers nutrient enrichment (e.g. from dog fouling), contamination relates to impacts such as spread of alien species.

Summarised area	European Sites	Relevant Designation	Disturbance to breeding birds	Disturbance to wintering/passage birds	Disturbance to non-avian interest	Trampling/erosion	Increased fire risk	Eutrophication	Contamination
Brecks	Breckland	SAC/SPA	✓			✓	✓	✓	✓
Valley Fens	Norfolk Valley Fens	SAC				✓?	✓	✓	✓
North Coast	North Norfolk Coast	SAC/SPA/Ramsar	✓	✓	✓	✓		✓	✓
Roydon & Dersingham	Roydon Common & Dersingham Bog	SAC/Ramsar	✓[1]			✓	✓	✓	✓
Broads	The Broads/Broadland	SAC/SPA/Ramsar	✓	✓		✓		✓	✓
Wash	The Wash	SAC/SPA/Ramsar	✓	✓	✓	✓	✓	✓	✓
East Coast	Winterton Horsey Dunes/ Great Yarmouth North Denes	SAC/SPA	✓	✓		✓	✓	✓	✓
East Coast	Breydon Water	SPA/Ramsar	✓	✓					

[1] Note that while Roydon Common & Dersingham Bog are not designated as SPAs, both have supported notable numbers of nightjars in recent year (Bright *et al.* 2010; NNNS 2014) and Roydon Common also supports a hen harrier roost.

2. Methodology

2.1 In this section of the report we provide details of our methodology.

2.2 The survey was designed to provide a snapshot of access patterns at a selection of access points onto European Protected sites. It was not designed to give accurate estimates of annual visitor numbers to each European site. Together with the local and county authorities and a range of organisations we agreed a sample of survey locations which represented the full range and types of site within the county. We timed survey work to coincide with periods when the nature conservation interest at each location was potentially the most sensitive, and when people were likely to be visiting.

Selection of Survey Sites

2.3 Potential survey points were identified at a workshop held in Norwich on the 26th February 2015. Surveys were focussed on sites within Norfolk. Participants from a range of organisations[2] selected survey points from the following broad geographic areas:

- The Coast (The Wash and North Norfolk Coast SAC; North Norfolk Coast SAC; The Wash SPA; North Norfolk Coast SPA)
- The Brecks (Breckland SPA; Breckland SAC)
- The Broads (Broadland SPA; The Broads SAC; Breydon Water SPA)
- Other (Great Yarmouth North Denes SPA; Norfolk Valley Fens SAC; Roydon Common and Dersingham Bog SAC; Winterton-Horsey Dunes SAC)

2.4 Each group was tasked with listing 10 main survey points and up to five additional points. Survey points had to fulfil the following criteria:

- Relevant to European Protected sites and their interest features;
- Relevant to areas where housing growth was likely to occur, for example easily accessible by road from settlements with new housing;
- Focussed around locations with parking, as new housing will mostly be beyond walking distance to European Protected sites;
- Locations where access and nature conservation interest coincide, i.e. where access has the potential to have an impact on vulnerable interest features;
- Capturing a range of sites, interest, seasons and issues;
- Ensuring good geographic spread;
- Safe to survey and suitable to interview people;

2.5 Following the workshop, we digitised the survey points, checked some potential survey locations on the ground and finalised a list with the steering group to match the available budget (40 survey points in total) and workshop suggestions. Selected survey

[2] Natural England, RSPB, National Trust, The Wash and North Norfolk Coast Europe
an Marine Site Management Scheme, Norfolk Coast Partnership, Holkham Estate, Norfolk Wildlife Trust, Broads Authority, Forestry Commission, Norfolk County Council, Norfolk Biodiversity Partnership, South Norfolk Council, Breckland Council, Kings Lynn and West Norfolk Borough Council, Norwich City Council, North Norfolk District Council, Broadland District Council, Great Yarmouth Borough Council.

points are shown in Map 3 (all survey points) and details of each point are given in Appendix 1. It should be noted that there were a number of sites which were surveyed twice, in summer and winter, at these locations we have assigned another, different survey point number to the summer/winter repeat. Throughout the rest of the report and in the Appendices we have grouped survey points into seven broad geographic areas as follows:

- Brecks (Breckland SPA; Breckland SAC) – 9 survey points
- Broads (Broadland SPA; The Broads SAC) – 7 survey points
- East Coast (Breydon Water SPA; Great Yarmouth North Denes SPA; Winterton-Horsey Dunes SAC) – 7 survey points
- North Coast (North Norfolk Coast SAC; North Norfolk Coast SPA, The Wash and North Norfolk Coast SAC - *partial*) – 10 survey points
- Roydon & Dersingham (Roydon Common and Dersingham Bog SAC) – 1 survey point
- Valley Fens (Norfolk Valley Fens SAC) – 2 survey points
- Wash (The Wash SPA; The Wash and North Norfolk Coast SAC - *partial*) – 4 survey points

Survey Effort and Timing of Surveys

2.6 Each survey point (individual numbered location) was surveyed for a total of 16 hours, with survey effort split equally over a weekday and a weekend day. Survey work was undertaken in four two-hour time slots to ensure coverage across the day and provide eight hours survey in a single day. The exact timing of these slots were adjusted depending on day-length. Between April and September the timing of surveys was as follows: 07:00-09:00; 10:00-12:00; 13:00-15:00; 17:00-19:00. While for winter surveys (between October and March) the following timings were used: 07:30-09:30; 10:00-12:00; 12:30-14:30; 15:00-17:00.

2.7 The one site where timings had to be adjusted to reflect gate opening times in these timings was at Thetford High Lodge (survey point 11). To ensure a consistent eight hour survey window the following timings were used: 09:00-11:00; 11:30-13:30; 14:30-16:30; 17:00-19:00.

Fieldwork methods

2.8 Survey work involved counts of people and face-face interviews with a random sample of visitors, following methods used widely by Footprint Ecology (e.g. Clarke *et al.* 2006; Liley, Jackson & Underhill-Day 2006; Cruickshanks, Liley & Hoskin 2010; Fearnley, Clarke & Liley 2010; Liley, Fearnley & Cruickshanks 2010; Fearnley, Liley & Cruickshanks 2011; Fearnley & Liley 2012; Fearnley, Liley & Cruickshanks 2012).

2.9 Surveyors were stationed at the survey point and counted visitors, in most cases maintaining a simple tally of people entering/leaving the site from the survey point. At some locations the tally reflected visitor flows along a particular path or through a gate way and the count area was carefully selected at each survey point to reflect the area visible to the surveyor.

2.10 This tally data provides basic information on the visitor flows (number of people, groups, minors and dogs) passing each access point. However at busy locations maintaining the accuracy of the tally becomes extremely difficult to do whilst also interviewing. The two sites at which tallies became approximate were at High Lodge (survey point 11) and at Holkham during the summer (33). At Holkham the site was the busiest location, and for a single survey session the tally total was a rounded estimate due to the extreme volume of visitors. At High Lodge the survey point was not the busiest, however there is very open access from a large car-park and as such counting was difficult and the values are considered approximate estimates.

2.11 Surveyors interviewed a random sample of people passing by approaching the next person seen (if not already interviewing). On busy sites the surveyors only targeted people for interviews that were leaving the site (i.e. completing their visit). On quiet sites, surveyors interviewed people entering and leaving. No unaccompanied minors were approached for interviews. Surveyors only interviewed those individuals who were using the site rather than staying in the car park (at some sites many cars were only stopping while drivers had a break).

2.12 The questionnaire (Appendix 2) was hosted on tablets and designed using SNAP survey software (version 11). As part of the questionnaire, the surveyor asked the interviewee where they had been (or planned to go). Routes were recorded as lines on paper maps, with the map shown to the interviewee and as necessary cross-referenced to landmarks and features at the site. The routes were then digitised to GIS (QGIS version 2.8.2-Wien). In the Broads, for visitors who were on boating holidays, and at sites such as Morston where visitors were sometimes participating in guided tours on boats, we still recorded routes, but of their boats' route of that day. These routes were often harder to record as some visitors did not have a good idea of where they were stopping. Moreover, for those on boating holidays often only a start and end point was known for the day and as such the route taken was very approximate.

Coverage and site specific issues

2.13 The two survey days (16 hour site surveys) were typically conducted over a few dates, usually either side of a weekend, but they could be spread over several days (on average three days between first and second survey day). The largest survey window was at Horsey Windpump (survey point 17) with a gap of 23 days between survey days. This gap was deliberate and intended to provide a survey day in early December (early in the seal visiting period) and one late in December (during Christmas holidays and at the peak of the seal visiting). This enabled us to average results over the seal pupping period as a whole.

2.14 There were issues at some survey points which affected the ability of surveyors to complete work at the sites. These incidents involve surveyors feeling threatened and having to leave the site. This resulted in partially completed surveys. We give the survey coverage by site in Table 2 and in total over 98% of the scheduled fieldwork was completed. Partially completed surveys/issues were encountered at:

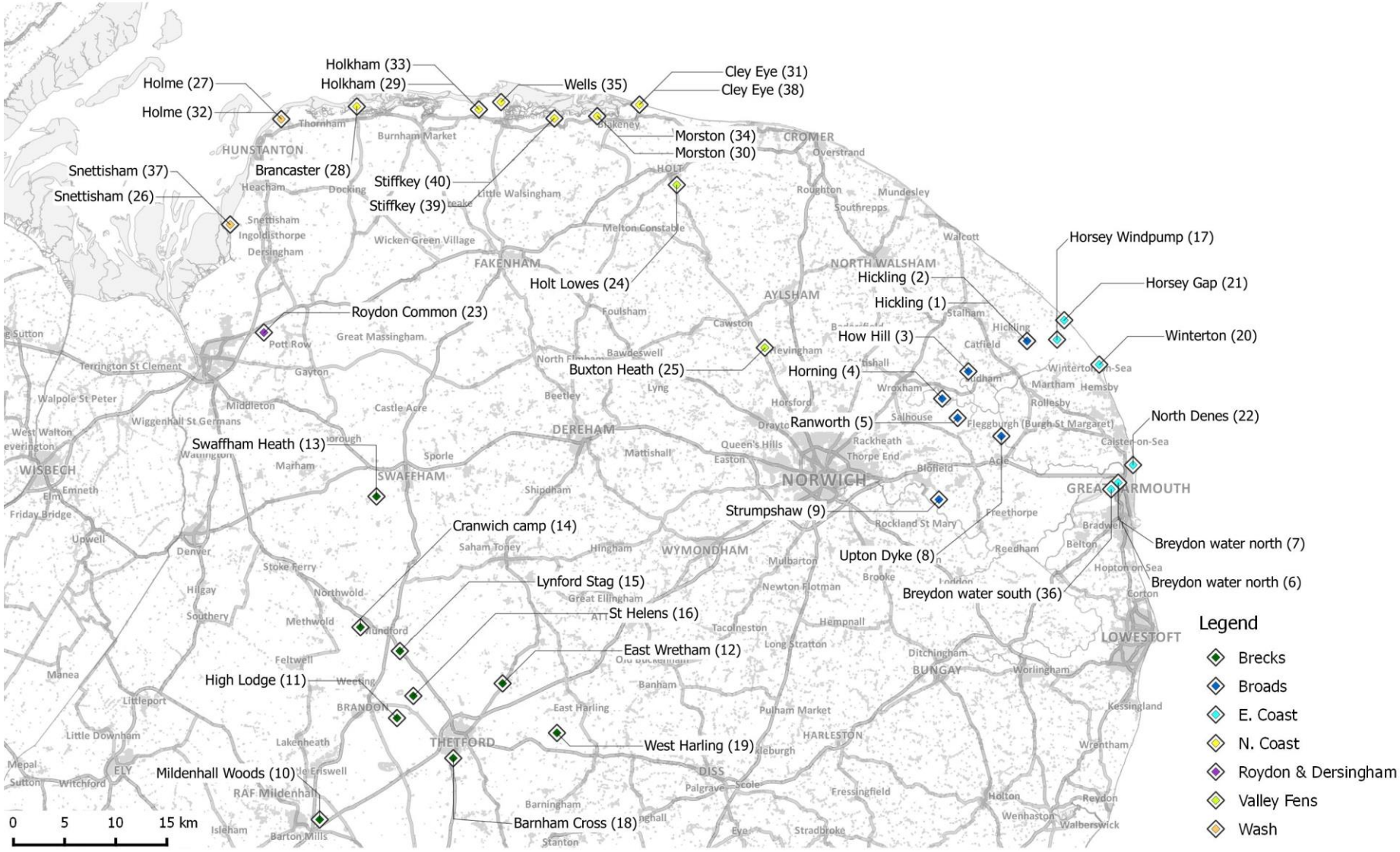
- Breydon Water north (survey point 7) last survey session on the weekend was stopped part way through (at 18:20); off-road motorbikes were being driven aggressively along the seawall. The surveyor left the area as they felt unsafe and to avoid any risks.
- Mildenhall Woods (survey point 10), no coverage during the last session on the weekend and the most of the weekday sessions, due to location clearly used as a meeting point for public sex.
- St Helens (survey point 16), had partial coverage during one of the weekday sessions. On the weekend day the surveyor had to abandon a session halfway through and the last sessions were not completed. In all cases this was due to the location being clearly used as a meeting point for public sex.
- Lynford Stag (survey point 15), had similar problems to Mildenhall Woods and St Helens. However, due to the large nature of the car park, the surveyor persisted and continued to interview users who were accessing the site. A characteristic of this site was that the majority of people driving into the car park did not leave their car, and the site is regularly used as a car/van stop. People who remained in their cars were not counted at any site as part of the tally totals.

2.15 Where there were issues with survey completeness we adjusted tally totals for incompleteness. The results are estimates, but allow comparison to all other survey points. However interview data could not be adjusted and reported results should be considered with this in mind.

Table 2: Survey work timing and completeness. Note: The Local Planning Authorities in which the survey points were located are listed. This includes the Broads National Park as an area.

ID	Location	Area (Norfolk LPA)	Survey window	Percentage of survey window completed (%)
18	Barnham Cross	Brecks (Breckland)	19-20th July 2016	100
14	Cranwich Camp	Brecks (Breckland)	9-13th March 2016	100
12	East Wretham	Brecks (Breckland)	12-14th June 2015	100
11	High Lodge	Brecks (-)	18-21st June 2015	100
15	Lynford Stag	Brecks (Breckland)	19-21st June 2015	100
10	Mildenhall Woods	Brecks (-)	13-17th June 2015	51
16	St Helens	Brecks (Breckland)	15-19th March 2016	77
13	Swaffham Heath	Brecks (Breckland)	13-15th June 2015	100
19	West Harling	Brecks (Breckland)	13-16th June 2015	100
2	Hickling Broad (S)	Broads (Broads NP)	19-23rd June 2015	100
1	Hickling Broad (W)	Broads (Broads NP)	16-22rd November 2015	100
4	Horning	Broads (Broads NP)	26-27th July 2015	100
3	How Hill	Broads (Broads NP)	12-13th June 2015	100
5	Ranworth	Broads (Broads NP)	24-25th July 2015	100
9	Strumpshaw Car Park	Broads (Broads NP)	5-9th June 2015	100
8	Upton Green	Broads (Broads NP)	11-14th June 2015	100
7	Breydon Water north (S)	E. Coast (G Yarmouth)	14-16th May 2015	97
6	Breydon Water north (W)	E. Coast (G Yarmouth)	9-11th January 2016	100
36	Breydon Water south	E. Coast (Broads NP)	8-10th January 2016	100
21	Horsey Gap	E. Coast (N Norfolk)	3-5th January 2016	100
17	Horsey Windpump	E. Coast (Broads NP)	5-29th December 2015	100
22	North Denes	E. Coast (G Yarmouth)	18-22nd July 2015	100
20	Winterton	E. Coast (G Yarmouth)	18-22nd July 2015	100
28	Brancaster	N. Coast (N Norfolk)	15-17th January 2016	100
31	Cley Eye (S)	N. Coast (N Norfolk)	23-27th July 2015	100
38	Cley Eye (W)	N. Coast (N Norfolk)	10-12th January 2016	100
33	Holkham (S)	N. Coast (N Norfolk)	2-7th July 2015	100
29	Holkham (W)	N. Coast (N Norfolk)	16-18th January 2016	100
34	Morston (S)	N. Coast (N Norfolk)	22-28th June 2015	100
30	Morston (W)	N. Coast (N Norfolk)	3-14th November 2015	100
40	Stiffkey (S)	N. Coast (N Norfolk)	23-28th June 2015	100
39	Stiffkey (W)	N. Coast (N Norfolk)	16-19th January 2016	100
35	Wells	N. Coast (N Norfolk)	23-26th July 2015	100
23	Roydon Common	Roydon & Dersingham (KL and W Norfolk)	26-28th June 2015	100
25	Buxton Heath	Valley Fens (Broadland)	10-17th May 2015	100
24	Holt Lowes	Valley Fens (N Norfolk)	24-28th June 2015	100
27	Holme (S)	Wash (KL and W Norfolk))	17-18th July 2015	100
32	Holme (W)	Wash (KL and W Norfolk))	15-18th January 2016	100
37	Snettisham (S)	Wash (KL and W Norfolk))	25-27th June 2015	100
26	Snettisham (W)	Wash (KL and W Norfolk))	10-19th September 2015	100

Map 3: Survey point locations. Locations with repeat surveys are ordered with summer first then winter second.



2.16 Surveys were conducted at a range of times during the year, reflecting when nature interest and/or pressures were greatest at the survey location. However this does mean direct comparison between the survey points should be undertaken with care. Table 3 shows the seasonal distribution of surveying for each area and should be considered when interpreting results. Interview data presented in the results is not weighted by the number of interviews. As such survey points with more interviews have a greater influence on the total and survey points are therefore not evenly represented in this manner. This is still considered valid when considering overall totals for areas, but we do draw attention to the influence of survey points and variability within these. We highlight where differences are significant later in the report.

Table 3: Seasonal distribution of survey points for each area across months, shown as a percentage of the number of surveys from the total for each area.

Month	Survey area (number of survey points shown in brackets)						
	Brecks (9)	Broads (7)	E. Coast (7)	N. Coast (10)	Roydon & Dersingham (1)	Valley Fens (2)	Wash (4)
Jan			43%	40%			25%
Feb							
Mar	22%						
Apr							
May			14%			50%	
Jun	67%	57%		20%	100%	50%	25%
Jul	11%	29%	29%	30%			25%
Aug							
Sep							25%
Oct							
Nov		14%		10%			
Dec			14%				

2.17 Weather during 2015 was overall fairly average. Notable deviations were in summer which was cooler and wetter; high rainfall during late autumn and mild temperatures in November and December[3]. These general climatic conditions for the year can affect visitor totals. Moreover, while every effort was made to avoid surveying on days with adverse weather, sometimes such conditions were impossible to avoid.

2.18 A summary of the weather conditions for individual survey points is provided in Appendix 3. No survey point had constant rain for the entire survey period. However at Horsey Gap (survey point 21), there was at least some rainfall during seven of the eight sessions. This was during a particularly wet period in November, although temperatures were mild. The five other survey points which had rainfall recorded at some point during more than half of sessions. These were Hickling (winter survey point 1), Horning (4), Ranworth (6), Cley Eye (31), Morston (34). With the exception of Horsey Gap (21),

[3] http://www.metoffice.gov.uk/climate/uk/summaries/2015/annual

mentioned previously, and Hickling (1) which were conducted in the winter, the four other survey points were during the unseasonally wet periods in June and July.

New housing data and predictions of changes in access

2.19 Data on current housing (February 2016) are held by Footprint Ecology, in the form of modified postcode datasets that give the number of residential properties per postcode. Data on prospective housing were provided by Norfolk County Council, and reflected a combined GIS layer indicating residential allocated sites over the current plan periods for all Norfolk authorities, as well as those which have come forward outside of planned growth (i.e. 'windfall' sites) during the year 2014/15. Not all the windfall sites will necessarily be granted planning consent. This future housing layer is therefore a best estimate of future development based on current knowledge. Further background (provided by Norfolk County Council) on how these data were compiled are given in Appendix 4.

2.20 Within the GIS we plotted concentric rings (2km intervals, out to 40km) around each survey point. Within each of these concentric rings – or buffers – we extracted the number of interviewees (from home postcodes obtained in surveys), the number of current houses and the number of future houses. We then divided the number of interviewee postcodes at each distance band by the number of residential properties within that distance band, to give the proportion of postcodes at a given distance band generated by the survey.

2.21 These values do not equate to visit rates, as only a sample of the total number of visitors at each survey point were interviewed. However the values do give an indication of the 'draw' of each site and how that draw changes with distance. The data were averaged for each survey point within our seven areas to generate a plot for each area showing the relationship between the proportion of residents interviewed at each distance.

2.22 Lines fitted to these plots reflect how visitor use 'decays' with distance and the equations from the fitted lines were applied to allocated and 2014/15 registered residential planning application data to make predictions of how visitor rates might change in the future under the development scenario provided by Norfolk County Council. As we only used allocation and registered planning application data from Norfolk the predicted change in access reflects the change associated with Norfolk residents only – i.e. we would expect greater increases than predicted as there will be additional growth in other areas outside Norfolk that we have not tried to factor into our predictions.

3. Survey results

Tally counts

3.1 During the 16 hours of survey at each survey point, our surveyors recorded the numbers of adults, minors and dogs entering and leaving sites as a tally during the entire period. For the survey locations with incomplete sessions (see methods above and Table 2), the numbers of adults, minors and dogs were extrapolated proportionate to the amount of data collected. Although only an approximation, we consider these data sufficiently accurate for analysis. The estimated data makes up only 1.9% of all surveying hours, and at the most 8% in a single area (Brecks, Table 4).

3.2 In total, including the estimated data, 6,096 groups were recorded entering or leaving sites (e.g. passing the surveyor) across all survey points. These groups consisted of 13,842 adults, 2,616 minors and 3,466 dogs. The totals give an idea of the footfall recorded during the standardised survey periods. Table 4 shows the adjusted total number of people/dogs recorded entering and leaving from tally counts for individual areas as well as the number of survey points and the percentage of survey sessions completed. This data is also shown on Map 4.

Table 4: Summary of the total number of people and dogs counted during tally sessions. Values presented include adjustments made to values for individual survey points with incomplete sessions.

	Number of survey points	Overall % of sessions completed	Total number of groups	Total number of adults	Total minors	Total dogs
Brecks	9	92.0	827	1,444	244	583
Broads	7	100	749	1,596	246	114
E. Coast	7	99.6	1,016	2,645	800	486
N. Coast	10	100	2,545	6,073	1,067	1,446
Roydon & Dersingham	1	100	47	71	5	35
Valley Fens	2	100	92	163	24	81
Wash	4	100	820	1,850	230	721
Total	**40**	**98.1**	**6,096**	**13,842**	**2,616**	**3,466**

3.3 There was considerable variation between survey points in the total number of individuals entering and leaving. This variation is shown in Figure 1 of the average number of people per hour (adults and minors) recorded. The highest single total for a survey point was at Holkham during the summer (survey point 33), where 1,928 people were recorded passing during all survey sessions, closely followed by Horsey Gap during the winter, 1,891 people (this is despite bad weather conditions at the latter). These equated to an average of 120 people per hour, and are both shown as outliers in Figure 1 .The other outlier value shown in Figure 1 was in the Brecks, for High Lodge (947 people, equivalent to 82 people per hour).

3.4 By area the highest numbers of people recorded from tallies was for the North Coast and Wash sites (Figure 1). Lowest median values were at the three areas of the Brecks, Roydon & Dersingham, and the Valley Fens, with typically 8 people per hour. At these three sites the range of visitors numbers recorded by survey point was relatively small (excluding the High Lodge outlier). However, comparison of average values for areas suggest the differences between areas were not significantly different (ANOVA, df=6, F= 1.691, P=0.154).

3.5 As the seasonal timings of these surveys are not strictly comparable, direct comparison between areas is not necessarily straight forward. Clearly many sites will be busiest in the summer, during periods of good weather. These formed the majority of surveys for those on the Broads and the Brecks (see Table 3). Conversely at other sites such as the North Coast there was roughly an even split between the summer and winter surveys (and on the North Coast many of the survey locations were surveyed in both the summer and the winter). Despite the relatively high winter focus compared to other sites, the North Coast survey points had high recorded footfall and therefore clearly do represent some of the busiest areas.

3.6 Winter surveys were dominant in the surveys on the East Coast, and as such would have been expected to pick up a lower footfall. However, coastal sites can often remain popular during winter, and the footfall presented in Figure 1 is heavily influenced by the outlier for Horsey Gap which had extremely high visitor numbers. The draw for visitors at this time of year, seal pupping season, is an unusual, but annual event. Results from here during pupping time will not be indicative of the usual pressure across the year. However the pupping period clearly represents the period when the site attracts the most visitors.

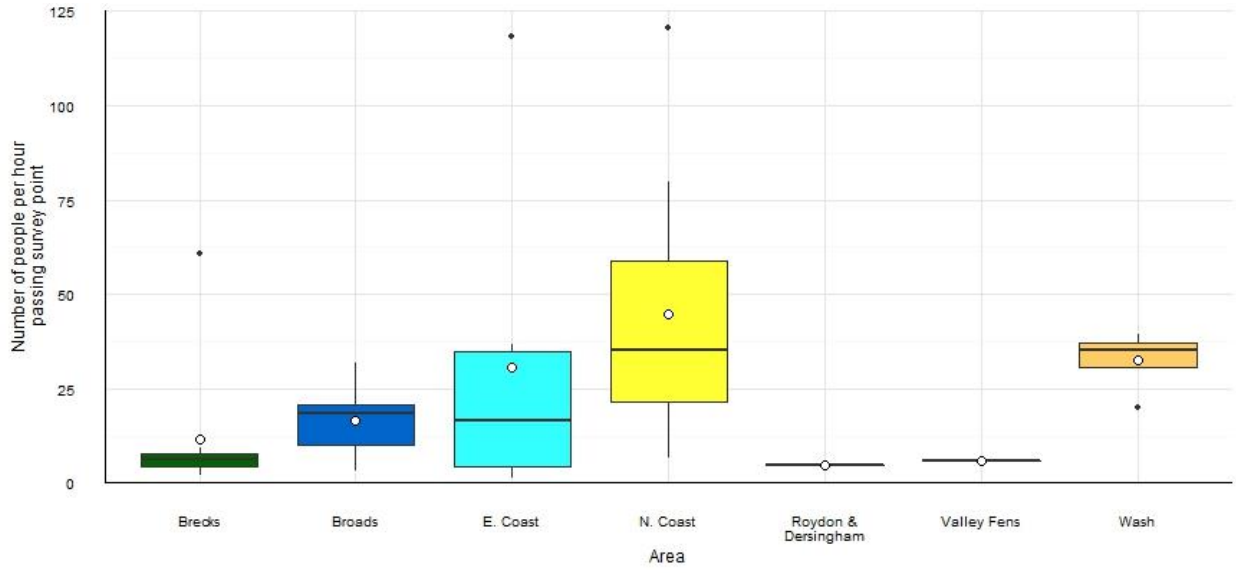


Figure 1: The average number of people (adults and minors) recorded passing each survey point in an hour, show as boxplots and averages (white dots). The data used to create boxplots and averages shown were averages for each of the survey points.

3.7 The tally data also gives basic information on the types of visitors using sites. The number of dogs and minors recorded relative to the number of adults shows some variation between locations (Figure 2). Overall, across all survey points, 69% of individuals passing were adults, 13% minors and 18% dogs. Survey points within the Broads usually had a very low proportion of dogs recorded from tallies, just 6%. Areas with a very high proportion of dogs were in Roydon & Dersingham, and in the Valley Fens, with 32% and 30% dogs from tallies. The Brecks and the Wash were also relatively high, both with 26% dogs across all survey points. The highest relative number of minors was recorded in the East Coast surveys (20% minors) and the lowest at Roydon & Dersingham (5%).

3.8 We examined numbers of adults, minors and dogs for differences between areas. The only measures which had any statistical significance was for the number of dogs between areas (df=6, K-W χ^2=19.679, p= 0.019).

3.9 The total numbers for each group are also shown for individual survey points in Figure 3. This figure also serves to show which sites contribute to the variability in total numbers of individuals/dogs recorded at sites as summarised from Figure 2. Individual sites with a high proportion of minors (>25%) were Hickling Broad in the summer (survey point 2) and Horsey Gap (survey point 21).

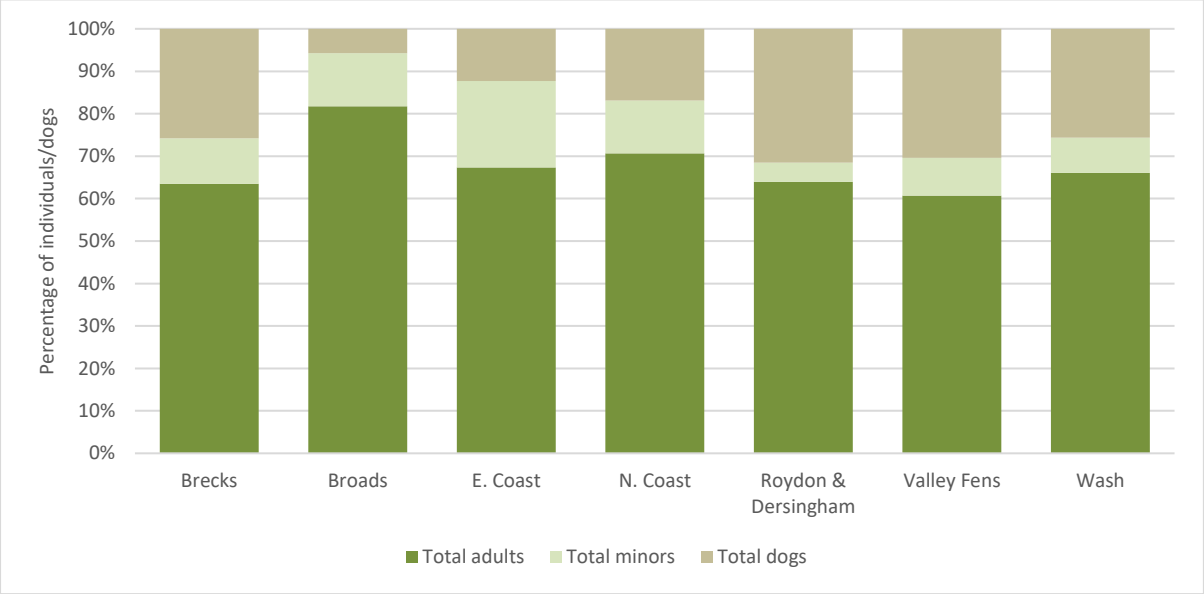


Figure 2: Proportion of adults, minors and dogs recorded during tallies at each survey point location grouped by area.

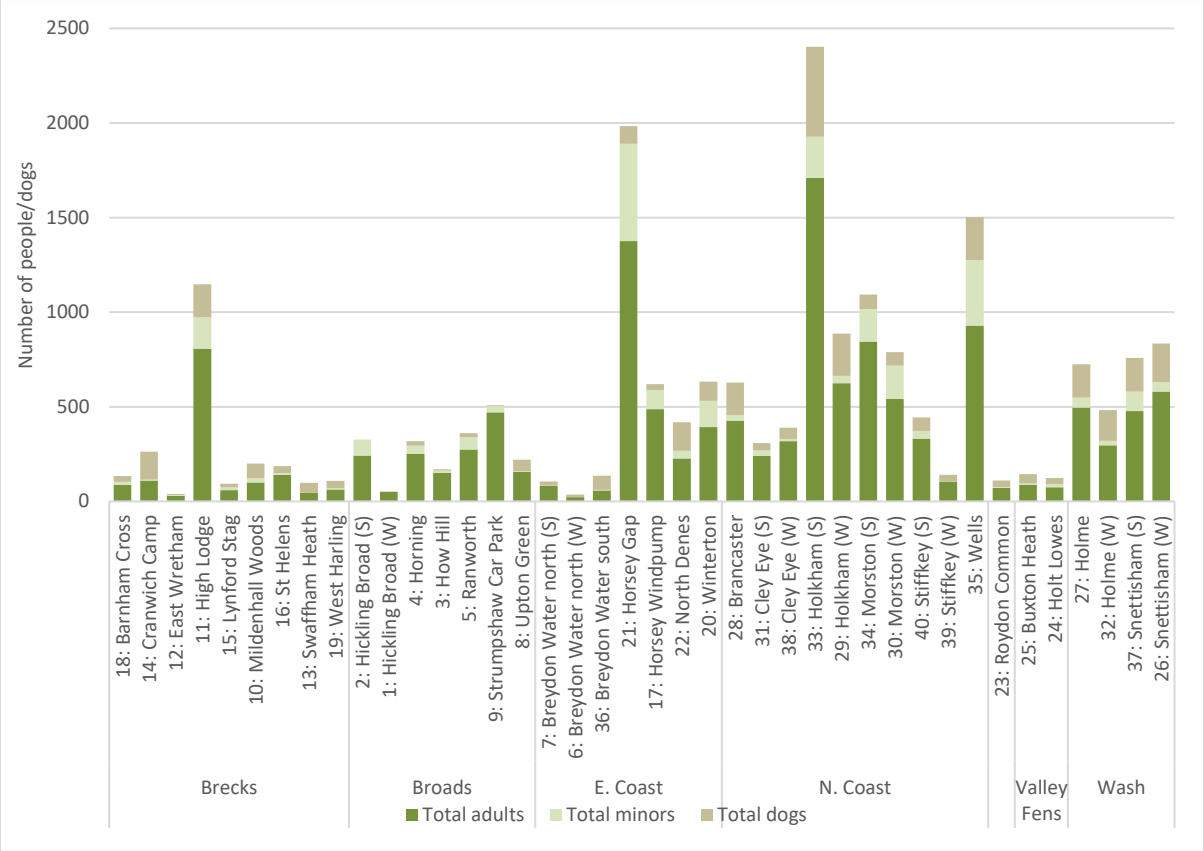
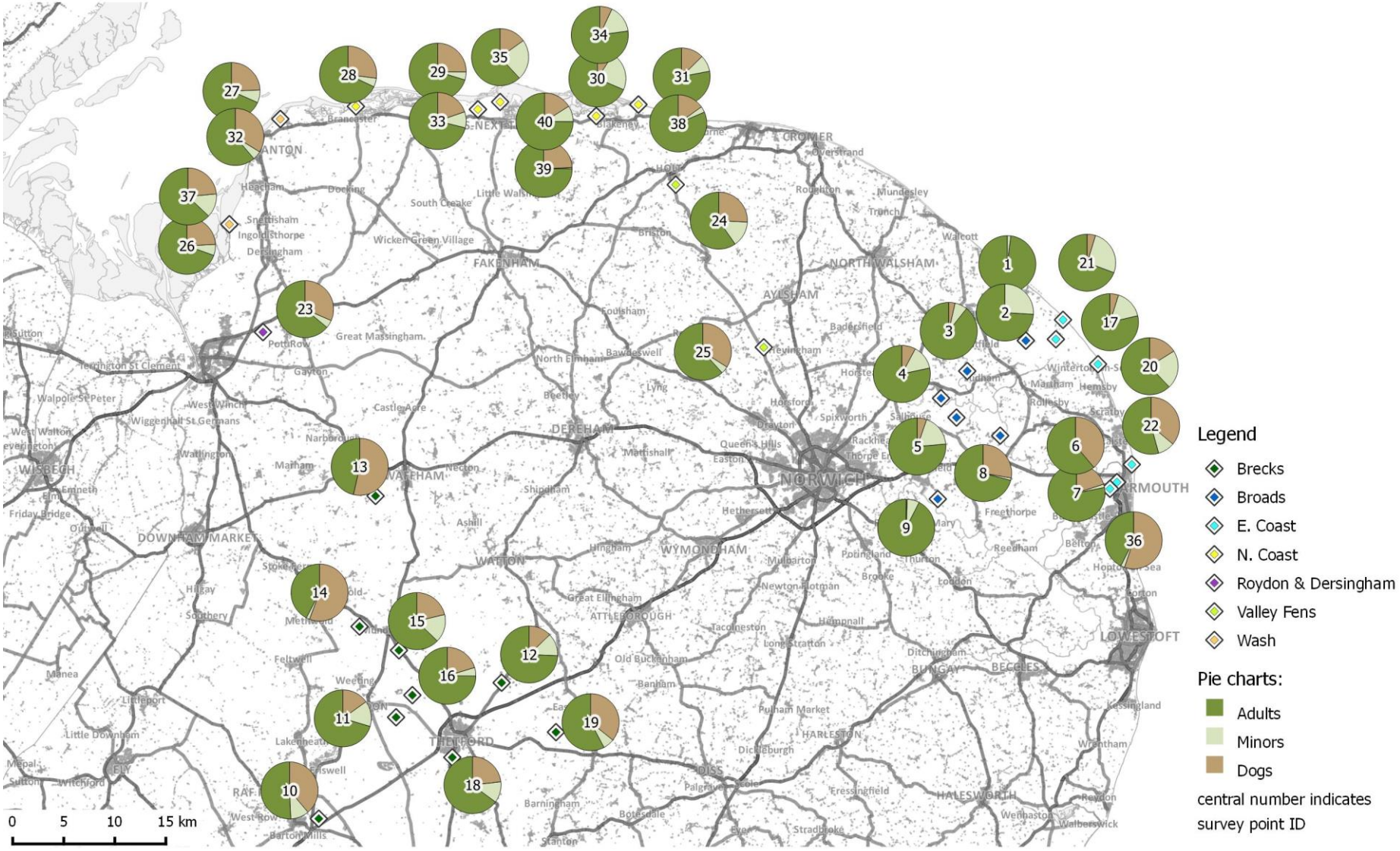


Figure 3: Total number of adults, minors and dogs recorded passing survey point locations at each survey point. Totals are all for 16 hours of surveying over a weekend and weekday (Note: for sessions with missing data these values are estimated).

Map 4: Tally count data shown as pie charts for survey points. Clearly overlapping pie charts are summer-winter duplicate surveys.



Interview data

Numbers of interviews and group composition

3.10 From all surveys areas the total number of interviews was 1,341 (Table 5). Overall, the average number of interviews conducted at a survey point was 33.5 (in a 16 hour survey period). Although there was some variation by area, the lowest average was in the Brecks, where surveyors completed on average 21.7 interviews per survey point.

3.11 The area with the highest number of interviews was the North coast (565 interviews). However this area also had the highest number of survey points. At an individual survey point, the fewest number of completed interviews was just 5 interviews at St Helens car park (survey point 16). This survey point also had only 77% of survey sessions completed and in addition the site was generally quiet. The other incomplete sessions also had low numbers of interviews; Breydon Water north (S) (survey point 7) with 10 interviews and Mildenhall Woods (survey point 10, also with incomplete coverage) with 15 interviews. Other survey points with 10 or fewer interviews were Hickling Broad (W) (survey point 1), East Wretham (survey point 12) and Breydon Water north (W) (survey point 6).

Table 5: Total number of interviews completed in each area.

Area	Total number of interviews	Number of survey points	Average number of interviews	Minimum number of interviews at a survey point
Brecks	195	9	21.7	5 (St Helens)
Broads	181	7	25.9	8 (Hickling (W))
E. Coast	180	7	25.7	10 (Breydon Water north)
N. Coast	493	10	49.3	17 (Cley Eye)
Roydon & Dersingham	25	1	25.0	25 (Roydon Common)
Valley Fens	54	2	27.0	22 (Buxton Heath)
Wash	213	4	53.3	37 (Holme)
Total	1,341	40	33.5	

Note: Breydon water north had two survey points, one for winter and one for summer. The number of interviews at both was 10.

3.12 Surveyors also recorded some basic information on the groups interviewed. The gender of members of the group, whether they had any dogs, and whether the dogs were off lead. The genders recorded in groups were typically evenly split between males and females. Females made up slightly higher proportion at the East Coast sites (53.7%) and males slightly higher at the Valley Fens (57.4%).

3.13 The numbers of dogs in a group that were on lead and off lead were compared as proportions for each group. Although this is only of the dogs on lead/off lead status when at the survey point, it can often be indicative of the general use in the site too. The average proportion of dogs off lead was on highest in Roydon and Dersingham and the Valley Fens, where almost three quarters of dogs where off lead (71% and 70%

respectively). The proportion of dogs on lead was greatest in the Broads (average group proportion; 86% on lead), where dog presence was typically low anyway. At all other sites the average proportion on lead was between 48% and 59% on lead. These differences were significant between sites (ANOVA; df=6, F=3.80, p=0.006).

Visit type

3.14 Interviewees were asked to describe the nature of their visit. Overall, across all areas, 66% of interviewees were on a short trip to the site, having travelled from home. The second most common response was "on holiday", and accounted for 32% of interviewees. Only a small proportion of people described their visit as a short trip to the area and staying with friends and family, rather than on holiday (2%). Just 4 interviewees (<1%) described their visit as work related.

3.15 By area it is clear that the sites are very different from each other in terms of the relative proportions of these different visitors types (Figure 4). In the Broads and North Coast sites, around half (46%) of all visitors interviewed were on holiday. This compares to 4% of interviewees at Roydon & Dersingham, and 5% of interviewees in the Brecks.

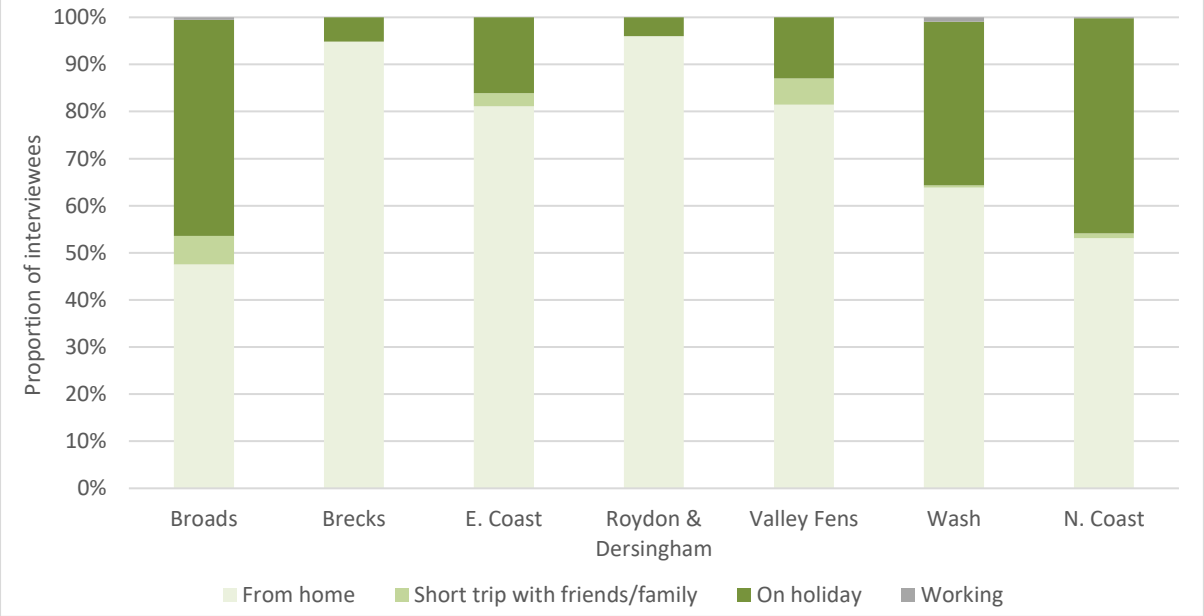


Figure 4: Proportion of interviewees describing the nature of their visit.

3.16 We applied the proportions of interviewees – as shown in Figure 4 – to the tally totals to give an indication of the numbers of total visitors at each survey point and the different types of visit (Figure 5). Differences between areas in the numbers of visitors from home and friends/family were not significant (df=6, K-W χ^2=11.996, p=0.062 and df=6, K-W χ^2=11.752, p=0.067). For the number of visitors on holiday there were significant differences between areas (df=6, K-W χ^2=24.395, p<0.001), highlighting the high proportions of holiday makers at the North Coast and Broads compared to the other sites.

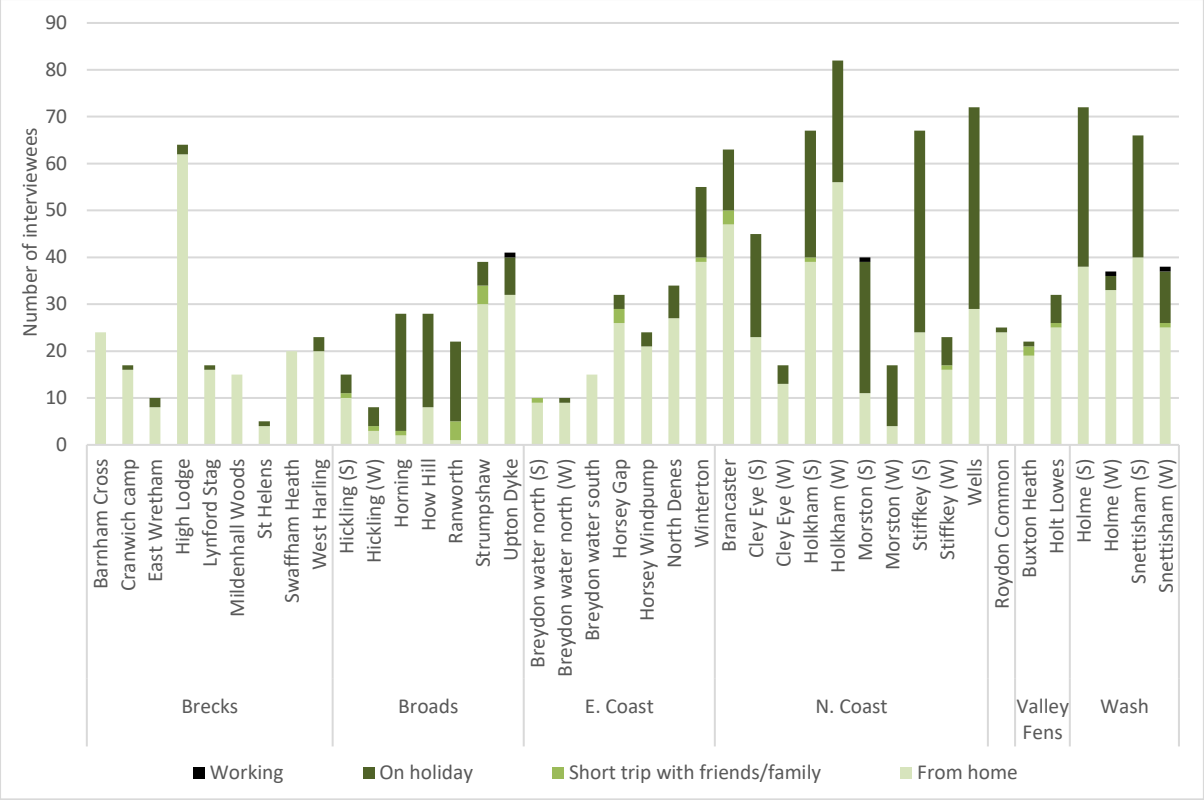


Figure 5: The number of interviewees from each of the different visit types at the survey points. Graph generated by applying the proportions from the interview data to the tally data.

3.17 Individual survey points where there were no interviewees describing themselves as on holiday were; three sites in the Brecks (Barnham Cross, survey point 18; Mildenhall Woods, 10; Swaffham Heath, 13) and two East Coast sites (Breydon Water north (S), 7 and Breydon Water south, 36). Conversely survey points with over 70% of interviewees on holiday were either from the Broads or the North Coast. These were: Horning, survey point 4 (89%); How Hill, 3 (71%); Ranworth, 5 (77%); the Morston summer survey point 34 (70%) and the Morston winter survey point 30 (76%).

Holiday makers accommodation

3.18 For visitors on holiday, the survey recorded accommodation type. The majority of interviewees were staying at self-catering accommodation (31%), closely followed by campsite/caravan sites (29%). This first and second ranking was fairly consistent between areas (Figure 6). The key notable difference between areas was the large number of people staying in boats on the Broads (59% of interviewees on holiday).

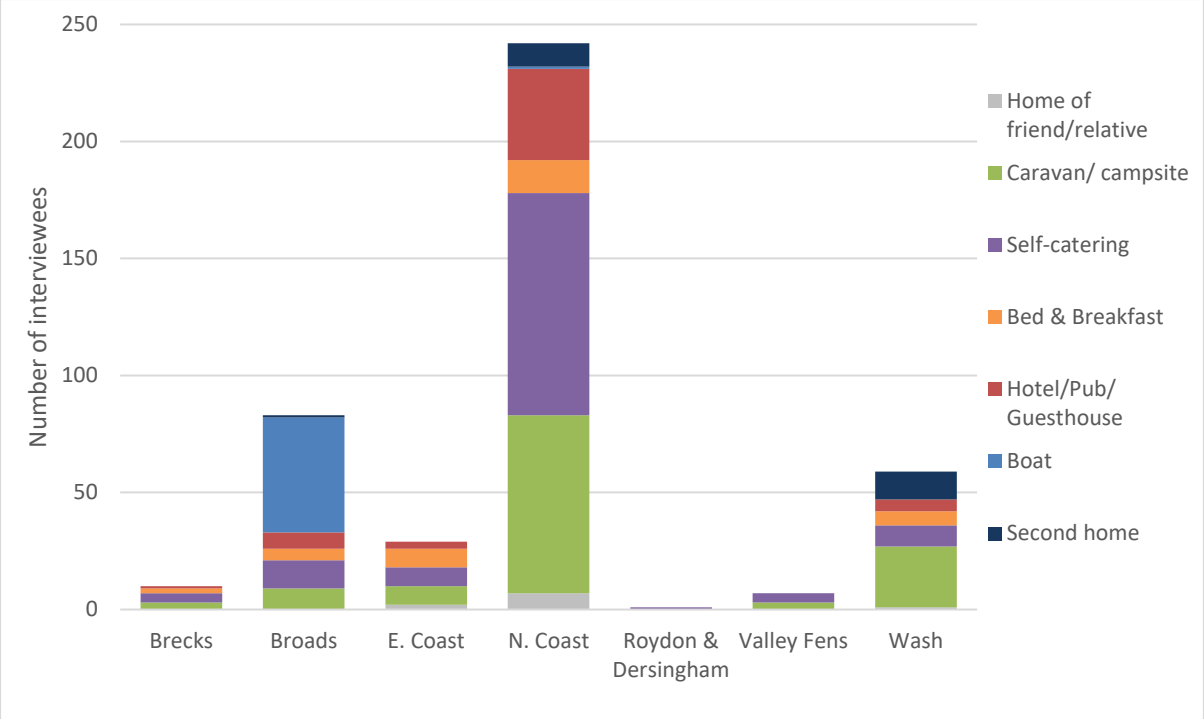


Figure 6: Accommodation use for interviews who responded they were on holiday in the area.

Activities

3.19 Interviewees were asked about the main activity they were undertaking during their visit. The surveyor categorised responses into one of 17 pre-set activities (see Appendix 2 for questionnaire), or used a free text option. The free text could also be used to clarify a response. Responses are summarised in Figure 7. Within the figure we have grouped the 17 pre-set activities into eight broad categories for ease of presentation.

3.20 Overall, the most commonly reported activity was dog walking, with 549 interviewed groups conducting this activity, representing 41% of interviewees. The second most common activity was walking (26%). Within individual areas this first and second ranking of dog walking and walking was consistent for the East Coast, Roydon & Dersingham, the Valley Fens, the Wash and the N. Coast (Figure 7). In these five areas, dog walkers and walkers typically accounted for just under three quarters of interviewees.

3.21 Only in the Broads and Brecks were these first and second rankings different. In the Brecks dog walking remained highest (48% of interviewees). But the number of interviewees conducting "other exercise/recreation" (typically cycling, see Table 6) was ranked second (24%). The relative proportion of activities conducted in the Broads was particularly different from all other areas. The majority of visitors described their activity as wildlife watching or viewing the scenery (29%). While roughly similar proportions of visitors were either walkers (21%) or conducting some boating activities (22%, this includes those on organised boat trips).

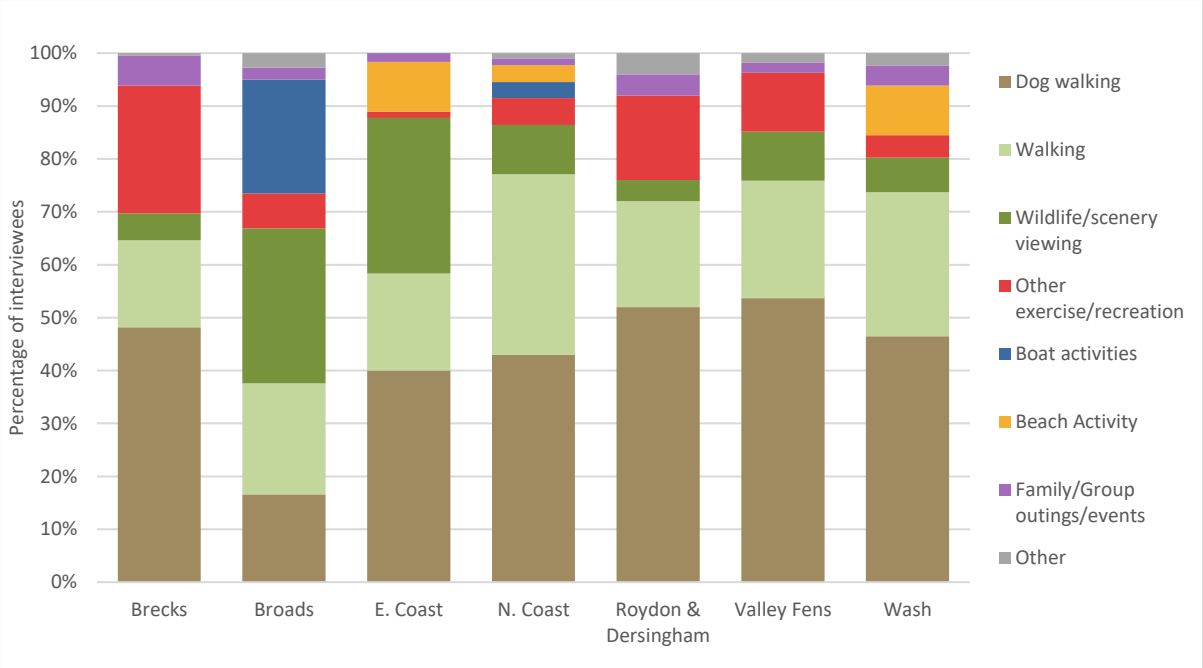


Figure 7: Main activities recorded in surveys show as the percentage of interviewees conducting activities summarised for each area. All interviewees area included, although activities have been simplified for presentation.

3.22 The numbers of individual interviewees conducting each activity are divided further, to show important subgroups of activities in Table 6. Important individual activities to note

from this table are that those categorised as "Wildlife/scenery viewing" in Figure 7 were mostly wildlife watching (86% across all areas). Those conducting "Boat activities" in the Broads were mostly boating or sailing on a hired or privately owned boat. Finally, those grouped as "Other exercise/ recreation" were mostly made up by those Cycling/ Mountain Biking, particularly influenced by high numbers at High Lodge (survey point 11). In all other areas those Cycling/ Mountain Biking were the not the majority group in this category.

3.23 The broad activity classes are used in Figure 8 and Map 5, but with results presented for individual survey points. This shows the variability within different areas. For example, within the Brecks the majority of those interviewees conducting "Other exercise/recreation" were at High Lodge (56%, survey point 11, mainly cyclists, as noted above). While all interviewees at Swaffham Heath (survey point 13) were dog walkers. Surveys at Hickling (both surveys in winter and summer) were the only surveys to record no dog walkers in the activities – as dogs are not allowed on the site.

3.24 In the Broads, the highest proportions (50%) of "Boat activities" were recorded at Horning (survey point 4), the highest proportion of interviewees dog walking (46%) at Upton Dyke (survey point 8), and the highest proportion of interviewees wildlife watching (85%) at Strumpshaw (survey point 9).

3.25 At the East Coast sites, dog walkers and wildlife watchers dominated. This was influenced heavily by around 70% of interviewees describing their visit as wildlife watching at both Horsey Gap (survey point 21) and Horsey Windpump (17); almost all to view the seals. There were also many interviewees visiting to watch wildlife at Breydon water north (both summer and winter, survey points 6 and 7). Surveys at North Denes (survey point 22) and Winterton (20) included the highest proportions of interviewees conducting "Beach activities" of any survey location (surveys were conducted in the summer).

3.26 The Valley Fens and Roydon Common were fairly similar in the composition of different activities. Half were dog walkers and the remainder mostly walkers, but also included wildlife watchers, runners/joggers and people doing photography.

3.27 The survey points with interviewees conducting "Beach Activities" were very site specific to those areas where the conditions were suitable. Locations with beach activities being conducted were North Denes (survey point 22), Winterton (20), Holkham (summer surveys; 33), Holme (27), and Snettisham (both summer and winter; 37 and 26). The proportion of these activities at the above named locations was always between 10 - 20% of interviewees. Furthermore, the proportion was always greater in summer surveys than in winter surveys at the paired summer-winter survey locations.

3.28 The "Boat activities" category included those on organised boat trips. Visitors on organised boat trips included almost all those interviews listed under boat activities at Hickling Broad (summer survey; survey point 2) and Morston (30 and 34). Around half those at How Hill (3), on boat activities were on organised boat trips, with the remainder on private or hired boats.

3.29 The largest percentage of interviewees in the "Other" category was at the Horning (survey point 4), with two interviewees working at the marina, and at Stiffkey (summer survey point 40) where three interviewees were foraging.

3.30 The numbers of interviewees conducting each activity within each area showed some significant differences. The number of walkers between the areas was significantly different (df=6, K-W χ^2=19.825, p=0.003), with the North Norfolk coast standing out for the high number of walkers. The number of interviewees undertaking boat activities was not quite significantly different between areas (df=6, K-W χ^2=18.129, p=0.059), with the Broads being the key area for boat based activities.

Table 6: More detailed break-down of activities, to show number of interviewees conducting each activity and as presented in Figure 7 and with further detailed subgroups. Highlighted (bold) values are those which represent more than 15% of the interviewees in each area.

Activity (as grouped in Figure 7)	Activity subgroups	Brecks	Broads	E. Coast	N. Coast	Roydon & Dersingham	Valley Fens	Wash	Total
Dog walking	Dog walking	**94**	**30**	**72**	**212**	**13**	**29**	**99**	**549**
Walking	Walking	**32**	**38**	**33**	**168**	**5**	**12**	**58**	**346**
Wildlife/ scenery viewing	Enjoy scenery	3	5		6	1		7	22
	Wildlife watching	7	**48**	**53**	40		5	7	160
Other exercise/ recreation	Cycling/Mountain Biking	**40**	2	1	8			1	52
	Horse riding	2						2	4
	Jogging/power walking	2	1		5	2	1	1	12
	Other	2	1		3	2		4	12
	Photography	1	8	1	1		5	1	17
	Water activities				8				8
Boat activities	Boating/Sailing		32		2				34
	Organised boat trip		7		13				20
Beach Activity	Beach Activity			17	16			20	53
Family/Group outings/events	Other	3	1						4
	Outing with family	6	2	3	4	1	1	8	25
	Visiting attractions	2	1		2				5
Other	Other		1		5	1		5	12
	Working	1	4				1		6
Total		**195**	**181**	**180**	**493**	**25**	**54**	**213**	**1341**

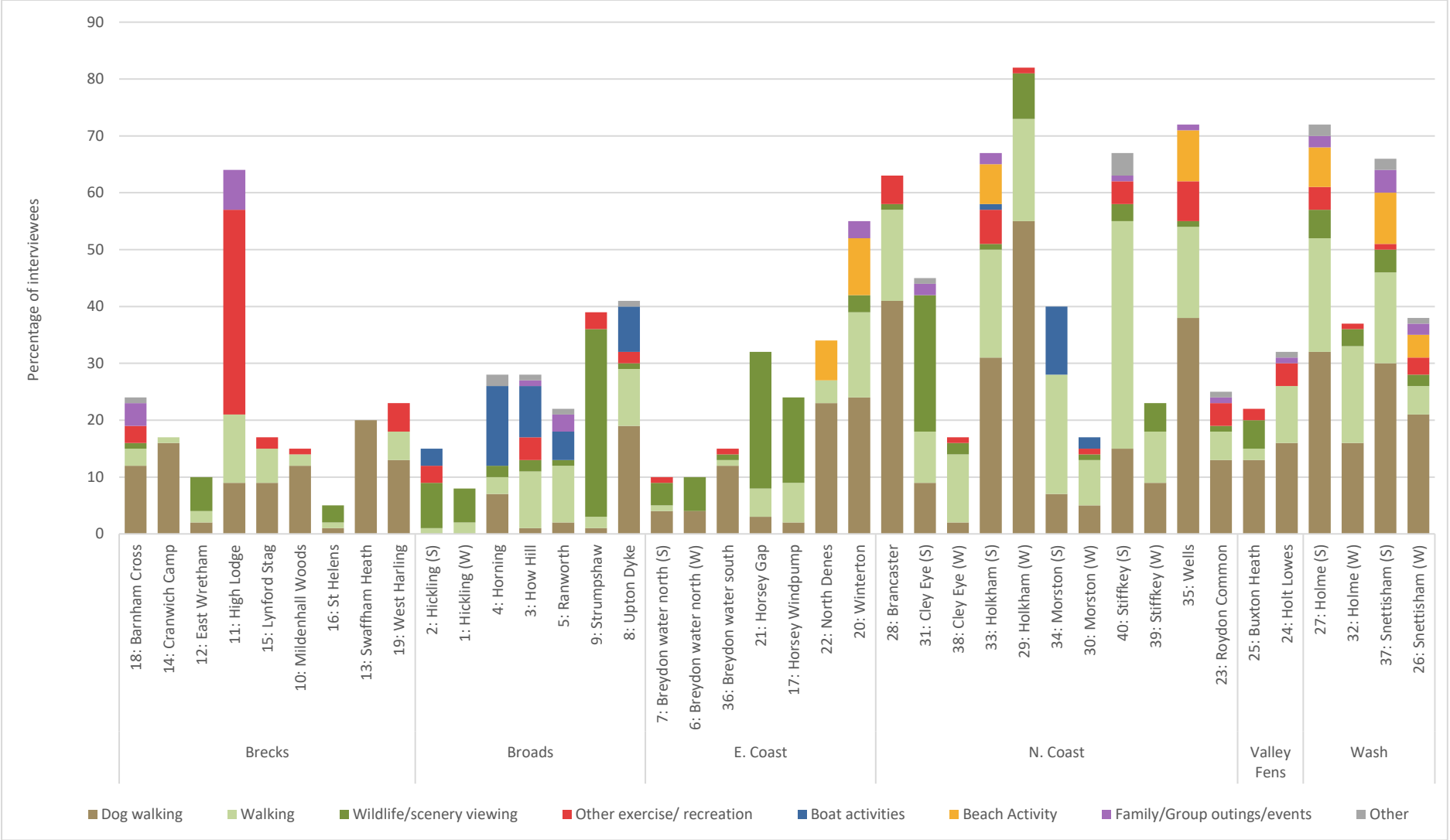
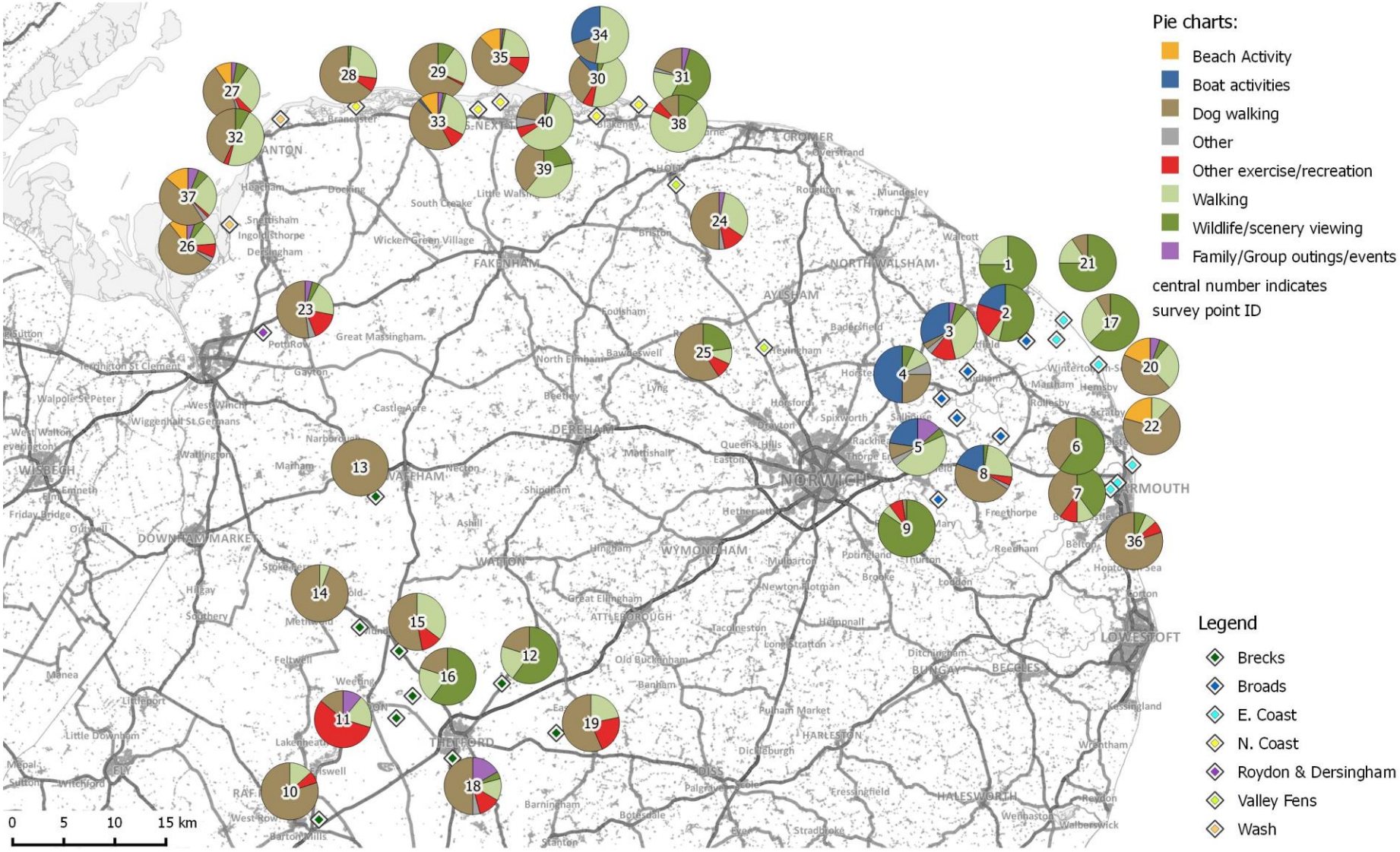


Figure 8: The number of interviewees conducting different activities recorded at the survey points from interviews.

Map 5: Activities from interviews as pie charts for survey points. Clearly overlapping pie charts are summer-winter duplicate surveys.



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3.31 Unsurprisingly just over half of interviewees staying on a boat were conducting "Boat activities". Those staying at bed and breakfast or hotels/guesthouses were predominately walking. Interviewees staying in second homes, home of friends/relatives or at campsites, included a large proportion of those who were dog walking.

Table 7: Cross-tabulation of broad activity types by the accommodation visitors on holiday were using. Values show the number of interviewees in each cross-tab group.

Activity	Accommodation type							
	Home of friend/relative	Campervan/ campsite	Self-catering	Bed & Breakfast	Hotel/Pub/ Guesthouse	Second home	Boat	Non-holiday
Dog walking	4	40	26	2	7	18	4	448
Walking	4	41	66	17	28	3	15	172
Wildlife/scenery viewing	2	11	18	7	12		1	131
Other exercise/recreation		8	6	5				86
Beach Activity		18	6		2	1		26
Family/Group outings/events		4	3	1				26
Other			1		1	1	2	13
Boat activities		3	7	3	3		28	10
Total	**10**	**125**	**133**	**35**	**53**	**23**	**50**	**912**

Visit duration and frequency

3.32 From all interviews the most commonly reported duration on site was 1 to 2 hours (31%), closely followed by 30 to 60 mins (27%). Again these varied between individual survey points and areas. Differences between areas are presented in Figure 9. Key differences were the large proportion of interviewees visiting for more than 4 hours in the Broads (29% of interviewees) and, conversely, at Roydon with the large proportion visiting for less than 30 minutes (36%).

3.33 The proportions for each area were tested against the overall average for all areas (as shown in Figure 9). Proportions which were significantly different from the overall average (at 0.05 level) were; the Brecks (χ^2=21.345, p =0.001), Broads (χ^2=33.825, p <0.001), North Coast (χ^2=36.675, p <0.001), Roydon Common (χ^2=47.215, p<0.001) and the Valley Fens (χ^2=29.576, p<0.001). These results indicate that visitors to the different areas visit for different lengths of time.

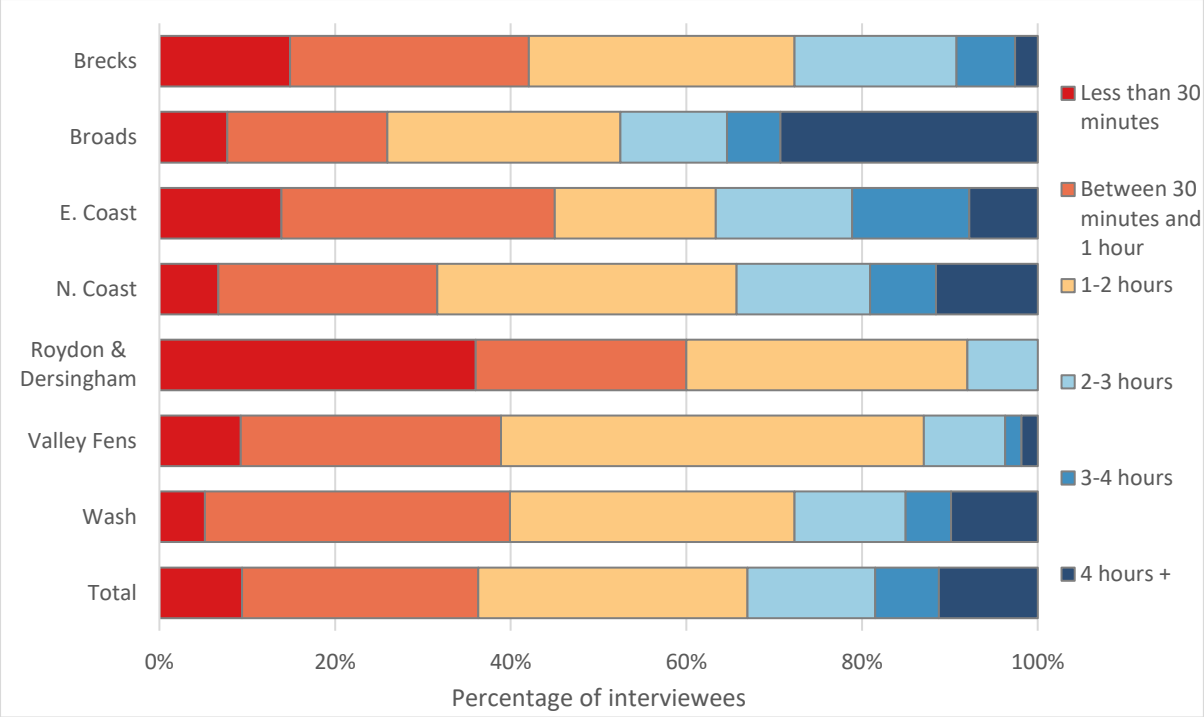


Figure 9: The duration of visit for interviewees shown as the percentage of interviews and created from totals for each area.

3.34 Interviewees were also asked how frequently they visited the sites. Nearly a third (31%) of all interviewees were on their first visit. For those that had visited the site before, the most common response was daily or most days at 18%. These two responses were categorised separately, but grouped for analysis (Table 8). This was closely followed by "1 to 3 times per month" and "Less than once a month", both 16% of interviewees.

Table 8: Reported visit frequency from interviewees for each area, shown as percentages. All interviewees used. Pale grey shading reflects the highest percentage for each area.

Row Labels	Daily or most days	1 to 3 times a week	1 to 3 times per month	Less than once a month	1 to 3 times per year	Less than once a year	First visit
Brecks	21	28	22	10	0	0	19
Broads	9	8	15	22	6	4	36
E. Coast	30	8	13	13	3	2	31
N. Coast	36	12	24	16	0	0	12
Roydon & Dersingham	31	11	19	6	2	2	30
Valley Fens	16	16	16	21	2	2	27
Wash	15	11	16	17	3	2	35
Total	**18**	**14**	**16**	**16**	**3**	**2**	**31**

3.35 Between areas the relative proportions of responses were similar. However, there was much more variation between individual survey points, as shown in Figure 10. Survey points with over 50% of interviewees visiting daily, if not more frequently, were: Cranwich Camp (survey point 14), Breydon water south (36), and North Denes (22).

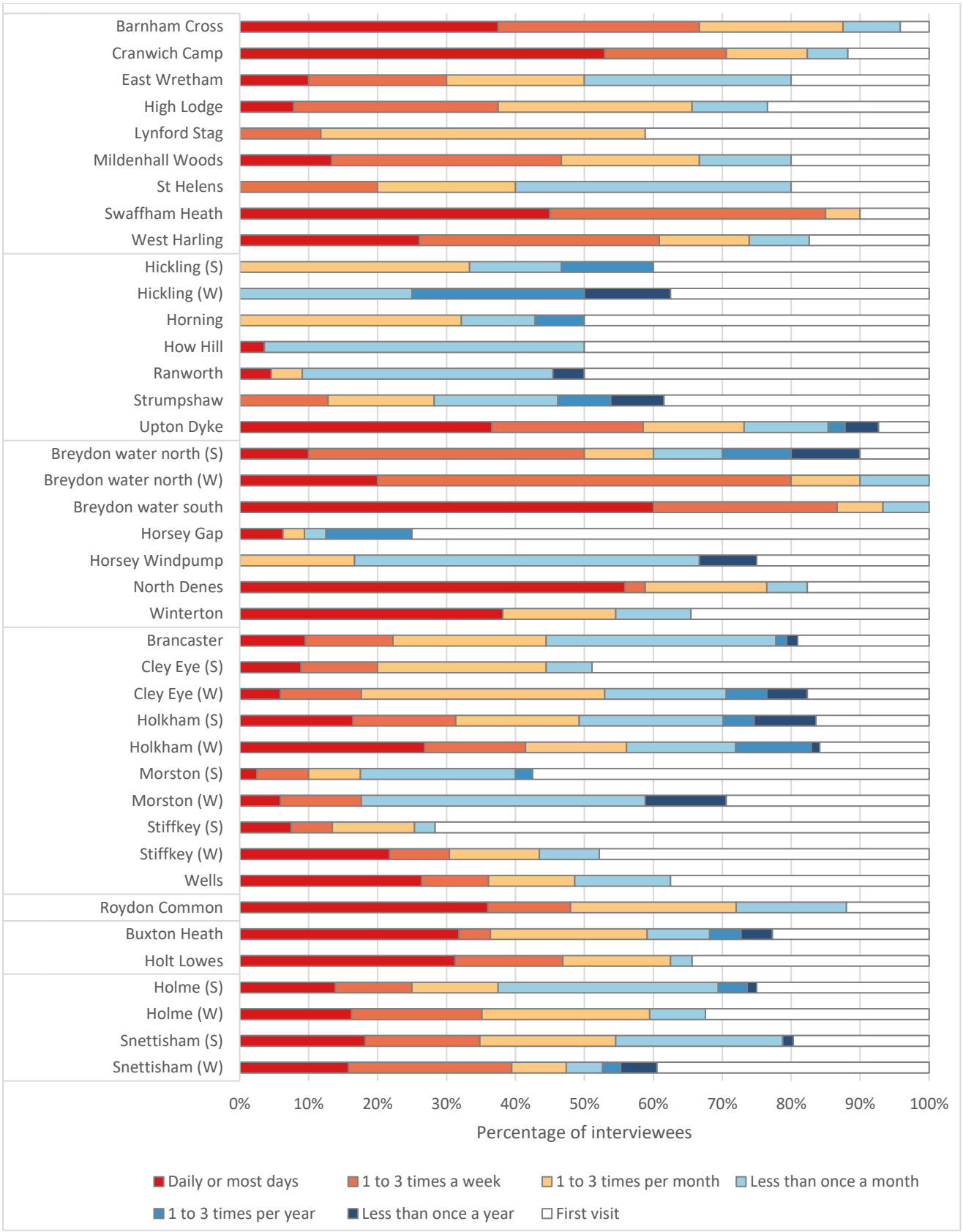


Figure 10: Interviewees visit frequency to the site they were interviewed at. All interviewees included.

3.36 Table 9 shows the same results, but only for those interviewees who described their visit as from home. This shows much less variation between areas in terms of local users. It worth noting that, for the Brecks and Roydon & Dersingham, no interviewees visited less frequently than "less than once a month".

Table 9: Reported visit frequency from interviewees for each area, shown as percentages. Visitors describing their visit as from home only. Pale grey shading reflects the highest percentage for each area.

	Daily or most days	1 to 3 times a week	1 to 3 times per month	Less than once a month	1 to 3 times per year	Less than once a year	First visit
Brecks	22	30	23	10	0	0	15
Broads	20	16	19	20	6	3	16
E. Coast	37	10	14	14	3	2	18
N. Coast	28	21	23	14	2	2	11
Roydon & Dersingham	38	13	25	17	0	0	8
Valley Fens	39	14	18	7	2	2	18
Wash	21	16	18	19	0	2	23
Total	**27**	**19**	**20**	**14**	**2**	**2**	**16**

Transport to sites

3.37 The majority of visitors arrived at sites by car (77%), followed by those arriving on foot (18%) and those by boat (3%). The grouped category of "other" includes mostly those arriving by bicycle, but also included a single interviewee arriving by horse and by motorised wheelchair.

3.38 Figure 11 shows the transport responses by area and groups these with whether the interviewee was on holiday or not. Of interviewees arriving by boat, 98% were in the Broads, with just one interviewee from the North Coast sites arriving by boat. Of those arriving by boat in the Broads, 98% were on holiday.

3.39 The Brecks had the largest proportion of interviewees arriving by "other" transport (although still only 3%). These predominately arrived by bicycle. Of these, two interviewees on holiday arrived by bicycle, representing 20% of those on holiday in the Brecks arriving by bicycle (Figure 11).

3.40 Across all areas at least 4% of interviewees arrived at the site on foot. The largest proportion of these was at the North Coast (38%) and the Wash (43%) and made up by visitors on holiday. The North Coast- Wash area is particularly popular with long distance walkers and may explain this visitor pattern. However, this was not asked as a specific activity and this is assumed indirectly on the basis of activity duration, route lengths and surveyor feedback.

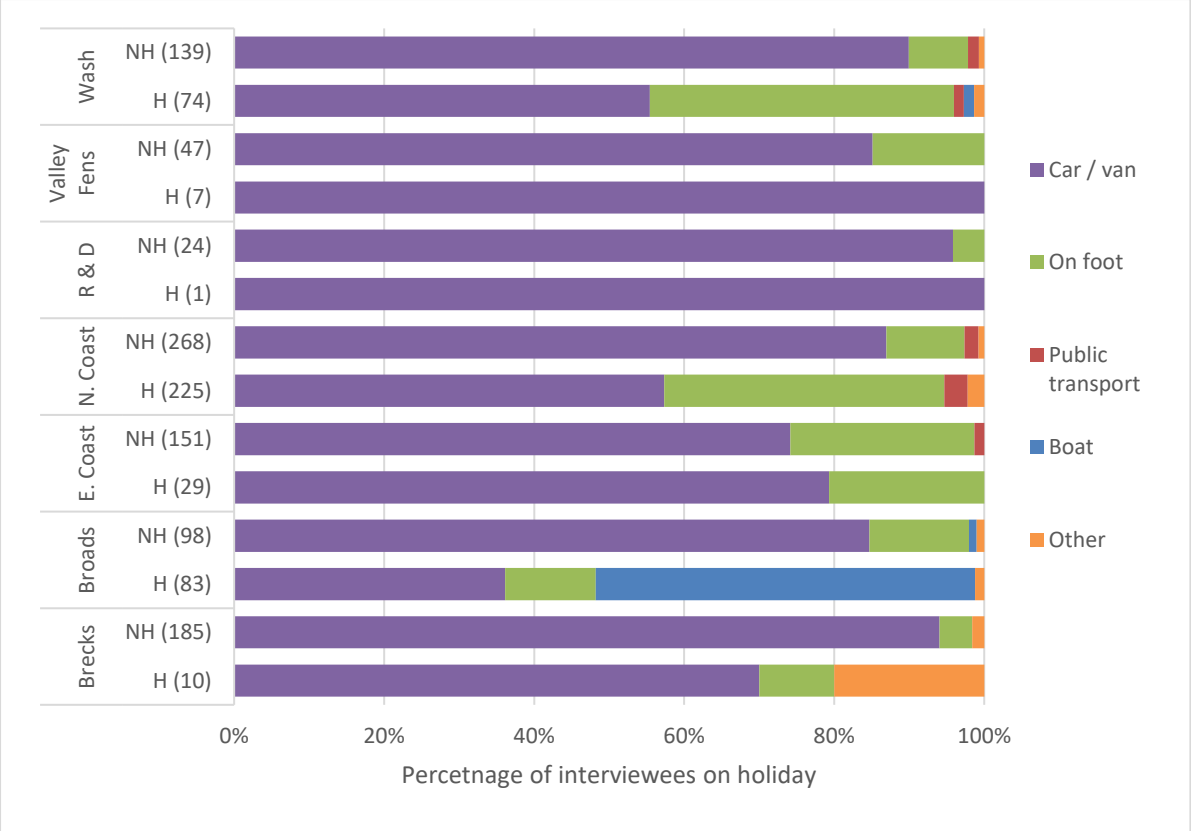


Figure 11: Percentage of interviewees for different modes of transport to site, for all interviewees recorded, separated by area and by those on holiday (H) or not (NH). Numbers in brackets indicate the number of interviewees represented in each group.

Reasons for Site Choice

3.41 Interviewees were asked to describe their reasons for visiting the site where interviewed, rather than another local site. All responses were recorded and the surveyor then continued to ask for a single main reason of these responses provided. There were 15 main reasons which were given by more than 5 interviewees, shown in Table 10. Almost half of the main reasons given by interviewees for visiting Roydon & Dersingham and the Valley Fens were related to proximity to home (46% and 41% respectively). At all other areas proximity to home was in the top three main reasons. However only in the Brecks and East Coast was this ranked top, at 22% and 27% respectively. At the North Coast the scenery was ranked highest (22%). Other reasons were the highest ranked main reasons in the Broads (35%) and the Wash (39%).

3.42 The other class was categorised as free text responses. These were often very diverse and harder to categorise. At the Wash other main reasons were very diverse. Proximity was important, but specifically for being close to a caravan/camping site or bed and breakfast/second home. Also there were many variations that the views, habitats and unspoiled nature of the site were the main reasons. In the Broads these reasons were also varied, but often related to boating (private owners and those hiring) and wildlife events, such as to see Swallowtail butterflies. Other reasons at the East Coast were again diverse, but some key themes often related to visiting to see the seals and to fitness/exercise in the Brecks.

Table 10: The percentage of interviewees citing their main reason for visiting each of the areas. Main reasons recorded from less than 5 interviews included for percentages calculations, but not shown. Grey cells indicate the top three ranked responses in each area (joint ranking also shown).

	Number of interviewees	Brecks	Broads	E. Coast	N. Coast	Roydon & Dersingham	Valley Fens	Wash
Close to home	207	22.4	19.6	26.9	18.3	46.2	41	16
No need for car	13	0.6	1.8	0	3.8	0	0	0
Quick/easy travelling	15	1.8	1.8	0.6	0.4	7.7	3	3
Refreshments/café	8	2.9	2.7	0	0	0	0	0
Safe	13	0	8.9	0	0.8	0	0	1
Few people	13	0	0	1.9	0.8	7.7	3	3
Scenery	118	10.6	6.3	9.6	21.8	7.7	15	7
Rural/wild	37	1.8	0.9	3.8	6.5	7.7	3	4
Particular wildlife	63	2.9	4.5	10.3	10.3	7.7	5	3
Habit	19	3.5	3.6	0.6	1.1	0	3	2
Good for dog	35	7.1	0	5.1	3.1	0	5	3
Can let dog off	9	1.2	0	0.6	0.8	0	5	1
Closest place for dog	9	0	1.8	1.9	1.1	0	0	1
Appropriate for activity	47	13.5	2.7	1.9	5.7	0	3	1
Near coast/water	72	0.6	9.8	10.3	9.5	0	0	10
Other	218	18.8	34.8	21.2	13.7	7.7	10	39

Awareness of conservation importance

3.43 All survey points were located at access points within or on the edge of European Protected sites. Many sites were nature reserves with interpretation and wildlife viewing facilities and some had visitor centres. The surveyors asked if visitors were aware of any nature conservation designations applying to the sites they were visiting. Considering all interviewees, just under half (46%) were unaware of any conservation designations/environmental protection that applied to the sites they were visiting. Just over one third (36%) were aware of a designation, and the remaining 20% unsure.

3.44 Between areas there was considerably less awareness of the conservation importance of the area in the Brecks (around 10% aware).This contrasts with the North Coast where awareness was highest (around 50% aware).

3.45 There were some clear differences between areas for this response, so, in order to examine the impact of locals, we assessed the difference between those on holiday or not. Although the differences were not significant overall, the proportion of non-holiday makers who were aware of conservation designations was consistently higher (Figure 12).

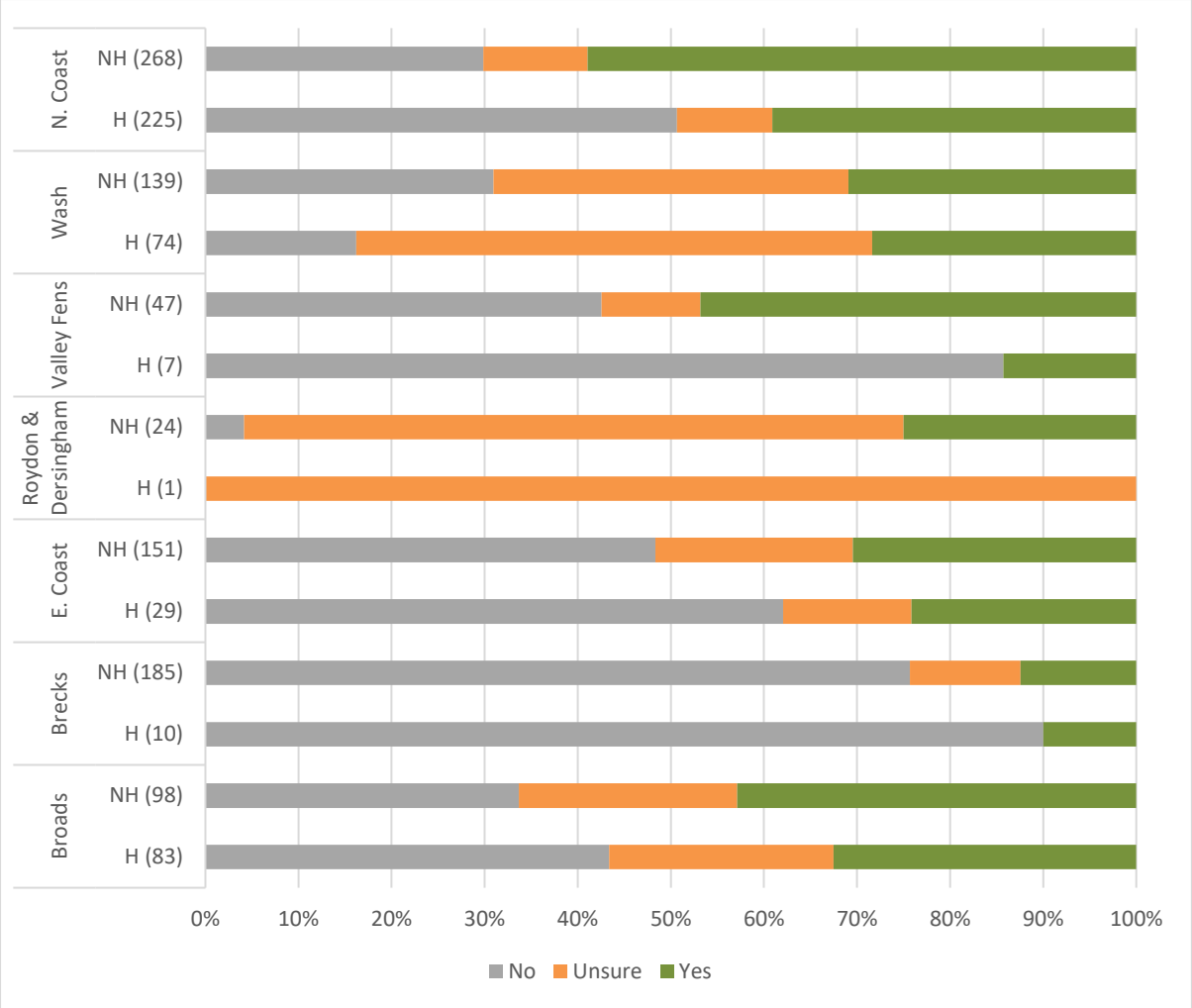


Figure 12: The proportion of interviewees responding; "no", "unsure" or "yes" to whether they were aware of any conservation designations on the site they were visiting. NH: not on holiday; H: on holiday.

Postcodes

3.46 Visitors were asked to supply a full postcode for their home. A total of 1,312 postcodes were generated during the survey (i.e. 98% of interviewees gave a valid home postcode or home settlement that could be accurately mapped within GIS). Seventeen interviewees were unable to supply a UK postcode as they were visiting from overseas. The highest number of overseas visitors was recorded at the North Coast survey points. No interviewees from overseas were recorded at the Roydon & Dersingham survey point, nor the two Valley Fen sites.

3.47 A total of 879 (67%) of the postcodes were interviewees on a short trip directly from their home (including 4 interviewees who were working). 677 of these were Norfolk residents (i.e. 78% of this group were Norfolk residents). A total of 411 (32%) postcodes related to interviewees on holiday and staying away from home, and a further 22 (2%) were staying away from home with friends and family.

3.48 Many interviewees were from outside Norfolk. Numbers of interviewees from Norfolk and outside Norfolk are summarised by area in Table 11. For survey points that are

close to the Norfolk county boundary it is inevitable that a high proportion of visitors will be from outside Norfolk, purely due to the location. This is the case, for example, with the Brecks survey points, which are often in close proximity to the Norfolk county boundary. One survey point was even located just outside Norfolk (Mildenhall Woods, survey point 10). Other sites (the Broads and the Norfolk Coast) may well draw visitors from well outside Norfolk due to their profile, 'draw' or the attractiveness of the location – for example the Broads has status equivalent to a National Park and is promoted as such and some parts of the coast are particularly scenic.

Table 11: Number of interviewees recorded from parts of the UK or overseas. Numbers in brackets show the percentage compositions for each area.

Area	Number of survey points	Total number of interviewees from Norfolk	Total number of interviewees from rest of UK	Total number of interviewees from overseas
Brecks	9	118 (61)	75 (38)	2 (1)
Broads	7	77 (43)	101 (56)	3 (2)
E. Coast	7	129 (72)	49 (27)	2 (1)
N. Coast	10	241 (49)	244 (49)	8 (2)
Roydon & Dersingham	1	24 (96)	1 (4)	0
Valley Fens	2	45 (83)	9 (17)	0
Wash	4	93 (44)	118 (55)	2 (1)
Total	**40**	**727 (54)**	**597 (45)**	**17 (1)**

3.49 The distribution of all postcodes is shown in map 6 within separate maps for those not travelling from home (e.g. on holiday, or on a short trip staying with friends/family) compared to those visiting from home. The postcodes of visitors on Map 6a (437 postcodes) shows visitors travelling to visit Norfolk sites from across the UK with the North Coast, Wash and Broads having particular long distance draws. The furthest distance was a visitor to the Wash from Elgin, Scotland (linear distance c. 600km).

3.50 Map 6b shows the distribution of home postcodes for those who were visiting from home, with all 875 postcodes shown. The furthest distance was for an interviewee in the Brecks from Tamworth, Staffordshire (linear distance c. 160km). The maps shown include many overlapping postcodes, with high densities in urban areas of Thetford, Norwich and Kings Lynn which are examined in more detail in subsequent maps for individual areas.

3.51 Using individual interviewees home postcodes the linear (Euclidean) distance to the survey point at which the visitor was interviewed could be calculated. The average distance between a visitor's home postcode and the survey point for those visiting from home was 24 km. While the half of all interviewees from home lived within 11 km (median value). For those on holiday or on a short trip staying with friends or family, these distances were much greater, on average 163 and 179 km respectively (median values; 157 and 174 km respectively). These distances measures are summarised as boxplots by area in Figure 13 and Figure 14. As apparent from the postcode maps, visitors travel large distances to visit the Broads, North Coast and Wash sites. These

differences between areas are much slighter when considering only visitors from home. The differences shown in Figure 13 and Figure 14 were both significant (df=6, K-W χ^2= 159.560, p<0.001 and df=6, K-W χ^2= 32.323, p<0.001), indicating significant differences in the relative draw of the different areas.

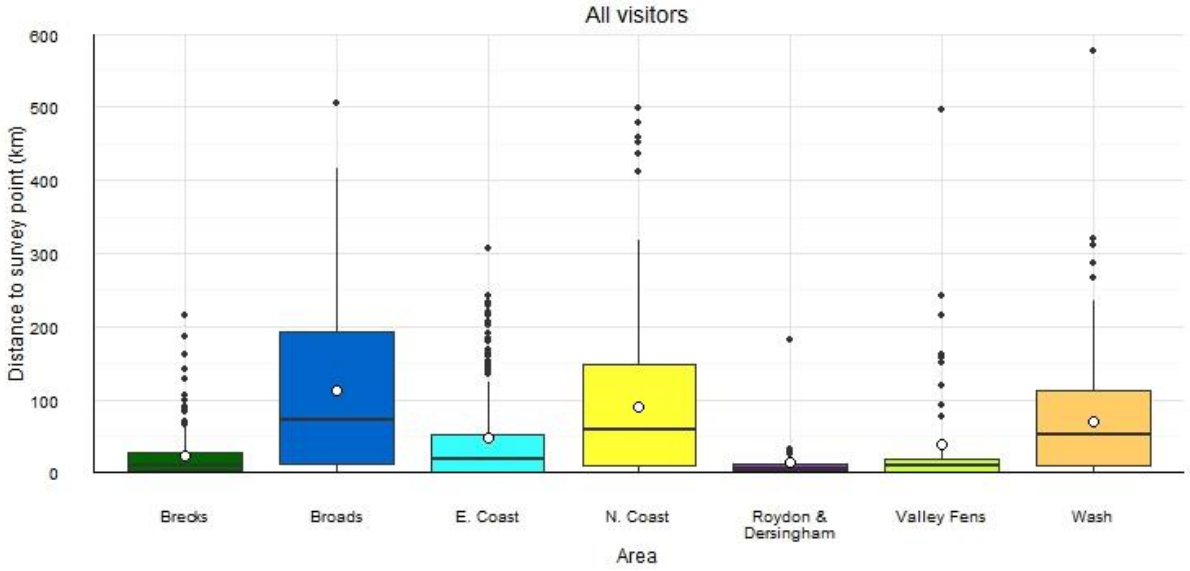


Figure 13: Boxplots to show the range of distances of interviewees' home postcode to the survey point. White dots show the average values for each area. All interviewees shown.

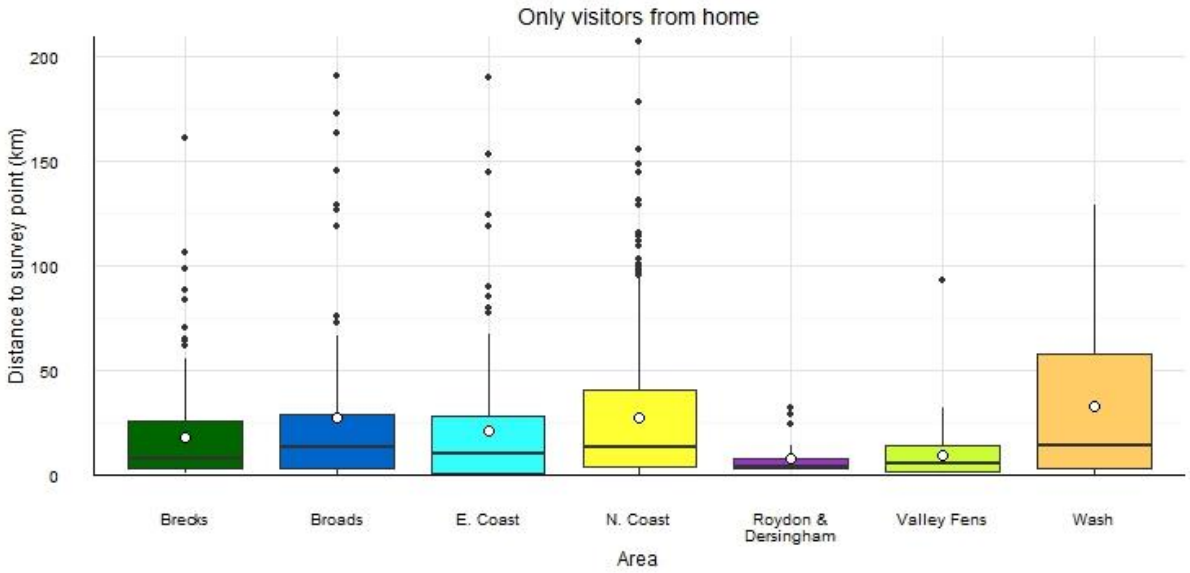


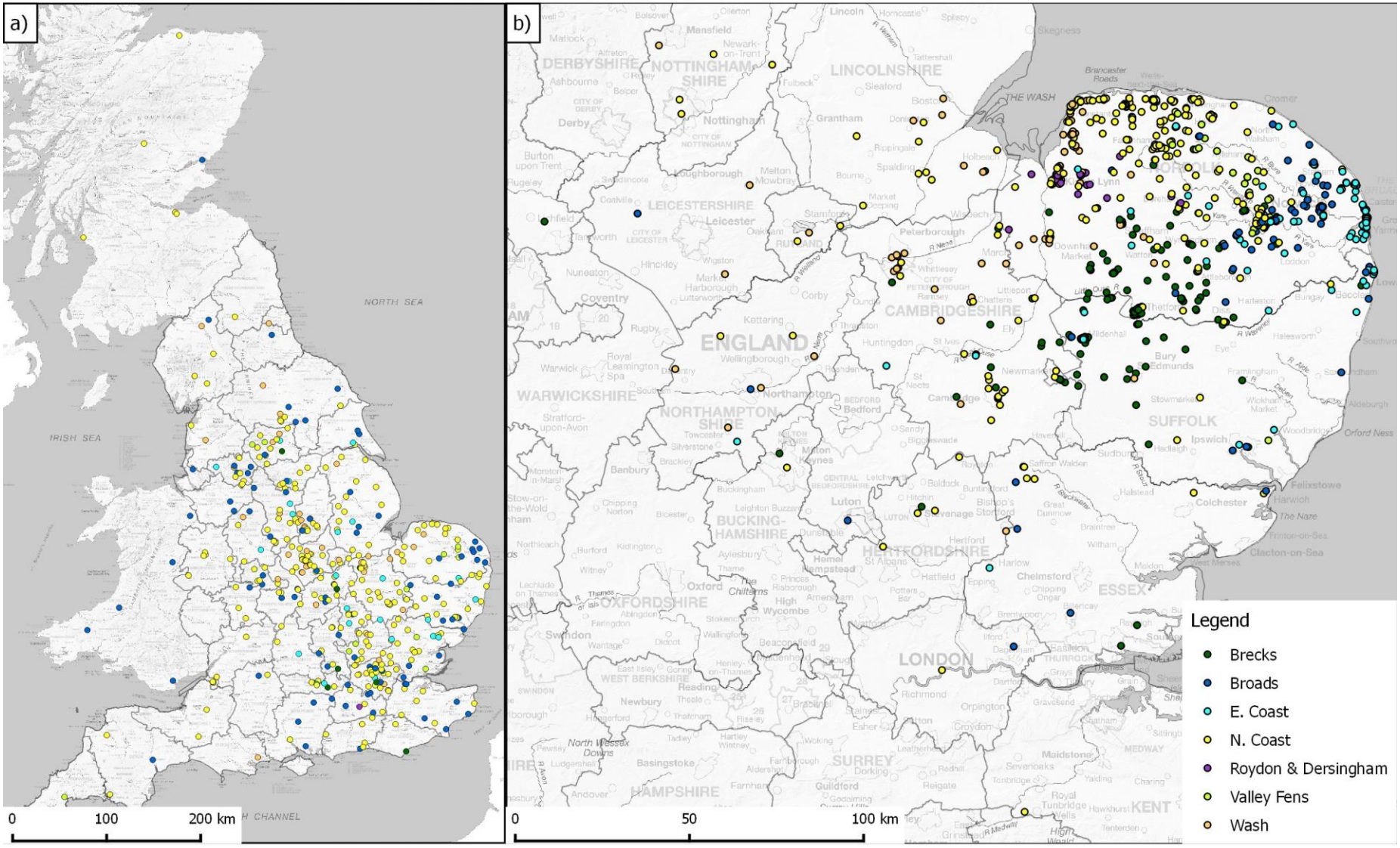
Figure 14: Boxplots to show the range of distances of interviewees' home postcode to the survey point. White dots show the average values for each area. Only interviewees from home shown.

3.52 Individual postcode maps are shown for interviewees from each area for Norfolk postcodes only in maps 7-12. These maps only show those interviewees visiting from home. These maps indicate approximate areas due to the grouping of postcodes within 2.5km of each other into concentric rings. The most frequent settlements where visitors came from for each of the areas were (ranked highest first):

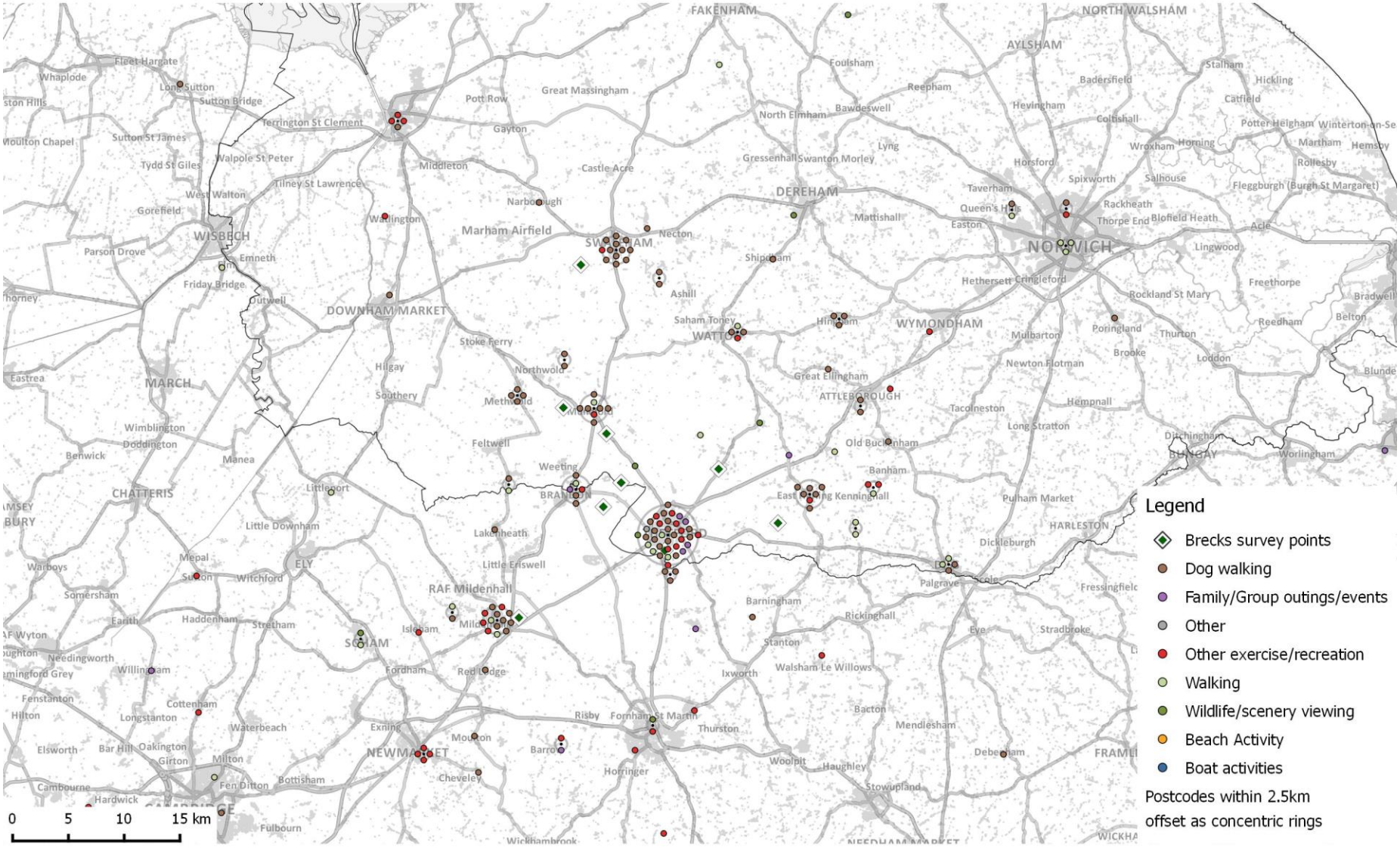
- Brecks: Thetford, Mildenhall, Swaffham, Mumford, Brandon.

- Broads: Upton-Acle area, Norwich, Potter Heigham area, Horning area
- East Coast: Great Yarmouth, Winterton area, Norwich, Martham
- North Coast: Wells, Burnham Market, Fakenham, Stiffkey, Cley-Blakeney area, Norwich.
- Roydon Common: Kings Lynn (inc. South Wotton), Roydon, Grimston
- Valley Fens: Holt, Hevingham, Norwich, Horsford.
- Wash: Snettisham, Kings Lynn, Holme, Hunstanton, Dersingham

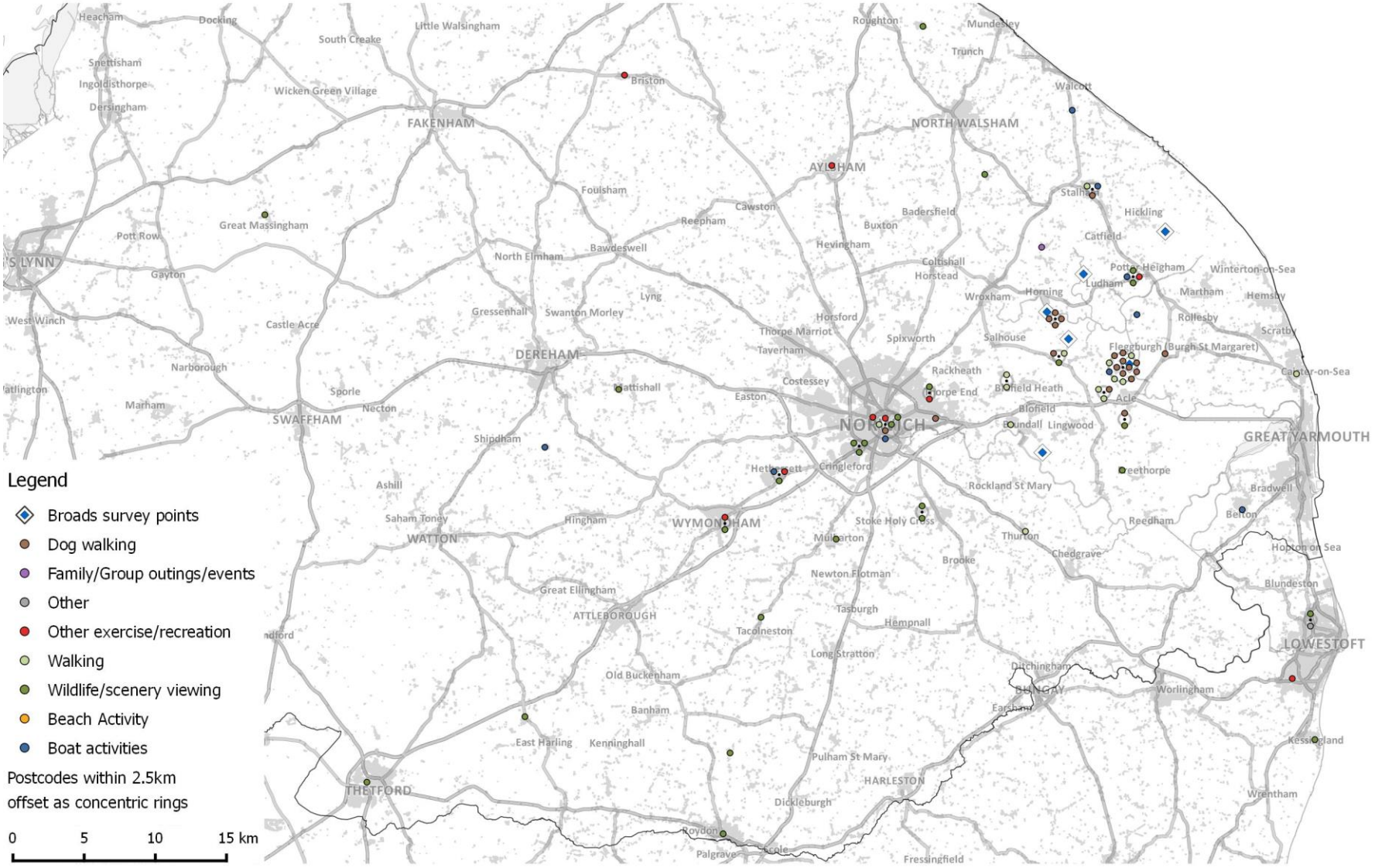
Map 6: Extent of home postcodes for a) all interviewees - excluding those directly from home and b) interviewees travelling from home.



Map 7: Postcodes of interviewees from the Brecks survey points labelled by activity. All Norfolk postcodes shown.

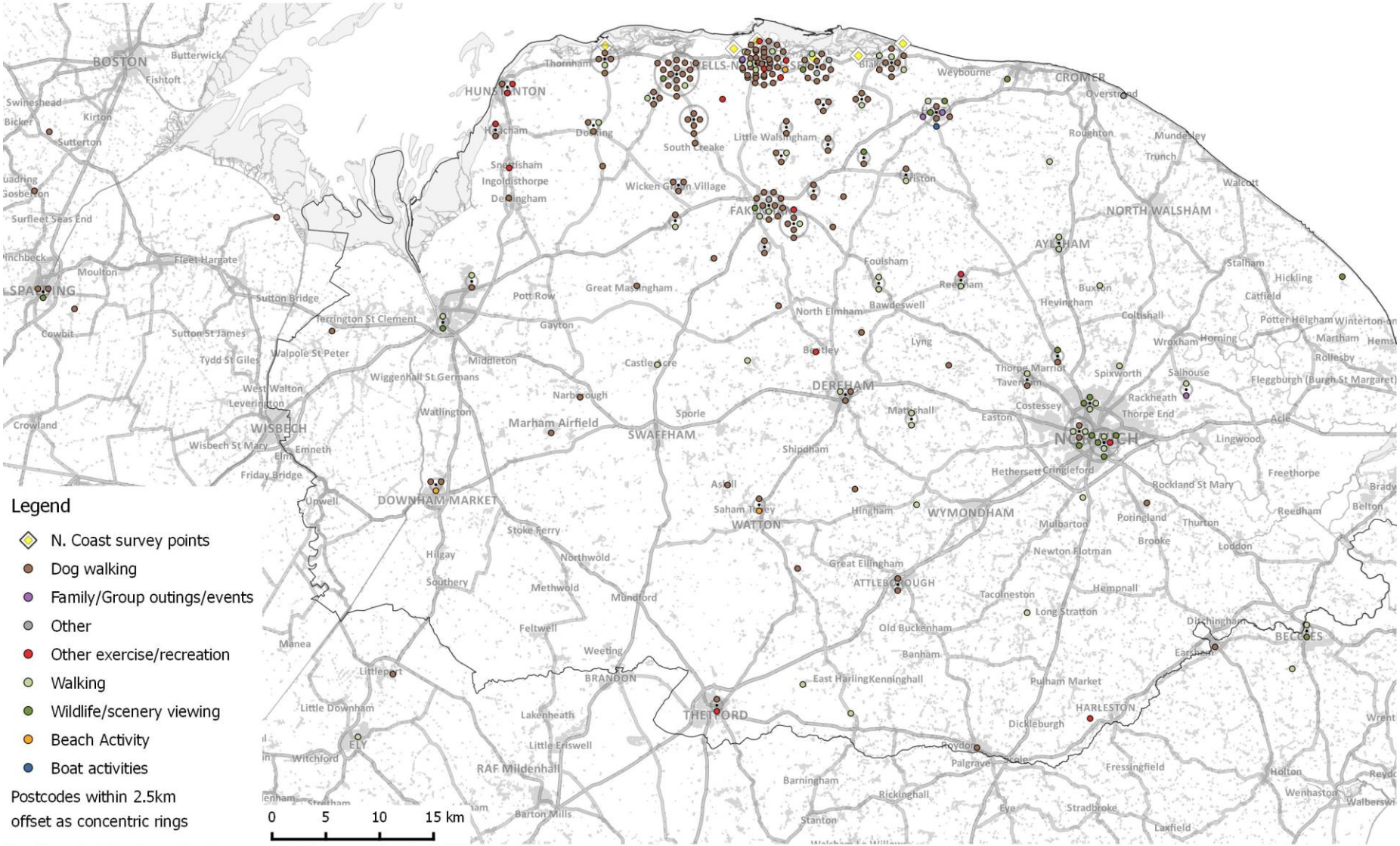


Map 8: Postcodes of interviewees from the Broads survey points labelled by activity. All Norfolk postcodes shown.



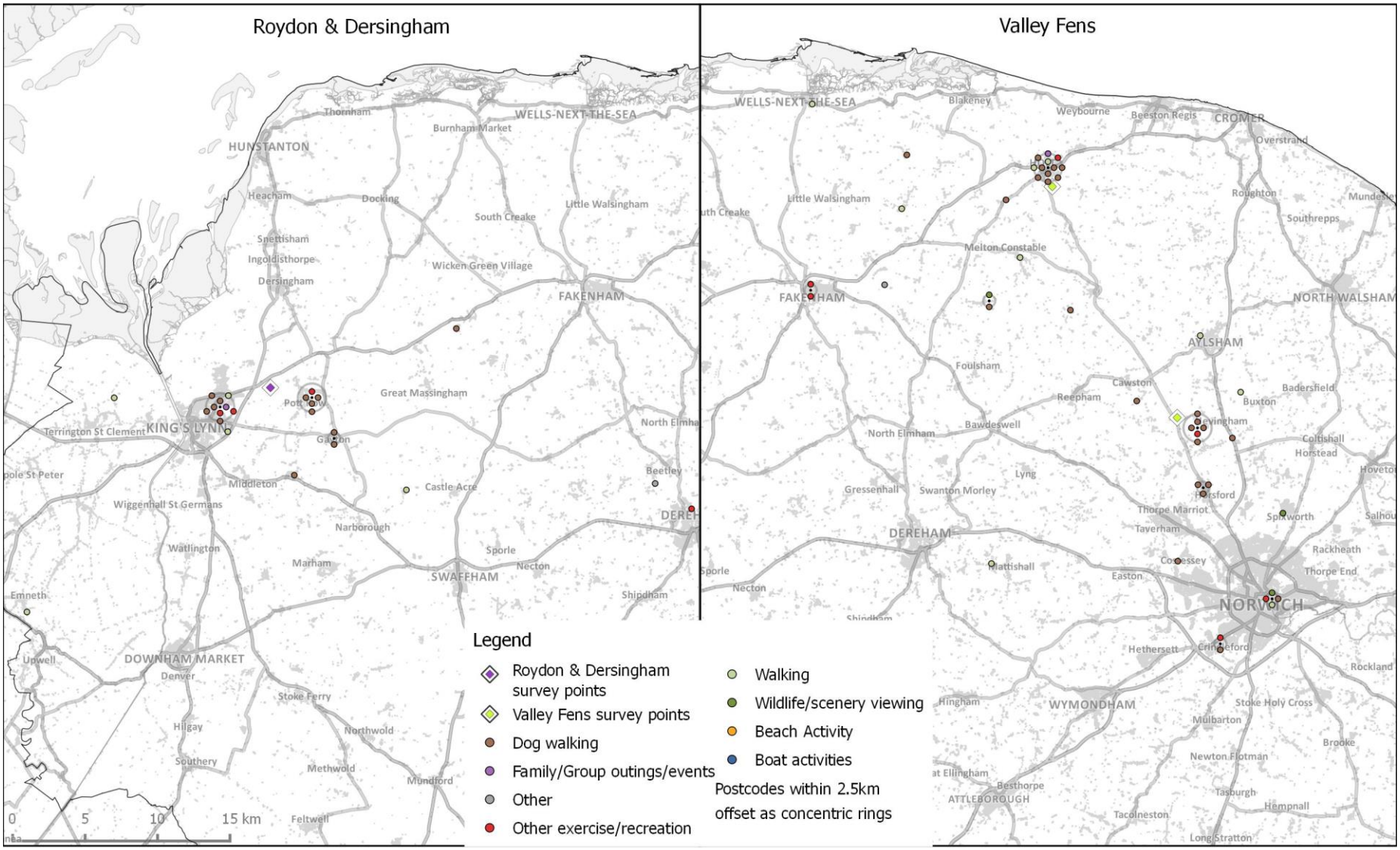
Map 9: Postcodes of interviewees from the East Coast survey points labelled by activity. All Norfolk postcodes shown.

Map 10: Postcodes of interviewees from the North Coast survey points labelled by activity. All Norfolk postcodes shown.



Map 11: Postcodes of interviewees from the Wash survey points labelled by activity. All Norfolk postcodes shown.

Map 12: Postcodes of interviewees from Valley Fens and Roydon survey points labelled by activity. All Norfolk postcodes shown.



Routes

3.53 Interviewees were also asked for information on their route during their visit. The surveyor captured an individual or groups' route on paper maps and we then digitised these in GIS. We could then calculate route length (i.e. distance walked). These routes are also shown in Maps 13 – 18 for individual areas. Overall the average route length recorded was 4.3km (median 3.2km indicating that half of all interviewees' routes were this length).

3.54 Individual route lengths differed considerably depending on the survey location and visitor. Table 12 shows how route lengths differed between areas. These differences in average route lengths were significant between areas (ANOVA on log transformed; df=6, f=18.46, p<0.001), with longer routes typically in the Brecks and North Coast compared to the shorter routes recorded in Broads, East Coast and Wash (significance level 0.001).

Table 12: Route length (km) of interviewees at all sites, by area.

Area	Number of routes	Average route length	Median route length	Maximum route length
Brecks	194	6.44	4.07	8.55
Broads	180	3.71	2.69	20.46
E. Coast	180	3.07	2.03	23.35
Roydon & Dersingham	25	3.61	3.40	12.93
Valley Fens	53	2.72	2.59	9.78
Wash	202	3.01	2.53	28.41
N. Coast	480	4.91	3.87	25.70
Total	**1314**	**4.32**	**3.18**	**16.42**

3.55 The long route lengths recorded at coastal sites and Broads were in part due to long distance walkers and boating groups. It should be noted that maximum values are likely to be greater still and that many long distance walkers were continuing to walk much further distances than they were able to report to surveyors given the scale of the paper maps available.

3.56 Map 13 shows the distribution of routes recorded from the Breckland survey locations. The high average value reported in Table 12 is influenced by the relatively large proportion of cyclists/mountain bikers, visible in Map 13, at High Lodge with a dense number of overlapping routes (darker lines) from many cyclists following set trails through Thetford Forest. The smallest area covered by routes clearly visible is at Cranwich Camp. The routes here were particularly unusual. The vast majority of users were dog walkers and often conducted several circular loops of two small grassland areas.

3.57 The routes in the Brecks are relatively open access because of the nature of the habitat with a wide range of tracks. In comparison the Broads routes, such as at How Hill or Hickling are often more restricted (Map 14), due to the terrain and available paths. The

long distance routes for the Broads are mostly influenced by boating groups along the River Bure.

3.58 Maps 15, 16 and 17, show routes along the coastal sites of the East Coast, North Coast and the Wash. Routes tend to be highly restricted when following coastal paths or inland areas (e.g. lots of overlap of the mapped routes between Stiffkey and Wells), reflecting access being concentrated in a narrow coastal strip. However, when locations have open access onto the shoreline (e.g. dunes or firm intertidal areas) routes disperse considerably. A particular hotspot for these was at Holkham and Wells, where the nature of the sites allows visitors to cover large areas.

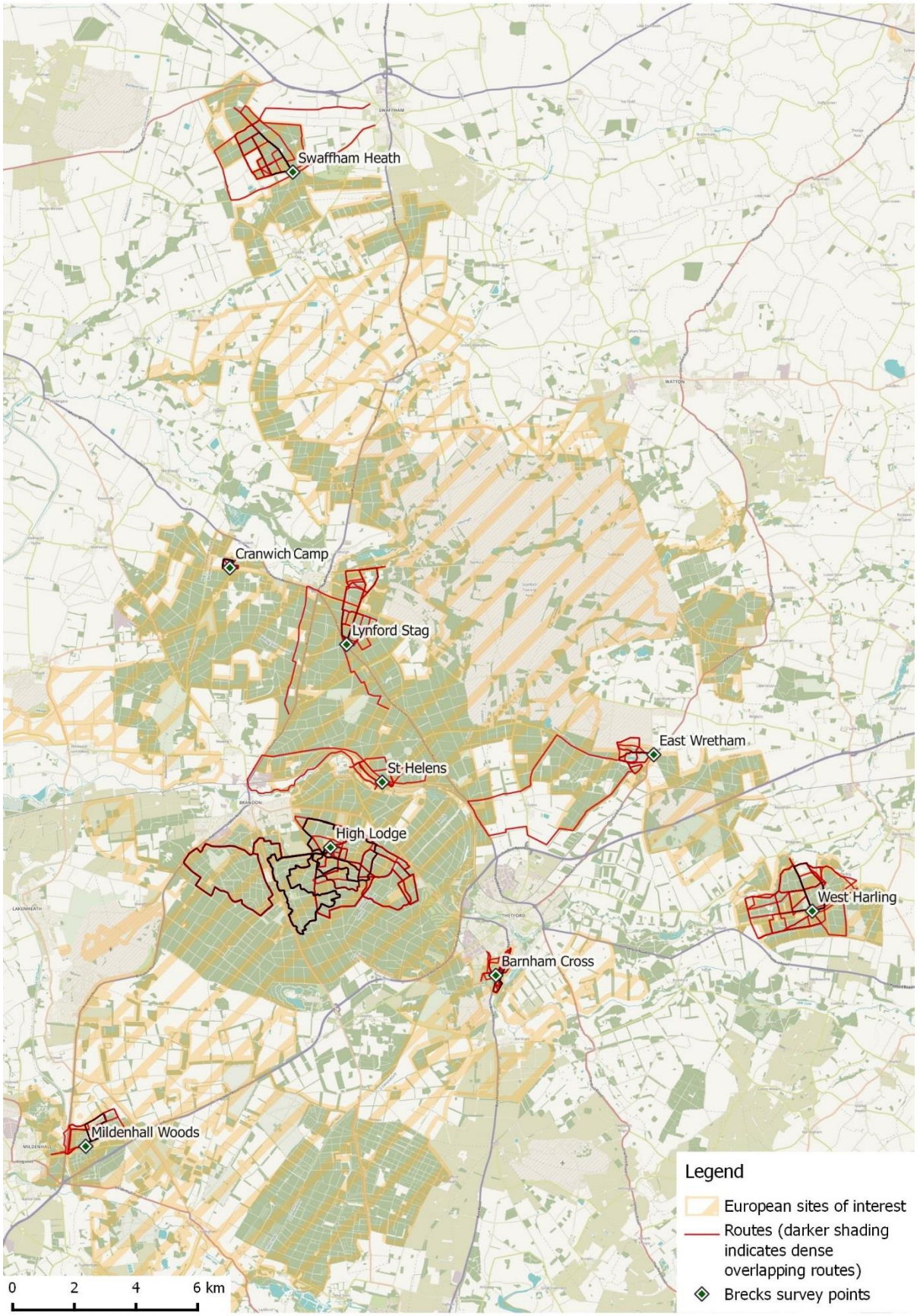
3.59 Routes for Roydon & Dersingham and the Valley Fens were fairly typical of inland dry sites. The majority of users appeared to stick to main paths, but there were a number of individuals who dispersed more widely. All these sites were fairly small and, as such, route length was generally shorter. A number of routes taken encompassed areas outside the designated site, creating longer routes overall. The survey location at Holt Lowes was particularly unusual in that the main footfall was outside the Valley Fens SAC. The adjoining land use is a well-advertised country park and attracts many visitors, and it can be seen that much of the access is focussed on the Country Park rather than the SAC.

3.60 Differences in route lengths between activities are shown in Table 13. Those conducting long routes were usually those on boat activities or cycling (included under "other exercise/recreation"). The differences between the average route lengths in Table 13 were highly significant between activities (ANOVA on log transformed; df=6, f=30.45, $p<0.001$).

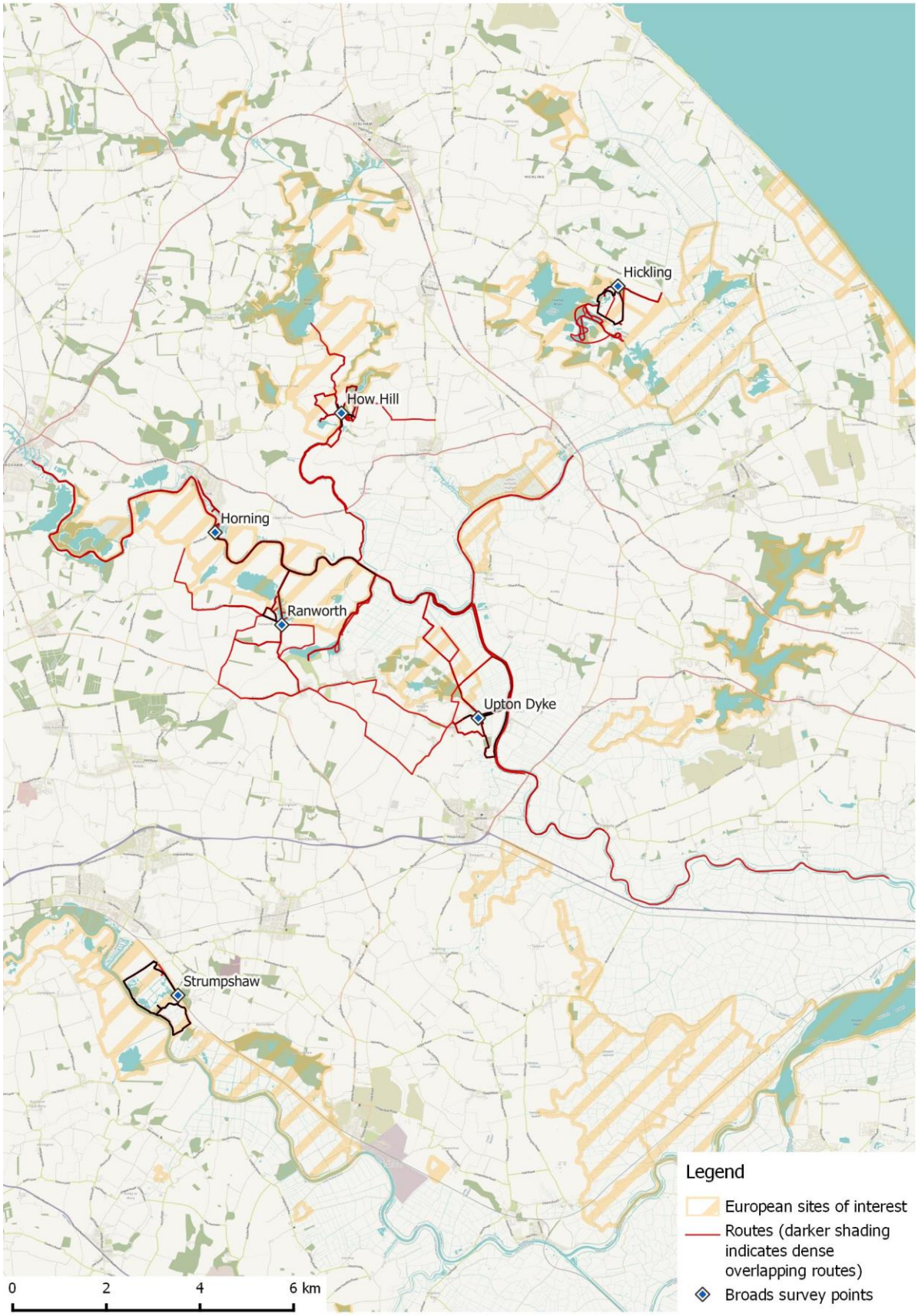
Table 13: Route length (km) of interviewees at all sites, separated by activity.

Activity	Number of routes	Average route length	Median route length	Maximum route length
Beach activity	53	2.11	1.7	28.41
Boat activities	53	8.19	7.64	20.46
Dog walking	536	3.31	2.93	14.91
Family/Group outings/events	33	2.07	1.45	8.00
Other	18	2.24	0.9	5.91
Other exercise/recreation	103	8.72	6.08	14.54
Walking	338	5.14	3.76	24.48
Wildlife/scenery viewing	180	3.37	3.1	28.41
Total	**1,314**	**4.32**	**3.18**	**28.41**

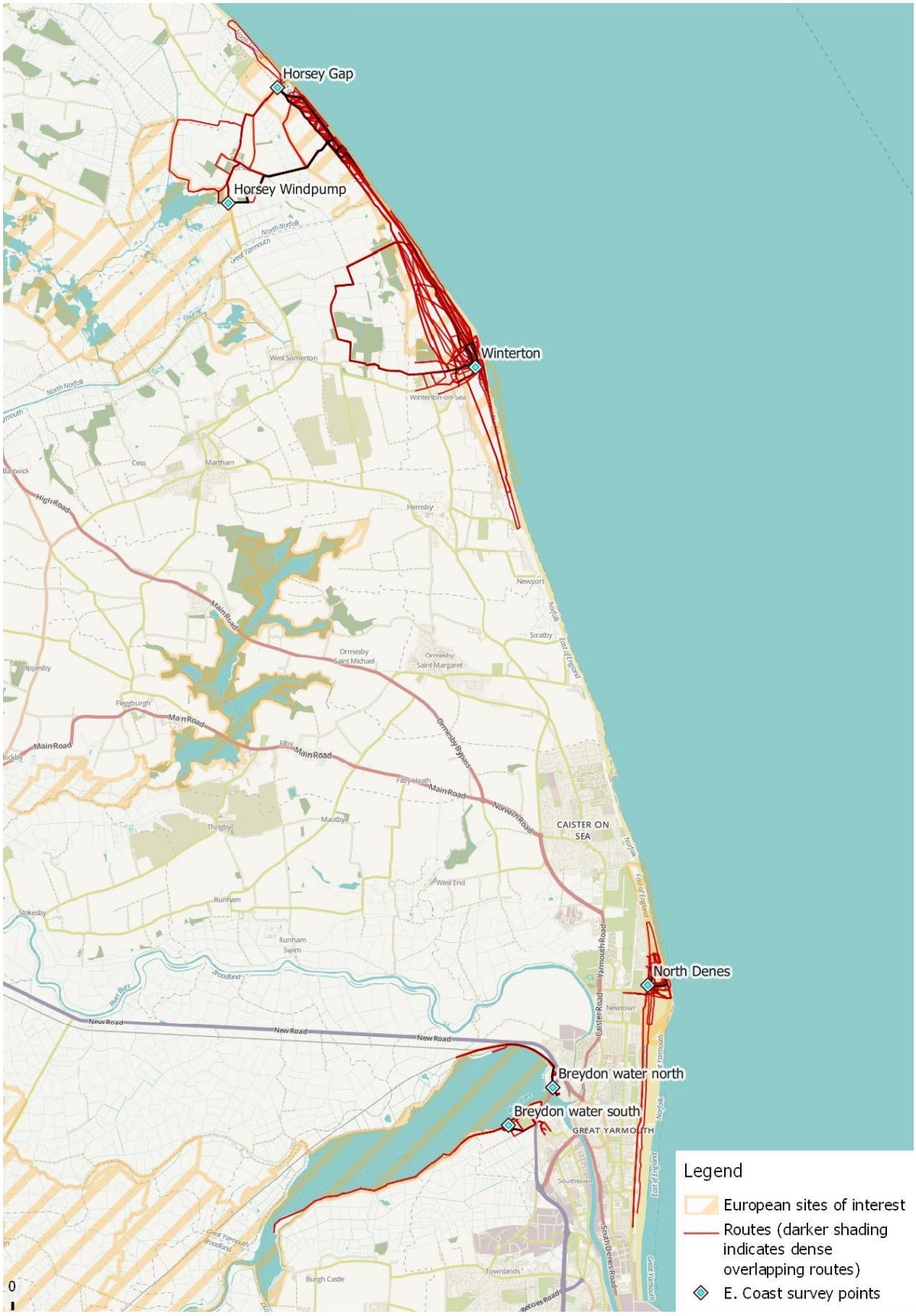
Map 13: Distribution of routes recorded from interviewees in the Brecks.



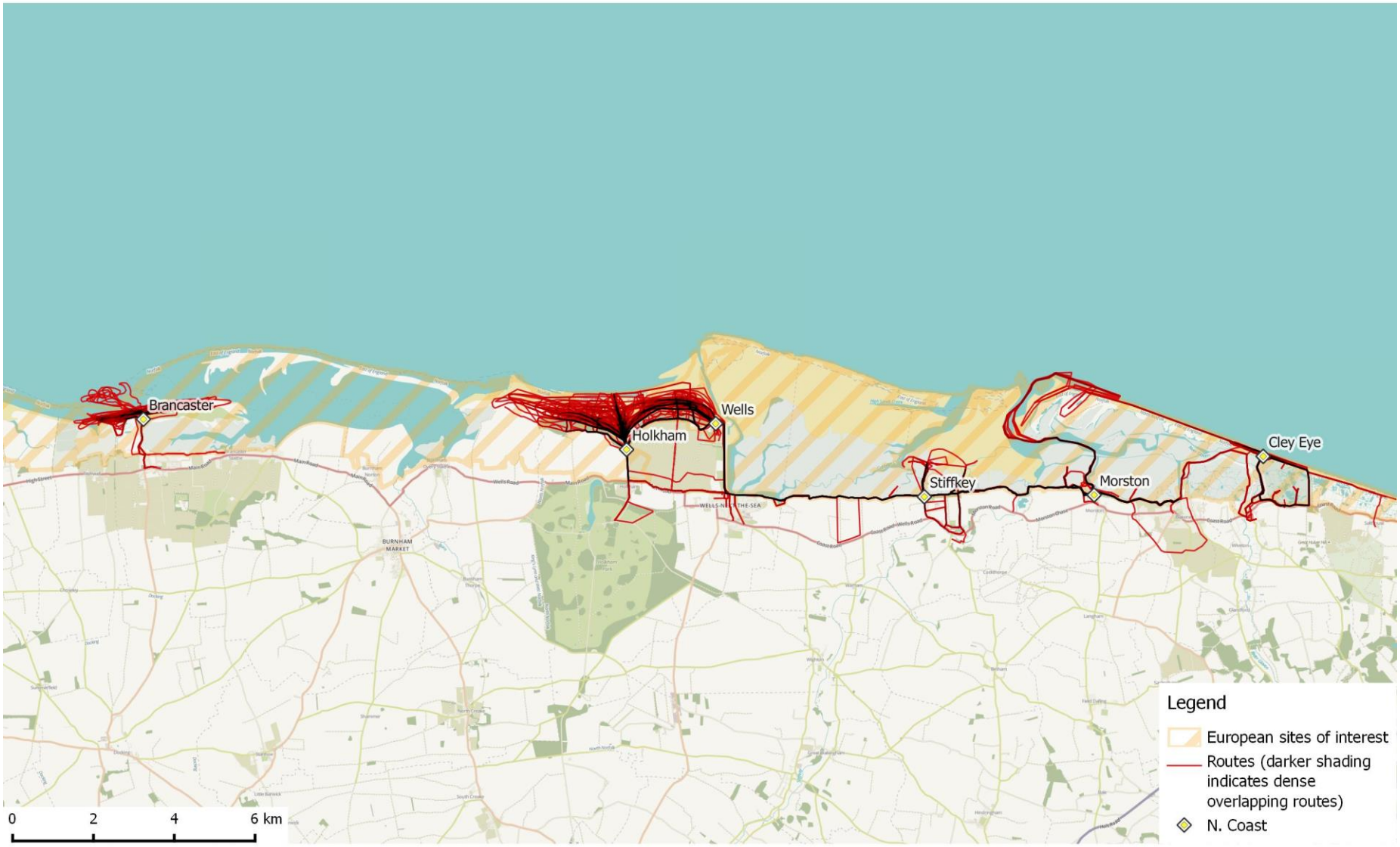
Map 14: Distribution of routes recorded from interviewees in the Broads.



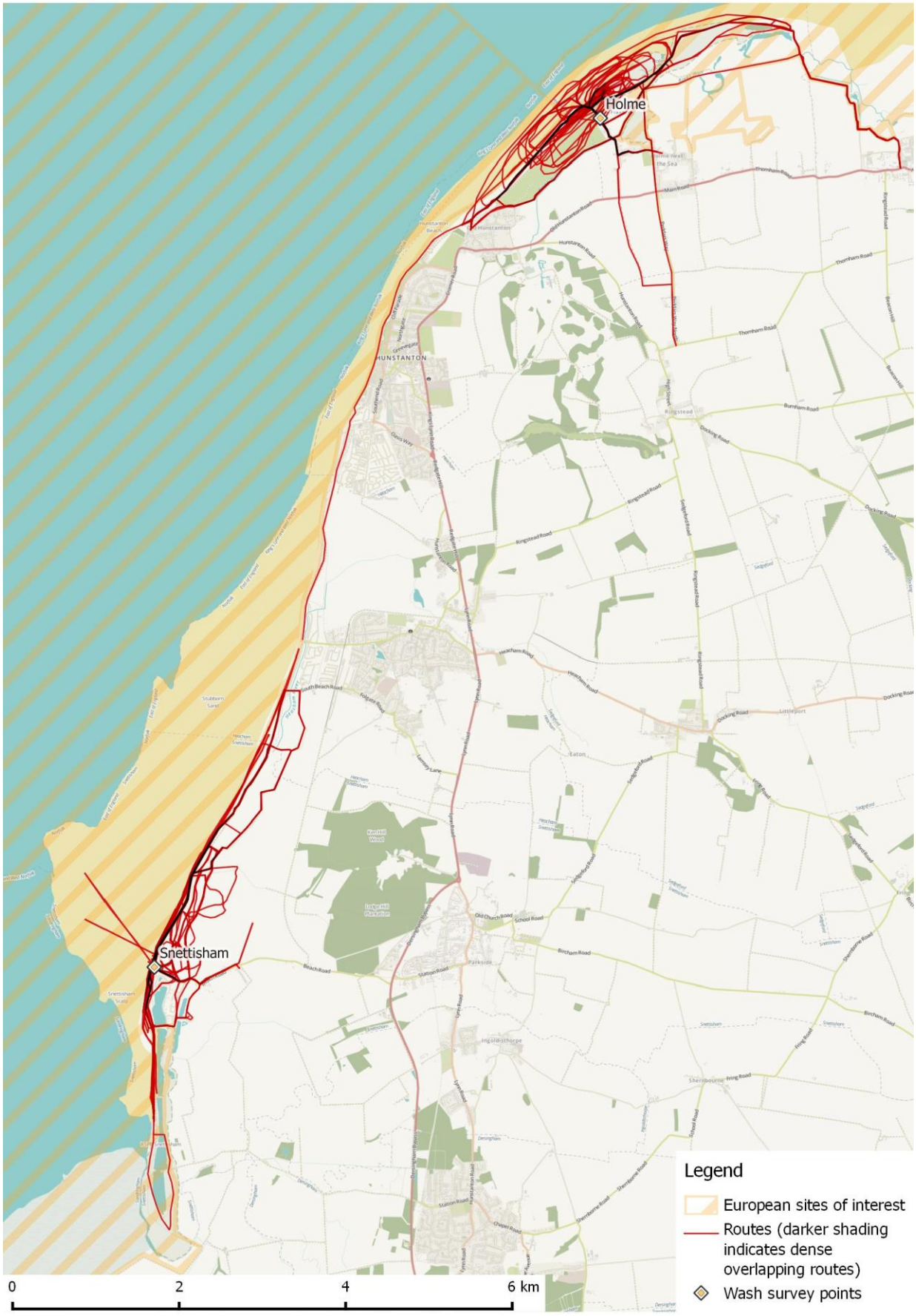
Map 15: Distribution of routes recorded from interviewees at the East Coast.



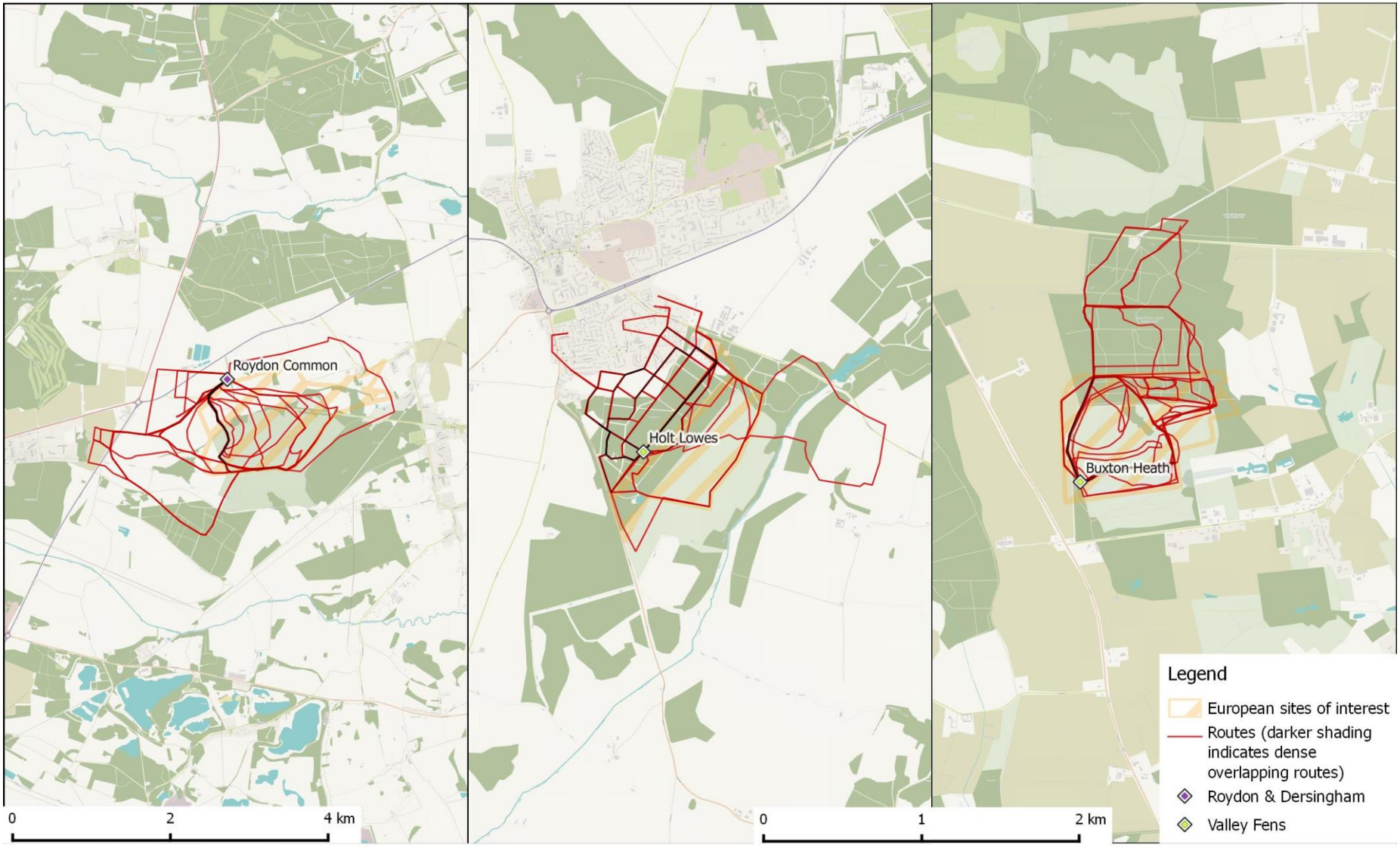
Map 16: Distribution of routes recorded from interviewees along the North Coast.



Map 17: Distribution of routes recorded from interviewees at the Wash.



Map 18: Distribution of routes recorded from interviewees at Roydon Common and the Valley Fens.



Key Results

3.61 Key results from the survey are:

- In total, including the estimated data, 6,096 groups were recorded entering or leaving sites (i.e. passing the surveyor) across all survey points. These groups consisted of 13,842 adults, 2,616 minors and 3,466 dogs.
- Survey points within the Broads usually had a very low proportion of dogs recorded from tallies, just 6%. Areas with a very high proportion of dogs were in Roydon & Dersingham, and the Valley Fens, with 32% and 30% dogs from tallies.
- 1341 interviews were conducted.
- Two thirds (66%) of interviewees were on short trip having travelled from home and around a third (32%) of interviewees were on holiday. Holiday-makers accounted for nearly half of all visitors interviewed at the North Coast and Broads whereas few interviewees in the Brecks and at Roydon and Dersingham were on holiday.
- Holiday-makers were typically staying in self-catering accommodation (31% of holiday makers) or campsite/caravan sites (29%), and over half (59%) of the holiday makers interviewed in the Broads were staying on a boat.
- Overall the most commonly reported activity was dog walking , with 549 interviewed groups conducting this activity, representing 41% of all those interviewed. The second most common activity across all interviews was walking (26%). Within individual areas this first and second ranking of dog walking and walking was consistent for the East Coast, Roydon & Dersingham, the Valley Fens, the Wash and the North Coast.
- The most commonly reported duration on site was 1 to 2 hours (31%), closely followed by between 30 and 60 minutes (27%). These times varied between individual survey points and areas. Key differences between areas were the large proportion of interviewees visiting for more than 4 hours in the Broads (29% of interviewees) and conversely at Roydon the large proportion visiting for less than 30 minutes (36%).
- Across all interviewees (including holiday makers), 31% of those interviewed were visiting the site for the first time. For those interviewees travelling from home on a short visit/day trip, over a quarter (27%) indicated they visited the site where interviewed at least daily, reflecting high frequencies of use by local residents.
- Over three quarters (77%) of all interviewees had arrived at the interview location by car. Most of the remaining interviewees (18%) had arrived on foot.
- 'Close to home' was one of the main reasons people gave for choosing the site where interviewed that day. Scenery was particularly important for those visiting the North Coast.
- Just over a third (36%) of interviewees were aware of a designation/environmental protection that applied to the site where visiting.
- Nearly all (98%) of interviewees gave their home postcode during the interview, allowing us to map visitor origins.
- For those interviewees visiting from home, the average distance between the home postcode and survey point was 24km. A total of 677 interviewees (52%) were visiting from home and resident within Norfolk. Some 16% of

interviewees had travelled from home on a short visit/day trip and lived outside Norfolk.

- In total 1314 routes were mapped from the interviews, showing where people had walked during their visit. Median route length across all sites and all activities was 3.18km. Across all sites the typical (median) dog walk was 2.93km, those walking covered a median distance of 3.7km while activities such as boating (median 7.64km) covered longer distances.

4. Overview and site by site summary

4.1 In this section we draw out key themes between areas and survey points and set out the relationship between some key individual results. We summarise information for each site, allowing readers to draw information at a site-specific level and then look across the different areas to key geographic differences.

Summary of metrics

4.2 Forty different survey points were covered within the survey, and we grouped these into seven broad areas for much of the analysis. For convenience, we provide a summary of some key metrics from the surveys by the seven areas (Table 14) and the site by site summary for each survey point in (Table 15). The metrics included in the tables reflect some of the key information useful when focussing on links between housing and access.

Table 14: Summary table giving details of key metrics from the survey for each broad area. Highlighted values indicate the top two (green) and bottom two values (red) for each metric.

Row Labels	Brecks	Broads	E. Coast	N. Coast	Roydon & Dersingham	Valley Fens	Wash	Total
Number of individuals (people and minors) per hour	11.1	16.4	30.7	44.6	4.8	5.8	32.5	25.6
Number of dogs per hour	3.7	1.0	4.3	9.0	2.2	2.5	11.3	5.3
Number of individuals (people and minors) per group	2.0	2.5	3.4	2.8	1.6	2.0	2.5	2.7
Number of minors per group	0.3	0.3	0.8	0.4	0.1	0.3	0.3	0.4
% of dogs seen off lead	60	27	43	43	67	79	37	46
% of interviewees on holiday	5	46	16	46	4	13	35	32
% of interviewees travelled from home	95	48	81	53	96	81	64	66
% of interviewees dog walking	48	17	40	43	52	54	46	41
% interviewees visiting for one hour or less	42	26	45	32	60	39	40	36
% interviewees visiting daily	12	7	22	11	8	20	9	12
% interviewees visiting once a week or more	49	17	38	26	48	43	32	32
% interviewees on first visit to the site	19	36	31	35	12	30	27	31
% interviewees arriving by car	93	62	75	73	96	87	78	77
% interviewees giving close to home as reason for visiting	28	16	27	15	48	37	22	21
% interviewees with home postcodes within Norfolk	61	43	72	49	96	83	44	54
% interviewees visiting from home, whose home is within 2 km	11	20	33	10	0	36	10	16
% interviewees visiting from home, whose home is within 5 km	35	32	43	28	54	45	33	35

Row Labels	Brecks	Broads	E. Coast	N. Coast	Roydon & Dersingham	Valley Fens	Wash	Total
% interviewees visiting from home, whose home is within 10 km	53	42	48	45	75	61	41	48
Median distance to home (all interviewees)	8.8	73.1	19.6	58.8	4.6	9.9	53.2	29.8
Q3 distance to home (all interviewees)	29.2	194.7	55.1	147.5	12.1	18.1	112.5	119.2
Median distance to home (interviewees from home)	7.9	13.4	10.7	13.7	4.5	5.5	14.5	11.3
Q3 distance to home (interviewees from home)	26.3	29.7	28.1	40.6	10.4	14.8	58.4	32.8

Table 15: Summary table giving site by site details of key metrics from the survey. Highlighted values indicate the top 5 (green) and bottom five values (red).

ID	Site Name	People per hour (from tally data)	Dogs per hour (from tally data)	Total interviews	Average % dogs seen off lead per group	% interviewees short visit from home	% interviewees dog walking	% interviewees visiting daily	% interviewees visiting for less than an hour	% interviewees arriving by car	Median distance from home postcode to survey point (km)	Median distance from home postcode to survey point – visitors from home only (km)	Median route length (km)
Brecks													
18	Barnham Cross	**6.4**	**1.9**	**24**	**57**	100	**50**	38	83	**79**	1	1	**1.9**
14	Cranwich Camp	7.3	9.1	17	81	94	94	53	82	100	4	4	1.1
12	East Wretham	2.1	0.3	10	50	80	20	10	50	100	12	9	2.5
11	High Lodge	60.9	10.8	64	29	97	14	8	6	98	23	22	12.9
15	Lynford Stag	4.6	1.3	17	56	94	53	0	59	94	26	26	3.5
10	Mildenhall Woods	7.6	4.9	15	74	100	80	13	53	87	6	6	3.2
16	St Helens	9.3	2.4	5	0	80	20	0	0	100	47	37	2.9
13	Swaffham Heath	2.9	3.3	20	60	100	100	45	50	95	4	4	4.8
19	West Harling	4.4	2.4	23	61	87	57	26	48	83	9	8	4.7
Broads													
2	Hickling Broad (S)	20.4	0	15	-	67	0	0	0	100	31	24	3.1
1	Hickling Broad (W)	3.3	0	8	-	38	0	0	13	100	98	24	2.7
4	Horning	18.4	1.6	28	17	7	25	0	25	32	175	17	2.4
3	How Hill	10.2	0.4	28	0	29	7	4	29	50	194	13	2
5	Ranworth	21.3	1.2	22	25	5	9	5	27	23	187	0	2
9	Strumpshaw Car Park	31.6	0.2	39	0	77	3	0	8	100	41	28	3.9
8	Upton Green	9.9	3.8	41	26	78	46	37	54	56	6	2	3.1
East Coast													
7	Breydon Water north (S)	5.3	1.3	10	50	90	40	10	50	70	13	12	1.4
6	Breydon Water north (W)	1.4	0.9	10	25	90	40	20	90	100	12	12	0.9

ID	Site Name	People per hour (from tally data)	Dogs per hour (from tally data)	Total interviews	Average % dogs seen off lead per group	% interviewees short visit from home	% interviewees dog walking	% interviewees visiting daily	% interviewees visiting for less than an hour	% interviewees arriving by car	Median distance from home postcode to survey point (km)	Median distance from home postcode to survey point – visitors from home only (km)	Median route length (km)
36	Breydon Water south	3.8	4.7	15	67	100	80	60	80	53	2	2	1.7
21	Horsey Gap	118.2	5.8	32	42	81	9	6	56	97	44	41	3.6
17	Horsey Windpump	36.8	1.9	24	0	88	8	0	0	100	31	28	5.8
22	North Denes	16.7	9.4	34	43	79	68	56	59	65	1	1	1.1
20	Winterton	33.2	6.4	55	57	71	44	38	31	60	24	7	1.9
North Coast													
28	Brancaster	28.6	10.6	63	41	75	65	10	60	92	47	29	2.7
31	Cley Eye (S)	16.9	2.4	45	36	51	20	9	50	89	44	11	1.7
38	Cley Eye (W)	20.7	3.7	17	67	76	12	6	31	71	41	24	4.5
33	Holkham (S)	120.5	29.7	67	37	58	46	16	32	94	50	15	4.2
29	Holkham (W)	41.5	13.9	82	37	68	67	27	41	91	31	15	4.3
34	Morston (S)	63.6	4.8	40	40	28	18	3	34	68	160	41	6.4
30	Morston (W)	44.8	4.5	17	50	24	29	6	51	35	156	4	4.6
40	Stiffkey (S)	23.3	4.4	67	72	36	22	7	31	52	102	8	3.4
39	Stiffkey (W)	6.7	2.1	23	60	70	39	22	29	70	44	10	3.7
35	Wells	79.8	14.2	72	41	40	53	26	18	42	87	2	3.9
Roydon & Dersingham													
23	Roydon Common	4.8	2.2	25	71	96	52	36	41	96	5	4	3.4
Valley Fens													
25	Buxton Heath	5.9	3.1	22	75	86	59	32	46	100	8	6	2.8
24	Holt Lowes	5.8	2	32	67	78	50	31	13	78	10	3	2.6
Wash													

ID	Site Name	People per hour (from tally data)	Dogs per hour (from tally data)	Total interviews	Average % dogs seen off lead per group	% interviewees short visit from home	% interviewees dog walking	% interviewees visiting daily	% interviewees visiting for less than an hour	% interviewees arriving by car	Median distance from home postcode to survey point (km)	Median distance from home postcode to survey point – visitors from home only (km)	Median route length (km)
27	Holme	34.3	11.1	**72**	33	53	44	14	18	79	85	**30**	2.4
32	Holme (W)	20	10.2	37	41	89	43	16	28	87	14	8	3
37	Snettisham (S)	36.3	**11.2**	66	58	61	45	18	17	71	42	13	2.2
26	Snettisham (W)	39.5	**12.6**	38	29	66	55	16	39	81	58	13	3.5

Table 16: Additional summary table giving site by site details of the percentage of interviewees who travelled home occurring within set distance bands. Highlighted values indicate the top 5 (green) and bottom five values (red).

ID	Site Name	Number of georeferenced interviewees travelling directly from home	% of interviewees home postcode within <2km (those travelled from home)	% of interviewees home postcode within <5km (those travelled from home)	% of interviewees home postcode within <10km (those travelled from home)
Brecks					
18	Barnham Cross	24	71	92	92
14	Cranwich camp	16	0	63	88
12	East Wretham	8	0	13	50
11	High Lodge	62	0	5	26
15	Lynford Stag	16	0	25	25
10	Mildenhall Woods	15	20	47	67
16	St Helens	4	0	0	0
13	Swaffham Heath	20	0	55	75
19	West Harling	20	0	35	65
Broads					
2	Hickling (S)	10	0	20	30
1	Hickling (W)	3	0	0	0
4	Horning	1	0	0	0
3	How Hill	8	13	25	38
5	Ranworth	1	100	100	100
9	Strumpshaw	29	0	7	17
8	Upton Dyke	32	47	63	72
E. Coast					
7	Breydon water north (S)	9	11	22	33
6	Breydon water north (W)	9	0	33	33
36	Breydon water south	15	53	93	100
21	Horsey Gap	26	4	4	8
17	Horsey Mill	20	0	5	15
22	North Denes	26	81	85	85
20	Winterton	39	41	49	54
N. Coast					
28	Brancaster	44	9	9	23
31	Cley Eye (S)	23	9	22	43
38	Cley Eye (W)	13	8	15	31
33	Holkham (S)	39	3	21	44
29	Holkham (W)	56	2	20	39
34	Morston (S)	11	0	18	36
30	Morston (W)	4	25	50	75

ID	Site Name	Number of georeferenced interviewees travelling directly from home	% of interviewees home postcode within <2km (those travelled from home)	% of interviewees home postcode within <5km (those travelled from home)	% of interviewees home postcode within <10km (those travelled from home)
40	Stiffkey (S)	24	17	38	54
39	Stiffkey (W)	16	31	44	50
35	Wells	29	24	**79**	**86**
Roydon & Dersingham					
23	Roydon Common	24	**0**	54	75
Valley Fens					
25	Buxton Heath	19	21	37	63
24	Holt Lowes	25	**48**	52	60
Wash					
27	Holme (S)	38	13	29	34
32	Holme (W)	32	22	47	53
37	Snettisham (S)	39	**0**	26	38
26	Snettisham (W)	25	4	32	40

Group size and composition

4.3 Tally data provided basic, but reliable information on the numbers of adults, minors and dogs. These can be averaged between areas to examine typical group sizes and members for each area. Across all survey points we averaged values to determine "typical groups". This shows a typical group consisted of just over 2 adults (2.27), with just over half of groups having a dog (0.57) and just under half having a minor with them (0.43).

4.4 The typical group composition can be compared between areas and is shown visually in Figure 15. At the Broads, East Coast, North Coast and the Wash, groups contained on average at least two adults. While at the Brecks, Roydon & Dersingham, and the Valley Fens, groups had, on average, less than two adults. These differences between areas were close to being significant (ANOVA using individual survey points; df=6, F=2.31, p=0.057). The number of minors in a group was typically between 0.11 and 0.44 (lowest at Roydon & Dersingham, highest at East Coast), and differences were not significant (df=6, F=0.36, p=0.901). The average number of dogs in a group was lowest in the Broads, with 0.2 dogs per group, compared to on average every group with a dog at the Wash. These differences shown in Figure 15 were close to being significant (df=6, F=2.33, p=0.055).

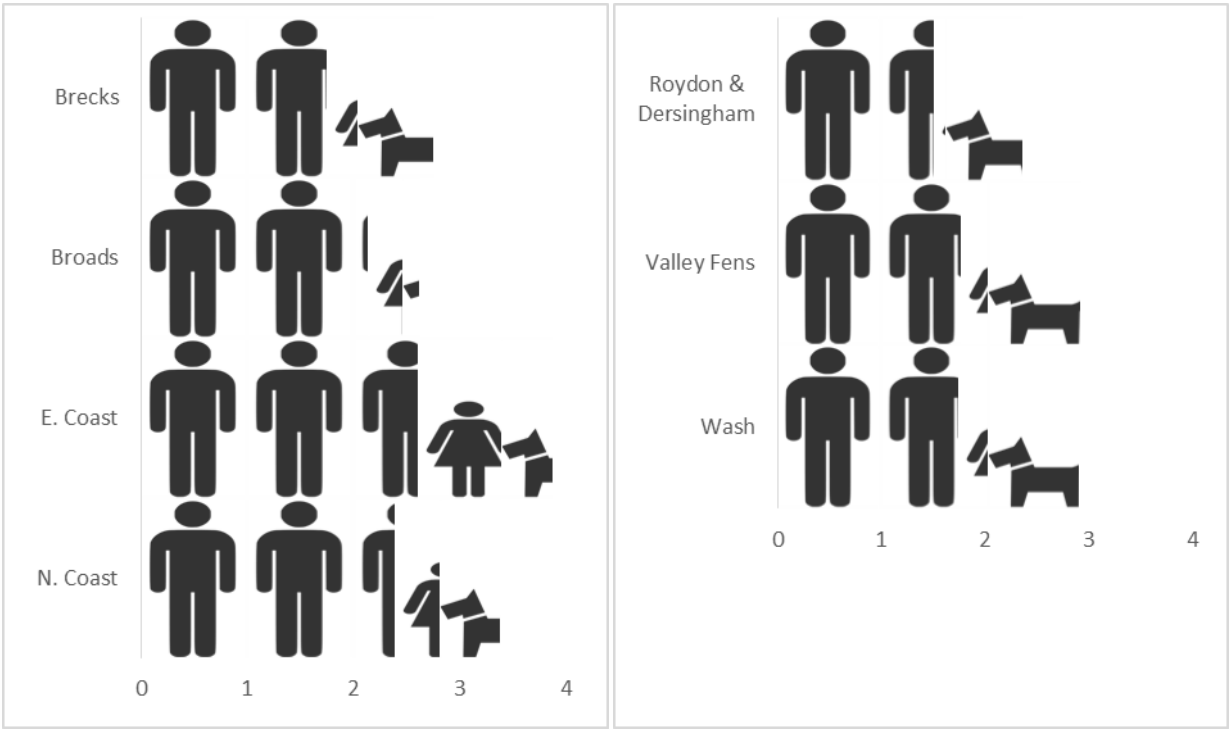


Figure 15: Pictographical representations of the average group constituent number of individual adults, minors and dogs recorded at each survey area.

4.5 The number of dogs and minors recorded typically as a percentage of all adults, minors and dogs from the tallies gives a general feeling of footfall at sites. Figure 16 shows the percentage of dogs (within the tally as a whole) plotted against the percentage of minors. At three sites (Swaffham heath (survey point 13), Cranwich Camp (14), and Breydon Water South (36)), just over half of "passes" recorded by the surveyor were of dogs into the sites. Some of the Breckland sites seem to be characterised by a high number of dogs and a low number of minors. More striking is that almost all the Broads site had very low proportions of dogs (with the exception of Upton Dyke, survey point 8), but a variable number of minors. Mostly this was dependent on location, but also time of year, as noted by the two extremes of survey point 1 and 2, Hickling in the winter and summer respectively. The site has a no dogs policy and in both the summer and winter no visitors with dogs were recorded, but in the summer the percentage of minors in the groups was markedly higher.

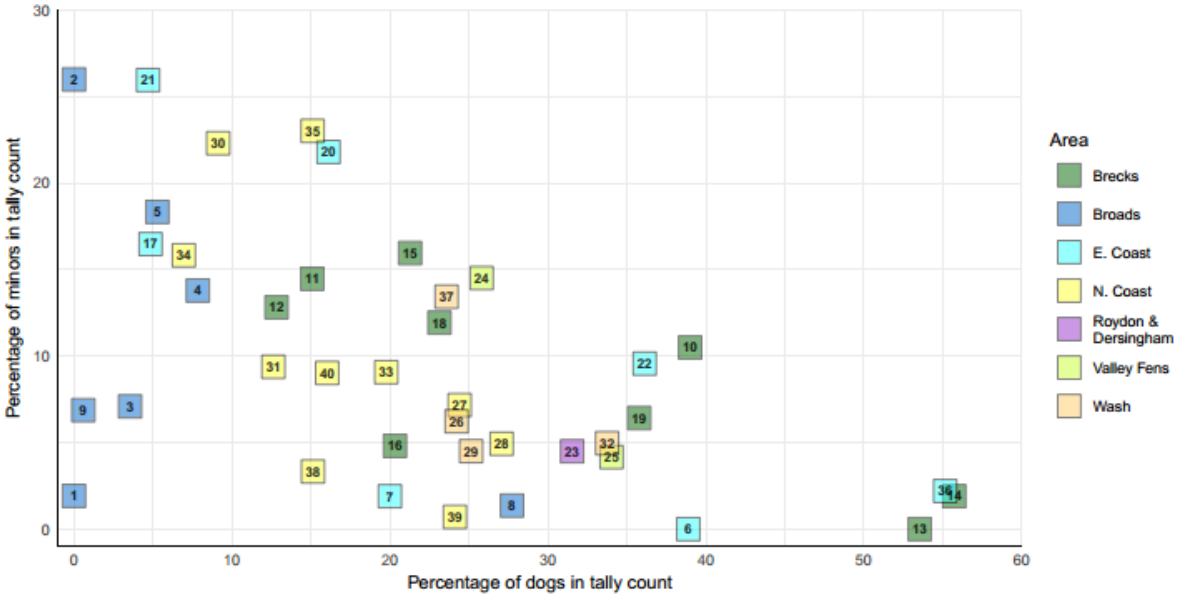


Figure 16: The numbers of dogs and minors recorded in tally counts, expressed as a percentage of the total number of adults, minors and dogs recorded, plotted against each other. Numbers indicate the survey point ID.

Similarities between sites across areas

4.6 Within the analysis we have grouped sites into seven areas that reflect their geographical distribution and the types of European Protected sites. Within each area there are different types of site and a wide variety of access points, ranging from informal parking and relatively little access infrastructure, to high profile sites that are nationally promoted and have permanently staffed visitor centres.

4.7 Using the visitor survey data we have explored whether it is possible to group sites based on the visitor data, rather than our broad geographic areas. For example are there survey points in different areas that appear to have similar characteristics in terms of their visitor use. Identifying such groups of sites may help to inform access management and provide a basis for mitigation required as a result of residential growth.

4.8 In Figure 17 we have produced a dendrogram, and in this plot sites which are similar are placed next to each other and the length of the lines and distribution of the splits reflects how different sites are. Figure 17 is derived solely using the numbers of adults, minors and dogs recorded at each survey point. Using these metrics, the plot separates five sites (Wells, High Lodge, Morston (summer), Holkham (summer) and Horsey Gap) as standing out compared to the others – these all had extremely high visitor counts and represent high profile destinations with a large draw. With the exception of High Lodge all are coastal.

4.9 After this the major splits are less apparent, but there is definite clustering of sites by area, for example the Breckland sites (with the exception of High Lodge) are clustered very closely. Similarly the two Valley Fens sites are close together. The plot suggests

similarities between the Breckland sites, Valley Fens and Roydon – these are all inland sites and lack the open water and national profile of the Broads sites.

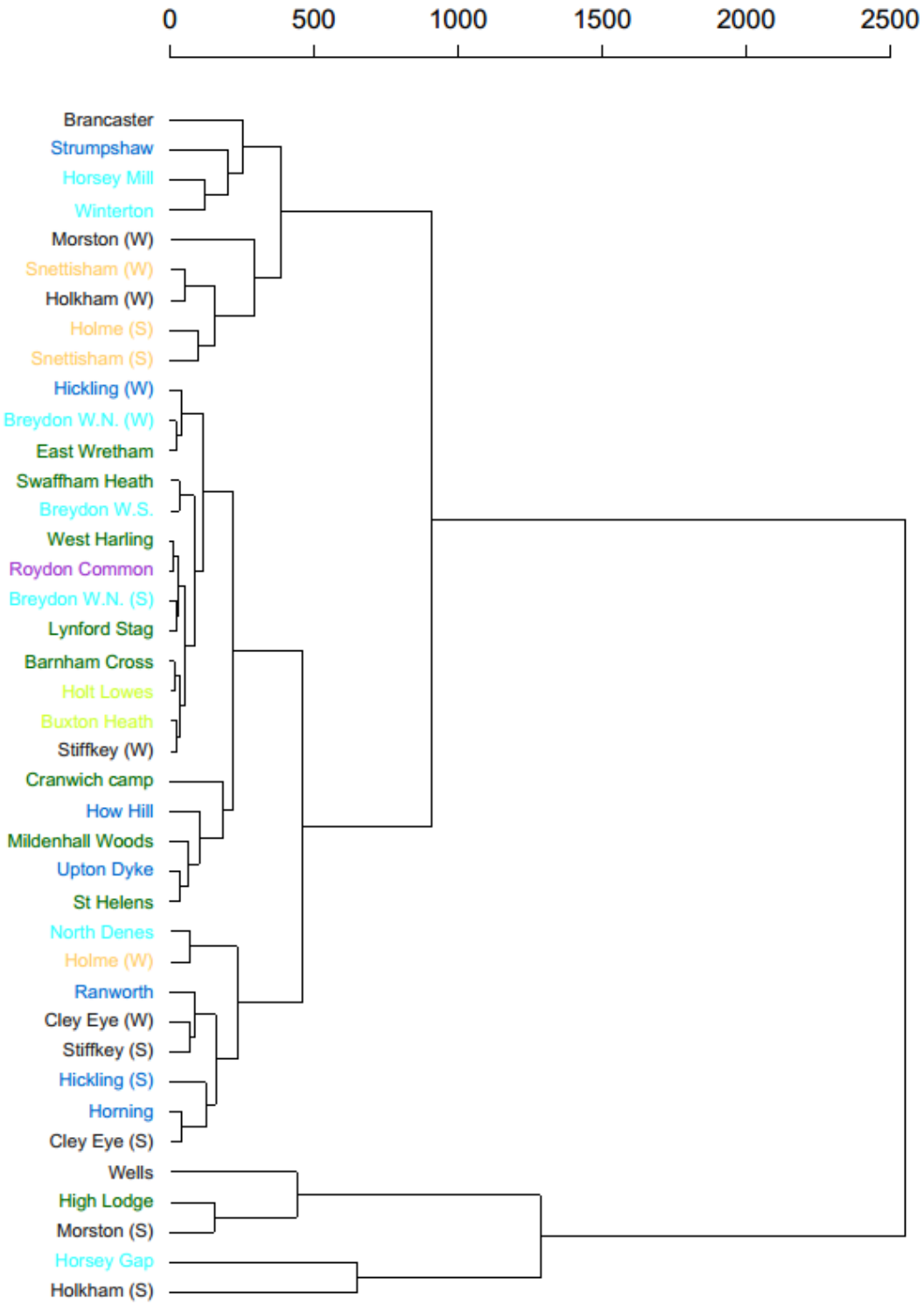


Figure 17: Dendrogram to show hierarchical clustering of survey points using just 3 variables; the number of adults, minors and dogs recorded from tallies. Colours are representative of areas as applied throughout, although North Coast sites have been coloured black so they are easier to see.

Distance from home postcode to survey point

4.10 The distance between interviewees' home postcode and the survey point is of particular interest in the context of this report. Figure 18 shows the relationship between the percentage of daily visitors and the typical distances between survey points and visitors. This figure serves to show the variation within areas at individual survey points. Sites with the highest relative numbers of frequent visitors were usually those with the shortest average distances. However within areas this trend was not always as apparent. For example, the Brecks sites typically have very short visitor distances, but do not always have a high proportion of daily visitors. This would suggest use is mostly by locals, typically within 20km, but that there is variation between sites as to whether these visitors are mostly daily or not. In the Broads the relationship between the proportion of daily visitors and the distance was also not as clear. Interview data at virtually all of the Broads survey locations reflects a low proportion of daily visitors, regardless of the average distance travelled. The exception is Upton Dyke which appears as a particular outlier, with a high proportion of daily visitors and a particularly local catchment.

4.11 The relationship between the proportion of dog walkers and average distance (from home postcode to survey point) shows a similar trend (Figure 19), which is perhaps to be expected as many dog walkers are daily visitors. Again it is important to note this relationship appears fairly clear overall, but the trend is more variable between areas. Many of the Brecks sites have both short distances and high average number of dogs in visitor groups. This contrasts with the Broads with longer distances and fewer dogs.

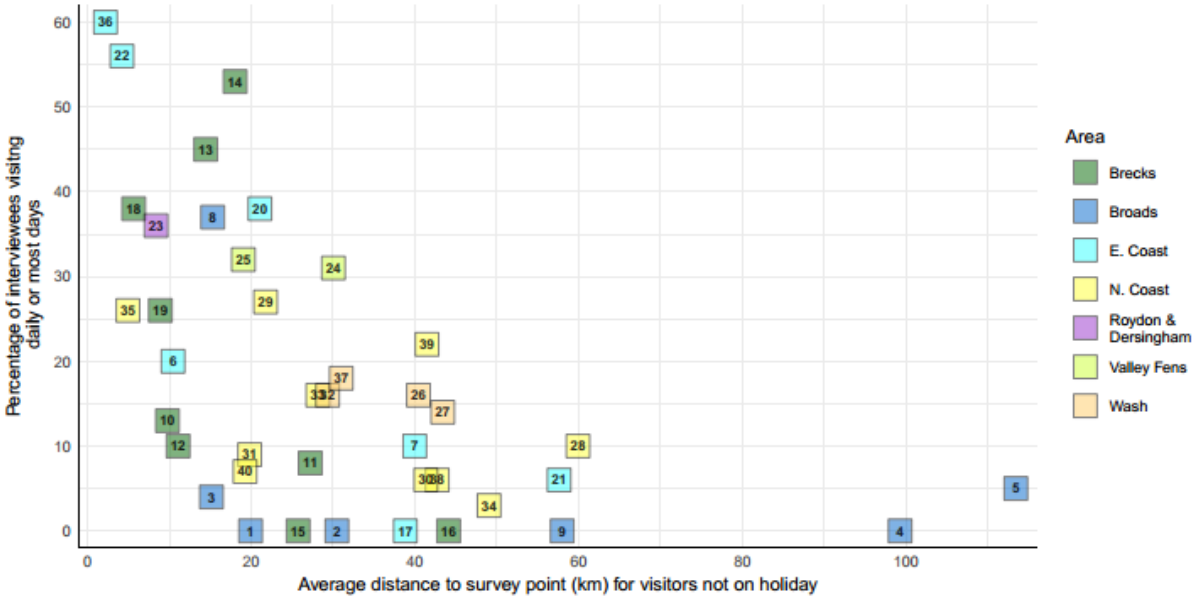


Figure 18: Scatter plot showing the percentage of visitors reported to visit daily or most days, compared to the average linear distance interviewees were from their home postcode for each survey point (for visitors not on holiday, i.e. travelling from home), labelled by area.

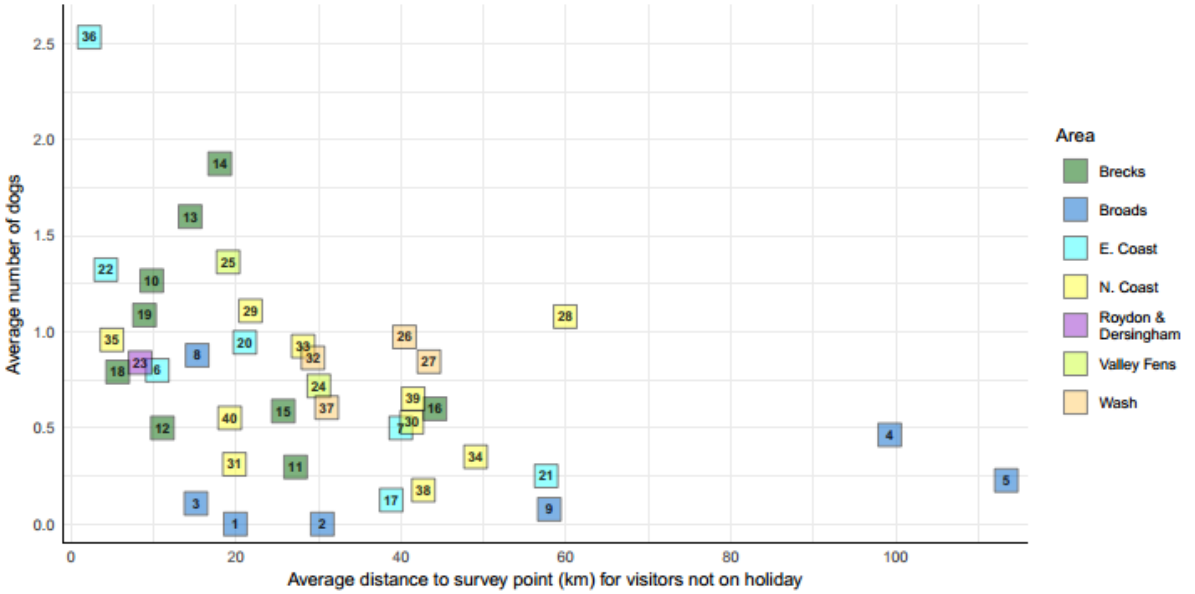


Figure 19: Scatter plot showing the average number of dogs in a group compared to the average linear distance interviewees were from their home postcode for each survey point (for visitors travelling from home, i.e. not on holiday), labelled by area.

Conclusions

4.12 In this section we have pulled out some broad themes from the data and looked across sites. Key findings include:

4.13 The East Coast and North Coast sites appeared to attract a relatively high proportion of families, while groups at the Broads tended to have relatively few children (much variation) and consistently few dogs (though this may reflect the survey points specifically as both Hickling and Strumpshaw Fen do not allow dogs). Roydon Common, the Valley Fens and the Brecks have a clear draw for dog walking and a relatively high proportion of visitors to these areas are dog walkers.

4.14 Within the main results section, we have grouped sites into areas that reflect the geography and types of European site present. However there are some similarities between sites across areas. High Lodge, Morston (summer), Holkham (summer), Wells and Horsey Gap all had extremely high visitor flows and were very busy sites, standing out from all the other locations. With the exception of High Lodge, the other Breckland sites appear (in terms of visitor flows) to be relatively similar to each other and also similar to the Valley Fens sites and Roydon.

4.15 Some of the sites on the North and East Coasts have high proportions of regular visitors (visiting at least daily) and high average distances from the home postcode to the survey point. This suggests that some of the sites with a strong draw over long distances still have regular visitors who come daily. Some of these sites are well away from centres of population. The Brecks sites have a very short visitor distance typically, but not always a high proportion of daily visitors.

5. Housing and implications for growth

5.1 In this section we use data (provided by Norfolk County Council) showing potential housing growth within the current plan period(s), in order to make predictions of the likely change in access at European Protected sites as a result of the cumulative levels of development across Norfolk.

Current and future housing distribution

5.2 Postcode data from February 2016 shows 409,618 residential properties associated with postcodes in Norfolk. Norfolk County Council provided a GIS layer of local plan housing allocations and known potential windfall sites, representing levels of development anticipated within the relevant and current plan periods for the different Norfolk planning authorities. These allocated sites were provided as a series of polygons representing their locations. The number of potential new houses across Norfolk totals 66,933 dwellings, an increase of around 16%. The allocated site polygons were converted to point data in the GIS, with points distributed randomly within each polygon to represent individual houses. The potential new housing (through site allocations) data is shown as red dots in Map 19 and Map 20 (which shows housing allocations in relation to the European Protected sites where visitor surveys took place).

5.3 In Figure 20 we show the current housing and allocated housing within different distance bands from each of the areas covered in this report. The data are also given in Appendix 5. The data show that the Norfolk Valley Fens and the Broads have relatively high levels of existing housing at relatively short distances, and that, for both of these, there are allocated sites for new housing mapped within relatively short distance bands (within 10km). This reflects the proximity of these areas to Norwich and to the North-east Norwich Growth Triangle. Levels of allocated sites for new housing within the nearer distance bands appear to be lowest for the Norfolk coast.

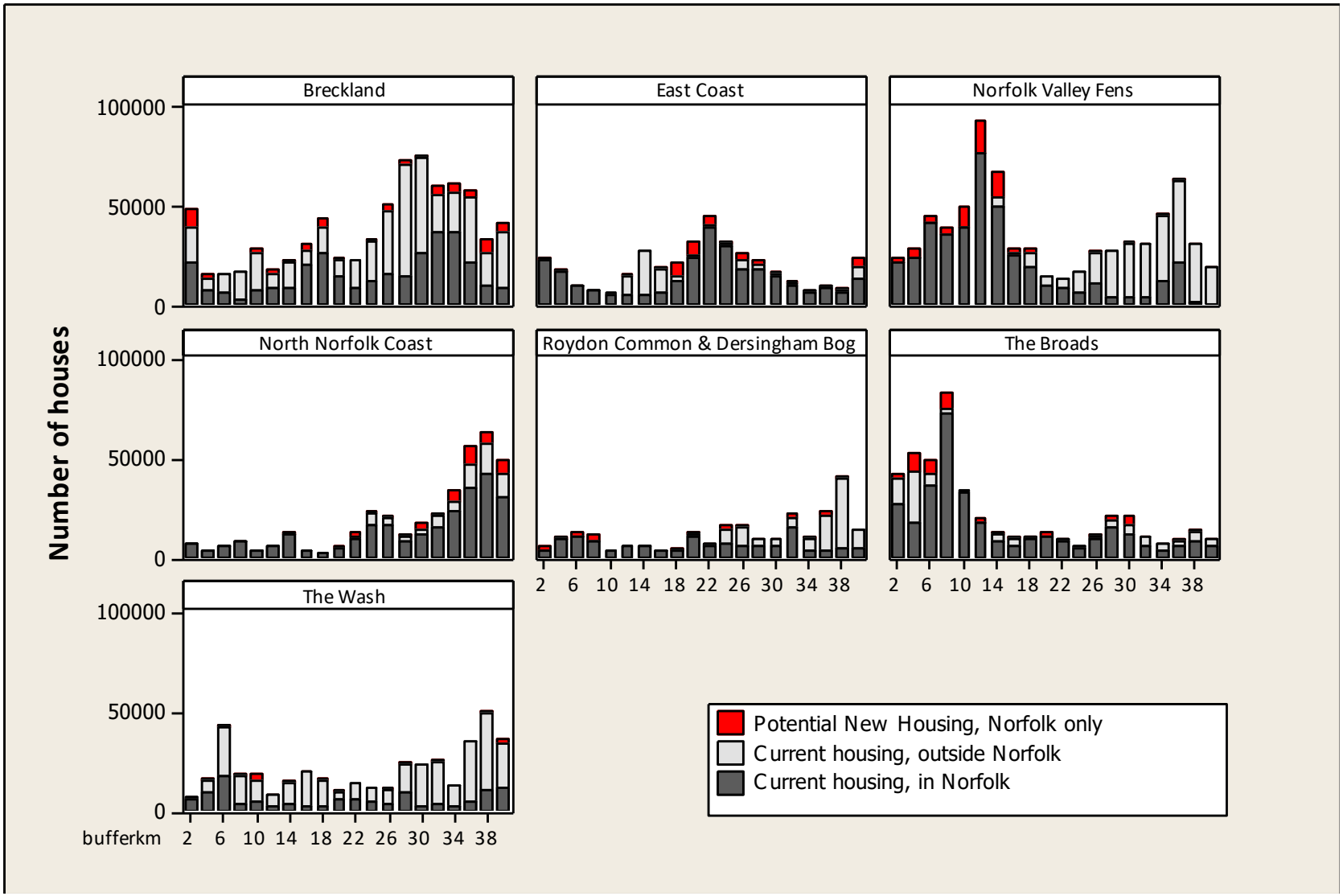
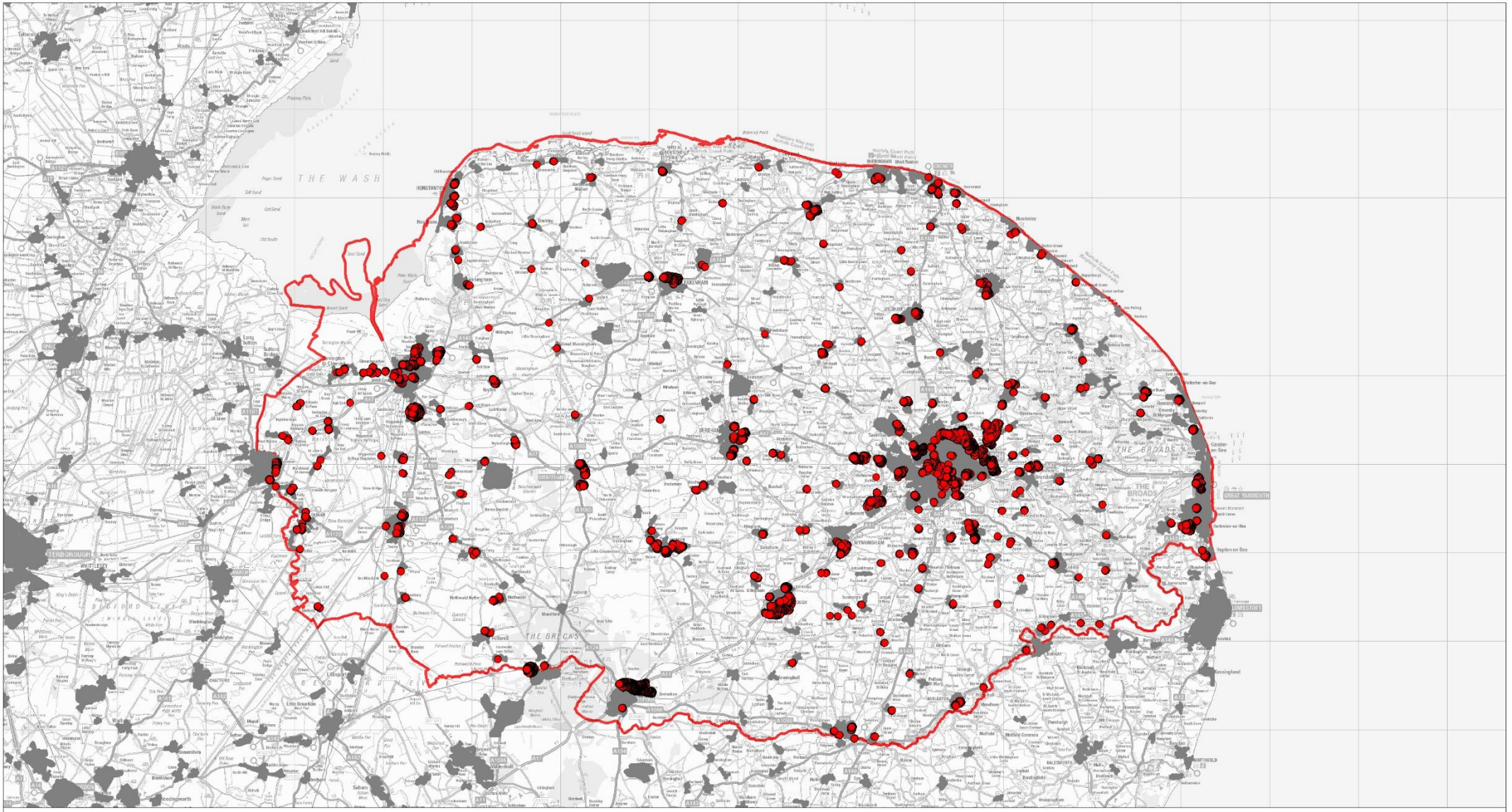
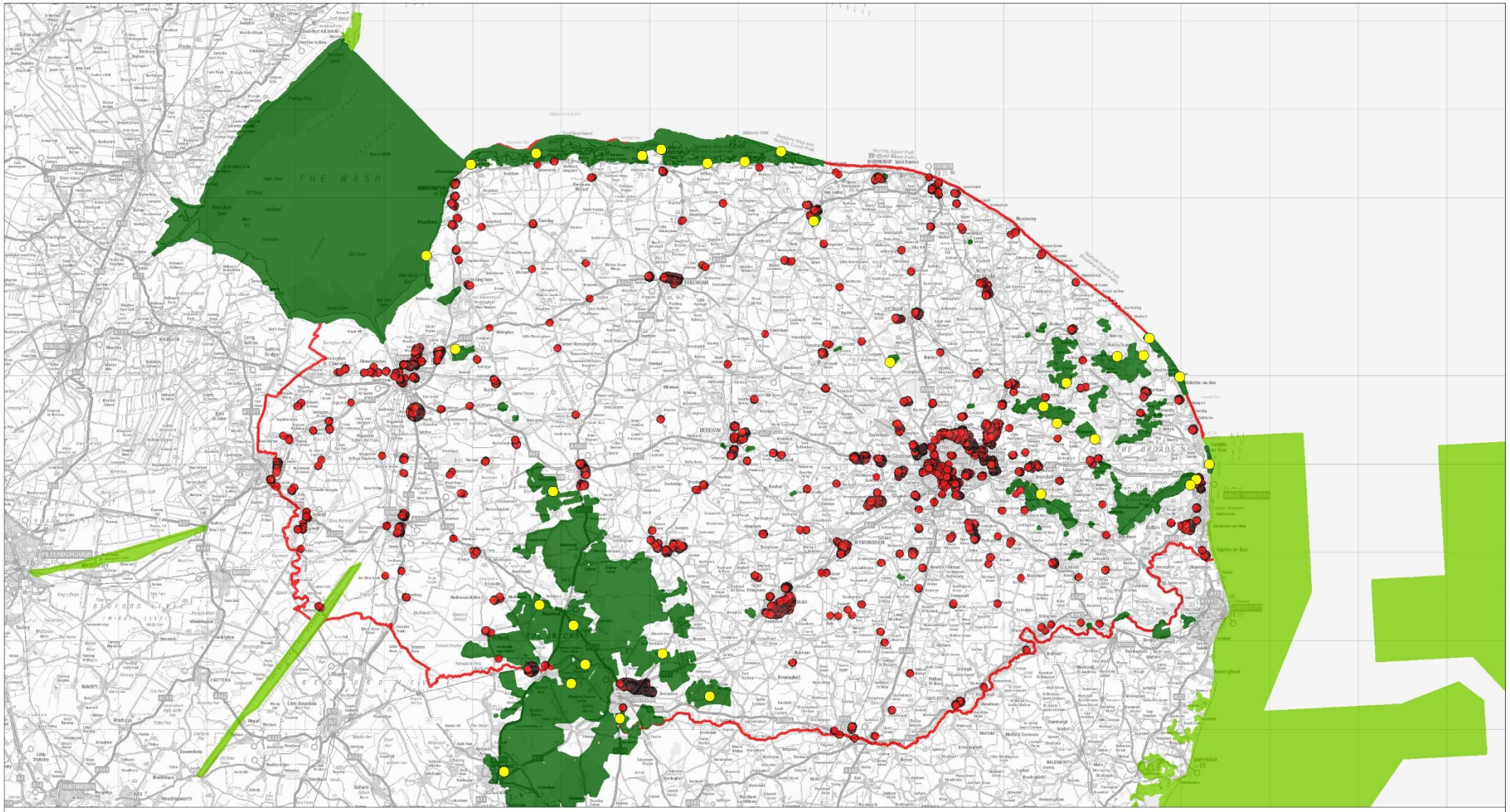


Figure 20: Current and potential new housing (Norfolk only) surrounding the different areas/European sites covered in this report

Map 19: Potential new housing and existing built-up areas



Map 20: Potential new housing and European sites where visitor surveys took place



Visit rates in relation to housing

5.4 Using the data on interviewees' home postcodes, we extracted the data for each survey point using distance bands (concentric rings) around each survey point. This gave us the number of interviewee postcodes per survey point in successive distance bands of 2km out to 40km. These data are given in Appendix 6. We then divided the number of interviewee postcodes at each distance band by the number of residential properties within that distance band, to give the proportion of postcodes at a given distance band generated by the survey (see methods). These values give an indication of the 'draw' of each site and how that draw changes with distance. The data were averaged for each survey point within our seven areas and the curves for each area are shown in Figure 21. These curves essentially show how visitor rates change with distance (how far people live away from each area). For each of the seven areas we have fitted a trendline, shown in Figure 21 as a red line. The lines have been fitted by eye, with reference to the r^2 value (the equations are given in Appendix 7).

5.5 We have plotted separate curves for each area, but given the low sample sizes (for example Roydon & Dersingham is based on a single survey point) we have not tried to plot separate lines for different seasons or types of access point. As such the lines represent typical rates based on the pooled data.

5.6 Two of the plots (those for the Brecks and Roydon & Dersingham) show low visit rates for the initial distance band (0-2km) and then show higher rates in the 2-4km band. This is slightly counter intuitive and is likely to be due to relatively few houses in the near distance band. Taking an extreme example, if there is only one house within the initial band then the results can only be 1 or 0 (depending on whether a person from that house is interviewed or not), i.e. very high or very low. With very a low pool of houses to base the results on, the plots are less likely to fit a smooth, predictable pattern. The pattern may also reflect the types of access points, for example if the surveys are focussed at pay and display car-parks at known visitor attractions, these are perhaps less likely to draw very local residents, who might choose to walk and access the site differently. We have therefore tended, when fitting the trendlines, to use the same equation across all areas and not fit curves to take into account the low initial point for the Brecks and Roydon & Dersingham.

5.7 The plots indicate that:

- The coastal sites and the Valley Fens have the highest visitor rates for local residents living within 2km;
- The North Norfolk Coast has the strongest draw of the seven areas and visit rates do not flatten out until around 12-14km.
- For the Brecks and the Wash, visitor rates flatten out at around 10km, suggesting that for these areas development within a 10km radius may particularly affect access;
- For the Broads, the Valley Fens, and the East Coast, visitor rates flatten very sharply and it would appear the sites have a relatively low draw from around 5km.

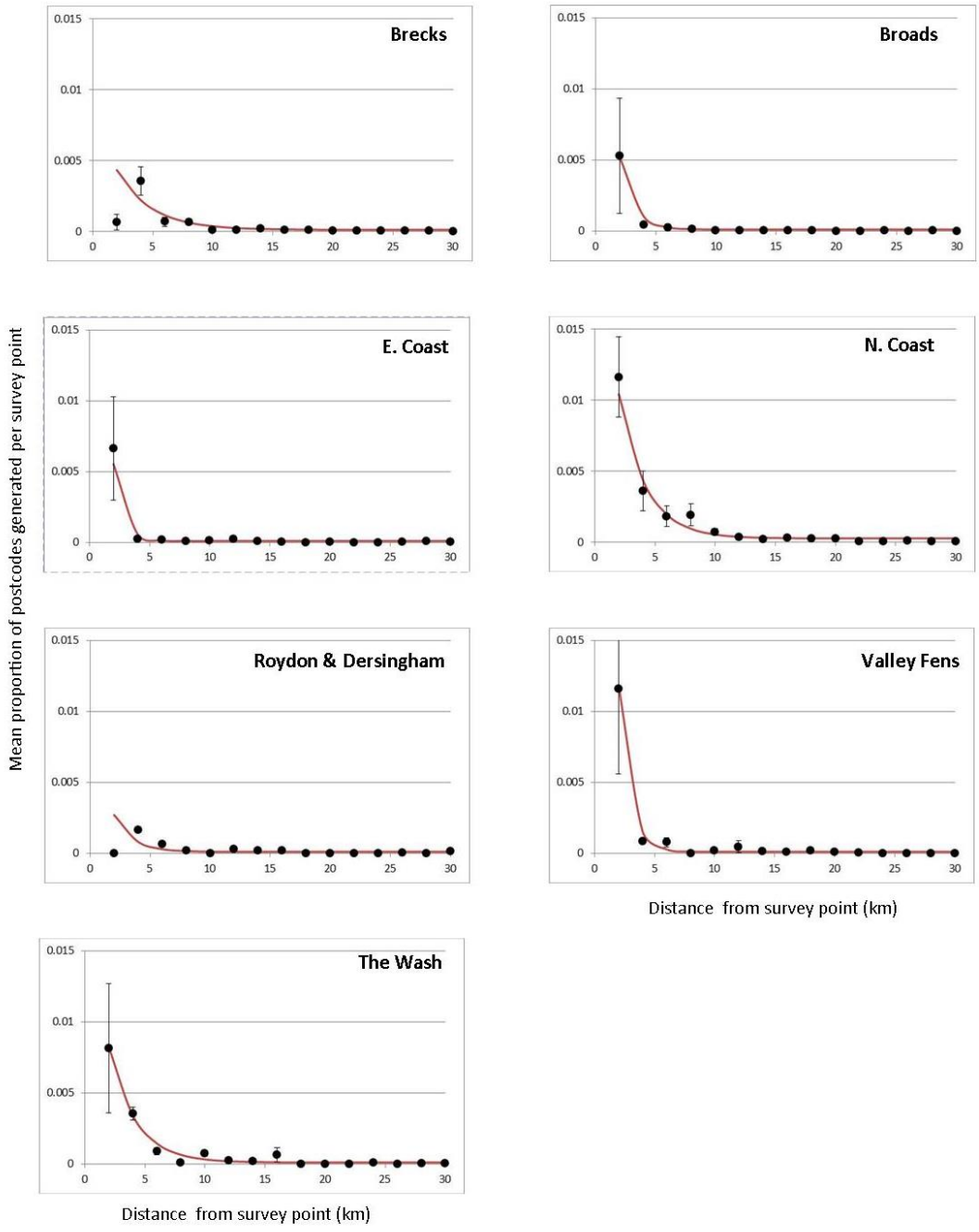


Figure 21: Relative 'draw' of each area in relation to distance from survey point (km). Black dots give the average (± SE) of the number of interviewee postcodes (within given distance band) divided by number of residential properties in that distance band. Red lines are manually fitted trend lines (equations in Appendix 6). All seven plots are drawn at the same scale. Data for visitors not on holiday, i.e. travelling from home only.

Predictions of Impacts of new housing in terms of changes in visitor numbers

5.8 The trend lines provide an easy visual comparison between sites and provide the basis for an approach to make predictions for change associated with new housing.

5.9 In order to make predictions of the impacts (in terms of increases in recreation) associated with the allocated housing data provided by Norfolk County Council, we used the same distance bands (concentric rings) as used in Figure 20 and undertook the following steps:

- We extracted from the GIS the number of current houses and potential/planned future houses within each Norfolk planning authority within each of the 2km distance bands.
- Using the equations from Figure 21 (see Appendix 7) we predicted how many visitors would have been interviewed within each of our seven areas, based on the current housing.
- Using the same equations we predicted how many future visitors would have been interviewed within each of our seven areas, based on the potential/planned future housing data provided by the County Council.
- By comparing the two sets of predictions, we could estimate the change in visitors as a result of the potential new housing. These predictions essentially indicate how the number of interviews might have changed should we have repeated the survey in the future.

5.10 The predictions suggest a baseline (i.e. current visitors, Norfolk residents undertaking short visits) of 1621. The predictions for allocated new housing are an additional 233 visitors, an increase of just under 14%. Given the potential overall housing increase as mapped by Norfolk County Council of 16%, this indicates an increase in access a little below the rate of allocated housing growth. There are, however, significant variations between areas. It is also important to note that this 14% figure is the change in access in the absence of any mitigation or avoidance measures. In many areas new development will be accompanied by green infrastructure and/or other mitigation measures designed to resolve recreation impacts to European Protected sites.

5.11 The figures are broken down by planning authority in Table 17 and Figure 22. It can be seen that the largest increase in visitors by Norfolk residents – were the survey to be repeated again in the future at the end of the current plan period – is predicted at the Brecks sites. We predict an overall 30% increase in access at the survey locations in the Brecks, predominantly driven by new housing within Breckland District. The current (2016) level of housing within Breckland is 59,613 dwellings and the data from Norfolk County Council suggests an increase of 17,058 dwellings, i.e. an increase of 29%. The East Coast sites are predicted to have the second highest increase in visitors, although the relative percentage (see Table 17) is lower than the Brecks. The change here is predominantly as a result of housing in Great Yarmouth and relates in particular to the survey points at Breydon Water. The North Norfolk Coast is predicted to see a 9% increase in access (by Norfolk residents), and this is from a range of districts, including Broadland, North Norfolk and Kings Lynn and West Norfolk.

Table 17: Predicted current and future visitors (Norfolk residents only) based on the equations from Figure 21. The table compares predictions for the number of interviews that would be undertaken were the survey undertaken now (housing data from 2016) or in the future (future housing scenario).

Area	Planning authority	Predicted current visitors	Predicted future additional visitors	% change
Brecks	Breckland	137	57	41
	Broadland	6	1	12
	King's Lynn and West Norfolk	41	6	14
	North Norfolk	2	0	11
	Norwich	13	1	10
	South Norfolk	29	4	12
	The Broads NP	0	0	0
	Total	**228**	**68**	**30**
Broads	Breckland	11	3	24
	Broadland	54	14	27
	Great Yarmouth	32	3	10
	North Norfolk	38	3	7
	Norwich	45	4	10
	South Norfolk	36	4	12
	The Broads NP	6	0	0
	Total	**223**	**31**	**14**
E. Coast	Breckland	0	0	0
	Broadland	37	12	34
	Great Yarmouth	252	20	8
	North Norfolk	19	1	6
	Norwich	45	4	10
	South Norfolk	27	3	12
	The Broads NP	3	0	1
	Total	**384**	**41**	**11**
N. Coast	Breckland	63	5	9
	Broadland	56	11	20
	King's Lynn and West Norfolk	95	7	8
	North Norfolk	193	10	5
	Norwich	20	2	10
	South Norfolk	13	2	17
	The Broads NP	1	0	2
	Total	**441**	**39**	**9**
Roydon & Dersingham	Breckland	70	1	2
	Broadland	3	0	0
	King's Lynn and West Norfolk	14	21	151
	North Norfolk	51	0	1
	South Norfolk	19	0	0
	Total	**156**	**23**	**15**
Valley Fens	Breckland	7	2	23
	Broadland	17	11	66
	Great Yarmouth	4	0	7
	King's Lynn and West Norfolk	1	0	4
	North Norfolk	37	6	17
	Norwich	13	3	21
	South Norfolk	8	2	28
	The Broads NP	0	0	1
	Total	**89**	**25**	**28**
Wash	Breckland	6	1	10

Area	Planning authority	Predicted current visitors	Predicted future additional visitors	% change
	Broadland	0	0	3
	King's Lynn and West Norfolk	88	5	5
	North Norfolk	6	1	11
	Total	101	6	6
Total		**1622**	**233**	**14**

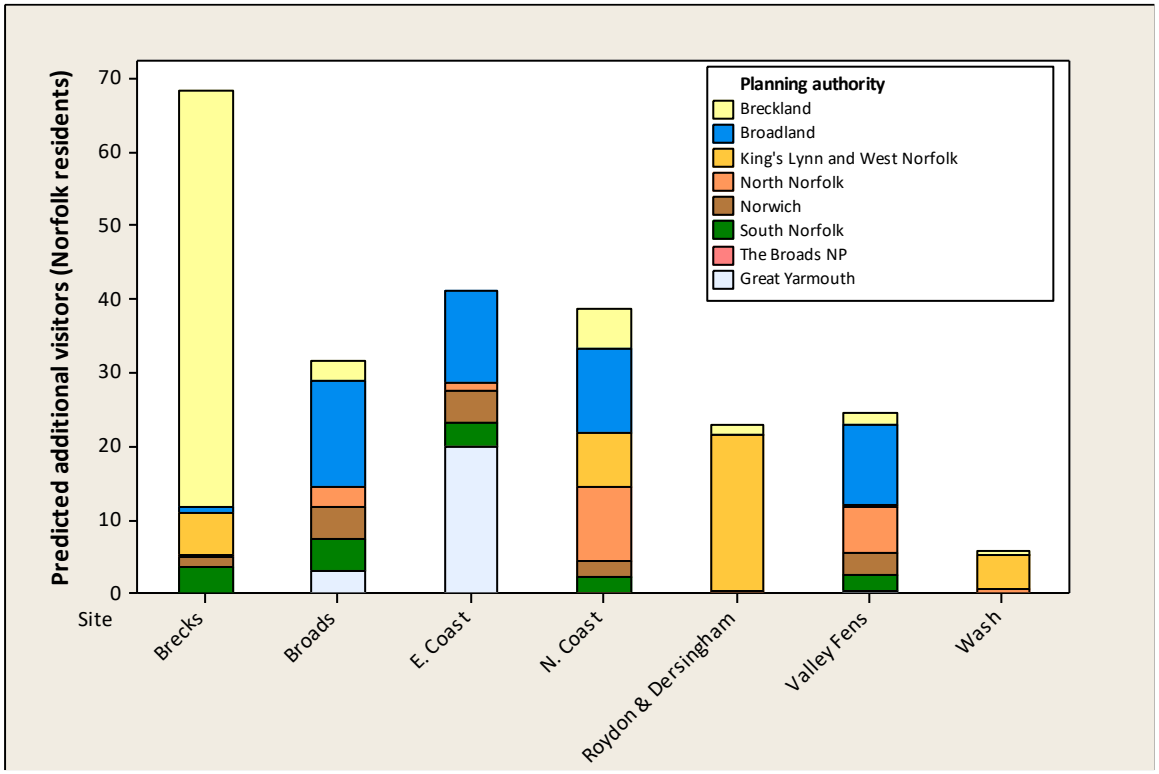


Figure 22: Predicted future additional visitors based on housing scenario provided by Norfolk County Council. The graph shows the predicted increase in visitors (i.e. additional interviews predicted assuming the survey were to be repeated in the future) for each of the areas. Data as in Table 17.

Housing change and visitor rates discussion.

5.12 We have used the decline in visit rates in relation to distance to make predictions of the effect of new allocated housing. We have simply predicted the change if the survey were repeated again in the future, given the increase in housing anticipated through planned site allocations. The predictions relate to the number of interviews that would be conducted with Norfolk residents. Our predictions of change are also based solely on housing data within Norfolk – i.e. we only considered visitors from home, living in Norfolk. We have estimated the change in these visitors under a current scenario and a future scenario with an overall quantum of new housing of nearly 67,000 properties.

5.13 As such the change in visitor numbers (14%) is relatively similar to the change in housing (16%). The distribution of the new housing affects the change in access predicted – as housing close to European Protected sites is assumed to have a bigger effect (in terms of increased recreation) compared to houses further away. The plots tend to suggest that increased housing is unlikely to have a marked effect on access at distances beyond 10km, unless the volume of housing is particularly large. The North Norfolk Coast and to some extent the Wash are exceptions, appearing to draw visitors from further afield.

5.14 Our predictions assume that visit rates per household will not change over time – i.e. our predictions assume the number of visits made per house will remain constant. Several factors such as climate change, changes in household sizes, changes in pet ownership patterns etc. might well mean that visit rates per property could change over time, either increasing or decreasing. Such changes are difficult to predict and we therefore make the predictions assuming access patterns per household will be similar in the future.

5.15 It is important to recognise that the housing data provided by Norfolk County Council is focussed on allocated sites. Sites may well come forward outside of local plan allocations and so the levels of residential growth may actually be higher in some parts of Norfolk. Equally some allocated sites have already been delivered or are in the process of delivery and it is possible that others may not necessarily be (wholly) delivered within the plan period. The future housing data is a snapshot in time and dynamic; it is to be expected that new or different options will become available. The predictions therefore provide a guide and indication of the scale of change based on the best available evidence at the time the report was produced.

5.16 We have grouped access points and sites by the areas used, and then plotted the relationship between the average proportion of interviewees in relation to the number of houses and distance from survey point. Within each group the survey data is from a range of different types of access points and types of site and was undertaken during different seasons, so there are some potential issues with grouping the data. By using averages from within each group we are – to some extent – controlling for some of this variation (and some of the other issues such as bad weather) that may have affected visitor use when the surveys were undertaken. Nonetheless, our sample sizes within each group are relatively small and (in the case of Roydon & Dersingham) the curve is

based on a single survey point rather than a mean. As such the shape of the curves is influenced by survey points chosen and may not necessarily reflect the European sites as a whole.

5.17 Within all the analyses and the consideration of postcode data we have used Euclidean distances – the distance as the crow-flies. These are different to the distance travelled, and do not take into account the road infrastructure and barriers to access such as estuaries.

6. Implications and mitigation

6.1 In this report we have presented the results of visitor survey work at a range of countryside sites across Norfolk. All the survey locations are internationally important wildlife sites where there are potentials for conflict between the management of recreation and the nature conservation interest. Recreation to such sites is important and often promoted, but it is essential to have a detailed understanding of how people use these sites, why they visit, what they do and how recreation patterns link to where people live. Such information has implications for spatial planning in the future in Norfolk. In this section of the report we consider those implications in more detail.

Housing in context

6.2 Within this report, we focus on the links between housing (where people live) and recreation use. Access patterns and visitor levels in the countryside are influenced by a range of factors, for example climate change (Coombes 2007; Coombes & Jones 2010). The way sites are managed, promoted and the infrastructure provided will influence visitor use. Work is currently underway on the England Coast Path, which will provide a new National Trail around England's coastline. Such factors are clearly outside the remit of local planning authorities, but local planning authorities are responsible for ensuring their local plans do not have an adverse effect on the integrity of European sites.

Similar studies and issues with recreation at other sites

6.3 Visitor survey work similar to the work undertaken across Norfolk has been undertaken at a range of other European Protected Sites. These surveys have focussed on heathland and coastal sites and have considered the implications of new housing. Examples include the Dorset Heaths (Clarke *et al.* 2006; Liley *et al.* 2007), the Thames Basin Heaths (Liley, Jackson & Underhill-Day 2006; Fearnley & Liley 2012), Ashdown Forest (UE Associates 2009; Clarke, Sharp & Liley 2010), the Solent (Fearnley, Clarke & Liley 2010), Cannock Chase (Liley 2012) and south-east Devon sites (Liley, Fearnley & Cruickshanks 2010). In some cases (e.g. Ashdown) the surveys have included detailed analysis of the impacts of recreation on the European site interest features or detailed ecological studies have taken place separately (Murison 2002; Liley *et al.* 2006; Murison *et al.* 2007; Stillman *et al.* 2012; White, McGibbon & Underhill-Day 2012).

6.4 As a result of these studies, protective measures have been put in place by local planning authorities to remove the risk posed by development pressure and ensure compliance with the Habitats Regulations. These mitigation measures are set out in a range of studies and planning policy documents (e.g. Thames Basin Heaths Joint Strategic Partnership Board 2009; Underhill-Day & Liley 2012; Liley & Tyldesley 2013; Liley *et al.* 2014; South-east Dorset LPAs 2016). A range of mitigation measures have been incorporated into these mitigation strategies, and tailored to the particular circumstances. Protective measures have included:

- Development constraint zones limiting development very close to sites (e.g. 400m buffers around heathland sites in Dorset, the Pebblebed Heaths and the Thames Basin Heaths)

- Mobile warden teams engaging with visitors and promoting responsible access (e.g. on the Solent, the Thames Basin Heaths and the Dorset Heaths)
- Provision of new green space – SANGs ('Suitable Alternative Natural Greenspace') to absorb additional recreation. SANGs are sometimes directly linked to particular developments or more strategic in nature, providing mitigation for development over a wide area. SANGs have formed the backbone of protective measures to date around the Thames Basin Heaths but also feature in mitigation approaches around the Dorset Heaths, the Pebblebeds, the Exe Estuary and Ashdown Forest.
- General awareness raising, often targeted at particular user groups such as dog walkers
- Provision of on-site access infrastructure such as changes to parking, path networks or way-marking.

6.5 Funding for these mitigation measures has been directly linked to development and funding secured through section 106 agreements and/or Community Infrastructure Levy (CIL). Such mitigation approaches are best delivered strategically as securing green infrastructure or long term wardening is complex and likely to be impossible to deliver piecemeal. Strategic approaches to mitigation, coordinated across multiple local authorities, are now in place for the Thames Basin Heaths, the Dorset Heaths, Ashdown Forest, south Devon (Exe Estuary, Pebblebed Heaths and Dawlish Warren), the Solent and Cannock Chase.

6.6 On the 23rd June 2016, the UK Referendum on continued European Union membership was held, and the UK voted to leave by a majority of 52%. Much of the UK's environmental legislation is in response to European legislation, and the UK exit from the European Union leaves many questions over the future of that legislation. Environmental issues clearly transcend national boundaries, particularly in relation to matters such as the health of our seas, responding to climate change and the global movement of species. The existing legislation is likely to remain in place for a number of years, and any evolution of the legislation is likely to continue to demand similar requirements for the protection of internationally important habitats and species. As such, competent authorities should continue to implement the legislation with the same rigour as before, in order to demonstrate adherence to the legislation and to prevent any risk of non-compliance to future wildlife legislation. Evidence gathering, assessment, seeking opportunities to restore wildlife interest, monitoring and dissemination of best practice should therefore continue with the same commitment as prior to the Referendum result.

Mitigation for Norfolk sites?

6.7 Drawing on the results in this study and work elsewhere, we can start to consider the long term management implications (relating to impacts from new housing) for the European sites included in this report. The allocated new housing scenario presented provides an indication of the scale of change and additional increases in recreation that might be expected from development in Norfolk (in the absence of mitigation). It is also clear that development outside Norfolk has the potential to increase access, and the data in this report provides an indication of where new development outside Norfolk

might be of concern. The UK population is steadily increasing and with more and more people wanting to visit and spend their leisure time in the countryside there will be a need to ensure that access is well managed and impacts minimised. Where houses are built and where people live will dictate where the pressure is likely to be greatest.

6.8 We make some suggestions here based on the findings of the visitor survey work. We stress however that our suggestions are not based on discussion with site managers and owners nor have we undertaken formal audits of the infrastructure present on sites and current access management approaches. Furthermore in several areas mitigation is already in place to, at least partially, deal with the projected growth. We have not collated information on existing mitigation as part of this work. We are aware of some recent work at some sites (such as the Norfolk Coast) involving partnership working to reduce disturbance to birds, and monitoring of the success of such approaches may help to identify gaps and need for further work. The suggestions here simply provide some options for mitigation that might be considered by the relevant local planning authorities.

Valley Fens, Roydon & Dersingham and the Breckland sites

6.9 For the survey points within the Valley Fens, at Roydon Common, and most of the Breckland sites, the results presented here show that there are relatively few tourists. Access is by local residents primarily for activities such as dog walking, as such these sites are in many ways similar in the visitor survey results. Implications may vary, given the different site interest and ecological vulnerabilities. For these sites it would however appear that there is a clear link between local development and increased recreation. Increased recreation has the potential to impact on the designated site interest in that there are clear impact pathways such as disturbance to Annex I birds (Murison 2002; Liley & Clarke 2003; Liley *et al.* 2006; Mallord *et al.* 2007) and dog fouling (Shaw, Lankey & Hollingham 1995; Taylor *et al.* 2005). Presently access levels at these sites appear relatively low (see Figure 3), at least compared to the other sites included in this survey. Low current visitor rates do not necessarily mean that there is no current impact from access or that future increases in recreation will not have an impact, and ecological studies are potentially necessary to rule out adverse effects on integrity. There have been some studies (for example relating to Woodlark and Nightjar in the Brecks, see Dolman 2010) which suggest no current impacts, but given the scale of future change predicted here, impacts may occur in the future.

6.10 The visitor survey work did not include all parts of these sites: the Brecks cover a very wide area; the Valley Fens include a number of different isolated sites, not all with public access and Dersingham Bog (part of the Roydon & Dersingham SAC) was not included in the survey. The unsurveyed areas with access are largely similar to the surveyed locations and as such there is no reason to believe that the access patterns on the other parts will not be broadly similar.

6.11 The allocated new housing data shows some fairly marked changes in housing for these sites – particularly within 2km for the Brecks and within the 0-10km radius for the Valley Fens.

6.12 Our understanding of the sites suggests the sites are relatively low key, with little access infrastructure (with the exception of the high profile sites in the Brecks such as High Lodge, which is a promoted site with considerable visitor infrastructure) and relatively little interpretation. For many visitors who are not visiting to see the wildlife, the sites provide a convenient, highly attractive local space for activities such as dog walking, and while such visitors may appreciate their surroundings and make a positive choice to visit the sites, it appears for the Valley Fens and Breckland sites that there is little awareness of the nature conservation importance of the sites (see Figure 12).

6.13 These sites would benefit from increased wardening provision, awareness raising (dogs on leads) and potentially additional access infrastructure. The presence of a warden on site ensures there is somebody who can talk to visitors, communicating the nature conservation interest of the sites (for example showing people birds) and approaching users causing disturbance or other issues. Wardens can distribute codes of conduct/information to share with visitors if required and be able to greet visitors, help them and ensure that their visit has little impact on the site. There is also the potential to direct visitors to try other locations (SANGs). The presence of on-site staff ensures any problems are quickly resolved. There are limited studies on the effectiveness of wardens in reducing access impacts, but there are indications that they make a difference (Medeiros *et al.* 2007).

6.14 Awareness raising can be undertaken through a range of approaches. Face-face contact, codes of conduct, on-site interpretation, on-line resources, material in the local media and events on-site can also play a role in ensuring visitors understand the issues and how they need to behave.

6.15 Access infrastructure can help to create awareness to visitors that access is carefully managed and that they are entering a special place that is well cared for. Measures such as clear controls on parking (stopping parking spreading along road verges etc.), dog bins (regularly emptied) and marked routes (that direct people along paths that provide good access without causing harm) are potential solutions. Such provision ensures sites are more robust and better able to cope with increased recreation pressure. Responses from interviewees at Buxton provided indication that when the ground is wet the main circuit of the site is often particularly muddy and impassable, provision of boardwalks etc. may have the potential to create routes that work for visitors and redirect access. There may be merits in changing habitat management approaches in some locations too, for example the presence of grazing animals can perhaps deter some dog walkers and help to ensure dogs are kept on leads.

6.16 SANGs are another possible approach for mitigation for new development and have provided the main mitigation delivery in areas such as the Thames Basin Heaths. The concept of SANGs is simple; that by providing alternative greenspaces that are easy to access and provide a similar recreation experience to the European site, some of the recreation pressure that would otherwise take place on the European site can be diverted. SANGs still remain a relatively new approach to mitigation and importantly they remain relatively untested (Liley, Panter & Rawlings 2015). Some authors (for

example Chapman 2014) are critical of the approach of SANGs, challenging their general applicability. Particular challenges relate to securing high quality greenspace that provides an alternative draw to the European site. In addition SANGs are generally highly expensive; both in terms of up-front costs and on-going management. Securing sites for access in perpetuity (in order to adequately mitigate for the permanent effect of new development), and managing those sites so that they provide an appealing visitor experience of a quality that matches the SPA, is no small undertaking. Given this high cost, it is essential that the approach of SANGs is carefully reviewed and scrutinised to ensure value for money.

6.17 Given the challenges outlined above, alternative greenspace is perhaps likely to be more effective for sites that have a local draw and are used regularly (e.g. a high proportion of daily visitors) for activities such as dog walking. If people choose to visit sites because they are local, close to home, easy to travel to and the only nearby greenspace, it would seem likely that alternative greenspace might be effective. It may even be possible to enhance and promote existing greenspace and infrastructure (such as existing path network) as part of a mitigation solution.

Coastal sites and the Broads

6.18 For the coastal sites and the Broads, there are a high proportion of visitors from home travelling from outside Norfolk and encompassing a wide geographic area. The sites have high numbers of tourists and there is already visitor infrastructure, access management etc. in place. Many of the sites actively promote visitors from a wide area (nationally).

6.19 For these areas links between local housing and recreation impacts are less clear. Nonetheless the results presented in this report show increases in access as a result of development across the county and as such there is pressure from growth. Given the scale of growth, it may be difficult to rule out adverse effects on integrity.

6.20 Potential solutions are considered below. Some of the measures discussed above may still be relevant, however given the draw of the sites, SANGs are likely to be less effective. We accept there may be options to create dedicated areas for dog walking linked to new development relatively near the coastal sites, and there may be options to create venues for water based activities around the edge of the Broads (such as at Whitlingham Country Park[4]). In general, however, SANGs are unlikely to provide an alternative destination for someone prepared to drive from Norwich to walk on the beaches of the North Coast or view seals at Horsey.

6.21 Given the sites are already relatively high profile nature reserves, with existing wardens etc., there may be little scope for increasing wardening provision on individual sites. There may be scope for some kind of mobile wardens with an awareness raising and showing people wildlife role. Mobile wardens could focus on areas at particular times of year where there are issues, such as seal pupping or when ringed plovers and little

[4] This site is immediately adjacent to Norwich and has dedicated water-based activities such as canoeing and sailing. It is well connected to the city and is likely to draw visitors that might otherwise go to the Broads.

terns are nesting. Such roles could supplement work already undertaken by existing stakeholders. Surveyors undertaking the interviews reported that visitors coming to see the seals tended to have a better experience at Horsey Gap where there were volunteer wardens on site to direct visitors and help minimise impacts. By contrast when surveys took place at Horsey Windpump there were issues with visitors parking, access to toilets etc. that could have been resolved with a warden/ranger present. This would suggest there are opportunities to increase wardening provision to smooth issues, ensure a better experience for visitors and better protection for the interest features.

6.22 The seals along the east coast are perhaps a unique situation, with the number of seals present increasing (and spreading along the coast), considerable publicity, ever increasing numbers of visitors and adaptive recreation management (voluntary wardens, roped off sections off-beach etc.) that have developed to resolve the challenges. The sustainability of this management in the long-term and the need for additional resources warrant careful consideration.

6.23 Given the prevalence of dog walking at nearly all sites (with the exception of some of the Broads), a generic dog-walking project could work well. A project in Dorset called Dorset Dogs[5] has won an award from the Kennel Club and been well received by dog walkers across the county. Dog walkers sign-up to receive emails and can access the website which provides information, news and allows dog walkers to interact with each other. There is a detailed gazetteer of dog walking sites and a code of conduct is widely promoted. The gazetteer, newsletters and code of conduct provide a means for positive messages regarding where dog walkers can go and how they should behave. The project also runs events which work to show dog walkers new sites or highlight issues on particular sites. Similar projects have now been established in other parts of the country.

6.24 With these coastal sites and the Broads the solutions to impacts from new development will clearly need to involve a range of bodies and the responsibility for delivery is beyond the scope of a single or even small group of local planning authorities. It may be that local authorities need to facilitate and help source funding, but work alongside a wide range of other bodies. There may be options for greater partnership working between organisations and private owners in some areas. This may be as simple as improving communication (e.g. during survey work at Horsey Gap the on-site volunteer wardens were caught out when the barn opened its parking and visitors started using a different access route). There may be opportunities for literature, apps or on-line material to be generic and work across sites, and generic symbols, signage etc. may help to present a consistent and easily understood message for visitors. Some of these may be addressed with the enhanced coastal access and new coastal route.

6.25 While mitigation delivery will require certainty of delivery (and therefore not reliant on unsecured funding opportunities) there may be opportunities for wider links for funding or partnerships. For example the health benefits of access are being increasingly

[5] http://www.dorsetdogs.org.uk/

recognised (Lee & Maheswaran 2011; Wolch, Byrne & Newell 2014) and reviews suggest outdoor exercise potentially has benefits above and exercise indoors (Thompson Coon *et al.* 2011). As a result, outdoor exercise is increasingly being promoted, for example by the NHS[6].

Conclusions and next steps

6.26 Norfolk contains several European sites, some very large, and is among the most important counties in England for nature conservation. Most of the sites have a legal right of public access and are popular destinations for recreation, visited by local people and those from further afield, including tourists. Recreation levels will continue to increase and the location and scale of new development will influence the level of visitor use. Increased recreation places increasing demands on the management of the European sites and can cause impacts to the designated interest features. As such strategic planning for residential development needs to ensure these issues are adequately addressed.

6.27 The visitor survey results provide a snapshot of the levels of use and patterns of access at selected locations. These results show where people travel from and help to make the links between new housing development and recreation use. The results show a range of different use and recreational draw for the different sites.

6.28 The key findings from this report relate to the cumulative, in-combination effects of development across all the local planning authorities in Norfolk. This is a unique perspective and for the first time shows the changes in recreation resulting from development across the County. Much of this development has been subject to plan-level Habitats Regulations Assessment and mitigation has been established as necessary. These assessments were undertaken without the benefit of this report.

6.29 Looking to the future there is now the potential at plan review and other key points for local authorities to address the issues of recreation pressure in a more strategic way. The results (for example Figure 22 and Table 17) highlight how recreation change (in particular at the North Coast, the Broads and the Valley Fens) will be linked to development across multiple local authorities. Solutions are likely to be most effective if delivered and funded in partnership. In other parts of the country strategic mitigation schemes have been established involving partnerships of local authorities delivering mitigation funded through developer contribution schemes. In South-east Devon and on the Suffolk Coast such schemes have been established to cover multiple sites with a range of habitats and ecological interest. Such approaches would provide Norfolk authorities with an effective way of delivering mitigation and would ensure mitigation was targeted, proportionate and fit for purpose. Any such mitigation schemes would need to be established to fit the local circumstances, organisations and site specific issues.

[66] E.g. National Health Service Website promotes green gyms and exercising outdoors

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Appendix 1: Details of survey points

This table summarises the final selected survey points. Where locations are listed twice it is to reflect survey visits at different times of year. Each row represents a single pulse of survey work encompassing a weekend day and a weekday and totalling 16 hours of survey effort. The Map Ref column cross references to Map 3 within the report.

Map Ref	Location	Description	Area	Survey period	Interest	Notes
18	Barnham Cross	Small car-park on east side of A134.	Brecks	Early summer 16	SAC interest	
14	Cranwich camp	Formal car-park to north of road	Brecks	March 2016	breeding woodlark/nightjar	Part surveyed in 2010 and selected as there may be potential to draw comparisons with previous surveys
12	East Wretham	Main NWT car-park next to house	Brecks	Early summer 16	breeding woodlark/nightjar	
11	High Lodge	Main Car-park, near ticket machine in car-park - where pay	Brecks	Early summer 16	breeding woodlark/nightjar	Survey hours adjusted to allow for gate opening etc; surveyed in 2010
15	Lynford Stag	FC car-park north of Lynford on north-east side of road	Brecks	Early summer 16	breeding woodlark/nightjar	Surveyed in 2010 and selected as there may be potential to draw comparisons with previous surveys
10	Mildenhall Woods	Mildenhall Warren Lodge Car-Park	Brecks	Early summer 16	breeding bird interest	
16	St Helens	Near to Santon Downham; the main FC car-park	Brecks	March 2016	breeding woodlark/nightjar	Surveyed in 2010 and selected as there may be potential to draw comparisons with previous surveys
13	Swaffham Heath	Small parking area to north of road, slightly down track, on edge of woodland	Brecks	Early summer 16	breeding woodlark/nightjar	
19	West Harling	Small parking area on west side of Bridgham Lane (heading north from road)	Brecks	Early summer 16	breeding woodlark/nightjar	
2	Hickling (S)	Hickling Broad NWT car-park	Broads	Early summer 16	breeding birds, fen vegetation	
1	Hickling (W)	Hickling Broad NWT car-park	Broads	Winter 15/16	Wintering waterfowl & raptors	
4	Horning	Horning Marina. Boat users, interviewing people in marina car-park that are hiring boats. Marina parking behind Ferry Inn	Broads	Early summer 16	breeding birds, fen vegetation	

Map Ref	Location	Description	Area	Survey period	Interest	Notes
3	How Hill	By cottage/info point intercepting people walking along river bank and on paths into reserve.	Broads	Early summer 16	breeding birds, fen vegetation	
5	Ranworth	Car-park opposite Maltsters pub, interviewer on path leading out from NW corner of car-park	Broads	Early summer 16	breeding birds, fen vegetation	
9	Strumpshaw	Near to RSPB visitor centre, on sw side of railway crossing	Broads	Early summer 16	breeding birds, fen vegetation	
8	Upton Dyke	Car-park nr Palmers Mill; survyeor standing at end of Dyke intercepting boat users and folk walking north	Broads	Early summer 16	breeding birds, fen vegetation	
7	Breydon water north (S)	Other side of underpass from asda car-park, intercepting people walking along seawall.	E. Coast	Early summer 16	breeding terns	Timing coincides with some wader passage and terns settling
6	Breydon water north (W)	Other side of underpass from asda car-park, intercepting people walking along seawall.	E. Coast	Winter 15/16	wader roost	
36	Breydon water south	Surveyor on seawall to east of rugby club, adjacent to small car-park	E. Coast	Winter 15/16	wintering waterfowl	
21	Horsey Gap	Focus on visitors heading south-east	E. Coast	Winter 15/16	seals and dune habitats	Seals are not an interest feature of SAC, but high volumes of visitors at this time of year may cause damage?
17	Horsey Wind-pump	National Trust car-park next to mill, intercepting visitors heading to beach and other routes	E. Coast	Winter 15/16	seals and dune habitats	Seals are not an interest feature of SAC, but high volumes of visitors at this time of year may cause damage?
22	North Denes	nw edge of North Denes dunes, off North Drive, opposite North Denes Middle School. Same location as used in 2008	E. Coast	Early summer 16	Breeding terns	Surveyed in 2008 and may be potential to draw comparisons with previous surveys; timing to match (mid July)
20	Winterton	In beach car-park, intercepting visitors coming from north or south (focus on north if too awkward to roam)	E. Coast	Early summer 16	terns and dune habitats	
28	Brancaster	Brancaster Beach Car Park. Surveyor at beach entrance (north-west corner of car park).	N. Coast	Winter 15/16	wintering waterfowl	
31	Cley Eye (S)	North-west corner of car-park	N. Coast	Early summer 16	breeding bird	
38	Cley Eye (W)	North-west corner of car-park and roaming car-park	N. Coast	Winter 15/16	wintering waterfowl	

Map Ref	Location	Description	Area	Survey period	Interest	Notes
29	Holkham	Lady Anne's Drive. At end of drive, by pines.	N. Coast	Early summer 16	terns and other breeding birds	
33	Holkham	Lady Anne's Drive. At end of drive, by pines.	N. Coast	Winter 15/16	wintering waterfowl	
27	Holme	Holme Next The Sea. Beach car-park, surveyor on road side of car-park	N. Coast	Early summer 16	breeding terns	
34	Morston (S)	National Trust car park. On sea defence by NT info building, including people going on boats	N. Coast	Early summer 16	terns, seals	
30	Morston (W)	On sea defence by NT info building	N. Coast	Winter 15/16	wintering waterfowl	
40	Stiffkey (S)	Car-park next to campsite and end of greenway	N. Coast	Early summer 16	May/June	
39	Stiffkey (W)	Car-park next to campsite and end of greenway	N. Coast	Winter 15/16	wintering waterfowl	
35	Wells	Surveyor standing at north-west corner of car-park, counting/intercepting people using path by lake along pines/to beach	N. Coast	Early summer 16	terns and other breeding birds	
23	Roydon Common	NW car park	Roydon & Dersingham	Early summer 16	breeding birds, heath habitats	
25	Buxton Heath	site car-park	Valley Fens	Early summer 16	heath habitats	
24	Holt Lowes	Survey point at viewpoint along forestry edge, inside site	Valley Fens	Early summer 16	heath habitats	
32	Holme	Holme Next The Sea. Beach car-park, surveyor on road side of car-park	Wash	Winter 15/16	wintering waterfowl	
37	Snettisham (S)	Car-park at end of beach road, right against sea wall, rather than RSPB car-park. Roaming to interview visitors heading N&S	Wash	Early summer 16	Breeding bird interest	
26	Snettisham (W)	Car-park at end of beach road, right against sea wall, rather than RSPB car-park	Wash	Autumn 16	wintering waterfowl	September as peak tides

Appendix 2: Questionnaire

Appendix 3: Summary of weather conditions at individual survey points

Summary of weather conditions as recorded by the surveyor during each two hour session. Data was largely subjective and related to general feel (cool/mild/warm/hot), cloud cover, percentage of survey period with rain etc.

Area	Location	Survey Point	Month	Number of sessions with rain	Average session percentage cloud cover	Number of sessions			
						Cool	Mild	Warm	Hot
Brecks	Barnham Cross	18	7	1	58		1	5	1
Brecks	Cranwich Camp	14	3	4	69	7			
Brecks	East Wretham	12	6	2	64	2	4		2
Brecks	High Lodge	11	6	1	75	1	3	4	
Brecks	Lynford Stag	15	6	2	95	2	4	3	
Brecks	Mildenhall Woods	10	6	4	92		1	5	
Brecks	St Helens	16	3	2	91	7			
Brecks	Swaffham Heath	13	6	4	80	3	4	2	1
Brecks	West Harling	19	6	4	80	1	3	2	2
Broads	Hickling Broad (S)	2	6	3	89	5	3		
Broads	Hickling Broad (W)	1	11	5	94	6	2		
Broads	Horning	4	7	5	94	4	4		
Broads	How Hill	3	6	3	72		5	3	1
Broads	Ranworth	5	7	6	94	3	5		
Broads	Strumpshaw Car Park	9	6	2	45	3	2	3	
Broads	Upton Green	8	6	3	55		5	2	
E. Coast	Breydon Water north (S)	7	5	1	70	3	5	2	
E. Coast	Breydon Water north (W)	6	1	4	95	7	1		
E. Coast	Breydon Water south	36	1	0	48	7	2		
E. Coast	Horsey Gap	21	1	7	91	5	3		
E. Coast	Horsey Windpump	17	12	0	70	2	6		
E. Coast	North Denes	22	7	1	48			5	2
E. Coast	Winterton	20	7	0	31		2	4	2
N. Coast	Brancaster	28	1	0	42	7			
N. Coast	Cley Eye (S)	31	7	5	92	2	3	3	
N. Coast	Cley Eye (W)	38	1	3	53	8			
N. Coast	Holkham (S)	33	7	4	69	1	3	2	2
N. Coast	Holkham (W)	29	1	1	56	7			
N. Coast	Holme	27	7	0	42		1	5	2
N. Coast	Morston (S)	34	6	5	81	4	2	2	
N. Coast	Morston (W)	30	11	2	98	5	3		

Area	Location	Survey Point	Month	Number of sessions with rain	Average session percentage cloud cover	Number of sessions			
						Cool	Mild	Warm	Hot
N. Coast	Stiffkey (S)	40	6	0	52	1	2	2	3
N. Coast	Stiffkey (W)	39	1	0	69	8			
N. Coast	Wells	35	7	2	72		4	3	1
Roydon & Dersingham	Roydon Common	23	6	2	88		2	4	1
Valley Fens	Buxton Heath	25	5	2	28	1	5	5	
Valley Fens	Holt Lowes	24	6	3	67	1	1	2	4
Wash	Holme	32	1	0	27	8			
Wash	Snettisham (S)	37	6	0	55		1	6	1
Wash	Snettisham (W)	26	9	1	28	4	2	2	

Appendix 4: Housing data note provided by Norfolk County Council

All spatial data relating to planned housing allocations is owned by the respective district authorities, namely; Breckland Council, Broadland District Council, Great Yarmouth Borough Council, Borough Council of King's Lynn and West Norfolk, North Norfolk District Council, South Norfolk Council and Norwich City Council.

This spatial data has been compiled and edited for the purposes of this report with agreement from each of the local authorities named above.

Here follows the process of data assembly;

- Original datasets obtained from each local authority, as aforementioned.
- File Type: Shapefile datasets containing Polygons.*
- Attributes contained within the data varied between Local Authorities. New Fields (columns) were created in Attributes Tables to detail housing numbers associated with each allocated site (HOUSING_NU). This also provided a common Field across the datasets.
- A sense-checking exercise was conducted, checking each polygon against the relevant Local Plan documents to ensure the site outline, allocated housing number and policy references were consistent.
- Data was then forwarded to Footprint Ecology for interpretation alongside other collated data.

*N.B. Each polygon represents an allocated or preferred site, as identified in the respective Local Authority's Local Plan (see below).

Local Authorities are often at a different stages in the Local Plan preparation process. This means that the timing of policy development and site selection for allocation is not consistent across Norfolk. The most up-to-date information with regard to housing allocations was used at the timing of this report. Sources as follows;

Local Plan Documents Used:

- Broadland District Council Site Allocations DPD (Adopted 2016)
- Broadland District Council Growth Triangle Area Action Plan (Adoption Imminent)
- Norwich City Site Allocations Plan (Adopted 2014)
- South Norfolk Council Site Allocations and Policies Document (Adopted 2015)
- South Norfolk Council Wymondham Area Action Plan (Adopted 2015)
- Breckland Site Specific policies and Proposals (Adopted 2012)
- North Norfolk Site Allocations (Adopted 2011)
- Great Yarmouth Borough Council, Awaiting Development Policies and Site Allocations DPD, Previous allocations used (2001)
- Borough Council of King's Lynn and West Norfolk Preferred Options for Detailed Policies and Sites 2013, not yet adopted.

All spatial data based on registered applications in 2014/15 is owned by Norfolk County Council and is based on major housing planning consultations constituting 10 or more dwellings across Norfolk.

File Type: Shapefile containing point data.

Attributes Tables contain Fields (columns) as follows;

- FID (Shape number in file)
- Shape (Point)
- Id (0)
- HOUSING_NU (Proposed number dwellings)
- REFERENCE (Local Plan reference if an allocated site)
- PARISH (Parish point lies within)

It should be noted that these development points are speculative, as not all planning applications are likely to be approved. This data was provided at the time of the report being compiled in order to give an indication of housing numbers coming forward outside of planned growth, and highlight where there were differences between allocated and proposed numbers.

Appendix 5: Housing change by area

The table gives the current and potential future levels of housing by area with housing totals given for 2km bands (drawn around the European site boundary, i.e. combined SPA, SAC and Ramsar for the relevant sites). The current housing totals relate to Norfolk only. The final section of the table gives the percentage increase. Allocated housing provided by Norfolk County Council.

Area	Distance from European Site Boundary (2km concentric rings)																			
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
Current housing (2016)																				
Breckland	21772	7621	6094	2791	7094	7664	7956	20127	25601	14579	8342	12351	15641	13863	26029	36199	36490	21410	9295	7743
East Coast	22004	16141	9097	6806	5119	5378	5456	5741	11870	23692	38928	29349	17800	17160	14570	9515	5322	8072	5570	12556
Norfolk Valley Fens	21546	23153	41232	35287	38849	76284	49945	24604	18959	9828	7832	6325	10380	3604	3910	3340	12247	21252	1497	0
North Norfolk Coast	6494	3380	5480	8247	3200	5353	11778	3150	2140	4930	9364	16165	16036	7765	11987	15801	23407	35407	42325	30270
Roydon Comm. & D'ham Bog	3932	9826	11168	7994	3529	5459	5845	3171	3870	10646	5980	7412	5219	6247	5654	15316	4110	3414	4415	4208
The Broads	27658	17248	36150	72925	33014	17143	8413	5426	9439	10101	8402	4719	9476	15597	11599	5717	3231	6087	8631	5467
The Wash	6209	9392	17670	3376	4821	2881	4010	2622	2769	5646	6063	4307	3864	9330	2493	3644	2759	5034	10854	12030
New																				
Breckland	10247	1475	125	141	2777	2857	1383	3553	4401	2014	264	997	2973	1858	1302	4451	4642	3930	6485	3972
East Coast	1284	1489	394	299	414	397	323	1491	6544	6263	5074	1949	3584	2220	1092	2092	55	298	1031	4487
Norfolk Valley Fens	2383	5333	4089	3202	11229	17383	12200	3091	2147	718	233	445	1194	434	200	130	1360	1162	0	0
North Norfolk Coast	217	174	674	343	56	145	1580	135	22	505	2019	1708	1285	531	3739	1111	5984	10106	5146	6499
Roydon Comm. & D'ham Bog	1672	292	1358	4364	295	408	183	100	369	1356	529	1511	538	310	259	2135	301	1290	605	260
The Broads	2004	9550	6905	8697	748	2147	1329	1406	562	1597	199	167	879	3014	3726	318	53	544	1148	585
The Wash	421	1007	1551	1656	3558	106	255	79	625	716	412	201	592	1910	111	133	26	90	465	2380
% change																				
Breckland	47	19	2	5	39	37	17	18	17	14	3	8	19	13	5	12	13	18	70	51
East Coast	6	9	4	4	8	7	6	26	55	26	13	7	20	13	7	22	1	4	19	36
Norfolk Valley Fens	11	23	10	9	29	23	24	13	11	7	3	7	12	12	5	4	11	5	0	

Area	Distance from European Site Boundary (2km concentric rings)																			
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
North Norfolk Coast	3	5	12	4	2	3	13	4	1	10	22	11	8	7	31	7	26	29	12	21
Roydon Comm. & D'ham Bog	43	3	12	55	8	7	3	3	10	13	9	20	10	5	5	14	7	38	14	6
The Broads	7	55	19	12	2	13	16	26	6	16	2	4	9	19	32	6	2	9	13	11
The Wash	7	11	9	49	74	4	6	3	23	13	7	5	15	20	4	4	1	2	4	20

Appendix 6: Interviewee postcodes by survey point and distance band

The table gives the number of interviewee postcodes per distance band per survey point, only visitors travelling from home (within Norfolk) included.

Survey Point ID	Area	Distance bands (km)																			
		2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
1	Broads	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0
2	Broads	0	1	1	1	0	0	0	1	0	0	0	1	1	0	0	1	1	0	1	0
3	Broads	1	1	0	1	0	1	1	0	0	0	1	0	0	0	1	0	0	1	0	0
4	Broads	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
5	Broads	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	E. Coast	0	2	1	0	0	2	3	0	0	1	0	0	0	0	0	0	0	0	0	0
7	E. Coast	1	1	0	0	1	2	0	1	0	1	0	0	0	0	0	0	0	1	0	0
8	Broads	15	2	4	1	1	1	3	1	3	0	0	0	0	0	0	0	0	0	0	0
9	Broads	0	2	0	2	1	2	1	1	0	1	0	4	0	1	0	2	0	0	0	0
10	Brecks	3	4	2	0	1	1	0	2	0	0	0	0	0	0	0	1	0	0	0	1
11	Brecks	0	3	4	8	1	0	5	2	1	3	4	2	2	4	1	0	2	0	1	3
12	Brecks	0	1	1	2	0	1	1	0	1	0	0	1	0	0	0	0	0	0	0	0
13	Brecks	0	11	0	4	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
14	Brecks	0	6	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	Brecks	0	3	1	0	0	1	1	0	0	0	0	1	2	0	0	1	0	1	0	0
16	Brecks	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
17	E. Coast	0	0	2	0	1	0	1	1	0	1	0	1	0	2	2	2	2	0	0	2
18	Brecks	17	5	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
19	Brecks	0	7	1	3	3	0	3	2	1	1	0	0	0	0	0	0	0	0	0	0
20	E. Coast	16	2	1	1	1	5	1	0	0	0	0	0	2	3	2	0	0	0	1	0
21	E. Coast	1	0	0	1	0	0	0	0	0	1	0	0	0	7	0	1	0	0	1	0
22	E. Coast	21	1	0	0	0	1	0	0	0	0	0	0	1	2	0	0	0	0	0	0
23	Roydon & Dersingham	0	9	7	2	0	1	1	1	0	0	0	0	1	0	1	0	1	0	0	0

Survey Point ID	Area	Distance bands (km)																			
		2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
24	Valley Fens	12	1	1	0	1	2	1	1	2	1	1	0	0	0	0	0	1	0	0	0
25	Valley Fens	4	0	6	0	2	1	1	4	1	0	0	0	0	0	0	0	0	0	0	0
26	Wash	1	6	2	0	1	1	2	1	0	0	0	0	0	0	0	2	0	0	0	0
27	N. Coast	5	4	2	1	1	1	1	0	0	1	1	0	2	0	0	0	0	1	1	0
28	N. Coast	4	0	0	4	2	2	1	2	2	0	1	1	2	1	0	1	0	0	1	2
29	N. Coast	1	9	2	9	1	2	2	5	3	2	0	0	1	0	1	1	2	2	1	1
30	N. Coast	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	N. Coast	2	3	0	5	0	3	0	0	0	1	0	0	0	0	0	0	1	1	1	2
32	Wash	7	6	2	1	1	0	1	1	0	0	0	2	0	0	0	0	0	1	0	2
33	N. Coast	1	3	4	7	2	0	0	6	0	3	0	0	1	0	1	0	0	0	0	0
34	N. Coast	0	2	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
35	N. Coast	7	16	0	1	1	1	0	1	0	0	0	0	1	1	0	0	0	0	0	0
36	E. Coast	8	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37	Wash	0	7	5	0	3	3	2	1	0	0	0	1	0	1	1	1	1	1	0	0
38	N. Coast	1	1	0	2	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0
39	N. Coast	5	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
40	N. Coast	4	0	7	0	2	0	1	2	0	1	0	0	0	0	2	0	0	0	0	0

Appendix 7: Equations from Figure 21

Equations from Figure 21. Equations describe the red lines in the figure – lines fitted by eye and to maximise the r^2. Based on data on the mean of number of interview postcodes divided by the number of residential properties within each distance band (2km bands, 2km – 40km).

Area	Equation	r^2
The Brecks	$Y=0.0085e^{-0.35x}+0.0001$	0.21
The Broads	$Y=0.028e^{-0.85x}+0.0001$	0.98
East Coast	$Y=0.06e^{-1.2x}+0.0001$	0.95
North Coast	$Y=0.025e^{-0.45x}+0.00025$	0.97
Roydon & Dersingham	$Y=0.035e^{-0.65x}+0.0001$	0.7982
Valley Fens	$Y=0.096e^{-1.05x}+0.0001$	0.9874
Wash	$Y=0.02e^{-0.45x}+0.0001$	0.9668