FOOTPRINT ECOLOGY

Recreation use of the New Forest SAC/SPA/Ramsar:

Overview of visitor results and implications of housing change on visitor numbers

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Summary

This report brings together the information from three separate surveys undertaken across the New Forest SAC/SPA/Ramsar in 2018/19. The surveys included:

1) A telephone survey with residents living around the New Forest (25km radius);
2) Face-face interviews and counts of people at a range of car parks and other access points across the New Forest SAC/SPA/Ramsar;
3) A series of simultaneous counts of vehicles using set parking locations across the New Forest SAC/SPA/Ramsar.

There is a separate report setting out the full results for each survey. Here we provide an overview of the results and use the results to consider the changes in access that might occur as a result of new housing within 25km radius over the period 2018-2036.

Anticipated levels of new housing indicate around 129,222 new dwellings may come forward within 25km of the New Forest SAC/SPA/Ramsar over the period 2018-2036. This would represent a 16.4% increase in housing within the 25km. We predict this would result in an increase of around 11.4% in the number of visits. This level of change solely relates to an increase in access from new housing within the 25km and additional visitors may come from further afield – for example tourist visits.

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Future housing data across local authorities were collated by Karen Eastley. Our thanks to Karen and all the local authority staff who provided data.

1. Introduction

Overview

1.1 This report, commissioned by a partnership of local authorities with funding from central government, is part of a series that relates to understanding the impacts of recreation (arising from new housing development) on the New Forest international nature conservation designations. The various studies are intended to inform necessary mitigation approaches.

1.2 In this report we also present the results of vehicle counts carried out within the boundaries of the New Forest international nature conservation designations. The work aims to understand variations in the level and use of parking locations by visitors in the New Forest.

Relevant legislation

1.3 The designation, protection and restoration of key wildlife sites is embedded in the Conservation of Habitats and Species Regulations 2017 (as amended), which are commonly referred to as the 'Habitats Regulations.' These Regulations are in place to transpose European legislation set out within the Habitats Directive (Council Directive 92/43/EEC), which affords protection to plants, animals and habitats that are rare or vulnerable in a European context, and the Birds Directive (Council Directive 2009/147/EC), which originally came into force in 1979, and which protects rare and vulnerable birds and their habitats. These key pieces of European legislation seek to protect, conserve and restore habitats and species that are of utmost conservation importance and concern across Europe. European sites include Special Areas of Conservation (SACs) designated under the Habitats Directive and Special Protection Areas (SPAs) classified under the Birds Directive. Ramsar sites, those wetlands of international importance that are listed in the Ramsar Convention are, through government policy, are also treated as European sites.

1.4 Public bodies, including local planning authorities, have specific duties in terms of avoiding deterioration of habitats and species for which sites are designated or classified, and stringent tests have to be met before plans and projects can be permitted. Importantly, the combined effects of individual plans or projects must be taken into account. For local planning authorities, this means that the combined effect of individual development proposals

needs to be assessed collectively for their cumulative impact, as well as on an individual basis.

The New Forest

1.5 The New Forest is one of the largest tracts of semi natural vegetation in the country, and as such is one of our most important wildlife sites. The area hosts three international wildlife site designations and is closely located to other international wildlife sites such as the Solent and Southampton Water.

1.6 The New Forest is classified as a SPA for its breeding and overwintering bird species of European importance, in accordance with the European Birds Directive. The designation relates to internationally significant breeding populations of Dartford Warbler *Sylvia undata*, Nightjar *Caprimulgus europaeus*, Woodlark *Lullula arborea*, Honey Buzzard *Pernis apivorus*, Hobby *Falco subbuteo* and Wood Warbler *Phylloscopus sibilatrix* and over-wintering Hen Harrier *Circus cyaneus*.

1.7 The New Forest is also designated as a SAC for its habitats and non-avian species of European importance, in accordance with the European Habitats Directive. This designation reflects the unique mosaic of habitats across the New Forest, which includes eight Annex 1 heathland, grassland, woodland, wetland, bog and open water habitats, together with three Annex 2 species, Stag Beetle *Lucanus cervus*, and Southern Damselfly *Coenagrion mercuriale*, and Great Crested Newt *Triturus cristatus*.

1.8 Also relevant is the New Forest's listing as a Ramsar site, under the Ramsar Convention. This recognises the international importance of the site as a wetland, supporting wetland flora and fauna of international importance, and adding to the global network of Ramsar listed wetlands.

Housing growth and recreation impacts

1.9 A challenging issue for UK nature conservation is how to respond to increasing demand for access without compromising the integrity of protected wildlife sites. Areas that are important for nature conservation are often important for a range of other services, including the provision of space for recreation for an increasing population. Such recreation space can be used for a wide variety of activities, ranging from the daily dog walks to competitive adventure and endurance sports.

1.10 There is now a strong body of evidence showing how increasing levels of access can have negative impacts on wildlife. Visits to the natural environment have shown a significant increase in England as a result of the increase in population and a trend to visit more (O'Neill, 2019). The issues are particularly acute in southern England, where population density is highest. Issues are varied and include disturbance, increased fire risk, contamination and damage (for general reviews see: Liley et al., 2010; Lowen, Liley, Underhill-Day, & Whitehouse, 2008; Ross et al., 2014; Underhill-Day, 2005).

1.11 The issues are not however straightforward. It is now increasingly recognised that access to the countryside is crucial to the long term success of nature conservation projects, for example through enforcing pro-environmental behaviours and a greater respect for the world around us (Richardson, Cormack, McRobert, & Underhill, 2016). Access also brings wider benefits to society that include benefits to mental/physical health (Keniger, Gaston, Irvine, & Fuller, 2013; Lee & Maheswaran, 2011; Pretty et al., 2005) and economic benefits (ICF GHK, 2013; ICRT, 2011; Keniger et al., 2013; The Land Trust, 2018). Nature conservation bodies are trying to encourage people to spend more time outside and government policy is also promoting countryside access in general (e.g. through enhancing coastal access).

1.12 There are two statutory purposes for national parks in England and Wales. The first is to conserve and enhance natural beauty, wildlife and cultural heritage and the second is to promote opportunities for the understanding and enjoyment of the special qualities of national parks by the public. This second purpose includes opportunities for open air recreation. However, if it appears that there is a conflict between the two National Park purposes, the Environment Act 1995 requires greater weight to be attached to the purpose of conserving and enhancing the natural beauty, wildlife and cultural heritage of the National Park (this is known as the Sandford Principle[1]). When national parks carry out these purposes, they also have the duty to encourage the social and economic well-being of local communities within the national park.

1.13 There is therefore, a significant challenge: to avoid or mitigate potential negative impacts associated with recreation so as to comply with legislation

[1] Named after Lord Sandford, who chaired the 1974 National Parks Policy Review Committee.

without compromising the ability of people to be outside enjoying sites for recreation.

Aims of this work

1.14 This report has been commissioned as an umbrella report, summarising the other visitor surveys and using the results to consider the implications in terms of future recreation patterns associated with housing growth surrounding the New Forest.

Other reports

1.15 The work forms part of a series of reports that relates to understanding the impacts of new development on the New Forest international nature conservation designations. The project as a whole involves visitor surveys combined with work to understand the impacts of recreation and relevant mitigation approaches. Other reports, produced in parallel with this one, and from which this survey draws, include:

- **Recreation use of the New Forest SAC/SPA/Ramsar: New Forest visitor survey 2018/19** - results of on-site face-face interviews with visitors conducted at formal car parks and other locations across the New Forest SAC/SPA/Ramsar;
- **Recreation use of the New Forest SAC/SPA/Ramsar: New Forest vehicle counts 2018/19 –** results of vehicle counts across the New Forest SAC/SPA/Ramsar car parks, counting all parked vehicles on a range of different dates over a year;
- **Recreation use of the New Forest SAC/SPA/Ramsar: Results of a telephone survey with people living within 25km** - the results of a telephone survey with 2,000 residents living within a 25km radius of the woodland/heathland areas of the New Forest SAC/SPA/Ramsar;
- **Recreation use of the New Forest SAC/SPA/Ramsar: Impacts of recreation and potential mitigation approaches** – sets out the impacts of recreation and provides options for mitigation and avoidance

1.16 This study is the first which has specifically considered visitors to the New Forest SAC/SPA/Ramsar. Previous work looking at visitor numbers and their activities and impacts in the New Forest includes *A Survey of Recreation Visits to the New Forest National Park* (Tourism South East Research Services & Geoff Broom Associates, 2005).

2. The three visitor surveys and the key findings

2.1 The three visitor surveys involved:

- Telephone survey, involving 2,000 interviews with people living within 25km of the New Forest;
- On-site survey, involving 5,236 interviews undertaken at 60 locations within the New Forest SAC/SPA/Ramsar, involving people visiting the area for recreation. Counts were also made simultaneously of the numbers of visitors passing each survey location;
- Counts of parked vehicles (at 270 parking locations, comprising 147 formal car parks, 33 gateways/start of tracks, and 90 laybys/verges) simultaneously, with the counts undertaken 15 times across the year.

2.2 These surveys complement each other, and each has different strengths and weaknesses. The telephone survey is the only survey that drills down to identify people who do not visit the New Forest and direct comparison is possible between those who visit and those who do not. Stratified sampling ensured even coverage by the volume of housing within given distance bands and local authorities. The disadvantage of the telephone survey is the difficulty in having confidence that the sample is random, as we rely on people to answer the phone (from an unknown caller) and give up their time to respond to questions about the New Forest. There is also the challenge of recall, as the questionnaire is asking people at home about previous visits to the New Forest.

2.3 The on-site survey provides more reliable interview data, but only for those people who definitely visit the New Forest. As such, the interview data are focussed towards those who were visiting the surveyed locations and intercepted to undertake an interview. The telephone survey is perhaps likely to include a wider range of visit types, given its more general nature. For example, the telephone survey captured information about visits that involved going for a drive, going to a pub/café or even visiting locations outside the National Park (e.g. Avon Heath, Moors Valley) which interviewees perceived as part of the New Forest landscape of woodland and heathland. Counts were also undertaken as part of the on-site fieldwork, however these are specific to very small windows in space and time – i.e. they relate to very specific points where the surveyor was positioned (i.e. totals of people through a car park) on a particular date.

2.4 The choice of survey locations was not random and was targeted to ensure good spatial coverage across the Forest and to ensure peripheral as well as central locations were surveyed. The on-site survey included 56 formal car parks (with 2439 spaces), and in the car park report we estimate a total of 147 formal car parks with 4,442 spaces (this excludes town and village centre car parks etc.). The on-site survey therefore covered around 38% formal car parks and the selected car parks involved around 55% of the formal car park spaces. As such it would seem that the on-site survey clearly covers a good proportion of car parks and the selection is more focussed towards the larger formal car parks.

2.5 The counts of parked vehicles provide information on the spatial distribution of visitors numbers, and shows how these vary with time. The counts are however focussed on those people who arrive by car, and do not include those who might leave their car at hotels, campsites or other accommodation and those who travel from their home by other forms of transport.

2.6 Key findings from the three surveys are summarised in the infographic on the next page.

TELEPHONE SURVEY

2000

Telephone interviews with 2000 people living within 25 km of the New Forest.

70%

95% had visited greenspaces and 70% had visited the New Forest woodland & heathland in the last year.

47%

37%

47% of visits were walkers and 37% dog walkers.

The elderly, those in flats and social grades C2, D &E less likely to visit.

48 visits per yr

Average visits to the New Forest woodland & heathland was 48 visits per interviewee per year.

Those within 5km typically made 122 visits per year.

122 visits

<5km

62%

<5km

62% of those within 5km said 3/4 of their visits to greenspaces were in the New Forest.

Small parks or improved footpaths close to home were preferred over a large new country park, as an alternative to the New Forest.

CP

Those living further away viewed the idea of a large single country park more positively.

ON-SITE SURVEY

2400

9.7

2400 hrs of survey, 23,368 people entering/passing - equivalent to 9.7 people per hour.

83%

5236

14%

5236 interviews.

83% of interviewees were visiting from home and 14% were on holiday.

26%

55%

26% of interviewees were walkers and 55% dog walkers.

Median route lengths were:

2.7km

12km

3.2km

26% daily

41% daily

26% visit daily. For dog walkers this was 41%.

166 visits per yr

On average, interviewees made 166 visits per year and the visit lasted 95 minutes.

95mins

62%

<5km

62% lived within a 5km radius of the SAC/SPA.

75% lived within 21km. For those visiting from home this was 14km.

21km

14km

67%

67% aware of a wildlife habitat or species that could be affected by recreation.

VEHICLE COUNTS

P 270

15

Counts from 15 dates and 270 parking locations.

Counts covered: 140 formal car-parks, 33 gateways & 90 lay-bys/verges. Totalling 4712 spaces.

4712 spaces

P

1006

In total 17,182 vehicles were counted, with median count being 1006.

Highest count was 2908 on Easter Sunday. Lowest was 370 in mid-March.

370–2908

60%

Even on Easter Sunday the total was only 60% of the parking space capacity.

Busiest locations were: Queens, Blackwater, Wilverley Plain and Bolderwood.

Vehicles counted: 6% vans, 4% caravans/ campervans, 3% with bike racks.

6%

4%

3%

am

school hols

weekends

spring/summer

Counts were higher in school holidays, spring/ summer, weekends and mornings.

3. Estimates of total visitor use of the New Forest SAC/SPA/Ramsar

3.1 The surveys were not designed to derive overall estimates for the number of visits made to the New Forest SAC/SPA/Ramsar and the focus of the work has been to understand the links between local housing and visitor use of the New Forest SAC/SPA/Ramsar. As such the surveys have not targeted town and village centres, tourist sites, major tourist accommodation providers (campsites, holiday parks) etc.

3.2 Nonetheless it is possible to generate some broad figures for the levels of use of the New Forest SAC/SPA/Ramsar, based on the data collected.

Estimates using on-site visitor survey tally counts

3.3 Counts were made at each of the 60 survey locations of the number of people entering and passing through during the survey periods. Tally data are summarised in Table 2 of the on-site visitor survey report. Using the totals of people entering and leaving we have extrapolated the data to derive a very approximate estimate of the overall levels of use of the survey locations across the year, as set out in Table 1.

3.4 We estimate 2,007,144 visits across the year to the surveyed locations. We have derived this estimate by adjusting the tally data for daylight when people might visit, so that the data relate to daylight hours rather than the 8 hours of survey. We assumed 9 hours of daylight in the winter and 12 for the spring and summer. We then assumed that the winter counts were indicative of use for the period October through to March, that the summer counts were indicative of the period July to August and the spring counts were indicative of the remaining months.

3.5 The approach is clearly crude, but would suggest around 2 million person visits to the surveyed locations over a year. It is hard to know what proportion of all possible entry points we have surveyed, as besides parking locations, visits will also originate from local housing, train stations, campsites etc. The survey locations did cover 38% of the formal car parks (55% of the spaces – see para 2.4), and this would suggest the overall number of person visits to the SAC/SPA/Ramsar is therefore likely to be over 4 million (and using the 38% value potentially 5.3 million). In addition, there

are the foot only entry points, for which it is impossible to determine how the data should be further scaled-up.

Table 1: Estimates of person visits per annum to the 60 on-site survey locations using tally data. Note WD for Weekday and WE for Weekend days.

	Winter		Spring		Summer
	WD	WE	WD	WE	WD & WE combined
Total people entering/passing	2,712	5,401	3,219	5,927	6,109
Adjustment for daylight (surveys were 8 hours)	1.125	1.125	1.5	1.5	1.5
Total people per day (adjustment for daylight applied)	3051	6076	4828	8891	9164
Relevant days in year	130	52	86	35	62
Total people for period	**396,630**	**315,959**	**415,251**	**311,168**	**568,137**

**Winter corresponds to October to March inclusive; spring corresponds to April to June inclusive, as well as September; and summer corresponds to July and August inclusive.*

Estimates using the vehicle count data

3.6 An estimate of annual visitor numbers was also made using data from the vehicle counts carried out at 270 parking locations across the New Forest, with count data summarised in Table 6 of the vehicle count report. The vehicle counts were used in conjunction with information on group size and dwell time, derived from the on-site visitor report. Dwell time per vehicle was calculated from the mean duration spent on site by interviewees arriving by car or van, per visit. Approximate seasonal estimates of weekend and weekday visitors across all vehicle count locations, split by morning and afternoon, are provided in Table 2.

3.7 We estimate 5,699,918 person visits across the year to the vehicle count locations. This would suggest a ball-park figure for the total access (those arriving by car) is around 5.7 million person visits per year. We have derived this estimate by calculating measures of parking opportunity (i.e. the maximum number of cars which could use a single parking space within a given time period), adjusted for dwell time and daylight hours. The same assumptions for seasonal daylight hour length are made as for the tally count estimates detailed above, as are the allocation of months within seasons. Furthermore, it was noted that some very small parking locations were not surveyed and there was opportunist parking on verges in the site. Finally, it should be noted that this does not cover the possibility cars were doubled counted (in one car park and later in another), however this seemed a very low likelihood and was not something noted by surveyors.

3.8 As with the tally count extrapolation, this application is nevertheless relatively crude and is also dependent upon a number of assumptions and caveats:

- All parking opportunities are used all of the time (i.e. there are no ‘gaps’ in vehicle occupancy throughout the day);
- The extrapolation of visitor numbers only applies to those arriving at vehicle count locations by motorised transport (i.e. it doesn’t neccesarilly account for walkers, cyclists, etc); and,
- None of the summer surveys were carried out in the morning period, so the initial vehicle counts for both weekday and weekend mornings have been calculated by multiplying the corresponding afternoon counts by 165% (see the Vehicle Count report).

Table 2: Estimates of person visits per annum to all surveyed parking locations using vehicle count data.

ID		Winter				Spring				Summer			
		WD		WE		WD		WE		WD		WE	
		am	pm	am	pm	am	pm	am	pm	am	pm	am	pm
A	Mean number of vehicles counted from all surveyed locations (adjusted for survey effort)	653.0	913.0	1411.0	1080.0	806.0	529.5	1957.0	1497.0	2203.6	1335.5	2659.8	1612.0
B	Period length (minutes)	270	270	270	270	360	360	360	360	360	360	360	360
C	Mean dwell time/vehicle (minutes)	81	81	95	95	80	80	97	97	103	103	116	116
D	Number of parking opportunities/period (adjusted for dwell time: B / C)	3.3	3.3	2.8	2.8	4.5	4.5	3.7	3.7	3.5	3.5	3.1	3.1
E	Number of cars/period/day (A x D)	2154.9	3012.9	3950.8	3024.0	3627.0	2382.8	7240.9	5538.9	7712.5	4674.3	8245.4	4997.2
F	Mean visitor group size	1.61	1.61	2.09	2.09	1.82	1.82	2.40	2.40	2.27	2.27	2.58	2.58
G	Number of individuals/day (E x F)	3469.4	4850.8	8257.2	6320.2	6601.1	4336.6	17378.2	13293.4	17507.4	10610.5	21273.1	12892.8
H	Number of days in year*	130	130	52	52	86	86	35	35	45	45	17	17
	Total number of visits/year (G x H)	**451,021**	**630,600**	**429,373**	**328,648**	**567,698**	**372,948**	**608,236**	**465,268**	**787,833**	**477,475**	**361,642**	**219,177**

**Winter corresponds to October to March inclusive; spring corresponds to April to June inclusive, as well as September; and summer corresponds to July and August inclusive.*

Overall estimates of visitor numbers in context

3.9 From the extrapolations of the vehicle count data and the on-site data it would seem that the overall footfall within the New Forest SAC/SPA/Ramsar is likely to be between 5 and 6 million visitors per year, and this excludes people walking out from campsites, other holiday accommodation and the town and village centres. It also excludes events and activities such as going for a drive. These are very approximate estimates.

3.10 Recent estimates of visitor volumes to the National Park are 15.2 million visits per annum (RJS Associates Ltd., 2018), and this includes the whole National Park, i.e. the towns and villages, the coast and the tourist attractions. Our estimates are therefore broadly in line with this more 'global' figure which is derived from previous visitor survey work and extrapolations based on general trends in access over the period 2004-2018.

4. Potential housing change 2018-2036

4.1 Relevant local authorities provided housing data to indicate approximate levels of new housing development 2018-2036.

Housing change

Approach

4.2 Spatially explicit housing information were collated by Test Valley Borough Council for all local authorities within a 25km radius (excluding the Isle of Wight). As each local authority were at different stages in their local plans and as existing plans cover different time periods, such information is difficult to bring together in a consistent and coherent way. All relevant local authorities provided information and estimates of housing growth for the period through to 2036, with the data combined into 2 separate GIS layers. One layer was housing market areas and for each a single level of growth (from small sites/windfall) for the period was provided. A separate GIS layer showed known large[2] sites anticipated for the period. These two GIS layers therefore showed the in-combination growth within 25km but it is important to note that they are indicative only and simply provide one scenario for the level and distribution of new housing. It is worth noting all housing numbers used were indicative and were based on the best available information at the time. Exact housing numbers will ultimately be determined through the respective Local Plan examination processes for each local planning authority.

4.3 We extracted the new housing data using the following:

1. Buffers drawn at 1km intervals around the New Forest SAC/SPA/Ramsar, as a series of concentric rings going out to 25km;
2. Buffers drawn at 1km intervals around each of the 60 survey points used in the on-site visitor survey work, these extended out to a maximum of 50km from each survey point;
3. Buffers drawn at 2 minute travel time intervals around each of the 60 survey points used in the on-site visitor survey work, these extended out to a maximum of 42 minutes.

4.4 These three sets of buffers were applied to the new housing data (which related to new housing within 25km of the SAC/SPA/Ramsar only). For the

[2] 50 or more dwellings

housing areas we calculated the amount of existing housing within each area and the volume of new housing anticipated, to give a proportional increase. This uplift was then applied to all existing postcodes within the area, i.e. small sites were assumed to come forward to match the existing spatial distribution of housing.

4.5 For the large sites, the GIS data were in the form of polygons representing an approximate area. We assumed the given amount of housing for each would be evenly distributed within the polygon. Where the housing site polygon spanned multiple buffers, the relative proportion of the housing was allocated to each buffer.

Scale of change

4.6 The indicative level of new housing (within 25km of the New Forest SAC/SPA/Ramsar) was estimated to be around 129,222 dwellings to 2036. There are currently around 789,813[3] residential dwellings within the same area and the potential increase is therefore around 16.4%. This gives an indication of the overall, cumulative change. Based on information currently available, this increase was broadly evenly split between small sites and large sites: with a 9.3% increase associated with large sites and 7.1% for small sites.

4.7 The distribution of current and potential future housing (to 2036) in relation to different distance bands from the SAC/SPA/Ramsar are shown in Figure 1. The spatial distribution of new housing is also shown in Map 1. We have used a 1km grid to show the change, with the blue and green shading representing potential housing change.

[3] Note that this figure excludes the Isle of Wight

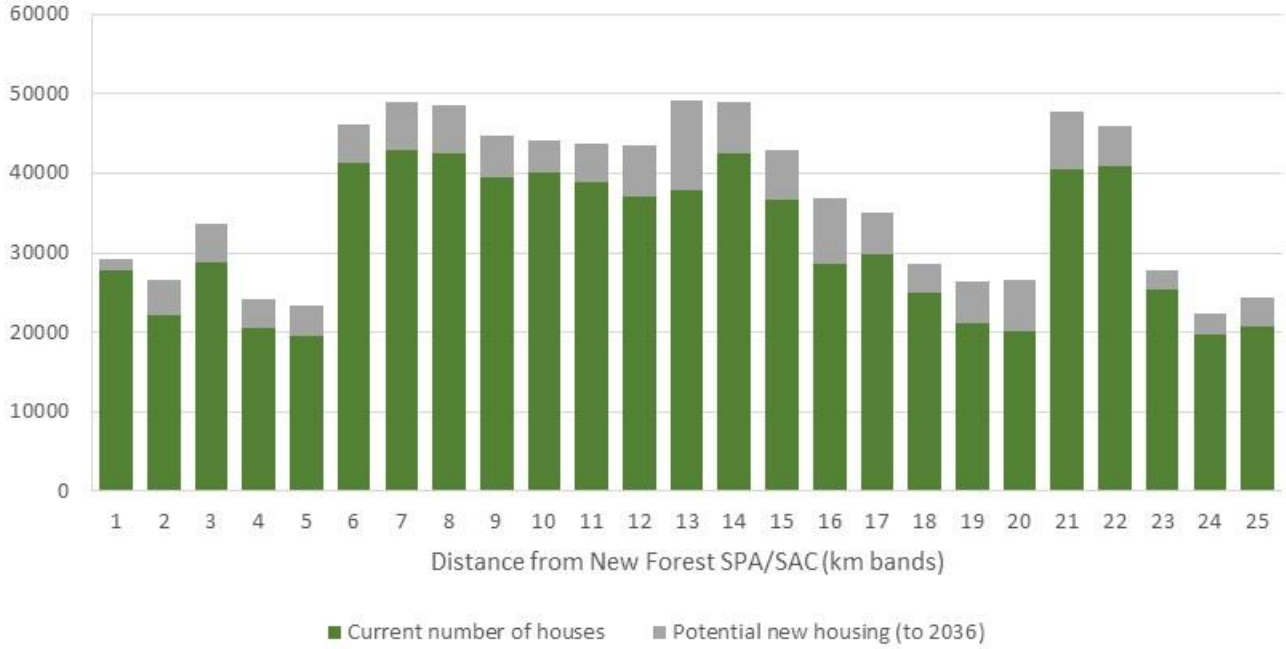
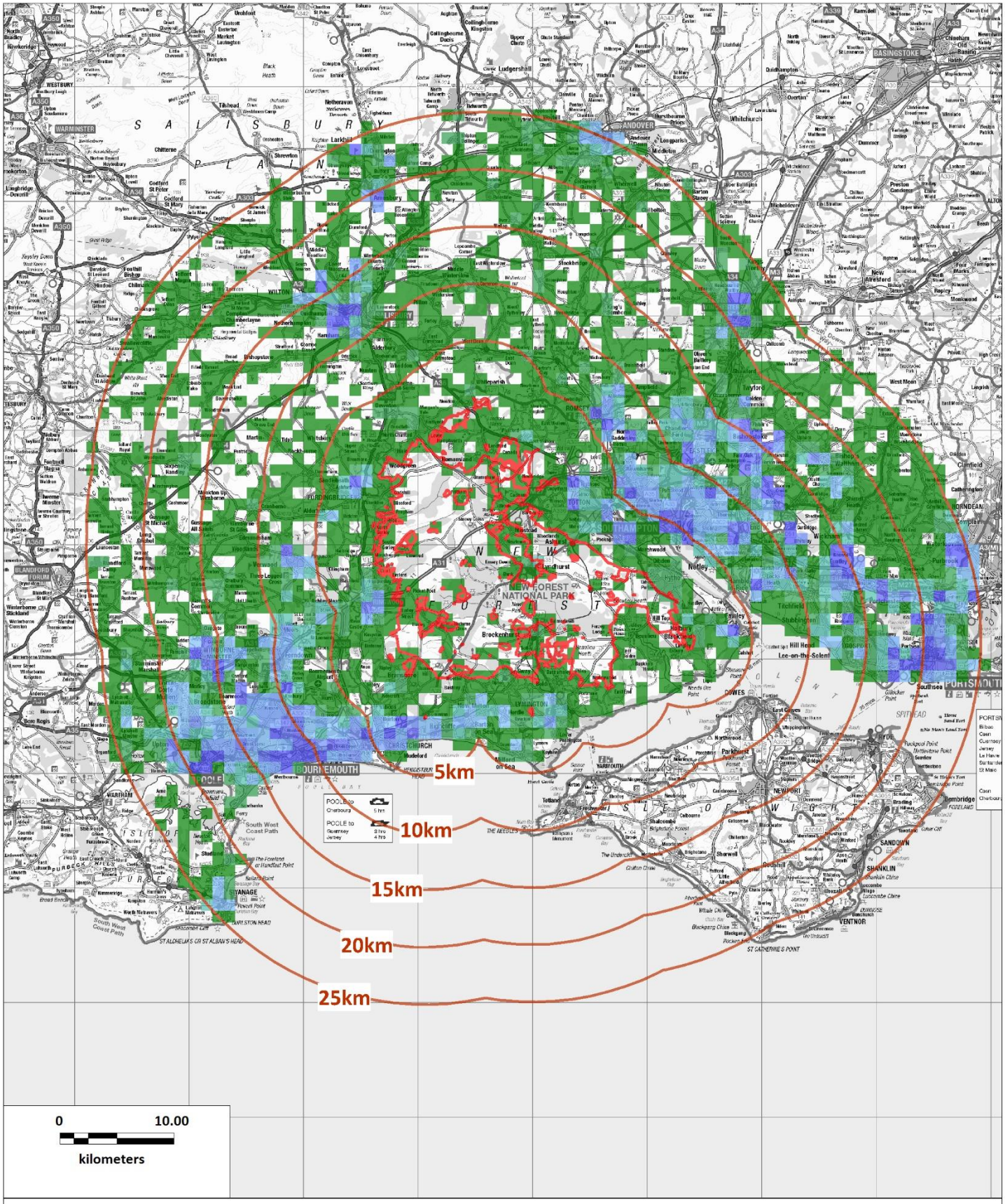


Figure 1: Potential levels of new growth in relation to current housing at different distances from the New Forest SAC/SPA/Ramsar.

Map 1: Potential numbers of new houses to 2036



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Designated site boundaries downloaded from Natural England website. © Natural England.

5. Predictions of change in visits as a result of new housing

5.1 In this section of the report we use the telephone survey data and the on-site survey data to model the effect of increased housing (within 25km and over the period 2018-2036, as described in Section 4 above) on visit numbers.

Telephone Survey data

Visit rate in relation to straight-line distance from the New Forest SAC/SPA/Ramsar

5.2 Various increasingly complex non-linear curves were fitted to the data on annual New Forest SAC/SPA/Ramsar visits (V) per telephone interviewee and their straight-line distance (D) from the SAC/SPA/Ramsar. The best fit least squares regression equation involved a double exponential decay curve given by the following equation (coefficient standard errors in brackets) was:

$$V = 240.6 * \exp(-0.4640 * D) + 64.3 * \exp(-0.0787 * D)$$
$$\quad (18.4) \qquad (0.078) \qquad (19.4) \qquad (0.019)$$

5.3 This equation, shown as solid purple line in Figure 2, allowed for the fact that after a few kilometres, the rate of visiting only declines very slowly, reflecting the long-distance attraction/'pull' of the New Forest to some people.

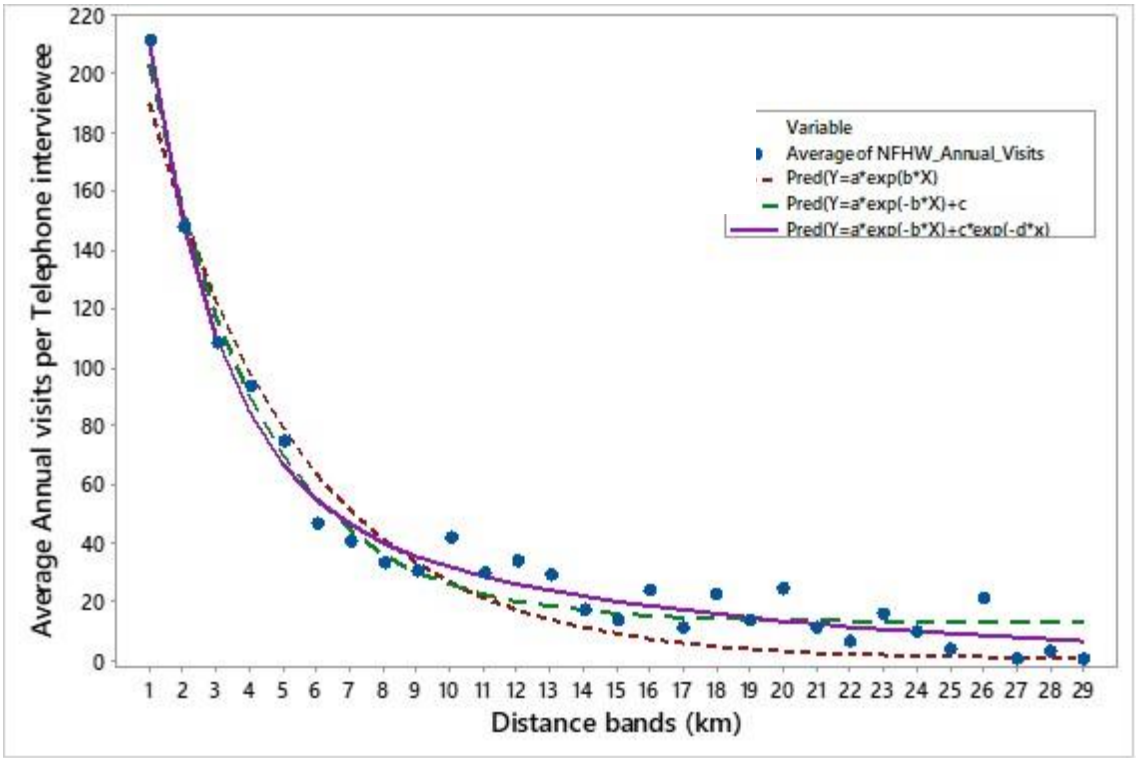

Figure 2: Plot of observed (solid circles) and predicted mean annual NFHW visits per telephone survey interviewee classified by straight line 1km distance bands. Lines represent different curve fits (dotted red: Y=a*exp(b*X); dotted green: Y=a*exp(b*X); solid purple: Y=a*exp(b*X)+c*exp(-d*x).

5.4 The annual visit rate per telephone interviewee (household), based on the best-fit smooth curve to the observed data declined from an average of about 211 visits for households within 1km straight-line distance of the SAC/SPA/Ramsar to around 67 visits from 5km, 32 visits from 10km and still 13 visits on average from 20km away (Table 3).

5.5 Based on the telephone survey interviewees estimates of their number of visits per year and the known number of dwellings within each 1km distance band of the New Forest SAC/SPA/Ramsar, the estimated total number of visits to the whole area per year would be around 32 million from residents within the first 25km (Table 3). Moreover, people within 8km of the New Forest SAC/SPA/Ramsar are estimated to make around 20 million visits per year. These estimates are clearly high and potentially reflect the issues with sampling and recall associated with the telephone survey (see para 2.2 above).

Table 3: Observed (Obs) and predicted (Pred) mean annual New Forest heath and woodland visits per telephone interviewee (household) per 1km distance band together with the number of dwellings (delivery points) per distance band and the estimated total annual number of visits by all people within each 1km distance band and cumulatively over the distance surveyed.

Distance band(km)	Interviewees	Mean Annual visits per household		Dwellings		
		Obs	Pred	Current	Future	% Increase
0-1	68	211.38	210.69	27,768	29,105	4.81
2	79	147.56	150.03	22,247	26,629	19.70
3	137	107.97	110.57	28,738	33,617	16.98
4	102	92.99	84.52	20,489	24,212	18.17
5	73	74.75	67.02	19,616	23,274	18.65
6	119	46.45	54.96	41,249	46,202	12.01
7	124	39.92	46.41	42,878	48,983	14.24
8	110	33.15	40.13	42,531	48,643	14.37
9	110	30.01	35.36	39,565	44,662	12.88
10	86	41.41	31.59	40,085	44,151	10.14
11	66	29.71	28.52	38,868	43,782	12.64
12	78	33.56	25.93	37,011	43,490	17.51
13	91	28.66	23.69	37,884	49,067	29.52
14	87	16.47	21.73	42,509	48,904	15.04
15	94	13.64	19.98	36,604	42,943	17.32
16	103	23.80	18.40	28,608	36,852	28.82
17	58	10.62	16.97	29,714	34,985	17.74
18	59	21.90	15.66	24,955	28,523	14.30
19	61	13.51	14.45	21,157	26,306	24.34
20	53	23.91	13.35	20,119	26,570	32.07
21	65	10.51	12.33	40,567	47,716	17.62
22	59	5.80	11.40	40,852	45,868	12.28
23	53	15.40	10.53	25,387	27,808	9.54
24	21	9.33	9.73	19,700	22,304	13.22
25	22	3.23	9.00	20,712	24,440	18.00
26	19	20.58	8.31	18,474	18,474	0.00
27	1	0.00	7.68	23,731	23,731	0.00
28	1	3.00	7.10	26,385	26,385	0.00
28-29	1	0.00	6.57	15,956	15,956	0.00
Total (0-25km)				**789,813**	**919,035**	**16.36**

5.6 The overall number of dwellings within 25km straight-line distance of the New Forest SAC/SPA/Ramsar is planned to increase by 129,222 to 919,035, an increase of 16.4%. However, the planned increase in housing varies with distance, being by far the least (4.8%) within the first 1km of the SAC/SPA/Ramsar boundary and highest in the 12-13km (29.5%), 15-16km (28.8%) and 19-20km (32.1%) distance bands (Table 3).

5.7 The percentage increase in dwellings within a distance band is expected to lead to the same percentage increase in annual visits to the SAC/SPA/Ramsar from future housing within that distance band. However, extra houses close to the SAC/SPA/Ramsar will lead to more extra visits to the SAC/SPA/Ramsar than the same number of extra houses further away as people who live closer visit more – this is explored in more detail later. Moreover, as the percentage increase in housing is relatively less close to the SAC/SPA/Ramsar, the predicted overall increase in annual visits is less than the overall increase in housing within 25km, being 14.7% based on the observed average visit rate per distance band and 14.5% based on the statistical best-fit smooth curve visit rate predictions.

Visit rate and age (based on telephone survey data)

5.8 One potential concern with a telephone survey of visit rate is that the achieved telephone survey respondents may be biased towards older/retired people who may on average visit the New Forest more and hence contribute towards a biased and over-estimate of visit numbers.

5.9 To assess this, the double exponential decay curve fitted to the individual visit rate with distance data was modified to include a multiplicative factor to represent the potential higher visit rate for people over 65 years old relative to younger people (Figure 3). The telephone survey data suggests that, on average, people over 65 visit 25% less (95% confidence limits of 15%-33%) than younger people. In fact, the annual visit rate of people over 65 (compared to younger interviewees) was lower in 17 of the first 20 1km distance bands covered by the telephone survey.

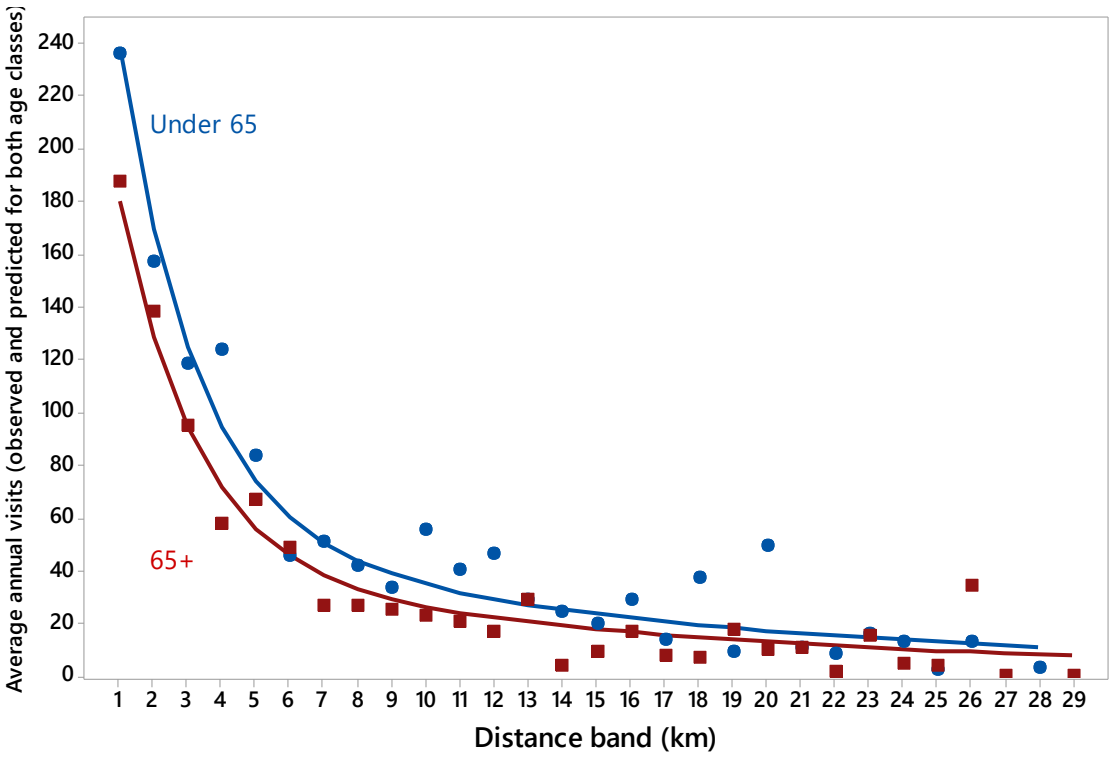

Figure 3: Observed and predicted average annual New Forest heath and woodland visit rare per telephone interviewee per 1km distance band separately for interviewees above and below 65 years old.

Visit rate in relation to travel time

5.10 The data analyses were repeated using 2-minute bands of travel time (on roads by car) instead of simple straight-line distance to the New Forest heath and woodland area. We used bands out to 42 minutes, drawn based on the nearest parking locations to the outer edge of the SAC/SPA/Ramsar on each road leading into the SAC/SPA/Ramsar.

5.11 Similar visit rate patterns were obtained to those found using straight-line distance bands, but surprisingly, the best-fitting double exponential decay smooth curve was not obviously any better for the travel time (TT) bands than for the simpler straight distance (D) bands (R^2 explained was 98.8% (TT) and 98.2% (D) for the fit of mean rate per band and 20.8% (TT) and 22.0% (D) for fit to the individual telephone interviewee data). The best-fit curve is shown as the purple solid line in Figure 4, together with the average observed visit rate per household in each 2-minute travel time band.

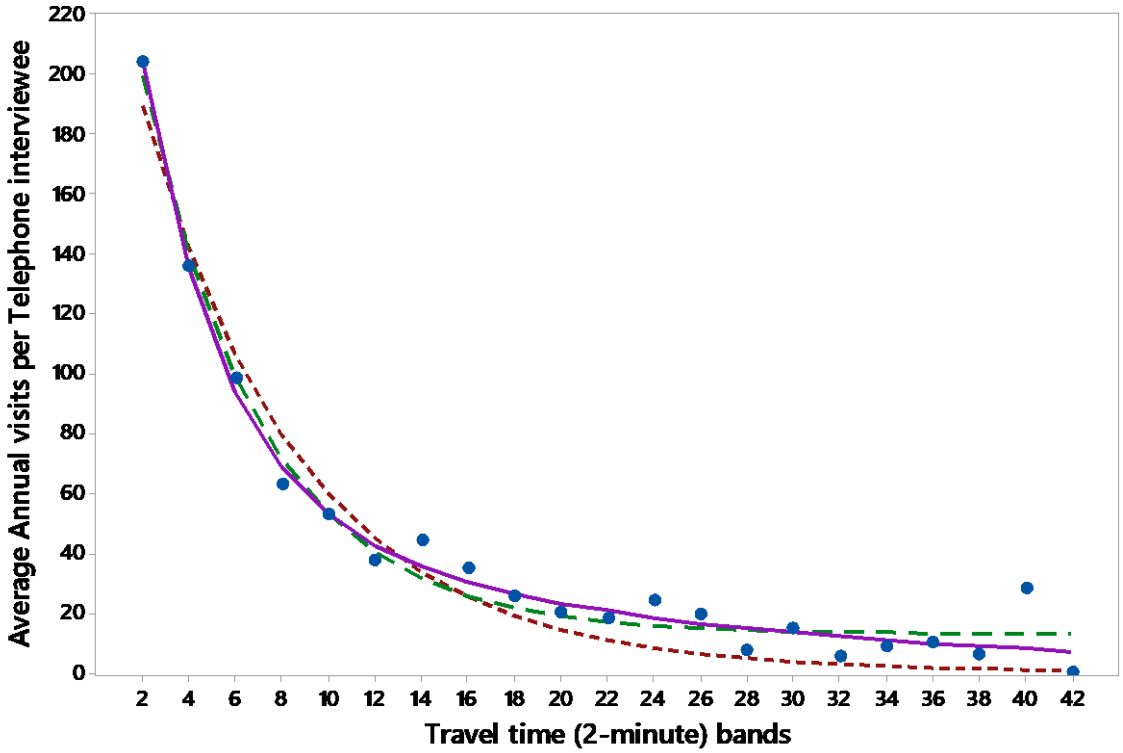

Figure 4: Plot of observed (solid circles) and predicted mean annual NFHW visits per telephone survey interviewee classified by 2-minute travel time bands. Lines represent different curve fits (dotted red: Y=a*exp(b*X); dotted green: Y=a*exp(b*X); solid purple: Y=a*exp(b*X)+c*exp(-d*x).

5.12 Using the current number of dwellings within each travel-time band, the total annual number of visits from households within 42 minutes travel time

was estimated to be around 29 million (using both observed and best-fit predicted visit rate per household per band).

5.13 Based on the planned new housing falling within each two minute travel time band from the SAC/SPA/Ramsar, our estimate of the resulting increase in annual visit to the SAC/SPA/Ramsar is 13.75% based on observed visit rates and 13.96% based on the best-fit smooth visit rate curve. These estimates are similar but slightly less than the corresponding estimates of 14.7% and 14.5% using the straight-line distance approach.

On-site visitor survey data

5.14 The on-site survey data provided data on the relative number of interviewees coming from each distance band or travel time band. The on-site surveyors also provided tally counts of the total number of people entering the SAC/SPA/Ramsar via that survey point (i.e. both those interviewed and those not interviewed). These tally counts enabled us to scale-up the number of interviewees per distance band to get an estimate of the actual visit rate per survey period from each distance or travel-time band. We used the on-site data from the winter and the spring to derive predictions from changes in housing.

Statistical predictive modelling of visit rates

5.15 The observed interviewee data did not have any visitors from some distance bands from some survey points. This could be because no visits are made from that distance, but more likely because there are currently few if any houses or at least insufficient houses within some distance bands of some survey points for us to expect to get any visitors during the few days of survey. If we simply used the observed visit rates data then we would predict building any number of new houses within distance bands with no observed visits to a survey point would lead to no extra visits to that survey point. This is obviously incorrect, which is why we needed to develop best-fitting statistical smooth curves to the observed data in order to make sensible predictions of the impact in visitor numbers from the planned extra housing.

5.16 The basic data used for statistical modelling in relation to straight-line kilometre distance band maximum (K) was the total number of interviewees V_{JK} at survey point J during the 16 hour on-site survey period per season (spring or winter) who came from each distance band (K). We then used the observed values for:

T_J = Season total of tally counts of all people entering survey point J during survey periods

S_J = Season total number of interviewees at survey point J

= sum of the V_{JK} across all distance bands K

$P_J = S_J / T_J$ = Proportion of season's visitor tally count to survey point J who were interviewed

and

H_{JK} = Current number of dwellings within distance band D_k of survey point J

Then the observed visit rate (per 16 hours per household) = $R_{JK} = (V_{JK} / P_J) / H_{JK}$

Thus the visit rates per season per household were then modelled using Poisson Generalised Linear Models as follows:

$Log(V_{JK}) = Log(H_{JK} \times P_J) + A + B_J + C_K$

5.17 In the above, A is a constant (average rate) term, the C_K terms represent the change (i.e. decline) in rate with distance K and the B_J terms represent any overall differences in visit rate (from any given distance) to the different on-site survey (access) points. All models were fitted using the R software package.

5.18 Numerous generalised linear model (function glm in R) variants were fitted involving forms of exponential decay in rate with distance (or some transformation of distance). However, the most parsimonious model for both the spring data, winter data and spring-winter combined interviewee data was a generalised additive model (function gam in R) which fitted a smooth 'spline' curve to describe the average decline in visit rate with distance K but allowing for multiplicative differences between the survey points about the average visit rate with distance curve. As such, one survey point may be estimated to have say a 20% higher visit rate than a second survey point for any specific distance). This best-fitting model to the observed on-site survey data is referred to as 'model gam1'.

Predicted number of visits based on visit rate by straight-line distance

5.19 The survey points with the highest predicted visit rates per household at any particular distance were survey points 23 Bolderford Bridge, 24 Blackwater, 40 Bolderwood and 59 Turf Hill. These relatively 'attractive' surveys points currently have relatively few houses within the first 1-3 km, but our modelling allows the prediction of the effect of any future housing close to these access points (from their more distant observed relatively high visit rates compared to other survey points).

5.20 The overall weighted average predicted visit rates agree very closely with the weighted average observed visit rate across all distance bands (Figure 5). Within a distance band, survey points are weighted by the number of current houses within that distance band – this approach means that the overall average observed rate from a distance band is simply the overall average

visit rate (total visits divided by total houses) per household amongst all houses in that band.

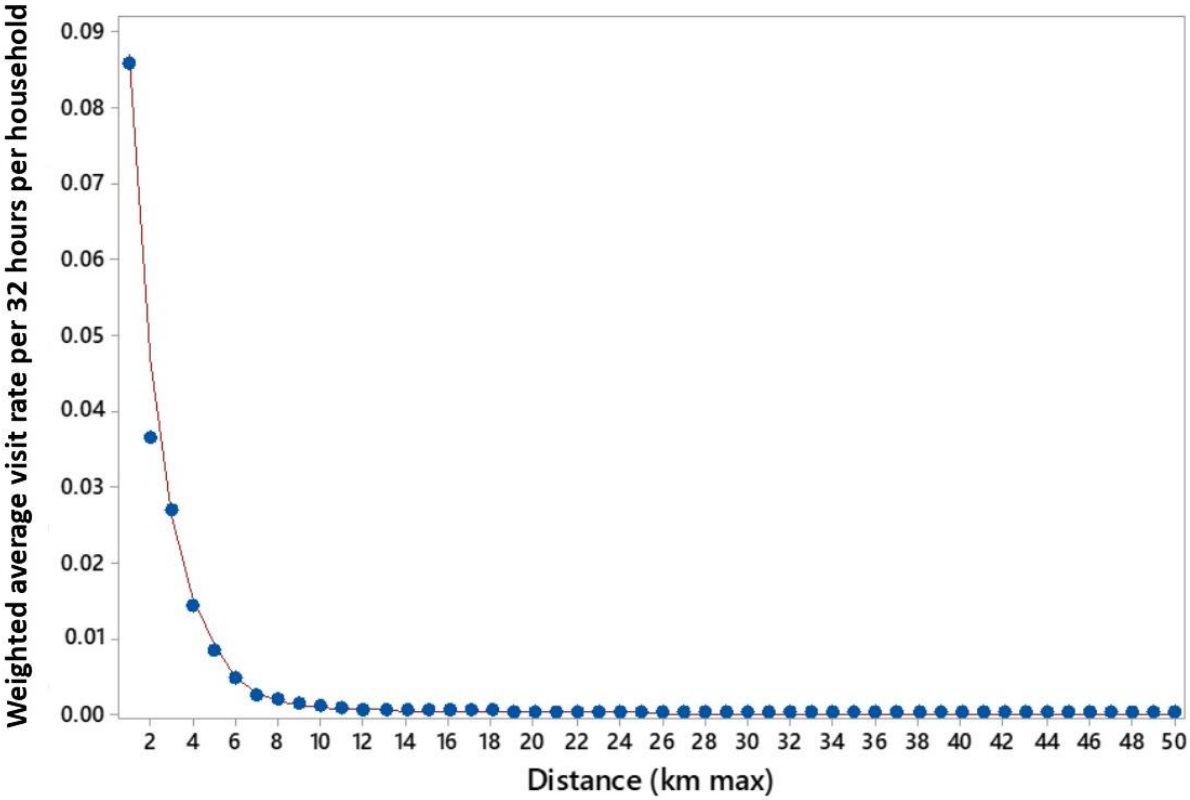

Figure 5: Plot of observed and model-predicted housing-weighted average visit rate per 32 daylight hours (of survey) in spring-winter per household in each 1km distance band from survey points.

5.21 The predicted current number of visits per 32 hours during spring-winter daylight were then obtained separately for each survey point by multiplying the model-predicted visit rate for that survey point and distance by the current number of houses within that distance band of that survey point and then summing across all distance bands 1-50km. By summing across all 60 surveyed access points we get an overall total for those survey points, which are assumed to be representative of the visits to the SAC/SPA/Ramsar area as whole.

5.22 The observed data (from the on-site survey tally counts) and model-predicted average number of visits per 32 daylight hours to each of the 60 survey points and overall agree well (Table 4). We then calculated the future total number of houses within each 1km band from each survey point. The same procedure involving the model-predicted visit rate per household in each distance band of each survey point were then combined with the future

housing to predict the future number of visits to each survey point per 32 spring-winter daylight hours and hence the predicted percentage increase in visits to each survey point and overall (Table 4).

5.23 The predicted percentage increase in visits varied from around 7% (at Balmer Lawn, Dibden Inclosure and Heath roundabout Pegasus crossing) up to 19% at the Smugglers Road survey point. The overall percentage increase in predicted visits across all 60 survey points was 11.4%.

5.24 The same results are presented in Table 5, but per 1km distance band (summed over the 60 survey points) to show how the planned future housing is less in general close to the survey points, resulting in predicted increases in visits of less than 5% from new houses within 2km of the SAC/SPA/Ramsar access points compared to an increase of around 20% from new houses 25-35km away The overall predicted increase in visit remains 11.4%.

Table 4: Observed and model-predicted number of visits per 32 daylight hours (of survey) during spring-winter period per survey point based on current housing, future housing and the predicted percentage increase. Grey shading highlights the top ten % increase values.

	Survey Point	Spring-Winter Combined visits per 32 hours			
		Observed	Model-Predicted		
			Current	Future	%Increase
1	Norley Wood	68	67.4	73.0	8.3
2	Setley Pond	179	177.9	193.0	8.5
3	Brownhills	172	171.0	192.0	12.2
4	Beaulieu Heath	177	174.1	190.6	9.5
5	Horseshoe Bottom	281	278.7	306.8	10.1
6	Wilverley Inclosure	354	350.8	388.2	10.7
7	Longslade Heath	102	101.1	111.3	10.1
8	Holmsley	83	82.3	92.5	12.4
9	Wilverley Pit	285	281.8	311.5	10.5
10	Hinchelsea Moor	96	95.0	104.2	9.7
11	Blackwell Common	174	172.7	189.1	9.5
12	Hatchet Pond	267	262.8	287.3	9.4
13	Burbush Hill	355	352.4	401.3	13.9
14	Hawkhill	171	167.9	185.1	10.3
15	Moonhills	246	243.7	263.6	8.2
16	Beachern Wood	232	229.9	247.5	7.7
17	Whitefield Moor	350	345.9	376.6	8.9
18	Burley Cricket	194	192.2	215.2	12.0
19	Balmer Lawn	359	355.5	381.9	7.4
20	Tilery Road	178	176.0	190.2	8.1
21	Mill Lawn	114	112.7	125.7	11.5
22	Smugglers Road	197	195.7	233.0	19.0

	Survey Point	Spring-Winter Combined visits per 32 hours			
		Observed	Model-Predicted		
			Current	Future	%Increase
23	Bolderford Bridge	551	544.0	590.6	8.6
24	Blackwater	694	681.6	754.6	10.7
25	Pig Bush	202	199.0	222.0	11.6
26	Vereley	328	325.3	377.5	16.0
27	King's Hat	180	178.5	195.0	9.2
28	Anderwood	130	127.1	142.6	12.2
29	Dibden Inclosure	565	562.6	602.9	7.2
30	Brock Hill	263	257.7	286.1	11.0
31	Heath roundabout Pegasus crossing	225	224.1	239.8	7.0
32	Clayhill	60	59.2	65.3	10.3
33	Shatterford	257	253.3	286.1	12.9
34	Knightwood Oak	168	164.4	183.0	11.3
35	Linford Bottom	320	317.8	366.6	15.3
36	Marchwood Inclosure	431	428.8	473.2	10.3
37	Boltons Bench	341	338.1	370.9	9.7
38	Rockford Common	385	382.5	439.7	15.0
39	Racecourse View	122	121.0	132.5	9.5
40	Bolderwood	466	453.7	512.7	13.0
41	Longdown	410	407.1	471.0	15.7
42	Deerleap	636	632.0	726.7	15.0
43	Ashurst	386	383.8	429.2	11.8
44	Minstead Road	21	20.8	22.9	10.5
45	Phone box on Woodlands Road	186	184.9	206.8	11.9
46	Andrews Mare	114	111.3	124.2	11.6
47	Ocknell Pond	43	41.6	47.2	13.3
48	Cadman's Pool	190	184.0	208.5	13.3
49	Stoney Cross	47	45.7	51.2	12.1
50	Rufus Stone	116	113.8	126.1	10.8
51	Abbots well	254	250.5	286.2	14.2
52	Janesmoor Pond	140	136.2	152.3	11.8
53	Fritham	279	270.8	304.7	12.5
54	Roundhill	134	131.2	145.4	10.9
55	Longcross	157	152.8	170.1	11.3
56	Bramble Hill Walk	76	74.0	82.3	11.3
57	Ashley Walk	199	195.1	228.1	16.9
58	Telegraph Hill	184	178.8	198.9	11.2
59	Turf Hill	317	309.3	342.3	10.7
60	West Wellow	294	289.2	324.7	12.3
	Overall (over 60 survey points)	**14505**	**14318.9**	**15949.2**	**11.4**

Table 5: Model-predicted total number of visits per 32 daylight hours (of survey) during spring-winter period per 1km distance band from the 60 survey points based on current housing, future housing and the predicted percentage increase.

Distance (km max)	Spring-Winter Combined visits per 32 hours			
	Current	Future	Difference	% Increase
1	866.6	906.5	39.9	4.6
2	1350.1	1415.5	65.4	4.8
3	1437.2	1577.5	140.3	9.8
4	1447.8	1598.4	150.6	10.4
5	1062.2	1179.9	117.7	11.1
6	981	1089.3	108.3	11
7	805.1	893.1	88	10.9
8	725.4	803	77.6	10.7
9	626.1	702.2	76.1	12.2
10	473.2	539.7	66.5	14.1
11	425.3	484.1	58.8	13.8
12	400.5	455.7	55.2	13.8
13	324.1	371.7	47.6	14.7
14	287.8	331.5	43.7	15.2
15	285.9	328.6	42.7	15
16	290	331.8	41.8	14.4
17	265.3	303.9	38.6	14.5
18	248.1	286.9	38.8	15.6
19	236.6	273.5	36.9	15.6
20	224.1	256.6	32.5	14.5
21	201	230.7	29.7	14.8
22	180.6	207.5	26.9	14.8
23	151.1	175.6	24.5	16.2
24	134.2	157	22.8	17
25	110.9	129.2	18.3	16.5
26	91.2	107.4	16.2	17.8
27	81	96.1	15.1	18.8
28	69.1	83	13.9	20.2
29	60.9	73.2	12.3	20.2
30	53.6	63.5	9.9	18.5
31	51.1	60.5	9.4	18.5
32	47.6	56.2	8.6	18.1
33	38.4	46.2	7.8	20.2
34	33.5	40.3	6.8	20.4
35	29.6	35.3	5.7	19.2
36	28.6	33.5	4.9	17.3
37	26.7	30.6	3.9	14.8
38	25.1	29.4	4.3	17
39	25.5	29.9	4.4	17.1
40	23.7	27.2	3.5	14.6
41	20.5	23.8	3.3	16.3
42	17.9	20.5	2.6	14.7
43	14.1	16.3	2.2	15.6
44	12.3	13.9	1.6	13.4

Distance (km max)	Spring-Winter Combined visits per 32 hours			
	Current	Future	Difference	% Increase
45	9.3	10.7	1.4	15.4
46	6.8	7.6	0.8	12.4
47	4.6	5.4	0.8	17.2
48	3.4	3.9	0.5	14.3
49	2.7	3.2	0.5	16.1
50	1.8	2	0.2	11
Overall (60 survey points)	**14318.9**	**15949.2**	**1630.3**	**11.4**

Predicting annual visits based on visit rate by travel time

5.25 The same methods and modelling approaches were used to analyse the on-site visitor data in relation to their travel-time away from the survey point at which they were interviewed rather than their simple straight-line distance away.

5.26 A similar generalised additive model (gam) incorporating a smoothed spline curve decline in visit rate with travel time, but allowing for constant proportional difference in visit rate between survey points gave the best fit to the interviewee numbers by travel time data. The housing-weighted observed and model-predicted average visit rate by travel time are shown in Figure 6.

5.27 The current and model-predicted future total numbers of visits per 32 hours daylight in spring-winter from housing in each 2-minute travel time band are given in Table 6 for all 60 survey points combined. Table 6 also gives the predicted % increase in visits from new houses within each travel time band and overall across all new housing within 50 minutes travel time of each surveyed SAC/SPA/Ramsar access point.

5.28 The percentage increase in visits from new houses is least from short travel times and the overall model-predicted increase in visits across all survey points is 11.4% (matching that found using straight-line distance bands) (Table 6).

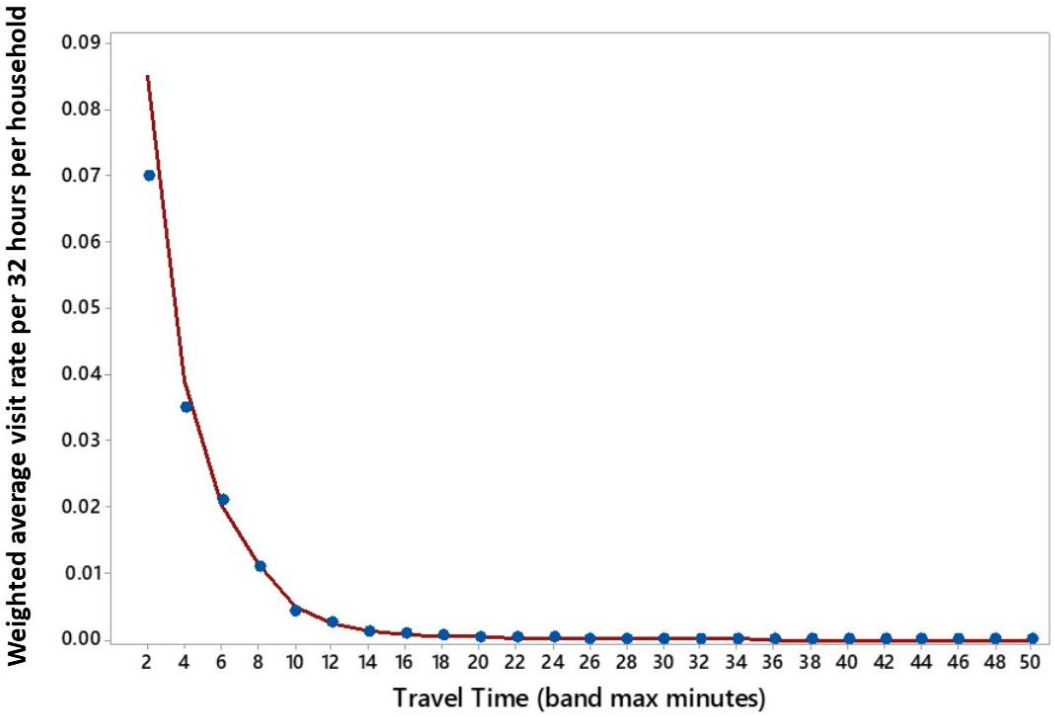

Figure 6: Plot of observed and model-predicted housing-weighted average visit rate per 32 daylight hours (of survey) in spring-winter per household in each 2-minute travel time band from survey points.

Table 6: Model-predicted total number of visits per 32 hours daylight during spring-winter period per 2-minute travel time band from the 60 survey points based on current housing, future housing and the predicted percentage increase.

Travel time band (minutes max)	Spring-Winter Combined visits per 32 hours			
	Current	Future	Difference	%Increase
2	779.5	815.3	35.8	4.6
4	1467.1	1555.8	88.7	6.0
6	1939.4	2103.5	164.1	8.5
8	1613.2	1813.4	200.2	12.4
10	1270.3	1400.7	130.4	10.3
12	1104.5	1216.3	111.8	10.1
14	949.8	1084.1	134.3	14.1
16	804.8	920.2	115.4	14.3
18	697.0	802.1	105.1	15.1
20	586.2	667.3	81.1	13.8
22	506.5	581.3	74.8	14.8
24	476.7	542.4	65.7	13.8
26	422.7	481.2	58.5	13.9
28	369.2	423.1	53.9	14.6
30	300.4	346.6	46.2	15.4
32	251.9	292.2	40.3	16.0
34	194.7	229.0	34.3	17.6
36	154.3	182.2	27.9	18.1
38	121.8	142.2	20.4	16.8
40	105.5	123.2	17.7	16.8
42	93.4	108.9	15.5	16.6
44	81.6	93.3	11.7	14.2
46	76.4	85.5	9.1	12.0
48	70.2	76.6	6.4	9.0
50	64.6	69.3	4.7	7.3
Overall (60 survey points)	**14501.9**	**16155.7**	**1653.8**	**11.4**

Summary and justification for model visit rate by distance

5.29 The most important justification of the need to model visit rate with distance is that, as we have shown, visit rate per household declines dramatically with distance especially over the first few kilometres. Therefore, the impact of each additional new house declines with distance.

5.30 This effect is summarised in Table 7, based on the straight-line distance predictions derived using the spring and winter data combined. It can be seen that only 0.09% of all proposed new housing occurs within the first 3km of the surveyed access points, but these are predicted to contribute 15.06% of all the predicted extra visits from people living in the extra houses. By contrast 34.10% of all planned extra housing occurs 30-50km from the survey points, but this is predicted to contribute only 4.50% of the extra visits from the new housing.

Table 7: The percentage of all planned extra housing and the percentage of predicted extra visits (per 32 hours daylight spring-winter) within 50km occurring within each 1km distance band.

Distance (km)	Mean number of extra houses per survey point	Predicted extra visits	% of extra houses	Cumulative % of extra houses	% of all extra visits	Cumulative % of extra visits
1	7	39.9	0.01	0.01	2.45	2.45
2	21	65.3	0.02	0.02	4.01	6.46
3	85	140.3	0.07	0.09	8.61	15.06
4	165	150.6	0.13	0.22	9.24	24.30
5	223	117.7	0.17	0.39	7.22	31.52
6	469	108.3	0.36	0.75	6.64	38.16
7	604	88.1	0.47	1.22	5.40	43.57
8	843	77.7	0.65	1.87	4.76	48.33
9	1129	76.2	0.87	2.75	4.67	53.00
10	1425	66.5	1.10	3.85	4.08	57.08
11	1641	58.8	1.27	5.12	3.61	60.69
12	1876	55.1	1.45	6.58	3.38	64.07
13	2209	47.6	1.71	8.29	2.92	66.99
14	2694	43.7	2.09	10.37	2.68	69.67
15	2992	42.7	2.32	12.69	2.62	72.29
16	3296	41.7	2.55	15.25	2.56	74.85
17	3525	38.5	2.73	17.98	2.36	77.22
18	4032	38.8	3.12	21.10	2.38	79.60
19	4326	37.0	3.35	24.45	2.27	81.86
20	4269	32.6	3.31	27.76	2.00	83.86
21	4418	29.7	3.42	31.18	1.82	85.69

Distance (km)	Mean number of extra houses per survey point	Predicted extra visits	% of extra houses	Cumulative % of extra houses	% of all extra visits	Cumulative % of extra visits
22	4497	26.8	3.48	34.67	1.65	87.33
23	4979	24.5	3.86	38.52	1.50	88.84
24	5320	22.8	4.12	42.65	1.40	90.24
25	4988	18.3	3.86	46.51	1.12	91.36
26	5034	16.2	3.90	50.41	1.00	92.35
27	5165	15.2	4.00	54.41	0.93	93.29
28	5398	13.9	4.18	58.59	0.86	94.14
29	5014	12.3	3.88	62.48	0.75	94.89
30	4419	9.9	3.42	65.90	0.61	95.50
31	4259	9.5	3.30	69.20	0.58	96.08
32	4373	8.6	3.39	72.59	0.53	96.61
33	4181	7.8	3.24	75.83	0.48	97.09
34	3783	6.8	2.93	78.76	0.42	97.50
35	3508	5.7	2.72	81.48	0.35	97.85
36	3071	4.9	2.38	83.86	0.30	98.15
37	2537	4.0	1.97	85.82	0.24	98.40
38	2462	4.3	1.91	87.73	0.26	98.66
39	2690	4.4	2.08	89.81	0.27	98.93
40	2324	3.5	1.80	91.61	0.21	99.14
41	2065	3.3	1.60	93.21	0.20	99.35
42	1959	2.6	1.52	94.73	0.16	99.51
43	1766	2.2	1.37	96.10	0.14	99.64
44	1249	1.6	0.97	97.07	0.10	99.74
45	1136	1.4	0.88	97.95	0.09	99.83
46	793	0.8	0.61	98.56	0.05	99.88
47	701	0.8	0.54	99.11	0.05	99.93
48	462	0.5	0.36	99.46	0.03	99.96
49	454	0.4	0.35	99.82	0.03	99.99
50	238	0.2	0.18	100.00	0.01	100.00
Total		**1630.2**	**100.00**	**100.00**	**100.00**	**100.00**

5.31 Anticipated levels of new housing indicate around 129,222 new dwellings may come forward within 25km of the New Forest SAC/SPA/Ramsar over the period 2018-2036. This would represent a 16.4% increase in housing within the 25km. We predict this would result in an increase of around 11.4% in the number of visits. This change is solely from new housing within the 25km and additional visitors may come from further afield – for example tourist visits.

5.32 It is important to note that the 11.4% figure is the scale of change predicted for the 60 surveyed points included in the on-site visitor survey. For our 11.4% increase to apply to the whole New Forest SAC/SPA/Ramsar we would have to be confident that the selected survey points were representative. As the survey points were carefully selected to include a wide range of entry points with a good geographic spread, there is no reason to suspect this would not be the case.

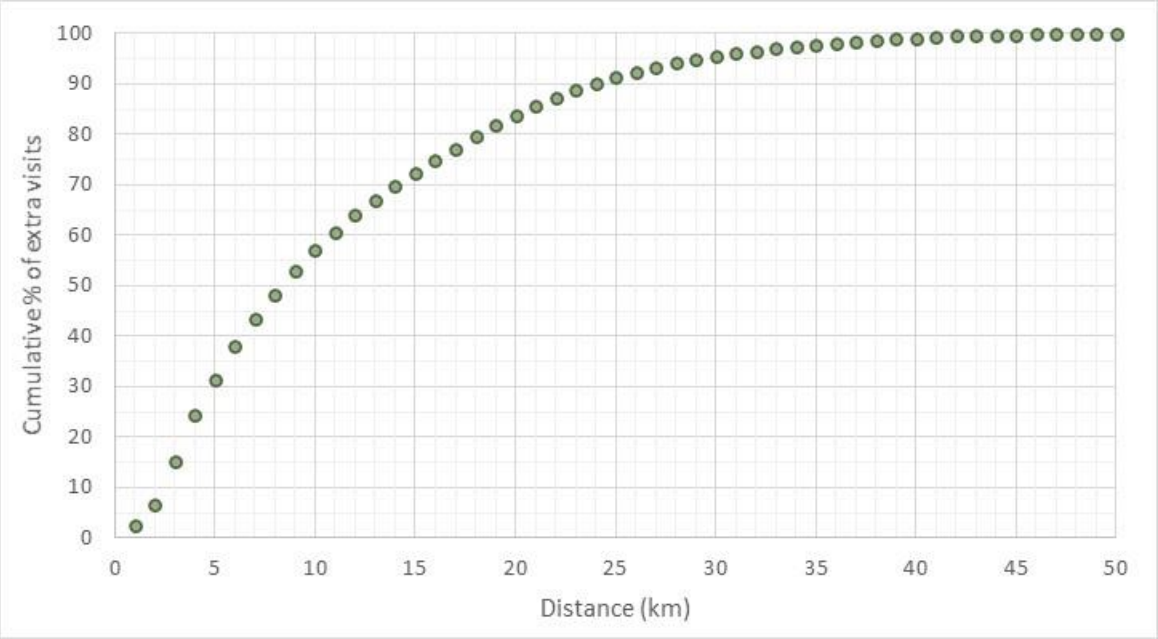

Figure 7: The cumulative percentage of extra visits with increased distance (values from final column in Table 7).

6. Discussion

6.1 In this report we bring together the different visitor surveys to estimate current levels of footfall to the New Forest SAC/SPA/Ramsar and make predictions about changes in visits as a result of further housing (over the period 2018-2036, within 25km of the SAC/SPA/Ramsar).

6.2 The change in housing is estimated to be around 16.4% and we suggest an increase of 11.4% in recreation use (solely linked to new housing within the 25km radius). The discrepancy between the two relates to the spatial distribution of new housing likely to come forward, with high rates of change further away from the SAC/SPA/Ramsar.

6.3 While the telephone survey results seem to suggest particularly high levels of use, our other survey results seems to broadly concur and also to fit with other estimates of visitor numbers within the New Forest (RJS Associates Ltd., 2018).

6.4 Looking back to the visitor survey work conducted in the New Forest around 15 years previously (Tourism South East Research Services & Geoff Broom Associates, 2005) it is interesting to note relative changes. A marked difference appeared to be in the numbers of dog walkers. In the previous work 24% of all interviewees (in the on-site survey) gave dog walking as their main activity. The 24% increased to 49% for local day visitors only. In the current survey, 55% of all interviewees gave dog walking as their main activity.

6.5 The mapped data for housing change are only indicative and represent the best information available at the time from the relevant local authorities. We have used a range of different data to make predictions of levels of use and future use associated with the new housing. These predictions are approximate and may not directly be taken as an estimate of increased level of impact, as this will depend on a wide range of factors, such as the behaviour and distribution of visitors. Impacts from recreation are considered in a separate report.

6.6 We have used both travel time and straight-line distance and the results are very consistent. Straight-line distances are the easiest to use, to describe and represent the simplest data. Travel times are more complex but provide useful checks of the effects of the road network and barriers to movement (such as estuaries). Travel zones can change over time (e.g. in relation to

traffic calming measures) and are in themselves an average – journey times will vary with season and time of day.

6.7 These models and predictions provide a means for local authorities to place the future growth in context and ensure mitigation is targeted and proportionate to the scale of change identified. Implications in terms of the European site interest and potential for mitigation are set out in a separate report.

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