Severn Estuary (Stroud District)
Visitor Survey Report

Final Report
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Client:	Stroud District Council
Main Author(s):	Jodie Southgate BA (Hons) MSc Grad CIEEM
Contributors/Surveyors:	Ben Blowers BSc (Hons) Grad CIEEM Chris Bowden (Director, Marketing Means) Sylvi Garratt (Surveyor) Lilian Legrange (Surveyor) Liz Onions (Surveyor) Margaret Rea (Surveyor) Ruth Waldrop (Surveyor) Helen Woodfin (Surveyor)
Report Prepared for Issue by:	Jodie Southgate BA (Hons) MSc Grad CIEEM *Ecologist, EPR Ltd*
Report Approved for Issue by:	Karen Colebourn BSc (Hons) CBiol MIBiol FCIEEM *Managing Director, EPR Ltd*

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EPR

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EXECUTIVE SUMMARY

An evidence base is being compiled under Delivery Policy ES6 of the Stroud District Local Plan (2015) on the potential for increased recreational pressure to adversely affect the Severn Estuary SAC/SPA/Ramsar site, which is designated for its internationally important populations of overwintering birds, estuarine habitats and migratory fish species. As part of this work, Stroud District Council commissioned EPR Ltd to carry out a visitor survey in the stretch of the Estuary which falls within the District, between Berkeley and Arlingham.

Face-to-face visitor questionnaire surveys using a standard methodology for coastal sites were carried out in December 2015 and January 2016 at nine key access points to the Estuary within the survey area. Surveys were conducted over both weekends and weekdays, and at varying times of day, to capture a representative sample of visitor activity in the winter.

In total 211 groups were interviewed during the visitor survey. The results indicate that baseline recreational pressure within the survey area is relatively low, at around 30.7 people and 12.3 dogs per hour, and that the majority of visits are made to the stretch between Sharpness and Saul Junction. The majority of groups were visiting the area for dog walking or walking, and the majority of dog walkers said they let their dogs off the lead.

A relatively high proportion of the groups interviewed had come from outside the District. A visitor catchment area of 7.7 km from the Severn Estuary is proposed, within which developments involving a net increase in housing may be required to contribute to the funding of impact avoidance and mitigation measures. Analysis with the aid of GIS mapping software has identified the areas around Sharpness and Saul Warth as having the highest potential for conflict between recreational activity and overwintering birds.

This study represents a key component of the emerging evidence base on the likely effects of increased recreational pressure on the qualifying features of the Severn Estuary. Further research is required, in particular targeted bird disturbance surveys in potential areas of conflict. Initial recommendations for the scope and content of an Interim Impact Avoidance Strategy are set out, to be refined and developed further in consultation with Natural England and other partners.

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1. INTRODUCTION

Background and Planning Context

1.1. The Severn Estuary is designated as a Special Protection Area (SPA) and Ramsar site for its internationally important populations of overwintering birds, and as a Special Area of Conservation (SAC) and Ramsar site for its overwintering birds, estuarine habitats and associated species of fish. As shown on **Map 1**, approximately 22 km of the Severn Estuary SPA/SAC/Ramsar site (hereafter 'The Severn Estuary') shoreline falls within the jurisdiction of Stroud District Council.

1.2. As set out in the Habitats Regulations Assessment (HRA) of the Stroud District Local Plan (URS, 2014), recreational pressure has the potential to impact upon the qualifying features for which the Severn Estuary was designated, in particular through disturbance to the bird species which use the Estuary for feeding and roosting during the winter.

1.3. The Stroud District Local Plan (SDC, 2015) sets out the requirement for around 7,700 new homes to be built in the District from 2015 to 2031. The resultant increase in the number of residents in the District is therefore likely to elevate visitation levels to the Severn Estuary. However, little is known about the current baseline of recreational pressure exerted on this part of the Estuary, nor the effects of recreational activity on its qualifying features.

1.4. Delivery Policy ES6 of the Local Plan identifies the need for further assessment work to establish a core recreational catchment zone around the Estuary over which potential impacts associated with recreational pressure are likely to extend, and within which development proposals that involve a net increase in housing may be required to contribute to the funding of impact avoidance measures.

1.5. In order to build an evidence base for Delivery Policy ES6, and design an effective impact avoidance strategy for housing development coming forward in the District, it is necessary to first quantify baseline levels of recreational pressure and analyse patterns of visitor access, and assess whether recreational activity is likely to come into conflict with important and/or sensitive areas for the overwintering bird assemblage for which the Severn Estuary is designated.

1.6. Stroud District Council therefore commissioned Ecological Planning & Research (EPR) Ltd to carry out a visitor questionnaire survey in winter 2015/16 on the Severn Estuary between Berkeley and Arlingham, anticipated to be the main section of the Estuary

accessed by current and future residents of Stroud District (hereafter referred to as 'the survey area'). This report documents the results of this study.

Aims and Objectives of the Survey

1.7. The aims and objectives of the visitor survey are as follows:

- Gather robust baseline information on levels and patterns of recreational use of the Severn Estuary in the survey area;
- Produce data to inform assessment of the recreational pressure baseline within the survey area, including analysis of recreational routes;
- Identify potential areas of conflict with overwintering birds for which the SPA/Ramsar site was designated;
- Identify a core visitor catchment area within which future development proposals may contribute to an increase in recreational pressure on the Estuary; and
- Generate a comprehensive dataset that can be compared with surveys in future years, and/or similar studies at other coastal sites, to enable monitoring of the baseline position.

Structure of this Report

1.8. **Section 2** of this report looks at the Severn Estuary in more detail, including the reasons for its designation and its conservation objectives. This Section also provides an overview of available information on the numbers and distribution of overwintering birds associated with the SPA/Ramsar designations within the survey area.

1.9. **Section 3** describes the methodology used for the visitor survey in detail. **Section 4** then presents the results of the visitor survey, using graphs and maps to illustrate key findings, and comparisons are drawn with similar studies at other coastal sites. **Section 5** discusses the implications of the results with reference to likely future visitation levels, sources of disturbance and potential conflict with overwintering birds. Finally, **Section 6** discusses the requirement for further work to fill remaining gaps in the evidence base, and sets out initial recommendations for the scope and content of an Interim Impact Avoidance Strategy.

2. THE SEVERN ESTUARY AND SURVEY AREA

Designations

2.1. The Severn Estuary is designated as a SAC, SPA and Ramsar site, collectively known as the Severn Estuary European Marine Site (EMS), for its habitats and species of international importance. These are described further below.

2.2. It is important to note that the area included within the Severn Estuary EMS extends well beyond the limits of the survey area covered in this study, stretching to Bridgwater Bay on the west bank and almost to Cardiff on the east bank. This is taken into account later in this Section when discussing existing data on overwintering birds.

Special Protection Area (SPA)

2.3. The Estuary was designated as an SPA in 1995 for its internationally important populations of overwintering Bewick's swan *Cygnus columbianus bewickii*, Dunlin *Calidris alpina alpina*, European white-fronted goose *Anser albifrons albifrons*, Redshank *Tringa totanus* and Shelduck *Tadorna tadorna*.

2.4. An SPA Review carried out in 2001 found that Curlew *Numenius arquata* and Pintail *Anas acuta* also qualify for addition to the citation along with Ringed Plover *Charadrius hiaticula* (the latter on passage only), and European white-fronted goose and Gadwall could be removed, although to date the citation has not been formally amended to reflect this.

2.5. The SPA is also designated for its internationally important assemblage of waterfowl. Natural England have advised that when assessing likely effects on the waterbird assemblage, this should include all regularly occurring migratory waterbird species that use the Estuary in winter, i.e. those included in Wetland Bird Survey (WeBS) counts, not just those listed as component species on the citation. NE have also advised (Swanson, 2016, pers. comm.) that certain species such as Redshank and Curlew also meet the SPA threshold criteria whilst on passage and so the guidelines for the definition of 'overwintering birds' are currently under review. This will be taken into account in any further surveys and/or future revisions of this report, as well as the development of any necessary impact avoidance measures.

2.6. The Conservation Objectives for the SPA (NE, 2016a) are defined as follows:

"Subject to natural change (…) ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:

- The extent and distribution of the habitats of the qualifying features;
- The structure and function of the habitats of the qualifying features;

- The supporting processes on which the habitats of the qualifying features rely;
- The population of each of the qualifying features; and
- The distribution of the qualifying features within the site."

2.7. Natural England and the Countryside Council for Wales (now Natural Resources Wales) expand upon these objectives in an advice document issued under Regulation 33 of the Habitats Regulations (NE & CCW, 2009). This explains that for each qualifying feature, the conservation objective is to maintain the population of that feature (e.g. Bewick's Swan) and its supporting habitats in 'favourable condition'.

2.8. Favourable condition is defined according to a number of criteria, one of which is that "aggregations of [the interest feature] at feeding or roosting sites are not subject to significant disturbance." The Site Improvement Plan for the Estuary (NE, 2015) also identifies public access/disturbance as a pressure or threat to the site's qualifying features.

Special Area of Conservation (SAC)

2.9. The Estuary was designated as a SAC in 2009 for the following habitat types, listed under Annex I of the EU Habitats Directive: Estuaries, Subtidal sandbanks, Intertidal mudflats and sandflats, Atlantic salt meadows, and Reefs. It was also designated for its populations of the following Annex II species: River Lamprey *Lampetra fluvialtilis*, Sea Lamprey *Petromyzon marinus*, and Twaite Shad *Alosa fallax*. The Conservation Objectives for the SAC (NE, 2016) are defined as follows:

"Subject to natural change (…) ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:

- The extent and distribution of qualifying natural habitats and habitats of qualifying species;
- The structure and function (including typical species) of qualifying natural habitats;
- The structure and function of the habitats of qualifying species;
- The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely;
- The populations of qualifying species; and
- The distribution of qualifying species within the site."

2.10. Although the focus of this report is on the impacts of recreation on the overwintering bird assemblage associated with the SPA and Ramsar designations, effects could also extend to the qualifying SAC habitat and species, for example through trampling,

erosion and pollution, as identified in the Site Improvement Plan for the Severn Estuary (NE, 2015). This is acknowledged and discussed further in **Section 5**.

Ramsar Site

2.11. The Estuary was designated as a wetland of international importance under the Ramsar Convention in 1995. The Ramsar criteria overlap with those for the SAC and SPA, and so the Estuary is designated as a Ramsar Site for its habitats as listed above, assemblage of migratory fish species including Atlantic Salmon *Salmo salar*, Sea Trout *Salmo trutta*, Sea Lamprey, River Lamprey, Allis Shad *Alosa alosa*, Twaite Shad and Eel *Anguilla anguilla*, and its internationally important populations and assemblage of waterfowl. Additionally, populations of Teal *Anas crecca* and Pintail (winter), Ringed Plover (passage) and Lesser black-backed gull *Larus fuscus* (breeding) were subsequently identified as meeting the Ramsar criteria in 2005.

Description of the Survey Area

2.12. The survey area is shown on **Map 1** and follows the route of the Severn Way long distance footpath. It is predominantly quiet and rural in character, with the largest settlements in the area being Berkeley (around 2000 inhabitants, approximately 1.5 km east of the Severn Way) and Frampton-on-Severn (around 1,400 inhabitants, approximately 200m east of the Severn Way). The majority of the surrounding land is used for arable farming and pasture. The M5 motorway lies around 4-6km to the east of the survey area.

2.13. The footpath largely follows the eastern bank of the Estuary at the northern and southern ends of the survey area. In between it has been routed inland, to follow the Gloucester and Sharpness Canal around the edge of Slimbridge Wildfowl and Wetlands Trust (WWT) nature reserve. The reserve provides the largest concentration of feeding and roosting habitat in the Estuary within the Stroud District, and is actively managed to maintain and enhance this interest.

2.14. Features of note within the remote southern part of survey area are the former Berkeley Power Station, which lies directly adjacent to the Severn, and Berkeley Pill, a channel where the Little Avon River empties into the Estuary. Further north is Sharpness Docks, an active shipping port and industrial area and the entrance to the Gloucester and Sharpness Canal. A small car park and picnic area is located just to the south of the port entrance, and a marina with facilities and a chandlery is located in the Old Dock to the north.

2.15. North of Sharpness, the Severn Way follows the route of the canal towpath (which runs parallel to the Estuary at this point) to the small village of Purton. The shoreline habitat here includes areas of saltmarsh and reedbeds. The route passes the Purton Hulks ship graveyard and the remains of the former Severn railway bridge, before diverting

inland around the edge of WWT Slimbridge and passing the village of Frampton on Severn. It then re-joins the Severn foreshore to the north of Saul Warth.

2.16. From here, the Severn Way passes by Hock Cliff, a popular fossil-hunting site, and continues to follow the foreshore around the bend in the river known as the Arlingham Horseshoe, the northern limit of the survey area.

Overwintering Bird Assemblage

2.17. In order to assess whether recreational activity within the survey area may conflict with the SPA waterbird assemblage, it is necessary to first understand the numbers and distribution of birds throughout the survey area, and their use of the habitats within it.

2.18. High tide roosts are generally considered to be particularly sensitive to disturbance. Natural England has not undertaken their planned study of high tide roosts in this part of the Estuary in winter 2015/16 (it is understood that this is now likely to take place in winter 2016/17). In the absence of this data, the following sources of information have been referred to, in order to inform our understanding of how overwintering birds use the survey area:

- Consultation with Mike Smart, local ornithologist and Wetland Bird Survey (WeBS) Coordinator for Gloucestershire;
- WeBS Core Count and Low Tide Data;
- Records from the Gloucestershire Centre for Environmental Records (GCER); and
- The results of bespoke winter bird surveys carried out in support of recent planning applications within the survey area.

2.19. The information gathered from these sources is discussed below and summarised at the end of this section and on **Map 2**. This is used as the basis for discussion of the results of the visitor survey in **Section 5**. Should further survey data become available after winter 2016/17, this report will be reviewed and revised accordingly.

Consultation with Mike Smart

2.20. Upon the recommendation of Natural England, EPR consulted Mike Smart, an experienced local ornithologist, on the location and nature of important bird sites in the survey area. Mike Smart is the WeBS coordinator for Gloucestershire, a Trustee of the Gloucestershire Wildlife Trust, a founder member of the Gloucestershire Ornithological Co-ordinating Committee and Chairman of the Gloucestershire Naturalists' Society.

2.21. Previously, Mike worked from 1974 to 1988 as Administrator of the International Waterfowl and Wetlands Bureau at Slimbridge, from 1989 to 1997 as Assistant Secretary General of the Ramsar Bureau, both in Slimbridge and at the headquarters

of the International Union for Conservation of Nature in Gland, Switzerland. He therefore has extensive knowledge of this part of the Estuary and its bird assemblage.

2.22. Mike produced a short paper for Natural England in September 2015 on the potential impacts of recreational disturbance on bird roosts along the Severn Estuary in Gloucestershire (Smart, 2015), which he prepared following consultation with other experienced ornithologists in the area.

2.23. In his paper, Smart notes that the section of the Estuary within the survey area is split into two basins: The northern (Slimbridge/Frampton) basin between Purton and Hock Cliff, and the southern basin which stretches from Sharpness and Lydney on the opposite bank of the Severn, down to the first Severn Bridge at Aust over 15 km to the south. He reports that "while there is considerable bird movement within each basin, including movement across the river between the east and west banks, there is relatively little bird movement between the two basins, which are separated by a deeper, narrower, steeper-sided section of river between Purton and Sharpness/Lydney."

2.24. The northern basin is described as having extensive mudflats where birds feed at low tide, as well as riverside fields and saltmarshes which are used as high tide roosts. The southern basin is similar but rather more maritime in character: it includes an extensive saltmarsh area (similar to the Dumbles at Slimbridge) which is subject to occasional spring tide flooding on the west bank at Aylburton Warth; a large artificial saltwater lagoon off Oldbury Power Station; and a bed of submarine rocks which crosses the estuary between Hills Flats on the east bank and Guscar Rocks on the west bank (some of these features lie outside of Stroud District).

2.25. Smart notes that wader high tide roosts (and breeding areas) are the "principal concern in terms of possible disturbance". At a project meeting at Stroud DC's offices in November 2015, he commented that birds are less vulnerable to disturbance at low tide, as they forage out on mudflats in the centre of the Estuary, which are inaccessible to the public. Places used for shelter during poor weather are assumed not be vulnerable, as there will be little recreational activity in such conditions,

<u>Known High Tide Roosts</u>

2.26. Smart states that five principal high tide roost sites are present in the Severn in Gloucestershire. Three of these are on the west bank, and two are within the survey area, at Slimbridge and Saul Warth.

2.27. The Slimbridge roost extends along the reserve's border with the Estuary, from just east of Purton to the point where Frampton Pill enters the Severn just south of Splatt Bridge in Frampton-on-Severn. Key species include Lapwing, Golden Plover, Dunlin

and Curlew, as well as geese, swans and ducks. This area has no public access and is permanently wardened by WWT staff, presumably to prevent disturbance.

2.28. The Saul Warth roost lies adjacent to the Slimbridge roost to the north, extending as far west as Hock Cliff. This roost is also important for waders, though less so for swans and geese. Smart reports that although there is no public right of way along the riverbank here, as it is in private ownership, some trespassing occasionally occurs. Birdwatchers generally view the site from the canal bank or footpath to the east, which Smart describes as "some way off the roost".

2.29. Recent monitoring of the Saul Warth area has found that the outer Warth is subject to considerable erosion, potentially affecting the habitat available for birds. This continues to be monitored. Bird surveys carried out by a local group from October 2014 to September 2015 found that the Warth was particularly important for waders moving up and down the Estuary, and for other wetland species such as Little Egret, Water Rail, Kingfisher and Cetti's Warbler.

2.30. An occasional, smaller high tide roost is located at Berkeley Pill in the southern part of the survey area. Smart also notes the presence of a large winter gull roost in the northern basin, mainly in the middle of the river on either mudflats or the water depending on the tidal state, which feed inland during the day and return to the Estuary in the evening to roost.

WeBS Data

2.31. WeBS data was provided by the BTO for the years 2004 to 2014[1]. This included Core Count and Low Tide Count data, described below.

2.32. Care must be taken when interpreting WeBS data as coverage is often incomplete or inconsistent between sectors, and monthly counts only represent a 'snapshot' of the number and distribution of bird species at the time of the survey. Waterbirds often move between sites and their behaviour can be affected by multiple factors such as weather, disturbance, tidal states, the time of day, and food availability. Nevertheless, WeBS data collected over a period of many years provides a useful picture of bird numbers in the different count sectors, and changes in these over time.

[1] Data were supplied by the Wetland Bird Survey (WeBS), a joint scheme of the British Trust for Ornithology, Royal Society for the Protection of Birds and Joint Nature Conservation Committee (the latter on behalf of the Council for Nature Conservation and the Countryside, the Countryside Council for Wales, Natural England and Scottish Natural Heritage) in association with The Wildfowl & Wetlands Trust. Although WeBS data are presented within this report, in some cases the figures may not have been fully checked and validated. Therefore, for any detailed analyses of WeBS data, enquiries should be directed to the WeBS team at the British Trust for Ornithology, The Nunnery, Thetford, IP24 2PU (webs@bto.org)

Core Count Data (High Tide Counts)

2.33. WeBS Core Counts are carried out monthly at high tide at coastal sites around the country. Counts are split up into sectors, of which five fall within the survey area. Coverage is incomplete, however, with only two of the sectors having been counted regularly since 2004. These cover the stretch of the Severn at the southern end of the survey area between Bevington and Berkeley, and the area around Slimbridge.

2.34. **Table 2.1** sets out a comparison of the Core Count data for these two sectors. The average of the ten highest winter (October to March) counts for each of the eight species which are listed individually as qualifying interest features on the SPA/Ramsar citations is given, with the peak (highest) count in brackets. These species were chosen for the purposes of comparison as it would be impractical to list all waterbird species, though notable counts for other species are also shown in the table. Note that sector 15402 stretches across to the western bank of the Estuary, so some records may originate from this area.

Table 2.1: *Summary of WeBS Core Count data since 2004 for selected species: Average of ten highest winter counts (peak count in brackets)*

Sector	15402 Slimbridge	15406 Bevington to Berkeley
Bewick's Swan	245 (306)	0 (0)
Curlew	420 (697)	4 (10)
Dunlin	2098 (3000)	18 (100)
European White-Fronted Goose	562 (750)	0 (1)
Gadwall	154 (187)	0 (0)
Pintail	489 (904)	0(0)
Redshank	47 (58)	28 (58)
Shelduck	446 (492)	27 (48)
Other notable counts		122 (400) Black Headed Gull, 135 (420) Common Gull, 148 (700) Lapwing, 247 (350) Wigeon

2.35. This shows that while Slimbridge has far higher numbers of key SPA bird species, the stretch of the Severn between Bevington and Berkeley appears to support good numbers of species included within the general overwintering bird assemblage, particularly gulls, Lapwing and Wigeon. It is not known whether these records are spread throughout the sector or concentrated in smaller areas, but given Mike Smart's description above, it is likely that the highest concentrations are found around Berkeley Pill.

2.36. Of the limited data available for the other Core Count sectors within the survey area, it is notable that a peak count of 1,200 Wigeon was recorded in Sector 15403, which runs north of Slimbridge to Saul Warth and Arlingham, including the western bank, in February 2009. Peak counts of 120 Curlew and 180 Lapwing were also recorded in this sector between October 2008 and March 2009, as well as 400 Lesser Black-Backed Gull and 280 Black-Headed Gull.

2.37. Sector 15410, which covers the area either side of Sharpness between Berkeley and Purton on the eastern bank only, recorded low number of birds in winter 2008/2009, with the only peak counts of note being 157 Black-Headed Gull and 49 Mallard. Sector 15411, which includes the area around Purton and extends to the west bank, recorded peak counts of 530 Wigeon, 136 Black-Headed Gull and 130 Lapwing during the same period.

2.38. Again, these records indicate that the sectors either side of Slimbridge do, at least occasionally, support good numbers of overwintering waterbirds associated with the SPA, though the area around Sharpness appears to be less important. While this data only represents a snapshot from a small number of days over one winter, it adds to the picture of bird use of the survey area.

2.39. Natural England has advised that complete Core Count coverage of the sectors within the survey area is planned by the BTO for winter 2015/16, with survey work underway at the time of writing. The results of these surveys will be reviewed when available, and this report revised accordingly if required.

Low Tide Counts

2.40. Low Tide Counts are carried out periodically at coastal sites around the UK. The Severn Estuary was most recently counted in the winter of 2008/2009. These counts focus on identifying important foraging areas for waterbirds.

2.41. The BTO provided data from the 2008/09 counts for both the Severn Estuary as a whole, and for the count sectors within the survey area. This allows comparison of count sectors, and analysis of the importance of the survey area for foraging birds within the context of the whole Estuary, much of which lies outside of Stroud District.

2.42. Key species are again picked out for illustration in **Table 2.2**. Mean counts for the survey period (one count per month from November 2008 to February 2009 inclusive) are given, with the peak count in brackets. Note that the sector boundaries for the Low Tide counts are different to those for the Core Counts. Again, some extend to the western bank of the Severn, and these are noted in the table.

Table 2.2: *Summary of 2008/09 Low Tide counts by sector for key species: mean counts over survey period, with peak counts in brackets*

Sector/ Species	**BV601** Northern half of Slimbridge, to Hock Cliff, incl. western bank	**BV602** Slimbridge inland (non-tidal)	**BV603** Southern half of Slimbridge to Purton, incl. western bank	**BV604** Sharpness to Purton, incl. western bank	**BV606** Sharpness to Berkeley Pill	**BV608** Around Berkeley Power Station	**Whole Estuary**
Bewick's Swan		105 (180)					109 (180)
Curlew	63 (167)	56 (78)	30 (62)	1 (3)	0 (1)	1 (2)	2299 (2612)
Dunlin	112 (360)	170 (521)	157 (340)	14 (50)	160 (423)		25634 (27144)
European White Fronted Goose		221 (507)	15 (60)				236 (507)
Gadwall		23 (68)	8 (32)				139 (151)
Pintail		96 (200)	55 (80)				446 (655)
Redshank	6 (10)	19 (30)	2 (3)	2 (8)	5 (13)	2 (3)	2656 (2936)
Shelduck	33 (54)	48 (123)	56 (78)	1 (3)		1 (2)	2173 (2450)
Other notable counts (outside of Slimbridge)				Common Gull 517 (2000)			Common Gull 1006 (2430)

2.43. This data shows that Slimbridge is also very important at low tide for Bewick's Swan, European White Fronted Goose, Gadwall and Pintail in particular, and holds a high percentage of the wintering population of these birds in the Severn Estuary as a whole.

2.44. Low numbers of Redshank were recorded throughout the survey area at low tide, and Curlew and Shelduck were also recorded in low numbers outside of Slimbridge. Dunlin were spread throughout the survey area north of Berkeley Pill, and a large concentration of Common Gull were recorded between Sharpness and Purton, which supports Mike Smart's observation that this area holds a large gull roost.

GCER Data

2.45. GCER provided records from the past 25 years for the overwintering bird species named on the SPA/Ramsar citations, including those listed under the general waterbird assemblage. The majority of records are from the year 2000 onwards.

2.46. The species which are individually cited as qualifying species in the SPA citation, Bewick's Swan, (European) White Fronted Goose, Curlew, Dunlin, Gadwall, Pintail, Redshank and Shelduck were pulled out from this dataset for closer examination. **Maps 2a** and **2b** show the location and density of records for each species in the survey area since the year 2000, accurate to the nearest square kilometre.

2.47. The nature of the dataset means that **Maps 2a** and **2b** only show individual records, not the number of birds associated with each record. Therefore these maps have been used to aid our understanding of the *distribution* of SPA birds in the survey area, and where concentrations of birds are likely to be found, rather than actual numbers of birds. The maps have been colour-coded according to the number of records to aid this interpretation. It is also important to remember that some records may represent one-off sightings of birds on passage, and so some professional judgement is required in interpreting the data.

2.48. The maps give a broad indication of the relative importance of different parts of the survey area for overwintering birds. Notably, records for Bewick's Swan, European White-Fronted Goose, Dunlin and Pintail are mainly concentrated within the grounds at WWT Slimbridge, with a scattering of records around Saul Warth/Hock Cliff to the north, and in the case of Gadwall, at Frampton Lakes to the east of Frampton-on-Severn. Curlew, Redshank and Shelduck appear to make wider use of the habitats within the survey area, but again records are concentrated at Slimbridge, with smaller clusters at Saul Warth and Sharpness.

Bespoke Winter Bird Surveys

2.49. Winter bird survey reports submitted with recent planning applications within the survey area have also been reviewed and are summarised below. Whilst the different survey

methods employed means that the data is not directly comparable, it adds to the overall picture of bird use of the survey area.

Berkeley Technology Centre Survey S.15/2828/FUL

2.50. A winter bird survey was carried out in winter 2014/15 in the area around the Berkeley Centre, a complex of buildings formerly associated with the Power Station, to inform a Habitats Regulations Assessment (HRA) of proposals to redevelop the centre. The survey report (JBA Consulting, 2015) was submitted to Stroud DC and is available on their online planning portal.

2.51. In total, 48 hours of survey were carried out on the development site and adjacent foreshore between October 2014 and March 2015, over a range of tides. The survey recorded very low numbers of waterbirds using this area. The highest number recorded of a single species was 45 Mallard foraging on the foreshore at low tide. None of the qualifying SPA bird species were recorded using the survey area. The report therefore concluded that the area around the Berkeley Centre is not well utilised by birds.

Severn Distribution Centre Survey S.13/2153/OUT

2.52. Winter bird surveys were carried out by All Ecology between December 2012 and November 2014 to inform the HRA of proposals for commercial development of a site just south of Sharpness. The site itself was surveyed, along with the adjacent area of the Estuary and foreshore. A total of 16 survey visits were made during the winter months across a range of tidal states.

2.53. This survey found that relatively high numbers of certain species used this part of the Estuary during the cold winter of 2012/13, and occasionally the site itself during extreme weather conditions. This included peak counts of 381/300 Lapwing and 190/250 Black-headed Gull on the Estuary and site respectively. By contrast, in winter 2013/14 only a single Lapwing was recorded during the surveys, along with a peak count of 64 Black-headed Gull and 105 Wigeon, all on the Estuary. In November 2014, notable counts included 218 Black-headed Gull on the Estuary, along with 108 Lapwing and 278 Dunlin. Peak counts varied considerably between surveys.

2.54. These records suggest that the Estuary foreshore to the south of Sharpness does occasionally support good numbers of overwintering birds associated with the SPA, particularly during poor weather.

2.55. As part of the application, a field approximately 230m to the south is proposed as mitigation for the loss of habitat at the application site which occasionally supports Lapwing during extreme weather. This field would be managed for the benefit of Lapwing and other waterbirds for a period of at least 15 years, including the creation of new scrapes.

Bays Hill Survey S.15/0735/OUT

2.56. Enzygo Environmental Consultants carried out winter bird surveys to inform the HRA for the above planning application. Twelve surveys were completed along the Severn Estuary foreshore between Berkeley Pill and Sharpness between October 2014 and March 2015.

2.57. Notable peak counts recorded during these surveys included 225 Wigeon, 140 Black-headed Gull, 97 Herring Gull and 60 Dunlin, though in other months far lower numbers were recorded. No Lapwing were recorded on any of the visits and numbers of other birds were low. Again, in line with the other surveys described above, this suggests that this part of the Estuary occasionally supports high concentrations of birds associated with the SPA.

Summary

2.58. In light of the data and information presented above, **Map 2** shows the location of key areas for SPA birds within the survey area. These include known high tide roosts, low tide foraging areas, and sites where high numbers of birds have been recorded.

2.59. The available information and data on the numbers and distribution of overwintering birds indicates that WWT Slimbridge is by far the most important area for birds within the survey area. Bewick's Swan, European White-Fronted Goose, Gadwall and Pintail are almost exclusively found here. The reserve has a network of footpaths and viewing hides in place and there is no public access to the high tide roosting areas adjacent to the Severn.

2.60. Saul Warth, to the north of Slimbridge, also supports a large high tide roost and high numbers of birds have been recorded here. While there is no direct public access to this area, there are footpaths in the vicinity and some trespassing is thought to occur.

2.61. The mudflats exposed at low tide to the west of Slimbridge, between Purton and Hock Cliff, are thought to be an important foraging area for wading birds and a roosting area for gulls. Public encroachment onto the mudflats in the open Estuary where the birds are feeding rarely occurs due to the dangerous nature of the terrain and, in any case, public access is not possible from the Slimbridge land, which makes up the majority of the shoreline in this area.

2.62. South of Slimbridge, the area around Sharpness has a relatively high number of GCER records for Curlew, Redshank and Shelduck compared to other parts of the survey area. Survey data provided with recent planning applications indicates that the area between Sharpness and Berkeley Pill occasionally supports high concentrations of some species, notably Lapwing, Wigeon and Black-headed Gull. Core count data also suggests that Berkeley Pill may be important for Lapwing, Wigeon and gulls, and a small/occasional high tide roost is present here.

2.63. The conclusions set out above will be revisited should further data on the distribution and numbers of overwintering birds within the survey area become available in the future (see **Section 6**).

3. VISITOR SURVEY METHODOLOGY

Background to Methodology

3.1. The visitor survey took the form of a standard exit poll questionnaire, which involves structured face-to-face interviews with visitors as they exit through a set of pre-determined access points within the survey area, utilising a standard set of questions.

3.2. This method has been used in other coastal recreation studies in the Solent (Fearnley, Clarke and Liley, 2010), North Kent Marshes (Fearnley & Liley, 2011) and the Exe Estuary (Liley, Fearnley & Cruickshanks, 2010) and originally developed from research on recreational impacts on heathland sites (Clarke et al., 2006, Liley et al, 2005). EPR have also used this method at coastal sites in Southend, Brightlingsea, Pagham Harbour and North Kent in recent years.

3.3. As described below, survey effort and timings were consistent with the studies mentioned above, as well as with similar surveys carried out by EPR at coastal sites, to allow comparison of results. The questions themselves were also based on those used in other studies, adapted slightly where appropriate to reflect the aims and objectives of this particular survey. The questionnaire is described further below and reproduced in full in **Appendix 1**.

3.4. The methodology set out in this Section was developed in consultation with the project team at Stroud DC, Mike Smart of the Gloucestershire Wildlife Trust and Gloucestershire Naturalists' Society, and Natural England. Local Parish Councils, the Association of Severn Estuary Relevant Authorities (ASERA) and the Canal and River Trust at Sharpness were also consulted and their comments taken into account when refining the methodology, particularly with respect to the location and number of access points.

Access Points

3.5. Nine access points were selected within the survey area at which the face-to-face interviews took place. Drawing on local knowledge and site visits, these are considered to represent 'pinch points' that a large proportion of visitors to the survey area are likely to pass through, with each of them located at a car park, or a key point for access on foot via existing public rights of way. Other factors taken into account included predicted visitor traffic, and proximity to future housing allocations and known important areas for overwintering birds.

3.6. The following access points (APs), all on the Severn Way, were therefore chosen for the survey, as described below and shown on **Map 3:**

- **AP1 Severn Lane/Bevington:** Next to the Estuary, to the south of the former Berkeley Power Station. This AP is likely to pick up visitors coming from the

Severn Way to the south or from the village of Bevington to the east, as well as existing visitor traffic coming south from the power station complex, which is proposed for redevelopment as a new Science and Technology Park in the Local Plan.

- **AP2 Berkeley Pill:** Next to the Estuary and a key pedestrian access point for people coming from the village of Berkeley to the east, potentially also an important area for birds in the south of the survey area.
- **AP3 Sharpness Picnic Area:** A car park in Sharpness, adjacent to a small green/picnic area known to be popular with dog walkers, and from which there is direct access to the Estuary.
- **AP4 Sharpness Marina:** Next to a Chandlery with footpaths running parallel to the Estuary in either direction. Close to a large car park and pedestrian access from Sharpness and Newton.
- **AP5 Purton:** On the canal towpath, close to the Purton Hulks where there is direct access to the Estuary. Short walk from a public car park.
- **AP6 Splatt Bridge:** On the canal towpath between Slimbridge and Frampton-on-Severn, close to a car park. Key access point for pedestrians coming from the village of Frampton-on-Severn.
- **AP7 Fretherne Bridge/Saul Warth:** Close to a car park, for access to Hock Cliff to the west or the canal towpath and Saul Warth, a high tide roost and popular birdwatching spot, to the south.
- **AP8 Arlingham Old Passage Inn**: Car park next to a pub, popular starting point for a variety of circular walks around the Arlingham Horseshoe, as advertised on information boards in the area.
- **AP9 Hock Cliff:** Close to high tide roosting areas, with footpath access to Arlingham to the west, Frampton to the east and Fretherne to the north.

3.7. These access points provide extensive spatial coverage of the survey area at a density of approximately 3 km of coastline per access point. This compares favourably to other studies, such as in the Solent (Fearnley, Clarke & Liley, 2010) which had approximately 17 km per AP, and North Kent at 6.8 km per AP (Fearnley & Liley, 2011) (calculated using GIS software). They each have features that are likely to attract different user groups such as walkers, dog walkers, families, weekend visitors and birdwatchers. They are therefore considered likely to pick up the majority of visitors accessing the Severn Way within the survey area, either on foot or by car.

3.8. Slimbridge WWT nature reserve is located within the survey area between Purton and Frampton-on-Severn. The grounds cover approximately 325 ha directly adjacent to the Severn Estuary, though there is no public access to the Estuary itself or adjacent saltmarsh. Large parts of the Slimbridge grounds are managed as habitat for wetland

birds and the reserve is a key site for roosting and foraging birds in the area, as discussed in **Section 2**.

3.9. Slimbridge is not included within the survey area for this study, as no public rights of way run through it and, as set out in the HRA of the Local Plan (URS, 2014), the WWT "has detailed strategies in place to manage recreational activity, screen visitors from areas where they will disturb birds and direct visitors to less disturbance sensitive parts of the site." The HRA also concludes that recreation at Slimbridge "will continue to be manageable without an adverse effect on the integrity of the SPA/Ramsar site" and that "attention should therefore be focussed on those parts of the SPA/Ramsar site outside the WWT reserve."

Survey Effort and Timing

3.10. In accordance with the standard used by other coastal visitor surveys, each access point was surveyed for up to 16 hours in total, split up into eight sessions lasting two hours each. These sessions were evenly divided between weekdays, weekends, morning and afternoons, to ensure that a representative mixture of visitors to the survey area would be captured. The timing of the sessions was designed to align with winter daylight hours when people are most likely to visit the survey area for recreation:

Morning sessions:	07.30/08.00 – 09.30 and 10.00 – 12.00
Afternoon sessions:	12.30 – 14.30 and 15.00 – 16.30/17.00

3.11. For health and safety reasons, some of the early and late sessions were cut short by up to 30 minutes in either December or January as the sunrise/sunset times during these months meant that surveys would be either started or finished in the dark. Given the remote location of some of the access points, it was decided that surveyors should only approach visitors in the daylight. In practice, this meant that on average, each access point was surveyed for 15 hours instead of 16. This approach was approved by Natural England and is not considered to be a significant limitation, as the number of visitors that may have been missed after dark is likely to be very small.

3.12. Half of the surveys were completed in December 2015, and half in January 2016. Again, this was to gain a more representative sample of winter visitation levels and patterns, and to reduce the possibility of factors such as unusual weather affecting the results. This also meant that the surveys coincided with the 'core' winter period for overwintering birds on the SPA (November to February inclusive).

3.13. As the surveys aimed to capture 'typical' recreational patterns in the winter, surveys were scheduled to avoid very poor weather such as high winds, heavy rain or snow. They were also timed to avoid the Severn Bore, an extreme high tide that occurs in the Upper Severn and attracts tourists and surfers, a potential source of bias in the results.

Interviews

3.14. The face-to-face interviews were conducted by Marketing Means, an independent specialist market research company with experience of carrying out similar exit poll questionnaires using this methodology. Marketing Means engaged local surveyors who are certified members of the Market Research Society and have extensive experience of positively engaging with potential interviewees and gathering robust data from face-to-face interviews.

3.15. EPR provided maps, questionnaires and a detailed written briefing, and liaised closely with a representative from Marketing Means throughout the course of the surveys to ensure that the agreed methodology was followed. Karen Colebourn of EPR also visited some of the surveyors in December to ensure that all was running smoothly.

3.16. Surveyors interviewed visitors as they exited through their access point in order to obtain information about their completed visit. Groups of people were counted as one, with only one person interviewed per group, and children under the age of 16 were not approached if alone. Topics included:

- Number of visitors and dogs per group;
- Where they had travelled from;
- Method of travel;
- Reason for their visit;
- Why they had chosen this site over others;
- When and how often they usually visit;
- Whether they let their dogs off the lead (if applicable);
- Whether they visit other open spaces in the area; and
- Facilities and features they would like to see in open spaces in the area.

3.17. Maps were used to aid data collection. Visitors were asked to annotate the route they had taken during their visit on a colour photocopy of a 1:25,000 Ordnance Survey map, and these were coded so that they could be matched to the corresponding questionnaire.

3.18. Metadata recorded for each interview included the time of day, weather conditions, tidal conditions, and any constraints or limitations. Surveyors were also provided with a notes sheet on which to record any of the following observations:

- Incidences of bird disturbance and the disturbance agent;
- Direction of flight if applicable, and species involved, if known;
- Time of the disturbance and brief description of what happened;

- Water-based recreation or activity;
- People leaving footpaths/public rights of way; and
- Any other incidents of note.

Entry/Exit Forms

3.19. In addition to interviewing visitors, surveyors kept count of the total number of people and dogs entering and exiting their access point on a separate form, also noting the time of day and whether the person/group was interviewed or not. This information was collected to allow analysis of overall footfall at each access point.

Data Analysis

3.20. Most questionnaire responses were multiple-choice; these were coded by Marketing Means and passed to EPR as a Microsoft Excel spreadsheet. Answers to the open-ended questions were typed out by Marketing Means and sorted into categories by EPR. Excel was used for the data analysis. All percentages and figures in the Results section are rounded to one decimal place.

3.21. The entry/exit forms were also provided to EPR as an Excel spreadsheet. These were then reviewed to remove obvious duplicates (where the same group/individual was recorded on both entry and exit). The total entries/exits were then added together to give the overall footfall for each access point. This method means that some duplicates may still be present if the surveyor did not recognise or notice an individual or group both entering and exiting. All figures given in the Results section are therefore to be taken as broad estimates only, for comparison with similar studies and any repeat studies in this survey area.

3.22. ArcGIS 10.3 software (ESRI UK) was used to aid analysis and presentation of the data collected during the surveys. This included analysis of visitor origins and travel distances (linear distance from point of origin to access point) using a Royal Mail Postcode Dataset for the UK (BHP Data Ltd) and the point distance analysis capability of the ET GeoWizards add-in (www.ian-ko.com).

3.23. The visitor route maps were each digitised using ArcGIS 10.3 and then analysed using the line density function of the Spatial Analyst extension. This analysis allows production of thematic maps showing the footpaths and roads in the area with the highest levels of visitor use (m/m^2) and thus the areas subject to the greatest density of recreational pressure. This can be broken down by different user groups (such as dog walkers vs non-dog walkers) and used to identify potential areas of conflict with sensitive bird areas, as discussed in **Sections 4** and **5**.

Limitations

3.24. Access points were surveyed simultaneously wherever possible to reduce the likelihood of double-counting visitors, but in practice this was not possible across all APs at all times. The access points were spaced sufficiently far apart to assume that few visitors would pass through more than one, and so the results assume no double-counting, in common with other studies (Fearnley, Clarke & Liley, 2010).

3.25. While the questionnaire was designed to be as simple and brief as possible, interviewees may decline to answer some questions, and some may be skipped by the surveyor, for example if the interviewee is in a hurry. This limitation is common to all face-to-face surveys and is not considered to be a problem as long as the overall dataset is large enough. Similarly, the 'routes walked' maps can vary in terms of accuracy, but again, in a large dataset some minor inaccuracies are unlikely to have a significant bearing on the overall results or analysis.

4. SURVEY RESULTS

Introduction

4.1. This section sets out the results of the face-to-face visitor surveys conducted in the survey area in December 2015 and January 2016. Results are broken down in detail where appropriate, for example by access point or user group, and graphs and maps are used to facilitate presentation of the results. Comparisons are made throughout to three similar coastal surveys on the Solent (Fearnley, Clarke & Liley, 2010), North Kent Marshes (Fearnley & Liley, 2011) and the Exe Estuary (Liley, Fearnley & Cruickshanks, 2010); full citations are given in the References section.

Overview

4.2. In total, 211 face-to-face interviews were conducted as part of the visitor questionnaire surveys throughout December 2015 and January 2016, involving 348 people. Additionally, surveyors recorded 461 people entering or exiting the access points in 273 groups. This represents a capture rate of 77.3% of groups and 75.5% of people, and so the interviews are considered to be a representative sample of visitor patterns in the survey area.

4.3. In total 27 groups declined to be interviewed, a refusal rate of 9.9%. Of these, 8 were jogging or cycling and 7 had already been interviewed on another day. This is comparable to the Solent (9%) and North Kent (7%) studies.

4.4. A range of weather conditions were recorded during the surveys, though the most commonly recorded weather type was 'cloudy' (49.8% of interviews), followed by 'Sunshine' (19.8%) and 'Cloudy and Showers (17.9%). Surveyors reported that it was windy for 13% of the surveys, and cold/frosty for 10%. Overall, it is considered that this is a representative mix of 'typical' winter weather.

4.5. The tidal state was also recorded by the surveyors as this could have an influence on visitor behaviour. Again, surveys were conducted across a range of tidal states: 40.4% at low tide, 23% at high tide, and 36.6% during the intertidal period.

4.6. No significant limitations were encountered during the surveys. In a small number of cases questions were not answered by the interviewee or ticked by the surveyor, and in these cases the percentages given are based on the total number of responses. The majority of questions that all groups could answer (i.e. not dependent on answering yes/no to a previous question) were answered by over 200 groups. It is therefore considered that a robust dataset has been collected that can be used for meaningful analysis of visitation levels and patterns in the survey area.

Footfall

Visitation Rates

4.7. The entry/exit count of 461 people across 15 hours of survey works outs to 30.7 people per hour across the whole survey area, or 3.4 people per access point per hour. This ranged from 0.5 people per hour at AP2 (Berkeley Pill) to 8.9 people per hour at AP5 (Purton).

4.8. In total, 185 dogs were recorded entering or exiting the access points during the survey period. This works out to an average of 12.3 dogs per hour across the whole survey area or 1.4 per access point.

4.9. When extrapolated across a ten-hour day (winter daylight hours), an approximate visitation rate of 307 people and 123 dogs per day can therefore be estimated for this part of the Estuary, or 55,950 people and 22,416 dogs across the winter period from October to March inclusive.

4.10. These figures are likely to be underestimates as despite selecting access points that would maximise coverage of the survey area, some visitors will have inevitably been missed by the surveyors. Nevertheless, this figure provides a baseline indication of visitation levels that can be used for comparison against any future surveys in the survey area.

Comparison of Access Points

4.11. Footfall varied greatly between access points. Of the 461 people recorded entering or exiting the survey area, 51.6% were recorded at either AP5 (Purton) or AP6 (Splatt Bridge). In contrast, AP1 (Bevington/Severn Lane) and AP2 (Berkeley Pill) recorded just 4.6% of all visits between them**.** Surveyors at AP1 in particular commented on how quiet the area was.

4.12. The numbers of dogs recorded at each access point showed that AP8 (Arlingham) had a relatively high percentage of dogs within the survey area at 18.4%, compared to 10.4% of people. AP5, which at 29.1% recorded the highest overall percentage of people, only had 19.5% of dogs, but AP6 had a high percentage of both people and dogs (22.6% and 21.1% respectively). **Figure 4.1** shows how the numbers of people and dogs compared across the nine access points.

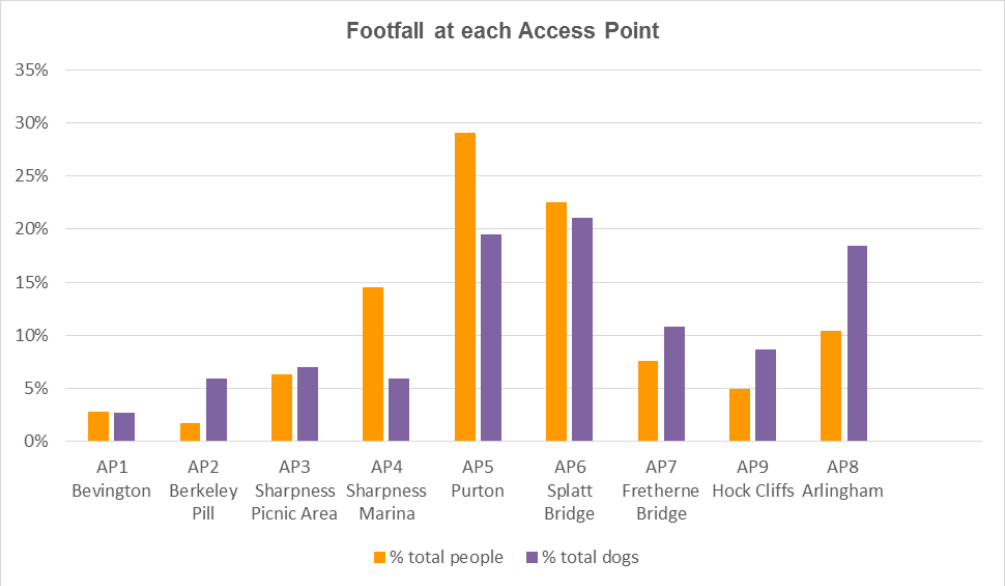

Figure 4.1: *Percentages of people and dogs entering/exiting each access point NB: AP9 and AP8 have swapped places on the graph so that the APs appear in geographical order from south to north)*

Visitor Profile

Age Range and Group Size

4.13. The questionnaire surveys revealed that of the 319 interviewees who gave their age, the majority were aged between 26 and 59 (53.3%) and 32.9% were aged over 60. The average group size was 1.6, with 91% of groups consisting of 1 or 2 people. The largest group interviewed was 8 people at AP5 (Purton). Similar results were recorded on the entry/exit forms, with an average group size of 1.7 people. This is comparable to the visitor surveys conducted in the Solent and North Kent, both of which also recorded average group sizes of 1.7.

Dog Ownership

4.14. Over half (51.6%) of the groups interviewed had at least one dog with them. This is slightly less than for the Solent (53%) and North Kent (65%). Between them, the groups had 154 dogs, which equates to 0.4 dogs per person, 0.7 dogs per group, or 1.4 dogs per dog-owning group. These results are mirrored by the entry/exit data, which recorded 185 dogs in 134 groups (out of a total of 273 groups). This also works out to an average of 0.4 dogs per person, 0.7 dogs per group or 1.4 dogs per dog-owning group.

Origins and Means of Travel

4.15. Overall, 57.1% of interviewees defined themselves as local residents and 33.3% said they were day visitors. Of the latter, 60% were interviewed on a weekday. This is markedly different to the Solent, Exe Estuary and North Kent studies, where far higher

percentages of interviewees were local residents (94%, 86% and 96% respectively, although the definition of 'local' varied between studies). Nevertheless, this suggests that the stretch of the Severn within the survey area is particularly attractive to day-trippers in the winter.

4.16. 15 of the groups interviewed (5.7%) said they lived on a boat. Of these, nine defined themselves as local residents, three as an overnight/multiple stay visitor, and three as 'other'. Eight of these groups were interviewed at AP6 (Splatt Bridge), the others at AP4, AP5 and AP7.

4.17. Just over half (52.6%) of interviewees drove to their access point, while 41.6% walked. This is broadly comparable to the Solent, but a higher percentage of walkers than at the Exe Estuary (29%) and North Kent (34%). Unsurprisingly, a higher percentage of local residents had walked rather than driven (58.3% versus 38.3% respectively). Dog walkers were more likely to have walked to the access point (49.5%) than groups without a dog (32.4%).

4.18. When comparing how people travelled to each access point, people were more likely to walk to AP2, AP6, AP7 and AP9, and more likely to drive to AP1, AP3, AP4, AP5 and AP8 (**Figure 4.2).** Two cyclists were observed entering/exiting the survey area (at AP5 and AP6) over the course of the survey, but none were interviewed.

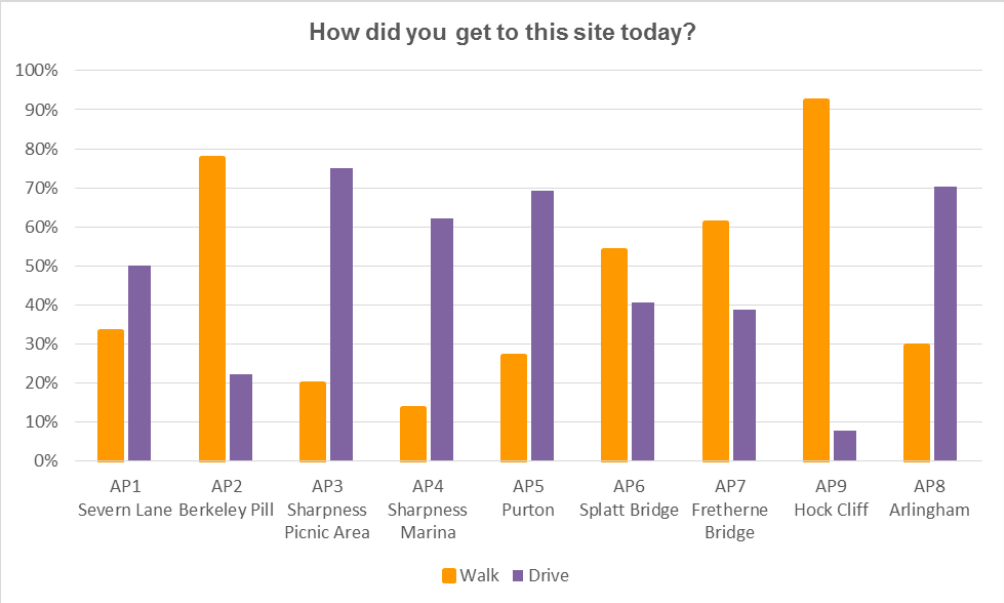

Figure 4.2: *Comparison of walking/driving rates to each access point (N=209) NB: AP9 and AP8 have swapped places on the graph so that the APs appear in geographical order from south to north)*

Visitor Origins and Catchment Analysis

Housing Density

4.19. As shown on **Map 4**, housing density within around 5km of the Severn Estuary within the survey area is notably low, with Berkeley being the only settlement of over 500 dwellings. Only 893 dwellings are present within 1km of the entire survey area. By contrast, over half of the individual access points in the Solent study had at least 1,000 dwellings within 1km each, over 15,000 homes are present within 1km of the Exe Estuary SPA (Liley et al., 2013), and the North Kent study comments that "levels of housing around the three European sites are currently relatively high compared to other estuary SPA sites in the UK" (Liley and Underhill-Day, 2013).

4.20. Analysis of housing density within different distance bands around each access point has been undertaken using the Royal Mail Postcode Dataset for the UK (BHP Data Ltd). The results are shown in **Table 4.1** below and illustrated in **Figure 4.3** for the 1km distance band.

Table 4.1: *Comparison of housing density around access points and visitor numbers (entries/exits)*

	Total visitors	**No. dwellings within distance band**		
		1km	**2km**	**5km**
AP1 Bevington	13	2	20	4731
AP2 Berkeley Pill	8	11	1297	6134
AP3 Sharpness Picnic Area	29	522	706	6995
AP4 Sharpness Marina	67	153	682	7139
AP5 Purton	134	51	129	4158
AP6 Splatt Bridge	104	200	508	2746
AP7 Fretherne Bridge	35	536	846	2688
AP8 Arlingham	48	521	734	6707
AP9 Hock Cliff	23	30	369	2164

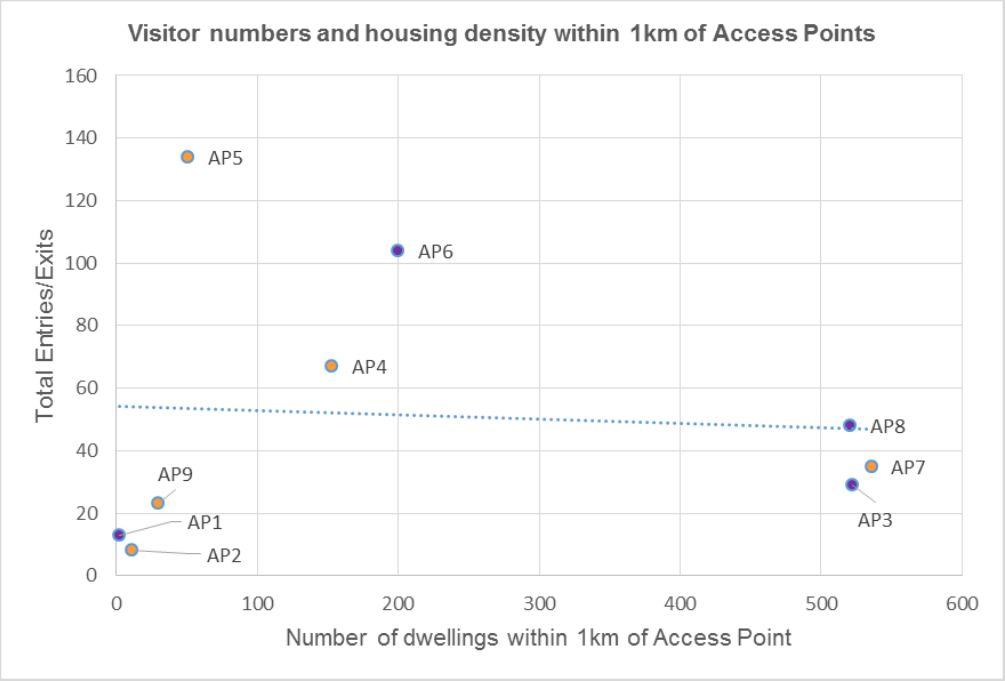

Figure 4.3: *Comparison of visitor numbers and housing density within 1 km of each Access Point.*

4.21. **Table 4.1** and **Figure 4.3** show that when taking each access point individually, in most cases there is no apparent relationship between the density of housing and the number of visitors. For example, AP2 recorded the lowest footfall despite having the highest density of housing within 2km and AP5 recorded the highest number of visitors despite having one of the lowest housing densities in the 1km and 2km distance bands. The Solent study, on the other hand, found a significant correlation between visitor numbers and housing density up to a distance of 5km from their access points (higher visitor numbers were associated with greater housing densities).

4.22. This lack of relationship may be explained by the general low housing density within 5km of the survey area, which means that there is a relatively small pool of potential 'local' visitors. As set out below, 'locals' use the Severn differently from those from further away. The distances that different types of visitors travelled to reach the survey area is explored further below.

Distances Travelled

4.23. All of the 211 groups interviewed gave a full and apparently accurate home postcode. These postcodes, representing home origins of visitors, were spatially analysed using GIS software. This revealed that the average (mean) distance travelled to reach an AP was 14.5km (straight line distance). This figure is likely to reflect both the relatively high percentage of people who said they were day or overnight visitors, and the low housing density close to the survey area. Less than half of all groups interviewed (42.2%) lived within 5km of their access point, while only 33 groups (15.6%) lived within 1km and 59 groups (30%) within 2km.

4.24. The average distance travelled by groups who said they were local residents was 4.9km, while those on day or overnight trips had travelled on average 28.9km. As shown on **Map 4a**, several day visitors originated from the Gloucester and Bristol areas.

4.25. The shortest distance travelled to an AP was 43m at AP5, and three groups had travelled just 45m to AP7. The three longest journeys (91 km, 205 km and 213 km) had all been made by groups visiting AP4 or AP5 for boating related reasons.

4.26. Overall, 42.3% of groups said they were visiting for dog walking purposes, but this rises to 69.7% for the subset of groups living within 1km of their access point, and 69.5% for groups living within 2km. Dog walkers had travelled 4.4km to their access point on average.

Distances Travelled on Foot or by Vehicle

4.27. The origins of visitors colour-coded by means of travel is shown on **Map 4b**. Visitors arriving on foot had walked 5.4km on average to reach their access point. Of the 33 groups living within 1km of their access point, 31 had walked there (93.9%) and a similarly high percentage (84.7%) of those living within 2km had also arrived on foot.

4.28. Calculation of the cumulative frequency distribution of the data shows that overall, 50% of those on foot lived within 1.8km or less of their access point, and 25% lived within 560m (**Figure 4.4**).

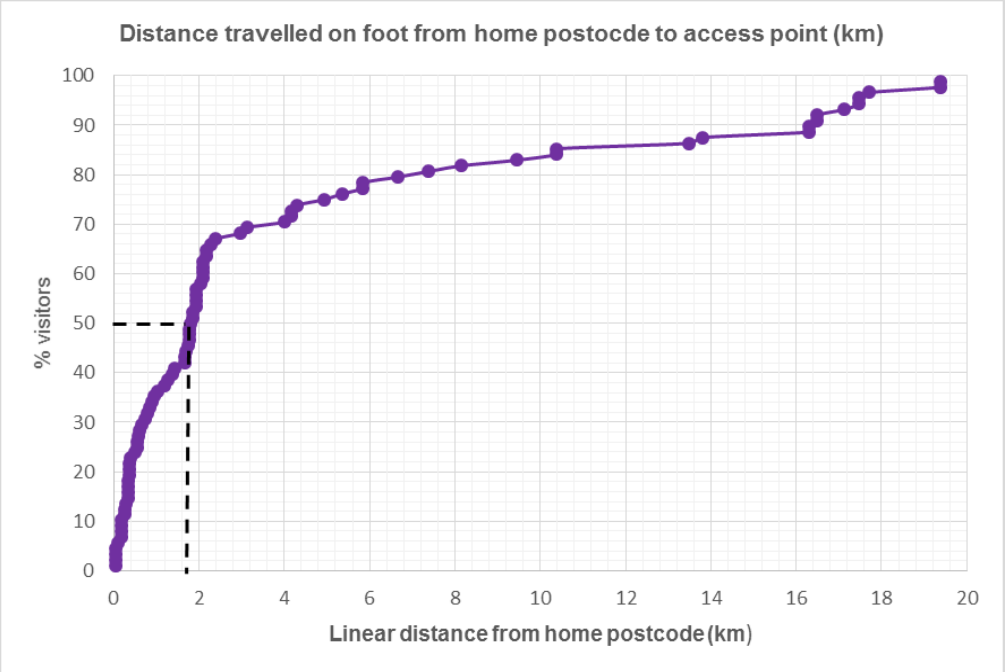

Figure 4.4: *Cumulative frequency distribution for visitors travelling on foot (N=87)*

4.29. Visitors travelling by car lived on average 17.5 km away from their access point, and 50% lived within 13.1 km. Only 19% had travelled less than 5km by car (**Figure 4.5**).

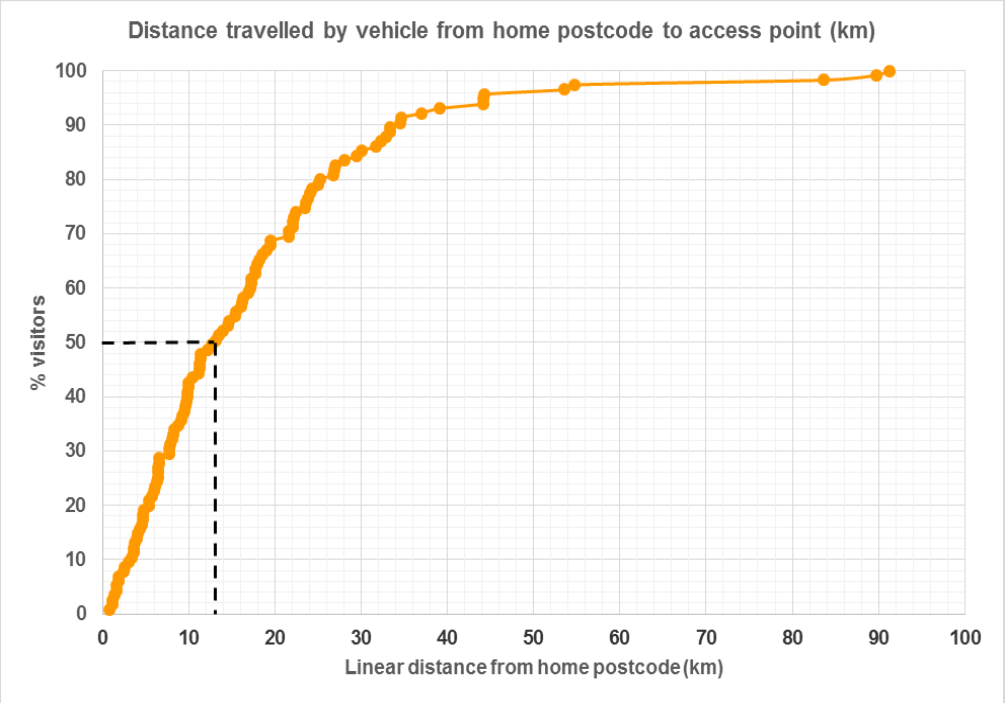

Figure 4.5: *Cumulative frequency distribution for visitors travelling by vehicle (N=115)*

4.30. Travel distances for both walkers and drivers are higher on average for those reported for the Solent, Exe Estuary and North Kent. In these studies, at least 50% of walkers lived within 0.7km, 1km and 0.8km of their access points respectively, and 50% of drivers within 4km, 10km and 4.2km respectively. Again, this is likely to reflect the comparatively low housing density in the vicinity of the survey area in this study.

Comparison of Access Points

4.31. **Maps 4c to 4e** show visitor origins colour-coded by the access point they were interviewed at, and the average distances travelled to each AP is shown in **Figure 4.6** below. This reveals that visitors to AP2, AP7 and AP9 were mainly local, whereas visitors to AP3, AP4 and AP5 and AP6 came from a much wider area.

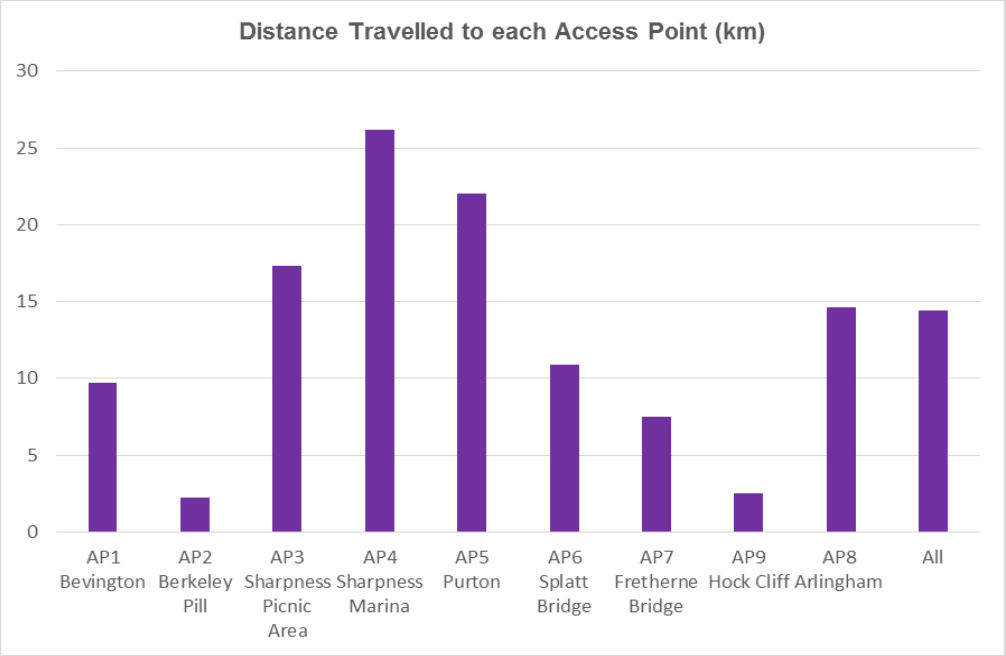

Figure 4.6: *Distances travelled to each Access Point (N=211) NB: AP9 and AP8 have swapped places on the graph so that the APs appear in geographical order from south to north)*

Catchment Analysis

4.32. A commonly used method for calculating the indicative visitor catchment for a site is to take an appropriate percentile figure from a cumulative frequency distribution curve. This involves plotting all of the travel distances in order from smallest to largest, and calculating the distance below which, for example, 20% of the distances fall (this would be the 20th percentile). Recreation studies on heathland sites in the Thames Basin have used the 75th percentile to propose catchment distances for these sites (Liley et al., 2005, Fearnley & Liley, 2013), and this approach was also used for the Solent study.

4.33. **Table 4.2** compares the distances travelled by different percentages of different visitor groups to reach their access points. This shows that 75% of all groups (i.e. the 75th percentile) live within 17.7km of their access point. To put this into context, the visitor catchments proposed for the Solent, North Kent and Exe Estuary are 5.6km, 6km and 10km respectively.

4.34. As discussed above, this disproportionately high figure is likely to stem from a combination of both the high proportion of visitors to the survey area from outside the District, and also the relatively low density of housing within 5km of the Estuary (see **Map 4** and 'Housing Density' above), meaning that there is a relatively low number of potential visitors living close to the Severn who might otherwise pull the average travel distance down.

4.35. For this study, however, the purpose of the catchment analysis is to inform a prediction of the likely recreational impacts associated with new housing allocations in the Stroud

District, in order to inform the development of impact avoidance and access management strategies under Delivery Policy ES6 of the Local Plan. As such, it is considered more appropriate to use the average travel distance by the residents of the District to calculate the indicative catchment distance for this purpose.

4.36. 142 of the 211 postcodes given (67.3%) were from within Stroud District. As shown in **Table 4.2**, three quarters (75%) of groups from within the District had travelled 7.7km to reach their access point. This figure represents a realistic catchment distance for visitors to the Severn Estuary survey area, within which developers might be expected to contribute to any necessary access management and impact avoidance measures (discussed in **Section 5**).

4.37. Notwithstanding the above, although Stroud DC cannot control changes to the number of visitors coming from outside the District, the contribution that these visitors make towards levels of recreational pressure in the survey area is considerable (32.7% of groups came from postcodes outside of the District) and must be considered in combination with the contribution from Stroud residents. This is also discussed further in **Section 5**.

Table 4.2: *Indicative catchments: Distances from within which the given percentages of groups travelled from home to reach their access points*

	Distances from within which different percentages of groups had travelled from home			
	25%	**50%**	**75%**	**90%**
All Visitors	1.8km	7.7km	17.7km	32.3km
Local Residents (Stroud postcodes)	1.2km	3km	7.7km	15.4km
Travelling on foot	560m	1.8km	4.9km	16.5km
Travelling by vehicle	6.3km	13.1km	23.5km	34.6km
Dog walkers	905m	2.1km	6.6km	9.7km

4.38. The cumulative frequency analysis is repeated in **Table 4.3** below, this time looking at the percentage of groups that had travelled from within distance bands of 1km, 2km, 5km, the proposed catchment of 7.7km, and 10km.

Table 4.3: *Percentage of groups that travelled from within given distance bands*

	Percentage of groups that travelled from within the given distance bands				
	1km	**2km**	**5km**	**7.7km**	**10km**
All Visitors	15.6%	28%	42.2%	50%	58.3%
Local Residents (Stroud postcodes)	23.2%	41.5%	62.7%	75%	81.7%
Travelling on foot	35.2%	56.8%	75%	81%	83%
Travelling by vehicle	0.9%	17%	19.1%	30%	42.6%
Dog walkers	26.4%	47.1%	66.7%	81%	90.8%

4.39. **Table 4.3** shows that whilst a visitor catchment of 7.7km would only pick up 50% of the total visitors (including those from outside the District), it would include 81% of walkers and dog walkers. It also shows that increasing the catchment distance to 10km would not pick up significantly more total visits than at 7.7km.

Temporal Patterns

Timing of visits

4.40. Most of the groups interviewed (92.2%) said they visited the site all year round. This is a notably higher percentage than for the Solent, Exe Estuary and North Kent (66%, 57% and 61% respectively).

4.41. More groups were interviewed (55%) and more entries/exits were recorded (64%) in January than December. However, numbers of dogs were more even, with 54% of dogs entering/exiting in January compared to 46% in December. This suggests that these results may be due to the fact that there were more sunny, and fewer windy, days in January. This may have put off some visitors from venturing out in December, but dog walkers are more likely to go out in all weathers.

4.42. The number of interviews conducted was fairly evenly split between weekdays (48%) and weekends (52%). However, the entry/exit data recorded significantly more groups at weekends (72%). These figures are broadly similar to the Solent, Exe Estuary and North Kent, where the numbers of groups interviewed at weekends were 60%, 68% and 56% respectively.

4.43. The time of day that people visited varied. Most interviews, and entries/exits, took place between 10:00 and 12:00 (35.4% and 33.4% respectively). However, when asked when they typically visit, most groups (46.2%) said that the time of day varies. Similar findings were reported at the Solent, Exe Estuary and North Kent.

Visitation frequency

4.44. Around a quarter (25.1%) of groups said they usually visited daily, though responses varied (**Figure 4.7**). Over half (52.6%) said they visited at least once a week, and 31.8% said they visited occasionally or monthly. Visitation frequency appears to be lower than for other coastal sites, with 42% and 26% visiting the Solent/North Kent daily respectively, and 70% and 67% at least once a week. This result may reflect the higher proportion of day visitors to the survey area (see Visitor Origins above), as well as other factors such as accessibility which influence peoples' choice of site (see Reasons for Visiting below).

4.45. Groups with dogs were more likely to visit daily (33.9%) and at least once per week (67.9%).

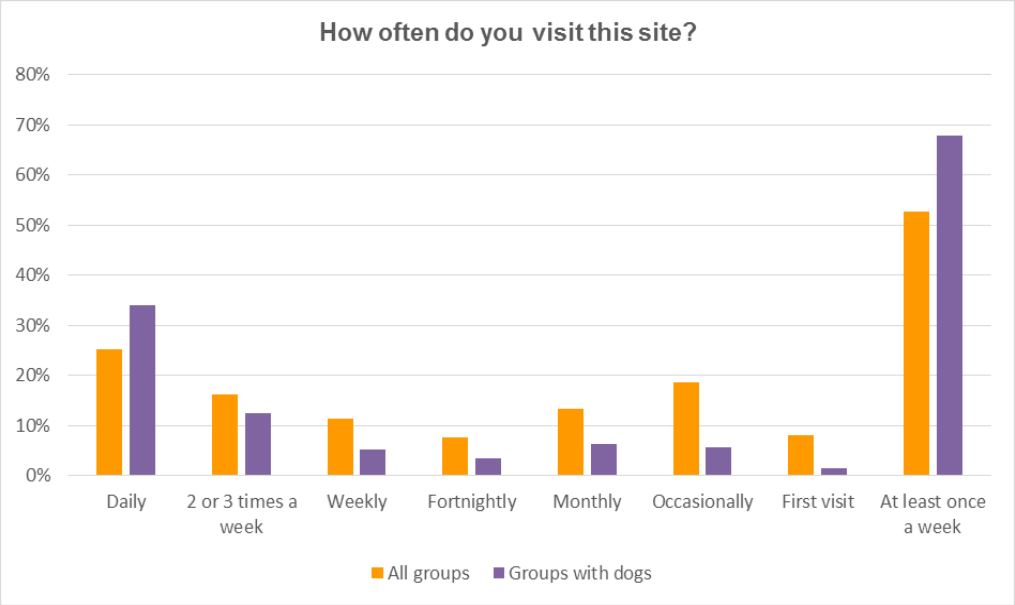

Figure 4.7: *Visitation frequency: all groups and dog owning groups (N=211, 109)*

Reasons for Visiting

4.46. Interviewees were asked about the main reason(s) for their visit that day. The two most popular answers were dog walking (42.3%) and walking (26.9%). 23 groups (11.4%) were visiting for water sports, or for reasons relating to their boat. Other reasons mentioned, though by no more than 6% of groups in each case, were birdwatching, for a day out, fishing, and for exercise/jogging.

4.47. Local residents were more likely than day/overnight visitors to be visiting for the purpose of dog walking (58%) and this rises to 69.5% when considering groups living within 2km of an access point. Visitors from further afield were most likely to cite walking as the reason for their visit (31.8%) followed by 'other' (23.5%) which included visiting or working on their boat, exploring the area, and for a day out. 20% of non-local residents said they were visiting to walk their dog(s). Visitors from outside the area were

also more likely to say they were visiting for bird or wildlife watching purposes (10.6%, compared to 1.7% of local residents).

4.48. Responses varied by access point, as shown in **Figure 4.8**. Notably, AP6 was most popular with walkers, but AP3, AP7, AP8 and AP9 had comparatively high percentages of dog walkers. AP3 and AP4 both had relatively high numbers of groups saying that they were visiting for other reasons. At AP3 several groups cited birdwatching, while at AP4 several were visiting to fish, or for reasons relating to their boat.

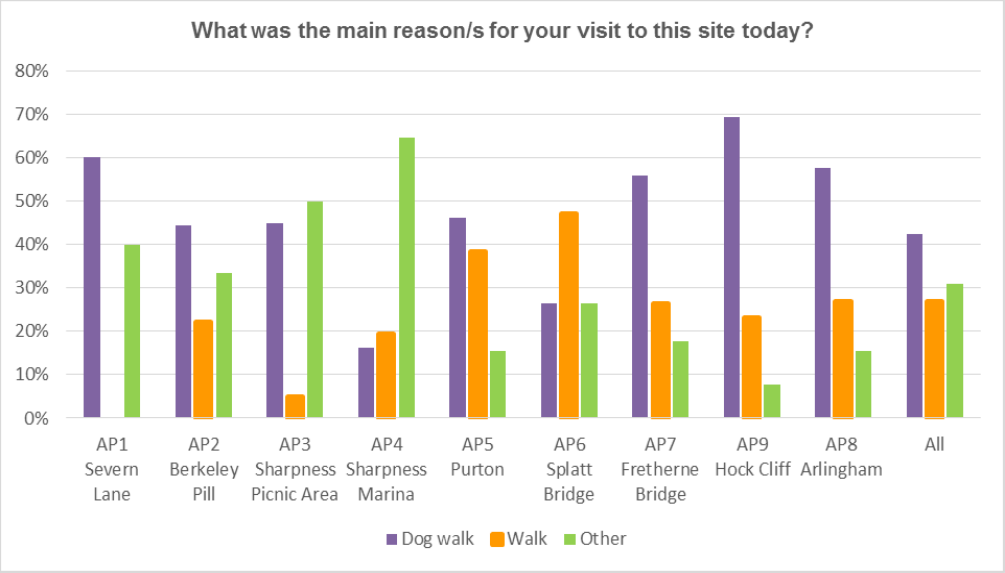

Figure 4.8: *Reasons for visit (N=201) NB: AP9 and AP8 have swapped places on the graph so that the APs appear in geographical order from south to north)*

4.49. Most groups (76.9%) said they always used this access point at the start of their visit. When asked why they liked to visit this site in particular, the most popular responses were access to/views of the water (49.8% of groups), 'it's close to where I live' (40.1%), 'peacefulness' (32.9%), 'enjoy the look/feel of this site' (30.9%), and 'ability to let the dog off the lead' (24.2%). Interviewees were allowed to choose multiple options.

4.50. **Figure 4.9** compares the responses of dog walkers to groups without dogs. Responses were generally similar, and 'access to/views of water' was important for both user groups, but a higher percentage of dog walkers chose 'close to home' and 'I feel safe' (and, unsurprisingly, 'ability to let the dog off the lead').

4.51. Similar responses were given in the Solent, Exe Estuary and North Kent studies, with 'close to home', 'attractive scenery' and 'good for the dog/dog enjoys it' cited as the most popular reasons for choosing these sites over others.

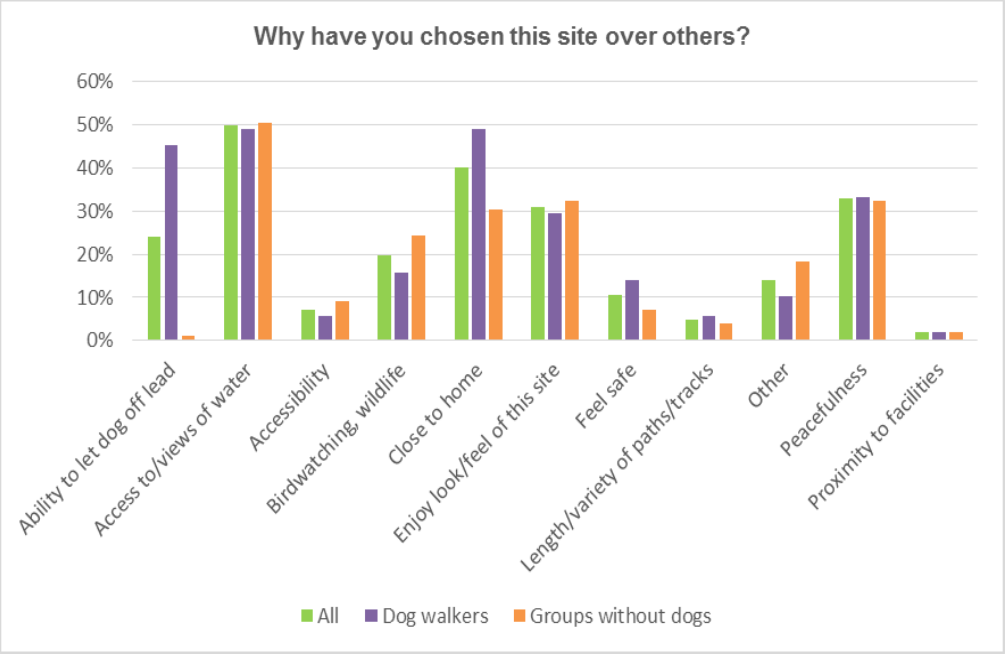

Figure 4.9*: Reasons for choosing this site over others (N=207)*

Visitor Behaviour

4.52. The majority of visits lasted more than 30 minutes (90.4%) and just over half were more than an hour (52.9%). Dog walkers were less likely as a user group to stay for over an hour (45.9%).

4.53. In total, 80.4% of groups with dogs said that they let them off the lead, and 38.2% said their dogs were allowed to stray off the path onto the mudflats, beach or grass. Over half of these groups (51.3%) were interviewed at AP7 or AP8.

4.54. Overall, 80% of groups said they themselves stayed on the paths during their visit. Of the 20% that said they did not, over half (57.1%) were interviewed at AP5, AP7 or AP8. There does not appear to be a link between dog ownership and people leaving the paths (47.6% had at least one dog with them, 52.4% did not).

Routes Walked

Recreational Pressure

4.55. In total, 204 groups clearly marked the route they had taken during their visit on a map. These were digitised and analysed using GIS software to create thematic maps showing comparative levels of path use within the survey area, thus indicating the areas subject to the highest levels of recreational pressure (**Maps 5a and 5b**).

4.56. **Maps 5a and 5b** show that the areas between AP4 (Sharpness Marina) and AP5 (Purton), and the canal towpath between Splatt Bridge and Fretherne Bridge are subject to relatively high levels of recreational pressure during the winter compared to the rest of the survey area. Sharpness Marina and Purton appear to be popular

locations for out-and-back routes of various lengths, whereas several visitors appear to complete a circular walk from Fretherne Bridge or Splatt Bridge via the canal towpath and back through the village of Frampton-on-Severn (or the reverse). The towpath north of Fretherne Bridge to Saul Junction, where the disused Stroudwater Canal meets the Gloucester and Sharpness Canal, also had moderate to high levels of use, and this route also formed part of a circular walk through the northern part of Frampton-on-Severn.

4.57. By contrast, **Maps 5a and 5b** show that the southern part of the survey area south of Sharpness, and the northern part of the survey area from Arlingham to Saul Warth (including Hock Cliff) currently experience low levels of recreational pressure in the winter. Relatively few people used the footpath leading down to the Severn foreshore and Hock Cliff from AP7 (Fretherne Bridge), the majority taking the canal towpath route south towards Splatt Bridge.

4.58. The Severn Way around 1 km either side of AP8 (Arlingham Old Passage Inn) experienced moderate levels of pressure, with most visitors appearing to walk out-and-back from the car park rather than complete one of the circular walks around the peninsula.

4.59. The results of the recreation pressure analysis fit broadly with the footfall figures described above, which also found that AP5 and AP6 experienced the highest levels of footfall. However, recreational pressure around AP7 appears to be higher than the footfall data suggests.

Distances Walked

4.60. On average, visitors walked (or in five cases, jogged) an average distance of 3.2 km during their visit. Groups with dogs walked slightly further at 3.3 km. The shortest walk was 173m and the longest 13 km, both groups were interviewed at AP4.

4.61. Distances walked were broadly similar at each access point, with the exception of AP3, as shown in **Figure 4.10** below. AP3 (Sharpness Picnic Area) has a car park and is next to a small, relatively contained area of green space and is likely to be attractive to people looking for a quick dog walk.

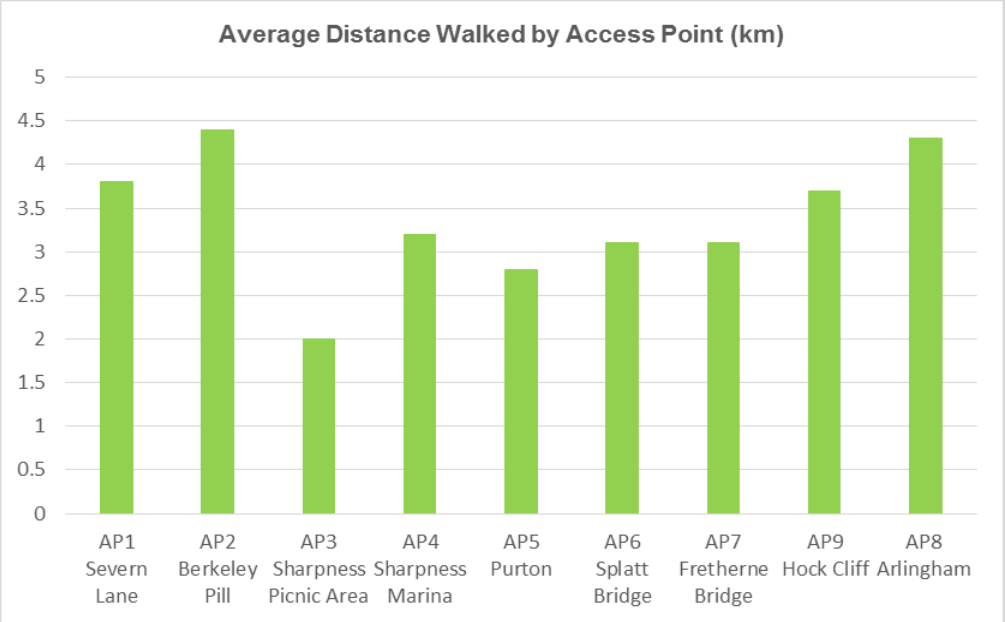

Figure 4.10: *Average distances walked at each access point (N=204) NB: AP9 and AP8 have swapped places on the graph so that the APs appear in geographical order from south to north)*

4.62. Average walking distances are comparable to the results of the Solent study, which found that groups walked 3.1 km on average, or 2.6 km for dog walkers. The North Kent study also recorded an average distance of 3.3 km for dog walkers but those without dogs walked further (4.3 km). Visitors to the Exe Estuary walked the shortest distances out of all the studies, at 2.1 km for walkers and 1.6 km for dog walkers.

Other Open Spaces

4.63. Interviewees were asked whether they regularly visited other open spaces for the same purpose. 73.9% said that they did, and most (64.1%) said that they drove there. Frequency of visits varied, but 46.7% of groups said they visited other sites monthly or occasionally, and 40.1% at least once a week.

4.64. In total, 112 other open spaces were mentioned by interviewees, 79 of these by just one group each. Several of those cited most frequently were other sites within the survey area. The most popular alternative sites were Sharpness/Sharpness Docks (20.3% of those who said they visited alternative sites), Purton (15%), Slimbridge nature reserve (13.7%), Saul (13%), and Arlingham, the canal/towpath, and Frampton/Frampton Lakes (8.5%). As such, groups who said they visited the AP at which they were interviewed relatively infrequently may still make regular visits to other parts of the survey area.

4.65. The reasons interviewees gave for choosing these sites were similar to those for visiting the access point at which they were interviewed. Again, 'access to/views of water' (48.3%) was the most popular response, followed by 'peacefulness' (41.4%), 'enjoy the

look/feel of the site '(37.2%), 'ability to let the dog off the lead' (31%) and 'it's close to where I live' (28.3%).

What Visitors Look for in Open Spaces

4.66. The last two questions of the survey were designed to find out what facilities and features visitors look for in the places they choose to visit. When asked whether any changes to open spaces around the Severn would encourage them to visit more, the majority of groups (65.3%) said that they liked the area as it is and would not change anything. After this, the most frequent suggestions were to improve footpaths (11.1%), followed by more or better parking facilities (5.5%). Seven groups (3.5%) said they would like more public toilets, and more litter and dog bins.

4.67. Studies in the Solent, Exe Estuary and North Kent found that people would be likely to spend less time at these sites if parking charges were introduced, the sites became busier, or if dogs were required to be kept on leads.

4.68. Interviewees were then asked what facilities or features they would like to see in any new open spaces provided near the Severn. 207 groups answered this question, with only 33% saying that there was 'nothing' they would like to see. The remaining 67% generated a 'wish list' of features, with more varied responses than to the previous question. The most popular suggestions were toilets and café facilities (both 21.2%), more parking (12.3%), benches or picnic tables (8.4%), dog bins (6.9%) and better footpaths (4.9%). Other ideas included minimal facilities, clear signposting, disabled access, kissing gates instead of stiles, a local shop, information boards, more footpaths, and more facilities for boat owners.

4.69. As a user group, dog walkers said 'nothing' more often than groups without dogs, but were slightly more likely to suggest toilets and cafes, as shown on **Figure 4.11,** which shows the total number of mentions for categories cited by at least five separate groups, and how dog walkers and non-dog walkers contributed to these totals.

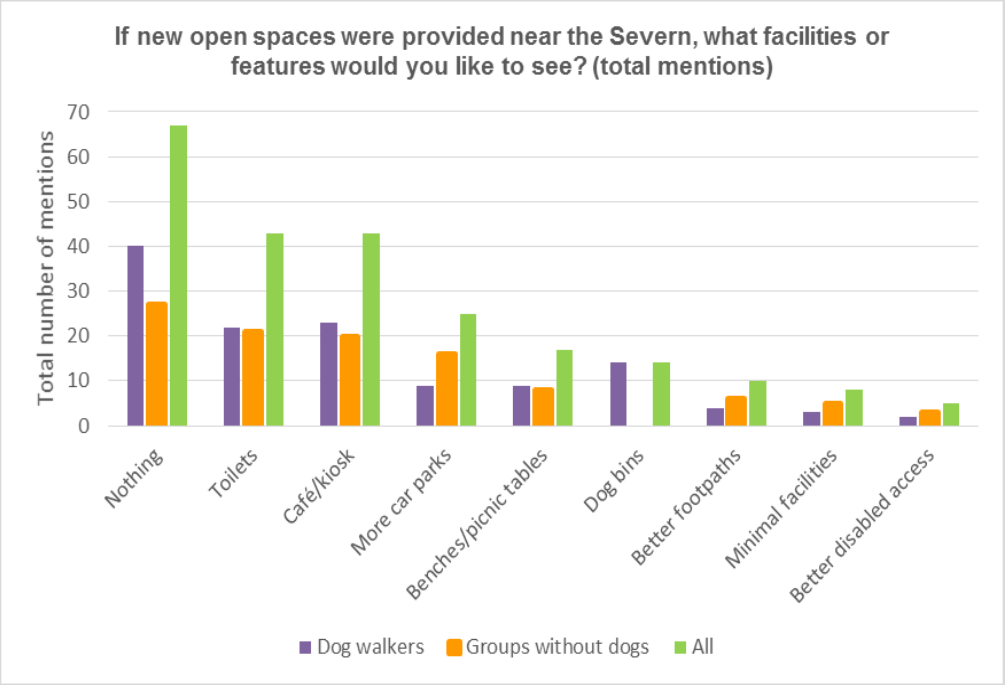

Figure 4.11: *Facilities/features at new open spaces: number of times each category was mentioned, and by whom (categories with at least five mentions are shown)*

4.70. The surveys on the Solent and Exe Estuary had very similar percentages of groups saying that there was 'nothing' they would want to see (33.5% and 34%), this was notably higher in North Kent (63%). The most common 'wish list' suggestions were for sites to have attractive scenery, be dog friendly, have good path surfacing, and to be closer to home.

Observations and Notes

4.71. As described in **Section 3**, surveyors were asked to make a note of any water-based recreation, bird movements and/or disturbance that they noticed at their access points. A large barge and a sailing boat were seen on the Estuary from AP1, three house boats were observed in the canal at AP5, and kayaking, rowing and canal boats were noted at AP6. Rowing teams were also observed on the canal at AP7.

4.72. No incidences of bird disturbance (leading to birds taking flight) were recorded. Flocks of birds, mainly geese, swans and gulls, were observed in flight along the Estuary by several surveyors. A helicopter landed on the river bank at AP8 on a Saturday in January.

5. DISCUSSION

5.1. This Section draws out the key findings of the visitor survey and discusses their implications in terms of likely future visitation levels and sources of recreational disturbance in the survey area. Areas of potential conflict between recreational activity and the qualifying features of the Severn Estuary are then identified, and the requirement for further research and the development of an Impact Avoidance Strategy is considered, for detailed discussion in **Section 6**.

Key Findings of Visitor Survey

5.2. A robust and comprehensive dataset was collected during the visitor surveys in winter 2015/16 and the results are considered to be an accurate representation of visitor levels and patterns in the survey area. The key findings from the results set out in **Section 4** are summarised below.

5.3. The results of the visitor survey found that visitation levels in the survey area are relatively low in the winter, with an average hourly rate of around 30.7 people and 12.3 dogs. Nevertheless, certain parts of the survey area were particularly popular and the area also attracted a high proportion of visitors on day or overnight trips in addition to local residents.

5.4. The majority of visits were made to AP5 (Purton) and AP6 (Splatt Bridge), and high levels of recreational pressure were associated with the areas around Sharpness, and the canal towpath between Sharpness/Purton and Splatt Bridge/Saul Junction. By contrast, the southern and northern parts of the survey area around Berkeley and Arlingham were subject to low and moderate levels of recreational pressure respectively.

5.5. The average ratio of dogs to people was calculated as 0.4 to 1. Dog walking was the most commonly cited reason for visiting the survey area, followed by walking. Sharpness Picnic Area and the areas around Fretherne Bridge and the Arlingham Horseshoe were particularly popular with dog walkers. Most groups said they let their dogs off the lead, and dogs were most likely to stray off the paths around Fretherne Bridge and Arlingham.

5.6. Housing density within the vicinity of the survey area is notably low at present. Only 15.6% of groups interviewed lived within 1km of their access point, and 30% within 2km. However, of those groups living within 1km, 2km and 7.7km of their access points, 69.7%, 69.5% and 92.2% were visiting for dog walking purposes respectively. This may have implications for any new development coming forward close to the Severn.

5.7. Visitors had travelled from a wide area, particularly to the area between Sharpness, Purton and Splatt Bridge. A linear visitor catchment distance of 7.7 km from the Estuary

has been proposed, based on 75% of groups living within the Stroud District having travelled from within this distance. Development proposals within this catchment resulting in a net increase in housing could be reasonably expected to contribute to the funding of impact avoidance measures, discussed further in **Section 6**.

5.8. Visitors were attracted to the survey area by the views of the water, its proximity to home, the peacefulness, and the ability to let the dog off the lead. Popular 'wish list' features for open spaces included toilets, cafe facilities, more parking, benches/picnic tables, dog bins and better footpaths. This information can be used to plan open space provision in the District that could help to divert recreational pressure away from the Severn (see **Section 6**).

5.9. The implications of these results in terms of future visitation levels and potential conflict with overwintering birds and sensitive habitats are discussed below.

Future Visitation Levels

5.10. **Table 5.1** below sets out approximate figures for the sources of new housing coming forward in the District from 2015 to 2031, within the 7.7km indicative visitor catchment area. This includes local plan allocations (large strategic sites are shown on **Map 4d**), small windfall sites (based on historical trends), and sites for which planning permission has already been granted up to April 2016. These figures are taken from parishes which fall at least partly within the 7.7km catchment area, but are not accurate enough to identify how much of each parish falls within the catchment. The data does not account for permissions which are not implemented or large windfall sites which may come forward in the future, and so the figures should be taken as broad estimates only.

Table 5.1: *Approximate levels of new housing to come forward within the 7.7km visitor catchment area from 2015 to 2031*

Existing planning permissions (to April 2016)	700
Local Plan allocations	2850
Windfall allowance (average over previous 12 years)	250
Predicted total supply 2016-2031	**3800**

5.11. New residents from each of these sources are likely to contribute to an increase in recreational pressure on the Estuary. The strategic Sharpness allocation in particular is likely to make a significant contribution given its location directly adjacent to the Estuary, and the nature of the proposals means that additional visits could be made by employees and tourists as well as residents.

5.12. Development proposals coming forward in these areas will therefore need to demonstrate that they can ensure no adverse effects on the Severn Estuary through the Habitats Regulations Assessment (HRA) process, and can also be reasonably expected to contribute to the funding of any necessary impact avoidance measures, discussed further in **Section 6**.

5.13. It is also noted that the proposed restoration of the Stroudwater Canal could contribute to an increase in visits to the area around Saul Junction and Fretherne Bridge, and additional water-based recreation along the Gloucester and Sharpness Canal.

Outside the District

5.14. While it is beyond the scope of this report to review the local plans for the authorities surrounding Stroud, it can be assumed that these involve a net increase in housing numbers. As evidenced by the visitor survey, some 32.7% of visitors had come to the survey area from postcodes outside the District and Sharpness is to be promoted as a tourism destination. As shown on **Map 4**, the wider Gloucester area in particular has a higher density of housing than any parts of Stroud, but is closer to the SPA than some of the eastern and southern areas of the District. In total, 21 groups (10%) interviewed came from the Gloucester/Cheltenham area. It can therefore be expected that additional recreational pressure will be also exerted on the Estuary by visitors from outside of the District.

Summary

5.15. As set out above, around 3,800 new dwellings are likely to be delivered within the 7.7 km catchment zone by 2031. Taking the average household size in Stroud of 2.3 people (ONS, 2012), and the estimated ratio of 0.4 dogs per person from the visitor survey, this equates to around 8,740 new residents within the visitor catchment of the Severn, and 3,496 dogs.

5.16. Analysis of the Royal Mail postcode dataset reveals that there are currently 258,534 residential delivery points (i.e. dwellings) within the 7.7 km catchment area, or around 594,628 residents. An additional 8,740 new residents represents a 1.5% increase in the number of residents, and therefore potential visits to the Estuary. An unknown number of additional visits are also likely to be made by people originating from new housing outside of the District.

5.17. It is not possible to calculate the likely increase in actual numbers of visits to the Estuary using on-site visitor survey data, and not all new residents will visit the Estuary for recreation, or dog walking. However it can be reasonably assumed that many of them, especially at Sharpness, will visit at least occasionally for this purpose, contributing to a modest increase in recreational pressure on the Estuary within the survey area.

5.18. Residents' surveys can be used to calculate the percentage of households/numbers of residents within the catchment area that currently visit the Estuary, and therefore estimate the actual number of additional visits that could originate from new housing sites. This is discussed in **Section 6**.

5.19. The predicted increase in recreational pressure will only become an issue if it is likely to generate significant adverse effects upon the Severn Estuary SAC/SPA/Ramsar site in light of its conservation objectives. The remainder of this Section therefore looks at whether this increase in recreational pressure is likely to come into conflict with the features for which the Severn Estuary SAC/SPA/Ramsar site was designated, thus triggering the need for impact avoidance measures.

Disturbance to Overwintering Birds

5.20. As identified in the HRA of the Local Plan (URS, 2013) and by Natural England in the Site Improvement Plan for the Severn Estuary (NE, 2015), the main potential impact of increased recreational pressure on the Estuary is disturbance to the overwintering birds associated with the SPA/Ramsar designations.

5.21. A variety of factors can influence how birds respond to disturbance, and the impact of disturbance upon them, such as the species involved, availability and proximity of alternative habitat, time of day, and habituation to the disturbance source. However it is generally acknowledged that disturbance can have energetic costs for birds by reducing the time they spend feeding or roosting, and this can have implications for their survival and reproductive success, particularly in winter when they are more vulnerable due to food shortages. Disturbance can also effectively reduce the amount of habitat available to birds, if they avoid highly disturbed areas.

5.22. The HRA of the Local Plan discusses the implications of disturbance in detail with reference to published research. It notes that "the most disturbing activities are likely to be those that involve irregular, infrequent, unpredictable loud noise events, movement or vibration of long duration" and that the three key factors influencing a species' response to disturbance are "species sensitivity, proximity of disturbance sources and timing/duration of the potentially disturbing activity."(URS, 2014).

5.23. There is some evidence that birds can become habituated to disturbance at busier sites, and so it is possible that a small increase in recreational activity at quieter sites could have a disproportionately large effect. However, habituation is generally acknowledged as an area of avian ecology that is poorly understood and requiring further research (Rees et al., 2007, Sutherland, 2007).

5.24. Little is known at present about the current levels of disturbance to overwintering birds within the survey area, the main sources of any disturbance, or how different species react. This gap in the evidence base requires further research. For now, reference has

been made to comparable studies to identify the most likely sources of disturbance, and this report will be updated if further information becomes available.

5.25. Bird disturbance surveys were carried out as part of the Solent, North Kent and Exe Estuary studies, in addition to the visitor survey work referred to in **Section 4**. In all three studies, the majority of potential disturbance events (defined as recreational activity within 200m of birds in the study area, or which resulted in birds being disturbed) did not elicit a response from the birds. However, the studies found that activity in the intertidal zone was more likely to cause birds to take flight than activity on the shoreline or open water. In particular, dogs off leads and water-based recreation accounted for the majority of major flights.

5.26. As discussed above, this visitor survey found that over half of groups had at least one dog with them, with over 80% let off the lead. The majority of dogs which were said to leave the paths, and potentially run onto intertidal habitats, were recorded at AP7 (Fretherne Bridge) and AP8 (Arlingham). Significant recreational disturbance is therefore most likely to occur in these areas. The intertidal area is not accessible from the Severn Way in the busy areas between Sharpness and Fretherne Bridge, though some degree of trespassing may occur, particularly around Saul Warth and south of Splatt Bridge, where access was possible in the past.

Water-based recreation

5.27. Water-based recreation also has the potential to cause significant disturbance, and this is likely to increase with the addition of new residents, tourism facilities at Sharpness, and the restoration of the Stroudwater Canal.

5.28. During the visitor surveys, some water-based recreation was observed, mainly in the form of rowing and narrow boats on the canal, and occasional canoes and kayaks. These smaller vessels could potentially access shallower areas of the Estuary that are closer to sensitive sites.

5.29. The need for additional access management measures and further survey work in relation to water-based recreation is also discussed in **Section 6**.

Other Sources

5.30. Other potential sources of disturbance to birds, which could increase with the introduction of new residents to the District, include wildfowling (both formal and informal), and fishing activities, It is beyond the scope of this study to investigate these further, but they should be taken into account as part of the further research discussed in **Section 6**.

Potential Areas of Conflict with Overwintering Birds

5.31. Disturbance to overwintering birds through the mechanisms described above is most likely to occur in areas where high levels of recreational activity, or particularly disturbing activities such as dogs off leads near high tide roosts or in the intertidal area, coincide with the important areas for birds described in **Section 2**.

5.32. **Map 6** therefore depicts how the different levels of recreational pressure shown on **Maps 5a and 5b** intersect with the important bird areas shown on **Map 2**. This has been used to identify areas where the potential for conflict between overwintering birds and recreational activity is highest, discussed below.

5.33. Overall, **Map 6** shows that the majority of the important bird areas do not coincide with high levels of recreational activity, or indeed areas where intertidal habitat can be accessed. In particular, the key high tide roost site at Slimbridge is set back from the Severn Way and visitor access to this area is managed by the WWT.

5.34. The canal towpath between Splatt Bridge and Saul Junction is subject to high levels of recreational activity and runs parallel to the high tide roost site at Saul Warth, but the majority of the towpath is set back and screened from the roost. However, as shown on **Map 6**, there is potential for conflict to occur in the area where the Severn Way leaves the towpath at Fretherne Bridge and re-joins the shoreline of the Estuary. The possibility of trespassing should also be considered as there is anecdotal evidence that this occurs in this area.

5.35. AP7 (Fretherne Bridge) and AP9 (Hock Cliff) were popular with dog walkers, and a high percentage of visitors interviewed at AP7 said that they let their dogs stray off the footpaths, which could potentially cause significant disturbance to roosting birds. Occasional trespassing is also thought to occur onto Saul Warth itself (see **Section 2**), and the planned restoration of the Stroudwater Canal may lead to increased visits to the area. This area would therefore merit further study and monitoring, discussed in **Section 6**.

5.36. The canal towpath between Sharpness/Purton is subject to relatively high recreational pressure, but this stretch of the Estuary is not thought to be of high importance to birds. Moreover, access to intertidal habitats here is also restricted by the fringe of reedbed between the towpath and the Estuary. The area around Sharpness Docks, however, has relatively high numbers of bird records and is subject to high levels of visitor pressure around the Marina and Picnic Site; the latter being particularly popular with dog walkers. These areas should also be prioritised for further study and monitoring, particularly in the context of the strategic site allocation in this location.

5.37. The area around Berkeley Pill is thought to be used by birds as a small, occasional high tide roost. To the north, the area of foreshore between Berkeley Pill and Sharpness is

thought to occasionally support high concentrations of certain species, and an area of land adjacent to the Estuary in this area is to be managed for the benefit of Lapwing and other waterbirds for the next 15 years. Visitor pressure in this area is currently relatively low (see **Section 6**).

Adverse Effects on Severn Estuary SAC

5.38. While disturbance to overwintering birds has been identified as the key potential impact associated with increased recreational pressure, the Site Improvement Plan for the Estuary (NE, 2015) also notes that public access/disturbance can have adverse effects upon the habitats for which the Severn Estuary SAC was designated. These include physical damage through trampling and erosion, and pollution through activities such as littering and dog fouling.

5.39. Although the scope of this study does not extend to an assessment of specific impacts on the SAC and Ramsar habitats, the potential impact avoidance measures discussed in **Section 6** would, by extension, also avoid or reduce impacts on the qualifying features of the SAC/Ramsar site as well as those of the SPA/Ramsar site.

Conclusion

5.40. This Section has discussed the results of the visitor survey in the context of future visitation levels and the potential for recreational activity to adversely affect the qualifying features of the Severn Estuary SAC/SPA/Ramsar site in the survey area. Likely sources of disturbance, and key areas of potential conflict, have been identified with reference to available information and data, though gaps in the evidence base remain and some assumptions have therefore been made.

5.41. In summary, housing, employment and tourism development to be delivered both within and outside the District is likely to generate a modest increase in levels of recreation in the survey area, particularly around Sharpness, Purton, Splatt Bridge and Fretherne Bridge. This activity has the potential to conflict with important areas for overwintering birds at Sharpness and Saul Warth, as shown on **Map 6,** and therefore a likely significant effect on the features for which the Severn Estuary SAC/SPA/Ramsar site was designated cannot be ruled out at present.

5.42. Further research is therefore required in order to inform a robust assessment of whether recreational disturbance in these potential conflict areas is likely to adversely affect the conservation status of the qualifying features of the SAC/SPA/Ramsar site, and this is discussed in **Section 6**. However, the results of this study indicate that some level of strategic impact avoidance and mitigation in the survey area is likely to be required.

5.43. This will need to be developed and refined in consultation with partners such as Natural England and ASERA as the results of further research become available, but the findings of this study provide the basis for the development of a targeted and

proportionate Interim Impact Avoidance Strategy to which developers within the 7.7 km catchment area can make financial contributions. Initial recommendations on the scope and content of this Strategy are set out in **Section 6**.

6. NEXT STEPS

Overview

6.1. As discussed in **Section 5**, recreational pressure in the survey area is predicted to increase as a result of planned development both within and outside the District. This has the potential to conflict with key areas for overwintering birds at Sharpness and Saul Warth, thus potentially undermining the conservation objectives for the Severn Estuary SPA/Ramsar site. Damage to SAC habitats may also occur. This triggers the need for impact avoidance measures, to avoid and reduce adverse effects on the features for which the Estuary was designated.

6.2. The visitor survey work set out in this report fills an important gap in the current evidence base in terms of baseline levels and patterns of recreation in the survey area. The results of this work can be used to develop an Interim Impact Avoidance Strategy, discussed further below. This is likely to require revision at a later date to ensure that the strategic measures are appropriate, targeted and proportionate. Further work is likely to be needed in order to understand whether birds in the potential conflict areas identified in this study currently experience significant disturbance from recreational activity, and if so, its effect upon them.

6.3. This Section therefore sets out recommendations for the scope and contents of an Interim Impact Avoidance Strategy, and also for the further survey work required to fill the remaining gaps in the evidence base.

Towards an Interim Impact Avoidance Strategy

6.4. As set out above, the results of the visitor survey work indicate that impact avoidance measures will be required. It is possible at this stage to set out the broad scope and content of an Interim Strategy, and the key principles that should underpin it, although the precise scope and nature of these needs to be further informed and refined through the bird monitoring and disturbance survey work described below.

6.5. A similar Interim Strategy was put in place by Stroud District Council in 2015 to avoid impacts on Rodborough Common SAC (SDC, 2015) and will be updated and converted into a Supplementary Planning Document in due course. This stipulates that developments resulting in a net increase of one dwelling or more within the 3km visitor catchment of the SAC (also established through visitor survey work), must either contribute to the funding of specific projects set out in the Interim Strategy, provide their own bespoke impact avoidance measures. Costs are on a per-dwelling basis and are collected through S106 contributions.

6.6. Elsewhere, the studies in the Solent, North Kent and Exe Estuary referred to throughout this report have resulted in similar strategies, which also set out targeted and evidence-based recommendations for mitigation measures and projects that can be funded

through per-dwelling contributions (Liley and Underhill-Day, 2013, Liley at al., 2013, SRMP, 2014), It would therefore be appropriate to implement a strategy of this type for the Severn Estuary SAC/SPA/Ramsar site within the Stroud District.

6.7. The Interim Strategy should comprise two key components: impact avoidance through the provision of alternative open spaces in suitable locations away from the Severn, and on-site mitigation, through the implementation of access management measures.

Impact Avoidance

6.8. A commonly used mechanism for avoiding a net increase in recreational pressure on European sites, pioneered and well established at the Thames Basin Heaths SPA, is to provide alternative open spaces to draw a proportion of visits from both new and existing residents of an area away from the SAC or SPA. These are known as Suitable Alternative Natural Greenspace (SANGs) sites.

6.9. Well-designed SANGs can be effective in avoiding a net increase in visits to a site, but cannot be relied upon as the primary means of impact avoidance for coastal sites, purely because the attraction of the coastal environment itself cannot be easily replaced or replicated elsewhere. Indeed, almost half (49.8%) of all groups interviewed during the visitor surveys said that access to/views of the water were the reason why they chose to visit the survey area.

6.10. Nevertheless, with careful planning and design, it should be possible to divert a proportion of visitors to new and/or existing alternative open spaces in the District. The Visitor Survey found that many groups also visited the survey area for reasons such as its peacefulness, and the ability to let their dog off the lead. These qualities can be provided in alternative locations. Reference should also be made to Natural England's Guidelines for the Creation of SANGs (NE, 2008) which set out a list of qualities to include when designing effective SANG sites.

6.11. Furthermore, the visitor survey generated a 'wish list' of features that visitors find desirable in the open spaces they visit. For example, many groups suggested toilets, café facilities, good parking provision, well maintained footpaths, and benches. If these facilities are provided and promoted at alternative open spaces, and are not available near the Severn, it is likely that some new and/or existing visitors will choose to visit the alternative sites instead, at least some of the time.

6.12. The location of alternative open spaces is also important, with many visitors saying that they liked to visit the Severn because it was close to home. Therefore, future open space provision should be located close to the large strategic housing sites. This is particularly important at Sharpness due to its proximity to the Estuary. A conveniently located, attractive, safe and well-maintained space set back from the Estuary where

dogs can exercise freely off the lead should be at the core of the impact avoidance strategy for this area.

On-site Access Management

6.13. While the provision of carefully designed alternative open spaces is likely to draw a proportion of visits away from the Estuary, it is inevitable that many people will continue to visit due to the unique qualities of the coastal environment. This is particularly true of tourists and visitors from outside the District, who make up a relatively high proportion of visitors to the survey area. On-site access management measures will therefore need to be at the heart of the Impact Avoidance Strategy.

6.14. As reported in **Section 4**, the visitor survey has gathered a wealth of information that can be used to plan and target evidence-based access management measures at different user groups and areas. For example, measures targeted at dog walkers will be particularly important around AP7 and AP8, where a high proportion of groups said they allowed their dogs to run off the paths. Similarly, footpaths could be improved in less sensitive areas such as the canal towpath between Sharpness and Purton, to encourage visitors to favour these areas.

6.15. On-site access management measures can be based around the following key themes:

- **Education and Awareness:** As per the Site Improvement Plan for the Estuary (NE, 2015), promote education and raise awareness about the sensitive birds areas and habitats in the survey area, for example on information boards and leaflets. This can be targeted at specific user groups such as dog walkers, and more heavily promoted in potential conflict areas such as Sharpness and Saul Warth. Working with ASERA and boat clubs, Good Practice Guidelines should also be produced for water-based recreational activity;
- **Zoning and Bylaws:** Consider the introduction of zoning and bylaws, for example to restrict access or require people to keep dogs on leads in sensitive areas and/or at certain times of year. The locations of boat moorings should also be reviewed to ensure that these are not in important bird areas;
- **Signage:** Clear signage can encourage people to keep to designated footpaths, and should be used to inform dog walkers about where dogs should be kept on the lead;
- **Wardening:** A regular warden presence can assist in enforcing zoning and bylaws, reinforcing educational messages and encouraging desired visitor behaviour;
- **Parking:** Management of parking provision and charges can be used to influence the areas that people prefer to visit for recreation. Current provision

should be reviewed at Sharpness, Purton and Arlingham in particular, which currently attract the highest proportions of visitors travelling by car; and

- **Footpaths and Infrastructure:** Visitors can be encouraged or discouraged from using certain areas through the quality and availability of footpaths and related infrastructure such as gates and stiles. Screening can also be used between footpaths and bird habitats. Formal slipways for boats can be located in (or relocated to) less sensitive areas. Rerouting or diverting footpaths away from potential areas of conflict could also be considered.

6.16. The Interim Impact Avoidance Strategy should be developed in close consultation with key stakeholders including Natural England, ASERA, Parish Councils, and the Canal and River Trust. It also presents an opportunity to work with landowners and wildlife conservation bodies in the District, such as the Gloucestershire Wildlife Trust and the WWT at Slimbridge, who may already have projects underway or in mind which could align with the strategic objectives of the Interim Strategy.

6.17. The Interim Strategy can initially be developed based on the findings of the visitor survey, and then updated and refined to take account of the results of the bird survey and disturbance work recommended to take place in winter 2016/17, discussed further below.

Further Research and Monitoring

Bird Numbers and Distribution

6.18. As identified in the Site Improvement Plan for the Severn Estuary (NE, 2015), further research is required to "understand how the Estuary is currently used by bird populations, identifying key locations (roosting, feeding) and particularly sensitive areas." This is also identified as an action in the Severn Estuary Management Scheme (ASERA, 2011).

6.19. The desk research and visitor survey work carried out for this study has identified the likely important areas within the survey area for overwintering birds; this should be confirmed (and updated if necessary) through field survey work. This requirement is likely to be fulfilled by Natural England's proposed high tide roost surveys in winter 2016/17, and the results of this work will feed into a review of the recommendations of this report.

6.20. Monitoring of bird numbers and distribution in the survey area can be carried out by ongoing WeBS counts. Natural England propose that five-yearly WeBS peak counts can be used as the basis for assessing the effects of recreational disturbance (NE and CCW, 2009). However, it should also be kept in mind that bird use of an area can be affected by other factors, including climate change, natural processes and changes to

habitats outside of the survey area, such as the proposed tidal lagoon projects in the lower Severn.

6.21. Therefore, in addition to surveys aimed at gathering data on bird numbers and distribution, targeted surveys of baseline levels and the effects of recreational disturbance on overwintering birds in the survey area are also strongly recommended, as set out below.

Bird Disturbance Surveys

6.22. Targeted bird disturbance surveys will allow a more robust assessment of whether recreational activity, both land-based and water-based, is adversely affecting the overwintering birds associated with the SPA/Ramsar site. This should take the form of an initial baseline study in winter 2016/17, and then a repeat study, timed to take place in ten years' time or one year post-occupation of the following large site allocations within the visitor catchment area, whichever is sooner:

- Sharpness;
- West of Stonehouse;
- Hunts Grove; and
- North East Cam.

6.23. Bird disturbance surveys should be targeted at the areas identified as having high potential for conflict between overwintering birds and recreational activity. These are shown on **Map 6** and cover the areas between Sharpness Picnic Area and Sharpness Marina, and Saul Warth to Hock Cliff.

6.24. The area between Berkeley Pill and Sharpness is currently subject to low recreational pressure and the Local Plan does not allocate any large scale housing development in this area, so conflict is considered unlikely to occur at present. However, this could change and it may also be necessary to conduct a targeted disturbance survey in this area. Any such survey would be the responsibility of the potential site promoters.

6.25. Policy SA5 of the Local Plan requires any development proposals at Sharpness to conduct a non-breeding bird survey; it is therefore recommended that this is designed to incorporate a disturbance element. The disturbance survey at Saul Warth to Hock Cliff could potentially be funded through contributions from developments in the proposed 7.7 km visitor catchment area.

6.26. The bird disturbance surveys should be based on the methodology used in the other recreational disturbance studies referred to throughout this report in the Solent, North Kent and Exe Estuary. This involves selecting vantage points that allow good views of

both birds and recreational activity, counting all birds in the survey area at the start and end of the survey period, and recording the following information:

- Potential sources of recreational disturbance, including the activity (e.g. canoeist, walker, dog off the lead) and duration;
- Location of the potential disturbance source (shore, intertidal, open water);
- Behaviour of each bird species prior to potential disturbance event (e.g. feeding, roosting);
- Response of each bird species to potential source of disturbance (e.g. no response, raised head, took flight); and
- Distance at which birds responded to disturbance, and distance displaced, if applicable.

6.27. The survey data will allow identification and comparison of the different types of recreational activity that elicited a disturbance response, the species which appeared to be most sensitive, the distances at which different species reacted, and so on. This information can be used to assess whether recreational activity is having an adverse effect on overwintering birds, and if so, the location and types of activity that have the greatest effect, in order to inform and refine the development of the Impact Avoidance Strategy.

Functionally Linked Land

6.28. Natural England (Swanson, 2016, pers.comm,) has highlighted the need to both identify and take into account 'functionally linked land' which is not part of the Severn Estuary SPA designation, but which supports the birds associated with the SPA and as such plays a role in maintaining the integrity of the SPA.

6.29. NE is in the process of mapping potential functionally linked sites within 5km of the Severn Estuary SPA. The results of this work should be taken into account when considering the potential for recreational activity to impact upon the conservation objectives of the SPA and should therefore feed into future monitoring of visitor levels and recreational pressure in the survey area, as well as the development of the Interim Impact Avoidance Strategy.

Visitor Monitoring Surveys

6.30. The visitor questionnaire survey set out in this report should be repeated in the future to assess whether baseline levels and patterns of recreation have changed following the delivery of the strategic sites in the Local Plan. As with the repeat bird disturbance study, this survey should be timed to take place in ten years' time, or at least one year post-occupation of the large site allocations within the visitor catchment area.

6.31. The repeat survey should follow the methodology outlined in **Section 3** so that it can be directly compared to the results of this study, including the number and location of access points and the survey effort. The questionnaire itself should also be largely identical although some questions may be adapted, for example to gain more information on how visitor use of the survey area and other open spaces may have changed.

Residents' Surveys

6.32. Targeted residents' surveys would complement the on-site visitor survey data gathered in this study. In particular, residents' surveys would allow the calculation of the approximate percentage of households/residents that currently visit the Estuary within a given survey area, which can then be used to estimate actual numbers for additional visits that are likely to be generated by new housing development. This will allow developers at the strategic large housing sites to assess the potential impacts of their specific proposals, which will in turn inform the Habitats Regulations Assessment process.

6.33. It is therefore recommended that residents' surveys are carried out for planning applications associated with the Local Plan large housing sites in the 7.7 km catchment area (Sharpness, West of Stonehouse, Hunts Grove and North East Cam) and any other strategic scale housing proposals considered through the planning application process. These should be led and funded by the developer(s), using a standard methodology to be agreed with Stroud DC.

Neighbouring Authorities

6.34. The work being carried out by Stroud DC to develop an evidence base for the impacts of recreational activity is focused on a discrete area of the Severn Estuary SAC/SPA/Ramsar site. However, the Estuary is a complex and dynamic ecosystem that crosses many administrative boundaries. Birds in particular are highly mobile and will utilise different parts of the Estuary at different times. Similarly, recreational patterns are not static but will change over time.

6.35. With this in mind, ideally the work being carried out in Stroud should also be undertaken by other local authorities that border the Severn Estuary. This would allow a more complete picture to emerge of the use of the Estuary by birds and for recreation, how these interact, and where these may come into conflict with each other. This could facilitate the development of a joined-up, overarching impact avoidance strategy for the entire Estuary with targeted measures for each local authority, an approach that is already used in the Severn Estuary Management Scheme (ASERA, 2011).

6.36. Should other local authorities with an interest in the Severn Estuary be minded to undertake such work, it is strongly recommended that the approach and survey methodologies are based on those used in Stroud, to allow integration and direct

comparison of the different datasets. A visitor survey should be undertaken as a minimum, ideally in tandem with targeted bird disturbance and residents' surveys, as outlined above.

Conclusion

6.37. The results of this visitor survey represent a core component of the evidence base for Delivery Policy ES6 of the Stroud District Local Plan. A comprehensive dataset has been gathered on the current levels and patterns of recreational activity at the Severn Estuary SAC/SPA/Ramsar site within the District, providing a baseline against which future monitoring studies can be measured.

6.38. In line with the aims and objectives of the survey, a core catchment zone of 7.7 km has been identified, within which future development proposals are likely to contribute to an increase in recreational pressure on this part of the Estuary.

6.39. Analysis aided by GIS mapping software has been undertaken to identify potential areas of conflict between recreational activity and important sites for the overwintering birds for which the SPA/Ramsar site was designated. Targeted survey work is recommended in order to understand both the levels and types of disturbance currently experienced by birds in these areas, and the effects of this upon them.

6.40. The results of the visitor survey have also been used to make initial recommendations regarding the scope and content of an Interim Impact Avoidance Strategy, to be developed in consultation with Natural England and other key partners such as the Environment Agency, and refined as further evidence becomes available.

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Maps

Map 1	Survey Area and the Severn Estuary
Map 2	Important Areas for SPA Birds
Map 2a	GCER Bird Records 1
Map 2b	GCER Bird Records 2
Map 3	Access Points and Possible Routes
Map 4	Residential Density
Map 4a	Visitor Origins and Type of Visitor
Map 4b	Visitor Origins and Method of Travel to Site
Map 4c	Visitor Origins by Access Point: AP1-3
Map 4d	Visitor Origins by Access Point: AP4-6
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Map 5a	Recreational Density (South)
Map 5b	Recreational Density (North)
Map 6	Potential Areas of Conflict

Appendix 1
Visitor Survey Questionnaire

SEVERN ESTUARY VISITOR QUESTIONNAIRE

***READ OUT*: "*Hello. I am carrying out a survey to find out about local patterns of recreation. I would be grateful if you could spare a few minutes to answer some multiple choice questions……*""**

ACCESS POINT – DO NOT READ OUT:

(1*) ☐ **(3*)** ☐ **(5*)** ☐ **(7*)** ☐ **(9*)** ☐
(2*) ☐ **(4*)** ☐ **(6*)** ☐ **(8*)** ☐

*** NOTE: Numbers refer to Aerial map location**

Date in December 2015 – *DO NOT READ OUT:*

Sat 5th ☐ Sun 6th ☐ Mon 7th ☐ Tues 8th ☐ Wed 9th ☐ Thurs 10th ☐ Fri 11th ☐
Sat 12th ☐ Sun 13th ☐ Mon 14th ☐ Tues 15th ☐ Wed 16th ☐ Thurs 17th ☐

Time – *DO NOT READ OUT:*

07:30-09:30 ☐ 10:00-12:00 ☐ 12:30-14:30 ☐ 15:00-17:00 ☐

Weather conditions - *DO NOT READ OUT:*

Sunshine ☐ Cloud and showers ☐
Sunshine and showers ☐ Heavy rain ☐
Cloudy ☐ Other (*write below*) ☐

TIDE – *DO NOT READ OUT:*

Low Tide ☐ High Tide ☐ Intertidal Period ☐

Q1. How many adults and children are present in your group, including yourself?
[Write number of people in group in each age category]

Number of 0-18 year olds:	
Number of 19-25 year olds:	
Number of 26-59 year olds:	
Number of 60+ years:	

Q2. How many dogs have you taken for this visit? *[If none, mark 0]*

Number = ☐

Q3. How did you get to this site today? *[SINGLE CODE]*

Walk ☐ Bicycle ☐ Other (*write below*) ☐
Car/van ☐ Motorbike ☐
Bus ☐ Boat ☐

Q4. Can you give the postcode of where you travelled from to visit this site? *[This identifies location to street only]*

Postcode:	
No postcode but precise location/road name is:	

Q5. Are you…?

A local resident ☐	An overnight/multiple night stay visitor ☐	Other (*write below*) ☐
A day visitor ☐		_____

Q6. What was the main reason/s for your visit to this site today? *[SINGLE CODE]*

Dog walking ☐	Jogging/exercise ☐	Fishing ☐
Walking ☐	Cycling ☐	Other (*write below*) ☐
Bird watching/ wildlife ☐	Watersports/ pleasure boating (*specify <u>type</u> below*) ☐	_____
_____		_____

Q7. Why have you chosen this site over others? *[MULTI CODE]*

Ability to let dog off the lead ☐	Length & variety of tracks/paths available ☐	Peacefulness ☐
Enjoy the look and feel of this site ☐	It's close to where I live ☐	Proximity to other facilities/features (e.g. car park, toilets, café) ☐
Wildlife/ birdwatching ☐	Access to water/beach ☐	Other (*write below)* ☐
Accessibility (car parking) etc. ☐	Views of water ☐	
Feel safe using this site ☐		_____

Q8. How often do you visit this site? *[SINGLE CODE; CHOOSE CLOSEST ANSWER]*

Daily ☐	Every other week ☐	First visit ☐ **Skip to Q11**
Two-three times a week ☐	Monthly ☐	
Once weekly ☐	Occasionally ☐	

Q9. What time of day do you most often visit? *[SINGLE CODE]*

Before 9am ☐	Between 12 and 2pm ☐	After 4pm ☐
Between 9am and 12 noon ☐	Between 2 and 4pm ☐	No particular time/varies ☐

Q10. What time of year, if any, do you normally visit? *[MULTI CODE]*

Winter –(Dec, Jan, Feb) ☐	Summer – (June, July, Aug) ☐	Or…All times of year ☐
Spring – (March, April, May) ☐	Autumn – (Sept, Oct, Nov) ☐	

Q11. Where did you go during your visit? *Draw neat path with arrows on MAP, show specific route walked/travelled, mark START and FINISH*

Map Number:	

Q12. Do you always use this access point at the start/end of your visit? *[SINGLE CODE]*

Yes ☐ No ☐ Not a regular visitor ☐

Q13. How long was your visit? *[SINGLE CODE]*

Less than 30 mins ☐ 30 mins – 1 hour ☐ Over an hour ☐

Q14. If you have a dog(s), was it let off the lead? *[SINGLE CODE]*

Yes ☐ No ☐ Don't have dogs ☐ ***Skip to Q16***

Q15. Did your dog/s venture off any of the footpaths or onto the mudflats/beach/grass?

Yes ☐ No ☐ Don't know ☐

Q16. And did you venture off any footpaths or onto the mudflats/beach/grass?

Yes ☐ No ☐ Don't know ☐

Q17. Do you visit any other open spaces or estuarine/coastal sites for the same recreational purpose? *[SINGLE CODE]*

Yes ☐ ***Go To Q18*** No ☐ ***Go To Q22*** Don't know ☐ ***Go To Q22***

Q18. IF *Yes TO Q17:* Please could you tell us the name of the <u>main alternative sites (max 3)</u> you visit, with a description of their location?

1……

2……

3……

Q19. How do you usually get there? *[SINGLE CODE;* if varies, state for *<u>main</u>*** alternative site*]***

Walk	☐	Cycle	☐	Other (*write below*)	☐
Car	☐	Motorbike	☐		
Bus	☐	Boat	☐		

Q20. How often do you tend to visit these sites? (if varies, state for *<u>main</u>*** alternative site)? *[SINGLE CODE]***

Daily	☐	Every other week	☐	Occasionally	☐
Two-three times a week	☐	Monthly	☐	First Visit	☐
Once weekly	☐				

Q21. What are your reasons for choosing this alternative site? *[MULTI CODE]*

Ability to let dog off the lead	☐	Feel safe using this site	☐	Views of water	☐
Enjoy the look and feel of this site	☐	Length & variety of tracks / paths available	☐	Peacefulness	☐
Wildlife / birdwatching	☐	It's close to where I live	☐	Proximity to other facilities / features (e.g. car park, toilets, café)	☐
Accessibility (car parking) etc.	☐	Access to water/beach	☐	Other (*write below*)	☐

_____

Q22. Are there any changes to the open spaces around the Severn Estuary that would encourage you to use them more?

Q23. If new open spaces were provided near the Severn, what facilities or features would you like to see?

READ OUT: That completes the interview. To check that all of the interviews that I do are genuine, our office staff will call back about 10% of the people that we interview. You will <u>not</u> be contacted for any other reason as a result of taking part. Please could you confirm:

(i) Your name: _____

(ii) Contact telephone number: _____

THANK AND CLOSE.

INTERVIEWER DECLARATION: I declare that I have carried out the interview with the named person, face-to-face, in accordance with the Market Research Society Code of Conduct.

INTERVIEWER INITIALS: _____

SIGNATURE: _____