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South Gloucestershire Visitor Survey 2024

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Summary

This report has been commissioned by South Gloucestershire Council to review the nature conservation impacts of recreation on the Severn Estuary and consider the implications with respect to the South Gloucestershire Local Plan, the Habitats Regulations Assessment (HRA) of the Local Plan and any mitigation requirements that might be relevant.

Impacts of recreation

The Severn Estuary is a European Marine Site (EMS); qualifying as a Special Area of Conservation (SAC) for a range of coastal habitats and for three fish species. The Severn Estuary Special Protection Area (SPA) is classified for its waterbird assemblage and for a range of species that occur on passage/over winter including a range of both wildfowl and wader species. It is also listed as a Ramsar site, with the Ramsar interest overlapping with the SAC and SPA features. These designations afford the site strict protection.

Impacts from recreation are a particular concern, recognised by Natural England as a current pressure and relate to:

- Damage (e.g. direct harm to vulnerable features from wear and footfall, e.g. trampling of saltmarsh vegetation)
- Contamination (e.g. eutrophication through dog faeces/urine, pollution as a result of dogs entering water bodies)
- Fire (e.g. from barbeques, campfires etc and potentially a risk to habitats such as reedbeds)
- Disturbance (e.g. impacts to birds from the presence of people, dogs, craft etc.)
- Other (public opposition to management, difficulty in grazing etc.

Disturbance to the wintering and passage bird interest is the key issue, and is relevant to the SPA and Ramsar features. Disturbance to roosts is the particular concern and most roosts in the South Gloucestershire area have been identified as having high or very high levels of disturbance. This disturbance is attributed to a range of activities and is an incidental (rather than deliberate) consequence of people visiting the shoreline for recreation, particularly those dog walking or angling.

Visitor survey

To better understand the recreational use, a visitor survey was undertaken along the South Gloucestershire shoreline in late autumn 2024. The survey used the same methods as a previous survey covering the upper reaches of the Estuary in 2022. The survey involved face-face interviews with a random sample of people at 5 different locations along the Severn Estuary and, at the same locations, tally counts of the number of people seen passing the surveyor.

Tally counts

- In total, 710 groups were noted entering, leaving or passing through at the survey point.
- These groups contained a total of 1,259 people (of which 149 were minors) and there were 392 dogs.

- From these totals the mean group size was 1.8 people (of which 0.2 were minors) and 0.6 dogs.
- There was 1 dog for every 3 people.
- Severn Beach was the busiest survey point and Whale Wharf was the quietest.
- All survey points were busier at weekends that on weekdays.

Interviews

- A total of 269 interviews were completed.
- The majority of interviewees (97%) were on a day trip or short visit and had travelled from home that day, 2% were on holiday and <1% were staying with friends or family.
- The most common activities that interviewees were doing that day were walking (44%), dog walking (36%), bird/wildlife watching (7%) and cycling/mountain biking (7%).
- Around half of the interviewees (51%) were visiting for less than an hour and a third (32%) were visiting for 1 to 2 hours.
- Almost half of the interviewees (47%) said that they visit the location where they were interviewed at least once a week, including 18% who visit every day. 14% of interviewees were on their first visit to the interview location.
- 40% of interviewees did not have a preferred time of day to visit, although 18% preferred late morning and 15% preferred early morning.
- Three quarters of interviewees (77%) indicated that they visit equally all year round and this was particularly the case for dog walkers (90% visiting all year round) and those who were cycling/mountain biking (89%).
- Car/van was the most common form of transport used by interviewees to reach the survey point (63%), followed by coming on foot (27%).
- The reasons most commonly cited for choosing to visit the location where interviewed were that it is close to home (29%) and for the scenery/views (28%).
- The median route length taken by interviewees during their visit was 3.1km.
- Other sites that interviewees also visit included Blaise Castle (named by 7% of interviewees), Severn Beach (6%), Aust (4%) and the lakes by Western Approach (4%).
- Suggestions made by interviewees for how the location could be improved for visitors included better/surfaced paths (8% of interviewees), more parking (8%) and more dog waste bins (5%). However, 54% did not want any changes.
- A total of 258 interviewees (96%) gave full valid postcodes that could be plotted in GIS. These interviewees came from 21 local authority areas, with the majority from South Gloucestershire (62%) and Bristol (17%).
- The median straight-line distance from home postcode to the interview location was 6.1km and the 75th percentile distance was 12.3km.

Implications

The visitor survey provides clear evidence of use of the Severn Estuary shoreline by local residents and there is evidence in the literature of a range of recreation impacts, particularly disturbance to birds. Any marked uplift in local housing (i.e. potentially within around 12.3km of the Estuary, the distance within which 75% of visitors interviewed during the survey originated), such as plan-led housing growth, will trigger likely significant effects from recreation to the Severn Estuary SAC/SPA/Ramsar. In order to rule out adverse effects on integrity, mitigation is likely to be necessary.

The visitor survey results from South Gloucestershire are similar to the wider survey of the upper reaches of the Estuary and neighbouring authorities have already established a strategic approach to mitigation. This provides an obvious model and potential delivery mechanism for mitigation delivery. How this might work and recommendations for next steps are set out in the report.

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Survey work was undertaken by Graham Blight and Hannah Howells.

1. Introduction

Overview

1.1 This report has been commissioned by South Gloucestershire Council to review the nature conservation impacts of recreation on the Severn Estuary and consider the implications with respect to the South Gloucestershire Local Plan, the Habitats Regulations Assessment (HRA) of the Local Plan and any mitigation requirements that might be relevant.

Severn Estuary

1.2 The Severn Estuary is one of the largest estuaries in Europe and is internationally important for the habitat and species the estuary supports. The exceptional importance of the estuary for nature conservation is reflected in a range of designations. It is a European Marine Site (EMS); qualifying as a Special Area of Conservation (SAC) for a range of coastal habitats and for three fish species. The Severn Estuary Special Protection Area (SPA) is classified for its waterbird assemblage and for a range of species that occur on passage/over winter including a range of both wildfowl and wader species. It is also listed as a Ramsar site, with the Ramsar interest overlapping with the SAC and SPA features.

1.3 SAC, SPA and/or Ramsar sites are referred to as European sites and are afforded strict protection through legislation and policy.

Balancing recreation and nature conservation

1.4 In the UK there is considerable overlap between nature conservation and recreation. Many of our most important nature conservation sites have legal rights of access, for example through Public Rights of Way. People are often drawn to sites that are important for nature conservation as they are large, scenic and often few other alternatives exist. Recreation use can include a variety of activities, ranging from the daily dog walks to competitive adventure and endurance sports. There can be a difficult balancing act between providing for an increasing demand for access without compromising the integrity of protected wildlife sites.

1.5 There is now a strong body of evidence showing how increasing levels of access can have negative impacts on wildlife. Visits to the natural

environment have shown a significant increase in England as a result of the increase in population and a trend to visit more (O'Neill, 2019). The issues are particularly acute in southern England, where population density is highest. Issues are varied and include disturbance, increased fire risk, contamination and damage (for general reviews see: Liley et al., 2010; Lowen et al., 2008a; Ross et al., 2014; Underhill-Day, 2005).

1.6 It is now increasingly recognised that access to the countryside is crucial to the long-term success of nature conservation projects, for example through enforcing pro-environmental behaviours and inculcating a greater respect for the world around us (Richardson et al., 2016). Access also brings wider benefits to society that include benefits to mental/physical health (Bragg and Atkins, 2016; Kondo et al., 2020; Lee and Maheswaran, 2011) and economic benefits (Bateman et al., 2014; Dasgupta, 2021; Day, 2020). Nature conservation bodies are trying to encourage people to spend more time outside and government policy is also promoting countryside access in general (e.g. through enhancing coastal access and the new England Coast Path).

Legislative context

1.7 The designation, protection and restoration of European sites is embedded in the Conservation of Habitats and Species Regulations 2017, as amended, which are commonly referred to as the 'Habitats Regulations'. Importantly, the most recent amendments (the Conservation of Habitats and Species (amendment) (EU Exit) Regulations 2019[1]) take account of the UKs departure from the EU.

1.8 The Regulations provide strict protection for European sites and this extends to local plans. Regulation 105 *et seq* addresses the assessment of local plans and there is also Government Guidance on the interpretation and application of the Regulations which includes local plans[2]. Local planning authorities, as public bodies, are given specific duties as 'competent authorities'. A competent authority should only approve a project or give

[1] The amending regulations generally seek to retain the requirements of the 2017 Regulations but with adjustments for the UK's exit from the European Union. See Regulation 4, which also confirms that the interpretation of these Regulations as they had effect, or any guidance as it applied, before exit day, shall continue to do so.

[2] Habitats regulations assessments: protecting a European site. Defra and Natural England. 24 February 2021. https://www.gov.uk/guidance/habitats-regulations-assessments-protecting-a-european-site (accessed 4 March 2021)

effect to a plan where it can be ascertained that there will not be an adverse effect on the integrity of the European site(s) (or exceptionally, if there is overriding public interest and no alternatives).

The South Gloucestershire Local Plan and context with neighbouring authorities

1.9 The South Gloucestershire Local Plan will set out a new growth strategy for South Gloucestershire, describing where and how many new homes, jobs and infrastructure are to be provided. The Plan has been developed through a series of Phases and is scheduled to be submitted around mid-2025 to the Secretary of State, who will appoint an Inspector or Inspectors to carry out an independent examination. Phase 3 of the Plan describes an emerging preferred strategy that would result in growth of 7,580 new houses within the District. This level of growth may increase further to accommodate unmet housing need from Bristol and new government targets.

1.10 Consultation responses from Natural England at Phase 3 of the Plan raised concerns about the implications of the Plan in terms of recreation impacts on the Severn Estuary. Recreation impacts were identified as an issue in the HRA screening report[3] that accompanied the Plan.

1.11 Furthermore, local authorities further upriver from South Gloucestershire, in order to address the risks associated with their local plans and fulfil their duties under the Habitats Regulations, have already established a strategic mitigation scheme. Stroud District Council first undertook work and established a mitigation strategy in 2017 (Stroud District Council, 2017). The scheme was then extended to cover neighbouring authorities in 2024 (Liley and Caals, 2024). This scheme extends to address the cumulative effects of local housing growth across 4 local authorities[4] and is broadly in line with those of other estuary sites where disturbance impacts are relevant, such as Poole Harbour, the Solent, the Exe Estuary, North Kent, the Essex Coast and the Suffolk Coast. The mitigation strategy was underpinned by a visitor survey (Caals and Liley, 2022) which did partly extend into South Gloucestershire, however the mitigation strategy does not address the risks

[3] See https://beta.southglos.gov.uk/static/4e52baa6365be9e909eb6536434340c3/HRA-Screening-Report-2023.pdf

[4] Forest of Dean District Council, Gloucester City Council, Stroud District Council and Tewkesbury Borough Council.

from housing growth in South Gloucestershire, meaning there is a clear gap in terms of mitigation for South Gloucestershire.

1.12 Further important context is The 'South Gloucestershire Linking the Levels' (SGLL) programme which will improve, restore, create, and connect internationally important habitat along the Severn Estuary in South Gloucestershire, contributing to the delivery of a range of strategies and plans including the Severn Estuary Strategy and the Association of Severn Estuary Relevant Authorities (ASERA) Management Scheme for the Severn Estuary European Marine Site (EMS). This includes the foreshore, saltmarsh, rhynes, wetlands and pills to deliver outcomes for nature, adaptation, and communities. Linking the Levels is funded through the Green Recovery Fund and development work will be undertaken to prepare a Full Delivery Programme (FDP) of agreed and costed programme priorities ready for seeking further funding and delivery after the 2-year GRF funded period (Stage 1).

The need for this report

1.13 This report has therefore been commissioned by South Gloucestershire Council to review the issues with respect to the specific local context, to collect visitor data for the full extent of the South Gloucestershire shoreline (thereby extending the coverage of the previous visitor survey work) and to consider the work undertaken in adjacent authorities and farther afield.

1.14 The report will consider the implications for the Local Plan and specifically the proximity to the urban areas of Bristol, and the new flood defences that may mean issues associated with recreation are different to other parts of the Severn Estuary. Other important local context relates to the Linking the Levels Project, and the report will consider implications of mitigation and discuss the context in terms of potential zones of influence (where relevant) and viability.

Report structure

1.15 The report is structured as follows:

- **Impacts of recreation on the Severn Estuary** - a desk-based summary of recreation issues with respect to the Severn Estuary SAC/SPA/Ramsar;
- **Visitor survey methods** - setting out the methods used in the visitor survey;

- **Visitor survey results**: **counts** - summarising the visitor counts, i.e. numbers of people recorded during the visitor survey;
- **Visitor survey results: interviews** – setting out the results from the interviews with a random sample of people visiting the South Gloucestershire shoreline;
- **Context and implications** – placing the results of the visitor survey into context ;
- **Recommendations** - a suggestion for potential next steps.

2. Impacts of recreation on the Severn Estuary SAC/SPA/Ramsar

Overview

2.1 The Severn Estuary is a large estuary with extensive intertidal mud-flats and sand-flats, rocky platforms and islands. Saltmarsh fringes the coast backed by grazing marsh with freshwater ditches and occasional brackish ditches. The subtidal seabed is rock and gravel with subtidal sandbanks. The site also supports reefs of the tube forming worm *Sabellaria alveolata*.

2.2 The estuary's classic funnel shape, unique in the UK, is a factor causing the Severn to have one of the highest tidal ranges in the world. A consequence of the large tidal range is an extensive intertidal zone, one of the largest in the UK. The tidal regime results in plant and animal communities typical of the extreme physical conditions of liquid mud and tide-swept sand and rock. The species-poor intertidal invertebrate community includes high densities of ragworms, lugworms and other invertebrates forming an important food source for passage and wintering waders and fish. The site is of importance during the spring and autumn migration periods for waders, as well as in winter for large numbers of waterbirds, especially swans, ducks and waders.

2.3 In this section of the report we consider how recreation may impact the nature conservation interest of the estuary, focussing on the European site interest.

Qualifying features

2.4 The qualifying features of the SAC, SPA and Ramsar are summarised in Table 1. Further details of the conservation importance and qualifying features can be found on the Natural England website[5].

[5] Relevant links and background are available for the SAC, SPA and Ramsar.

Table 1: European site qualifying features for the Severn Estuary. In the qualifying features column, for the SPA, NB denotes non-breeding features.

Site	Reason for designation (# denotes UK special responsibility)
Severn Estuary SAC	H1170 Reefs H1130 Estuaries H1140 Mudflats and sandflats not covered by seawater at low tide H1110 Sandbanks which are slightly covered by sea water all the time S1099 *Lampetra fluviatilis*: River Lamprey S1095 *Petromyzon marinus*: Sea Lamprey S1103 *Alosa fallax*: Twaite Shad H1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
Severn Estuary SPA	Waterbird assemblage A394(NB) *Anser albifrons* albifrons: Greater White-fronted Goose A037(NB) *Cygnus columbianus bewickii*: Bewick Swan A048(NB) *Tadorna ta*dorna: Common Shelduck A051(NB) *Anas strepera*: Gadwall A149(NB) *Calidris alpina alpina*: Dunlin A162(NB) *Tringa totanus*: Common Redshank
Severn Estuary Ramsar	The Ramsar listing is for a number of criteria relating to estuarine habitat communities and migratory fish (Salmon *Salmo salar*, Sea Trout *S. trutta*, Sea Lamprey *Petromyzon marinus*, River Lamprey *Lampetra fluviatilis*, Allis Shad *Alosa alosa*, Twaite Shad *A. fallax*, and Eel *Anguilla anguilla*) in addition to the extensive waterfowl assemblage.

Impacts of recreation

2.5 Potential impacts of recreation to the qualifying features of the European site are summarised in Table 2 and relate to the following broad pathways:

- Damage (e.g. direct harm to vulnerable features from wear and footfall, e.g. trampling of saltmarsh vegetation)
- Contamination (e.g. eutrophication through dog faeces/urine, pollution as a result of dogs entering water bodies)
- Fire (e.g. from barbeques, campfires etc and potentially a risk to habitats such as reedbeds)
- Disturbance (e.g. impacts to birds from the presence of people, dogs, craft etc.)
- Other (public opposition to management, difficulty in grazing etc.).

Table 2: Potential impacts from recreation relevant to the Severn Estuary SAC/SPA/Ramsar

Pathway	Impact	Notes	Relevant qualifying features	References
Damage	Trampling and wear	Heavy footfall can result in vegetation wear, compaction & erosion. Likely to be limited to those areas of habitat accessible to people	Saltmarsh	Lowen et al. (2008b); Coombes (2007)
Contamination	Nutrient enrichment from dog fouling	Risks from dog fouling resulting in increased nutrient levels and changes in vegetation. Impacts likely to be limited due to relative inaccessibility of many habitat areas	Saltmarsh	Harris (2023); De Frenne et al. (2022)
Contamination	Contamination of water bodies from dogs	Dogs swimming in ditches and other waterbodies brings potential risks from increased turbidity and pollution from flea treatments etc	Eel; possibly other fish?	Groome et al. (2018); Denton & Groome (2017); Perkins et al. (2020); Denning *et al.* (2024)
Contamination	Fly tipping/litter	Short-term impacts to interest features likely to be minimal but risks of long-term contamination, particularly from introduced species from garden waste possibly a risk. Also risks of staff time drawn from other essential duties.	?	
Fire	Increased fire risk	Fire risk linked to recreation through discarded cigarettes, BBQs etc.	Reedbed, saltmarsh	Kirby & Tantram (1999);
Disturbance	Disturbance to non-breeding waterbirds	Risks from avoidance of otherwise suitable areas, reduced feeding rate, stress and increased energetic costs.	Wintering waterbirds	Van der Kolk *et al.* (2022); Archer (2019); Hockin *et al.* (1992)
Other	Disruption of management	Disruption such as dog attacks to livestock; gates left open; theft of equipment/material; all issues to be expected at more urban sites or those with more recreation – potentially most relevant on functionally-linked land around the estuary.	Wintering waterbirds	
Other	Public opposition/objection to management	Management interventions such as grazing, water level management etc. can be sensitive and opposed by local residents, leading to issues achieving the necessary	Wintering waterbirds	Woods (2002)

Pathway	Impact	Notes	Relevant qualifying features	References
		management – potentially most relevant on functionally-linked land around the estuary.		
Other	Damage to infrastructure, vandalism etc.	Direct damage can occur through graffiti and deliberate vandalism which tend to be issues at more urban sites – potentially most relevant on functionally-linked land around the estuary.	Wintering waterbirds?	

Disturbance

2.6 Disturbance to the wintering and passage bird interest is the principle concern, and is relevant to the SPA and Ramsar features.

2.7 Disturbance to wintering and passage waterfowl can result in:

- A reduction in the time spent feeding due to repeated flushing/increased vigilance (Bright et al., 2003; Fitzpatrick and Bouchez, 1998; Stillman and Goss-Custard, 2002; Thomas et al., 2003; Yasué, 2005)
- Increased energetic costs (Nolet et al., 2002; Stock and Hofeditz, 1997)
- Avoidance of areas of otherwise suitable habitat, potentially using poorer quality feeding/roosting sites instead (N. H. Burton et al., 2002; N. H. K. Burton et al., 2002; Cryer et al., 1987; Gill, 1996)
- Increased stress (Regel and Putz, 1997; Thiel et al., 2011; Walker et al., 2006; Weimerskirch et al., 2002).

2.8 Issues are associated with a range of activities including those on the shore (walking, dog walking etc.), on the water (such as jet skis, kayaks and paddleboards) and in the air (drones, paragliders and other airborne craft).

2.9 Natural England's site improvement plan[6] for the Severn Estuary SAC/SPA/Ramsar identifies public access/disturbance as a current pressure and a threat and prioritises it above all other pressures or threats identified. The plan states: "*Public access and recreation (including third party activities) may have an impact on bird species sensitive to disturbance, causing displacement from feeding, roosting and moulting areas, and if severe could affect long term survival and population numbers and distributions within the Estuary. There are a wide range of recreational activities within the site (walking, dog walking, horse riding, biking, beach activities, angling, wildfowling, other shooting (e.g. clay pigeon)) that may cause damage to habitats where pressure is high*."

2.10 Similarly, for the Severn Estuary SSSI, which underpins the European designations, Natural England's website has a list of current pressures for the SSSI interest[7]. There are 8 pressures listed of which two are recreational disturbance related: "Sporting Activities" which are cited as a High Risk but

[6] See the Natural England website: https://publications.naturalengland.org.uk/publication/4590676519944192
[7] https://designatedsites.naturalengland.org.uk/SitePressures.aspx?SiteGuid=c6ac95e3-5a50-e411-a6ba-000d3a2004ef&SiteCode=S1002284&SiteName=Severn%20Estuary%20SSSI (Accessed 12/12/24)

potential status and "Recreational Disturbance" which is a High Risk and an Active (i.e. current) status.

2.11 Further background and evidence on recreation impacts for the Severn Estuary can be found in a range of reports and studies. Coming Home to Roost (Archer, 2019) was a 3 year project to monitor high-tide waterbird roosts along the South Gloucestershire and Bristol coastline of the Severn Estuary. The report found some degree of disturbance on a third of roost visits and during the most critical period (Dec-Feb) this was as high as 40%. Most roost sites experienced high or very high levels of disturbance during the project period. There was very little evidence of deliberate disturbance of roosts, with most occurring incidentally as people used and enjoyed coastal amenities. Dogs off leads and sea anglers fishing close to roosts together accounted for almost two thirds of recorded events. Walker disturbance accounted for almost one fifth of known disturbance events.

2.12 Key wader roosts within South Gloucestershire were also mapped and documented by Woodward *et al* (2016), who summarised the disturbance issues for each roost. The descriptions are similar to those in the Coming Home to Roost report with most roosts being regularly disturbed by anglers, dog walkers, walkers etc.

2.13 While the above focus on the SPA, the birds will roam widely and also use areas outside the SPA boundary. Such sites that are potentially functionally-linked to the SPA/Ramsar may also be potentially vulnerable to disturbance. Such sites may become more important in the long-term as a result of climate change, sea level rise and increased storminess and are also likely to be more accessible. Key locations around the estuary that are potentially functionally-linked are described by Palmer and Smart (2021).

3. Visitor survey methods

Survey locations

3.1 Surveys took place at 5 survey points (Table 3 and Map 1). These were locations at which it is possible to access the Severn Estuary and which would be suitable for intercepting visitors for interview.

Table 3: Visitor survey points

ID	Location name	Grid reference	Description
1	Oldbury on Severn	ST60859243	On the track leading from the village to Thornbury Sailing Club
2	Whale Wharf	ST58829102	Small parking area with access to the Severn Way
3	Old Passage	ST56158817	New footpath off Passage Road, south of Aust
4	New Passage	ST54468643	On the Severn Way, at the end of New Passage Road
5	Severn Beach	ST53868475	At the end of Station Road, near Riverside Park

Survey logistics

3.2 Surveyors undertook counts and visitor interviews within standard two-hour periods, standardised across survey points. Face-to-face interviews were conducted with a random selection of visitors, with the surveyor selecting the next person they saw after completing the previous interview, with only one person interviewed per group or party.

3.3 Alongside the interview data, surveyors maintained a tally of all people passing, recording the number of groups (of any size), individuals, minors, dogs and cyclists. These counts allow a comparison across survey points in terms of visitor volume/footfall, and indicate the proportion of visitors that were interviewed at each location.

Questionnaire design

3.4 The questionnaire (Appendix 1) was designed using Snap XMP software and was conducted using tablet computers running the Snap Offline Interviewer app. The route that the interviewee had taken on site (or was planning to take) was drawn by the surveyor onto a paper map, using a unique reference number to match it to the corresponding questionnaire data and these routes were subsequently digitised into GIS.

Survey timings

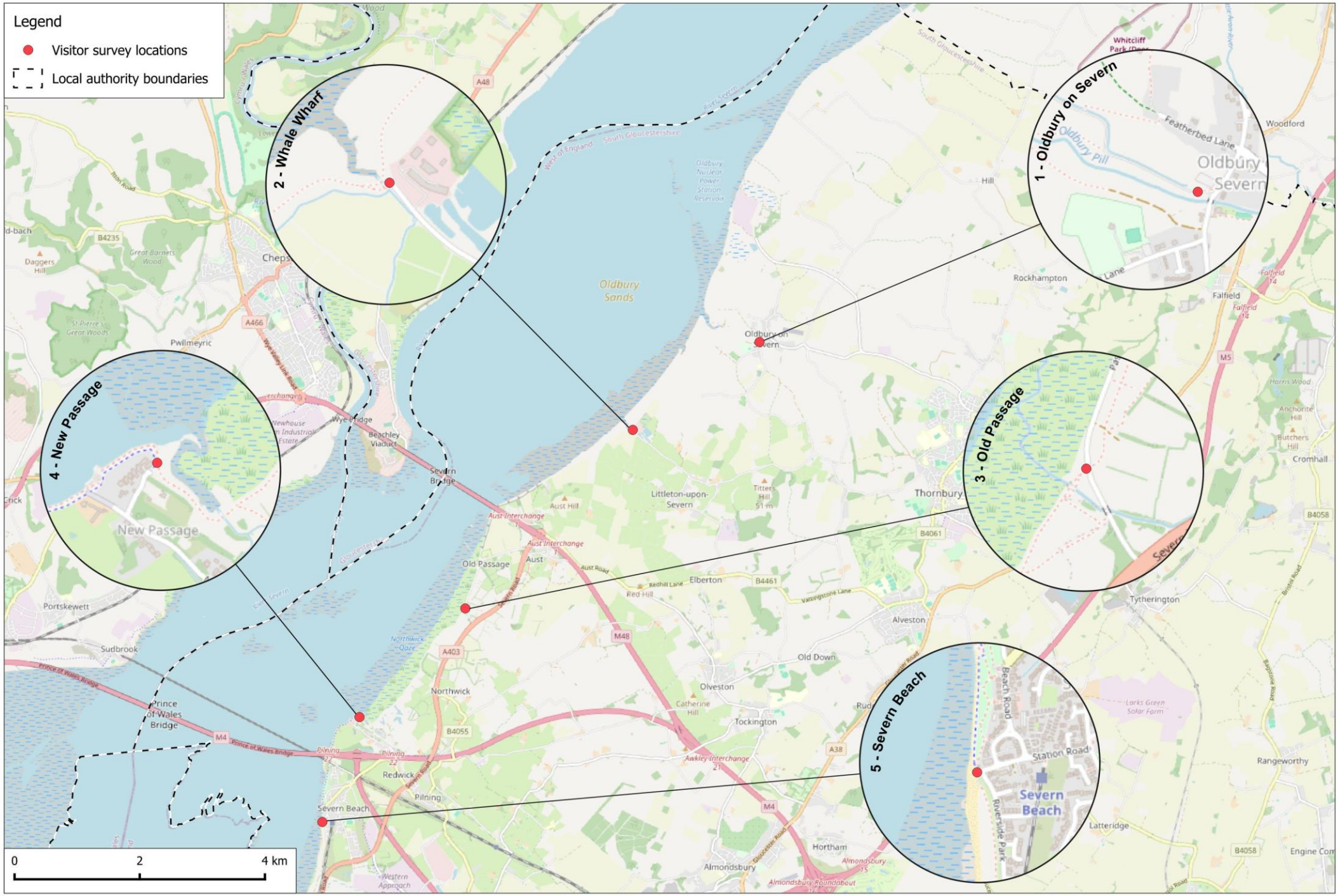
3.5 Each survey point was surveyed for 16 hours, with 8 hours on a weekend day and 8 hours on a weekday. Surveys were split into 2-hour periods to provide breaks for the surveyors and comparable survey windows across all locations. Survey times comprised**:** 07:00-09:00, 10:00-12:00, 13:00-15:00, and 16:00-18:00.

3.6 Some fieldwork had to be rescheduled due to strong winds, heavy rain and a flood alert. Fieldwork was completed between 4th and 26th October 2024.

3.7 Weather during fieldwork was mostly sunny and mild, with maximum daily temperatures between 13°C and 16°C. The majority of the 2-hour sessions (85%) had no rain.

3.8 There was a major incident on the M5 on 4th October which resulted in a closure between junctions 14 and 15, and then a planned closure of the M4 between junctions 18 and 19 over the weekend of 19th-20th October. It is not known what effect (if any) either of these closures may have had on visitor numbers.

Map 1: Visitor survey locations



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Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors.

4. Visitor survey results: counts

4.1 Tally data are summarised in Table 4. In total, 710 groups were noted entering, leaving or passing through at the survey points. These groups contained a total of 1,259 people (of which 149 were minors) and 392 dogs. From these totals the mean group size was 1.8 people (of which 0.2 were minors) and 0.6 dogs. There was 1 dog for every 3 people. Cyclists made up 11% of the people seen.

4.2 Severn Beach was the busiest location from the tally data, with 477 people counted passing the surveyor. It also had the greatest number of dogs, minors and cyclists. Whale Wharf was the quietest survey location, with 88 people counted.

4.3 The number of people entering at each location is shown in Figure 1, split by weekday/weekend and adults/minors. Overall, there were 67% more people counted on weekends than weekdays, and all survey locations had more people counted at weekends than on weekdays.

4.4 The number of dogs counted at each location on weekdays/weekends is shown in Figure 2. There was less of a clear pattern between weekdays and weekends, with weekends accounting for 55% of the dogs counted, and weekdays 45%.

Table 4: Summary of tally data for each survey location. It includes all people passing the surveyor, regardless of direction. 'Groups' includes lone individuals. 'People' is a total headcount, including minors (under 18s). The highest value in each column is highlighted in red. Two days (16 hours) were spent at each location.

Survey location	Groups	People	Dogs	Minors	Bicycles	People per group	Dogs per group	% minors	% on bicycles
1 - Oldbury on Severn	143	263	124	18	13	1.8	0.9	7%	5%
2 - Whale Wharf	47	88	36	5	1	1.9	0.8	6%	1%
3 - Old Passage	117	210	48	13	38	1.8	0.4	6%	18%
4 - New Passage	135	221	53	21	40	1.6	0.4	10%	18%
5 - Severn Beach	268	477	131	92	52	1.8	0.5	19%	11%
Total	**710**	**1,259**	**392**	**149**	**144**	**1.8**	**0.6**	**12%**	**11%**

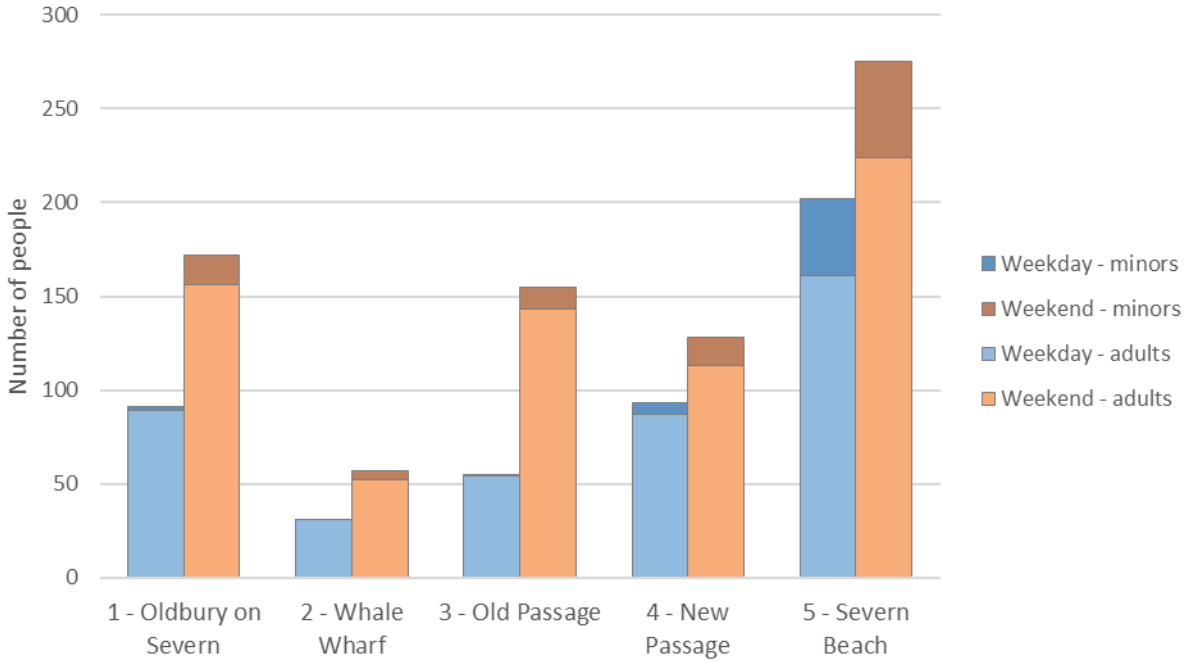


Figure 1: Number of people (adults and minors) counted at each survey location on weekdays and weekends.

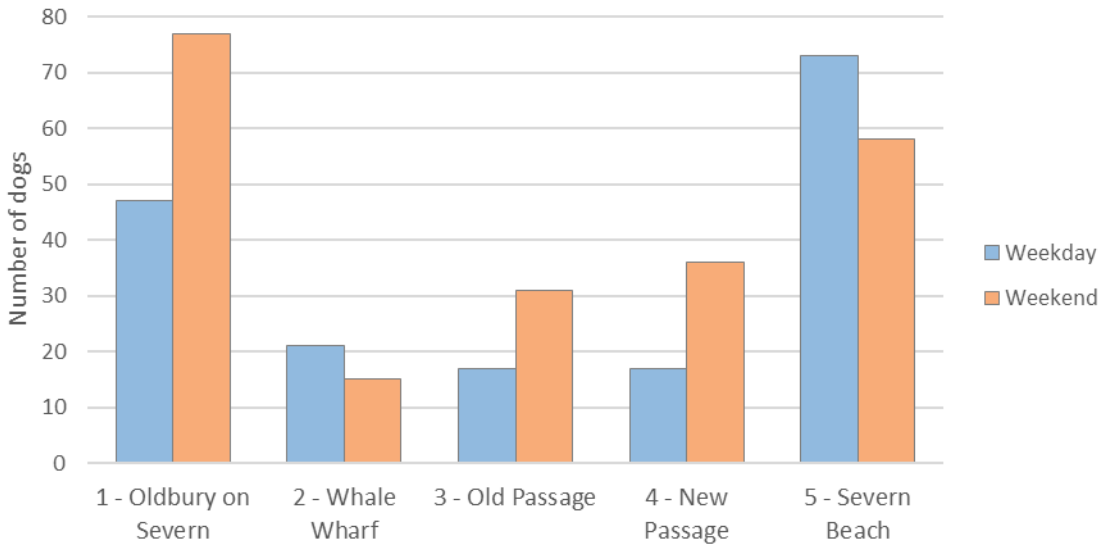


Figure 2: Number of dogs counted at each survey location on weekdays and weekends.

5. Visitor survey results: interviews

Overview

5.1 A total of 269 interviews were conducted, with 125 interviews (46%) on weekdays and 144 (54%) at weekends (Table 5). The median interview duration was just over five minutes.

5.2 As well as the 269 people who were interviewed, an additional 57 people were approached for interview but declined to take part for a variety of reasons. The most common reasons for not wanting to take part in the survey were not having enough time or being in the middle of a run or cycle ride.

5.3 There were also 61 people who were approached for interview but had already been interviewed, and so were not re-interviewed.

Table 5: Number of people approached for interview by survey location.

Survey location	Weekday interviews	Weekend interviews	Total interviews	Already interviewed	Refusals
1 - Oldbury on Severn	30	36	66	8	6
2 - Whale Wharf	15	14	29	1	1
3 - Old Passage	13	24	37	16	14
4 - New Passage	32	26	58	10	9
5 - Severn Beach	35	44	79	26	27
Total	**125**	**144**	**269**	**61**	**57**

5.4 Most interviewees were either on their own (127 interviewees, 47%) or with one other person (105 interviewees, 39%). The remaining 37 interviewees (14%) were in groups of between 3 and 10 people.

5.5 The mean group size (including those on their own) amongst the interviewed groups was 1.8 people. Only 24 interviewees (9%) had 1 or more minors (under 18s) with them.

5.6 111 interviewees (41%) had between 1 and 4 dogs with them, resulting in a total of 149 dogs. Just over a third of these dogs (53 dogs, 36%) were off lead at the time of the interview.

Visit type (Q1)

5.7 The majority (260 interviewees, 97%) were on a day trip or short visit from home. 6 interviewees (2%) stated they were on holiday in the area and staying away from home while 1 interviewee (<1%) was staying with friends or family in the area. A further 2 interviewees (1%) did not fit into any of these categories.

Activity (Q2-3)

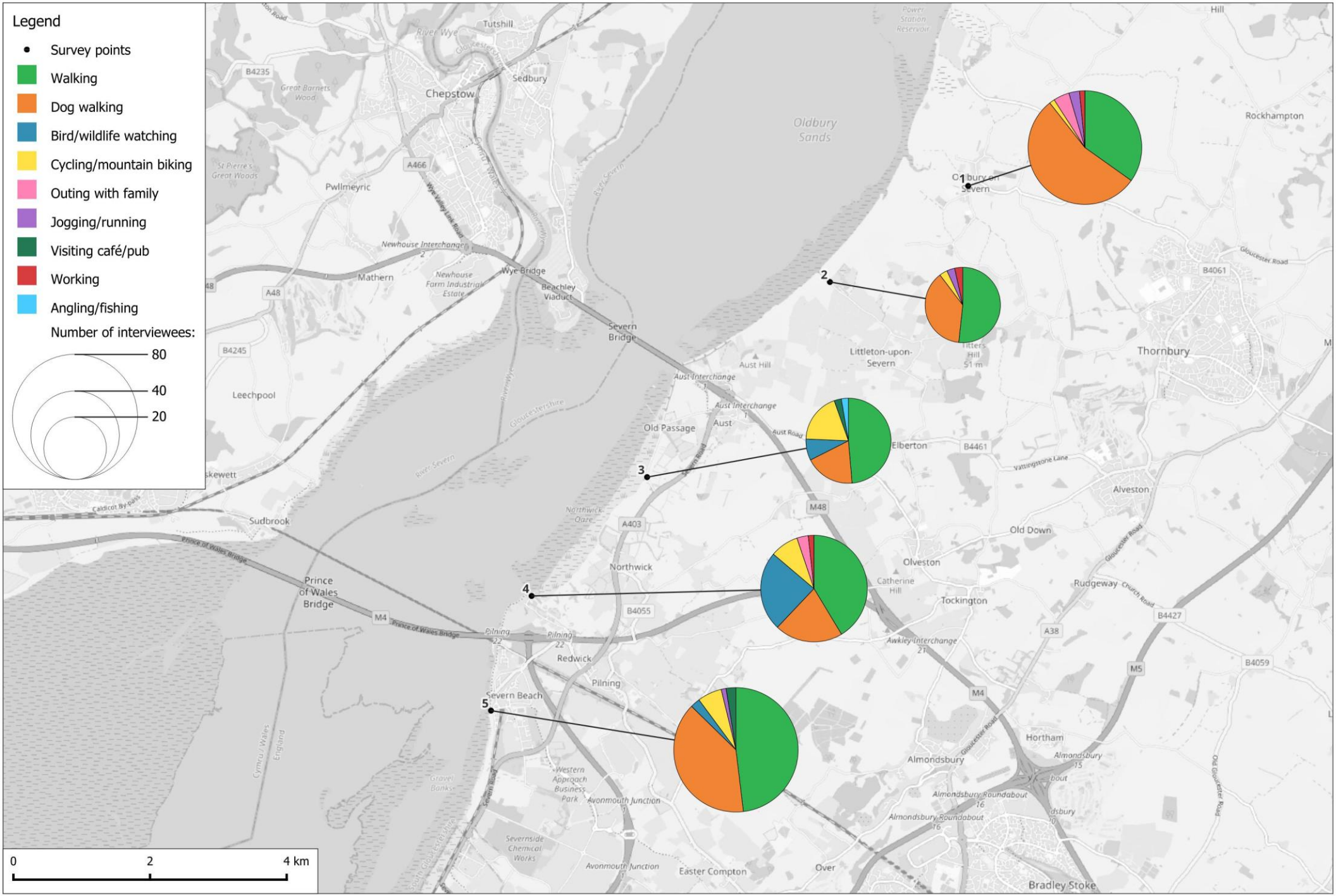
5.8 The most frequently cited main activities of interviewees were walking (118 interviewees, 44% of interviewees), dog walking (97 interviewees, 36%), bird/wildlife watching (19 interviewees, 7%) and cycling/mountain biking (also 19 interviewees, 7%). Other activities included an outing with family, jogging/running, visiting a café/pub, working and angling/fishing (Table 6).

5.9 The proportion of interviewees with each activity type varied by survey location (Map 2). For example, at Oldbury on Severn, over half of the interviewees (55%) were dog walking. New Passage had the highest proportion of interviewees who were bird/wildlife watching (24%) and Old Passage had the highest proportion of interviewees who were cycling/mountain biking (19%).

Table 6: Main activity of interviewees (Q2) by survey location. The highest value in each row is highlighted in red.

Survey location	Walking	Dog walking	Bird/ wildlife watching	Cycling/ mountain biking	Outing with family	Jogging/ running	Visiting a café/pub	Working	Angling/ fishing	Total
1 - Oldbury on Severn	23 (35%)	36 (55%)	0 (0%)	1 (2%)	3 (5%)	2 (3%)	0 (0%)	1 (2%)	0 (0%)	**66 (100%)**
2 - Whale Wharf	15 (52%)	11 (38%)	0 (0%)	1 (3%)	0 (0%)	1 (3%)	0 (0%)	1 (3%)	0 (0%)	**29 (100%)**
3 - Old Passage	18 (49%)	7 (19%)	3 (8%)	7 (19%)	0 (0%)	0 (0%)	1 (3%)	0 (0%)	1 (3%)	**37 (100%)**
4 - New Passage	24 (41%)	12 (21%)	14 (24%)	5 (9%)	2 (3%)	0 (0%)	0 (0%)	1 (2%)	0 (0%)	**58 (100%)**
5 - Severn Beach	38 (48%)	31 (39%)	2 (3%)	5 (6%)	0 (0%)	1 (1%)	2 (3%)	0 (0%)	0 (0%)	**79 (100%)**
Total	**118 (44%)**	**97 (36%)**	**19 (7%)**	**19 (7%)**	**5 (2%)**	**4 (1%)**	**3 (1%)**	**3 (1%)**	**1 (<1%)**	**269 (100%)**

Map 2: Main activity of interviewees by survey location. Pie charts are sized in proportion to the number of interviewees.



Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors.

5.10 Interviewees were also asked about any other activities that they (or people with them) were undertaking during their visit, and these additional activities are summarised in Figure 3. Some activities were named more often as an additional activity than as a main activity, for example bird/wildlife watching and visiting a café/pub. However, walking and dog walking remained the two most common activities, even when taking into account these additional activities.

5.11 Activities grouped as 'other activity' included fossil hunting, drone flying, having lunch, collecting seaweed and looking for the submerged forest.

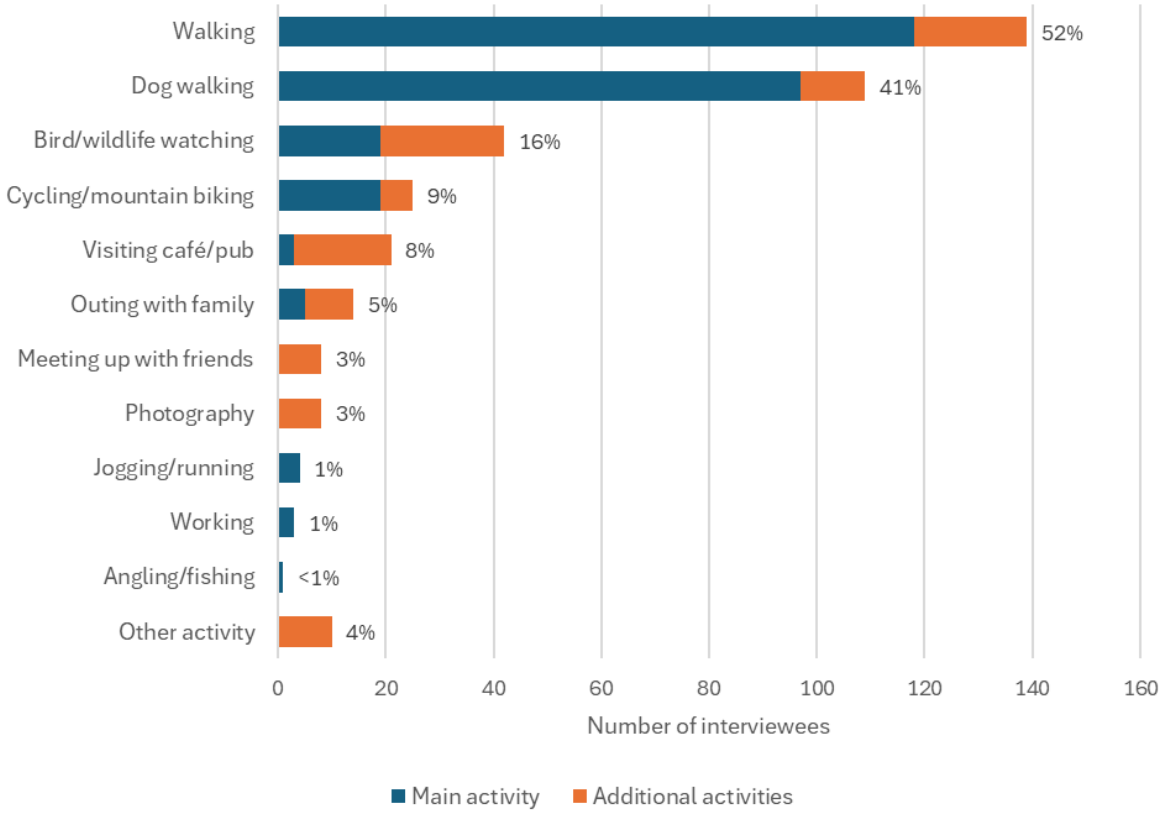


Figure 3: Activities undertaken by interviewees and others in their group. Includes both their single main activity (Q2) and any additional activities (Q3). Labels indicate the percentage of interviewees undertaking each activity type (whether as a main activity or an additional activity). Percentages will not add up to 100 since interviewees could name multiple activities in Q3.

Visit duration (Q4)

5.12 Around half of the interviewees (137 interviewees, 51%) were visiting for less than an hour and around a third (87 interviewees, 32%) were visiting for 1 to 2 hours (Figure 4). Based on the categorical responses relating to visit duration the typical visit duration was around 81 minutes[8].

5.13 There were some differences between activity types, with dog walkers tending to have shorter visits (70% of them staying less than an hour) and bird/wildlife watchers and cyclists tending to stay longer (32% of both groups staying for over 2 hours).

5.14 There were also differences between survey locations, for example at Oldbury on Severn over three quarters of the interviewees (82%) were spending less than an hour there.

[8] Less than 30 minutes = 20 mins; 30 minutes to 1 hour = 45 mins; 1 to 2 hours = 90 mins; 2 to 3 hours = 150 mins; 3 to 4 hours = 210 mins and more than 4 hours = 300 mins. Typical visit duration is then the average based on the number of interviewees that gave each of the above categories.

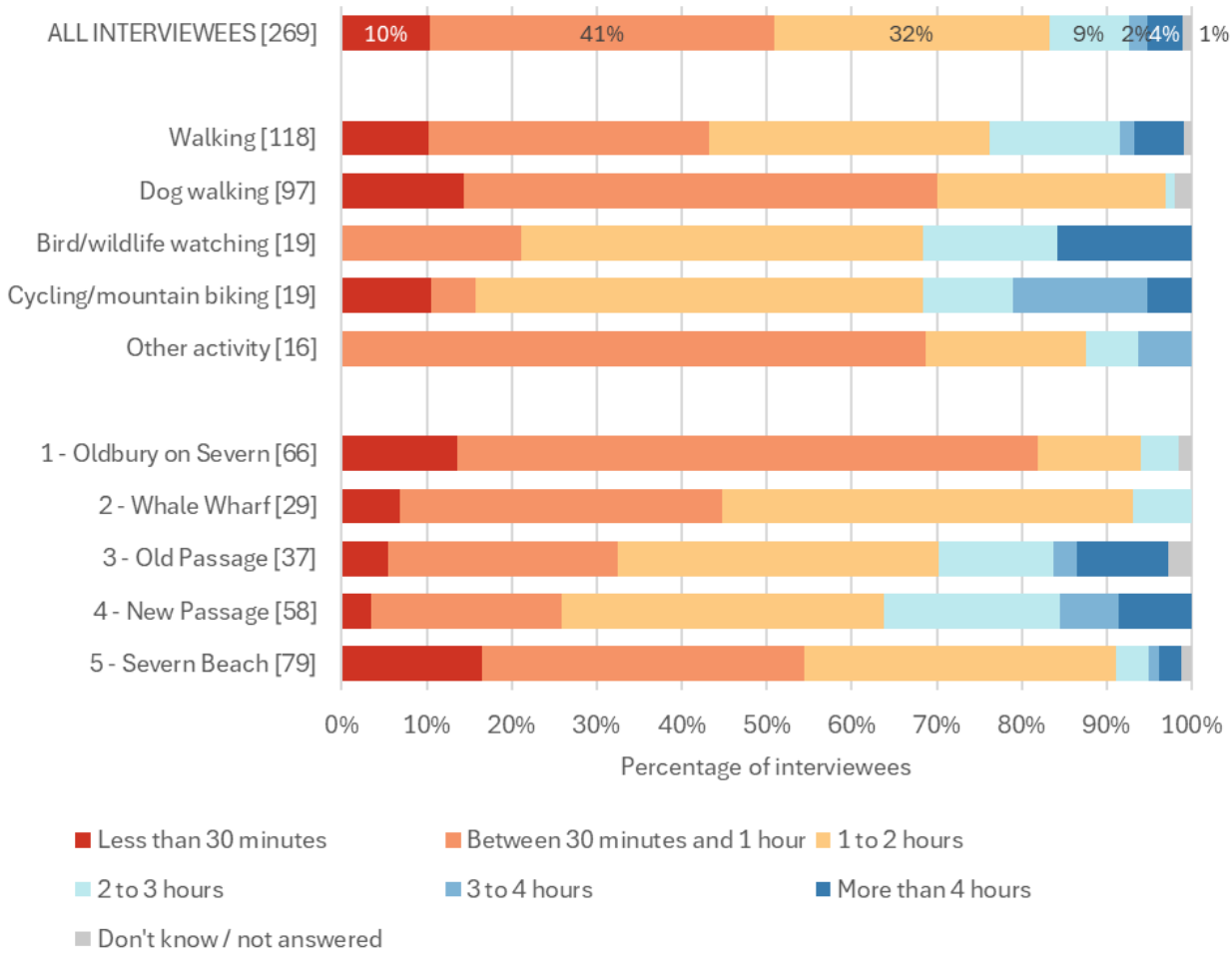


Figure 4: Visit duration of interviewees (Q4) by main activity and survey location. Numbers in square brackets refer to the sample size.

Visit frequency (Q5)

5.15 Visit frequencies are summarised in Figure 5. Overall, almost half of the interviewees (126 interviewees, 47%) indicated that they visit the interview location at least once a week, including 48 interviewees (18%) who visit that location on a daily basis.

5.16 Amongst the most common activity types, those who were dog walking tended to be the most frequent visitors, with almost a third of them (31%) visiting on a daily basis.

5.17 Severn Beach had the highest proportion of interviewees who visit daily (33%). By contrast, Old Passage had no interviewees visiting daily and had a relatively large proportion of first-time visitors (32%).

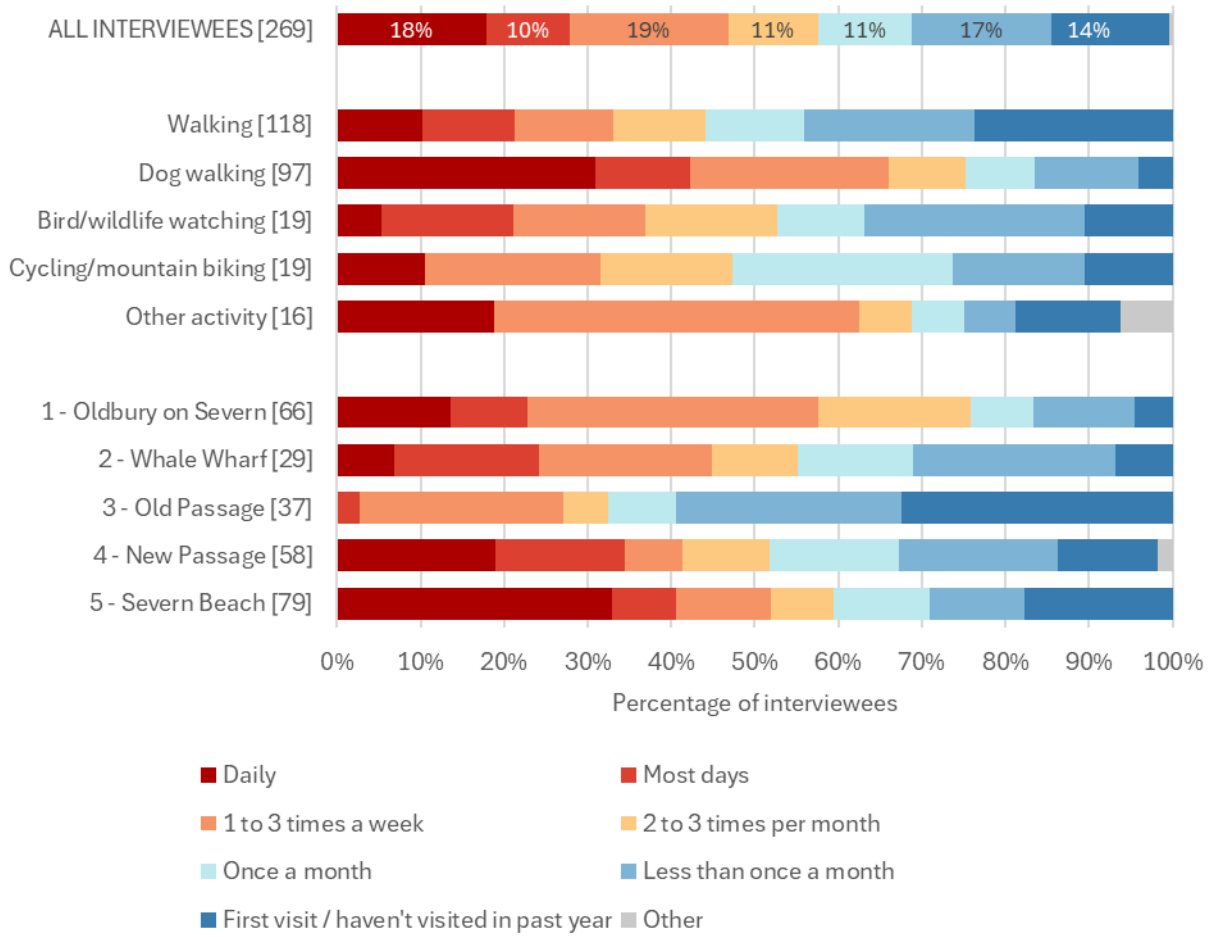


Figure 5: Visit frequency of interviewees (Q5) by main activity and survey location. Numbers in square brackets refer to the sample size.

5.18 Based on the categorical responses relating to visit frequency, interviewees had visited the interview location around 109 times on average over the past year (i.e. twice a week)[9].

Time of day (Q6)

5.19 When asked what time of day they tend to visit, the most common response (108 interviewees, 40%) was that it varies, and they don't have a particular time of day that they usually visit (Table 7). This was the most common response for all activity types and all survey locations. Where a preference was expressed, the most common responses were 'late morning' (48 interviewees, 18%) and 'early morning' (40 interviewees, 15%).

[9] "Daily" = 350 visits; "Most days" = 200 visits; "1 to 3 times a week" = 110 visits; "2 to 3 times per month" = 27.5 visits; "Once a month" = 10.5 visits; "Less than once a month" = 3 visits; "First visit" = 1 visit. Typical visit frequency is then the average based on the number of interviewees that gave each of the above categories.

Table 7: Number of interviewees (%) and the time of day that they tend to visit (Q6), by their main activity. The highest two values in each row are highlighted in red. N is the number of interviewees. This was a multiple choice question, so percentages will not add up to 100.

Main activity	N	Early morning	Late morning	Early afternoon	Late afternoon	Evening	Varies / don't know	First visit
Walking	118	5 (4%)	22 (19%)	7 (6%)	11 (9%)	7 (6%)	47 (40%)	28 (24%)
Dog walking	97	30 (31%)	16 (16%)	9 (9%)	13 (13%)	19 (20%)	33 (34%)	4 (4%)
Bird / wildlife watching	19	4 (21%)	2 (11%)	2 (11%)	3 (16%)	1 (5%)	9 (47%)	2 (11%)
Cycling / mountain biking	19	1 (5%)	5 (26%)	2 (11%)	1 (5%)	1 (5%)	9 (47%)	2 (11%)
Other activity	16	0 (0%)	3 (19%)	1 (6%)	0 (0%)	0 (0%)	10 (63%)	2 (13%)
Total	**269**	**40 (15%)**	**48 (18%)**	**21 (8%)**	**28 (10%)**	**28 (10%)**	**108 (40%)**	**38 (14%)**

Time of year (Q7)

5.20 The majority of interviewees (206 interviewees, 77%) stated they tended to visit equally all year (Table 8). This was the most common response for all activity types and all survey locations. The proportion of interviewees who visit all year round was particularly high amongst dog walkers (90%), cyclists (89%) and those interviewed at Oldbury on Severn (91%).

Table 8: Number of interviewees (%) and the time of day that they tend to visit (Q6), by their main activity. The highest two values in each row are highlighted in red. N is the number of interviewees. This was a multiple choice question, so percentages will not add up to 100.

Main activity	N	Spring (Mar-May)	Summer (Jun-Aug)	Autumn (Sept-Nov)	Winter (Dec-Feb)	Equally all year	Don't know	First visit
Walking	118	6 (5%)	4 (3%)	7 (6%)	2 (2%)	79 (67%)	2 (2%)	28 (24%)
Dog walking	97	2 (2%)	2 (2%)	3 (3%)	2 (2%)	87 (90%)	0 (0%)	4 (4%)
Bird / wildlife watching	19	1 (5%)	1 (5%)	1 (5%)	3 (16%)	13 (68%)	1 (5%)	2 (11%)
Cycling / mountain biking	19	0 (0%)	0 (0%)	0 (0%)	0 (0%)	17 (89%)	0 (0%)	2 (11%)
Other activity	16	1 (6%)	1 (6%)	2 (13%)	0 (0%)	10 (63%)	2 (13%)	2 (13%)
Total	**269**	**10 (4%)**	**8 (3%)**	**13 (5%)**	**7 (3%)**	**206 (77%)**	**5 (2%)**	**38 (14%)**

Mode of transport (Q8)

5.21 The most common forms of transport that interviewees had used to reach the interview location were car/van (170 interviewees, 63%) and on foot (72 interviewees, 27%). Other modes of transport used by interviewees were bicycle, train, scooter and taxi. There was some variation between survey locations (Figure 6), and the proportion of interviewees arriving by car/van ranged from 49% at Severn Beach to 81% at Old Passage.

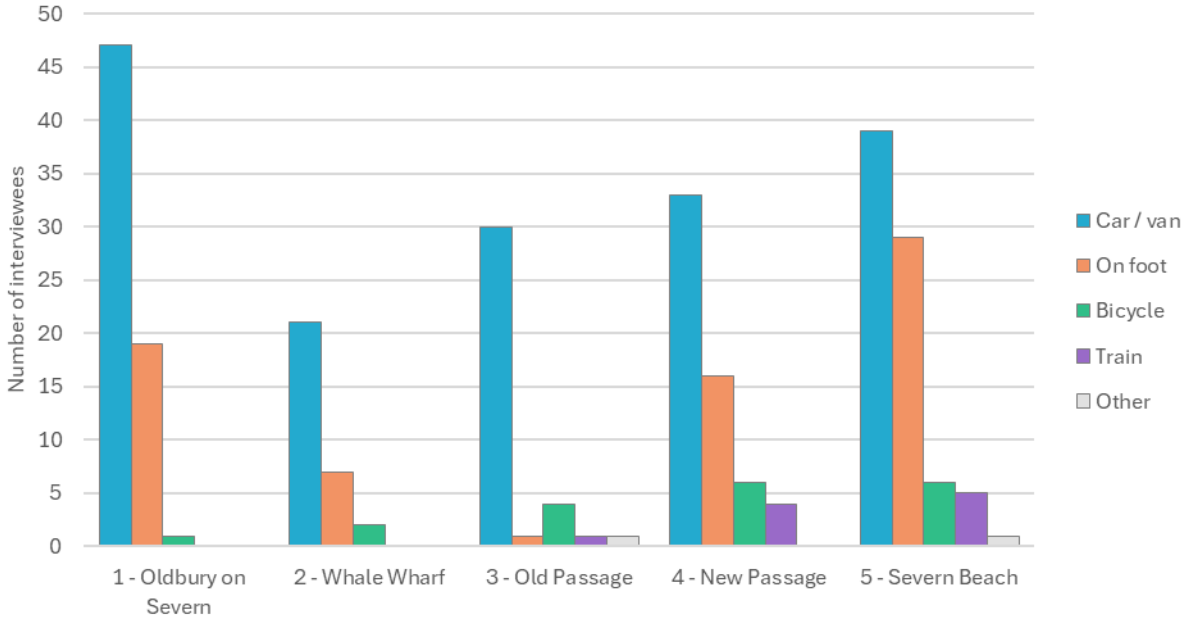


Figure 6: Mode of transport (Q8) used by interviewees to get to the survey location.

Choice of location (Q9-10)

5.22 Reasons that interviewees gave for choosing to visit the location where they were interviewed are summarised in Figure 7. The two most commonly cited reasons were that it was close to home (78 interviewees, 29%) and because of the scenery and views (76 interviewees, 28%).

5.23 Particular wildlife interests cited by interviewees included Short-eared Owls, Lesser Yellowlegs and migratory birds.

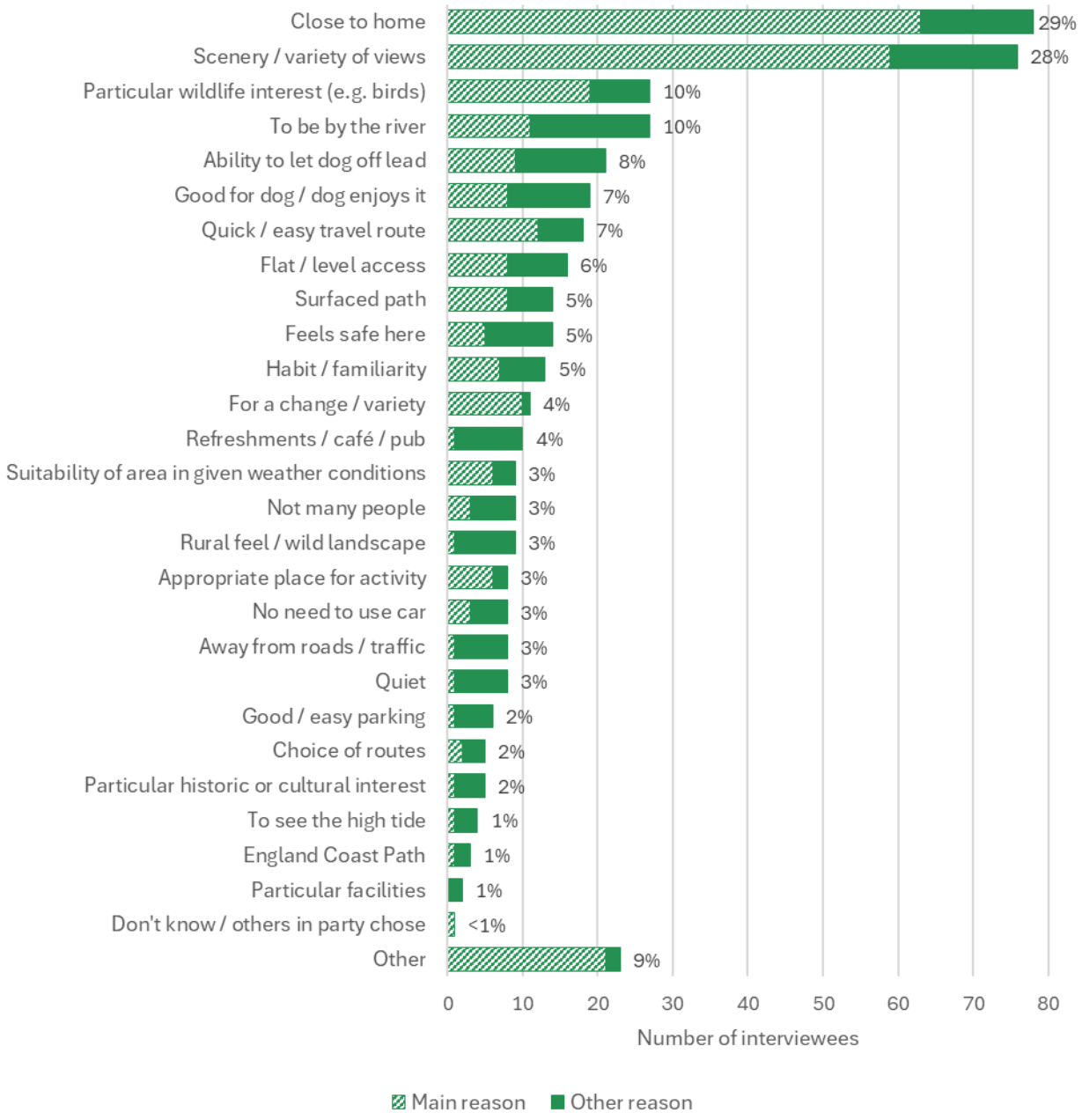


Figure 7: Reasons given by interviewees for choosing to visit the specific location where interviewed that day rather than somewhere else (Q9-10). Interviewees could give multiple reasons and were then asked which one of those was their main reason. They were not prompted or shown any options. Responses were categorised by the surveyor and then additional categories were added following a review of free text responses. Labels indicate the total percentage of interviewees who cited each reason.

Routes taken on site (Q11-13)

5.24 A total of 262 interviewees were able to describe to the surveyor the route that they had taken (or planned to take) during their visit. These routes have been digitised from the paper maps and are shown as lines in Map 3 and as a heatmap in Map 4. Some interviewees indicated that their route had gone onto intertidal areas in which case the map of their route is only approximate. However the vast majority of interviewees' routes appeared to follow footpaths such as the Severn Way. The maps show that the highest density of routes was on the path between Severn Beach and New Passage, and the track between Oldbury on Severn and Thornbury Sailing Club.

5.25 Heatmaps for the four most common activity types are shown separately in Map 5. The heatmap for walking shows high footfall at the northern end of Severn Beach, whereas for dog walkers the track between Oldbury on Severn and Thornbury Sailing Club stands out. Bird/wildlife watching was mostly concentrated between New Passage and Pilning Wetlands, while cyclists used the Severn Way between Aust and Severn Beach, as well as a network of other routes including the Severn Bridge.

5.26 Across all interviews, route lengths ranged from 0.5km to 47.2km, with a median route length of 3.1km. Route length data are summarised by the interviewee's main activity in Figure 8 and by survey location in Figure 9.

5.27 Cyclists tended to have much longer routes than any of the other activity types, with a median route length of 16.8km. Old Passage was the survey location where interviewees tended to have the longest routes (median route length of 7.4km), possibly due to the high proportion of cyclists interviewed there. The other survey locations had median route lengths between 2.3km and 4.0km.

5.28 Two thirds of the interviewees (181 interviewees, 67%) stated that the route they had followed or intended to follow that day was similar in length to their usual route. For 33 interviewees (12%), their route was much shorter than normal while for 8 interviewees (3%) it was much longer than normal. The remaining interviewees were either unsure or did not have a typical visit, for example if they were visiting for the first time.

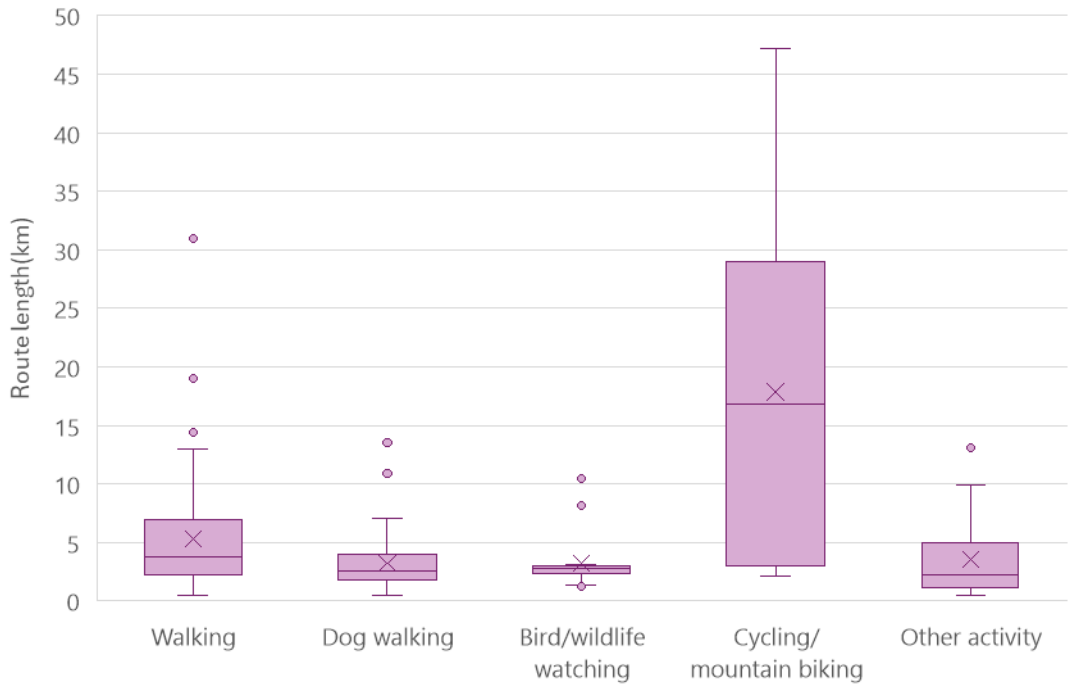


Figure 8: Route lengths by activity. Horizontal lines show the median, crosses indicate the mean, the boxes show the interquartile range and the whiskers the maximum and minimum values.

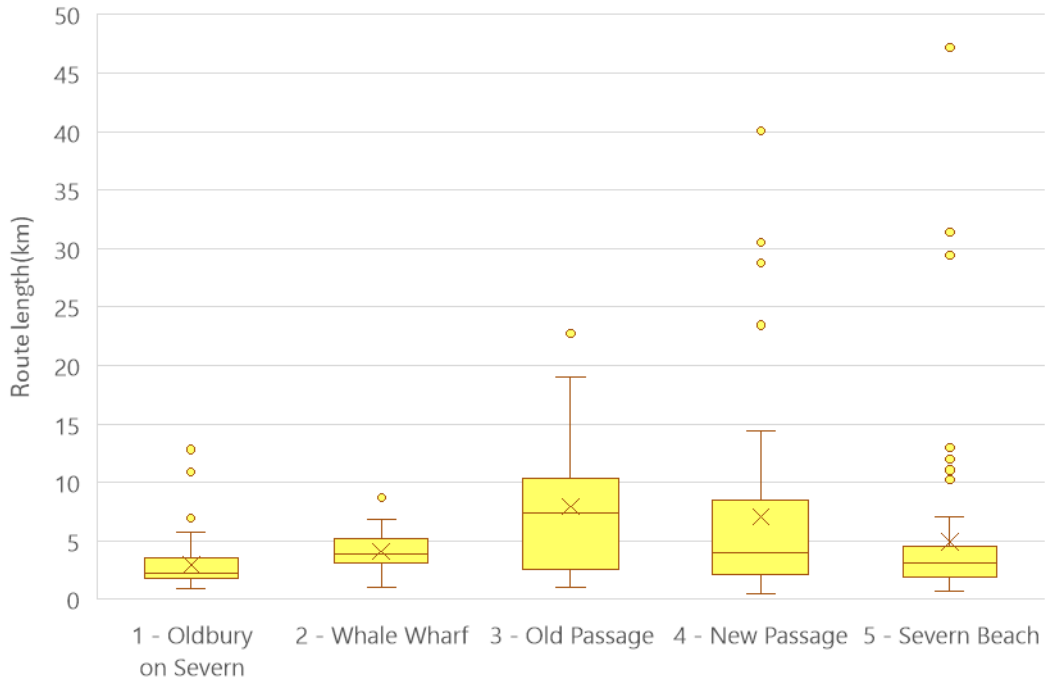


Figure 9: Route lengths by survey location. Horizontal lines show the median, crosses indicate the mean, the boxes show the interquartile range and the whiskers the maximum and minimum values.

5.29 Factors that had influenced interviewees' choice of route are summarised in Figure 10. The most common factor, cited by a fifth of interviewees (56 interviewees, 21%) was habit (e.g. following their 'usual route'). Other common factors were particular viewpoints or features (e.g. the river or the bridges) cited by 31 interviewees (12%) and the weather (30 interviewees, 11%).

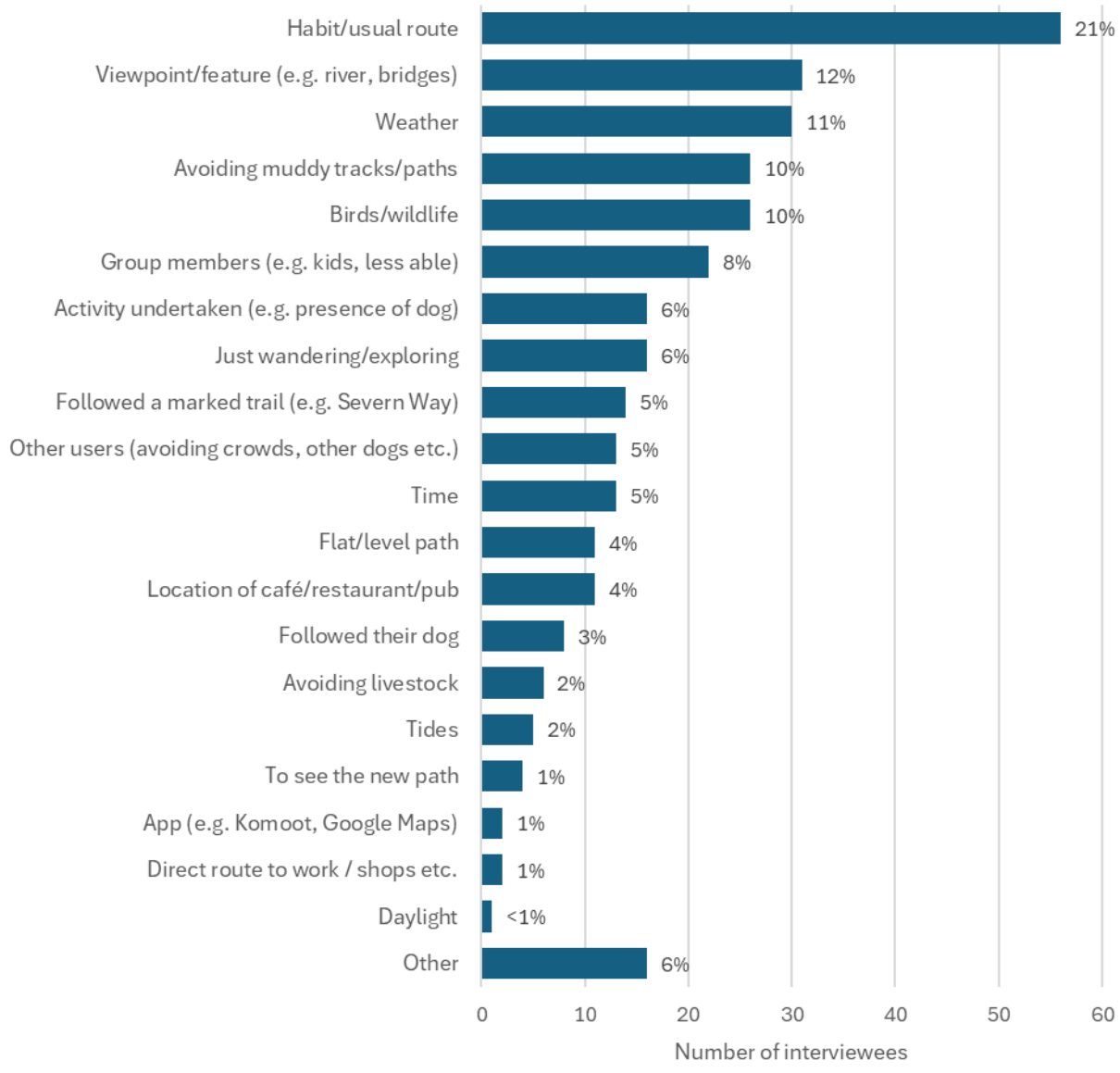
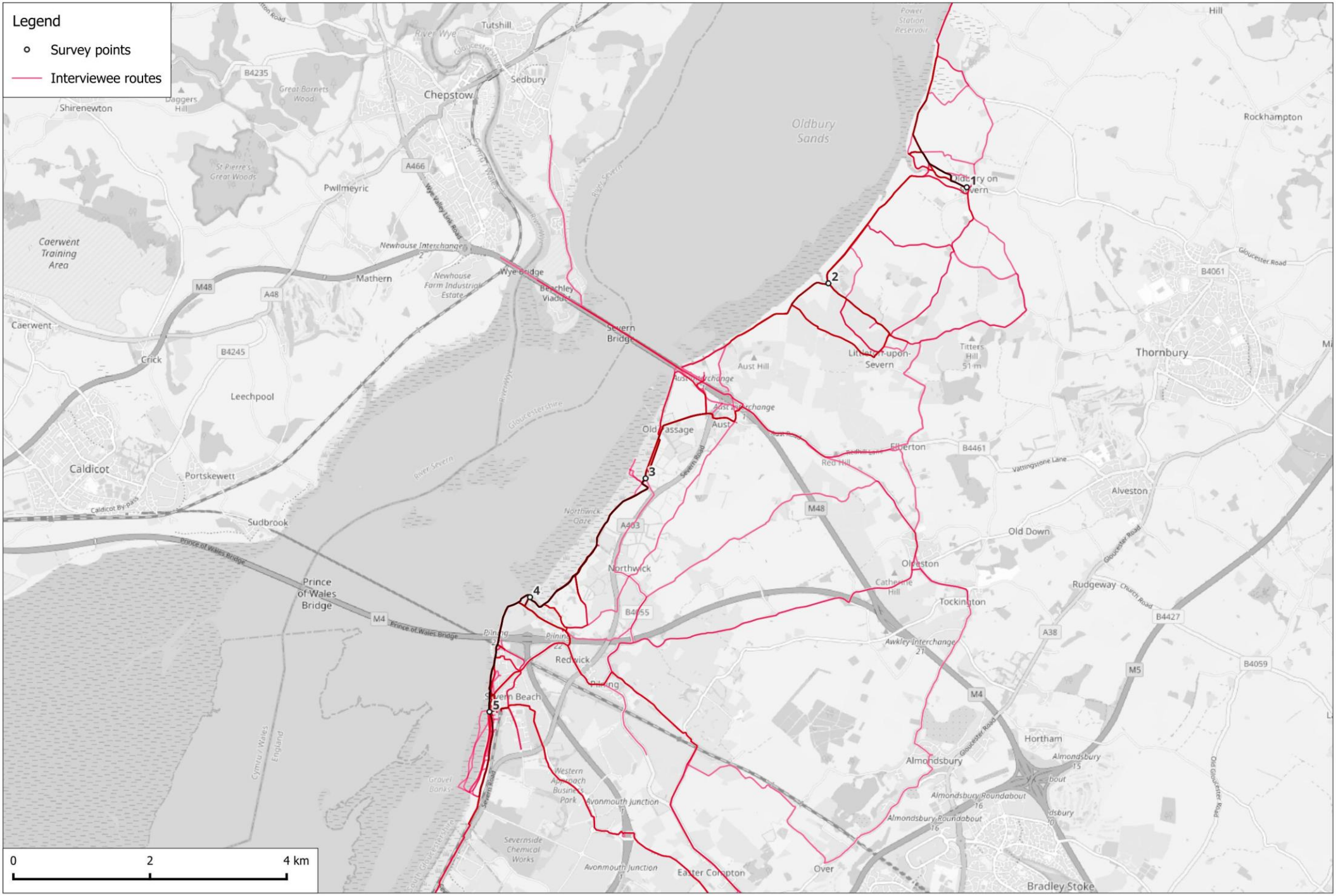


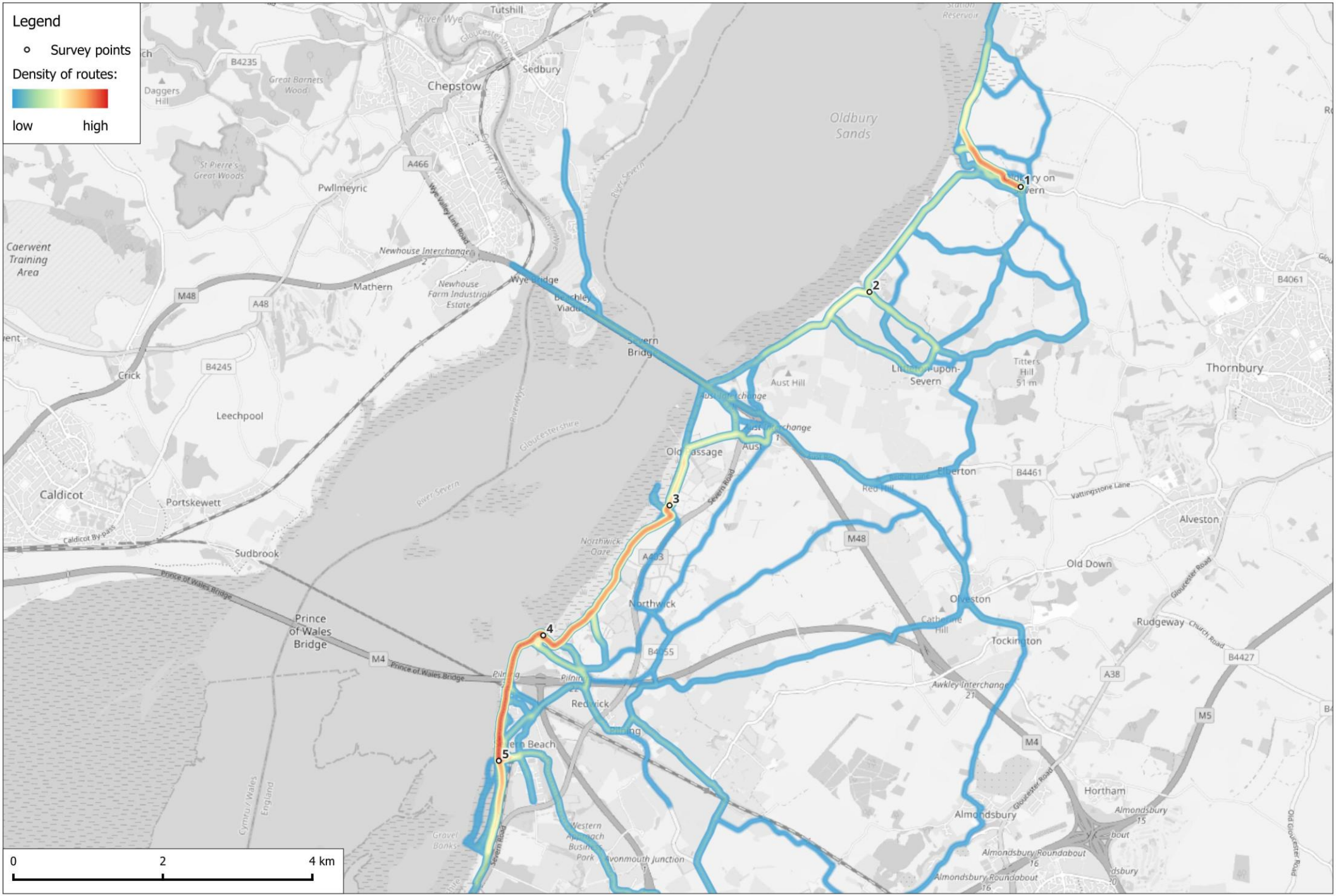
Figure 10: Factors influencing route choice (from Q13). Categories based on pre-determined list with additional categories added to include commonly cited 'other' responses recorded as free text and picked up after reviewing the data. Value labels give the overall percentage of interviewees who cited given factor. Interviewees could cite more than one factor and therefore percentages exceed 100.

Map 3: Routes taken by interviewees during their visit. Darker lines indicate overlapping routes.



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Map 4: Routes taken by interviewees during their visit, shown as a heatmap.



Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors.

Map 5: Routes taken by interviewees during their visit, shown as a heatmap and separated by activity type.



Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors.

Other locations visited (Q14-15)

5.30 When asked to name an alternative location that they would have visited that day if they had not visited the location where they were interviewed, 51 interviewees (19%) stated that they would not have gone anywhere else and a further 31 interviewees (12%) were not sure or didn't know. In total, 187 interviewees (70%) named an alternative location. All interviewees were then asked to name an additional two sites that they visit for their activity.

5.31 The combined responses to Q14 and Q15 (i.e. up to three sites named by each interviewee) resulted in 144 different locations. This does not include non-specific locations e.g. 'local fields'. The sites most frequently named were Blaise Castle (19 interviewees, 7%), Severn Beach (16 interviewees, 6%), Aust (12 interviewees, 4%) and the lakes by Western Approach (12 interviewees, 4%). Sites named by at least 2 interviewees are presented as a word cloud in Figure 11.



Figure 11: Word cloud showing the names of other sites that interviewees also visit for their activity (Q14-15), with font size indicating the frequency with which each site was named. Interviewees could name up to 3 alternative sites. All locations named by at least 2 interviewees are included. Word cloud created using https://www.wordclouds.com.

Site improvements (Q16)

5.32 Over half of the interviewees (145 interviewees, 54%) did not suggest any changes to the location that they were visiting and were happy with it as it is. The most common suggestions were regarding path improvements and parking capacity. Many of the comments regarding path improvements were about the surface of the path between New Passage and Aust, as some found the loose stones uneven and hard to walk on. Almost all of the suggestions for more parking came from interviewees at Severn Beach. Calls for better accessibility included gates suitable for wheelchairs and mobility scooters at Oldbury and Whale Wharf.

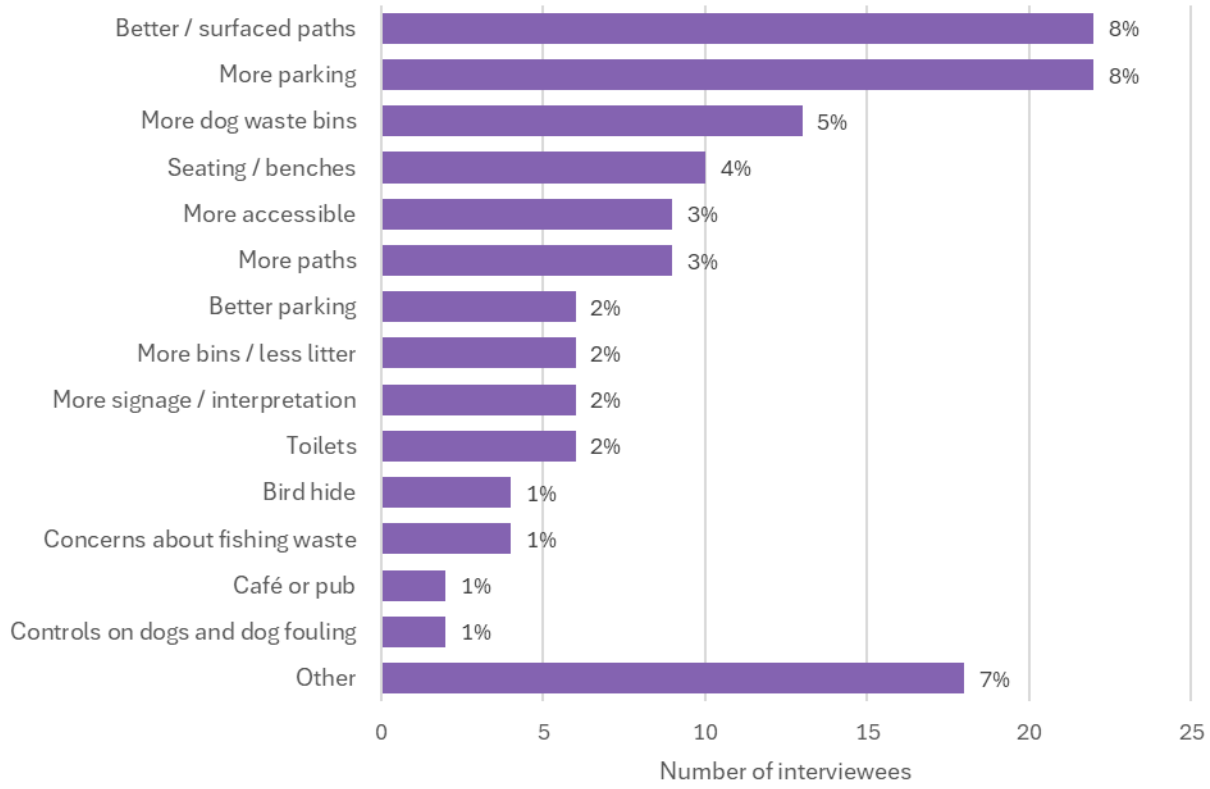


Figure 12: Suggestions made by interviewees for how the location they were visiting could be improved for visitors. Interviewees were not prompted or shown any options. Responses were categorised by the surveyor with additional categories added following a review of free text responses.

Further comments or feedback (Q17)

5.33 Almost a third of interviewees (84 interviewees, 31%) made additional comments at the end of the interview. Comments relating to site improvements have been included in the analysis of Q16. A range of other

comments were recorded, including appreciation of the site and observations on how the area has changed over time.

Visitor origins (Q18-20)

5.34 A total of 258 interviewees (96%) gave full valid postcodes that could be plotted in GIS. The distribution of these is shown by survey location in Map 6 and by visit frequency in Map 7.

5.35 The majority of interviewees (167 interviewees, 62%) were from South Gloucestershire with an additional 46 interviewees (17%) from Bristol. In total, interviewee postcodes spanned 21 local authorities. All local authorities with at least 2 interviewees are listed in Table 9.

Table 9: Number (%) of interviewees by local authority area. Only includes local authorities with at least 2 interviewees.

Local authority	Number (%) of interviewees
South Gloucestershire	167 (62%)
City of Bristol (B)	46 (17%)
Sir Fynwy - Monmouthshire	10 (4%)
Bath and North East Somerset	7 (3%)
Stroud District	7 (3%)
Gloucester District (B)	3 (1%)
Forest of Dean District	2 (1%)
Casnewydd - Newport	2 (1%)
North Somerset	2 (1%)

5.36 The linear distance between each interviewee's home postcode and the survey location at which they were interviewed was calculated in GIS. Data are summarised for different groups of visitors in Table 10. Overall, half of the interviewees came from within a radius of 6.1km and three quarters came from within 12.3km. Considering only those on a day trip or short visit from home, half came from within 5.8km and three quarters from within 11.1km.

5.37 Those who were dog walking tended to live closest to the location where they were interviewed, with a median distance of 2.2km. Interviewees who were bird/wildlife watching tended to live furthest away, with a median distance of 14.5km.

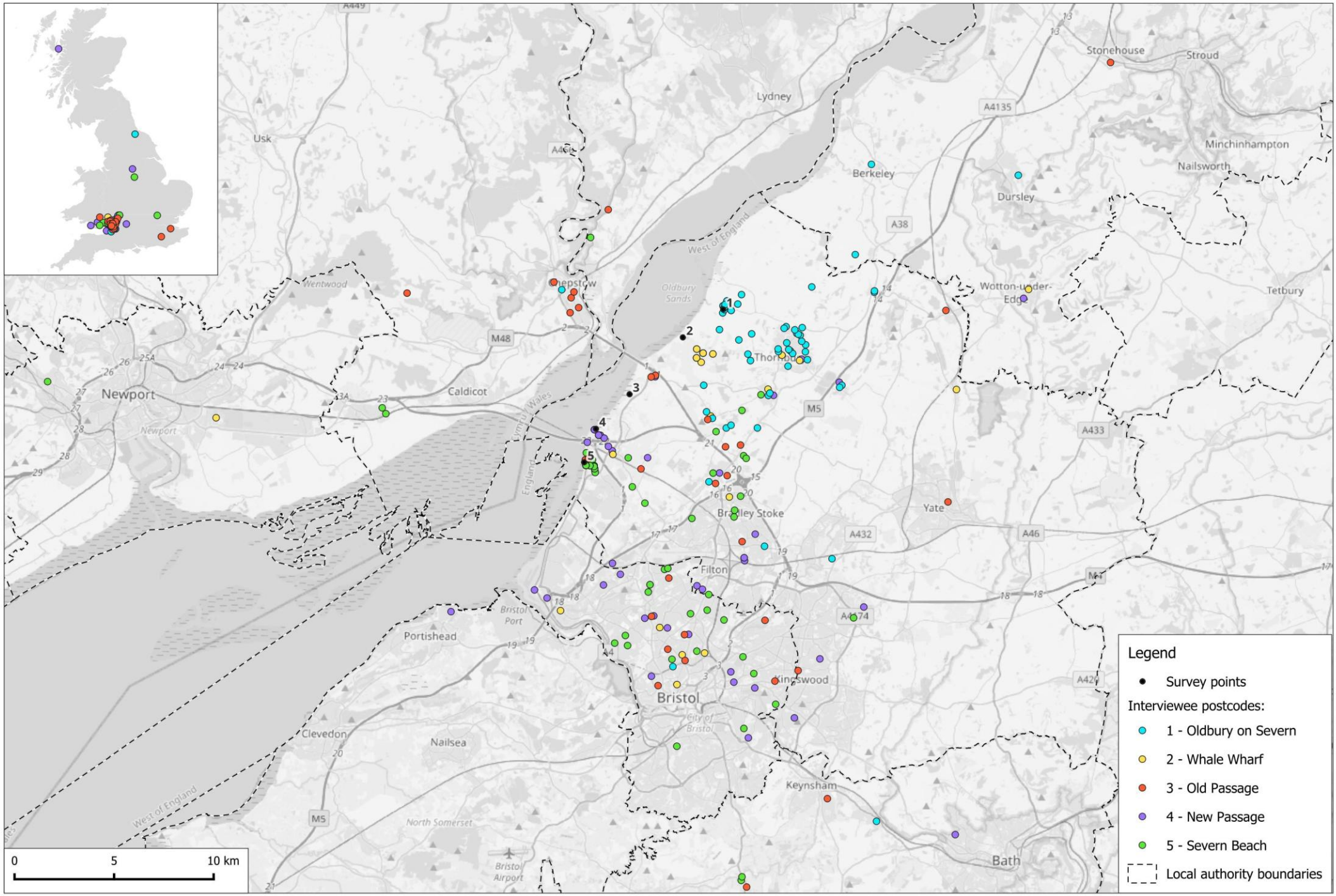
5.38 Interviewees at New Passage and Old Passage tended to live furthest from the survey location (median distance of 9.8km and 9.4km respectively).

Those interviewed at Oldbury on Severn were generally more local, with a median distance of 4.0km.

Table 10: Summary statistics for different groups of interviewees and the straight-line distance (km) between the survey point and their home postcode. N is the number of interviewees within each group who gave full, valid postcodes. Q3 is the 75th percentile i.e. the distance within which 75% of interviewees live.

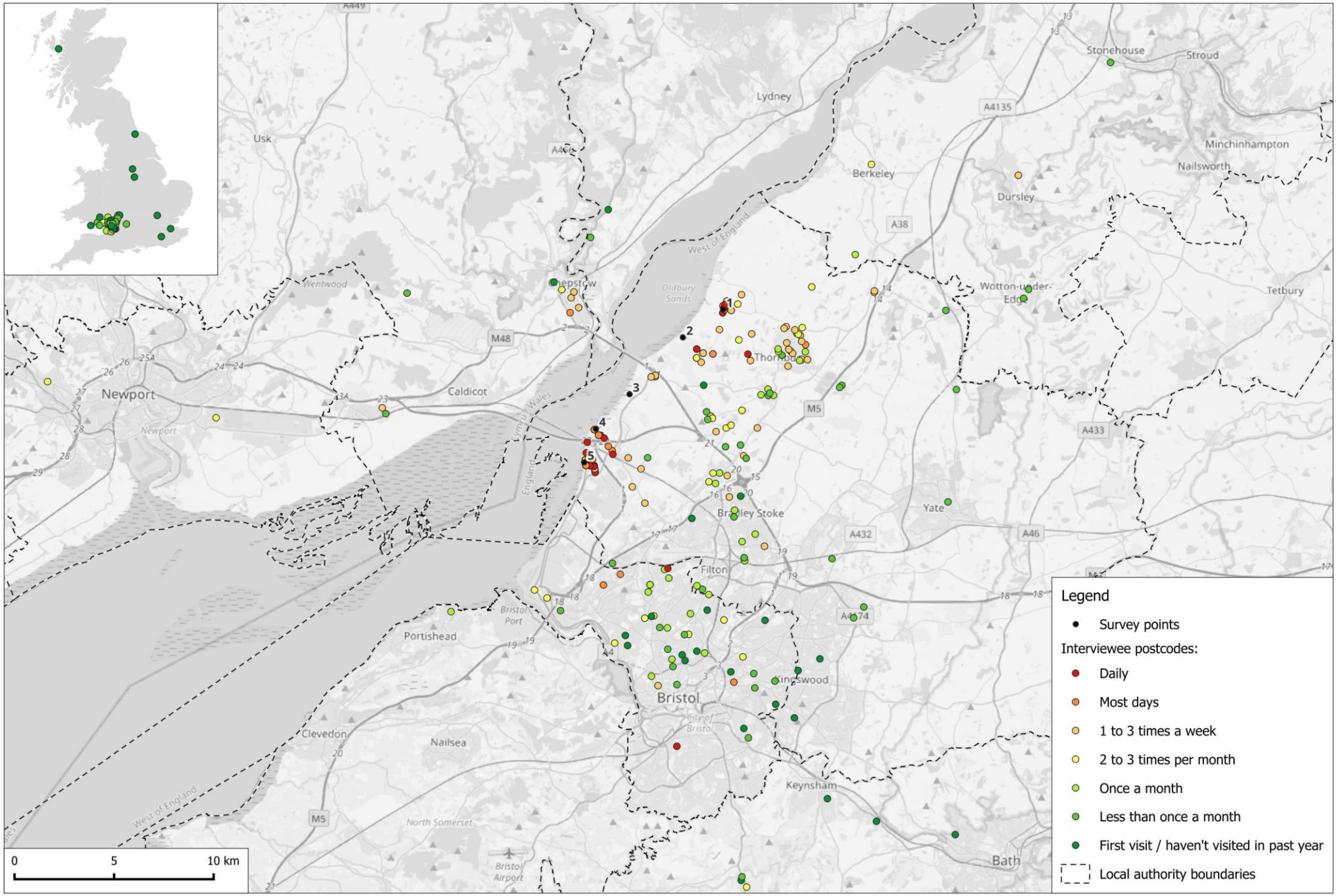
Category	N	Mean (± SE)	Range	Median	Q3
All interviewees	258	15.9 ± 3.3	0.1 - 665.5	6.1	12.3
Visit type: Day trip/short visit from home	250	8.4 ± 0.7	0.1 - 73.2	5.8	11.1
Main activity: Walking	112	22.4 ± 7.0	0.1 - 665.5	8.5	14.9
Main activity: Dog walking	94	8.8 ± 3.0	0.1 - 218.4	2.2	7.6
Main activity: Bird/wildlife watching	17	19.0 ± 3.7	1.9 - 57.4	14.5	28.3
Main activity: Cycling/mountain biking	19	16.5 ± 9.7	0.4 - 190.3	6.8	10.0
Visit frequency: Daily	47	1.1 ± 0.4	0.1 - 15.0	0.3	0.6
Visit frequency: Most days	26	2.3 ± 0.7	0.1 - 14.5	1.0	3.9
Visit frequency: 1 to 3 times a week	48	5.2 ± 0.9	0.4 - 40.8	3.8	6.1
Visit frequency: 2 to 3 times per month	28	9.1 ± 1.2	0.8 - 27.3	8.5	10.3
Visit frequency: Once a month	30	10.3 ± 1.4	0.3 - 37.1	9.2	10.7
Visit frequency: Less than once a month	44	15.8 ± 1.8	3.0 - 57.4	13.6	17.4
Visit frequency: First visit	34	72.7 ± 22.8	0.5 - 665.5	16.0	53.1
Survey point: 1 - Oldbury on Severn	66	10.5 ± 5.0	0.1 - 330.6	4.0	6.4
Survey point: 2 - Whale Wharf	27	8.1 ± 1.4	0.9 - 23.8	5.1	15.0
Survey point: 3 - Old Passage	35	22.5 ± 7.8	1.4 - 218.4	9.4	16.3
Survey point: 4 - New Passage	55	28.2 ± 12.5	0.1 - 665.5	9.8	16.1
Survey point: 5 - Severn Beach	75	11.4 ± 3.4	0.1 - 191.6	6.5	10.3

Map 6: Interviewee postcodes by survey point.



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Map 7: Interviewee postcodes by visit frequency.



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6. Context and implications

Key findings

6.1 The visitor survey results show that the Severn Estuary in South Gloucestershire is primarily visited by those walking (44% of interviewees) or dog walking (36%), alongside a range of other activities (which combined account for around 20% of interviewees). Virtually all interviewees were visiting on a short visit directly from home and 75% lived within 12.3km of the location where interviewed. All survey locations were markedly busier at weekends, suggesting the Estuary perhaps has a particular draw for those with a little more time available or wanting a particular experience, rather than attracting people for a routine visit. Nonetheless 18% of interviewees stated they visited on a daily basis. On average interviewees were estimated to make around 109 visits per year to the interview locations and the typical visit lasted around 81 minutes, with visitors taking a route of around 3.1km during their visit. Visitors typically arrive by car. When asked about alternative locations visited, 19% of interviewees stated they wouldn't have gone anywhere else, and for those that did many of the places named were other parts of the Severn Estuary.

Limitations

6.2 The visitor survey achieved a good sample size in terms of the number of interviews and achieved good spatial coverage within South Gloucestershire. Key points to note that may have had some effect on the results are:

- Surveys were undertaken in the late autumn, coinciding with the period when the non-breeding bird interest is present. The survey period avoided holiday periods (the October half-term) but may not be representative of use for the whole winter. The autumn period is however a time when many birds have recently completed a long migration, are undertaking moult and when recreation use can be high, as such it is a particular point at which wintering or passage birds can be vulnerable to disturbance (Cutts et al., 2013; Davidson and Rothwell, 1993).
- Activities such as cycling and running are harder to intercept (and persuade to stop for an interview) compared to some other activities and may have been under sampled in the interviews. As

Table 5 shows, a total of 57 people were approached but declined to be interviewed, with many of these (47%) at Severn Beach.

- Tide and weather may have had varying effects on visitor numbers and use at the different locations. While every effort was made to avoid bad weather (and indeed surveys were rescheduled to avoid severe weather), no effort was made to balance tide and this may account for some of the differences between days – for example it was clear some of the interviewees at Oldbury on the weekend survey day were drawn to see the high tide.

Context with other parts of the estuary

6.3 The survey results provide a snapshot of visitor use on the relevant parts of the Severn Estuary and, as the methods duplicated those used in the previous survey (Caals and Liley, 2022, which covered the SPA north from South Gloucestershire, including the west side of the Estuary down to Chepstow) the combined data provide a more comprehensive overview of visitor use on the Severn Estuary. Key findings from the two surveys are summarised in Table 11. In many ways the two datasets are quite similar, for example the group size, number of dogs per person, % of those visiting daily, % arriving by car are identical (or virtually identical). Notable differences appear to be that the South Gloucestershire sites are busier (more people per hour from the tally counts) and a smaller percentage of dog walkers were interviewed.

Table 11: Selected metrics from the survey. Note that the figures in the Caals and Liley relate to the combined data from all survey points, which included some on potential functionally-linked land and therefore away from the estuary shoreline.

Metric	This survey	Caals & Liley 2022
Number of survey points	5	7
Tally data: mean number of people per group	1.8	1.8
Tally data: mean number of dogs per group	0.6	0.6
Tally data: mean number of people counted per hour	15.7	9.7
Number of interviews	269	586
% Interviewees on a day trip or short visit from home	97	93
% Interviewees with main activity of walking	44	35
% Interviewees with main activity of dog walking	36	49
% Interviewees visiting daily	18	19
% Interviewees arriving by car/van	63	63
% Interviewees arriving on foot	27	33
Median route length during visit (km)	3.1	3.7
Median distance from home postcode to survey point (km)	6.1	4.1
75th percentile distance from home postcode to survey point (km)	12.3	11.3

Visitor survey results in context with the SPA interest

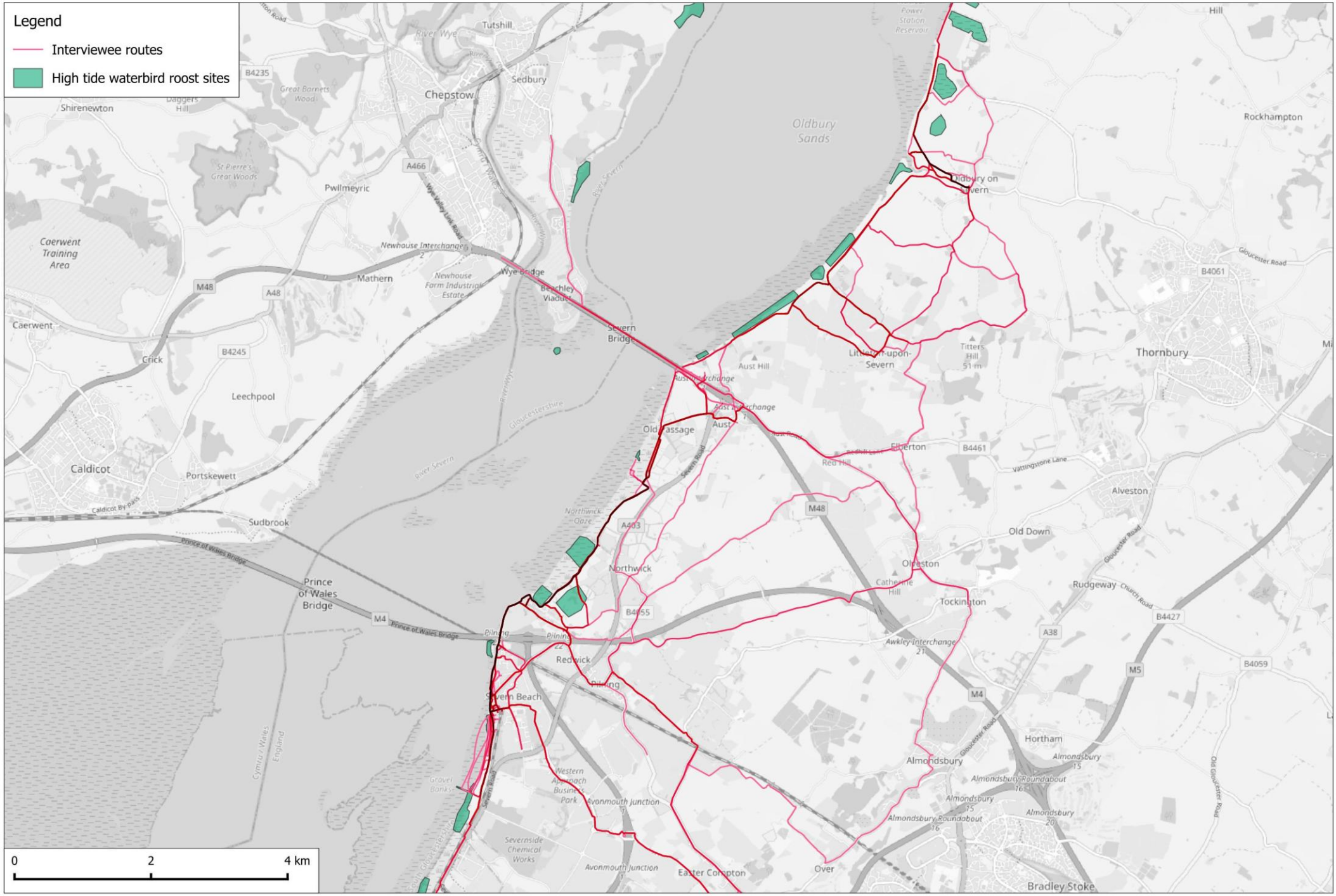
6.4 Key bird roost sites along the South Gloucestershire shoreline are described in Archer (2019) and also Woodward *et al.* (2016) with corresponding GIS files available on the Natural England website[10]. The roosts are shown in Map 8 alongside the visitor route data. This clearly demonstrates the spatial overlap between the recreation data and the bird data and shows that there is much recreational activity taking place in and around the key areas for birds. The routes are mapped from the interviews and reflect where people indicated they had been/were planning to go and as such are approximate. Nonetheless it is interesting to drill into the data to pick out some of the routes and activities that appear to pose particular risks for the birds. These included:

- An angler walking out onto the saltmarsh at Cake Pill on Aust Warth to fish for Flounder;
- A birdwatcher in the same area of saltmarsh at Aust Warth;
- Operation of a drone from the coast path at Northwick Warth;

[10] https://naturalengland-defra.opendata.arcgis.com/datasets/severn-estuary-high-tide-waterbird-roost-sites-clevedon-to-oldbury-in-bridgwater-bay/explore?location=51.547142%2C-2.610335%2C12.86

- Two routes apparently passing through intertidal areas to the west of Riverside Park at Severn Beach (one person dog walking and the other birdwatching and looking for a submerged forest).

Map 8: Routes taken by interviewees during their visit, in relation to high tide roost sites. Darker lines indicate overlapping routes.



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Implications of the findings with respect to HRA

6.5 HRA follows a step-by-step process with clear stages. In Stage 1, A 'likely significant effect' following Waddenzee[11], is a '*possible significant effect; one whose occurrence cannot be excluded on the basis of objective information'*. It is a low threshold and simply means that there is a risk or doubt regarding such an effect. The screening stage is a preliminary examination, sometimes described as a coarse filter, or following Sweetman[12], as '*a trigger for the obligation to carry out an appropriate assessment'*. There should however be credible evidence to show that there is a real rather than a hypothetical risk of effects that could undermine a site's conservation objectives.

6.6 The conservation objectives for the SAC are to 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.

6.7 The conservation objectives for the SPA are to 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,

[11] Waddenzee: European Courts C-127/02 Waddenzee 7th September 2004, reference for a preliminary ruling from the Raad van State.
[12] Sweetman: European Court C – 258/11 Sweetman 11th April 2013, reference for a preliminary ruling from the Supreme Court of Ireland

- The distribution of the qualifying features within the site.

6.8 The marine conservation advice package produced by Natural England and CCW[13] highlights that bird communities are highly mobile and the activity of different species relates to the tide and a range of other factors, which vary between species. One important factor is the level of disturbance which needs to be maintained at or below levels necessary to provide favourable conditions for birds' feeding and roosting areas. The package goes on to state that management should aim to avoid both damage to the supporting habitats and disturbance to the birds.

6.9 Clearly, drawing on the information in previous sections of this report there is credible evidence to show a real risk, with evidence of birds being directly flushed and abandoning roost sites (see section 2). The route data from the visitor survey substantiates these observations. The visitor survey components demonstrate the link between where people live and recreation use. As such any increase in housing within the local area (as defined by a zone of influence – see para 6.21) will potentially increase recreation use and trigger likely significant effects, either alone (for large allocations or development in close proximity) or in-combination (i.e. cumulative effects of development around the estuary, including in neighbouring authorities).

6.10 Following the HRA process, having identified likely significant effect, Stage 2 involves the appropriate assessment and integrity test. Here a plan can only be adopted if the competent authority can demonstrate that it will not adversely affect the integrity of the European site (or in exceptional circumstances, whereby the plan or project is of overriding public interest, there are no alternatives and then compensation is required).

6.11 Changing recreation patterns, such as the increasing popularity of paddleboarding and an increase in dog ownership (e.g. Morgan et al., 2020), mean predicting future impacts can however be challenging. Furthermore, impacts around recreation use have in recent years been exacerbated by climate change (affecting the species distributions, habitats, access patterns etc.) and the Covid pandemic which resulted in an increase in recreation use of local greenspaces and an increase in awareness of the importance of access for well-being and general health (Natural England and Kantar Public,

[13] Available from the Natural England website: https://publications.naturalengland.org.uk/publication/3184206?category=3212324

2021; Poortinga et al., 2021; Randler et al., 2020). Bird flu is also a current concern for a range of waterbirds and has impacted a range of species.

6.12 In order to be confident of ruling out harm and concluding no adverse effect on site integrity from recreation, for the Severn Estuary SAC/SPA/Ramsar and in relation to housing growth (in the areas where people visit the estuary) mitigation is likely to be necessary.

Potential options for mitigation

6.13 Potential mitigation measures, relevant to the South Gloucestershire shoreline[14] could include:

- Visual screening at select locations to hide people and dogs from birds
- Diverting people along less sensitive routes, such as avoiding the top of the river wall/service tracks at key locations
- Modification of visitor routes to direct people, e.g. from car parks and access points
- Consistent messaging and branding around the sensitivities of the site and need to modify behaviour
- Signage and interpretation
- Provision of alternative greenspace to deflect local recreation use, e.g. through provision of dedicated spaces for dog walking/exercise
- Face-to-face engagement, e.g. through wardening/ranger presence
- Direct engagement and work with local dog walking community
- Direct engagement and work with local anglers
- Enforcement to address anti-social behaviour, e.g. through Public Space Protection Orders.

6.14 These measures fit with the existing approach already established in neighbouring authorities and by the Severn Estuary Partnership / ASERA. Also relevant is the England Coast Path, which has been subject to HRA. Critical to any mitigation is that any new provision is targeted towards use by local people, which will undertake different activities and behave differently than, for example, those people potentially following a long-distance route.

[14] The points listed are largely ideas generated during a workshop held in September 2024, see Acknowledgements for participants

Other strategic mitigation schemes

6.15 Recreation pressure is complex, as the way visitors use a site can change with time, and the distribution of a European site's qualifying features can also change. Furthermore, to ensure effectiveness, mitigation needs to include a package of measures that work together in an integrated way. For example, educating visitors, reinforcing messages with site-based staff, and providing the right infrastructure to meet visitor needs and influence visitor behaviour could all fit together as part of a mitigation package, but are the kinds of measures that cannot be delivered in a piecemeal way, implemented by individual developments. Any mitigation also needs to be effective in the long-term, lasting as long as necessary to address any impacts and in relation to housing growth this therefore indicates a need for mitigation in-perpetuity. This is again difficult to ensure for a range of different developments across a wide area.

6.16 By addressing risks up front, a strategy can provide a proactive, cross-boundary solution that ensures cumulative impacts of growth are taken into account. By setting out necessary resources and costs up front, there is clarity for developers and the assessment process is streamlined.

6.17 A range of strategic mitigation schemes have therefore now been established around the country to address the challenges associated with increased recreation pressure and the cumulative effects of housing growth across multiple local authorities. Some of the schemes have now been running for many years and they include a range of coastal/estuary sites such as the Exe Estuary, the Solent, the North-Kent coast, Plymouth Sound, the Suffolk Coast, the North Norfolk Coast and the Northumberland Coast. Further details on some of these are provided in Appendix 2 (see also Beveridge et al., 2024 for a review of a selection of schemes).

6.18 The need for such an approach for South Gloucestershire was identified in the Coming Home to Roost report (Archer, 2019), which recommended that "*to begin to address some of the disturbance issues identified above, a coordinated response from South Gloucestershire Council, Bristol City Council, Natural England and other relevant authorities is needed. Critically this involves constructive and ongoing dialogue with key user groups, including local sea angling clubs, access groups and local resident groups to look at how people can continue to enjoy the coastal environment whilst protecting the high-tide roosts on their doorsteps*."

6.19 The scheme established for the Severn Estuary by the Forest of Dean District Council, Gloucester City Council, Stroud District Council and Tewkesbury Council provides an existing example and model for the upper reaches of the Severn Estuary. The strategy covers the period 2024-2041 but is subject to review on at least five yearly basis. As with many other strategic mitigation schemes, mitigation measures comprise:

- SAMM (Strategic Access Management and Monitoring) which includes ranger provision, access management on and around the Severn Estuary (e.g. measures relating to car parking, signage, dog bins etc); and
- Off-site green infrastructure (including SANG, 'Suitable Alternative Natural Greenspace') that increases the amount of green space available for recreation and provides opportunities for recreation away from the European site.

6.20 The levels of housing growth that the strategy aims to mitigate are around 16,488 dwellings. The strategy uses developer contributions to fund mitigation, with the overall cost of mitigation (some of which is secured in-perpetuity) split across the growth needing mitigation, such that the per dwelling cost (£521 for each dwelling, excluding green infrastructure costs) is the same across the zone of influence.

Identifying where future housing may trigger likely significant effects in South Gloucestershire

6.21 The use of the 75th percentile has become the standard way to use home postcode data from visitor surveys to reflect the area where the majority of visitors originate and it has been widely used to inform HRAs and mitigation approaches around the country (see Liley, et al., 2021)[15]. The approach was first used in Dorset Heaths and the Thames Basin Heaths. At both these locations, 5km was rounded up from the 75th percentile from the visitor survey data (Clarke et al., 2006; Liley et al., 2006). The assessor's report from the Examination in Public for the South-east Regional Plan (Burley, 2007) provides background and context on the different zone options originally considered for the Thames Basin Heaths.

[15] See also appeal decision APP/X0415/W/22/3308630, Millen Homes Ltd against Buckinghamshire Council, published October 2023. https://acp.planninginspectorate.gov.uk/ViewDocument.aspx?fileid=54374907

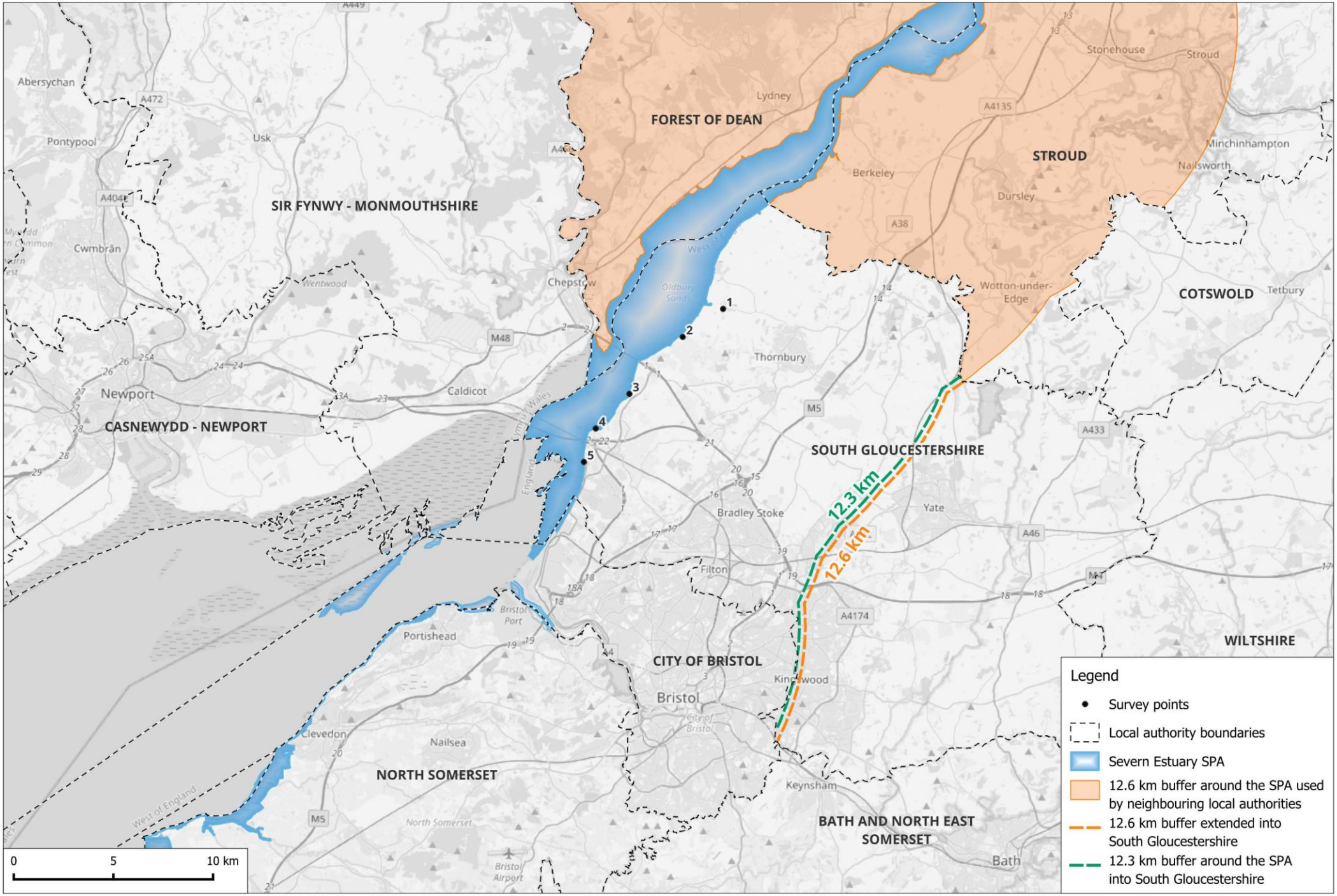
6.22 The use of the 75th percentile is useful in defining a zone that encompasses the area where most visitors originate yet excludes some of the areas where people travel large distances and are visiting only very occasionally. The questionnaire data involved interviews with a random sample of people visiting in a 16 hour window of survey effort, and as such the 75th percentile is based on a snapshot of visitor use from quite a narrow time window, at a time of year that is relevant to the European site and potential recreation impacts. A narrow time window is important as anyone who had already undertaken the survey was not re-interviewed and with a longer time window at each survey point there would be a risk of under-sampling local visitors (that tend to visit more frequently).

6.23 From the visitor survey data presented here, the relevant distance (the 75th percentile) is therefore 12.3km (drawn from all interviewees) or 11.1km (those visiting from home only). The equivalent distance from the 2022 Severn Estuary visitor survey was 12.6km (this was based on all those interviewed at the estuary survey points, excluding those on functionally-linked land sites). The 12.3km and 12.6km distances are reflected in Map 9. It can be seen that there is little material difference between the two and they essentially capture the part of South Gloucestershire that lies north of Bristol and neatly align with the north-east corner of Bristol. This provides a broad indication of how a zone of influence could look for South Gloucestershire and where the area of focus in the HRA (where likely significant effects would be triggered).

6.24 Based on Map 9 and the comparison of the results from the 2022 survey with the data presented here, there appears to be little evidence to support any marked variation in the application of a zone of influence and the area where new housing growth might have an impact.

6.25 While the zone describes where development would be expected to result in increased recreational use, the impacts of development within this zone will not necessarily be even. People living very close to the estuary will visit more frequently, and therefore a single dwelling in close proximity would be expected to have a greater impact compared to one much further away and still within the zone. While this might seem to support the establishment of multiple zones, other strategic mitigation schemes have largely avoided creating different bands or charging schedules for different areas (see Burley, 2007 for discussion and background). This is largely due to the added complexity, the difficulties in apportioning mitigation costs and the challenges in defining the boundaries of multiple zones.

Map 9: Severn Estuary buffered by the distance which covers 75% of interviewee postcodes (12.3 km), with the buffer used by neighbouring local authorities (12.6 km) shown for comparison.



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7. Recommendations

7.1 At present it may be difficult for the HRA for the Local Plan at Regulation 19 to reach a conclusion of no adverse effects on the integrity of the Severn Estuary SAC/SPA/Ramsar. The HRA will however not need to be finalised until the point at which the plan is adopted, and it should be possible by the point the plan is submitted to have a clear plan in place for mitigation.

7.2 This report should be shared with Natural England alongside a request for formal advice regarding next steps, potentially alongside the HRA. The competent authority must consult the statutory nature conservation body (Natural England) at the appropriate assessment stage of HRA and should have regard to their representations. As such getting formal advice and support from Natural England is important and will inform the next steps for mitigation delivery.

7.3 In light of the advice from Natural England, this report could then be shared with neighbouring authorities upriver and a dialogue commenced on joint approaches to mitigation. Given the similarities in the visitor data between South Gloucestershire and the upper reaches of the Severn Estuary SAC/SPA/Ramsar, it would seem sensible for South Gloucestershire to become part of the existing mitigation scheme (should the other authorities involved in that scheme agree). This would allow South Gloucestershire to take advantage of the existing work already done by its neighbours (working in partnership with the Severn Estuary and ASERA) and those authorities would also benefit in terms of the scheme becoming larger, more strategic and underpinned by a larger scale of development. The scheme as a whole is likely to be strengthened by incorporating additional potential delivery partners and projects, such as Linking the Levels.

7.4 While it could be possible for South Gloucestershire to develop a mitigation approach in isolation, there are some clear and strong reasons for not doing so. Residents from South Gloucestershire do visit the Stroud parts of the estuary, as the 2022 visitor survey clearly demonstrates, and equally there is some evidence from this survey of residents of Stroud District visiting the South Gloucestershire parts of the Estuary. If there were two different mitigation schemes there is a risk of people getting different messages, signs, communication, branding etc. depending on which section of shoreline they happen to visit that day. This would likely be confusing to members of the public. There is also an obvious risk of duplication – for

example with respect to publicity, engagement, events etc. - meaning costs are likely to be much higher than if resources were pooled into one strategic scheme. A further issue is that a certain level of housing growth is necessary to ensure funding for mitigation (such as rangers or other staff costs) in-perpetuity and this may not always be achievable on a local authority by authority basis, however with pooled resources such measures are feasible. This ensures a more robust and effective package of mitigation.

7.5 In light of the dialogue with authorities upriver, there is also a need to check with Bristol City Council and North Somerset regarding their local plans and the need for mitigation for the Severn Estuary SAC/SPA/Ramsar with respect to recreation use. There may be merit in these other authorities also integrating into any strategic mitigation scheme or at least ensuring that any approaches dovetail with South Gloucestershire.

7.6 In terms of timing, the HRA for the S. Gloucester Local Plan will need to be able to demonstrate that adverse effects on integrity for recreation impacts and the Severn Estuary SAC/SPA/Ramsar can be ruled out. In order to reach such a conclusion, it will probably be necessary for some protective policy or wording to at least establish the principles for mitigation and how mitigation can be implemented. Prior to submission of the Local Plan in mid-2025 it will therefore be necessary to be clear on how to deliver any necessary mitigation. With the potential to join the existing strategic mitigation scheme, this should be straightforward. Ideally, an interim strategy that sets out some level of developer contribution and initial mitigation measures will be in place by submission or at least by the time the Plan is adopted (and the point at which the HRA is finalised).

7.7 It will be necessary to agree a point at which the existing strategic scheme can be reviewed/updated to incorporate an additional local authority, and this may be some time into the future. The existing mitigation scheme was established in 2024 and, while intending to run until 2041, that strategy should be reviewed and updated on at least a 5-year basis (alongside annual reviews of budget and measures to be funded). As such 2029 may be a good point for the strategy to be widened to include South Gloucestershire. This would leave an interim period where mitigation will need to be secured. It will be necessary to review the level of housing growth likely to come forward within the approximate zone of influence within this time period and consider mitigation measures necessary.

7.8 Mitigation within this interim period could be informed on the existing strategic approach and measures already identified there. There is the potential for South Gloucestershire to produce an interim strategy that mirrors the wider strategic approach, for example SAMM interventions such as the signage and interpretation, waymarking, path audit, path improvements and other access infrastructure could easily be commissioned and planned so the work dovetails with that taking place in other parts of the estuary. Alternative green infrastructure could also be required at a similar level and quality. Given the existing Linking the Levels Project and the work already underway as part of that project, there is existing momentum and staff with the relevant experience of sites on the ground. It may well be possible to incorporate some of the mitigation measures in terms of access infrastructure etc into the work already underway, adding value to some of the management work already funded and in place.

7.9 Any funds collected and surplus at the time of South Gloucestershire joining the wider strategy could then be directed into the existing strategic scheme ensuring long term mitigation delivery. Such an interim approach would provide confidence for developers and planners that the necessary mitigation was secured, in place and would be effective.

7.10 Finally, the Council may wish to note that changes to legislation and mitigation approaches may happen in the future. The Planning Reform Working Paper: Development and Nature Recovery[16] was published by the Ministry of Housing, Communities and Local Government (MHCLG) and Defra in December 2024. This indicates that there may be changes to primary legislation and planning reform, with the intention to move responsibility for planning and implementation of strategic mitigation onto the state. Until any changes are implemented by the government, it is necessary for the Council as competent authority to fully assess the impacts of development and ensure necessary mitigation is in place.

[16] https://www.gov.uk/government/publications/planning-reform-working-paper-development-and-nature-recovery/planning-reform-working-paper-development-and-nature-recovery

References

Archer, R., 2019. Coming Home to Roost High-tide Roost Monitoring Project Severn Estuary 2016 to 2019. RSPB.

Bateman, I.J., Harwood, A.R., Abson, D.J., Andrews, B., Crowe, A., Dugdale, S., Fezzi, C., Foden, J., Hadley, D., Haines-Young, R., Hulme, M., Kontoleon, A., Munday, P., Pascual, U., Paterson, J., Perino, G., Sen, A., Siriwardena, G., Termansen, M., 2014. Economic Analysis for the UK National Ecosystem Assessment: Synthesis and Scenario Valuation of Changes in Ecosystem Services. Environ Resource Econ 57, 273–297. https://doi.org/10.1007/s10640-013-9662-y

Beveridge, L., Cheater, S., Davidson, N., Senapati, S., 2024. Compilation and Review of Evidence Leading to SANG and SAMM Provision (No. RP04518). Report by Lepus for Natural England.

Bragg, R., Atkins, G., 2016. A review of nature-based interventions for mental health care. Natural England Commissioned Reports, Number 204.

Bright, A., Reynolds, G.R., Innes, J., Waas, J.R., 2003. Effects of motorised boat passes on the time budgets of New Zealand dabchick, Poliocephalus rufopectus. Wildlife Research 30, 237–244.

Burley, P., 2007. Report to the panel for the draft south east plan examination in public on the Thames Basin Heaths Special Protection Area and Natural England's Draft Delivery Plan. Planning Inspectorate.

Burton, N.H., Rehfisch, M.M., Clark, N.A., 2002. Impacts of disturbance from construction work on the densities and feeding behavior of waterbirds using the intertidal mudflats of Cardiff Bay, UK. Environ Manage 30, 865–71.

Burton, N.H.K., Armitage, M.J.S., Musgrove, A.J., Rehfisch, M.M., 2002. Impacts of man-made landscape features on numbers of estuarine waterbirds at low tide. Environ. Manage. 30, 857–864.

Caals, Z., Liley, D., 2022. Severn Estuary Visitor Survey 2022 (No. 681). Footprint Ecology / Stroud DC.

Clarke, R.T., Liley, D., Underhill-Day, J.C., Rose, R.J., 2006. Visitor access patterns on the Dorset Heaths. English Nature Research Report 683.

Coombes, E.G., 2007. The effects of climate change on coastal recreation and biodiversity. University of East Anglia, School of Environmental Sciences, Norwich.

Cryer, M., Linley, N.W., Ward, R.M., Stratford, J.O., Randerson, P.F., 1987. Disturbance of overwintering wildfowl by anglers at two reservoir sites in South Wales. Bird Study 34, 191–199.

Cutts, N., Hemingway, K., Spencer, J., 2013. Waterbird Disturbance Mitigation Toolkit Informing Estuarine Planning & Construction Projects. University of Hull.

Dasgupta, P., 2021. The Economics of Biodiversity: The Dasgupta Review. HM Treasury, London.

Davidson, N., Rothwell, P., 1993. Human disturbance to waterfowl on estuaries: conservation and coastal management implications of current knowledge. Wader Study Group Bulletin 68, 97–106.

Day, B.H., 2020. The Value of Greenspace Under Pandemic Lockdown. Environ Resource Econ 76, 1161–1185. https://doi.org/10.1007/s10640-020-00489-y

De Frenne, P., Cougnon, M., Janssens, G.P.J., Vangansbeke, P., 2022. Nutrient fertilization by dogs in peri-urban ecosystems. Ecological Solutions and Evidence 3, e12128. https://doi.org/10.1002/2688-8319.12128

Denning, L., Pugh, M., Pitts, V., Dynamic Dunescapes partners, 2024. The Sand Dune Managers Handbook. Version 2. (No. LIFE17 NAT/UK/000570; HG-16-08643). Dynamic Dunescapes (DuneLIFE) project.

Denton, J., Groome, G., 2017. Dogs and ponds: a case study from Headley Heath. Conservation Land Management 15, 4–8.

Fitzpatrick, S., Bouchez, B., 1998. Effects of recreational disturbance on the foraging behaviour of waders on a rocky beach. Bird Study 45, 157–171.

Gill, J.A., 1996. Habitat choice in wintering pink-footed geese: quantifying the constraints determining winter site use. Journal of Applied Ecology 33, 884–892.

Groome, G., Denton, J., Smith, P., 2018. The impact of dogs on the environment, InPractice. CIEEM.

Harris, S., 2023. Beware the dog: the ecological and environmental impacts of pet dogs. British Wildlife 34, 487–496.

Hockin, D., Ounsted, M., Gorman, M., Hill, D., Keller, V., Barker, M.A., 1992. Examination of the effects of Disturbance on birds with reference to its importance in Ecological Assessments. Journal of Environmental Management 36, 253–286.

Kirby, J.S., Tantram, D.A.S., 1999. Monitoring heathland fires in Dorset: Phase 1.

Kondo, M.C., Oyekanmi, K.O., Gibson, A., South, E.C., Bocarro, J., Hipp, J.A., 2020. Nature Prescriptions for Health: A Review of Evidence and Research Opportunities.

International Journal of Environmental Research and Public Health 17, 4213. https://doi.org/10.3390/ijerph17124213

Lee, A.C.K., Maheswaran, R., 2011. The health benefits of urban green spaces: a review of the evidence. J Public Health 33, 212–222. https://doi.org/10.1093/pubmed/fdq068

Liley, D., Caals, Z., 2024. Severn Estuary Recreation Mitigation Strategy 2024 - 2029 (No. 681). Footprint Ecology / Stroud DC.

Liley, D., Jackson, D., Underhill-Day, J., 2006. Visitor Access Patterns on the Thames Basin Heaths (No. 682). English Nature Research Reports, N682, Peterborough.

Liley, D., Lake, S., Underhill-Day, J., Sharp, J., White, J., Hoskin, R., Cruickshanks, K., Fearnley, H., 2010. Welsh Seasonal Habitat Vulnerability Review. Footprint Ecology / CCW.

Liley, D., Panter, C., Chapman, C., 2021. Zones of influence for strategic housing growth and recreation impacts: review and best practice. Habitats Regulations Assessment Journal 20–22.

Liley, D., Underhill-Day, J., 2013. Thames, Medway & Swale Estuaries - Strategic Access Management and Monitoring Strategy (N Kent SARMP). Footprint Ecology / Medway Council.

Lowen, J., Liley, D., Underhill-Day, J., Whitehouse, A.T., 2008a. Access and Nature Conservation Reconciliation: supplementary guidance for England.

Lowen, J., Liley, D., Underhill-Day, J., Whitehouse, A.T., 2008b. Access and Nature Conservation Reconciliation: supplementary guidance for England.

Morgan, L., Protopopova, A., Birkler, R.I.D., Itin-Shwartz, B., Sutton, G.A., Gamliel, A., Yakobson, B., Raz, T., 2020. Human–dog relationships during the COVID-19 pandemic:

booming dog adoption during social isolation. Humanit Soc Sci Commun 7, 1–11. https://doi.org/10.1057/s41599-020-00649-x

Natural England, Kantar Public, 2021. Impact of Covid-19 on engagement with green and natural spaces (Natural England Report No. PANS003). The People and Nature Survey for England.

Nolet, B.A., Bevan, R.M., Klaassen, M., Langevoord, O., Van der Heijden, Y., 2002. Habitat switching by Bewick's swans: maximization of average long-term energy gain? J. Anim. Ecol. 71, 979–993.

O'Neill, R., 2019. Monitor of Engagement with the Natural Environment – The national survey on people and the natural environment. Headline report 2019 (NECR No. 275). Natural England and the Office for National Statistics.

Palmer, E., Smart, M., 2021. Identification of land with proven or possible functional linkages with the Severn Estuary SSSI/SPA Phase 5 (Gloucestershire and Worcestershire).

Perkins, R., Whitehead, M., Civil, W., Goulson, D., 2020. Potential role of veterinary flea products in widespread pesticide contamination of English rivers. Science of The Total Environment 143560. https://doi.org/10.1016/j.scitotenv.2020.143560

Poortinga, W., Bird, N., Hallingberg, B., Phillips, R., Williams, D., 2021. The role of perceived public and private green space in subjective health and wellbeing during and after the first peak of the COVID-19 outbreak. Landscape and Urban Planning 211, 104092. https://doi.org/10.1016/j.landurbplan.2021.104092

Randler, C., Tryjanowski, P., Jokimäki, J., Kaisanlahti-Jokimäki, M.-L., Staller, N., 2020. SARS-CoV2 (COVID-19) Pandemic Lockdown Influences Nature-Based Recreational Activity:

The Case of Birders. International Journal of Environmental Research and Public Health 17, 7310. https://doi.org/10.3390/ijerph17197310

Regel, J., Putz, K., 1997. Effect of human disturbance on body temperature and energy expenditure in penguins. Polar Biology 18, 246–253.

Richardson, M., Cormack, A., McRobert, L., Underhill, R., 2016. 30 Days Wild: Development and Evaluation of a Large-Scale Nature Engagement Campaign to Improve Well-Being. PLOS ONE 11, e0149777. https://doi.org/10.1371/journal.pone.0149777

Ross, K., Liley, D., Austin, G., Clarke, R.T., Burton, N.H., Stillman, R.A., Cruickshanks, K., Underhill-Day, J., 2014. Housing development and estuaries in England: developing methodologies for assessing the impacts of disturbance to non-breeding waterfowl. Footprint Ecology, unpublished report for Natural England.

Stillman, R.A., Goss-Custard, J.D., 2002. Seasonal changes in the response of oystercatchers Haematopus ostralegus to human disturbance. J. Avian Biol. 33, 358–365.

Stock, M., Hofeditz, F., 1997. Compensatory limits: energy budgets of Brent Geese, Branta b. bernicla, the influence of human disturbance. Journal für Ornithologie 138, 387–411.

Stroud District Council, 2017. Strategy for the Avoidance of Likely Significant Adverse Effects on the Severn Estuary SAC, SAC and Ramsar Site.

Thiel, D., Jenni-Eiermann, S., Palme, R., Jenni, L., 2011. Winter tourism increases stress hormone levels in the Capercaillie Tetrao urogallus. Ibis 153, 122–133. https://doi.org/10.1111/j.1474-919X.2010.01083.x

Thomas, K., Kvitek, R.G., Bretz, C., 2003. Effects of human activity on the foraging behavior of sanderlings Calidris alba. Biological Conservation 109, 67–71. https://doi.org/10.1016/S0006-3207(02)00137-4

Underhill-Day, J.C., 2005. A literature review of urban effects on lowland heaths and their wildlife. English Nature, Peterborough.

van der Kolk, H.-J., Ens, B.J., Oosterbeek, K., Jongejans, E., van de Pol, M., 2022. The hidden cost of disturbance: Eurasian Oystercatchers (Haematopus ostralegus) avoid a disturbed roost site during the tourist season. Ibis 164, 437–450. https://doi.org/10.1111/ibi.13035

Walker, B.G., Dee Boersma, P., Wingfield, J.C., 2006. Habituation of Adult Magellanic Penguins to Human Visitation as Expressed through Behavior and Corticosterone Secretion. Conservation Biology 20, 146–154.

Weimerskirch, H., Shaffer, S.A., Mabille, G., Martin, J., Boutard, O., Rouanet, J.L., 2002. Heart rate and energy expenditure of incubating wandering albatrosses: basal levels, natural variation, and the effects of human disturbance. J Exp Biol 205, 475–83.

Woods, N.. I.Eds.P. of the . . ., 2002. Do Dorset's heaths have a future?, in: Underhill-Day, J.C., Liley, D. (Eds.), Sixth National Heathland Conference. RSPB, Sandy, Beds., Bournemouth.

Woodward, I.D., Calbrade, N.A., Norfolk, D., Slater, A., Burton, N.H., Wright, L.J., 2016. Identification of Wintering Waterfowl High Tide Roosts on the Severn Estuary SSI/SPA Phase 2 (Clevedon to Oldbury) & Phase 3 (Bridgwater Bay) (BTO Research Report No. 683). Report for Natural England by the BTO, Thetford.

Yasué, M., 2005. The effects of human presence, flock size and prey density on shorebird foraging rates. Journal of Ethology 23, 199–204. https://doi.org/10.1007/s10164-005-0152-8

Appendix 1: Questionnaire



Good morning/afternoon. I am conducting a visitor survey on behalf of South Gloucestershire Council to find out how people use this area for recreation. Can you spare me a few minutes please?

Q1 ...

- ◯ **Are you on a day trip/short visit and have travelled directly from your home today**... *if no*
- ◯ **Are you on a short trip/short visit & staying away from home with friends or family** ... *if no*
- ◯ **Are you staying away from home, e.g. second home, mobile home or on holiday**
- ◯ If none of the above, **How would you describe your visit today?**

Further details

Q2 **What is the main activity you are undertaking today?** *Tick closest answer. Do not prompt. Single response only. Record any additional activities on the next page (Q3).*

- ◯ Dog walking
- ◯ Walking
- ◯ Jogging / running
- ◯ Outing with family
- ◯ Cycling / mountain biking
- ◯ Bird/wildlife watching
- ◯ Photography
- ◯ Meeting up with friends
- ◯ Visiting cafe/restaurant/pub
- ◯ Angling/fishing
- ◯ Other, please detail:

Further details

Q3 **Are there any other activities that you (or members of your group) are doing whilst you are here today?** *Tick all that apply. Do not prompt. Leave blank if not applicable.*

- [ ] Dog walking
- [ ] Walking
- [ ] Jogging / running
- [ ] Outing with family
- [ ] Cycling / mountain biking
- [ ] Bird/wildlife watching
- [ ] Photography
- [ ] Meeting up with friends
- [ ] Visiting cafe/restaurant/pub
- [ ] Angling/fishing
- [ ] Other, please detail:

Further details

Q4 **How long have you spent / will you spend here today?** *Single response only. Do not prompt.*

- ○ Less than 30 minutes
- ○ Between 30 minutes and 1 hour
- ○ 1-2 hours
- ○ 2-3 hours
- ○ 3-4 hours
- ○ 4 hours +
- ○ Don't know

Further details:

Q5 **Over the past year, roughly how often have you visited this location?** *Tick closest answer, single response only. Only prompt if interviewee struggles.*

- ◯ Daily
- ◯ Most days (180+ visits)
- ◯ 1 to 3 times a week (40-180 visits)
- ◯ 2 to 3 times per month (15-40 visits)
- ◯ Once a month (6-15 visits)
- ◯ Less than once a month (2-5 visits)
- ◯ First visit / haven't visited in past year
- ◯ Don't know
- ◯ Other, please detail

Further details:

Q6 **Do you tend to visit this location at a certain time of day?** *Tick closest answers. Multiple answers ok. Do not prompt.*

- ☐ Early morning (before 9am)
- ☐ Late morning (between 9am and 12pm)
- ☐ Early afternoon (between 12pm and 2pm)
- ☐ Late afternoon (between 2pm and 4pm)
- ☐ Evening (after 4pm)
- ☐ Varies / Don't know
- ☐ First visit

Q7 **Do you tend to visit this location more at a particular time of year for [***insert given activity***]?** *Multiple answers ok. Do not prompt.*

- ☐ Spring (Mar-May)
- ☐ Summer (Jun-Aug)
- ☐ Autumn (Sept-Nov)
- ☐ Winter (Dec-Feb)
- ☐ Equally all year
- ☐ Don't know
- ☐ First visit

Q8 **How did you get here today?** *If necessary prompt with:* **What forms of transport did you use?** *Multiple response possible - e.g. train and bicycle.*

- [ ] Car / van
- [ ] On foot
- [ ] Bicycle
- [ ] Bus
- [ ] Train
- [ ] Motorbike
- [ ] Other, please detail

Further details:

Q9 **Why did you choose to visit this specific location today, rather than somewhere else?** *Tick all responses given. Do not prompt, tick closest answers.*

- [ ] Don't know / others in party chose
- [ ] Close to home
- [ ] No need to use car
- [ ] Quick / easy travel route
- [ ] Good / easy parking
- [ ] Particular facilities
- [ ] Refreshments / cafe / pub
- [ ] Choice of routes
- [ ] Away from roads/traffic
- [ ] Feels safe here
- [ ] Not many people
- [ ] Scenery / variety of views
- [ ] Rural feel / wild landscape
- [ ] Particular wildlife interest (e.g. birds, plants)
- [ ] Particular historic or cultural interest
- [ ] Habit / familiarity
- [ ] Good for dog / dog enjoys it
- [ ] Ability to let dog off lead
- [ ] Appropriate place for activity
- [ ] Suitability of area in given weather conditions
- [ ] For a change / variety
- [ ] Other, please detail

Further details:

Q10 **Which of those reasons would you say had the most influence over your choice of location to visit today?** *Single choice, tick their main reason only. List is based on their answers to Q9.*

- ◯ Don't know / others in party chose
- ◯ Close to home
- ◯ No need to use car
- ◯ Quick / easy travel route
- ◯ Good / easy parking
- ◯ Particular facilities
- ◯ Refreshments / cafe / pub
- ◯ Choice of routes
- ◯ Away from roads/traffic
- ◯ Feels safe here
- ◯ Not many people
- ◯ Scenery / variety of views
- ◯ Rural feel / wild landscape
- ◯ Particular wildlife interest (e.g. birds, plants)
- ◯ Particular historic or cultural interest
- ◯ Habit / familiarity
- ◯ Good for dog / dog enjoys it
- ◯ Ability to let dog off lead
- ◯ Appropriate place for activity
- ◯ Suitability of area in given weather conditions
- ◯ For a change / variety
- ◯ Other reason (Further details:)

Q11 **Now I'd like to ask you about your route today. Looking at the area shown on this map, can you show me where you started your visit today, the finish point and your route please.** *Probe to ensure route is accurately documented. Use **P** to indicate where the visitor parked (if applicable), **E** to indicate where they started and **X** to indicate where they finished. Mark the route with a solid line for the route already taken and a dotted line for the expected or remaining route, with arrows to indicate the direction.*

Enter the map reference below, or write 'no map' with brief reason if no route map completed.

Q12 **Is / was your route today the normal length when you visit here for [***insert given activity***]?** *Tick closest answer, do not prompt. Single response only.*

- ◯ Yes, normal
- ◯ Much longer than normal
- ◯ Much shorter than normal
- ◯ Not sure / no typical visit
- ◯ First visit

Q13 **What, if anything, influenced your choice of route here today?** *Tick closest answers, do not prompt. Multiple responses ok.*

- ☐ Weather
- ☐ Daylight
- ☐ Time
- ☐ Habit / usual route
- ☐ Other users (avoiding crowds, other dogs etc.)
- ☐ Group members (e.g. kids, less able)
- ☐ Avoiding muddy tracks / paths
- ☐ Followed a marked trail (e.g. Severn Way, Severn Beach Heritage Trail)
- ☐ Location of cafe/restaurant/pub
- ☐ Activity undertaken (e.g. presence of dog)
- ☐ Birds / wildlife
- ☐ Followed their dog
- ☐ Interpretation / leaflets / promotion / app
- ☐ Viewpoint / feature
- ☐ Direct route to work / shops etc.
- ☐ Just wandering/exploring
- ☐ Other, please detail

Further details:

Q14 **Where would you have visited today for [given activity] if you could not have visited here?** *Do not prompt. Ask for spelling if necessary.*

- ◯ Nowhere / wouldn't have visited anywhere
- ◯ Not sure / don't know
- ◯ Alternative site:

Q15 **Please could you tell me the name of 2 other locations that you also visit for [*given activity*]?** *Do not prompt. Ask for spellings if necessary.*

1st site name:

2nd site name:

Q16 **Are there any changes you would like to see here with regards to how this area is managed for access?** *Do not give options or prompt. Tick closest option(s).*

- ☐ No changes / leave as is
- ☐ More parking
- ☐ Better parking
- ☐ More paths
- ☐ Better / surfaced paths
- ☐ More bins / less litter
- ☐ More dog waste bins
- ☐ Controls on dogs and dog fouling
- ☐ Facilities for dogs (e.g. training areas, washing facilities)
- ☐ More accessible
- ☐ Seating / benches
- ☐ Toilets
- ☐ Cafe
- ☐ Changes to habitats / scenery
- ☐ More natural / wild
- ☐ Not sure / don't know
- ☐ Other, please detail below

Further details:

Q17 **Do you have any further comments or general feedback about your visit and access to this area?**

Q18 **Finally, to identify how far people have travelled, what is your full home postcode?**
This is an important piece of information, please make every effort to record correctly. If necessary, reassure them that we don't want their full address, and it will only be used to work out where people are coming from.

Q19 *If visitor is unable or refuses to give postcode:* **What is the name of the town or area where you live?**

Q20 *If visitor is on holiday ask:* **Which town / area are you staying in?**

That is the end. Thank you very much indeed for your time.

TO BE COMPLETED AFTER INTERVIEW FINISHED.

Q21 **Survey location:**

- ◯ 1 - Oldbury on Severn
- ◯ 2 - Whale Wharf
- ◯ 3 - Old Passage
- ◯ 4 - New Passage
- ◯ 5 - Severn Beach

Q22

Number of people in group (including minors)	
Number of minors in group (under 18s)	
Number of dogs with group	
Number of dogs with group seen off lead	

Q23 **Did the interviewee struggle with answering questions because English was not their first language?**
Tick if you feel this may have influenced their responses.

☐

Q24 **Surveyor comments**. *Note anything that may be relevant to the survey, including any changes to the survey entry that are necessary, e.g. typos/mistakes/changes to answers/additional information.*

Appendix 2: Selected examples of other European site mitigation schemes

This appendix summarises a selection of other European site mitigation schemes and broad approaches for mitigation in-place. The table only gives examples of schemes relating to recreation[17]. The table only includes schemes that are established, and it should be noted that there are also a number of schemes in development. Hyperlinks relate to project specific websites or relevant local authority pages with further information and details. ZOI refers to zone of influence (for example for collection of developer contributions).

Area	Issues & sites addressed by mitigation strategy	'Exclusion zone'	ZoI	SANGs/GI	Wardening	Other mitigation measures	Monitoring measures	Further details and notes
Dorset Heaths	Recreation and urbanisation; heathland SPA and 2 heathland SACs	400m	5km	Heathland infrastructure projects (including SANG) for all development. Bespoke SANG for sites with around 50 dwellings or more.	Dedicated wardening team and through local authorities	Dog project, fire projects (including education and awareness raising) and variety of other projects	Automated counters, vehicle counts, interviews, bird monitoring.	Long-running scheme with joint study.
Thames Basin Heaths	Recreation and urbanisation; heathland SPA	400m	5km	Minimum of 8ha of SANGs per 1,000 residents	Thames Basin Heaths Partnership, currently c. 9 full time equivalents	Dog Project, education work and dedicated education officer.	Automated counters, vehicle counts, interviews, fire records, bird monitoring.	Long-running scheme. Each local authority has produced their own study/mitigation in line with agreed strategic approach.

[17] Note that there are also schemes addressing water quality, air quality etc.

Area	Issues & sites addressed by mitigation strategy	'Exclusion zone'	ZoI	SANGs/GI	Wardening	Other mitigation measures	Monitoring measures	Further details and notes
South-east Devon	Recreation and urbanisation; sand dune SAC, heathland SPA/SAC and estuary SPA/Ramsar.	400m around heath-land only	10km	Some SANG at strategic locations identified in strategy	2 Full-time equivalents.	Dog Project, bird refuges on estuary, patrol boat on estuary, codes of conduct.	Targeted work on effectiveness of refuges; some visitor survey work	3 local authorities, and various zones reflecting the relevant European sites.
Solent	Recreation impacts for 3 coastal SPA/Ramsar sites	No	5.6km	Some SANGs plus other infrastructure set out in mini 'Access Management Assessments' each focussed on different sections of coast.	Team of rangers, engagement staff and a monitoring officer.	Awareness raising and wider promotion, dedicated dog post	Automated counters, vehicle counts, interviews, targeted work testing effectiveness of ranger presence.	Bird Aware Project established with strong branding. More site-specific projects and awareness raising work still being developed.
Cannock Chase	Recreation impacts to heathland SAC	400m	15km	No	Delivery Officer and Engagement Officer only so far	Parking strategy and access management strategy for the SAC with series of interventions and targeted measures.	Vehicle counts, interviews.	6 local authorities have signed a joint memorandum of understanding which ensures joint approach
North Kent	Recreation impacts for 3 coastal SPA/Ramsar sites	No	6km	No	3 rangers	Dog Project, Codes of Conduct, Signage and Interpretation and	Liley & Underhill-Day (2013)	4 local authorities, each with slightly different approaches to

Area	Issues & sites addressed by mitigation strategy	'Exclusion zone'	ZoI	SANGs/GI	Wardening	Other mitigation measures	Monitoring measures	Further details and notes
						Site-Specific Enhancements		developer contributions.
Essex Coast	Recreation impacts for 9 coastal SPA/Ramsar sites and 1 SAC	No	4.5-20.8km	No	Ranger team being built up over time, will include water-based ranger.	Education and communication, codes of conduct, habitat-based measures.	Visitor surveys, bird monitoring and vegetation monitoring	11 local planning authorities, joint study in preparation.
Burnham Beeches	Recreation and urbanisation impacts for a woodland SAC	500m	5.6km	No	1 Engagement Ranger/SAC Ambassador	Electronic interpretation, events and promotion, access plan/carrying capacity study	Visitor surveys, soil and ecological impacts	Each local authority will develop their own mitigation approach. Chilterns and South Bucks described.
Suffolk Coast	Recreation impacts for 8 coastal/estuary sites including mix of SAC, SPA and Ramsar	No	13km	Large sites only	Delivery officer and team of rangers	Dog Project, codes of conduct, signage and interpretation, awareness raising, range of site-specific projects	Visitor surveys (counts and interviews), bird monitoring,	4 local authorities and joint strategy covering numerous sites along large stretch of coast
South Tyneside	Recreation impacts for coastal SAC and a coastal SPA	No	6km	No	Delivery office and 0.5 full time equivalent ranger post	Dog Project, review of parking.	Automated counters and bird surveys	Interim strategy established.
Poole Harbour	Recreation impacts for coastal SPA and Ramsar	No	Variable, not based on specific distance	Rolling 5-year programme of Infrastructure Projects	Project coordinator and a warden	Leaflets, litter clearance and engagement	Visitor and bird surveys	2 local authorities with a joint study

Area	Issues & sites addressed by mitigation strategy	'Exclusion zone'	ZoI	SANGs/GI	Wardening	Other mitigation measures	Monitoring measures	Further details and notes
South Pennine Moors SPA	Recreation, urban effects and supporting habitat for moorland SPA and SAC	400m	7km for recrea-tion; 2.5km for support-ing habitat	Improvements to existing GI	3 rangers and a delivery officer	Interpretation, awareness raising, access infrastructure, parking.	Visitor surveys, ecological monitoring	study
Northumberland Coast	Coastal SPA/Ramsar and suite of coastal SSSI. Wintering, passage and breeding bird interest plus dune plants/habitats.	none	0-7km (all develop ment); 7-10km (develop ments of 10+ units, tariff 50% of the 0-7km rate)	None	2 wardens and support costs	Wardens key element to the mitigation. Wardens have enforcement powers in relation to dogs (PSPOs).	Monitoring	
Ashdown Forest	Heathland SPA/SAC	400m	7km	Strategic SANGs and developer led SANGs	Ranger managed by Ashdown Forest Conservators	SAMM strategy updated in 2023 and includes a range of plans and further studies	Bird and visitor monitoring	
All Cornish sites	3 different coastal/marine SAC sites and 1 SPA site classified for wintering waterbirds	none	12.3-12.5km	Developer led	Dog warden visits 5hrs per month to Penhale Dunes	Campaigns around dog fouling, measures to control/better manage parking		Single study covering all European sites in Cornwall

Area	Issues & sites addressed by mitigation strategy	'Exclusion zone'	ZoI	SANGs/GI	Wardening	Other mitigation measures	Monitoring measures	Further details and notes
Chilterns Beechwoods	Beech woodland and grassland SAC	500m	12.6km	8ha per 1000 residents; developer led or LPA	2 rangers and a delivery officer	Tree protection measures, ride management, signage, interpretation, gateway/hubs and parking changes	Visitor numbers, ecological impacts, tree health.	Focuses on the Ashridge Estate part of the SAC
Cotswold Beechwoods	Beech woodland and grassland SAC	none	15.4km	8ha per 1000 residents; developer led or LPA	2 rangers and a delivery officer	Parking changes, interpretation, signage, awareness raising strategy	Production of a monitoring strategy, visitor interviews.	
Severn Estuary	Estuarine SAC/SPA/Ramsar	none	12.6km	8ha per 1000 residents; developer led or LPA	2 rangers and a delivery officer	Signage, interpretation, awareness raising including work with dog walkers	Visitor interviews, ecological monitoring and reporting system	