The People and Nature Surveys for England (Accredited Official Statistics)

Technical Report

Date: December 2023

Version: 6

Note that this is a working document and will be updated as the survey develops and progresses.

www.gov.uk/natural-england

Version / date published	Produced / updated by	Quality assured by
1/ 30//9/2020	Stephen McGinigal (Kantar Public)	Simon Doxford and Rose O'Neill (Natural England)
2/ 13/01/2021	Simon Doxford (Natural England)	Katherine Burgess and Nathan Shaw (Natural England)
3/ 29/09/2021	Katherine Burgess (Natural England) Stephen McGinigal (Kantar Public)	Nathan Shaw (Natural England)
4/ 20/11/2022	Ruth Lamont and Tom Marshall (Natural England) Stephen McGinigal and Richard Crawshaw (Kantar Public)	Sergio Milheiras and Caitlin Clark (Natural England)
5/ 29/11/2023	Tom Marshall, Sergio Milheiras, Fränze Kibowski and Ruby Grantham (Natural England) Stephen McGinigal, Luke Taylor, Richard Crawshaw (Verian*)	Caitlin Clark (Natural England)
6/ 6/12/2023	Moira Scarff, Tom Marshall (Natural England)	Caitlin Clark (Natural England)

*NB Kantar Public changed name to Verian in November 2023

Contents

Glossary

Design Weight

Design weights account for different probabilities of selection and if used are the starting weight used in any rim weighting calculation.

In C-PANS, Verian (previously known as Kantar Public until November 2023) calculated a design weight to compensate for just one child per household being surveyed. Children from households with only one eligible child were given a design weight of 1, children from households with more than one eligible child were given a design weight of 2.

The design weights are derived as 1 divided by the probability of selection.

Non-response/Rim weighting

The non-response weights are intended to account for different probabilities of completing the survey.

The non-response weights are derived through iterative proportional fitting, also known as calibration raking or rim weighting. This method follows an algorithm which iteratively weights the sample to match known marginal distributions until the weighting converges. In other words, the algorithm starts with the design weight (if applicable, if not it starts with a value of 1) and then iteratively adjusts this initial weight to match each of the target distributions in turn until it converges on a weighting solution which matches all of the target distributions at once.

The target distributions are based on demographic targets described within the technical report.

Design effects

Weighting reduces the effective sample size of a dataset; because of the differences in the probabilities of selection and the probabilities of response, the achieved sample provides less information than a notional simple random sample[1] of the same size. The design effect quantifies the extent to which the expected sampling error in a survey departs from the sampling error that can expected under simple random sampling.

Weighting efficiency is the inverse of the design effect (1/Deff). This indicates how much statistical power is lost by weighting, the lower the efficiency the more power is lost.

Effective Sample Size

The effective sample size (ESS) is an estimate of the sample size required to achieve the same level of precision if that sample was a simple random sample.

---

[1] That is, a sample where all cases had exactly the same probabilities of selection and of response (having been selected).

It is calculated by dividing the unweighted sample size by the design effect. It is the sample sized used when calculating confidence intervals or in any tests of statistical significance.

Confidence Intervals

When a survey is carried out, the respondents who take part are only a subset of those in the population and as such may not give an exact representation of the 'true' average in the population. The reporting uses 'Confidence Intervals' to account for the fact that the survey is based on a subset of the population. A 95% Confidence Interval is a margin of error around an estimate, which gives a range of values within which you can be 95% confident that the true mean will lie.

For instance, if 1000 people are interviewed, and 500 (50%) of them say that they agree with a statement, then you can be 95% confident that true proportion of people who agree with the statement is between 50% +/- 3% (47%, 53%). The analysis of Confidence Intervals within PANS uses the Complex Samples Module within the analytical software package, Statistical Product and Service Solutions (SPSS) to correct for these effects.

Statistically significant differences

Statistically significant differences are differences that are very unlikely to occur by chance. Statistical tests are used to determine the probability of these differences occurring. Significant differences reported at the 95% confidence estimate the difference would occur by chance only 5% of the time. At the 99% confidence level, this would only occur 1% of the time. PANS data releases report on significant differences at the 95% confidence level.

Weighting matrix

The weighting matrix refers to the variables the PANS survey is weighted by, and population statistics used to weight the data to. These include:

- Age*Gender
- Region
- Age*Highest qualification
- Children aged <16 in the household
- Ethnicity
- Long-lasting health condition
- Number of cars / vans available for use by the household
- Urban/Rural
- Dog ownership

Weighted base

The weighted base is the base size of the data once the weights have been applied. In this survey, each month is weighted so that the weighted base size is 2,083.

Weighted profile

The weighted profile is the profile of the data once the weights have been applied. The profile is usually expressed in percentages and should closely match the profile of the weighting targets.

Calendar Month Factor

The calendar month factor is used to adjust the number of visits within a month based on the time frame of question and the number of days in each month. The timeframe for the frequency of visits question is 14 days, the Calendar Month Factor is applied in order to account for the number of times this can period occurs within each calendar month based on the number of days in the month. The table below shows the calendar month factor applied for each month:

Month	Days in the month	Calendar Month Factor
April	30	2.142857
May	31	2.214286
June	30	2.142857
July	31	2.214286
August	31	2.214286
September	30	2.142857
October	31	2.214286
November	30	2.142857
December	31	2.214286
January	31	2.214286
February	28	2
March	31	2.214286

Trip factor

The Trip Factor is the number of trips the respondent has made in the last 14 days.

Weights for Grossed estimates

These weights gross up the number of respondents to match an overall figure. In this survey, they are grossed to match the adult population (16+) in England. These weights also take into account the overall population size, modularisation and the time frame of the questions. These should be used when grossed estimates are required.

Weights for Proportions or percentages

These weights produce adjusted percentages for Modules 2A and 2ASub to account for the fact that detailed information is only collected for one visit, regardless of the number of visits which respondents reported having made in the last 14 days. To ensure this sample is representative of ALL visits – the number of visits needs to be accounted for. The final grossed weight for the number of visits is multiplied by the number of visits.

1. Introduction to The People and Nature Surveys for England

1.1 Technical Report

This technical report provides details of the development of The People and Nature Surveys for England (both adults' and children's surveys) and the methods used to deliver them. The report was initially developed when the adults' survey was launched in 2020. Since 2020, it has undergone a number of revisions, reflecting refinement of the methodology and a section on the children's survey was added. The report will continue to be expanded and updated as work on The People and Nature Surveys progresses.

The report is intended to provide users with sufficient background and technical information to enable use of the datasets, interpret the findings of reports and understand the design of the surveys.

1.2 The People and Nature Surveys for England

The People and Nature Surveys for England—the Adults' People and Nature Survey (PANS) and Children's People and Nature Survey (C-PANS)—gather evidence and data through an online survey relating to people's enjoyment, access, understanding of and attitudes towards the natural environment, and its contributions to wellbeing. The surveys build on the Monitor of Engagement with the Natural Environment (MENE) survey[2] which ran from 2009 to 2019.

The data derived for the People and Nature Surveys enables users to:

- Understand how people use, enjoy and are motivated to protect the natural environment, as well as barriers to accessing the outdoors.
- Monitor changes in use of the natural environment over time, at a range of different spatial scales and for key groups within the population.
- Understand how being in the natural environment can affect health and wellbeing.
- Understand environmental attitudes and the actions people take at home, in the garden and in the wider community to protect the environment.
- Ask parents about their child/children's use and enjoyment of the natural environment as well as barriers to this.
- Understand children's views (aged 8 to 15) on a selection of these topics.

[2] https://www.gov.uk/government/collections/monitor-of-engagement-with-the-natural-environment-survey-purpose-and-results

The surveys are led by Natural England in partnership with the Department for Environment, Food and Rural Affairs (Defra). They contribute to Natural England's delivery of statutory duties, inform Defra policy and natural capital accounting, and contribute to the 'G indicators' in the outcome indicator framework for the 25 Year Environment Plan.[3]

During the first four years of the surveys, Verian (formerly Kantar Public, until November 2023) has been commissioned to deliver the surveys using an online panel survey, sampling a representative sample of up to 25,000 adults (aged 16+) and 4000 children and young people (aged 8-15) in England on a yearly basis. Data collection was originally planned for a minimum of three years, at which point the surveys were reviewed. Natural England and Defra envisage that the surveys will be a long-running national dataset.

Statistics from the surveys are published as Accredited Official Statistics. Reports and analysis

If you have any feedback regarding this document, please contact the Natural England People and Nature Surveys project team via email – people_and_nature@naturalengland.org.uk.

1.3 Structure of the report

This technical report provides details of the development of the two surveys. Sections 2 through 8 cover the adults' survey and section 9 covers the subsequent development of the children's survey. These appear under the following section headings:

Section 1: *Introduction to the People and Nature Surveys.*

Section 2: *Development of the Adults' Survey.* This looks at the work taken prior to this survey and the transition from MENE.

Section 3: *Questionnaire Development for the Adults' Survey.* This section looks at the stages of questionnaire development including a stakeholder workshop, cognitive testing and live trial of the survey.

Section 4: *Adults' Questionnaire Content and Structure.* This section looks at the overall questionnaire structure and modularisation, geo-coding of respondent visit location and changes to questionnaire since the survey started in April 2020.

Section 5: *Sampling Quotas for the Adults' Survey.* This section looks at the development of the quotas used to ensure that the survey data is nationally representative.

Section 6: *Weighting of the Adults' Survey.* This section looks at the development of the interim and final weighting schemes.

Section 7: *Data processing and publication:* This section looks at details of data production, quality assurance and data publication.

[3] https://oifdata.defra.gov.uk/

Section 8: *Children's survey.* This section outlines the process by which the children's survey was developed, sampling and fieldwork for the children's survey.

2. Development of the Adults' Survey

The People and Nature Survey (PANS) builds on the Monitor of Engagement with the Natural Environment (MENE) survey which ran from 2009 to 2019. MENE collected evidence on outdoor recreation behaviour, attitudes and engagement with the natural environment.

In 2017, Natural England and Defra commissioned a strategic review of the MENE survey method and questionnaire ('Monitor of Engagement with the Natural Environment Strategic Review'). This was in part to consider the implications of a move to an online survey, and to make sure that the survey method and questionnaire addressed current and future policy needs, including collecting the evidence needed to inform progress against the 25-year Environment Plan. The full set of documents detailing the findings of the strategic review of MENE have been published by Defra.[4]

Alongside the strategic review commission, Natural England led a series of discussions and workshops with users of the data to understand what was most useful, what was not, how the dataset and outputs could be improved and any concerns about transitioning to a new survey.

The MENE review included two phases. Phase 1 was a scoping phase which involved desk research of existing surveys and workshops with users of MENE to understand what they were looking for in a new survey. The findings from the strategic review suggested that an online panel would be the most appropriate method of data collection for the survey. Phase 2 took the learnings from phase 1 and tested them. Given that one of the key recommendations was testing the survey using online data collection there was a focus on ensuring that the questionnaire reflected this change. The questionnaire testing involved:

i. Cognitive interviews – two days of in-depth cognitive interviews in London and Wallsend to evaluate how participants understood, processed and responded to key questions proposed for the survey questionnaire. This allowed further refinement of questions and topics for inclusion before the survey piloting.

ii. A quantitative pilot - testing of a selection of the questions which could be included in a new online survey, covering a range of areas including visit taking, attitudes to the natural environment, gardening and visits taken by children. These questions were tested across two waves of the Kantar TNS online omnibus survey. Also a small selection of questions that could be included in a new online survey were tested using the Kantar TNS face-to-face omnibus survey to help identify any mode effects (i.e. variations in responses cause due to collecting data using a different method).

[4] http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=19989&FromSearch=Y&Publisher=1&SearchText=BE0132&SortString=ProjectCode&SortOrder=Asc&Paging=10%23Description

iii. Social media analytics pilot – undertaken to assess the suitability of social media analysis as a source of insight about how people use and engage with the natural environment.

Some of the key recommendations from the review were to:

i. Use an online panel to conduct the survey, with a modular design to enable completion within 10-12 minutes

ii. Ask about visits in the last 14 days (as opposed to last 7 days in MENE)

iii. Use an interactive map (using Google Maps API) to record the location of the most recent visit to the natural environment

iv. Develop new questions to better understand attitudes and behaviours, perceptions of quality and beauty, and the health and wellbeing benefits gained from being in nature.

v. As far as possible, use a mixed methods approach to complement the main quantitative survey dataset.

Following the MENE review and stakeholder discussions, Natural England and Defra developed plans for the People and Nature Survey to build on and replace MENE. The new name reflects the fact that, because of the change of methods and in many cases question wording, it should not be considered a continuous dataset. Verian (then Kantar Public) was awarded the contract to deliver the People and Nature Survey in autumn 2019.

2.1 Moving to an Online Survey

The MENE review recommended a quantitative online survey with a representative sample of the English adult population as the core approach for the new study.

Following Phase 1 of the strategic review, face-to-face and telephone interviewing approaches were discounted largely due to decreasing response rates and increasing costs, while more statistically pure random probability sampling methods are considered unfeasible due to the associated high cost per interview and the large sample size requirements to meet sub-national information needs.

2.1.1 Strengths and Limitations of Online Panels

PANS is conducted by Verian using Kantar's online Profiles panel. The online panel brings benefits in terms of speed, ability to interview during lockdown/social distancing restrictions and reducing social desirability bias.

However, it is important to flag limitations around representativeness of data collected through this method:

1. Since panels are opt-in there is the risk that panellists are not representative of the general population.[5] There are, however, several official statistics where elements around the data generating process in relation to panellist self-selection are unknown and must be modelled.
2. Online panel surveys exclude the off-line population.

To minimise the risk of bias around representativeness, Kantar's online Profiles Panel uses a variety of recruitment methods. This includes opt-in email, e-newsletter campaigns, and social media. This ensures the inclusion of 'hard to reach' groups on the internet (e.g. ethnic minority group, seniors) thereby increasing population coverage and improving quality of the sample provided.

To quantify the risk around representativeness of online panel surveys, sample composition analysis was undertaken during development of these statistics to compare online panel methods and MENE. It showed that the online samples tend to be more representative than MENE in terms of age and working status. However, online samples tend not to represent the very oldest in the population well (as they are the least likely to have internet access). Both the online panel and MENE tend to achieve samples that are broadly representative of the population by region. Online samples tend to under-represent people from ethnic minority backgrounds, which is why an additional quota criterion on ethnicity was set for PANS. The survey was also developed specifically to ensure it worked well on mobile devices as approximately four in ten surveys are completed on a mobile phone or tablet.

Quota objectives to achieve a nationally representative sample in terms of age, gender, region, ethnicity, and education level have been achieved consistently each month since the survey began (at least 95% of the target (see Section 5).

In relation to exclusion of off-line adults, although internet penetration amongst the adult English population is now at 96% (Source: ONS, 2020[6]) levels of coverage still vary by demographic group, in particular by age (e.g. just 61% of households with a lone resident aged 65+). Also, the profile of people who join an online survey panel is different from those who do not. Panellists are more likely to be female, younger and less affluent than the norm. Other differences will also exist - for example, panellists tend to use the internet more frequently than the population.

It should also be noted that, all survey methods are likely to over represent certain groups and under represent others, for example the current MENE face to face approach over represents older people and those who are most likely to be at home when interviewers make contact.

---

[5] Kantar Profiles use a variety of checks to ensure that they adhere to European Society for Opinion and Marketing Research principles of respondent validation, verification and honesty. These include UP address checks, AI machine learning, de-duping from source and a propriety tool called Honesty Detector.

[6] https://www.ons.gov.uk/peoplepopulationandcommunity/householdcharacteristics/homeinternetandsocialmediausage/bulletins/internetaccesshouseholdsandindividuals/2020

2.2 Use of an Interactive Map

As part of the strategic review, development and testing of an interactive map for recording visit destinations was undertaken, involving two stages:

1. Expert consultations with individuals with experience undertaking equivalent surveys which used an interactive map.
2. Public testing of a beta version of an interactive map through a series of 50 interviews.

2.2.1 Expert Consultations

Expert consultations were undertaken with individuals with experience of conducting equivalent surveys which used an interactive map approach, similar to that proposed for the new survey. A total of 6 interviews were undertaken with feedback collected on relevant experiences from a range of organisations including Natural England, Canal and River Trust, University of Exeter, University of Derby, Transport for London and Transport Focus.

2.2.2 Public Testing

Public testing of a beta version of an interactive map was undertaken through a series of 50 interviews with a broad selection of members of the public. Key finding from these interviews are outlined below:

- The majority of respondents found the map easy to use and were able to accurately locate the place visited (42 of the 50 interviews located the place visited in an acceptable level of accuracy).
- The majority of respondents were regularly online and most used an online map or app on a very regular basis.
- Where issues were encountered, confidence with technology was more of an issue than using maps but this was encountered in a very small number of cases and is less likely to be an issue for those recruited to take part in an online survey.

Testing the location map was one of the key aspects of the People and Nature Survey questionnaire development process. Testing this built on the strategic review, particularly the usability testing.

2.3 Comparability of PANS Data with MENE

The MENE review recommended that the People and Nature Survey continued to track key metrics from MENE. It was initially hoped that it would be possible to construct a continuous dataset for a small number of key indicators at a population level via a ‘backward’ harmonisation – recalibrating the historic MENE data to match the data from the People and Nature survey. However, after an initial appraisal of the proposed approach, it was identified that it would not be possible to directly compare the results between MENE and PANS in this way due to change in sample design, mode of data collection, recall period and question wording.

Work was carried out in 2023 to identify how trends across the two surveys can be compared. The review found that there are significant differences between PANS and MENE, relating to:

- Sample design
- Survey mode
- Questionnaire design
- Timing.

The extent of these differences means that direct comparisons cannot be made between the two surveys. However, for some key topics, it can be appropriate to compare high-level trends observed in MENE with those observed in PANS. A report is available on Gov.uk summarising the findings of this work.

2.4 Accredited Official Statistics

Statistics from PANS are currently published as accredited official statistics. The PANS team has worked with the Office for Statistics Regulation (OSR) to ensure that the Code of Practice for Statistics is adhered to throughout the project.

2.4.1 The transition from PANS to MENE

When PANS was launched, Natural England notified the Office for Statistics Regulation (OSR) of their proposal to move from MENE's face-to-face approach to an online method of data collection.[7] The OSR undertook a compliance check to look at the transition to the new survey focussing initially on the quality of the MENE data and statistics[8]. This identified a number of actions and areas for further consideration for PANS throughout the transition. These included:

- Applying the lessons learned from cleaning and maintaining the MENE dataset to develop a good understanding of, and document, the quality of the People and Nature Survey data.
- Communicating clearly the value of the new People and Nature Survey and we encourage the team to continue its wide engagement to promote and develop the new statistics.
- Building on strengths of MENE, including the local authority dashboard, allowing users to access and integrate local-level data, and developed an interactive, visual story map summarising and reflecting on 10 years of MENE data.
- Creating robust and reproducible quality assurance process based on MENE QA were developed for the PANS dataset (See Section 7) and continuing to

[7] Statistics derived from MENE were designated as National Statistics. In June 2020, the OSR published a review of Defra Group statistics, which included MENE, focused on user engagement.[7] This highlighted MENE as a case study and included recommendations to support the Defra Group in enhancing its user engagement and provide broader learning for other statistics.

[8] https://osr.statisticsauthority.gov.uk/correspondence/compliance-check-monitor-of-engagement-with-the-natural-environment-mene-statistics/

communicate widely with stakeholders through regular quarterly dataset releases,[9] as well as through a dedicated User hub[10].

- Publishing the MENE strategic review[11] to support decision making during the transition from the MENE survey, which used face-to-face methods, to the current online People and Nature Survey.

2.4.1 Experimental and Official Statistics

For the first year of data collection (April 2020 – March 2021), statistics from PANS were published as experimental statistics. In light of this, the OSR conducted a rapid regulatory review of the April 2020 published outputs.[12] The basis of the review was to ensure that the survey outputs were produced in line with the three pillars of the Code of Practice for Statistics: Trustworthiness, Quality and Value.

The OSR noted that the approach to user engagement from Natural England/Defra for these statistics has been "exemplary", the Quality Assurance process is "proportionate and robust". The review also discussed the move to an online panel for data collection and concluded that "The methods used and their limitations are explained clearly and aid interpretation of the statistics".[13]

Over the first year of data collection, a collaborative analysis framework was developed with users, quality assurance processes were refined (see Section 7) and finalised an optimal bespoke weighting scheme approach (see Section 6). Based on these actions, products from the People and Nature Survey were therefore deemed of sufficient statistical quality to merit ongoing production as official statistics from April 2021.

2.4.3 Accredited Official Statistics

On 23rd June 2022, the Head of Profession for Statistics at Defra voluntarily requested that OSR carry out an assessment of PANS' compliance with OSR's Code of Practice for Statistics. A successful review would result PANS being designated as an accredited official statistic.

---

[9] https://www.gov.uk/government/collections/people-and-nature-survey-for-england

[10] https://people-and-nature-survey-defra.hub.arcgis.com/

[11] http://randd.defra.gov.uk/Document.aspx?Document=15172_MENEStrategicReviewFinalReport.pdf

[12] https://www.gov.uk/government/statistics/the-people-and-nature-survey-for-england-monthly-interim-indicators-for-april-2020-experimental-statistics

[13] https://osr.statisticsauthority.gov.uk/wp-content/uploads/2020/06/Rapid_review_letter_Natural_England_People_and_Nature_Survey_indicators.pdf

The initial results of the review, including four measures Natural England are required to take to ensure compliance, were published in January 2023. Following the publication of this review, the Defra Head of Profession for statistics published an action plan demonstrating how Natural England would meet these requirements by November 2023. On 29th November 2023, the OSR published a letter confirming that PANS had met these requirements. Statistics published from 29th November 2023 have been published as accredited official statistics.

3. Questionnaire Development for the Adults' Survey

Following the strategic review of MENE, Natural England developed a draft questionnaire for the new survey which included some questions from MENE and new questions which had been identified as being important to users during the review process. This draft was provided to prospective suppliers within the People and Nature invitation to tender.

Following award of the contract to Verian (then Kantar Public), the subsequent process to further develop the questionnaire for PANS involved:

i. Questionnaire design workshop with users

ii. Usability testing

iii. Further cognitive testing

iv. Live trial

3.1 Questionnaire Design Workshop

Verian hosted a questionnaire design workshop, attended by stakeholders from within Natural England, Defra, other government and NGO users and several academics. This workshop brought together key stakeholders for the project to discuss the options available for the questionnaire. Users were presented with a summary of the findings from the initial questionnaire reviews and early recommendations.

The workshop provided an opportunity to sense check the work that had been done during the strategic review and early drafting to ensure that key stakeholders are on board with the proposed direction, understand the priority areas for users (including proposed sample sizes for different questionnaire modules) and what topic areas needed to be added.

A key outcome from the workshop was to confirm which areas of questioning were higher and lower priority. This was to rationalise the draft questionnaire that came out of the strategic review, and to guide Verian's further development of the questionnaire.

3.2 Cognitive/Usability Testing of Questionnaire

Twenty-nine cognitive interviews were conducted in January 2020.

The primary purpose of this stage of cognitive testing was to examine how well the questions perform when asked of survey respondents, that is, if respondents understand the questions correctly and if they can provide accurate and consistent answers. This was achieved through in-depth, semi-structured interviews with a small number of respondents similar to those that will be targeted in the main stage of the survey. This included **usability testing** – checking that respondents were able to easily complete the survey online, including use of the survey map to accurately select the location of the most recent trip to a green and natural space.

The objectives of **cognitively testing** the questionnaire were to:

- Explore understanding of question wording and phraseology for both the question as a whole and any key words and phrases it might contain, particularly how respondents understood the descriptions used to describe the services they had interacted with
- Understand what decision processes the respondent uses in coming to an answer
- Understand the period of recall; can respondents accurately recall time-specific information- such as visits in the last year, last month and last 14 days for themselves and in some cases for a child
- Test overall feelings about the questionnaire:
    - Order of questions
    - Respondents feelings of complex areas - areas that were difficult to answer
    - Areas that were causing discomfort or respondent fatigue
- Make recommendations on how the questions can be improved or refined

Interviews were carried out in London on 15th January 2020 and Leeds on 17th January 2020. All interviews were conducted in person. Twenty-two interviews were conducted using a laptop computer and 7 with a phone/tablet. The interviews lasted about 45 to 60 minutes (depending on questionnaire routing). Respondents were recruited by Verian to cover a variety of age groups and highest education levels (please see the 'Sample' table below). All individuals recruited indicated that they used the internet to some extent. This is this is because the survey will be conducted on an online panel.

A spread of interviews by age, gender and education level were achieved.

Table 3.1 Cognitive interview sample profile 1

Sex	
Male	15
Female	14

Table 3.2 Cognitive interview sample profile 2

Age	
18-34	9
35-54	11
55+	9

Table 3.3 Cognitive interview sample profile 3

Education and Employment	
Working full-time (30+ hours per week)	18
Working part-time (8 to 29 hours per week)	8
Unemployed - less than 12 months	1
Student - in full-time education	2

The key findings from this stage of testing were:

- The map function worked very well up to the point where the respondent needs to move on to the next screen. Nearly everyone found the location of their visit immediately but were unsure about whether they then needed to click on the exact location (for example to select the playground within the park they visited – as one example).
    - The recommendation was to make the instructions clearer.

- Verian tested out a variety of 'grid' options with multiple rating scale statements in a question. There was some variation in preference for how grids are presented but on balance 'dynamic' grids (where one statement is presented on screen and when the respondent selects an answer the next statement is presented) work best for most people rather than 'matrix' grids (where all statements are presented on the

same screen). Dynamic grids limit the amount of text on screen and ensures the instructions are clear. Where respondents were presented with multiple statements on screen (using the 'matrix' grid approach), this tended to confuse people (particularly those who are less tech-savvy). Matrix grids were also particularly poorly received when using mobile phone.

- There were a number of questions where respondent instructions were a little 'hidden'. This included references to single and multiple answer code options.
    - The recommendation was to make the instructions stand out by keeping them on separate lines to the actual question and preamble text.

- Some questions and preambles were overly 'wordy' and they take quite a long time for respondents to read and digest. In extreme cases, some respondents were taking up to a minute to read and respond to what were assumed to be quite straightforward questions.
    - These questions were reviewed and tested in the next stage of cognitive testing

- Some respondents were not sure exactly what to include in visits/activities – particularly relating to whether to include the route they take to work. For example, one said he cycled along the canal to get to work. He would have probably included it if he was completing the questionnaire on his own.

3.3 Cognitive Testing

Further cognitive testing was undertaken to test additional areas of the questionnaire in more depth. The objectives of cognitively testing the questionnaire were to:

- Develop/test questions and concepts relating to the barriers to engagement, perceptions/importance of quality of green and natural spaces, and wellbeing;
- Understand what decision processes the respondent uses in coming to an answer;
- Understand the period of recall; can respondents accurately recall time-specific information- such as visits in the last year, last month and last 14 days for themselves and in some cases for a child;
- Test overall feelings about the questionnaire:
    - If the response lists were appropriate and if anything was missing
    - Ensure that respondents understood questions in the same way
- Make recommendations on how the questions can be improved or refined.

Twenty cognitive interviews were conducted in January 2020. Interviews were split between Birmingham on 21 January and in Leeds on 24 January.

All interviews were conducted face to face using a paper questionnaire.

Respondents were recruited by Verian to cover a variety of age groups and highest education levels (please see the 'Sample' table below). All individuals recruited indicated that they used the internet to some extent. This is this is because the survey will be conducted on an online panel.

Verian achieved **a spread of interviews by age, gender and education level**.

Table 3.4 Cognitive interview sample profile 1

Sex	
Male	10
Female	10

Table 3.5 Cognitive interview sample profile 2

Age	
18-34	7
35-54	6
55+	7

Table 3.6 Cognitive interview sample profile 3

Education and Employment	
Working full-time (30+ hours per week)	14
Working part-time (8 to 29 hours per week)	3
Not working (retired/looking after children)	3

The key findings from this stage of testing were:

- People did not actively think of barriers to engaging with nature. In both unprompted and prompted questions they had their existing priorities - often relating to home life (looking after family) and work, and considered that they generally engaged sufficiently with the natural environment.
- The main reasons for not engaging more with the natural environment were mostly that conditions such as weather made it unappealing (and that when it was nicer they go out more). Cost was a definite barrier but generally the codes already drafted had covered the range of responses.
- Respondents generally did not find the quality of the natural environment to be a barrier to visiting. There were some mentions of a lack of adequate facilities such as toilets, car parks, public transport options and cafes, but again, the response lists were sufficient to cover the range of responses given.
- Respondents had problems answering a question about the length of time that their breathing rate was increased for during a recent visit to the natural environment.

    - The recommendation was to remove this question.
- Minor changes to other questions were recommended.

3.4 Live Trial

Verian conducted a 'live trial' of the questionnaire in February and March 2020. This was originally planned to be a small scale soft launch the survey – to around 100 participants - to accurately test interview length before launching the main survey to the full panel. Due to the requirements to test the sampling approach and questionnaire length fully across all modules this was extended to c.1040 respondents (half the size of a full month of survey interviewing).

The live trial built on the previous stages of cognitive and usability testing.

There were four main goals for the live trial:

1) To test the overall and module script length against the costed maximum average length of 10 minutes. This is to find an optimum balance of survey coverage and survey quality (minimising dropouts/drop-off in response quality which typically occur in long online surveys);
2) To test the modular scripting approach to ensure the correct proportions and selections of respondents are being asked each module;
3) To review responses to questions;
4) To test the feasibility of meeting nationally representative quotas for age, gender, region and ethnicity.

    a. **Day of week survey completed and the day selected for 'most recent visit'**

A broadly even spread of interviews were achieved on each day throughout the two week period, with slightly less than average number of interviews on Mondays (this is partly due to the there only being one 'full' Monday of interviewing where Verian were attempting to get a significant number of responses) and Saturdays and more than average on Sundays.

Table 3.7 Live trial – day of week survey was completed

Day of week	Number of interviews
Monday	71
Tuesday	160
Wednesday	176
Thursday	152
Friday	181
Saturday	87
Sunday	214

In order to achieve a nationally representative sample of people in England, quotas were set on age/gender (interlocked), region, ethnicity and education.

Respondents were asked about their age, gender/sex, region and education level at the start of the survey. If they did not meet one of the quotas, for example if it was full, they were screened out of the survey. They were also screened out if they answered ‘don’t know’ or ‘prefer not to say’ to these questions. Please see Section 5 of the report for more information on the population targets used for quotas.

Respondents were asked about their ethnicity towards the end of the survey. However, this was a soft monitoring quota and they were not screened out depending on their responses. Please note that respondents are required to answer a question giving permission to be asked about ethnicity before it is asked. Almost all (98%) of those interviewed gave permission.

Please see the tables below for more detailed information about the targets and achieved number of interviews for each quota.

Table 3.8 Live trial – sample profile 1

Sex x Age	Achieved		Target
	Count	%	%
Male - 16-24	61	6	7
Male - 25-39	122	12	13
Male - 40-54	128	12	12
Male - 55-64	77	7	7
Male - 65+	109	10	10
Female - 16-24	68	7	7
Female - 25-39	131	13	13
Female - 40-54	134	13	12
Female - 55-64	79	8	7
Female - 65+	132	13	12

This survey asks which of the 9 regions in England that the respondent lives in. These responses are then combined into the larger regions of North, Midlands and South, which are used for the quotas. The table below shows how the nine regions fit into the three larger regional groupings.

Table 3.9 Live trial – sample profile 2

Region (Net)	Region	Achieved		Achieved (Net)	Target (Net)
		Count	%	%	%
North	North East	65	6	28	28
	North West	146	14		
	Yorkshire and the Humber	85	8		
Midlands	East Midlands	101	10	30	30
	West Midlands	109	10		
	East	104	10		
South	London	147	14	41	42
	South East	160	15		
	South West	124	12		

The question asking about a respondents ethnicity was placed towards the end of the survey (this was a quota to be monitored to check representativeness of the sample approach and was not used to screen anyone out of the survey. As mentioned above, this was preceded by a question checking whether they agree to be asked about their ethnicity or not, which gives the opportunity for respondents to opt out of sharing this information. Only two per cent of respondents opted out of the question.

Table 3.10 Live trial – sample profile 3

Ethnicity	Achieved			Target
	Count	% of total sample	% asked question	%
White	897	86	88	87
Non-White	118	11	12	13

Table 3.11 Live trial – sample profile 4

Education	Achieved		Target
	Count	%	%
Degree + (level 6 or above)	307	29	28
No Degree (level 5 or below)	734	71	72

Live trial interview length

The costed (median) average interview length for the survey is 10 minutes. After 1,041 interviews the average median interview length was 9 ½ minutes. When looking at the mean interview length, which is more significantly affected by outliers than the median, the average interview length was 13 minutes.

There were a couple of recommended changes suggested following the live trial that would increase the average survey length slightly but still keep the overall survey length at around 10 minutes.

Live trial main findings

There were only minor revisions recommended following the pilot. The majority of questions had low levels of non-informative responses (‘Don’t know’/’Prefer not to say’) and most were able to use the survey map to enter the location of their most recent visit.

3.5 Revisions Following Live Trial

Additional changes were made to the questionnaire following the live trial. The majority of these changes focussed on ensuring that the section of questions on attitudes to the natural environment (module 5) captured the information required by Natural England and

Defra. The decision was taken to maintain ethnicity as a quota category as it fulfils Natural England's equalities requirements.

3.6 COVID-19 Revisions

The survey was launched during the early stages of the COVID-19 pandemic and the PANS team ensured the survey was responsive to the needs of policymakers and the public as the COVID-19 pandemic developed. Questions already developed for the survey allowed it to look at people's experiences of nature, health and wellbeing, and attitudes and behaviours during the pandemic. In addition to this, the team developed additional questions specific to the pandemic context and addressing questions around engagement and barriers to engagement with nature during this time. These questions were developed with users in April 2020 and were added to the survey, going live from the start of May 2020. It was intended that the COVID-19 questions run until end March 2021, but these have now been extended to cover the time period that restrictions remain in place and / or additional restrictions are likely to be reinstated.

To ensure survey questions were in-line with government guidance (especially during lockdown periods), additional introductory wording about COVID-19 was used. This was amended in line with COVID-19 guidance changes. The research questions guiding development of additional COVID-19 survey questions are included as annex 1 in this report. Key changes to the survey due to the COVID-19 pandemic are tracked in Table 4.3.

Specific COVID-19 questions were removed from the survey in April 2023.

4. Adults' Questionnaire Content and Structure

PANS uses a 'modular' approach to maximise the number of questions asked while keeping the survey length manageable.

There is clear evidence that lengthy online questionnaires can result in increased volumes of respondents dropping out and a reduction in data quality, particularly towards the end of the survey. Also, with the increasing use of smartphones and tablets, surveys need to be as viewable and easy to complete on a small screen as on a PC. The survey was designed to be no more than 10-12 minutes in duration per interview.

In order to collect the breadth of information needed by all stakeholders, a modular approach, in which certain questions are asked to different groups of respondents, a greater range of data can be collected without impacting on quality.

In MENE, which used a weekly omnibus survey, the approach taken was to change the questionnaire on a regular basis and have modules of questions rotated in and out of the questionnaire on a weekly or monthly basis. The People and Nature Survey has the benefit of being a continuous survey where each survey module is allocated to a proportion of respondents.

Recommendations on the modules to be used in the People and Nature survey took into account a number of factors:

1) Topics where a large sample size and sub-national level analysis is desirable need to be asked at the highest sample size including data on visits taken to the natural environment.

2) The need to cross-analyse results between modules needs to be taken into account in decisions regarding the timing of question modules and the collection of demographic data.

3) Certain modules will not be asked together and therefore, the results for these cannot be cross-analysed e.g. no respondent would be asked about both wildlife gardening and levels of concern for the natural environment.

Detail on the modular structure, a visual guide, sample sizes for each module and the questionnaire content is available within the questionnaire[14].

[14] http://publications.naturalengland.org.uk/publication/6382837173583872

Table 4.1 Initial modular questionnaire structure – April 2020

Module	Contents
Screening/ Eligibility	This section included questions to monitor how representative the survey was of the population including region, sex, age and education status
1	Frequency of time spent outdoors in last 12 months Green and natural spaces visited in last month Change in quality of local green and natural spaces in last five years Attitudes towards local green and natural spaces
2 2A[15]	Number of visits to green and natural spaces in last 14 days. If any visits: Details of most recent visit including: Location Length of visit

[15] Within module 2A there is a sub-module of questions (M2A_SUB) asked to a randomly selected 30% of respondents that reported having any visits to green and natural spaces within the previous 14 days

2B	Who went with Journey details (including transport used, distance travelled, starting location) Activities during visit (and whether these were enough to raise breathing rate) Money spent during visit Reasons and perceived benefits of visit Whether visit was routine Perceived beauty of most recent visit site If no visits in last 14 days: Reasons for no visits (including health related reasons) Barriers to engagement with green and natural spaces Ease of visiting green and natural spaces with public transport/without a car
3	Children's engagement with the natural environment Screening questions to see if any children aged under 16 in the household (If more than one child in the household) Selection of one child that parent answers questions about Frequency of time child spent outdoors in last 12 months Green and natural spaces child visited in last month and who they went with

	Whether any visits in last month were part of a school trip (and if so, how far they travelled) Perceived benefits child gains from spending time in green and natural spaces Whether want child to spend more time in green and natural spaces Barriers to child's engagement with green and natural spaces Adult barriers to engagement Whether want to spend more time in green and natural spaces Barriers to engagement with green and natural spaces
4	Attitudes and behaviours Most important issues facing the UK Perceived importance of protecting the environment and reasons for looking after the environment Concern about damage to the natural environment Whether think there will be a change in the variety of animal and plant life in next 50 years Concern about consequences of a loss of variety of animal and plant life Top four most important environmental issues Connectedness with nature questions

	Frequency of environmental actions Whether going to make lifestyle changes to protect the environment Frequency of environmental behaviours in last month Whether household has environmental tools/energy sources Frequency of eating meat/driving/flying Whether try to reduce consumption (of meat/dairy, energy, water waste and things bought in general) Perceptions of best ways of tackling environmental problems Whether different organisations are doing enough to protect the environment Whether agree businesses or individuals who create pollution or cause environmental damage should be responsible for repairing the damage they cause
5	Use of gardens Access to private or shared garden or allotment (and whether it has paved or natural surface) Importance of having a garden or allotment Frequency of gardening behaviours
6	Demographics

	Marital status Number of children (aged under 16) in household Employment status Annual household income Ethnicity Number of vehicles in household Whether has a dog Health status and impact, including whether has any physical or mental health conditions/illness lasting or expected to last at least 12 months Number of days in past week done a total of 30 minutes or more of physical activity, which was enough to raise breathing rate
6B	ONS wellness questions How often feel lonely Rating out of 10 for: Satisfaction, worthwhileness, happiness, worry/anxiety

4.1 Modular Structure

As noted above, one of the main considerations when developing the questionnaire was balancing the questionnaire length, the sample size of each module with the ability to cross-analyse questions in one module against those in another module. The approach taken from April 2020 was to split the questionnaire into ten equal sized groups. Each group would be asked of a randomly selected one in ten respondents. Table 4.2 shows allocation to modules in April 2020 (this was revised from May 2020 as shown below in Table 4.4).

Table 4.2 Module allocation April 2020

Module Group	Modules asked
1	2,3
2	2,3
3	2,3
4	2,3
5	2,3
6	2,4
7	2,5
8	2,5
9	2
10	2

The approach taken above does mean that you cannot cross-analyse questions in sections 3 and 5 with those in section 4.

4.2 Geo-coding

The survey captures both the start and destination of the most recent visit for respondents that report having any visits to green and natural spaces in the previous 14 days. Geocoding of visits allows Natural England and Defra to better understand geographic patterns of visiting. The data also feeds into the analysis for the Outdoor Recreation Valuation tool.[16]

[16] https://www.leep.exeter.ac.uk/orval/

For the majority of visits taken,[17] the start point will be respondent's home. In the first year of interviewing (April-June 2020), 80% of respondents provided a valid postcode that allowed additional geo-coding to be added to the dataset. Verian added on latitude/longitude and Northing/Easting coordinates to the data.

The most recent visit location coordinates were captured using the interactive map in module 2. In the first year of interviewing, almost all (99%) respondents with any visits were able to provide a location which produced latitude/longitude and northing/easting coordinates.

For Year 1 Q1 to Q3, Natural England added to both these sets of coordinates by appending the following for each of visit location and home post code:

- Lower layer super output area (LSOA)
- Indices of multiple deprivation (IMD)
- Local authority
- Upper tier local authority

For Year 1 Q4 onwards, Verian took on this process. Due to using slightly different sources, and changes made to certain geographies (e.g., merging of Local Authorities into Buckinghamshire), some geographies will have changed (see Section 4.3). The availability and detail of these geographic fields will vary between different versions of the published data (see Section 8.4).

Natural England and Verian checked that visit and home post code locations were all within UK territory. Visits outside of the UK territory, and invalid postcodes, have been removed from the dataset. Verian append the following for each of visit location and home post code:

- Lower layer super output area (LSOA)
- Indices of multiple deprivation (IMD)
- Local authority
- Upper tier local authority
- Urban/Rural status

These data are appended by matching visit location and/ or home post code to the most recent version of the ONS National Post Code Look Up File (ONS NSPL).

4.3 Revisions to Content and Structure

Questionnaire content and structure evolve based on periodic reviews, the changing COVID-19 situation and through our QA processes. As such, changes have been made to the questionnaire. Key changes are listed in Table 4.3, and will be updated as and when necessary.

[17] 94 per cent between 2009 and 2019 on MENE.

Table 4.3 Key questionnaire changes

Change	Details	Date
Module 5 proportion asked increased from 20% to 40% of the sample	These changes were made to help Natural England and Defra answer and track key research questions that arose from the COVID-19 pandemic. Natural England have published a list of the key research questions that the COVID-19 research was looking to answer as an annex to the published questionnaire[18]. These research questions are included as annex 1 in this report. Table 4.4 shows the revised modular structure from May 2020.	May 2020 onwards
Demographic section (module 6) asked of everyone	As above.	May 2020
COVID-19 questions added (CV_Q1, CV_Q2A, CV_Q2B, CV_Q3A, CV_Q3B)	In light of COVID-19, specific questions were developed to capture the impact of the pandemic on people's experiences of nature (in gardens and public places), health and wellbeing, and attitudes and behaviours	May 2020
M1_Q6 added		May 2020
M3_Q7B, M3_Q7C added		May 2020
M5_Q1B, M5_Q1D, M5_Q1E, M5_Q1F added		May 2020
M4_Q8 responses changed	Removed: a) I feel part of nature b) Being in nature makes me happy	May 2020

[18] http://publications.naturalengland.org.uk/publication/6382837173583872

	Added a) I always find beauty in nature b) I always treat nature with respect c) Spending time in nature is very important to me d) I find being in nature really amazing	
Illnesses_Impact question added		September 2020
Wellbeing_worried changed to Wellbeing_anxious	Question name changed to match the Office for National Statistics standard. Two columns are provided in the dataset to provide a distinction between the data captured.	October 2020
Sex question name changed name to Gender	Question text changed from ‘What is your sex?’ to ‘What gender do you identify as?’	October 2020
Illnesses_Detail_TEMP question added	University of Glasgow asked for this temporary question to be added.	November 2020
M3_Q7B responses changed	Response option ‘Once or twice a month’ changed to ‘Once or twice in the last 14 days’ to reflect that respondents were being asked about visit frequency in the last 14 days. Two columns are provided in the dataset to provide a distinction between the data captured.	March 2021
M5_Q1B responses changed	Response option ‘Once or twice a month’ changed to ‘Once or twice in the last 14 days’ to reflect that respondents were being asked about visit frequency in the last 14 days. Two columns are provided in the dataset to provide a distinction between the data captured.	March 2021

Ethnicity responses changed	Response options and groupings updated to relate to the Office for National Statistics guidance[19].	March 2021
Region data changed	The region field is now presented in a different manner. Previously it was presented as the answer given by the respondent, but to increase accuracy, it is now calculated from the Postcode where possible and then from the respondents answer.	March 2021
Countryside Code questions added (CC_Q1, CC_Q2)	New Countryside Code launched in April 2021 to help people enjoy the outdoors. Questions added to assess whether people are enjoying the countryside in a safe and respectful way and to gauge awareness in general of the countryside code.	April 2021
COVID questions removed (CV_Q3A, CV_Q3B)	Removed as similar information can be gathered from M4_Q13A.	April 2021
Illnesses_Detail_TEMP removed		April 2021
Illnesses_Detail added	Note, same question as Illnesses_Detail_TEMP. Only variable name changed.	April 2021
Biological Sex question added		April 2021
Gender_ID question added	Gender_ID from April 2021 is preceded by a question that asks about sex registered at birth.	April 2021

19 https://www.ons.gov.uk/methodology/classificationsandstandards/measuringequality/ethnicgroupnationalidentityandreligion

Sexual Orientation question added		April 2021
Geography calculations	From Year 1 Quarter 4 onwards, Verian appended the home and visit geographies rather than NE. Due to using slightly different sources, and changes made to certain geographies (e.g., merging of Local Authorities into Buckinghamshire), some geographies will have changed.	August 2021
ONS Harmonised wellbeing questions	Format of response options changed from categorical list to open numeric box.	April 2022
CV_Q1	Question wording changed to “Thinking about life now, since the coronavirus restrictions have been lifted, have you noticed any of the following?” Additional response options added: Visiting green and natural spaces further away from me has been even more important to my wellbeing. I am visiting green and natural spaces further away from me more	April 2022
CV_Q2A	Question wording changed to “Since the coronavirus restrictions have been lifted, have you increased the amount of time spent on any of the following?”	April 2022
CV_Q2B	Question removed	April 2022
M2B_Q2	Removed answer code 13 “Stayed at home to stop coronavirus spreading/ Government restrictions.”	April 2022
M2B_Q4B	Question removed	April 2022
M3_Q7C	Question wording changed to “Thinking about life now, since the coronavirus restrictions	April 2022

	have been lifted, have you noticed any of the following?"	
M4_Q1	Response code 4 changed to "Health/NHS"	April 2022
Countryside Code questions (CC_Q1, CC_Q2)	Question wording and response codes updated	May 2022
M2_Q6b	Provisional follow up question for people who 'don't know' how many visits they took in the last 14 days added	December 2022
(M1_Walk_a) (M1_Walk_b)	Questions added about how long it takes participants to walk to their nearest green and natural space and whether this is the place they visit most frequently	April 2023
M2_Q6c	Provisional M2_Q6b replaced with new follow up question for people who 'don't know' how many visits they took in the last 14 days.	April 2023
M2A_Q8A	'Cycling and running' answer options replaced with separate 'cycling' and 'running' options.	April 2023
M4_Q8	All Nature Connection Index questions consolidated in module 4, resulting in Q49PLUS (M1_Q6) being removed from module 1 and added to M4_Q8.	April 2023

Table 4.4 Module allocation – revised from May 2020 onwards

Module Group	Modules asked
1	2,3
2	2,3
3	2,3
4	2,3
5	2,3

6	2,4
7	2,5
8	2,5
9	2,5
10	4,5

5. Sampling Quotas for the Adults' Survey

The method of data collection in PANS is the Kantar Profiles online panel in People and Nature. Specifically, it is the England subset of Kantar's global online Profiles panel as the main sample source. The Profiles panel is part of an association of quality-conscious panel providers that work together to fulfil sample requirements that cannot be fulfilled by a single provider within the required timescale – as is the situation here. Running the survey on a single panel may lead to significant repeat interviewing, raising the risk of panellist behaviour being conditioned by participating in the survey multiple times. This study supplemented the Kantar Profiles panel with the Netquest, Panelbase, Bilendi, MarketCube and CINT panels. This was necessary to ensure 25,000 interviews with adults per year. Panellists are not eligible to be sampled for the survey for three months after they participate in PANS.

All these partner providers have been vetted by Kantar Profiles as reputable and offering high quality sample. They are approved Kantar Profiles suppliers following similarly stringent processes and procedures for panel recruitment and maintenance and comply with all regulatory requirements including Data Protection Act 2018 and accredited quality standards. Beyond the necessity of using multiple panels, there is also sometimes a benefit to mixed-source surveying as it can smooth out single panel idiosyncrasies. To ensure a consistent approach and to safeguard our time-series, the same blend of sample across providers will be used each month. To minimise the risk of bias, the Kantar Profiles panel uses a diverse set of recruitment sources and a variety of recruitment methods. This includes opt-in email, co-registration, e-newsletter campaigns, and traditional banner placements. Kantar Profiles and their panel partners also hold demographic information about panellists, such as age, gender, region and social grade, which is used to stratify the sample when it is drawn. This will help ensure that the final sample is representative of the population in terms of these characteristics.

The strengths and limitations of online panels have been discussed in Section 2.

The proposed sample size of 25,000 per year allows for robust stand-alone analysis to be conducted by region and key sub-groups as well as reliable time series data, offering a monthly sample of around 2,080 interviews. Annex 2 presents the sample size and confidence intervals at LA level for three years of the survey for the survey question "No_Of_Visits" asking about number of visits to green and natural spaces in the last 14 days. This is likely to be the most commonly used survey question at LA level.

Small Area Estimation (SAE) was conducted on historical MENE data by Dr Alex Gibson, RAE Consulting to check whether the People and Nature survey sample size would be likely to produce useful Local Authority (LA) level indicators of the number and proportion of adults visiting green and natural spaces. This built on a feasibility study conducted for the MENE Review.[20]

[20] http://publications.naturalengland.org.uk/publication/5051507248726016

Dr Gibson's SAE was based on an assessment of the precision of SAE-based estimates of analogous LA-level indicators of visits to 'open spaces' using data from Natural England's MENE survey (2009-19).

The work demonstrated that SAE will be able to generate relatively precise estimates using three years of survey data. The preliminary SAE work also concluded that it would be highly likely that, even using a single year's data, the approach could be extended to MSOA level to obtain a relatively fine-grained insight into variations in the use of 'green and natural spaces' across England. This research was conducted before the COVID-19 pandemic. The assumption made since then is that behaviour will be affected by the pandemic and this will be picked up in any model built using data from the People and Nature Survey. SAE based on PANS data has been conducted and will be published in early 2024.

As part of the survey development process Verian reviewed the likely sample profile of the new survey (based on similar online panel surveys including the MENE strategic review online panel pilot) and used this to inform the survey size and quota design. Specifically, which population sub-groups are likely to be over or under-represented in the raw unweighted sample. The quotas that Verian and Natural England agreed to use for People and Nature were initially age and gender (interlocked), region (GOR) and highest level of education. Quotas need to be set to compensate for known biases in online panels. Younger people and men are generally under-represented on panels (as they tend to be across all survey methods), so quotas by age and gender/sex[21] interlocked. It is important to note that the population targets used (see below) only include male and female categories. The current survey allows respondents to identify as male, female or in another way[22]. As there are not yet robust population targets that allow for more than male/female categories, in order to manage interviewing fieldwork (and monitor quotas) anyone that selects response code 3 is randomly assigned to either male or female in the quota targets and in the weighting. This includes the quota (see Table 5.1) tables in this report.

However, for analysis purposes the full response list is included in the dataset and any combining of response categories should be clearly stated in any reporting.

Verian also applies quotas by region (GOR collapsed into three categories – North, Midlands, South) and highest level of education (using the standardised European classification – ISCED11). It should be noted that highest level of education is highly correlated to other factors which will be important for the current survey, including socio-economic grade and working status. Verian recommended using the following education-level quotas:[23]

---

[21] Based on the following quotas. Eight categories in England– men aged 16-24, women aged 16-24, men aged 25-39, women aged 25-39, men aged 40-54, women aged 40-54, men aged 55-64 and women aged 55-64, men aged 65+ and women aged 65+.

[22] The wording of the question and response codes is under review to ensure that it remains accurate and in line with principles of best practice and inclusion.

[23] This will help to address the known under-representation of panels for people with lower levels of education.

- No degree (levels 0-5)
- Degree level (levels 6-8)

The population statistics used for the quotas are sourced from the latest available ONS Mid-Year Population Estimates, Labour Force Survey and Crime Survey for England and Wales and are subject to change on an annual basis as updated population statistics are released. Verian did not initially propose setting any other quotas beyond those described above. This for the following reasons:

- The more quotas there are, the greater the amount panellists that may need to be approached to identify people who are still eligible to take part. This will affect the project costs and timings.
- Having too many quotas may make it impossible to reach the target number of interviews: as the quotas for the fastest responding demographic sub-groups fill up first, Verian may be left looking for unachievable combinations that cannot be fulfilled.
- Setting additional quotas would not necessarily reduce bias: a 2015 experiment found that "…increasing the extent of demographic selection quotas used did not reduce bias or improve accuracy"[24].

To get an idea of the likely sample composition, Verian analysed recent surveys that have used a *similar methodology* to that which will be used for PANS. Please note that this analysis should be treated as a best estimate rather than as a robust forecast. This is because:

- While these other studies have used similar approaches, there are still differences (e.g. in terms of panel blend, quotas and sample size). These may all affect the final sample profile achieved.
- The panels are not static – people are constantly joining and leaving them. As such, historic sample profiles cannot be treated as a guarantee of a future sample profile.

The variables included in the analysis were:

- Working status
- Socio-economic grade
- Ethnicity
- Age
- Region
- Urban / rural
- Presence of children

[24] Gittelman, S.H., Thomas, R.K., Lavrakas, P.J. and Lange, V., 2015. Quota Controls in Survey Research: A Test of Accuracy And Intersource Reliability in Online Samples. Journal of Advertising Research, 55(4), pp.368-379.

Key findings from this analysis were:

- Online samples tend to be more representative than MENE in terms of age (in terms of the banding historically used for MENE analysis) and working status. This is one of the main weaknesses of the approach used for MENE – the achieved sample had too many older people that were economically inactive.
  In contrast, online studies typically all include age as a formal quota, ensuring the sample is broadly representative of the population. Having said this, it should be noted that online samples tend not to represent the very oldest well (as they are the least likely to have internet access). While online samples will generally have roughly the correct proportion of individuals aged 65+, these are predominantly aged 65-74 and the 75+ group tends to be under-represented.
  For working status, online samples tend to be broadly representative of the population even when it is not included as a formal quota. This is likely to be because age is correlated with working status.
- Both the online and face-to-face approaches tend to achieve samples that are broadly representative of the population by region. For online samples, this is also the case when region is just used to stratify the sample rather than included as a formal quota.
- Online samples tend to under-represent ethnic minorities. The studies included in this analysis have c.91% white respondents, when population benchmark statistics indicate the figure should be 86%. In this respect, the online samples are less representative than the face-to-face approach used for MENE.
- Online samples slightly under-represent individuals living in rural areas. ONS data indicates 18% of adults 16+ live in rural areas, whereas only 16% of respondents in the online studies analysed (limited to those that provided a valid postcode). However, this is a slight improvement over MENE (c.14% rural in Y10).
- Online samples tend to broadly have the correct proportion of individuals with a child.

Following this analysis, Natural England and Verian agreed to use ethnicity as a quota target in the live trial. This was subsequently included in the main survey fieldwork.

The target proportion of interviews each month for the different quota categories is below:

Table 5.1 Monthly quota targets

		Target April 20 – March 21[25]	Target April 21 – March 23[26]
Male by age	M 16-24	6.8%	6.7%
	M 25-39	12.5%	12.5%
	M 40-54	12.2%	12%
	M 55-64	7.2%	7.3%
	M 65+	10.3%	10.4%
Female by age	F 16-24	6.5%	6.4%
	F 25-39	12.5%	12.4%
	F 40-54	12.4%	12.3%
	F 55-64	7.4%	7.6%
	F 65+	12.2%	12.4%
English region	North	27.7%	27.7%
	Midlands	30.2%	30.2%

[25] Targets for April 20 to March 21 were based on ONS Mid-Year Population Estimates 2019 for gender, age and region, the Labour Force Survey April-June 2019 for ethnicity and Crime Survey for England and Wales 2018 for education status

[26] Targets for April 21 to March 22 were based on ONS Mid-Year Population Estimates 2019 for gender, age and region, the Annual Population Survey April 2019-March 2020 for ethnicity and Crime Survey for England and Wales 2018-19 for education status. These targets remained in place between April 22 and March 23.

	South	42.2%	42.1%
Education status	Degree + (level 6 or above)	28.5%	29.2%
	No degree (level 5 or below)	71.5%	70.8%
Ethnicity	White	86.5%	86.1%
	Non-White	13.5%	13.9%

6. Weighting of the Adults' Survey

Weighting is used to ensure the sample is representative of the population. For any weight variable in the data each respondent has a value which represents the weight to which their response should play in the overall analysis. Weighting in data multiplies the sum of responses to any question by the sum of the respondent weights to provide a weighted count. This section includes information on the development of different weights throughout the adults' survey.

6.1 Interim Weight Development

For the first year of the survey (April 2020 – March 2021), monthly indicators were generated using an interim weight whilst a bespoke People and Nature Survey weight was being developed. This weight was developed using a similar approach taken in MENE in Year 10 and was representative of the English adult population, according to the latest population estimate data available from the Office for National Statistics[27] and based on the weighting developed for the MENE survey data[8]. This approach is appropriate given the large similarities between MENE and the People and Nature Survey, and the significant amount of MENE data which supports the selection of key variables used to develop the MENE weights. These have been applied at aggregate level for each monthly People and Nature interim indicator.

The MENE approach and the targets used for the weighting in Year 10 can be found in the published technical report[28]. It should be noted that the approach used to weight the People and Nature Survey monthly data differs slightly from that used for MENE.

- Due to questionnaire differences:
    - People and Nature Survey does not capture social grade
    - People and Nature Survey does not capture whether the self-employed work full-time or part-time. As such, when weighting by working status Verian did not split out part-time from full-time.
- Due to the use of different data capture methodologies:
    - MENE had separate weighting targets for "75-84" and "85+". However, the People and Nature Survey is conducted online and therefore does not cover the most elderly very well (they are the most likely population sub-group to

[27] https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/annualmidyearpopulationestimates/mid2019estimates

[28] See Appendix 2 - https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/875153/MENE_Technical_Report_Years_1_to_10v2.pdf

be offline). When weighting the People and Nature Survey monthly data Verian have combined these into a “75+” category.

Data was weighted to minimise non-response across observable demographic characteristics (see Tables 6.1 and 6.2 for the variables that were included in the weighting). This demographic non-response weight was created using a raking calibration. Calibration is an iterative process, ending with a respondent profile that matches the population profile on several dimensions simultaneously. Table 6.1 and 6.2 show the both the unweighted sample profile and weighted sample profile for April 2020.

Table 6.1 Interim weights monthly weighting profile – Age and Sex

	Population		April 2020 survey sample	
	N (000s)	**%**	**Uwtd %**	**Wtd %**
Age and Sex[29]				
Male 16-24	3,000	6.8%	6.8%	6.8%
Male 25-34	3,780	8.5%	6.9%	8.5%
Male 35-44	3,469	7.8%	9.3%	7.8%
Male 45-54	3,741	8.4%	8.6%	8.4%
Male 55-64	3,199	7.2%	7.2%	7.2%
Male 65-74	2,625	5.9%	7.8%	5.9%
Male 75+	1,947	4.4%	2.7%	4.4%
Female 16-24	2,838	6.4%	6.4%	6.4%
Female 25-34	3,711	8.4%	7.8%	8.4%
Female 35-44	3,509	7.9%	8.5%	7.9%
Female 45-54	3,831	8.6%	8.5%	8.6%
Female 55-64	3,300	7.4%	7.3%	7.4%
Female 65-74	2,825	6.4%	9.9%	6.4%
Female 75+	2,611	5.9%	2.2%	5.9%

Table 6.2 Interim weights monthly weighting profile – Other key weighting targets

[29] Respondents reporting their gender as "other" were allocated to male or female at random.

	Population		April 2020 survey sample	
	N (000s)	%	Uwtd %	Wtd %
Region[30]				
East Midlands	3,819	8.6%	10.0%	8.6%
East of England	4,931	11.1%	11.4%	11.1%
London	7,027	15.8%	15.4%	15.8%
North East	2,136	4.8%	4.9%	4.8%
North West	5,780	13.0%	12.3%	13.0%
South East	7,213	16.3%	15.9%	16.3%
South West	4,489	10.1%	9.3%	10.1%
West Midlands	4,646	10.5%	10.6%	10.5%
Yorkshire and the Humber	4,345	9.8%	10.2%	9.8%
Urban/Rural[303]				
Urban	35,849	80.8%	82.0%	80.8%
Rural	8,537	19.2%	18.0%	19.2%
Children in Household[31]				

[30] Where respondents provided a valid postcode, this has been used to classify respondents. Otherwise this is based on self-reported data. For postcode, respondents that did not provide a valid postcode or provide self-reported data were assigned to "urban" for the weighting.

[31] Answers of "don't know" and "prefer not to say" were treated as "No" for the weighting.

Yes	12,653	28.5%	24.8%	28.5%
No	31,733	71.5%	75.2%	71.5%
Sex & Working Status				
Male Working	13,482	30.4%	31.1%	30.4%
Male Not Working	8,279	18.7%	18.1%	18.7%
Female Working	11,373	25.6%	27.6%	25.6%
Female Not Working	11,252	25.4%	23.2%	25.4%

The weighting efficiency for the April 2020 data was 89%. This is equivalent to a design effect of 1.12 and an effective sample size of 1,859.

Analysis of questions asked to random subsets of the overall sample

Certain questionnaire modules are asked to random subsets of the overall sample. This reduces the mean survey length and minimises respondent burden.

Respondents are randomly selected into these modules within the survey script. The random allocation means that the overall weight will also compensate for imbalances in the sample profile of these groups. Although it should be noted that random sampling error will mean the weighted profile of each subset will differ slightly from the weighted profile of the overall sample. The smaller the subset of respondents, the larger this random variation is likely to be.

Table 6.3 shows the variables included in the monthly analysis and the percentage of the sample each question was asked to.

Table 6.3 – Percentage of sample asked key questions in monthly indicators April 2020 – March 2021

Question	% of sample question asked to in April 2020	% of sample question asked to in May 2020 onwards
Q1 In the last 12 months, how often, on average have you spent free time outside in green and natural spaces?	100%	100%
Q2 Which of the following type(s) of green and natural spaces have you visited during the last month	100%	100%
Q6 How many times, if at all, did you make this type of visit to green and natural spaces in the last 14 days?	c.90%	c.90%
Q34b In the last 12 months, how often, on average, has this child spent free time outside in green and natural spaces?	c.50% (asked Q34a which Q34b is routed from)	c.50% (asked Q34a which Q34b is routed from)
Q4b: How much do you agree or disagree with the following statements relating to green and natural spaces generally. In general, green and natural spaces should be: **(b) Good places for mental health and wellbeing** **(e) Places that encourage physical health and exercise**	100%	100%
Q59a: How important is having access to a garden or allotment to you personally?	c.20% (asked Q59 which Q59a is routed from)	c.40% (asked Q59 which Q59a is routed from)
Q49: How much do you agree or disagree with the following: **(a) I feel part of nature** **(b) Being in nature makes me happy**	c.20%	c.100%

Verian compared (across the variables included in the weighting) the weighted profile of the overall sample to the weighted profile of each subset used in the monthly reporting. The differences observed were generally all well within the confidence intervals for each statistic.

Further information on how to use these figures, including comparisons with figures generated using the People and Nature Survey weight, has been published.[32]

[32] https://www.gov.uk/government/publications/survey-methods-and-technical-details/methods-and-limitations

6.2 People and Nature Survey Weight Development

With the launch of the new People and Nature Survey (PANS) and the shift to an online methodology, Verian wanted to review whether the MENE demographic weighting approach is still fit for purpose and to revise the weighting scheme if necessary.

The purpose of weighting is to reduce the net error of survey estimates. Weighting aims to reduce bias, but this is usually at the cost of a reduction in precision (which is related to the variance of the weights as well as the sample size). To reduce bias, the variables included in the weighting need to be correlated with the key survey outcome – the number of visits made to green and natural spaces in the last 14 days.

The approach taken to develop the new weighting scheme was to:

- Identify the demographic variables which could potentially be included in the weighting matrix and to source appropriate benchmark population statistics.
- Conduct regression modelling to identify which of these variables are significantly associated with the number of visits which people have made in the last 14 days.
- Assess the scheme for precision of survey estimates.

To begin with, Verian reviewed data from the first quarter of People and Nature Survey (April-June 2020). However, as this period coincided with the COVID-19 pandemic and a lockdown period, it was decided to postpone this work due to the unknown consequences on the population profile for the demographic variables identified in stage 1; in particular "working status" which was removed from the weighting matrix as the latest data available at the time pre-dated the Coronavirus outbreak.

Verian revisited the weighting approach after data had been collected for the first three quarters of year 1 which allowed them to:

- Check whether the associations identified between the number of visits and the demographic variables still held outside of the strict Coronavirus lockdown period that coincided with Q1 of the survey.
- Re-evaluate whether working status should be included in the weighting matrix (where up to date statistics were available).

6.2.1 Benchmark Population Statistics

There are twelve variables captured in the People and Nature Survey which were considered for inclusion in the weighting matrix[33].

- Urban / Rural
- Region

[33] Although for the purpose of weighting, age and gender have been combined into a single variable.

- Age by Gender
- Working status by Gender
- Long lasting health condition
- Number cars / vans
- Education
- Ethnicity
- Dog ownership
- Children under 16

These are variables for which robust population benchmarks exist. This list includes the variables historically used to weight the MENE survey[34], as well as several other variables which are likely to correlate with the number of visits made to green and natural spaces in the last 14 days.

The benchmark population statistics and the data source used for each of these variables when developing the PANS weight is provided below[35]. It is intended that the benchmark statistics used for the weighting will be updated on an annual basis (should updated data be available).

Table 6.4a – Benchmark population statistics used for developing the PANS weight (April 2020-March 2021) - Region

Region (ONS Mid-Year Population Estimates 2019)	%	N (000s)
North East	4.8%	2,193
North West	13.1%	5,935
Yorkshire and the Humber	9.8%	4,452
East Midlands	8.7%	3,936
West Midlands	10.5%	4,766

[34] Apart from social grade, which is not collected in the People and Nature Survey.

[35] Population statistics were updated in April 2022

East	11.0%	5,024
London	15.7%	7,118
South East	16.3%	7,413
South West	10.2%	4,633

Table 6.4b – Benchmark population statistics used for developing the PANS weight (April 2020-March 2021) – Age by Gender

Age by Gender (ONS Mid-Year Population Estimates 2019)	%	N (000s)
Male 16-24	6.7%	3,060
Male 25-34	8.4%	3,834
Male 35-44	7.8%	3,549
Male 45-54	8.3%	3,766
Male 55-64	7.3%	3,337
Male 65-74	5.9%	2,683
Male 75+	4.5%	2,053
Female 16-24	6.4%	2,893
Female 25-34	8.3%	3,776
Female 35-44	7.9%	3,599
Female 45-54	8.5%	3,857
Female 55-64	7.6%	3,446
Female 65-74	6.4%	2,893
Female 75+	6.0%	2,724

Table 6.4c – Benchmark population statistics used for developing the PANS weight (April 2020-March 2021) – Age by Qualification

Age by highest qualification (ONS Labour Force Survey Oct-Dec 2019)	%	N (000s)
16-69 Degree +	26.9%	12,231
16-69 No degree	56.5%	25,682
70+	16.6%	7,557

Table 6.4d – Benchmark population statistics used for developing the PANS weight (April 2020-March 2021) – Marital status

Marital status (ONS Labour Force Survey Oct-Dec 2019)	%	N (000s)
Single (incl. cohabiting)	35.1%	15,958
Married / civil partnership	48.8%	22,172
Separated / Divorced / Widowed	16.1%	7,340

Table 6.4e – Benchmark population statistics used for developing the PANS weight (April 2020-March 2021) – Presence of children in household

Children aged under 16 in Household (ONS Labour Force Survey Oct-Dec 2019)	%	N (000s)
No	70.2%	31,905
Yes	29.8%	13,565

Table 6.4f – Benchmark population statistics used for developing the PANS weight (April 2020-March 2021) – Working status by gender

Working status by Gender (ONS Labour Force Survey Oct-Dec 2019)	%	N (000s)
Male Working	32.7%	14,871

Male Retired	9.5%	4,321
Male Other	6.9%	3,124
Female Working	29.2%	13,271
Female Retired	11.7%	5,302
Female Other	10.1%	4,581

Table 6.4g – Benchmark population statistics used for developing the PANS weight (April 2020-March 2021) – Ethnicity

Ethnicity (ONS Labour Force Survey Oct-Dec 2019)	%	N (000s)
White	86.4%	39,291
Asian	7.2%	3,286
Black	3.5%	1,593
Mixed & Other	2.9%	1,300

Table 6.4h – Benchmark population statistics used for developing the PANS weight (April 2020-March 2021) – Long lasting health condition

Long lasting health condition (ONS Labour Force Survey Oct-Dec 2019)	%	N (000s)
Yes	39.9%	18,148
No/DK/Ref	60.1%	27,322

Table 6.4i – Benchmark population statistics used for developing the PANS weight (April 2020-March 2021) – Number of cars / vans available in household

Number of cars / vans available for use by the household (National Travel Survey 2017)	%	N (000s)
0	18.7%	8,487

1	37.0%	16,808
2	32.0%	14,548
3 or more	12.4%	5,627

Table 6.4j – Benchmark population statistics used for developing the PANS weight (April 2020-March 2021) – Urban / Rural status

Urban / Rural[36] (ONS Small Area Population Estimates 2018)	%	N (000s)
Rural	18.0%	8,168
Urban	82.0%	37,302

Table 6.4k – Benchmark population statistics used for developing the PANS weight (April 2020-March 2021) – Dog ownership

Dog ownership (Verian Voice February 2020)[37]	%	N (000s)
Dog	26.6%	12,113
No dog	73.4%	33,357

6.2.2 A note on working status

As mentioned previously, “working status” was initially removed from the weighting matrix due to concerns that available benchmark population statistics were not accurate or would quickly become out of date. However, statistics published by the ONS between October – December 2020 (Table 6.5) indicated that there had only been a slight reduction in the proportion of people in employment, presumably due to Government schemes such as the Self-Employment Income Support and the Furlough schemes.

Table 6.5 – Labour Force Survey benchmark statistics (England 16+)

[36] Using the ONS 2011 rural/urban classification of LSOAs

[37] There is no existing robust source of data for dog ownership. As such, we included the People and Nature Survey question on the second wave of the Verian Public Voice random sample panel.

	Oct – Dec 2019	Oct – Dec 2020
Male working	32.7%	31.8%
Male retired	9.5%	9.5%
Male other	6.9%	7.8%
Female working	29.2%	28.8%
Female retired	11.7%	11.8%
Female other	10.1%	10.2%

Additionally, people in work were slightly underrepresented in the interim weighting solution when compared to these new employment figures (Table 6.6) – which could have led to bias in survey estimates. Therefore, Verian recommended that "working status" should be included in the weighting matrix.

Table 6.6 – Interim weight profile compared to Labour Force Survey statistics

	Interim weight profile (Q1-Q3)	LFS Oct – Dec 2020
Male working	29.9%	31.8%
Female working	25.7%	28.8%

6.2.3 Regression Modelling

Regression modelling was used to identify variables which were significantly associated with the number of visits which people have made in the last 14 days and should be included in the PANS weighting matrix. Verian used an ordinary least squares regression; the dependent variable was Q6:

> *"How many times, if at all, did you make this type of visit to green and natural spaces in the last 14 days?"*

Responses of "Don't know" and "Prefer not to say" at Q6, "Never" at Q1, and "No visits in the last month" at Q2 were treated as 0 visits.

This work was initially conducted with Q1 data and revisited when Q1 – Q3 data was available. The final model specification based on Q1 – Q3 data is presented in Table 6.7, which shows that nearly all these variables were significantly associated ($p<0.05$) with

number of visits. Marital status was found not to be associated and so was removed from the weighting matrix. This confirmed the findings from the model ran in Q1.

Table 6.7 - Tests of Model Effects (Final Specification) Q1 – Q3 data

	Wald Chi-Square	df	Sig.
Urban / Rural	21.444	1	0.00
Region	47.590	8	0.00
Age by Gender	139.655	12	0.00
Working Status by Gender	19.365	4	0.00
Long lasting health condition	93.082	1	0.00
Number cars/vans	46.142	3	0.00
Education	114.458	2	0.00
Ethnicity	27.060	3	0.00
Dog ownership	784.141	1	0.00
Children under 16	5.092	1	0.02

To minimise the risk of bias, it is therefore important to ensure that the weighted People and Nature Survey sample is representative of the population in terms of these variables.

6.2.4 Precision of Survey Estimates

The standard formulae used to calculate confidence intervals and standard errors requires data to come from a random probability sample. In such a sample, every individual in the target population has a known non-zero probability of being sampled for the survey. These formulae are not appropriate to use for studies – such as the People and Nature Survey – that use non-probabilistic sampling. In the People and Nature Survey, the sample is sourced from online access panels (which do not cover the whole population) and quotas are used to control the sample composition during data collection.

Verian estimated the sampling variation in the visit estimates for the weighting scheme using the methodology proposed by Kuha and Sturgis (2017[38]). Bootstrap resampling was used to draw one hundred sets of respondents from the achieved sample (in a way which

[38] See: https://www.europeansurveyresearch.org/news/non-prob/INPS_06_Kuha.pdf and https://rss.onlinelibrary.wiley.com/doi/full/10.1111/rssa.12329

matched the monthly quota sampling design). These new samples were then weighted using the weighting scheme. Verian then used the distribution of the weighted estimates (from the resamples) to estimate the precision of the visit estimates for each weighting scheme.

Table 6.8 shows the estimated design factor and the design effect for the weighting scheme.

Table 6.8 – Design factor and Design effect (Q6 Number of visits)

	Design Factor	Design Effect
People and Nature weighting scheme	1.11	1.24

6.2.5 Agreed Weighting Approach for The People and Nature Survey

Based on this analysis, Verian and Natural England agreed to use the much more comprehensive weighting scheme for PANS going forward, and data from Q1 to Q3 was updated.

6.3 People and Nature Weight List

This section provides an outline of the People and Nature weights available within the dataset. For more information on which weight to use when analysing PANS survey data a weighting guidance document has also been produced (annex 4[39]). For an introduction on how to apply survey weighting within a number of software packages please refer to the guide produced for MENE[40].

6.3.1 Demographic Weight (grossed to general population)

A demographic weight was produced using the calibration process outlined above. Data was weighted to minimise non-response across observable demographic characteristics. This demographic non-response weight was created using a raking calibration. Calibration is an iterative process, ending with a respondent profile that matches the population profile on several dimensions simultaneously.

In summary, each monthly sample has been weighted to match the population profile in terms of:

[39] Also published on: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1021832/The_PeopleandNature_Survey_For_England_Weighting_Guidance.pdf

[40] http://publications.naturalengland.org.uk/publication/2248731

- Age*Gender
- Region
- Age*Highest qualification
- Children aged <16 in the household
- Ethnicity
- Long-lasting health condition
- Number of cars / vans available for use by the household
- Urban/Rural
- Dog ownership
- Working status

The weighting targets used are populations estimates (in thousands).

This demographic weight has been used to derive all weights detailed below.

6.3.2 Grossed Weights

Weight_Grossed_M1_Q2

This weight should be used to obtain monthly estimates of the total number of adults aged 16+ who have visited each type of green and natural space (frequencies of M1_Q2_1 to M1_Q2_12).

This weight is the same as the grossed demographic weight – in order to produce estimates that are grossed to the population of adults in England each month has a weighted base of 45,470 (000s) which is equivalent to the number of adults in England in the 2019 ONS Mid-Year Population Estimates.

Weight_Grossed_No_Of_Visits

This weight should be used to obtain monthly estimates of the total number of visits to green and natural spaces (the sum of No_Of_Visits).

This weight is based on the grossed demographic weight, but has two stages of design weighting to compensate for the study design:

1. Modular survey design – c.90% of respondents are asked this question each month. A design weight has been calculated to ensure that each monthly sample at this question has a weighted base of 45,470.
2. The questionnaire only asks about visits made in the last 14 days (rather than in the whole month). A ‘Calendar Month Factor’ has been calculated to compensate for this. The Calendar Month Factor is equal to the number of days in the survey month divided by 14.

The final weight has been calculated by multiplying the two design weights with Weight_Grossed_M1_Q2.

It should be noted that Verian conducted some analysis to check whether the “No_Of_Visits” variable should be capped. The concern was that some individuals reported a very high number of visits and that the inclusion of these values could

substantially reduce the effective sample size. Verian trialled capping values at 14. This is the approximately the 98th percentile (similar to the approach used on the Crime Survey for England and Wales). This was not found to have much of an impact on the precision of survey estimates and it was therefore decided to proceed using the uncapped values. This is consistent with the approach used for MENE.

Weight_Grossed_M2A_SUB_Q4B

This weight should be used to obtain monthly estimates of the total amount in £s (000s) spent on visits to green and natural spaces (the sum of variables M2A_SUB_Q4B_1 to M2A_SUB_Q4B_6).

This weight is based on the weight produced for No_Of_Visits (Weight_Grossed_No_Of_Visits*)*, but has a further two stages of design weighting to compensate for the study design:

1. Modular survey design – c.30% of respondents that report one or more visits (at No_Of_Visits) are asked this question each month. A design weight has been calculated to ensure that the number of visits made each month by this sub-sample, matches the number reported at No_Of_Visits by *all respondents asked the question*.
2. The fact that the survey only captures spend for one visit – not all visits made in the 14-day reference period. A 'Trip Factor' has been calculated to compensate for this. The Trip Factor is equal to the number of visits the respondent reported having made in the last 14 days (No_Of_Visits).

The final weight has been calculated by multiplying the two design weights with Weight_Grossed_No_Of_Visits.

6.3.3 Proportion Weights

Weight_Percent

This weight should be used when conducting analysis of modules 1,2,4 and 6.

This weight was created by scaling the demographic weight for each month to the monthly target sample size (2,083).

This weight can also be used for modules 2 and 4[41] – even though they were asked to random sub-sets of the overall sample. The random allocation means that the overall weight will also compensate for systematic imbalances in the sample profile of these groups. Although it should be noted that random sampling error will mean the weighted profile of each subset will differ slightly from the weighted profile of the overall sample. The smaller the subset of respondents, the larger this random variation is likely to be.

Weight_Percent_M5

[41] It should be noted modules 1 and 6 were asked to all respondents.

A separate weight is required for module 5, because the randomisation for this module changed within Q1. In April 2020, this question was asked to c.20% of respondents. From May 2020 onwards, this question was asked to c.40%. As such, with the overall weight applied (Weight_Percent) April would be under-represented in the weighted sample.

A design weight (1 / probability of selection into the module) has been used to compensate for this. Respondents from April have a design weight of 5 (1 / 0.2), and respondents from May onwards have a design weight of 2.5 (1 / 0.4). The final weight has been calculated by multiplying the design weight with Weight_Percent.

Weight_Percent_M6B

A separate weight is required for module 6B, because the randomisation for this module changed within Q1. In April 2020, this question was asked to c.25% of respondents. From May 2020 onwards, this question was asked to everyone. As such, with the overall weight applied (Weight_Percent) April would be under-represented in the weighted sample.

A design weight (1 / probability of selection into the module) has been used to compensate for this. Respondents from April have a design weight of 4 (1 / 0.25), and respondents from May onwards have a design weight of 1 (1 / 1). The final weight has been calculated by multiplying the design weight with Weight_Percent.

Weight_percent_M2A

This weight should be used when conducting analysis of the detailed visit information collected in module 2A.

Questions within module 2A relate to a visit which a respondent has been on. Detailed information was only collected for one visit, regardless of the number of visits which respondents reported having made in the last 14 days. To ensure this sample is representative of ALL visits – the Trip Factor (derived for M2A_SUB_Q4B) needs to be accounted for. This weight is calculated by multiplying Weight_Grossed_No_Of_Visits and the Trip_Factor.

Weight_Percent_M2A_SUB

This weight should be used when conducting analysis of the detailed visit information collected in module 2A_SUB.

Questions within module 2A_SUB were asked to c.30% of those that responded to Module 2A. Detailed information was only collected for one visit, regardless of the number of visits which respondents reported having made in the last 14 days. To ensure this sample is representative of ALL visits – the Trip Factor (derived for M2A_SUB_Q4B) needs to be accounted for. This weight is the same as Weight_Grossed_M2A_SUB_Q4B.

7. Processing and Publication of Data Collected in the Adults' Survey

The PANS Quality Assurance process has been developed in line with the Code of Practice for Statistics and the pillars of trustworthiness, quality, and value. The research has been designed in collaboration with Natural England and Defra to ensure that these pillars have been met throughout the research process, from questionnaire development to producing the data. The following section will outline this process.

7.1 Questionnaire Programming and Quality Assurance

The questionnaire was developed using a strict version control process, where minor and major versions were clearly indicated and only one person at a time could make edits to each of the versions. The questionnaire document was checked before survey programming started to ensure that it was logical, screen outs were appropriately positioned (for example to screen out respondents who were not in England or those who were under 16) and that all appropriate answer codes were included (for example, "Don't know" and "Prefer not to say" codes). The questionnaire was programmed in UNICOM intelligence software (commonly known as 'Dimensions', an industry standard data programming and processing platform) and was Quality Assured by Verian's survey programming team before being checked by the research team at Verian. The Verian research team checked the following, using a checking log and a script checking guide:

- terminations in the questionnaire where people screen out or the interview is meant to stop for another reason before the end of the survey
- all questions and answer codes were included (without any typos)
- all questions were asked of the correct respondents (to ensure that the filtering of respondents based on responses to previous questions or module allocation was working correctly)
- that the allocation of survey modules was working correctly
- question types (for example, whether a question is a single code or multi code)
- the look and feel of the survey to ensure it was easy to use for respondents

To provide an additional check of the modular design and survey programming, "dummy" data was generated through the script to replicate real respondents' answers. An SPSS datafile and checking syntax was then used to check complex question routing and the random allocation variables that decide which questionnaire route respondents are assigned to. Any amendments were detailed in a Scripting Amendments Form (SAF) form and then signed off once the amend had been actioned and checked by the research team. All programmed questionnaires were signed off by the director on the project.

Each month, Natural England may choose to make minor changes to the questionnaire. These changes will be checked individually using the above process.

7.2 Data Production and Quality Assurance

Verian produce and deliver quarterly formatted datasets. For data collected between April 2020 and March 2022, Verian also produced and delivered monthly unformatted datasets.

Each quarter, the analysis specification is developed in collaboration with Natural England to ensure that the data set is clear and easy to use. This includes the naming and labelling conventions from questions and response codes.

Datasets are produced using IBM SPSS v28. To produce the quarterly data, the monthly data is merged, checked and cleaned using SPSS syntax by the Verian research team. Using a checking log, the Verian research team check that:

- only cases that were interviewed in correct months were included
- all variables listed in the analysis spec, including derived variables, are present
- variable name, variable labels, value codes, special codes match the questionnaire and spec
- the routing for each variable and module allocation using syntax. This was done using the data dictionary function in SPSS alongside the checklist mentioned above.
- all derived variables match their specification (such as any visits in past 7 or 14 days)
- coded responses were back-coded into the original responses in the dataset correctly.

Once the data has been signed off by the Verian director on the project, the location data and weights are merged in using syntax. The data set is then delivered to Natural England using a secure transfer system.

Natural England also undertake a detailed quality assurance workflow (updated quarterly) using a combination of automated scripts (written in R) for data checks and more manual processes for sense checks. Our workflow is split into four stages.

High level data checks: Firstly the dataset is checked as a whole looking at, but not limited to: all fields present, IDs are unique, correctly formatted dates, valid coordinates, field names and labels.

Module level data checks: Next, data is checked across each module and focuses on a more detailed QA than the high-level checks. Routing and rule checks are undertaken for each module (e.g. if a respondent has answered M2A then they should have answered M2A_Q1) and then across all modules. Survey sample sizes and demographic quotas are then checked to ensure targets are met.

Sense checks: Once the data has been quality assured, its context is then checked (i.e. do the results make sense?). This includes, but is not limited to:

- Checking weighted responses against monthly indicators
- Checking weighted responses against historical datasets
- Checking weighted responses of a subset of random questions make sense
- Checking similar figures between linked questions within the survey
- Comparing standardised questions with other surveys.

Issues discovered during these checks are raised with Verian who then provide an updated dataset. Natural England's QA process then begins again. Once the datasets have been signed-off we undertake our final checks. Please get in contact if you want more detailed information on the QA checks we undertake.

Publication checks: Finally, pre-publication checks are run to double-check a few key aspects of the dataset including correct fields are published for correct datasets, correct weights are supplied and only anonymised data has been published.

Systematic bias checks are also undertaken regularly throughout the survey. These are an extension of the sense checks and enable us to see whether systematic bias exists in the data in regard to non-completion of the survey, individual modules or individual questions as well as lack of comprehension (indicated by latency) among survey participants.

- ❖ Natural England's quality assurance workflow is updated quarterly, and changes will be reflected in this document. An overview of Natural England's quality assurance workflow[42] has been published.

7.3 Analysis of Survey

Verian reviewed the survey in February 2021 (using data collected between April 2020 and January 2021) to analyse whether the survey was being completed to the same level of quality across the population. Checks were made on how long it was taking people to complete the survey, and levels of response to specific questions. Verian checked:

- Overall survey length in minutes
- Module length in seconds
- Length of responses to Q6 (Number of Visits) and use of the visit location map in seconds
- Proportion agreeing to share postcode
- Proportion providing non-informative responses ("Don't Know" or "Prefer not to say") to Q6 (Number of visits)

Responses were reviewed across categories in the table below.

[42] https://www.gov.uk/government/publications/survey-methods-and-technical-details/quality-assurance-qa-procedure

Table 7.1 – Categories used for analysis of responses

Age	16-24 25-39 40-54 55-64 65+
Gender	Male Female
Education level	Degree or higher No degree
Ethnicity	White (including White minorities) Mixed or multiple ethnic backgrounds Asian or Asian British Black or Black British
Annual household income	Less than £15,000 £15,000 to £19,999 £20,000 to £29,999 £30,000 to £39,999 £40,000 to £49,999 £50,000 to £59,999 £60,000 to £79,999 £80,000 to £99,999 £100,000 to £149,999 £150,000 or higher

The data from this review is in Annex 5. Following a review of this data from Natural England it was agreed that no changes to the questionnaire were required.

7.4 Monthly Indicators

For the first two years of data collection (April 2020 to March 2022), Natural England published monthly data outputs from the adults' survey with a focus on the impact of COVID-19 on adults' (and parents reports on children's) engagement with the natural environment. For the first year of the survey (April 2020 – March 2021), indicators were generated using interim weighting methods. These interim weighting methods used during the first year of data collection enabled us to publish timely data on people's engagement with nature during COVID-19 while a bespoke People and Nature Survey weight was in development.

For the second year of the survey (April 2021 to March 2022), releases were published using a bespoke People and Nature Survey weight. As such, there will likely be small differences between the results obtained using the interim weighing method and the People and Nature Survey weight.

The supporting data tables for publications in the first year of the survey have been updated with the People and Nature Survey weight. All previous publications and supporting datasets are available[43].

Small differences will be seen between figures in monthly publications compared to other publications (at a quarterly or yearly level).

For quarterly datasets, responses are backcoded from the other specifiy code, into the pre coded list where appropiate. The result is a reduction in the number of responses in the 'other specify' field and an increase in the number of responses in the pre coded list when compared to the monthly indicators. Therefore, all the differences in reported percentages are positive when comparing the quarterly to the monthly.

In the Year 2 monthly indicators, M2A_Q8A was weighted using the overall People and Nature weight rather than the question specific weight. This is because the question specific weight is only calculated every quarter. Therefore figures for this question will differ between monthly and quarterly publications.

7.5 Data Publication

Summary statistics from the People and Nature Survey are published on GOV.UK. From spring 2023, complete datasets are now published via the UK Data Service (UKDS) to increase the robustness in how we manage disclosure of the data collected within the survey. By using the UKDS, we can provide varying levels of potentially sensitive data in line with official advice from the Office for National Statistics as well as adhering to the

[43] https://www.gov.uk/government/collections/people-and-nature-survey-for-england#contents

highest standards of data management required for National Statistic status. Additionally, the UKDS undertake their own disclosure checks which provides another level to the QA procedure for the dataset, and also allows us to publish the data in different formats which are more widely used by our core users.

PANS publishes three datasets, via UKDS, with varying access levels to better meet the needs of our users: Open, Safeguarded, and Controlled.

Open Access: The majority of our data is freely accessible to all users without any registration. It excludes any potentially sensitive variables. M2A_SUB_Q4B is edited (top coded to £100) due to statistical disclosure control.

Safeguarded Access: To access this dataset, users need an account with the UKDS and must adhere to their End User License agreement[44]. It includes all open access variables, plus selected variables with residual disclosure risk. The following variables are banded or truncated due to statistical disclosure controls aiming to eliminate the ability for someone to identify a respondent based on a combination of their responses to demographic and geographical questions:

- M2A_SUB_Q4B – Top coded to £100
- No_Of_Children – Top coded to '6 and over'
- M3_Q1 – Top coded to '6 and over'
- Income – Top coded to £50,000+

Controlled Access: This dataset is designed for users who are likely to carry out advanced modelling or statistical analysis. It includes all safeguarded variables, plus potentially sensitive variables, such as Orientation, Ethnicity_Detailed and home geography variables. Statistical disclosure controls have not been undertaken on the dataset. As such, users will have to be accredited with the UKDS and do a training course before they can access the data through SecureLab. Their data usage must be approved by Natural England.

For more information about the three access levels, please check the guidance available in the UKDS website[45] and the data dictionary published alongside the data.

8. Children's Survey

PANS has a module of questions which asks parents about their child's/children's engagement with the natural environment. However, in recognition that it is important to ask children and young people directly about their experiences and attitudes, Natural

[44] https://www.ukdataservice.ac.uk/get-data/how-to-access/conditions/eul

[45] https://ukdataservice.ac.uk/help/access-policy/types-of-data-access/

England and Verian developed an additional children's People and Nature Survey (C-PANS).

The first C-PANS survey (August 2020, 'Wave 0') provided insights into children and young people's behaviours and attitudes in relation to the natural environment, specifically during the COVID-19 pandemic. The pilot included a nationally representative sample of 1501 children and young people aged 8 to 15 using Kantar's online Profiles panel. The raw data and summary statistics are available online. This first pilot offered valuable insights which contributed to our understanding of experiences of nature during the COVID-19 pandemic.

Following this successful pilot, the survey has been adapted for use on an on-going basis to allow attitudes and behaviours to be looked at over time. The survey will be conducted in two waves each year to capture both school holidays and term-time. The aim is to collect around 4,000 responses from children and young people aged 8-15 each year to capture data over time and assess change. C-PANS will also aim to be adaptive and accommodating to any new and timely research questions relating to children and young people and nature.

8.1 C-PANS Development

The C-PANS questionnaire was developed using the following:

1) Stakeholder interviews

2) Qualitative 'triad' interviews with children

3) Development and pilot

4) On-going development

5) Input from the C-PANS Young Advisory Group

8.1.1 Stakeholder Interviews

In early 2020, informal scoping interviews were conducted with five key stakeholders to understand what users were looking to capture from C-PANS.

These interviews were conducted with stakeholders representing Natural England, Defra, Groundwork, UK Youth and Step Up to Serve. Interviews were carried out to (i) garner views on the proposed coverage of the new survey, and (ii) to identify areas which should be included in forthcoming qualitative research with the target population (children and young people aged 8-15).

Stakeholders were asked to sense check the appropriateness of the following themes as the basis to develop questions for the pilot survey:

- Understanding and perceptions of the natural environment
- Accessibility of the natural environment
- Reasons for and benefits from spending time in the natural environment
- Attitudes to the environment

- Health and wellbeing
- Environmental behaviours, including social action (e.g. volunteering)

All interviewees thought that these themes were broadly right and provided good coverage. None thought any were inappropriate, and no other additional themes were suggested to consider. All interviewees were willing to provide further advice should this be required. Some of the key points from these interviews are below.

Survey mode – There were no comments or concerns about children and young people not being able to complete an online survey, including at eight years old. A ten-minute duration was also seen to be okay. Keeping participants engaged through the ordering of questions would be important, particularly those who have limited or negative perceptions of the natural environment. It was suggested that a 'piggy-back' approach could be undertaken (i.e. parents completing PANS before consenting and handing over to their child to complete). As such, parents will be on hand to provide guidance and help participants to complete the survey. In this case, it was suggested that appropriate guidance should be provided for parents[46].*

Evidence base – Most interviewees were not aware of any similar surveys (in the UK or further afield) which provided insight into children and young people's views of the natural environment. Step Up to Serve's annual National Youth Action Survey covers aspects of children and young people's attitudes to the environment but in the context of social action (e.g. "improving the local area"). Natural England's pilot survey was welcomed, particularly with its potential to provide long-running data to explore trends.

Key themes – There were several recurring themes or issues raised within stakeholder discussions. Themes identified by stakeholders were then used to direct qualitative interviews with children and young people:

- **Designing a survey which accommodates a wide age range**. It is clear that understanding and engagement with the survey will vary substantially between children and young people aged 8 to 15. Stakeholders thought this could not be overstated when designing a survey with this broad target audience.
- **Suitability of language.** The importance of using age-appropriate language when talking about the natural environment, and green and natural spaces was

[46] A pilot survey 'piggy-backing' off of the People and Nature Survey was planned to assess whether recruiting Adults' PANS respondents with children to have one of their children complete a survey directly after they had completed the main survey would be successful. Approximately 25% of PANS respondents had any children in the household. From this we could assume a maximum of 15% had any children aged 8 to 15 in the household that could complete a survey. This was anticipated to provide a sample frame of about 300-320 each month.

This pilot survey to test this method was placed on hold because COVID-19 lockdown restrictions led to higher than usual number of children being with their parents than normal in a survey that would be sensitive to response rates as discussed above. It was felt that it would be a risk to conduct a pilot to test response rates of a 'piggy back' approach during this period. The success of the standalone 'pilot' survey demonstrated that an alternative approach would work.

highlighted. Given the variation in sophistication of language and understanding between the ages of 8 and 15 (see above), this is critical.

- **Salience and understanding**. It is not clear how much children and young people will have thought about and discussed some of the areas the new questionnaire intends to cover, particularly younger children.
- **Agency and choice**. This was a key theme that ran through the discussions, in terms of (i) how much choice children and young people have *generally* about what they do and where they go, and (ii) whether they have choice or influence over their visits to green and natural spaces *specifically*. Based on this, questions related to choosing to do certain things and taking part in certain activities might need to be presented differently to questions used with adults.

8.1.2 Qualitative 'Triad' Interviews with Children and Young People

Qualitative interviews with children and young people were completed in early 2020 to further develop the C-PANS methodology and questioning. In particular, to better understand how children and young people think and talk about nature and environmental issues.

Methodology- A qualitative approach using 'triads' (in-depth interviews with three people) was adopted, comprising:

- Face-to-face interviews with triads in participant homes
- Children and young people aged 8 to 15 years old
- 12 triads (total of 36 participants)

Participants were recruited via their parents with an agreed set of quotas to ensure a broad cross-section of children and young people. The profile of interviewed participants is summarised in Tables 8.1 and 8.2.

The **key findings** from the interviews were that:

- Participants used basic terms and concepts to describe nature and acknowledged its complexity, but they generally agreed with the definition of nature as things and places that are not man-made.
- Spontaneous perceptions of nature tended to be associated with natural spaces that were close to home, particularly for younger children who tended to think about their immediate space and what was available.
- When describing natural environments, children and young often spoke about activities they participate in when in natural spaces rather than the landscape. They generally felt that passive interaction with natural spaces, like going for walks, was boring.
- They felt they had access to local natural spaces but needed permission or assistance from adults to visit larger natural spaces that were further away. This was due to travel and cost.

- While they were able to speak confidently about environmental issues, the term ‘environment’ was not always immediately recognised.

- Social and personal action for the environment was limited and where participants were engaging, they were often taking part in discreet tasks rather than prolonged social or personal action.

Table 8.1 – Qualitative interview sample profile 1

TOTAL	ALL TRIADS	TRIADS ACHIEVED	TOTAL PARTICIPANTS	PARTICIPANTS ACHIEVED
	12	12	36	36
QUOTAS				
Location				
London and South East	6	6	18	18
Midlands / Birmingham	6	6	18	18
Age				
8 – 10 years	4	4	12	12
11 – 13 years	4	4	12	12
14 – 15 years	4	4	12	12
Area / Age				
Urban 8 – 10 years	3	3		
Rural 8 – 10 years	1	1		
Urban 11 – 13 years	3	3		
Rural 11 – 13 years	1	1		

Urban 14 – 15 years	3	3		
Rural 14 – 15 years	1	1		

Table 8.2 – Qualitative interview sample profile 2

TOTAL	ALL TRIADS	TRIADS ACHIEVED	TOTAL PARTICIPANTS	PARTICIPANTS ACHIEVED
Interest in nature				
1 Not at all Interested	MIX	0		
2		0		
3		6		
4		5		
5 Very Interested		1		
Access to nature				
Yes	RECORD	12		
No		0		
SEG				
ABC1	MIN 6	6		
C2DE	MIN 6	6		
ALL CHILDREN Gender				
Male			MIN 15	18
Female			MIN 15	18

ALL CHILDREN Ethnicity				
White – British			MIN 18	21
Mixed – White & Black Caribbean			MIN 12	2
Mixed – White & Black African				5
Black or Black British – Caribbean				1
Asian or Asian British – Indian				4
Asian or Asian British – Pakistani				3
Refused				0

8.1.3 Development and pilot

The questionnaire was developed by Verian and Natural England, incorporating feedback from stakeholder interviews and qualitative triad interviews with children and young people. Learning from development work with PANS also formed the basis of the survey and is reflected in the similarity of their designs.

The C-PANS questionnaire was designed to be clear and easy to understand for children and young people using simplified language, icons and sliding bars for easy-to-use response lists. Screening questions were written for parents before handing over the survey to their child. The survey received ethical approval from Natural England's Ethics Committee on the basis that the questionnaire made sure that Verian received explicit permission from both the parent and child to conduct the interview.

As well as covering themes agreed within the stakeholder interviews, during the development of C-PANS, the survey team were responsive to the developing COVID-19 pandemic and worked to ensure questioning was appropriate and insightful within this context. Several questions included in Wave 0 were therefore specific to the pandemic context allowing for an in-depth look at experiences during this time. It was planned that these questions would be modified for later waves where they are no longer applicable.

In 2023, a Young Advisory Group of 24 children and young people was established to input on C-PANS. The young advisors provided constructive feedback on the survey,

including on the accessibility and relevance of survey questions, and developed their own survey question. The feedback and child-led question were integrated into Waves 5 and 6 of C-PANS.

Wave '0' Pilot

Natural England commissioned Verian to conduct a C-PANS pilot survey ('Wave 0') of children and young people aged 8 to 15 in England through the Kantar Profiles panel in August 2020. To be representative of children and young people aged 8 to 15 in England the survey had quotas on age, region and ethnicity. The quota targets and their sources are listed in Table 8.3.

Survey invitations went out to adult panellists that had not been invited to complete PANS that month (between the 6th and 18th August 2020 inclusive). Adult panellists completed a screening questionnaire and then handed the survey over to a child aged 8 to 15 in their household who had agreed to take part in the survey. In total, 1,501 surveys were conducted. Table 8.3 shows numbers achieved for each of the quota categories.

The pilot was completed during the school holidays, but this was also in the context of the pandemic when many children and young people will not have been attending school 'normally' for some time due to pandemic-related school closures and differences in the reopening of schools.

Table 8.3 – Pilot survey quota targets and numbers achieved

		Target number	Target %	Achieved number	Achieved %
	total	1,500	100%	1,501	>100%
Age (from ONS Mid-Year Population Estimates 2019)	8-11	779	51.9%	763	50.8%
	12-15	722	48.1%	737	49.1%
Region (from ONS Mid-Year Population Estimates 2019)	North	410	27.3%	419	27.9%
	Midlands	458	30.5%	455	30.3%
	South	633	42.2%	627	41.8%
	White	1,148	76.5%	1,171	78%

Ethnicity (from Labour Force Survey April-June 2019)	Non-White	353	23.5%	321	21.4%

Note: Achieved numbers are not always 1501 due to some missing demographic information.

The weighting included a design weight and a non-response weight. The design weight was calculated to compensate for the fact that just one child per household was surveyed. Children and young people from households with only one eligible child were given a design weight of 1, children and young people from households with more than one eligible child were given a design weight of 2. The next stage of weighting was to apply a non-response weight to ensure that the weighted sample matched the population targets mentioned above.

The survey had a design effect of 1.21, which provides an effective sample size of 1,237.

The pilot survey formed the basis of the on-going C-PANS questionnaire by:

- Testing and confirming the effectiveness of this kind of survey design with children and young people aged 8 to 15. Response rates were high and completion times reasonable (averaging approximately 7 ½ minutes), showing that children and young people were able to make use of this online survey format.
- Piloting a range of questions relating to children and nature. These have been used as part of the Wave 1 and later surveys.
- Providing timely insights into children and young people's experiences of nature within the pandemic. Although these pandemic questions were not continued forward to Wave 1, they show the potential for the survey to include timely and responsive topics that require data.

Following the pilot, it was agreed that C-PANS would be most beneficial implemented both in school holiday time (as with the pilot) and in school time. This allows for a better understanding of how children and young people engage with nature both in and outside of school and allows for us to ask school-related questions more easily. It was also noted that sample sizes for children and young people from ethnic minority groups were too small for any detailed analysis across a range of ethnic backgrounds (for example, there were only 54 children from Black or Black British background in the survey) and so a boost to these samples that was sufficient to allow for analysis within a range of ethnic backgrounds would be applied going forward.

8.1.4 On-going development

As with PANS, the C-PANS questionnaire content and structure evolve based on periodic reviews, input from key stakeholders and user feedback, as well through our QA processes. All changes to the questionnaire following Wave 1 have been detailed in the published 'C-PANS questions and change log'. This includes details on sources and/or additional development work published for any new questions.

8.2 C-PANS Implementation

8.2.1 Sampling

Each 'Wave' of the survey aims to gather responses from 2000 (1500 + 500 ethnic minority boost) children and young people aged 8 to 15 through Kantar's Profiles panel. This was a pragmatic sample size chosen based on resource and achievable representative sample size within the timeframe of the survey. Details on the Profiles panel can be found within the PANS survey sampling description, and strengths and limitations of online panels have been discussed in Section 2.

C-PANS has two Waves per year, once during the school holidays and once in the school term-time. Sampling timeframes are determined based on:

- Matching the previous years' dates as closely as possible
- Providing a period of 21 days for surveys to be live/completed
- Keeping school holiday and term-time survey Waves as close together as possible to minimise seasonal differences in temperature/weather
- Ensuring an appropriate timeframe to allow for children and young people to reflect-back on the last week/2 weeks of activity in holiday time and/or term-time.

Sampling quotas are based on age, region and ethnicity. The quota targets and their sources are listed alongside each years' data. The population statistics used for the quotas are sourced from the latest available ONS Mid-Year Population Estimates and Labour Force Survey and are subject to change on an annual basis as updated population statistics are released. Quotas will therefore be updated if necessary, in accordance with these. Quotas for the nationally representative sample of 1500 children and young people in Waves 1-4 and Waves 5-6 (excluding the boost of 500 children and young people from ethnic minority groups) are in Tables 8.4 and 8.5.

8.2.2 Fieldwork

Survey invitations are sent to adult panellists through Kantar's Profiles panel who complete screening questions to establish, 1) that they have a child aged 8-15 in their household who is willing to take part in the survey, and 2) to ask some basic background questions about that child. Once complete the parent/guardian is then instructed to hand the electronic device displaying the survey to the child. Explicit consent was requested from both the parent and child.

Adults are instructed to let the child self-complete the survey but to answer the child's questions if they need help at any point. There is no modular structure to C-PANS and therefore all children and young people are eligible to receive all questions.

The tables below (Table 8.4 and Table 8.5) show sample sizes achieved for each Wave to-date against quotas.

Table 8.4 – C-PANS survey quota targets and achieved sample, Waves 1 to 4

		Target %	Wave 1	Wave 2	Wave 3	Wave 4
Age ONS Mid-Year Population Estimates 2020	8-11	51.5%	51.5%	51.5%	52.3%	51.3%
	12-15	48.5%	48.5%	48.5%	47.7%	48.7%
Region ONS Mid-Year Population Estimates 2020	North	27.2%	27.2%	27.2%	29.1%	27.3%
	Midlands	30.4%	30.5%	30.5%	32.3%	30.5%
	South	42.3%	42.3%	42.3%	38.5%	42.2%
Ethnicity[47] Labour Force Survey England October – December 2020	White	78.2%	78.1%	78.2%	80.3%	78.6%
	Non-White	21.8%	20.4%	20.7%	19.7%	21.4%

Table 8.5 – C-PANS survey quota targets and achieved sample, Waves 5 to 6

			% Achieved	
		Target %	Wave 5	Wave 6

[47] Respondents had to consent to being asked about ethnicity so the sum of responses may be less than 100%.

Age ONS Census 2021	8-11	50.8%	51.8%	48.8%
	12-15	49.2%	48.2%	51.2%
Region: ONS Census 2021	North	27.5%	27.7%	28.8%
	Midlands	30.8%	30.8%	27.4%
	South	41.7%	41.5%	43.8%
Ethnicity[48] Labour Force Survey England July – September 2022	White	77.5%	76.4%	81.2%
	Non-White	22.5%	23.1%	17.8%

8.2.3 Weighting of the children's survey

Weighting was used to ensure the sample is representative of the population. The weight in C-PANS 'Weight_percent' is derived from a design weight and a non-response "rim" weight.

Design weight- A design weight was calculated to compensate for just one child per household being surveyed. Children and young people from households with only one eligible child were given a design weight of 1, children and young people from households with more than one eligible child were given a design weight of 2. A design weight is not used on its own for analysis, but rather it forms the starting point of the non-response weight.

Non-response "rim" weight- The design weight was input into a raking algorithm that ensured the sample margins matched the population margins for the following variables:

- Age and Gender
    - Waves 1 to 4 - ONS Mid-Year Population Estimates for 2020
    - Waves 5 to 6 - ONS Census 2021

[48] Respondents had to consent to being asked about ethnicity so the sum of responses may be less than 100%

- Region
    - Waves 1 to 4 - ONS Mid-Year Population Estimates for 2020
    - Waves 5 to 6 - ONS Census 2021
- Ethnicity
    - Waves 1 to 4 - Labour Force Survey October - December 2020
    - Waves 5 to 6 - Labour Force Survey July – September 2022

Compared to the pilot, as children and young people from ethnic minority groups were boosted in the sample, ethnicity weighting targets were changed to be more granular than the pilot (when the sample size of ethnic minority children and young people did not support weighting by any more detailed categories).

The benchmark population statistics (for children and young people aged 8-15 years in England) used were as follows:

Table 8.5 – CPANS weighting targets

	Waves 1 to 4	Waves 5 and 6
Age and Gender	**N** (000s)	**N** (000s)
Male 8-9	741	707
Male 10-11	715	709
Male 12-13	706	701
Male 14-15	667	670
Female 8-9	705	674
Female 10-11	681	673
Female 12-13	669	667
Female 14-15	634	637
Region		
North East	247	246
North West	717	722

Yorkshire and the Humber	538	530
East Midlands	465	463
West Midlands	596	598
East	620	613
London	893	852
South East	923	905
South West	519	509
Ethnicity		
White	4317	3998
Mixed or multiple ethic groups	300	337
Black/Black British	321	663
Asian/Asian British	467	327
All other	113	113

8.2.4 Data processing and publication

Questionnaire development: During questionnaire development stages, the C-PANS questionnaire has been developed in line with the Code of Practice for Statistics and the pillars of trustworthiness, quality, and value. Collaboration between Natural England and Defra, as well as input from other stakeholders fostered these pillars during the design and ongoing development process. Engaging and getting feedback from children and young people in the C-PANS Young Advisory Group ensured the accessibility and relevance of the questionnaire to children in the target age group for the survey.

Questionnaire programming: Quality assurance during questionnaire processing follows procedures similar to those used in PANS, including formalised checks on the programmed survey and the generation of “dummy” data to test-run the survey. Checks are repeated as changes are made to the survey.

Data production: As with PANS, Verian perform quality checks on the raw dataset before sharing with Natural England who then carry out their own quality assurance checks. This includes checks like:

1. High-level checks: These are undertaken across the dataset as a whole e.g., Checking the correct fields exist in the data (as per dataset specification), respondent IDs are unique, and all fields that should contain data for every row do so (i.e. questions that are asked of every respondent).
2. Question-level checks: These check answers for specific questions in the survey e.g., ethnicity and disability only asked for those who provided consent, all children and young people are aged 8-15 and questions that require a selection only contain the correct range of answers as per the SPSS 'values'
3. Sense checks: This section focuses on whether the data that has been cleaned, makes sense in the context of its use e.g., Quotas for region, age and ethnicity have been met, the weights work, basic analyses show sensible responses corresponding with previous Waves.
4. Final data checks: A final set of critical tests should be undertaken before publishing e.g., No sensitive information remaining in dataset (e.g., open-ended questions containing names/places that may be identifiable), all fields are filled out and correct weights are applied.

Data publication: As with PANS, C-PANS summary statistics are published on GOV.UK and complete datasets (open, safeguarded and controlled access) are published in the UK Data Service.

Thematic analysis of open-ended responses

Where response options are not given within C-PANS and instead respondents are asked to type their own response, inductive thematic analysis is completed to group responses into common themes. Thematic analysis is completed using the following steps:

1. Two coders separately complete inductive thematic analysis on 10% of responses. This involves providing common theme names to similar responses until all responses are categorised and each theme has a number of responses sitting under it. To avoid loss of insights but retain a manageable number of themes, 'main' and 'sub' themes are often used as part of this coding process.
2. Once both coders have completed coding the first 10% of data, they come together to compare their final themes and the text responses assigned to them.
3. Using the primary coders dataset as the base, any common themes are kept and any differences are discussed so that final themes could be agreed upon. Any disagreements are resolved through use of a third coder to make a final decision.
4. The agreed themes are then used by the primary coder to amend their coding and to complete coding on the rest of the data.
5. Once complete, the second coder reviews all themes and data assigned to these, and further discussions/amendments are made in conjunction with the primary coder.

Annex 1: COVID-19 Research Questions

During the COVID-19 pandemic, the project explored the following additional research questions. It was decided that these were no longer a key priority of the project in March 2023, but these have been retained in the project technical report for reference.

Theme	Question	Why do we want to ask this?
Gardens	RQCV1.1 Has the amount of time people spend in the garden (etc.) changed in response to CV-19[49]?	Would, in part, help us to understand the role of gardens (etc.) during CV-19 and also useful for inferring the impact on those who do not have them. Pre-requisite for answering RQCV1.2, RQCV1.3, RQCV1.4
Gardens	RQCV1.2 Has the role of gardens (etc.) changed in response to CV-19?	Would, in part, help us to understanding the role of gardens (etc.) during CV-19 and also for inferring the impact on those who do not have them. How does this vary across the population? May also, in part, help us to understand any change in environmental behaviours and connection to nature in response to CV-19 as mediated through garden spaces. If include responses about different ways of sensing/noticing nature will help answer Comms Team Q about

[49] When refer to CV-19 this includes all aspects of the pandemic – Government restrictions, material changes to lifestyle, the illness itself, anxieties, etc.

		what people are noticing more in nature. Pre-requisite for answering RQCV1.3 and RQCV1.4
Gardens	RQCV1.3 What have the health and wellbeing outcomes been as a result of any change in the amount of time spent and the activities carried out in gardens over the CV-19 period?	Will help us to understand the impact of CV-19 on health and wellbeing and the role of gardens in mediating impact. Will help us to understand the differentiated experience of CV-19 nationally. Pre-requisite for answering RQCV1.4 Could help answer Comms Team Q about what people valuing from nature connections? How does this vary across the population?
Gardens / Inequality	RQCV1.4 What impact has a lack of a garden (etc.) had on people during CV-19?	Will help us to understand the differentiated experience of CV-19 nationally. Will help us to infer the importance of local green space during such crises. May also, in part, help us to understand whether disadvantage (in terms of access to quality green space) was exacerbated or not during CV-19 (also see Inequality themes). Helps answer Comms Team Q about whether people are more connected to local nature during this time.

		If no garden, what are people doing to connect to nature?
Gardens / Inequality	RQCV1.5 Has naturalness of garden affected the above?	Do those with more natural outside spaces experience the current period differently to those with less natural spaces?
Inequality	RQCV2.1 Has CV-19 exacerbated inequalities in access to green and natural spaces? (Access to quality green space as separate Q?)	Links to gardens and MENE analysis which suggests BAME and deprived communities have less access to gardens. Link to garden questions. Hypothesis that existing trends seen in MENE data re inequalities in access to green & natural space will be exacerbated during CV-19. Link to visit questions. Links to research indicating females more adversely affected by CV-19 more generally.
Inequality	RQCV2.2 Has CV-19 exacerbated inequalities in access to high quality green and natural spaces?	As above but concerning quality of accessible green and natural space specifically.
Inequality	RQCV2.3 Has CV-19 exacerbated inequalities in other aspects – e.g. less women finding ways/time to connect to nature?	As above but looking at different populations
'Solace in Nature'	RQCV3.1 Have people found alternative ways to connect with nature and greenspace/landscapes during CV-19?	Ways people without gardens are coping with the restrictions/limitations and whether nature or outside exercise is playing a role. And more generally around how people are creatively adapting to limitations.

Solace in Nature	RQCV3.2 Are people feeling more connected to Nature during CV-19?	Has peoples' relationship with nature changed? Is this sustained? Does this have a relationship with reported health and wellbeing? What aspects of nature are people 'connecting' to / noticing Eg birdsong, wildlife, plants, sounds, smells etc? What do people value about this?
Life under lockdown: Visits to green & natural spaces	RQCV4.1 Are people visiting local green spaces more, less or about the same during CV-19?	Have local green spaces become even more important? What is the role of natural and green space during times of national crisis/stress? Starts answering Q about role that green spaces have in coping and adjusting to new circumstances. Importance of local green space. Are people getting out more or less than usual? Partly helps answer how people are interpreting 'rules' around spending time outside. How does this vary across different communities?
Life under lockdown: Visits to green & natural spaces	RQCV4.2 Are people visiting different/new local green spaces during CV-19?	Have local green spaces become even more important?

		What is the role of natural and green space during times of national crisis/stress? Starts answering Q about role that green spaces have in coping and adjusting to new circumstances. Importance of local green space. How far are people traveling? Partly helps answer how people are interpreting ‘rules’ around spending time outside. How does this vary across different communities?
Life under lockdown: Visits to green & natural spaces	RQCV4.3 Have reasons for visiting local green spaces changed during CV-19?	Have local green spaces become even more important? What is the role of natural and green space during times of national crisis/stress? Helps us to understand any changes we may see in shifts in how local green spaces are used. Helps us to understand which outcomes are sought from local green space and the activities required. Partly helps answer how people are interpreting ‘rules’ around spending time outside. Are people using green space to alleviate negative impacts, such as low mood, anxiety related to current situation? How does this vary across different communities?

Life under lockdown: Visits to green & natural spaces	RQCV4.4 What is the role of nature / wildlife during times of national crisis/stress? RQCV4.5 What is the role of natural and green space during times of national crisis/stress?	
Life under lockdown: Visits to green & natural spaces	RQCV4.6 Have people's experiences of local green spaces changed during CV-19?	Links to above Qs. May, in part, help us to understand what good quality green spaces are like during this time. Probes issues of differential effects of restrictions, issues relating to social distancing, impact of fear, impact of social censorship (acceptable spaces to visit), impact of CV-19 on ability and motivation to visit. Also, positives relating to reduction in different types of pollution. How does this vary across different communities?
Life under lockdown: Visits to green & natural spaces	RQCV4.7 Have visit restrictions disproportionately negatively affected those with a disability?	See the above RQCV4 Qs and consider how the answers vary by different communities. Using a combination of responses to Qs 1, 4, 5, QCV1, 6, 11, 23, 24, 27a, 28, 29, 29b, 32, 33, 39a, 39c, 41, 68, 74, 75, 76, 77, 78, 79, 80, 81 – in bold is particularly relevant.
Life under lockdown: Visits to green & natural spaces	RQCV4.8 Have perceptions of quality in local green and natural spaces changed during CV-19?	Could help answer Comms Team Q about what people valuing from nature connections?

		More about what makes a quality green space needed to inform this. Links to/overlaps with RQCV4.4 – combine?
Life under lockdown: Health and wellbeing	RQCV5.1 Are people exercising (outside) more or less during CV-19?	The role of exercise in coping/adjusting to CV-19? Impact on health of CV-19? Are people exercising more outdoors and will this be sustained?
Life under lockdown: Environmental behaviours	RQCV6.1 Have people's environmental behaviours altered during CV-19?	Will this be sustained?
Life under lockdown: Environmental behaviours	RQCV6.2 Why have people's environmental behaviours altered during CV-19?	What can we learn about encouraging/discouraging certain behaviours?
Life under lockdown: Environmental behaviours	RQCV6.3 Has CV-19 altered people's attitudes to environmental issues?	Will this be sustained? Priority Causes Solutions Responsibility Etc.
Children	RQCV7.1 Has the role of green and natural space changed during CV-19 to one where accommodating children is more or less important?	How has CV-19 changed our opinions on the role of green and natural space?

Children	RQCV7.2 Has there been any change in whether people feel local green and natural spaces are ‘good for children to play’	As above – change in ideas of what quality and utility values green spaces have and should hold
Children	RQCV7.3 Are children visiting green and natural spaces less during CV-19?	Importance of green space for children during such times
Children	RQCV7.4 Are more adults visiting green and natural spaces with children during CV-19?	The role of local greenspace in people coping and adjusting to CV-19. Alternative activities for children.
Children	RQCV7.5 Are more adults playing with children during visits to green and natural spaces during CV-19?	The role of local greenspace in people coping and adjusting to CV-19. Alternative activities for children.
Children	RQCV7.6 Are more adults visiting green and natural spaces for reasons of childcare (entertainment) during CV-19?	The role of local greenspace in people coping and adjusting to CV-19. Alternative activities for children.
Children	RQCV7.7 How many children have access to a garden or local green space?	Understanding inequality in children’s access
Children	RQCV7.8 What is the role of natural and green space for children during times of national crisis/stress?	
Children	RQCV7.9 What is the role of nature / wildlife for children during times of national crisis/stress?	

Children	RQCV7.10 Have the types of green and natural spaces children visit changes during CV-19? How?	Importance of different types of green space for children during such times
Children	RQCV7.11 Have barriers to children spending their free time in green and natural spaces changed during CV-19?	Inequality of access during CV-19

Annex 2: Table of Confidence Intervals – Any visit to green and natural spaces in the last 14 days by local authority

The table below displays the unweighted sample size and 95% Confidence Intervals (CIs) by local authority for the survey question 'No_of_Visits' which asks about the number of visits to green and natural spaces in the last 14 days.

Local authority	Sample size (No_of_Visits – April 20-March 23)	Indicative Max. 95% Confidence Interval (for a simple random sample of an equivalent size) + / - %pts
Adur	121	11.8
Allerdale	156	9.7
Amber Valley	205	9.3
Arun	210	9.1
Ashfield	231	7.5
Ashford	300	7.1
Babergh	143	9.7
Barking and Dagenham	244	7.6
Barnet	572	4.9
Barnsley	303	6.6
Barrow-in-Furness	84	13.0
Basildon	243	7.4
Basingstoke and Deane	224	7.7
Bassetlaw	156	9.1
Bath and North East Somerset	225	8.3
Bedford	322	6.5
Bexley	267	7.3
Birmingham	1607	2.8
Blaby	117	10.5
Blackburn with Darwen	156	9.2
Blackpool	241	7.7
Bolsover	124	10.3
Bolton	344	6.0
Boston	95	11.1
Bournemouth, Christchurch and Poole	524	5.4
Bracknell Forest	150	9.9

Bradford	630	4.9
Braintree	200	8.0
Breckland	188	8.6
Brent	365	6.3
Brentwood	91	12.8
Brighton and Hove	309	6.3
Bristol, City of	476	5.0
Broadland	156	8.7
Bromley	318	6.6
Bromsgrove	93	13.1
Broxbourne	116	9.9
Broxtowe	176	7.9
Buckinghamshire	569	5.0
Burnley	110	11.0
Bury	293	6.7
Calderdale	260	7.5
Cambridge	219	7.0
Camden	207	7.3
Cannock Chase	97	14.2
Canterbury	182	9.1
Carlisle	154	10.2
Castle Point	109	11.1
Central Bedfordshire	341	6.0
Charnwood	190	7.7
Chelmsford	242	6.9
Cheltenham	125	11.3
Cherwell	134	11.2
Cheshire East	396	6.5
Cheshire West and Chester	344	6.4
Chesterfield	175	8.0
Chichester	102	11.3
Chorley	100	13.2
City of London	304	7.2
Colchester	326	5.8
Copeland	58	24.1
Cornwall	729	4.6
Cotswold	86	13.4
County Durham	660	4.6
Coventry	436	5.3
Craven	42	18.4
Crawley	176	8.6
Croydon	417	6.0
Dacorum	172	8.7
Darlington	185	8.2

Dartford	149	9.2
Derby	390	5.4
Derbyshire Dales	69	13.8
Doncaster	304	7.0
Dorset	418	6.3
Dover	140	9.5
Dudley	414	5.3
Ealing	346	6.6
East Cambridgeshire	114	10.2
East Devon	127	10.7
East Hampshire	147	9.8
East Hertfordshire	190	9.0
East Lindsey	190	8.1
East Riding of Yorkshire	409	6.0
East Staffordshire	143	9.3
East Suffolk	354	6.0
Eastbourne	173	8.3
Eastleigh	135	10.0
Eden	55	17.4
Elmbridge	162	8.7
Enfield	355	6.5
Epping Forest	138	9.7
Epsom and Ewell	86	15.2
Erewash	181	8.8
Exeter	168	9.8
Fareham	224	8.7
Fenland	119	9.8
Folkestone and Hythe	137	10.5
Forest of Dean	79	19.6
Fylde	126	11.5
Gateshead	237	6.8
Gedling	164	7.7
Gloucester	181	8.8
Gosport	146	8.5
Gravesham	108	11.3
Great Yarmouth	176	8.0
Greenwich	315	6.3
Guildford	135	10.3
Hackney	168	8.5
Halton	139	9.1
Hambleton	109	11.5
Hammersmith and Fulham	205	7.3
Harborough	93	12.3

Haringey	327	6.5
Harlow	105	11.0
Harrogate	145	10.2
Harrow	328	6.8
Hart	95	14.2
Hartlepool	103	10.3
Hastings	112	11.5
Havant	133	9.1
Havering	255	7.1
Herefordshire, County of	149	10.2
Hertsmere	132	10.8
High Peak	56	14.6
Hillingdon	304	7.4
Hinckley and Bosworth	125	10.5
Horsham	174	9.0
Hounslow	267	7.7
Huntingdonshire	236	7.9
Hyndburn	89	12.6
Ipswich	236	6.8
Isle of Wight	220	7.8
Isles of Scilly	1	521.4
Islington	217	7.3
Kensington and Chelsea	152	9.8
King's Lynn and West Norfolk	234	7.3
Kingston upon Hull, City of	241	6.5
Kingston upon Thames	184	8.3
Kirklees	535	5.0
Knowsley	128	9.6
Lambeth	292	6.6
Lancaster	173	10.0
Leeds	1062	3.7
Leicester	575	4.6
Lewes	123	10.4
Lewisham	310	6.3
Lichfield	81	13.0
Lincoln	211	8.1
Liverpool	585	4.9
Luton	295	6.7
Maidstone	211	10.0
Maldon	42	17.1

Malvern Hills	66	13.8
Manchester	737	4.1
Mansfield	154	8.1
Medway	339	6.4
Melton	50	15.3
Mendip	90	14.7
Merton	222	8.1
Mid Devon	56	14.1
Mid Suffolk	122	10.7
Mid Sussex	162	9.6
Middlesbrough	150	8.8
Milton Keynes	290	6.6
Mole Valley	91	16.8
New Forest	173	9.9
Newark and Sherwood	136	9.7
Newcastle upon Tyne	423	5.2
Newcastle-under-Lyme	89	12.2
Newham	307	6.5
North Devon	82	12.8
North East Derbyshire	134	11.0
North East Lincolnshire	186	8.4
North Hertfordshire	153	9.5
North Kesteven	126	9.8
North Lincolnshire	168	9.4
North Norfolk	173	8.8
North Northamptonshire	471	5.2
North Somerset	243	8.0
North Tyneside	255	6.7
North Warwickshire	40	19.9
North West Leicestershire	102	12.7
Northumberland	381	6.0
Norwich	301	6.1
Nottingham	431	4.9
Nuneaton and Bedworth	153	9.9
Oadby and Wigston	74	14.1
Oldham	312	6.8
Oxford	178	8.7
Pendle	68	13.9
Peterborough	326	5.6
Plymouth	352	6.3

Portsmouth	269	6.9
Preston	160	9.9
Reading	160	8.5
Redbridge	274	7.5
Redcar and Cleveland	182	8.3
Redditch	119	10.8
Reigate and Banstead	143	10.0
Ribble Valley	44	23.3
Richmond upon Thames	182	8.9
Richmondshire	33	23.6
Rochdale	198	8.9
Rochford	177	9.2
Rossendale	72	14.8
Rother	135	10.2
Rotherham	207	8.5
Rugby	146	8.6
Runnymede	87	14.3
Rushcliffe	174	9.5
Rushmoor	81	14.0
Rutland	33	22.8
Ryedale	42	18.4
Salford	312	6.1
Sandwell	426	5.4
Scarborough	151	9.9
Sedgemoor	130	10.5
Sefton	324	6.7
Selby	114	13.0
Sevenoaks	92	14.4
Sheffield	714	4.3
Shropshire	353	6.7
Slough	151	9.2
Solihull	266	6.9
Somerset West and Taunton	213	7.5
South Cambridgeshire	131	10.8
South Derbyshire	124	9.5
South Gloucestershire	270	7.8
South Hams	95	14.1
South Holland	153	9.3
South Kesteven	195	8.4
South Lakeland	74	12.6
South Norfolk	159	9.2
South Oxfordshire	129	11.2
South Ribble	100	12.6

South Somerset	204	9.0
South Staffordshire	108	11.1
South Tyneside	171	9.4
Southampton	292	6.6
Southend-on-Sea	260	6.8
Southwark	275	6.6
Spelthorne	111	11.4
St Albans	132	10.6
St. Helens	167	9.5
Stafford	144	9.9
Staffordshire Moorlands	94	12.7
Stevenage	108	10.5
Stockport	423	6.1
Stockton-on-Tees	209	8.0
Stoke-on-Trent	330	5.8
Stratford-on-Avon	124	10.5
Stroud	115	13.9
Sunderland	321	6.2
Surrey Heath	103	12.1
Sutton	295	7.4
Swale	166	9.1
Swindon	256	7.5
Tameside	254	7.8
Tamworth	111	10.5
Tandridge	70	14.2
Teignbridge	182	8.5
Telford and Wrekin	182	7.9
Tendring	198	8.4
Test Valley	110	12.3
Tewkesbury	99	13.5
Thanet	174	9.5
Three Rivers	117	12.1
Thurrock	212	8.2
Tonbridge and Malling	117	11.2
Torbay	175	8.5
Torridge	57	15.0
Tower Hamlets	369	6.0
Trafford	240	7.4
Tunbridge Wells	125	11.7
Uttlesford	105	12.5
Vale of White Horse	140	11.0
Wakefield	374	6.0
Walsall	406	5.3

Waltham Forest	265	7.0
Wandsworth	296	7.0
Warrington	242	7.8
Warwick	257	7.6
Watford	121	12.1
Waverley	115	10.9
Wealden	170	9.5
Welwyn Hatfield	128	10.7
West Berkshire	180	9.2
West Devon	64	13.2
West Lancashire	86	14.4
West Lindsey	130	10.8
West Northamptonshire	576	4.7
West Oxfordshire	80	13.3
West Suffolk	203	7.6
Westminster	290	6.4
Wigan	394	5.9
Wiltshire	554	5.5
Winchester	148	10.2
Windsor and Maidenhead	142	10.2
Wirral	344	6.8
Woking	111	11.3
Wokingham	178	10.7
Wolverhampton	419	5.2
Worcester	167	8.9
Worthing	126	10.1
Wychavon	148	9.4
Wyre	135	10.6
Wyre Forest	131	10.3
York	267	7.6
Don’t know	196	9.3
Prefer not to say	281	7.2
Missing/Invalid post code	326	6.9

Annex 3: Data Issues

Natural England published the first People and Nature Survey adult respondent data on 30 September 2020. Within that published dataset, four coordinate fields derived from the full post code for 5119 respondents were published in error (Postcode latitude, Postcode longitude, Postcode easting, Postcode northing). The breach was first identified on 21 October 2020 by Natural England and the data was taken down from the release page on GOV.UK the same day. The risk of a respondent's residence being identified from the People and Nature Survey data published on 30 September 2020 is low due to the size of a typical postcode area. The four coordinate columns mentioned above have been removed and the new dataset was uploaded to GOV.UK on 30 October 2020.

Link to breach report

Annex 4: Weighting Guidance

This section explains how to apply weights to the data from the People and Nature Survey (PANS). It is aimed at those who have downloaded the data and intend to run their own analysis.

Standard Weight

Most questions within survey modules 1,3,4,5 and 6 use 'Weight_Percent'. The weighted number of respondents with this weight is scaled to match the number of survey respondents.

Module Weights

There are different weights to use for questions in Module 2, Module 5 and some questions with Module 6. These were created due to the change in module allocation selection probabilities between April 2020 and May 2020.

Weights for grossing estimates to the adult population in England

There are some questions within Module 1 and Module 2 where weights are produced to gross up the number of respondents to match the adult population (16+) in England and provide monthly totals for number of visitors to different types of green and natural spaces, number of visits and total expenditure.

'Weight_Grossed_M1_Q2' produces an estimate of the total number of adults aged 16+ who have visited each type of green and natural space in the **past month** (in 000s).

'Weight_Grossed_No_Of_Visits' produces an estimate of the total number of visits to green and natural spaces in the **past month** (in 000s).

'Weight_Grossed_M2A_SUB_Q4B' produces an estimate of the total amount in £s (000s) spent on visits to green and natural spaces in the past month.

Cross tabulating

If you wish to cross tabulate between two fields in the dataset, then use the weight that is associated with the survey question. For example:

- If you want to look at M2A_Q2 versus Age then you would use 'Weight_Percent_M2A' as this is associated with the question you are interested in (M2A_Q2).

Question	Weight to use for %	Weight to gross estimates to adult population (in 000s)	Additional information
Wave	Weight_Percent	n/a	
Module2Or3Or4Or5	Weight_Percent	n/a	
Region	Weight_Percent	n/a	
Age_Band	Weight_Percent	n/a	
Gender	Weight_Percent	n/a	
Qualification	Weight_Percent	n/a	
M1	Weight_Percent	n/a	
M1_Q1	Weight_Percent	n/a	
M1_Q2	Weight_Grossed_M1_Q2	Weight_Grossed_M1_Q2	This weight produces an estimate of the number of visits to each type of green and natural space in the past month (in 000s')
M1_Q3	Weight_Percent	n/a	
M1_Q4	Weight_Percent	n/a	
M1_Q5	Weight_Percent	n/a	

M1_Q6	Weight_Percent	n/a	
CV_Q1_1	Weight_Percent	n/a	
CV_Q2A	Weight_Percent	n/a	
CV_2B	Weight_Percent	n/a	
CV_Q3A	Weight_Percent	n/a	
CV_Q3B	Weight_Percent	n/a	
M2	Weight_Percent	n/a	
No_Of_Visits	Weight_Grossed_No_Of_Visits	Weight_Grossed_No_Of_Visits	This weight produces an estimate of the number of visits in the **past month** (in 000s')
Any_Visits_7	Weight_Percent	n/a	
Any_Visits_14	Weight_Percent	n/a	
M2A	Weight_Percent_M2A	n/a	
M2A_Q1	Weight_Percent_M2A	n/a	
M2A_Q2	Weight_Percent_M2A	n/a	
M2A_Q3	Weight_Percent_M2A	n/a	
M2A_Q5	Weight_Percent_M2A	n/a	

M2A_Q6	Weight_Percent_M2A	n/a	
M2A_Q7	Weight_Percent_M2A	n/a	
M2A_Q8A	Weight_Percent_M2A	n/a	
M2A_Q8B	Weight_Percent_M2A	n/a	
M2A_Q8C	Weight_Percent_M2A	n/a	
M2A_Q9	Weight_Percent_M2A	n/a	
M2A_SUB	Weight_Percent_M2A_SUB	n/a	
M2A_SUB_Q1	Weight_Percent_M2A_SUB	n/a	
M2A_SUB_Q2	Weight_Percent_M2A_SUB	n/a	
M2A_SUB_Q3	Weight_Percent_M2A_SUB	n/a	
M2A_SUB_Q4A	Weight_Percent_M2A_SUB	n/a	
M2A_SUB_Q4B	Weight_Grossed_M2A_SUB_Q4B	Weight_Grossed_M2A_SUB_Q4B	This weight produces an estimate of the total amount in £s (000s) spent on visits to green and natural spaces in the **past month**
M2A_SUB_Q5	Weight_Percent_M2A_SUB	n/a	
M2A_SUB_Q6	Weight_Percent_M2A_SUB	n/a	

M2A_SUB_Q7	Weight_Percent_M2A_SUB	n/a	
M2A_SUB_Q8	Weight_Percent_M2A_SUB	n/a	
M2B	Weight_Percent	n/a	
M2B_Q1	Weight_Percent	n/a	
M2B_Q2	Weight_Percent	n/a	
M2B_Q3	Weight_Percent	n/a	
M2B_Q4A	Weight_Percent	n/a	
M2B_Q4B	Weight_Percent	n/a	
M2B_Q5	Weight_Percent	n/a	
M2B_Q6	Weight_Percent	n/a	
M2B_Q7	Weight_Percent	n/a	
M3	Weight_Percent	n/a	
M3_Q1	Weight_Percent	n/a	
M3_Q2	Weight_Percent	n/a	
M3_Q3A	Weight_Percent	n/a	
M3_Q3B	Weight_Percent	n/a	

M3_Q3C	Weight_Percent	n/a	
M3_Q4	Weight_Percent	n/a	
M3_Q5	Weight_Percent	n/a	
M3_Q6	Weight_Percent	n/a	
M3_Q7A	Weight_Percent	n/a	
M3_Q7B_Old	Weight_Percent	n/a	
M3_Q7B	Weight_Percent	n/a	
M3_Q7C	Weight_Percent	n/a	
M3_Q8	Weight_Percent	n/a	
M3_Q9	Weight_Percent	n/a	
M4	Weight_Percent	n/a	
M4_Q1	Weight_Percent	n/a	
M4_Q2	Weight_Percent	n/a	
M4_Q3	Weight_Percent	n/a	
M4_Q4	Weight_Percent	n/a	
M4_Q5	Weight_Percent	n/a	

M4_Q6	Weight_Percent	n/a	
M4_Q7	Weight_Percent	n/a	
M4_Q8	Weight_Percent	n/a	
M4_Q9	Weight_Percent	n/a	
M4_Q10A	Weight_Percent	n/a	
M4_Q10B	Weight_Percent	n/a	
M4_Q11	Weight_Percent	n/a	
M4_Q12	Weight_Percent	n/a	
M4_Q13A	Weight_Percent	n/a	
M4_Q13B	Weight_Percent	n/a	
M4_Q14	Weight_Percent	n/a	
M4_Q15	Weight_Percent	n/a	
M4_Q16	Weight_Percent	n/a	
M4_Q17	Weight_Percent	n/a	
M5	Weight_Percent_M5	n/a	
M5_Q1A	Weight_Percent_M5	n/a	

M5_Q1B_Old	Weight_Percent_M5	n/a	
M5_Q1B	Weight_Percent_M5	n/a	
M5_Q1C	Weight_Percent_M5	n/a	
M5_Q1D	Weight_Percent_M5	n/a	
M5_Q1E	Weight_Percent_M5	n/a	
M5_Q1F	Weight_Percent_M5	n/a	
M5_Q2	Weight_Percent_M5	n/a	
M5_Q3	Weight_Percent_M5	n/a	
M6	Weight_Percent	n/a	
Marital_Status	Weight_Percent	n/a	
No_Of_Children	Weight_Percent	n/a	
Work_Status	Weight_Percent	n/a	
Student_Work_Status	Weight_Percent	n/a	
Income	Weight_Percent	n/a	
Ethnicity_Consent	Weight_Percent	n/a	

Ethnicity	Weight_Percent	n/a	
Ethnicity_Detailed	Weight_Percent	n/a	
No_Of_Vehicles	Weight_Percent	n/a	
Dog	Weight_Percent	n/a	
Illnesses	Weight_Percent	n/a	
Illnesses_Detail_TEMP	Weight_Percent	n/a	
Illnesses_Impact	Weight_Percent	n/a	
General_Health	Weight_Percent	n/a	
Activity	Weight_Percent	n/a	
Home_Rural_Urban_Asked	Weight_Percent	n/a	
M6B	Weight_Percent_M6B	n/a	
Wellbeing_lonely	Weight_Percent_M6B	n/a	
Wellbeing_satisifed	Weight_Percent_M6B	n/a	

Wellbeing_worthwhile	Weight_Percent_M6B	n/a	
Wellbeing_happy	Weight_Percent_M6B	n/a	
Wellbeing_worried	Weight_Percent_M6B	n/a	
Wellbeing_anxious	Weight_Percent_M6B	n/a	

Annex 5: Analysis of Survey Response Quality

The tables below are taken from analysis of survey responses between April 2020 and January 2021 (inclusive).

Overall survey length in minutes (median) – rounded to nearest minute	
Age	
16-24	10 mins
25-39	11 mins
40-54	11 mins
55-65	12 mins
65+	14 mins
Gender	
Male	12 mins
Female	12 mins
Highest qualification received	
Degree+	11 mins
No degree	12 mins

Ethnicity	
White	12 minutes
Mixed or multiple ethnic backgrounds	12 minutes
Asian or Asian British	11 minutes
Black or Black British	14 minutes

Average length in seconds (median)						
	Module 1	Module 2	Q6 Number of visits	Visit Map	Module 4	Module 6
Age						
16-24	152	147	12	25	239	129
25-39	155	152	12	24	254	120
40-54	172	168	15	34	287	128
55-65	193	198	18	44	322	146
65+	215	227	21	59	372	167
Gender						
Male	180	181	15	37	305	138

Female	182	174	16	34	307	137
Highest qualification received						
Degree+	170	172	14	31	278	127
No degree	186	180	16	37	315	142
Ethnicity						
White	183	181	16	36	308	138
Mixed or multiple ethnic backgrounds	182	178	15	32	264	139
Asian or Asian British	157	152	13	25	265	129
Black or Black British	199	187	15	33	407	151

Percentage of respondents agree to share postcode (Q82)	
Age	
16-24	64%
25-39	78%
40-54	85%
55-65	86%
65+	86%
Gender	
Male	81%
Female	81%
Highest qualification received	
Degree+	80%
No degree	81%
Ethnicity	
White	84%
Mixed or multiple ethnic backgrounds	78%

Asian or Asian British	71%
Black or Black British	75%
Annual household income	
< £15k	76%
£15k - £19,999	81%
£20k - £29,999	83%
£30k - £39,999	82%
£40k - £49,999	83%
£50k - £59,999	81%
£60k - £79,999	84%
£80k - £99,999	83%
£100k - £149,999	78%
£150k +	66%

Q6 (Number of Visits) Percentage of respondents giving "Don't Know" or "Prefer not to say" response
Age

16-24	19%
25-39	13%
40-54	8%
55-65	7%
65+	4%
Gender	
Male	10%
Female	9%
Highest qualification received	
Degree+	9%
No degree	10%
Ethnicity	
White	8%
Mixed or multiple ethnic backgrounds	13%
Asian or Asian British	14%
Black or Black British	12%

Annual household income	
< £15k	12%
£15k - £19,999	11%
£20k - £29,999	8%
£30k - £39,999	9%
£40k - £49,999	8%
£50k - £59,999	9%
£60k - £79,999	9%
£80k - £99,999	9%
£100k - £149,999	8%
£150k +	14%